Annual Review 2020

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BRITISH ASSOCIATION FOR BIOLOGICAL ANTHROPOLOGY AND OSTEOLOGY ANNUAL REVIEW

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WELCOME TO THE ANNUAL REVIEW FOR 2020

Charlotte Primeau
University of York

Welcome to the Annual Review for BABAO 2020.

Well, I think it is safe to say that 2020 was not the year that we expected! The pandemic certainly changed plans for most of us and without doubt has made this a very difficult year. Difficulties have been experienced across all members from established researchers and lectures to students and independent researchers alike.

Despite this, it has been lovely to see the successes of students passing their courses and collaborations between departments and researchers still going on. I am sure this has not been easy – so well done to us all!

We have also seen a lot of changes within the Board of Trustees for BABAO, with several longstanding Trustees leaving and the influx of some familiar faces and some new faces to continue the work within our community.

Gratitude must be mentioned to our out-going Annual Review Editor, Diana Swales from University of Dundee: Thank you for all your hard work in compiling The Annual Review for these preceding years. Without you we would have missed so much of what has been going on within our community.

I would also like to say on a personal note that I am excited to have joined the Board of Trustees for BABAO and I am very much looking forward to contributing to our association.

I hope you all enjoy the Review and thank you for finding time to include your valuable contributions and sharing your knowledge, experiences, news and updates with the rest of us within the BABAO community.

ASSOCIATION NEWS

President's Column

Rebecca Redfern
Museum of London

Dear Members,
It is a standing joke between Jelena and I that when we're asked, "Which period in history would you like to go back to?" we never ever say the Medieval period, particularly the 14th century, because of climate change, food insecurities and the second plague pandemic… although I think in the future we might choose 2020-21 instead! The Covid-19 pandemic has changed all our lives, and for me, it has shown us the importance of being thoughtful and kind to one another. Many of us 'clapped for heroes', which includes several of our members and on behalf of us all, I would like to thank them for their care and service.

Throughout it all, the association has kept going, adapting to lockdowns and furloughs, taking on new challenges and shifting to online events. Our social media platforms have been fantastic at keeping us all in touch, and despite the personal and professional challenges facing the trustees, they have kept plugging-away at all the small jobs that keep our association (as Jelena would say) 'rocking and rolling'. None of this would have been possible without them; the out-going trustees (Ceri Boston, Anwen Caffell, Claire Hodson, Catriona McKenzie, Lauren McIntyre, Diana Swales, Michael Rivera and Charlotte Roberts) have mentored their successors and continue to be 'on call' as we tackle many difficult tasks, such as updating our website. Lizzy Craig-Atkins deserves a special thank-you, as she kindly stayed on as Treasurer until Gina McFarlane was elected. Gina and the other new trustees (Christopher Aris, Rebecca Avery, Rebecca Cadbury-Simmons, Giselle Kiraly, Bennjamin Penny-Mason, Suzanne McGalliard, Charlotte Primeau) have met their responsibilities with enthusiasm and diligence, and have adapted brilliantly to virtual working. Although many of us have never met, I am struck by how well we've been able to pull together to continue the

work of the previous committee and to deliver the actions decided at the AGM.

This year has also been busy for our various interest groups (as you'll see from the reports), and the trustees and I are grateful to all the members who volunteer their time and expertise for the association – particularly in recent weeks for our review work with Dr Arday.

Although the 2020 Teeside conference was postponed, it did not stop Tim Thompson, Dave Errickson and Amber Collings bringing us some much needed Christmas cheer with BABAO's first Christmas quiz! Fingers crossed we can meet at the conference in September, where the winner 'Nerd Immunity' will receive their prize!

Finally, I would like us to remember two eminent scholars in our field. Our former President, Holger Schutkowski, who passed away last March. Holger received BABAO's first 'Honorary Lifetime Membership Award' and over the years the association benefitted hugely from his involvement and leadership. Very sadly, Tony Waldron passed away last month. Tony taught many of our members and contributed so much to the study of human remains.
Take care and stay safe,
Becky

Report from the Membership Secretary

Bennjamin J. Penny-Mason
York Osteoarchaeology

At the end of 2020, BABAO had 535 active members, a marginal decrease on the 542 members which the society had at the end of 2019. BABAO recruited 108 new members during 2020 in comparison to 106 new members during 2019 (both figures including those re-joining); this was still slightly above average for the last four years (103.3).

The composition of our membership remained similar to the previous year: over half of the membership comprised of employed members (285, 53.3%), as well as student members (179, 33.4%), unwaged members (56, 10.5%) and retired members (15, 2.8%).

A quarter of the membership (133, 24.9%) comprised of overseas members: the majority of which represented members from Europe (78, 58.6%), as well as North America (35, 26.3%), the Antipodes (13, 9.7%) and elsewhere in the world (7, 5.4%) – these proportions were similar to those of 2019.

Nearly a third of BABAO members (174, 32.5%) provided information regarding their area of occupation (individuals were able to select up to two categories). Most reporting members were found to be employed within academia (74, 42.5%), followed by commercial archaeology (44, 25.3%), with smaller proportions in curatorial/museum roles (10, 5.7%) and as forensic practitioners (10, 5.7%). Additionally, some members (36, 20.7%) also declared other forms of occupation, including *administration, education, IT-related fields, leisure, medicine/healthcare, retail* and *publishing.*

Of the 179 active student members, over three-quarters (139, 77.7%) provided information regarding their level of study. The reporting students were recorded as being engaged in doctoral (82, 58.9%), masters (46, 33.2%) and undergraduate (11, 7.9%) courses.

Over half of the membership (278, 51.9%) provided information on their areas of interest. *Human bioarchaeology* (253, 91.0%) and *forensic anthropology* (191, 68.7%) were the two most popular areas of interest, followed by *medical anthropology* (90, 32.4%), *human evolution* (66, 23.7%) and *primatology* (10, 1.9%). Additionally, some members (23, 4.3%) also declared additional areas of interest, including *archaeology, archaeological science, burned human remains, cemetery excavation, dental anthropology, funerary archaeology, gender, genetics, geometric morphometrics, mummy studies, Roman archaeology, social anthropology, taphonomy* and *zooarchaeology.*

I would also like to encourage all members who have not completed a 'change of details' form recently to do so – the forms are available from the membership section of www.babao.org.uk. Please do send me updates on changes in job titles, positions, affiliations, and personal details, and ensure you keep your postal address up to date. Please do not hesitate to contact me if you have any questions regarding your BABAO membership: you can email me at membership@babao.org.uk.

Finally, much gratitude is owed to the outgoing Membership Secretary Anwen Caffell for all her diligent efforts over the past five years – thank you for all your hard work.

Report from the Grants Secretary

Sophie Newman
Sheffield University

In 2020, the BABAO Board of Trustees awarded seven academic research grants.

Project Summaries

Samantha DeSimone (Bournemouth University) - £1,000
Evaluation of photogrammetric point clouds for the recording of mass graves during excavation

Mass graves, both forensic and archaeological, present particular challenges for investigators, as complex deposits often characterised by commingling and disarticulation. The question of how to record these contexts rapidly and accurately remains unresolved. Current digital technologies offer potential to capture complicated spatial data in three-dimensions. This project investigates point clouds, as generated from photogrammetry, for recording relationships in an experimental mass grave created at the Forensic Anthropology Center of Texas State University. The point clouds will be compared with other modalities, with accuracy evaluated using check points.

Emma Doherty (Durham University) - £1,000
The impact of socio-ecological environment on the ontogeny of multimodal communication in chimpanzees

I aim to investigate the ontogeny of multimodal communication in chimpanzee infants. By collecting video recordings of focal individuals over a 6-month field period, my objective is to examine to what extent socioecological factors, namely interactional experience and communicative environment, affect the ontogenetic trajectory of multimodal signal production in our closest living relatives. By studying the role of social experience on multimodal communicative development in chimpanzees, I aim to contribute to our current understanding of the cognitive processes underlying hominid communication more generally and further, to our understanding of the evolutionary origins of human language.

Catrin Fear (University of Nottingham) - £219.30
Caught in a Trap: A pilot study examining the presence of lead debris in dental calculus from medieval mining populations

This project is a pilot study on the possible presence of lead microdebris in dental calculus from individuals associated with lead mining from Castleton, Derbyshire. This work will be carried out as a project to complement Fear's PhD project 'What's your poison?: identifying lead ingestion and its effects in medieval England' which examines lead impact in Medieval Britain. Dental calculus microdebris includes accidentally inhaled environmental particulates, including those associated with occupation. Therefore, through microscopic analysis of the debris, it may be possible to examine individual and population exposure to lead particulates for individuals associated with lead mining.

Christianne Fernée (University of Bristol) - £1,000
Under pressure: exploring dental functional biomechanics

Teeth act as an interface between the body and the environment, in the form of the food that is being consumed. They are, therefore, commonly used to make inferences regarding an individual's diet. Studies have linked differences between and within species in tooth size and shape to the ability to withstand large forces and abrasive diets. However, whether these features actually have a functional impact has not been directly tested. This research will use a novel integrated method, that brings together imaging, modelling and real-world validation, to understand how teeth react under pressure and whether these dietary inferences are valid.

Kori Filipek (Durham University) - £1,000
Metal Detecting: A multidisciplinary investigation into the effects of environmental pollution in the development of s(Cu)rvy

This project combines trace element, proteomic, and palaeopathological analysis of four Medieval non-adult individuals from Transylvania. By examining the hydroxylation levels of proteinogenic amino acids in bone collagen alongside copper concentrations within tooth enamel from non-adults with and without skeletal lesions consistent with scurvy, the metabolic effects of potential copper toxicity can be assessed on children living in close proximity to metal-processing areas.

Samantha Leggett (University of Cambridge) - £1,000
Understanding Iberian Transitions - Diet and Mobility in Azuqueca de Henares throughout the first millennium AD

The archaeological sites of Azuqueca de Henares, Guadalajara, Spain chart changes to a rural community from the Roman period to the Umayyad Caliphate (1st-10th centuries AD) covering the whole of the first millennium AD. This project seeks to better understand how these socio-political changes impacted migration to the region and foodways by using stable isotope analysis of human and animal bones and teeth. With such large changes to religion and trade in the region we aim to see if and how people outside of urban centres adapted to these shifts in rulership, worldview and diet.

Pila Mata Tutor (Universidad Complutense de Madrid) - £1,000
The erratic behaviour of cut marks left by bread serrated knives in intact and burnt bones

This experiment aims to simulate an attempted dismemberment and posterior burning of a limb. A bread serrated knife is first employed to induce sharp trauma to a pig long bone which is afterwards cremated in a controlled open pyre to (1) analyse the degree of survival of sharp trauma after fire damage, (2) study the cut marks from a serrated implement and (3) quantify the differences before and after the process. The aim is to further understand the erratic behaviour of the toolmarks left by a bread serrated knife in intact and burnt bone.

New Grants:

Two new grant schemes were announced in 2020.

The BABAO Symposia/Workshop grants are intended to support events for the benefit of BABAO members. For example (but not limited to) enabling the dissemination of research and/or emerging techniques, promoting good ethical practice and EDI initiatives, or allowing career development/training opportunities related to biological anthropology (relating to humans and non-human primates, extinct and extant) and osteoarchaeology (human and non-human). This may be via seminars, small symposia, workshops, one-day conferences, or other similar events. These events must be open to all BABAO members that may wish to attend. **Further information on guidelines and how to apply can be found at -** https://www.babao.org.uk/grants-and-prizes/symposia-workshop-grants/

Rapid turnaround Microgrants are now available to all BABAO members in immediate need of financial support to access resources that enable them to continue to advance their learning, careers or professional practice. **We encourage applications from members of groups who are particularly under-represented among the BABAO membership: members from Black, Asian and other minority backgrounds, LGBTQI+ members, members with disabilities, first generation scholars, and those with caring responsibilities, among others. Further information on how to apply can be found at -** https://www.babao.org.uk/grants-and-prizes/rapid-turnaround-microgrants/

2021 BABAO Research Grants Update
The BABAO Grants application round for 2021 will open in February 2021, and will close in May 2021 (dates to be announced nearer the time).

Please note that if your proposed project will include destructive analysis, you will now also need to submit a destructive analysis supplementary form at the same time as the main application form, and by the deadline.

The application forms as well as further guidance and information on eligibility, how to apply, and what can be funded can be found at the following Web address: http://www.babao.org.uk/about/researchgrants/

Report from the Student Representative

Katie Faillace
Cardiff University

This year was a tough one as we suddenly found our community had to adjust to a virtual world. We began hosting more frequent online events beneficial to students, including a Forensic Anthropology Ask Me Anything (AMA) with Gillian Fowler, a Q&A on Commercial Archaeology and how to use Archaeological Databases with Dr Lauren McIntyre, a Publishing Panel with Dr Jessica Hendy, Jelena Bekvalac, and Professor Tim Thompson, and a discussion on Race and Racism in Biological Anthropology with Dr Jason Arday.

Our student members have been incredibly involved in the conversations and plans to move our field and our organisation forward as we all reckon with equality, diversity, and inclusion issues, particularly the issue of racial injustice following the increased momentum of Black Lives Matter movements in the summer. Many student members participated in the discussion following Dr Michael Rivera's public letter to BABAO, contributing thoughtful and insightful anecdotes and suggestions. However, I think what best illustrates our student members' commitment to making our discipline and BABAO more welcoming and inclusive is the dramatic increase in students and recent graduates on the EDI sub-committee and who were recently elected to Trustee positions. Our student members continue to push our discipline forward and I am looking forward to seeing what we accomplish this year!

I'd like to remind all of our student members that we now have a student Facebook group (https://www.facebook.com/groups/2000703866 1/), with the idea of facilitating discussions and interactions! This group is also exclusive to student members as a safe space for "silly" questions and peer support. If you are no longer a student but still wish to be part of the online community, we have set up a separate, BABAO-wide group here: https://www.facebook.com/groups/BABAOinfo/ and on Twitter, @BABAO_info (run by Communications Officer Chris Aris).

I welcome all questions, comments, concerns, and suggestions regarding student issues, so please do get in touch. You can find me in the Facebook groups, on Twitter (@toothkate), or email of course (FaillaceKE@cardiff.ac.uk)!

Report from the Museum Representative

Trish Biers
Curator of the Duckworth Laboratory
University of Cambridge

As you will likely be aware, this year saw all of the nation's museums shut due to Covid-19. There were points throughout "lockdown" where some managed to re-open, if only for a short while, but accessing collections for research was almost non-existent. The BABAO community rallied and shared online teaching tools, information about digital collections, and provided access to excavation reports. Museums also got creative with hosting webinars and events, and some very interesting web-based tours of galleries and collections. Early in the year, I created a new Museum Hub for our members with resources about museum work, collections with human remains, and most recently repatriation and decolonisation links. In addition, the Sale of Human Remains taskforce is now a member collective for monitoring the trade/sale of human remains and in particular, the role of social media is having on the increase in these transactions globally. Please don't forget to reach out should you need anything!

PEOPLE

Obituary for
Jochen Holger Schutkowski

Biological anthropologist specializing in scientific studies to reconstruct diet, disease, and mobility in ancient populations

As a teacher of osteology for archaeology and anthropology students Holger Schutkowski often had to be inventive. On one occasion he faced a long wait from suppliers for models of human teeth in order to demonstrate natural variation and sampling strategies so had casts made of his own masticators. Fully up to the job the casts are still in use, showing not only his appetite for home-spun solutions but also a preference for circumventing officialdom and bureaucracy when it suited him.

Human remains fascinated Holger, and his enthusiasm was infectious. Colleagues recall his patience when excavating complicated prehistoric burials, and his precision when laying out ancient skeletons in the laboratory for analysis. Ethical considerations were always at the forefront of his thinking and led to his involvement in the Working Group on the Revision of Burial Legislation led by the Ministry of Justice in 2011. He was soon afterwards appointed Chairman of the influential Advisory Panel on the Archaeology of Burials in England (APABE), a tricky time as deep-seated concerns about the storage and treatment of human remains found voice through protest groups and the popular press, challenging museums and researchers to rethink working practices and tighten up established systems. As colleague Simon Mays recalls, ' his unfailing good humour and people-skills allowed manu potential difficult situations to be successfully resolved through compromise and consensus'.

Research into the life and death of individuals and whole communities lay at the heart of his academic work. Starting with studies into the determination of the age and sex of individuals as a way of building up profiles of small population groups he quickly moved into the field of human ecology with studies of diet, disease, and adaptation, publishing in quick succession a monograph entitled *Human ecology: Biocultural adaptations in human communities* in 2006 and an edited volume entitled *Between biology and culture* in 2008. Both were well received and pushed the field of bioarchaeology forwards, arguing for synthesis and greater nuance to be applied in the analyses of interactions between biological systems and human cultures.

Never one to shy away from a challenge, Holger took on the knotty problem of making sense of cremated bone, becoming an expert on burned remains at a time when few others had got to grips with this widely represented material. In class he sometimes played a video in which he demonstrated how to excavate an urn full of cremated bone in the field, a film no doubt as memorable to students as a 'how- to-do-it' piece as it was amusing to see their tutor with long hair and flared trousers. Another pioneering line of

research was determining the sex of infant skeletons, a problem previously regarded as intractable. But his big break came with the development of isotope analysis as a way of documenting mobility patterns amongst human communities by looking at chemical signatures in tooth enamel that could be related back to drinking water in the places people lived. Quickly seeing the potential, he applied the technique to look at populations from prehistoric and early historic times across the Middle East to help sort out some of the most puzzling melting pots of human culture anywhere in the world. He was one of the first in Britain to take an explicitly biocultural approach to isotopic studies of human remains, demonstrating that isotopic and histological analysis should only, and can only, exist within the context of wider bioarchaeological studies, and are meaningless without the biocultural background.

Outside of archaeology music was his great passion. Almost any music was of interest, but chamber music was his favourite and while competent on many instruments from the piano to a guitar it was the viola at which he excelled. As a young man he mastered the demanding viola parts in Smetana's string quartet number 1 in E minor "Aus meinem Leben" (For my Life). And from school-days onwards he played in orchestras and ensembles both for personal pleasure and for the delight of those listening. Most recently he played with the Winchester Symphony Orchestra where friends and fellow musicians described him as the 'best viola player we ever had', delivering solos in pieces such Elgar's Enigma Variations with unparalleled expression and poignancy.

Jochen Holger Schutkowski, always known as Holger, was born on the 3 September 1956 in Berlin, but spent most of his childhood in the town of Wilhelmshaven in Lower Saxony on Germany's North Sea coast, with his parents and his older sister Bettina. The north-lands suited him, and in later life he defined himself as a 'Northerner', accepting the inherent propensity for directness, modesty, and the delights of a strong cup of tea accompanied by sweets. Holger studied anthropology at Göttingen University, mentored by the renowned German anthropologist Professor Bernd Herrmann. He completed a dissertation on the diagnostic value of the petrous portion of the temporal bone for sex determination in 1983, a PhD on the sex determination of juvenile remains in 1990, and his Habilitation in 1998.

He was appointed to a lectureship in the Department of Archaeology in the University of Göttingen in 1989, pursuing his interests in bioarchaeology with a Deutsche Forschungsgemeinschaft (DFG) postdoctoral fellowship in 1994–5 and a research fellowship in the University of Copenhagen in 1995. Returning to Göttingen he became acting head of department in 1995–6, by this time married to the prehistorian Helen Hofbauer.

In 2000 he moved to Britain to take up a Readership in Biological Anthropology in the School of Archaeology, Geography and Environmental Sciences at the University of Bradford, later becoming Associate Dean for Research and Knowledge Transfer, and Head of Division from 2006 to 2010. During this time he became closely involved in the excavations at Sidon in Lebanon with Claude Serhal, but never neglected his administrative duties back home. Faculty in Bradford recall that he was at the helm during a difficult period for the Department with staff cuts looming and talk of closure. He was pivotal in turning that around, well-liked and trusted despite the hard decisions concerning staffing issues that had to be made. Indeed, colleagues fondly remember that he always seemed to be on their side rather than the voice of management; a real testament to his skills was that the department retained a close sense of identity and friendship that endured through those years.

After a decade in Bradford new opportunities beckoned, and in 2011 he moved south to Bournemouth University to become Professor of Bioarchaeology and Deputy Dean in the School of Applied Sciences. He led the Bioarchaeology Group through several

organizational reshuffles that galvanized their future within what is now the Department of Archaeology and Anthropology. His research bridged science and the humanities, investigating the biological outcomes of socio-cultural strategies in human/environment interaction and looking also at forensic applications of physical anthropology. He combined morphological and instrument-analytical approaches to the study of human skeletal remains, and employed ecological and social theory as interpretive frameworks. Key projects included studies of dietary variability amongst human populations of the Near East from the Neolithic to the modern period funded by the Polish Ministry of Science and Higher Education, the interrelationship of diet and status in early medieval Alemannic societies funded by the British Academy, and the Hyksos Enigma funded by the European Research Council. More than forty papers in peer-reviewed journals and conference proceedings resulted from this work, as well as monographs and edited volumes. He served as an associate editor for the *American Journal of Physical Anthropology*, *Environmental Archaeology*, and *Bulletins et Mémoires de la Société d'Anthropologie de Paris*, and was a regular participant and speaker at international conferences and meetings on both sides of the Atlantic. But despite all these successes at the cutting edge of the discipline, he never lost sight of the importance of teaching. Again, this was an area where Holger excelled, in which his eloquence and love of precision combined perfectly with his boundless enthusiasm and joy of sharing his knowledge with others. In this sense perhaps Holger's most significant legacy is the great many students who were privileged to benefit from his wisdom and insights, and who now carry that forward.

Holger was widely recognized and honoured for his contributions to physical anthropology and bioarchaeology, being elected a Fellow of the Royal Anthropological Institute in 2012, and a longstanding member of the British Association for Biological Anthropology and Osteology (BABAO). He was Chair/President of BABAO from 2004 to 2009, and at the 2018 Annual Meeting in Cranfield was appointed their first Honorary Lifetime Member. He was also a member of the Accreditation Panel for Forensic Practitioners of Royal Anthropological Institute and the British Association for Forensic Anthropology, recognizing the need to integrate academic training with professional practice.

Always happy at heart and unpretentious, he had a wicked sense of humour. It is said that he once laughed so much that he half fell out of his chair at a graduation ceremony in Bradford when the Chancellor, the cricketer Imran Khan, peddled the age-old joke in which a well-known commentator absent-mindedly tells listeners that 'the bowler's Holding, the batsman's Willey'. Preferring small gatherings to large crowds, he espoused down-to-earth wisdom, was calm under pressure, and an unfailing source of sane and sensible advice.

Dispite enduring Motor Neurone Disease (MND)for more than five years Holger was teaching and researching right up until his death, latterly leaving his palliative care unit in order to spend a day at the university giving lectures, attending seminars, and talking to his students and research team. He showed remarkable courage and a positive outlook throughout, asserting that while it could take his physical abilities it could never dull his determination to live life to the full. Reflecting on the time living with MND Nivien Speith remembers how he constantly accepted change and adjusted accordingly: favourite walks became rides in his wheelchair; voice-banked words became bright new lectures, and listening to concerts replaced playing in the orchestra. The whirr of his motorized wheelchair became a familiar sound around the Bournemouth campus, and no-one will forget his impish smile as he swung into view. Stoic to the end, he perhaps sometimes secretly savoured the idea that casts of his teeth would be preserved for ever in the Department's teaching collection.

Jochen Holger Schutkowski, biological anthropologist, was born on 3 September 1956. He died of Motor Neurone Disease (Amyotrophic Lateral Sclerosis) on 30 March 2020, aged 63.

Compiled by Timothy Darvill and Nivien Speith, with generous assistance from many of Holger's friends and colleagues.

The obituary was originally published on the website for PPA:
https://paleopathology-association.wildapricot.org/resources/Documents/Holger%20Schutkowski.pdf

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Natasha Powers has left Allen Archaeology to take on the role of Associate Director and Regional Lead for the North for the Cultural Heritage and Archaeology team at WSP UK. She is leading the teams based in Leeds, Manchester and Scotland and will be based in the Leeds office.

Charlotte (Charlie) Primeau has taken up the post-doc position in bioarhaeology with the COMMIOS project at the University of York, under Ian Armit. This multidisciplinary project, combining funerary archaeology, osteology, aDNA and stable isotopes, explores population migrations and interactions across Britain and continental Europe during the Iron Age.

https://commiosarchaeology.com

NEWS & PROJECT UPDATES

"How BABAO helped saving the lives of refugees"

Christian Harkensee
Department of Paediatrics, Queen Elizabeth Hospital Gateshead, Gateshead, UK

We may think of our network largely focusing on events in a distant past, but 2020 showed how relevant our skills and experience is for present times. At the peak of the Covid-19 pandemic, the BABAO member, doctor and humanitarian worker Dr Christian Harkensee put out a desperate call to our network seeking help with an epidemiological model of a potential Covid-19 at Moria refugee camp. Located on the Greek island of Lesvos, Moria was Europe's largest refugee camp; nearly 20,000 refugees were living there under extremely overcrowded and poor living conditions. The BABAO network put Dr Harkensee in contact with Dr Tucker Gilman and Professor Andrew Chamberlain from the Department of Earth and Environmental Science, University of Manchester. Dr Gilman and Professor Chamberlain took up this challenge, and with the help of Dr Siyana Mahroof-Shaffi, a GP from London and director of the NGO Kitrinos Helathcare (which provides medical care in Moria) and Dr Harkensee developed an elaborate outbreak model that predicted a very rapid epidemic with extremely high infection rates, and simulated a number of potentially mitigating interventions. The data from this model helped to persuade the Greek authorities and the United Nations High Commissioner for Refugees (UNHCR) to evacuate the most vulnerable refugees (the elderly and chronically ill) out of the camp before an outbreak, and to implement measures improving hygiene and reducing overcrowding.

Coronavirus eventually reached the camp in August 2020. The camp was destroyed by a huge fire in September, and the subsequent displacement propagated a massive outbreak of Covid-19 which, nevertheless, has not resulted in any fatalities and only very few hospital admissions. The interventions, based on the research facilitated by the BABAO network, have undoubtedly saved lives. The model has recently been accepted for publication by the journal BMJ Global Health.
https://gh.bmj.com/content/5/12/e003727

"Best practice in projectional radiography of human dry bone specimens – A literature review and confirmatory research using an archaeological assemblage"

James Elliot
Canterbury Christ Church University

James Elliott, a lecturer in diagnostic radiography at Canterbury Christ Church University, has received £5000 funding from the College of Radiographers Industry Partnership Scheme Research Grant. The project will investigate an evidence-based approach to human dry-bone radiography for archaeological or forensic remains. The research will culminate in the radiographic survey of an assemblage of Late Roman human bones from Canterbury Archaeological Trust. More information and updates can be found at his research blog - www.paleoimaging.com

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MUSEUMS AND OTHER INSTITUTIONS REPORTS

MOLA (Museum of London Archaeology)

Don Walker

Team

MOLA London: Michael Henderson, Don Walker

MOLA Northampton: Chris Chinnock

MOLA osteoarchaeology blogs can be found on the organisation website:

http://www.mola.org.uk/blog/osteoarchaeology

https://www.facebook.com/MOLArchaeology

https://twitter.com/MOLArchaeology

After five very successful years as osteologists in the London office, Niamh Carty and Elizabeth Knox have left MOLA. Elizabeth has started an AHRC CDP PhD Studentship in Archaeology, jointly run by MOLA and University of Sheffield. We wish them both the very best of luck in their continuing careers in archaeology.

Following positive feedback from schools in Birmingham, a continuing programme of HS2 community and engagement projects saw the osteology team involved in a further series of 'Osteology Live' workshops. Live-streamed from a digital classroom, the sessions provided science-based sessions relating to the KS3 National Curriculum. Evidence from the excavations at Park Street Burial Ground, Birmingham and St James Gardens Burial Ground, London, was featured in these sessions.

Excavation and Contract Work

Park Street, Birmingham (HS2)

Work on the Park Street Burial Ground in Birmingham by MOLA Headland Infrastructure (MHI) on behalf of HS2 Ltd continued with consultants from WSP. This formed part of a programme of archaeological and heritage works in advance of the construction of the HS2 terminal at Curzon Street. The study of more than four thousand 19th-century burials from this important centre of the Industrial Revolution has reached the assessment stage. Acting as an overflow burial ground for St Martin's Church, Park Street Burial Ground contained evidence of the effects of rapid population growth and urbanisation on the inhabitants of the town, with examples of trauma, infection and metabolic disease. A number of dissected burials, possibly originating from Birmingham Medical School, provided key evidence of anatomical investigation and teaching.

A14 Cambridgeshire

Following on from excavations in advance of the A14 Cambridge to Huntingdon road improvement scheme, full recording is nearing completion on the c 150 inhumations and c 300 deposits of burnt bone from a range of sites ranging from the Neolithic up to the Anglo-Saxon period. A coordinated programme of scientific testing involving aDNA, isotope analysis and radiocarbon dating is ongoing and will be incorporated into the project results.

Shard Place, Southwark

Analysis work was completed this year on c 800 burials from a 17th-century burial ground used to inter patients from St Thomas's Hospital, Southwark. Elevated mortality was observed in young adults, perhaps reflecting increased vulnerability to disease amongst servants and apprentices, many of whom would have migrated to London. Individuals with skeletal signs of venereal syphilis may have been housed in the specialist 'foul wards' that were known to have been built at the hospital. The burial ground also contained early evidence of surgical intervention in the form of limb amputation. This site will be published as a MOLA Studies Series.

Bank End, Southwark

Two late Roman inhumations, one adult female and one adult male, were excavated from 1 Bank End, Southwark. This area originally formed part of an island in the Thames and the burials appear typical of the more isolated examples of funerary activity in this period. Further analysis will follow in 2021.

Hat and Feathers public house, Islington

An isolated post-medieval grave containing the prone burial of an adult male was discovered at the Hat and Feathers, just off the Clerkenwell Road. Full analysis of the individual will follow in 2021.

Kibwroth (Leics)
As part of continued residential development around the village of Kibworth, large open area archaeological excavations have unearthed remains dating from prehistory through to the early medieval period. Previous excavations had revealed early medieval burials. As part of the most recent phase of excavations two Roman inhumations, an adolescent and an unsexed adult, were discovered. A single crouched older adult male burial originally thought to be Bronze Age in date due to the proximity of a prehistoric barrow ditch, was proven to be of early-middle Neolithic date, following radiocarbon date analysis. The burial had been placed in a pit and a second skull, also probably male, had been placed higher within the same pit. The second skull was also sampled and gave a similar date to that of the crouched inhumation. Healed fractures were present in the distal left ulna and an unsided proximal hand phalange of the primary burial. The second skull displayed a possible traumatic wound to the right parietal though post-depositional/taphonomic damage could not be ruled out.

Kennington (Oxon)
A total of three inhumations were discovered during excavations at a large multiphase site. An adult male had been buried in the fill of an undated ring ditch, a further adult male and a non-adult individual had been interred in discrete graves. Possible sharp-force trauma was noted in one of the adult males. Antemortem tooth loss (possibly as a result of trauma), spondylosis, possible clay-shoveller's fractures and non-specific periosteal lesions were also observed. At present a tentative Iron Age date has been assigned based on a single fragment of pottery. Radiocarbon dating has been recommended.

A43 Corby Link Road (Northants)
Archaeological excavations in advance of road construction and associated infrastructure revealed a number of sites dating to various periods. Two poorly preserved inhumations were recorded and likely date to the early medieval period. Two deposit of cremated human bone were found in close association with a Roman enclosure system and one of the contexts provided a radiocarbon date, which confirmed a date within the Roman period. A further 25 contexts containing cremated human bone in another part of the site were resolved to be the remains of a middle Bronze Age cremation cemetery. Whilst most pits were thought to be burial pits, some may have been associated with the deposition of pyre waste.

Quarry excavations Cambridgeshire
The latest phase of excavations on a quarry site in Cambridgeshire identified a series of enclosures dated to the Iron Age and Roman periods. In addition, a total of 13 contexts containing cremated human bone were

recovered. These were dispersed over a large area, sometimes occurring in small groups or pairs. Only one of the contexts contained any dateable material, a small piece of pottery dated to the Bronze Age.

Oxford New College (Oxon)
During archaeological excavation in advance of development at New College, Oxford, a single grave was identified. It contained the prone burial of an elderly female, directly overlain by the supine burial of a second adult female. No dating evidence was present within the grave though Roman and medieval features were identified in the vicinity. A radiocarbon date has been sought as part of further analysis. The second female to be interred in the grave displayed a scoliotic curve of the thoracic vertebrae.

Baston Manor Pit (Cambs)
Three deposits of cremated human bone were analysed as part of ongoing works at a quarry in Baston, Cambridgeshire. Earlier excavations in the area revealed inhumations and cremated bone deposits dated to the mid-late Roman period. The deposits of cremated bone were dispersed throughout the site.

Other sites
Publication of a large furnished early medieval cemetery associated with a prehistoric burial mound is expected in the new year and includes osteological analysis of c70 inhumations dating predominantly from the late 5th to 7th centuries AD.
The analysis of a large inhumation and cremation cemetery dated to the early medieval period and excavated in Northamptonshire is underway with further news and publication expected in 2021.

Centre for Human Bioarchaeology, Museum of London

Jelena Bekvalac
Curator of Human Osteology

As felt by everyone, 2020 was not the year any of us at the Museum of London could have imagined and the impact for everyone. In the weeks before the middle of March when Becky and I closed the door at the CHB, thinking we would be back in the not too distant future but of course after nine months unfortunately not, we had been able to participate in outreach events with groups. In February, I had the pleasure of being at Charterhouse to be part of a schools outreach session focused on the Black Death and again to participate in the session Bodies of Knowledge at Welcome with secondary school pupils as part of the Youth Training programme. We were both able to participate in the Public Health Study Day for secondary schools organised at the museum by our Learning Team and for those attending having the opportunity of learning about skeletal remains as a primary source of information.

The British Museum in February held a very interesting one-day symposium, *Managing Digital Data* at the Stevenson Lecture Theatre which I was very pleased to be able to attend and listen to the different speakers discussing digital data, its usage, the often rapid developments and the challenges that can be faced in heritage sectors. *"Museums, galleries and other organisations serving the cultural sector are increasingly engaged in conducting original research, whether through small-scale internal projects or larger, externally funded initiatives. Ongoing research is creating multitudes of data, presenting us all with a management challenge. This is especially true in an era where there is a growing presumption that the results of research will be available through open access".*
In light of the major changes, which at that point we were all unaware of to be experienced by everyone; the issues raised and discussed had a resonance that proved to be even more pertinent and relevant. With the severe restrictions experienced from mid-March, digital data/platforms and access have proved to be fundamental and central to future planning of digital resources.

Unfortunately, as with so many other organisations, the many planned outreach events over the course of the year from mid-March had to be cancelled and staff furloughed in the museum, including Becky

and me in the CHB being on alternate furlough. Throughout this time, however, and still on going, Becky has been working tirelessly with the formulation and development of the pre-history gallery for the New Museum. The New Museum work continued throughout 2020 and with the plans still in place for the move to the new location site at West Smithfield.

Luckily, with the access and resource for digital platforms and forums we were able to carry out some outreach activities. The museum was able to organise a digital based Work Experience Programme in June and I was delighted to able to take part, speaking about the role of being a curator at the museum with the focus on the archaeological skeletal collections. In July, I had the pleasure of being part of the panel discussion for the on line BABAO Publishing Workshop, organised as part of the BABAO outreach programme and in August was interviewed as part of a podcast series in Our City Together, which the museum was a partner with the City. For inclusion as part of the programme for Black History Month October with Learning, Becky was recorded talking about findings from areas of her research with the Roman collections. In October, I gave the lecture for the Society of Antiquaries, Ordinary Meeting Fellows' Lecture, about the Impact of Industrialisation on London project and talking on the same subject I was the guinea pig for the Wandsworth Historical Society to be their first digital guest speaker, which apart from one digital glitch (which was me!) all went well. There was an early Christmas present in December, with the very exciting news when Gaynor Western and I were told that the publication from the project, *Manufactured Bodies: The Impact of Industrialisation on London Health* had been nominated in the Book of the Year category for the 2021 Current Archaeology Awards.

For student researchers, we know 2020 has been such a difficult and challenging time for accessing data and information, with plans for projects put into disarray and many projects having to be modified or completely altered. The CHB with the digital osteological data sets it has on line and others that Becky and I were eventually able to gain access to were, we hope able to help with a number of research projects. Well done to you all for persevering in such exceptional circumstances and still be able to produce dissertations. We are very happy to help as much as we can with research and project studies, so please do continue to contact us if we can be of help with sharing site information and osteological data.

Lastly, but by no means least was the very best of news with the election of Becky as President of BABAO. My heartfelt congratulations to her as a friend and work colleague. I know that during her term as President she will be an admirable advocate for the BABAO membership and conscientious with all the work ahead.

Wishing everyone a good 2021, to keeping safe and hopefully all being able to be together in September for the annual BABAO conference.

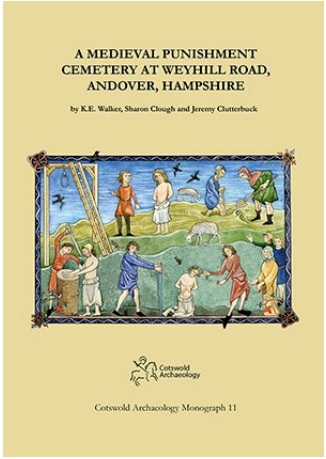
EXCAVATION AND ANALYSIS OF HUMAN REMAINS IN 2020

Cotswold Archaeology
Sharon Clough

2020 started with great promise for completing some long term projects and starting new ones, but as with many organisations it all came to a grinding halt with the Covid-19 outbreak. Many projects were put on hold and some are yet to re-start. We have though been very busy in the field and I hope that at my next review I will be able to bring news about some really exciting discoveries.
We did though manage to publish the work at Andover on the execution cemetery at

Weyhill, sadly though the book launch as cancelled.

https://cotswoldarchaeology.co.uk/weyhill-medieval-punishment-cemetery-monograph-release/



There have been all the usual small sites and single discoveries – please contact CA for details.

Cotswold Archaeology deposit all their grey literature reports with Archaeology Data Service and in their online library http://reports.cotswoldarchaeology.co.uk/

Email Sharon with any queries: sharon.clough@cotswoldarchaeology.co.uk

Follow our updates on twitter **@cotswoldarch or Facebook page CotswoldArchaeology & Instagram**

Guard Archaeology Limited

Iraia Arabaolaza

York Place to New Haven Project, Edinburgh

Excavations in advance of the Edinburgh Trams works undertaken by GUARD Archaeology between July and November 2020 revealed more than 350 inhumations from St Mary's Church graveyard (current South Leith Parish Church). Dating to the medieval and post-medieval periods the inhumations were mostly buried singly in coffins, although some were placed in groups within burial pits. All skeletons as well as disarticulated remains, amounting to more than 500 kg, were lifted and stored for further analysis.

As part of community benefits a weekly onsite archaeology vlog were carried out in order to aid the community in learning about their heritage. https://www.edinburgh.gov.uk/tramstonewhaven/community-benefits

Post-excavation analysis of both articulated and disarticulated remains will be conducted along with radiocarbon dating and parasite analysis of selected remains. Furthermore, post graduate students from the University of Dundee will conduct facial reconstructions on selected inhumations.

Sawmill Field, Helensburgh, Argyll and Bute

Following an initial evaluation which uncovered several features of archaeological potential including a Bronze Age cremation urn, a monitored archaeological topsoil strip, map and sample excavation was carried out by GUARD Archaeology on the southern outskirts of Helensburgh. The work was undertaken in two phases between 16 - 23 March 2020 and 16 June - 30 July 2020 due to the COVID-19 pandemic lockdown in Scotland. The excavation uncovered the remains of a burial cairn with three stone-built cists, two of which contained cremated bone, and four separate Bronze Age burial urns of varying type including one small collared urn. In addition, several other features of likely prehistoric date were excavated across the site.

Post-excavation analysis of the human remains will be conducted in due course.

Oxford Archaeology
Heritage Burial Services
Compiled by Louise Loe

Team

Oxford Archaeology South: *Louise Loe (Head of Heritage Burial Services), Lauren McIntyre (Osteoarchaeologist), Mark Gibson (Osteoarchaeologist), Helen Webb (Osteoarchaeologist), Camille Guezennec (Trainee Placement), Iulia Rusu (Osteoarchaeologist), Mandy Kingdom (Osteoarchaeologist)*

Oxford Archaeology East: *Natasha Dodwell (Osteoarchaeologist and Head of Finds and Environmental), Zoe Ui Choileain (Osteoarchaeologist and Finds Assistant)*

Oxford Archaeology North: *Stephen Rowland (Archaeology Project Manager)*

Like elsewhere in the profession, this past year has been particularly challenging, because of the combination of a very busy programme of excavation and post-excavation and the impact of Covid. Construction has not stopped (in fact, it has increased considerably) and so, we too, have continued our burials archaeology work. This covers the length and breadth of the country and ranges from small to medium-sized interventions to large infrastructure projects.

As a result of Covid, we have adjusted our working practices to facilitate home working as far as practicable, with sites still operating if staff can meet 'social distancing' and other safe working requirements. The continued development of Oxford Archaeology's digital systems has helped significantly with this, the OA Digital Recording System (OA DRS), a web-based database which can be linked in real time to spatial data and viewed from any device via a web-based map interface ('OA WebMap'), in particular (see article in the *CIfA Yearbook and Directory* 2020). However, most of all, it is the resilience, commitment and enthusiasm shown by all staff which is helping us through this unprecedented time. I sit here with great admiration for everyone's ability to dig deep (no pun intended) and focus on some truly wonderful osteoarcheology. Below is a summary of this work, concentrating on a selection of projects which reflect the broad scope and coverage of our work over the past year.

Fieldwork

Buckinghamshire

Bradwell Abbey: One inhumation of suspected medieval date was recovered during the excavation of drainage trenches. Six medieval inhumations were previously identified at the site during excavations in the 1970s. The abbey was founded in the 12th century and closed in 1524.

Cambridgeshire

Ely, Field D extension: A single inhumation was found between Romano-British trackside ditches during this phase of work in the North West of Ely. A single copper pin was recovered with the skeleton.

Horstead Heath, Linton: Two inhumations associated with a Bronze Age ring ditch were found. One of the inhumations was buried with a small iron knife and may be Anglo-Saxon (awaiting C14 dates). There were also five Bronze Age cremation burials.

Waterbeach Barracks: Eighteen inhumations and two cremations were recovered and are Roman in date. Two areas of inhumation graves were recorded, as well as two cremation deposits. The western group of inhumations was notable for comprising individuals who had been decapitated, their heads lying at their feet.

Dorset

Dorset Visual Impact Survey: Work on this site was reported in last year's review and is on-going. Further Bronze Age inhumations and urned and un-urned cremations have been excavated. In addition, a group of Romano-British inhumations (c. 25 individuals) have been found, including juveniles and adults, within stone lined cists and coffins, some with associated finds, including hob nails, glass, a shale bracelet and pottery vessels. The pottery may date to the 1st century AD (or earlier) and may be Durotrigion in origin. A new phase of work has started to uncover a small Anglo-Saxon cemetery.

East Riding of Yorkshire
A63 Castle Street Improvement Scheme, Kingston Upon Hull: Excavation and recording at Holy Trinity Burial Ground (1783-1861) in partnership with Humber Field Archaeology ahead of improvement to the A63, Castle Street for Balfour Beatty on behalf of Highways England. All funerary remains are being archaeologically removed from just over a third of the area of the burial ground (c. 3508m2). It is estimated that up to c. 17,000 burials may lie within this area, making this the largest archaeological post-medieval cemetery investigation to take place in the North of England.

The main phase of work started in October and is being undertaken by a team of up to 93 archaeologists and osteoarchaeologists. In accordance with the faculty, all human remains, which must not leave the site, will be reburied within the 42-week programme of field work. A sample of 1,500 skeletons and their associated coffin fittings and artefacts are being selected for a programme of detailed scientific analysis, running concurrently with the fieldwork programme in an on-site laboratory facility. All other articulated burials are being stratigraphically recorded, rapidly recovered, and reburied. A bespoke digital recording system has been devised which allows fieldwork records (written and photographic) to be captured onto a centrally managed database using tablet computers and integrated with other digital recording systems, including a dynamic map of the excavation ('Webmap') and OA's osteology recording system ('Osteology Database').
https://highwaysengland.co.uk/our-work/a63-castle-street-archaeology/

Lancashire
Poulton-le-Fylde near Blackpool: A probable Beaker period pyre and unurned cremation burials were found during excavations on Highways England's A585 Windy Harbour to Skippool Road Improvement Scheme. The pyre contained a near-complete but broken vessel and the end of an archer's bracer made from Lake District tuff.

Norfolk
Horstead Water Tower: 10 middle Bronze Age cremations were excavated. Three of the burials were urned and all were truncated.

Northampton
Kettering: A collared urned cremation burial and two unurned cremation burials were found in plot R25, one of the excavation areas of a large urban development on the eastern side of Kettering. Radiocarbon dates suggest that they are early Middle Bronze Age in date and are contemporary with other cremation burials excavated to the south in the earlier phases of this ongoing project.

Somerset
Hinkley Point, Area 2: Six Iron Age inhumations (five adults and one adolescent) so far from the upper fills of six out of c.80 pits in the central haul road and western cable trench areas. One was lying head-first, on their back and with their legs sticking up towards the top of the pit. The remaining five were tightly crouched.

In addition to the above, burials have been excavated at the following sites:

- Monks Farm, Kelvedon, Essex: Two cremation burials (currently undated).
- Foxbridge, Swindon evaluation: Seven Romano-British inhumations. Five of these have been lifted and are to be fully analysed.
- Innsworth, Gloucester: 12 probable/possible Romano-British inhumations so far. One of these, a child, had glass beads, a possible small knife and iron and copper fittings.
- Monk's Farm, Kelvedon Essex: Two cremation burials. Undated.
- Twigworth: One Iron Age inhumation and one probable Roman inhumation
- Wykham Park, Banbury: Urned and unurned cremations and inhumations
- Heights Primary School, Caversham, Reading: Unurned cremations
- Grange Paddocks, Bishops Stortford: 10 Romano-British burials, all infants

- Whittington Way, Bishops Stortford: Romano-British child and adult cremations and inhumations

Post-excavation

Cambridgeshire

Gidding Road, Sawtry: Post excavation assessment of Roman human remains, comprising one inhumation and one cremation deposit. The skeleton is 60% complete and most of the bone is affected by some degree of erosion. Most of the dentition survives, indicating an age of 26 – 44 years. A small quantity (239g) of cremated human bone, found in association with a Roman flagon represents the burial of an older subadult/adult. Full analysis will commence this year.

Gloucestershire

Hunts Grove, Quedgeley, Gloucestershire

One unurned cremation, two crouched inhumations and a small amount of disarticulated bone were analysed and a grey literature report has been completed.

One of the inhumations comprised the poorly preserved and partial remains of an adult, possibly male. The individual was lying in a prone position, orientated north-south with the head at the north end. The second inhumation was in an oval pit and comprised the badly disturbed and disarticulated (plough disturbed?) remains of an adult, tentatively a male skeleton, almost certainly crouched, with the head at the north end of the grave. This individual had severe unusual dental occlusal wear, possibly caused by habitual activity involving the teeth (the angled, cupped wear on some of the teeth is reminiscent of patterns noted in early agricultural populations). Neither graves contained any finds and collagen preservation was not sufficient for radiocarbon dating, but they have been provisionally dated to the late Iron Age-early Romano-British period (approx. 45-120 A. D.).

The cremation burial comprised human bone and charcoal within a sub-circular pit. The bone, which weighed 4.3g, represented the remains of at least one juvenile aged over 1.5 years. There were no grave goods, so this cremation is undated, but is presumed to be of early-middle Roman date, though earlier dates are feasible.

Hertfordshire

Whittington way, Bishops Stortford: Post excavation assessment of fourteen deposits of cremated human bone (urned and unurned) and three inhumations, all recovered from later prehistoric and Late Pre-Roman Iron Age/Early Roman transition features. It is recommended that six deposits are sampled for radiocarbon dating. Full analysis will commence this year.

Wiltshire

Worthy Down

Full analysis and publication report on skeletons excavated at Worthy Down Camp between 2014 and 2016 as part of Project Wellesley, a major development across two sites. The work was commissioned by Skanska on behalf of the Defence Infrastructure Organisation.

Nineteen inhumation graves were recorded. Coins that had been deliberately placed in some of the graves dated the burials to the second half of the 4th century AD, and this late Roman date is supported by radiocarbon dating. The burials were generally orientated NW-SE, with the head commonly at the west end, but are unlikely to be Christian graves, as they displayed a diverse range of rites. Most burials were supine but one burial had been decapitated, the head being placed at the feet, another burial was crouched, and two others had been laid on their sides.

Analysis of the skeletons showed that the assemblage mainly comprised adults below the age of 45 years. There was evidence of poor dental health and nutrition, joint disease, and fractures caused by violence or injury. Stable isotope analysis on six of the skeletons suggested that they had spent their childhoods outside Britain in a region with a warmer, wetter climate, potentially the Iberian peninsula or the southern European or North African side of the Mediterranean.

Visit the OA Library at:
https://library.thehumanjourney.net/
This site is used to disseminate material, including grey literature client reports and supporting archives, produced by Oxford Archaeology. We have recently added a downloadable copy of *'Given the Ground', A Viking Age Mass Grave on Ridgeway Hill, Weymouth*.

Teaching/outreach etc.

Oxford University Department of Continuing Education (OUDCE) teaching

Heritage Burial Services has continued to deliver osteology sessions on the Diploma and Advanced Diploma in Archaeology and the Undergraduate Certificate in Archaeology

Oxford Archaeology Graduate Trainee Scheme

On this scheme, graduates are taught the skills and knowledge necessary to undertake the role of an archaeologist with PIFA grade responsibilities and remuneration. The training does not specifically focus on osteoarchaeology, but it provides a route into the profession and is recommended for those who are considering a career in osteoarchaeology. More information can be found at: https://oxfordarchaeology.com/community-training/training/graduate-trainee-scheme.

Media

Musee Dela Bataille De Fromelles, Fromelles, France – interview to accompany digital resources for *Out of the Shadows and into the Light: Permanent Exhibition*. (L Loe)
https://www.musee-bataille-fromelles.fr/en/out-shadows-and-light-permanent-exhibition

Bone Detectives (Channel 4) – Stoke Quay, Ipswich. Selection of three Medieval burials from this site (L Loe)

Small Screen Science podcast: Series 2, episode 2, *Zombie Apocalypse Science: Walking Dead* (L McIntyre).
https://www.smallscreenscience.co.uk/ep2-walking-apocalypse-dead-apocalypse-science

Live on-line talk on human skeletons excavated in Hinxton, Cambridge, for the Wellcome Genome Campus's public open Saturday event, *Bioarchaeology*

Website: https://oxfordarchaeology.com/
Facebook: https://www.facebook.com/oxfordarchaeology
Instagram: https://www.instagram.com/oxfordarchaeology/?hl=en
Twitter: https://twitter.com/oatweet
Flickr: https://www.flickr.com/photos/63884732@N04/albums
Sketchfab: https://sketchfab.com/oxford_archaeology

Sedgeford Historical and Archaeological Research Project (SHARP)

Sophie Beckett

2020 was set to be a big year for the Sedgeford Historical and Archaeological Research Project (SHARP). It was due to be the 25th season of annual excavations. Although it was not possible to run an excavation season this year and SHARP's anniversary celebration plans have been postponed, the project team have nevertheless been active in continuing with post-excavation and archival research, as well as planning the 2021 excavation season (see www.sharp.org.uk for details and bookings).
SHARP has continued to make progress towards its aims of investigating the archaeology and history of the northwest Norfolk parish of Sedgeford, embedded within an ethos of public participation, albeit remotely and often virtually. Adoption of advances in communication technology has enabled the team to improve the sharing of ideas, plans and hypotheses throughout the year, 'out of season'.

A free one-day webinar was held in November 2020; *the Anglo-Saxon Revolution*

in Norfolk. This event was sponsored by the North West Norfolk History Society and was very well attended. Over 250 delegates tuned in to experience excellent lectures delivered by nine speakers. A conference recording is available, free-of-charge on the SHARP website (https://www.sharp.org.uk/single-post/the-anglo-saxon-agricultural-revolution-in-norfolk-conference-14-november-2020). A book, resulting from the conference, is also currently being edited by Dr Rik Hoggett. It will include additional chapters written by the SHARP Team setting the Sedgeford context for the evolution of the social and economic revolution of the 'long 8th century'.

The Human Remains team had an excellent start to the National Lottery Heritage Fund project in 2019 (https://www.sharp.org.uk/blog-1/archive/2019/11). Work on *Volunteering with a Disarticulated Community: Towards Re-association of Anglo-Saxon Bones* that was planned for this year has been postponed until 2021. In the meantime, the team has successfully built upon the work-to-date with several exciting follow-on projects.

SHARP will collaborate with Gloucestershire Archaeology, who have gained funding from Gloucestershire County Council (www.glosarch.org.uk). A *Growing our Communities* grant will enable Dr Sophie Beckett to deliver free osteo-archaeology training for volunteers in Gloucestershire. They will record some of the disarticulated human remains from Sedgeford.

A grant awarded by the National Archives Collaborate and Innovate programme *Archives Testbed Fund* will enable SHARP to investigate whether **photographs of excavations that are donated by volunteers and visitors to help overcome post-excavation challenges. SHARP is currently running two questionnaires, that you might be able to help with. The first is for current and past SHARP volunteers to register their interest in donating their photographs. The second is perhaps more for the wider BABAO membership and is a survey that reviews current practice for donated photograph collections (including but not limited to those of human remains). There is a SHARP blog post which provides further information** (www.sharp.org.uk/single-post/sharp-needs-your-help-warning-this-post-contains-images-of-human-remains). The two questionnaires can also be accessed directly using the following links. Please do forward the links on to anyone you think may be interested in participating.

Register of Interest: https://docs.google.com/forms/d/e/1FAIpQLSepp2vrUpkjdZrqgpkK-qdu0nIyBaOh13oqm0NwHgafDtyTJQ/viewform

Review of Current Practice for Donated Photograph Collections: https://docs.google.com/forms/d/e/1FAIpQLScmWa8tinkUruvZVF-oPaypAJPwAva86YGgh0iei0o1FBPEUQ/viewform

Human Remains Team supervisor, Lucy Koster (lucy.koster@arch.ox.ac.uk) completed her dissertation on the disturbance of human remains at Sedgeford and was nominated by Oxford University for the Tony Baggs Undergraduate Dissertation Prize. She is currently on the MSc in Archaeological Science course at Oxford University and her research project will involve isotope analysis to study life history at Zvejnieki, Latvia. Lucy is then planning on continuing with isotope analysis work to undertake DPhil studies and investigate weaning within the early-medieval population from Sedgeford.

Dr Sophie Beckett has been appointed an honorary fellow of Melbourne Dental School, University of Melbourne, Australia. SHARP is looking forward to further developing its research into the study of dental calculus from skeletal remains from Sedgeford.

Tentatively peering into 2021, the SHARP team and volunteers alike are hopeful of being reunited during an on-site summer season. The human remains (HR) team are also looking forward to congregating once again for the annual HR research gathering at Sedgeford, even if this is later in the year than the usual dates.

Keep up to date with SHARP news by following the SHARP blog (https://www.sharp.org.uk/blog-1).
SHARP Human Remains team contacts: Lorraine Horsley (lorriehorsley@hotmail.com) and Dr Sophie Beckett (drsophiebeckett@gmail.com)

Wessex Archaeology

Jacqueline McKinley and Gemma Whelan

Burial Archaeology Team

Principle Osteoarchaeologist – Jacqueline McKinley (JMcK)
Senior Osteoarchaeologists – Ceri Boston (CB) and Kirsten Egging Dinwiddy (KED); Osteoarchaeologist – Emma Robertson (ER); Jenni Crangle (JC)

Introduction

The beginning of our year saw some adjustments to the team. KED, having admirably fulfilled the role of Senior Osteoarchaeologist for almost a decade (and part of the Team for even longer), decided she wanted other professional challenges and has moved into Post-Excavation Management. She has not abandoned us completely, and will keep a foot in the camp for many months yet as she completes the important work she has been undertaking on major Romano-British and Anglo-Saxon cemeteries in Wiltshire, and medieval and post-medieval cemeteries in London, Southampton and Bath (see BABAO reviews 2019 and 2018 for earlier stages these sites). The Team required another experienced senior osteoarchaeologist to take-over Kirsten's role, and following interviews in December 2019, Dr Ceridwen Boston was appointed in the New Year.

Ceri had the unfortunate experience of commencing at Wessex Archaeology as the first Covid-19 lockdown commenced in March – not the easiest of starts! The company – as with other contracting archaeological organisations – has remained active throughout the year, being closely associated with 'development' which is deemed an essential service. Inevitably there have been many adjustments to working practice both in the field and in the laboratory/office to preserve a safe working environment, with many of those usually working in the lab./office working from home.

It might be deemed fortunate under the current circumstances that no cemeteries of any great size were in our fieldwork programme for 2020. Several small cemeteries, and numerous small burial groups and singletons were excavated, predominantly prehistoric in date, from various sites across southern and central England. Further details pertaining to these sites will feature in the 2021 review.

Unsurprisingly, the team members have had little direct interaction with one-another over most of the year and – with the sometime exception of JMcK – have mostly worked from home. Analyses completed in 2020 are outlined below, with all Team members remaining heavily engaged with numerous on-going projects covering a wide temporal and geographic range.

KED hosted our regular Council for British Archaeology (Wessex Region) Osteoarchaeology course in the Wessex Archaeology offices in early March, shortly before lockdown; this now almost annual event is always over-subscribed with numerous participants returning year on year. As part of Wessex Archaeology's ongoing commitment to *Operation Nightingale* and the support of injured veterans, Dr Diana Swales (CAHID, University of Dundee) provided a series of osteological workshops on our behalf at Otterburn Training Camp, Northumberland, as part of Exercise LiDAR Truth, an excavation targeting two newly identified prehistoric features identified through an assessment of LiDAR data on the army range.

The following summary excludes projects subject to client confidentiality.

Analysis

Waterbrook Park, Ashford, Kent (65741/3) (JMcK)

Cremated human bone was recovered from 56 contexts associated with 53 features distributed across two temporally distinguished areas of the site: Area A as Mid-Late or Late Iron Age and Area B Mid-Late Bronze Age. In each Area the majority of the features formed two broad groups with dispersed singletons or occasional pairs of features distributed between the groups. The excavated material includes the remains of a minimum seven unurned burials, with a possible/probable further nine. Secondary deposits of pyre debris were recovered from the backfills of most graves, and fine particle fuel ash and charcoal was observed and/or recovered from the majority of the remaining features. At least 25 of the fills from the latter represent or probably represent deposits of pyre debris (deliberate or incidental), whilst the nature of the deposits in a substantial proportion of the features (15) remains inconclusive.

The enigmatic nature of many of the deposits at Waterbrook Park rendered deduction of the minimum number of individuals (MNI) represented within the assemblage problematic. The intrinsic divisibility and portability of cremated remains readily accommodates the possibility of material from one cremation being deposited in several locations within an area functioning as a 'mortuary zone', as well as removal of material from that zone for curation or deposition – including burial – elsewhere. Consequently, following a careful consideration of various factors - including the deposit type, feature location, duplication of skeletal elements and potential associations between deposits – a estimated MNI for the Late Bronze Age was given as eight and for Late Iron Age-Romano British six. Pyre goods in the form of small quantities of cremated animal bone, fragments of worked bone object and blue/green spot staining indicative of the presence of copper-alloy, were recovered/observed in material from up to six graves.

Derby Road, Doveridge, Derbyshire (205730) (JMcK)

Cremated human bone was recovered from 14 contexts distributed across eight features associated with an Early Bronze Age ring ditch. The deposits included the remains of one urned and five unurned burials; a second possible urned burial had been made in the upper fill of the grave housing one of the latter, though this addition could have comprised a *memento mori/mortuis* deposit rather than a burial *per see*. The remains of the inverted urned burial were recovered fully intact and the vessel contents micro-excavated under laboratory conditions having first being subject to a CT scan.

A minimum of eight individuals is represented, including five immature individuals and three adults; the former group include a neonate and a young infant of less than one year of age buried independently, the latter in a grave situated – potentially located – central to the area described by the inner ring ditch. Pyre goods in the form of cremated animal bone (three graves; sheep/goat/deer, pig with adults, dog with children), worked bone object (a knife pommel) and copper alloy (one grave) were recovered.

The substantial quantity of bone (1782g) recovered from the complete, inverted vessel formed two 'packages' of material evident in the CT scan. On excavation and analysis, the 'lower' package was found to contain the remains of a subadult (13-17 yr) and the upper those of a juvenile (7-12 yr) together with a few elements from an infant. The clear division between the 'packages' (both in the CT and in excavation) supports the impression of each being contained within a flexible bag (i.e. textile/skin/leather). A 20 mm thick 'crust' of material seen in the CT scan was found to comprise a layer of 'dust' fraction bone in what would have been the base of the first bag to be placed in the vessel. The presence of this material indicates that the bag had been curated somewhere other than in the vessel for long enough for the small particles to amass in the bottom of the bag and form the solid crust which held on its final deposition and inversion of the urn in burial.

Meriden Quarry, Worcestershire (P3982) (JMcK: *For Worcestershire Archaeology*)

Cremated bone was recovered from six contexts associated with two Early Bronze

Age ring ditches, including the remains of at least one unurned burial and a cremation-related deposit pertaining to a second cremation. The MNI of two included a male subadult (13-16 yr) and a female subadult/adult (13-35 yr). Pyre goods inclusive of animal bone was recovered with both deposits, species including roes deer, pig, cattle and dog, the latter representing a very rare occurrence for this period of a 'working status' or 'pet' species being included on the pyre with the deceased. Blue/green spot staining suggestive of the presence of copper-alloy on the pyre was seen on some skeletal elements.

Cranbourne Farm Coombe Bissett, Wiltshire (218471) (JMcK)
Remains of an inhumation burial recovered under 'rescue' conditions in 1994 during construction of a barn received funding for analysis. The late Romano-British/early post-Roman singleton comprised the remains of a mature adult male.

Portsmouth Harbour (111320) (JMcK)
The articulated remains of the anterior portion (frontal and facial bones, and parts of the parietal bones) of a human skull were recovered in Portsmouth harbour. Radiocarbon analysis of a fragment of the left parietal bone returned a later 19th–early 20th century date. The remains are probably those of a mature adult male, with an estimated age of 25–40 years.
Galloper Wind Farm (104811)/Leiston-cum-Sizewell (LCS 161), Suffolk (JMcK)
Cremated human bone was recovered from the remains of four Romano-British burials, three urned and one unurned; the graves forming two closely related pairs. A MNI of four adults, including at least one possible female over 40 years of age, was identified; minor pathological lesions were observed in two individuals including patches of lamellar periosteal new bone on upper limb elements.

Eaton Leys, Milton Keynes, Buckinghamshire (207760) (CB)
Cremated human bone was recovered from 71 contexts, many heavily truncated, across five areas of the excavation (Areas A- E) which was located on a low east-west ridge to the south of the Roman town of Magiovinium. Remains of early to mid Romano-British date were recovered from all areas of the site and included a minimum of five urned and six unurned burials. The Anglo-Saxon remains were confined to a small cemetery in Area A. The assemblage includes the remains of 27 urned, two possible urned and one unurned burial, and five other cremation-related deposits. A small square four-posted structure in the northern half of the burial ground has been interpreted as an Anglo-Saxon mortuary house. Other deposits, including the remains of five unurned burials, from various areas of the site, could not be securely dated but are most likely to be Late Iron Age/Romano-British in date.

A MNI of 44 was identified; 10 Romano British, 30 Anglo Saxon and four undated. The majority in both temporal groups comprised subadult/adult or adult individuals, with no infants or juveniles (<13 years). It was possible to indicate the sex of approx. 40% of the MNI, male and females being present in both temporal phases. Minor pathological lesions, including periosteal new bone and degenerative joint changes, were observed in the remains of a small number of individuals (seven Romano-British; three Anglo-Saxon). A rare example of sharp force trauma to the cranium was observed in the parietal vault of one Anglo-Saxon female.

Pyre goods in the form of animal bone, were recovered from some 40% of the Romano-British and 35% of the Anglo-Saxon burials; pig, sheep, cattle and bird remains were found in the former and sheep dominant in the latter.
Former Grove School Site, The Grove, Dorchester, *Dorset* (117171/2) (KED)
The remains of 13 Romano-British inhumation burials comprised an unexpected find revealed during the cutting of foundation trenches for a development on the west side of Dorchester. Their presence indicates the existence of an extra-mural cemetery to the west of the ramparts of *Durnovaria,* but the extent of the cemetery was not defined due to the nature and circumstances of the find. Consequently, the analysed assemblage forms a small, unknown proportion of the original

cemetery population. A MNI of 16 individuals was identified, all but one was adult (53% female, 40% male, 7% unsexed), most of whom had survived into or beyond their fourth decade. Minor pathological lesions and several uncommon morphological variations were observed including a small Stafney's defect on the lingual surface of the mandible of one male, and precondylar tubercles and a pharyngeal foveola on the base of the skull of one female.

Petersfinger 1985, Wiltshire – Anglo Saxon Burial SU1631 2934 (222180)(KED)
The remains of an Anglo-Saxon inhumation burial found during service trenching in 1985 within the southern half of a 6th-century cemetery excavated in the late 1940s–early 1950s, proved to be those of an adult male (40–50 years); distinguishing features include the presence of a pterygoalar bar across the right Foramen Ovale, on the base of the skull.

St Mary, Handsworth, Sheffield, Yorkshire (233590)(JC & JIMcK)
The disarticulated remains of a minimum of six adult individuals were excavated from below the concrete floor of an early 20th century addition to St Mary Church. The trench was located within an early 20th century addition, and it is possible that the graves from which this disarticulated material derived lay external to the building. The remains showed no signs of lesions associated with advanced age. No definite statement regarding sex of the individuals could be made in the rapid scan undertaken but the presence of both males and females is indicated by the marked variations in size and robusticity of the bones.

WSP

Natasha Powers

St Petri Kirche, Berlin
Work continues on this international research project investigating the origins of *The First Berliners*, which centres on 4000 individuals excavated by a team led by Claudia Melisch between 2007 and 2009. In total, 3809 burials have been assessed to MOLA standards and the result of this work are currently in press (in German). The burials could be divided into six separate phases from 1047 to 1717, though most of those buried died between 1047 and 1299 or between 1500 and 1599.
Additional historical, isotopic and DNA analyses have now been carried out, together with further investigation of the radiocarbon dates to refine phasing.
On 14th March, the project was to host an international colloquium with two days of presentations and discussions within the project team, followed by a day long public event. With impeccable timing this coincided perfectly with the closing down of public buildings in Berlin as COVID restrictions began. The project team were able to meet for one day and share and discuss their individual findings. This led to some fascinating discussions and to a more robust and holistic approach to interpretation. There were also presentations from those who are leading related research, including Ronald Risy who has overseen the excavation of 22,134 burials from St. Pölten in Austria – a fascinating and important project and a skeletal assemblage which will provide vital comparative data to add to our understanding of medieval Europe.
As the public events could not be held, all the presentations (in a mix of German and English) have been made available on-line and can be accessed via the project You Tube channel (Ausgrabung Petriplatz Berlin): https://www.youtube.com/channel/UCHG_CIqVef9MdB3brQI9CjA

York Osteoarchaeology

Malin Holst, Anwen Caffell, Katie Keefe, Paola Ponce, Elina Petersone-Gordina, Jordi Ruiz Ventura, Benn Penny-Mason & Leslie Quade

Reports on small assemblages are not listed and one large assemblage could not be listed for client confidentiality reasons. We are currently analysing large skeletal populations from the Lincoln Bypass and Waterside, Leicester.

Allan Archaeology, Scole, Norfolk, EPG
Nineteen skeletons were excavated close to Scole Roman town Scheduled Monument,

along a Roman road between Colchester (*Camulodunum*) and Caistor St Edmund (*Venta Icenorum*). The skeletons were in extended supine position, and a range of orientations. Most skeletons were adults, with three non-adults, and preservation was very poor. There were more females compared with males. Degenerative joint changes and infection were common. One individual had likely experienced a partial dislocation of the lower jaw. The prevalence of dental disease was relatively low.

WYAS Archaeological Services, Dightlington, West Yorkshire, BPM
The excavations uncovered the partial remains of a barrow and identified five cremation burials within pits inside it. A further three pits containing burnt bone were recovered from a second area of excavation, though to date to the Neolithic or Bronze Age. Of the four confirmed human cremated bone assemblages, three contained adults and one a likely older juvenile (9+ years). On average, the cremation deposits contained approximately 57% of the amount of bone expected from an adult cremation.

WYAS Archaeological Services, Yorkshire Playhouse, Leeds, West Yorkshire, BPM
Ten post-medieval skeletons were excavated from a burial ground associated with the Leeds first Methodist chapel, including six adults, four non-adults and a large assemblage of disarticulated human bones. Three skeletons had periosteal reactions on the legs. Joint disease was seen in the spine and hip of one skeleton. Dental health was moderate, with widespread dental calculus concretions, as well as evidence of minor caries and early periodontitis. Five individuals could be associated with documentary material and there is evidence of potential familial links between skeletons.

York Archaeological Trust, The Newington Hotel, York, KK
Seventy-six skeletons and three cremation burials were excavated, near the 1950ies Trentholme Drive excavations. The cemetery was disorganised, with few grave goods and 29 coffins. A total of 63 adults (31 males, 13 females, 19 unsexed), seven adolescents, one older juvenile, four younger juveniles and one infant were analysed, most of whom were incomplete. There was a high incidence of pathology, with developmental anomalies and limited metabolic disease, but a high incidence of dental enamel hypoplasia. Evidence for trauma was largely accidental, but partly the result of interpersonal violence, including two nasal fractures, a stabbing injury and an incomplete decapitation. One adult of unknown sex a had complex peri-mortem fracture to their left tibia and fibula and underwent the amputation of the lower limb at the ankle, which they did not survive. Evidence for amputation is highly unusual for Roman Britain and thus of national significance. Chronic sinusitis was common, rib lesions were recorded in six adults and just under half of the population had periosteal reactions of the lower limbs. One young middle adult female had *hypertrophic osteoarthropathy*. Joint disease was prevalent. The dental health of the population was poor, with higher than average levels of caries and calculus.

DEPARTMENTAL REPORTS

Cranfield Forensic Institute
Cranfield University
Sophie Beckett

Cranfield Forensic Institute (CFI) has now moved into newly renovated buildings on the Cranfield campus in Bedfordshire, in time to welcome a new cohort of MSc Forensic Programme students for the 2020-21 academic year. Investment of £ 3.5 million by Cranfield University and over £7 million by the South East Midlands Enterprise Partnership has enabled the creation of excellent teaching and research facilities at Cranfield campus that both students and staff are excited to use. In particular, the newly installed virtual autopsy table has been of interest to many of our Forensic Archaeology and Anthropology MSc students. CFI continues to have a base onsite at the Defence Academy of the United Kingdom at

Shrivenham, especially for students to utilise its unique research and teaching capabilities.

CFI welcomes several new staff including; Alice Farren-Bradley and Dr Peter Campbell as a Lecturers in Cultural Heritage Under Threat, Dr Nathaniel Erb-Satullo as Lecturer in Archaeological Science, Dr Thomas Delbey as Research Fellow and Stephanie Kimpton as Laboratory Technician. We also welcome back Dr Karl Harrison as a Reader in Forensic Science.

A new MSc course in Forensic Investigation of Heritage Crime has launched and has welcomed its first student cohort (https://www.cranfield.ac.uk/courses/taught/forensic-investigation-of-heritage-crime). The course is the first degree programme to be offered in this subject, worldwide. It examines the threats to cultural heritage in the UK and internationally, including looting, trafficking, fraud, and destruction. Using forensic investigation techniques, students develop specialist skills in the investigation of crimes against culture. Several of the MSc modules are also available as 5-day-block short courses.

Congratulations to Laura Brown, Chandra Finaughty and Rosie Crawford on being awarded fully-funded studentships for the MSc Forensic Programme. Congratulations to Dr Nicholas Márquez-Grant for gaining re-certification as an FA-1 Forensic Anthropologist by the Royal Anthropological Institute, and for Dr David Errickson for gaining certification at FA-III level. This year, David has also gained accreditation as a CIfA Associate. Dr Sophie Beckett has been appointed as an Honorary Fellow of *Melbourne Dental School*, University of Melbourne, Australia (https://dental.unimelb.edu.au/news-and-events/meet-our-honorary-staff-dr-sophie-beckett) and Professor Peter Zioupos was appointed Visiting Professor at the *Institute for Future Transport and Cities*, Coventry University.
CFI staff continue to work on forensic archaeology and forensic anthropology casework, both in the UK and internationally, including Police Domestic cases and Human Rights investigations. In March 2020, Cranfield University ran an international symposium to gather together scientists and other professionals, from many different nations, who work to recover and identify those Missing or Killed in Action. This was a very successful event, establishing an extensive network for support and development within this important field of work. In 2020, operations of Cranfield's Recovery of Conflict Casualties (CRICC) team continued, working with the Defense Prisoner of War/Accounting Agency (DPAA) in particular to recover US personnel who died abroad during WWII. In 2021 the team will be heading out to Germany and Sicily. As ever, those who are interested in being considered as a member of the CRICC team, please do get in touch (https://www.cranfield.ac.uk/centres/cranfield-forensic-institute/cricc).

Well done to CFI PhD students who gained their doctorates in 2020. We wish them all the best in the future:

Brown, D. *A re-assessment of the use of tanks at the Battle of Bullecour*t, 1917

Cummaudo, M. *Identification of Human vs Non-Human Bone (sus scrofa) in Forensic Anthropology: Historical perspectives*

McGivern, H. *Changes to the Micro-Architecture and Material Properties of the Human Clavicle and Rib in Ontogeny*

Nyombi, A. *Thermal and Catalytic Processing of Solid Fuels to Minimise Carbon Monoxide Emissions*

Saunders, E. *Femoroacetabular Impingement and Cam Morphology: Contributions to Bioarchaeology and Forensic Anthropology*

Willis, C. *Institutional Death: A Multidisciplinary Study of Burial Practice at RNH Haslar*
Wilkinson, E. *Resilience and Learning: A Case Study of the Department for*

International Development's Governance and Transparency Fund

CFI's current PhD students include:

Arnold, E. *Bone Disease, Integration of Nano and Macro Scale Studies*

Henwood, B. *A multi-faceted approach to the analysis of weapons recovered in combat zones to differentiate fake from genuine production, and identify patterns of mark obliteration and other common points of alteration*

Cai, Y. *Development of Customised Novel Model for Surgical Planning in Adolescent Flatfoot Corrective Surgery*

Davies, S. *High Resolution Mapping of Bone: The Pathogenesis of Osteoarthritis*

Giles, S. *Estimation of the Post-mortem Interval in Forensic Anthropology* (see PhD abstracts)

Lloyd, R. *Forensic Toxicology in Embalmed Human Remains*

Longo, A. *Digital 3D shape-comparison analysis for automated assessment in Forensic Anthropology* (see PhD abstracts)

Rickman, J. *The Formation and Differential Diagnosis of Conoidal Projectile Wounds in Flat Bones*

Wessling, R. *Forensic Anthropology: Virtual Skeletal Analysis*

A review of 2020 would not be complete without some mention of the ongoing global pandemic and its effects on CFI. Staff and students have made tremendous efforts to counter-act the many limitations and obstacles that COVID-19 has thrown our way and everyone within CFI is very appreciative of all of the collective teamwork. Focussing on silver-linings, Dr Nicholas Márquez-Grant has continued to lecture internationally in a number of countries including Mexico, Chile, USA, Spain, Russia as well as at many UK institutions, but with considerably less jet-lag this year!

In the summer, CFI was able to run its Practical Archaeological Excavation module. Students led by Dr David Errickson explored a site at Corsham, Wiltshire and uncovered archaeological evidence dating the mid-medieval period. Further excavation in future years is planned. Cranfield Forensic Institute was also part of the 2020 Rat Island Recovery team. This work featured on Channel 4's television series: *Britain's Most Historic Towns: Naval Plymouth* (https://www.channel4.com/programmes/britains-most-historic-towns/on-demand/70449-003).

Of course, the best mention has been left until last; Dr David Errickson's role as co-host of the BABAO quiz in December with Prof. Tim Thompson and Dr Amber Collings. This was a very enjoyable event and lots of fun, albeit a virtual meeting. Here is to the hope of BABAO gatherings in person in 2021.

To keep up to date with Cranfield Forensic Institute follow our blog https://blogs.cranfield.ac.uk/category/forensics/
or follow us on Twitter (@CranfieldForSci).

PhD Abstracts:

Development of a Customised Novel Model for Surgical Planning in Paediatric Flat Foot Corrective Surgery
Yanni Cai (Yanni.Cai@cranfield.ac.uk)
Children often suffer from 'Flatfoot' a condition associated with foot arch flattening and extreme foot joints malalignment. True incidence of flatfoot is unknown, but according to several studies 50% of children have flatfoot initially which while growing corrects itself by developing a normal foot arch, ending with 10% of adolescents still having the condition. Treatment depends on the type of flatfoot. Surgery is recommended when patients experience pain, to prevent disability and arthritis in adulthood. However, surgery brings its own challenges. Given the complex structure and the not fully

understood foot biomechanics, there is no universal agreement on how to treat flatfoot successfully and no optimal surgical methodology has yet been established. Surgical planning still today relies on educated guessing by the foot surgeon based on experience, therefore there is a lot of disagreement about optimal surgery for individual patients. This research project aims to develop a parametric model to improve our understanding of flatfoot surgery. The project entails foot scans, parametric modelling, tissue assessment, geometrical analysis and pressure mapping on the floor both pre- and post-surgery. Successful surgery greatly improves the quality of life of the patients. On the other hand, unsuccessful surgery raises questions and may lead to litigation and expensive after surgery care; so this new surgical planning 'tool' will safeguard against failures, failures being painful, embarrassing and costly!

Estimation of the Post-mortem Interval in Forensic Anthropology
Stephanie Giles (s.giles@cranfield.ac.uk)
The development of research decay facilities such as the University of Tennessee's Anthropology Research Facility (ARF), has now made it possible to observe taphonomic events and acquire evidence-based explanations before formulating PMI estimation theories. However, most experimental research studies have used such facilities as a means by which to test predictions, consistent with deductive reasoning. Experiments are often unsystematically constructed and reduced to observe the effects of exposure to a single variable in question, often using very small porcine sample sizes, which arguably questions the applicability of the results to forensic practice. It is apparent that a huge body of decomposition data sits within retrospective case studies and photographs in UK Police Forces. Such archives hold photographs of cadavers both at the scene and in the mortuary, alongside case notes containing circumstantial evidence surrounding the death. Ultimately, thousands of cases can be generated and subject to statistical evaluation which may provide a more applicable means to inform our understanding of the PMI in the forensic field.

Digital 3D shape-comparison analysis for automated assessment in Forensic Anthropology
Angelina Longo (a.longo@cranfield.ac.uk)
Morphological assessment methods are an important tool in the kit of every anthropologist and are especially common in age and sex assessment. While these methods are generally considered accurate and easy to apply (specifically for sex assessment), they are also known to be highly subjective, with the level of accuracy directly relating to the experience of the examiner.
The aim of this thesis is to develop a feature comparison algorithm capable of automatically comparing individual skeletal CT scans of unknown age and sex to a database of known samples. As part of this project a database of 100 – 150 CT scans of known age and sex from different sources will be created. Using automatic shape-comparison analysis the created algorithm will generate a statistical estimation of sex and age for the unknown scan, using an average of the closest matches found within in the database. The algorithm will also have the potential to be used in reconstruction of damaged remains by identify the closest physical match in the database as a base for digital reconstruction. This application could be used by practitioners to assist in their assessment and support the findings of any skeletal analysis undertaken. Additionally, the application could allow for an initial assessment, if a physical anthropologist is not immediately available. By allowing researchers to add datasets to the database, the chance would arise to create an extensive and diverse research resource.

Department of Archaeology
Durham University
Tina Jakob

This has been a truly challenging year for all of us, but owing to the supportive and collegiate nature of our department, we successfully managed to keep up with research and teaching commitments, despite

the struggles of getting our heads around online teaching and restricted laboratory access.

People:
Charlotte Roberts retired at the end of October 2020, but is still associated with the Department of Archaeology, Durham University. She was also part of the team that won Performance of the Year for the Bodies of Evidence (17th century Scottish Soldiers) exhibition in the Living North awards (A celebration of the north-east). The Bamburgh Bones/Accessing Aidan project has been nominated as best research project featured in Current Archaeology during 2020 (see Projects). Charlotte and Rebecca Gowland attended a workshop at Arizona State University in early 2020, funded by the National Science Foundation, on "21st Century Bioarchaeology: Taking Stock and the Way Forward".

Rebecca Gowland has taken up her new role as Deputy Executive Dean (People and Culture) as job share together with Jason Arday (Sociology). Of course, she is still based in the Department of Archaeology and continues as director of the MSc Human Bioarchaeology and Palaeopathology programme.

News and Project Outlines:
Charlotte Roberts continues to work on the ongoing HLF-funded project related to Bamburgh Castle and the Bowl-Hole Anglo-Saxon cemetery – as a Steering Group Member she has been responsible for the content of the digital ossuary and relevant information on the accompanying website. This part of the project is now complete (https://bamburghbones.org/ossuary/digital-ossuary/).
She worked with the British Academy through the summer months of 2020 in relation to the 'Shape the Future' series of workshops and publications (https://www.thebritishacademy.ac.uk/programmes/covid-19-shape-the-future/). This initiative was to show, beyond the sciences, how the social sciences, humanities and arts can shape a positive, post-pandemic future for peoples, economies and environments. In particular she has highlighted the contribution that knowledge from bioarchaeology can make to shaping the post-pandemic landscape (see Publications).
Charlotte is currently co-editing two volumes on *The bioarchaeology of cardiovascular disease* (Michaela Binder, Charlotte Roberts, Daniel Antoine), and Evolving fields: *The Role of Bioarchaeology in Evolutionary Medicine* (Kim Plomp, Charlotte Roberts, Sarah Elton and Gillian Bentley)

Andrew Millard, Janet Montgomery, Darren Gröcke and Joanna Moore are collaborating with Dr Elina Petersone-Gordina and Dr Guntis Gerhards from the Institute of Latvian History, University of Latvia, in terms of providing Carbon and Nitrogen ($^{13}C/^{12}C$ and $^{15}N/^{14}N$) analysis from bulk dentine and bulk bone for dietary reconstruction, and Amelogenin peptide analysis from dental enamel peptide for sex determination. The analyses are carried out within the project "Gender, sex and status in Iron Age Latvia (7th–12th centuries AD), Project No. lzp-2018/1-0395, which is a fundamental and applied research project funded by the Latvian Council of Science.
The aim of the project is to study burial customs in Iron Age populations from Latvia in the light of gender, sex and status, employing archaeological materials and bioarchaeological methods, as well as isotope, peptide and ancient DNA analyses. To achieve the aim, archaeological cemetery populations with reasonably good preservation of skeletal remains from different regions of Latvia are being analysed. The amelogenin peptide analysis is used to determine biological sex of the individuals, while ancient DNA data is mainly used for studying their kinship. Dietary isotope analysis will reveal information about differences in diet and thus, access to resources between different population, sex, and age groups. The project will essentially reconsider the existing preconceptions about gender, sex, and status in Middle and Late Iron Age populations in Latvia. The results of the project will be of importance not only to archaeologists, but also researchers in other

fields both in Latvia and abroad, promoting the understanding of similarities and differences in the history of Baltic and European countries. The project runs from 2018 to 2021, and the principal investigator is Dr Guntis Gerhards, Institute of Latvian History, University of Latvia.

PhD student success:
Leslie Quade has successfully finished her PhD research entitled "When in Gaul, do as the 'Romans' do? Shifting Health in Gaul during Late Antiquity (300-700 CE)" and has now taken up a postdoctoral position at Masaryk University, Brno, Czech Republic. Samantha Tipper, who recently received her PhD degree after completing her research on "A Bioarchaeological Analysis of Spinal Pathology across Ancient Nubia between 300 BC and 1500 AD" is now a Senior Lecturer in Forensic Science at the University of Lincoln. Congratulations to both of them and best of luck for the future!

New PhD student:
In 2020 we welcomed Hannah Liedl (see abstract below) who will be working on human remains as part of the Phaleron Bioarchaeology Project (http://phaleron.digital-ascsa.org/project/).

MSc dissertation projects:
Baviskar, Y. When mosquitoes kill: Assessing malaria in the British India from AD 1850-1947
Bennett-Jones, D. Can examination of dry skeletal material, and calcified or mummified soft tissues provide evidence for chronic renal failure in archaeological remains?
Bowles, C. Grave comparisons: The European mass grave in times of conflict and epidemic disease
Eckford, E. Radical interventions: The role of the Radcliffe Royal Infirmary in the development of eighteenth and nineteenth medical sciences
Ferenczi, L. Health inequalities and air pollution in industrial London (18th and 19th century)
Hewitt, W. Acklam Wold, Garton Station and Kemp Howe: A study of three Anglo-Saxon cemeteries in East Yorkshire from the People and Place Project
Holdaway, J. Who cares? Utilising the Index of Care, disability theory and first person narratives to assess the nature of care at Radcliff infirmary
Hodgson, L. A micro-CT investigation of the spatial and temporal progression of mineralisation of enamel hypermineralisation in the first permanent molar
Klostermann, P. Quick and painless. The role of anaesthetics and surgical progress in hospital collections
Morgan, B. Fractures and interpersonal violence in 19/20th Century North America: The effect of institutionalisation
Morris, A. Restudy, Re-evaluation and Research: An evaluation of the use and reuse of Archaeological Collections in Publications dated between 1981-2019
Robinson, K. Fractured leprosy: The analysis of the Peterborough, Midland Road, collection
Sibon, H. Effects of the Black Death pandemic on mobility and health in medieval London
Smith, C. Investigating the influence of social status on dental health for non-adults from post medieval London
Strang, S. The Shamrock shore: Analysing the health and disease of Irish migrants during the Great Irish Famine

PhD abstracts:
Hannah Liedl
Department of Archaeology, Durham University
Supervised by: Rebecca Gowland, Tina Jakob and Jane Buikstra (ASU)
The Birth of Democracy and its Impact on Health and Disease
The first half of the first millennium BC witnessed significant changes in the Eastern Mediterranean. After the "Dark Age" following the collapse of the Mycenaean palaces, an increase in population levels led to the development of urban centres and the formation of *poleis* during the 8th century BC. The rise in population demanded new settlement organisation resulting in the establishment of democratic structures in 6th century Athens. In comparison to the

Classical period (480-320 BC) little is known about the early beginnings of the *polis* in the Archaic period (700-480 BC) or the lives of the people under its influence.
My PhD project aims to examine the impact of these processes on the lives of the general population in Athens and will address research questions concerning how the profound social changes affected the lived experience of the Athenian population. The project will focus on human remains excavated from the cemetery at Phaleron (Athens) which was used for the burial of the non-elite population during the Archaic period. Analysis will allow an investigation into changes in health and diet linked to the *polis* formation. A comparison of contrasting social groups identified within the cemetery will provide a greater understanding of the inter-sectional effects of these political changes on differing subsections of the population. This project has the potential to uncover new information about living conditions of the non-elite population, a social class often underrepresented in the historical and archaeological record, and how the *polis* community treated marginalised groups.

Leslie Quade
Department of Archaeology, Durham University
When in Gaul, do as the 'Romans' do? Shifting Health in Gaul during Late Antiquity (300-700 CE)
Supervised by: Rebecca Gowland and Rob Witcher
The fall of the Roman Empire has long been characterized as a period of regression and deterioration of living conditions across Europe– the 'Dark Ages'. The nature of the cultural and political environment during Late Antiquity (300-700 CE) and whether transitions might be considered as continuous or catastrophic has been a contentious source of debate.
The skeletal remains of 844 individuals from Roman and Late Antique Gaul were analysed for demographic data (age, sex), growth disruption (Height-for-Age Z scores, femur length), non-specific stress indicators (dental enamel hypoplasia, cribra orbitalia, tibia periosteal reaction), carious lesions and trauma to contribute to current understanding of Late Antique transition. A subset of 65 individuals were also included in a pilot study for the detection of cortisol in dental enamel and dentine.
Gallo-Roman samples demonstrated more skeletal signs of stress than either Late Antique sample. This suggests that social and cultural factors rooted in Roman lifeways were more deleterious to health than the process of transformation. Gallo-Roman individuals may have been more regularly exposed to stressors throughout the life course, as a result of overcrowding and insalubrity in urban settlement structures. Changes in mortality patterns between males and females from the Roman period to Late Antiquity suggested a differential transition experience based on sex and gender. Cortisol concentrations were detected from within archaeological tooth dentine and enamel, but results were insufficiently linked to other skeletal stress indicators or sex. Stress experience as indexed through cortisol analysis did not reveal differences between Roman and Late Antique samples.

Department of Archaeology
University of Cambridge

Trish Biers

In light of the tough year 2020 has been, our staff and students at Cambridge continue to do exciting work while supporting each other with Zoom lab meetings, Slack chatrooms for teaching support and pet pictures, and Wonder department socials.

We welcome our newest staff member to the Biological Anthropology programme, Dr Amélie Beaudet, Lecturer in Human Origins. She joins us from the University of the Witwatersrand (South Africa) and will continue her research on "Little Foot", the nearly complete Australopithecus skeleton found in South Africa, and results of a project developed in close collaboration with the University of Pretoria and the Steve Biko Hospital (South Africa) that was initiated in 2016. Emilia Franklin joins us as a new PhD, supervised by John and Piers Mitchell. She is using osteological and demographic analysis

to research the epidemiology of plague outbreaks and the nature of plague mortality in medieval England and is funded by the Cambridge Trust.

The Duckworth Laboratory remains closed indefinitely for research visits to the collections pending National and University Covid guidelines. Updates are posted on the Duckworth Facebook page and website. We are joined by two new staff members, Duckworth Administrator Josh Giles, and Palaeoanthropology Laboratory Technician Giuseppe Castelli.

The Ancient Parasites Laboratory, led by Piers Mitchell, was closed from mid March to September due to COVID, but is now active once again. Journal articles were published in 2020 on parasites in Roman period Turkey and Serbia, and medieval and renaissance period Belgium. Our collaboration with colleagues at the Max Planck Institute for the Science of Human History in Germany resulted in the world's first determination of the intestinal microbiome for past communities from analysis of the contents of communal latrines, which resulted in plenty of worldwide media interest. Research in the lab included projects on Roman period Italy, Belgium and Britain, Lombard period Italy, and medieval England and Belgium.

Department Projects Updates:
The Wellcome Trust funded project 'After the Plague: Health and History in Medieval Cambridge' has moved into the concluding stages of researching the population of Medieval Cambridge. Professor John Robb along with other members of the project, Craig Cessford, Jenna Dittmar, Sarah-Jane Harknett, Ruoyun Hui, Sarah Inskip, Toomas Kivisild, Piers Mitchell, Bram Mulder, Tamsin O'Connell, Alice Rose, Christina Schieb and Jay Stock, as well as many associated researchers, including Marcel Keller and Eugenia D'Atanasio, have been largely focussed on compiling and writing up the findings from the project. In particular, the team have been working on a final project monograph, due to be published as part of the McDonald Institute Monograph series.

'After the Plague' PhD news:
Bram Mulder submitted his PhD thesis in August 2020, entitled 'Functional adaptation in cortical and trabecular bone. Differential effects of mechanical loading and the implications for reconstructions of past activity' and successfully passed his viva in September. Alice Rose submitted her PhD thesis, entitled 'Life in Medieval Cambridge: an isotopic analysis of diet and mobility' in November 2020 and successfully passed her viva in December. Both are now employed as postdoctoral researchers on the 'After the Plague' project.

Other 'After the Plague' BABAO member news:
Sarah Inskip was awarded a UKRI Future Leaders Fellowship at the University of Leicester, starting in October 2020. She will be researching the impact of the arrival and commodification of tobacco on the health of Western Europeans from 1600-1900.
Alongside her work on the 'After the Plague' project, Jenna Dittmar continued to conduct research on health during the Bronze Age in Northwest China. Jenna will be starting a British Academy funded postdoctoral research fellow post at the University of Aberdeen in January 2021 researching temporal trends in health in Scottish and Irish skeletal assemblages with Professor Marc Oxenham.

Postgraduate Research Abstract:
Life in Medieval Cambridge: an isotopic analysis of diet and mobility
Alice Rose
University of Cambridge

PhD Abstract (submitted November 2020)
Cambridge was a well-established town and an important trade centre in the High and Late Medieval period (11th-16th century). Historical accounts and archaeological evidence indicate that the Late Medieval period was a tumultuous chapter in English history, with episodes of war, climate change, famine and plague. It is argued that the social and economic changes, particularly those associated with the Black Death of 1348-50, would have significantly affected food

production and procurement in England and that dramatic population reduction may have resulted in changes in population replacement and diversity. However, it is not fully understood to what extent events in the Late Medieval period affected towns like Cambridge, and whether they were experienced universally across the local population.
This thesis, therefore, utilises contextualised isotope analysis of human and faunal skeletal remains from cemetery sites excavated from Cambridge and its hinterlands, dating from the Neolithic to the Post-Medieval period, to investigate what life was like for the population living in the High and Late Medieval period. The High and Late Medieval isotope results were then placed into context with data across the longue durée, to evaluate the scale of change. A multi-tissue (bone, dentine, enamel) multi-isotope (δ13C, δ15N, δ18O, 87Sr/86Sr) approach was used to understand specifically how diet and mobility varied at an intra- and inter-individual and population scale. The results of the isotope analysis have allowed for the characterisation of diet across multiple sites, indicating variation based on social status, religious beliefs and locality. Isotope analysis has identified a small number of individuals who were unlikely to have spent their childhood in Cambridge and may have migrated into the town. Potential localised, short-distance migration in women has also been identified. Most importantly, this thesis concludes that the data does not show conclusive temporal changes in the High and Later Medieval periods which could be linked to events in the 14th century. Some general temporal change in diet may be present, but this is likely to be linked to the increasing popularity of marine fish consumption following the 'fish event horizon'.

Institute of Archaeology
University College London
Rebecca Watts

We would like to start by saying a huge congratulations to all of our MSc Bioarchaeology and Forensic Anthropology students for their hard work and determination over the summer. We were so impressed by your adaptability and creativity, and our research meetings, statistics sessions and writing updates were bright points of enjoyment during an otherwise bleak few months. You produced some really excellent dissertations and it has been a joy to hear from those of you who have already secured jobs in North American and Europe, and to support others who are planning for careers and further study. Well done to you all – we are very proud of you.

It was in all the kerfuffle that our esteemed colleague, Professor Tony Waldron, chose to make a discreet exit from the Institute of Archaeology. Over the past 40 years Tony has simultaneously entertained, inspired and terrified countless PhD and masters students, first as an Honorary Research Fellow working with Don Brothwell on the MSc Archaeology and Ancient History of Disease, right up until the programme's current incarnation as the MSc Bioarchaeology and Forensic Anthropology. Without Tony the course at UCL would simply not exist and his presence and humour will be greatly missed. Thank you for being a wonderful colleague and friend.

We also welcomed a new member of staff to the teaching team in September 2020, Dr. Sarah Stark who joins us as associate lecturer (teaching). Sarah's geomorpho-magic has already added some extra sparkle to our Term 1 teaching and we are looking forward to setting up some fun projects in 2021.

Although many of our research activities are currently on hold Carolyn has been involved in a number of projects that focus on the forensic applications of digital imaging and 3D printing and Simon has been able to beaver away at his new edition of Dental Anthropology. In November 2019 Rebecca visited Rwanda to excavate an Urewe site with John Giblin (National Museums of Scotland), Maurice Mugabowagahunde and André Ntagwabira (Institute of National Museums of Rwanda), on a project funded by the Institute of Bioarchaeology at the British

Museum. While there she was invited to speak with history students at the University of Rwanda and hopes to return in 2022 for a further season of fieldwork.

Current PhD students:
Rachael Carew: An investigation into 3D printing of osteological remains: the metrology and ethics of virtual anthropology

Elizabeth Church: A Photogrammetric Approach to Forensic Sex Estimation

Marion Davidson: The Frequency, Accuracy, and Reliability of the Ancestry Estimation Methods in Bioarchaeology and Forensic Anthropology

Melissa Dobson: Intervertebral disc disease: its prevalence, distribution and relationship to other spinal pathology in two human skeletal populations from Chichester, England

Katrina Gafner: Understanding the Thermal Alteration of Cranial Blunt Force Trauma Fractures

Aaron Gasparik: Analysing the variations in rotator cuff disease prevalence in skeletal assemblages from different geographic, social and temporal contexts throughout the UK

Maura Griffith: Sex Estimation of Juvenile Remains Using Dental Metrics

Panos Kratimenos: Burial position and mortuary practice as indicators of cultural and political change during the Maya 'Collapse

Martin Lo: New Approaches to Age Estimation Using the Pelvis in Modern British Populations

Lisa Monetti: Evidence of changing cremation practices in Britain through analysis of cremated human remains

Madeline Robles: The utility of the cranial sinuses in the estimation of age, sex, and ancestry

Christopher Silvester: A dental revolution? The intriguing effects of the profound social and dietary changes of the 18/19th centuries on the masticatory system

Connor Welty: Cranial Morphology and Development in Down Syndrome using 3D Geometric Morphometrics

School of History, Classics and Archaeology
University of Edinburgh

Linda Fibiger

There is no point pretending that 2020 was a normal year, or that academic life continued as usual during the global Covid-19 pandemic. I would like to start this contribution by highlighting that my colleagues made an enormous effort to accommodate continued bioarchaeology teaching and student research under difficult circumstances. If there is one thing that the events of this past year have made clear, it is that, before anything else, we have a duty of care and need to look after ourselves and after each other, and I would like to thanks all of my bioarchaeology friends and colleagues for their support.

At Edinburgh, we adapted to the Covid-19 pandemic by undertaking a hybrid teaching model for our MSc Human Osteoarchaeology programme. Seminar lectures have been running online live, with weekly socially-distanced lab sessions (in streams) where we have taught hands-on experience in working with skeletal human remains along with digital resources. Despite the restrictions, the pandemic has provided opportunities to involve guest lecturers and speakers from all over the world. Students have also been taught in how to work with digital and imaging data (e.g. CT-scans, digital radiographs and scanned histology slides) to a greater extent than before. The musculo-skeletal anatomy module has placed greater focus on functional anatomy, and how to apply that knowledge in a biological anthropological setting, than in previous years.

The 'One Health Archaeology Research Group' (https://www.ed.ac.uk/history-classics-archaeology/research/research-groups/one-health-archaeology) and the Conflict Archaeology Research Group (https://www.ed.ac.uk/history-classics-archaeology/research/research-groups/conflict-archaeology) also managed to keep things going digitally, and continue to do so this semester.

Linda Fibiger continued her work as a Research Scientist for '*The Fall of 1200BC: The role of migration and conflict in social crises at end of the Bronze Age in South-eastern Europe*', funded by a European Research Council Consolidator Grant and led by Dr. Barry Molloy (http://www.thefall1200.eu/index.html). Travelling was cut short in March, and the focus had to shift to data analysis and all things virtual. This included virtual project presentations at the University College Dublin Archaeology research day, virtual project meetings via zoom and – a first for this osteologist - long distance/virtual sampling, ably assisted by Dr Katarina Dmitrovic, National Museum Čačak, Serbia, who patiently presented various teeth and cranial fragments to the camera that were then selected and sent off for detailed recording and stable isotope and micro-CT analysis. This is not the way any of us would usually operate, but The Fall project was very grateful to be able to arrange this, as this virtual sampling meant less of a delay for lab analysis.

All other fieldwork and data collection projects that rely on the summer break for their continuation had to be put on hold, and we hope to have more updates next year.

Ongoing PhD research

Barlow, A.: Cotton Town Blues. Investigating inequality in the 19th century cemetery population of St Peter's Parish Church Cemetery, Blackburn, Lancashire, UK, through stable isotope analysis.

Coskun, G.: Facial Evaluation of a Contemporary Adult Greek Population Sample: Comparison of Two Methods

Espinosa Rosero, S.: Forensic Anthropology techniques of positive identification through anomalies in the human bone registry

De Pace, M.: An investigation of the survivability and mortality of Medieval Mesembrians through physiological stress markers and dietary reconstruction

Evatt, A.: A bioarchaeological investigation of European Mesolithic burial practices and taphonomy

Girdwood, L.-K.: A Comparative Analysis of the Evolution of Oral Health Pathologies and Stable Isotope Ratio Dietary Indicators through the Historic Period in Two Contrasting Medieval Populations from Scotland, UK, and Ibiza, Spain.

Hannah Harrison: Home is where the heart is: Domestic infant burials in Ancient Egypt's Middle Kingdom (c 2055 BCE – c.1795 BCE)

Ide, L.: Never Done: A bioarchaeological study of women's work, task, and occupation in medieval Scotland.

McMath, P.: An osteoarchaeological investigation into Byzantine human health on the Black Sea Coast of Bulgaria

Reeve, I.: Morbidity and mortality in relation to the environment: a comparison of British urban and rural skeletal populations

Waters, E.: Zoological analysis of the Unicorn

Zhang, W.: Violence and conflicts along the ancient Silk Road: A bioarchaeological research on the human remains unearthed from cemeteries in late Bronze Age to Han (1000 BC-200 AD), north-western China

Completed PhD Research

Astrom, C.: Comparative Projectile Trauma: An Examination of the Differences in Skeletal Trauma Inflicted by Firearms and Archery

Bonicelli, A: Investigating rib biomechanical properties and their potential for Forensic applications

Boyle, A.: Cowboys and Indians? Violence in Early Medieval South-East Scotland, AD400-800.

Dissertations Submitted for MSc Human Osteoarchaeology programme 2019/20

Courts, S. 2020. Exploring the effects of dental disease on the accuracy of Brothwell's dental aging method

Le Fèvre, C. 2020. Comparing methods to determine temperature of cremated remains: Colour and crystallite size

Macaud, S. 2020. Diet and identity in St Olofsholm, Gotland, Sweden, 11th century AD: A carbon, nitrogen and sulphur stable isotope analysis

Morris, A. 2020. FRUITS of the Mediterranean: An analysis of diet in Ibiza, Spain and Leptminus Tunisia during the Late Antiquity-Byzantine period using FRUITS software

Nefeli, M. F. 2020. Impact of stress on the appositional growth of non-adult long bones from the Kilkenny Union Workhouse in Ireland during the Great Famine

Schlather, D. 2020. Radiographic bone density analysis of the Kilkenny Union Workhouse mass burials

Department of Archaeology
University of Sheffield

Tegid Watkin

It has been a challenging year at The University of Sheffield's Department of Archaeology as staff and students alike adapted to the trials of online and socially-distanced teaching and learning. Despite everything this year has thrown at us, the department has remained committed to providing our students with the training and education that they hoped for when they first came to study at our department, and our Human Osteology and Funerary Archaeology (HOFA), Osteoarchaeology and Palaeoanthropology MSc courses have continued to engage our students through a combination of online learning and lab-based practicals, when permitted. Autumn 2020 saw the launch of an exciting new Masters programme to expand out bioarchaeology provision. The MSc Archaeological Science offers a range of pathways for specialist study in the scientific analysis of archaeomaterials and human, animal and plant remains.

This year we said farewell to Dr Pia Nystrom, who retired after 25 years at the University of Sheffield. Pia has been a towering figure in our Department since joining what was then the Department of Archaeology and Prehistory in 1995. Throughout her career at Sheffield, Pia has taught more than 350 Masters students in human osteology, anatomy and primatology through the MSc HOFA course alone, and she has acted as supervisor or advisor for countless doctoral projects.

In recognition of her incredible contribution to the Department of Archaeology and the field of biological anthropology, Dr Nystrom received the 2020 BABAO Mentorship Award in recognition of her commitment to mentorship in higher education and as recognition of the considerable part she has played in the achievements of so many of the organisation's members. Staff and students alike at the Department would like to extend their deep gratitude to Dr Pia Nystrom, and wish her every happiness in her well-earned retirement.

This year also saw the departure of Dr Sophie Newman from the Department of Archaeology. Sophie joined us in 2017 as a Research Technician and Demonstrator in Human Osteology, and throughout her time in that position has demonstrated an exceptional commitment to providing outstanding

technical support to research staff and students. Her expertise has been greatly valued by Masters students through her patient and insightful teaching, and we wish her every success in the future. Dr Newman remains an Honorary Research Fellow at the Department of Archaeology.

The department wishes to extend a welcome to our new Teaching Associate in Anatomy and Osteology and University Teacher in Anatomy, Chris Aris. Chris is an alumnus of the 2016-17 HOFA cohort, and he will be convening the Human Osteology and Human Anatomy modules, and will also be co-directing the HOFA Master's program. Chris will continue his research into the microevolution of modern human enamel while at the Department.

Tegid Watkin, also an MSc 2016-17 alumnus (Palaeoanthropology), and a current PhD student, joins the teaching team as the new Teaching Technician and Demonstrator in Human Osteology.

Many thanks and congratulations to our outgoing 2019-2020 cohort of Masters students for their hard work during an extremely challenging year. Notable recognition goes to Abigail Akehurst, Sydney Patterson, Stephanie Rylance and Maria Tortras, who all graduated with Distinctions in the Human Osteology and Funerary Archaeology 2019-2020 program. During the 2020 Autumn Semester we also welcomed in the new MSc intake of 9 HOFA, 11 Osteoarchaeology, and 3 Palaeoanthropology students in addition to five students on the new MSc Archaeological Science course.

Congratulations to Rebecca Haywood, who successfully completed her PhD studies in May 2020 with her thesis titled 'An assessment of dietary adaptation and mandibular morphology in non-human primates, as comparative models for early hominins'. Congratulations also to Marit van Cant, who was awarded her PhD in 2020 for her thesis, 'Dyed-in-the-wool: the impact of occupational behaviour and the environment on small urban and rural communities in Flanders, C. 1200-1860 AD'

Staff Updates

Lizzy has been working on publication of the British Academy funded project 'The material body: An interdisciplinary study using history and archaeology': (https://www.sheffield.ac.uk/archaeology/research/material-body) with historian of gender and the body, Prof. Karen Harvey and analysis of human skeletal remains from medieval Torksey, Lincolnshire (https://www.york.ac.uk/archaeology/research/current-projects/tentstotowns/#tab-1) in collaboration with Prof Dawn Hadley, Prof Julian Richards and Dr Gareth Perry at York. In autumn she recorded an episode with the team from The Great British Dig which focused on excavations of Anglo-Scandinavian burials in Masham, N. Yorks, and will be shown on Channel 4 in Spring 2021.

The Society for the Study of Childhood in the Past, whose President is Dr Katie Hemer, aims to hold its annual conference in Otago, New Zealand later this year. Details TBC.

Kevin Kuykendall continues his 'Where are all the Neanderthals?' research project at Creswell Crags, but further excavation has been postponed until 'post-covid' times. He remains involved in the Creswell Heritage Trust and the committee to develop a bid for UNESCO World Heritage Site status. In addition, he appeared on the ITV programme for children 'IRL with Team Charlene' in October 2020 to explore the biological basis of variation in human skin colour.

New Doctoral Research Projects

Elizabeth Knox joined us as a new PhD student this year. Her thesis, titled 'A multidisciplinary investigation into the social impact of foetal and maternal mortality during the industrialisation of England', will look at the osteological and archaeological evidence of foetal mortality during the Industrialisation period from contemporary sites across

England. This project is funded by an AHRC collaborative doctoral award with.

Ongoing Doctoral Research Projects

Barlow, A.: Coming of age: a biocultural investigation of reproductive practices in Industrial Britain.

Ford, J.: Hyaenas and Neanderthals in the British Middle Palaeolithic.

McAfee, I.: Osteoarthritis in past populations: risk factors and comparative analysis of clinical diagnoses and treatments.

Meza Escobar, O.: The Cementerio General de Santiago skeletal collection: lifeways and health experience of the population of Santiago de Chile ca. 1850-1970.

Monaco, M.: A critical examination of social stratification in prehistoric Cyprus using skeletal and funerary data.

Oleman-Grace, K.: Homo erectus life history: revisiting regressions in the light of recently recovered smaller-brained individuals.

Poniros, S. The Biological Anthropology of Diversity: Interdisciplinary Approaches to Migration and Ancestry in Roman Britain.

Purchase-Manchester, S.: A Radiographic Analysis of Middle Ear Infection in Human Skeletal Remains.

Shiner, M.: Transient relations: non-adult funerary practices in 1st -10th century AD Wales and Ireland and the origin of separate infant burial grounds.

Strati, V.: The effects of industrialization on the state of health and disease of a Victorian urban population: a case study from St. Hilda's Church, South Shields (Newcastle).

Triozzi, B.: A biocultural study of the Vestini population of Loreto Aprutino: diet, health, status, and identity in the 6th- 4th Centuries BC in Central-Southern Italy.

Waller-Cotterhill, C.: One foot in the grave: an experimental examination of the effectiveness and development of the Anglesey Leg and an analysis of prostheses during the long Nineteenth Century.

Watkin, T.: A comparative three dimensional geometric morphometric analysis of the fourth and fifth carpometacarpal joints in humans, non-human primates and fossil hominins, and its application in hominin early stone tool use.

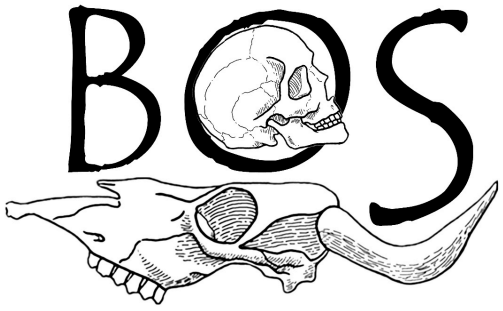
Wigley, B: A bioarchaeological examination of the impact of early-life stress on later health outcomes using procrustean assessments of dental fluctuating asymmetry.

Online Activities

You can find regular updates regarding research projects and upcoming events via personal and project pages on our departmental website. The Department of Archaeology is also active on Facebook (https://www.facebook.com/ArchaeologyShefield), Twitter (Shef Archaeology @UniShefArch), and YouTube (Archaeology Sheffield). Dr Lizzy Craig-Atkins is on Twitter at @ecraigatkins, and Dr Katie Hemer is on Twitter at @KatieAHemer.

Bioarchaeology & Osteoarchaeology at University of Southampton (Bos)

Sonia Zakrzewski



Well, let's be honest. As for everyone else, 2020 was a weird year for *BOS.* Most of the year was spent working out how to maintain as much face to face contact teaching and research for our bioarchaeology and osteoarchaeology students. Sadly during the year, we said goodbye to some of our

colleagues. Dr **Andrei Soficaru**'s tenure as a Marie Skłodowska-Curie post-doctoral fellow finished in the summer. He was working on the Women at the Edge of Empire project, drawing together human osteology, stable isotopes, mortuary behaviour, material culture and epigraphy to examine how the identities of migrant women, and local women married to migrant men, responded to intercultural contact at the eastern border of the Late Roman Empire (4-6th centuries AD). Dr **Sarah Stark**, having done an exceptional job of moving the teaching of the Bioarchaeology Masters programme online during Lockdown 1, left us to join UCL's Institute of Archaeology as a teaching fellow for their MSc in Bioarchaeological and Forensic Anthropology. Both are and will continue to be very much missed in Southampton.

A lot of research was put on hold during this year, but **Alex Dickinson** was part of the Bioengineering and Computed Tomography team that worked with Southampton Hospital to develop a novel personal respirator of healthcare professionals treating COVID-19 (PeRSo). **Sonia Zakrzewski** got irritated by the misunderstanding of the genetics of race in regards COVID-19, especially by the so-called "Naked Scientists" and wrote a short piece for *Sapiens* about it.

Teaching this year was obviously affected by COVID. Luckily last year's Masters cohort had completed most of their practical teaching when the first lockdown was called. This meant that they had completed their dissection lab time with **Scott Border**, **Ian Jenkins**, **Jenny Skidmore**, **Stuart Morton**, **David Walker** and **Amgad Sbayah**. and palaeopathology sessions with **Simon Mays**. As mentioned previously, Sarah Stark rose to the challenge amazingly of delivering complex practical teaching using 3D models online.

The students who started their courses this autumn have enjoyed their face to face practical teaching of human bioarchaeology and zooarchaeology, but obviously have not had the normal access to the dissection rooms. Planning is currently ongoing to facilitate face to face palaeopathology and advanced osteoarchaeology teaching in the spring of 2021.

Our second cohort of MSc Archaeology students has now graduated. Some of these followed a wide curriculum, whereas others followed a Bioarchaeology pathway. Those following the latter pathway were required to take compulsory modules in the Bioarchaeology of Human Remains and the Analysis of Archaeological Faunal Remains, together with optional modules in palaeopathology, themes in osteoarchaeology and molecular archaeology. Additionally, our third cohort of integrated Masters students has now graduated. These students, who obtained either MArc or MSciArch, were able to continue their studies for a fourth year, following a Masters level programme of modules and research.

Current Research Students

Nina Maaranen, based at Bournemouth University, supervised jointly by Holger Schutkowski and Sonia Zakrzewski, successfully defended her doctoral thesis. She is now working as a postdoctoral researcher on the ERC Hyksos Project for which Holger Schutkowski was the lead in the UK.

Continuing Research students:
Mike Burgess - Neolithic zooarchaeological and human assemblages and the changes in ecology

Steph Evelyn-Wright – Attitudes to and recognition of disability in Roman bodies and their representation and burials in cemeteries

Emily Mitchell – healing and treatment of trauma on board the Mary Rose

Kaylea-Ann Raczkowski Wood – Neanderthal mobility and locomotion: a finite element analysis

Emma van der Velden – Real Roman Britain: a skeletal and isotopic analysis of rural and urban populations in the south

Dissertations Approved for the MSc Archaeology (Bioarchaeology) 2019-2020

Dana Allan − Dead and Varied: Variation in funerary practices resulting from the social status of pathology in the Gravettian of Moravia

Jade Fennell − A Behavioural Narrative of Death and Burial: Towards an empirical framework for understanding the mortuary practices of the European Upper Palaeolithic

Mackenzie Masters − Untangling Death: Developing a chaîne opératoire interpretative model for the investigation of archaeological mass graves.

In addition, some students delayed their dissertation submission for COVID reasons.

Department of Archaeology and Anthropology
University of Winchester
Heidi Dawson-Hobbis

In a challenging year for staff and students alike some projects still managed to go ahead. Dr Christina Welch (Department of Theology, Religion and Philosophy) in collaboration with Dr Monika Knul and Dr Heidi Dawson-Hobbis has been continuing her work on the West Hill Cemetery Project. In September 2020 Harry Ower an MSc Human Osteology and Funerary Studies student gained permission from the city council to explore two areas of the cemetery where graves were not marked on the cemetery records but were indicated in GPR explorations. Assisted by 6 students (undergraduate and postgraduate) and supervised by staff, he located coffin remnants and human remains which were recorded and left in-situ.

Dr Heidi Dawson-Hobbis and Dr David Ashby ran a Winchester Research Apprenticeship Project (WRAP) with 3 students, which involved collating and archiving some of the material from the excavation of the cemetery of the hospital of St Mary Magdalen, Winchester.

While the Anglo-Georgian Expedition to Nokalakevi had to significantly scale back excavations in 2020, Dr Paul Everill was lead author on a paper – to be published in Anatolian Studies in 2021 – analysing two cemetery populations from the Hellenistic and Byzantine periods at Nokalakevi, Georgia, undertaken in collaboration with colleagues at the Georgian National Museum and National Agency for Cultural Heritage Preservation of Georgia.

Prof Tony King has been engaged in research into regional factors in the production and consumption of cattle, sheep, goats and pigs in Roman Britain, with publication in the Journal of Roman Archaeology and Proceedings of the Hampshire Field Club & Archaeological Society.

Dr Heidi Dawson-Hobbis appeared on the Channel Four programme 'Bone Detectives: Britain's Buried Secrets' presenting some of her research, in collaboration with Avon Archaeology Ltd, on a 19th century burial ground at St George's church, Bristol.

Dissertations approved for the MSc Human Osteology and Funerary Studies (graduating 2020)
Lesley Johnson – Hard work never killed anyone: a biocultural re-analysis of the late Roman cemetery at Victoria Road West, Winchester.
Kim Batten – Light of Ages: assessing how long bone weights are affected by age, lifestyle and disease.

POSTGRADUATE RESEARCH ABSTRACTS

Unlocking teeth: Development and application of isotopic methods for human provenance studies
Ester Plomp
Delft University of Technology

PhD Abstract (defended)
As part of the NEXUS1492 ERC project this work focused on the development and application of biogeochemical methods to address human mobility, combining the exploration of a new isotopic technique (Nd)

with the evaluation of already established methods (Sr, O, C).
Nd isotope analysis of dental enamel could potentially provide provenance information where Sr and O isotopes cannot, particularly in coastal environments. Nevertheless, Nd isotope analysis needs to be validated further before it can be applied more broadly.
To increase the robustness of archaeological and forensic interpretations based on isotopic analyses, it is crucial that isotopic variability within a single dental element, between multiple dental elements of the same individual and populational isotopic variability is quantified. This work established that a single sample location is not representative for the total dental enamel Sr, O and C isotope variation. Enamel samples should be taken from the inner enamel, with no preference for a particular region as lateral and cuspal enamel are expected to provide comparable results. Carious enamel should be avoided for sampling as this produced inconsistent isotopic data. For modern Dutch individuals Sr isotope variation > 0.0002 is required to argue for mobility and differences under 2 ‰ are negligible for $\delta^{18}O$ and $\delta^{13}C$.
It is essential that isotopic reference materials are correlated to isotopic values in human tissues. For modern globalised societies the preferred reference materials are human tissues, as the isotopic values of modern human tissues may become incompatible with from those of the local environment and geology.
https://doi.org/10.5281/zenodo.3929551

Dead in a Ditch: A taphonomic examination of human and animal remains from non-formal funerary deposits in south-east England during the Late Iron Age and Early Roman periods

Ellen Green
University of Reading

PhD Abstract
Human remains in the British Late Iron Age are often found in contexts which, to modern eyes, seem inappropriate: ditches, quarry pits, wells and grain storage pits. These remains are frequently in a partial and disarticulated state, and accompanied by animal bones. These deposits appear to have continuity in the early Roman period, however there is debate over the extent. Interpretation of this phenomenon has evolved rapidly throughout the past 50 years, from an assumption that these remains were buried 'without care' or treated as rubbish to the idea that these deposits represent ritual activity. While there has been much work on the 'ritual' nature of these depositions, they have tended to focus on stratigraphic processes and identifying the line between ritual and rubbish and have often used very different methodologies and interpretive paradigms for human and animal remains despite the similarities in context.

This PhD will seek to utilize both micro and macro taphonomic analysis to identify the pre-depositional processes that human and animal remains were subject to. The differences and similarities in how these remains were treated have the potential to inform on attitudes towards humans and animals as well as informing on ideas of identity and fragmentation within the Late Iron Age and how these might have changed after the Roman conquest. By combining object biography with scientific analysis, this research can go beyond the simple dichotomy of whether or not these deposits are 'ritual' and start to unravel the processes that went into their creation.

'Tell me what you eat, and I will tell you who you are': A Multi-Tissue and Multi-Scalar Isotopic Study of Diet and Mobility in Early Medieval England and its European Neighbours

Sam Leggett
University of Cambridge

PhD Abstract (defended)
This thesis is concerned with the impact of socio-economic, political and environmental shifts on Early Medieval communities, specifically England and its links with continental Europe. I have utilised multi-tissue (bone, dentine and enamel), multi-

isotope (δ13C, δ15N, δ18O and 87/86Sr) and multi-proxy data to analyse the lifeways of people in Early Medieval England within a European context in a multi-scalar way (sub-continental, regional, kingdom and community scales). This meta-analytical approach has allowed me to investigate Early Medieval transitions across the first millennium AD and better characterise and disentangle human-environment interactions in the period. Throughout this thesis high levels of isotopic variability and cultural dynamism within Early Medieval communities are clear. The core themes of this work are – climate and environment, changing foodways and migration.

This approach has allowed me to better provenance people based on isotopic diversity and see cross-cultural contact. It also highlights the impact of climate change (the Late Antique Little Ice Age and Medieval Warm Period) on human δ18O values, showing the widespread and relatively rapid impact these events had on climate and on drinking water sources.

The significant diachronic changes in both diet and in mobility patterns found here reflect the highly dynamic and far from insular position of England within Europe in the first millennium AD. My analyses support a model of continual and relatively large-scale migration from the continent Europe across the period, and changes to foodways which reflect not just shifts in economics and agricultural practice but changing worldviews (e.g. the impacts of Christianisation).

Isotopic data when combined with archaeo-historical evidence show that identity construction in Early Medieval communities was highly complex, and there is no clear link between isotopic patterns and grave goods usually seen as "ethnic" signifiers. I show that these were multi-origin communities in continual contact through long-distance networks which influenced the changes we see throughout the first millennium AD.

Dyed-In-The-Wool: The Impact of Occupational Behaviour and the Environment on Small Urban and Rural Communities in Flanders, c. 1200-1860 AD

Marit Van Cant
University of Sheffield

PhD Abstract (submitted)

This thesis presents a bioarchaeological study of six cemetery populations from Flanders (Belgium), dating from the medieval to early modern periods. The six sites represent populations from different regions/contexts (coastal, inland, small urban and one high-status group), and through a multi-faceted study incorporating historical, archaeological and osteological evidence, provides the opportunity to explore the impact of socioeconomic and environmental conditions on the health status of individuals working within rural and small urban habitats between the late 12th and 19th centuries.

In order to interpret inter- and intra-population variability, patterns of mortality, stature, diseases and activity markers (entheseal changes or EC) were assessed to investigate the consequences of a physically active lifestyle in an economically important and dynamic period. Historical socioeconomic research detailed the significance of Flanders in the production and trade of wool, linen, cloth, and specified the labour-intensive cultivation of flax and other crops that instigated a major impact on the working lives of both citizens and peasants. The analysis of EC supports the regional and gender labour differentiation between coastal and inland Flanders, whilst the palaeopathological investigation further indicates the consequences of the environment on health, especially upon those residing in a riverine, coastal or polder area.

This research demonstrates the complementary and interdisciplinary nature of integrating a bioarchaeological study within a historical socio-economic framework, and elucidates, not only the impact of an arduous lifestyle on working individuals, but also the vulnerability of the people across status groups to the environment.

The University of Sheffield (UK) and the Vrije Universiteit Brussel (Belgium)
Supervisors: Dr Katie Hemer (co-supervisor) and Prof Dr Dries Tys

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FORTHCOMING CONFERENCES, COURSES AND WORKSHOPS

22nd Annual Conference of the British Association for Biological Anthropology and Osteoarchaeology

We are pleased to announce that BABAO's September 2021 conference will be held by Teeside University.

More information to follow.

Contact: Prof Tim Thompson, t.thompson@tees.ac.uk

Sudan Studies Research Conference 2021

Warsaw Edition. 4th September at the National Museum of Warsaw. Contact Sam Tipper on Stipper@lincoln.ac.uk or go to www.sudan-conference.com for more information. #DUSESG

The Forensic Aracheology SIG 1st Annual Virtual Poster Conference

The Forensic Archaeology SIG is pleased to announce their 1st Annual Virtual Poster Conference, showcasing the multidisciplinary nature of Forensic Archaeology. The online conference will be held on Monday 8th March to Tuesday 9th March 2021.

https://www.archaeologists.net/civicrm/event/register?id=142&reset=1

Call for posters
The Forensic Archaeology SIG would like to invite posters from all related fields of forensic archaeology, especially adjunct subjects. The deadline for poster submission is **Friday 26th February 2021.**

Poster submissions should be submitted to the Forensic Archaeology SIG via email: fasigcomm17@gmail.com making sure that your submission file does not exceed 8MB.

Distance Education in Wildlife Forensic Sciences & Conservation, University of Florida

https://masters.wildlife.forensics.med.ufl.edu/courses/wildlife-forensic-pathology/https:/masters.wildlife.forensics.med.ufl.edu/about/faculty/john-cooper-dtvm-frcpath-frsb-cbiol-frcvs-and-margaret-cooper-llbfl

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