

A RESEARCH FRAMEWORK FOR THE ARCHAEOLOGY OF WALES

**PALAEOLITHIC AND MESOLITHIC
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1) Introduction

The Palaeolithic and Mesolithic periods in Wales span a long period of time from the early Neanderthals present at Pontnewydd Cave some 230,000 years ago to the emergence of Neolithic farming communities around 6,000 years ago. For much of these periods the evidence we hold is scanty, as there are long periods when there was not a human presence, and other periods when any evidence for people is thin. As well as looking at the human aspects, such as societal organisation, the mobility and seasonality of settlements and material cultural evidence, the broader context of climate and environment and the associated faunal and floral changes are important to understanding these periods. The reinterpretation of sites that were excavated historically, alongside new research and exploration of cave sites with potential to generate new data. An area where there has been particular advances made over the past five years is in the flourishing of new scientific techniques. Many new approaches are emerging in fields such as genetics, genomics and in isotopic studies that can shed light on people's lives, activities and diets at times in the past. Together this work is helping to bring Palaeolithic and Mesolithic people back into focus as the centre of research at this time.

2) List of relevant recent research undertaken since 2016.

a) Field survey, and assessment of lithic collections

- *Discovering the Ancestors*: a community fieldwalking project at six study areas in Pembrokeshire during 2019-20. (DAT Project 152, Cadw-funded).
- Field reconnaissance on Skokholm Island, Pembrokeshire: casual and on-going monitoring of exposed soil by the resident wardens (Wildlife Trust of South & West Wales).
- Reconstruction of Holocene geographies under Cardigan Bay, by Martin Bates.
- CHERISH Project. The team made exploratory visits to The Nab Head, and have prepared aerial photography coverage, with a view to possible future recording and monitoring (RCAHMW).

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b) Excavation/evaluation

- Ffynnon Beuno Cave, Denbighshire, Dr Rob Dinnis: continuing fieldwork, with a short field season in 2019. Post-excavation work included new radiocarbon dates (on ultrafiltered collagen) for fauna from intact Late Pleistocene sediments in the eastern fissure passage. These show that the material accumulated $\geq 50,000$ years ago (Dinnis 2017).
- Wogan Cavern, Pembrokeshire, Dr Rob Dinnis: study of archive material from undocumented historical excavations, as well as field trips to examine exposed deposits in the cave. Extant collections attest to probable Early Mesolithic occupation, while field observations suggest the possible presence of intact Pleistocene deposits. A first phase of test excavation was undertaken in 2021.
- Goldcliff, Newport, Professor Martin Bell: on-going regular monitoring of intertidal sites, drone survey to map intertidal sediments, further recording of human, animal and bird footprints included in the PhD thesis of Kirsten Barr (details below). Discovery of wood structures in palaeochannel base, interpreted as fish traps dated 5210-4912 cal. BC (unpublished). Recording of four additional Mesolithic activity areas. Total of four early Upper Palaeolithic flint artefacts unstratified (one of these previously published 2007), and a Pleistocene bone assemblage from intertidal head (unpublished).
- Severn Estuary Levels, Newport and Monmouthshire. Professor Martin Bell: evidence for organic material culture is very poorly represented in Britain by comparison with most areas of continental Europe. In addition to the worked Mesolithic wood from Goldcliff reported in 2007 more than 30 very well-preserved pointed stakes have now been lifted from the recently found wooden structure interpreted as a fish trap. This is the largest assemblage of worked Mesolithic wood from Britain and further demonstrates the potential of intertidal sites. The evidence for Mesolithic woodworking is included in a Reading University PhD thesis being written by Adam Turner.
- Haverfordwest Welsh Medium School, Withybush, Haverfordwest: evaluation, watching brief with excavation, by Archaeology Wales in 2017. Developer-funded. Features include undated pits, stake-holes and gulleys, some of which included struck lithic material which, although undiagnostic, may well be Mesolithic and presumably part of the concentration of such activity in the locality (David and Painter 2014).
- Excavations at Porth-y-Rhaw, Pembs, 2019: these have recovered a small collection of probable Mesolithic flints from below the Iron Age rampart. Further excavation of the site took place in July 2021, without significant Mesolithic finds.

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- Plot adjacent to Castle Hill, Hylas Lane, Rhuddlan, Denbighshire, excavated by Aeon Archaeology. 314 artefacts recovered from a site which is effectively an extension of Site E of Quinnell *et al.* (1994). It has generated a mixed assemblage with both early and late components.
- Llanfaethlu, Anglesey. Excavated by CR Archaeology. Although predominantly of Neolithic date, Llanfaethlu is a multiperiod site with Mesolithic - Post Medieval remains. The Mesolithic component at the site is comprised of two elements - residual lithics within later contexts, and a tree-throw containing human remains with around 1800 lithic artefacts ranging from struck pebbles to microliths. Six charcoal samples from the feature have been radiocarbon dated. With the exception of one later date, believed to be intrusive, the dates returned were between 7728 - 7070 cal BC. Collagen yield from the human remains was insufficient for radiocarbon dating, but works are currently on-going to date the tooth enamel which it is hoped will provide an indicative date when interpreted in conjunction with the existing dates. Post-excavation works are continuing but the working hypothesis is that this tree throw site functioned as a marker within the landscape and was utilised as a shelter and as a cache site for raw materials.
- Upper Blackhole Cave, Gower. Excavation by Rick Schulting and small crew. This is a small burial cave/crevice with the scattered remains of an estimated 4-5 individuals, though this may increase when excavations are completed. The single radiocarbon date available places the human remains in the mid-fourth millennium BC (late Early Neolithic), and it is expected that all the remains will be of similar age. The small number of faunal remains are assumed to be modern. Trial excavations in 2015 recovered six flint microliths with no other lithics, below the level containing the human remains. No datable material was found with the microliths, but they are of Late Mesolithic form. The most recent and final excavations in 2021 recovered a very finely made complete leaf-shaped arrowhead at the same level as the human remains, as well as another microlith from the same lower levels as the previous examples. Post-excavation analysis continues.
- Mochdre, Powys, Possible Mesolithic Structures (PRN 166806, PRN 166807 & PRN 166808) discovered during work undertaken by Archaeology Wales in advance of the A483/A489 Newtown bypass. It includes a line of stakeholes interpreted as a Mesolithic windbreak, a linear ditch containing Mesolithic flintwork and a second ditch with a microlith in its fill.
- Domgay Lane, Four Crosses, Powys. (PRN 152646, 152641, 152642 and 152643) Possible Mesolithic lithics from test pitting in 2007.
- Llandegai, Gwynedd. Mesolithic pit (PRN 70047) from evaluation ahead of construction of a residential development.

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- Y Bryn lithic scatter, Porthmadog (PRN 33604) A microlith and two blades were found on the western part of Y Bryn during work related to the Porthmadog Bypass. These seemed to be separate from the larger lithic scatter on the hill (PRN 33595) and could indicate transitory Mesolithic activity (Parry 2013).
- Porth Forllwyd, Anglesey. Surface Collections, test pitting and archaeological evaluation of land in the vicinity of Lligwy Bay, Anglesey. Part of the University of Bangor and Area of Outstanding Natural Beauty (Sustainable Development Funded) Mesolithic of Anglesey project.
- St Govan's Head, Pembrokeshire (PRN 113206) New Mesolithic lithic scatter.
- Crugiau Cemaes, Pembrokeshire (PRN 112696) Mesolithic microlith found during excavation of two enclosures at Crugiau Cemaes.
- Porth Rhyffydd, Anglesey (PRN 38271) Flint scatter at head of Porth Ruffydd. 121 flints, including a core, blades and a microburin indicating a Late Mesolithic date. The flints come from the mineral soil, which has not been severely eroded here.
- Trwyn Du, Anglesey (PRN 38245) Early and later Mesolithic lithic scatter comprising 102 pieces, including four microliths, a scraper and a microburin.

c) Analysis

- Long Hole, Gower, Swansea, Dr Rob Dinnis: publication of 2012 excavation and new study of previous collections (Dinnis *et al.* 2019). This work tied together all the collections from the cave and highlighted the importance of platform deposits partially excavated in 1969 by J. Campbell.
- Llanarmon Cave, Denbighshire, Dr Rob Dinnis: publication of material from 2012-16 excavations (Dinnis *et al.* 2018). This work highlighted the cave's faunal assemblage as important for understanding the Pleistocene-Holocene transition.
- Review and reinterpretation of Late Pleistocene fauna from Welsh and other British sites, Dr Rob Dinnis (Dinnis *et al.* 2016).
- Statistical analysis of radiocarbon dates for Wales as a proxy for investigating variations in settlement activity over time (MA dissertation by M. Efstathiou, UCL, 2020).
- *Stones of Stonehenge Project*: has accumulated numerous Mesolithic radiocarbon dates from the Preseli area, mostly un-associated with relevant archaeology.
- South Wales Gas Pipeline (Milford Haven to Tirley): limited evidence for Mesolithic activity (much less certainly of the LUP) at occasional locations along the route, now published (Cotswold Archaeology Monograph 13).

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- Series of radiocarbon dates and stable carbon/nitrogen isotope measurements on human remains from caves in north and south Wales, dating from the Mesolithic to Roman Iron Age (Schulting 2020). The Mesolithic dates relate to Worm's Head Cave and Mewslade, with a discussion of the latter site in particular, as the remains here are of uncertain attribution.
- Publication of a large ancient DNA project including a small number of Mesolithic human remains from Wales (Brace *et al.* 2019). The results provide further support for large-scale population replacement by continental farmers at the start of the Neolithic.

d) What has changed since 2016: new scientific techniques

- Development of techniques for rapid intertidal survey using in combination: drones, 3D photogrammetry and differential GPS.
- Development of methodological advances in aDNA should be applicable to some human and animal bones finds from Welsh sites (cf. Brace *et al.* 2019). Work on sedimentary DNA is fast developing but requires very well stratified and sealed contexts.
- Compound-specific radiocarbon dating (although not yet applied to pre-Neolithic residues in Wales).
- Stable sulphur isotopes ($\delta^{34}\text{S}$) are becoming far easier to measure in bone/tooth collagen due to improvements in mass spectrometry. Their widespread application to faunal and human remains could provide another means of assessing population mobility.
- Development of methods to identify lipids and organic binders in potential cave/rock shelter pigments.

3) The relevance of the work above to research frameworks detailing where activities sit within the previous research agenda.

a) Colonisation and recolonization

- Review and reinterpretation of Late Pleistocene fauna from Welsh and other British sites, Dr Rob Dinnis. Consolidating knowledge of the timing of human and animal presence in Wales during the Palaeolithic.
- *Discovering the Ancestors* (DAT Project 152, Cadw-funded): a community fieldwalking project at six study areas in Pembrokeshire during 2019-20. Further fieldwork has been curtailed following the adjustment of priorities in the wake of the Covid-19 epidemic.

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- Statistical analysis of radiocarbon dates for Wales as a proxy for investigating variations in settlement activity over time (MA dissertation by M. Efstathiou, UCL, 2020).
- Reconstruction of Holocene geographies under Cardigan Bay, by Martin Bates *et al.* (in prep).

b) Chronology

Consolidating knowledge of the timing of human and animal presence in Wales during the Palaeolithic

- Ffynnon Beuno Cave, Denbighshire, Dr Rob Dinnis
- Llanarmon Cave, Denbighshire, Dr Rob Dinnis
- Statistical analysis of radiocarbon dates for Wales as a proxy for investigating variations in settlement activity over time (MA dissertation by M. Efstathiou, UCL, 2020).
- *Stones of Stonehenge Project*: has accumulated numerous Mesolithic radiocarbon dates from the Preseli area, mostly un-associated with relevant archaeology.

c) Prospection

- Ffynnon Beuno Cave, Denbighshire, Dr Rob Dinnis
- Llanarmon Cave, Denbighshire, Dr Rob Dinnis
- Wogan Cavern, Pembrokeshire, Dr Rob Dinnis
- Upper Blackhole, Gower, Swansea, Professor Rick Schultng
- *Discovering the Ancestors* (DAT Project 152, Cadw-funded): a community fieldwalking project at six study areas in Pembrokeshire during 2019-20.
- Field reconnaissance on Skokholm Island, Pembrokeshire: casual and on-going monitoring of exposed soil by the resident wardens (Wildlife Trust of South & West Wales).
- Reconstruction of Holocene geographies under Cardigan Bay, by Martin Bates *et al.* (in prep).

d) Ground-truthing

- Wogan Cavern, Pembrokeshire, Dr Rob Dinnis

e) Artefact analysis

- Long Hole, Gower, Swansea, Dr Rob Dinnis: re-evaluation of artefacts and the document archive from various libraries and museum collections, including those that are held in the British Museum and at National Museum Wales.

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- Gwernvale, Powys, Dr Elizabeth Walker. Re-evaluation of the Mesolithic artefacts from the pre-cairn construction phase of the monument held in National Museum Wales.
- Hoyle's Mouth Cave, Tenby, Pembrokeshire, Dr Elizabeth Walker. Preparation of a report on the late Glacial artefacts recovered from excavations in the cave.
- Goldcliff and Gwernvale, Dr Tom Elliot, University of Worcester. PhD thesis on laser ablation of artefacts in the Wye area for sourcing raw materials.

4) The research questions.

a) Mobility and Seasonality in Prehistory

- How can the evidence for mobility and seasonality be better garnered, analysed and understood?
- How can current and projected analytical methodologies overcome the problems of lithic sourcing in Wales in order to provide a better insight into the movement of people during the Pleistocene and early Holocene periods?
- Can exotic items such as cowrie shells found on certain sites determine status?
- New data are required about the use of river valleys, as well as coastal locations, and their use as routeways across the landscape in the early Holocene.
- Further study and dating of human and animal footprints can offer an indication of mobility and connectivity during the early Holocene period.
- Analysis of peat deposits at coastal, riverine and lacustrine sites has potential to offer new information about seasonality and the mobility of people around the landscape.
- More investigation is needed that will bear on matters of subsistence, of plant and animal resources and the role of fishing and seasonality. This requires a more systematic study of our coastline and the associated off-shore deposits.
- Shell middens are a key resource and their potential is demonstrated by sites at Prestatyn and Tremadoc (Bell 2007; Robinson 2019) which indicate they are likely to be more widely distributed than previously thought.
- Expansion of baseline strontium isotope ($^{87}\text{Sr}/^{86}\text{Sr}$) data for the investigation of human and animal movements in the Palaeolithic and Mesolithic. The addition of $\delta^{34}\text{S}$ to investigate mobility has been made more accessible by improvements in instrumentation. Continued improvements in sampling

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resolution should enable finer-scale temporal analyses of human and animal mobility (e.g., sub-annual for humans and even higher for fauna).

b) Natural Landscapes

- What is the role of fauna, humans, and other agents of disturbance in the Late Glacial and Holocene landscape?
- Can recording and investigation of shell midden sites offer new potential for the survival of material and the continuity of the use of sites beyond the later Mesolithic and into the Neolithic period?
- Shell middens also contain items that are sometimes not associated with the economics of such sites.
- Analysis of peat deposits in coastal contexts , in river valleys and at inland lakes has potential to offer new information about seasonality and the mobility of people around the landscape.
- More research into palaeoenvironmental sequences is required to determine local natural landscapes at specific times in the past. An update of Astrid Caseldine’s Environment of Wales book would be timely.
- There is a need to identify more artefacts made of organic materials to understand resource exploitation during the early Holocene.
- The importance of Welsh cave sites for reconstructing the palaeo-environmental of the Late Pleistocene and Pleistocene-Holocene periods.
- To prospect cave and rock shelter sites for potential rock art.

c) Researching the Transitions

- Can the transition between the Mesolithic and Neolithic be better quantified and understood?
- Currently there are different approaches taken towards the study of the late Mesolithic landscape and environment to those traditionally used to study the early Neolithic. Environmental studies that can bridge and flow across this transition are required.
- Further research is required to investigate the finer details surrounding the large-scale population replacement that now seems to characterise the Mesolithic – Neolithic transition, based on ancient DNA analyses. Scientific techniques need to be deployed further to determine what happened and when.

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- Further research is required to investigate the continuity or otherwise, of cultural transmission during the late Mesolithic and into the Neolithic.

d) Artistic Endeavour

- Can the database for evidence of rock art be expanded and increased?
- Within Wales and along the borderlands there is a significant portable art assemblage which is accompanied by a limited number of cave sites that contain potential early prehistoric rock art. Both forms of artistic endeavour exist throughout the Upper Palaeolithic and the Mesolithic periods. Ideally, a full database of this material would benefit researchers engaged in the concepts of ritual and symbolic behaviour.

e) Public Engagement, Awareness Building and Delivering Impact

- How can the archaeological profession in Wales improve and increase the amount of public engagement and impact taking place? Models such as those adopted by the Living Levels Partnership Project require scrutiny for potential adaptation and application towards other research projects based on the Palaeolithic and Mesolithic archaeology around Wales. The success of such projects lies in their ability to engage and mobilise members of the public. This can be achieved by increasing experimental work and by a greater involvement for members of the public both in determining some of the research questions to be asked and in delivering the answers.
- The synergies that exist between the study of environments in the past and work done on the colonisation and adaptation of habitats that can emerge from archaeological work should be paired with nature conservation work in fields such as rewilding and in habitat management.
- Opportunities need to be identified that use research undertaken for these periods in ways that contribute towards raising public awareness of the contribution research into aspects of Palaeolithic and Mesolithic archaeology may make towards understanding climate change. By embedding the research with the climate change framework it can offer a significant change towards the public understanding of past climate and environmental change plus the human impact both of and on the humans themselves.
- Some development work may pose a threat to both the historic and the environmental resource, e.g. Severn barrage, tidal lagoons, wind-farms etc. Such schemes could provide opportunities to raise the prominence of the archaeology alongside the review of the natural landscapes affected by

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developing research collaborations that connect these two areas of work. When dealing with the Pleistocene and early Holocene periods, there is a natural synergy that could be strengthened through such collaborations and by building community connections with partners including, e.g. nature conservation organisations and charities, such as the Welsh Wildlife Trusts.

- There is potential for promoting the understanding of climate change and developing ways to link past climate change to those relating to the future.

f) Colonisation and recolonisation

- How can the successive population movements into Wales be better recognised and their nature better understood?
- The pattern of human presence and absence across Wales at specific times is a theme that requires further elucidation.
- Palaeolithic evidence is largely reliant upon historical collections and the associated chronologies linked to the human presences are poor.
- Work is needed to explore the perception that there is a pattern of concentration of Mesolithic activity in some areas and not in others. This has been highlighted by the Milford Haven – Tirley gas pipeline transect and also is apparent along the present-day coastline.
- Targeted survey of inland locations to counterbalance coastal bias, e.g. investigation of river valleys, lakesides, uplands and rock shelters.
- Systematic mapping of submerged topographies and identification of possible focal points or areas for Mesolithic exploitation.

g) Chronology

- The topmost priority must surely be the establishment of a chronological framework for human activity in Wales and for its environmental context. It is integral to all the other themes, for both the Palaeolithic and the Mesolithic, and needs to be singled out. Within such a theme sub-themes might include:
 - Consolidating knowledge of the timing of human and animal presence in Wales during the Palaeolithic
 - Establishing the timing of initial Holocene colonisation
 - Tracking change in lithic technologies throughout the Mesolithic, focusing on transitions between Early>Late Mesolithic and Late Mesolithic>Neolithic
 - Refining the chronological framework for environmental change (sea level, vegetation, sediments, geomorphology)

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- Application of scientific techniques to extend the range of dating (e.g. OSL, ¹⁴C ultrafiltration) as well as its refinements (e.g. Bayesian analysis and single amino-acid methods).
- Whilst there may still be some potential for the dating of archived material, the dependent priority must be the scientific dating of newly identified stratigraphic sequences where artefacts, structures, and evidence for environmental change can be securely linked. Options for this in the Palaeolithic are clearly extremely limited, but the exposure of new sequences in caves and the readiness to exploit chance indicators of open-air sites present opportunities, as do exposures of Pleistocene alluvial sequences in valleys. Particular attention should be given to Pleistocene sediment exposures in coastal situations especially in the Severn Estuary where several finds of Palaeolithic artefacts have been made in intertidal contexts. Ideally these would be supported by enhanced education/training of professional and local communities to help in the recognition and exploitation of such rare occurrences.
- In the Mesolithic the potential for establishing a chronology may be rather greater. Despite the acknowledged potential of inter-tidal sites, there needs to be focus also on the exposure and dating of terrestrial sequences, in river valleys and likely upland topographies, with precedence given to the dating of sequences rather than sites of mixed lithic signatures where stratigraphy is absent or unclear. Wetland edge contexts offer particular potential for the establishment of datable sequences. Geoarchaeological investigations are needed to identify the key topographic and sedimentary contexts in which Mesolithic activity is likely to occur. To achieve this, there are two preliminary requirements: *prospection* and *ground-truthing*.

h) *Prospection and Ground Truthing*

- How is it best to utilise traditional and emerging the chronologies for the location, recording and verification of significant archaeological features and deposits?
- This could be applied to the Palaeolithic, e.g. for locating undiscovered sediment traps.
- Extend field reconnaissance into under-researched areas as this can be extremely rewarding, capable of quite radically extending settlement distributions.
- To achieve more than occasional and very local results, field reconnaissance needs to be activated as widely as possible. For this to be effective, suitable expertise and enthusiasm must be disseminated more widely amongst professionals (including commercial archaeologists) as well as in local communities [e.g. through PAS etc].

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- Target such explorations using predictive modelling/GIS, supplemented with input from aerial and satellite remote sensing (and with seismic techniques in the offshore zone).
- As there is a rich potential resource along the Welsh coastline studies akin to those undertaken by Historic England and the Rapid Coastal Zone Assessment programme and CITiZAN, the Coastal and Intertidal Zone Archaeological Network in England, would merit being undertaken around Wales.
- Projects could entail the field checking, planning, and dating of submerged forest exposures when they occur.
- To examine the geology and geomorphology of landscapes as a means to determine potential site location. Such work predicting coastal exploitation and fishing sites has proved successful in Denmark and would plausibly be applicable to Wales. The research questions need to engage the new generation of scientists working on palaeolandscape studies across Wales.
- To supplement this with ground-based remote sensing where appropriate, to identify settlement sites where stratigraphy may survive (e.g. palaeochannels). If present, organic preservation would be at a very high premium, potentially opening a huge window on knowledge of the period.
- Undertake a survey of caves along the limestone cliffs of the south Gower Coast in search of LUP rock art and historic graffiti.
- Undertake prospection for pigments within caves, as is currently taking place in caves in the Wye Valley and at Creswell Crags. There is an increased potential for the use of geochemistry for identifying pigment.
- Human and animal footprints of Mesolithic date have now been found on several sites in the Severn Estuary and in west and north Wales; they represent a key resource for identifying past human activity and ecology. Submerged forests of Mesolithic date are widespread around Wales and represent areas of preserved Mesolithic land-surface with great palaeoenvironmental potential and are often associated with artefacts. In the case of both footprints and submerged forests, techniques for their rapid recording need to be refined and potential sites monitored following storms.
- To apply new prospection methods to previously known sites to determine future potential.
- To use older museum collections as a basis for identifying new sites with potential.
- Follow up the discovery of surface collections of lithic artefacts with coring, test pitting, and trial trenching to confirm, characterise and sample

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stratigraphic sequences. Area excavation to follow, if appropriate, to contribute to other research themes.

i) Artefact analysis

- What contribution can artefact analysis make to themes such as cultural change, colonisation and functional adaptations.
- *Discrete lithic assemblages*: these are badly needed, from stratified and dated sites (see above), to help overcome the very limited conclusions that can be drawn from the lithic analysis of surface collections of mixed ages. This should lead to a more refined characterisation of Mesolithic toolkits as they evolved through time, allowing (for example) more confident interpretations of settlement patterns based on lithic signatures alone (for example, allowing better-informed evaluation in advance of commercial development).
- A more highly resolved typology would also identify chronological/functional markers of significance, and allow the recognition of material influences from outside Wales (e.g. Irish Sea region, France).
- To re-evaluate artefacts and the document archive from various libraries and museum collections, including artefacts and documentation that are held in the British Museum and the National Museum of Wales.
- *Functional analysis*: the functions of stone tools characteristic of the Mesolithic in Wales remain very poorly understood – if at all. If suitably preserved assemblages can be recovered, functional analysis supported by programmes of experimental archaeology should be attempted. Such work should aim to understand the functions of, for example, denticulate scrapers, truncations, burins, awls, notched pieces and utilised flakes/blades; the functions of pebble tools such as ground-stone axeheads and bevelled pebbles also need to be elucidated. Knowledge of the use of these tools would allow more informed interpretation of wider subsistence and perhaps social issues.
- To make the application of use-wear analysis, residue analysis and experimentation a more integral and routine aspect of lithic artefact assemblage research.
- *Raw materials analysis*: there remains scope for projects which can comprehensively map and characterize primary and (some) secondary geological sources of lithic artefacts, and attempt to match the two using their respective petrographic/chemical signatures. As flint is not the only raw material used for knapped tools, such studies should also be applied to chert, quartz, tuff and other materials. Such research might help understand:

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- Direction of movement of social groups
- Definition of spheres of influence and/or social territories
- Identification of pre-Neolithic quarrying
- Identification of non-Welsh sources
- Identification of offshore sources
- To create a full database of where relevant raw materials occur in the landscape and to apply the data to identify and seek to understand raw material procurement strategies.
- To ensure that research, particularly that which emerges from development control is mindful of the range of local raw materials that may be available for tool manufacture. Raw materials differ across Wales and research needs to take this into consideration and ensure that recovery strategies are appropriate.

j) Continue to locate the Research Agenda for Wales within wider British and European contexts.

- Remain aligned to the Research and Conservation Framework for the British Palaeolithic (Prehistoric Society and English Heritage 2008) and the Mesolithic Research and Conservation Framework (Milner and Blinkhorn 2013) and, the Maritime and Marine Historic Environment Research Frameworks (Bell *et al.* 2013).
- Establish links further afield, for example, between EUP lithic collections from Wales and those from Belgium and France.
- The Welsh Framework should also be linked to other areas of high potential for Mesolithic and Palaeolithic activity (e.g. the Wye Valley, the Mendips, Creswell Crags and Star Carr).

k) Continue to promote the need to consider a potential Palaeolithic and Mesolithic resource.

- It is essential that developers understand the potential for there to be a Palaeolithic and Mesolithic resource and that investigation is undertaken of deposits of these ages. It will mainly be through future developer-funded work that new sites, particularly of Mesolithic age, may be recognised. For this, landscape 'hotspots' need to be identified, such as coastal sites, estuarine sites, riverine sites and upland sites. The four regional HERS will assist in identifying areas of potential significance.

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- To provide input into the development of mitigation strategies that helps ensure an adequate resource is provided for such work. Fundamental techniques, including sieving, need to be deployed routinely alongside good, well justified, sampling strategies, to ensure that full palaeo-environmental reconstruction and raw material analysis can take place.

5) Recent or additional literature

Allen, J.R.L. and Bell, M. 2019. Seascapes, landscapes and changing coastlines. In A. Aberg, M. Redknap and S. Rees (eds) *Reclaiming history from the sea*. Aberystwyth: RCAHMW.

Barber, A., Hardy, A. and Mudd, A. 2019. *The Prehistoric Archaeology of the A477 St Clears to Red Roses Road Improvement Scheme 2012*. Cirencester: Cotswold Archaeology Monograph 12.

Barker, L., Driver, T. and Hunt, D. 2019. Bardsey Island, Henllwyn eroding isthmus (SH 1151 2109) *Archaeology in Wales* 59, 119-121.

Barr, K. 2018. *Prehistoric Avian, Mammalian and H. sapiens Footprint-Tracks from Intertidal Sediments as Evidence of Human Palaeoecology*. Unpublished PhD thesis Dept of Archaeology University of Reading.

Barr, K. forthcoming 2021. Walking beside our ancestors. In Barnett, C. and Walker, T (eds) *Environment, Archaeology and landscape*. Oxford: Archaeopress.

Bell, M. 2018. Goldcliff-tracks of Mesolithic footprints. In A. Fischer and L. Pedersen (eds). *Oceans of Archaeology* 178-179. Moesgaard: National Museum of Denmark.

Bell, M. 2020. *Making One's Way in the World: the footprints and trackways of Prehistoric people*. Oxford: Oxbow.

Bell, M., Manning, S. and Nayling, N. 2009. Dating the coastal Mesolithic of western Britain: a test of some evolutionary assumptions. In P. Crombe *et al.* (eds). *Chronology and Evolution within the Mesolithic of North-West Europe*, 615-634. Brussels Conference. Newcastle: Cambridge Scholars Publishing.

Bell, M. and Warren G. with Cobb, H., Fitch, S., Long, A., Momber, G., Schulting, R. and Spikens, P. 2013. The Mesolithic Period. In J. Raunsley and J. Adams (eds). *Maritime and Marine Historic Environment Research Frameworks*, 30-49. York: CBA Research Report 171.

Brace, S. Diekmann, Y., Booth, T.J., van Dorp, L., Faltyskova, Z., Rohland, N., Mallick, S., Olalde, I., Ferry, M., Michel, M., Oppenheimer, J., Broomandkhoshbacht, N., Stewardson, K., Martiniano, R., Walsh, S., Kayser, M., Charlton, S., Hellenthal, G., Armit, I., Schulting, R., Craig, O.E., Sheridan, A., Parker Pearson, M., Stringer, C., Reich, D., Thomas, M.G. and Barnes, I. 2019.

Palaeolithic and Mesolithic

Ancient genomes indicate population replacement in Early Neolithic Britain, *Nature Ecology and Evolution* 3, 765–771.

Charlton, S., Brace, S., Hajdinjak, M., Kearney, R., Booth, T., Reade, H., Tripp, J.A., Sayle, K.L., Grimm, S.B., Bello, S.M., Walker, E.A., Gilardet, A., East, P., Glocke, I., Larson, G., Higham, T., Stringer, C., Skoglund, P., Barnes, I. and Stevens, R.E. 2022. Dual ancestries and ecologies of the Late Glacial Palaeolithic in Britain in *Nature Ecology & Evolution* DOI: 10.1038/s41559-022-01883-z

Cole, J. 2015. Examining the presence of symmetry within Acheulean handaxes: a case study in the British Palaeolithic. *Cambridge Archaeological Journal* 25 (4) 713-732.

Coles, B. 2019. *Avanke, Bever, Castor: The Story of Beavers in Wales*. Exeter: WARP.

David, A. 2020. Six millennia and counting: a prehistoric 'persistent place' at Penpant, north Pembrokeshire. *Archaeologia Cambrensis* 169, 31-62.

David, A. 2020. Hunter-gatherers: Upper Palaeolithic and Mesolithic Discoveries: 12,600 – 4000 BC. in T. Darvill, A. David, S. Griffiths, J. Hart, H. James, K. Murphy and J. Rackham. *Timeline: the archaeology of the South Wales gas pipeline*, 22-31. Cirencester: Cotswold Archaeology Monograph 13.

Dinnis, R. 2017. Of Neanderthals and Modern Men. *Descent* 258, 24-25.

Dinnis, R., Pate, A. and Reynolds, N. 2016. Mid-to-Late Marine Isotope Stage 3 mammal faunas of Britain: a new look. *Proceedings of the Geologists' Association* 127, 435-444.

Dinnis, R., Appleton, P., Boulton, J., Buckley, M., Davies, J.S., Edwardson, I., Hankinson, R., Needham, A., Schouten, R. and Williams, C. 2018. Recent excavations at Llanarmon Cave, Denbighshire. *Archaeology in Wales* 57-58, 61-69.

Dinnis, R., Bates, M.R., Bello, S.M., Buck, L.T., Davies, J.S., Preece, R.C., Walker, E.A., Boulton, J., Flas, D., Harris, S.-J., Mogg, J. and Schouten, R. 2019. Archaeological collections from Long Hole (Gower, Swansea, UK) and their place in the British Palaeolithic. *Cave and Karst Science* 46, 37–46.

Dinnis, R., Boulton, J., French, J.C., Buckley, M., Davies, J., Hervé, M., Howells, S., Jimenez, E-L., Ludlow, N., Masson-MacLean, E., Mogg, J., Pickard, C., Walker, E.A., Williams, D., Chamberlain, A.T. and Stringer, C. 2022. The archaeological potential of Wogan Cavern (Pembroke, UK): results of the first fieldwork season. *Cave and Karst Science: Transactions of the British Cave Research Association* 49, No.2, 65–72.

Eastham, A. 2015. Goosey goosey gander with Jemima Puddleduck in attendance: two Stone Age occupation caves in South Pembrokeshire. *Pembrokeshire: the Journal of the Pembrokeshire Historical Society* 24, 35-49.

Palaeolithic and Mesolithic

Efstathiou, M. 2021. *An Occupied and Abundant Landscape? Exploring Mesolithic Pembrokeshire in the five thousand years before the arrival of the first farmers*. MA dissertation, UCL, unpublished.

Elliot, T. 2019. *The Mesolithic in the Marches: geochemical lithic sourcing in the lower Wye Valley*. PhD Thesis, University of Worcester, unpublished.

Garcia Rovira, I. and Sinnott, S. 2019. *A483/A489 Newtown Bypass, Newtown (Powys): Final Report*. Archaeology Wales (PRN 166806, 166807, 166808).

Garrow, D. and F. Sturt. 2017. "Stepping Stones to the Neolithic? Islands, Maritime Connectivity and the 'Western Seaways' of Britain 5000–3500 BC" [dataset]. York: Archaeology Data Service [distributor]. <https://doi.org/10.5284/1016098>

Hall, J. and Sambrook, P. 2016. *Land north of Domgay Hall, Four Crosses, Powys Historic Environment Desk-based Assessment*. Trysor (PRN 15646, 152641, 152642, 152643).

Hankinson, R. 2017. Caves in north-east Wales. *Archaeology in Wales* 56, 124-125.

Hodge, E.J., Hoffmann, D.L., Richards, D.A. and Smart, P.L. 2016. Uranium series ages for speleothem and tufa deposits associated with quaternary mammalian fossil evidence in England and Wales. *Proceedings of the University of Bristol Speleological Society* 27 (1), 73-80.

Lane, A. and Redknap, M. 2020. *Llangorse Crannog: The Excavation of an Early Medieval Royal Site in the Kingdom of Brycheiniog*. Oxford: Oxbow Books.

Milner, N. and Blinkhorn, E. 2013. *Mesolithic Research and Conservation Framework*.

Nash, G.H., Garcês, S., Gomes, H., Rosina, P., Nicoli, M., Volpe, L. and Vaccaro, C. 2016. Assessing the geochemistry of possible inorganic applied pigments within Cathole Cave, Gower peninsula, South Wales. *Proceedings of the University of Bristol Speleological Society* 27 (1), 81-93.

Parker Pearson, M., Bevins, R., Ixer, R., Pollard, J., Richards, C., Welham, K., Chan, B., Edinborough, K., Hamilton, D., Macphail, R., Schlee, D., Schwenninger, J.-L., Simmons, E. and Smith, M. 2015. Craig Rhos-y-felin: a Welsh bluestone megalith quarry for Stonehenge. *Antiquity* 89, 1331-1352.

Parker Pearson, M., Pollard, J., Richards, C., Welham, K., Kinnaird, T., Shaw, D., Simmons, E., Stanford, A., Bevins, R., Ixer, R., Ruggles, C., Rylatt, J. and Edinborough, K. 2021. The original Stonehenge? A dismantled stone circle in the Preseli Hills of west Wales, *Antiquity* 95, 85-103.

Parry, L. 2013. *A487 Porthmadog, Minffordd and Tremadog Bypass*. Gwynedd Archaeological Trust (PRN 33604).

Palaeolithic and Mesolithic

- Philp, R. 2019 *Changing Tides: the archaeological context of sea-level change in prehistoric South Wales*. Cardiff University unpublished PhD thesis.
- Prehistoric Society and English Heritage. 2008. *Research and Conservation Framework for the British Palaeolithic*.
- Rees, C. and Nash, G.H. 2017. Recent archaeological investigations at Kendrick's Upper Cave, Great Orme, Llandudno. *Proceedings of the University of Bristol Spelaeological Society* 27 (2), 185-196.
- Robinson, G. 2019. Exploration of a buried seascape: the cultural maritime landscape of Tremadoc Bay. In T.J. King, and G. Robinson, (eds). *At Home on the Waves: human habitation of the sea from Mesolithic to today*, 144-173. New York: Berghahn.
- Schulting, R. 2020. Claddedigaethau Mewn Ogofâu: Mesolithic to Romano-British Human Remains (Mainly) From the Caves of Wales. *Proceedings of the University of Bristol Spelaeological Society* 28 (2): 185–219.
- Shobbrook, A. and Poucher, P. 2017. *Haverfordwest Welsh Medium School Withybush, Haverfordwest: watching brief*, Archaeology Wales Report 1592, July 2017.
- Smith, G. and Kenney, J. 2014. Mesolithic flint scatters at Penrhossfeilw Common, Holy Island. *Anglesey Antiquarian Society Field Club Transactions* 76-106.
- Walker, E.A. 2016. The Palaeolithic and Mesolithic periods in Pembrokeshire. In H. James, M. John, K. Murphy and G. Wainwright (eds), *The Pembrokeshire County History Volume I: Prehistoric, Roman and Early Medieval Pembrokeshire*, 1–54. Haverfordwest: The Pembrokeshire County History Trust.
- Walker, E.A. 2020. The Prehistoric lithic artefacts in A. Lane and M. Redknap. *Llangorse Crannog: the excavation of an early medieval royal site in the kingdom of Brycheiniog*, 194-204. Oxford: Oxbow.
- Walker, E.A. and Davis, O. 2021. Burry Holms, Gower, Wales, UK: the prehistory of an island. *The Archaeological Journal* DOI:10.1080/00665983.2021.1936754.
- White, C. E. 2021. Researching the Mesolithic: recent archaeological investigations at Porth Forllwyd as part of the Mesolithic of Anglesey project. *Proceedings of the Anglesey Antiquarian Society & Field Club Transactions* 2020, 38–68.
- Wysocki, M., Jacobi, R. the late, Walker, E.A. and Whittle, A. 2022. Skeletal remains from Parc le Breos Cwm and Cat Hole Cave: a case of mistaken identity. *Archaeologia Cambrensis* 171, 21–28.

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