ISSUE 34

The Post Hole

The student-run archaeology journal

January 2014

Homo Heidelbergensis: With an Emphasis on the Type Specimen from Mauer

Insectiforms in Olmec-Style Art and Writing

An Interview with Tim Sutherland

ISSN Print: 2052-0778
ISSN Online: 2051-9745

Acknowledgements

The Post Hole is grateful to the University of York's Department of Archaeology for essential financial and collaborative support, which has greatly assisted the running and growth of the student-run archaeology journal since its establishment in 2008.

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Department of Archaeology

The Post Hole is also grateful to Heritage Technology for professionally redeveloping its website in 2012, and continuing to provide technical support since then.

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Finally, *The Post Hole* wishes to thank University of York students Kerrie Hoffman and Phoebe Haigh for their superb design of this front cover.

Hard copies of *The Post Hole* are printed by University of York *uniprint* (http://goo.gl/EHjiK)

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Front cover: The jaw of Homo heidelbergensis; mandible (lower jaw) of the type specimen of Homo Heidelbergensis from Mauer near Heidelberg, Germany (Image Copyright: replica, museum of the Institute of Earth Sciences, University of Heidelberg).

Editorial Team

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Editorial: A new year for *The Post Hole*

Firstly, I would like to start off by wishing you all a 'Happy New Year'. I hope you had an excellent holiday. A lot happens over the Christmas period and we thank you for your maintained interest and continued support.

I would like to apologise for the delay in releasing Issue 34. Due to University deadlines and exams, we have had to postpone the release. Now that essays are all handed in and exams completed, we are happy to announce the release of the new issue. Over the holidays, we managed to release the beginning of our 'Digging through the Profession of Archaeology,' with our first interviewee Nick Pearson, a commercial archaeologist. We hope to release the next few in the series, so keep checking our **Facebook, Twitter** and **website** pages for details. The interviews, along with our special interview series, can be found on our homepage or at http://www.theposthole.org/read/interviews. If you would to participate in this series, please email editor@theposthole.org for more details.

Don't forget there is still time to send your photographs, illustrations or paintings in to us for *The Post Hole* Photo competition! The closing date is the 25th of January and the winner's image will be published as the front cover of February's issue of *The Post Hole*, with the winner also receiving a free poster and copy of the February issue. We will publish a selection of worthy runners-up on our website. The team and I look forward to receiving your entries, and for more details head to http://www.theposthole.org/photo-competition.

The first issue of 2014 contains five exciting and stimulating articles. Within this issue, we have included a special feature interview which will be made available in the 'special features' section of the website at a later date. The team are very excited to announce that the special feature interview is with Tim Sutherland. If you are unaware, Tim is a battlefields archaeologist and a lecturer at The University of York. The founder and coordinator of CAIRN: Conflict Archaeology International Research Network, and the director of Towton Battlefield Archaeological Survey Project, Tim has an extensive research background within this field. For more details on his previous work and external activity, see https://www.york.ac.uk/archaeology/staff/honorary-visiting/tim-sutherland/#research. This rare interview, facilitated by **Charlotte Argue**, is a special insight into Tim's recent TV series 'Medieval Dead', and other current projects he is working on.

Also within issue 34, **Sophie Harper** gives a first-hand account into the rise of blogs and their role within archaeology today. An interesting article, it gives food for thought into what the future holds for archaeology in the media.

James Perkins provides us with an interesting article review of Kennett D.J & J.P "Early State Formation in Southern Mesopotamia: Sea Levels, Shorelines, and Climate Change". The original article is published in

Journal of Island & Coastal Archaeology, 2006, 1:67-99, and can be accessed via this link http://www.tandfonline.com/toc/uica20/1/1#.UtJr7unuPmQ. Well worth a read, it would be excellent if we could get some responses to this article review.

Arnaud F. Lambert once again provides us with another stimulating and inspiring article. Lambert explores throughout this article, Olmec-style art focussing mainly on the insect-like animal figures. Lambert continuously writes for us, and we would like to take this opportunity to thank him. His articles are original and fascinating – other papers written by him are featured in issues 26, 27, 29 and 32 (http://www.theposthole.org/archive).

Finally **Jordan Scott Myers** presents an interesting argument in 'Homo heidelbergensis, with an emphasis on the type specimen from Mauer'. Myers tackles a controversial topic addressing common theories in palaeoanthropology in a subjective and considerate manner. Incorporating the differing theories, Myers is able to provide a strong argument to reach a sound conclusion.

The team is very excited for the release of this issue and what 2014 holds in store for *The Post Hole.* As always we rely on your submissions, so please send them in to Taryn Bell, our Submissions Editor, at submissions@theposthole.org. In our last issue, we put out a call for anyone interested in becoming a member of the team; whether you are at university, working within the field or just have a general interest, we need you! The offer still stands so if you are interested or have any questions, please email the Editor-in-Chief at editor@theposthole.org.

Best wishes,

Emily Taylor
(Editor-in-Chief of *The Post Hole* - **editor@theposthole.org**)

The Post Hole team (minus Alex Drosinaki, Phoebe Haigh and Sophie Austin).

The rise of blogs as knowledge-making space

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With the rise of the technological age, we have seen great changes occur within archaeology as a discipline. The most important change has been accessibility; television, radio and the internet now construct how we perceive archaeology. This ranges from the impact of Time Team to Wikipedia. An aspect of this technical movement often overlooked is blogs. More frequently associated with fashion and celebrities, there is now an increase in academic blogs. The SAA (Society for American Archaeology) conference consisted of a lecture detailing the impact of blogs in disseminating knowledge, not only to professionals, but also the wider public. People across the world shared their blogs via "Doug's Archaeology", one of the most popular archaeological blogs, highlighting the sheer number of blogs out there.

As part of an exploration into the blogosphere, third year students at The University of York, including myself, created individual blogs on a subject of our own choice as part of the module "Visual Media in Archaeology" ran by Sara Perry. This included blogs about home towns and their features, historic figures, and archaeological sites. Others explored more conceptual ideas, showing the range of concepts that came as a result of the module. The intent of the blogs was to bring a relatively unknown topic to a wider, or possibly different, audience. By using Google's "blogspot", we could see our viewing ratings and the source it came from. So we embarked on our voyage of discovery into the world of the internet. Initially, we were all fairly apprehensive: would anyone read our blogs? What difference would it make? But as we progressed through the module, we began to see it less as a blog, and more as a knowledge-making space. The more posts we did, the higher our viewings went. Although generally our viewing numbers were not particularly extraordinary, many received positive feedback, and it became clear that we had made an impact on some of the public.

Blogs are now moving to the forefront of archaeology, and they will only keep expanding. Our venture into blogging has highlighted the potentials that can be found within the internet, and specifically blogs, in assisting the growth of archaeology. It has been described as the next step in publicising the discipline, widening the audience learning about innovative research projects alongside many other subjects. By taking a look at our blogs through our aggregate site, you will hopefully see a new perspective on the internet as an area of exploration of knowledge.

More information on blogs and to view the third year students one, can be found at
http://visualmedia-archaeology2013.blogspot.co.uk/

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An article review of Kennet D.J & J.P 'Early State Formation in Southern Mesopotamia: Sea Levels, Shorelines, and Climate Change'

The article in review is published in the Journal of Island & Coastal Archaeology (2006), 1: pp.67-99.

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The impact of the environment upon early states has long been a subject of archaeological research, but Kennett and Kennett's work aims to readdress a perceived imbalance in the discussion of southern Mesopotamian state formation. They argue that other scholars have overlooked environmental changes and have also evaluated the archaeological record in context of an environment that was static or assumes a present day environment, (Kennett and Kennett 2006, 67). However, they fail to include almost any mention of Northern Mesopotamia to provide as a comparison, or to discuss whether climatic change in the north caused possible migration; instead, it focuses on sea level and sediment changes in the Gulf. They argue that it seems peculiar that climate change has long been accepted as a major factor of societal collapse, (Weiss et. al. 1993), yet its role in the formation of such societies is barely discussed. They formulate such argument regarding the past climatic state of Mesopotamia using "newly available paleo-environmental records for the region", (Kennett and Kennett 2006, 67). The strengths and weaknesses of such data and their overall argument is discussed in part in this review.

The article itself is subdivided in a standard fashion: an abstract, which has been broadly summarised above, followed by an introduction that outlines the existing scholarship regarding the formation of early states in Southern Mesopotamia from c.3300BC onwards, itself followed by the extensive assimilation of data of "postglacial environmental change in Southern Mesopotamia", (Kennett and Kennett 2006, 69), covering data for the last 15,000 years. This is followed by a section discussing "state development in Southern Mesopotamia", (Kennett and Kennett 2006, 79), which centres on the available archaeological evidence from c.6000BC, giving a broad chronological account from the Ubaid Period to the Late Uruk Period. Finally, the two sections of data are brought together in the discussion portion as the article explores the relationship between climate change and societal developments before drawing the conclusion that "global eustatic (sea level movement from glacial freeze and thaw) and climate changes influenced dynamic environmental conditions in Southern Mesopotamia, along with inter-related changes in human demography, economy and socio-political organisation", (Kennett and Kennett 2006, 90).

The introductory section of the article is a good summary of each of the variety of theories regarding state formation in southern Mesopotamia, giving a multitude of references to build a comprehensive

background on the issues in existing scholarship. This is useful, but the content of this section itself adds very little and is arguably an elongated reference list. Kennett & Kennett (2006) stress that all factors require consideration in the context of the environmental changes, and that greater credence be given to the idea that climate change caused states to form, not simply collapse. They also disregard the study by Lees & Falcon (1952) which stated that sediment deposition was counterbalanced by tectonic shifts causing slightly higher sea levels; this study is supported by both Pollock (1999) and McIntosh (2005), highlighting confusion with regard to ancient sea levels in the Gulf. This section builds upon the abstract and expands their methodology with regard to the use of paleo-environmental data but is unspecific at this point with no sites or particular methods discussed at this stage. Kennett & Kennett (2006) criticise other scholars for assuming that the environment had been unchanged in Southern Mesopotamia throughout the Holocene; in particular, they reference the work of Susan Pollock (1992) as an example of apparent naivety to assume that the environment remained unchanged. This assumption that the climate and environment is the same in the modern day as that of the time of early state formation is something that needs addressing; Kennett and Kennett's (2006) work is useful in this argument but it seems that this issue is one of slightly older scholarship of pre-2000. Pollock (1992, 305) states that "there is no evidence to suggest that these basic (environmental) features were significantly different then from now" but does clarify that much of the past environment at the time was little understood. However, in Pollock's (1999, 34) work of *Ancient Mesopotamia,* she now asserts that the "physical environment is never stable… the climate has changed and the natural vegetation has profoundly altered". This reflects the possible effect that techniques such as paleo-environmental analysis and remote sensing have given an understanding of environmental changes and how ancient Mesopotamia may have looked, specifically river movements (Hritz 2010). It would have been prudent for Kennett and Kennett (2006) to include Pollock's (1999) later assessment of climate change in Mesopotamia as it would have improved their argument regarding the reliability and plausibility of the paleo-environmental data as a previous sceptic now accepts significant climate change in Ancient Mesopotamia. They could also have included how modern day discussions of anthropomorphic climatic change and research in the late 1990s have altered certain scholars' opinions.

The section concerning paleo-environmental data is extensive and, as one would expect, the terminology used is highly scientific and I personally struggled to understand some of the language with little to no definitions provided for technical terms. This paper assumes prior knowledge of such studies and processes. For someone who has never studied these processes in depth, it is difficult to assess and comment on the conclusions from the analyses of paleo-environmental data. There are numerous charts and graphs provided in this section; these are effective in allowing the reader to assess the text in pictorial form, but even then some figures are still harder to understand and interpret, for example Figures 5 and 6, (Kennett and Kennett 2006, 75, 77). The provenance of the data itself should be scrutinised, but this is not just a negative reflection upon the article itself, more a cautionary note to the use of such data in general. One example is the study of Soreq Cave which has been mostly led by the

work of Bar-Matthews (1997; 2011), who has repeatedly sampled the site for speleothems to analyse and plot the possible ancient climate with peaks and troughs of rainfall and aridity that has been linked with sea levels. In the earlier 1997 study, Table 1 (Bar-Matthews 1997, 160) demonstrates the ranged variability of the data in terms of how accurate the dating of the speleothems was. Samples thought to be 4500 years old had a range +/- 600-900 years for error, so samples could have been anything from 5400 to 3600 years old. How can assumptions regarding a direct relationship between climate change and cultural changes be made with a possible 1800 year variation on the samples? Generally, the evidence for climate change in Mesopotamia is limited; Soreq Cave in Israel is one of the few sites that provide an unbroken record for the last 25,000 years and is therefore relied upon for many reconstructions of the ancient climate (Bar-Matthews 1997). Whilst being part of the same broad weather system, as Mesopotamia is not in the region itself, it is a singular example and therefore there is little-to-no comparative evidence to challenge it with. By Bar-Matthews' (1997; 2011) own admission, the data of the cave relies on continuity between the isotope levels and climate for the past 25,000 years which is in no way guaranteed. In my opinion, Kennett and Kennett's (2006) article does not expand upon the discrepancies of the data enough and discuss the possible flaws with it.

Wossink (2009), challenged the assumption that because climate change and social change occurred contemporaneously it signifies a cause-and-effect relationship, and noted that scholars fail to identify archaeological evidence for definitive correlation. In this article, the section summarising the relationship between climate and social change deals in general hypotheses that lack definitive archaeological support. This is not a criticism of only Kennett and Kennett (2006); with the whole field study of climate and environmental change, the data set is still limited. Admittedly, the error range in the Soreq Cave study has been dramatically reduced since the fresh 2011 study by Bar-Matthews to +/- 20-100 years in some cases, which could obviously not have been included in this article as it predates such research. But there is still not enough direct evidence for the climatic changes in Mesopotamia and even less of its definitive impact upon human settlement. Modern studies using remote sensing and fresh analyses of a wider range of data samples more directly relevant to Mesopotamia may in the future provide a more complete picture of early state formation, but they are not included in this study.

Kennett & Kennett's "Early State Formation in Southern Mesopotamia: Sea Levels, Shorelines and Climate Change", despite only being composed in 2006, is arguably an article of its time. It attempts to rectify the apparent oversight regarding climatic change and its impact upon state formation, and undoubtedly their general argument that climate played a significant role in early state formation is surely likely. However, often they fail to use direct archaeological evidence and instead rely upon chronological correlation, and the data with regards to the environment is not scrutinised to a high enough degree and effectively presented at face value. The exclusion of Northern Mesopotamia and a study of its climatic differences, which may have affected state formation, arguably weakens their work. This article is suitable for someone with some experience with the arguments regarding state formation and environmental

changes both past and present, but the nature of its argument must be considered carefully. The subject would certainly benefit from a reassessment and evaluation with the modern techniques of remote sensing and survey; it is subject to wider problems in the archaeological and environmental records, yet fails to recognise this, to its detriment.

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An insight into Battlefield Archaeology – an interview with Tim Sutherland

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Tim Sutherland, a battlefield archaeologist, talks about his recent TV series Medieval Dead as well as current archaeology projects he is working on, including his project at Towton.

We'll start with some background on your academic career. Where did you study?

One day whilst working as a qualified joiner I became somewhat disillusioned and walked into the Jobcentre - there was an offer to be a trainee archaeologist for a year, and so I took it. I was then accepted at York for an undergraduate course, but decided that I would initially prefer to study for a more practical qualification and so did a two year HND in Practical Archaeology in Dorset. After specialising in geophysical survey I later went to Bradford to do a degree in BSc in Archaeology and in 1995 an MSc in Archaeological Prospection and Geophysics. In 1996, developers discovered a mass grave of combatants from the 1461 Battle of Towton and so I joined a group of osteologists from Bradford University to excavate the burial site. As I then had a great deal of archaeological experience I ended up helping to run the site, along with the osteologists, one of whom was Malin Holst (an osteologist now at the University of York). We supervised the systematic removal of the skeletons and the survey work and this lead on to the start of my PhD in 1997.

Tell us more about your research at Towton.

After we uncovered the mass grave we needed to put the grave into the battlefield context and so I started my part time PhD related to this subject. This involved finding archaeological evidence of the battle itself. As I researched the project I realised that no one had carried out a formal multidisciplinary battlefield archaeology survey before in the UK, which was rather surprising given that in the USA battlefield archaeology was an acknowledged discipline.

What research has been carried out so far at Towton?

Following the start of the project I investigated many of the acknowledged sites associated with the battle which took several years. These were almost all found to be erroneous. I was therefore removing rather than recovering, what was formerly accepted to be the evidence of the battle. At the same time I began working with a metal detectorist, Simon Richardson who had been detecting the site for many years. Any artefacts he found he had been locating approximately on a sketch map of the site. I therefore asked him if he would record them more accurately which he then did. In 2003 after discussions relating to artefact distribution patterns on the site we determined he should search in a certain artefact rich area. It was

then that he found his first arrowhead. Now we have over 350. Just before 2005, we then found some human small remains on the surface whilst geophysically surveying this area. We excavated a small test pit and found that they marked the site of the mass graves in the middle of the battlefield. These graves now await further evaluation as to how big they area and how many there are in that location. In 2010 we instigated the Towton Battlefield Landowner Agreement, which meant that all the relevant landowners gave permission to ban unauthorised metal detecting on their land. It's been very successful and is the first of its kind in this country. It's something I've considered for years, due to problems of unauthorised metal detectorists not recording their finds. The work now progresses in selective areas. Latterly, the project has been involved in the TV series *Medieval Dead,* with our continued and successful hunt for King Richard III's chapel.

Has there been other TV involvement at Towton?

There has been a great deal of interest in Towton since we recorded the mass grave. In 1997 I help make a programme with the Royal Armouries. In 1999, the documentary *Blood Red Roses* was filmed for Granada Television, which won an archaeological television award and, at the time, had bigger viewing figure than Time Team. This came out just before the book on the mass graves was published, hence the name for the book, *Blood Red Roses*!

How did *Medieval Dead* come about?

I've known Jeremy Freeston, the director of the *Medieval Dead* series, for many years, and he liked the format of the Blood Red Roses programme, which thus sparked *Medieval Dead*. He rang me up with the concept of the series and used my research projects and contacts to make it a reality: Towton, Agincourt, Visby, Masterby and Tadcaster. Jeremy wanted to use the forensic application of archaeology in the series, which is why we use the scientific evidence whenever possible and engage renowned academics such as Professors Charlotte Roberts and Anne Curry, who are experts within their own field.

Is *Medieval Dead* the first big TV series for you?

I've maybe had 20 or so TV appearances since I first worked at Towton and this has made me more aware of how archaeology is portrayed on TV. But Medieval Dead was the first series that I've had a major involvement with.

What other countries has *Medieval Dead* been shown in, and what was the reception like?

The series was first shown in Sweden, before it was even finished, and then in Australia and New Zealand. However, it hasn't been shown in America yet and the reception it receives there will be important. We've had good feedback so far, and the series has been generally well received. There have been a few negative comments but that's what happens. We get slight criticism that the programme is a bit watered down, but it's for television so it has to be viewer-friendly, and the series was also made on a very tight budget.

With the televising of *Medieval Dead* and the recent Time Team special on the Battle of Hastings, do you think battlefield archaeology is becoming more popular with the public?

It is, but it is also simply not about it being popular, it's important that battlefield archaeology is seen as normal, in the way that geophysical survey is now regarded as an accepted part of archaeology. I feel that it's something that's necessary in the field of archaeology.

Over what length of time was Medieval Dead filmed?

Medieval Dead was filmed over a year and a half and it was a rush to get it finished! I initially didn't think we'd get the go ahead to do it at all. As the series was being shown in Sweden before the series had been finished, this meant that the Mästerby episode did not contain all of the final results when it was broadcast.

Would you do another series?

Certainly. Another series of Medieval Dead is planned but as I've run out of my current research projects and so I need to look at some other projects that I have been, or would like to be involved with.

Any other future TV projects?

Jeremy, the director wants to do some work at Waterloo for the 200th anniversary. We have another programme planned for the 600th anniversary of the Battle of Agincourt in 2015 and we are potentially covering archaeological work on another battlefield in Portugal and an early medieval battlefield and mass grave near Chester.

Figure 1. Tim during filming for *Medieval Dead* (Image Copyright: Stephanie Smith, Dragonshead Production).

Do you have any control over the end product of the TV show?

I get some say during the filming and I am able to state what I do and do not approve of. In the end, it is a compromise that has to be made. It is, after all, television.

How do you find working with archaeologists abroad and what reception do you receive?

It varies, some countries are very accommodating. Gotland was wonderful and the people very hospitable. On Gotland there are sheep that have silver-like fleeces that are very expensive. The locals realised that I was going to buy one and gave me a fleece as a thank you for helping them with the project and for getting others involved in their work. But in other areas it is different. In some countries the bureaucracy almost inhibits successful archaeological work. When working abroad, you have to take care how you represent yourself, the university and one's own organisation. Wherever you go, you find there are issues that tend to arise and have to be dealt with sensitively, for example attitudes towards metal detecting or human remains.

How do other countries regulate metal detecting?

Portugal, for example, does not permit the ownership or the use of metal detectors. This is acceptable to a point although archaeological work suffers because of it. Battlefield Archaeology as we understand it does not exist there. In Sweden, metal detecting is regulated and requires a permit. However, the EU laws are potentially going to be relaxed, down to UK levels, which, I feel would be a mistake.

What is the future of UK battlefield archaeology?

In Americans battlefield archaeology is generally well accepted, especially by the government as all National Parks do not permit random detecting. The UK is playing catch up. The Germans started relatively recently but have caught up with us, and in some cases are even surpassing us! We should be utilising metal detectors as valid archaeological survey techniques and regulate metal detectorist more successfully. There is still so much to do in the country regarding the protection of our battlefield heritage.

Do Americans come over here to research?

We try to liaise with our American colleagues whenever we can. Some of my colleagues go over there and sometime they come to see how we do things here. However, some people come from all over the world to exploit our poor heritage laws. We are currently part of a small discipline worldwide which encourages helpful association in all these respects.

Is battlefield archaeology easier in the USA?

Yes, they have a relatively shorter military history and so they can focus on a shorter time frame, most of which is dominated by lead shot and bullets from the War of Independence or the American Civil War. These are much easier to find than, for example, medieval arrowheads. But, even so, there are hundreds of battlefields within that shorter time frame.

What other projects are you currently involved in?

I'm currently involved in a project on the Battles of Lewis (1264) and Evesham (1265). Both involved Simon De Montfort, who instigated Parliamentary democracy, and who won the first and was killed at the second. I currently want to do more work at Evesham and might even be able to make a television programme about the site. I've also been involved as an advisor with the Battle of Lützen (1632) Germany, where they began to carry out a 100% metal detector survey on the battlefield – experts were brought in from around Europe. The initiators of this project were desperate to locate the mass graves and we eventually suggested that they might be in a certain location. An open area excavation was carried out and they found a mass grave. Once the grave was found, it was, unbeknown to us and rather controversially, lifted in a block and cut in two parts to facilitate storage. The metal detecting then stopped, and so it was apparent that they just wanted to access the grave.

I hear you are also involved with the Battle of Agincourt?

Yes, we are currently looking for evidence of the location of the battlefield and I'm going back out there soon. We are currently trying to locate the mass graves from the battle and we think we are close to finding them. The project will be sponsored by the Royal Armouries at the Tower of London, and the Musée de l'Armée, Paris. A British army officer, John George Woodford was working at Agincourt in 1818 and found the mass graves but we can't find whereabouts this was. His records are lost but he apparently found the battlefield site. However because the lost records, we are back to square one. People have come forward with information following the publicity on *Medieval Dead* and so we're currently following these leads. Agincourt is symptomatic of historic battlefields generally: We don't know where a given battlefield is as we have no evidence to prove it. It's more common to find post medieval sites. Considering we base our history on them it's rather bizarre! In-depth research can be exciting as well as interesting, especially when you find something new.

You are also involved in CAIRN (Conflict Archaeology International Research Network) which you created. When did CAIRN start?

I set up CAIRN in 2003 so it's now over 10 years old. It was the result of a group of battlefield archaeologist colleagues wishing to share information and methods etc. These included the foremost battlefield archaeologists from around the world, including Doug Scott, Tony Pollard and Glenn Foard. I invited like-minded people to join and it's really snowballed since then. It is now a Global Network.

Thanks to Tim for taking the time to speak to me and for more general information on some of his projects…

Towton Facebook page https://www.facebook.com/pages/Towton-Battlefield-Archaeology-Project/114493701914520?fref=ts

CAIRN Facebook page https://www.facebook.com/pages/Conflict-Archaeology-International-Research-Network-CAIRN/148763468494695?fref=ts

Insectiforms in Olmec-Style Art and Writing

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Although insect-like animal figures form only a minor part of Olmec-style art, their significance to the Formative period inhabitants of the southern Gulf Coast lowlands, should not be underestimated. In this paper, I analyze all documented examples of insect-like forms in Olmec-style art, and detail their possible meaning in light of both contextual data and Mesoamerican analogs from the Classic and Late Post-classic periods. It is found that insectiforms may have symbolized transcendence or movement relative to an *axis mundi*.

Introduction

"Insectiforms", a general term encompassing artistic representations of all types of terrestrial arthropods such as insects and arachnids, are not a common subject in Olmec-style art. Unlike felines (Coe 1972; Grove 1972; Joralemon 2007), crocodilians (Stocker, Meltzoff, and Armsey 1980), frogs and toads (Kennedy 1982), serpents (Otero 1975), and even sharks (Arnold 2005); insectiforms are found on only two known examples of Olmec-style art and writing. These representations are limited to the southern Gulf Coast lowlands of Mexico, in the area surrounding the major ceremonial centre of San Lorenzo Tenochtitlán. Although their restricted distribution and low frequency might lead to the assumption that insectiforms were not prominent features in the religious and political symbolic systems for which Olmec-style art is most well-known, these representations occur in contexts which suggest that insectiforms were potent symbols to the inhabitants of the southern Gulf Coast of Mexico during the Early Formative period (1200-900 BC).

In this paper, I attempt to clarify the significance of insectiforms in Olmec-style art and writing. To accomplish this task, I analyze all documented examples of insect-like forms in Olmec-style art and detail their possible meaning in light of both contextual data and Mesoamerican analogs from the Classic and Late Post-classic periods. This evidence suggests that insectiforms may have served as symbols of transcendence or movement in reference to an *axis mundi* in both Olmec-style art and writing.

As mentioned previously, the only two known examples of Olmec-style art with representations of insectiforms – San Lorenzo Monument 43 and the Cascajal Block – are from the southern Gulf Coast lowlands in the state of Veracruz, Mexico. Both of these artifacts can be assigned to the late Early Formative period. San Lorenzo Monument 43 was discovered in the context of San Lorenzo B phase fill dated to approximately 900 BC (Coe and Diehl 1980, 352). The Cascajal Block was reportedly found in a gravel quarry near the community of Lomas de Tacamichapa. A majority of the ceramic sherds and clay

figurine fragments from the same area also date to the San Lorenzo phase (1200-900 BC) (Rodríguez Martínez et al. 2006, 1611).

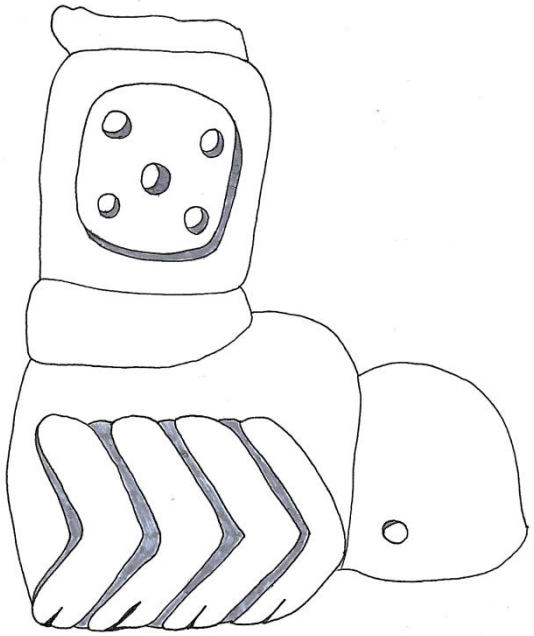

Figure 1: *Unscaled drawing of San Lorenzo Monument 43* (Museo de Xalapa, Veracruz, Mexico) (Image Copyright: Arnaud F. Lambert).

San Lorenzo Monument 43 (Figure 1) is a small three-dimensional basalt sculpture which measures 38cm in height, 36cm in length, and 24cm in thickness. It depicts an insectiform with a jointed body, consisting of a head, thorax, and abdomen, although several smaller segments adhere to the abdominal section, possibly forming a tail. Unfortunately, this portion of the figure also appears to have been damaged. More reminiscent of an arachnid, such as a scorpion, than an insect (see Cyphers 2004, 104-105; Medellín Zenil 1971, 42), the figure has eight segmented legs depicted in high relief descending from its thorax. The head is slightly pointed and has two eyes rendered as punctate circles towards the bottom of each side of the head.

Most notably, the abdominal section of San Lorenzo Monument 43 also contains a circular low-relief panel with five punctate circles organized into a quincunx design -- a common geometric symbol in Mesoamerican iconography consisting of five points arranged in a cruciform pattern, such that four of these points form a square and a fifth serves as its center (MacLeod and Stross 1990, 17, Fig. 1; Séjourné 1970, 90-91; Stross 1986, 283; Taube 2004, 76).

The Cascajal Block (Figure 2) is a serpentine slab measuring 36cm in length and 21cm in width. It is 13cm in thickness. The block is incised with 62 graphic signs (possibly glyphs). These signs make up a signary of 28 abstract and naturalistic designs (Rodríguez Martínez et al. 2006, 1612-1613). The abstract signs are

common in Olmec-style iconography (Joralemon 1971) and include the crossed-band (Figure 3l) and the U-shaped sign (Figure 3k). Among the naturalistic signs, there are some which resemble plants such as corn (Figure 3g); others appear to be objects common in the iconography of Olmec-style art in the Gulf

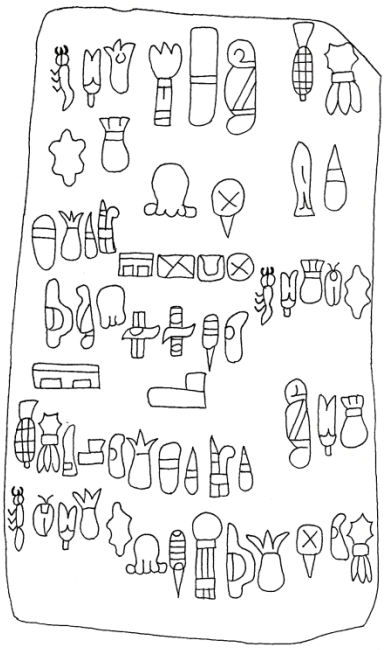

Figure 2: *The Cascajal Block* (redrawn after Rodríguez Martínez et al. 2006:1612, Fig. 4) (Image Copyright: Arnaud F. Lambert).

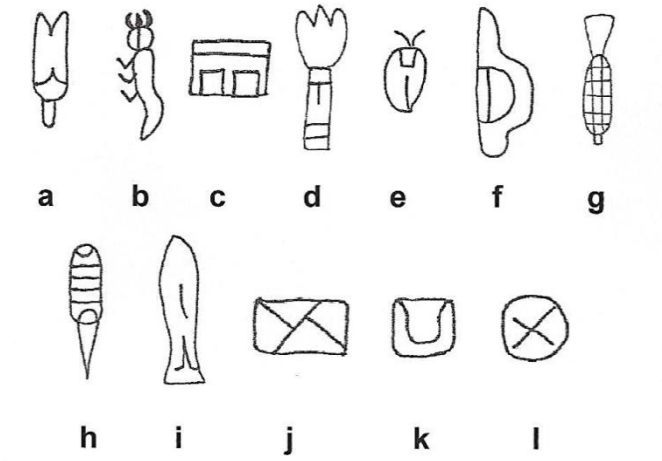

Figure 3: *A selection of signs from the signary of the Cascajal Block:* (a) maize sprout (Sign #1), (b) insectiform (Sign #4), (c) throne (Sign #11), (d) torch (Sign #12), (e) vegetal design (Sign #15), (f) knuckle-duster (Sign #16), (g) corn (Sign #17), (h) perforator (Sign #20), (i) fish (Sign #21), (j) mat (Sign #22), (k) U-shaped sign (Sign #23), and (l) crossed-band (Sign #26) (Image Copyright: Arnaud F. Lambert).

Coast region and beyond, such as thrones (Figure 3c), mats (Figure 3j), torches (Figure 3d), perforators (Figure 3h), and knuckle-dusters (Figure 3f); and possibly animal forms such as fish (Figure 3i).

Among the possible animal forms depicted on the Cascajal Block, the most relevant to this study is Sign #4 (Figure 3b). This graphic sign occurs three times in the Cascajal Block and depicts an insectiform rendered in profile. These figures are reminiscent of San Lorenzo Monument 43, but are shown two-dimensionally with only three jointed legs, suggesting that they are not arachnids. Furthermore, the heads of each of these figures are bisected and decorated with mandibles. The bodies of these figures share the same general undulating form which is sometimes segmented, but not always.

Although there has been some argument concerning the orientation and reading order of the signs on the block (compare Rodríguez Martínez et al. 2006; Magni 2008; and Mora-Marín 2009), their relationship to Olmec iconography of the Early and Middle Formative periods is clear. The general meaning of its incised signs however, remains elusive. To address at least part of this problem, i.e., the meaning of the insectiform in Sign #4, I would first like to draw attention to its placement in a repeated sequence in involving Sign #1 – a maize sprout design marked by a V-shaped cleft (Figure 3a). In another sequence, Sign #15 (Figure 3e), is situated between Signs #1 and #4. It is interesting to note that in other examples of Olmec-style art, such as a series of jade celts from nearby Río Pesquero (Figure 4), Sign #1 is often used to symbolize sprouting maize, and is frequently affiliated with representations of an *axis mundi* through the symbolism of the quincunx. This identification, in turn, suggests that the insectiform in Sign #4 is also related to Formative period conceptions of an *axis mundi*. Confirmation of this symbolic relationship exists in other examples of Olmec-style art, notably San Lorenzo Monument 43.

Insectiforms in the Mythologies of Mesoamerica

Like many societies around the world, the peoples of Mesoamerica did not classify insectiforms in a manner congruent with the Linnaean taxonomic system of Western science and entomology (Sutton 1995, 254-255). Rather, mythological narratives appear to have been the most salient sources for the conceptualization and classification of terrestrial arthropods (see Berlo 1983; Curran 1937; Kelley 1972; Taube 1983, 2003). Central among these myths were references to the *axis mundi* (Signaos 1985, 129-130).

For example, the Late Post-classic and Early Colonial period Mexica sources collected by the Franciscan missionary Bernardino de Sahagún, frequently mention insectiforms. In many of these sources, spiders, scorpions, and ants were depicted not only as poisonous adversaries, but their natural habitat of bushes and trees was also noted (Curran 1937, 196-197; 200-203).

The predatory nature of scorpions is also well documented in the painted manuscripts of the Post-classic Maya, such as the Madrid Codex (Tozzer and Allen 1910, 305-306). Thus, even though references connecting insectiforms to an *axis mundi* no longer appear salient by AD 1500, these ethnohistoric sources suggest that indigenous observations of the natural ecology of these insectiforms may have informed some of the symbolism present in the Olmec-style art of the Formative period. Indeed, such connections are much clearer in the Middle Classic period (AD 450-650) art of Teotihuacán.

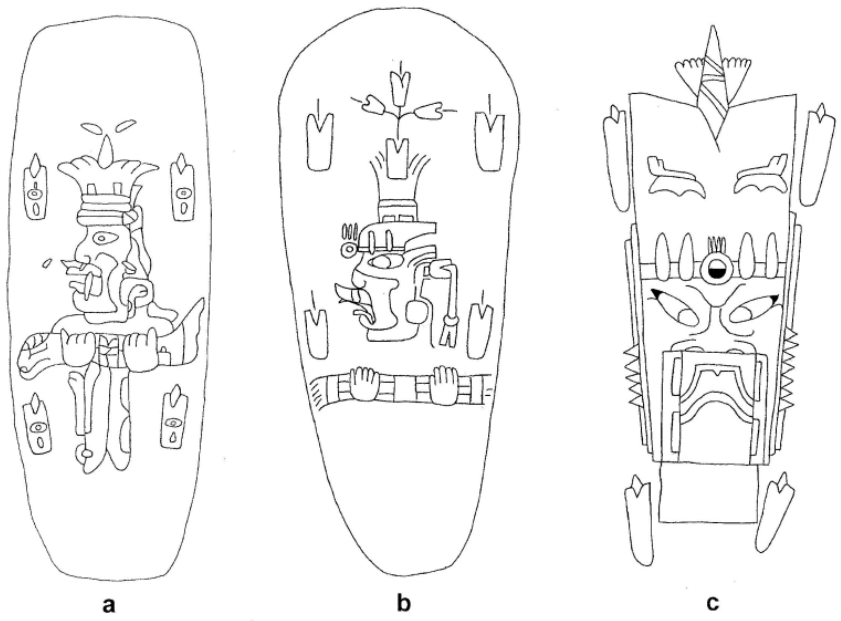

Figure 4: *Representations of the axis mundi in the Olmec-style art of the Gulf Coast Lowlands:* (a) jade celt from Río Pesquero (Museo de Xalapa, Veracruz, Mexico); (b) jade celtfrom Río Pesquero (redrawn after Joralemon 1976:41, Fig. 8e); and (c) design on a jade celt from Río Pesquero (redrawn after Joralemon 1976:41, Fig. 8d). Drawings are not to scale. (Image Copyright: Arnaud F. Lambert)

Recalling the linguistic associations between spiders and mothers among contemporary Nahuatl, Otomi, and Huichol speakers (Kelley 1972), spiders also appear to have formed a significant part of Classic period religious and political symbolism. Karl Taube (1983), for instance, has analyzed the depictions of the so-called "Spider Woman" of Teotihuacán. In addition to her distinctive "fanged" nosebar suggesting the pedipalps of a spider, Taube has found that the Spider Woman had a number of iconographic associations including the "ollin" or intertwined tree in the murals of Tepantitla (Taube 1983, 151, Fig. 1) and quincunx signs in the murals of Tetitla (Taube 1983, 153, Fig. 3). Interestingly, the architectonic forms of this deity were also associated with agricultural bounty at Teotihuacán (Taube 1983, 152, Fig. 2). Thus, it appears that the Spider Woman was most closely related to the earth and underworld, water and creation and served to mediate and transverse these realms of the cosmos (Taube 1983, 140-143). Interestingly, a different insectiform, the centipede, appears to have served as a similar conduit between the underworld and the heavens among the Classic period Maya, although in this role centipedes seem to have been contrasted with serpents (Taube 2003, 437-438). While centipedes were primarily associated with death and the underworld, serpents were more commonly connected with bringing water from the underworld into the sky realm.

Taken together, these ethnohistoric and archaeological analogues further serve to highlight the relationship between various insectiforms and the concept of the *axis mundi*. However, they also point to

the transcending aspects of insect-like figures relative to the horizontal and vertical dimensions of the cosmos. Not only are insects and arachnids masters of the land and trees, they are also capable of moving from the underworld to the celestial realm through these arboreal *axes mundi* (Siganos 1985, 130-133). It is therefore not surprising that insectiforms were simultaneously seen as harbingers of life and death, creation and destruction in ancient Mesoamerica. They transcended traditional categorizations of the world.

Conclusions

This paper has argued that the insectiforms present in Olmec-style art and writing are best interpreted as symbols of movement or transcendence relative to an *axis mundi*. Archaeological and contextual evidence has shown that these insect-like forms were related to maize agriculture, maize sprouts, and the *axis mundi* during the Formative period. An examination of Mexica ethnohistoric sources from the Late Post-classic and Early Colonial periods and Classic period archaeological materials from Teotihuacán, suggested that even though insectiforms such as ants and spiders took on new meanings during the ensuing millennia, they also maintained a symbolic relationship with the concept of the *axis mundi* which emphasized their ability to transcend many of the salient of conceptual categories (i.e., life and death / creation and destruction / the underworld and the celestial realm) of ancient Mesoamericans. Given the continuity of symbols such as the quincunx and the *axis mundi* affiliated with the insectiforms, it is very likely that similar notions informed the use of these figures in the Olmec-style art and writing of the Gulf Coast lowlands of the late Early Formative period (c. 900 BC).

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Homo Heidelbergensis: with an emphasis on the Type Specimen from the Mauer

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Homo heidelbergensis has been a subject of controversy in palaeoanthropology for more than 100 years. Some paleoanthropologists feel that fossils assigned to the palaeo species deserve their own nomenclature, while others feel that they represent an outlier of either *Homo erectus*, or Neanderthals.

The first theory argues that *H. heidelbergensis* represents either an evolved *H. erectus*, or a primitive Neanderthal; which would suggest that the Homo lineage transitioned through anagenesis, or a gradual change from *H. erectus* into Neanderthals, after which the species went extinct. The second theory suggests evolution through cladogenesis (or the splitting of species), which would support the hypothesis that *H. heidelbergensis* was a separate species which split, resulting in both the Neanderthal lineage, as well as the modern *H. sapien* line. This paper will address both theories.

Background

The Mauer mandible is the first example of *H. heidelbergensis*. It was discovered by a worker in a sandpit, from a depth of more than 24 meters, in the village of Mauer, near Heidelberg, Germany, in 1907 (Bahain et al. 2010; Field 1932; Haidle & Pawlik 2010; Harvati 2007; Lewin 1998; Collard & Wood 1999; Collard & Wood 2007). It was given the name of *Homo heidelbergensis* by Professor Otto Shoetensack of the University of Heidelberg, and subsequently dubbed as the "type specimen" for the species (Harvati 2007).

The discovery of the Mauer mandible was crucial for understanding human origins (Harvati 2007; Bahain et al. 2010), but it was soon under criticism after the unveiling of *Eoanthropus dawsoni*—more commonly known as Piltdown man (Field 1932; Stringer & Weiner 2009). The Piltdown man remains were presented to the scientific community in 1912 by Charles Dawson. The significance of the find was in the "ape-like" mandible in complete contrast to the mandible found in Mauer (Stringer & Weiner, 2009).

In 1955, tests were able to prove that Piltdown man was a forgery (Oakley & Weiner 1955); further research showed that the cranium was from an anatomically modern human, while the mandible was modified from a modern orang-utan (Stringer & Weiner, 2009). The European scientific community was in support of the idea of Piltdown man before it was ever found. As far as they were concerned, it was the evidence they had been looking for regarding the order and location for which human evolution had occurred, and papers had already been published affirming the validity of Piltdown man.

The Mauer mandible lacked the distinctly "ape-like" traits that were anticipated for the order of human evolution at that time; it was the belief that the human brain and crania evolved before the mandible

(Stringer & Weiner 2009). This would mean that remains of human ancestors at that time would be expected to exhibit modern crania, and ape jaws. Henry Field published a paper in 1932 claiming that the oldest remains found in Europe were *E. dawsoni* in Sussex, and *H. heidelbergensis* in Mauer (Field 1932).

Nomenclature

When defining the genus *Homo*, people use characteristics such as brain size, hand dexterity, and lithics (Collard & Wood 1999). However, when it comes to the distinctions separating species, the variability and differences are much more subtle. *H. heidelbergensis* meets all the criteria for the genus of *Homo*; the problem however is not about genus, but rather species. *H. heidelbergensis* can be said to represent a late form of *H. erectus*, or a primitive form of Neanderthal. *H. heidelbergensis* presents features that are derived from *H. erectus*, as well as apomorphic traits found only in Neanderthals (Hublin & Klein 2009; Clark 1970; Lewin 1998).

The fossils assigned to *H. heidelbergensis* may represent two separate species as well; *H. heidelbergensis* representing the European population, and *H. rhodesiensis* representing the African population (Manzi 2011; Clark 1970; Lewin 1998). There may have been as many as seven different hominin taxa throughout the Pleistocene (e.g. *H. erectus, H. antecessor, H. heidelbergensis, H. rhodesiensis H. helmei,* Neanderthal*, and H. sapiens*) (Bae 2010).

Geography

Specimens assigned to *H. heidelbergensis* have been discovered in Europe, Africa, and Asia. Their relationship to modern human populations is complex; in an effort to better understand the relationship, four separate models were published by Chris Stringer (2002):

1. *Recent African Origin*, arguing that modern populations arose in Africa around 100kya and spread throughout the world replacing all other hominin species with little/no hybridization.
2. *The* (*African*) *Hybridization and Replacement Model,* similar to the first, but allows for a greater hybridization between the migrating population and indigenous populations.
3. *The Assimilation Model,* also accepts an African origin for modern humans. However, it differs from the previous models by denying replacement, or population migration, as major factors in the appearance of modern humans. Instead, this model emphasizes the importance of gene flow, admixture, changing selection pressures, and the resulting directional morphological change.
4. *Multiregional Evolution*, this model differs extremely from the previous three. It rejects Modern African origin, and instead argues for human evolution to have taken place in Africa, Europe, and Asia simultaneously through gene flow and genetic continuity between Pleistocene hominid populations.

Many specimens of *H. heidelbergensis* have been found outside of the locale of the type specimen from Mauer. In Bilzingsleben, 28 skull fragments, eight teeth, and half of a mandible (of at least three individuals) were found that dated to ~320-412,000 years old (Haidle & Pawlik 2010). Steinheim an der Murr has revealed a skull dating to ~250-300,000 years old (Haidle & Pawlik 2010). In Reilingen, workers found two parietals and a right temporal giving an age of ~250-115,000 years old (Haidle & Pawlik 2010).

H. heidelbergensis fossils have also been found in Bodo, Ethiopia, where skulls have been found that date to more than 600,000 years old (Balter 2001), along with Broken Hill in Zambia, where a very well preserved cranium was found in 1921 (Rightmire 2001). There have also been discoveries of a cranium from Petralona, Greece and a partial cranium from Arago Cave in France (Balter 2001; Rightmire 1998; Lieberman & Bar Yosef 2005; Bermúdez de Castro Dennell, & Martinón-Torres 2011).

Some of the most recent and important finds have been found in Sierra de Atapuerca, Spain. Atapuerca has revealed two major assemblages, both consisting of hominin remains. The oldest assemblage is referred to as the TD6 level of the Gran Dolina site, and dates to ~800,000 years old (Bermúdez de Castro et al. 2004). The second site is named the Sima de los Huesos site, and dates to ~500-400,000 years old (Bermúdez de Castro, et al., 2004).

Dating

The Mauer mandible has been dated to 609 ± 40 ka, based on forms of both absolute and relative methods (Bahain et al. 2010). According to Bahain et al. (2010), it was found resting in a fluvial deposit level of sand and gravel left by the Neckar River.

The methods used for the relative dating of the mandible consisted of cross-faunal correlation with the abundance of mammalian faunal remains found at the same level, as well as the layers above and below. There were also magnetostratigraphic studies on the clay below and within the layer of the find, giving the specimen a date of younger than 780,000 years old. The 'Mauer sands' have become famous for their rich mammal fauna representation, which clearly indicates interglacial climate conditions. The faunal evidence—in particular the micromammals—place the 'Mauer sands' into the Marine Isotope Stages of MIS 15 or MIS 13, although the majority of stratigraphic arguments favor a correlation to MIS 15, and therefore an age of ca ~600,000 years ago (Löscher, Maul, Schreiber, & Wagner 2011).

For a more accurate date, Bahain et al. (2010) used absolute dating techniques. The first technique used was InfraRed-RadioFluorescence (IR-RF), which can date the last light exposure of the potassium feldspar grains in the sand. For the lower sands they came up with ages of 607 ± 55 ka, 603±56 ka, 554±33 ka, and 502±27 ka. The upper sands revealed ages of 508 ± 50 ka and 420 ± 23 ka (Bahain et al. 2010).

Lastly they used electron spin resonance of quartz (ESR), coupled with uranium-series (US) dating (ESR-US) to analyze eight herbivore teeth. The majority of the teeth showed uranium uptake occurring postmortem, allowing for a reliable calculation using ESR-US. They admit that for 25% of the samples,

they were not able to determine the p-parameter, which left them with only four usable teeth for statistical age estimations (two from the lower sands, and two from the upper sands). When all these different dating techniques are combined, they reveal the mean age for the *H. heidelbergensis* type specimen from Mauer to be 609 ± 40 ka (Bahain et al. 2010).

Genetics

Understanding ancient populations in a strict sense is difficult, due in large to a lack of fossil evidence (Forster 2004). The use of genetic analysis allows us a better window into the past by averaging mutation rates that give estimates about when genetic lineages could have split (Forster 2004).

Determining coalesence times for Neandertals and modern *H. sapiens* is dependent on the assumed divergent time used in the equation for humans and chimpanzees, as well as an estimated rate of mutation (Beerli & Edwards 2002). When a human chimpanzee estimated divergence of 4-5 million years ago is used, the date for the Neandertal and modern *H. sapien* divergence is estimated at 550-690,000 years ago (Krings et al. 1997). In contrast, when the estimated divergence for humans and chimpanzees is placed at 5 million years ago, the new estimated date for the modern *H. sapien* split from Neandertals results in a range of 631-789,000 years ago (Beerli & Edwards 2002). Both results suggest an age when *H. heidelbergensis* would have been a viable European population, thus suggesting that they are a likely candidate for the last common ancestor of modern *H. sapiens* and Neandertals.

Morphology and Pathology

When the Mauer mandible was discovered it was almost fully intact, although some teeth were lost in 1945 (Harvati 2007).The mandible is robust but lacks a chin, and has a much larger corpus than is found in modern European populations (Collard & Wood 2001). The mandible exhibits great breadth of the ascending ramus, which is contrasted by the smaller sized dentition, which is consistent with Neanderthals and some modern Europeans (Harvati 2007; Bae 2010; Bailey 2002).

The Mauer mandible exhibits signs of periodontal disease, as well as a healed fracture near the mandibular condyle (Czarnetzki, Jakob & Pusch 2003; Schwartz & Tattersall 2000). New analyses of the Mauer mandible indicate that the owner had incipient osteoporosis, as noted by an articular calculus and a depression in the medial part of the left mandibular condyle, with expansion into the inferior part of the ramus. Incipient osteoporosis is an arthrotic condition indicative of a trauma-induced *osteochondrosis dissecans* (Czarnetzki, Jakob, & Pusch 2003).

Looking at the mandible from Mauer it is easy to see why it does not represent an anatomically modern human, but the details distinguishing it from both *H. erectus* and Neanderthal are more difficult to decipher. The mandible is wide, robust, and has a low ascending ramus with a receding chin, which is typical of *H. erectus*. It also exhibits smaller molars that are well within the modern human range, and at the lower end of the size for the Zhoukoudian *H.erectus* (Conroy 2005). The Mauer mandible alone does

not show any particular affinity to Neanderthals based on its tooth crown morphology, as it lacks a mid-trigonid crest— a typical Neanderthal trait (Bailey 2002).

When the type specimen for a paleo species consists of a single mandible, it is difficult to make inferences about other traits found in the species (i.e. brain size and encephalization). For this reason, it is important to include other *H. heidelbergensis/rhodesiensis* specimens in our discussion of the differences between the former and the latter(s). When other *H. heidelbergensis/rhodesiensis* fossil finds are taken into account (e.g. Arago, Bodo, Broken Hill, and more recently Atapuerca); the observer will see a distinct degree of encephalization within the species.

Encephalization quotient (EQ) is a way for paleoanthropologists to determine brain growth relative to body size (in mammals); this gives them a better understanding of the brain size relative to body mass, rather than just absolute brain size (Dubreuil 2010). An EQ is figured through a mathematical equation: observed brain size divided by expected brain size.

Formula: EQ= observed brain weight (g)/0.0991 (body weight (g)) ^0.76 (Conroy, 2005).

H. erectus has an average cranial capacity of ~1000-1100cc, which when figured in the above equation gives them an estimated EQ of 4.1. Neanderthals and *H. heidelbergensis* both share an EQ value of ~5.0; with *H. heidelbergensis* having a cranial capacity averaging ~1300cc, and Neanderthals averaging ~1500cc (Dubreuil 2010). The difference in cranial capacity and shared EQ value between the two can be explained by the larger body mass of Neanderthals.

With this information, it is easy to see that *H. heidelbergensis* does not fit the category of either *H. erectus* or Neanderthal. Their brains were too big for the former, and too small for the latter. The evidence presented regarding brain size, body mass, and EQ values, strongly suggests that *H. heidelbergensis* is a representation of an intermediate species.

Discussion/Conclusion

The evidence laid out in this paper would support the legitimacy behind the classification of the Mauer mandible into the taxon of *H. heidelbergensis*. If the reader accepts the differentiation between *H. heidelbergensis* and *H. rhodesiensis*, then the geographical distribution of *H. heidelbergensis* would appear to be limited to Europe. This geographical isolation of a species is easily understood through restricted gene flow, and climatic variability. Natural selection would favour traits that would raise the overall fitness levels of a species in a distinctive climate; while geographical isolation would restrict those traits to populations within that given region. Although at the moment, conclusive evidence has not been found that could explain the distinction of *H. heidelbergensis* as having resulted from a particular speciation event, or through a gradual form of anagenesis. There has never been a particularly heated debate with regards to the date of the Mauer mandible; with the general consensus lying at ~500,000

years. However, with the recent dating techniques performed by Bahain et al. (2010) a new and more secure date of 609 ±40 ka has been established.

The Mauer mandible has often been cited as proof that *H. erectus* was present in Europe, due to their many shared traits; these shared traits mainly consist of the ascending ramus which is broad and short—a classic *H. erectus* feature. The Mauer mandible also exhibits another typical *H. erectus* trait: a receding chin. The teeth of the mandible appear to be intermediate between *H. erectus* and Neanderthals, and even modern populations of *H. sapiens*.

As stated earlier in this paper, there is a limited amount of information that can be gained from a single mandible, which is why it is important to include other *H. heidelbergensis* specimens when questioning the legitimacy of the nomendature. Encephalization quotients have become an increasingly important way to follow hominin evolution through the fossil record. A dramatic increase in Encephalization quotients can be seen from *H. erectus* to *H. heidelbergensis* (4.1 up to 5.0). Meanwhile, a respectively similar Encephalization Quotient can be seen between *H. heidelbergensis* and Neanderthals (~5.0), which can be explained by variation in body size relative to brain size. Neanderthals having a larger brain mass (~1500cc) compared to *H. heidelbergensis* (~1300cc); but body proportions were also variable, seemingly larger in Neanderthals.

The problem with so many paleoanthropologists today is that they tend to want to "lump" all the hominin fossils from the middle Pleistocene into the *H. heidelbergensis* clade, regardless of the geographical location. While this approach seems harmless enough, it raises questions which in turn challenge the idea of having *H. heidelbergensis* kept as a legitimate hominin species representing an intermediate form between *H. erectus* and Neanderthals.

The biggest problem with trying to "lump" all hominin species from the middle Pleistocene into a single nomenclature is that it suggests gene flow across continents (e.g. Africa, Europe, and Asia) at a time when transportation was limited to walking. The idea also discounts regional variation, bottlenecking, restricted gene flow and climatic extremes between geographical latitudes; which in turn help shape the traits favoured by natural selection both within and across populations, explaining the variation expressed in specimens from various geographic locations. If the species of *H. heidelbergensis* is considered only in a regional context—specifically Europe—then it would appear that they are a legitimate species, allowing the Mauer mandible to remain the "type specimen" for *H. heidelbergensis*.

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