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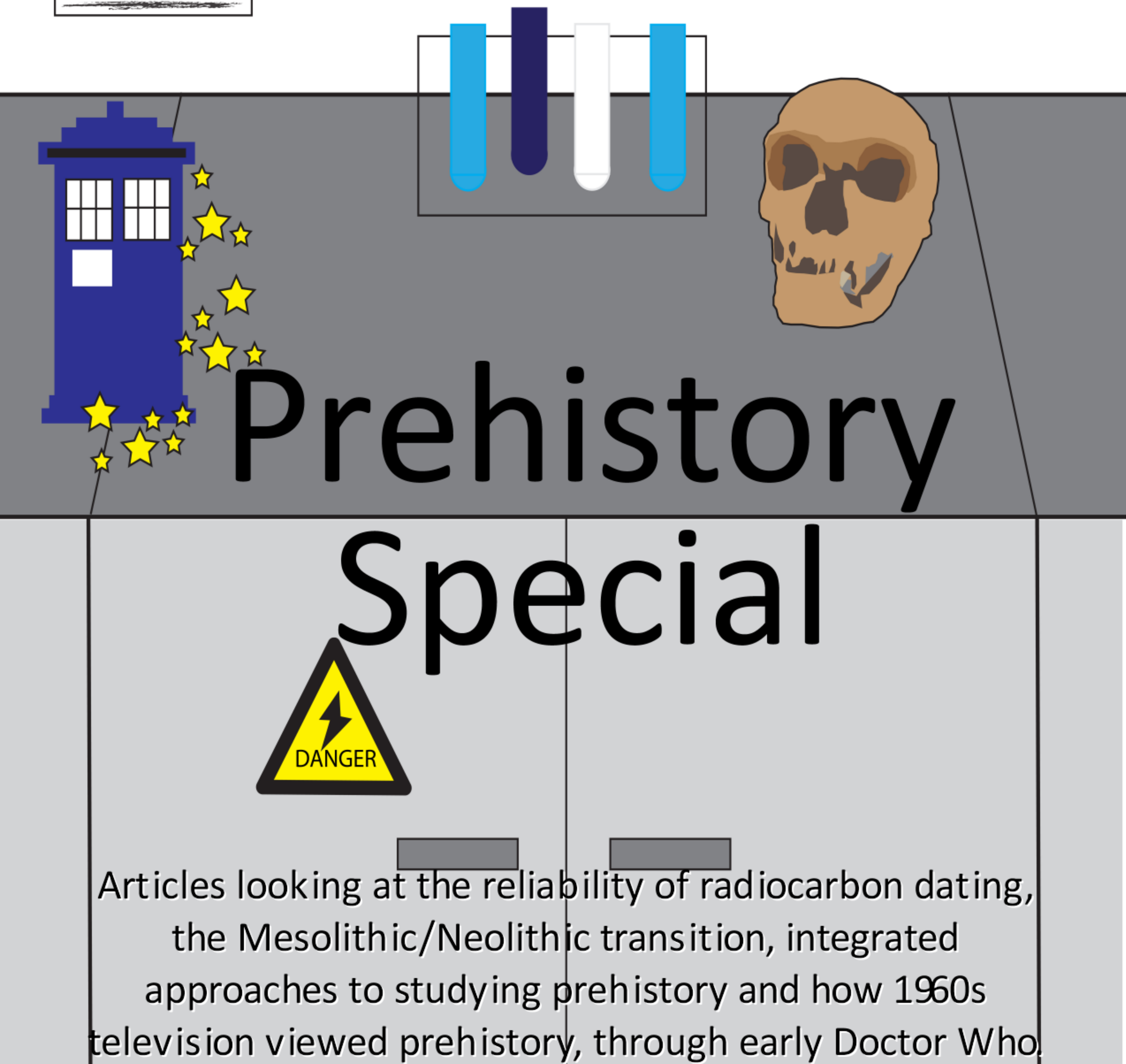

Prehistory Special

Articles looking at the reliability of radiocarbon dating, the Mesolithic/Neolithic transition, integrated approaches to studying prehistory and how 1960s television viewed prehistory, through early Doctor Who.

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Contents

1 Assessment of reliability and usefulness of radiocarbon dates while studying colonisation processes.

Robert Dickson

One of the most important aspects of studying early humans is understanding how and when they entered and colonised new areas. For example, during the Mesolithic period, new areas of land became available for the very first time due to deglaciation. While it is known when these areas could not be inhabited, it is often hard to work out exactly from when they were the subject of human occupation. So can radiocarbon dates be used to date sites in a reliable enough fashion that an overall chronology of a region can be established?

The process of using radiocarbon dates as a tool for analysing population data has been around since the 1960's (Kuzim and Keats 2003). By the late 1980's, the first full numerical analysis of a radiocarbon dataset took place, with an emphasis on trying to establish a timeline of human population size (Rick 1987). Since then there have been attempts to model the process of peopling the Americas (Anderson and Gilliam 2000; Fidel 2002). More recently, Kuzim and Keats (2005) have used radiocarbon dated sites to try and track the original peopling of Siberia during the Palaeolithic in a very similar study to the one attempted here. From these efforts it is clear that many scholars in this field believe that radiocarbon dates have a place in such work. However, it should be noted that, as with any archaeological technique, there are limitations and weaknesses that need to be addressed before any data produced in this way can be produced or assessed.

Pettitt et al. (2003) have analysed the reliability of radiocarbon data through the lens of establishing population densities and colonisation patterns. They call into question the usefulness of radiocarbon dates, especially in regards to the more ambitious uses through larger and larger datasets and more widely ranging research questions. They argue that as more radiocarbon dates have been produced and published over the years it has become clear that some of the dates are more 'archaeologically valid' than others. If radiocarbon dating is to continue to be a useful tool then this issue needs to be addressed.

In their work looking at the reliability of using radiocarbon dates in the analysis of sites from the Palaeolithic, Pettitt and his colleagues (2001) cite H.T. Waterbolks' 1971 article: 'Working with Radiocarbon Dates'. In this paper he sets out a number of key factors that need to be addressed before any radiocarbon dates can be used in the analysis of a larger project. While not all of them are pertinent to this study, there are a few that need to be addressed here.

The most important point made is that any dated sample needs to be clearly associated with the site that it is being dated; this problem is negated in this study by the fact that all the dates used show direct evidence of human activity in their associated layer and thus any date retrieved through their study can be applied as evidence for human occupation at that time. The issue of contamination is brought up a number of times and there are a small number of sites that may show examples of this. The date given from the study conducted at Larig in Allt na Fearna in the highlands, for example, (McCullagh & Tipping 1998) has been noted as possibly being anomalous. However, the study from which this date was taken was not clear on the subject either way and there are only two other dates associated with this study (Rideout 1992, MacKie 1976) that have any doubt in this way and both of these only have ‘possible doubts’.

Another concern raised was the reliability of individual radiocarbon dates. While each date published in a reputable source must be taken on good faith to be as accurate as possible, the impact of single unreliable results on this study can be easily negated. If any of the radiocarbon laboratories which have produced the dates used in this study come into question in the future, either from outside sources or if they themselves realise information or reports that call into question any batches of data produced, the data in question can be easily removed from the study, since all of the sites have been entered into the database along with their radiocarbon codes.

In the aforementioned study of Palaeolithic Siberia, Kuzim and Keats (2005) lay down the basic problems that are associated with using radiocarbon dated sites as a method of tracking the colonisation of an area. They make a list of assumptions that need to be made before such a study can take place and many of their problems are relevant to this study. First and foremost it has to be assumed that there is a close and relative approximation between the sites that have been discovered and assigned radiocarbon dates, and the total number of sites that can be assigned to this time period.

In a Scottish case study (Dickson 2011) it seems that this is indeed the case. There are a number of areas or regions that, while they have sites associated with them, do not all have a radiocarbon date, such as in the administrative district of Moray. There are two sites associated with the region (Carter 1993, Burl 1984), one dated to 6740 cal BP and the other to 6006 cal BP. However, there is at least one more site associated with the area known since the 1940’s: the coastal site of Culbin Sands (Lacaille 1944). It simply has not appeared in the study due to it being a lithic assemblage and thus has no radiometric date associated with it. However, this seems to be the exception rather than then norm and it should be assumed that as much of the area is represented through the study as is possible.

Another problem raised by the study conducted by Kuzim and Keats (2005) concerns differentiating between sites that have been occupied continually for a long period of time and sites that were occupied intermittently. Their solution was to group together dates in ‘occupation episodes’ regardless of whether the dates came from different occupation layers. If the dates all came from the same 1,000 14C period they are counted as one occupation episode. If the overall time period is more than 1,000 14C then they were counted as two or possibly more occupation episodes. This was originally an issue relating to this study of the Scottish Mesolithic, but it was one that resolved itself once it was decided that the focus would be limited to the first date for each site as opposed to a larger analysis of continued occupation.

In conclusion while there are certainly doubts relating to the reliability of radiocarbon dates (Pettitt 2001; Pettitt et al. 2003), studies such as the one produced by Kuzim and Keats (2005) show that, as long as the limitations are laid out beforehand, radiocarbon dates can be used to gain a wider understanding of the population changes and colonisation chronology of a given area.

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2 Nuances in the Archaeological Record Regarding the Mesolithic-Neolithic Transition

David Mennear

The aim of this article is two-fold; to help show the effects of an integrated multidisciplinary approach in studying and understanding the Mesolithic-Neolithic transition, and a discussion on the several issues that the transition had on selected archaeological sites and cultures. Thus the article will limit itself in scope, with the discussion of two European cultures and a Japanese culture which will help to highlight the different techniques and approaches used in understanding the nuances in the archaeological record.

The transition from a hunter-gatherer lifestyle to farming as a means for a stable food return varies enormously depending on which cultures are under discussion and investigation. Additionally, this fundamental transitional period was not an immediate or permanent change in lifestyle; the boundaries between the Mesolithic and Neolithic are becoming ever more blurred as new evidence comes to light (Price 2000: 4). Zvelebil notes, 'The adoption of farming must have had a number of causes which were variable from region to region and were contingent on the region environmental and socio-economic conditions' (Zvelebil 1986: 13).

The LBK Across the Central European Plain

The first culture to be discussed is the Linearbandkeramik culture (LBK) of the Central European Plain (CEP). The predominant impulsive spread of the LBK has been pinpointed and dated from 5700 BC to 4500 BC, and has its origins ascertained to the Middle Danube, and tributaries in Hungary (Scarre 2005: 407). Throughout the LBK culture it has been noted that the sites are often found on fertile loess soils of the CEP as they provided the optimal growing conditions for agricultural use. Price notes this is in contrast to the 'Mesolithic foragers [who] were [more] concentrated in marine, riverine and rich lacustrine environments' and that 'recent surveys in the interior European basins have failed to reveal substantial Mesolithic remains' (Price 2000: 5). The numerous LBK settlements, often located in fertile forest clearings, are very similar in both structurual and material remains which suggests a relatively strong cultural coherence which 'colonised' its way across central Europe (although this has recently been debated). There is also suggestion of an LBK movement from a communal to a later household level of organisation, as the long houses excavated are unique familiar units in the typical village layout (Keeley 1992: 86). It must be noted, however, that there were regional differences in lithic, ceramic and dietary choices within the composition of the LBK culture.

There is also evidence of violence and cultural in-fighting within neighbouring LBK groups from osteological analysis of human remains at the both Talhiem site in Southern Germany, Herxheim in Southeast Germany and the LBK site of Schletz in Eastern Austria. The evidence points towards injuries inflicted with LBK-style weaponry, specifically targeting the male population, rather than by foraging or other farming groups (Scarre 2005: 411). Violence, it seems, is endemic to human populations throughout the course of human history. The geographical predisposition for farming and intensive adaptation of fertile land for farming settlements presents a key development in the nature of land use by human societies in the spread of European agriculture. Interestingly the spread laterally across the CEP contrasts with the later uptake of agriculture around the eastern Baltic and western Russia in 3500 BC, where biologically wild resources were still heavily used up until the 3rd millennium BC (Price 2000: 16; Zvelebil and Lillie 2000).

The Jomon and Yayoi of Japan

Not all societies were exposed to agriculture so quickly, as is evident throughout the Jomon period in Japan. Lasting from approximately 14,000 BC to 300 BC, the Jomon culture contains evidence for the earliest use of pottery in the world and made extensive use of the large variety of environments in the Japanese archipelago (Akazawa 1986; Kaner and Ishikawa 2007; Mithen 2003). The Jomon have been classed as predominantly a hunter-gather-forager culture until the Yayoi period around 300 BC, when the adoption to agriculture was fully implemented with intensive rice agriculture, weaving and the introduction of metallurgy (Mays 1998: 90). There has long been discussion as to whether the Yayoi culture were settlers from mainland Asia who explicitly brought agriculture to the Jomon of Japan, as an integration model, or if the Yayoi superseded the Jomon as propagators of agriculture (Akazawa 1986; Kaner and Ishikawa 2007; Mays 1998). Studies have been carried out on the measurements of skull morphology, in particular the study of the modern day aboriginal Ainu people located in Hokkaido, a large island north of mainland Japan, who maintain they are the Jomon's descendents. Craniometric and multivariate analysis of human skeletal measurements have led to results that indicate that the Jomon are distinctive in head shape from the Yayoi, but they still share distinct similarities with the modern day Ainu population (Akazawa 1986: 151; Mays: 90). This has led to theories that population pressures pushed the Jomon northwards up through Japan to the modern day island of Hokkaido, whilst the Yayoi immigration wave helped to spread agriculture across Japan.

The importance of this work highlights the movement of the adaptation of agriculture in a relatively late time frame, in comparison to mainland Asia and Europe. Palaeoenvironmental evidence suggests this is due to the richness and diversity of the Japanese archipelago, with heavy densities of the Jomon population in 3500 BC located in central and eastern Japan (Kaner and Ishikawa 2007: 2). Stable village sites with pit dwellings, storage areas and burial facilities have been excavated and studied, yet there is only a hint of cultivating nuts and plants. It must also to be noted that Akazawa (1986: 163) points out:

> Rice cultivation would seem redundant to those Jomon societies whose procurement was regulated by year round demands of different major food gathering activities whereas it would seem attractive to those Jomon societies characterised by a simple food procurement system, supported by a single major food gathering activity.

Ongoing data conflicts with the accelerated mass spectrometry (AMS) results from human and animal bone have resulted in suggestions that the impact of the Yayoi culture should be pushed back to 1000 BC or 900 BC. However, the results from sites located on coastal areas could be contaminated with the 'marine radiocarbon reservoir effect', a natural distortion of radiocarbon dates by the dissolving of calcium carbonate which could thus require a possible need to recalibrate existing dates (Kaner and Ishikawa 2007: 4). The outcome of the timing of adoption of agriculture in the Late Jomon/Yayoi period is still hotly debated, as outlined by a few issues discussed above. Yet the archaeological evidence presents a hunter-gather society managing to thrive without agriculture in a range of diverse environments, until later cultural re-adjustment and migrations of people came into contact with the existing Jomon culture and fostered a change towards widespread rice agriculture (Akazawa 1986; Mays 1998).

Portuguese Mesolithic to Neolithic Changes on the Atlantic Coast

Moving on to the Portuguese Atlantic coast, the evidence points to a different motivation in the timing for the implementation of agriculture. Stable isotopic analysis and the dental attrition rates of a number of skeletons have revealed a great variety of information regarding diet changes during the Mesolithic to Neolithic transition. Work carried out by Lubell et al. (at the Moita do Sebastiao, Melides and Fontainhas Roche Forte II sites in Southeast Portugal) demonstrates a gradual dietary change from a mixture of terrestrial and marine resources in the Mesolithic to a diet more dependent on terrestrial food in the Neolithic (Lubell et al. 1994). The date for this transition has been dated to around 5000 BC in central Portugal, with changes beginning around 6000 BC or maybe even 7000 BC (Lubell et al. 1994: 201). This indication of change in food origin is a feature of the 'Neolithic package'. But as we have seen with the Jomon culture, key indicators of the Neolithic (such as pottery and long term village sites) do not always show a movement or adoption towards full blown agriculture. This key concept of the 'Neolithic' package is constantly being reassessed as new evidence blurs this important transitional period in the development of humanity (Zvelebil 1986).

So what other evidence is present in Portugal? Zvelebil and Rowley-Conwy (1986: 68) note a continuing Mesolithic economy, with large shell middens present on the River Muge located at Cabeco da Amoreira and Cabeco da Arruda. Palaeoenvironmental evidence indicates that they were located near shallow lagoon and estuary type environments, with the shell middens themselves dating back to mid 4000 BC with long periods of use. Evidence from the middens has also revealed the presence of faunal remains, such as auroch, roe deer, red deer, badger and lynx, suggesting a rich environment of resources. Evidence of cemeteries include those found at the above sites alongside Moita do Sebastiao, with evidence pointing towards a 'probable increased group size and (increase in) social complexity' (Zvelebil and Rowley-Conwy 1986: 68). This suggests socially and economically complex hunter-gatherer communities near the Atlantic coast with a dependence on seasonal marine resources. The use of cemeteries and long lived sites suggests greater sedentism, which could have opened the hunter-gatherers up to pre-adaption of agriculture.

The early conservatism of the Mesolithic population is noted by the choices of marine and some terrestrial food illustrated by the narrow nitrogen isotopic range from stable light isotope studies, along with a homogenous diet recorded in the earlier middens. This later contrasts to the wider range of carbon and nitrogen isotope averages and the broader range of molar attrition recorded in the Neolithic skeletons, suggesting a greater inclusion of terrestrial foodstuffs into the diet (Lubell et al. 1994: 213). The timing of the adaption to agriculture was culturally defined in this locality, and Lubell et al. conclude that the Neolithic was 'an intensification of a trend which started as an adjustment of food supply during an earlier period of sea level, climatic and vegetational change' (Lubell et al. 1994: 214). This, with the above evidence, drove the long term changes and adoption to farming as it was culturally embraced and practised as the trend continued.

Conclusion

Throughout this discussion it has become clear that the mechanics of the transitional period are various and too diverse to fully discuss here. Inevitably different timings of the adoption occur throughout the world; not one single cause can be suggested for the emergence of agriculture (Lubell et al. 1994; Price 2000; Scarre 2005; Zvelebil and Lillie 2000). It is the amalgamation of a multidisciplinary investigation that helps to clearly define and produce a record of this key prehistoric period and its outcomes for the human population, and it is hoped that this article shows but a small part of that effort.

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3 Media Perceptions of Prehistory: Mesolithic Hunter/Gatherers in early Doctor Who

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For many students currently taking degrees, the year 1963 probably sounds like prehistory! However, it was this year that the recently popular and newly 'cool' series 'Doctor Who' began. Admittedly, back then it had a grandfatherly Doctor, a teenager and two older companions, the budget was tiny and the sets and monsters sometimes wobbled. But there must have been something about the programme that kept it on air for twenty six years, spawned an American co-produced TV movie in the 90's and caused a BBC reboot of the series in 2005.

Returning to the winter weekends of 1963, the Doctor's first TV adventure, 'An Unearthly Child', saw him on a then present-day Earth and his granddaughter at a London school, where two teachers became suspicious about her strange knowledge and the basic gaps in it. They followed her home, pushing their way into a Police Box in a junkyard where they thought she was being held prisoner. They stumbled into the TARDIS... (Doctor Who, 1963).

Fearing that the teachers, Ian and Barbara, would talk about what they had seen if he let them go, the Doctor set his craft in motion, kidnapping the teachers and plunging them all back to the 'stone age' (Doctor Who, 1963).

What developed then was a basic capture and escape story. The time travellers find themselves in a prehistoric landscape, where the Doctor is quickly taken hostage. He had been in the process of lighting a pipe when a watching native took him by surprise and forced him back to his camp (Doctor Who, 1963).

This, to the archaeologist or archaeology student, is a world of Mesolithic hunter-gatherers. The local tribe worship Orb (the sun) who has deserted them in recent months (probably due to a volcanic ash cloud acting as a barrier) and they fear the return of the Great Cold (the last Ice Age perhaps, still fresh in the tribal memory). Food is scarce, likely due to the lack of sunlight, and the tribe is barely surviving (Doctor Who, 1963).

The tribal leader has died suddenly, taking with him the secret of making fire which his son, Za, was not taught before inheriting the role. Kal, who has recently joined the tribe claiming to be the sole survivor of his own people, has captured the Doctor. He wants to lead the tribe and challenges Za, claiming the Doctor and his friends will make fire for him (Doctor Who, 1963).

Despite this being the early 1960's, there are a number of archaeological elements in the story that we would recognise today. The battle between Za and Kal is a basic struggle for power and status within the tribe. As well as worshipping Orb, these people also venerate the ancestors, as the time travellers are imprisoned within the Cave of Skulls, a repository for the bones of the dead. This is sealed by a large boulder, but there is another way in and out, known only it would appear to the most elderly member of the tribe, a woman (Doctor Who, 1963).

Gender archaeology is also catered for, as the two tribal women (the old woman just mentioned and Za's mate), rather than being weak females are shown as having strong influences upon the men around them, as well as having their own agendas. At one point, the old woman helps the travellers escape, because she does not want things within the tribe to change. Za's mate meanwhile has a persuasive effect upon the young tribal leader, instructing him subtly in how to be a stronger leader and frustrate the plans of Kal (Doctor Who, 1963).

Props are also well made and impressive looking. The stone axes seen on screen are familiar to anybody who has studied such artefacts, while the flint knife brandished by Kal in the final episode is also a faithful recreation of a stone tool. Good to see that such attention to detail was being put into what was essentially a children's programme at the time it was made.

The actors took their roles seriously, throwing themselves into the parts as if this were a play aimed at adult audiences. These are not performances that are 'dumbed down' or in any way aimed at a younger audience. They are played straight, real and to a very competent script.

Eventually, the travellers make fire for Za, who then defeats Kal in battle. Rather than releasing them as promised, Za wishes to keep them around to advise him, but the Doctor and his friends have other ideas, tricking the tribe and escaping, though their next journey is to face the Daleks for the first time (Doctor Who, 1963). Talk about jumping out of the frying pan into the fire!

In conclusion, for a kids television programme made on a tight budget in the 1960's, a lot of thought and care went into the production of the first ever Doctor Who story. It is not perfect, for even though the 'caveman' section takes up just three episodes of four it feels long, with a repeated capture and escape sequence. But the script, acting and props made not only an interesting story for a general audience, but also a fascinating one for anybody with an interest in archaeology and especially prehistory. Well worth seeking out for anybody that has yet to watch this early television classic.

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4 Arguing For a More Integrated Approach to Interpreting Prehistoric Cultures

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The study of prehistoric cultures is never going to be easy as there is so much variation in space, time, social and economic context. But I feel it is made all the more difficult by the fact that few archaeologists follow an interdisciplinary approach in their studies.

This opinion is somewhat due to me being a bioarchaeology student. Bioarchaeology adds methodology from the life sciences to the archaeologist's tool kit to help interpret archaeological phenomena. However, I do not wish to talk specifically about bioarchaeology as I believe an interest in interdisciplinary research should be held within all branches of archaeology. I shall give examples of the benefits that an interdisciplinary approach can give to archaeological research with reference to the investigations of the Viru Valley (Peru), Maiden Castle and Star Carr. I shall then suggest how I think an interdisciplinary approach may be achieved.

Prehistoric archaeology is endowed with a huge spectrum of sub-disciplines that contribute to research practice. Over the past six decades numerous innovations in theory, technology and procedure have greatly expanded the scope of research on prehistoric cultures. In 1953, American archaeologist Gordon Willey published his influential book "Prehistoric Settlement Patterns in the Viru Valley, Peru". Prior to this, the majority of archaeologists studied individual sites (Trigger 1989, 284). Willey was influenced by the holistic thinking of anthropologists Julian Steward and Franz Boas who applied their ideas of cultural ecology (the influence of the environment on culture change) to investigating the multiple prehistoric communities of the valley (Renfrew and Bahn 2008, 36).

Willey established the study of settlement patterns by using an unusually large array of survey methods to identify the context of multiple sites in relation to each other and the variable environment, plotting any changes through time and space. All resolutions of survey were employed from field walking and topography on a large scale to aerial photography on a smaller scale. Spatial data was correlated with relative time through seriation of pottery found from the field walking and subsequent excavation. This novel approach to interpreting prehistoric culture inspired the application of ecological frameworks to archaeological investigation, most notably by Lewis Binford and the New Archaeology paradigm in the 1960s.

In 1985, Niall Sharples excavated the well-known Iron Age hillfort Maiden Castle. However, Sharples didn't spend his entire time within the ramparts. Like Willey and Binford, he was aware that the site he was investigating had to be situated within a landscape, and that it was only by doing this that an appreciation of the site's chronology and economy could be made (Sharples 1991, 20). A number of environmental indicators were studied in order to achieve this, including: the local distributions of geology and soil type, suggesting the agricultural potential of the area; and microanalysis of pollen grains and mollusc shells, which helped identify the changing nature of the local environment and vegetation as each species of plant and snail is sensitive to these conditions. The relative frequencies of different types of snail shell and berry within the ditches of the fort were stratigraphically sequenced to illustrate the phases of deforestation and regeneration of woodland immediately surrounding these features (Sharples 1991, 26-27).

The use of radiocarbon dating allowed Sharples to make an equally comprehensive analysis of the site's chronology (Sharples 1991, 18 and 54). Technologies of absolute dating were not available to Mortimer Wheeler who excavated the fort ramparts in the mid-1930s. Because of this, Sharples was much better able to suggest the length and patterns of habitation at the site.

To a Culture-Historical archaeologist from the early twentieth century, the Mesolithic site of Star Carr may not seem particularly remarkable. But thanks to the work of Grahame Clark in 1949, it has received much deserved attention from archaeologists. Clark recognised the need to include organic remains in the interpretation of a site. Many of his contemporaries focused exclusively on non-organic artefacts like pottery and lithics for dating purposes due to the unavailability of modern techniques of absolute dating and because of the lower survival of decomposable artefacts like bone and plant remains (Trigger 1989, 265). Fortunately, the land around Star Carr is largely composed of peat allowing for excellent preservation of organic material.

Our current understanding of the site would not be possible without ecological methodology. Pollen environmental sampling identified the site as being on the edge of a lake and provided some insight into the diet of its inhabitants (Renfrew and Bahn 2008, 37). Clark's excavation at Star Carr was substantiation that detailed analysis of animal bones deciphered as much archaeological information as the analysis of human bones and other artefacts. As well as being a source of food, red deer were found to hold symbolic meaning to the local communities as a number of skulls made into head-dresses have been excavated. Recent interpretation is suggesting that these items may have had ritual significance due to their deposition on the lake-edge. Antler has been studied to suggest the season of their exploitation, which has later been questioned with the contrasting indication of season from the phase of eruption in deer teeth (Mellars and Dark 1988, 159-160). The dendrochronological analysis of wooden floor surfaces in later investigations have encouraged further discussion of the seasonality of the site's use and refined Clark's radiocarbon dating of it (Mellars and Dark 1988, 119).

Certain aspects of an individual's health and lifestyle can be derived from analysis of their organic chemistry. Stable isotope analysis of the bones of a canine excavated at Star Carr revealed it to have had marine fish as part of its diet. This has helped inform understanding of the domestication of animals in Mesolithic Britain and has suggested that the site was periodically occupied by a mobile hunter-fisher community (Clutton-Brock and Noe-Nygaard 1990, 651). The chemistry of artefacts provides a unique insight into the lifestyles within and between different communities. Manufacture, trade and subsistence can be investigated through the analysis of organic residues from pottery that can help determine what foods were contained within them (Grant, Gorin and Fleming 2008, 91-92).

Organic residue analysis has been used in recent academic research on patterns of dairying in southern Iron Age Britain, with a selected pottery assemblage from Maiden Castle used for part of the sampling. Lipids from pottery shards were extracted and analysed to reveal the proportion of pottery used to contain dairy products, the correlation of pottery style with this function, and the predominant species source of the dairy (Copley et al. 2005, 493). The line of enquiry of this research is very different to the ecology-centred approach followed by Sharples, but the cultural and economic significance of the site at the contrasting scales of its past environment and its assemblage of pottery can be interpreted together to help build a more holistic view of the site.

Willey's investigation of the Viru Valley in Peru encouraged the integration of geographic context in the archaeological interpretation of sites. By taking into account the unique relationships between neighbouring communities and the environment, archaeologists could further their insight into prehistoric systems of subsistence, trade and relations beyond what they could only infer from the study of material culture. Using a similar approach, Sharples' study of Maiden Castle focused on its relationship with the geology and agricultural potential of the surrounding area to imagine the occupant's perspective of the world around them. This added to the earlier work by Wheeler who took an internal perspective of the physical structure of the site. The use of environmental sampling indicated aspects of the site's character no longer observable today and radiocarbon dating altered the evaluated age and chronology of habitation.

The large extent of preservation of organic remains at Star Carr allowed Clark to use a variety of analytical techniques from the fields of ecology and organic chemistry in his study of the purpose, seasonality and length of the sites occupation. Osteological analysis of deer skulls suggested the species had symbolic meaning to the community, with signs of ritual use and deposition. Analysis of other faunal remains has hinted at the intensity of the site's use, and dendrochronology from more recent investigation has calibrated Clark's radiocarbon dating of the site. The stable isotope analysis of canine bones revealed the animal to be an early example of a domesticated dog in Mesolithic Britain and supported interpretation by Clark and others that the site was only used seasonally from the identification of partial marine diet. The employment of these many techniques allowed an extensively discussed comprehensive investigation of life at Star Carr.

What Willey, Sharples and Clark have done is something that few other archaeologists have achieved: they have united different archaeological subdisciplines for the common purpose of interpreting past cultures. This has undoubtedly led to their research being some of the most far reaching in archaeology. Why then have few other archaeologists adopted an interdisciplinary approach to their work?

The discipline of archaeology originated from multiple areas of academic enquiry. This encouraged the adoption of many styles and methods of investigation, meaning that from its earliest days archaeology was a subject only in its objective of studying past humanity. Theoretical debates such as in the Science Wars and between Processualism and Post-Processualism haven't been the cause of fragmentation; rather they have been symptoms of it, drawing much-needed attention to its permanent existence. Lack of cohesion in funding, education and dissemination all exist because of the very nature of archaeology's origins, and unless dealt with shall continue to limit its progress. By simplifying funding and removing ring-fencing, academics would be freer to collaborate with one another. This in turn would make easier the provision of a shared grounding in the principles of archaeology to students, enabling greater appreciation of the benefits different practices can give to archaeological research. To reach an integrated archaeology, dissemination of research would have to reach wider audiences with the use of an integrated media and a common vocabulary.

Reversing many of the things that made archaeology what it is today in order to create a more unified endeavour is filled with risk and is certainly a daunting prospect. But the prospect of an archaeology that asks more questions and gives fuller interpretations is perhaps a prospect worth aiming for.

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