

Centre for Palaeoecology, University of York

Research Forum 1998

*Abstracts from a one-day forum
held at the Tempest Anderson Hall, York
on 28th October 1998*

Environmental Archaeology Unit
Department of Biology
University of York
PO Box 373
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Centre for Palaeoecology

*A joint research endeavour of the
Departments of Biology
and Archaeology*

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Compiled by D. Jaques and K. Dobney

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Research Forum 1998 - Contributions

Programme:

10.00 *Assemble (coffee).*

10.30 **Chair:** *Welcome and introduction.*

10.40 **Tim Skerry** (Department of Biology, York): *Responses of the skeleton to lifestyle - the hows and whys of bone structure.*

11.10 **Ben Gearey** and Malcolm Lillie (Centre for Wetland Archaeology, University of Hull): *Recent geoarchaeological and palaeoenvironmental research in the Vale of York: preliminary results from the Humber Wetlands Survey.*

11.40 **Chris Loveluck** (Humber Archaeology Partnership) and Keith Dobney (EAU): *A match made in heaven or a marriage of convenience? The problems and rewards of integrating palaeoecological and archaeological data.*

12.10 **Don Brothwell** (Department of Archaeology, York): *Why additional posterior buttressing on the hind canon bones of some sheep?*

12.30-14.00 *Lunch*

14.00 **Paul Hughes** (University of Southampton), Allan Hall and Harry Kenward (EAU): *An archive of rapid climate change and mire development from Church Moss, Davenham, Cheshire.*

14.30 **Keith Dobney** (EAU): *Of falconry, foraging and farming: thoughts on the significance of raptor remains recovered from proto- and early Neolithic sites in the Middle East.*

14.50 **Cluny Johnstone** (EAU): *Alas poor Yorricks! Notes on three unusual skeletons.*

15.10 **John Carrott** and Harry Kenward (EAU): *Multum in parvo: the significance of small archaeological insect assemblages.*

15.30-16.00 *Tea*

16.00 **Lisa Hodgetts** (University of Durham): *Rudolph the Stone Age reindeer: reindeer in prehistoric Norwegian society.*

16.20 **Allan Hall** (EAU): *Parvum in multo? A survey of developer-funded projects undertaken by Palaeoecology Research Services at the Environmental Archaeology Unit in 1997-8.*

16.40 *General questions, discussion and closing remarks*

Responses of the skeleton to lifestyle - the hows and whys of bone structure

Tim Skerry (Department of Biology, University of York)

Although the skeleton has many functions, including calcium homeostasis, and haematopoiesis, the single factor that accounts for the shape, structure and mass of our bones is the need that bone should resist mechanical forces without fracture. This requirement is necessary to protect vital structures such as the brain and heart, and to allow efficient locomotion, with little likelihood of fracture under all normal and most unusual loads. Naturally, one solution to this would be that each of us would have a very massive skeleton which was unlikely to be damaged by all but extreme loads. However, that would be costly to grow, maintain and use, and it would be likely that individuals carrying around excessive amounts of bone would be unable to catch prey or evade predators. The solution that has been adopted is therefore that the skeleton responds to the demands placed on it by our lifestyles so that active people have stronger more massive bones than inactive ones. Naturally this process depends on an adequate supply of nutrients, and appropriate hormones, but those factors are best considered to be permissive to the attainment of adequate bone mass. If, for example, an individual has too low an intake of calcium, or in women after the menopause, bone mass may be too low to maintain the normal safety factors, so that mild overloads cause fractures. From an architectural standpoint, therefore, the mass and structure of a bone may give clues towards the diet, activity, age and health of the individual. The mechanisms behind the alterations in bone structure are complex, but involve the responses of bone cells to mechanical and biochemical signals, which are integrated in order to provide the cellular activity which will generate the most appropriate mass of bone for a given set of circumstances. Recent research here in York suggests that bone cells share common signalling mechanisms with the brain, and use chemicals previously regarded to be exclusively neurotransmitters to allow communication between cells. Since it has been suggested that the origin of the mineralised skeleton was a structure which enveloped and protected the brain, perhaps it is unsurprising that there should be similarities between the cells of two tissues which at first sight seem so disparate.

Recent geoarchaeological and palaeoenvironmental research in the Vale of York: preliminary results from the Humber Wetlands Survey

Ben Gearey and Malcolm Lillie (Centre for Wetland Archaeology, University of Hull)

The Humber Wetlands Survey has been investigating the lowlands around the Humber Estuary for the past four years. The survey has divided the *c.* 300,000 ha of lowlands into six discrete physiographic units. Three of these have been completed to publication, and the fourth, the Vale of York region, is in press.

This talk will present the preliminary results of the palaeoenvironmental programme of the Vale of York. This programme integrates transect coring, sediment analyses, spot pollen sampling, high resolution palynological analysis and the use of radiocarbon determinations in order to enable a picture of landscape development to be generated for the Holocene period. The chronology of river and bog development is assessed, and the results obtained from these palaeoenvironmental analyses are integrated with the results of the archaeological survey of the region in order to facilitate an integrated approach towards the understanding of past human activities in the Vale.

Details of the relative and absolute chronology of landscape development will be addressed, and the overall picture will be considered in light of the known vegetational and anthropogenic influences in the Vale over the past 10,000 years.

A match made in heaven or a marriage of convenience? The problems and rewards of integrating palaeoecological and archaeological data.

Chris Loveluck (Humber Archaeology Partnership) and Keith Dobney (EAS, University of York)

The marriage of archaeological science and ‘conventional archaeology’ has, and continues to be, uneasy, at best and irreconcilable at worst. There is no doubt still a problem of the perceived value of environmental archaeology, in particular, within archaeology, which in turn results in much of its interpretative potential remaining unfulfilled. All too often this is a direct result of the ‘compartmentalisation’ of the various disciplines and the lack of real integration of common research aims and results. Although the principles of integration are outlined by the MAP 2 process, implementation of the working model proposed has proved to be cumbersome and bureaucratic.

In this paper we discuss the problem and, using data from the Middle-Late Saxon site of Flixborough, N. Lincs., provide examples of how integration of all lines of evidence has provided a series of important and significant insights into the life of the inhabitants. Here, the range and quality of the evidence from the site has provided an excellent opportunity to establish archaeological criteria for defining the character of Middle to Late Saxon high-status rural settlements, both within the area of the Humber estuary and more widely in England. The finds assemblages are of particular value for investigating the different facets of the economy of such a settlement, especially animal husbandry, exploitation of wild resources, craft and industrial activities and the changing character of the settlement through time.

Why additional posterior buttressing on the hind canon bones of some sheep?

Don Brothwell (Department of Archaeology, York)

This contribution is to call attention to the occurrence in some sheep metatarsals of abnormal bone development. Currently, we need more information on how commonly this feature occurs in sheep samples. The anomaly presents itself as a rounded line of additional sub-periosteal cortical bone extending down the posterior aspect of the sheep metatarsal. The question is whether this is truly buttressing and if so why does it form? The additional bone growth will be considered in more general aetiological terms in relation to the interpretation of the metatarsal anomaly.

An archive of rapid climate change and mire development from Church Moss, Davenham, Cheshire

Paul Hughes (University of Southampton), Allan Hall and Harry Kenward (EAO, University of York)

In response to a proposed road development, designed to relieve traffic congestion in Davenham village, a three metre depth of well developed mire deposits lying below prime pasture land at Church Moss were investigated for their archaeological potential. Preliminary biostratigraphic analyses provided limited evidence to suggest that the local vegetation had been disturbed by Mesolithic people. More detailed analysis, involving open area excavations and a full post-excavation biological assessment, demonstrated that all of the disturbance features could have been natural events. However, during the assessment phase of the project, it became clear that the mire deposits at Church Moss represented a valuable palaeoenvironmental archive. This presentation aims to demonstrate the significance of the climate change and vegetation development records preserved in the peats at Davenham.

The proxy-palaeoclimatic archive

Beetles and bugs are highly mobile and sensitive to air temperatures, so their fossil remains provide a valuable insight into palaeoclimate change. This technique of climatic reconstruction has the disadvantage that suitable sampling sites are rare. The open area excavations at Davenham provided the opportunity to extract samples of sufficient size to make fossil invertebrate analysis viable. Furthermore, invertebrate concentrations were adequate to good and the palaeoenvironment suitable for the preservation of vital terrestrial indicator species. Interest in the site was greatly increased when radiocarbon dates indicated that the deposits straddled the transition from the Devensian Lateglacial to the early Holocene: a time of dramatic climatic change. The deposits at Davenham also offer a much-needed chance to extend the geographical range of sites covering the Lateglacial period to an area that has previously received little attention.

Mire vegetation development

The mire development sequence at Church Moss is rather unusual in that the lifespans of hydrosere stages are extended, compared with those expected as a consequence of undisturbed succession. The natural course of development has been slowed by the gradually rising groundwater water-table. Additionally, the rising water-table has enhanced the chances of preservation of plant remains leading to the development of a significant thickness of Lateglacial age fen peats offering particularly good stratigraphic resolution for palaeoenvironmental reconstruction.

Of falconry, foraging and farming: thoughts on the significance of raptor remains recovered from proto- and early Neolithic sites in the Middle East

Keith Dobney (EAS, University of York)

“The origin of falconry, both geographically and chronologically, is still hidden in darkness, and it seems doubtful whether we shall ever discover the cradle of this ancient sport.” (Epstein)

The remarkably consistent presence of raptor remains at many proto- and early Neolithic sites in the Middle East, and the bias in favour of specific elements, have previously been noted by numerous workers. Where the presence of raptor remains at these various sites has been discussed, they have either been used to provide detailed palaeobiogeographical information, or presented as indicating the presence of complex totemic or symbolic activities. However, the raptor (and other vertebrate) data from many of these sites could also support another hypothesis which has, as yet, not been fully explored, i.e. that living birds of prey were tamed, managed and perhaps trained in the first faltering steps towards falconry.

Seen within the cultural and environmental framework of the early Holocene, a time of the so-called ‘broad-spectrum revolution’, the significance of raptor remains from proto- and early Neolithic sites in the Middle East may perhaps best be interpreted in both an economic and a symbolic light.

The broad-spectrum sites of the Middle East are extremely significant in that they probably represent occupation by groups of humans who had only recently become sedentary but who still utilised hunting and gathering as an economic strategy. The theory of rapidly declining resources, as a result of intensive exploitation within a fixed territory, seems to be a plausible explanation for the apparent shift in focus towards smaller, less rewarding, species which forced many of these groups inextricably down the road towards domestication. What is perhaps most intriguing about the idea that raptors were being tamed (and possibly used for falconry) as early as the proto- or early Neolithic period, is the temporal proximity of this activity (if it happened) to the beginnings of domestication of the earliest major economic species, i.e. sheep and goat. The domestication of the dog (as a possible companion and/or hunting aid) is now firmly established as having taken place during the Mesolithic period (perhaps even earlier). Could experimentation with taming and management of raptors, as a new additional hunting strategy and/or for ‘religious’ purposes, have acted as a prelude to the beginnings of the utilisation of the major domesticates?

Alas poor Yorricks! Notes on three unusual skeletons

Cluny Johnstone (EAU, University of York)

The aim of this talk is to present the results of osteoarchaeological analysis of three human skeletons with unusual pathological conditions examined by the speaker during the last year.

The first skeleton was recovered during the 1997 excavations of a late Roman farmstead at Campanio in Sicily. The skeleton was reasonably complete and standard criteria suggested an adult (25-35 yrs) male individual, with an estimated stature of 167-180 cm. The burial position was slightly unusual the body being buried on its right side, with the head oriented to the west, facing south. A variety of oral pathologies, including sub- and supra-gingival calculus, antemortem tooth loss, apical abscess, caries cavity and periodontal disease were noted. Vertebral and pelvic arthropathies were also noted, together with healed rib fractures and an ununited fracture of the left acromion process. The bones of the cranial vault showed severe thickening due to expansion of the diploe, with destruction and alteration of the interior surface of the fragments. The changes to the skull suggest the individual may have suffered from anaemia - possibly Thalassaemia, given the geographical location (Mediterranean).

The second skeleton was recovered during excavations at the former female prison in York (now the Castle Museum). The skeleton (dating to the late 18th/early 19th C) was reasonably complete and standard criteria suggested a female individual, approximately 25 years old with an estimated stature of 159-166 cm. Schmorl's nodes were noted on both surfaces of the vertebra from 5th thoracic to 2nd lumbar. All were centrally placed and most circular and quite deep, becoming less regular and larger lower down. An unusually large number of Wormian bones were noted along both the coronal and lambdoid sutures. The most notable feature was the fact that the skull had been crudely sawn in half horizontally to gain access to the cranial vault. During excavation the ribs were noted to have been in a splayed position suggesting the chest cavity had also been opened. These observations suggest that an autopsy was carried out on the body prior to interment.

The third skeleton was recovered during excavations in the crossing of Ripon Cathedral. The skeleton was well preserved but incomplete (lower legs missing) and standard criteria suggested a female individual, over 30 years old, with an estimated stature of 160 cm. A single caries cavity, two small Schmorl's nodes, and the partial, congenital, exposure of the sacral canal were noted. More interesting changes to the bones of the chest region were noted. The neural spines of the middle thoracic vertebrae appeared to be flattened caudally and ventrally, but without any obvious changes to the structure of the bone indicative of disease or a traumatic event. The sternum was excessively curved inwards at the lower end and was slightly asymmetrical, again without any changes to the structure of the bone. The lower ribs also appear to be excessively curved. On the basis of these changes, it is suggested that, as this was a female, probably of high status, these may reflect long-term changes to the bones of the individual as a direct result of restrictive corsetting from an early age.

Multum in parvo: the significance of small archaeological insect assemblages

John Carrott and Harry Kenward (EAU, University of York)

Our recently completed investigation of associations of insects (mostly beetles) in intensive occupation deposits showed characteristic groupings which could be related to deposit type and which are, therefore, regarded as valuable in interpretation.

These groupings are now being employed to complement the long-established categories such as 'aquatics', 'wood feeders', 'foul decomposers', 'grain pests' and the like.

We are, generally, comfortable in interpreting large assemblages (of at least 100 MNI of adult beetles and bugs) by inspecting species lists and referring to assemblage statistics based on 'ecological' groupings. However, this becomes increasingly more difficult and subjective as assemblage size decreases. To address this we have used tests of the significance of over-representation of our identified groups within small assemblages. To test this approach we have cross-referenced assemblages with significant excesses of categories to archaeological feature type for the data from 16-22 Coppergate, York, and found some strong correlations. We are, therefore, encouraged to use a test for significant excesses of ecological groups as part of routine investigation. We suggest that this should be done with reasonably homogenous data sets, since assemblages from very different kinds of site may not be reasonably compared. Nevertheless, it is probably justifiable to amalgamate, for example, Anglo-Scandinavian sites in York or Roman urban deposits in Carlisle to provide larger data sets.

Rudolph the Stone Age reindeer: reindeer in prehistoric Norwegian society

Lisa Hodgetts (Department of Archaeology, University of Durham)

Recent work on bone material from Younger Stone Age (YSA ca. 6500-3800 BP) house middens of Varangerfjord, north Norway, suggests that, while the diet was dominated by marine species, reindeer (*Rangifer tarandus*) played an important role in the economy and culture of the region. Though reindeer constitute only a small part of the total faunal assemblage, the majority of bone and antler tools were made of reindeer. This was doubtless for practical reasons, as reindeer longbones are more suitable for artifact production than the short, stocky bones of seals.

There are unusual patterns of reindeer body part representation at these sites which do not appear to relate to either preservation conditions or meat utility. This could be partly due to the fact that reindeer were hunted primarily as a source of raw material rather than meat. In addition, I suggest that the reindeer carcass may have been subject to social or kin-related rules for distribution, which were not applied to more commonplace prey such as seal.

The current staff of the EAU

Ancient Monuments Laboratory Fellows

Keith Dobney		vertebrates
Allan Hall		plant remains
Harry Kenward	Director; invertebrates, especially insects	
Raimonda Usai		soils and sediments

Palaeoecology Research Services

John Carrott	microfossils, particularly parasite eggs; molluscs and computing	
Deborah Jaques		vertebrates
Cluny Johnstone		vertebrates
Frances Large		insects
Darren Worthy		technician

Other staff and research students

Mark Beech		postgraduate student
Susan Haynes		postgraduate student
Ian Barnes		postgraduate student
Sam Bolton		placement student

The Unit's Line Manager in the Department of Biology is Professor Peter Young.

About the EAU

The Environmental Archaeology Unit is a research group within the Department of Biology at the University of York. It was established in 1975 with funding from the Historic Buildings and Monuments Commission (Department of the Environment) and the Leverhulme Trust. Currently four Research Fellows are funded by the Ancient Monuments Laboratory of English Heritage, and a variable number of other staff (typically four or five) are supported from commercial contracts and English Heritage project funding. Strong contacts have grown with other institutions including many archaeological units and university departments.

The Unit strives towards an integrated approach to environmental archaeology, drawing together information from many aspects of the subject, including studies of soils and sediments, pollen, plant macrofossil remains of all kinds, invertebrates (including parasitic nematodes, insects and other arthropods, and molluscs), and vertebrates. We believe that the integration of evidence is crucial in building a more solid foundation for the interpretation of the evidence as a whole from archaeological deposits, leading to the recovery of much more valuable information than work on single specialisms or isolated parallel studies.

The Unit, together with the Environmental Archaeology Laboratory at Durham, constitute the Northern Regional Team of AML contractors. The co-ordinator of the Northern team is based at York. Both groups are charged with providing advice concerning all aspects of environmental archaeology, carrying out assessments and main phase site projects, and executing programmes of research and review.

The EAU contract group, *Palaeoecology Research Services* (PRS), is able to organise and execute environmental archaeology studies of most kinds, including evaluations, drawing on a wide range of expertise. More information can be obtained from the staff of PRS (01904 434475, 434487, fax 433850).

The Departments of Archaeology and Biology at the University of York in 1995 formed the interdisciplinary *Centre for Palaeoecology*, an umbrella for the activities of the EAU and other researchers in the broad areas of palaeoecology and environmental archaeology.

A list of publications and reports by EAU staff and associates is available free on application to the Director, and is also accessible through the internet.

The Unit's web page can be found at <http://www.york.ac.uk/inst/eau/>.