circaea

The Bulletin of the Association for Environmental Archaeology
CIRCAEA is the Bulletin of the Association for Environmental Archaeology, and - as from Volume 4 - it is published twice a year. It contains short articles and reviews as well as more substantial papers and notices of forthcoming publications.

The Newsletter of the Association, produced four times a year, carries news about conferences and the business of the Association. It is edited by Vanessa Strozer and Bruce Lewitan, to whom copy should be sent c/o B. M. Lewitan, University Museum, Parks Road, Oxford, OX1 3PW.

Editorial policy for CIRCAEA is to include material of a controversial nature where important issues are involved. Although a high standard will be required in scientific contributions, the Editors will be happy to consider material the importance or relevance of which might not be apparent to the editors of scientific and archaeological journals, such as papers which consider in detail methodological problems like the identification of difficult bioarchaeological remains.

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Do you have a pet theory or piece of received wisdom that you love to hate? Why not write about it for pleasure (but not profit) in *Circums?* The Editors wish to produce an issue devoted to 'iconoclasm', to give contributors an opportunity to express their misgivings about, or downright diabolism in, some of those cherished theories and practical methods that appear to have stood us in good stead for years. We wouldn't want to encourage criticism for its own sake, but a forthright though constructive reconsideration of old ideas can only be refreshing and productive. Short contributions will be welcomed as well, on longer, more formally structured papers.

As many of you will already know, a new journal has appeared in recent months - Archaeozoaology - published by La Perle Sauvage, and edited by Pierre Ducos at Bordeaux. At Prof. Ducos' suggestion, the Editors of this journal have agreed to exchange copies of each issue of *Circums* and *Archaeozoaology* and to reproduce in each summary of papers published in the other. (This, of course, makes it more imperative that our contributors supply a summary!) Despite its name, *Archaeozoaology* is thus far devoted entirely to papers about microszps. Those who work on invertebrates remains in archaeology should obviously be encouraged to offer contributions to it, to prevent it becoming yet another 'vertebracist' publication.

Many others of you (probably not the same group) will be aware that 'CTW' (Flore of the British Isles) has reached a third edition (published by the Cambridge University Press in May this year, and now authored by Clapham, Tutin and Waron). It costs a staggering £55 (staggering, considering its potential sales) and, although now in a somewhat easier-to-handle format, one is still completely lacking from the text. Oh, so it's only Zannichellia - about half-a-page's width - but one might have expected better. This is not simply a minor omission, since all subsequent families are misnumbered - and do not therefore tally with the Synopsis of Families at the front of the book, where Zannichellaceae is listed. One wonders whether 'CTW' will be dumped in a few years' time like Godwin's second edition 'MBF', when the cost of storing over-priced tomes outweighs any profit CUP is likely to make!

Following a comment from a reader, we must set the record straight by revealing that the Sherlock Holmes parody in *Circums* 4(2) emanated from Phillipa Tolkien, although most people probably guessed! Michael Ryder also wrote in response to this piece - more of that below. This kind of mischief drawn forth a mixed response, but on the whole we would prefer to encourage humorous articles providing that they have a serious underlying point.

Last, but certainly not least, the Editors would like to thank Kate Watson and Tracy Painter, employed at the Environmental Archaeology Unit on a Marguerite Services Commission Community Programme scheme, for transferring most of the copy for this issue of *Circums* from typescript to floppy disk.

Front cover: The warty-shelled egg of the ear-worm, *Ascaris* (probably *A. lumbricoides* L.). Based on an original photomicrograph of a fossil specimen from Lindow Man, by Dr A. J. Wilson (Department of Biology, University of York).
Much progress has been made since my first report on this site was submitted for publication in ‘Miscellany’ in these pages last year (Circles, 4(1), 6-10). The archaeological stratigraphy of the midden (using the term very loosely) can be divided into Zones A, B and C (working from the base upwards) for the purposes of generalized description and discussion, and of these Zones B is now covered by five radiocarbon dates from the Lower Mutu Laboratory in New Zealand, ranging from 2,500 to 5,000 B.C. The error terms, ranging from 250 to 500, are larger than one might desire but since the dates were obtained free of charge one can hardly complain! The Australian National University will have begun dating samples from Zone A (expected to range in age from 5,000-3,000 B.C.) in July 1987, and ten samples from pollen cores K.L.2 and EMK7 (collected north of the site) are currently being dated on the accelerator at Oxford.

William Thompson has just finished a second period of fieldwork in Thailand as I write (April 1987), aimed at collecting plant material from mangrove and other environments to identify the plant microfossil remains. He has been working at the Institute of Archaeology, London, during July 1987, extracting material from the coprolites.

Five of the larger coprolites were sent to me first so that I could extract what I needed for pollen analysis. These were all calcified and absolutely rock hard. I scraped out sufficient material from the centre of the very largest, and prepared this using hydrochloric acid, then a weak solution of tetra-sodium pyrophosphate followed by routine methods. It proved to be poor in pollen but had some phytoliths, monocotyledon leaf fragments and microfossil charcoal. There was nothing there to identify it positively as of human origin or to give much information of any value at all. I have sliced small sections out of the four other coprolites but need to find more information on preparation methods before proceeding any further. If anybody has any information or ideas about treating calcified coprolites I would be very pleased to know.

The large monolith from the side-wall of the excavation mentioned in the previous report is now in New Zealand with Prof. Hyndman and is being examined by a geologist as part of a PhD project. This is most fortunate as we did not have a geomorphologist with us as a member of the fieldwork team. I had intended to work on the phytoliths but a report by Pearseall (1986) based on phytolith analysis of samples from excavations in the Philippines, rice field soils and modern reference material of numerous locally collected plants, including rice, suggests that this technique is fraught with difficulties for South-East Asian work at least. Fujiwara is cited elsewhere (Fouch 1984, 3) as claiming that he can not only identify rice phytoliths from Japan but those of associated grass species such that remains on the type of cultivation can be made. Pearseall confirmed that rice produced distinctive phytoliths but those did not occur in the rice field soils which she studied or in samples from the excavation. She also discovered that some grasses move both the typical Panicoideae and Chloridoideae forms of phytolith present. So my work on phytoliths here, at least for the time being, been curtailed. Although the problems associated with pollen analysis are legion, it is a tried and tested technique capable of yielding useful results.
In all, four pollen profiles from the near environs of Khok Phanom Rung are now available and research is progressing upon a fifth. Three of those already correlated are from north of the site, as is the one (KL5) which I am currently working on. The one from south of the site (JB2) was prepared by Judith Brown. She has also analysed another two from areas east and south-west of the site and within a 10 km radius to provide a rudimentary perspective of regional variation in the lower Ram Pahang valley. Unfortunately she has now left The Queen's University of Belfast, deterred by the disillusioned employment prospects in the academic world, and might not write up her findings for a degree. This would be a great pity as she has put in considerable effort on the laboratory work. Nevertheless semi-detailed reports on core JB2 and my core KL5 have been prepared (Maloney and Brown in press), as well as on cores KL2 and BJMR2 (Higham and Palenoy in press). Nothing has been published on core FJ3 yet but this does not differ greatly from BJMR2, and core KL5 looks, from the first few pollen counts, as if it, too, is going to be similar, with *Phyllophora* and *Shugulea* comp. dominating the spectra until late in the record when *Ceratopogonites* (possibly indicative of tree-dominated freshwater swamp or lowland dryland forest) increases, followed by an increase in grasses. JB2 differs in that it has a high *Phyllophora* content but very little *Shugulea* in most samples.

Grass pollen rises earlier at KL2, which is located nearest to the site, and some consistency in the microfossil charcoal peaks of the various cores tends to suggest that the vegetation was burnt off before initial occupation of the site and in association with the increases of grass pollen. The lower 15-20 cm of the archaeological stratigraphy was very rich in charcoal and a sample from the 'natural' contained macro- and microfossil charcoal but no pollen or phytoliths. Some of the grass pollen has the right size and surface patterning to be from rice but it is impossible to be as sure as Tuckered at all. (1986) have recently been for material from Japan, where the number of grass species present in the local vegetation is likely to be lower and rice was growing on the site in question (Ubuka Dog in south-west Honshu). One thing that is almost certain is that, while rice macrofossils were present at our site from the very base of the archaeological record, the pollen evidence suggests that it could not have grown around the site until later prehistory. This is not to preclude the possibility that it had actually been cultivated on a small scale on the mound itself or that it was present as a wild plant (and collected) or under cultivation further inland. A core from the south-west edge of the mound contains bands of incised charcoal and it is hoped to subject this to pollen analysis in due course so that the record from this side of the site can be elaborated upon.

Ken McKenzie (Riverina-Murray Institute of Higher Education, Wagga Wagga, Australia) has kindly examined the sponge spicules, foraminifera and ostracods contained in some KL2 samples, and he reports that most taxa associated with the period of mangrove pollen dominance are of nearshore marine affinity but all those present can also be found in deltas and protected embayments. This at least confirms that the site was near the sea (it is now c. 20 km inland), if not surrounded by it. Cores BJMR2, FJ3 and KL5 have a high percentage of extremely corroded pollen which may indicate that the mangrove was not growing nearby but some distance inland from the site, which may have been an island in a shallow sea, although a similar pattern might be expected if it was a levee.

Anhpan Kijjam, who has been working on the fish remains from the site, found that large groups (e.g., Seriidae) were very frequent until zone C. Groups come into the estuaries at the start of the wet season and so are only available seasonally. Coastal species such as shark, ray and squid also occurred but a significant quantity of freshwater fish, of which small catfish were most common, were present throughout the
Following a semi-serious piece in the last issue of Ciceroa concerning the recognition of modern contaminants such as cigarette filters in archaeological deposits, Dr Michael Ryder has written to remind us that he published an article in *Antiquity* in 1974 (Vol. 48, p. 6) with a similar sentiment; we reproduce it here, with the permission of the author and of the Editor of *Antiquity*.

*Belgic cotton, or don’t dig and smoke; a cautionary tale*

Some time ago, I received from a Belgic excavation that shall be nameless some fibres from what had appeared to be some wool with two cut ends suggesting a “double-out” made while the fleece was being shorn. It was thought that this might throw light on the introduction of a white, fine-wooled sheep into Britain.

My first reaction to the white colour with the naked eye was that the fibres appeared to be flax, since even non-pigmented animal fibres usually have yellow discoloration. Also the fibre length was too regular to represent a “double-out” from a fleece.

Under the microscope the fibres appeared twisted like cotton, but had the pigment that is added to de-lustre synthetics. Also the diameter distribution was too uniform for wool. Another expert I enlisted thought the fibres might be silk, and at this stage since the sample clearly was not wool (my main interest) I withdrew from the investigation through lack of time.
The filters were then sent to a textile testing laboratory which confirmed my suspicion that material was a modern synthetic, and identified the mass (which I had not seen in its entirety) as a cigarette filter.

Amusing as this may be, it wasted an appreciable amount of several experts' time, and strikes at the very roots of archaeology. If such a large object as a cigarette end can creep into an excavation un-noticed, what hope have we that really small finds, such as insect parts are not modern intrusions?

It appears that archaeological excavation needs a form of hygiene skin to that in food preparation if not that of the surgical operation. Is it too fanciful to suggest that the archaeologist will one day, like the surgeon, work through a "drapé" so that only that part actually being excavated is exposed?

Dr Ryder also informs us that he has moved to Southampton; his new address is 4 Capsway Close, Southampton SO1 0EX, U.K.

Archaeozoologia - A new scientific journal

Archaeozoologia, a new periodical whose first number has recently appeared, has been established in response to the need for an international journal for archaeozoology. Entirely devoted to this subject, it will be of interest not only to archaeozoologists, but also to other archaeological scientists, to archaeologists and to zoologists.

The first number (two will be published each year) is devoted to the publication of the papers given at the Fifth International Congress of Archaeozoology, which took place in Bordeaux last August. These papers, more than one hundred in number, cover a wide range of topics, including taphonomy, seasonality, domestication, etc., and provide an invaluable survey of current research in the field.

Hereafter, Archaeozoologia will become an international forum for zooarchaeology, publishing papers, notes and reviews. Most of the papers and other contributions will be in English, the remainder in French with detailed English summaries.

The following papers and (English) summaries (rendered exactly as in the original) appeared in the first issue of Archaeozoologia:

A revision of the faunal remains from two Central Sudanic sites: Khartoum Hospital and Esh Shafeinah

Joris Peters

Comparison of the fauna from two Central Sudanic sites: Khartoum Hospital (KH: 8 000 - 7 000 B.P.) and Esh Shafeinah (ES: 6 000 - 5 000 B.P.). Hunter-gatherers from KH are compared with pastoralists from ES with large and small livestock (geot sheep) and dog.
A study of bone remains of a shell-mound of approximately 7500 B.P. occupied during 3 to 500 years. The principal species are 
Leptaena arctica and 

Arca depressispina. A description of the bone remains and comments on the diet of the human group.

Vicuñas (Lagidium vicugna) and Tarucas (Hippocamelus sp.) in early southamerican economies
Guillermo L. Mengoni-Gonalons

The bone remains from a cave of northern Argentina (9 900 to 8 200 B.P.) are described and the subsistence strategies on both sides of Andes are compared.

Buffer resources and animal domestication in prehistoric northern Chile
Brian Hasse

The author, referring to Wilkinson's definitions, attempts to join the frequency of buffer resources with the domestication process using data from of 11 sites in the region of the salar Lake de Atacama (Northern Chile, 11 000 to 2 500 B.P.).

The incidence of these resources is low in the sites of hunters and high in the sites of breeders. Their exploitation is a sign of an evolution toward domestication.

Variations of tooth size of moose (Alces alces L.) during six millennia in Northern Sweden
Elisabeth Irgren

An example of how a mammalian species may vary biometrically during different climatic conditions

The dimensions of the teeth of today's moose are compared with those of prehistoric moose (4 500 to 2 000 B.C.). The decreasing size of the moose since the climatic optimum is confirmed.

The Prellup Aurachs - an Archaeozoological discovery from Noreal Denmark
Kim Aarin-Skjærden and Erik Brinch-Petersen

Discovery of an Aurach Skeleton at Prellup (North West Zealand, Denmark) in 1983, dating from 8410±30 B.P., associated with 15 microliths. It concerns a very large male of 18-20 years of age. Nine to twelve arrows hit the animal, none of which were fatal.
New dates for old animals: the reindeer, the aurochs, and the wild horse in prehistoric Britain

Juliet Clutton-Brock

Summary of progress in a dating study of the Reindeer, the Aurochs and the Wild Horse with the goal to determine the time of extinction of these species in Great Britain (7800 B.C. for the Reindeer and the Horse, Bronze Age for the Aurochs).

Remarques préliminaires sur les chevilles osseuses des boeufs de l'Italie nord-orientale

Alfredo Miele

The preliminary results of a study of the variation of horn-cores from the sites of Verzolo, Frioulis, Trentino and South Tyrol, dating from recent neolithic to the middle ages, are presented. The size at the ulthers decreases from the Neolithic (116 cm) to recent Bronze (106 cm) and increases again during the Iron Age.

Its maximum size is reached during the Roman epoch and decreases again in the Middle Ages. The size increase is less marked in the mountain zones of Tyrol.

The relations of different horn-core assemblages are described. The differences at the same site, between the ox and the bull are extremely variable. The differences become important from the beginning of the Iron Age.

The form and dimension of horn-cores seems to be a good racial character. The relation between the horn-core dimensions and the size at the ulthers is not shown, nor the existence of different races in the same region, at the same time.

Introduction de l'âne (Equus asinus) au pays basque

Jesús Altuna et Koro Murielzkurrena

The history of the introduction of the donkey on the Iberic Peninsula is not well known.

The oldest presence in Andalousie comes from sites in the region of Malaga (Herrmann); in the site of Cerro de la Fortuna, there were 130 remains discovered dating, with certainty, to the Pharonician epoch. Recently, nine donkeys rests were found at the level of Celtiberiques de la Hoye (in Basque country). The donkey had thus spread rapidly to all parts of the Iberic Peninsula.

It is possible that the donkey's appearance is even older if the discovery of its remains unfortunately unmeasurable, at the level of Iron Age I on Castillar de Mendavia (Navarre), were confirmed.

Between Andalousia and the Basque country, we can, whatawere cite the donkey remains of Banchin del Hoyo (Cuenca) from the IV century before Christ.
Archaeology in Australia: the tendency to regionalization

David Horton

Archaeology in Australia has a number of unique qualities which have resulted from the combination of its archaeology and its fauna, both of which have a number of unusual features. Solutions which have been developed for the problems encountered may prove useful to archaeologists in other parts of the world and, conversely, work done elsewhere may prove useful in Australia if adapted to suit the particular conditions in this continent.

The contents of the first regular number (Vol. 1; 1) will be:


To subscribe, or for further information, please contact:

Pierre Duco (Editor), Laboratoire d’Archéologie, 117 Avenue de Courcelles, France.

This book is intended for students and for the intelligent layman. It does not set out to satisfy the specialist archaeozoologist or to be an exhaustive survey of the field. Invertebrate animals receive little attention beyond the use of marine molluscs as indicators of seasonal occupation, and I dare say that molluscs and insect specialists will consider themselves to have been hard done by once again. All that being said, however, Simon Davis has set out to produce a wide-ranging introduction to a rapidly developing field in which bones, like it or not, have been the major raw material. The result is a textbook which is pleasantly readable, copiously and attractively illustrated - a book which will provide a much-needed up-dating of some of the faithful old retainers of the undergraduate reading list.

The book starts with an interesting and helpful survey of 19th century examples of zoarchaeology, placing these early records of fossil bones in the context of the size, grading acceptance of evolution and of the antiquity of the world. The first major section of the book describes and discusses practical matters such as taphonomy and taxonomy, as well as providing a good introduction to bone biology. It is refreshing to find a text intended for archaeologists which treats bone as a living tissue, not as the dead, immutable analogue of stone or ceramic. Perhaps some description of shell structure and chemistry would not have gone amiss, however, if only to supplement the account of incremental growth in bivalves. The numerous methodological problems associated with bone studies are presented briefly and clearly, rather in the manner of a well-structured lecture. There is no trace of either gloom or panic, the two syndromes which so often overwhelm discussions of archaeological bone methodology. At times Davis is refreshingly candid, for example:

'Perhaps the most serious shortcoming is that investigators vary in their ability to identify bones correctly.' (p. 23).

We do, don't we, but how many would cheerfully admit as much in print? One interesting methodological suggestion is the use of a restricted list of identified elements, i.e. not recording every identifiable scrap, but only those derived from particular parts of the skeleton. Such a procedure may be common in Near Eastern archaeology it could certainly be more widely applied in Britain.

The second part of Davis' book is a survey of non-avian relationships (to borrow Don Brothwell's ringing phrase) from the early Pliocene to the post-glacial period. Here the coverage is necessarily superficial, skimming through the millennia somewhat amiss. There are numerous case studies, however, selected from all the major continents. Some topics receive more detailed consideration than others. The extinction of the Pliocene megafauna is discussed at length, with presentation of the arguments for and against the 'quaternary' hypothesis. Davis offers his own opinion, making it very clear where the data end and his opinion begins. The origins of animal domestication are also given a thorough working-over, the older theories of Chile and even Malthus being given due consideration alongside more recent literature. Inevitably such broad-brush treatment leaves gaps and permits only brief discussion, if any, of complex arguments. A reader new to the subject might be bewildered by the statement on p. 150 that 'In a hunting economy, man was likely to exploit the animal carcass to the full.' having been told on p. 113...
that North American bison kill sites represent '...mass killings and substantial waste...'. However, given the degree of selectivity which must have been necessary in the preparation of this book, the text is remarkably free of non-sequiturs and over-simplification.

Overall, I thoroughly enjoyed The Archaeology of Animals. At a technical level, the precise use of terminology is satisfying, especially the consistent use of 'captive' as the correct alternative to the horrid 'capricides' which infects so much of the literature. The case studies are informative and appropriate, with plentiful illustration. Davis' habit of drawing vignettes of the appropriate species to illustrate graphs and histograms adds to the book's attraction. The reproduction of photographs is sometimes rather poor, though 'Beachcomber' devotees will enjoy the picture of Sebastian Payne apparently performing dentistry on an Angora goat (p. 40). Students will find this book to be a useful introduction to the subject, with sufficient reference to the literature to allow a topic to be pursued in greater detail. Those with a general interest in archaeology or natural history will find plenty of material for enjoyable browsing, spiced with the occasional unexpected turn of phrase. On p. 122 Davis asks 'What or the giant domestic?'. That indeed?

T. P. O'Connor


Nicolae Russell's book surveys the historical evidence for selective breeding of horses, cattle and sheep in England from Tudor times to the late 18th century. The author describes himself as a biology teacher 'struggling to make sense of history', and the book is a distillation of his Ph.D. thesis. There are two reasons for bringing this book to the attention of CHM readers: first because a small proportion will have some academic interest in the subject matter and, second, because Russell's survey of Classical and Renaissance theories of reproduction and heredity makes fascinating reading for all who are interested in the history and development of scientific thought.

Viewing the past from a modern agricultural context, it is easy to fall into the trap of accepting that selective breeding has improvement of form, productivity, wool, or whatever as its target. Russell corrects this idea firmly, showing that the mental framework in which early breeding strategies were developed centred on the notion that the forms of living things were created perfect, and that man's efforts in breeding his livestock could only stave off inevitable degeneration. The parallel with modern theories of cosmic entropy is rather tempting! Having set the intellectual background, Russell goes on to show how the concept of pedigree analysis, which Figured large in 17th and 18th century horse breeding, was justified by analogy with the inbreed families of the nobility, presumably turning a blind eye to the gentry's habit of illegitimate outbreeding. The idea that the adult qualities of a filly, calf or daughter could be predicted by examining the characteristics of family antecedents persisted into the famous breeding experiments of Robert Bakewell. Russell is hard on Bakewell, but probably not unfairly. His analysis of the actual benefits of Bakewell's 'improvement' of Longhorn cattle and Dinsley Leicester sheep shows clearly that in terms of food conversion and dressing-out ratio, Bakewell achieved little.
Like many things like this contains a lot of information, including useful tables which
resemble flows and sharp deadweight records by region through the 15th to 17th centuries.
The text is peppered with references, all of them, regrettably, filed in a footnote
system. Apparently, the publishers disapprove of the Harvard system. Despite this
failure, the bibliography is copious, and Russell's thorough scouring of primary sources
will render the book a useful resource for non-historians.

Now for the gripes. For around 10p per page, this reviewer sees some unevenness of
print quality, perhaps even good reproduction of photography. Clearly the publishers have
to make a profit in a short print-run, but the price of this book is far too high for the
reader to overlook smeared and hazy photographs, thin paper, and a print quality which
varies from evanescent to splodgy. The printer and publishers have done the author no
credit, and have let down a useful and interesting book.

T. P. O'Connor

AEA one-day meeting at The University of Birmingham,
March 1987

Summaries of papers, supplied by authors

The following is an extended summary of Richard Macphail's paper presented at Birmingham.

The soil micromorphology of tree subsoil hollows

Introduction

Most excavators and environmentalists are familiar with subsoil hollows on their
sites, and frequently these are ascribed to the earlier presence of trees, on the basis of
their field morphology (Lietebry 1975) and the land snails which they may contain (Evans
1972).

Such hollows are of interest to soil scientists because, on shallow soil sites on
limestones particularly, they represent the deepest soil profile available for study. For
example, at Hazleton long cairn, Gloucestershire, on oolitic limestone, the Neolithic
palaeosol averaged some 15 cm in thickness, whereas subsoil hollows provided soil up to 45
cm in depth (Macphail 1986a). Similarly, these subsoil hollows may provide the deepest
soil sequence for small or soil pollen investigations if conditions are suitable for their
survival.

Soil micromorphology has now been applied to a number of subsoil hollow features, and
although complementary physical, chemical and geophysical analyses have been carried out
(Macphail 1985b Allen and Macphail in press), this paper will concentrate upon the results
of the micromorph studies. The latter may also suggest why data from standard laboratory
analyses of bulk samples can sometimes be difficult to interpret.
Soils formed under broadleaved forest are typically Argillic Brown Earths (Avery 1988), known elsewhere as Udalfs, Luvisols or Sole Leisoliths (Bouchaouz 1992). When formed on thin drift or residual weathering debris of limestone, the generalised profile, from the surface down, has a Bkhor (L/F) organic surface layer; a dark brown humus, biologically worked, finely structured A1 or Bt horizon; a yellowish-brown Eb or Ab horizon which may be moderately depleted of clay and iron; a brown, moderately clay-enriched Bt horizon showing clay coatings; and a reddish-brown ferruginous Beta B horizon at the weathering junction between the soil and underlying limestone (or chalk) or parent material C horizon. Initially trees tend to take root and grow in the deeper patches of the drift mantle where it overlies the irregular surface of the limestone. Enlarged tree hollows are gradually formed by the concentration of water containing reactive organic leachates which concentrate at the base of the tree and its root hole, and enhance the activity of the roots probing into the limestone.

Modern examples of the wind-throw of trees show that a hollow is formed in the soil, and that pale weathered subsoil/parent material clings to the root plate, remaining until frost and rain loosen it, or the tree decays. The hollow in the direction of the 'throw' contains disrupted brown soil, whereas the edges of the hollow as a whole slowly infill with topsoil. A discrete pattern of weathered parent material and soil is thus produced which, seen in plan, has a bowing or horse-shoe shape, with brown soil infilling one side of the hollow and describing the outside circle of the feature. Brown soil also intercalates, at depth, with the wedge of pale disrupted subsoil/parent material fallen from the root plate (Lutz and Gilmour 1939; County et al. in prep.). The slow infilling of a hollow can of course be disturbed by fauna burrowing through accumulations of soil and leaf litter. In thin sections of infilled tree hollows this faunal activity can be seen to produce a homogenised and very porous fabric as at Bulkeley Camp, Hampshire (McNeill 1995). By contrast, at Hazleton Long cairn and Fleasmoor Bottom, Sussex, the infills remained very heterogeneous, and fragments of the Beta B clay, the Bt and the Eb horizons were readily distinguishable (McNeill 1988b; McNeill in Allen in prep.). Soil micromorphology can thus demonstrate the physical mixing of the original horizons of the forest profile, the surviving ped fragments of which may provide the only available indications of the nature of the original forest soil cover. Obviously, bulk analyses of such heterogeneous soil material found in tree hollows will only give average measurements of clay or organic matter content.

In addition to the physical mixing of previously horizontal soil horizons, soil from the broken edges of soil fragments is readily sacked and washed down into the coarse soil fissures after rainfall. This mobilised soil is often relatively unsorted and forms coatings and infills (Bullock et al. 1985) of coarse clay, silt and fine sand.

To summarise, the post-tree-throw fabric may show:

a) juxtaposed fragments of various soil horizons;

b) fragments of Bt horizons which often have clay coatings in their porosity which are not orientated to the present-day vertical and therefore relate to their forest soil ancestry; and

c) infills of poorly sorted soil in between the soil fragments.

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Many forest soils, especially the deeper ones, do not have obvious tree hollows, but have fabrics similar to those just described within their subsoils. For instance, a soil formed on Jurassic (silty) limestone in the Italian Appennines, known to have been deforested in the 1940s, had such a microfabric, which can be clearly related to this phase of deforestation (Macphail in press; County et al. in press). Using examples like this and the previously described tree-throw microfabrics as a model, it should therefore be possible to look at archaeological palaeosols to see if there is similar evidence of tree disturbance that can be directly linked to human activity. For example, at Ascapeheath, the presence of fine artefacts within the heterogeneous subsoil hollow may link this disturbance microfabric with Neolithic Age forest clearance (Macphail in press). Other sites, such as the Bronze Age camp at Chyasswater (Macphail and Neal 1987) and the Neolithic roundhouse at Carn Brea (Macphail in press) in Cornwall, have similar fabrics relating to soil disruption and infills. These are quite close to the surface (20-40 cm), sometimes associated with wood charcoal, and apparently just post-date sharply contrasting soil microfabrics associated with cultivation which occur at the soil surface. From previous studies (Romans and Abbottson 1983; Macphail et al. in press) it has become evident that cultivation can produce its own specific microfabric, and at Chyasswater and Carn Brea this is in the form of a homogenous fine fabric containing phytoliths and "quariflaccate"-type (grass-derived) charcoal, within which are rounded voids (voids) coated by very dusty clay. In these instances, the microfabric may be interpreted as suggesting that forest clearance was succeeded by cultivation, rapid archaeological burial preserving this sequence before any biological remodelling could take place.

Conclusions

The study of subsoil hollows provides useful information on the early soil history, even if the original horizons only occur as fragments. Microfabrics resulting from tree-throws are not confined to subsoil hollows but may be present in all soils on which trees grew. Sometimes these fabrics, which have been equated with deforestation in modern soils, have been found in archaeological soils where supporting evidence may suggest forest clearance. Occasionally microfabrics indicative of cultivation may be superimposed on those of forest clearance.

References


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**The Newcastle Quayside Project**

**Environmental Archaeology in a Rescue Context**

The Newcastle Quayside Project was set up by the Archaeological Unit for North East England to study the changing face of the river-front of the Tyne below Newcastle. Two major sites were excavated behind the present-day quayside, the first in 1984-5 and the second in 1985-6.

From the start a strict time limit had been imposed both on the excavation and on the post-exavagation work. which meant that as much as possible of the environmental work had to take place during the period of excavation. The paper presented at Birlingham first discussed the advantages and problems of on-site sieving and sorting, but concluded that the advantages of getting the raw sediment processed and the residues sorted during the excavation, with the help of labour from a Manpower Services Commission Job Creation Scheme, far outweighed the disadvantages.
The results of the environmental work from the first site, Queen Street, were then summarized in terms of the environment of the riverside prior to the extensive land-reclamation which took place from the early-mid 13th century, and second of the composition of the dumped material. This comprised both deposits which remained waterlogged and which formed a stable surface for building on, and non-waterlogged material which accumulated in the streets above, from the early 14th century onwards. The evidence suggests that the site was originally on the exposed foreshore of the Tyne, and subject to flooding. Analysis of the sediments and diatoms suggests that the site was possibly situated near the mouth of a freshwater tributary. Dumping seems to have taken place rapidly and to have involved domestic rather than industrial rubbish, with plant remains representing the sort of weeds likely to have been growing on disturbed and unstable ground nearby, with a small component of food plants, including grape and fig, some possible cornfield and hay meadow weeds and possibly a few garden plants. The seed component was diluted by mineral matter, possibly from redeposited soil of floor sweepings, and abundant wood chips. No plant taxon was dominant in any of the samples. A wide variety of fish was represented, though gadids and herring predominated. Sand eel and small herring bones may have been present in the guts of other fish, but the evidence is inconclusive with regard to whether the remains originated in the documented fish-markets nearby. The problems of taphonomic processes were discussed in the context of both the mammal and fish bones.

The results of this work will be published in a monograph volume of *Archaeologia Aeliana* in 1998.

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**Snails by numbers**

How do you interpret large amounts of bio-archaeological material - in this case snails? We used the following methods:

1. Plotting the distribution of species through the samples;
2. Looking at each assemblage as a whole using diversity and multivariate analysis.

**Diversity**

Rank order curves (Evans, J. G. pers. comm; Kenward 1978) were plotted to show species number ratio of individuals relationship. These proved to be useful in extreme cases. Underlying distributions have been sought to define this relationship we used the logarithmic series, described by alpha, the index of diversity (Fisher, Corbet and Williams 1943; Kenward 1978; Southwood 1966; Taylor et al. 1976). To avoid assumptions based on an underlying model, non-parametric indices were used: Shannon-Wiener, Brillouin, Berger-Parker and Simpson-Yule (Southwood 1966). All showed similar trends.

**Multivariate Analysis**

We used GenStat (Alvey et al. 1977) to carry out the various steps of the Principal Components Analysis. From the arrangement of the variables along the principal component
We used Clustan (Wishart 1972) to identify and quantify the similarity between the different samples with a variety of different clustering techniques.

The results have been very promising, but we know this is only the beginning. We now realise that other approaches may be equally appropriate. We would welcome feedback and advice.

References


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The Spice of Life?

For some time now, Phillipa Tominson, Barrie McKenna and I have been recording assemblages of plant macrofossils from urban archaeological deposits, primarily in York and Beverley, that have yielded a range of seeds or fruits that seem likely to have been used whole (or in the case of the larger ones, also crushed or milled) as food flavourings. The list currently comprises oxtail poppy (Papaver somniferum), linseed (Linum usitatissimum), coriander (Coriandrum sativum), celery-seed (Apium graveolens), dill (Anethum graveolens), fennel (Foeniculum vulgare), and summer savoy (Satureja hortensis - though I wonder whether the 'seeds' of this plant were actually used, or whether it has simply arrived in the deposits from dried plants being stored or used as a leaf herb). They are often found together with large concentrations of the 'brain' (in this case, the spermoderm layer) of wheat/rye (cf. Camilla Dickson's paper in the last issue of Circasea) and it is tempting to conclude that some, at least, were used to flavour and/or decorate some kind of bread or biscuit. It is, of course, impossible to distinguish the precise way such plant foods were used from the fossil remains - the contents of cress pit which provide most of this information obviously represent many different meals.
Readers may be interested in these few thoughts on the matter of the changing food flairsures in contemporary Britain, offered as a personal view and in the hope that they do not simply emphasise the negativity of the authors; your own views and anecdotal information would be gratefully received.

To someone like myself, raised in the 50s and 60s almost exclusively on white sliced loaves (through a period when, ironically, most commercially-made 'brown' bread was, to say the least, unpalatable), the idea of streaching seeds on or, more adventurously, putting seeds in a loaf, was distinctly unusual. Although my experience may not be typical, I have a feeling that the use of such spices largely disappeared from commercial (and probably also domestic) bread-making in Britain until the revival, in recent years of the 'real loaf' (as well as greater access to 'exotic' foods through easier foreign travel and assimilation of many ethnic groups from all over the world). Much the same might be said regarding the use of spices (or herbs, for that matter) in other foods - apart from a few that continued to be used during what we might see as a dull period in British 'culinaire' (if it can be traced with the term) nutmeg, ginger (dry, ground powder only, of course), cloves and cinnamon (all used mainly in sweet dishes), pepper (though there has gradually been a return to the use of fresh-ground black pepper rather than the acrid, ready-willed white form), mustard (now available in a bewildering range of types, including whole-grain, not simply a yellow powder to be made into a condiment as required) and 'pickling spices', containing exotic items such as coriander and chillies.

Probably the most familiar of these spices to British readers, at least, in the context of bakery products is poppy seed (Papaver somniferum), typically used as a decoration. Elizabeth David, long a doyenne of British cookery writers, in her Spices, Salt and Aromatics in The English Kitchen (Percydon 1970) asserts that poppy seeds (e.g. 'are the seeds of papaw rhoes' [sic], perhaps as a way of reassuring us that they (ibid.) 'do not contain opium'. I grew some pale blue-grey coloured poppy seed, bought from a wholefood shop in York this year; the resulting plants were clearly different from those of P. somniferum that had appeared 'spontaneously' nearby. They key out to P. somniferum spp. setigerum, the supposed wild progenitor of P. somniferum sp. somniferum.

The use of linseed (Linum usitatissimum) for human consumption was completely unknown to me until I visited Norway in 1980. An ordinary supermarket in Oslo was selling this amongst the more usual grains, nuts and beans, and I was told that it was largely used as a laxative. Since then I have encountered Linseed, a heavy, moist kind of rye-grain bread containing linseeds (sold, in this instance, in the delicatessen of a department store in Leeds), as well as recipes in some of the more progressive books on bread-making. The latter also mentions celery-seed, coriander, cumin (Cuminum cyminum), and coriander (Coriandrum sativum), of which the last is probably the only one to be used in commercial baking, as a flavourogy for the kind of rye-bread that is made from wholemeal wheat flour with an admixture of rye flour (in contrast to the pumpernickel-style rye-breads). Sesame (Sesamum indicum) and sunflower (Helianthus annuus) seeds are also becoming more widespread within and upon breads.

The last spice I want to mention is Roman coriander (or fennel flowers, or kalanjer - Nigella sativa), in which I recently developed an infatuation having being shown a 'unknown' fossil seed by a colleague, which I thought might be a Nigella sp. Soon after, I purchased some nigella seed in a wholefood shop in York, mainly as a voyage of discovery (they have an intriguing and elusive flavour), partly as a source of material for the reference collections of both our laboratory and that of the colleague with the putative Nigella seed. Only eight days after seeing the fossil specimen I happened to call in at a local 'Vienna bakery' in suburban York for a loaf and was astonished to see a ring of white bread in the window, decorated with sesame seeds and nigella. The shop assistant, not unreasonably, did not know what the latter were (she does now, poor women!), but mentioned that the owner of the bakery had been to Turkey and brought back a recipe by which the bread in question had been made, pleasantly serendipitous, I thought.

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Spice and famine food? The botanical analysis of two post-Reformation pits from Elgin, Scotland

David Robinson *

Summary

The botanical analysis of the contents of two post-Reformation pits from Elgin has revealed some interesting details about contemporary life in the town. One pit appears to have functioned as a latrine, the other as a repository for past ash. The latrine pit contained a wide range of arable weed seeds and fruits together with large numbers of intestinal parasite eggs. Many of the seeds and fruits are present as small fragments and they may have been ground for use as famine food. The pit also contains wads of flax and other fibres which are interpreted as 'toilet paper'. Small squares of cloth which were recovered during the excavation may have served a similar purpose or may alternatively have been used as passaries or sanitary towels. A large number of crushed and ground black mustard (Brassica nigra) seeds were recovered from one sample and they are taken to represent usage as a spice.

Introduction

In the late 1970s portions of the 'backlands', properties which run perpendicular to the High Street in Elgin (Moray Region, formerly Morayshire, in the north-east of Scotland), were excavated under the direction of Bill Lindsey (Lindsey forthcoming). Much of what was found dated from the 13th and 14th centuries, although material of 12th and 15th century date was also present. At one site, 26-28 South College Street, two pits of a later date, provisionally 17th or 18th century, were encountered and it is the analysis of the contents of these which forms the basis of this account. The pits were clay-lined and were cut into freely-draining natural sand. They were provisionally designated by the excavator as latrine pits and the main aim of the botanical analysis was to confirm or refute this interpretation.

Methods

Three samples were analysed. Two (656 and 865) came from the primary fill of pit 17, the third, (814) was from material used to back-fill pit 18. The whole of samples 614 and 855 were used for analysis, their total volumes being 75 ml and 50 ml respectively. A 100 ml sub-sample was removed from sample 865. The samples were dry-sorted to remove any large or obviously fragile plant remains, soaked overnight in a 1% solution of sodium hydroxide (NaOH) and sieved through 1.25 mm and 0.30 mm sieves, before the organic

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remains were wet-sieved and identified using both low- and high-power light microscopy (max. x1000 and max. x1000). The results are presented in Table 1. The nomenclature follows Clapham et al. (1981) and Watson (1981) unless authorities are given in the text.

Results and Interpretations

Table 1. Plant and animal macrofossil remains from Elgin SC77, divided according to their likely origin or use. Abbreviations: pdf - pod fragment; s - seeds; f - fragment; foil - foil; sa - saucer; fa - fruit; liv - leaves; rts - roots; lhp - leaf-base spindle; ah - ash; fbo - fruiting body; * carbonised; + present; ab abundant.

<table>
<thead>
<tr>
<th>Food and other useful plants</th>
<th>part(s)</th>
<th>814</th>
<th>858</th>
<th>863</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brassica sp. (mustard, kales, etc.)</td>
<td>pdf</td>
<td>+</td>
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<tr>
<td>B. nigra (black mustard)</td>
<td>v</td>
<td>ab</td>
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<tr>
<td>7 charred bread</td>
<td>f</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Linum sp. (flax)</td>
<td>fb</td>
<td>+</td>
<td>+</td>
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<tr>
<td>Malus sp. (apple)</td>
<td>pfp</td>
<td></td>
<td>+</td>
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<tr>
<td>Prunus cf. prunus (plums, prunes)</td>
<td>s</td>
<td></td>
<td>+</td>
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<tr>
<td>Rubus idaeus (red raspberry)</td>
<td>pfp</td>
<td>+</td>
<td></td>
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<tr>
<td>unidentified plant fibres</td>
<td>fo</td>
<td>ab</td>
<td></td>
<td>+</td>
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</table>

Useful Species (* denotes possible food plants)

| Agrostemma githago (corn cockle) | s | + | ab | ab |
| Centaurea sp. (cornflower/knapsacks) | a | + |   |   |
| Chenopodium album (fat hen)* | s | + | + |   |
| Polygonum sp. (pericarps/knotgrass)* | fr | + |   |   |
| Raphanus sativus (wild radish)* | pdf |   | + | + |
| Sesuvium arvensis (corn spurrey)* | s | + | + |   |
| Stellaria media (chickweed)* | s | + |   |   |
| Thalipha arvensis (field penny-cress) | s | + | + |   |
| Triticum cf. Triticum (spreading hedge parsley) | fr | + |   |   |

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**Pit 17 - two samples**

Sample 896 was made up of fibrous plant material in a sandy-silt matrix. Fine fibre were felted and coarser ones were aligned in loose short bundles. Fine seed and fruit fragments abounded and it was obvious from the species present that the material was largely faecal in origin. This is despite the absence of cereal tests (bran) fragments which are reported in similar material from other Scottish sites (Dickson et al 1975; Fraser 1981; Fraser forthcoming Fraser and Dickson 1982; Robinson in press). Cereal tests fragments are rather delicate and it is quite possible, given the sandy silty conditions which prevailed, that they were present but had been degraded as was the case at the medieval site in Mill Street, Perth (Robinson forthcoming). The more robust remains, the fragments of seeds and fruits of contaminant weeds are so characteristic of fossil faeces, tend to survive. In this case the species present included corncockle (*Agrostemma githago*), a serious cornfield weed in earlier times, being difficult to separate from the cereal crop and notorious for its content of toxic sapogenins (Wilson 1975). Present in lesser quantities were flour-sized fragments of field pennycress (*Thlaspi arvense*), corn spurrey (*Spinula arvensis*) and fat hen (*Chenopodium album*). These are common arable weeds and crop contaminants but they have also been used as

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### Heathland and wetland species

<table>
<thead>
<tr>
<th>Species</th>
<th>lvs</th>
<th>rts</th>
<th>fls</th>
<th>lbsp</th>
<th>s</th>
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<tbody>
<tr>
<td>Calamagrostis viridis (heather)</td>
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<td>Cyperaceae (sedges, etc.)</td>
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<tr>
<td>Erica caespitosa (heaths, etc.)</td>
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<tr>
<td><em>Erica scoparia</em> (heath cotton)</td>
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<tr>
<td><em>Junger mel. (rushes)</em></td>
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### Possee

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<tr>
<td><em>S. papillosum</em></td>
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<tr>
<td><em>Trichophorum lacustre</em></td>
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### Animal remains

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<tr>
<td>feather</td>
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<td>ab</td>
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<tr>
<td>hoof</td>
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<tr>
<td>tail</td>
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<tr>
<td>unidentified</td>
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<td>ab</td>
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<tr>
<td>insect remains</td>
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<tr>
<td>Trichuris sp. (equine)</td>
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<tr>
<td>sheep's wool (with attached skin)</td>
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### Miscellaneous

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<tr>
<td><em>Ceracrococcus vexillum</em> (fungus)</td>
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<tr>
<td>charcoal</td>
<td></td>
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<tr>
<td>fungal spores</td>
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<tr>
<td>pest</td>
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<tr>
<td>pest ash</td>
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23
Small fragments of a charred vesicular material were moderately abundant in the sample. They were generally 2-3 mm in diameter and have been tentatively identified as charred fragments of bread. They bear a remarkable resemblance to charred reference material of dense 'sourdough' breads. Eggs of the intestinal parasite whipworms (Trichuris sp.) were abundant in the sample and in many cases were seen adhering to seed fragments. Their presence suggests at least a mild level of infection and further confirms the presence of faecal material. No attempt was made to measure the eggs or identify the species of Trichuris. In the view of the observer evidence it seems likely that they are from Trichuris trichiura, the human whipworm. The few animal hairs present, provisionally identified as being from deer (M. M. Appleseed, pers. com.), are also likely to have had their source in faeces, or perhaps kitchen refuse. Plant fibres on the other hand were much more abundant and many have been identified as being of flax (Linum sp.). These fibres are characterised by having obvious nodes or 'knees'. Not all the fibres possessed this character, however, and it appears that a mixture of fibres is present. They could represent the residue from use of the pit for retting of fibre plants or possibly textile waste dumped directly in the pit. However the most probable explanation is that the material represents 'toilet paper' as large wads of moss, the material normally present in deposits interpreted as 'cess', were absent. It is not clear whether the fibre waste was a preferred commodity or just a substitute for moss.

Sample 863 was mostly from a compacted organic sandy silt with some looser sandy material. It, too, obviously represented faecal material although it lacked the large quantity of plant fibres found in the previous sample. Cereal bran fragments were again absent, but food plant residues, possible charred bread fragments and wad seed fragments were abundant.

A very high proportion of the eluted residue was found to be made up of seeds of black mustard (Brassica nigra). These were either whole, crushed or coarsely ground. The seeds are characterised by having on their surface a coarse 'huppy' reticulum with lumina 50-100 μm in diameter. This reticulum is much more prominent than that found in any other Brassica species. In addition the palisade cells beneath the reticulum are also distinctive, having lumina which are either elongate (6 x 8 x 3 μm) or roughly circular (6 x 5 μm in diameter) (Ainsworth 1956). The seeds were difficult to measure because most were crushed or mashed up, however, the majority appeared to be in excess of 1 mm in diameter. Seed pod fragments were also recovered from this sample. They closely resemble reference material of various Brassica Species and it was not possible to identify them positively as coming from R nigra. This plant has an extremely long history of usage as a spice, being the source of mustard mentioned by Pythagoras and being employed in medicine by Hippocrates in 450 BC. It was described as a garden plant by Robertus Magnus in the 13th century and has had numerous mentions in Herbs in Herbarix (Hendrick 1972). The young plants were eaten like spinach or used in salads and the seeds were a major source of mustard the world over until they were replaced by those of white mustard (Sinapis alba) about two decades ago (Hendrick 1970). In the light of this it seems more likely that the seeds were used as a spice rather than a famine food. Mustard flour made from wild radish or charcoal (Sphages raphanistrum) was more commonly used in this latter respect (Orry 1984), although it also found use as a spice, the so-called 'Orcham mustard'.
Other fruit plants present in the sample included apple (*Malus* sp.), pip fragaments, a raspberry/blackberry (*Rubus idaeus/fruticosus*) pip and possibly opium poppy (*Papaver cf. somniferum*). The latter were and are used as a spice and as decoration on pasties and puddings. Used seeds and fruits, some intact, some in fragments, were more numerous and from a wider range of species than in the previous sample. Some, such as *carriolilum* (*Aegopodium podagraria*), *cornflower/cornflowers* (*Centaurea spp.*), wild radish or charlock (*Raphanus raphanistrum*) and possibly spreading hedge parsley (*Taraxacum cf. japonica*) are likely to have been unavoidable crop contaminants. Others, like the persicarias/knot grasses (*Polygonum spp.*), chickweed (*Stellaria media*), corn spurrey (*Spergula arvensis*), fat hen (*Chenopodium album*) and field pennycress (*Thlaspi arvense*) may have been intentionally retained or even added to the food crop (Gurry 1984). The flax seed fragment which was recovered may also have been part of the diet or may have had a medicinal use. Whiuponum (*Tricholium*) eggs were again present as were animal fibres, which in this case had skin attached and were provisionally identified as being wool (H. W. Appleyard, pers. comm.). Cereal pollen grains were found adhering to the seed fragments in association with the whiuponum eggs.

Conclusions

The analysis of the fill of pit 18 (sample 914) provides little information other than that the pit was back-filled with a mixture of peat and peat ash which presumably originated from a nearby hearth.

The conclusions from the analysis of the contents of pit 17 are much more interesting and, with respect to the social status of the contributors to the latrine material, are also rather conflicting. On the one hand the presence of black mustard and *Opium* poppy seeds and the possible evidence for consumption of Vernonon and mutton suggest a lifestyle above that of the average commoner (Donaldson 1794, cited in Fraser forthcoming), whilst on the other hand the abundance of fragments of so-called famine food species suggests the contrary. It may be that these fragments just represent the normal level of contamination in flour available at that time or that the latrine material was from persons of mixed social status. The presence of the whiuponum eggs is of little value in resolving this question as these worms probably afflicted rich and poor alike.

The seeds of flax and other plant fibres from this pit are interpreted as having been used as 'toilet paper' and small squares of cloth recovered from the pits during the excavation may well have served a similar purpose. It has been alternatively suggested (C. A. Dickson pers. comm.) that the cloth squares could have been used as pressies as described by Dioscorides in A.D. 65 (Gurthe 1933) and as widely used since that time. There are no plant remains present which may have used in connection with the pressie but this is hardly surprising as an extract of the plant rather than the plant itself is likely to have been used. A further possibility is that they represent tampons or sanitary towels, as has been suggested from medieval Gerwyn by Krywidiak et al. (1983). Although obviously organic in content, samples 856 and 863 are remarkable for their high sand and silt content. This could have had its origins in the sand into which the pits are cut. It is also possible that deliberate covering of the faecal material with sand took place. This would reduce the odour from the material and promote its breakdown by micro-organisms. This practice was the basis or which earth closets, which were used in country areas until relatively recently, functioned efficiently.
I would like to thank Bill Lindsay (Falkirk), H. M. Appleyard (Halifax) and Cailla Dickson (Glasgow) for their helpful comments and suggestions regarding this work. The research took place at Glasgow University in 1985 and was funded by the Scottish Development Department (Historic Buildings and Monuments), Edinburgh. The excavation at 28-28 South College Street took place in 1987 under the auspices of the Erskine Archaeological Heritage Trust with monies provided by the Manpower Services Commission and the Scottish Development Department, Ancient Monuments Division.

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The role of the 'junior' in environmental archaeology: a personal view

Rebecca Nicholson *

Summary

From the author's standpoint as someone employed within archaeology to co-ordinate on-site 'environmental' work and undertake specialist investigations of one class of biological remains, the advantages and disadvantages of such a position are discussed.

'The very great need for scientists coming into archaeology to work under the guidance of experienced people, and to have access to good facilities and reference materials from the beginning is best satisfied by the establishment of junior posts in association with existing centres. This is much to be preferred to the establishment of isolated junior scientific posts associated with archaeological organizations where there is no opportunity for training and supervision. However admirable may be the efforts of people in such positions to train themselves and to build up their laboratory facilities and reference collections, it is wasteful of resources, and carries a high risk that results will be published before adequate standards have been reached.' (Thomas 1983, 50)

The aim of this short discussion is to present a personal view of the situation regarding the employment of the junior 'environmentalist' in archaeology, to assess the advantages and disadvantages of getting up posts within the existing archaeological units, and to suggest how the needs of the specialist can be met within an archaeological framework. The term 'junior' is used here to refer to archaeologists and scientists who have undergone a basic training in environmental archaeology, but have not had extensive practical experience.

To explain the personal bias in the paper, at the time of writing I am employed as a Junior Researcher in the Archaeological Unit for North-East England, to act as both the 'on-site' environmentalist and a Specialist in one of the aspects of the biological remains recovered from our excavations (fish bones). The post is therefore at least in part of the type that the Archaeological Science Committee of the DBA (Thomas 1983, above) dismissed, so I felt that there was a need to put forward a personal view of the value of the 'in-unit' environmentalist.

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To turn firstly to the advantages of the postgraduate linking in a single post the on-site environmentalist with the worker on one of the specialist areas has one obvious advantage, which is that the specialist in at least one area of study has seen the excavations and been involved in them to a much greater degree than any laboratory-based specialist could be. This can enable sampling on-site to be geared much more closely to answer particular research questions formulated by the specialist, some of which may only be generated as a result of seeing the excavation in progress and only therefore be of a much more interdisciplinary nature than is often the case when 'off-site' specialists formulate questions in isolation from the excavation. By working closely with the post-excavation team the on-site/in-unit environmentalist can also speed up the progress of specialist report writing by being on-hand to answer queries and sending the relevant documentation to the other environmental specialists involved in the project. Crucially, too, the environmentalist can assess the results of the specialist reports as they arrive and take a wider view of the conclusions, enabling a synthesis of the results of the environmental analyses to be presented.

The appointment of an on-site environmentalist should also lead to a greater amount of the 'technical' work associated with sampling and processing samples being undertaken on-site, by the excavation team under supervision, resulting in time-saving within the laboratory as much 'ready-processed' material can be sent. By allowing the on-site environmentalist an important role in the post-extraction programme, it is also possible to attract better qualified applicants than would have applied for a purely excavation post.

So much for the advantages of the creation of junior posts within archaeological establishments. Now for the problems. The major disadvantage, as Thomas has pointed out, is that a newly-qualified environmentalist (and long-trained environmentalists, for that matter) requires easy access to a comprehensive body of reference material, which few, if any, archaeological units can provide. The specialist also requires, to a greater or lesser degree depending on the specialism concerned, access to scientific equipment, much of which is beyond the pocket of archaeological establishments. While individual workers will, of necessity, build up their own reference collections, the time and money needed to build up a comprehensive collection would not be tolerated by most funding bodies, and not surprisingly so!

The concept of an individual environmentalist creating a laboratory is therefore an unrealistic aim, and the time and money would be much better spent in already established laboratories manned by a number of specialists. The other valid point made by the Archaeological Science Committee (see quotation from Thomas (1983), above) is that junior researchers, in particular, need easy access to other workers in their field to enable constructive discourse and criticism to take place resulting (it is hoped) in improvements in standards of work. There is indeed a danger of publishing work before adequate standards of identification and interpretation skills have been reached, and this applies no less to the contract worker, established at home, than to the junior researcher in isolation within an archaeological establishment.

So what is the best way forward? If junior workers are restricted to working within established laboratories under careful supervision, who is going to take on co-ordinating the job of the on-site environmentalist? If on-site environmentalists are precluded from any of the post-excaavation work, apart from the 'technical' tasks they will rapidly become disenchanted with the subject, and will find advancement difficult without a specialisation in their pockets. Yet on-site environmentalists must have a training in
environmental archaeology in order to understand sampling requirements, and the needs of specialists. In my view the best way forward is to employ much greater flexibility within junior posts, to enable the environmental archaeologist to work both on-site, and at the post-excavation stage within an established laboratory to pursue a specialization, but with frequent visits back to the archaeological establishment to keep up to date on the progress of the archaeological interpretations. The obvious problem is, of course, the non-availability of established laboratories in some regions. While the ideal solution would be the creation of more established laboratories, in the present financial climate this seems a little unlikely. There are, however, Universities, Polytechnics and Colleges accessible from most areas of the U.K., where ties with scientific laboratories may be possible. Speaking as one based in a Unit within a University it is surprising how much help is available outside the Archaeology Department, once communications are established, but perhaps communication should be the first objective for, without a concerted effort on this front, it is surprising how little information passes between university departments, let alone between departments and bodies outside the academic establishment.

Reference

The role of palaeocology in understanding variations in regional survey data

A. J. Schofield

Summary

This paper is presented, not by a trained palaeoecologist, but by someone involved with regional survey and the interpretation of variations in the density and form of lithic collections across the landscape. It is suggested that broad generalizations regarding early prehistoric land-use can be made from existing palaeoecological evidence - in this case defined as pollen and non-marine mollusca - in its published form, and used as a framework within which variations in artefact density may be more fully understood.

Introduction

Over the past decade, central-southern England has seen a renaissance of archaeological activity brought about, at least in part, by the switch from site-based research projects to a broader regional frame of enquiry. A considerable amount was known about prehistoric 'places' in the Wessex landscape, but our knowledge of the 'space' between those places was, to say the least, limited.

At around the same time, palaeoecology really came of age (see, for example, Evans 1975), and in the last decade our knowledge of how and to what extent early prehistoric communities were manipulating the Wessex landscape has increased dramatically. In particular, it has been demonstrated that events were taking place not only in different places and at different times, but often at varying scales of intensity. Work in coastal and estuarine environments (e.g. Haskins 1978), on areas of chalk downland (Watson 1982), on Tertiary sands and gravels (Seッグtieф 1983; Barber 1978) and in major river valleys (Allen 1988; Seッグtieф 1989: Scaife and Burin 1983; 1985) has demonstrated the extent to which land-use intensity varied between distinct resource patches within the environment.

Unfortunately the potential for integrating this kind of information into regional field survey projects has not yet been fully realized (but see Schofield in press), possibly because such information is only useful if it reflects events within the precise study area under investigation. This may not necessarily be the case and it is argued here that such a relationship would in fact be of considerable benefit in understanding patterns of both settlement and land-use for the mesolithic, neolithic and Bronze Age periods. This paper defines the case for integration by means of a case study from the upper Meon valley, south-east Hampshire.

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With the exception of the analysis by Gordon and Shakesby (1973) of dry valley-fills at Butser Hill, no palaeoecological results were available from anywhere near the study area itself. Rather than treat that as a lost cause, however, it was decided to draw in results from other river valleys in the region by way of analogy, to see whether any generalizations could be made and a general model of changing land-use devised. It became clear that in the mesolithic few areas in this part of southern England were open, an exception being Wimnall Moors in the Itchen valley near Winchester, where the grass pollen was equivalent to around 40% of the total arboreal pollen sum (Linton 1982). Another example is the Avebury region where Smith (1904, 107) noted the tendency for mesolithic fires associated with easily woodland disturbance to be concentrated in the valley bottoms.

It is not until the early neolithic that distinct trends really begin to emerge. At Easton Lane (Allen 1988), Easton Down (Mason 1982) and other low lying sites in the Itchen valley, for example, clearance occurred at an early date, with cereal cultivation present on valley slopes. In the Ouse and Curleworth valleys in Sussex, Scaife and Burin (1983) suggest a similar theme with woodland being opened up at an early neolithic or even mesolithic date.

On the surrounding chalk uplands and gravel interfluvies however, a very different picture is presented. In contrast to the large-scale clearance occurring in river valleys, temporary small-scale deforestation was more typical, appearing for example at Brook, Kent (Kerney et al. 1984, 155) and on the Sussex Downs (Thomas 1982). In each case this was followed by the regeneration of scrub and woodland. It was not until the early to middle Bronze Age that many of these areas still maintaining primary woodland were cleared on a permanent basis. This was the case, for example, on the Hog's Back, Surrey where 'wild wood' was removed on a local scale for the construction of a bronze age barrow (Allen 1984a). A similar theme is reflected in the sequence from the Vals of Brooks, where temporary clearance in the neolithic was succeeded by a more substantial clearance episode in the middle Bronze Age (Howey 1981), and at Tiford Bottom, where an early Bronze Age date was produced for primary clearance (Bell 1983).

A similar picture is suggested by work in the area west of Poole Harbour. Swaggie (1959) quotes an early neolithic date for floodplain clearance at Mareham, while in the surrounding area Hawkins (1978) records little evidence for the impact of man, again prior to the middle Bronze Age. The only exception to this is the site at Ringmore which produced cereal pollen grains dated to the late Atlantic phase; it may be no surprise that here, as at Mareham we are dealing with a valley bottom location.

Although the evidence for woodland disturbance is therefore fairly widespread both in time and space, it does appear to show a clear distinction between the scale and intensity of land-use in river valleys and that over the rest of the landscape (Table 2 and Fig. 1). There is clearly a case to be made for applying these general observations to the distribution and behaviour of prehistoric communities in southern England. In order to clarify the nature of this distinction in terms of the results described below, two types of population response may be identified:

(a) coarse-grained responses in which groups will spend disproportionate amounts of time in particular resource patches;
(b) fine-grained responses where a group encounters and uses resources in the same proportions in which they actually occur.

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Figure 1. Schematic reconstruction of valley land-use strategies through time. The black bar beneath each section represents the spatial limit of human activity as represented by surface artefact collections. A: Mesolithic - localized small-scale clearance episodes focused on valley floor. B: early Neolithic - intensive floodplain clearance and cereal cultivation. C: later Neolithic - clearance of terraces; some woodland regeneration. D: early to middle Bronze Age - clearance on a large scale including for the first time areas of interfluve and chalk downland.
We may therefore expect to see a coarse-grained selective response in valley floor environments where the resource ‘package’ is both stable and particularly favourable to long-term settlement. It is here that we should expect to see intensity and continuity of
The concentration of early prehistoric communities in river valleys indicated by palaeoecological evidence is an inference further maintained by the archaeological record. Although few known ‘settlement sites’ have been excavated in southern England, those that have tend to occur, with very few exceptions, in the narrow, compact ecological zones which run parallel to river valleys. For the mesolithic period this is most clearly illustrated by Froom’s (1972) investigations in the Kennet valley and the relationship between that area and the Berkshire Downs (Richards 1978) from which few mesolithic finds were recovered. This is a pattern which continues into the neolithic and is illustrated in the case of northern France where settlements display a marked concentration on river valleys, with a particular emphasis on gravel spurs overlooking the valley floor (Moull 1983). This is also the case in southern England, although the evidence is far less substantial. At Pampill, Dorset (Field et al. 1984), Corhamp, Hampshire (Piggott 1954, 383) and Oxford, Wiltsire (Rahtz 1982), for example, settlements appear in analogous situations to those in the Aln and Nene valleys of northern France. It is only in the Bronze Age that we begin to see settlements appearing with any frequency on the chalk uplands, although they still continue to occur in valley contexts.

Smith’s (1984) investigation of neolithic human ecology in the Avebury region further maintains this idea of a ‘valley adaptation’. The distribution of both mesolithic and early, middle and late neolithic settlements in the area displays a clear tendency towards river valley locations. Few valley settlements in this area have significant breaks in their occupational history, while if sites such as Kemp Knoll are truly reflective of what was happening on the surrounding uplands, settlement here was distinctly intermittent.

We can conclude therefore that the evidence both from archaeological sources and from palaeoecological investigations in the south of England suggests that a coarse-grained response can be identified, with foragers and early farmers spending a disproportionate amount of time in valley environments, at least up until the end of the neolithic. We may now consider, by means of a case study of a regional surface survey, whether this relationship can be confirmed.

Case Study: the upper Mene valley survey

The upper Mene is one of several chalk streams maintaining a constant year-round temperature which runs from north to south across the Hampshire Basin, with low river terraces and pastures on the valley floor, valued today for their quality spring grazing. The survey of the upper reaches was carried out between 1984 and 1986 with the aim of locating areas of mesolithic and neolithic activity and trying to identify changes in land-use between those periods. Data collection was carried out by field walking based on a 15m line interval and concentrating on three blocks of land each encapsulated an area of floodplain, terrace and interfluve and which were spaced at 2-3 km intervals (Fig. 2). Areas 1 and 2 were situated on an area of Lower Chalk while area 3 was located on an area of undifferentiated Upper Chalk downland.
From both the high density of artefacts in fields within the Moon valley in relation to those over 1 km distant (Table 3) and the disparity between density figures from valley contacts and those from areas which contain no major valley system (Table 4), it is clear how closely the evidence is associated with river valleys. It is also interesting to note the degree of consistency in the proportion of tertiary flakes which occur in fields within the Moon valley. Tertiary flakes were by far the most frequently retouched waste class and such a degree of consistency as is suggested by the low standard deviation given in Table 3 may well reflect a degree of functional autonomy within that context, namely for settlement as opposed to hunting or quarrying activities. It has been demonstrated both here and in the Avon valley survey (Schofield forthcoming) that these types of activity produce very different patterns and combinations of artefacts, and that any degree of regularity must be looked at in terms of a coarse-grained adaptation.

Table 3. Density of worked flint in relation to valley/non-valley contexts within the Upper Moon survey area.

<table>
<thead>
<tr>
<th></th>
<th>valley</th>
<th>non-valley</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 25)</td>
<td>(n = 19)</td>
</tr>
<tr>
<td>flint per ha.</td>
<td>39.3</td>
<td>11.7</td>
</tr>
<tr>
<td>s.d.</td>
<td>29.5</td>
<td>13.3</td>
</tr>
<tr>
<td>% retouch</td>
<td>7.0</td>
<td>6.9</td>
</tr>
<tr>
<td>s.d.</td>
<td>5.1</td>
<td>4.5</td>
</tr>
<tr>
<td>% tertiary</td>
<td>20.0</td>
<td>20.5</td>
</tr>
<tr>
<td>waste</td>
<td>3.8</td>
<td>8.4</td>
</tr>
</tbody>
</table>

Most of the material described was either mesolithic or early neolithic in date; there was a high proportion of blades, while numerous microliths and blade cores were recovered on the valley floor and terraces. Both the density of artefacts and the high proportion of scrapers tend to support the idea that it was in these areas that settlements were concentrated. Both from existing finds and from the survey, a clear distribution of axes and arrowheads has emerged which appears mutually exclusive to that of settlement. The arrowheads and axes - suggesting extractive activity, such as hunting and felling timber - all occur on the Upper Chalk and away from the river, a trend which is mirrored elsewhere in southern England and which applies to all periods of prehistory (Gardiner and Shennan 1985, Bradley and Ellison 1976).

Figure 2 (opposite). Location of the survey area and the three sample units within it.
Table 4. Variable plant-density characteristics between survey areas in southern England.

<table>
<thead>
<tr>
<th>Area</th>
<th>Mean density</th>
<th>S.D.</th>
<th>Min.</th>
<th>Max.</th>
<th>No. cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Hampshire</td>
<td>8.0</td>
<td>10.0</td>
<td>0.0</td>
<td>70.5</td>
<td>275</td>
</tr>
<tr>
<td>Avon valley</td>
<td>18.7</td>
<td>12.6</td>
<td>0.0</td>
<td>61.8</td>
<td>82</td>
</tr>
<tr>
<td>Meon valley (Lower Chalk)</td>
<td>12.4</td>
<td>12.5</td>
<td>0.0</td>
<td>66.0</td>
<td>31</td>
</tr>
<tr>
<td>Meon valley (Upper Chalk)</td>
<td>50.0</td>
<td>28.8</td>
<td>16.8</td>
<td>110.6</td>
<td>13</td>
</tr>
</tbody>
</table>

It is suggested therefore that the valleys contained settlements and were subject to the coarse-grained response described above, while the areas away from river valleys remained wooded through to the Bronze Age simply because their role as extended territories did not necessitate large-scale clearance. These areas were used throughout prehistory for hunting and foraging, as reflected in the distribution of microliths, leaf-shaped, transverse and barred and tanged axesheads, and the supply of flint, as reflected in the distribution of tranchet and polished stone axes.

Discussion

The case study demonstrates quite clearly the advantage of applying general models of settlement and land-use history to artefact distributions supplied by regional survey. In the past, our concern has been with locating 'places' where people lived at a particular time. Instead we should begin to focus on those aspects of behaviour which are repetitive and accumulative in nature, and leave the analysis of precise moments or events to those involved with excavation. Regional survey cannot answer those very specific types of question but can provide a very detailed general picture of land-use and settlement over a long period of time. This picture would be greatly enhanced if we were to spend a little more time studying the palaeoecological evidence and establishing hypotheses which could direct the focus of attention for areas and questions under investigation.

The relationship between palaeoecology and the interpretation of surface artefact collections is therefore crucial if we are to achieve a fully integrated picture of what prehistoric communities were doing in this area of southern England. It would enable us to produce not a random collection of black-and-white snapshots but a full portfolio, illustrating in 'glorious colour' the extent to which prehistoric communities were exploiting their environment.

Acknowledgements

I am grateful to the many people who assisted with surface collection and the landowners in the Meon valley who were so co-operative. Special thanks go to my research.
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A survey of the Association for Environmental Archaeology and its membership: 1980-86

Bruce Leviatan *

Summary

Some aspects of the history and changing size and distribution of membership of the Association for Environmental Archaeology are presented and discussed.

Most of you will know me by name if not by sight. I am the person who pesters you each year to 'pay up or be struck-off the membership list'. If you pay by standing order, you may have shared some of the annual headaches I get trying to rectify - at the expense of the AEA and my own time - the errors of the banks. If you pay by cash or postal order or cheque, you may occasionally find your name on a roll of members who have not paid up which appears in the January issue of the Newsletter. (I do this, rather than writing to you individually as it saves time and postage, and I hope it is not embarrassing if your name does appear).

I took over the job of Membership Secretary in 1984, and in the same year, Vanessa Straker took on the job of Treasurer. Rob Wilson became General Secretary in 1984, and this job has since passed on to Mark Robinson. Besides the major task of editing and publishing Circass, the final job devolving to a member of the AEA committee is that of Publications Officer - this is presently being done by Rob Snailfe. Prior to 1984, all these jobs, except the production of Circass, were done solely by Nick Balam, who was also instrumental in setting up the AEA back in 1979, along with Professor Geoffrey Dimbleby, Don Brothwell and Simon Wilson. (In fact, if my memory serves me correctly, some of the first discussions at which the idea of the AEA was made public took place at the CBA Urban Environmental Archaeology conference in York). Thus, we all owe a tremendous debt to Nick who built-up the organisation to the healthy state in which I found it (see Table 5). Even now he has not completely stepped aside from AEA duties, as he represents us on the Science Panel of the CBA. This paper, therefore, is dedicated to him.

Prior to 1983, the membership records were handled manually, but since then they have been computerised, so in starting this survey my first task was to try to fill in the 1979-82 'gap' on the computer. Luckily the full membership list which appeared in Newsletter 5 (November 1980) helped, but the records previous to this are limited, so I have not included 1979 in the survey.

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When I started work on this paper, I was simply interested to see for myself how our membership has grown. One of my more pleasant tasks has been to send out details to people wishing to join, and it seems that in each year there has been a fairly large enrolment of new members. Almost immediately, however, a number of other questions posed themselves, and the list of topics to consider grew to form those listed below, to which numbers (1)-(5) cover the seven-year period, and (6) covers 1986 only. Two additional topics I could not fully answer, because the records are not complete enough, relate to the proportion of students, and the division of interests. (To some extent the latter can be gleaned from the Research Interests listings in Newsletter 13 and 14.)

1) Number of members in each year.
2) Numbers of resignations, new enrolments and reinstatements in each year.
3) Number of overseas members in each year.
4) Number of institutional members in each year.
5) Relationship of membership numbers to rises in subscription.
6) Distribution of members.

Numbers (1)-(5) are covered in Table 5 which shows the total membership in each year, and how this is made up in terms of new members and reinstated members. It also summarizes the number of resignations in each year. The table gives numbers of overseas and institutional members, but only indicates their net increase or decrease, since these figures are not broken down for resignations, reinstatements or new enrolments. The table shows that after an initial small fall in numbers (most of which was due to resignations from overseas members) the membership has steadily increased, with 1983 the boom year, but increases in 1985 and 1986 being in the order of 30 members. The proportion of overseas members has also grown and they now form about 14% of the total.

Table 5. Summary of AEA membership 1980-1986

+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
|-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------|
| New members     | - 0 1 103 19 46 49 | -                | - 5 0 2 4 19 23 | -                | - 0 0 1 4 5 9 | -                | -                |
| Resignation     | -                | - 5 0 2 4 19 23 | -                | - 0 0 1 4 5 9 | -                | -                | -                |
| Reinstatement   | - 0 0 1 4 5 9 | -                | -                | -                | - 0 0 1 4 5 9 | -                | -                |
| Total           | 141 136 137 238 254 283 310 | 125 125 125 125 125 125 125 | 125 125 125 125 125 125 125 | 125 125 125 125 125 125 125 | 125 125 125 125 125 125 125 | 125 125 125 125 125 125 125 | 125 125 125 125 125 125 125 | 125 125 125 125 125 125 125 |
+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+-----------------+
It is interesting, therefore, to note that subscription increases have not, apparently, had any adverse effect upon membership numbers. The first increase, from £2.00 to £4.00 actually occurred in 1983, the year of the greatest increase in membership, and the second increase, in 1986, does not seem to have affected the trend since then. This is illustrated by the graph (Fig. 3), which shows the increase in membership year by year, and gives pointers for the years in which the subscription was increased. The increases in subscriptions, of course, are equated with improvements in the service of the AEA. 1983 saw the birth of *Cicada* and 1986 the rebirth of the *Newsletter* which had been suspended when *Cicada* first appeared. Part of the reason for the 1983 'boom' must be the appearance of *Cicada*. Many people who had not previously come across the AEA may have heard of the Association by reading *Cicada*, and others, who had heard of us but not joined, may have been attracted by the idea of receiving the journal.

![Graph showing AEA membership from 1980-86.](image-url)
Returning to the table, the only note upon which any alarm may be sounded is the number of resignations in each year. These rose from two in 1983 to 23 in 1989, and although membership also increased, the proportion of resignations in each year has grown (from 0.8% in 1983 to 7.3% in 1990). One explanation may be that we pick up a flush of student members around conference time, and these stay in the AE arguably only for a year or two. On average, however, people tend to stay members for three years or longer, and over a third of the present membership comprise people who joined in 1981. At the present moment, only a few of the new entrants are outstripping losses, but this is no reason for complacency, and we should ask why the trend towards an increased percentage of resignations is occurring. One explanation may be that most of the losses are students who have graduated and left academia (and because the number of students enrolling has grown, so the number of student losses has also increased). The reinstatement figures show that most people do not change their minds after leaving the AE. Most reinstatements occurred after a one-year gap which may indicate simple absent-mindedness, but some were after three- or four-year gaps.

As may be expected of an organization formed in and operating from Britain, the majority of members are British (86.4% in 1990). Most of these are from England, with only ten (3.2%) in Wales, nine (2.6%) in Northern Ireland and thirteen (4.1%) in Scotland. London is the clear winner in terms of concentrations, with 58 people in Greater London and six more close-by (total 19.6%). Other main concentrations are in Sheffield (19, 5.0%), Cambridge (17, 5.4%) and Bristol (11, 3.5%). Then come Leicester at ten (3.2%), York and Southampton at nine (2.6%) each and Belfast at eight (2.5%). Other locations have six or less; locations with two or more members are listed in Table 6 and their distribution throughout the British Isles is shown in Fig. 4. Table 6 also lists overseas members and quantifies each location. Most of these members are from Europe (38 out of 49) with 11 from the Netherlands representing the largest single overseas contingent.

What lessons, if any, are to be learnt from these figures? Firstly, that the AE is still a growing organization, and must now represent a potentially powerful lobby for environmental archaeology, in Britain at least. This latter fact is underlined by the recent input by the AE into comments concerning the Hart Report (see Newsletter 12) and the House of Commons Environment Committee (Newsletter 13). Perhaps the time has now come to question whether the AE should take a more active role in lobbying the issues surrounding environmental archaeology and landscape/nature conservation.

A second point is that we should not become complacent about our state or status. The increase in resignations has been pointed out, and we should seek to try to stem this leak. One way of doing this, and improving our service to members, is if people write to members of the committee with suggestions, complaints, etc. Open letters to the Newsletter would also be welcome as would be papers and suggestions for Circuits.

Thirdly, as our overseas membership increases, we should consider ways of improving our service to them. One outstanding issue is the cost, to the member, of sending the annual subscription in sterling. A possibly cheaper alternative would be to send the currency equivalent of £6.00 (allowing an additional sum for exchange rate charges in Britain). If this is cheaper than sending money orders or cheques made out for £6.00 sterling, then please feel free to use this method of payment (see Newsletter 16 for full details of this scheme). Another possible improvement of the AE’s service to overseas members would be if we held meetings overseas more regularly than in the past (to date there has been one meeting, held in the Netherlands). This, however, is very much in the
Figure 4. Distribution of REA members throughout the British Isles (at time of writing). The number of members at each location is indicated by the size of the symbol.
A recent suggestion for an improvement to our service is for a fund to be set up to help unemployed, low-waged and student members attend meetings and conferences organised by the AEA. Applications to this fund should be made to the Treasurer (see Newsletter 18 for details). This facility will also be available to overseas members, though we may not necessarily be able to contribute 100% of their expenses.

Finally, a few words on the organisation of the AEA. The present committee is made up as follows: Mike Allan, Annie Grant, James Greig (elected 1988), Kevin Edwards, Rob Scalfie and Mark Robinson - all elected members, and Vanessa Straker (Treasurer), Harry Kenward (Editor, Cirence) and Bruce Levent (Membership Secretary) - co-opted members. The other editors of Cirence are Allan Hill and Terry O'Connor. The editors of the Newsletter are Vanessa Straker and the present author. I am also AEA representative on the CBA Board, whilst Nick Balsam is the AEA representative on the CBA Science Panel. Any member may nominate another member for a position on the committee. The name and address of the nominee (who must be agreeable to being nominated) together with the names and addresses of the nominator and a seconder should be sent to the Secretary before the AGM (which is held during the annual conference), when voting takes place. Committee members serve for three years on a yearly overlap basis. The three co-opted members are semi-permanent (i.e. until they get fed-up with the job!). Other posts are decided by the committee.

The AEA has three types of membership: ordinary membership which is open to anyone with an active interest in environmental archaeology at a subscription of £6.00 per year; institutional membership which costs £9.00 a year; and Honorary Life Membership which is free and is conferred upon those who are considered to have contributed greatly to the practice and reputation of environmental archaeology. Such status is given by vote at AGMs and at present there are two Honorary Members: Professors Geoffrey Diezley and Fred Highton. The AEA committee would welcome suggestions for any other people who deserve Honorary Membership, and will refer such suggestions to the membership at the following AGM.
<table>
<thead>
<tr>
<th>Region</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Britain</td>
<td>2 members: Eastbourne, Edinburgh, Exeter, St Albans, Glasgow, Salisbury, Wakefield, Winchester.</td>
</tr>
<tr>
<td></td>
<td>3 members: Lancaster, Lancaster, Leeds, Manchester.</td>
</tr>
<tr>
<td></td>
<td>4-10 members: Reading (4), Bradford (5), Cardiff (5), Oxford (6), Belfast (8), Southampton (9), York (13), Leicester (10),</td>
</tr>
<tr>
<td></td>
<td>over 10 members: Bristol (11), Cambridge (17), Sheffield (15), Greater London (56).</td>
</tr>
<tr>
<td>Continental Europe</td>
<td>Single member countries: Austria (Vienna), Hungary (Budapest), Italy (Rome), Switzerland (Basel), France (Gijon, Besancon Cedex)</td>
</tr>
<tr>
<td></td>
<td>Two members: Denmark (Copenhagen [2], Aarhus), Sweden (Goteborg, Umeå, Uppsala)</td>
</tr>
<tr>
<td></td>
<td>Four members: Eire (Dublin [3], Cork), Norway (Oslo Bergen, Oslo, Stavanger)</td>
</tr>
<tr>
<td></td>
<td>Six members: West Germany (Frankfurt, Göttingen [3], Hamburg, Munich)</td>
</tr>
<tr>
<td></td>
<td>Eleven members: The Netherlands (Amersfoort [3], Amsterdam [8], Haerneoude, Utrecht)</td>
</tr>
<tr>
<td>Other Countries</td>
<td>Single members: Canada (Ottawa), Israel (Jerusalem), Jordan (Amman)</td>
</tr>
<tr>
<td></td>
<td>Two members: South Africa (Portoria)</td>
</tr>
<tr>
<td></td>
<td>Three members: USA (Boston [2], Florida [11])</td>
</tr>
<tr>
<td></td>
<td>Four members: Australia (Adelaide, Canberra [2], Victoria)</td>
</tr>
</tbody>
</table>

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Notes for contributors

Articles for inclusion in *Circaea* should be typed double-spaced on A4 paper. Line drawings should be in black ink on white paper or drawing film to fit within a frame 153 x 250 mm. Captions should be supplied on a separate sheet of paper, and labelling on figures should either be in Letraset (or an equivalent) or should be in soft pencil. Half-tone photographs can be accommodated, but authors wishing to make extensive use of photographs, or colour, should note that they may be asked to contribute towards the high cost of production. The editors will modify short contributions to fit the layout and convention of *Circaea*. The same principle will be applied to idiosyncrasies of spelling and punctuation. Scientific articles will be submitted to referees: authors may, if they wish, suggest suitable referees for their articles.

**TWO COPIES** of scientific articles should be submitted. Authorities must be given to Latin names, either at their first mention or in a comprehensive list, and species lists should follow a named check-list. References should follow the so-called modified Harvard convention, but with *Journal* titles preferably given in full, not abbreviated. World list abbreviations will, however, be acceptable if the author has a definite preference. For guidance as to the preparation of material for publication, contributors are referred to *The British Ecological Society's booklet 'A Guide to Contributors to the Journals of the BES'*, and *The Royal Society's 'General Notes on the Preparation of Scientific Papers' (3rd ed. 1974), The Royal Society*). Text proofs of papers will be provided and should be returned within three days of receipt.

Ten free reprints will normally be supplied to the authors of scientific articles: further copies will be available, if requested at the time proofs are returned, at a charge of 5p per side plus postage.

Copy dates for *Circaea*: Spring issue – and November; Autumn issue – and June.

The Editors, CIRCAEA, c/o Environmental Archaeology Unit, University of York, York Y01 5DD, U.K. Tel. (0904) 430000 ext. 5531/5849.
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