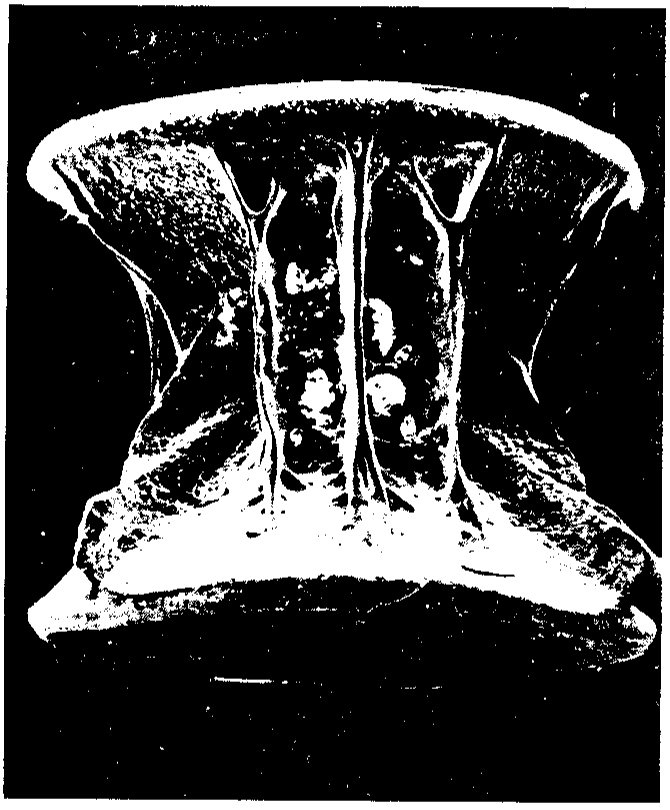
Volume 1 Number 3 September 1983

circaea



This Issue:

Evans In The Field – Groningen Report
Innes and Tomlinson on Merseyside – Publication – ßurhinus

The Bulletin of the Association for Environmental Archaeology

CIRCAEA is the Bulletin of the Association for Environmental Archaeology, and is published three times a year. It contains news and short articles as well as more substantial papers and notices of forthcoming publications and conferences. Editorial policy 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. Circaea is edited by Allan Hall, Harry Kenward and Terry O'Connor, and is assembled and printed at the University of York. Circaea is distributed free to members of the AEA and available to institutions and non-members at six pounds sterling per annum. At present, copyright resides with individual authors. Circaea is published by the Association for Environmental Archaeology, c/o Room 530, Fortress House, 23 Savile Row, London W1X 2AA. Enquiries concerning membership of the AEA should be sent to N. D. Balaam at that address.

Notes to 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 165 x 245 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 idiosyncracies 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 page plus postage.

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Copy dates: January issue - 15th November; May issue - 15th March; September issue - 1st July.

The Editors, c/o Environmental Archaeology Unit, University of York, York YO1 5DD, U. K.

CIRCAEA VOLUME 1 NUMBER 3, SEPTEMBER 1983 (PAGES 71 TO 102)

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PAPERS

Editorial

It has become clearer over the last few months that the DoE is moving towards a policy of using consultants on a project-funded basis as a substitute for sustained financing of rescue environmental archaeology. While some refreshment of the existing system can only be welcomed, project funding seems unlikely to be a suitable mechanism by which to achieve long-term cost-effectiveness.

Project funding is beset with dangers. First of all, it reduces the number of people who can make a career (as opposed to pin-money) out of environmental archaeology. Some of our colleagues have mortgages - even children - to support. To argue for jobs alone would be inappropriate: but there is already far more work to be done than hands and minds to do it.

Environmental archaeology cannot efficiently be treated site by site. There are several reasons for maintaining continuity. It is axiomatic that the 'specialist' is indeed a specialist, thoroughly familiar with the subject matter and capable of preparing reports to a high standard - not just someone who happened to be available when the project cheque was signed and who is likely to have to learn 'on the job' and who will therefore neither be cost-effective nor do justice to the material. Furthermore, archaeological projects are increasingly based on groups of related sites excavated over several years. It would be frankly absurd if, for example, seeds from four related sites excavated in successive years were worked on by four different consultants to different standards, using different recording systems and without opportunity to re-examine the previous years' work. Project funding will not pay for comparative studies, re-working of earlier material, or the development of techniques.

The DoE cannot and must not rely on having a pool of sporadically employed specialists eagerly competing for a few months' work here and there. Many of these people will become disillusioned and will quickly drop out of the subject. There is a danger that those who remain will be the least competent, because the first to get out will be those who are most seriously trying to build a career and who have the most marketable skills. The policy of employing specialists on an ad hoc basis has been rigidly applied for several years by the Welsh Office, with consequences to Welsh archaeology which can at best be described as detrimental. Do we wish to hand over environmental archaeology, now accepted as essential to good archaeology, to an ill-trained and transient population of part-timers?

An even more horrifying scenario is that of of a purely competitive business with specialists tendering for projects. Naked competition of this kind could all too easily lead to dropping standards, superficial work, and outright fraud. Furthermore, it would endanger the already tenuous grapevine of communications which interconnects DoE staff and

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Cover photograph: Ventral view of precaudal vertebra of herring (Clupea harengus L.) from 10th century levels at 16-22 Coppergate, York. Photograph - R. Hunter and A. K. G. Jones.

consultants. A purely commercial system could only be made to work well if teams of specialists combined to form consultancies, with standards and prices under tight control. However, we are then faced with the hideous spectre of the AEA having to establish a rigidly enforced closed shop to control and protect its members. Nobody would gain from such a system. We wonder whether the originators of the several palynological consultancies which already exist have considered these dangers.

All this says nothing of the need for adequate reference material, integration of different specialists' results, and thorough training. Some established posts are essential to provide continuity of techniques and to curate the reference collections which are necessary to us all. Project-associated funding could be made to work - with effort and given a network of established institutions like the existing units, but covering both the necessary range of disciplines and the geographical regions. These units - which observation suggests need to be staffed by two to four experienced people - could then take on graduates or their equivalent, either as short-term technicians or as trainees in a specific discipline. The editors have direct experience of this process and have found it to be most satisfactory. Reports are written, facilities are fully utilised, and people are given a good start, whether for a career as laboratory technicians or in environmental archaeology.

All is not gloom, then. We have the makings of a good system already. The danger is that if project funding is applied without the most careful consideration, the good points of the present arrangements will be lost and only the disadvantages remain.

This is the third and final part of Volume 1 of Circaea, and a point at which the Editors can take stock. There have been some difficulties, mainly consequent upon inexperience and a tendency to try to do too much too quickly. Nevertheless a steady, albeit slow, flow of copy has arrived and the quality of contributions has been at least as good and often a lot better than anticipated. We are, however, still looking for more material and we hope that the high quality of production achieved by the York University Printing Unit (witness Figs 12-16 in Peter Murphy's paper in 1(2)) will encourage would-be contributors.

We would like to remind potential authors that Circaea will publish a very wide range of material, whether untouchable data (providing they say something) or erudite articles. We did, however, decide at an early stage not to publish advertisements, although we are happy to insert loose sheets provided by members (without charge). The same service will be provided for non-members and institutions for a modest fee.

This issue contains a pleasing diversity of matter. Jim Innes and Philippa Tomlinson give an account of some aspects of their work with the Merseyside Archaeological Survey, emphasising the way palynological investigations can complement archaeological data-gathering. John Evans has been pressed into evaluating the role of fieldwork in teaching environmental archaeology to archaeology students. We hope this will have some effect in spreading the word. James Greig gives a personal

view of the recent meeting of the International Work Group for Palaeoethnobotany in The Netherlands. For those of the large British (or as the organizer would have it, Anglo-Saxon!) contingent present, the meeting was a welcome opportunity for stimulating discussion with workers from many other parts of the world. The editors were particularly pleased to receive Valerie Black's constructive thoughts on the subject of editing and refereeing, prompted by the Opinion column in Circaea 1(1). We heartily concur with all she says.

Miscellany

Environmental Consultancy Service

Dr J. A. Taylor of the Geography Department, University College of Wales, Aberystwyth, Dyfed SY23 3DB, has sent us notice of an 'Environmental Consultancy Service for Archaeologists, Palaeo-ecologists, Environmental Scientists, Biogeographers, Conservation and Planning Authorities and Engineers'. A wide range of services is offered, including laboratory identification and analysis and field survey. Anyone interested should contact Dr Taylor.

A Dirty Word?

In Circaea 1, 30, Andrew Jones asks for publications which use 'cess' as a single word. In Sybil Marshall's 'Fenland Chronicle' (Cambridge University Press, 1967), there is an interesting account of peat cutting in the fens at the end of the 19th century. On p. 29 we read 'The size of each block, or cess, was ...', and on the next page 'The cesses were set off the spade in rows ...'. No-one who has dug peat from the bottom of a wet bank could miss the analogy between it and the contents of a cess-pit.

There is a curious reciprocity between the words cess and bog. In the East Anglian vernacular one digs a cess from a bog, while in more widespread vulgar speech, a bog receives cess.

Jones mentions that the etymology of 'cess' is doubtful, and advances one speculation upon it. Another is to relate the word to the Latin cedere (past participle cessum) which has a variety of meanings including to yield or give up. So on this interpretation, cess is that which we cede from ourselves to the outside world.

Yours etc.,

J. B. Tyldesley.

19 Harlow Oval, Harrogate, HG2 ODS.

Fieldwork in teaching environmental archaeology: the Cardiff course

J. G. Evans

The value of fieldwork as an aid to teaching environmental archaeology at the undergraduate level is raised in conversation every so often, and it is a topic that may be brought up by various of one's colleagues in the Faculty of Arts and University Administration when one is trying to get finance for student fieldwork. To my mind, fieldwork is such an integral and obvious part of teaching the subject that I find it difficult to know what to say. But, at the request of the Editors, here goes!

First some necessary background. The course in Environmental Archaeology at University College, Cardiff, constitutes 12.5% of the Honours course in Archaeology. It is taken by both Arts and Science students but is not compulsory - depending on the year, perhaps between one- and two-thirds of the class opt for environmental archaeology. (It is restricted to the British Isles, incidentally, because this is the basis of the Honours Archaeology course as a whole.) There are four sections, loosely: (1) the present-day state of affairs; (2) environmental history; (3) laboratory techniques; (4) man-land relations. The last is not dealt with at length because it is (or should be) covered in the various period courses. Laboratory techniques are dealt with by myself and various colleagues in other departments. Environmental history is covered in a number of textbooks, including my own and the Simmons and Tooley volume, and is thus not taught in detail. This leaves the present-day state of affairs, which, with fieldwork, laboratory classes, lectures and essays, constitutes more than 50% of the course.

The aims of studying present-day environments are to familiarise the students with a range of geology, geomorphology, soils, plants and animals. There are two strands to this: (1) basic recognition of rock and soil types, and plant and animal species; (2) ecology. Some of this can be done in the laboratory and it is surprising how much can be taught. I have run a course for several years in angiosperm taxonomy - basically identifying flowers - and all the students soon become adept at using a key, even to the extent of identifying grasses. Nevertheless, the laboratory leaves a lot to be desired - a hand specimen of basalt pulled out of a drawer leaves less of an impression than a visit to the pillow lavas of Strumble Head.

Fieldwork is usually qualitative and anecdotal. It is difficult, with the range of geomorphologies, vegetations, habitats and so on to be covered, for it to be otherwise. I usually begin at the 'habitat' or 'small-scale geomorphological situation' level - various types of shore, coastal vegetation, woodland structure, and grasslands, for instance. The basic unit of the field work is the half- or one-day excursion. In these, one of the above or other habitats is studied. Taking, for example, an area of upland (300 m) in the South Wales Coalfield one first of all outlines the main geology, geomorphology and vegetation zones or types (usually in horizontal sleet), and introduces at the start the idea of looking at landscapes through time. The next stage is to make sure that the students can recognise a few common grasses - mainly Nardus, Festuca, Agrostis, Molinia and Poa - both as individual plants and as vegetations. Other major types of vegetation are pointed

out, such as bracken, heather, and Juncus. The colours in the landscape begin to take on a new significance. So, too, do the pollen diagrams. Then a few soil pits are dug and one enlarges on ideas about environmental change. Bronze Age cairns and medieval shielings provide a nucleus around which to talk about upland settlement. Lastly one augers into the infilling of a small corrie bog and old lake, and introduces more environmental history and some new sediment types. Fauna in this sort of upland context is difficult - black slugs, ravens, and sheep do not make good teaching material - but it is easier on the shore or in a wood.

After a few weeks of this sort of thing, in which the major environments are seen (and which goes along in conjunction with laboratory classes, lectures and essay writing), more difficult situations are selected - more difficult both to appreciate and of access. The main object, as well as adding to the range of environments experienced, is to look at the land on a broader scale than previously - over 1000 square kilometres rather than a few square kilometres. Day excursions are made to the Gower caves, to the coastal swamps of Swansea Bay, to the real Molinia uplands (600 m) to the north of the Coalfield, and so forth. The individual units studied earlier now take on a new significance in this broader context. Standing on the plateau of the mid-Wales uplands one can look across the lower heights of the Coalfield to the Swansea Bay levels and Bristol Channel. Exmoor can be seen on the far side, and, up-river to the east, the Mendip Hills and the gap of the Somerset levels. Now it is not only a magnificent panorama. All the various habitats at every scale right down to the individual parts of the grass spikelet can be felt.

Changes in vegetation, patterns of herbivore seasonal movements, climatic gradients and so forth, can be more clearly visualised. So too can the various activities of ancient human communities, historic and prehistoric.

At some stage - preferably later rather than earlier - a five-day field course is taken. Ideally this should be well away from the home territory - South-west Ireland, North-east Yorkshire, Ayrshire and Cornwall have all been visited in the past by Cardiff groups with varying degrees of success. Lately, because of financial constraints, we have opted for Fishguard, but this year we are once more being adventurous and plan to go to Ireland. The purpose of these five-day courses is to compare and contrast the major land zones of the area visited with the situation in South-east Wales. Also, new geomorphological contexts may be seen - for example, South-east Wales is poor in really good high mountain scenery,. rocky coasts and limestone pavements. Offshore islands are always good fun - our last visit to Great Blasket was memorable (in many ways!), and this April a group of us spent five days on Skomer surrounded by gulls and puffins by day and manx shearwaters by night. The relevance of huge animal populations to the possible seasonal movements of people can only be appreciated when one is in amongst them, as one is with the wild geese of the Severn mudflats in late winter and the breeding seabirds of offshore islands in spring and early summer.

The crucial point really with fieldwork is to become familiar with the raw data and situations - as near as possible - faced by earlier human groups, the situations they lived in and exploited.

What more can one say? I would appreciate ideas, especially on ways of devising fieldwork that was more quantitative and in which students could participate more actively. The integration of fieldwork and laboratory analysis is one area where there are possibilities. A few years ago, inspired by Martin Bell's work, I collected holdfasts of Laminaria and other low water seaweeds, and these provided material for several interesting laboratory classes in which the students not only made semi-quantitative assessments of the epifauna and considered its relevance in the archaeological context, but learnt a lot about various important hard-bodied invertebrate groups.

Dr John G. Evans, Department of Archaeology, University College, P. O. Box 78, Cardiff CF1 1XL.

Cumulative Frequencies and Sample Testing

I was pleased to see the article by Bruce Levitan on the sampling of animal bone (Circaea 1, 7-12). The Coppergate excavation in York yielded about 3 million pieces of bone, so we are also convinced that effective sampling methods are necessary.

Towards the bottom of p. 10, Levitan compares percentage frequencies of ovicaprid mandibles falling into different tooth-wear stages, in the samples and in the sub-samples. He makes the comparison for raw frequencies and cumulative frequencies. Chi-squared tests on cumulative frequencies indicate no significant difference between sample and sub-sample; similar tests on raw frequencies show significant differences.

When cumulative frequencies are formed, each new class contains all the frequencies up to and including itself. Therefore cumulative frequencies are not independent classes; the effective number of degrees of freedom is much less than (number of classes minus 1). So in this case, there was a statistically significant difference between the samples and the sub-samples, although the sub-samples may have been adequate to define the age structure of the population for the purposes in hand.

The formation of cumulative frequencies is a very useful tool for smoothing sparse data. The purpose of this letter is to warn against the idea that significant differences in frequencies may be non-significant by displaying them in cumulative fashion.

Yours etc.,

J. B. Tyldesley,
19 Harlow Oval, Harrogate, HG2 ODS.

[Editors' Note: The question of significance testing of cumulative percentage results by way of a modified Kolmogorov-Smirnov Test is discussed by Goodman, L. A. 1954. 'Kolmogorov-Smirnov test for psychological research', Psychological Bulletin 51, 160-8; an example of its use is given in Klein, R. G. 1978. 'Stone Age predation on large African bovids', Journal of Archaeological Science 5, 195-217.]

Which way is archaeobotanical research going?

A review of the papers and posters at Groningen

The International Work Group for Palaeoethnobotany had its triennial symposium during a busy week for all concerned at the Biologisch-Archaeologisch Instituut at Groningen in the Netherlands in June 1983. The range of topics covered by the various contributions shows how this field of research is developing, and this article is a summary and discussion with some personal comment.

Ethnographic research

The best source of information on how farming was carried out in the past probably comes from people who still farm in a traditional manner, often growing traditional crops. Likewise our knowledge of gathering comes from observations of the use of wild plants. Both of these sources of information are disappearing rapidly, and it is of the utmost urgency that as much as possible is found out before it is too late. Botanists have realised the need to conserve primitive crop varieties in botanic gardens and gene banks, but archaeobotanists need to know how they were grown and processed in order to interpret archaeological remains. It is not just the onset of mechanised farming that is causing traditional ways to die out, for Gordon Hillman remarked that emmer cultivation is becoming very rare in Turkey because the women, who do the laborious processing, get the men to grow wheat which may not taste as good as emmer but is easier to process. New information from the Near East, and parallel work by Glynis Jones on the Greek Islands, is permitting the detailed interpretation of many cereal remains, determining the stage of crop processing at which charring occurred; this represents a very valuable advance on our understanding of what happened. This kind of ethnographic study requires an enormous amount of time and effort to see farming in rather inaccessible places and at various times of the year, and also in learning the necessary languages.

Important work is also being done by Professor Körber-Grohne on the fruit trees in parts of Germany. The primitive and traditional varieties of these are becoming very rare, and need to be recorded; in this case by beautiful water colours as well as in writing. Perhaps the British plum varieties need the same treatment!

Modern parallels and experimental archaeobotany

Ethnographic research has provided data on the exact content of grain, chaff, and weed seeds, at different stages of grain processing, and this now allows precise interpretation of archaeological remains. It seems important to be able to demonstrate scientifically that a particular deposit could have arisen in a given way. Several papers dealt with aspects of experimental archaeobotany, covering such materials as charred seeds, dung, and the detection of hay. The results should improve interpretation of some sites.

Very precise work

If anyone thinks that the identification of plant remains is straightforward, the chances are that they do not work in the field. The papers and discussions showed the value of long experience and great persistence in studying large seed floras and in identifying them as far as possible. The scanning electron microscope is being used for detecting surface characters on cereal grains. We all know the difficulties of assembling a large reference collection of material of proven identity in a form that is easy to use, at the same time as producing results that the archaeologists need, especially in the case of large groups like the grasses. The end result may be the identification to species of plants which have distinct ecological preferences, and hence a more detailed interpretation. Large fossil floras are important in showing the presence of taxa with rather low seed production or survival. In many cases, very abundant weed seeds may provide a large flora, but only sparse records of other plants. Apart from seeds, results of identification of non-reproductive parts of dye plants found at York were shown.

Such precision is assisted when the material studied is well preserved. Swiss work on whole ears of grain from lake villages shows that it is possible to have a very precise knowledge of what the cereals were like, and how they were grown and harvested. It is also possible to compare the characters of the whole ear of Triticum turgidum (in this case) with Gordon Hillman's identification characters from his study of modern varieties. Other papers and demonstrations showed the great interest in the specialist study of cereals that exists within archaeobotany, and progress is remarkable. Others have directed their thoughts to subjects like sampling strategy, which is valuable. There still seem to be areas worthy of discussion such as the numbers of seeds which have to be counted.

Distribution mapping, summaries, and historical comparisons

The natural follow-on from very precise results is the drawing of distribution maps to show which crops were where, and when, and comparison with what is known from historical sources. Several contributions dealt with this, allowing a knowledge of the history of agriculture or even of beer brewing to be gained. The history of use of food plants, and especially of fruit, is usually well shown by faecal remains like cesspit contents, giving data on diet through the ages. It seems that the Romans brought a large range of plants which they either introduced or imported into parts of Northern Europe, but when the Roman Empire came to an end so did the cultivation or import of these exotics, and agriculture seems to have gone back to prehistoric simplicity and lack of variety. In the Middle Ages and later on, more and more plants were introduced or imported, like plums, cherries, peaches and grapes, culminating with peanuts, which were found in 19th century deposits at Amsterdam. Some Canadian cesspits from the 19th century proved similarly interesting.

The amount of archaeobotanical information is probably sufficient to give a picture of changing agriculture and diet in much of Northern and Central Europe, but elsewhere data are very scarce. There seems to be a great need for results from South-west Europe and from parts of

South-east Europe too (although some results from Central Bosnia were presented).

How many disciplines?

Seeds were the main subject at the IWGP. Some people specialise in charred seeds and grain, and others in waterlogged seeds. A few did pollen analysis as well, or could identify other plant remains like mosses or wood. It seems that most people decide on a subject area within archaeobotany which they can tackle, realising that it would probably not be practicable to try to cover the whole field because it needs so much time and experience to do justice to each part of it.

Collaborative work with specialists in other disciplines was not much in evidence at this botanical meeting, but some people said that they had round-table discussions to sort out interpretation according to the various lines of evidence.

Another way in which this subject is multidisciplinary is in the academic background of archaeobotanists. Those who have degrees in Botany will have had a grounding in pure science which is valuable even if it is then necessary to learn most of the necessary systematics and anatomy for doing archaeobotany. The archaeobotanists with archaeology degrees may have more experience in relating the results to archaeological questions than a pure botanist without archaeological experience.

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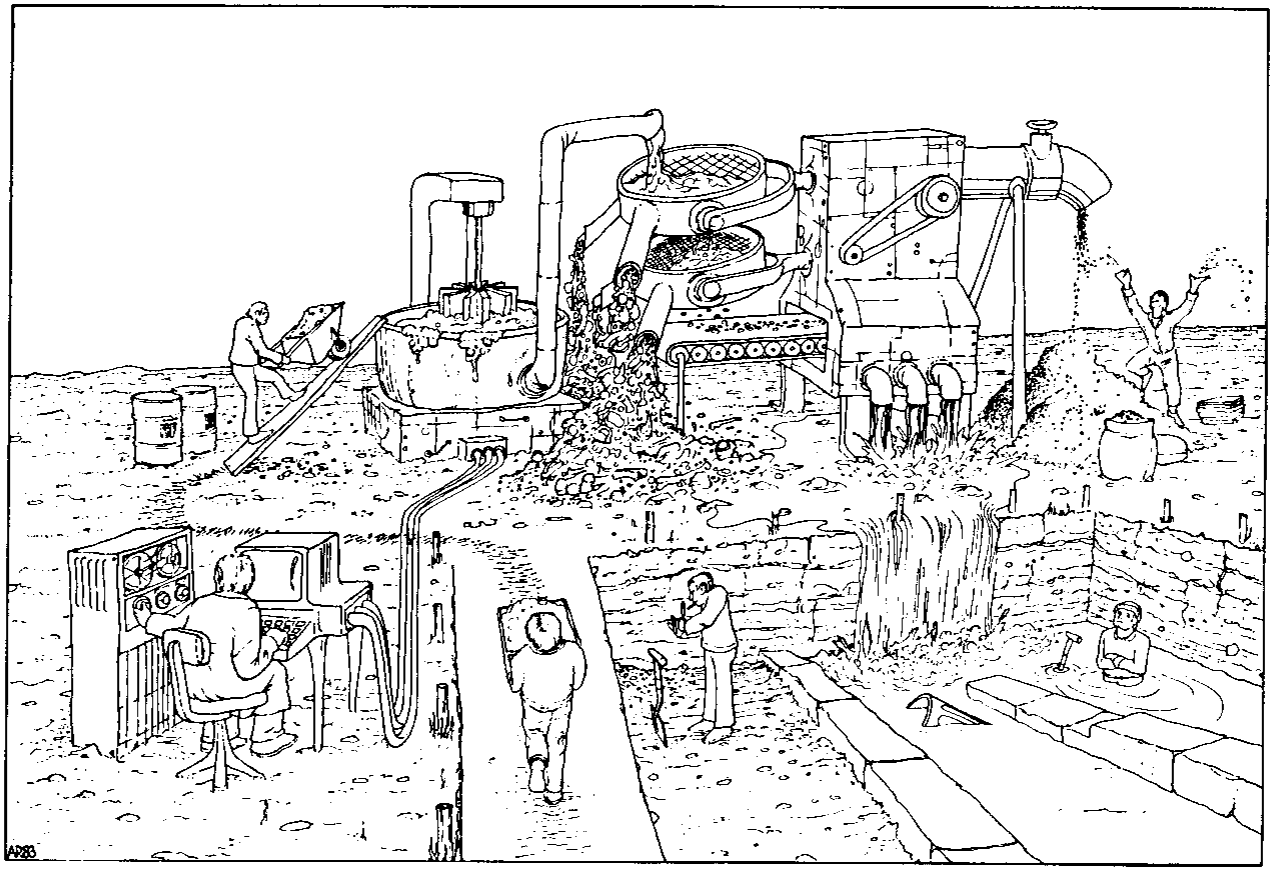

A technique for the extraction of charred grain from waterlogged deposits

Circaea vol. 1 no. 3, September 1983, pages 83-93

An approach to palaeobotany and survey archaeology in Merseyside

Jim Innes* and Philippa Tomlinson**

Introduction

Since 1977 the Archaeological Survey of Merseyside has been accumulating data from field surveys, excavations and documentary sources with the aim of establishing a Sites and Monuments Record to guide future research and planning decisions in the county (Sheppard 1977, Chitty 1981). Preliminary results showed a distinct paucity of archaeological sites in Merseyside from all periods before 1700 AD. The existence of large and well scattered areas of peat bogs in the county suggested a potential for environmental research, which could complement conventional archaeological survey. It was therefore decided to set up a programme of pollen analysis, linked with other aspects of landscape studies, such as botanical fieldwork, documentary studies and aerial photography. The aim of the palynological work was twofold. First, it was to discover the nature and extent of human activity in Merseyside from the earliest periods until as late as the peat records would allow (Sheppard et al. 1978), linking this information, as much as possible, with the expanding volume of archaeological data. Second, it was to provide a detailed vegetation history of Merseyside to act as a basis for future research.

The aims of this paper are to explain the reasons for the methods used; show the overall research design; cite a case study which highlights the type of results and some of the problems of interpretation; and consider how appropriate these techniques are for archaeological survey.

Palaeoenvironmental zones

Merseyside is well suited to a landscape-based approach to archaeology, for it has an irregular distribution of a wide range of surface geologies likely to have resulted in great diversity in soils and vegetation over a relatively small area. The surface geology comprises outcrops of Triassic sandstone and Carboniferous rocks surrounded by large plains of Devensian tills and outwash sands. Superimposed on these are a variety of Flandrian sediments consisting of silts, sands and clays of marine and fluviatile origin, coastal and terrestrial blown sands and a range of organic deposits from blanket peats to coastal raised moss. The cultural implications of this aspect of Merseyside's landscape evolution have been discussed more fully elsewhere (Innes and Tomlinson in press b), but its influence on the development of settlement and land use patterns is thought to have been

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Environmental Zone	Features	Surface Extent
A. SOLID ROCK OUTCROPS Mainly Wirral, Liverpool, and St Helens/Prescot. Much less in North Merseyside	Weathering sandstone; higher altitudes (to 100 m OD); steeper slopes; better drainage; lighter, more acid soils; lighter woodland and heathland	Almost constant (some later burial by organic deposits or marine silt)
B. GLACIAL TILL Mainly South Merseyside and Wirral. Much less in North Merseyside	Stiff, stony clays; mid-altitude (7-70 m OD); undulating lowland plain; impeded or lateral drainage; heavier, less acid soils; denser woodland	Contracting (burial by later deposits of fluvioglacial sand, deposits of peat, blown sand, silt and alluvium)
C. FLUVIOGLACIAL DEPOSITS (Shirdley Hill Sands) Mainly North Merseyside e.g. Sefton and Knowsley	Coarse grained sands; mid-altitude (7-70 m OD); undulating lowland plain; better drained except where high water table; lighter, more acid soils; lighter woodland	Contracting (burial by later deposits of peat, blown sand, silt and alluvium)
D. CENTRAL MOSSLANDS Central Merseyside, e.g. Knowsley, St Helens	Organic deposits; depressions in mid-altitude undulating plain; peat formation after drainage impedance; organic soils; reedswamp, fen carr, raised bog	Expanding (progressive expansion from basin foci)

E. RIVER VALLEYS (Mersey, Alt, Fender, Birket, Ditton Brook)	Alluvial silt; incised upper courses; broader lowland valleys fertile, fine-textured soils; fen carr, denser woodland	Almost constant
F. PERIMARINE ZONE Wirral and Sefton especially	Peats and freshwater clays; low altitude (below 7 m OD); low gradients; impeded drainage; organic soils; reedswamp, fen carr, bog, mere, blown sand	Expanding (spatial fluctuation with sea-level change; progressive expansion over littoral plain)
G. INTERTIDAL ZONE All coastal areas	Marine silts, sands, clays, muds, sandflats, lagoons, saltmarsh	Broadly constant (spatial fluctuation with sea-level change and tidal regime)

Table 7. Simplified summary of primary environmental zones in Merseyside. Cultural factors excluded.

significant. While avoiding too determinist a view of geological factors, it seems clear that they can have a fundamental influence both on settlement (e.g. Mellars and Reinhart 1976) and vegetation patterns (e.g. Oldfield 1963, Brubaker 1975), and it is therefore legitimate to approach the past using the concept of 'archaeological geology' (Rapp and Gifford 1982) as a main theme.

In order to achieve a palaeoenvironmental framework for the region, so that cultural evidence may be interpreted in the context of the evolution of the landscape and the history of the vegetation, the area has been divided into seven zones for the purposes of this survey. Each zone comprises areas with varied assemblages of soils, topography, micro-climate and other factors such as the relation to contemporaneous sea level. Although seven main zones have been recognised initially (Table 7), there remains much scope for further subdivision on second-rank environmental factors. The past landscape was not as simple as these zones imply, as there would have been variations in their spatial juxtaposition and fluctuations in their relative area with time.

Palaeobotanical techniques

While the technique of pollen analysis records natural vegetational successions brought about by progressive climatic and pedological changes, in theory its potential value to the survey archaeologist lies in its capacity to record landscape changes of a much finer order (Smith 1979). Environmental disturbance of a limited extent and duration should be detectable in the pollen record. It should also be possible to reveal the influence of man in episodes of forest recession. The identification of pollen types associated with the effects of particular forms of land use, such as fire-clearance, arable cultivation or livestock herding, should allow the progression to be made from mere recognition of probable human clearance to an interpretation of its likely character and ecological consequences. This requires a good understanding of the ecological affinities of indicator pollen grains (Behre 1981).

In practice, however, it is clear that great caution must be exercised in the execution of a research programme of this kind, for uncritical reliance upon pollen analysis for cultural inference provides many opportunities for speculative error. A host of variables, including initial site selection (Jacobson and Bradshaw 1981), preservation medium (e.g. Keatinge 1983), proximity to sources of indicator pollens (e.g. Greig 1982), and factors of pollen transport, production and preservation all serve to blur the signal received from the past. Edwards (1979, 1982) has discussed many of these constraining factors in detail and has stressed the dangers inherent in assuming direct environmental-cultural correlations, as any attempt to distinguish specifically cultural information from natural will be endangered by both the limitations of the pollen method and the pre- or misconceptions of the palynologist. Such dangers may be minimised by a representative sampling strategy, rigorous and objective presentation of the data, avoidance of over-specific cultural or economic labels in its interpretation, and its alliance with archaeological and other landscape data throughout. If handled responsibly, it is possible to use pollen data as a basis for a more general regional synthesis of environmental history (e.g. Jones et al. 1980, Caseldine and Maguire 1981). Ideally it should be possible to identify the regional effects of a particular

archaeological culture, as with Pennington (1975) for the Neolithic and Turner (1979) for the Romano-British period.

The peatlands in Merseyside are scattered through the different zones defined in Table 7 and were growing throughout the prehistoric and early historic periods. As many complete sequences of peat as could be sampled within the time available were collected across the county. Where possible a transect of cores was taken to allow interpretation of local variations in peat stratigraphy and surrounding vegetation. This material, when pooled with the results of previous work (e.g. Birks 1965, Cundill 1981, Godwin 1959, Tooley 1978), provides a reservoir of pollen data from inland and coastal deposits across the study area and may be correlated with the standard radiocarbon-dated pollen diagram for North West England from nearby Red Moss (Hibbert et al. 1971).

Case study

Simonswood Moss is part of a large raised bog complex in central Merseyside and forms part of the central mossland zone (Table 7). Evidence from early maps and documents shows that extensive drainage and reclamation have much reduced the original area of these mosses, but Simonswood is as yet undrained. A core was recovered from Simonswood Moss C (SJ49 NW 448 099) as part of a transect across the moss. It contained a lens of charcoal near its base, in a well-humified amorphous peat overlying Phragmites peat and gyttja. It was decided to investigate this particular section in more detail in order to look closely at the pollen evidence associated with the charcoal layer. This involved the use of smaller sampling intervals than time would normally have allowed. The stratigraphy is shown in Table 8. Samples were taken for pollen analysis at 1 cm intervals and were prepared using the standard method (e.g. Jones and Cundill 1978). Pollen grains were counted until a total of 150 tree grains was reached. The resulting pollen diagram is displayed as Fig. 17. This shows all pollen and spore types as percentages of total tree pollen. Alnus has been excluded from the tree pollen sum.

Table 8. Stratigraphy of Simonswood Moss C profile.

Stratum	Depth (cm)	Description
4	383-386	Well humified black amorphous peat
3	386-387	Well humified black amorphous peat with fragments of charcoal and a slight silt fraction
2	387-389	Well humified black amorphous peat
1	389-390	Less well humified dark brown peat containing rhizomes of Phragmites

The diagram is composed of a single Local Pollen Assemblage Zone (SMC-1) which is characterised by Quercus, Ulmus, Alnus and Corylus. Although applicable to this site only, SMC-1 may be correlated with zones on diagrams from other sites in the central mossland area and with the standard regional diagram at Red Moss (Hibbert et al. 1971). High Ulmus and Alnus frequencies suggest a correlation with Regional Pollen Assemblage Zone 'e' at Red Moss.

Three stages in the history of forest clearance are recognised and are used to subdivide the diagram into zonules 1-3.

Zonule 1, 390-387 cm: In this zonule few indications of forest disturbance are recorded, as tree and shrub pollen dominate the assemblage. Quercus, Ulmus and Alnus frequencies are high, while Betula, Corylus, Pinus and Tilia are also significant. Calluna is present in moderate values, while herb pollen remains consistently low. Dry land herb pollen is almost absent.

Zonule 2, 387-386 cm: A small fall in total tree pollen frequencies occurs, with Quercus, Betula and Pinus all affected. Alnus pollen frequencies are also reduced, while Corylus values rise sharply to a marked peak. Ulmus values are undiminished. Other shrub taxa present at a higher frequency include Salix, Sorbus and Calluna. Dry land herb pollen frequencies rise, Plantago lanceolata, Artemisia, Urtica and Rumex being recorded, the last of these at high values. Gramineae and Cyperaceae values increase, while Pteridium spores show peak frequencies.

Zonule 3, 386-383 cm: Tree pollen taxa return to dominance of the assemblage, Quercus and Betula especially so. Ulmus values are unchanged, while Fraxinus becomes represented consistently and Corylus values remain high. Representation of Pteridium and dry land herbs is much reduced. Sphagnum frequencies are greatly increased.

The evidence from Simonswood Moss C apparently records a local forest fire, as the appearance of charcoal in the stratigraphy is coincident with pollen fluctuations indicating the replacement of mixed woodland with open-habitat communities. The presence of herbs indicative of disturbed conditions, for example Plantago lanceolata, Urtica, Pteridium, Artemisia and Rumex, suggests the creation of substantial areas of bare ground following clearance, while the removal of the tree canopy evidently encouraged the expansion and flowering of heliophyte shrubs, particularly hazel. This temporary clearance was followed by the eventual regeneration of woodland in the affected area. Three other results of this disruption of the woodland ecosystem may be noted: (a) the presence of silt amongst the charcoal suggests that soil was washed onto the site following erosion initiated by the fire clearance; (b) higher Sphagnum values suggest that an increase in bog acidity and growth rate may have occurred, perhaps caused by increased runoff resultant upon the removal of the vegetation from the surrounding sandy soils by the fire; (c) the establishment of a more light-demanding secondary woodland with more Fraxinus and Corylus may have followed clearance.

SIMONSWOOD MOSS C

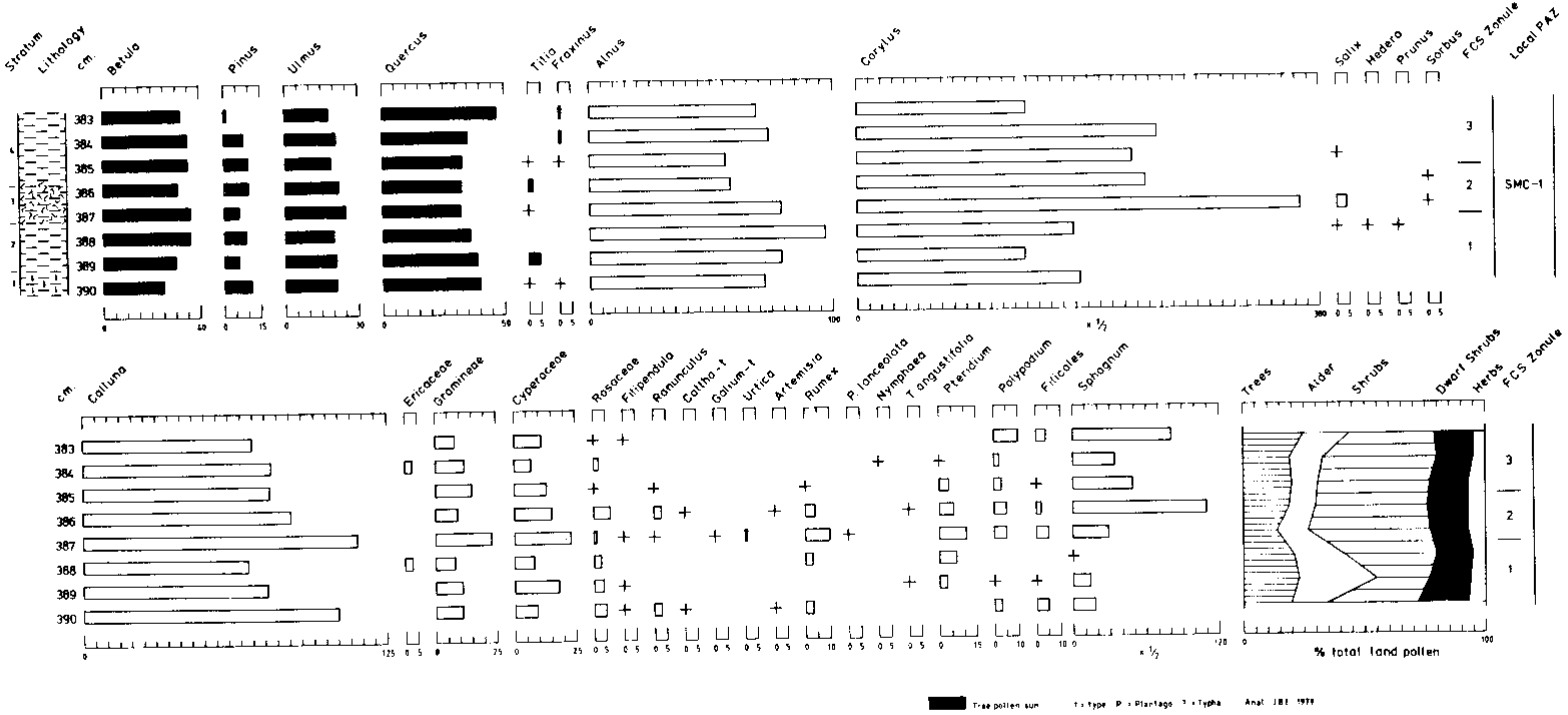

Figure 17. A short pollen diagram through a charcoal-bearing peat horizon at Simonswood Moss C, Merseyside. Frequencies are calculated as percentages of total tree pollen, Alnus being excluded from the tree pollen sum. F.C.S. = Forest Clearance Stage; P.A.Z. = Pollen Assemblage Zone.

The proposed correlation of this diagram with Regional PAZ 'e' at Red Moss, and therefore with Chronozone Flandrian II, suggests that, if this fire clearance is considered to result from human activity, it can probably be assigned to a Mesolithic cultural context. It would thus compare broadly with other examples of lowland lakeside Mesolithic clearance (e.g. Sims 1978) in balancing the more numerous records of Mesolithic-age clearance from the uplands of England (e.g. Jacobi et al. 1976, Simmons and Innes 1981). In a regional context, it may be compared with similar pollen and charcoal evidence of fire clearance presented by Tooley (1978, 80) from the Starr Hills, Lytham Fylde, Lancashire, although in that case dated to late in Flandrian I.

Simonswood Moss lies within an area of outwash sands (Shirdley Hill Sands) and the clearance recorded at this site seems to have taken place in an ecotone betwen the wetland habitats of the mossland zone and the mixed woodland communities of the sandy plain. It is interesting that the charcoal occurs in the stratigraphy at a point just above where Phragmites peat has given way to a more amorphous peat. If Welinder (1976) is correct in stressing the high resource potential of reedswamp communities to hunter-gatherers, the firing of the vegetation in this case might be seen as an attempt to re-establish locally high productivity environments by the creation of diverse, seral woodland communities (Mellars 1976), following the loss of reedswamp resources through hydroseral succession.

Recent intensive fieldwalking in the area of Simonswood Moss has led to the recovery of some Mesolithic flint assemblages. These have been found on the Shirdley Hill Sands, where they occur in slightly elevated locations within the generally very flat terrain. They are little more than a kilometre from the pollen sampling site and in mid-Flandrian times would presumably have been situated on the fringes of the then more extensive wetland area. Microliths of later Mesolithic, geometric, type are included in these assemblages, so that some at least of the sites could be of Flandrian II date. It would be easy to assume a relationship between the flints and the fire clearance, but at this stage it is only possible to guess. The extent of the fire is not clear (there was no record of it in other borings at Simonswood); it could have been very small-scale. There is, of course, no direct evidence that this fire was of human intention.

There are a number of problems of interpretation to be resolved before evidence such as this can be related to the archaeology, both locally and within the county. It is difficult to place the clearance phases from each of the sampling sites directly into archaeological periods. It is only possible to date such clearances by correlating with radiocarbon-dated sites and by working back from known cultural phases, such as the beginnings of arable agriculture. Despite this, each new pollen diagram serves to refine the overall picture.

Overall results and general conclusions

The environmental research programme has, in general terms, been able to show widespread influence of human activities in Merseyside through most periods (cf. Innes and Tomlinson in press a and b). It has indicated those parts of the study area which offer greatest potential for the recovery of archaeological material of specific

periods. It has been possible to suggest some differences in the distribution of each archaeological culture between the various zones. The vegetation history of the county is gradually being pieced together and tentative vegetation maps have been drawn up for each period.

Detailed palynological records from individuals sites such as Simonswood Moss form the main source of the palaeobotanical data for the construction of the regional vegetation history. Such pollen records, however, provide evidence which is restricted both in time and space. The deficiencies of this kind of 'snapshot' research are shared by all forms of site-orientated archaeology. Is it possible to extrapolate the understanding of the site to an understanding of the territory or region as a whole? This problem might be overcome by recruiting more pollen evidence from a range of sites within the palaeoenvironmental zones, within any major sub-zone recognised and in areas of inter-zone transition, where steep environmental gradients stimulate diversity. Further work on pollen samples from archaeological sites would be useful if any suitable ones were excavated in the region.

The zonal approach put forward here has formed a useful basis for the application of palynology in a survey role. It must be used with care, for unrecognised local factors may cause significant variations from the expected generality. It does help to highlight some of the difficulties of pollen interpretation. When allied to other archaeological and ecological factors, however, a synthesis of an overall landscape history can be produced which can act as a framework for the study of human activity on a regional scale.

Acknowledgements

We very much appreciate the freedom and encouragement given by Brian Sheppard and Gill Chitty, successive Field Archaeologists in Merseyside, to the environmental survey team, who as part of the Archaeological Survey of Merseyside were employed on Manpower Services Commission-funded schemes administered by The University of Liverpool and Merseyside County Museums. Research facilties were provided by Dr Malcolm Hughes and Dr Gareth Evans of the Biology Department, Liverpool Polytechnic. The White Moss Peat Company kindly permitted access to Simonswood Moss. We are grateful to Derek Hudspeth (University of Durham, Department of Geography) for photography of Fig. 17, and to Vicki Innes for typing the manuscript. We are very grateful to Dr. Kevin Edwards, University of Birmingham, for commenting critically on an earlier draft of this paper.

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Final manuscript received 16th August 1983.

The name of the game is communication

An archaeological editor's view of publications in environmental archaeology

In his thought-provoking comments in the first 'Opinion' column, Harry Kenward, experienced as an author (and now himself an editor), is highly critical of the standard of some recent publications in environmental archaeology. Where does the responsibility lie for the 'unrefereed and badly edited' reports he so rightly castigates? Were they good drafts spoiled by ignorant and unsympathetic editors, or disorganized and badly written texts insufficiently improved? From his comments, and from general editing experience, I would conclude that there is room for improvements on all sides, and some of the practical difficulties with suggestions for dealing with them are discussed below.

There is, however, a deeper problem which arises from the nature of the subject itself. Environmental archaeology is of its essence a co-operative venture, combining two disciplines and depending for its development, which is paying increasing dividends to both scientists and archaeologists, on mutual co-operation and understanding. Yet the publication record suggests that there is also ignorance and intolerance, even downright arrogance, to be found, and on both sides of the divide. Some archaeologists condemn scientists as illiterate, while almost priding themselves on their own 'innumeracy', and many scientists are no more complimentary! Such attitudes are, or should be, without foundation, yet their prevalence is an indication of a gross lack of understanding in some quarters which is hampering not only the publication process but the development of the research itself.

Such strains are not confined to environmental archaeology, or even to associations between scientists and non-scientists, though that is admittedly an extra dimension. They may be encountered whenever specialists from different disciplines explore a common field, and archaeologists find them in their relations with historians or architectural historians as well as with their scientific colleagues.

First there is the problem of language. Each discipline has its own terminology, and each too its own background knowledge, its own unspoken assumptions too familiar to be spelled out. Technical terms, although usually recognizable for what they are, are often daunting to those unacquainted with them, while what appears to be in plain English will often conceal hidden snares. The architectural historian's 'battered' plinth or 'weathered' buttress may be perfectly preserved, while the medieval historian's 'forest' may contain large areas lacking in pollen from trees.

Secondly, there are differences of approach, resulting from different traditions and training and perhaps even more from the nature of the material studied. The questions one specialist asks will often be the ones the other cannot answer; the facts he can supply may not be the ones the other needs to know. It is not easy to relate well-established historical dates to strata below ground, and the closely dated, firmly sealed deposits the biologist would like to sample

are rare on archaeological sites. The biological assemblage from the most significant excavated layer may not be diagnostic of conditions existing at the time.

Such problems are inevitable; they need to be mutually recognized and understood and positive steps should be taken to circumvent them. Much can be achieved by joint planning in sampling and research and regular interchange of facts and interpretations which will also reduce the amount of time spent on less productive work and increase the growth and spread of knowledge and understanding. Moreover the ensuing publications should be free from many of the troubles under discussion.

Some practical problems of publication

Articles on environmental archaeology written by scientists for scientific journals, and presumably intended for scientific readers, no doubt have their own problems but are outside the experience of this author. This discussion is mainly concerned with reports written by scientists for archaeological publications, edited by non-scientific editors and intended for the general archaeological reader. Of these the most difficult is the specialist contribution to the definitive report of an archaeological site. Such a report will probably be collated by the site director who acts as 'co-ordinating author'; if it is published in monograph form he may also act as editor; if it appears in a journal, the journal editor will also handle it. Whether one or both are responsible the position is the same - they are probably unfamiliar with the subject of the scientific text in their hands. It is no good condemning the publication system, the main framework of which is unlikely to change. What we must all do, authors and editors, archaeologists and scientists alike, is to work together to correct our errors or better still learn to avoid them altogether. The more co-operation there is between authors and editors or co-ordinating authors before as well as during publication, the easier this will be. The lack of contact in some of the instances cited in Harry Kenward's 'Opinion' was almost unbelievable.

The author's text

The following practical points are relevant to reports on environmental archaeology, but most of the recommendations could be applied with equal advantage to the preparation of drafts on any subject.

1. What level is required? Is the author writing for his scientific colleagues or the general archaeological reader? If the publication is an archaeological report and the results are not being published elsewhere there can only be one answer: both must be catered for. The essential data needed for scientific research must be provided, but the principal results, their interpretation and significance, must be communicated to the 'intelligent layman'. On the one hand, the inclusion of data tables, species names in Latin, and precise terminology are fully justified and editors must accept them as such. On the other, scientific results can and should be expressed in intelligible and well-constructed English. A one-word explanation of a

technical term, a brief glossary at the end, or even a footnote (1), will help non-specialists over the initial hurdle and increase the educative process.

2. The quality of the text. The better the draft, the less the editor will want, or have, to do, the quicker the whole process will be and the better the finished result. Some authors are paragons, but many more could could make a much better stab than they do at the 'well-organized, tightly written, accurate report' which Harry Kenward defines so neatly. Such an improvement would certainly save the editor time and trouble - and why not? Some authors seem to take it for granted that the editor will carry out the tedious jobs which they find themselves too busy to do correctly in the first place; some lack the experience to produce a well-ordered report, while others think it does not matter and editors are pedants and fuss-pots anyway! It has even been suggested that, provided the facts and arguments are down in black and white, questions of arrangement and expression are without significance, as though the reader should bring his trowel to dig the meaning out with. Surely the aim of all should be a clear, concise and correct piece of communication. Muddled sentences imply muddled thinking, whereas a well-presented report suggests a well-ordered piece of research and will certainly enhance the author's reputation.

3. Organization and arrangement. The author knows his material with all its byways. The reader coming to it fresh needs a clear path to follow with directions and signposts in the form of headings and cross-references. Not all readers have time to study a complete text; they need to know quickly if the report contains material of use to them, and if so where to find it. A closely-written, continuous argument may not prove helpful, however academically irreproachable. The often repeated advice to 'say what you are going to say, say it, and then say you have said it', provides a useful initial framework.

4. Clear and concise language. An archaeological report is not a work of literature, but it should essentially be straightforward and unambiguous. Well-constructed sentences are clearer and easier to follow than those that ignore the rules of grammar. Colloquialisms are out of place in a scholarly text and the unthinking use of catch phrases is better avoided. Unnecessary words, particularly over-qualifications, are tedious as well as a waste of time and money; degrees of probability are important, but a simple 'may', 'might' or 'possibly' can be just as effective as 'it is not inconceivable that', while introductory phrases such as 'it is interesting to note that', can be omitted altogether.

5. Accuracy. Correct citing of figures, dimensions, orientations, and other such details, are or should be the author's responsibility. If the arithmetic is wrong or the percentages do not add up the reader, and the editor, may rightly suspect the accuracy of the original record or calculations. Editors and referees will look out for such errors but it should not be taken for granted that they will find them. Checking is essential, and if figures need to be checked back to the original data, this should be done before the text is submitted or at any rate before it goes to press.

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1. That, and indeed this, are examples of the use of footnotes which seem perfectly proper and convenient.

6. Illustrations and tables. These should be clearly drafted, provided with adequate captions, and numbered not in the order in which they were thought of but the one in which they should appear; references to all should be included in the text.

7. House style and consistency. If the publication is known and a style sheet is available it should be followed as closely as possible. If none is available authors should use the system they are familiar with, but try to use it consistently. Consistency is not only a matter of style but an aid to clear communication.

8. References and footnotes. The Harvard system is gaining acceptance in archaeological circles, but it is not the only convenient method. Historians generally do not favour it because it is often inappropriate to their material, much of which is unpublished anyway (2). It is actually unhelpful to quote a familiar series of documents under the names of the many different scholars who edited different portions of it. Abbreviations such as Cal. Pat. can be used in the text and explained in a Harvard style bibliography with the agreement of both scientists and historians, and other such compromises can be agreed. Editors will, however, expect to follow their own house style, and the use of two systems in one publication should certainly be avoided. At all events authors should provide full and accurate bibliographical detail for the editor's use. References in footnotes can be inconvenient and hard to follow, but I would not advocate the abolition of footnotes altogether. Used with discretion they can provide a place for additional information which would burden the main argument in a text, and one or two examples are included here.

The editor's part

It is assumed in what follows that the editor, whether copy-editor, academic editor or 'co-ordinating author', is probably an archaeologist or historian dealing with scientific material, but again most of the principles are those which should apply to editing in general.

1. Reference back. Some reports will need very little amendment, others a great deal, but it should always be a firm principle that the author must at the very least be given an opportunity to see a revised text before it is too late for alterations to be made. It is much more successful to refer queries and suggestions back at an earlier stage.

2. Textual amendments. The editor may not be familiar with the scientific details but he certainly ought to be able to understand the English. An experienced editor will often sense an error even in unfamiliar material and it is always worth checking back to the author; the text may be quite correct, but the query may uncover an error that would have remained undetected. Confused wording or badly constructed sentences may usually be safely amended, but if obscure terms are not defined, or if the meaning is not apparent, it is better to return the text for explanation. The result is often an improved wording that pleases both author and editor alike. Unnecessary verbosity may be

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2. This matter is covered in a recent British Standard (Recommendations for citation of unpublished documents, BS 6371: 1983), but I have not yet obtained a copy.

pruned, but facts, figures and technical terminology should not be omitted or altered without the author's agreement.

3. Integration of contributions. The results of specialist research will be reflected in the main conclusions of a site report, and these and the work of the other specialists may also affect the interpretation of the environmental evidence from other sites. The co-ordinating author, probably the site director, is responsible for integrating the whole, but should not alter the sense of any contribution without the specialist's agreement. A proposal to circulate the whole report to all the specialist authors is a little unrealistic - there may be over twenty of them - and this would anyway be rather too late. Some form of consultation and exchange of information at an earlier stage can surely be devised.

4. Time-lag. Environmental archaeology is a rapidly advancing subject, and reports that have lain dormant in an editor's desk may need to be reinterpreted in the light of more recent results - another reason for timely consultation.

5. Proofs. Even when the text has been discussed and agreed with the author he has a right to expect a sight of the proofs. A journal editor will probably send complete proofs of a composite report to the co-ordinating author and it should be his responsibility to distribute it, not forgetting to include a complete bibliography with each portion; the journal editor cannot be expected to do the circulation and would not have the necessary information. Provided doubtful points have been settled in advance, the author may be asked to keep amendments to a minimum.

The author's reaction

Editors often find that well-established authors are more tolerant of editorial comments, suggestions or amendments than those with less experience. Indeed some authors now look back with gratitude to the editor of their first published work, although that was not their attitude at the time. The editor's aim is a better publication, and if he is experienced it is profitable to consider his revisions with patience. A shortened sentence may express the author's argument with greater clarity, and incorrect alterations of meaning may be the result of original ambiguities. If errors or queries derived from unfamiliarity with the subject are dealt with helpfully, the editor will be better equipped for his next scientific text. The author should reserve his just annoyance, to use no stronger term, for the editor who does not give him the opportunity to see or amend the revised text.

Referees

Although the author must be held responsible for his own text, one's own mistakes are often the most difficult to see, and checks are clearly necessary on the quality of the research as well as on the accuracy and clarity of the text. Having carefully read through and checked the text himself, an author would be wise to hand it to both scientific and archaeological colleagues to see if it meets their requirements.

Thereafter it will be passed to an editor, who will wish or be required to have it approved by a suitable referee. With a single-subject article this should cause little difficulty. As before, however, problems arise with the contributions to a major report. A site director may send his excavated material to the twenty or so specialists mentioned above, each presumably chosen as an expert in the appropriate field. He will not expect to submit all of these reports to another twenty experts, or to treat environmental scientists differently from specialists in pottery or ironwork. The editor of the journal who may publish the complete report will no doubt send it to a general referee, and perhaps to the Department of the Environment for a grant; neither can be expected to seek out separate referees for all the individual parts. Clearly specialist refereeing is essential, yet the existing system of archaeological publication, quite reasonably, does not provide suitable machinery. Is there a means whereby the scientific world could provide its own system of refereeing to check such texts before they passed into non-scientific hands? Is this perhaps something the AEA would take upon itself, in the interests of its own members?

The burden of responsibility

Clear communication depends on co-operation and the responsibility can only be a divided one. Editors and referees have important secondary roles and control may also be exercised by heads of departments in or for which the work was done, but the principal onus must lie on the author himself. The report will appear under his name and affect his academic reputation. He should exercise this responsibility with care, and should not be prevented from doing so by lack of consultation.

Future developments may increase the burden. The Council for British Archaeology and the Department of the Environment are pressing for an increasing use of microfiche publication, in which the author may be expected to produce the text in the form of camera-ready copy. If this encourages earlier and closer co-operation and discussion between the parties involved it can only benefit the practice and publication of environmental archaeology as a whole.

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The Inside Back Page

News has arrived at this desk of the fruits of recent researches by my former colleagues at the University of Lowestoft. Perspicacious readers will recall that the redoubtable Dr Myfanwy Crepuscular has been on a sabbatical rest-cure, unravelling the moss-stitch and cables of her Aran-conformed intellect. The cure has clearly been successful, and in the latest volume of the Beccles and Bungay Antiquarian and Philosophical Abstracts she tells of a momentous discovery.

Work in the Lowestoft archaeoscatological laboratory has centred on the contents of a late 15th century cess pit from an otherwise irrelevant site in the Welsh Marches. Scientists wearing rubber gloves have been painstakingly analysing the contents of the pit with a view to reconstructing late medieval diet in this particular provincial cul-de-sac. Amongst the bran and corncockle seeds there lurked what appeared to be a curiously formed and wondrously preserved faecal stool. This item attracted particular attention because of its considerable size and unusual helical shape. The opinion of an acknowledged authority on faecomorphogenesis was duly sought and the stool was pronounced to have been passed by a little known species of very hairy yeti, probably of a subspecies resident in the Tien-Shan mountains. This was confirmed by the recovery from the stool of a single seed of Spuriophyta emmanuensis, a prostrate perennial herb only recorded from three locations in Western China. Dr Crepuscular took the controversial decision to sacrifice a fraction of the stool to the newly-developed and terribly exciting radiovanadium dating, which complex procedure showed beyond reasonable doubt that the stool was voided in July 1496 ad. This was a very important conclusion.

Columbus, it will be recalled, sailed across the sea in 1492, on a Spanish state-funded job creation scheme. It is generally alleged that he arrived in what we now know as America, but Crepuscular's publication of the Llanfihangel Stool clearly shows that the expedition penetrated deep into Central Asia, wisely leaving America to its indigenes and a few dreadfully old Vikings. The proven fact that Columbus brought a Tien-Shan yeti back to Europe also explains two great mysteries which have baffled scientists for many years. The first is the tremendous epidemic of venereal disease which accompanied the return of Columbus. The master mariner's crew are not to be blamed: merely a half-crazed hominid coming to terms with the consequences of evolution and cheap Spanish wine. The second mystery which is thus solved is the curious phenomenon that people from the Welsh Borders tend to be dark and hairy, have difficulty with coherent language, and spend much of their time pining for high places. All this from one stool.

The further works of Dr Myfanwy Crepuscular will no doubt have similar impact. Rest assured that this column will waste no time in presenting further advances to the interested public.

Incidentally, perusers of the quality press may have noted an article concerning a Dr Loy, of British Columbia, who has been extracting minute traces of haemoglobin from the business ends of ancient stone tools. Analysis of the haemoglobin permits identification of the species which yielded the blood, and several specimens have been identified as human. Murder most foul? Possibly - but most archaeological excavations have their quota of skinned knuckles and lacerated limbs. Prick us - do we not bleed?

Burhinus