

Editorial

This and the next issue of *Circaea* are being published together, in an attempt to 'catch up'. As always, we apologise to authors who have had a long wait to see their articles in print; we trust that a steady flow of copy will mean that we can produce 9(2) before too long.

Book Reviews

Milles, A., Williams, D. and Gardner, N. (editors) (1989). *The Beginnings of Agriculture. British Archaeological Reports, International Series 496. Symposia of the Association for Environmental Archaeology 8.* 267 pp. ISBN 0 86054 636 5. £17.00.

This volume forms the proceedings of the annual conference of the Association for Environmental Archaeology held in Cardiff in September 1987. Out of the original papers a reduced number were submitted for publication; as a result the volume has a decidedly European flavour, no bad thing given the Near Eastern focus of most volumes on early agriculture. What is presented falls into three main groups: theoretical considerations concerning the adoption and spread of agriculture, reviews of the practical considerations of inferring agricultural strategies from assemblages of organic remains, and case studies synthesising the available environmental evidence (inevitably based on bones and plant remains) in terms of the economic strategies adopted on a site or regional basis.

The first three papers, grouped under the title 'theoretical approaches to the beginning, spread and organisation of agriculture' proved to be fairly tough going for someone not thoroughly versed on previous approaches to the beginnings of agriculture. Ken Thomas's paper on hierarchical approaches to the evolution of complex agricultural systems certainly didn't mix with the late night cocoa, introducing terms like 'holon', 'cybernetic theory' and 'agro-ecosystems' into a discussion on the applications of systems to the elucidation of economic strategies. Although thought-provoking, it would have been useful to see a little more reference to practical applications of these complex theories to

excavated material, although Thomas himself admits (p. 67) 'in practice it will prove to be very difficult to demonstrate the existence of process-functional hierarchies using archaeological data'. Some of the diagrams (e.g. figure 4) did nothing to aid this reader's understanding of the concepts involved.

Royston Clarke's paper on the integration of social and ecological approaches to early agriculture and Paul Halstead's application of a primarily ecological approach combined with a sociological model were more easily digested. Clarke concentrates on the development of risk-management strategies and consequent development of social organisation through the Mesolithic and Neolithic, using a number of bone assemblages from Italian sites. He argues that the diverse environment in northern Italy encouraged the continuation of hunting within the subsistence system during the Neolithic, as a risk-minimising strategy against the chances of agricultural failure. At the same time, populations in more uniform environments, where a subsistence strategy based on hunting and gathering was less reliable and so higher risk, adopted agriculture earlier and more exclusively. Consequently, more complex social structures evolved in these ecologically homogeneous areas, invoked by the need to develop strategies to buffer against the risk of crop or livestock failure.

Halstead examines the development of agriculture in south-east and central Europe, looking at settlement distributions and environmental evidence to suggest the strategies adopted for subsistence on a short-term (annual) and long-term basis. On the annual scale, his approach mainly derives from a study of the archaeologically recovered remains teamed with environmental determinism. On the inter-annual scale risk-buffering mechanisms are stressed, and settlement patterns seen as a consequence of the need (or lack of need) for co-operation on a local or regional scale, depending on the scale of risks involved. In a diverse environment, it is argued, risks are usually local, so risk-buffering involves local co-operation and village settlement. In more uniform environments risks are more regional (e.g. drought) so longer distance contacts are required to reduce the risks of starvation. These contributions go some considerable way towards the integration of environmental archaeology with archaeological theory;

perhaps future sessions of the Theoretical Archaeology Group will take note.

Of more specialist interest, Caroline Grigson reviews the criteria for, and problems of, differentiating domestic from wild animals. She reviews previously published studies of early domestication of cattle from the Middle and Near East, and concludes that standards of recording and publication have been insufficient to enable a comprehensive study of the origins of domestication. Barbara Noddle concentrates on the domestication of cattle and sheep in northern Europe and Britain. The mind boggles at the concepts of frustrated male aurochs being driven into bogs, and at the population of aurochs being so large that they were 'forced to graze in dangerous situations'. Both of these papers provide extremely useful sources of information (in the latter case some of it previously unpublished) for the study of the development of cattle and both contain extensive bibliographies.

On the plant side, Kevin Edwards gives a thorough review of the methodological problems with reconstructing early agricultural practices from pollen records, and suggests some ways in which things might be improved. Standards of recording (to enable verification of identifications) are again stressed as requiring improvement, and other evidence of agricultural practices, for example by the study of weed floras, charcoal and soil micromorphology, should be sought. Hansjörg Küster summarises the pollen evidence for the Neolithic in south central Europe, largely recognising the problems outlined by Edwards; perhaps the most useful aspect of his article is the extensive bibliography, including many non-British references. Frank Chambers examines the evidence for the early exploitation of rye in north-west Europe, stressing its value as a crop on poor soils in marginal areas, its problems as a free-threshing cereal and a carrier of ergot, its versatility, and literary tradition which suggests it was largely considered a weed. Records of rye from archaeological sites indicate that it was present in pre-Roman times, but whether as a weed or a crop is unclear. The utilisation of wild foods in Neolithic Britain is discussed by Lisa Moffet, Mark Robinson and Vanessa Straker. In contrast to central Europe, wild foods such as nuts and berries seem to have played an important role in Britain during the Neolithic, and charred cereal remains are poorly

represented. Whether this is a true reflection of the later adoption of cereal cultivation on a large scale in Britain, as the authors suggest, or a product of retrieval methods or site type, as Legge suggests in an earlier chapter, remains to be tested.

David Robinson and Peter Rasmussen's detailed report on the primarily botanical research undertaken on waterlogged deposits from a Neolithic lake village at Weier, north-west Switzerland, demonstrates what can be achieved by a co-ordinated environmental and archaeological approach which incorporates a sensible sampling strategy. Apart from the obvious importance of a site which produced the earliest western European record of repeatedly cultivated and manured arable fields, the study is exceptional in the rigour with which the deposits were analysed. The material discussed in this paper includes hiliwash from fields as well as samples taken from a building interpreted as a byre. Approaches discussed include experimental investigations into the extent to which cattle, sheep and goats digest different sorts of fodder, as well as the more traditional methods of analysing plant macrofossils. The results indicate that a wide range of plants were utilised to provide leaf fodder, which must have been used to overwinter animals.

The most contentious paper presented at the conference was apparently that by Roy Entwistle and Annie Grant, who dared to challenge the existing views on the importance of cereal cultivation and animal husbandry in the British Neolithic and Bronze Age. Their approach is one of confrontation: based on the lack of an extensive database, they argue, we should not close our minds to alternative ways of viewing early economies. They conclude that there is no good evidence to support the interpretation of a cereal-based Neolithic economy, or for dairy-based cattle husbandry. This view is extensively debated and rejected by Legge, in his reply to their paper which is substantially longer than the original contribution. Clearly the former authors have achieved their aim if it was to stimulate debate.

Legge's paper, like many of the others provides an extremely comprehensive bibliography. Indeed, apart from some excellent papers, this volume is worth consulting for the references alone. Although many papers which appeared in the conference were unfortunately not published

(Susan Limbrey's paper on soils has been an example cited of a useful, but as-yet unpublished contribution) the volume has still maintained a balanced approach to the wide topic of early agriculture. It should be relevant to archaeologists of all persuasions, not just so-called environmentalists. On a more technical level, the standard of presentation is unusually professional for a BAR volume; even the illustrations are legible and the photographs understandable. Clearly a great deal of editorial time has been devoted, and the result means that, in contrast to many recent BARs, the volume is, in this reviewer's opinion at least, worth its price.

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Conference Report

British Academy—Royal Society Discussion Meeting on *New Developments in Archaeological Science*, at the Royal Society, London, 13th–14th February 1991

This conference was the seventh in a series of joint meetings with the British Academy on archaeological science held at the Royal Society since 1969. A wide variety of techniques was surveyed, with the exclusion of dating which was covered by posters. Dating will also be discussed in the next joint symposium, on *The origin of modern Homo sapiens and the impact of science-based dating* in February 1992. Despite heavy snowfalls, over 200 people attended, and the combination of good time control and a professional projectionist ensured refreshingly smooth running. There was a surprising lack of younger speakers, and of representatives from centres such as London, Sheffield, and Southampton.

Some talks focused on the impact of new analytical methods (e.g. in biochemistry) and others on new interpretations that can now be made as substantial bodies of data become available (e.g. in dendrochronology). Most speakers resisted the temptation to become bogged down in methodological detail, and concentrated on illustrating results. New techniques of presentation are also starting to reach the archaeological world, with many

clear, specially-prepared multi-colour graphics in use. The days of the fuzzy, grey graph (or worse, large tables of data in tiny print) may be numbered.

The symposium began with an excellent demonstration by Dr Mike Baillie (Belfast) of how to present elegant ideas elegantly. He likened the long (7000 years+) tree-ring chronologies from Belfast and Germany that are now in routine use for dating to a 'tree-ring kit without a set of instructions', and then drew on a wide range of historical, archaeological and palynological data to try and discover just what ring patterns and overall patterns of bog-oak growth and death might mean in terms of environmental change. The studies of the Neolithic 'colonisation' of Britain—distinct changes seem to be happening at about 4000 bc—and on the effects of volcanic eruptions are very exciting, as is the concept of looking at prehistoric change over periods of a few calendar years rather than in hundreds of radiocarbon years.

Continuing the theme of *Prehistoric human environments*, Professor B. Berglund (Lund, Sweden) described a ten-year project, with 25 staff in six university departments, studying all aspects of the landscape of southern Sweden over the last 6000 years. As we admired the resulting sequence of detailed land-use maps and reconstruction drawings, it became obvious that this is the kind of approach that we should all be taking. While the generous support of the Swedish National Bank certainly helped this project, the reasons for its success (and the failure of so many other 'interdisciplinary' projects) must also relate to efficient organisation and the location of all the team members in one small city.

Dr M.-A. Courty (CNRS, France) ended the morning with a convincing demonstration of how soil thin-sections can tell us about the formation of archaeological deposits. Judging by a gorgeous colour section of a coprolite filled with grass-phytoliths, there is even more potential in this work if allied with analysis of bulk samples.

After lunch the theme was artefact studies, with three talks on characterising metal and stone, where the novelty lay less in the techniques used than in their careful application to archaeological questions. Dr N. H. Gale (Oxford) presented a close look at Bronze Age trade in the Aegean, where the sources of metal objects have been determined

using mass spectrometry analysis of isotope ratios. A key element in his work has been detailed sampling of ores in the field. Dr Paul Craddock (British Museum) described an interdisciplinary approach to early mining and smelting in Europe, stressing the importance of experimental and ethnographic work. This detailed and diverse approach allowed a strong argument for independent innovation of techniques throughout Europe. This is, of course, in sharp contrast to the long-established concept of transfer of metallurgy technology from the Near East to Europe. A similarly wide-ranging approach to an old idea was taken by Dr O. Williams-Thorpe (Open University) to the origin of the Stonehenge bluestones. The heroic transport on rafts of these stones from Wales to the Salisbury plain has been a tenet of British archaeology for so long that, as the lengthy discussion afterwards made clear, the well-butressed argument that these stones are just glacial erratics will take some time to sink in.

There were two technical talks in this session, with Professor M. S. Tite (Oxford) on the role of the scanning electron microscope in studying the microstructure of ceramics, and Clive Orton (Institute of Archaeology, London) on the statistics of counting potsherds.

On Thursday morning we returned to bioarchaeology, with Dr R. P. Evershed (Liverpool) on the use of gas chromatography to separate the components of organic residues on potsherds, and mass spectrometry to identify the molecules involved. Although this kind of work has been going on for some years, previously results have been limited to a handful of potsherds per site. The Liverpool project, as well as looking in detail at important aspects of biochemistry such as post-deposition degradation, is looking at large numbers of early medieval potsherds. Professor Martin Jones (Cambridge) then surveyed the wide range of techniques now used in looking at human diet and exploitation of vegetation. Instead of looking at just a few components in great detail, it is becoming possible to integrate these sources of information, to look at food-webs as whole systems.

Two lectures made up the session on site survey techniques. Dr I. Shennan (Durham) took the broader perspective of remote-sensing of landscapes. Multi-spectral waveband scanners on the French 'Spot' satellite and on

aeroplane surveys are picking up very subtle changes in vegetation and, therefore, in underlying features. The raw data are often available cheaply, and the computers that allow them to be handled easily now cost £5000 or so, compared with sums of twenty times that amount five years ago. As Dr Shennan's work in the East Anglian fens shows, this is technology that is now 'up and running'. Mr A. Aspinall (Bradford) looked at geophysical techniques better suited to relatively small areas such as archaeological sites. Techniques such as radar are giving very pretty vertical sections, but a great deal more fieldwork is needed to decide what these actually mean stratigraphically.

The final session concerned the analysis of bits of human body. Professor N. J. van der Merwe (Harvard) described some very nice case studies using carbon isotopes to investigate early primate diet in Africa, and the spread of maize in North America. In regions where C4 plants grow or are grown, this is clearly a useful technique, but the potential of isotopes of other elements, which might be of use in other areas, is still unclear. Dr P. E. Hare (Carnegie Institution) discussed the use of amino acids from ancient bone in dating and diet studies. To end the conference papers, Dr R. E. M. Hedges (Oxford) looked at the very new field of studying ancient DNA. Efforts at present concentrate on extracting sufficient material for sequencing; any assessment of this work as applied to archaeology will have to wait on these.

In his closing remarks Professor Colin Renfrew (Cambridge) made a couple of important points that attracted disappointingly little discussion from the floor. He drew attention to the closer integration between scientists and archaeologists, and contrasted the major developments in archaeological science over the last 30 years with the almost total lack of change in excavation techniques over the same time period. The talks at this conference certainly made clear that working in teams has led to genuine integration on specific projects. All the projects described featured a clear statement of archaeological aims deriving from close collaboration with excavators. While it is true that a lot of new work is driven by the availability of new technology, this is not in itself a bad thing. If a new, more powerful technique is applied, there is a good chance it will turn up something previously unsuspected, with attendant important implications for

Helbinterpretation. A major theme of this conference was the astonishingly good preservation of organic materials from the past, for example of DNA in charred seeds or lipids in potsherd walls.

A point which was not raised is the risk that the current readiness to support the development of new techniques may divert funds from applying existing techniques to archaeological endeavours. To achieve the type of excellent synthesis presented by Prof. Berglund, dedicated and often tedious analysis of basic data is essential. One can also compare the paucity of large-scale seed and bone reports from British excavations to the excellent work coming from other European countries.

The contrast between the high quality of work going on in the laboratory and the usually casual nature of excavations is dismaying, and this seems to be a major weak point in overall strategies. It's also dismaying that techniques developed twenty or more years ago, such as flotation and radiocarbon dating, are still not fully exploited. This has little to do with money, but involves questions of organisation and communications that fell outside the scope of this highly stimulating conference.

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Short contributions

Percival and Helbæk's archive of plant remains

Fellow archaeobotanists may be interested to know of an archive of plant remains held in the herbarium at Reading University. Most of it originates from excavations of the 1920s and 1930s from sites all over the world, including many of the classic British sites published in Helbæk's *Early Crops in Southern England* (1953, *Proceedings of the Prehistoric Society* 18, 194-233) such as Meare, Fifield Bavant, Hembury, Itford Hill and Maiden Castle. The plant macrofossils were sent to Professor John Percival at Reading for identification, and amended identifications were added by Helbæk in November 1957. There is also a collection of Helbæk's own material which

comes mainly from Scandinavia and southern England.

The full list of the carbonised and desiccated plant remains held at Reading (copied from Percival's notebook) is given below. Visits to the herbarium to examine the material should be arranged through Dr Stephen Jury, Plant Science Laboratories, University of Reading, Whiteknights, Reading, RG6 2AS (telephone 0734 875123).

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Ancient Cereals

A list of desiccated and carbonised archaeological plant remains held at the Reading University herbarium, Plant Science Laboratories, Whiteknights, Reading, as recorded in Professor J. Percival's notebook. Amended identifications marked as * were added by H. Helbæk in November 1957. The 'P' numbers have been added more recently to assist in locating the material. [] notes are added by WJC.

EGYPT

- P18 Emmer 28/2900 Badarian, Mostagadda, M. Egypt. From Guy Brunton, 1928.
- P19 Barley 2800, ditto.
- P14 Emmer?? Predynastic Al Badari, M. Egypt. From Guy Brunton, 1924.
- P17 Emmer chaff & spikelets Predynastic Mostagadda, M. Egypt. From Guy Brunton, 1928.
- P16 Emmer chaff & spikelets No.1215 Badarian, Mostagadda, M. Egypt. From Guy Brunton, 1928.
- P15 Possibly emmer with dorsal hump and broad apex. Badarian, Mostagadda, M. Egypt. From Guy Brunton, 1927 (winter).
- P112 Wheat from Fayum in various gravels. From Miss Catn-Thompson 1925-6.
- P113 Wheat grains from K pits 33 & 44, Fayum. From Miss Catn-Thompson, 1926. See Times April 6 & August 11 1926.
- P115 Emmer & a little barley Fayum, pit K. 13. Miss Catn-Thompson, 1925-6.
- P117 Straw & barley grains chiefly pit 14, Fayum. Miss Catn-Thompson, 1925-6.
- P114 Barley grains from pits 33 & 44, Fayum. Miss Catn-Thompson, 1926. See Times April 6 & August 11, 1926.
- P111 Barley in various gravels, Fayum. Miss Catn-Thompson, 1925-6.