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THE BUTSER ANCIENT FARM PROJECT

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Experimental archaeology can be sensibly claimed to be fundamental to the progress of archaeological thought and practice. Especially is this so with relation to prehistory and excavation technique. In fact, experiments have been conducted for as long as archaeology has been practised but it is only relatively recently that the experiments have been subjected to rigorous scientific controls. As a general description experimental archaeology is an umbrella term like geography or even archaeology itself. It embraces quite properly activities and studies ranging from mycology to model-building, cultural anthropology to thermodynamics.

In basic terms it seeks to ask the questions of "how" and "why" of the "what" that is recovered by excavation and field work. In the examining process it is often necessary to borrow techniques from a multitude of different disciplines but only insofar as those disciplines are applicable. A great danger is presented by the over-application of a technique beyond the limits of the available evidence and question involved. For example, there is always the attractive invitation offered by the techniques of modern geography to apply "landscape interpretation models" which, within the present acquisition of data from prehistory, cannot be logically supported.

Experimental archaeology is most easily understood when presented in the form of a scientific formula. The formula consists of four elements. Initially and of the greatest importance is the archaeological data. The raw evidence achieved by excavation and fieldwork is supplemented only too rarely by fragmentary documentary sources. The second element of the formula consists of the interpretation of that data, the explanation offered by the excavator of the material recovered. The explanation, in reality, is only an hypothesis based upon the specific site evidence and comparable material from elsewhere. It is a matter of growing concern that the majority of excavation reports are, in fact, the presentation of an hypothesis and not the record of an excavation containing detailed information about and description of the data recovered. The present situation in archaeology - lack of finance and forced salvage operations - is s-rving to produce more and more such hypotheses unsupported by accurately recorded data. It is of vital consequence that such data be recorded in order to allow the possibility of reinterpretation. Total excavation is total destruction. The archaeologist is in an even safer position than the doctor. At least there is the possibility of exhuming the latter's mistakes. It has been said that excavation is the examination of a site cubic centimetre by cubic centimetre. The assumed second half of that statement is clearly - "and should be similarly recorded cubic centimetre by cubic centimetre".

The logical third element of the formula introduces the experimental phase. The hypothesis offered by the excavator should be subjected to rigorous empirical testing, ideally at a one to one scale. The purpose is to assess the validity of the hypothesis. It must be emphasised that one is dealing only with validity and invalidity, not historical truth. Indeed, historical truth is a concept difficult to accept even with documentary source evidence. The major value of experimental work is the establishment of probability. More often than not experiments prove a negative rather than a positive.

The test of hypothesis validity depends upon the comparison of the fourth element, the experimental data with the first element, the excavated data. If there is adequate agreement between these data the hypothesis can be accepted as valid, if not, the hypothesis is invalid.

The formula, therefore, is cyclical and can, in fact, be started at any point. For example, the model-builder invariably begins at the hypothesis stage, the model is the experiment and the data produced is the standard against which the archaeological data is to be measured. Similarly one can hypothesise a process that "must" have happened although there is no archaeological evidence as yet. The manufacture of charcoal fuel was vital for the production of metal and yet there is virtually no evidence of its manufacture in the archaeological record. An experiment to produce charcoal is constructed, the process carefully monitored and the effects of that process which may survive archaeologically, are minutely recorded. Armed with this comparative material the excavator is better equipped to observe whether such evidence is available. In this way, by providing "comparanda", the experimenter is focussing attention upon details which may exist but have previously not been recognised or even seen.

Occasionally one can achieve a "spin-off" from an experiment designed to test a totally different hypothesis. For example, there is considerable doubt as to how prehistoric pottery was made and there are a variety of systems which need careful examination. One particular system, known as the pit-clamp, has been tested exhaustively at the Ancient Farm. The clamp consists of a shallow bowl dug into the ground surface some 45 cm in diameter by 15 cm deep.

The bowl is lined with straw, dried pots are placed in position and covered with dry and green timber. Thereafter a covering of turves is positioned before firing. The resultant pottery from this process, fired in a reducing atmosphere, bears favourable comparison with prehistoric pottery. However, after twenty firings in the same bowl and subsequent cleaning, a pit was produced 1.00 m deep by 1.50 m in diameter. All evidence of burning within the pit was soon destroyed by normal weathering. This resultant pit, the side-effect of pottery manufacture, has direct parallels with excavated examples.

One further example of the experimental "spin-off" has been the production of carbonised seeds. A complex series of grain storage experiments in underground silos include the specific test of firing a pit immediately before storage. Although the pit is physically cleaned before firing, seeds from the previous storage period are often trapped in the interstices of the chalk rock. The firing destroys many of these but a proportion, in one case over a thousand seeds were beautifully carbonised and thus in a state which could survive. (1)

The range of experimental work is considerable and the applications of the basic formula outlined above are virtually infinite. However, one significant factor that emerges from all experimental work is the inadequacy of the prime data - both the method of its acquisition and the system by which the acquisition is recorded. It is of great importance to recognise that archaeological data as achieved represents its final functional phase and the information present, especially in the case of a pit, may bear no relation to its original function whatsoever. Similarly it is of little value to concentrate upon artifactual material, whether it be decorative brooches, the province of the art-historian, broken tools or animal bones if the structural evidence is ignored. In this situation one counts as a structure post-holes, pits, ditches, gullies and any feature which is cut into the ground. Physical evidence like stone walls and timber beams are accorded the minutest of inspection and recording details but the post-hole or pit is regularly regarded as the repository for "rewarding artifacts" with little or no attention paid to its structure. Yet the wall of a pit may well provide the ephemeral traces of evidence which would explain its prime function. It is the close scrutiny of the minutiae which will facilitate improved interpretation. It is only when the micro-situation is under control that any attempt may be made to understand the broad picture.

Consequently, it has been the work of the experimental archaeologist, not only to focus attention upon the inadequacies of data retrieval and recording but also to make a positive contribution towards improving techniques. There are many cases that could be quoted but two particular examples will serve admirably. The first and major example has been the work of Philip Barker who has pioneered the system of area excavation in this country (2). That his work began as an experiment is beyond all doubt. The principle of stripping a large area layer by layer and recording in great detail all the material evidence present, including textural changes, has led to a re-appraisal of excavation technique. The major significance lies in the fact that such evidence is open to re-interpretation and emphasises how subjective the majority of excavations have been in the past.

The second example is the work of H.N. Jarman, A.J. Legge and J.A. Charles in the production of Froth Flotation Cells (3) and the sieving experiments by S. Payne (4). These experiments successfully improved the acquisition of material evidence, the presence of which had hardly been previously recognised.

Experimental archaeology has already made a significant contribution especially in this last aspect of focussing attention on retrieval and recording techniques. However, this is only the beginning. The cyclical formula of prime date > hypothesis > experiment > experimental data leading to validity and probability assessment serves to remind us of the unquestioning acceptance of archaeological theories that pervade the subject at present.

It is according to the principles of the above formula that the Butser Ancient Farm Research Project was set up in August 1972 (5). This project is unique in British and in world archaeology in that it seeks to reconstruct and operate as an economic working unit an Iron Age farmstead dating to approximately 300 BC. It is the intention to explore all the aspects of such a farmstead, reconstruction buildings and processes, plant cultivation and animal husbandry as evidenced by the archaeological and documentary sources. The establishment of a reference archive of such material and comparable ethnographic evidence is regarded as a critical and integral part of this project.

The project is situated on Little Butser, a spur to the north of Butser Hill in Hampshire. Approximately fifty-seven acres of land will ultimately be under the control of the farmstead but at present only thirty acres are in use comprising the spur itself and its wooded slopes. The land is provided by the Hampshire County Council. Initial funding of the research was made by the Ernest Cook Foundation.

Inevitably the following paragraphs summarise but a little of the work achieved during the past three years at the Ancient Farm. The object is, however, to indicate briefly the areas of research at present in hand.

The spur was occupied during the Iron Age period and the extent of that occupation is being steadily examined. Two field monuments, an unusual dished-platform and a 60m length of unfinished ditch are the clearest indication of that occupation but subsequent examination of apparently "sterile" areas have indicated much more extensive evidence. This is of particular concern when placed in the context of other sites with little clear field evidence or even no clear evidence at all. The excavation has concentrated upon examination of development areas prior to reconstruction work and upon the major feature, the dished-platform. Prior to any work on site a photogrammetric survey of the area was made as well as the establishment of ten fixed datum points. Various techniques have been used in the excavation process the most important of which has been the approach from the grass-surface downwards. Attention has also been paid to recording techniques including the use of a photographic gantry tower costing less than £10 which allows mosaic and stereoscopic photography.

The major concern during the past three years has been the construction of two houses and a field system and the acquisition and domestication of the appropriate livestock in order to set up the farmstead. Ultimately it is planned to build four houses and attendant structures within a ditched and banked enclosure with field systems and paddocks radiating from it. In real terms, however, the whole farmstead will be the first outdoor scientific laboratory researching into archaeology. Each of the component structures and every process will be a research experiment in itself, the complete farmstead similarly being a full-scale experimental project. In brief, the whole and each of its parts is the subject of the most rigorous research.

Within the compass of this paper, it would be impossible even to catalogue in any detail the findings and implications of the work achieved to date. Consequently only three specific aspects of the research programme are dealt with below. However, the establishment of the farmstead is some way towards completion. A great deal of data has been already achieved concerning the crops of the prehistoric period and their yield factors, sowing and ploughing techniques, the domestication and training of cattle, potential grass economy, timber and leaf economies, animal control and husbandry. There is considerable need to stress that all these agricultural programmes must be the subject of many years of research work if valid statistical information is to be gained. It is totally without meaning, for example, to discuss yield figures for various types of cereals unless these have been achieved both over a period of several consecutive years and under carefully recorded details of treatment and climatic conditions. A bald figure of X cwts or bushels per acre is singularly meaningless.

Perhaps the research programme which has yielded the most significant results to date has been that devoted to the problems of the storage of grain in underground silos. The feature of the pit so common on many British Iron Age sites on a variety of subsoils, continues to present great problems for interpretation. From documentary evidence it is thought that some pits were used for the storage of food and that of these pits some were used for the storage of grain. It is worth stating at this point that not all pits are for grain storage. It is quite wrong even to adopt this interpretation as a first option. By examining a number of variables involving shape, size and type of lining against specific constants of climate and stored product, it has been possible to establish that seed grain can successfully be stored in a pit. The accepted theory that grain stored in a pit was for consumption and could be broached and sealed like a larder door has been largely dispelled by this research evidence.

Consequently it also brings into question the hypothesis that some population computation can be achieved by mathematical analysis of pit capacity against consumption rates. This final piece of evidence loads too many variables into the formula for it to be at all tenable.

Yet there is still a large number of basic questions that only a long-term research programme can seek to answer. The life-span of a grain storage pit (see Figure 1) is one such key question. In the light of the present experimental data which includes a detailed mycological study of both stored produce and pit wall, it is most unlikely that there is a terminal life span for a pit. This factor also increases the difficulty of pit interpretation. However, there is a distinct possibility of ascertaining some pit functions from the study of experimental pit walls. The establishment of comparanda obtained from a monitored life-cycle of a pit is a clear and vital aspect of experimental archaeology.

The most impressive visual aspect of the research programme is to date the reconstruction of two round-houses which form the nucleus of the farmstead. The reconstructions are respectively based upon ground plans drawn from Maiden Castle in Dorset and Balksbury in Hampshire. The former (see Figure 2 and3) is a post-build structure six metres in diameter with interwoven hazel wattle walls. The central post-hole as recorded by the excavator was utilised for a central support for the apex of the roof. That this interpretation of a central post-hole is probably in error is demonstrated by the latter structure which is over nine metres in diameter with an unsupported roof span. It is also necessary to emphasise that a reconstruction is in no way a replica. Rather it is one possible physical structure which is postulated from the archaeological evidence. It would be quite wrong to think of such structures as being real Iron Age houses. The operation of the basic formula of experimental archaeology can, perhaps, be best seen in this kind of reconstruction work. One is interested specifically in validity and probability judgements.

The Maiden Castle Round-house, completed in 1973, has been subjected to a careful monitoring programme with some fascinating implications. In order to construct the house over thirty trees were used, seven tonnes of daub and over one tonne of thatch. This last item, according to the cereal research programme, represents the straw from over an acre of land. If one accepts the standard yield figures offered for the prehistoric period this amount of straw would be drawn from over four acres. Yet this house is representative of the smaller variety. Woodwork was of the simplest kind utilising only the axe-cut friction plate joint with raw-hide lashing. Again the hides of three cattle were required in the construction.

The completed structure has achieved a degree of validity in that it has successfuly withstood four hurricanes and, during the winter of 1973-74, over a metre of rain. Despite the excessive rainfall, no drip trench has formed under the eaves. However, since the house was used for the storage of grain during the winter periods, it became infested with rats which lived under the walls. Their activity has palpably altered the "archaeological evidence" in that a gulley has been created around two-thirds of the circumference of the house producing what might be interpreted as a "construction trench". The presence of <u>Rattus rattus</u> has been recognised in the Roman levels at York and one suspects that it is only a matter of time before its prehistoric presence is identified. Even failing that, zoologists suggest that the vole fulfilled the present role of the rat before its appearance. One further aspect of the use of the structure has been the creation of a shallow depression immediately outside the doorway. This has been caused by eaves drip and the passage of feet. This last observation has been instrumental in the location of a doorway in the recent excavation of a round-house at Skipton in Yorkshire.

The selected evidence discussed in the previous paragraph serves to underline the value of establishing "comparanda" of vital significance to the interpretation of excavated sites. There is a much greater need for the multiplicity of interpretation, the recognition of a number of potential explanations for any particular feature.

The second round-house, which has only recently been completed is entirely different in concept and construction. It depends upon the hypothesis of a timber frame structure utilising sophisticated joinery of neolithic date including mortice and tenon joints, scarf joints and wooden pegs. The roof structure, based upon five major rafters and a pentagonal ring beam supports two tonnes of reed thatch. The major implication of this reconstruction is that a central post is not a necessary integral feature for a house of this size. Mathematically it is possible to span even greater distances. It is worth noting that the ground area of this house is greater than the average modern house and yet is still only in the medium range of Iron Age house plans. The round-house with cone-shaped roof is not only an elegant structure but also demonstrates a considerable degree of engineering sophistication.

Finally, since experimental work always focusses attention upon the raw archaeological data, one specific research project has been implemented at the Ancient Farm to seek improved methods of excavation.

The process of turf removal prior to excavation especially on sites with a shallow soil cover has always seemed to be a potential distortion of the available evidence. It would be advantageous to excavate literally from the grass surface downwards. The major problem is the grass itself and the root-bonded topsoil. However, if the process of photosynthesis can be stopped, the grass will die and the roots rot away. By covering the area due for excavation with a layer of black plastic sheeting or similar opaque material for a period of twelve weeks, photosynthesis, the way in which plants convert sunlight into energy, is stopped completely and the resultant area can be trowelled immediately. This allows all artifacts to be plotted in their spatial context and texture changes to be recorded from the outset. The longer the period the area is covered the better. The ideal time span being twenty-four weeks. Since, in the rural situation, such advance warning for rescue excavation is common, it would seem to be a potential answer to increase data recovery.

As has been stated above, this paper is necessarily brief and extremely selective in content. The intention has been to indicate the nature and role of experimental archaeology and to confirm that it is not a peripheral discipline of passing interest but fundamental to improved interpretation and excavation technique. In this respect the Butser Ancient Farm Research Project, unique in its conception and execution, the first open-air scientific research laboratory for archaeological studies, is of key significance.

References

1. H.C. Bowen and P.D. Wood, 1968, Experimental Storage of Corn Underground and its Implications for Iron Age Settlements. Bull, Univ. London Inst. Arch.

P.J. Reynolds, 1969, Experiment in Iron Age Agriculture. Trans. Bristol & Gloucs. Arch. Soc.

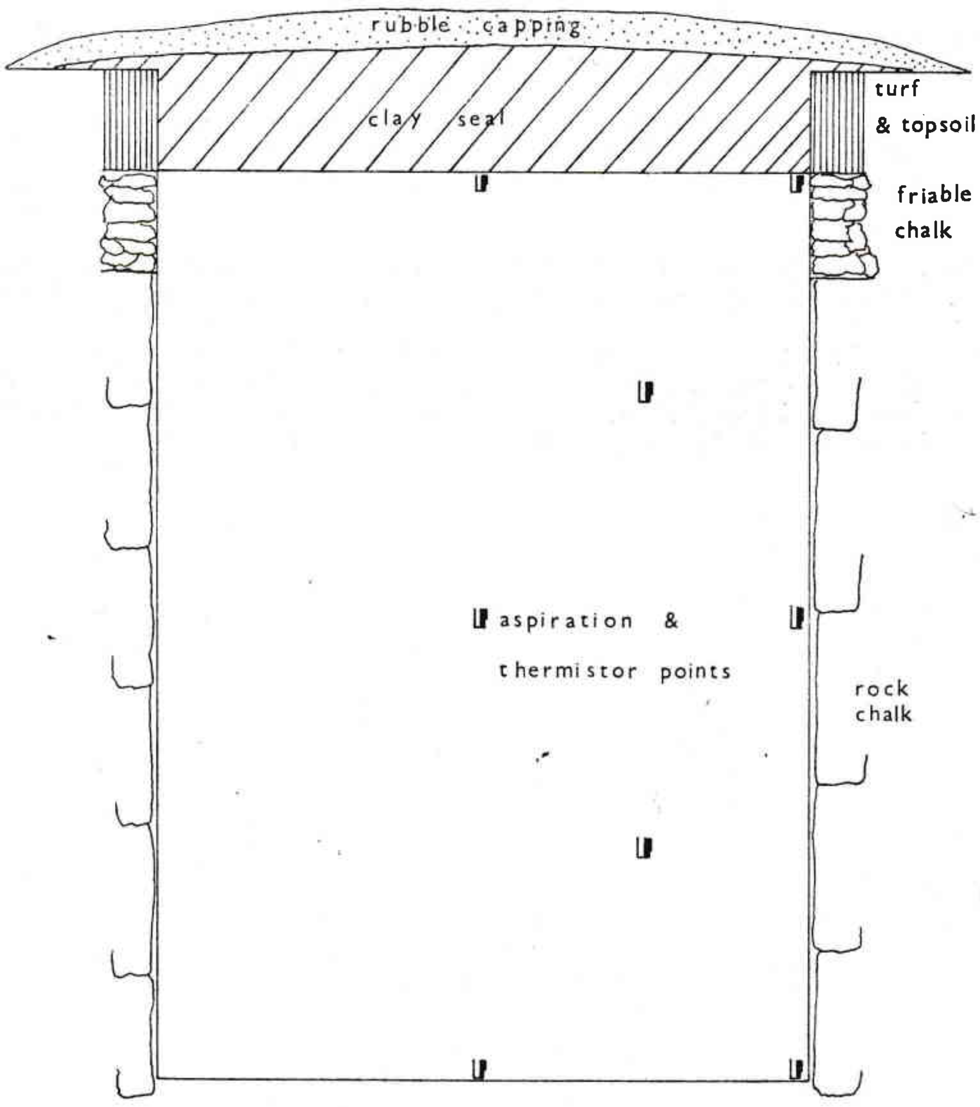
P.J. Reynolds, 1972, Experimental Archaeology. Worc. Arch. Newsletter, Special Edition.

2. P.A. Barker, Hen Doman, Montgomery: Excavations 1960-7, Château Gaillard III, European Castle Studies.

3. H.N. Jarman, A.J. Legge, J.A. Charles, 1972. Retrieval of Plant Remains from Archaeological Sites by Froth Flotation. Papers in Economic Prehistory (Ed. E.S. Higgs), Cambridge University Press.

4. S. Payne, 1972, Partial Recovery and Sample Bias: The Results of some Sieving Experiments. Cambridge University Press.

5. Prehistoric Farm at Butser Hill, Project for Research and Education, 1970. Research Committee on Ancient Agriculture of the British Association for the Advancement of Science and the Council for British Archaeology. January 1970.



UNLINED UNCOVERED GRAIN STORAGE PIT 1972-73
LITTLE BUTSER

Scale in Decimetres

A typical experimental pit.

Ferme archaique
de Butser

Hutte ronde de
Maiden Castle

Butser Ancient Farm

Maiden Castle Round-House