

A NEW HYPOCAUST FOR THE MILLENNIUM

by Dr. Peter J. Reynolds – Director, Butser Ancient Farm

In 1972 when Butser Ancient Farm was set up its original brief was to explore the agricultural and domestic economy of the late Iron Age and the Roman Period. Inevitably a two-phased operation it was envisaged that an Iron Age farmstead would first be built surrounded by fields and paddocks wherein empirical trials could be carried out to test the theories and ideas proposed by excavators of Iron Age sites. In effect it was to be, and became, an open-air laboratory. As soon as the first phase had been established it was intended to build a small Roman villa with attendant fields and farm buildings. Such intentions take no account of the vicissitudes of chance and more particularly the problems of funding. The Ancient Farm, however, has survived these last three decades having pioneered the experimental testing of interpretations – and in so doing has achieved a global reputation. Currently it is on its third site, bioclimatically different from its predecessors, located on the upper chalk at Bascomb Copse near Chalton in Hampshire.

In all this time, apart from a minor excursion into the Roman period when the so-called Romano-British grain-drier was explored and found not to dry grain but more probably to be a malting floor, the second phase of the original remit had not been implemented up until three years ago. It was then decided at least to make a start. The new farm site had sufficient overall area to set aside a zone for Roman research. Thereafter, in association with David Johnston of Southampton University, the house element of the Sparsholt Roman Villa complex which he had excavated was selected for specific study. Setting out to build a Roman house is in itself a daunting task and naturally one that would require considerable funding. This latter problem was set on one side while a research design was argued about and settled upon. It was decided to explore the first phase of the house structure and to concentrate upon the northern part of the building which contained a channelled hypocaust. This design had the great advantage of being limited to the completion of only part

of the building, the rest of it being essentially more of the same, and would allow the implementation of a significant experimental research programme into the workings of a channelled hypocaust.

The excavation had revealed considerable remains of the hypocaust room, along with the wall footings and walls to floor level of the building, which allowed the excavator to distinguish the two phases of construction; first the main building serviced by an integral corridor and the location of the doorways or arches and then the added rooms of phase two at each end of the structure. Virtually the whole of the building had tessellated floors with the central room graced with a splendid mosaic, which is currently on exhibition in Winchester Museum. In addition, window glass was found in association with the hypocaust room. Within the research design mosaic floors and wall plaster have been postponed until later in the programme.

The building itself is single storeyed and constructed of flint and mortar walls set on chalk foundations, with a stone tiled roof. The intention is to build the suite of rooms of the northern end, including the roof.

In the last three years the underfloor elements of the hypocaust have been finished, including an opus signinum floor over it, and the walls presently stand at a metre high. During this time a great deal has been learned and many questions engendered, not least of which is the original purpose of the building being a house or a suite of offices.

In practical terms the archaeological evidence has been

faithfully reconstructed. The stonework which forms the islands in the hypocaust was built with Purbeck limestone. Purbeck is some forty kilometres from Sparsholt and given the need for six tonnes of stone in the building there has to be a good reason for its importation and use. Perhaps the heating trials will reveal more. On the other hand it may simply be that it is easier to build the corbelled channels with flat stone blocks rather than with field flints. Initially it was thought that the Roman box flue tiles would cause huge problems of manufacture. In the event it was discovered that the commercially available modern ceramic flue tiles are virtually the same shape and dimensions as their Roman predecessors.

The walls themselves, built with flint and mortar, are quite fascinating. Field flints, ubiquitous in the upper chalk regions of southern England and in this county often referred to as “Hampshire diamonds”; have been used as a building material for the last two thousand years. Their value as a building material and their longevity is attested by the ancient churches and houses which stand to this day. Walls constructed of rough stones are described by Vitruvius, a Roman architect of the first century who wrote a treatise ‘On Architecture’ (*De Architectura*), as *opus incertum* as opposed to buildings constructed of orthogonal blocks. This, therefore, is the work of the rough stone mason but nonetheless is still highly skilled.

Field flints come in all shapes and sizes and apart from having to be collected from the fields after autumn ploughing, have to be graded on site

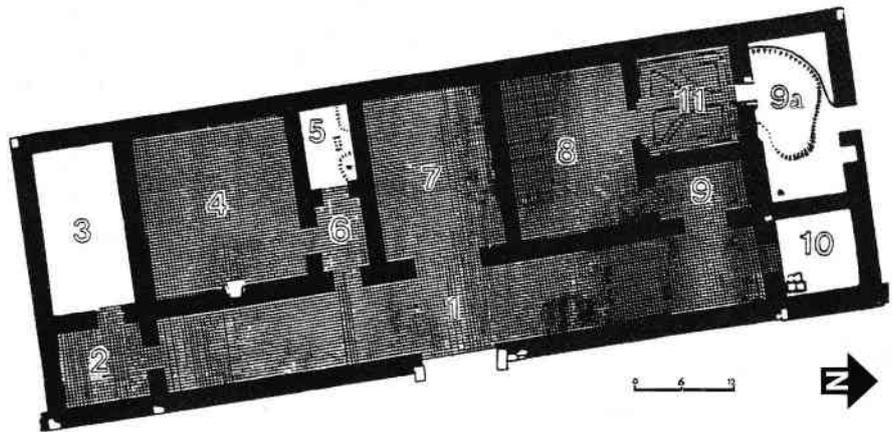


Fig. 1. General plan of the villa house.

Drawing by Peter Reynolds.

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before use. For the wall to be strong it has to be tied together by through stones, long stones which reach from the outer face of the wall deep into the interior. Such stones are at a premium and during the last three years of flint collection an assessment of their frequency against all other shapes comes out at a ratio of 1 : 90. They are much sought after, prized and handled with extraordinary care. The walls are built with facing stones inside and out, with every third or fourth stone being a through stone and then the internal wall is carefully put in place. It is an absolute misnomer to describe such walls as "rubble filled". Each and every stone is carefully mortared into position whether on the outside face or in the interior. The mortar, the same as in the original, is a mixture of grit and quicklime at a ratio of 6 : 1. In reality the mortar holds the stones apart rather than sticking them together. Opus signinum, the Roman cement, is the same mixture but with the added component of one part of crushed brick and tile. The sheer quantities of materials necessary for the construction are quite surprising. For example, a cubic metre of wall requires two tonnes of flint!

In March of this year the

temptation to test the hypocaust, now complete with its cement floor, proved irresistible. A smoke pellet was ignited just inside the *praefurnian* arch of the stokehole. There was no fire, no pre-heating and even the wind was blowing in the wrong direction. Within thirty seconds smoke began to issue from the tubuli nearest the stokehole, within forty seconds all ten tubuli were belching smoke. The Romans seemed to have got it right – while visiting heating engineers were full of gloom-laden prophecies.

This is the first working hypocaust built of the original materials to have been constructed in Britain in the last sixteen hundred years. Once the walls are built and roofed over it should prove possible to conduct full scale experiments to test its efficacy and efficiency, the nature and quantity of fuel needed to reach



Fig. 3. Hypocaust room during construction showing the islands of Purbeck limestone, the channels and the tubuli in the walls and the praefurnian arch and stoke hole. Photo: Peter Reynolds.



Fig. 4. Hypocaust room with the channels corbelled over and ready for the opus signinum floor to be laid. Photo: Peter Reynolds.

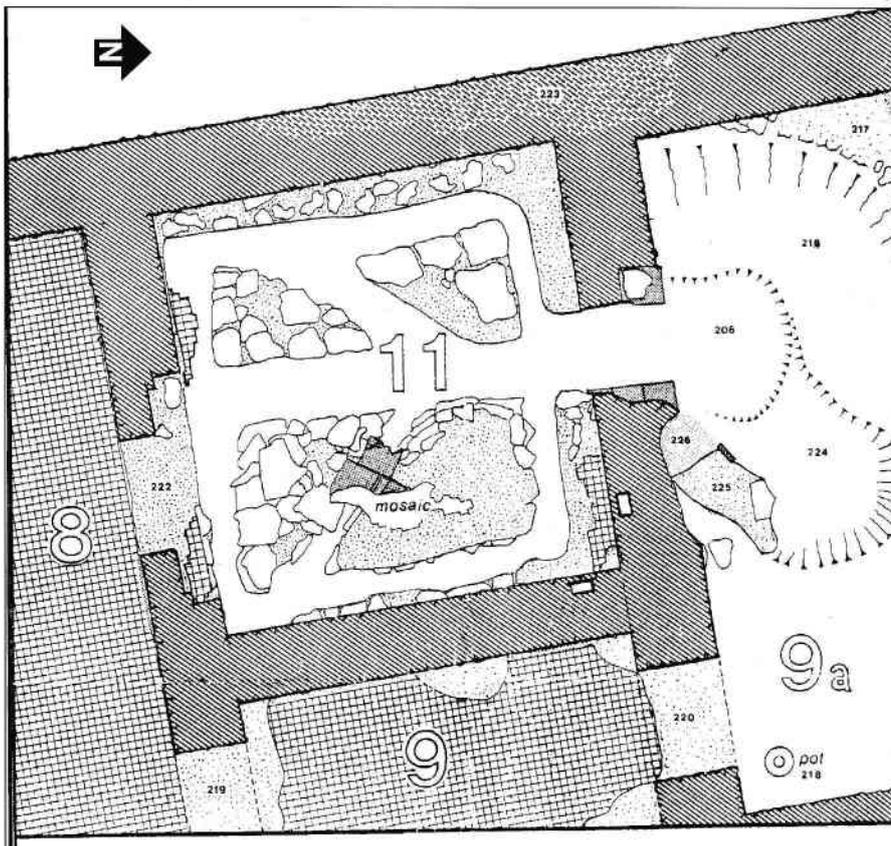


Fig. 2. Detailed plan of hypocaust room.

Plan by Peter Reynolds.

and to maintain a temperature, and the opportunity to explore a Roman three-dimensional living space with tessellated floor and plastered walls. It will also provide a unique educational resource.

So far the work has been funded by The Friends of Butser Ancient Farm, Mr. Ian Pretchet and, this season, with a small grant from The Association for Roman Archaeology. To all of these, and the volunteers who help on site, the author expresses his gratitude.



Inevitably, in order to push this exciting project forward, funds are urgently required for building materials, monitoring equipment and labour.

The Ancient Farm is located near Chalton signposted off the A3 four miles south of Petersfield and ten miles north of Portsmouth.

Open daily from 10 am – 5 pm, Easter to October.