The Witchert Buildings of Buckinghamshire, England: Learning Sustainable Construction from our Ancestors

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INTRODUCTION

Using earth as a construction material fulfills many of the requirements for "green building". It is a non-toxic material, and the thermal mass of the thick walls helps reduce the amount of energy used to heat and cool buildings. One of the main "green" properties of earth as a building material is that it is readily available and in some areas it is available on the same property as proposed buildings, or nearby. This is the case with a particular form of earth construction called Witchert.

The word "witchert", "wichert", "whitchert" or "wychert" is used in Buckinghamshire, England to describe a particular type of sub-soil, from which boundary walls, houses, churches and barns have been constructed. The term witchert is thought to be a local corruption of the words " white earth" which describes the creamy-beige color of the soil that is used to build the structures (Andrew, 1986). Witchert construction is one of several earth-building techniques that have been used in England in the past, such as Cob and Clay Lump. The exact number of witchert buildings in Buckinghamshire is unknown, but a search of English Heritage's database of listed buildings found over 200 listed witchert structures in Buckinghamshire. Listing by English Heritage gives statutory protection that limits the amount of alteration and addition that can be carried out on the structure. The structures are located in a number of small villages located to the south-west and north-west of the county town of Aylesbury. The majority of structures are in the village of Haddenham and the adjoining villages of Cuddington, Chearsley and Long Crendon. The majority of these protected structures range from the 17^{th}, 18^{th} & 19^{th} Centuries, and their continued existence can be contributed to the understanding of the original builders on the strengths and weaknesses of earth as a building material. Pair of typical witchert cottages is shown in figure 1.

Figure 1 A pair of witchert cottages Cuddington, Buckinghamshire.

A "GREEN" MATERIAL?

In their book "Green Building Materials", Spiegel and Meadows (1999) argue that green building materials are those that use the earth's resources in an environmentally responsible way. The material should be renewable, nontoxic, made from recycled materials and be recyclable, energy and water efficient and manufactured in an environmentally friendly way. The material used to build the witchert walls of Buckinghamshire satisfies most of these requirements. It is a nontoxic material that is capable of being recycled and requires only human energy for its manufacturer. The resulting thermal mass of the walls provide a thermally efficient building that is cool in summer and warm in winter.

Walter Rose (1942) a native of Haddenham wrote of the early builders of the village in his book "Good Neighbours", he describes how, after originally building their homes with timber and wattle and daub, they discovered that "nature had made generous provision for the village" by providing the soil from which they could build homes. This discovery appears to have taken place as early as Elizabethan times (Rose, 1942) and a great number of buildings still exist from the 17th century (Andrew, 1986). It is the coming of the railways in the 19th Century that appears to have established brick as the dominant building material, with only a small number of buildings being constructed after the first world war, possibly as part of the interest sparked by the publication of Clough William-Ellis' "Cottage Building in Cob, Pisé and Chalk and Clay in the early 1920's.

THE CONSTRUCTION PROCESS

The construction process is very similar to that of Cob. First of all the soil was dug out from the ground. It was found in a layer just underneath the topsoil. Rose (1942) describes how the soil was excavated early in winter and left out-side throughout the winter to allow the frosts to break the soil down. In the spring construction work commenced by constructing the foundation for the wall, this was called a "grumpling". The grumpling was constructed using local limestone

field stones laid in an earth mortar, these extended to approximately one to two feet above the ground. The soil was then prepared for construction by soaking it with water and treading and turning it until it had a dough-like consistency. Straw was added to hold the soil together during construction and drying.

Two workman were used to construct the wall. One workman stood on the grumpling, the other was positioned on the ground and it was their responsibility to pass the soil for construction to the workman on the wall. This was done using a flat-pronged fork. The workman on the wall then patted and consolidated the soil into position. This process was repeated until a height of approximately 18" high was reached. The wall was then left a few days to dry. At this point the sides of the witchert wall were cut straight and smooth using a spade. This 18" lift or layer of soil was called a "berry" and additional berries were added until the full height of the wall was reached.

In Haddenham and the surrounding villages there are a number of different structures. The majority of the structures are dwellings, but there are also a number of barns, stables and a handful of chapels. What are most interesting are the boundary walls that appear around and within the village of Haddenham. These walls, some as high as nine feet (Andrew, 1986) were often topped with thatched, although most of the surviving examples have tiled copings. Figure 2 shows a tiled coping and a thatched wall.

Figure 2 Witchert walls showing tiled and thatched copings.

UNDERSTANDING THE MATERIAL

The witchert builders understood their material well. They knew its strengths and weaknesses and constructed accordingly. There is a saying that appears regularly in the literature on earth building that says, *"Give a building a good hat and a good pair of boots and it will last forever"*. The witchert builders heeded this advice well. Figure 3 shows a grade 2 listed stable building. The listing is as follows:

> *Stable building and store. C18. Witchert on a rubblestone plinth. Hipped thatch roof. 2 bays with gable end to road and east wall along Spicketts Lane, the witchert wall rounded at the junction. West elevation facing Nunhayes Cottage has central board door and windows either side* (English Heritage, 2002).

This building shows clearly how the builders understood the limitations of the material. The building has a substantial footing that extends well above the ground; these are the buildings "boots." This prevents the earth material from becoming excessively wet from either ground water or by splashing rainwater. Water is the main cause of deterioration of earth buildings. The changes in volume that the addition and removal of water causes, severely weakens the earth causing it to break away. The thatched roof provides the buildings "hat". The substantial overhang of the roof keeps the wall dry by protecting it from the rain. Many of the witchert walls are left unfinished, as the original builders knew that if they were constructed wisely no additional protection was required. The deterioration that can be seen in figure 3 was caused not by water but by the activities of Masonry Bees who have nested in the walls. Insects and rodents make no distinction between earth in the ground or in walls, and their activities have caused considerable damage to many buildings in the area.

Figure 3 Witchert Stable in Cuddington, Buckinghamshire.

THE DECLINE OF WITCHERT

Like many local building materials, witchert fell out of favor as the building material of choice. The coming of the railways and better roads in the 19th century made bricks more readily available and this became the dominant material. The use of witchert declined rapidly and the knowledge base was lost. When the local authority, Aylesbury Vale District Council, wanted to

rebuild a short length of boundary wall in the mid 1990's they were unable to find any local contractors with the requisite expertise. A specialist building conservation contractor was finally hired from outside the area to reconstruct the wall. Figure 4 shows the wall during its reconstruction.

Figure 4 Reconstruction of a witchert wall in 1995.

This loss of knowledge has also led to poor maintenance and repair of some of the buildings. When the author inspected a number of the boundary walls in 1996 he identified a number of poor repairs to the walls. These included the use of heavy concrete renders to walls that in some places had cracked and allowed water to penetrate and damage the witchert. The wall in figure 5 shows where an area of eroded wall had been repaired using interior plaster that is not only unsightly but will deteriorate rapidly when exposed to rain.

Aylesbury Vale District Council has recently responded to this problem by producing a guide to help owners of witchert structures repair and maintain their buildings properly. This follows the excellent publications produced by the Devon Historic Buildings Trust that were produced to remedy a similar problem with Cob buildings in the southwest county of Devonshire.

Figure 5 Repairs to a witchert wall using interior plaster.

WHAT CAN WE LEARN FROM OUR ANCESTORS?

If we look closely at the way our ancestors built we can learn valuable lessons. When there was little or no energy available then they used materials that used little or no energy to produce them. When transportation links were poor or non-existent, they looked to their locality to provide their materials. When they used these local materials, they used them wisely by paying special attention to the strengths and weaknesses of the material and detailing the material accordingly. We can also learn that if we do not pass on the knowledge that was traditionally passed down from master to apprentice then it is lost. This loss of knowledge has led to many poor repairs being carried out on these historically important structures. There is plenty the builders of today can learn from our ancestors.

REFERENCES

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