

Appleby Archaeological Group AGM on 14th January was followed by excellent presentations from two of the group's members. The first was given by Ron Lyon, a former metallurgist and foundry worker, and an active member of the Cumbrian Industrial History Society. He gave us a fascinating talk entitled "Bloomery to blast: the iron industry in Cumbria".

Haematite or iron oxide ore was first used by Neolithic people as a cosmetic pigment due to its striking colour, but there is little evidence of iron production until the mediaeval period, and surface workings ceased before the 14th century. The iron ore was heated to 1100°C by burning charcoal, but the iron had many impurities and had to be forged in a bloomery to remove this slag, and produce some 5 tons per year. At this stage, it took 100lbs of ore to produce 30lbs of iron, but 5 tons of wood to make the 1 ton of charcoal needed to produce only 0.3 tons of iron; ore and bloomsmithy furnaces which now produced some 50 tons per year were therefore moved to the woodlands. This heavy use of timber conflicted with the national need for wooden warships, and in 1561 a decree of Elizabeth I abolished the bloom smithies to protect the trees. The blast furnaces that then developed could produce about 1500 tons of iron per year. Water power was gradually harnessed for bellows to increase the heat, and to drive drop hammers for forging. Larger masses of metal could now be heated, and with the slag now floating on top, the molten metal was tapped out from below to form pig iron; fineries then remelted the pig iron to form cast bars, and chaferies forged the cast bars onto wrought iron. Ron illustrated all these processes by a series of excellent slides of iron works of various kinds.

Furnaces would run for two months until the charcoal ran out, then they would move and start again. In 1711-49 eight furnaces were built, six of which were owned by only three companies. But by 1800 only four were left, reduced to a single one by 1900. There was still a huge demand but Abraham Darby's invention of coke to smelt the iron meant that much larger quantities of iron could be produced near the coalfields. It was not as pure as the product from charcoal, but peat, brown coal and anthracite could be mixed and used to produce higher quality coke. In the 1800s there were 20 coke-fired blast furnaces, and 32 puddling furnaces, but by 1877 the decline had started. As the furnaces of the Lake District went out of business, the water power of the mills was used to make bobbins for the cotton industry, and also for sawmills as the cotton industry faded. Many of the old works and associated buildings remain today, and are well worth visiting. Most have been taken over and converted to new uses, but they are an impressive reminder of a formerly great Lake District industry.

The second speaker was Harry Hawkins, whose long-term interest in archaeology began with evening classes about the first site to develop the experimental restoration approach at West Stow Anglo-Saxon village in Suffolk. It was an intriguing account of the development of what has come to be the standard method to reconstruct the archaeologies of the past based on the greater understanding of successive generations of researchers.

In the years after 400AD, successive waves of Angles, Saxons, Frisians and Jutes driven out of their homelands on the other side of the North Sea by population pressure and the search for new lands, began to raid Britain's east coast, then to winter there in small numbers, and finally to make permanent settlements there and inland. Much of the Suffolk Interior was breckland but the valleys were better, richer and more cultivable land, with Essex clay to the south, so it was mostly in the

river valleys and estuaries that the newcomers chose to live. Stow village was inhabited from 400 to 650AD, and then abandoned. It was the first whole village complex to be fully excavated, from 1965 to 1972, using the same techniques used today but less sophisticated. The main features were what came to be known as the "SFBs", or sunken feature buildings, evidently supported by two, four or sometimes even six vertical tree trunks held upright in postholes. During the excavation it became clear that there had been settlement on the same site since the Ice Age, and a full chronology was established from that time until the Romans built 10 pottery kilns here over some 70 years, then much debris then nothing until the Saxon period and its subsequent abandonment.

The site was then covered over by a sandstorm, and only rediscovered by a workman in the 19th century, when various vicars then excavated bits of it in a rather amateur way. Then in the 1960s Stanley West decided to excavate the site, complete with reconstructed buildings, in what came to be recognised as the start of "experimental archaeology". With only posthole evidence as a starting point, the construction methods and resulting shapes had to be worked out by trial and error, from a simple two-post pyramid with planked ends, to a more complex building with high planked side walls using three posts at each end. Finally the familiar wattle and daub finish over a planked construction evolved, with a shallow pit inside. With German colleagues also now doing experimental reconstructions, this evolved into hearths for fires and cooking on a suspended mud floor on planks over a central pit. Above-ground storage barns also left a four-posthole trace. Gradually the whole village was reconstructed and its functioning parts established. This became the basic model for the long period of the Anglo-Saxon settlement that determined the pattern of rural England as we now know it up to the time of Athelstan who unified the separate kingdoms by the treaties and agreements at Dacre and Eamont Bridge. The talk was illustrated with slides of the various different types of building reconstructed, and the layouts of the complete village as it emerged during the excavation. It was particularly interesting to follow the evolution of archaeological techniques in parallel with the evolution of the house types discovered on this ground-breaking dig.

Stephen Walker

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