Reprinted from: Gloucestershire Society for Industrial Archaeology Journal for 1991 pages 34-44

IRON WORKING AT FLAXLEY ABBEY.

H.J. Ellis

The Cistercian Abbey of Flaxley lay on the eastern edge of the Forest of Dean (Ordnance Survey Grid Reference 691154); little of the monastic buildings survives, incorporated into the present private house which carries on the name of the Abbey. It lies in the now quiet valley of the Flaxley Brook, but in past times in the valley (sometimes called the Vale of Castiard - the Valley of the Chestnuts) the brook was the power source for a number of mills, forges and a charcoal blast furnace. (1)

Flaxley is the most easterly of the known iron working sites in the area, although it lies just outside the currently accepted boundaries of the Forest of Dean. There is evidence for iron-working interpreted as Roman within a mile of the Abbey site(2) but the earliest documented references so far found to iron working associated with the Abbey itself is a charter of Henry, Duke of Normandy (later King Henry II) dated about 1140 (3), granting land for the Abbey together with a forge at Edland. This name appears in other publications as Ardland, Ardlond, Erdland, Edlaud and Hardlande (4),(5), in contexts which suggest that they all refer to one place. Nicholls (6) identifies the name with Elton, near Westbury-on-Severn but documents in the Gloucester Record Office (7) relating to the Flaxley Grange Estate refer to Arlands Grove or coppice bounded by 'lands of St White's to the east and north, by part of Dean Forest called Heywood and Stockwell west, extending in length to Lynards Wood in the south'. Lynards Wood has not been identified but Heywood and Stockwell appear on modern maps, together with St.White's road and suggest a location more or less corresponding with the modern town of Cinderford. Originally Flaxley's monks were allowed two oaks each week from the forest for their forge but a later charter dated about 1281 (8) substitutes a tract of woodland whose boundaries were described as starting and finishing at Ardlond. These boundaries describe the area still known as Abbots Wood between Cinderford and Ruspidge and thus some distance from Nicholl's Elton location. Ardlands Grove is adjacent to both Flaxley Grange and Abbotswood and seems in all respects a highly probable location for the monks' forge.

A brief note (9), quoting a chain of references back to King Henry III is evidence for a 'stationary forge' owned and worked by the monks in the village of Flaxley but no details have come to light.

No other documentary evidence relating to iron working by the monks of Flaxley has come to notice but monastic records would have been dispersed or destroyed following the Dissolution. Nicholls (10) gives a date of 1541 for the closing of Flaxley Abbey and its handing over to Sir William Kingston. Letters Patent cited as handing the property over to his son, after Sir

William's death in 1545 list various manors and granges but there is no reference to iron working although this may not be significant.

A starting date for a charcoal blast furnace at Flaxley has not been positively established, but the existence of a smelting operation at Flaxley by 1680 is confirmed by an Order of the Forest Mine Law Court in that year which fixed prices for iron ore delivered to various sites including Flaxley. (11) This date is also given as the earliest reference by Schubert. (12) Hart (13) records the furnace as being in the hands of the Foley partnership in 1686-7, the accounts for that period surviving.

Subsequently the furnace passed into the hands of the Boevey family; (13) correspondence preserved in the Abbey between the then owner, Mrs Boevey and her agents around 1710-1720 contains references to 'keeping the furnace in blast'. A letter dated 27 November 1717 contains references to blowing and to controlling the blowing rate by adjusting the water level. Arrangements for the supply of charcoal from birches near Speech House are discussed in a letter dated 23 December in the same year. These letters confirm that a charcoal blast furnace with water-powered blast was in operation in 1717, whilst an earlier letter of 18 September 1717 refers to a blast (i.e. a period of furnace operation) possibly prior to 1712. These letters are the earliest documents so far seen which specifically refer to a charcoal blast furnace at Flaxley, but it is probable that more information may be found in the Foley papers or in papers preserved in private hands at Flaxley Abbey. The letters so far seen give interesting details regarding the iron working business and it is to be hoped that they will eventually become accessible for study.

Rudge (15) has the furnace out of use for nearly a year by 1802; he goes on to say that by the time of writing (1858) the furnace had 'been long since removed, and the pools drained'. Schubert (16) notes the furnace as in production in 1806 but a large iron block bearing the legend Flaxley Ironworks 1812' is preserved in the Abbey, suggesting that work may still have been in progress at that date.

Rudge (15) writes in October 1802 of the high quality of Flaxley iron attributed to 'working the furnace and forges with charcoal without any admixture of pit coal'; Lancashire ore was in use at that time although there is also a note that cinders were added as available. The supply of charcoal was limited and the furnace could only be kept in operation for about nine months at a time. Lady Boevey's letters show that charcoal supply had been a problem in her day almost a century earlier. At the time when Rudge wrote he records that the furnace had been out of use for 'nearly a year'. Hart (13) also gives 1802 as the date for the closure of the furnace.

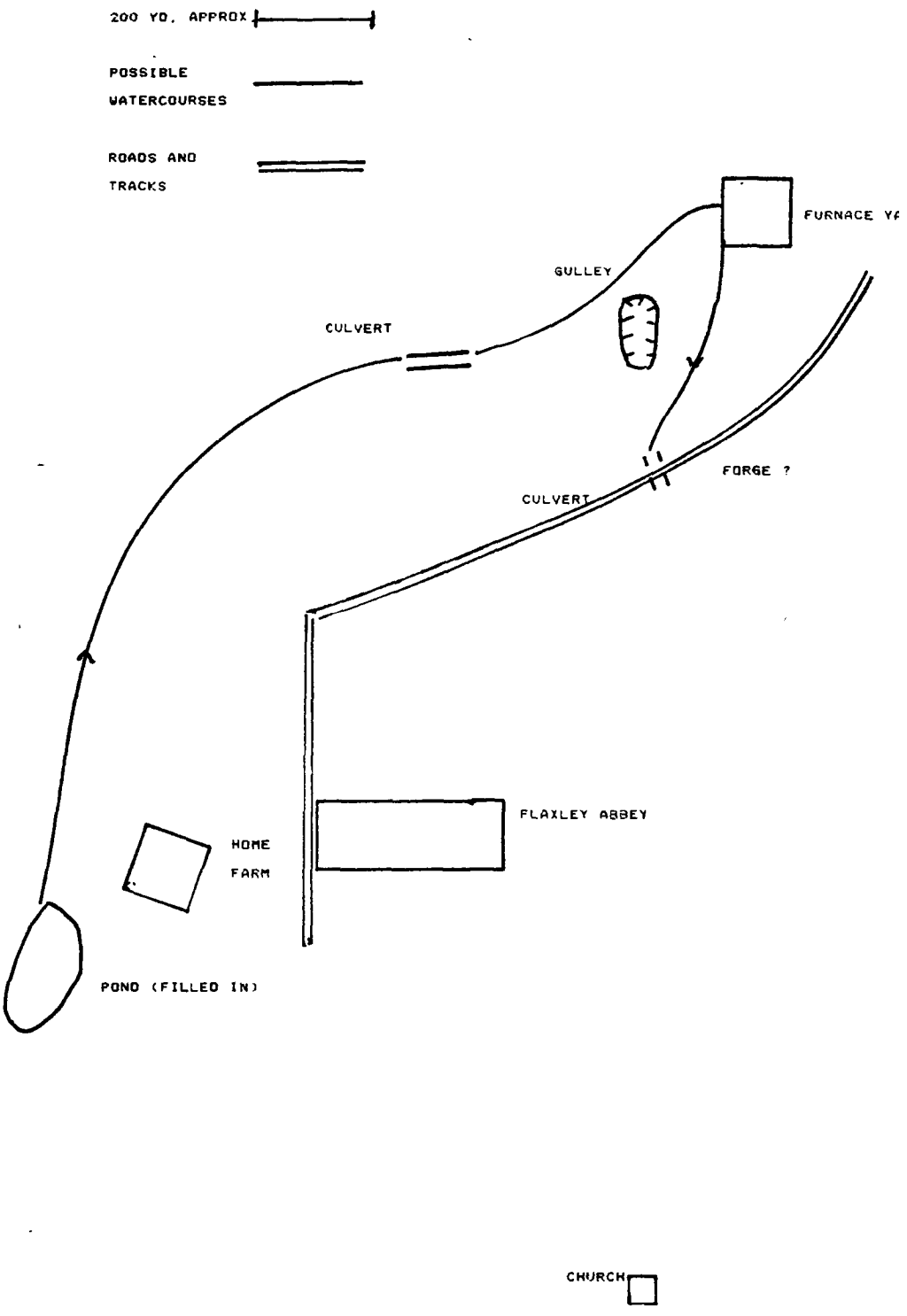

Fig. 1 DIAGRAM SHOWING FLAXLEY FURNACE ENVIRONS

Rudge's comments imply that any remains would be scanty; however, Mr townley, a former worker on the Flaxley Estate dug, sketched and photographed a number of stone structures on the site (un-published). Through the kindness of Mr Townley, a meeting was arranged in the late 1970s between himself, Society members Mrs M. Lewis and Mr Graham Curzon and the Abbey's owner, Mr F.B. Watkins who was interested in the furnace. After Graham Curzon's death a tape recording of this meeting was found including reference by Townley during a site walk to a water wheel which he recalled having seen, implying its existence in or after 1900. The wheel has not survived nor is it possible to pinpoint its location from the recording (Mr Townley had also died before the tape was discovered). However, following contacts made at this meeting Mr Watkins very kindly gave permission for Society members to investigate the site, taking over the work which he was carrying out.

The site, Figure 1, lies on a fairly steep slope south-east of the Abbey, OS reference 691153. It corresponds with a site marked as 'Kennel' on the 1880 Ordnance Survey plan and to an area of about four acres shown on a map of Flaxley Estate believed to date from about 1790 (17) as 'furnace yard, buildings, together with workmen's houses and gardens'. Comparison with modern Ordnance Survey maps shows that the Estate map is highly accurate. The yard area is now largely covered by post-war conifer planting and remains, if any, could be deeply buried as was found at the Abbey Tintern site. (18)

Unlike some other furnace sites the visible remains at Flaxley were not identifiable as specific buildings, perhaps a confirmation of Nicholas' record of the demolition of the furnace. All that was visible were fragments of walls and some masonry pillars (Figure 2). Walking the site yielded plentiful evidence of charcoal, green slag typical of charcoal furnaces, bear material (a mixture of metal, slag and charcoal) roof tiles, both stone and clay and stone furnace lining. Tree growth and other environment changes have made it difficult to identify the remains which Townley recorded. The exposed masonry pillars were recognisably of two types, rectangular and square. Dimensions of the rectangular pillars were about 2 ft. x 4 ft. 6 in. and those of the square form about 3 ft. side. The rectangular pillars which formed a line were shallow structures unlike the square examples. Some of the square pillars showed evidence of repairs or rebuilding using poorer quality materials such as rough stone and brick in contrast to the faced masonry at lower levels. The crossover in alignment of the two types suggests that they represent different functions or more probably different phases in the furnace operation. The square pillars are considered to be supports for some form of wooden launder which had carried the water supply for the wheel, similar to those recovered at Abbey Tintern Furnace. (18) The function of the rectangular pillars remains obscure.

When actual excavation started it was soon evident from the topography of the site and the available work-force that the standard technique of layer-by-layer exposure of the site would not be possible in a practical time-scale and the decision was taken to concentrate on tracing the water supply, as this should lead to the wheel-pit and thence the site of the actual furnace.

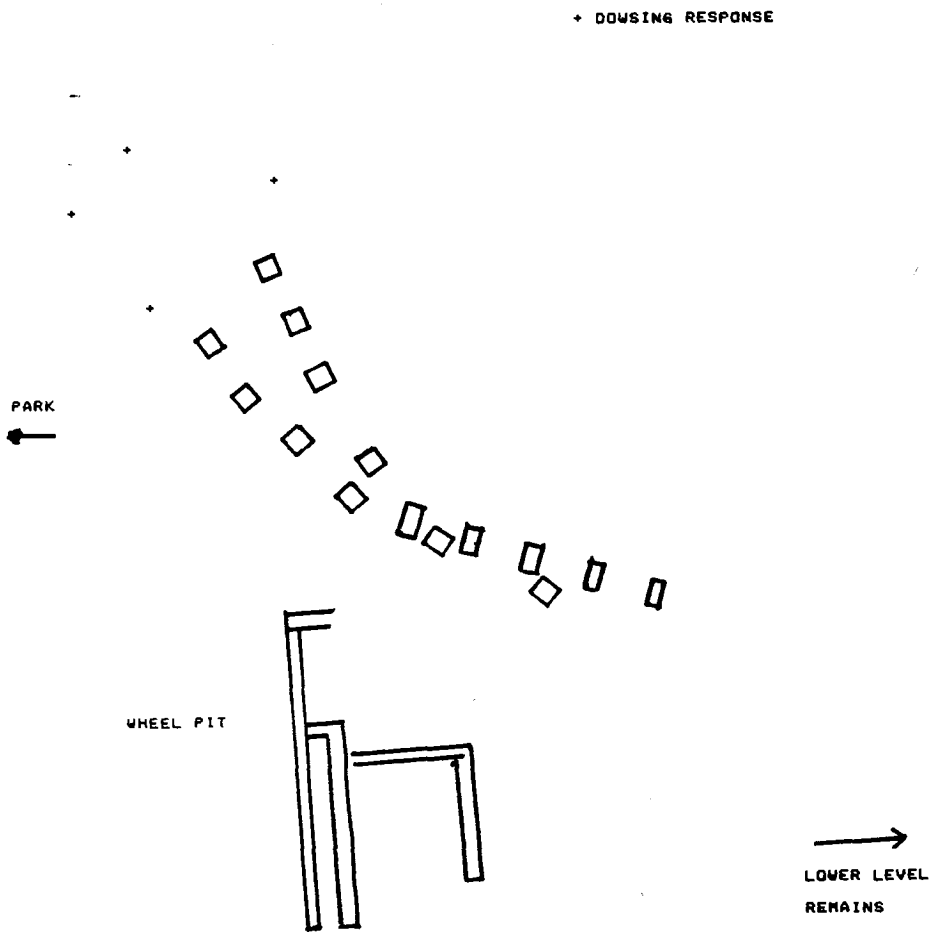

Fig. 2 LAYOUT OF PILLARS AND WHEEL PIT

Examination of the area showed no obvious source of water sufficient to supply the needs of a large wheel but a possible course for a leat running east and north of the Abbey could be identified following the ground contours. This led to a millpond, now filled in, at the Home Farm which is shown on the O.S. map as being fed by a 'drain' from a point higher up Westbury Brook. The map also shows a fragment of drain north-east of the Abbey which would be on a favourable alignment for the projected leat.

A trial section was dug to investigate the large gulley in the park; this uncovered large amounts of modern rubbish and evidence for an old ground surface sloping downwards towards the wood edge and the area of exposed remains but digging was abandoned when the depth became too great for safety.

Field walking along the route showed a dip in the ground under the avenue of the trees east of the Abbey, on the anticipated line. Two small exposures of masonry were found and excavation exposed a covered stone-built culvert crossing the avenue. Damage to the roof was noted at two places and these could be related to the route of an old track which formerly crossed the park. The end nearer the furnace site had been partially blocked by upright stones and a modern earthenware pipe field drain led out from the culvert. Further evidence for the existence of a leat on the line projected was obtained through the services of a dowser, who surveyed the park and found, among other lines, strong indications of a watercourse following the contours linking the culvert with the pillars at the main site. A trial section was dug at a point indicated by the dowser and a shaped clay bed was revealed at the depth predicted. The dowser had predicted two water courses and penetration of the clay bed revealed a piped land drain presumed to be a continuation of that found at the culvert.

The culvert has not been dated and could be later than the furnace operating period but the existence of the culvert implies the presence of a stream and the only logical reason for a stream in this place and direction would be to supply water to the area of the furnace.

Indications obtained by the dowser closer to the furnace site suggested that the leat had split into two as it approached the edge of the wooded area, although there was of course no indication if the two courses had been contemporary. Traces of the water were lost as the edge of the wood was approached; taken in conjunction with the fall of the old ground surface found in the gulley section and the nearness to the lines of square pillars this suggests that the leat in this area changed to an elevated launder.

A levelling survey has been made which shows that the relation between the bed of the culvert and the present tops of the pillars is such as to permit a fall of a foot or two across the

park area, so that there is no apparent difficulty here and it is reasonable to assume that the general lines of water supply to the wheel have been defined.

Within the wooded area there were very faint indications of a possible watercourse route which could have been a tail-race; this followed a line back to a known culvert through which ground water still flows, discharging into works above the site of the forge which existed on the brook. Rudge (15) records that the water 'after flowing through the works discharges into a large basin below the house'. The Estate Map shows a pond in this region, traces of which are still visible. A fragment of wall was visible on the upper part of this line and excavations were started in this region. This uncovered a short length of stone-lined drain about 6 inches wide and deep, which had been blocked off at its lower end and had no visible relation to any feature at its upper end. At this point further lines of rough stonework were revealed about 4 feet apart following the projected line downhill for about twenty feet, strongly suggestive of a wheel pit (Figure 3).

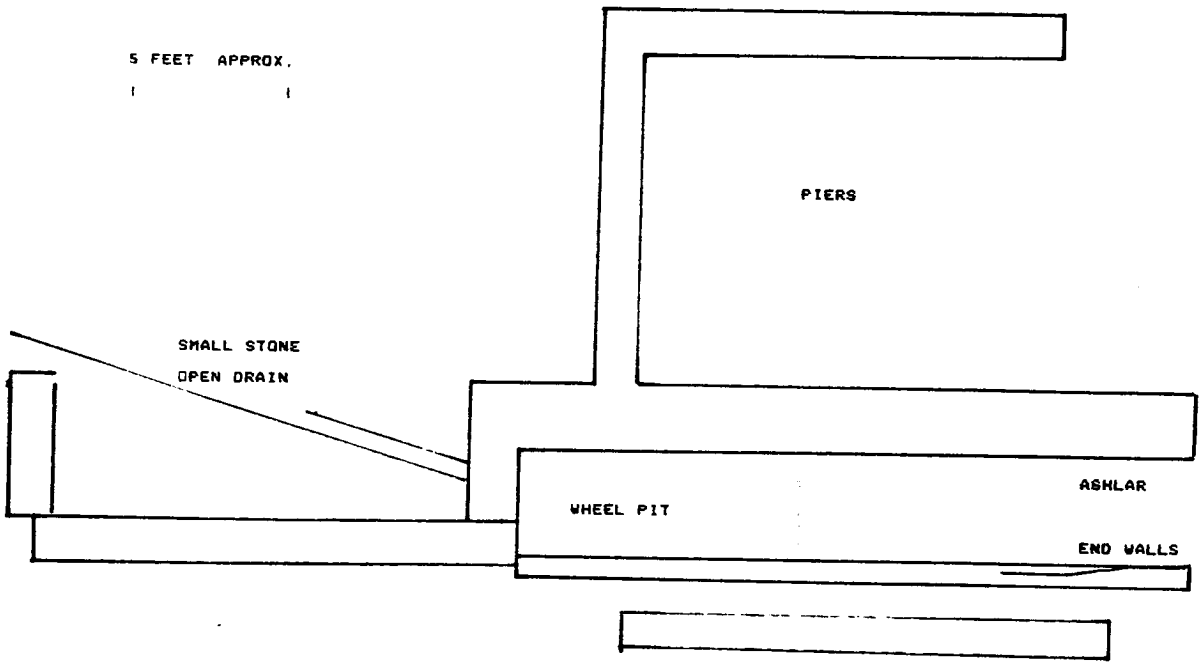

Fig. 3 WHEEL PIT AREA

At the upstream end the supposed pit was closed by a wall of dressed stone masonry which turned into a concave slope as it continued downwards. Some worked stone was also found on the sides of the pit at this end but it is probable that robbing had taken place.

Explorations beyond the sides of the pit revealed wall lines on the side remote from the main leat. It was tempting to identify these with the bellows house for the furnace but as the work progressed it was found that the area defined by the walls was too small. The width was about eleven feet whereas in order to fit the usual size of furnace found in the Forest area it would need to have been twenty to twenty-four feet. As this area was cleared roof tiles were found in a layer of debris which suggested remains of collapsed wall and roof structures; below this level a layer of soft whitish plaster was found and there was evidence that the walls had been 'whitewashed'. Under this layer were three masonry piers which suggested supports for a wheel axle and associated machinery; there were also deposits of a hard material which contained finely crushed slag and possibly some form of cement. Interpretation of this area suggests some form of slag-crushing although this may not have been contemporary with the furnace. The presence of an outer wall adjacent to the wheel pit could be taken to show that the pit was inside a building, as has been suggested at Rockley Furnace in South Yorkshire. (19)

The downstream end of the wheel pit was excavated to a depth of about five feet uncovering walls of squared masonry in contrast to the rough stone of other parts. There was no evidence in the exposed ends to suggest that they were anything other than the original finished faces of the structure and they gave a width for the pit of three feet.

This phase of the work provided strong evidence to support the idea of a water supply carried by a leat from the area of the Home Farm but gave no information which would help to locate the furnace proper.

Small sections did not give any indication of structures on the other side of the wheel pit area and this would seem an improbable place for a furnace since it would be cut off from the rest of the site by water supply routes. Rudge, (15) refers to the 'wheels which work the bellows and hammers'. This could be read as applying to hammers at the forges situated on the actual course of Westbury Brook or to hammers used in ore-crushing operations at the furnace site. In the light of these records and of findings in the area of the recovered wheel-pit, the apparent presence of two distinct routes for water on the evidence of the dowsing results and the pillar alignments, there was a strong case for considering that another wheel-pit existed.

A trial trench at the level of the access track exposed a cement floor edged with brickwork; local information identified this as the remains of the kennels which had been demolished in recent times. Following this floor level back into the wooded bank revealed massive masonry, probably part of a wall running transversely to the trench (Figure 4). Through the kindness of Mr Watkins a mechanical digger was brought in to remove as much of the bank as was considered safe, using the kennel floor as a guide to depth of excavation. This digging led to the recovery of a long section of transverse wall footings, two to three feet in thickness. Construction of this feature showed several variations along the length exposed although there were no gaps. Two distinct drainage channels were found, a covered system and an open drain; at one point this was spanned by a rough stone bridge-like structure. This could not be related to any other feature and its function other than as a simple means of access could not be determined. The covered system turned through a right angle to discharge into a channel below the kennel floor.

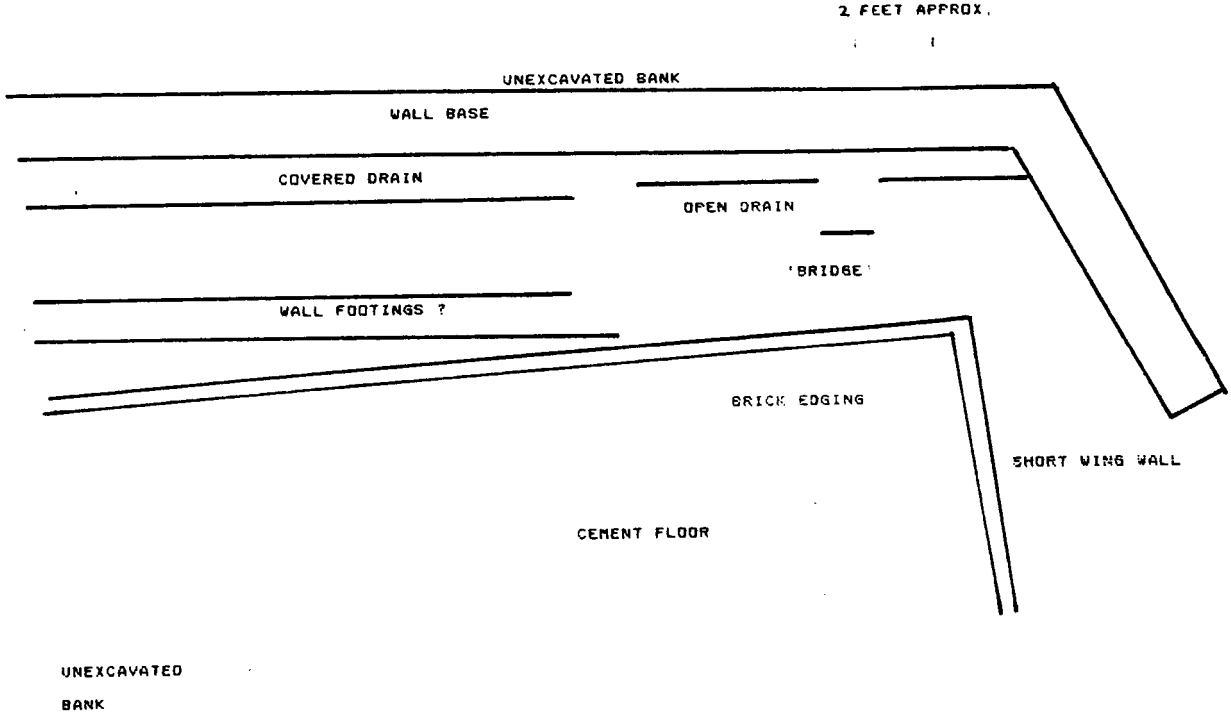

Fig. 4 LOW LEVEL REMAINS BELOW KENNEL FLOOR LEVEL

In front of this covered drain more stonework was found extending below the kennel floor but it has not been completely excavated or identified. Beyond the kennel floor an area of sand was found in a trial pit, together with fragments of iron which may indicate the presence of a casting floor but further investigation was not possible due to the extent of the overburden of soil in the area.

There should be a large charcoal house on the site since production figures of twenty tons of iron per week suggest a weekly charcoal consumption of the order of 100 tons. The 1790 estate map also refers to workers houses and gardens in the area and these may have left traces under the woods. Early work had revealed the outline of a rough building but the remains are of thin rough walls and stonework underlying these features at some points suggest that they belong to a late or even post-furnace period.

It is unfortunate that circumstance have compelled the team to discontinue their work although there is ample evidence to show that the site would repay much more extensive excavation. If the trees are ever cleared it would be possible for a mechanical digger, carefully handled, to remove much of the overburden of soil using features so far recovered as guidelines and perhaps reveal extensive structures.

Acknowledgements

Grateful thanks are due to Mr Watkins for allowing the Society to work the site and for his co-operation throughout. Thanks are also due to the late Graham Curzon for initiating and organising the work and to Mrs M. Lewis for devoted work over the entire period of the excavation and to Mr G. Bannister who joined the work in recent years. There have been valuable contributions from a number of individuals whose names sadly are not on record. To them we extend both apologies and thanks.

References

1 Townley, W.H., & Mansfield, R.J., April 1974, Industrial sites in the Vale of Castiard, Gloucestershire Community Council Publication.

2 Scott Garett,C., 1956, Trans Bristol and Gloucestershire Archaeological Society, Vol 75 pp199.

3 Atkyns, Sir R., 1712, The Ancient and Present State of Gloucestershire.

4 Crawley-Boevey, A.W., 1887, The Cartulary of Flaxley Abbey, pp16.

5 Nicholls, H.G., 1858, Forest of Dean, David and Charles reprint, pp16.

6 Nicholls, H.G., 1966 (reprint), Iron Making in the Olden Times in the Forest of Dean, David and Charles, pp11.

7 GRO D4543/2/2/1.

8 Crawley-Boevey, A.W., op. cit. p32.

9 Crawley-Boevey, A.W., op. cit. p34.

10 Nicholls, H.G., 1858, Forest of Dean, pp52.

11 Nicholls, H.G., 1966 (reprint), Iron Making in the Olden Times in the Forest of Dean, pp11.

12 Schubert, H.R., 1957, History of the British Iron and Steel Industry, pp375.

13 Hart, C., 1971, The Industrial History of Dean, pp81.

14 Crawley-Boevey, A.W., op. cit. pp34.

15 Rudge, A History of Gloucestershire, pp66.

16 Schubert, H.R., op. cit. pp358.

17 GRO Film MF285.

18 Pickin, J., 1982, Journal of Historical Metallurgy, Vol 16 (2) pp1 and vol 17 (2).

19 Crossley, D.W., 1978, Rockley Furnace Excavations, Dept of Economic and Social History, Sheffield University.