

## REMNANTS OF NEWENT FURNACE

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The charcoal blast-furnaces of West Gloucestershire were of national importance in the 17th and 18th centuries. They included Cannop, Bishopswood, Lydbrook, Parkend, Linton, Longhope, Flaxley, Gunn's Mill, and Newent, the latter being just north of the town and known also as Elmbridge, Ellbridge, or Oxenhall furnace.

Of some 16 sites, only the furnace at Gunn's Mill survives more or less intact, and in view of the heavy task of demolishing such massive structures, it might almost be supposed that their early removal reflected some overall strategy. At all events, little enough now stands. (1).

The surviving buildings at Newent are therefore of particular interest, but the difficulties in assembling a true picture may be likened to a jigsaw with vital pieces missing, and others added from a different puzzle altogether.

Archival evidence reveals the furnace's unusual beginnings. A document of 1647 refers to "Ellbridge Mill (a corn-mill) part of which is now converted into a furnace for making iron". (2). The Foley family acquired an interest in 1658, and in 1688 an indenture mentioned the "furnace of Newent --- and the Steelwork and Mill to the said Furnace adjoining". (3). Thus by this time the works were of some extent.

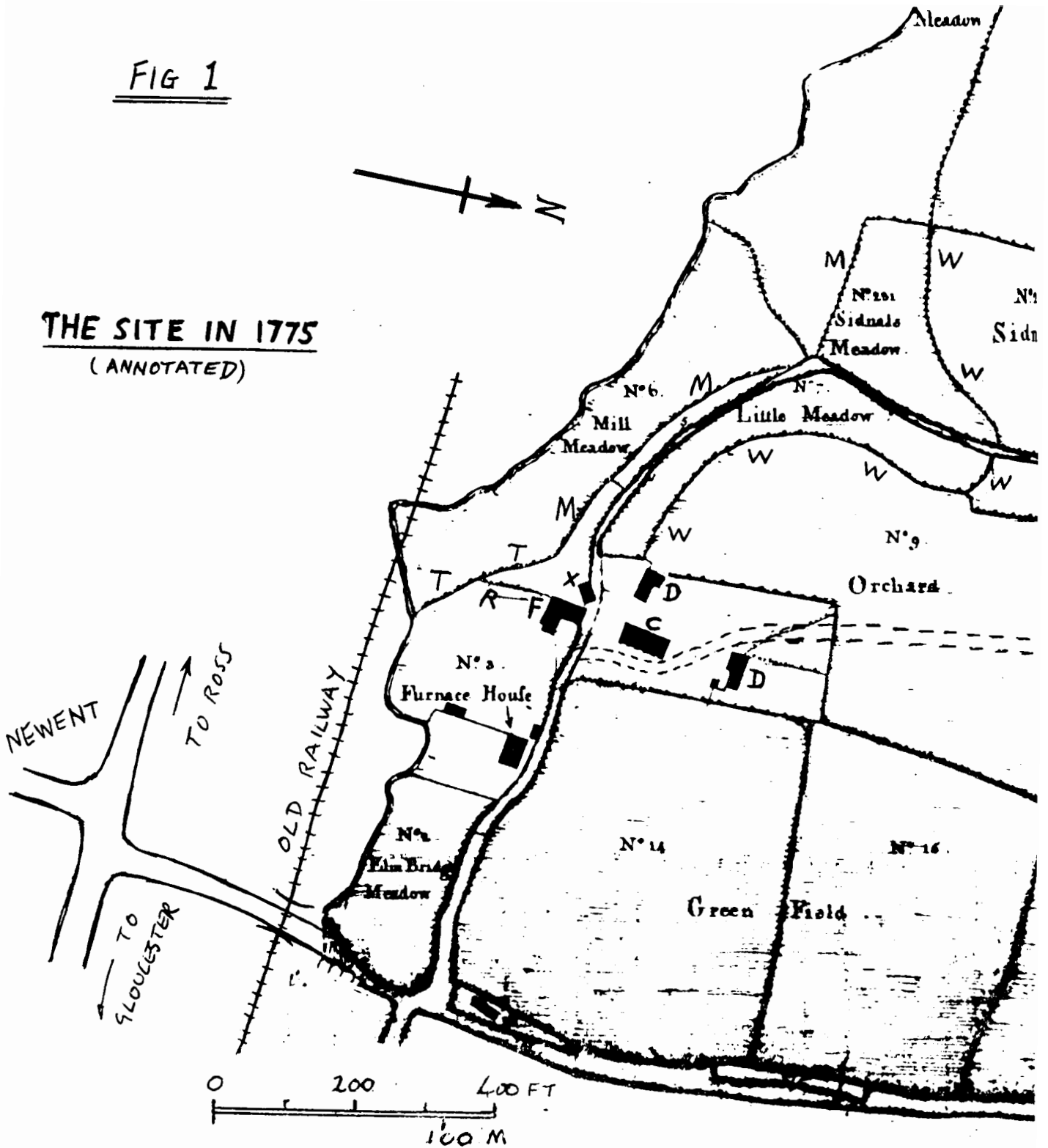
Water for the bellows came from a large pond half a mile to the north-east which now serves for agriculture. Three big storage reservoirs were built at Gorsley and supplied the pond by a leat<sup>(4)</sup>. The end of Newent furnace is as clouded as its origin, but certainly came after 1751 (5). It is marked on Taylor's map of 1777, but Rudder's 1779 history of Gloucestershire refers to it as "out of blast for some time".

The scale of the works can be gauged from an inventory of 1749 (Hereford Record Office) which includes a casting room, stock-taker's room, clerk's house, also founders and stocktakers' houses.

The earliest plan or map (6) so far discovered (Fig.1) is dated 1775, to a scale of 3 chains/inch. At such a date we might expect the furnace to be shown, especially bearing in mind Rudder's implication of its existence when he wrote. Unfortunately the scale is small, and by comparison with buildings in the area still extant, errors come to light. The charcoal store C scales 68ft x 28ft, compared to approximate actual dimensions of 75ft x 34ft i.e., 10% low on the longer side, and more on the shorter.

FIG 1

THE SITE IN 1775  
(ANNOTATED)



The two buildings D,D, doubtless featured in the 1749 inventory. The L shaped building which now occupies the supposed site or close proximity of the furnace has given rise to speculation, and is the main concern of this account. Examination reveals major modifications, some carried out perhaps two centuries ago, presumably to convert for farm purposes. Additions to the

north end need not concern us. Of the brick and half-timbered upper storey, the side walls appear older than the infilled wall over the double-doors. However, that the upper storey survives as it was in 1840, can be confirmed by a painting (7). Incidentally, there is a remarkable resemblance to Gunn's Mill, as altered to its present form (8).

An unresolved question is whether or not the building is the same as the L shaped representation F on the 1775 plan. On casual scrutiny there could be little doubt, but on scaling the dimensions a much longer structure in the north-south axis is indicated. However, in view of the unreliable nature of the plan, it is safe only to deduce from this evidence alone, a strong probability rather than a certainty that the 1775 building was substantially longer than now. That we are talking of basically the same structure would seem definite, considering its obvious antiquity.

Difficulties are again encountered when the wing is considered. Inspection shows an "add on" construction to the main section, but whether before or after 1775 is hardly possible to decide. It is important to observe that the main section, which consists almost entirely of local yellow/grey Downton sandstone, apparently suffered partial demolition before the wing was built. This is borne out by the ragged, protruding and broken state of the walls, not only on the elevation where the wing abuts, but also on the south end, on either of the big double doors. The pillars of these, and the wall above, supported by a brick lintel are seen to be of later construction (see photograph). It should also be recorded that a post-hole recently dug against the south-west corner has revealed foundations extending a foot or more southerly, and again presenting the same ragged appearance, as though robbed of stone.

Altogether, it is tempting at this point to conclude that the furnace itself stood immediately south of the present building, and the heavy walls still extant at that end are its vestigial remains. There are also various further factors, some tending to support the theory, and others giving rise to doubt. The details are quoted below, as far as walls plastered and whitewashed in places, and the presence of farm machinery etc. will permit.

As can be gathered from Figs. 2 and 3, the ground floor of the main section is divided into two areas, the front (south) and the rear (9).

#### Front area

A buttress reaches to the ceiling with a pronounced batter in the south-west corner, and serves no purpose in the present structure. In the west wall faintly can be discerned an infilled aperture about 5 ft square without a lintel, also a circular hole nearly 4 ft diameter, which from the outside appears contemporary with the wall. There is a parallel buttress between the two, cut away in a segment to maintain the integrity of the hole. The timber flooring of the room above totals about 2 ft thick.

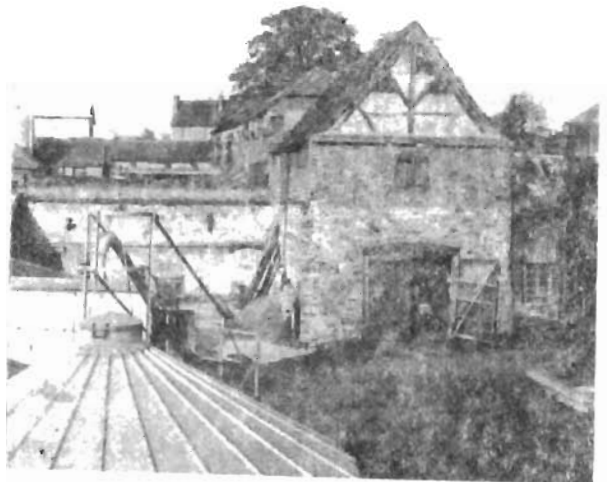
The eastern wall is almost 3 ft thick to a height of some 8 ft, then reducing by a step and revealing part of a fine circular arch. The remainder of this arch is seen from the rear area, to which it gives access from the wing. The arch is of a higher standard than the rest of the stonework. Two feet above the floor below the arch is a shelf or platform of stone, the length and extent of which cannot be gauged due to later brickwork and a higher level of floor on the other side. This shelf could have significance in relation to the circular hole opposite. (see later).

Rear area

This comprises a kind of cellar vault with brick roof of a type encountered in basements of old houses. The walls are several feet thick and it appears that each has been cut through to provide a window. Examination of the apertures so formed suggests that the arch is contemporary with the walls, and this is borne out by the manner in which the brickwork is carefully blended into the masonry associated with the arch. Nevertheless, there is a lingering doubt - see under the next paragraph. It is suspicious that the inner end of the vault is butted up against a stone wall, which itself stands proud of the parallel retaining wall outside. The stone wall contains a vent that comes out in the floor of a shed on the northern end of the upper storey. This may be a later addition.



1



2



3



1. The main building 1972. Note circular walled-up hole, perhaps for the waterwheel axle.

2. The main building and yard, charcoal store partially obscured.

3. The charcoal store from the south-west, 1972.

## Internal Division

This is partly masonry, completed by half-timbering. Where it stands whole, the masonry wall is 2 ft 3 in thick and appears contemporary with the west wall. It is now mainly only 6 ft high and the eastern end has been roughly broken away, probably when the half-timbered partition was built above it. The division curves round to make room for access from the wing to the rear area. The fact that the masonry wall would apparently have entered the archway is a peculiar feature, and takes some explaining. It seems to me not impossible, that both the arch and the vault are themselves additions to the original structure, though the purpose is obscure. The half-timbered division probably dates from the same period as the upper storey.

## West Elevation

This is visible from a large concreted area or yard, shortly to be covered by a farm building. The north side of the yard is bounded by a masonry retaining wall with little sign of holes or other features, equal in height to the stonework of the west wall. The two walls appear from the intersection to be contemporary.

The square and circular holes previously mentioned are low down at the southern end, and are largely obscured by building materials etc. There are signs of other apertures in this wall, now filled in.

In one respect, the 1775 plan is an embarrassment. The yard is not shown, but instead there is a small building X, which occupies a situation seemingly straddling the 15 ft retaining wall. This is quite unaccountable unless the yard is post-1775, which seems unlikely in view of its relationship with the west wall.

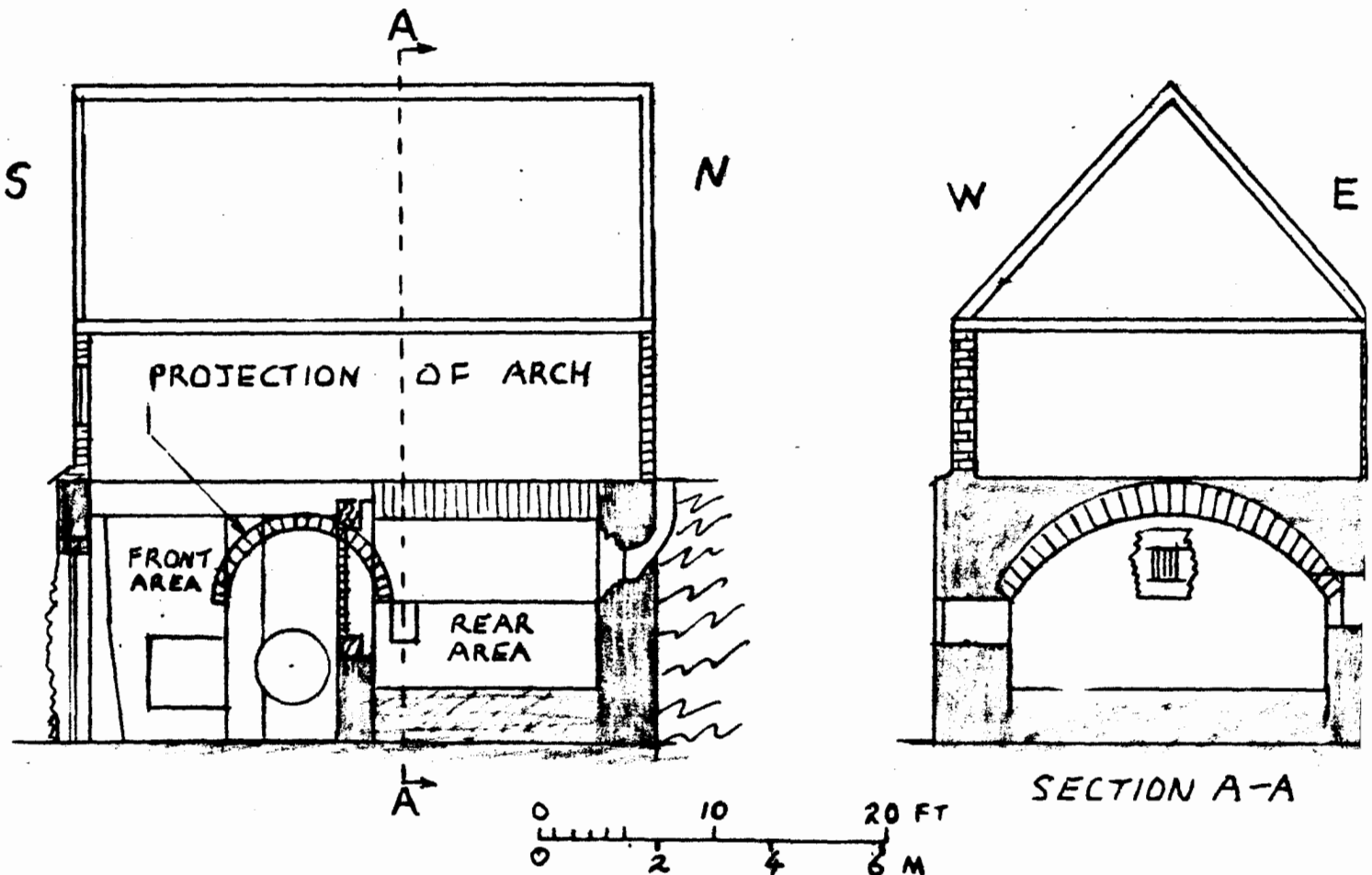
## Watercourse

Towards an understanding of the site, the height at which the water for the wheel entered is important to be ascertained. I have assumed the watercourse followed the sinuous field boundary W on the 1775 plan, and think this is virtually certain. The level corresponds more or less with the 35 metre contour and the top of the retaining wall. The fact that there is no opening in this wall may be taken as evidence that the launder, if it came into the yard area, did so at this level, at least.

The top of the retaining wall is nearly 11 ft above the centre of the circular hole, which might be supposed accommodated the bellows waterwheel axle. If so, a wheel diameter of 20 or 21 ft is implied, which is in the same order as the practice at Parkend, Cannop and Lydbrook furnaces, all built or re-built about the same time (1630s) with wheels of 22 or 23 ft (10).

Another important dimension is the level of the Ell Brook into which the tail-race discharged. According to a Dumpy-Level survey just carried out, the centreline of the circular hole is  $15\frac{1}{2}$  ft above water level. This is ample for a 20 ft diameter wheel, except perhaps in time of heavy flood. It would be interesting to know how other furnace sites compare in this respect.

FIG 3      SECTIONS THROUGH MAIN BUILDING



Slag Tip

Much grey-green slag occurs in the sub-soil around the site, and the generally higher area now occupied by battery-chicken units may be attributable to slag or debris, raising the ground surface above that of the valley floor. (11)

Charcoal Store

This splendid building is now in a delapidated condition. It is built of red sandstone, Downton sandstone and brick. The floor slopes, and its lower or exit end is several feet above the floor of the main building, upper storey.

Corn Mill

It might be anticipated that the 1630's cornmill was converted to employ its watercourse, wheel and perhaps the building itself for blowing the furnace. But such mills usually operated on small heads. Upstream, Crooke's Mill, demolished about 1900, had 8-10 ft head as can be deduced from its remnants; downstream, Cleeve Mill has 6 or 7 ft at most.

It is almost beyond a question, that to give the necessary power the watercourse for the furnace was newly constructed in conjunction with the pond, together with the wheel and appropriate buildings. Therefore, how the old mill could have been utilized at all, except for ancillary purposes, is hard to envisage.

Further clues are on the 1775 plan (Fig.1). There is marked "Mill Meadow", and the field boundary M running parallel to the watercourse W is highly suspicious, although the significance did not strike me until this account was virtually completed. The boundary could denote the original mill leat; it is just where it would be expected and offers to explain the peculiar thin slice of land between Mill Meadow and the lane. (This part of the lane was abandoned before 1842, it subsequently taking the route shown by the dotted lines on Fig.1).

On the ground we find definite evidence of the leat, 6 ft wide in one place, on a ridge or shelf of land extending about 100 yds in length. There are also possible traces 450- 550 yds west of building F, just above the brook. TT or TR being on a low level, could denote the tail-race. If the former, the corn-mill and hence the furnace stood at the intersection of TT and MM. This would also account for the field boundary (watercourse) W turning south at its end, but offers no solution to the building X, hanging so to speak, in mid-air (see under West Elevation). The theory is not without attraction, but if valid, means that not a trace of the furnace now remains, unless part of the mill did extend to include the building F.

At all events, the probability of MM following the course of the corn-mill leat of 350 years ago must be very great.

#### Interpretation of Building

Turning now to the tentative hypothesis expressed earlier, if the furnace stood immediately against the southern end of the present building, the front area could have housed the bellows, with the twyers being just outside the site of the double-doors, and the wheel alongside the west wall (12). However, it could be argued that this wall bears no tell-tale witness of a wheel, such as water erosion or circular scratches often encountered elsewhere. Perhaps the wheel stood a little distance away. The casting shed could have occupied the wing on the 1775 plan though it appears rather small for the purpose. A timber roof to the front area is in keeping with timber bridges at Cannop, Lydbrook and Parkend (10).

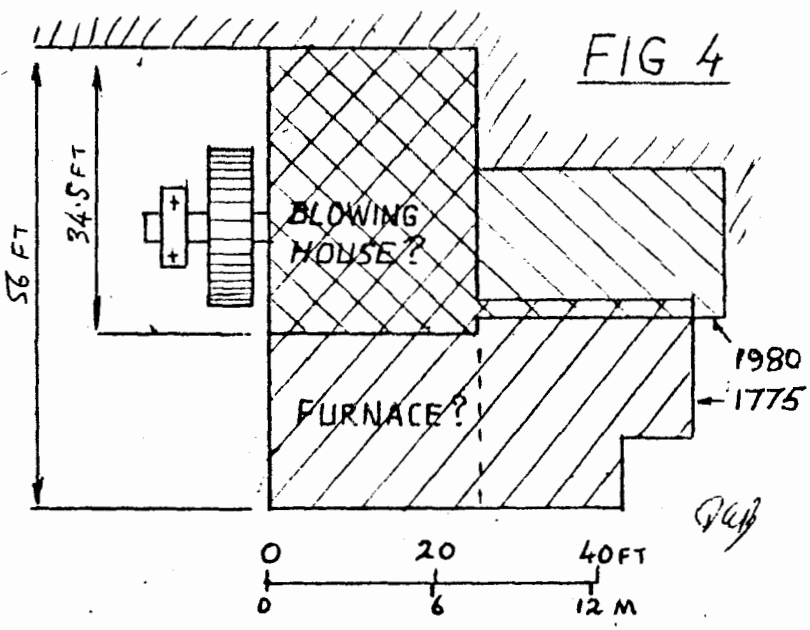
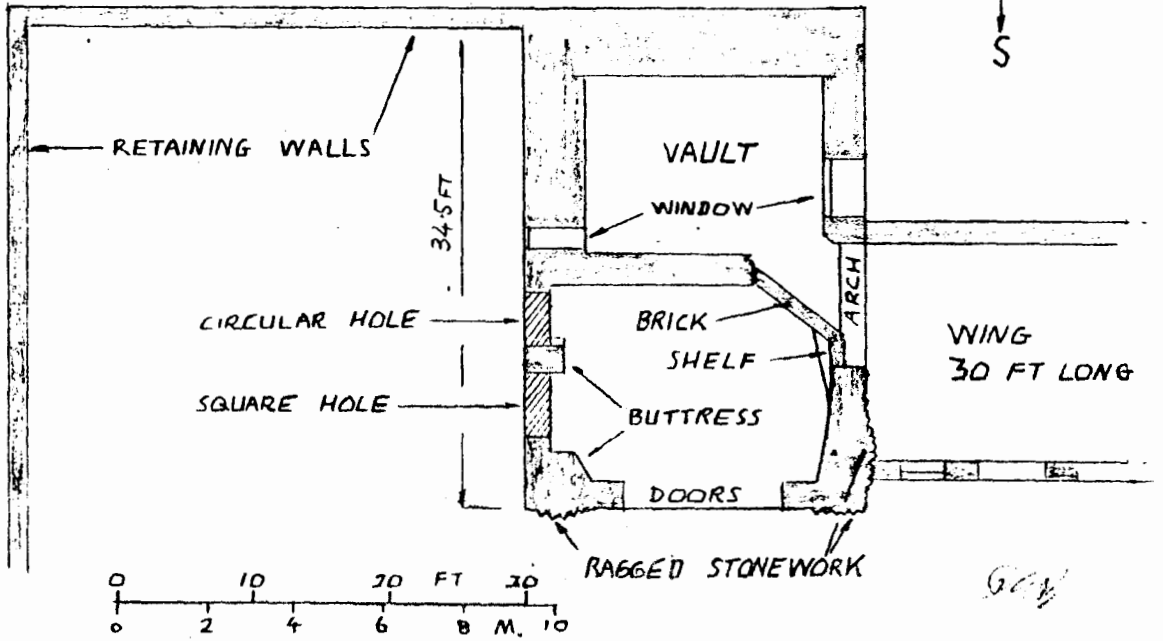
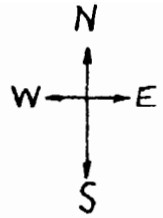
In the front area, the shelf on the eastern side might have taken the cam-axle pedestal bearing. The proximity of the masonry wall (dividing wall) is difficult to explain, leaving little clearance for the axle and cams. Perhaps it supported the lever fulcrums. However, this configuration fails to explain the ragged wall on the east side, and the arch.

Furthermore, the masonry (15 ft) is too low to correspond to the furnace top, which must have been 20 ft high or more. Possibly the structure was lowered for farm conversion. We may of course be witnessing the remnants of the "steelwork and mill", and not the furnace at all.

The conjectured layout is shown in Fig.4. It includes the present ground plan, and the 1775 outline which has been scaled up by 8% so that the widths co-incide, as they must. (We have already seen that this adjustment is in the same order as that necessary to correct the charcoal store). The overall length of

FIG 2

PLAN OF SITE





The overall length of the main building then proves to be 56 ft, or 21.5 ft longer than at present.

### Concluding Remarks

I have set out primarily to record the visible remains of the site of Newent Furnace, as seen through the eyes of an engineer, rather than an architect or historical metallurgist. I have also put forward a possible interpretation, admittedly somewhat lacking in conviction, but sufficient perhaps, to stimulate the thoughts of others. The task has proved full of interest and surprise from beginning to end, and a site more worthy of attention would be hard to find.

### References

1. The Flaxley site is undergoing excavation by Graham Curzon. In conversation with Professor R.B. Peel recently, I was surprised to learn that charcoal blast furnaces are still extensively employed in Brazil, producing millions of tons of iron annually.
2. For further historical and economic details, see B.L.C. Johnson, New Light on the Iron Industry of the Forest of Dean Trans B & G A S 1953, also R. Stiles Elmbridge Furnace Gloucestershire Historical Studies V, 1971.
3. G.R.O. D2184.
4. D.E. Bick, The Oxenhall Branch of the Hereford & Gloucester Canal GSIA Journal 1972.
5. See B.L.C. Johnson, also H.R. Schubert, History of the British Iron and Steel Industry from C 450 BC. to A.D. 1775. 374, 382. For some reason, Schubert treats Elmbridge and Newent as separate furnaces.
6. Foley Estate Map GRO. D603 To compare this map (26.6 inch/mile) with the 1st edition 25 inch Ordnance is an illuminating study of rural change between 1775 and 1885.
7. Reproduced in J. Douglas, Historical Notes on Newent and District 1912.
8. C.E. Hart, The Industrial History of Dean Plate 7.
9. For a comparison with plans of Gunn's Mill, see B.V. Cave Mill Sites on the Longhope, Flaxley and Westbury Streams GSIA Journal 1974.
10. Hart, Chapter 1: Schubert, Appendix X11.
11. Several long forgotten sources in the Newent area provided iron-ore for the furnace. I intend to cover this aspect in a future publication.
12. See Hart, Fig. 5, p 66, for a reconstructed plan of a charcoal blast furnace (after G.R. Morton). A similarity will be apparent in the general layout.

### Acknowledgments

The survey could not have been undertaken without the helpful co-operation of Mr. & Mrs. Goulding of Oakdale, and Mr. Heath of Furnace Farm. My constant probings and requests for access to various parts of the site have met with every courtesy, and my thanks are due to them all.

I am also grateful to the staff of Gloucester and Hereford Record Offices for assistance willingly rendered.