EXCAVATIONS AT THE MINNINGLOW BRICKWORKS, ROYSTONE GRANGE: 1981-86

By Simon Probert

INTRODUCTION

The post-medieval landscape at Roystone Grange is particularly rich in archaeological remains. Lead-working, stone-quarrying, and the intensification of farming in the early-nineteenth century have all left their imprint. The building of the High Peak Railway in the 1820s stimulated still further activities, of which brick-making was one of the most important. Silica sands occurring at the interface between the carboniferous and dolomitised carboniferous limestone were discovered to be fine refractory material. Bricks of this material were ideal for furnaces and, as a result, integral to the expansion of industry in the towns around the fringes of the Peak District. Bricks were, moreover, needed to build the houses in which the fast-expanding Victorian workforce had to be accommodated. The Minninglow brickworks, therefore, like those others strung along the High Peak railway as it crossed the White Peak, were typical of the region at this time.

No exact dates are known for the Minninglow brickworks. The works do not appear on the Geological Survey of 1840, but are recorded as being in operation on the Ordnance Survey map of 1899, and as disused on the edition published in 1910. The works, it seems, belong to the second half of the nineteenth century. *Kelly's Directory of Derbyshire* for 1886, 1891, 1895 and 1899 includes a reference to the "High Peak Silica Company", which was operating in the parishes of Ballidon and Parwich. Whether the company was interested in both sand exploitation and brick-production is not clear. The proprietors of this company, according to Bulmer (1895), were Thomas Wragg and Sons, of Burton-on-Trent. The same edition of Bulmer also records that Mr Herbert Biggin, of Elton, was the works' manager.

THE SITE

The brickworks cover an area of about 0.3 hectares, and are situated beside the Cromford and High Peak Railway (now the High Peak Trail), 1.2 kilometres east of Roystone Grange Farm and a little under one kilometre south of Minninglow Grange, at a point where Gallowlow Lane, a medieval track-way, meets the railway. Sand was in fact quarried about 600 metres to the west, and brought up Gallowlow Lane to the works (Fig.1).

A survey of the works, aided by the outline given on the Ordnance Survey map of 1899, has enabled identification of its principal features (Fig.1). Two kilns (A and B) lay in the extreme south of the compound, furthest from the lane. Immediately north of these were two rectangular buildings (C and D). The western building contained two parts: a rectangular northern section, and in the south a smaller room (E), in which there was a pit, measuring 3.0 x 3.0 metres. Another building (F) was located towards the northern end of the complex, beside which lay a stone-lined pond (G). The entire compound had been constructed upon a terrace stretching out from the railway; on its east side, a platform (H) also served as the base of the east wall of Building D.

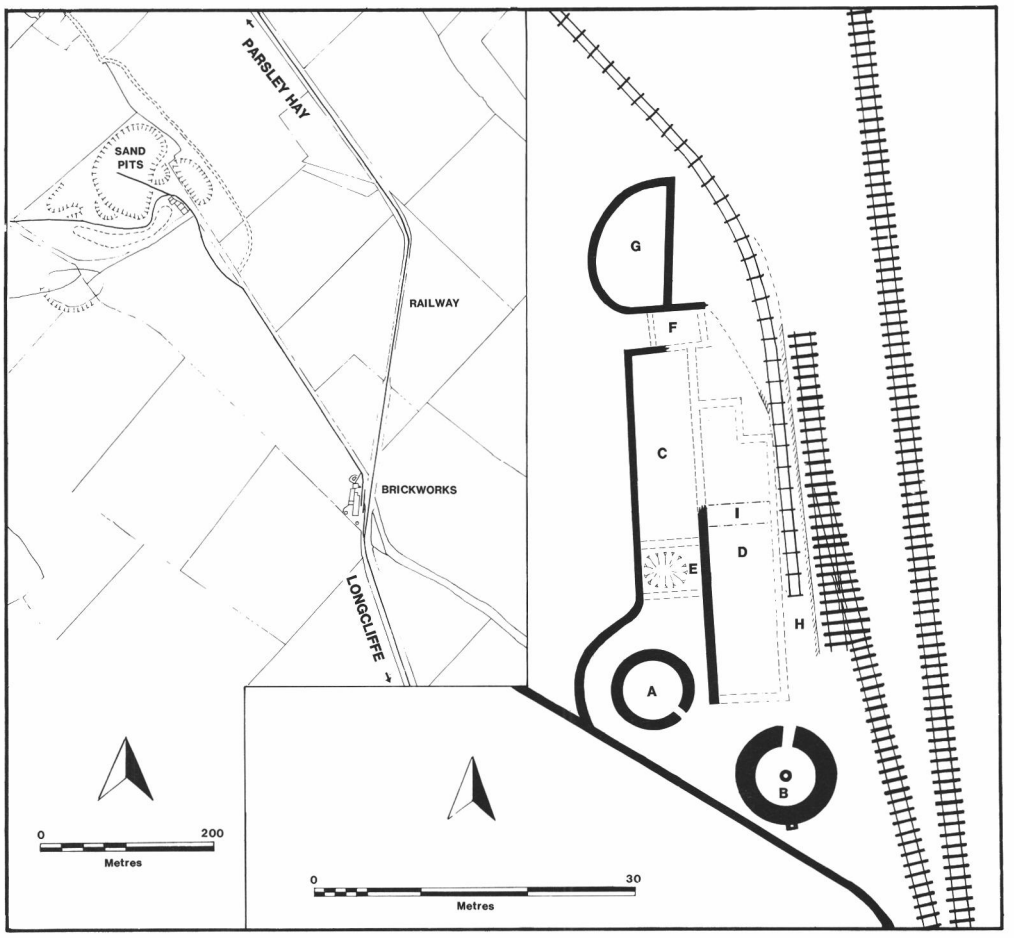

Fig. 1 Minninglow Brickworks: general plan of the works and sand pits,beside the High Peak Railway

THE EXCAVATIONS

The excavation of the works took place from 1981 to 1986, as part of the Roystone Grange Project. The two kilns (A and B) were fully exposed, and a cutting was made through Building D.

THE KILNS

Kiln A appears to have preceded Kiln B. Five periods were identified in their operation, as follows:

Phase 1. Kiln A was constructed with an outer shell of shaped gritstone blocks with an inner skin of brick, and with brick-built flues and a brick floor. The overall diameter was 7.8 metres, with a firing area of 5.3 metres served, in its later phases, by ten flues. Only two features relating to the first phase of operation were found: the brick-built chimney base on the southern margin of the kiln; and the circular flue in the centre of the firing area. These suggest a kiln *c.*7.8 metres in outside diameter, which began as a downdraught type.

The downdraught kiln is characterised by its complex circulation. Air is drawn into the kiln through fires, rises, and is then drawn back down through the centre of the firing area, to exit via an underfloor conduit and external chimney. This process was considered more efficient than

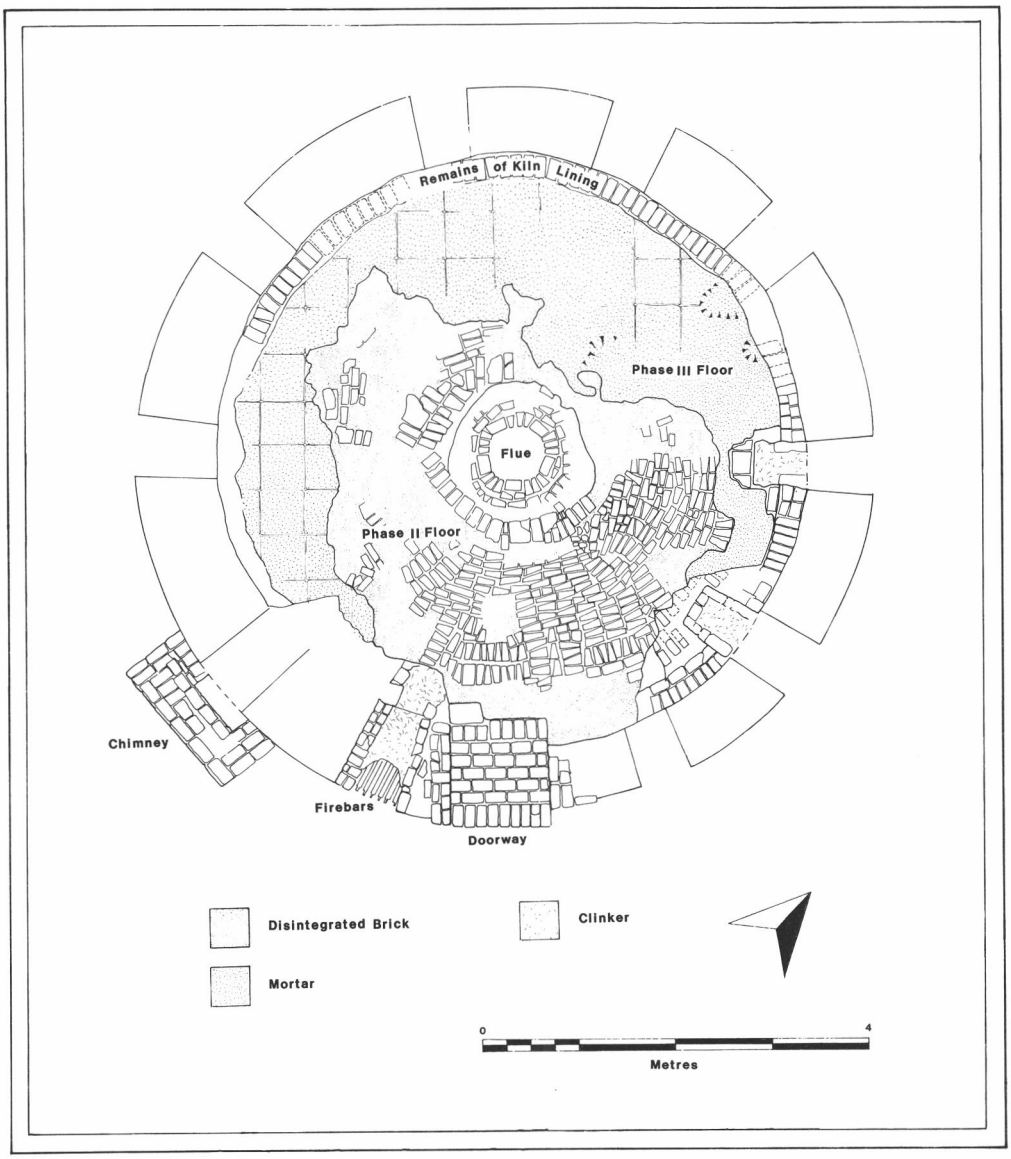

Fig. 2 Minninglow Brickworks: plan of Kiln A

the updraughting system because the improved circulation of hot air led to a more even firing of the product.

No indication of either the diameter of the firing area or the number of flues was found. The wedge-shaped furnace bricks used in the later (Phase 2) floor are probably from the lining of this first phase. They do not resemble any other bricks used for lining the kilns, which prompts the suggestion that they were specially imported for the construction of the first phase of Kiln A.

Phase 2. After Phase 1, Kiln A was demolished to floor level, and the chimney and central flue

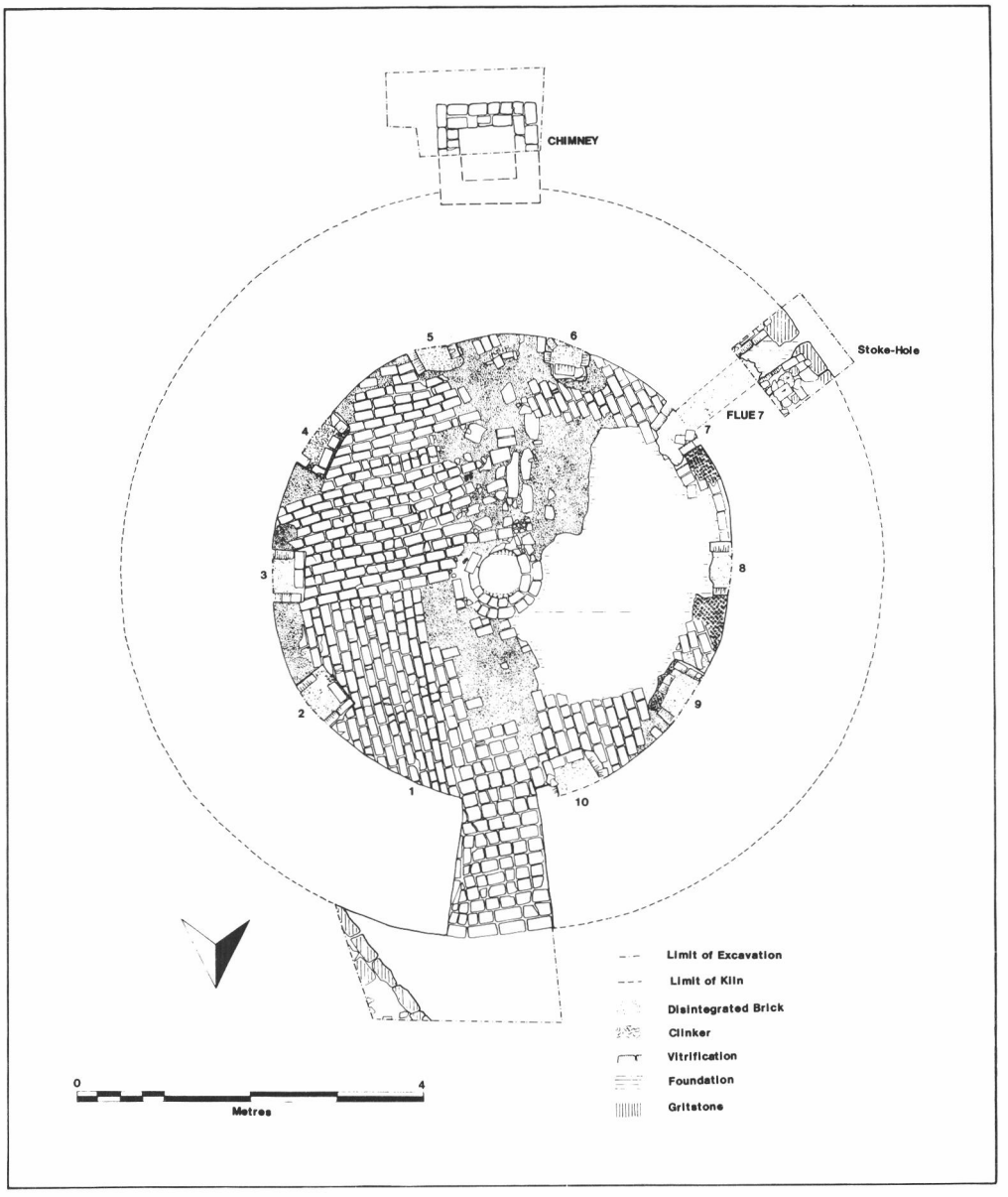

Fig. 3 Minninglow Brickworks: plan of Kiln B

were filled with rubble. A new, simpler, updraught kiln was constructed, with an outer gritstone skin. During Phase 2, Kiln A had a firing area of 5.3 metres. Air was heated in ten flues, and was vented through the roof. The interior skin of the Phase 1 wall was stripped away, and the best bricks were used to re-surface the floor of the firing area. The new lining consisted of yellowish, standard size (23.0 x 12.0 x 10.0 cms) frogless bricks.

Phase 3. The lining of Kiln A was again replaced (Fig.2). The floor level was raised by about 12.0 cms, with the addition of large brick blocks set in a yellowish grey mortar; and the firing

12.0 cms, with the addition of large brick blocks set in a yellowish grey mortar; and the firing area was extended from 5.3 metres to 5.6 metres by removing some of the rubble core in the wall of the kiln. Finally, a woven steel band was cramped and bolted around the entire kiln, which suggests that the kiln had been weakened by the enlargement of the furnace area. (It is likely that the paring of its walls also led to a reduction of the kiln's heat retaining properties, making it generally less efficient.)

Phase 4. Kiln A was stripped of its lining and much of its floor, almost certainly to provide material for the construction of a new kiln, B, alongside. Kiln B resembles its predecessor insofar as it had a similar sized firing area. However, it was built with thicker walls, and thus a greater capacity for retaining heat. As in the case of Kiln A, a downdraught arrangement, with the external chimney on the southern margin, preceded an updraught one.

Phase 5. Kiln B was transformed from a downdraught to an updraught type (Fig.3). The central underfloor conduit was blocked with rubble,as was the external chimney. Presumably a central chimney was built. In addition, the entrance into the kiln was widened, and given its present wedge shape. (This alteration halved the width of Flue 1.) Some of the earlier flooring blocks were also removed, trimmed to approximately half their size, and then used to support the fire bars in the ten flues.

To judge from the great sheet of vitrification covering the inner wall on its south side, Kiln B was abandoned after it had been damaged by an uneven heat, possibly caused by the strong, gusting winds on the hillside.

BUILDING D

A trial trench, XXXI, measuring 9.0 x 2.0 metres, was dug in order to discover some clue as to the function of Building D. In it were found the traces of parallel, brick-built walls, running north-south. From such a small excavation it is difficult to draw an accurate conclusion, but it is tempting to interpret these walls as the bases of a drying platform: in other words, Building D may have been used as a drying shed.

FINDS

Only broken bricks, a few pieces of coal, the steel fire bars used in the kilns, and the large woven band holding Kiln B together, were found in the course of the excavations. No pottery, glass or other materials were discovered, which suggests that either the working areas were kept clean, or the use of such material was confined to areas not excavated.

DISCUSSION

The product

Kilns A and B were fired periodically rather than continuously. The kilns were loaded, fired and left to cool over a period of about ten days. The firing area in each kiln suggests a capacity of 10,000-12,000 standard sized bricks. If there were three firings a month, we might estimate an output in excess of 30,000, and hence an annual output of nearly 400,000 bricks.

Though only the standard sized, frogless brick was stamped by the company (with the signature HPSC), several types of brick may have been produced in the yard. Indeed, both kilns were probably constructed from variants of the local product: it is unlikely that the company felt it worthwhile to stamp bricks used for these purposes. However, as a result the product remains enigmatic.

Wasters were probably used to repair the yard or the railway, while the rest were dispatched by railway to neighbouring towns. A few bricks were, nonetheless, used to build the piers

supporting the eastern barns in Roystone Grange Farm. (These may, of course, have been robbed at some later date from the abandoned kilns.)

The kilns

Both kilns began as downdraught types, but were subsequently converted to be updraught ones. It is not difficult to appreciate why this happened in the case of Kiln A, but it is altogether curious as to why the pattern was repeated in respect of Kiln B. Downdraughting may have been intended to ensure an even firing within the kiln, and to minimise the number of wasters, but presumably the exposed situation of the works and the frequency of the strong winds necessitated the alterations. In their later phases, both kilns had ten stokeholes and downdraught chimneys located on their southern sides. However, Kiln A had an entrance on its south-east side, while that of Kiln B was on the north. The works' manager may have hoped that, by altering the position of the entrance in the later kiln, he could return to the use of the downdraught type which had been unsuccessful in Kiln A.

The works in the local economy

The sequence of alterations to Kiln A shows that the company was responding to the needs of a growing market, but preferred at one stage to bind the kiln together with a large steel band rather than invest in a new one. In sum, the operation appears to have been on a small scale, possibly with a narrow profit margin. Woodforde (1976: 98) notes that a good brick-moulder could produce 2,000 bricks a day. On this basis, it would have required fifteen man-days to have made a kiln load for either of the Minninglow kilns. If there was only a single moulder available, each of the kilns could have been fired only every two to three weeks, whereas a significantly higher output was probably needed to overcome the relatively high transport costs. Hence we are entitled to conjecture that there were at least two moulders working, to produce batches for firing every ten days or so. In addition to these men there would have been those employed as diggers in the sand-pit, as carters from the sand-pit to the works, and as labourers in the various firing and stacking operations. A workforce of ten or more persons may be considered to have been fairly high for such a small output, and must have been vulnerable to the increased productivity created by the introduction of brick-making machinery in the late Victorian period. In such circumstances, these upland brickworks, like so many other constituents of the Roystone Grange economy, were marginalised as the industry became more intensive and competitive. The result, inevitably, was that the majority of the works alongside the High Peak railway lasted for only a short time. Even so, the quality of the local sand ensured that the brickworks at Friden, five kilometres to the north-west of Minninglow, was able to capitalise upon the invention of new technology and, with less local competition, could manufacture a type of brick which is still in demand today.

ACKNOWLEDGEMENTS

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REFERENCES

Bulmer, T. (1895) *History, Topography and Directory of the County of Derbyshire*. Derby.

Woodforde, J. (1976) *Brick to Build a House*. London.