SHORTWOOD BRICKWORKS

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The brickworks at Shortwood, in the parish of Pucklechurch just north of Bristol, represent one of the few remaining examples of the once common, pre-automation, nineteenth century brickworks. At peak production, the works cannot have produced more than half a million bricks per week, an insignificant figure compared with the output of a modern works. Despite this low production, the works remained a feasible economic unit in this century through its concentration on the production of specialised engineering, load bearing and facing bricks of high quality, and was thus able to survive in production until 1969. Additionally, floor and roofing tiles were produced in the early days of the works.

Shortwood was a natural site for a brickworks, since the area contains extensive clay deposits of a particularly high quality. It is not now possible to determine accurately the date of the beginning of brickmaking on the site, but the earliest of the present remains are at least a century old. The site was originally owned by the Shortwood Brick and Tile Company, which subsequently went into liquidation in a depression in trade. In 1903 the works were acquired by the Cattybrook Brick Company, a local firm founded in 1864 at the nearby larger Almondsbury plant. The Shortwood works continued under the same management, until the Cattybrook Company itself was taken over by the Ibstock Group in 1969.

The present remains consist of the massive claypit, excavated to a depth of over 50 ft, and which is now being filled in by Council tipping. Clay was transported to the works from this pit by a tramway, which still remains. The works themselves consist of a complex of buildings of various ages. The main shed, although somewhat altered, probably represents the earliest structure on the site. There are also two brick kilns, one a very early Hoffman continuous kiln, possibly the earliest example of this type in existence in Britain today. At Shortwood this is known as the 'German' kiln. The other is a Guthrie (locally 'Belgian') kiln, built in 1946 on the site of earlier kilns of the same type. Each kiln has an associated drying shed. There is also an old downdraft tile kiln, strengthened by strapping with railway lines. The works was connected to the nearby Midland Railway by its own branch, and was equipped with a turntable for handling trucks. The lines have now been lifted, but the masonry base of the turntable and the site of sidings can still be seen.

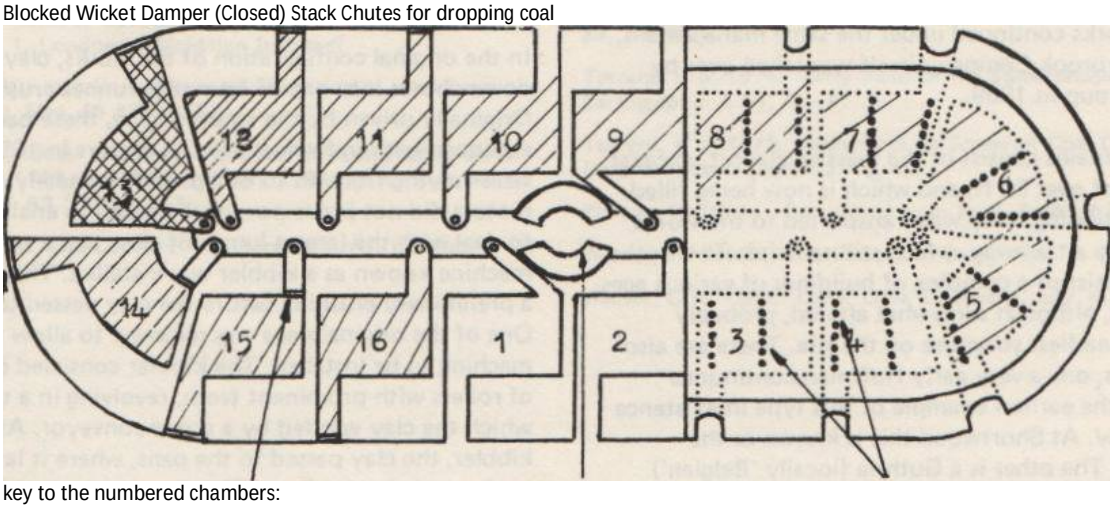
Internally, much machinery remains, and although most of it is relatively modern (twentieth century), it still conforms closely to the original machinery of the nineteenth century works. Motive power for this machinery was originally provided by a steam engine, driving through gearing. When the Cattybrook Company took over, they replaced this engine by a horizontal single cylinder engine, which had originally been used at sea, but came to Shortwood from service in a Lancashire cotton mill. This engine drove through belts, and lasted until 1951 when it was replaced by a number of electric motors. The tall chimney which served it was truncated for safety reasons in 1974, and all that now remains of the engine is a section of the main drive shafting in the wall of the former engine house.

Although of early design, the succession of the processes at the plant was extremely logical, and a description of the stages undergone by the clay in its conversion into bricks will provide the clearest idea of the activities at the site. Clay was extracted from the pit by a combination of rock drills and blasting, and was transported in skips up the endless rope, two track tramway to the main shed, where it passed under a lean-to extension. Here the skips were unloaded. Each skip contained around six cwt. of clay, but was ingeniously balanced so as to be easily tipped by hand. Until 1918, the skips were pulled up the tramway by mules, but in that year a separate electric drive was installed. Clay could be delivered from the lean-to direct to the crushing plant, or alternatively to a wet weather store, used as an insurance against rain interrupting the process of extraction in the pit. The skips were then switched through a system of points to return to the pit down the other track.

In the original configuration of the works, clay was rolled down chutes into one of four edge runner crushing pans. Originally driven by the steam engine, these pans were equipped with individual electric motors in 1951, of sizes varying from 45 to 60 hp. Unfortunately, these motors did not prove powerful enough to enable the pans to deal with the largest lumps of clay, and a special machine known as a kibbler was installed. This provided a preliminary crushing before the clay passed to the pans. One of the original pans was removed to allow this machine to be installed. The kibbler consisted of a set of rollers with prominent teeth, revolving in a trough into which the clay was fed by a screw conveyor. After the kibbler, the clay passed to the pans, where it lay on a perforated circular floor. This floor was rotated by the motor, and so imparted motion to the vertical edge runners. The runners forced the clay through the perforations in the floor of the pans, so completing the first stage in the crushing process. Below the floor, the crushed clay was collected in pits. The pans remaining at Shortwood date from different periods, and their runners are of different weights.. Allthe machinery in the works was highly stressed, and breakages were not infrequent, hence the varying age of the existing plant.

From the pits, the crushed clay was lifted by continuous belt bucket elevators to the highest level in the shed, whence it descended over screens to ensure correct grading. Oversized lumps were returned to the pans for further crushing. From the screens, clay passed along conveyor belts to two mixers, and to the pug mill, where it was compressed into bricks. The two mixers were similar in design, consisting

of a narrow trough through which the clay passed. Revolving inside the trough was a series of cruciform knives, which began the process of mixing the clay into a truly homogenous mass. Water could be added to assist this process, but was not generally needed at Shortwood, owing to the high water content of the natural clay.
The design of the pug mill was generally similar to that of the mixers, except that the trough was entirely enclosed forming a sort of cylinder, about two feet in diameter. After further mixing with knives, the clay was forced through a brick-shaped mould or die by a helical screw, which exerted a pressure equivalent to 14 tons per square inch. When it left the pug, the clay formed a column of the length and breadth of a brick. Owing to the high pressure exerted, and the extremely compact nature of the mixed clay, the strain on both mixers and pug mill was intense. Fracture of the blades of the knives was common, and numberous replace-ment sets are still to be seen in corners of the works. Lying in one corner is the ruptured casing of a previous pug mill, for which the pressure proved too great.
The column of clay extruded from the pug was then cut into individual bricks by a compressed air powered wire cutting machine. This was controlled by photo-electric cells, and operated in a manner analagous to an automated cheese cutter. The wet bricks were then transported to the drying sheds on hand carts. The main drying shed at the north end of the plant was designed to hold around 200,000 bricks when full. Hot air was provided by
furnaces at the west end, fed, in later years, by automatic screw feed arrangements. The combustion gases from the furnaces passed through flues under the floor of the shed, draft being provided by a stack, assisted after 1951 by an electric fan. The bricks remained in the shed for from 3 to 7 days, depending on their proximity to the furnaces, and the hottest gases.
From the shed, the bricks were taken to the kilns for firing. Both the brick kilns at Shortwood were operated on the continuous firing principle. Each consisted of a ring of interconnected chambers grouped around a central flue to the stack. The chambers in the Hoffman held from 17 - 22,000 bricks each, depending on the position of the chamber - those at the corners holding the larger number. There was a single entrance or 'wicket' into each chamber. Fuel for the fires was provided by dropping coal down chutes in the roof of the chamber, into specially constructed fender grates on the floor.
Bricks for firing were stacked inside the chamber in such a manner that hot air could pass among them, and the wicket was then sealed with bricks and plaster. Each chamber was connected to its neighbours by a honeycombe of 'trace holes' at the bottom of the dividing walls, and to the chimney by a separate flue and damper. The principle of firing was that the fire was drawn through the trace holes from chambers which were already alight, both by the draught from the holes, which were never blocked, and by opening the damper to the chimney. Gradually, the temperature in
Blocked Wicket Damper (Closed) Stack Chutes for dropping coal



key to the numbered chambers:
1 being filled
2 empty
3 being cleared
4/12 cooling down
13 burning 14/16 heating up
The strength of shading represents the temperature of the chamber concerned.
drawing based on diagram in A B Searle, MODERN BRICKMAKING, 1956 ed.

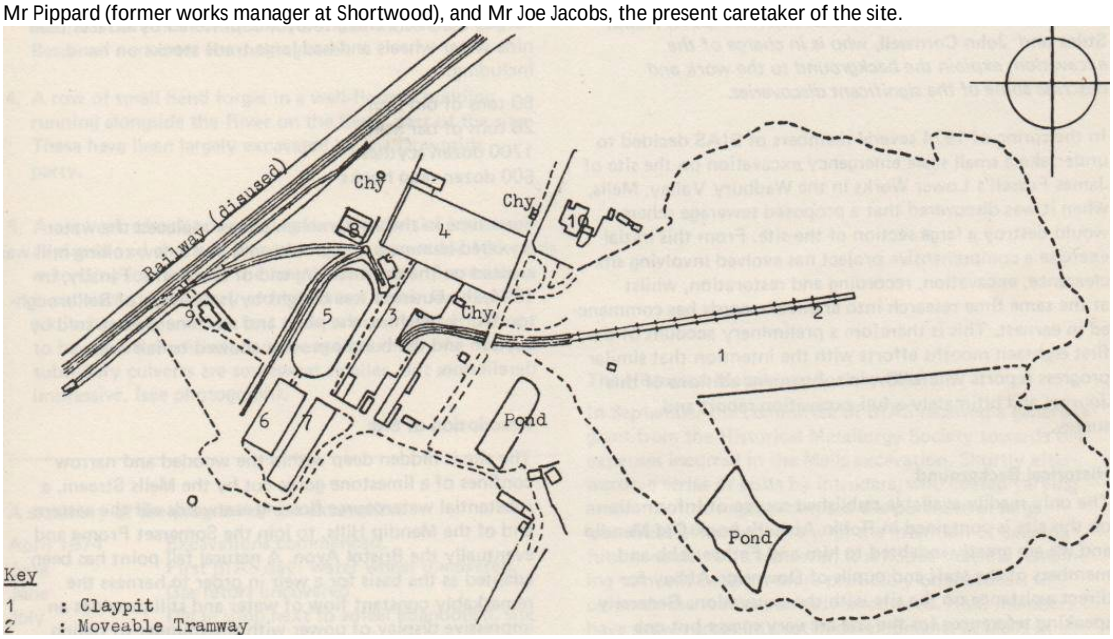
DIAGRAMMATIC REPRESENTATION OF A HOFFMAN KILN

the chamber in question reached a level at which the fuel spontaneously ignited. After this, all that was necessary was to provide more fuel, through the holes in the roof of the chamber, for so long as it was wished to continue the 'burn', as it was termed. When necessary, the damper could be closed, and the fire drawn through to adjoining chambers. When the burn was completed, fuel would be withheld, and the fire allowed to go out. Thus the fire moved around the kiln from chamber to chamber in succession, and one chamber was always alight. Hence the name continuous kiln.

In the Hoffman kiln at Shortwood there were 16 chambers, and a normal distribution would be: one empty; one being filled; four heating up to and actually burning, and the remaining ten in various stages of cooling down. The Guthrie kiln had 20 chambers, and was fired in the same manner. Its predecessors, however, were not divided into chambers by permanent walls, the chambers being created by plastering paper across a suitable row of the stacked bricks. Trace holes were provided by suitable cuts and tears in the paper. Coal for the kilns came initially from the nearby Parkfield Colliery, and after this closed from Tredegar and then Leicestershire, exploiting the advantage of the direct rail link. Coal for general use around the plant (which could be of poorer quality) was also obtained from Coalpit Heath. The kilns had to be fuelled at all hours, and a small hut was provided on top of the kiln for shelter for the firemen. The Hoffman at Shortwood was in continuous operation from the time the plant was restarted after the war in 1946, to the eventual closure in 1969.

As they left the kilns, the bricks were stacked for loading into railway trucks, and thus transported from the plant. When it closed in 1969, it was intended to demolish the plant entirely, and to build a modern replacement slightly to the north, a site now occupied by Brandybottom Colliery. These works were to use the clay from underneath the present plant, since this was reputedly the finest quality available on the site. With the current economic climate unfavourable to expansion in the brick trade, it seems likely that the Shortwood works may survive for some time yet, a last reminder of what was once a bustling industry.

The authors gratefully acknowledge the assistance of the Ibstock Brick (Cattbrook) Company, and in particular of Mr Weldon, Mr Pippard (former works manager at Shortwood), and Mr Joe Jacobs, the present caretaker of the site.



SHORTWOOD BRICKWORKS 1975 N

3 Main Shed
4 Main Drying Shed
5 Hoffman Kiln
6 Guthrie Kiln
7 Drying Shed
8 Old Tile Kiln
9 Offices
10 Manager's House

Based on the Ordnance Survey 1:2500 scale, 1965 & 1974 Editions.

Picture from the Company's file

Shortwood Brickworks about 1920