

# THE EXCAVATION OF A 19th CENTURY POTTERY KILN AT SHARPE'S POTTERY, SWADLINCOTE

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with contributions

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## SUMMARY

*Stoke-on-Trent Archaeology undertook the excavation of a 19th century pottery kiln at Sharpe's Pottery Heritage & Art Centre, Swadlincote, Derbyshire (NGR SK 2983 1954; Fig. 1). The archaeological evidence revealed that the kiln was a circular, multi-flued, up-draught type with a separate hovel that was probably used to fire earthenwares. The kiln's firing chamber utilized a foundation design that has been observed in kilns at other potting centres, both regional and national. The remains indicated that, prior to its demolition in the closing years of the 19th century, the kiln had undergone repair and possible rebuilding.*

## INTRODUCTION

During June, October and November 2010, Stoke-on-Trent Archaeology undertook a programme of archaeological work both prior to and during the construction of a café extension at Sharpe's Pottery Heritage and Art Centre, Swadlincote, Derbyshire (NGR SK 2983 1954; Fig. 1). The extension was to be constructed in an area occupied by one of the factory's original pottery kilns, which was demolished toward the end of the 19th century (Fig. 2).

## A BRIEF HISTORY OF SHARPE'S POTTERY

The potworks was established in 1821 by Thomas Sharpe and was one of several new potteries founded in the Swadlincote area in the early 19th century, all of which produced yellow-bodied earthenwares (Godden 1972, xxviii; Smith 2008, 107).

On the death of Thomas Sharpe in 1838 ownership of the works passed to his brothers, Edmund and William who continued production under the name 'Sharpe, Brothers & Co.' (Godden 1972, 225). After William's death in 1870 the pottery continued to prosper under the direction of Edmund Sharpe, manufacturing a variety of cheap bodies, such as 'Derbyshire Ironstone Cane (or Yellow) Ware, buff drab ware, fire-proof ware, Rockingham ware, mottled ware, and black lustre ware' (Jewitt 1883, 375-6). Sanitary wares in yellow and white fabrics, sometimes decorated with transfer-printed designs, constituted another element of Sharpe's repertoire and one for which the firm would become globally renowned. By 1912, sanitary wares formed the dominant component of the factory's output. Although new investors were

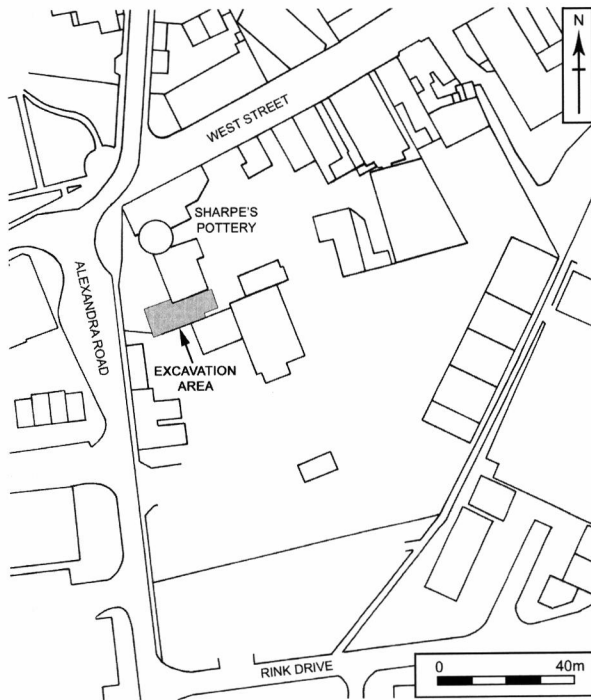
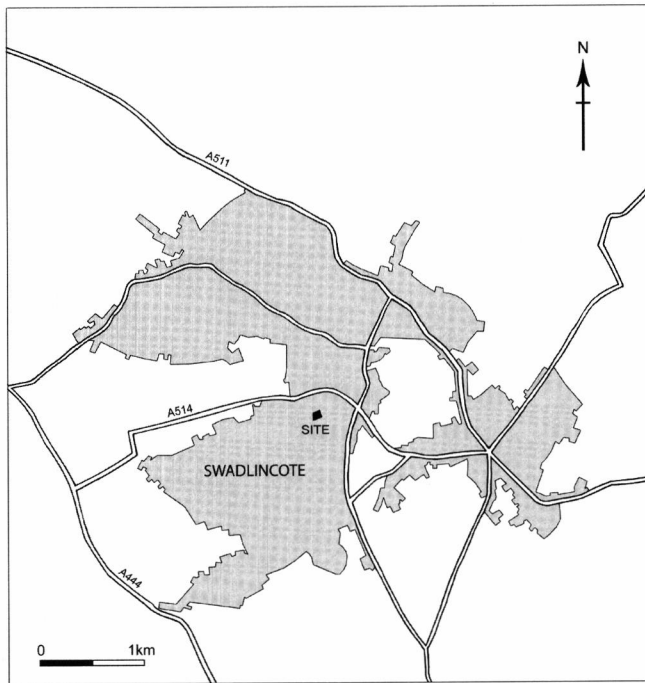


Fig. 1: Location plan, showing Sharpe's Pottery and the excavation area.

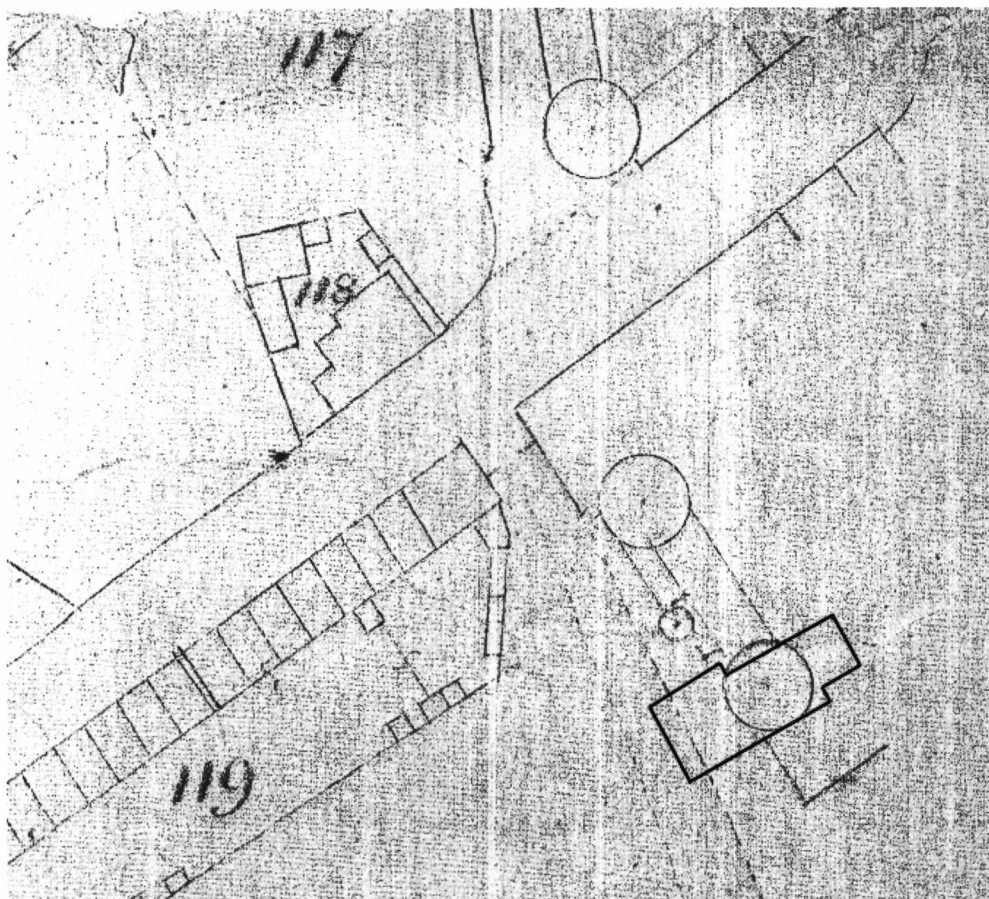


Fig. 2: Sharpe's Pottery in 1856. The factory is shown on the southern side of the road and comprises two kilns separated by a rectangular range with adjacent muffle kiln. The excavation area is shown over the southern kiln.

introduced to the business following Edmund's death in 1894, the Sharpe family maintained the controlling interest until 1923 when the firm was sold to Messrs. Aldridge, Boddice and Whitaker. The latter partner, Solomon Whitaker, acquired the entire business in 1939 and oversaw a move away from earthenware sanitary goods to the production of Vitreous ware. The firm suffered in competition with the larger, more modern manufactories in Stoke-on-Trent and eventually closed in January 1968 (Heath 1999, 12-14). The last of the factory's original kiln hovels was granted Grade II Listed Building status by English Heritage in 1981 and renovation of the surviving structures on site began in 1999. The site opened as a museum and gallery in 2003.

## THE ARCHAEOLOGICAL WORKS

The programme of archaeological investigations comprised a watching brief, evaluation and excavation. As anticipated, the project identified remains of the pottery kiln (recorded as Kiln 1), which lay beneath later levelling deposits and brick floor surfaces. Although evidence of two other kilns (Kilns 2 and 3) and two former factory buildings (Structures 1 and 2) was also encountered, these remains were either revealed only in part on the edge of the development area or were extremely fragmentary. As such, work focused on the recording of Kiln 1.

### THE POTTERY KILN (KILN 1)

The kiln comprised a brick-built circular firing chamber, approximately 6.50m in diameter, with a surrounding hovel (Fig. 3; Plates 1 and 2). Both elements had been extensively disturbed, principally by 20th century services and the northern extent of each sat beneath the main museum building. The firing chamber comprised two, abutting rings of brickwork (1016) and (1023) positioned concentrically to a central void of *c.* 3.40m diameter, filled with compacted sand, kiln furniture and pottery sherds (1028). The outer ring (1016) comprised two courses of common and refractory bricks laid flat and jointed with white/grey fireclay; the basal course sat directly upon the natural yellow clay subsoil (1048). The partial remains of at least three rectangular ash pits featured within (1016), each representing the position of one of the kiln's fireboxes. Given the distribution of the surviving ash pits, the kiln would have originally featured at least nine fireboxes. The pits were lined with grey/yellow refractory bricks, with common brick floors that sloped slightly upwards towards the mouth, presumably to assist in raking out ash and clinker. There was some evidence, however, to suggest that each pit had once also featured a refractory lining over the base. The kiln's inner ring (1023) was constructed of two courses of refractory bricks jointed with fireclay. The basal course sat on the orange sandy material (1028) that was also exposed in the centre of the kiln and appeared to have been laid more neatly than the brickwork above. Originally, (1023) had been present above (1028) across the entire kiln centre, as was indicated by an isolated row of bricks (1024).

Sitting within (1028) was an ambiguous, slightly splayed 'U'-shaped arrangement of refractory bricks (1026) laid flat in a single course.

The sandy deposit (1028) located in the centre of the kiln was 0.23m thick and sat above the natural clay subsoil (1048). It was composed of sand, biscuit-fired extruded clay strips, kiln furniture and pottery sherds dating to the first half of the 19th century. Although (1028) provided the construction horizon for brickwork (1023), it did not extend beneath the outer ring of the kiln's foundations (1016). This form of foundation design was common during the 19th and early 20th centuries and is referred to in contemporary sources as a 'cork'.

The hovel structure surrounding the kiln was represented by three sections of curving double-skinned, mortared red-brick wall (1013) and small patches of an internal blue-brick floor (1008) and (1010), bedded on a thin layer of black ash and coarse sand (1009). Originally the external diameter of the hovel would have been approximately 9.45m, which would have given it a circumference of 29.70m. Interestingly, the firing chamber appeared to be positioned eccentrically to the hovel, which would have created a working space of no more than 0.40m between the ash pits in the south-western quarter of the kiln and the hovel wall. This would have made the raking out of the ash pits and the stoking of the fire mouths extremely difficult.

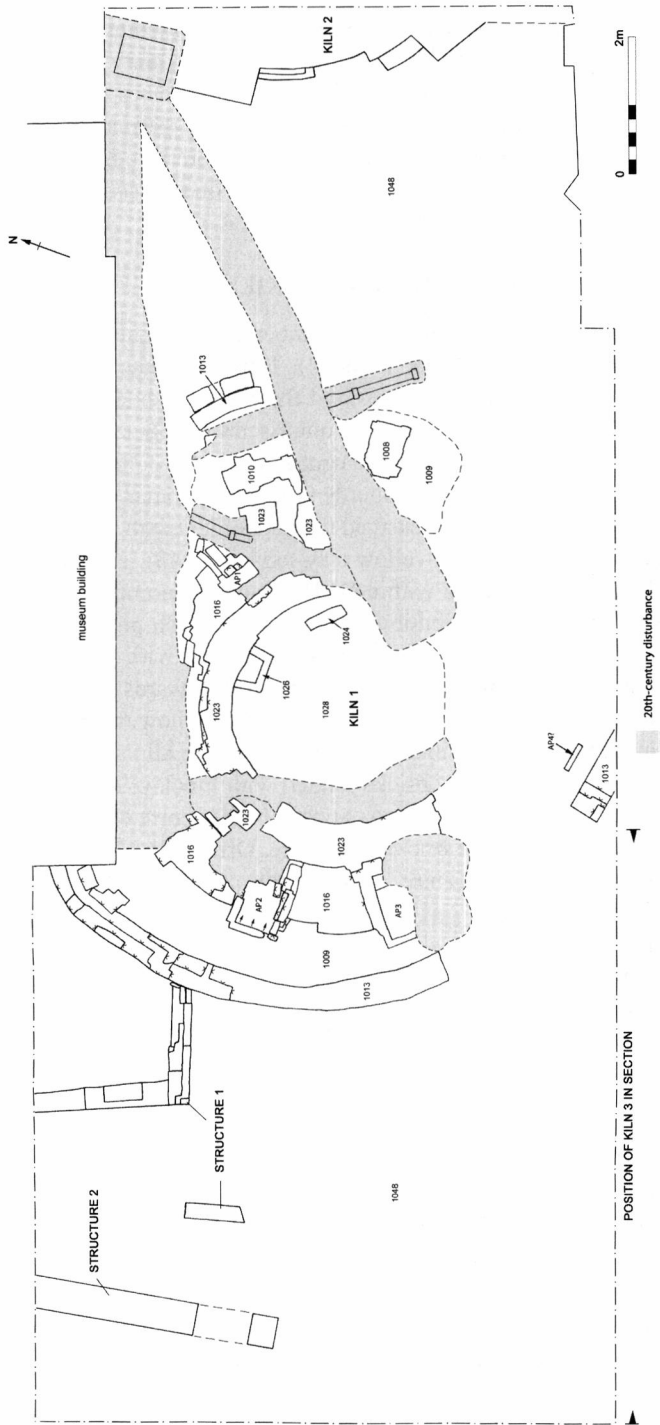


Fig. 3: Post-excavation plan of the development area showing the excavated kiln.



Plate 1: View of central section of the kiln, looking south (scales: 1.0m)



Plate 2: General view of the kiln, looking east, with hovel wall (1013) in foreground (scales: 1.0m, 2.0m).

## DISCUSSION

The excavated kiln was a circular, multi-flued, coal-fired, up-draught type with separate firing chamber and hovel. The two other kilns revealed on the periphery of the development area appeared to represent 'close-coupled' structures, in which the stack was constructed directly on top of the firing chamber.

Up-draught kilns were heated via a series of fireboxes set into the circumference of the circular firing chamber. The heat generated by each firebox passed into the firing chamber via a series of sub-floor flues and vertical chimneys, or 'bags'. During firing, heat, smoke and gasses were drawn up and around the wares, which were stored in refractory containers called saggars, and out through the firing chamber via a series of manually-operated vents ('dampers') in the crown, finally discharging from the stack above (Fig. 4). In contrast, down-draught kilns employed a more efficient system of heat distribution, wherein heat was drawn back around the chamber and down through a series of vents in the floor that were connected to a central well built into the kiln's foundations. This was in turn linked to a separate chimney that could serve one or more kilns.

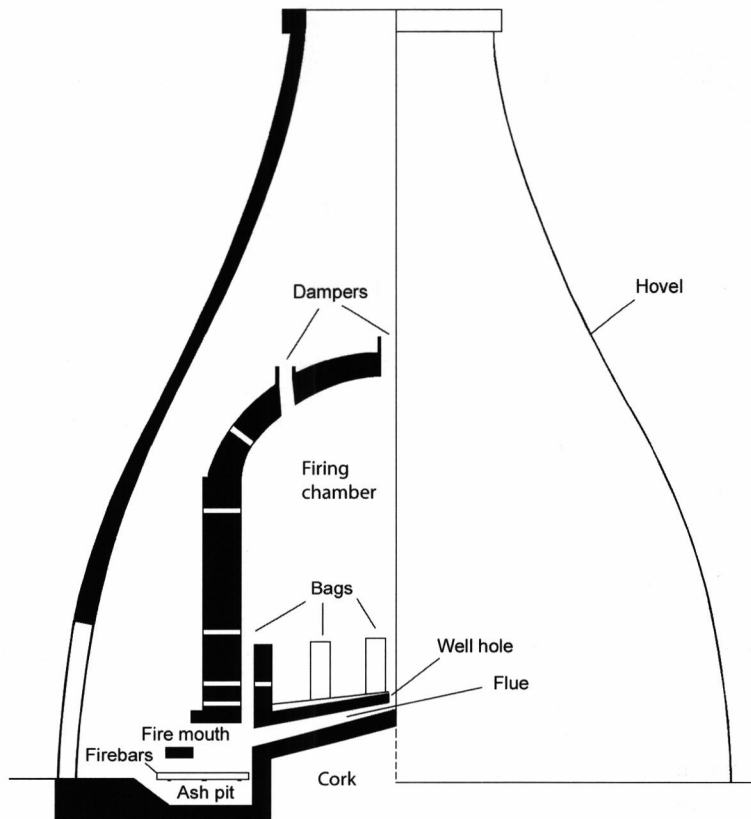


Fig. 4: Cross-section of a typical up-draught pottery kiln with hovel, showing principal components



Although it has been speculated that the southern half of Sharpe's potworks was historically the scene of glost production (Heath 1999, 29-31), it was not possible to conclusively establish if the excavated kiln was originally used for biscuit or glost firings (or both), or indeed if this designation changed over time. The excavation of numerous pottery kilns in Stoke-on-Trent has revealed that most up-draughts share a basic structural design that appears largely unaffected by their precise function. As such it is difficult to distinguish between a biscuit and a glost kiln from archaeological remains alone. A possible source of assistance in determining function is provided by S. R. Hind (1937, 61-3), who relates the function of a pottery kiln to the internal diameter of its firing chamber. The internal diameter of the chamber of the Sharpe's kiln was approximately 4.60m, placing it within Hind's size range for an up-draught, earthenware glost kiln (Hind 1937, 63). Given that Sharpe's output in the 19th century was dominated by earthenwares, this attribution is at least feasible, although some caution regarding Hind's figures should be exercised, as a consistent correlation between his designations and the chamber diameters of kilns of known function has yet to be demonstrated. It is also probable that a variety of factors influenced kiln size, including the overall scale of the individual factory's output, the total number of kilns within the works and perhaps even the date at which they were built.

The 'cork' foundation utilised by the kiln was composed of pre-fired material that sat beneath the brickwork of the firing chamber and prevented the drawing of moisture from the surrounding ground during firing; the desiccated material acting as a barrier between the two. This was an important constructional element, as any significant drying out and contraction of the earth around the kiln's foundations could lead to subsidence, resulting in damage to the flues (Sandeman 1921, 195). This foundation design appears to have been employed widely from at least the early 1800s until the mid 20th century. Cork foundations have been observed in almost all up-draught kilns (down-draughts have a different foundation design) excavated in the north Staffordshire Potteries (see Forrester 2007, 8; Cramp and Goodwin 2009, 10), and have also been encountered in other ceramic-producing sites, such as the Lanwill Works, Brierley Hill (Nichol and Ratkai 2005) and the Denaby Pottery, South Yorkshire (Gregory 2004, 151). As such the Sharpe's kiln fits comfortably into a regional and national pattern of pottery kiln design.

Elements of the kiln suggested that some degree of repair or even rebuilding had been undertaken on the structure, but the nature and extent of this activity was unclear. Pottery kilns were subject to a great deal of thermal stress during the firing cycle and regular repairs were necessary, particularly in areas exposed to the most intense heat, such as fireboxes, flues and bags. In the case of up-draught kilns, the damage caused by heat was exacerbated by the basic inefficiency of the design. It has been estimated that during each firing the brick shell enclosing the kiln chamber would absorb up to 36.36% of the total heat generated by the fireboxes; the wares in comparison were subjected to only 11.34% (Hind 1937, 70). The commercial life of a kiln was limited to approximately 20 years before complete or partial rebuilding was required (Sandeman 1921, 200). The sampling of common brick types from the firing chamber and hovel of the Sharpe's kiln indicated that an original core of early to mid 19th century fabric was present within the structure, particularly in the hovel. A later phase of substantial repair or partial rebuilding was, however, represented by bricks dating to the middle of the century; brick structure (1026) appeared to belong to this phase, although its precise function remains enigmatic. More localised repairs appear to have taken place during the 1880s.



The relationship between the hovel wall and remains of the firing chamber of the kiln was interesting, as the latter was situated eccentrically to the former. This arrangement initially suggested that hovel and firing chamber may not have operated contemporaneously, as positioning of the two elements would have created a very narrow space between the southern edge of the chamber and the hovel wall. Further excavation, however, seemed to suggest that the two did function together and no conclusive evidence of any other hovel or kiln structures was located within the area of the excavated kiln. The reasons for this odd positioning of hovel and firing chamber are elusive, although excavations within the extant northern hovel revealed potential evidence of a similar arrangement (Parry and Hayward 1999, 3). As these two kilns were probably the first to be constructed within the works, the possibility that both were characterised by off-set firing chambers is curious. Presumably, construction of the initial component of each kiln would have dictated positioning of the second element; was there a site constraint common to the locations of both kilns that contributed to their eventual configuration? Space certainly does not seem to have been a factor; historical map evidence appears to show that over 30 years after the kiln's construction much of the site remained undeveloped.

### CONCLUSIONS

The project at Sharpe's Pottery successfully generated information regarding one of the pottery kilns used on site and related its construction method to that employed at other potting centres. Although a determination of the precise function of the kiln was not possible from the archaeological remains alone, its discovery has at least prompted a discussion of the limits of the archaeological evidence for such structures, and highlighted the value of supporting sources. Despite the global prominence of the region's pottery industry during the 19th century, south Derbyshire is one of the least studied areas of ceramic manufacture in Britain (Campion 2006, 251). Although limited in its scope, it is hoped that the project at Sharpe's will represent a starting point for the systematic archaeological investigation of the south Derbyshire industry.

### ACKNOWLEDGEMENTS

Thanks are due to all who contributed to the Sharpe's Pottery project: Heather Anne Cope, Richard Cramp, Alison Nicholls, Joe Perry, Peter Stuart and Zoë Sutherland of Stoke-on-Trent Archaeology; Steve Baker, Development Control Archaeologist, Derbyshire County Council; Philip Heath, Heritage and Conservation Officer, South Derbyshire District Council; Emma Fyffe and Paul Patten of Sharpe's Pottery & Heritage Trust; the volunteers from the Friends of Sharpe's Pottery; Professor John Cassella and the forensic science students of Staffordshire University; Dr. David Barker; John Tibbles and CW Plant Hire Ltd.

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