

# RESEARCH BULLETIN

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## **Bricks at York Factory**

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This report on bricks is a segment of a research project aimed at collecting information on the artifacts recovered from York Factory National Historic Site, a nineteenth and twentieth century Hudson's Bay Company site, near the mouth of the Hayes River, in northern Manitoba. The objective of such a project is to provide a better understanding of the artifacts themselves, how and when they were used, how they can be best interpreted and their significance to York Factory, as well as other fur trade sites.

All too often, it has been the practice by many archaeologists to neglect analysis of bricks recovered from historic sites. The objective of this report is to provide the basic information required to conduct an analysis of bricks. This bulletin examines bricks archaeologically recovered and historically documented from York Factory. It provides a discussion on the attributes of bricks, the York Factory brick types, manufacturer marks, the history of three companies supplying bricks to York Factory, the archaeological implications arising from the study of bricks and a glossary of brick terminology.

### **The Brick Sample**

A total of 204 complete and fragmented bricks were recovered during the 1978, 1979 and 1980 field seasons at York Factory. These bricks were primarily recovered from test excavations and from the eroding riverbank (Table 1). With the exception of the one brick collection from the "Cook House" foundation, none of the remaining bricks could be identified as a specific functional part of a structure/feature. The York Factory bricks were examined for particular characteristics which are discussed below. Based on these characteristics a typology was created.

### **Brick Characteristics**

Observations of certain brick attributes may enable signifi-



cant interpretations to be made about the date of manufacture and function of the bricks. Harley (1974) created an elaborate typology for English bricks based on the characteristics: shape, size, surface treatment, weight, colour, texture, hardness and method of manufacture. In the analysis of the York Factory bricks consideration was given to all attributes except weight and hardness. Shape, size, colour and surface treatment were thought most important because of their ease of identification and potential for interpretation of date of manufacture and function of the bricks.

The most common brick shape at York Factory is the rectangular prism or plain parallelepiped; a shape recorded by Harley (1974: 66) to have a number of variants and to be the most common shape. York Factory bricks of this shape measure 21.1 cm to 23 cm in length, 9.8 cm to 11.4 cm in width and 5.9 cm to 6.2 cm in thickness. There is one other brick shape at York Factory, not specifically identified by Harley but probably attributable to one of the purpose-shaped brick types. These bricks are blocky rectangular in shape, measuring 31 cm by 21 cm by 18 cm. Brick shape in conjunction with brick size can be a temporal and functional indicator and suggest the method in which they were manufactured. Size alone, however, although an important attribute to observe, because of its standardization during the late eighteenth and nineteenth centuries is for the most part not a valid dating tool (South 1964; Lazurus 1965).

The colour of brick refers to the fabric, not the surface colour, which may be discoloured due to deposition or by factors related to fabric composition and firing temperature. Fabric colour is dependent upon the properties of the clay, inclusions in the clay and the temperature at which the clay is fired. The bricks at York Factory are in hues of red, yellow-red and yellow based on the "Munsell Book of Color" (1976)(Table 2). Brick functions can be suggested by their colour. Bricks in yellow hues are generally hard fire or refractory brick known as firebricks, while red and yellow-red bricks are often common, face or paving bricks (see Appendix A).

Surface treatment, whether intentional or accidental, can be helpful in determining the manufacture date and function of the brick (Harley 1974:67). For the York Factory bricks, however, it was more useful in determining the method of manufacture. The bricks with intentional surface treatment have impressed shallow frogs or manufacturer's marks on one face. The accidental surface treatments, created while the clay was still soft during the manufacturing process, include shallow horizontal or vertical lines and deeper indentations on one or more faces. Accidental surface treatments produced during the firing include over-firing of the brick to a stage where the shape is warped and the colour is grey-brown.

Observing the texture of bricks can provide insight on the method of manufacture, the temperature at which the bricks were fired and a detailed analysis of the inclusions

may indicate the clay source. There is a great deal of variation in the texture of the York Factory bricks. These bricks were placed into five groups based on size and regularity of non-plastic inclusions, presence or absence of flow lines, and porosity of the body:

- 1) regular coarse texture with non-plastic inclusions less than 5 mm in diameter, flow lines are absent;
- 2) irregular coarse texture with cinder and stone inclusions less than and greater than 5 mm in diameter, flow lines are absent;
- 3) irregular coarse texture with cinder and stone inclusions greater than 25 mm in diameter, flow lines are present, dense, over fired;
- 4) homogeneous fine sandy texture with iron (?) inclusions less than 5 mm in diameter, flow lines absent.

The indication of manufacturing methods used to produce bricks is often difficult to determine because of the technical similarities in the processes operative during the nineteenth century. Harley (1974:64) outlines six methods of shaping bricks but does not indicate the characteristics to observe in order to identify these manufacturing methods. However, as stated, earlier, the treatment of the surface of the brick is helpful in determining the method of manufacture. The following characteristics were therefore considered in the identification of the manufacturing methods for the bricks recovered at York Factory: smooth or rough faces, drag lines on the exterior faces, circular or square stress lines in cross-section, uniformity of brick shape and the texture of the body (the ratio of flux to clay). Based on the above characteristics the bricks appear to be produced in a mould or by the continuous extrusion method.

Moulded bricks were produced by placing tempered clay into a mould frame, the excess clay is removed by running a strike across the top of the mould. The filled mould is turned upside down on a pallet and the formed brick is transferred to a drying shed, the hack. Several weeks later the bricks are burnt in a brick kiln (Harley 1974:104).

A number of variations can occur in the basic method of moulding bricks; one variation noted in the York Factory brick sample, involved the use of a stock. This is a board which is attached to the moulding table and projects upward from the base of the mould (Harley 1974:65); "...just big enough for the mould to slip down upon" (Lloyd 1972:34). The stock formed a corresponding depression (the frog) on the brick and this served as a key for mortar (Harley 1974:65). Bricks produced by this method were popular from the late eighteenth century onwards (Harley 1974:80).

The extrusion method, also known as the wire-cut process, involved the continuous extrusion of clay through a rectangular aperture. The required length of clay was cut-off into bricks with taut wires. It eliminated the use of individual moulds and thus mechanized the shaping process. This method appeared around the year 1855 (Harley 1974:65).

### **Brick Types**

The attributes of the York Factory bricks and the typology created by Harley (1974) for bricks found in Britain were used as the basis for identifying the seven brick types represented at York Factory (Table 3). Only one York Factory type (Type 1), however, conforms to one of Harley's nineteenth century types.

**Type 1** - These bricks are impressed with the manufacturer's mark "HICKMAN & CO/STOURBRIDGE" or "RUFFORD/STOURBRIDGE" (Fig. 1). They are rectangular prism shaped, have shallow horizontal lines on the height end surface where the required length of clay was cut-off during manufacture by the extrusion method. They measure 23 cm (9 1/16 inches) in length, 11.2 cm to 11.4 cm (4 3/8 to 4 4/8 inches) in width and 5.9 cm to 6.1 cm (2 5/16 to 2 7/16 inches) in thickness. The fabric is yellow-orange brown (Hickman) to yellow-brown (Rufford) coarse earthenware with many regular non-plastic inclusions less than 0.5 cm in diameter and no flow lines (texture group 1).

**Type 2** - These bricks are impressed with the manufacturer's mark "SADLER BROTHER/STOURBRIDGE/WORKS/OLDBURY" (Fig. 2). They are blocky-rectangular in shape, measuring 31 cm (12 3/16 inches) in length, 21 cm (8 2/8 inches) in width and 18 cm (7 1/16 inches) in thickness. The fabric is a yellow-orange brown coarse earthenware. Fabric texture and method of manufacturer were not identified in the field lab.

**Type 3** - Bricks in this group are incomplete, therefore shape, size and manufacturing method could not be determined. The fabric is dark yellow-brown to green-yellow coarse earthenware. Fabric texture is irregular, rough, with cinder and stone inclusions less than and greater than 5 mm in diameter, stone inclusions less than and greater than 5 mm in diameter, and no flow lines (texture group 2).

**Type 4** - Bricks in this group are incomplete. The shape and size could not be determined. (Thickness is 6.4 cm or 2 4/8 inches.) The fabric is dark yellow-brown to yellow-green coarse earthenware, texture is homogeneous fine sandy with inclusions less than 5 mm in diameter. Flow lines are absent (texture group 4). A depression in the top surface represents a frog and suggests the bricks were manufactured in a stock mould.

**Type 5** - Bricks in this group are incomplete. Shape, size and manufacturing method could not be determined. The fabric is red or orange-red coarse earthenware. Texture (group 5) is homogenous fine sandy with few non-plastic inclusions less than 5 mm in diameter and no flow lines.

**Type 6** - These bricks are rectangular prism shaped and measure 21.1 cm (8 5/16 inches) in length, 9.8 cm (3 7/8 inch-

es) in width and 6.2 cm (2 7/16 inches) in thickness. The fabric is a coarse earthenware in a dark red to dark red-brown, varigated with a yellow-brown chalk like fragments. The exterior surfaces are yellow-brown indicating during the drying process the lighter weight watery particles settled at the top and formed a smooth surface, different in colour than the body. Also shallow horizontal lines are present on one face. Texture (group 3) is irregular coarse with cinder and stone inclusions greater than 25 mm in diameter. Flow lines are present. The surface treatment, in combination with the presence of many non-plastic inclusions and flow lines suggests these bricks were "hand-made" in a mould, possibly with local clays and temper.

**Type 6a** -Bricks in this group are incomplete. They differ from Type 6 in colour and size due to overfiring. The fabric colour is a grey-brown. They vary in size from 9 cm (3 9/16 inches) to 9.3 cm (3 11/16 inches) in width and 6 cm (2 3/8 inches) to 7.1 cm (2 13/16 inches) in thickness. The thickness measurement can vary 0.5 cm for a single brick.

**Type 7** - These bricks are incomplete. Shape could not be determined. The size measures 9.9 cm (3 7/8 inches) in width and 6.4 cm (2 4/8 inches) in thickness (length could not be determined). The fabric is a coarse earthenware in a dark red-brown varigated with yellow-brown chalk like fragments. A depression in the top surfaces represents a frog and suggest the bricks were manufactured in a stock mould.

### **Manufacturer Marks**

To date at York Factory twenty bricks with impressed marks represent the three English manufacturers: Hickman, Rufford and Sadler Brother[s]. These companies, established in the 1850s, were located in Stourbridge, north of Worcester in west central England, a small district important for the mining of clay for the production of firebricks, furnaces and ovens (Jewitt 1970:156).

Impressed marks on bricks were generally produced by pressing a metal imprint die into the unfired clay brick. The manufacturer's name and location appear on one brick surface as simple block letters arranged in straight or curved lines (Fig. 1 and 2). The letters are 1.5 cm or 1.9 cm high, 1.1 cm or 1.3 cm wide and impressed 1-2 cm or 2-3 cm deep. Mark impressions "HICKMAN & CO./STOURBRIDGE", "RUFFORD/STOURBRIDGE" and "SADLER BROTHER[S]/STOURBRIDGE/WORKS/OLDBURY" are irregular in depth from top to bottom and side to side, suggesting the bricks were stamped with a hand-held die. After about 1870, when brickmaking was mechanized, the company name or logo or location could be impressed into the surface of the brick as part of the manufacturing process (Kelly 1977:86). This increased brick production and no doubt made the brick impressions regular in depth.

Brick marks, like manufacture marks on other objects, help to provide information about the origins, date of manufacture and intended functions of the bricks. Not all bricks recovered at York Factory were marked with a manufacturer's name; 184 bricks were either too fragmentary to determine if a mark were present or were not marked.

### **Company Histories**

In addition to the three brick manufacturers identified by marks on the excavated bricks, an examination of the Hudson's Bay Company records for York Factory lists eight suppliers of bricks from 1785 to 1880 (Hudson's Bay Company Archives, B239/ee, Ship Invoices, 1785-1880)(Table 4). Company histories could only be traced for three of the brick suppliers. This information was obtained through correspondence with E.R.L. Edwards, Chief Information Officer for the Brick Development Association, England. What follows is a brief history of the three companies supplying bricks to York Factory during the nineteenth century and comments on the similarity of the York Factory brick types to the brick descriptions recorded in the historic documents.

### **Hickman & Company**

Hickman & Company was located in Stourbridge, west central England and was formed around 1845 for the manufacture of handmade firebricks, to be used mainly in the gas and steel industries, the lining of boilers and the needs of railway companies. In the 1920s the company was taken over by Garrett & Co., but continued until the late 1960s under the name H.T. Hickman, when the works closed (E.R.L. Edwards 1979; pers. com.).

The Hickman Company was not listed as a brick supplier in the archival records, however, this company may have supplied bricks at a date later than 1880 or another company may have supplied the "Hickman" bricks to York Factory.

### **Rufford**

The Rufford Company, located in Stourbridge, England, was established in the 1850s for the production of handmade fire bricks to supply the gas, steel and railway industries. This company also manufactured glazed baths. In 1927 the company is believed to have closed (E.F.L. Edwards 1979: pers. com.).

Woodcroft (1969:494) lists a Francis Tongue Rufford registering a patent for the "manufacture of bath and wash tubs or wash vessels" on the 28th Nov. 1848. Also a F.T. Rufford is titled in the catalogue of the "Great Exhibition of the Works of Industry of all Nations, 1851" as patentee with John Finch for "Porcelain wash and steam tubs, full-sized. Glazed brick and slabs" (1851:725).

F.T. Rufford is listed in the York Factory Ship Invoices as a supplier of 9 inch fire bricks in the years 1865, 1867, 1868 and 1871 (H.B.C.A.B.239/ee/108f.5,95f.1, 108f.323). As discussed above, the Type 1 bricks are roughly 9 inches in length and yellow in colour suggesting they are firebricks. The historic record, therefore, confirms the Rufford marked bricks are intended for use in areas where there is intense heat.

### **Sadler Brothers**

Sadler Brothers Stourbridge Works, Oldbury was established around 1845-1850. Through family ties the company was associated with the Earl of Dudley's Conygre Blue Brickworks which manufactured blue engineering bricks comprising blue and brown brindles, also hard reds and a wide range of special shapes. The Stourbridge Works closed before 1939. The Earl of Dudley's Conygre Blue Bricks was managed by Septimus Sadler until 1946, when the Stourbridge Brick Company took them over (E.R.L. Edwards 1979: pers. com.).

John Harvey Sadler is listed as registering a patent on 7 July 1847 for "constructing bridges, aqueducts and similar structures" (Woodcroft 1969:497). It is quite probable J.H. Sadler was associated with the Sadler Brothers company, and his patent was for construction methods with bricks of one of the special shapes supplied by the Sadler Brothers company.

Although Sadler Brothers is not recorded in the archival records as suppliers of bricks, the archaeologically recovered oversized Type 2 bricks indicate this company was supplying special shaped bricks for a purpose as yet unidentified.

### **Archaeological Implications**

There are a number of additional factors to be considered in the analysis of bricks which may aid archaeological interpretation.

- 1) Bricks are often re-used. If this is not recognized and the bricks are relied upon as a date indicator, the interpretations may be misleading. Although identifying re-use is difficult, one can suspect re-used bricks when features are constructed with bricks of different colours and sizes that have no apparent pattern. Also, historical records often document the re-use of bricks, as is the case for several structures at York Factory.
- 2) A change in colour and size of bricks, provided there is some regularity in the change, may indicate different construction phases.
- 3) Material adhering to bricks may suggest the function of the bricks. For example, charring of the brick surface may indicate use in a fire hearth; or the adhering of vitreous material may suggest use in a kiln.

- 4) For centuries, a wide variety of brick shapes and sizes have been produced for different purposes. Brick standards varied from one century to the next. Generally the mid-eighteenth to early-nineteenth-century brick measured  $8 \frac{3}{4}$  to 9 inches (22.1 cm to 22.8 cm) in length,  $4 \frac{1}{4}$  to  $4 \frac{1}{2}$  inches (10.7 cm to 11.3 cm) in width and  $2 \frac{1}{2}$  to  $2 \frac{5}{8}$  inches (6.3 cm to 6.6 cm) in thickness (Harley 1974:76). By the late-nineteenth and twentieth centuries a British Standard for bricks (B.S.I.657) specified a slightly thicker brick,  $8 \frac{3}{4}$  inches (22.1 cm) in length,  $4 \frac{3}{16}$  inches (10.8 cm) in width,  $2 \frac{5}{8}$  inches (6.7 cm) in thickness with tolerances in length and width of only  $\frac{1}{8}$  and in thickness,  $\frac{1}{16}$  (Harley 1974:77).

The York Factory brick types do not conform exactly to the British Standard for bricks set out for the eighteenth, nineteenth and twentieth centuries. Most of the brick types are small compared to the standard size but are closest in size to the late eighteenth and early nineteenth century standards. However, date information based on manufacturer marks indicates that the early nineteenth century standard was probably in effect until at least the mid-nineteenth century.

As noted in the previous pages of this report, a large portion of the bricks from York Factory were recovered from the eroding riverbank and most of the bricks were incomplete. Because of the archaeological context in which they were found the specific functions of these bricks are unknown and little can be said about brick re-use and construction phases. Subsequently, only minimal interpretations have been made about the site. With further excavation it is anticipated that brick structural features will be uncovered. These structural features and the knowledge of brick attributes will enable the identification of functional and temporal data about the bricks at York Factory.

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TABLE 1. York Factory Brick Types and Structure/Feature/Area Association.

STRUCTURE/ FEATURE/AREA ASSOCIATION <sup>1</sup>	BRICK TYPE								TOTAL <sup>2</sup>
	1	2	3	4	5	6	6a	7	
Beach Finds	40	6	-	-	-	-	-	-	46
Boat Launch	-	-	4	-	2	3	-	-	9
Cook House	-	-	-	1	-	-	-	-	1
Dog Meat House/ Oil Cloth Factory	13	-	7	5	-	6	-	1	32
Palisade/Drain- age Ditch	-	-	-	-	1	6	-	-	7
Sawpit	1	-	-	-	18	-	-	-	19
Support Struc- ture (possibly a flagpole)	-	-	1	-	2	4	2	2	11
Test pits on Riverbank transects	1	-	5	-	12	2	7	-	27
Test pits south- west of Depot	5	-	8	-	23	12	2	-	50
Unidentified Structure	-	-	1	-	1	-	-	-	2
TOTAL	60	6	26	6	59	33	11	3	204

<sup>1</sup> For structure/feature/area descriptions and locations refer to Adams and Burnip (1981).

<sup>2</sup> Quantity represents complete and fragmented bricks; in some instances the bricks collected represent only a sample of what is extant. e.g. Cook House.

TABLE 2. York Factory Brick Colours.

<u>Red</u>	<u>Munsell Code</u>
dark red	7.5R 5/6
dark red brown	7.5R 4/4
red	10 R 5/8
<u>Yellow-Red</u>	
orange-red	2.5YR 5/8
orange-red	2.5YR 6/10
grey brown	5YR 4/1
yellow-orange brown	7.5YR 8/8
<u>Yellow</u>	
yellow-brown	2.5Y 8.5/4
dark yellow-brown	2.5Y 7/6
green-yellow	5Y 7/6

TABLE 3: York Factory Brick Types

Type	Shape	Size in cm	Colour	Surface Treatment	Texture	Manufacturing Method	Function	Date	Number in Sample *
1	rectangular prism (parallelepiped)	L:34 W:11.2-11.4 T: 5.9-6.1	yellow- orange brown to yellow- brown	impressed "HICKMAN & CO/ STOURBRIDGE" or "RUFFORD/STOUR- BRIDGE" shallow horizontal lines on end surfaces	regular coarse, non-plastic inclusions less than 5mm, flow lines absent	extrusion	fire-bricks	post 1855	60
2	blocky rectangular	L:31 W:21 T:18	yellow- orange brown	not identified	not identified	not identi- fied	purpose- shaped	19th c.	6
3	--	--	yellow- brown to green- yellow	--	irregular, rough, cinder and stone inclusions less than and greater than 5 mm, flow lines absent	--	?	?	26
4	--	L:? W:? T:6.4	dark yellow- brown to yellow- green	frog in top surface	homogenous fine sandy, inclusions less than 5 mm flow lines absent	stock moulded	?	19th c.	6
5	--	--	red to orange- red	--	homogenous fine sandy, few non- plastic inclu- sions less than 5mm, flow lines absent	--	?	?	59

TABLE 3: York Factory Brick Types

Type	Shape	Size in cm	Colour	Surface Treatment	Texture	Manufacturing Method	Function	Date	Number in Sample *
6	rectangular prism	L:21.1 W: 9.8 T: 6.2	dark red to dark red- brown varigated with yellow- brown	shallow horizon- tal lines on one face, deeper indentations on all surfaces (flow lines)	irregular coarse, cinder and stone inclusions great- er than 25 mm, flow lines present	hand moulded	common, face or paving	?	33
6a	same as Type 6	L:? W: 9- 9.3 T: 6- 7.1	grey- brown	deeper indenta- tions on all surfaces (flow- lines), warped shape	same as Type 6 and over fired	same as Type 6	common, face or paving	?	11
7	—	L:? W: 9.9 T: 6.4	dark red- brown varigated with yellow- brown	frog in top surface	irregular coarse, stone inclusions less than 10 mm	stock moulded	common, face or paving	19th c.	3

--not identified

? unknown

\* this number includes complete &amp; fragmentary bricks; T=204.

TABLE 4. York Factory Brick Suppliers recorded in the Hudson's Bay Company records (H.B.C.A.B239/ee)

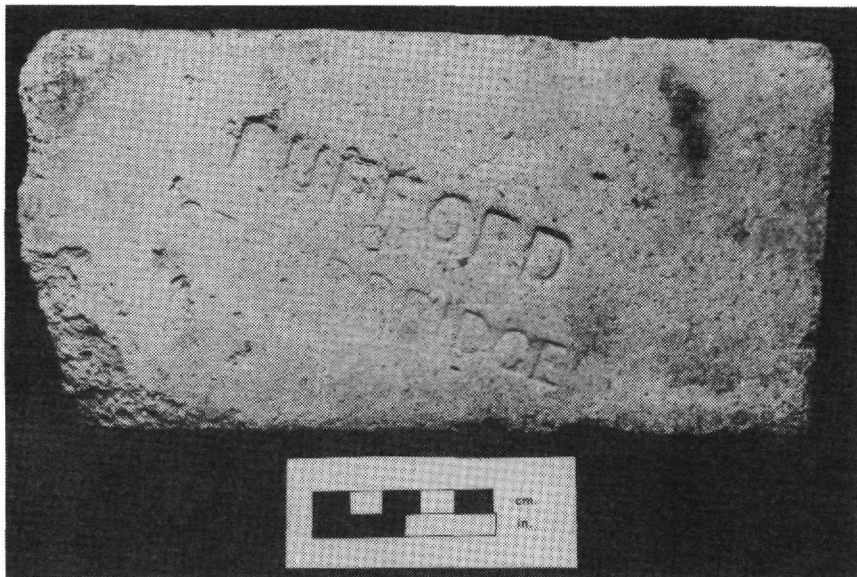
The table indicates the year, quantity and type of brick shipped to York Factory.

Year	Supplier	Quantity	Description	Reference
1785	--	12,000	Bricks	B.239/ee/1f.46
1788	--	10,000	Grey Stock Bricks	B.239/ee/1f.100
1789	--	13,000	Bricks	B.239/ee/1f.121
1790	--	6,000	Bricks	B.239/ee/1f.134
1792	--	10,000	Bricks	B.239/ee/2f.1
1793	--	1,000	Bricks	B.239/ee/3f.1
1824	C. Stonehouse	10,000	Bricks	B.239/ee/16f.33
1829	W. Farmer	--	Bricks	B.239/ee/23f.
1832	W. Farmer	100	Oven Bricks	B.239/ee/26f.47
1833	Rhodes & Co	12,000	Bricks	B.239/ee/27F.38
1834	T. & W. Rhodes	5,000	Pavings Bricks	B.239/ee/28F.71
1839	T. & W. Rhodes	5,000	Paviors Bricks	B.239/ee/37f.61
1852	H. Kilvington	500	Malin Pavior Bricks	B.239/33/105f.96
1855	D. Mountague	1,000	Stourbridge Fire Bricks	B.239/ee/74f.17
1856	Arley Colliery	1,000	9 inch Fire Bricks	B.239/ee/78f.23
1862	J. Maw	1,000	Stourbridge Fire Bricks	B.239/ee/87f.39
1863	James Maw	1,000	Stourbridge Fire Bricks	B.239/ee/89f.32
1865	F.T. Rufford	2,000	9 inch Fire Bricks	B.239/ee/107F.460
1867	F.T. Rufford	3,000	9 inch Fire Bricks	B.239/ee/108f.5
1868	F.T. Rufford	2,000	9 inch Fire Bricks	B.239/ee/95f.1
1871	F.T. Rufford	3,000	9 inch Fire Bricks	B.239/ee/108f.323

Figure 1. Bricks marked with a manufacturer's mark.

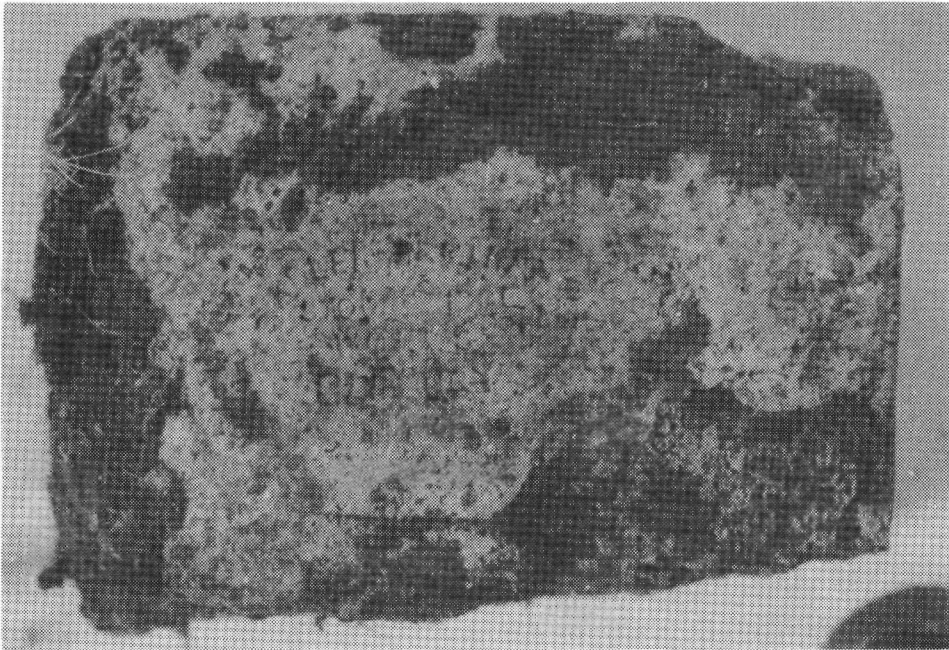


- a. York Factory brick Type 1, impressed with the manufacturer's mark "HICKMAN & CO/STOURBRIDGE". (Photo by J. Hamilton.)

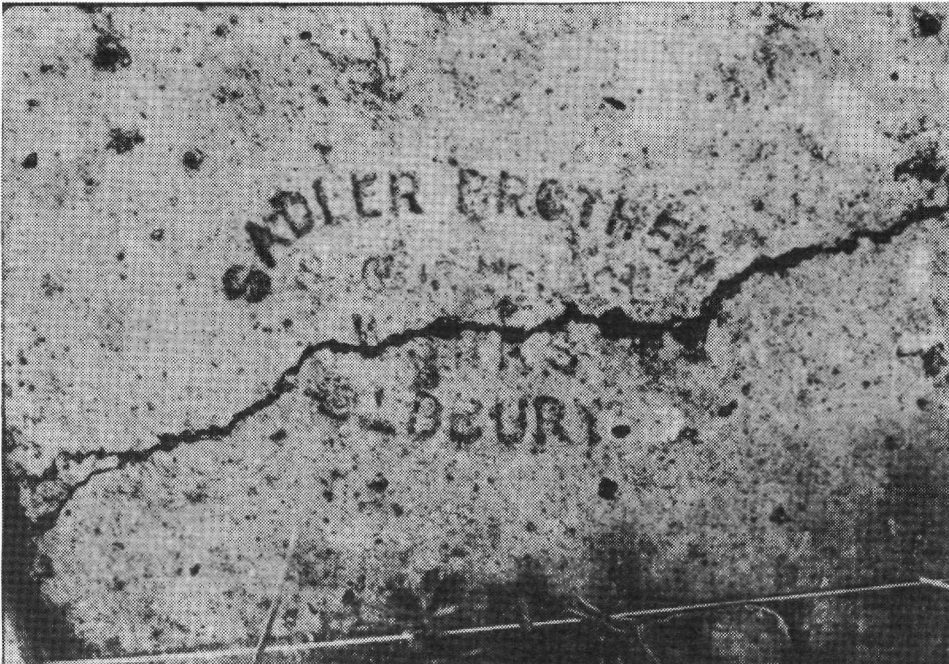


- b. York Factory brick Type 1, impressed with the manufacturer's mark "RUFFORD/STOURBRIDGE". (Photo by J. Hamilton.)

Figure 2. Bricks marked with a manufacturer's mark.



- a. York Factory brick Type 2, marked with the manufacturer's mark "SADLER BROTHER/STOURBRIDGE/WORKS/OLDBURY". (Photo by J. Hamilton.)



- b. Close-up view of the "SADLER BROTHER" brick. (Photo by J. Hamilton.)

## **Appendix A: Glossary of Brick Terminology**

**Bricks** - Bricks are made of clay with coarser material such as sand or gravel. They are burnt or fired, not baked, in a clamp or a kiln and slightly fused.

**Brindled Brick** - A building brick used in engineering work. They are made from a ferruginous clay, indigo or blue-black in colour with streaks of red or brown due to too much air in the last stages of firing. Although unsuitable for facing because of their striped surface, they have a high crushing strength and are otherwise perfect.

**British Standards Specifications** - A publication of the British Standards Institution which describes the quality, composition and dimensions of a material, such as bricks.

**Burnt Clay** - Clay burnt in a kiln or clamp, not baked by the sun as is adobe clay.

**Clamp** - A kiln constructed of the bricks that are to be fired, except for the permanent flues built up from burnt bricks.

**Clay** - A natural material characterized by its plasticity. Clay consists of one or more minerals together with silica and other impurities. Kaolinite is the most common clay mineral.

**Clinkers** - Bricks which have been partially melted.

**Common bricks** - Clay building bricks made as economically as possible without attention to appearance and intended for general purposes, particularly for internal walls.

**Continuous Extrusion Process** - A stiff clay mixture is forced in a column through a rectangular aperture and then cut off into bricks by taunt wires. Also known as the wire-cutting process.

**Cutters** - Soft bricks sawn to shape or rubbed smooth, used for gauged brickwork.

**Drag-Lines** - Shallow lines along the length or height of a brick created accidentally during the manufacturing process.

**Engineering Bricks** - Building bricks made from marl which when fired will have high crushing strength and low water absorption. They are used in the construction of engineering work such as railway arches and engine foundations.

**Extrusion** - See Continuous Extrusion.

**Facing Bricks** - A building brick made specifically to perform a decorative function. Such bricks are made in a variety of textures and colours and are used in the outside leaf of a wall.

**Firebricks** - Bricks capable of resisting an intense heat. Made from a clay with a high quartz content. Also known as refractory bricks.

**Firing** - The exposure of bricks or other ceramic ware to heat in a kiln.

**Fletton Bricks** - An English building brick made in Fletton district by the semi-dry process from shale found in the Oxford Clay beds.

**Flow Lines** - Stress lines or cracks in the body of the clay caused by differential drying of the clay after shaping, while the clay is still soft, prior to firing.

**Frog** - An indentation on one face of a brick to provide a key for mortar and to reduce its weight.

**Grey Stocks** - In 1850 grey stocks were described as "good bricks, but not of irregular colour and not suited for face work" (Woodforde 1976:107). A 1749 description states that grey stock bricks were primarily used to face the fronts of buildings either by themselves or mixed with red stocks (Lloyd 1972:36). See **Stock**.

**Hack** - A shed for drying bricks. The hack is constructed of a double row of bricks, with a one-foot space between them and two feet high, set on boards in the open to dry. A top protects the bricks from the weather.

**Hand-Moulding** - Prior to the introduction of machinery, bricks were hand-moulded by throwing the plastic mass of carefully prepared clay into a wooden mould frame. To facilitate removal of the green bricks, the interior sides of the mould were either coated with sand which adhered to the brick to form a sandfacing, or water was used giving a smooth surface to the finished brick. The green bricks were then allowed to dry in **Hacks**.

**Hard-Reds** - Red engineering Bricks. See **Engineering Bricks**.

**Machine-Moulding** - The action of hand-moulding is simulated by machine.

**Malm Brick or Marl Bricks** - A malm brick is described in 1850 as being the best building bricks, yellow in colour, used in the best descriptions of brick work (Woodforde 1976: 107). They are made from a clay that has been mixed with chalk or limestone.

**Marl Bricks** - See **Malm Brick**.

**Pallet** - A board used in the transport of unfired bricks.

**Parallelepiped** - A rectangular prism.

**Paving Brick** - A dense vitrified clay brick for use as a paving material.

**Paviours** - Clamp-fired stock bricks that are not first quality but are hard, well-shaped and of good colour.

**Place Bricks** - A very poor quality clamp-fired stock brick, used for inside work where little stress is laid upon them and sold for considerably less than a stock brick.

**Red Bricks** - A red brick in 1756 was described as being a **Stock** or **Place** type, made well and used in fine work, ornaments over windows and in paving (Lloyd 1972:37).

**Sammel Bricks** - An underfired building brick, salmon-pink or yellow-pink in colour with a rough textured body unsuitable for facing, but used for inside filling of walls. Also known as salmon bricks.

**Semi-Dry Process** - A process used to shape building bricks. The hard clay is powdered then fed into moulds and there consolidated by heavy pressure. The greatest number of bricks made by this process are **Flettons**.

**Soft Mud Process** - A process used mainly for making yellow **Stock Bricks**. The clay is made into a paste by adding water then pushed into wooden moulds. This process is a direct mechanization of the early hand-moulding method.

**Stock** - A fixed piece of shaped wood that defined the position of the mould on the moulding table. The stock enabled the **Frog** to be formed on the brick.

**Stock Brick** - Stock bricks are made by hand on a board called a **Stock**. Today they are machine made and the name generally refers to only the yellow London stock brick.

**Stress Lines** - See **Flow Lines**.

**Strike** - A wooden bat or rod used to smooth the wet clay surface in a mould.

**Temper** - Non-plastic inclusions, such as sand, added to a clay mass to improve plasticity. In brickmaking temper serves the purpose of reducing shrinkage on drying and preventing cracking under heat.

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