REPORT

Brick-pits of Leicestershire

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Leicester City once had thriving extractive industries within its limits, but these have changed over the years as workings have developed more within the surrounding county. The extractive industries were the quarrying of clay for brick-making, gypsum for plaster, sand and sandstone for building, as well as limestone quarries worked for lime, building stone and the manufacture of mortar. Few traces of these are visible today. The brick industry is therefore only one of many that worked the ground in the city and county. Surveys of Leicester's industries for the British Association meetings of 1907, 1933 and 1968 (which were held in Leicester) make little mention of brick making, but there are records of much earlier production (McWhirr, 1997).

An outcrop of Mercia Mudstone Group (formerly known as the Keuper Marl, of Middle to Late Triassic age) underlies most of the western side of the county (Carney *et al*., 2009). The Group is divided into five formations: Tarporley Siltstone, Sidmouth Mudstone, Arden Mudstone, Branscombe Mudstone and Blue Anchor formations (Howard *et al.,* 2008). Beds dip at around one degree to the southeast through the area of Leicester city (Horwood, 1913). The western part of the Mercia Mudstone Group is largely covered by the alluvial terraces and floodplain of the River Soar, and elsewhere there is an extensive cover of glacial deposits across much of the county. Small outcrops of the Branscombe Mudstone Formation occur above the terraces west of the River Soar but no brickworks seem to have operated there.

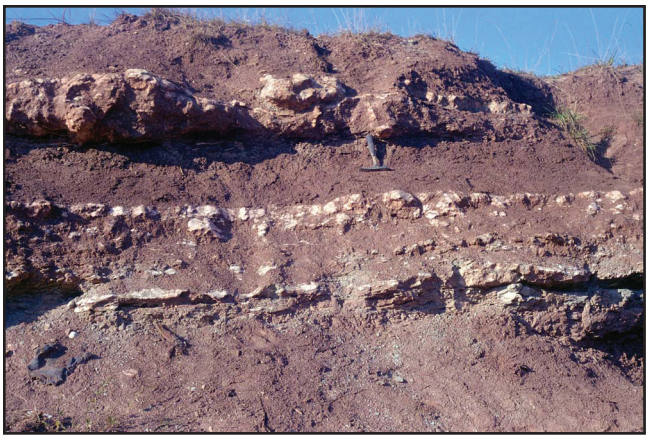
The Mercia Mudstone originated as a desert deposit (Bosworth, 1907, 1908, 1912; Jefferson *et al*., 2002). Its red mudstones and siltstones, commonly known as marls, were used for the brick-making, but some had to be washed to remove dispersed gypsum that was liable to form bubbles in the bricks and hence reduce resistance to weathering. The overlying Lias Group mudstones were not widely used for bricks as they contained calcareous fossils that broke down in the kilns to create carbon dioxide bubbles with deleterious effects.

Brick-pits in Leicester city

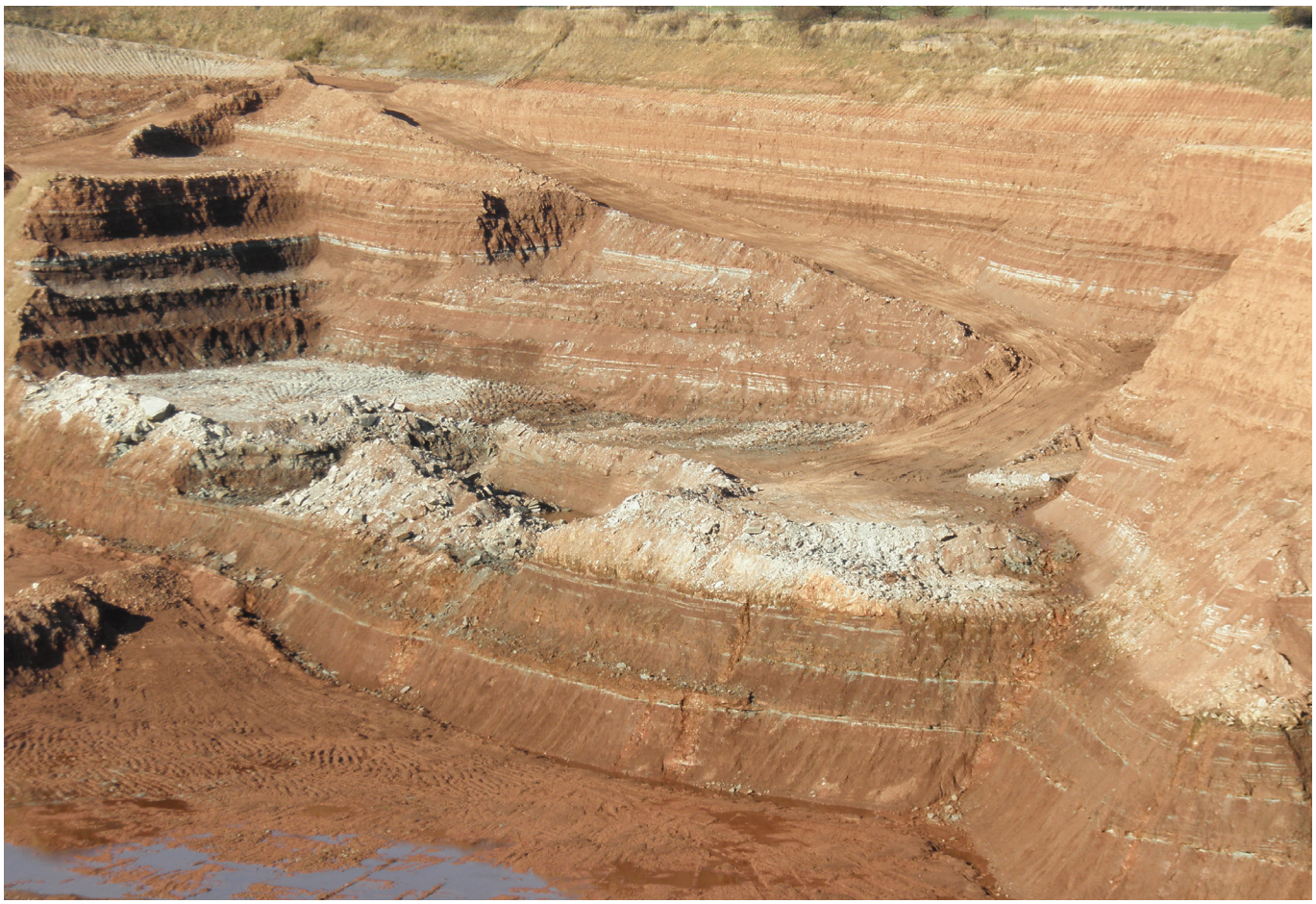
Mercia Mudstones underlie the eastern parts of Leicester and were quarried from the gently rising hillsides east of the Soar Valley. Just inside the present northeastern city boundary, the Thurmaston, New Star, Belgrave, County, High Mere and Humberstone brick-pits lay close together, and a pit at Sileby now lies just north of the city boundary. Thurmaston also had a pottery works. All these were later filled in, before industrial estates were built on top, and little beside New Star Road preserves the memory. The Gipsy Lane brick-pits extended off Ireton Road and Barkby Lane nearby (Bosworth, 1912). Pits near Ireton Road were operated by the Leicester Brick Co. and by Winterton & Weston. Another was worked by Barrow Bros and became an ammunition dump during World War II. After the war there were scares due to children finding live ammunition, so the pit was filled in and an industrial unit was built on the site.

In the Gipsy Lane area the Mercia Mudstone contains beds of nodular gypsum, the Newark Gypsum, accompanied by fibrous satin spar gypsum, and some was used to produce plaster. The immediately underlying red beds have greenish reduction spots that contain the rare uranium and vanadium minerals, coffinite and vesignieite (King & Wilson, 1976; Faithfull & Hubbard, 1988; Bevins *et al*. 2010). These minerals also occur in the exposed gypsum beds, so the Ireton Road pit has been scheduled as an SSSI. The site is much overgrown, but there is still a good rock face visible. In the 1950s, a section up to and including the Penarth Group was exposed and yielded fragments of the Rhaetic Bone Bed. This sequence also included the Blue Anchor Formation (formerly the Tea Green Marls), which occurs at the top of the Mercia Mudstone Group; this consists of up to 8 m of greenish grey mudstones.

Nearer the city centre, Spinney Hill Park was developed on the site of large brick-pits that had been filled with rubbish and landscaped as a park by 1907. Near the city railway station there was a brick-pit at the northern end of Prebend Street; it was later filled in, and the Collegiate School was built on top, now also long defunct. Another pit was by upper Swain Street, subsequently filled in and covered by Hillcrest hospital, now also defunct. There was a brick-pit described (Harrison, 1877) as "near the cemetery", presumably that on Welford Road; the site later held the cattle market, and it is now a retail park. Yet another brick-pit was on the site of the playing fields of Wyggeston Girls School, now Queen Elizabeth College on Regent Road. Further south, there were quarries and brick kilns either side of the railway, close to its junction, at Knighton



Mercia Mudstone containing beds of nodular gypsum at the horizon of the Newark Gypsum, in the old quarry face at Gipsy Lane (photo: Keith Ambrose; BGS, NERC, #P893900).



Current extraction of brick-clay from the Mercia Mudstone at the Ibstock quarry (photo: Keith Ambrose; BGS, NERC, #895027).

Fields (also known as Knighton Junction brickworks); they have long been filled in and re-developed. The University of Leicester student flats (Nixon Court), close to the Homebase store, cover the eastern brick-pits. South of the railway junction there was another brick works on Saffron Lane.

Just outside the city boundary near the Wigston railway junction there was a brickpit at Glen Parva (Browne, 1901), and not far from the city boundary there were extensive brickpits and kilns at Blaby, west of the long-disused County Arms pub. Another pit was by the canal east of this pub; many years ago, houses were built on the rubbish fill and subsequently had problems with methane emissions. All the brickworks were defunct by the time of the British Association's survey of the Leicester area in 1907, with only that at Knighton Junction being marked on the accompanying map (Nuttall, 1907).

Brick-pits in Leicestershire county

West of Leicester city an isolated brick-pit was at Glenfield. Known as the Premier Brick & Terra Cotta Works, it was west of the village close to the defunct railway. Brick-works within the city all worked the Branscombe Mudstone Formation in the upper part of the Mercia Mudstone Group, but the Glenfield site worked the Gunthorpe Member of the Sidmouth Mudstone Formation, in the lower part of the Mercia Mudstone Group, and was quarried into the early part of the 20th century. Another former brick-works outside the city lay in Bradgate Park, on the edge of Charnwood Forest. This also worked the Gunthorpe Member and is believed to be the source of the bricks for Bradgate House. With the building of Bradgate House beginning in the 1490s, it would be the oldest surviving brick-pit in the county. The freshness of its face suggests it was also worked much later.

A high demand for bricks to build terrace housing for factory workers arose in the 19th century. After the Coalville to Leicester railway was built, large brickworks opened up in the county in and around the Leicestershire Coalfield and the bricks were transported to Leicester by rail. But this source was overtaken by the import by rail of mass-produced bricks of the London Brick Company from the Oxford Clay brickworks of Bedfordshire and Cambridgeshire. This led to a partial demise of the local brick industry, but since closure of the London Brick Company, the Leicestershire brick industry has picked up. There are now six brick-works and quarries in the county, and four of these are currently working, at Measham, Ibstock, Desford and Heather. Those at Shepshed and Ellistown are currently mothballed. Five of the works are owned by two of Britain's largest brick companies, Ibstock and Hansons. Shepshed is privately owned by Charnwood Forest Brick Ltd.

Brick-works that were associated with collieries used fireclays from the Coal Measures to make bricks in the early days, but these evolved to work the Mercia Mudstone Group, along with those not associated with coal mines. The presence of iron minerals (mainly haematite) in the Mercia Mudstone produces the typical red brick. Most of the brickworks now use the Tarporley Siltstone, which yields a good mix of micaceous mudstones and sandstones for creating a wide range of bricks. The quartz grains from the sandstone are necessary to prevent excessive shrinking during firing, and the presence of mica contributes favourably to the process of vitrification that produces a glassy bond to give the brick its strength. The mineral dolomite, commonly present in the Mercia Mudstone, has the effect of producing paler bricks. Blending of different clays, and importing other materials such as fireclay, anthracite and chalk, produces bricks with different properties and colours. Although deemed to be a useful ingredient for brick making, mica is not routinely added at all brickworks. The Dorket Head works in Nottinghamshire works the generally poorly micaceous Gunthorpe Member, but they do not add any mica to the clays.

Measham brickworks opened in the late 18th century. In 2010, Hanson's new £50 million factory was, at the time, the largest and most modern in Europe, producing 30,000 bricks per hour. Currently, the quarry has six million tonnes of reserves, enough for another 25 years at the current production level of 100 million bricks per year.

The other main producer in the county is Ibstock Brick. It originally opened as a coal mine in 1825 but by the 1830s, the mine site was also producing clays suitable for making bricks. Over the next ten years, a primitive brickworks was developed. This sideline grew and assumed a greater importance at the beginning of the 20th century. In 1928 the coal pit closed and the company's sideline of making bricks, tiles and pipes was elevated to centre stage. Ibstock Collieries changed its name to the Ibstock Brick & Tile Company in 1935. It is now Britain's largest brick manufacturer, with quarries all over the country and an annual capacity of more than 900 million bricks. Ibstock Quarry works a larger range of the Mercia Mudstone Group that includes the Tarporley Siltstone Formation and Radcliffe and Gunthorpe members of the Sidmouth Mudstone Formation.

The brickworks at Ellistown, Desford and Heather grew up from collieries in the late 19th to early 20th centuries. Desford has estimated reserves of around 6.5 million tonnes; extraction levels are around 250,000 tonnes per annum, giving it a life span of about 26 years. Extraction of clay at the site is undertaken on a campaign basis, usually twice a year for about three or four weeks at a time. Excavated clay is loaded into dumpers by hydraulic excavators and taken to the clay stocking area adjacent to the brickworks via the site haul roads. Stockpiles are created using a blend of clay resources designed to meet the production requirements of the brickworks. About 250,000 tonnes per annum is extracted from the quarry, while another 20,000 tonnes of other clays are imported for blending. Coal slurry is also imported and blended with the clays to control the carbon content that aids the firing and also affects the colour of the fired brick.

Throughout the county, there is evidence of many former small-scale workings in the Mercia Mudstone Group, some of which may have been local sources of bricks. Brick-works are also known from the villages of Earl Shilton, Nailstone and Scalford, and the latter worked the Lower Jurassic Whitby Mudstone Formation.

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