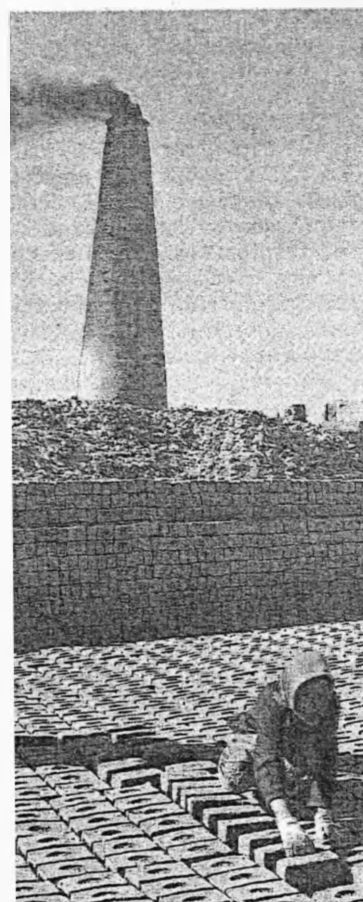


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BRITISH BRICK SOCIETY

# INFORMATION 128

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Fig. 1 South Asia from Karachi to Kolkota showing places mentioned in this issue of *British Brick Society Information*. Names in plain type are of places mentioned in this issue; names in *italic type* are of places included for reference. Names in India are given in modern form, not that favoured during the British administration of the sub-continent.

## Editorial: Brick in Asia

Brick is used across almost all of Asia. From a potentially vast subject and forced to select from the material available, the editor of *British Brick Society Information* has chosen to concentrate on brickmaking and brick buildings in South Asia, with the addition of a news item on 'Measuring the Great Wall of China', the longest brick structure in the world and probably the one in which the most bricks were used.

The initial *raison d'être* of providing members of the British Brick Society with an issue devoted to 'Brick in Asia' arose from a chance discovery of the article on brickmaking in India by a serving officer of the Royal Engineers published in one of the weekly issues of the periodical *Building News* in 1878. At the time when the article was turned up the writer was looking for a reference to government buildings in London in the late Victorian period in connection with a multi-authored article, 'The Building of the New War Office, 1897-1906: the Connection with Brickmaking at Arlesey, Bedfordshire', included in *BBS Information*, **115**, February 2011. Sometime in the final months of 2010, Lawrance Hurst submitted the five photographs which accompany 'Modern Brickmaking in India: A Photographic Essay' which appears on pages 10-25 of this issue of *British Brick Society Information*. It seemed sensible to try to include a transcript of the officer's article with these photographs. Unfortunately, throughout 2011, 2012 and most of 2013, the reference collections of Birmingham Central Library were closed off pending the removal of all books and periodicals to the new Library of Birmingham. An early opportunity to make the transcript was thus denied to the writer and subsequent attempts in the new library to locate the specific issue of *Building News* have been somewhat thwarted. In the last four months of 2013 and throughout 2014, access to material in the stacks of the Library of Birmingham has been severely limited; items are produced on only one day every four weeks and then only if due notice is given; and if a specific item is not produced, the supervisory staff are unwilling to authorize their subordinates to go to the basement stack to attempt to find the item requested.

Once the writer has been able to transcribe the article in *Building News*, a transcript will be included in a further issue of *British Brick Society Information* to be devoted to 'Brick in Asia'.

As Lawrance Hurst makes clear the brickmaking techniques seen in his photographs used have a long history, going back to Harrappa and Mohenjo Daro cultures of the third millenium BC.

Because local details of the geography of South Asia are possibly little known to members, this 'Editorial' is accompanied by two maps: the places marked on them reflect the items in this issue of *BBS Information*. On figure 1, opposite, places in South Asia from Karachi to Kolkota are shown; these include those instanced in the contributions from Lawrance Hurst, David Kennett, Terence Smith and one building noted in 'Brick in Print'. Figure 2 indicates the location of places in north-east India, Bangladesh, and Burma (now Myamar) which are featured in the contributions of David Kennett, Ann Los and Verity Montagu, together with one item in 'Brick in Print'.

The editor is much obliged to and very grateful to those who responded to the call for papers on and provided pictures of brickmaking and brick buildings in Asia.

In making the selection of articles to include in this issue of *British Brick Society Information*, some contributions have been held over. Ann Los, one of the most long-standing members of the British Brick Society, has sent to editor a series of black-and-white photographs of brickmaking in India in the Great War (1914-1918) which will now be used to accompany the transcript of the 1878 *Building News* article. Only in an initial draft stage, what began as a potential editorial on 'Mud Brick, Fired Brick and Glazed Brick in the Near East' is still being worked on; the editor hopes to be able to use this when sufficient further items on brickmaking and brick buildings in Asia are available for a

further issue of *British Brick Society Information* to be devoted to the continent.

Interesting, but now disused and ruinous, brick buildings featured in the episode devoted the comedian Billy Connolly in television programme 'Who Do You Think You Are?'; a distant ancestor of his mother had been a member of the first group of soldiers sent to relieve the siege of Lucknow in 1857. These soldiers, members of a regiment normally stationed in Madras (modern Chennai), had marched a thousand miles north to relieve Cawnpore (now Kanpur) but were two days too late. They were then sent on the still besieged Lucknow where they joined the garrison in defending the fort before troops from Calcutta (now Kolkata) arrived several months later. At Lucknow various brick buildings, mostly unroofed and with much of the internal plaster patchy or non-existent, were seen as Connolly walked round the fort. If a member has information on this fort or any other brick buildings in India, native built or constructed for either the East India Company before 1857 or the subsequent British colonial administration after that date, the editor would welcome an article for this projected issue of *BBS Information*.

Subsequent to the Annual General Meeting in Bury St Edmunds on 17 May 2014, the British Brick Society held two further meetings in the summer. On Saturday 26 July 2014, a group walked along the spine road of Worcester examining public and commercial buildings in the city as well as two brick churches. On Saturday 6 September 2014, members visited Aldershaw Handmade Tiles Ltd at Seddlescombe, near Battle, East Sussex. Reports on these two meetings will appear in the next issue of *British Brick Society Information*, to be sent to members in the early part of 2015.

It is hoped that one of the issues *British Brick Society Information* to be sent to members during 2015 will be devoted to 'Brick in Churches'; contributions are invited.

The editor currently holds one article and two book reviews as well as some shorter items although he knows of other potential articles for the issue. To make up an issue of either 36 or 40 pages, the editor would particularly welcome further contributions on 'Brick in Churches'. It would help if he could be notified of any potential contribution, however short, by 28 February 2015 and to receive copy by 5 April 2015.

DAVID H. KENNETT  
Editor, *British Brick Society Information*,  
Shipston-on-Stour, November 2014.

## Cover Illustration

Brickmaking in Afghanistan; bricks are drying in the sun and the chimney of a kiln occupies the background. This could be from anywhere in Asia in a region extending from Gaza and Israel/Palestine through Iraq, Iran, Afghanistan, Pakistan, and India to Burma and Thailand. Similar scenes of bricks being dried in the sun are also found in Bolivia in South America.



Fig. 2 North-East India, Bangladesh, and Burma: sites mentioned in this issue of *British Brick Society Information*. Names in plain type are of places mentioned in this issue; names in *italic type* are of places included for reference. Names in India are given in modern form, not that favoured during the British administration of the sub-continent.

**Book Notice:**  
**Surveying Islamic Architecture**

Moya Carey (consultant), *An Illustrated History of Islamic Architecture*,  
Wigston, Leicestershire: Southwater, 2012,  
128 pages, numerous unnumbered colour photographs and maps,  
ISBN not stated, price £8-99 paperback with flaps.

The sometimes glorious architecture of Islam is found in many different cultures around the world — from Spain to India, and Turkey to West Africa — each of which has been under Muslim rule. The many types of Islamic structures include mosques, madrasas minarets, mausolea, bazaars, suqs (buildings for the storage of merchants' goods), caravanserais, fortifications, palaces, and, indeed, whole cities. The first section (pp.18-33) examines the main types of Islamic architecture, explaining the layout and purpose of each one. The splendid refinement of such architectural achievements signifies a longstanding culture of taste and discernment. Islam is the common factor in this great output from so many different cultures; although the civilian populations of Western Asia and elsewhere in the Islamic world were never exclusively Muslim, they have long been ruled by caliphs, sultans, shahs and emirs who were. The first caliphate of the Islamic empire was founded by al-Muawiyah of the Umayyad clan in 661 and lasted for 90 years. Beginning with the dynasty of these first Umayyad rulers, the second section (pp.36-123) covers Islamic architecture through the centuries and in different cultures. There are special features on the Dome of the Rock in Jerusalem, the Great Mosque of Damascus, Samarkand tombs in Uzbekistan, the Great Mosque in Córdoba, the garden in Islamic architecture, the Taj Mahal at Agra, and the Topkapi palace in Istanbul.

Islamic architecture in Africa is mainly constructed of mud brick, into which paired wooden poles have been placed horizontally for ease of maintenance. In contrast, depending on materials available in the locality, construction in Asia could be of stone or of brick.

From Asia, notable Islamic brick buildings considered include: in Iraq, the spiral minaret of the Great Mosque at Samarra (pp.34, 46-47) and the tomb of Zumurrud Khatun of 1193 in Baghdad (p.44); in Uzbekistan, the mausoleum of Ismail Samani, the first of the Samanid dynasty, in Bukhara; in Iran, the mausoleum tower of Gunbad-i-Qabus, 60 metres (197 ft) high, built in 1007 at Gorgan, the Friday Mosque at Isfahan, tombs and mosques built by the Seljuks at Seveh and Damghan; and the tomb towers at Kharraqan of 1067 and 1093.

The book ends with a two page 'Glossary' (pp.124-5), understandably brief but rather too limited. The three pages in the work by Stierlin noted in the next paragraph are better but the fullest glossary known to me is the eleven pages in Michael Rogers' book instanced in the next paragraph. Rogers also has a most useful one page bibliography of works in standard European languages.

The photographs in Carey's book are good, but there are better-written introductions to Islamic architecture including Michael Rogers, *The Making of the Past: The Spread of Islam*, Oxford: Elsvier-Phiadon, 1976, and Henri Stierlin, *Islam from Baghdad to Cordoba: Early Architecture from the 7<sup>th</sup> to the 13<sup>th</sup> Century*, Köln, London, etc.: Taschen, 2002. Terence Smith has told me that the best introduction to Islamic architecture known to him is George Michell, ed., *Architecture of the Islamic World: its History and Social Meaning*, London: Thames and Hudson, 1978, reissued in paperback, 1995. On a wider canvas, architecture is an important element in both volumes in the Pelican History of Art series, R. Ettinghausen, O. Grabar and M. Jenkins-Madina, *Islamic Art and Architecture 650-1250*, New Haven and London: Yale University Press, 2001, and S.S. Blair and J.M. Bloom, *The Art and Architecture of the Islamic Lands 1250-1800*, New Haven and London: Yale University Press, 1994. Amongst the books of an earlier generation, the work of K.A.C. Creswell remains important. *Early Muslim Architecture*, Oxford: the Clarendon Press, 2 volumes, 1932 and 1940, and subsequent editions, and *The Muslim Architecture of Egypt*, Oxford: the Clarendon Press, 2 volumes, 1952 and 1959, should be available in larger reference libraries.

D.H. KENNETT



# Measuring the Great Wall of China

David H. Kennett

The Great Wall of China was remeasured in 2012 and the results were reported in various English newspapers. As a major brick monument, the Great Wall (figs.1 and 2) is of considerable interest to members of the British Brick Society. The Great Wall of China (fig.1) is the one of the few man-made structures on planet Earth which are visible from space. It is brick-faced and largely of brick construction but with a rammed earth core. It was not built as a single wall but in a number of stages and with various parallel walls in the eastern sections. Throughout local materials are employed: in some areas neither brick nor stone was used as neither was readily available.

At its greatest extent during the Ming Dynasty (r.1368-1644), in official terms the Great Wall of China stretched from Laolongtou (the Old Dragon's Head) at Shanhaiguan, in the Bo Hai (the Gulf of China), in the east to Jiayuguan, beyond the Gobi Desert, in the west; the wall thus runs through a series of the northern provinces: from east to west, Hebei, Shanxi, Shaanxi, Ningxia, and Gansu. At Shanhaiguan, where the wall reaches out into the Bohai Sea, the great tower above the wall was rebuilt in the 1990s, long after it had been destroyed in the Boxer Rebellion of 1900, the opening event of Chinese nationalist revival in the twentieth century. However, there is also a portion of the Great Wall east of Shanhaiguan, ending at Dandong on the Yalu River, which here forms the border with Korea.

In *The Great Wall of China 221 BC -AD 1644*, Stephen Turnbull translates the reference in *Shi Ji* ('the records of the grand historian') of the creation of the first wall:

After Qin had unified the world, Meng Tian was sent to command a host of 300,000 ... and built a great wall, constructing its defiles and passes according to the configurations of the terrain. It started at Lintao, crossed the Yellow River, wound northwards touching Mount Yang, and extended to Liadong, reaching a distance of more than 10,000 *li*.

Qin Shihuangdi, a man previously known as Ying Zheng, ruled an increasingly substantial part of China in the years between 246 BC and 210 BC, finally unifying the country in 215 BC with the defeat of the Xiongnu at the bend of the Yellow River; he is the emperor buried with the army of terracotta warriors at Xian. A further reference in the *Shi Ji* records how in building the wall for the Emperor Qin, his general, Meng Tian,

utilised the natural mountain barriers to establish border defences, scooping out the valleys and constructing ramparts and building installations at other points where they were needed.

Later records note the Great Wall as built by Emperor Qin as *wan li chang cheng*; where '*chang cheng*' means 'long wall' or 'great wall' and '*wan li*' is synonymous with 10,000 *li*, when one *li* is the around 500 metres, so Meng Tian's wall for the Emperor Qin was somewhere in the region of 5,000 kilometres (3,125 miles) in length.

The Emperor Qin produced the idea of a great defensive wall; the idea has given rise to much myth over the succeeding two millennia. Essentially, his successors enjoying "the mandate of heaven to unify the world" built on the concept: Han dynasty emperors Wendi (r.202-157 BC) and Wudi in 119 BC both commissioned walls. The Han lasted four centuries until AD220. After the fall of the Han, there was chaos in China for three centuries but in the third quarter of the sixth century, the brief rule of the Northern Qi dynasty (r.550-577) brought some stability; the Northern Qi also built walls. Reunification of all of China was accomplished under the Sui dynasty (r.581-618) and their successors, Tang dynasty (r.618-907), both of whom built walls: the Tang thought their military prowess and wall-building capabilities superior to those of their immediate predecessors.

After the fall of the Tang dynasty, the country split into northern and southern kingdoms, with the former falling prey to conquest by the Manchurians and later by the Mongols under Genghis Khan



Fig.1 The Great Wall of China commands the high ground and takes no account of the local topography. Here the brick-built wall and the regular watchtowers snake across the landscape of north-east China north of Beijing. The parapet is clearly visible.

in 1211. The Mongols re-unified China in 1279, ruling until the rise of the Ming dynasty in the mid fourteenth century. The Ming emperors, having permanently moved the capital of a unified China north to Beijing from its traditional base at Nanjing and seeing the fragmentation of the country which ensued when northern barbarians had been permitted to overrun China, to counter the continuing threats of invasion from the Mongols, in 1471, set about creating the great barrier we see today. Brick and stone are both used, brick more often than stone, with these solid materials facing ramparts of rammed earth. A new section was built in the spring of each year completing a distance of 1,700 *li* in three years. Thus by 1474, some 850 km (530 miles) of wall had built by 40,000 men and women. The defences included 800 watchtowers (fig.2) and forts. Thereafter, the wall was extended and kept in good repair for the succeeding half millennium. The Great Wall even played its part in defending China in the Sino-Japanese War (1937-1945).

Whilst the sections around Beijing and to the immediate east and west are brick walls enclosing a rammed earth core, local materials were used elsewhere: sand and vegetation in the far west, often without any stone or brick facing. Where stone is prevalent, particularly if it is easily split into suitably-sized blocks in the quarry, the local stone is used for the casing of the wall. In these sections, brick is often used for the wall walk and the parapets.

Bricks were both mud bricks dried in the sun used mainly for the inner core, and kiln-fired bricks used for the exterior. Brick kilns were sited near the wall to minimize transport, both distance and the labour expended in moving building materials. Kilns were of large capacity, often producing



Fig.2 Throughout its length, the Great Wall of China has watchtowers at regular intervals. This photograph of the brick built wall in north-east China shows two ruined towers, one at a much higher elevation than the other. Both, however, sit on the edge of a precipitous cliff. The wall, here in a partly ruinous state, is set back from the edge of the cliff. Originally, there would have been parapets both at the front and the back of the brick-floored walkway.

many thousand bricks in a single firing. They were fired to a temperature of 1150 degrees Celsius for seven days in a reducing atmosphere, producing a characteristic dark blue brick, often seen as almost black. At the end of the firing process the contents of the kiln were quenched in water to cool the bricks. These bricks were square in form and on average four times the size of the regular house brick, each side being about 500 mm (18 inches). In addition, half-size bricks were made for the crenellations.

When laid, the bricks were held together with a strong mortar made from a mixture of lime, clay and rice flour, the last a 'secret ingredient' only discovered towards the end of the twentieth century; in some sections where the bricks have decayed the mortar remains.

When remeasured in 2012, the overall length of the Great Wall of China was recorded as 13,170.6956 miles (21,073.112 km.).

For those who wish to know more about the Great Wall, a short account is Stephen Turnbull, *The Great Wall of China 221 BC- AD 1644*, Botley, Oxford: Osprey Publishing, 2007, and a superb photographic survey of the wall is D. Schwartz, *The Great Wall of China*, new edn: London: Thames and Hudson, 2001.

# Unloading a Clamp and Transporting Bricks: A Mid-Nineteenth-Century Islamic Depiction

Terence Paul Smith

Parts of the Islamic world have a long tradition of brickmaking and brick building, particularly, and unsurprisingly, where stone was not readily available — in, for example, stone-starved Baghdad, but not in limestone-rich Jerusalem.<sup>1</sup> Throughout the vast area covered by Islam and over its almost-one-and-a-half millennia, manufacturing methods, where bricks were used at all, have varied from place to place and age to age. Ronald Lewcock briefly describes kiln-firing and illustrates it with a photograph, though without stating where and when the latter was taken.<sup>2</sup>

Figure 1 left is from a series of coloured illustrations depicting various crafts, and shows brickmaking and the transport of bricks; also included, for the sake of comparison, is an illustration of hewing and transporting stone (fig.1 right). They were produced in Kashmir in the 1850s.<sup>3</sup> Both drawings are in a simple, flat style with little attempt at perspective and with the figures shown only in profile. In contrast to Lewcock's description, it is clear that these Kashmiri bricks were *clamp*-, not *kiln*-, fired, for no permanent kiln structure is depicted.

The clamp is being dismantled and the fired bricks — coloured red in the original and clearly of rectangular format — are being placed in bucket-shaped baskets.<sup>4</sup> The full baskets are carried, on the back, to a punt-like boat which is moored to the bank. The bricks, it appears, are simply tipped, higgledy-piggledy, in the boat, in contrast with the neatly stacked stones in the right-hand illustration. The latter looks precariously unstable — does this boat, perhaps, have a deeper keel than the brick-laden boat? But both boats, it appears, are capable of carrying quite heavy loads.<sup>5</sup> A number of bricks appear to have been dropped between clamp and river bank: presumably they were gathered up later and placed in the boat. (So too with the stones.) Between the river bank and the brick-boat is a narrow gangplank, giving access to the latter.

The illustrations must relate to one of the hotter parts of Kashmir, for the workers clearly prefer to work in minimal clothing: only the boatman in the stoneworking illustration is fully, and then only lightly, dressed. The brickmakers are all stripped to the waist, clad only in knee-length shorts and bare-headed and bare-footed; nor, even for handling the bricks, are gloves worn. A discarded waist-length upper garment and a turban-like hat are shown on the grass. There are also two (red) pots or basins, presumably for holding the brickmakers' food and/or drink.

Below the main brickmaking illustration are depictions of a basket loaded with bricks, two paddles, a long pole, a rope and a peg for mooring the boat, and two further turban-like hats. The other (stone) illustration shows a paddle being used to propel the boat and, resting against the piled stones, a long pole, perhaps used as a punt-pole when the water was shallow enough, or simply for pushing the boat away from rocks or other obstacles; in the brickmaking illustration these are shown lying in the bow of the boat.

Although some aspects such as clay-winning, moulding, and drying are not depicted, the illustration offers an insight into brickmaking in mid-nineteenth-century Kashmir, a part of the world whose brickmaking techniques have not previously been considered in these pages.<sup>6</sup> They echo practices familiar from the pre-industrial western world, including clamp-firing, the use of baskets for carrying bricks, and transport by water — always the most efficient method before the development of railways, and later, lorries and well-engineered roads.<sup>7</sup>

## NOTES AND REFERENCES

1. G. Michell, ed., *Architecture of the Islamic World: its History and Social Meaning*, London: Thames and Hudson, 1978, *passim*; also D. Talbot Rice, *Islamic Art*, revised edn, London: Thames and Hudson, 1975, pp.58-62 and *passim*; J.W.P. Campbell, with photographs by W. Pryce, *Brick: A World History*, London: Thames and Hudson, 2003, pp.72-77, 114, 115, 148-157. The Islamic world — that is, those parts of the globe where Islam is or was the official or dominant religion — stretches from the Iberian peninsula to Indonesia; but the former was finally lost with the 'Christian' conquest of the Kingdom of Granada in 1492.

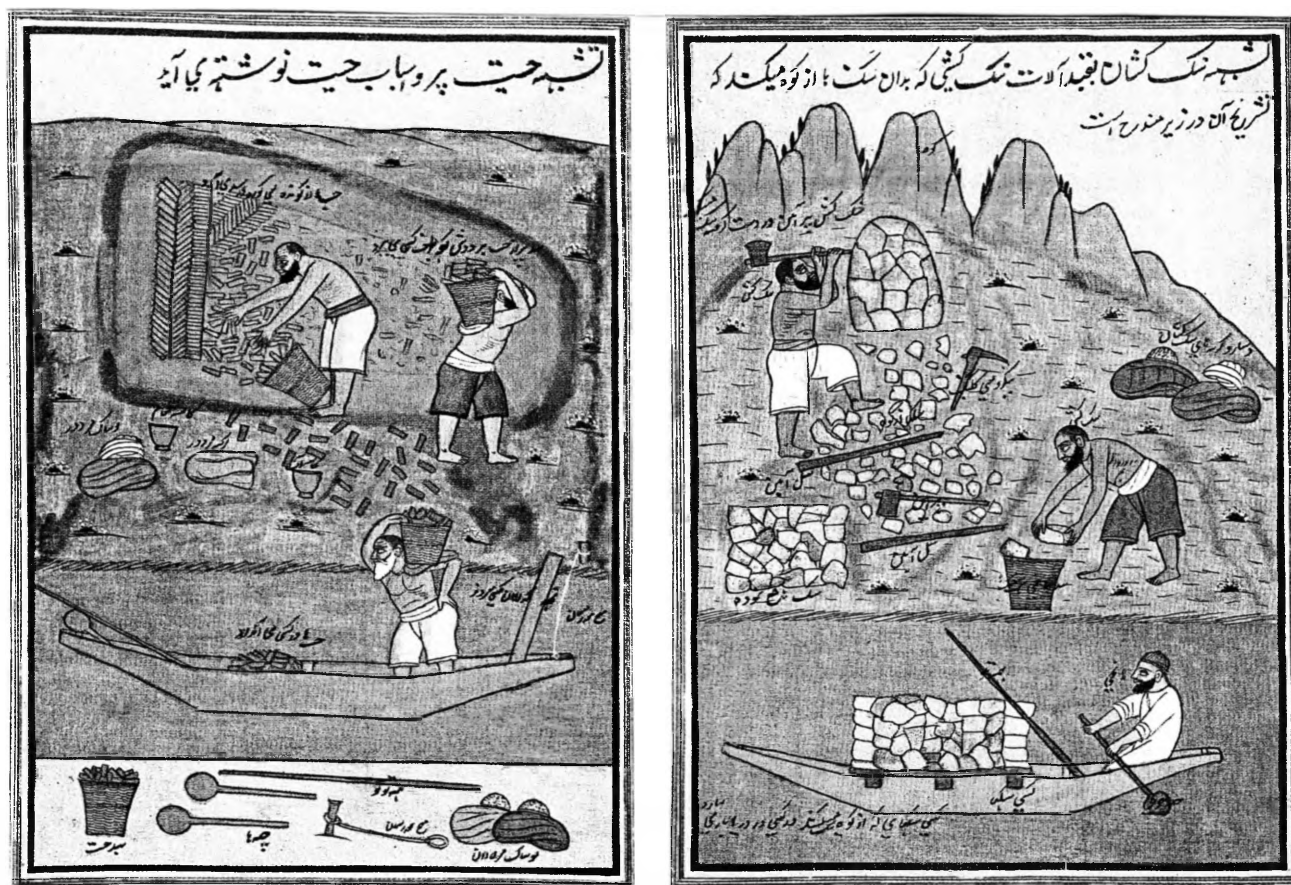


Fig.1 Mid-nineteenth-century illustrations showing unloading a brick clamp (left) and hewing stone (right) in Kashmir; in each case a boat is used for transport.

2. R. Lewcock, 'Architecture, Craftsmen and Builders: Materials and Techniques' in Michell, 1978, p.137 with photograph at p.115.

3. Kashmir in the nineteenth century covered a large part of south-west central Asia; it is now split between China, India, and Pakistan, with the boundaries disputed: see *The Times Concise Atlas of the World*, 11th edn, London: Times Books, 2009, p.138, where the contested boundaries are shown. The climate varies throughout this large region; as noted below, the illustration must depict work in one of its hotter parts.

4. Historically, Islamic bricks were often, but not invariably, of square format and of varying sizes: Lewcock, 1978, pp.136-7; perhaps the format of the 1850s Kashmiri bricks was due to British influence in the period of East India Company rule.

5. The stone-working tools shown are the axe, the jad-axe (adze), and poles which may be crowbars. On the boat, the stones appear to be stacked on a sort of pallet laid from gunwale to gunwale.

6. For clay-winning, moulding, and drying in a present-day brickfield in India see figs.1-3 respectively of L. Hurst, 'Brickmaking in India in the Twenty-First Century: a Photographic Essay', this issue *BBS Information*, pp.23-29, *infra*.

7. For clamps, baskets for carrying bricks, and transport by water in medieval England see, for example, T.P. Smith, *The Medieval Brickmaking Industry in England 1400-1450*, being *British Archaeol. Reps*, **138**, 1985, pp.50, 118 n.375, and 58-9 respectively. 'Baskets were made for carriage, including the moving of bricks ...': J. Harvey, *Medieval Craftsmen*, London and Sydney: B.T. Batsford, 1975, p.156; they are explicitly mentioned in the 1409 building accounts for the North Bar (gate) at Beverley, Yorks.E.R.: A. Leach, 'The Building of Beverley Bar', *Trans. East Riding Antiq. Soc.*, **4**, 1896, pp.31, 34; they are briefly mentioned, but their use in building curiously underrated, in L.F. Salzman, *Building in England down to 1540: a Documentary History*, corrected edn with additions, Oxford: Oxford University Press, 1967, pp. 31, 354.



## From Brickworks to Colliery in Assam, India

Ann Los



Fig. 1 (left) Gaily-dressed women hack brickmaking clay from the claypit servicing the British-built brick kilns at Ledo, in north-east Assam, India. Other women carry the brick-sized and brick-shaped clay lumps to the waiting transport. The clay is taken on a narrow-gauge railway in tipper trucks to the brick kilns. A photograph from the 1970s.

Fig. 2 (right) In the underground depths of a mine in the Assam coalfield in the 1970s a saddle-tank engine named *Sally* hauls trucks with coal. The engine's fuel is a mixture of wood shavings and slack. Cow dung is plastered around the smokebox door to prevent air leaks.

The group of photographs (figs.1-3) included with this note are derived from piece by Colin Garratt in *Practical Photography* for November 1978. Whilst the first photograph shows winning the clay, the chief interest of the group is in the locomotive and rolling stock used to transport bricks and just how similar locomotives used to transport bricks were to those used underground to haul coal.

Ledo is a small town in Assam, near the border between India and Myamar (formerly Burma), in the upper reaches of the Brahmaputra River, and close to the foothills of the Naga Hills. Here, at some point in the late nineteenth century or in the first half of the twentieth, the British built a brickworks to serve the collieries on the Assam Coalfield. The clay was hacked from the earth using a tool like a large hoe by women workers who were gaily dressed in colourful saris (fig.1, lower left). The use of the hoe had the advantage that the lumps of clay retrieved were approximately brick-shaped and brick-sized as can be seen in the cut marks to the right of the lower woman. Other women took the brick-shaped and brick-sized clay lumps in baskets to waiting rail transport (fig1, upper right).

The engines used in the brickfield and in the collieries are saddle tank engines, with the U-shaped water tank above the boiler. Only a curved roof plate on four supports protected the driver and fireman; the supports look rather flimsy. Engines in both locations have a wide fender, almost a cow-catcher in relation to the width of the whole. Almost certainly these engines were manufactured in Britain by one of the firms whose principal activity was the export of railway engines to the colonies and to the rest of the world: Bayer-Peacock of Manchester may not have built these particular engines but they certainly exported railway engines to India. Both on the underground line in the coalfield and



Fig. 3 A saddle tank engine pulls four tipper trucks either with raw clay or finished bricks along a narrow gauge railway on the Assam coalfield in the 1970s.

that on the surface between the clay pit and the brickworks, the railway is a narrow gauge one. An engine named ‘Sally’ worked in the coalfields. Her fuel was wood shavings and slack (sometimes called ‘nutty slack’), a relatively low-grade fuel. The smokebox was plastered with cow dung to prevent air leaks, which would have been hazardous and potentially fatal not just to the engine driver but also to miners working at the coal faces far behind her. The engine in figure 3, working above ground, does not have the smokebox plastered with cow dung. One does wonder about the safety implications of naked flames belching forth from ‘Sally’ as she chugs along her invisible underground track.

The trucks behind the engine are tipper trucks; those in figure 3 are laden with either clay or red bricks. Only two trucks are shown in figure 1 at the clay pit as opposed to the four with an open platform with a brake at the rear in the illustration in figure 3.

Colin Garratt commented that the scene in figure 3 ‘might have been rural Shropshire at the dawn of the industrial revolution’.

# Brickmaking in South Asia: Working Conditions in a Rural Industry

David H. Kennett

## INTRODUCTION

During the past three years, the writer has come across individual items on aspects of brickmaking in the Indian sub-continent either published in other places or broadcast on radio or television.

Whilst each item on brickmaking may be specific to an individual place, it is obvious from collecting them together that working conditions in brickfields are not dissimilar throughout India, Pakistan and Bangladesh. These notes follow a consideration of 'Working Conditions in Asia: Brickmaking and Building', *BBS Information*, **104**, July 2007, pages 19-25, which explored part of the same terrain, although most of that article examined working conditions in China rather than in the Indian sub-continent.

The maps accompanying the Editorial of South Asia (figure 1 on page 2) and North-East India, Bangladesh and Burma (figure 2 on page 4) show the location of the places instanced in these notes. The maps also show the principal cities of the four countries.

## WORKING CONDITIONS: THE PUBLISHED VISUAL RECORD

Every day *The Guardian* uses its centrefold spread to publish a large-scale photograph on a topic of current interest in its 'Eyewitness' series; on some days there is a selection of photographs, whilst on Saturdays the selection comprises 'Photographs of the Week'. The writer has used two of the large-scale photographs and other material in his possession to present an account of working conditions in the brickyards of India, Bangladesh and Pakistan from digging out the clay to transporting bricks from the kiln.

By their very nature, brickfields are situated on the edges of major cities and towns although the industry is better described as a rural one.

A photograph by Felix Clay, 'Eyewitness: Khulna, Bangladesh', published in *The Guardian*, 17 December 2013, as a double-page spread, shows the extent of a Bangladeshi brick factory in the riverine mud of the Ganges/Brahmaputra delta east of Kolkata (Calcutta), India. Khulna is situated beside an eastern subsidiary stream, one of many in the Ganges/Brahmaputra delta. The caption informs us that out of the mud, workers make between 50,000 and 60,000 bricks a day, using mainly hand tools to hack, dig and cut the mud from the ground. The only mechanical devices shown in the photograph are a well-head and a wide wheelbarrow. The country is an extremely poor one. Workers at the brick factory are not well paid; even so, the caption informs us that a fisherman and his wife have to work in the factory to supplement the meagre earnings from their primary activity. The photograph shows much evidence of child labour. In the front group of nine persons, two certainly look as though they are primary-school-age children; one, a boy clad in nothing more than frayed shorts, is probably no older than nine.

Across the centre ground of the Khulna photograph are rows of drying bricks, probably more than half a kilometre in length; behind them are what appear to be stacks of fired bricks. A single chimney in the rear centre of the photograph belches relatively thick black smoke: coal is presumably the fuel. The chimney channels the waste product of the kiln processes into the air rather than recycling the heat into the firing process. In consequence, workers suffer from diseases caused by particulates in the smoke.

A similar double-page spread photograph by M. Muheisen, 'Eyewitness 13.01.11: Islamabad, Pakistan: Another Brick in the Wall', in *The Guardian*, 14 January 2011, shows the building of a clamp in one of the many brickfields on the outskirts of Islamabad, the modern capital of Pakistan. The workers in the photograph are fully-clothed, wearing turban-like headgear, a long shirt-like garment with the sleeves buttoned at the wrist, trousers, and shoes. Working with unfired bricks,



they are not wearing gloves. All the male workers in the Islamabad photograph appear to be adult that is over eighteen years of age. But elsewhere in Pakistan, boys aged twelve or even younger were in charge of donkeys used to carry bricks: the child in the paragraph below figure 1 was the breadwinner for his eight younger brothers and sisters.

The unfired bricks are bring transported to the clamp in two canvas panniers slung either side of a donkey and on the animal's back. Layers of fabric protect the back of the donkey from chafing by the bricks. Donkeys are used as the beast of burden in transporting bricks throughout India and Pakistan.

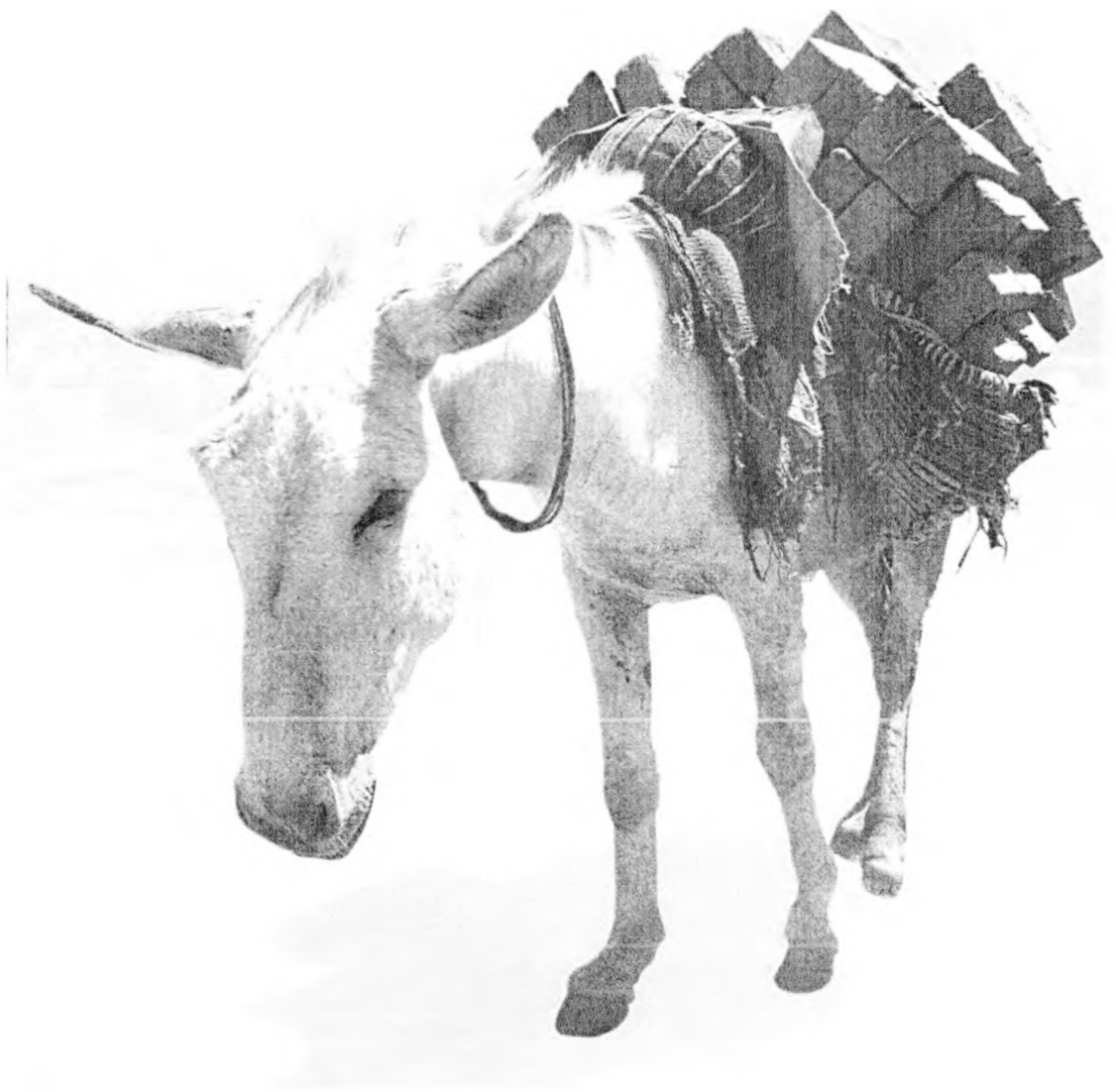


Fig. 1 Donkeys laden with two panniers full of bricks are a common sight on Pakistani, Indian and Bangladeshi brickfields.

Publicity material from The Brooke, an animal charity which provides free veterinary services for donkeys and horses working in the brickfields of Pakistan, has on its cover a collapsed donkey burdened with too large a load of bricks, dehydrated and suffering from chaffing sores; other publicity has shown a dehydrated, over-burdened donkey collapsed in front of a brickworks with its kiln belching out black smoke whose gases are noxious to humans and animals. The case highlighted in the publicity was a twelve-year-old boy named Azim who after a school day was/is working in brickfields near Peshawar. Azim, and his hardworking donkey, Chitta, transported green bricks to and fired bricks from the kiln in loads which caused the animal to become dehydrated and collapse from

exhaustion. The animal was also suffering from raw packsaddle wounds — something judged too graphic to show in the photographs in the publicity.

Part of the work of The Brooke is concerned with prevention as much as cure: there are correct ways to fit a packsaddle so that it does not cause excessive chaffing; water is essential to prevent dehydration; grooming and cleaning out hooves ensure good animal husbandry.

In addition to Pakistan and India, The Brooke works in countries in Africa, where donkeys are used for transporting bricks. Egypt and Ethiopia are two countries where the charity is active.

Some time ago, the writer chanced upon a photograph of a brick factory at Allahabad in India showing a tall, statuesque, and obviously very strong, young woman carrying ten bricks on a pad on her head walking away from a clamp kiln being dismantled after firing (fig.2). She is using her hands to steady the load. The usual load for a woman worker to carry on her head is eight rather than the twelve or even fourteen bricks carried by a male worker. A child of primary-school-age would be expected to carry eight bricks on his head; boys of secondary-school-age are treated as adult males even at fourteen.

## CHILDREN OF THE BRICKFIELDS: AN ONGOING FACT

A quarter of a century ago, *The Sunday Times Magazine* had on its cover the photograph of a child of eight wearing a turban and carrying a load of bricks, two piles of four bricks placed on a board. The caption read, 'This child is eight: he carries three tons of bricks a day'. The article carried the title and subtitle:

Children of the Dust:

In the brickworks of India boys become men at eight years old and die early, innocent victims of a system which turns a blind eye to the exploitation of children.

Their lives were described by one simple word: "burdened".

On Tuesday 29 July 2013, in response to the speech to the United Nations by the then sixteen-year-old Malala Yousafzai, shot by the Pakistan Taliban a year earlier for speaking out against the attempted total closure of educational opportunities for girls, the 'Education Guardian' pages of *The Guardian* carried a piece entitled 'The Taliban is not the biggest barrier to education for Malala's peers'. The sixth paragraph read

Barriers to equal opportunity start long before children enter school. More than 40% of under-fives in Pakistan have been stunted by malnutrition ... Some 8 million of Pakistan's school-age children are spending their days not in school nurturing their minds, but working in brick kilns, sweatshops and fields.

Children in brickfields do the jobs they have done for centuries: carrying green bricks to the kiln before firing; emptying the kilns; carrying fired bricks to be stacked before being transported away from the brickfield; loading the transport whether using road or rail.

The reasons for child employment in brickyards are the same in the second decade of the twentieth-first century as they were for the whole of the twentieth century and earlier centuries: poverty. It matters not whether the poverty line is drawn at a dollar a day (approximately seventy pence) or two dollars a day, both less than the price of a cup of coffee. Boys as young as eight, the then age of Ganesh, the boy featured in *The Sunday Times Magazine* in 1988, have become the chief breadwinner for their families. Injury or death to their fathers and the need to support a parent bringing up his younger male siblings and/or his sisters leads to these children becoming the only paid worker in the family.

One wonders if Ganesh is still alive. Of him and his contemporaries, the article noted of these boys:

At 10 years old they are little adults, old men at 30 and finished at 40, broken under the weight of the bricks or dying of silicosis brought on by the all pervading dust.

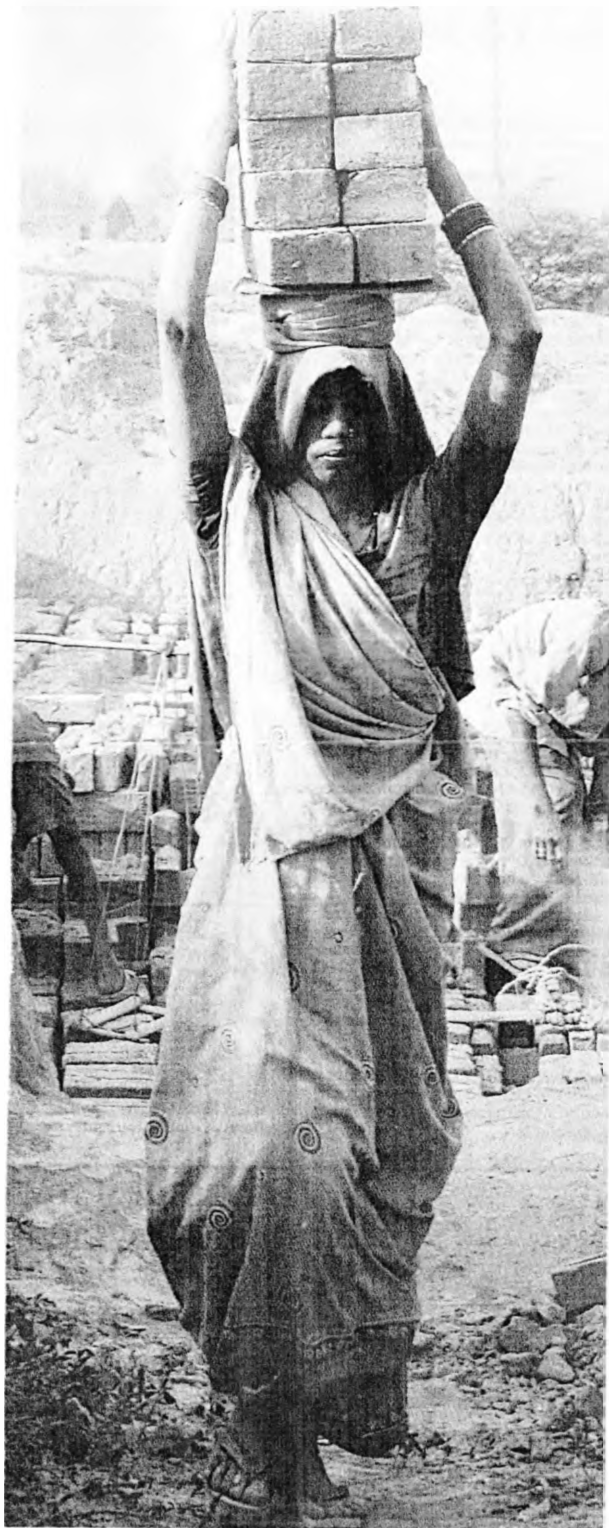


Fig. 2 Young woman carrying bricks at a brickyard in Allahabad, India.

And again:

The dust is everywhere; a softness underfoot, a throat-pricking dryness in the air which clogs the nostrils and claims young lungs with the insidious hiss of emphysema. By the end of the day, hair, skin, every scrap of clothing is coated with fine clay powder. Even the evening meal of chapatis and potatoes is so much dust in the mouth. No wonder the children call this “the work of the dust”.

Chapatis and potatoes are cooked using the heat of the kilns. Home for the fifty child workers at the kiln in Shiliguri is a makeshift den with walls of bricks and a metal roof covered with straw.

Working hours are dawn to dusk with a three-hour break in the middle of the day when the midday sun is too fierce to permit work, especially when the heat is exacerbated by the heat of the kiln. Work is seven days a week. The children work barefoot. The working season lasts seven months from December until the onset of the monsoon rains in June.

The child workers earn 15 rupees (about 80 pence) for every thousand bricks they move; but after deductions of 40 rupees a week for food, their wages were retained until the end of the work season and then the accumulated total sent to their parents.

The child workers of India are members of the Harijanis, the Untouchables; the lowest caste.

At the Shiliguri brickworks featured in the article, the only workers are men and boys. Shiliguri is a town in the plains of north-east India between Nepal and Bhutan and to the north of Bangladesh. Elsewhere in India, brickworks employ women to do similar work to the boys at Shiliguri (see fig.2).

Brick kilns in India, Pakistan, Bangladesh, and in south-east Asia are vast affairs. That in Shiliguri is 150 metres long and 30 metres wide. It is not unique but can be matched elsewhere on the sub-continent. It is ‘a production line so primitive but also so cheap to run that it can easily undercut any modern factory-made bricks’.

In conclusion, I am most grateful to long-standing BBS member Ann Los for drawing my attention to the well illustrated article in *The Sunday Times Magazine*.

## BLOOD BRICKS

A report by Humphrey Hawkesley on BBC Radio 4’s ‘From Our Own Correspondent’, 4 January 2014 focused on a Hyderabad brickyard in Andhra Pradesh, India, but stressed that conditions there are typical of many yards throughout the country. (He might have added that they also occur elsewhere in the sub-continent: Bangladesh and Pakistan.) The problems mentioned are: bonded labour — virtually slavery; minimum wages — often withheld anyway; child labour, with infants as young as five having to work; physical and sexual abuse; and appalling living conditions: to live in a mud hut too small to stand up in is to consider one’s self fortunate! And punishments are harsh: one boy who ran away but was recaptured was given a choice: he could have a hand or a foot cut off — without anaesthesia, of course. He chose to lose a foot. This would be monstrous for a hardened criminal — but for an innocent child .... United Nations directives against such abuses — alas, a mouse squeaking at cats — are ignored with impunity.

There is a certain irony in the fact that this exploitation involving bricks should occur in one of those developing countries collectively known as BRICs. The workers refer to their products as ‘blood bricks’ — a term which, unlike ‘Accrington Bloods’, is not, or not *just*, a reference to their red colour. There are those in India wealthy enough to build lavish brick homes (see *BBS Information*, 121, September 2012, pp.31-32). One wonders if *they* wonder about the source of their bricks — in a country that can afford nuclear weapons and a space programme.

T.P. SMITH

# Place Brickmaking in India: a Photographic Essay

Lawrance Hurst

The five pictures of place brickmaking on the North Indian Plain which accompany this note were taken by a colleague whilst on holiday in India beside the road between Jaipur and Udiapur. They show slop moulding on the ground (in the place), drying and firing in clamps, in the way it must have been done for centuries and continues today, and just as it must have been done around London and in Kent until the late nineteenth century. This is almost exactly as the excerpt from Owen's *A New and Complete Dictionary of Arts and Sciences* of 1763 quoted by Lawrance Hurst in his article on 'Place bricks — their making, properties and use' in *British Brick Society Information*, **112**, April 2010;<sup>1</sup> the description is reproduced in Appendix 1 below.

This was presumably the way in which bricks were made for the construction of Moenjodaro in around 3500 BC and explains why there is no trace of brickmaking activity surviving in the vicinity because nothing would be left for archaeologists to find after the brickmakers had moved on.

## APPENDIX 1

Description of the making of place bricks given by William Owen in *A New and Complete Dictionary of Arts and Sciences*.

Making of BRICK. With regard to the manner of making bricks, we have place-bricks, generally made on the eastern part of Sussex; so called because of a level smooth place just by where they struck or moulded. In this place, the bearer-off lays the bricks firmly down in ricks or rows, as soon as moulded, where they are left till they are stiff enough to be turned on their edges, and drest, i.e. till their inequalities are cut off; when they are dry, they carry them to stacks, or places where they row them up, like a wall of two bricks thick, with some small intervals betwixt them, to admit the wind and air to dry them. When the stack is filled they are covered with straw on the 'top, till they be dry enough to be carried to the kiln to be burnt.

Stock-bricks are of the same form with place-bricks, though different in the quality of their earth, and manner of making. They are made on a stock, that is, the mould is put on a stock, after the manner of moulding or linking of tiles; and when one brick is moulded, they lay it on a piece of board, a little longer than the brick, and on that brick they lay another like piece of board, and on this, another brick, till after this manner they have laid three bricks on one another; and so they continue to strike and place them on the stage, as they do tiles, till the stage is full, then they take each three successively, and carry them to the stacks, and turn them down on the edges, so that there will be the thickness of a thin piece of board betwixt each brick. When the stack is filled with one height of bricks, from one end to the other, they begin to set them upon those first laid on the stack; by that time they will be a little dried, and will bear the others; for they are moulded of a very stiff earth. When they come to set a second, third, &c. height or course, they cater them a little, as they call it, to prevent their reeling. When the stack is as high as they think fit, they cover them with straw, as they do place-bricks, till they be dry enough to burn. This way is more troublesome than that of making place-bricks; but they are forced to have recourse to it in many places, where, if they laid their bricks abroad in a place to dry, as they do place-bricks, the nature of the earth is such, that they would burst to pieces.<sup>2</sup>

*Note:* Captions to the illustrations (figs.1-5) appear on page 25.



Fig. 1





Fig. 2

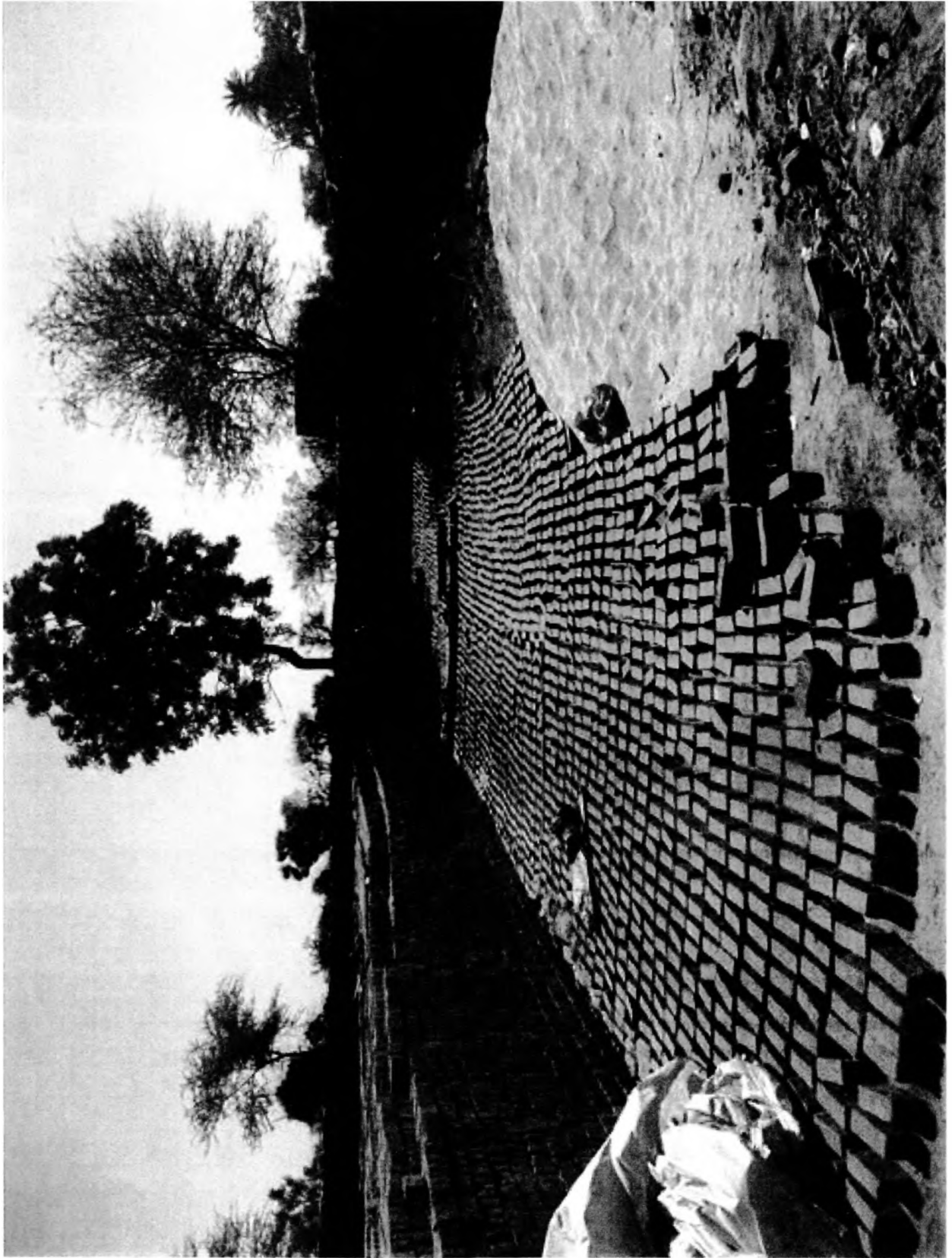


Fig. 3



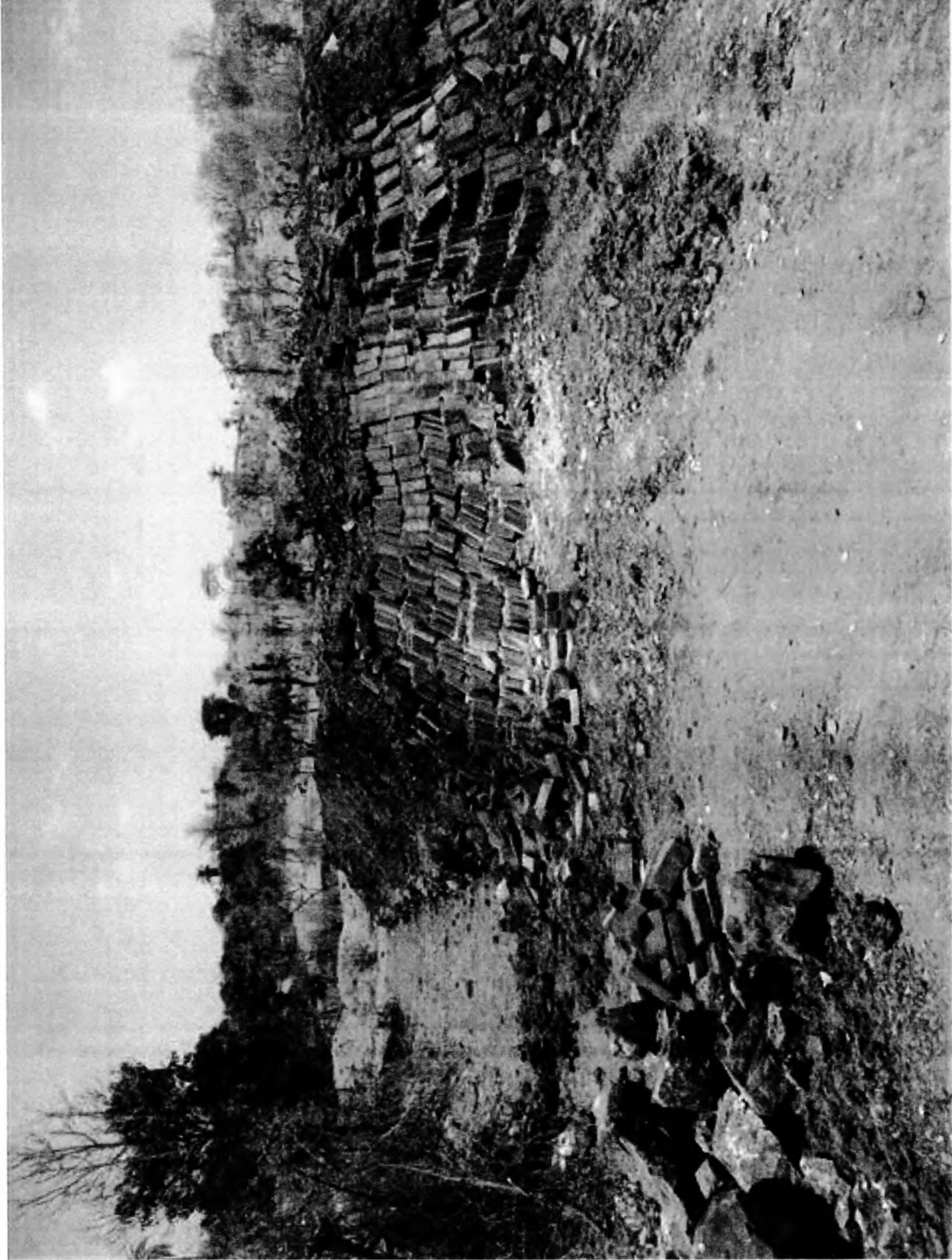


Fig. 4



Fig. 5

## REFERENCES

1. L. Hurst, 'Place bricks -- their making, properties and use', *BBS Information*, **112**, pp. 20-26. Sciences: By a Society of Gentlemen. The second edition, printed for William Owen, London, 1763, pp.377-8; quoted Hurst, p.21.
2. *A New and Complete Dictionary of Arts and*

## Captions to illustrations

- Fig. 1 An adult brickmaker using a five-part slop mould to make bricks on the ground, with a younger worker in the background using a mattock to break up the clay. The bricks are being made in the area from which the clay has been dug.
- Fig. 2 The brickmaker lifting clay from the pile beside him to put into the mould. Note how each group of five green bricks is off-set slightly from the one next to it.
- Fig. 3 Individual brick are laid out separately to dry prior to the construction of a large clamp.
- Fig. 4 A partly-dismantled clamp with bricks set on edge.
- Fig. 5 Two brick clamps beside the road from Jaipore to Udiapore.

## Book Review:

### Persian Brick is not only Beautiful and Instructive but also Clever

Sheila S. Blair, *Text and Image in Medieval Persian Art*,  
Edinburgh: Edinburgh University Press, 2014,  
xvi + 336 pages, 142 illustrations, many in colour,  
ISBN 978-0-7486-5578-6, price, hardback, £75-00

Henri Stierlin, *Persian Art and Architecture*,  
London: Thames & Hudson, 2012,  
280 pages, numerous unnumbered illustrations, many in colour,  
ISBN 978-0-500-51642-3, price, hardback, £42-00.

Both of these books were expensive but highly worthwhile presents to myself; that by Sheila Blair was a conference purchase at half price. Both books are beautifully produced and extensively illustrated. Both have much to excite the student of brick buildings, especially one who is unlikely to travel to the eastern part of south-west Asia to see the buildings. Blair recounts how she was unable to get a visa in 2011 to travel through Khurasan in northern Iran; in 2014 the new Iranian government appears to want to be seen promoting tourism from the west and has relaxed border restrictions.

Both books are by authors whose contributions to the wider study of Islamic art and architecture in general and specifically to Persian art and architecture in particular are well-known. This reviewer's own shelves, for example, include *The Art and Architecture of Islam 1250-1800* by Sheila S. Blair and her husband, Jonathan M. Bloom, and Henri Stierlin's *Islam from Baghdad to Cordoba: Early Architecture from the 7th to the 13th Century*.<sup>1</sup>

Stierlin's book is translated from his *L'Art Persan* <sup>2</sup> and covers the Persian sphere of influence, a much wider area than modern Iran, in eleven chapters ranging from 'The Rise of Islam' (pp.22-47), in Persia beginning with the Islamic conquest of 637-642, to the twentieth-century 'Khiva: A Khanate in Central Asia' (pp.256-261). Between these two are seven chapters useful to the student of brickwork and its uses: 'The Seljuks' (pp.24-61), 'The Mongol Invasions' (pp.62-81), 'Timur and Samarkand' (pp.92-37), 'Bukhara and the Shaybanids' (pp.158-175), 'Isfahan and the Saavids' (pp.176-195), 'Reflections of Paradise' (pp.196-233), and 'The 18th and 19th Centuries' (pp.234-255). The remaining two chapters — 'The Islamic Golden Age' (pp.82-91) and 'Minatures' (pp.138-157), — are primarily concerned with non-brick matters. Sadly, the latter does not include any illustrations of building technology or references thereto.<sup>3</sup>

Stierlin's photographs emphasise the varied uses of brick in the Persian sphere of influence. Thus, page 35 is a close up view of the Tomb of the Samarids in Bukhara, a monument Stierlin suggests was built in or before 907, the year when its inhabitant, Ismail Samani, died.<sup>4</sup> The bricks are laid in small blocks alternating a vertical group of three stretchers with one where three edges of narrow bricks laid vertically; the effect gives a texture akin to high quality knitting. The monument has corner columns of four stretchers on top of one another alternating with four laid so that a corner shows (close-up photograph on page 38). A later monument in Bukhara, the Kalyan Minaret erected in 1127, uses a series of nine major brick bands, each one different and adjoining ones marked off by a narrower band. In the centre of Bukhara is The Ark, the great fortress. Built of unglazed brick, the walls slope outwards in a gentle convex curve punctuated at regular intervals by great semi-circular towers bursting out with curving walls in three dimensions. Stierlin's photograph (pp.160-1) shows one side including a corner tower which at the top is almost a complete circle attached only tangentially to the citadel's wall. What Stierlin's photograph also shows is the breaks between the eight building seasons as well as the putlog holes left for maintenance.

In the eleventh century, unglazed brick was used by the Seljuks to create patterns on the minarets of the mosques in Isfahan and elsewhere whilst in The Friday Mosque in Isfahan has twin minarets decorated with glazed brick as are the walls of the great courtyard. The men who designed and built the brick structures of Isfahan and elsewhere showed great engineering skill. Stierlin illustrates how a square space is transformed by corner squinches into a circular space at the base of the dome (p.58): it is very sophisticated. They follow the example of the buildings erected by previous



Fig.1 The Tomb of the Samarids at Bukhara.

rulers of the world: the Babylonians, the Elamites, the Sassanians. Even in its present, severely reduced state, the seventh-century Sassanian great arch at Ctesiphon remains impressive; but much has fallen within the period since photography has been available.

Glazed brick shines in the strong light of the very dry sand belt that more or less encircles the earth north and south of latitude 30 degrees North.<sup>5</sup> Blue in a great variety of shades was the favoured colour but white, green, yellow are all found. Even without its glazed brick the Gur-i Mir, the tomb built in Samarqand for Timur's favourite grandson, Muhammad Sultan, with its ribbed dome would be spectacular; with its silver and blue interior created from papier mâché laid on a network of wooden struts in front of the brickwork, the interior is breathtaking. Equally sophisticated brickwork occurs in the series of glazed specials which are laid to form quotations from the Qur'an. The jambs of the entrance to the Friday Mosque in Natanz, built in 1304, has a double band of Qur'anic inscriptions, one in the square Kufic script using blue glazed brick, the other in a cursive script using unglazed brick set against a blue background. Friezes to tombs could be even more elaborate. Now in the Aga Khan Museum, Toronto, is a 'brick' forming part of an early-fourteenth-century frieze decorated in four separate colours: most prominent is part of an inscription from the Qur'an in cobalt blue using a *thuluth* script raised up from a background of white palm leaves and turquoise vine tendrils, with raised edges contains other texts from the Qur'an inscribed in a *naskhi* script in black against a white glazed background.

Towards the end of Stierlin's work are two photographs (pp.253-5), a reminder of the fragility of all ancient monuments, especially those in Persia (modern Iran). The now destroyed city and fortress of Bam in south-east Iran suffered a major earthquake in 2003. The fortress and many of the city's buildings had been built of mud brick, some originally dating from prehistory and rebuilt more than once. Like all the mud brick fortress of the eastern Persian frontier, Bam had largely been destroyed by the Mongols in the thirteenth and fourteenth centuries but subsequently had been rebuilt. The mud brick wall of the fortress stretched for over a mile and had thirty-eight towers, some with elaborate decoration in mud brick. To ensure that water ran off the walls, they sloped outwards.



Fig.2 The Tomb of Uljaytu at Sultaniyya.

Blair's book is a more specialist work but delves deeper. Her conclusion is worth quoting first: "To put it succinctly, Persian art is not only beautiful and instructive, but also clever." (p.290); an adaptation of these words provides the title for this review. After a brief introduction (pp.1-10), each chapter concentrates on one of five well-known and frequently illustrated objects from the middle Islamic period of Persian art, roughly the tenth to the sixteenth centuries. The author discusses first 'The Art of Writing: A Bowl from Samarqand' (pp.11-56), an object in the Freer Gallery of Art, Washington DC and her second chapter examines 'Perfuming the Air: A Rosewater Sprinkler from Herat' (pp.57-111), now displayed in the David Collection, a private museum in Copenhagen. Her third subject is 'Monumentality under the Mongols: The Tomb and Uljaytu at Sultaniyya' (pp.112-171); the fourth, an addition to the lectures on which the book is based, looks at a 'Romantic Interlude: The Wedding Celebrations from a Manuscript with Three Poems by Khwaju Kirmani' (pp.172-227). The fifth essay examines 'Proclaiming Sovereignty: The Ardabil Carpets' (pp.228-283), artefacts now in the Victoria and Albert Museum, London and the Los Angeles County Museum, California, USA.<sup>6</sup>

The bowl belongs to the tenth century and the rosewater sprinkler is approximately a century later. The tomb has a precise building date, 713 AH (1313-14 AD); its inhabitant ruled from 1304 to 1317. . The manuscript is approximately a hundred years later 798 AH (1396 AD) and the carpet from 946 AH (1539-40 AD).

The object in question is the starting point. The discussion moves into a wider sphere. That of the rosewater sprinkler moves to similarly decorated objects like candlesticks and on to elaborate ewers to Islamic poetry, thence to buildings of the Ghurid dynasty and the inscriptions carved on them, to the art of calligraphy in a bilingual copy of the Qur'an, to more on metalware and ceramics, taking in also leatherwork and furniture. Brick buildings are illustrated: the minaret of Jam in central Afghanistan (p.71); the two domed buildings at Chisht, between Jam and Herat (p.73); and the congregational mosque at Herat (pp.76 and 77). Both the minaret and the portal of the mosque have inscriptions executed in bricks with a turquoise blue glaze. These are buildings of the final third of the twelfth century.

Students of brick will be most interested in the chapter on the tomb of Uljaytu at Sultaniyya (pages 113-171), now an isolated building on an isolated site in north-east Iran but once part of a great Mongol city. The brick-built tomb was part of a complex surrounded by a low stone wall, with another tomb and a mosque within the enceinte. Blair omits to reproduce the instructive pictorial map of 1537 by Matrakci Nusuh of the complex which is included in *The Art and Architecture of Islam 1250-1800*.<sup>7</sup> Internally, the tomb is an octagonal building crowned by a double-shelled, pointed dome;



externally the dome was ringed by eight minarets; today, only stumps survive. The north front is extended out to meet the east and west sides, thus providing triangular internal spaces incorporating stairs to the upper elements. To the rear of the central space is a rectangular hall. All is on a monumental scale. The octagonal hall has an internal diameter of 25 metres (82 ft) and an external one of 38 metres (125 ft); the rectangular hall measures 15 by 25 metres (49 by 82 ft).

The present day remoteness of the building in its now isolated setting is amply brought out by the photograph occupying pages 80 and 81 of the book by Stierlin also reviewed in this notice. Blair reproduces the first close-up photograph taken by Antoine Sevruguin and another, better-known one, included by Eugène Flandin and Pascal Coste in their *Voyage en Perse*, whose two volumes were published in 1851 and 1854. The book which permitted scholars and architects to become acquainted with the structure and in the case of Louis J. Bourgeois between 1903 and 1913 to be inspired by it to create the Second Baha'i House of Worship at Wilmette, Illinois, USA.<sup>8</sup> From the now destroyed first temple at Ashgabad (now Ashgabat), Turkmenistan, all Baha'i temples have been nine-sided; for which the octagonal Uljaytu tomb may have provided a potential model. The Baha'i successors to Uljaytu's mausoleum are discussed by Blair on her pages 160-162.

Blair's illustrations of the structure of the tomb and adjacent rectangular hall include elevation and ground plan (p.115) and a section showing the ovoid double-shelled dome over the tomb (p.116). Her internal photographs (pp.118, 119) show the brick vaults to the crypt and the gallery. Figures and photographs reveal a level of sophistication in building in brick in the early fourteenth century which it would be difficult to match in Europe.

Even more difficult to match would be the decoration found on the brickwork of the tomb of the Samanids at Bukhara, Uzbekistan, according to Blair built in the 930s rather than the 907 favoured by Stierlin. The structure is almost a perfect cube: its sides are slightly tapered. The highly decorative brickwork has a rounded dome as its ceiling. As Blair remarks (p.136), it cannot have been without antecedents. It had notable successors, such as the tomb of Sultan Sanjar (r.1118-1153) at Marv, Turkmenistan, another square building constructed of brick but with a pointed dome. This tomb was the inspiration for the now destroyed tomb of Ghazan (r.1290-1307), which from a near contemporary illustration now in Berlin (reproduced p.130) shows a twelve-sided structure in a courtyard: the pinkish red colour of the building suggests brick. Uljaytu wanted his tomb to be more magnificent than his brother's who in turn had desired to outdo Sanjar.

Later Mongol tombs, built of brick and adorned with tile, took inspiration from the tombs of Uljaytu and Ghazan. The tomb at Kunya Urgench, Turkmenistan, was renovated for princess Turabeg Knaum, direct descendant of Genghis Khan, probably by Timur in the 1380s. Ahmad Yasavi (d.1166) was a Sufi sheikh responsible for converting the nomadic peoples of the steppes to Islam. Initially he was buried in a modest structure at Turkestan, Kazakhstan; by the 1390s, it had become a place of pilgrimage. Timur replaced the original building with a complex of portal, gathering place and tomb room with crypt, the same configuration as found at Kunya Urgench and Sultaniyya. As with Gothic cathedrals in contemporary Europe, Timur's builders encountered structural problems. The tomb of Ahmad Yasavi was initially built between 1391 and 1395 but, perhaps because of innovations in the vaulting systems, required revetment and a new superstructure was added between 1397 and 1399. The tomb at Sultaniyya also influenced the tomb built by Timur, for his grandson and heir at Samarqand in the first decade of the fifteenth century: Timur died unexpectedly in 1405 and was buried there. The Gur-i Mir is much illustrated by Stierlin (pp.114-117) but not by Blair.

Blair's lectures were delivered in 2011; Stierlin's book appeared in French in the same year. Less than twelve months later, a work appeared demonstrating that for the Near East and Iran, climate change produced economic and social catastrophe in the century and a quarter between 950 and the Battle of Manzikert in 1071.<sup>9</sup> The temperature in the Persian lands dropped by 2 degrees Celsius, thus allowing the Seljuks to sweep into the country from the north. The Mongols first arrived in Persia because of a serious political mistake: the then Shah executed and then returned the severed head of Genghis Khan's ambassador, hardly a move designed to endear one ruler to another.

One important lesson of which the books by Stierlin and Blair constantly remind us is that Persia has been a superpower, albeit with periods of relative impotence, for a very long time: since before Cyrus the Great defeated Babylon in 539 BC and his son, Darius the Persian, impressed the makers of glazed brick so that they would take their skills into the southern part of the Zagros Mountains to adorn his capital at Susa.<sup>10</sup> The buildings and artefacts of the tenth to sixteenth centuries

are just one phase in the indisputable reality of the geo-politics of south-west and central Asia. In those same centuries, in cultural terms the Persians used their political and economic power and influence wisely.

D.H. KENNETT

## NOTES AND REFERENCES

1. S.S. Blair and J.M. Bloom, *The Art and Architecture of Islam 1250-1800*, New Haven and London: Yale University Press, 1994, and H. Stierlin, *Islam from Baghdad to Cordoba: Early Architecture from the 7th to the 13th Century*, Köln, London, etc.: Taschen, 2002.
2. H. Stierlin *L'Art Persan*, Paris: Imprimerie Nationale Éditions, 2011.
3. For one such illustration, see T.P. Smith, 'Unloading a Clamp and Transporting Bricks: A Mid-Nineteenth-Century Islamic Depiction', this issue of *BBS Information*, pp.00-00.
4. This dating is followed J. Campbell, *Brick: A World History*, London: Thames & Hudson, 2003, p.75. *Ibid.*, pp.74-77, has superb photographs, by Will Pryce, of the Tomb of the Samarids.
5. The writer's only experience of this belt is northern Texas in the early autumn where temperatures can reach over 95 degrees Celsius but it is a dry heat. The level of humidity is very low, unlike the same level of heat but with near 100 per cent humidity in New Orleans.
6. To emphasise the familiarity of these five items, in Blair and Bloom, 1994, Blair herself illustrates the page from the Khwaju Kirmani manuscript on p.32; the tomb of Uljaytu at Sultaniyya on p.7, accompanying it with the view of the city in 1537; and the Arbil carpet in the V & A on p.172. Discussions of these and the parallels she adduces in her present book can also be found in Blair and Bloom, 1994. Blair and Bloom, 1994, is confined to the thirteenth century and beyond.
7. Blair and Bloom, 1994, fig.3; the tomb is considered *ibid.*, pp.7-8 with figs.3-5 and 7. See also Campbell, 2003, pp.118-121. M.S. Rogers, *The Spread of Islam*, Oxford: Elsevier Phiadon, 1976, p.15, illustrates both Nusah al-Martaqi's 1537 representation and the remains of the tomb.
8. Wilmette lies outside the limits of the city of Chicago and hence no information on the Baha'i temple is available in A. Sinkevitch, *AIA Guide to Chicago*, Orlando, Austin etc.: Harcourt, 2004. Blair informs us that the building is constructed of concrete. The writer has not seen the building.
9. R. Ellenbaum, *The Collapse of the Eastern Mediterranean Climate Change and the Decline of the East, 950-1072*, Cambridge: Cambridge University Press, 2012 (pbk, 2013), *passim*.
10. For glazed bricks at Susa see Campbell, 2003, pp.36-39; for glazed bricks in Babylon, *ibid.*, pp.34-35, and I.L. Finkel and M.J. Seymour, eds., *Babylon: Myth and Reality*, London: British Museum Press, 2008, pp.41-59, 71-73, and 85, with many coloured illustrations.



# Aspects of Brick in Central Burma

Verity Montagu

## INTRODUCTION

The photographs accompanying this article were taken on a visit to Burma, a country since renamed Myanmar, in January 2002. They show brickmaking at Bagan, south-west of Mandalay (figs. 1 and 2) and the unfinished Mantara Gyi Pagoda at Mingun, about 10 miles (16 km) north-west of Mandalay.



Fig.1 Brickmaking at Bagan, Burma.

## BRICKMAKING AT BAGAN

Bricks used in the restoration of the stupas and temples at Bagan (alternatively Pagan) are made from local clay with the addition of a little cement which is brought in and some very fine sand. The most expensive item needed is the water, kept in tarpaulin-lined pits.

We watched a couple of men at work; one was scooping the clay from a prepared mound and shaping it roughly into brick-size parcels (fig.1, lower right), and the other producing the brick (fig.1 centre). The workers are expected to make 2,580 bricks in a day, for which they get paid about 30 pence, working a twelve-hour day, seven days a week.

Made to effect restoration of the monuments at Bagan, the modern bricks are the same size as the ancient ones. The latter were 370-400 mm (15-16 inches) in length, had a width of 180-225 mm (7-9 inches) and a height of 50 mm (2 inches). The narrowness of the bricks can be seen in the bricks set on edge in figure 2.

We did not see the kiln but there was smoke coming from a shed further over the field and in between were row after row of bricks drying (fig.2). In his book, *Brick: a World History*, James Campbell states that the bricks are fired in clamp kilns using palm roots and charcoal as fuel. The tall trees reaching up beyond the top of figure 2 are one form of palm tree. Each firing is about 50,000 bricks.<sup>1</sup>

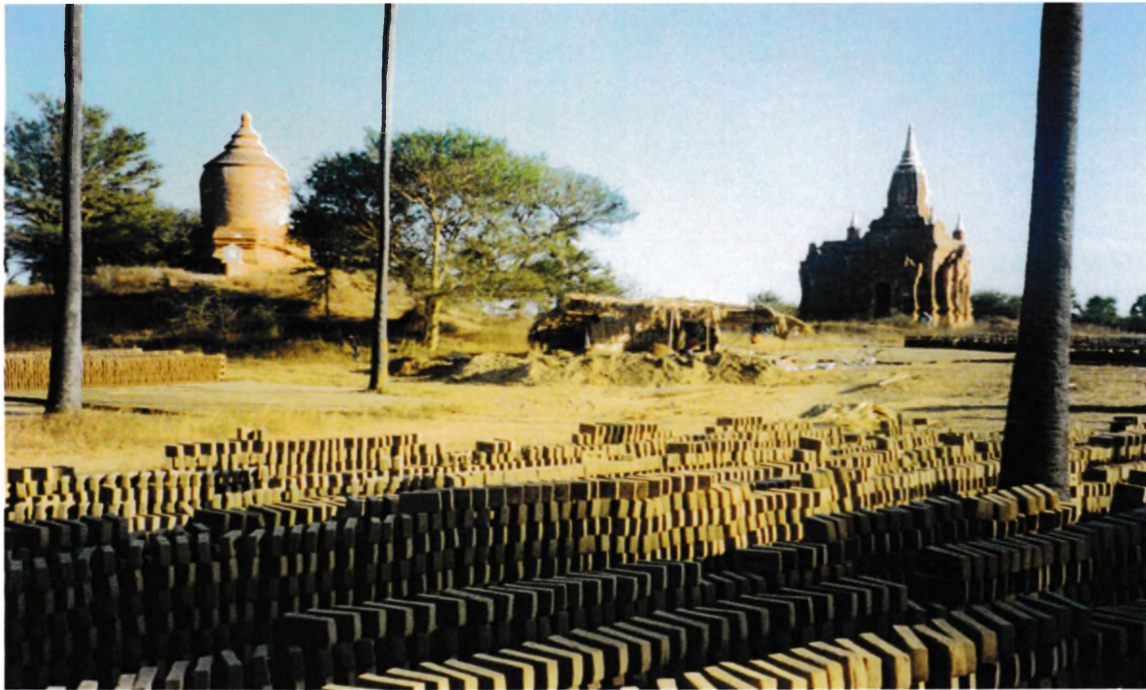


Fig.2 Bricks drying at a brick factory at Bagan, Burma, with brick-built stupas in the background.

In the background of the drying in figure 2 area are several stupas. A stupa is a structure built to enclose a sacred object, which is housed in a sealed room. A stupa is totally sealed and has no door. But the structures are not completely solid, despite their thick walls. The interior of a stupa is a series of vaulted spaces, either a pointed vault or a barrel vault.

The stupas in the background of figure 2 are some of the more than two thousand monuments surviving from a total of around five thousand stupas and temples built at Bagan. In the eleventh century AD, Bagan was the capital of a kingdom covering much of Burma and extending into parts of Thailand. Its best-known ruler, Anawrahta (*r.* 1044-1077) was a contemporary of King Edward the Confessor (*r.* 1042-1066) in England. He initiated the building of the complex.

Bagan survived as a major cultural and religious centre until it was invaded by the Mongols in 1287 but they did not destroy the site. Hereditary groups of *hpaya kywan* occupied the area and they were dedicated to the upkeep of the site.<sup>2</sup>

## THE UNFINISHED PAGODA AT MINGUN

The unfinished Mantara Gyi Pagoda at Mingun (fig.3) is a vast brick edifice which although standing 162 feet (50 metres) high; however, it is only one-third of its originally projected height of 500 feet (152 metres). Its scale can be judged from the size of the two people seen against the white central portion of figure 3. The structure towers above the bank of the River Ayeyarwady (Irawady) (fig.6). Construction began in 1790 and continued for seven years until economic difficulties and local suspicions of the edifice being a potential curse leading to the destruction of the kingdom brought building work to a halt. Burma, like other parts of south-east Asia, experienced a severe economic crisis around the year 1800.

The patron of this vast building enterprise was King Bodawpaya (*c.* 1744-1819) ruled central Burma for 38 years, coming to power in 1781; in addition to an extensive area around Mingun and Mandalay, he was lord of Tanintharyi, the Mon lands, and Rakhaing lands. King Bodawpaya was the fourth son of Alaungpaya, the founder of the Konbaung dynasty.

The pagoda was constructed to house a tooth of the Buddha, secured by King Bodawpaya from a visiting Chinese embassy. The precious relic was enclosed in a chamber lined with lead which was filled with 1,500 gold figures, 2,434 silver images, and 37,000 other objects, including a soda



fountain, a newly-invented machine imported from England. The shrine and its contents were sealed within the partly constructed pagoda.

The pagoda is built entirely of brick and no rubble seems to be present. King Bodawpaya was a militarily successful monarch and imported thousands of slaves from his newly conquered southern territories to act as labourers in the building of the pagoda.

In 1838, almost two decades after the death of King Bodawpaya, a substantial earthquake hit central Burma, creating a huge gash down one side of the unfinished pagoda (figs.3 and 4). As with the economic difficulties of the first two decades of the nineteenth century, after the earthquake, no one had the drive to repair or to continue building the Mantara Gyi Pagoda.

The top of the structure is marked by platforms constructed of very large bricks (figs.5 and 6). It is quite a climb to the easy viewing area (see the path to right of pagoda on figure 3) but I was permitted to go on and tackle the next stage, albeit bare foot and escorted by two small boys who said they were guides, so I could at least see all sides and had a good view of the backsides of two huge brick lions built to guard the entrance across the road.

The whole edifice is mind-boggling in its concept. What do other British Brick Society members make of it?

For the pagoda, King Bodawpaya had a great bell cast in 1790. Still surviving, although dislocated from his housing on the pagoda in the 1838 earthquake, the bell weighs 87 tonnes, and is 12 feet (3.7 metres) high and 16 ft 6 in. (5 metres) wide at the base.

There are a number of other notable pagodas in Mingun (fig.4 in the background). The Poadow Pagoda is a smaller replica of the Mantara Pagoda. King Bodawpaya built a second pagoda in 1816. The whitewashed Settuwya Pagoda was built to house a marble foot of the Buddha.

In 1816, Baggidaw, the grandson of King Bodawpaya, built the Myatheindan Pagoda as a memorial to his favourite wife, Princess Simbyume. This was damaged in the 1838 earthquake but was rebuilt by King Mindon in 1874.



Fig.3 The Mantara Gyi Pagoda at Mingun, central Burma: general view. The gash on the left is as a result of an earthquake in 1838. The size of the edifice can be judge by the two people seen against the base of the whitewashed portion in the centre. The structure is 162 feet (50 metres) high.





Fig. 4 left  
Fig. 5 right  
Captions  
opposite







Fig.6 The view across the Ayeyarwady River (also known as the Irawady River) from the top of the Mantara Gyi Pagoda at Mingun, central Burma.

Fig.4 (opposite, left) The gash in the side of the Mantara Gyi Pagoda at Mingun is a result of a major earthquake in 1838. The damage allows examination of the construction of the edifice, showing that bricks were used throughout.

Fig.5 (opposite, right) The top of the constructed part of the Mantara Gyi Pagoda at Mingun is made of large flat bricks providing a viewing platform and indicating where the building would have narrowed in width.

## REFERENCES

1. J.W.P. Campbell, *Brick: a World History*, London: Thames & Hudson, 2003, p. 83 gives a full account of brickmaking at Bagan (called by him 'Pagan', the old transliteration of the name in Burmese).
2. Campbell, 2003, pp. 82-87, for another account of the stupas of Bagan, illustrated with many photographs in colour by Will Pryce.

## Book Review: *Brick in Early Soviet Architecture*

MaryAnne Stevens, M. Tsantsanoglou, and Richard Pare (curators and editors),  
*Building the Revolution: Soviet Art and Architecture 1915-1935*

272 pages, numerous black-and-white and colour photographs

London: Royal Academy of Arts, 2011

ISBN 978-1-905711-92-5, Price £22-95

This large format book is the catalogue of an exhibition arising from a collaboration between the State Museum of Contemporary Art, Thessaloniki, Greece, and the Shchusev State Museum of Architecture, Moscow, Russia, initially displayed in Thessaloniki, Greece. It was shown in Spain in both Barcelona and Madrid in Spring and Summer 2011, respectively, before moving to the Royal Academy of Arts, London from 29 October 2011 to 22 January 2012. A preliminary review of the exhibition appeared in the 'Review' section of *The Guardian*, Saturday 5 November 2011.

The book has two introductory essays. Jean-Louis Cohen of the Institute of Fine Arts, New York, writes on 'Uneasy Crossings The Architecture of the Russian Avant-Garde between East and West' (pp.13-21) and Maria Tsantsanoglou describes 'The Synthesis of Art and Architecture in the Russian Avant-Garde The Costakis Collection Testimony' (pp.22-7); she is the director of the Costakis Collection. The section on 'Art' has illustrations of the first 61 catalogue entries. This is followed by two short essays and an interview. 'Photographs from the Shchusev State Museum of Architecture: Soviet Architecture of the 1920s and early 1930s' (pp.94-5) are discussed by Maria Ametova and Maria Rogazina, curators at that museum, whilst Christina Lodder of the University of St Andrews looks at 'The Painter and Architect: Explorations towards a Constructivist Architecture' (pp.96-9). 'Spreading the Word' (pp.101-7) is an interview with the photographer Richard Pare, of the Canadian Centre for Architecture, Montreal, whose colour photographs taken between 1993 and 2010 are much used in the volume. Pages 108 to 249 comprise the well-illustrated catalogue of architectural items featured in the exhibition. There is a Glossary (pp.250-2), Biographies: Artists (pp.253-6), Biographies: Architects (pp.257-65), a page of Further Reading (p.266), and a four-page index (pp.267-70). The building descriptions are arranged under 'State Communications' (pp.110-135), 'Industry' (pp.136-165), 'Housing' (pp.166-207), 'Education, Health, Recreation' (pp.208-235), and Lenin Mausoleum (pp.236-247). Hereafter, notices of individual buildings will be of those where brick plays a major role in the structure.

Discussion of the uses of brick in the early Soviet era can usefully begin with housing. The Soviet Doctors' Housing Cooperative in Kiev of 1927-1930 by Pavel Aleshin (pp.174-5) uses red brick as an accent to a white brick building situated on a large corner site. It is essentially two blocks, set at right-angles to one another, and linked by a concave portion with extensive balconies for the flats on the first, second and third storeys. The two main blocks have bullnose ends and on the street frontages linked square bays which provide balcony space. Before 1914, Aleshin had travelled in central Europe and his design reflects some of what he saw in Hamburg, Vienna and Budapest.

Brick is hidden in the Student Housing for the Textile Institute in Moscow (pp.180-3) but construction photographs (pp.180, 181) show brick in Header Bond being used for the drum towers housing staircases. The brick of Ivan Nikolaev's 1929-1931 building was later covered with concrete. Workers' Housing in St Petersburg of 1927 (pp.184-7) is brick covered with stucco.

Only one private house was built in Moscow in the Soviet era, that designed by Konstantin Melnikov for his family's occupation (pp.200-5); it incorporates his architectural studio. This singular honour was a reward for the success of the Soviet Pavilion in the *Exposition internationale des Arts Décoratifs et Industriels Modernes* in Paris in 1925. The double white cylinder, constructed between 1917 and 1931, has hexagonal windows irregularly placed on the first three rows but more regular and many more of them on the top three rows which light the architect's studio (p.202, exterior; pp.204-5, interior). Rough bricks were used in the construction protruding and receding in a relatively regular fashion — two rows forward, two rows back, but a single row is used for each where the windows intervene — so as to provide good keying of the thickly applied stucco (p.201). In 2011, the Melnikov House was still inhabited by one of the architect's granddaughters but "its future is precarious" (p.200).

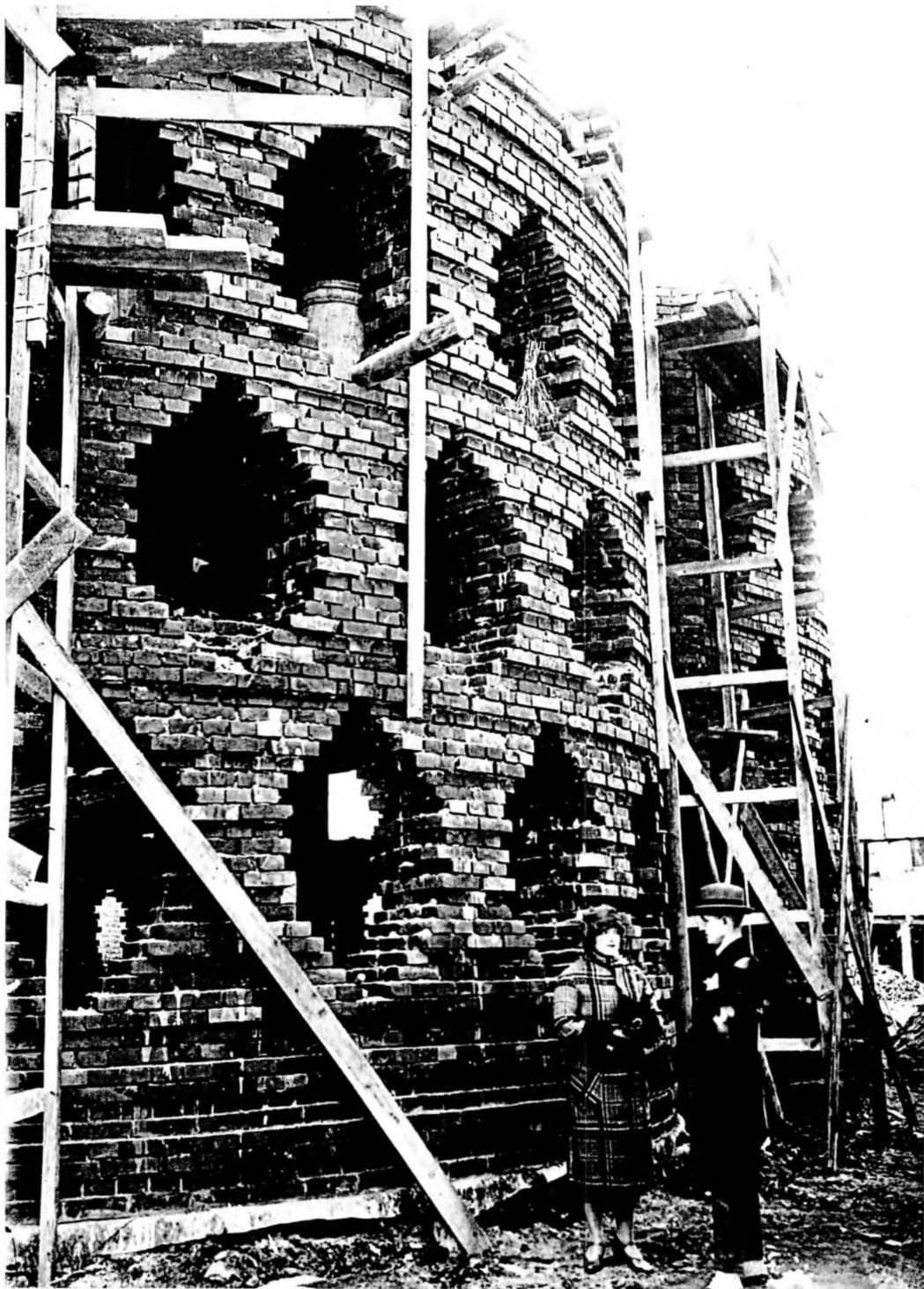


Fig.1 Construction photograph of the Meknikov House, Moscow, taken in the late 1920s. Designed for the architect's own occupation with his family, this was the only private house built in the city in the Soviet era. The bricklaying has been done in such a way as to key in the white plaster finish and to provide for the hexagonal openings for the windows. The people in the photograph are the architect Konstantin Melnikov and his wife.

Externally, the classically-inspired MoGES (Moscow City Electric Power Station) by Ivan Zholtovskii, completed in 1926, appears to be of concrete but a construction photograph (p.146) demonstrates that it is brick with a skin. Incidentally, the same photograph also shows the use of horse-drawn carts in the Soviet building trade in the 1920s. A subsidiary power plant, visible above

the main building (pp.144-5) is of brick and what appears to be a brick-built house can be seen at one end of the plant which faces the Moscow River.

Erich Mendelsohn's Red Banner Textile Factory in St Petersburg (pp.152-7), built between 1925 and 1937, is a building its architect sought to disown: only photographs of the model were permitted and not photographs of the building, as the architect considered it had not been constructed to sufficiently high standards and its final form had deviated from his plans and elevations. However, the power plant facing a road junction was erected as intended and this is given due prominence. Whilst the modern view of this disused plant shows painted and concrete surfaces, a photograph from the 1930s (p.152) makes it clear that what is covered with plaster and painted red is brick underneath.

The street façades of the Gosplan Garage in Moscow (pp.160-3) are concrete. Designed by Konstantin Melnikov with V.I. Kurochkin in 1936, a photograph (p.161) taken soon after it opened clearly shows brick used in the construction of the rear of the office block, a portion somewhat hidden from general view; the remainder of the exterior is sculptured concrete. The interior of the garage has unadorned brickwork walls.

Entirely of red brick is Moscow's Central Institute of Aerodynamics and Hydrodynamics (pp.164-5) by a team led by Aleksandr Kuznetsov. Built between 1924 and 1928, the institute was a centre of innovation and thus its architects chose then innovative architectural forms — large areas of glazing, a porthole window, rounded corners — but the technological backwardness of the early Soviet state meant that brick had to be used because concrete was not available.

Konstantin Melnikov was the designer of one of the best-known buildings of the early Soviet era, the Rusakov Workers' Club, Moscow, of 1927 (pp.212-19), one of five he designed for different trade unions in the city. The three cantilevered seating areas for a single stage fly high above the rest of the building: both James Stirling at the Engineering Building, Leicester University, and Basil Ward at the Dyson Perrins Organic Chemistry Laboratories, Oxford University, copied the concept but not the idea of subdivision into three separate auditoria. A modern photograph (pp.216-17) shows the Rusakov Workers' Club covered in white, but its external appearance belies the fact that this is a brick building, as a 1993 interior photograph by Richard Pare (p.219) demonstrates.

Photographs of both the Rusakov Club (p.216) and the Melnikov House (p.202) show other brick buildings in the background. The former is in safe hands; but, as noted, the latter is under threat. More than one of the buildings in the volume show their age and lack of maintenance, particularly those buildings which are empty or are no longer in use for the purpose for which they were built. The threat may not be neglect but can be avarice. Even as this review was being prepared, the first structure considered in the book, the Sharbolovka Radio Tower in Moscow (pp.112-115) could be on the brink of being destroyed and its site used for a "lucrative development opportunity" ('Architects demand halt to destruction of Russia's Eiffel Tower', *The Guardian*, 20 March 2014).

Further consideration of the Moscow buildings quoted in this review can be found in M. Kiernan, *Moscow: A Guide to Soviet and post-Soviet Architecture*, London: Ellipsis, 1998.

DAVID H. KENNETT

## Received for Review

T. Ratilainen, R. Bernotas, and C. Herrmann, editors,  
*Fresh Approaches to Brick Production in the Middle Ages*,  
[being *BAR International Series*, 2611],  
Oxford: Archaeopress, 2014,  
v + 106 pages, 101 figures,  
ISBN 978-1-4073-1242-2, price £24-00 (stiff covers)  
Available from Hadrian Books, 122 Banbury Road, Oxford OX2 7BP

It is hoped to provide a review of this survey of recent work in northern Europe in a future issue of *British Brick Society Information*.



## BRICK IN PRINT: ASIA

Between August 2012 and July 2014, the compiler and the Editor of the British Brick Society received notice of a number of publications of interest to members of the society. The present collection of notices includes some items held over for this special issue of *British Brick Society Information* devoted to 'Brick in Asia' — though with one Egyptian item also included here.

'Brick in Print' has become a regular feature of *British Brick Society Information*, with surveys usually two or three times a year. Members who are involved in publication or who come across books and articles of interest are invited to submit notice of them to the editor of *BBS Information*. Websites may also be included.

All contributions in this section are by the compiler.

TERENCE PAUL SMITH

1. Kazi Khaleed Ashraf, 'The Friendship Centre, Gaibandha, Bangladesh: Urbana', *Architectural Review*, **1390**, December 2012, pages 52-57.

This brick building, a joint winner of the 2012 ar + d Emerging Architecture Awards (to which this issue of *Architectural Review* is dedicated), was designed by Kashef Mahboob Chowdhury: the 'Urbana' of the byline, though the article does not explain this, is the name of the Dakha-based architectural practice co-founded by Chowdhury and Marina Tabassum. The building is in a rural area close to the small town of Gaibandha in northern Bangladesh. Built for an NGO to serve the local community, it is 'laid out as a mat [*sic*: 'carpet' might have been the better metaphor] of pavilion-like buildings, open courts, pools, and walkways' (p.54). The complex comprises offices, meeting rooms, a library, a prayer space, and a tearoom, as well as dormitories and spaces for private functions. They reflect the neighbouring brick-built Buddhist monasteries, and are themselves, as the photographs show, of variegated red brick in Stretcher Bond, though with the lintels formed of soldier courses and with the tops of the walls capped with header-courses. There are also a few well-turned semi-circular arches using headers-on-edge.

The whole is surrounded by an artificial embankment, so that it *appears* to be below ground level. This, together with grassed roofs and the open courts, gives a resemblance to 'the exposed ruins of Roman hypocausts' (p.54, figure caption: and see the relevant photograph across pp.52-53); at the same time it also 'invokes the image of an ordered village or the campus of a Buddhist monastery, as well as the horizontal matrix [that is, the *plan* — so why not say so?] of a Mughal fort-palace' (p.56). The design also allows for natural ventilation, thus obviating the need for air-conditioning. It is an intriguing building, aptly compared by Kazi Khaleed Ashraf with the Bangladesh projects of Louis Kahn (1901-1974), whom Chowdhury greatly admires. The article is illustrated by six drawings and seven colour photographs, some of excellent quality.

One may briefly mention (uncredited) reports on two highly commended projects in the ar + d Awards. The Cassia Co-op Training Centre, Sumatra, Indonesia, by TYIN Tegnestue — a non-profit organisation of architects and students at the Norwegian University of Science and Technology, Trondheim — is mostly of timber but includes some mud brick structures (pp.64-67). And the Recycled Brick School, Tongjiang, Jianxi Province, China, by John Lin [see item 5 below] and Joshua Bolchover with Rural Framework, University of Hong Kong, includes — as its name suggests — salvaged and reused materials from an earlier school on the site. The building is of concrete-frame construction with red-brick piers between tall windows; perforated screens of red brick to aid ventilation; and roofs of brick rubble adding thermal mass and trapping wind-blown plants and mosses to form a naturally green cover (pp.79-81).

Other joint winners and highly commended projects include some striking buildings: Optical Glass House, Hiroshima, Japan, by Hiroshi Nakamura; Bloc 10 Housing, Winnipeg, Manitoba, Canada, by 5468796 Architecture — one of those buildings which really evoke a 'Wow!' and which is, for me, the winner of winners; and the House for Three Sisters, Murcia, Spain, by Blancroft Reus Arquitectura. But they cannot be considered here since they do not include bricks.

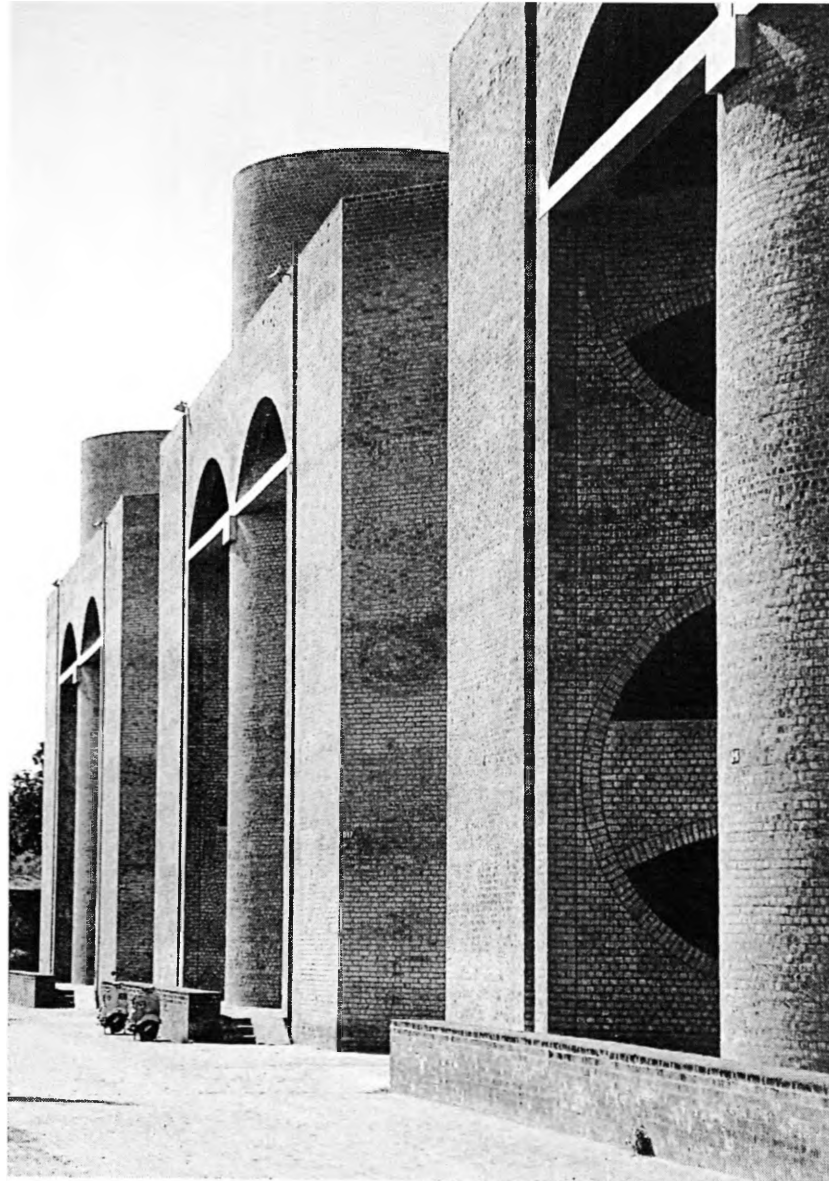


Fig.1. The Indian Institute of Management, Ahmedabad, Gujarat, India; 1962-74: Louis Kahn. A feature of the guesthouses is the cylindrical stairwells to each block. The use of cylindrical stairwells, elliptical arches and circular features containing cross bracing of brick shows the ambition of the architect and the original craftsmen.

2. William J. Curtis, 'India: Modern Heritage under Threat', *Architectural Review*, **1406**, April 2014, pages 23-25.

The Indian Institute of Management (IIM), Ahmedabad, Gujarat, India (1962-74) is one of the finest brick designs by the Estonia-born American architect Louis Kahn (1901-1974). Unfortunately, 'the local construction and brick was poor compared to that of [Kahn's] buildings ... in the United States' (J. Rosa, *Louis I. Kahn, 1901-1974: Enlightened Space*, Köln, London, etc.: Taschen, 2006, p.62). As this brief article notes, the building suffered some damage in the earthquake of 2001. More disturbingly, the initially poor brickwork has never been adequately maintained, and there is now a real possibility that large parts of the complex will be demolished and replaced by glitzy buildings 'in the image of an emerging management elite'; to this observation William Curtis adds: 'If this happens it will be an act of vandalism that will reflect very badly on the reputation of IIM as a responsible institution' (p.23). At pp.24-25 is an impressive double-spread colour photograph of the building.



Fig. 2 Slaves, overseen by a seated Egyptian, making mud bricks: detail of a fifteenth-century BCE painting.

The building is considered with others, including the concrete Maison Shodhan, Ahmedabad (1951-54) by Le Corbusier (1887-1965), which are also threatened. Curtis sees this as a result of an ‘age of greed and privatisation in the public realm,’ in which ‘[h]istorical and cultural memory matter less and less: today it is the price of everything and the value of nothing’ (p.25). It is a sad reflection and a damning indictment.

3. Robert Littman, Marta Lorenzon and Jay Silverstein, ‘With & Without Straw: How Israelite Slaves Made Bricks’, *Biblical Archaeology*, **40**, 2, March/April 2014, pages 60-63.

‘Bricks without straw’ has entered the English language as an apophthegm for an attempt to create something, literally or metaphorically, with inadequate means. And, as every schoolboy *used* to know, it refers to the Old Testament story of the Hebrew slaves in Egypt: ‘Let my people go,’ demanded the brothers Moses and Aaron, to which Pharaoh responded with a command to the taskmasters and supervisors of the slaves: ‘You shall no longer give the people straw to make bricks ...; let them ... gather straw themselves. But you shall require of them the same quantity of bricks as ... previously’ (Exodus, 5.7-8 NRSV).

For some years, the authors of this article have been studying the making of mud bricks at their excavation site at Tell Timai in the Nile Delta. Such bricks have been made ‘at least since the fourth millennium BCE.’ (p.60) and the Egyptian word for them, *djebet*, gives *via* Arabic and Spanish, the modern word, *adobe*. A painting of the fifteenth century BCE in the Tomb of Rekhmire, an Egyptian vizier, shows them being made by Nubian and Semitic (though not necessarily Hebrew) slaves, supervised by a seated Egyptian official (fig.2). They are still made in that troubled country.

Straw temper is added to a mixture of clay, silt, and sand ‘to absorb the stresses associated with drying, thereby reducing shrinkage and preventing the formation of fissures and cracks’ (p.61) during drying in the Egyptian sun. Generally ½lb of straw is needed per cubic foot of mud mixture. In the bricks made for repairs at Tell Timai red ochre (iron oxide) was added to give a red colour, distinguishing them from the brown originals. The authors also had some bricks made *without* straw and a photograph at page 63 shows the much poorer, fragile bricks which resulted.

Straw could only be gathered at harvest time and would have been stored for use year-round in brickmaking. Presumably, Pharaoh prevented the slaves from using these stores, and thus ‘in effect oppressed the Israelites by maintaining the quota ... without providing [some of] the materials necessary to produce them’ (p.63).

This well-illustrated article gives many more details of the production process. It is also worth viewing the associated website at [biblicalarchaeology.org/mudbrick](http://biblicalarchaeology.org/mudbrick) (accessed March 2014).

One may add that the Hebrew text uses *kash* (‘stubble’) rather than *teben* (‘straw’ proper), as

noted in my 'Bricks Without Straw: Abstract of an article by Dr Henry Stern' (*Jewish Chronicle*, 1 April 1983), *BBS Information*, 31, November 1983, pp.7-9. Dr Stern suggested that liquid in the straw would result in 'a more solid brick, less liable to be deformed during handling and drying'. Perhaps this informs the comment that 'straw contained an acid that made the clay easier to work and stopped the bricks from shrinking': P. Lawrence, ed. R. Johnson, *The Lion Concise Atlas of Bible History*, Oxford: Lion Books, 2012, p.31. But the *binding* effect of the straw was probably more important.

A letter from Michael Curtis in *Biblical Archaeology Review*, 40, 5, September/October 2014, p.60 questions 'how topsoil can be used to make mud bricks'. The authors reply, pp.60-61, that prior to 'the construction of the Aswan Dam (and still partly today), the top-soil of Egyptian fields ... presented a good combination of clay-silt-sand' — a material suitable for making mud bricks when mixed with a temper of straw or whatever.

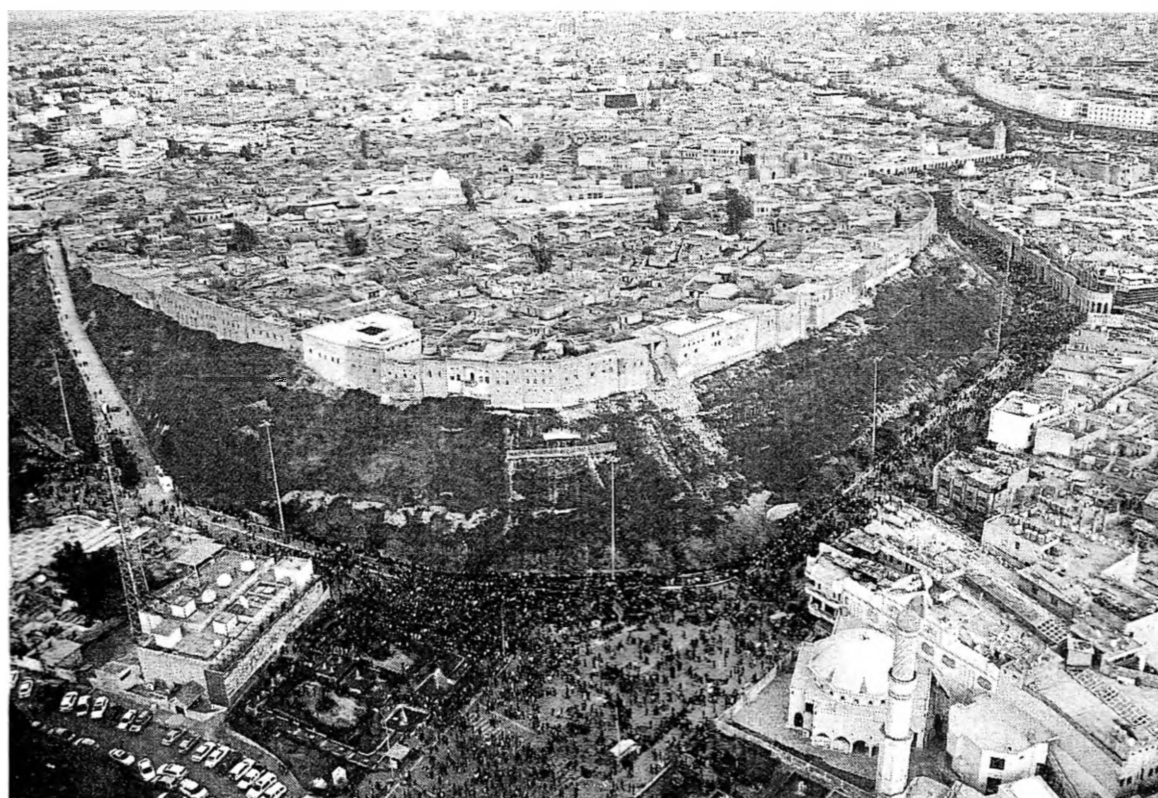


Fig. 3 The Citadel at Erbil in Iraqi Kurdistan. The brick citadel wall is the curving structure seen across the centre of the photograph.

4. Hilary Munro, 'Erbil Citadel',

*Current World Archaeology*, 5, 8 (issue 56), December 2012/January 2013, pages 50-52.

This article is in the magazine's regular 'Travels to...' series, highlighting places worth visiting but without being (at least explicitly) commercially promotional.

'Erbil — also Arbil, Irbil, or, in Kurdish, Hawlêr — is the capital of Iraqi Kurdistan' (p.50). Some 200 miles (320 km) north of Baghdad, it is the fourth-largest city in Iraq. More intriguingly, it is 'the oldest continuously inhabited urban site in the world' (p.50). Rising above the modern ever-expanding town is the 'citadel' (fig.1) — a defended settlement for civilians rather than a military structure *simpliciter*.

'At first glance, the citadel appears dusty and disappointing .... But in the late afternoon's soft light ... the [unfired mud] bricks glow golden-brown [and] the real beauty of the site is revealed in the honeycomb and herringbone brick patterns' (p.51). The photographs — particularly at the bottom of

p.51 — show that the brickwork is even more complex: there are corbel tables; recesses with triangular ‘arches’ formed by corbelling and framing window grilles of various patterns; and diaper-work of recessed bricks. These striking buildings, however, are in a seriously dilapidated and deteriorating state, requiring constant attention.

Unfortunately, although we are told that the citadel ‘is the only place in the world that can give an idea of what it might have been like to walk the streets [of *Erbil*, or *elsewhere*?] 4,000 years ago’, we are also informed that the houses ‘have been replaced and rebuilt [surely an unnecessary doublet?] over the centuries’ (p.51), leaving us perplexed about the dates of the citadel’s present mud-brick buildings. And, despite the implication of that first statement, it is hard to believe that there has been no architectural development throughout six thousand years.

The brickwork of Erbil citadel is certainly enticing. But since this piece was first written, travel to Erbil has become reckless — if, indeed, possible.

5. Austin Williams, ‘House for All Seasons, Shaanxi Province, China: John Lin’,  
*Architectural Review*, **1385**, July 2012, pages 38-45.

This remarkable rural house in Shijia village, Shaanxi Province, China, by John Lin —educated in New York and now assistant professor at the University of Hong Kong — is ‘the winner of this year’s [*Architectural Review*] House Award for his contemporary take on a vernacular village house’ (p.41). Austin Williams, after a perhaps over-long introduction, offers a warm appreciation of the building, which has an earthquake-resistant concrete frame clad with traditional red sun-dried mud bricks, made on site.

A long rectangular structure, it combines entrance hall, rooms, four courtyards, and a pig pen, all beneath a stepped roof masked by the orthogonal brickwork parapet around the whole. The roof — stepped down to a central valley — allows collection of rainwater, which passes through a filter, and is heated by solar panels on one of the roof-slopes, whilst ‘pig-effluent biogas ... feeds the methane cooker’ (p.44). There are other ecological features within the building.

These include the brickwork itself. Apart from the quoins and the bottommost and topmost courses, two of the walls are screens of honeycomb brickwork created by building in Flemish Bond but omitting the stretchers in course one, the headers in course two, the stretchers in course three, and so on, to provide a cooling breeze in summer. Other outer walls include square and rectangular panels of similar brickwork, some behind closeable windows to prevent unwanted breezes in winter. Internally, there are brick walls in various bonds, including the honeycomb arrangement. There are also some brick piers. It is a pragmatic approach to brickwork which avoids mere effect for effect’s sake.

This is an impressive building, ecologically friendly and intended as a model for future housing in an increasingly urbanised China. Mud brick may not be appropriate to Britain, but some of the ecological ideas might, *mutatis mutandis*, be applied here.

The eleven runner-up and commended houses — in Australia, France, Ireland, Japan (three), Malaysia, New Zealand, Spain, and Switzerland — are of varying styles and materials. But not one is a *brick* house and so cannot be considered here.

6. Various (mostly unnamed) authors, ‘AR + D Awards for Emerging Architecture 2013’,  
*Architectural Review*, **1402**, December 2013, pages 27-89.

This issue of *AR* is largely devoted to the winning and highly commended projects of this annual competition, sometimes designated ‘ar + d’ (see item 1 above). Winning entries are assessed by named contributors, others anonymously. The projects use a variety of materials and all are intriguing, some stunning. But *British Brick Society Information* can consider only those using brick.

The Bamboo Courtyard Teahouse in a park in Yangzhou, China, by the HWCD practice (pp.70-73) includes ‘austere volumes of grey brick’ in Stretcher Bond ‘wrapped in bamboo pergolas and colonnades that ... veil and add depth and complexity to the facade’. The judges were impressed by the building’s ‘lyricism’ and the ‘deft handling of materials’.

Brick is far from veiled in the Nyanza Education Centre, Rwanda, by Dominikus Stark Architekten (pp.82-85), a fortress-like structure with a low turret at one angle. Following local

precedent, the building looks inwards to a square courtyard. The handmade bricks have ‘intriguing irregularities and colour variations’, though all are in shades of light red. Laid in English Bond, they have prominent black mortar joints. They are also used for square piers, steps, and floors. Timber is scarce in the area, so other materials are steel, sheets of papyrus, and wickerwork. It is an austere but attractive building, skilfully ‘reconceptualising vernacular precedents to create an authentic modern architecture in a challenging context’.

Much less emollient is the Sky Courts Exhibition Hall in Chengdu, China by Höweler & Yoon Architecture (pp.86-89). The building has an irregular plan with only one (re-entrant) right angle in the wrap-around walling, all other angles being obtuse (four) or acute (two). It is of local grey bricks in Stretcher Bond. All are ‘oriented in the same direction, so that west and east walls are smooth while other facades have a serrated quality’ — best appreciated in the photograph at pp.86-87. The mass of brickwork is minimally relieved by the textural effects, by the red Corton steel window units, and by the slanting roof-lines. At least there are no distracting expansion joints — presumably lime mortar is used. The judges were impressed by the ‘inward-sloping eaves’, curiously *overlooking* (pun intended) that they are visible only from the air, so that users of the building will never see them. I cannot share the judges’ enthusiasm for a building whose quirks, one hopes, will not be repeated too often — if at all.

## Changes of Address

If you move house, please inform the society through its Membership Secretary, Dr Anthony A. Preston at 11 Harcourt Way, Selsey, West Sussex PO20 0PF.

The society has recently been embarrassed by material being returned to various officers from the house of someone who has moved but not told the society of his/her new address.



# BRITISH BRICK SOCIETY

## MEETINGS in 2015

Saturday 28 March 2015

### *Spring Meeting*

Oxford — South and West

*Morning:* The Queen Street area, including retail and former factory buildings now converted to retail use, new office buildings, St Peter's College, and the buildings of the Oxford Union. *Afternoon:* The Tawney house beside one branch of the River Thames, the new buildings in the former brewery area, former industrial buildings near Oxford Station, and ending at Seacourt Tower and Botley church.

Saturday 30 May 2015

### *Annual General Meeting*

Black Country Living History Museum, Dudley, West Midlands

With visit to the brick buildings of the museum after the meeting.

Saturday 27 June 2015

### *London Meeting*

Battersea

Battersea Power Station is infamous but the former borough has much more to interest the brick enthusiast. Battersea Old Church is eighteenth century and there is a fine 1890s brick church by James Brooks. At the foot of Lavender Hill is a fine brick-built department store (Arding & Hobbs); brick public buildings by Edward Mountford are the public library, the former town hall now arts centre, and the former Battersea Polytechnic whose shell is preserved in the conversion to expensive housing.

Saturday 25 July 2015

### *Summer Meeting*

Brick Churches in north-east Buckinghamshire and other brick buildings in the area

Bletchley, Fenny Stratford, Bow Brickhill, are all due to the patronage of Browne Willis, the local landowner; Willen church was designed by the scientist Robert Hooke for his tutor at Westminster School. There are also interesting rural railway stations.

Saturday 5 September 2015

### *Brickworks Meeting*

The York Handmade Brick Company, Alne, North Yorkshire

*Details of the Spring Meeting in this mailing.*

*Full details of the Annual General Meeting and the Visits in June and July 2015  
in future BBS Mailings*

*The British Brick Society is always looking for new ideas for future meetings.*

*Suggestions of brickworks to visit are particularly welcome.*

*Offers to organise a meeting are equally welcome.*

*Suggestions please to Michael Chapman, Michael Oliver or David Kennett.*

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