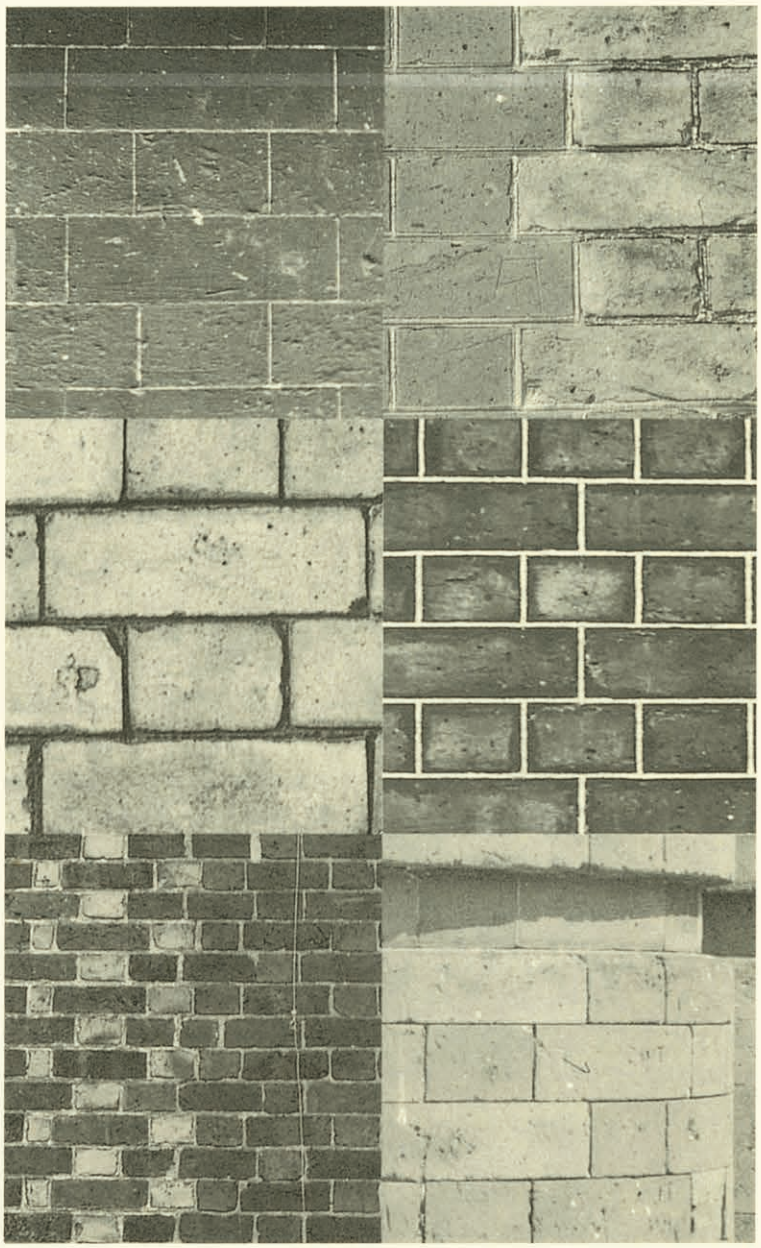
The Georgian Group Guides

NO2

BRICKWORK



A Brief Guide to the Types and Repair of Georgian Brickwork

A	B
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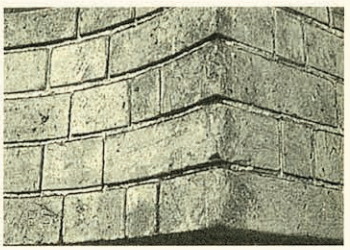
A) RUBBED RED BRICKS IN TOKEN-HOUSE YARD, CITY OF LONDON. B) CONTRASTING RED AND YELLOW STOCK BRICKS FROM SPITALFIELDS, EAST LONDON. C) CAMBRIDGESHIRE WHITES. D) TUCK POINTING IN WEST LONDON. E) BURNT HEADERS IN A SUSSEX WALL. F) RUBBED AND GAUGED PIER AT KENSINGTON PALACE, LONDON

BRICK WORK is one of the most characteristic and attractive elements of the Georgian house. The vast majority of colours, textures and sizes contribute substantially to the interest of even the most modest Georgian facades, and enormously enhance the surrounding streetscape. However, in many cases good brickwork is ruined by bad repointing, which serves to destroy both individual bricks and the wall as a whole, or by unsympathetic and structurally harmful external treatments.

This leaflet is not designed as a technical manual; the further reading listed will provide more technical and historical information. It serves rather as a general guide for house owners on the simple do's and don'ts of brick maintenance.

Before starting any work in Georgian brickwork, always consult the Conservation Officer of your local District or Borough Council first. And remember that if your house is a listed building - or in some cases even an unlisted one in a Conservation Area - you will need Listed Building Consent or planning permission from your local council before attempting most alterations or repairs.

HISTORY



BRICKS were first brought to Britain by the Romans. Only during the sixteenth century, however, did brick become widely used in Britain, and it was not until the late seventeenth century that the elaborate brick patterns of the continent began to be enthusiastically mimicked by British designers. The restoration of Charles II in 1660 marked the beginning of what can be termed the finest period of British brickwork; gauged or rubbed bricks began to be used on a large scale, whilst the demand for bricks in general soared after the Great Fire of London of 1666. After c. 1720 Palladian designers reacted against the late seventeenth century predilection for warm red brickwork, and introduced bricks whose aspects had more affinity with stone, ranging in colour from light yellow to dull brown.

New bonds were introduced as the century progressed. The Brick Tax of 1784 checked demand, however; builders resorted on occasion to using flint, cob or mathematical tiles to construct their walls, and often restricted the use of brick to window and door dressings. Whereas stucco became highly fashionable during the Regency period, cheap bricks continued to be used behind the stucco skins.

Brick sizes varied greatly up to the middle of the nineteenth century, but in 1840, with the Imperial brick, a standard nominal thickness of 9" x 4½" x 3" was widely adopted and was only superseded in 1969 by the slightly smaller metric brick, nominal size 215 x 102.5 x 65mm.

BRICK TYPES

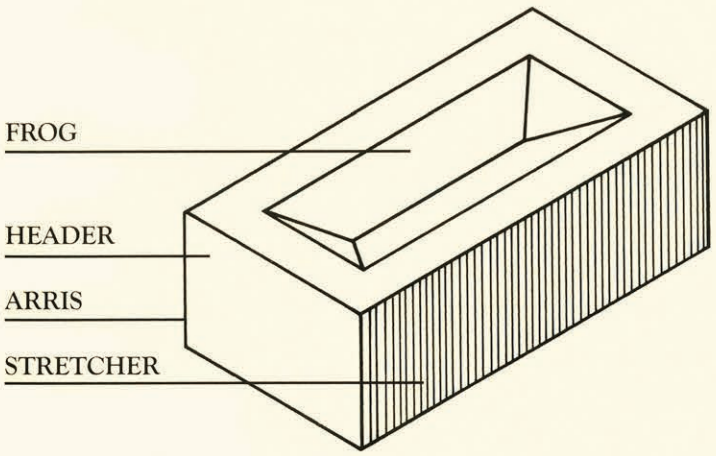
MODERN BRICKS can be found to match numerous Georgian or Victorian examples, but exact replacement is not always possible. Care must be taken, therefore, to save old bricks wherever possible. Many architectural salvage firms retail salvaged Georgian bricks, which look far better in or adjacent to a weathered brick facade than brightly-coloured modern products. Hand made bricks - wholly produced by hand, are still available from companies, and most of these can manufacture moulded bricks of numerous sizes and shapes to order.

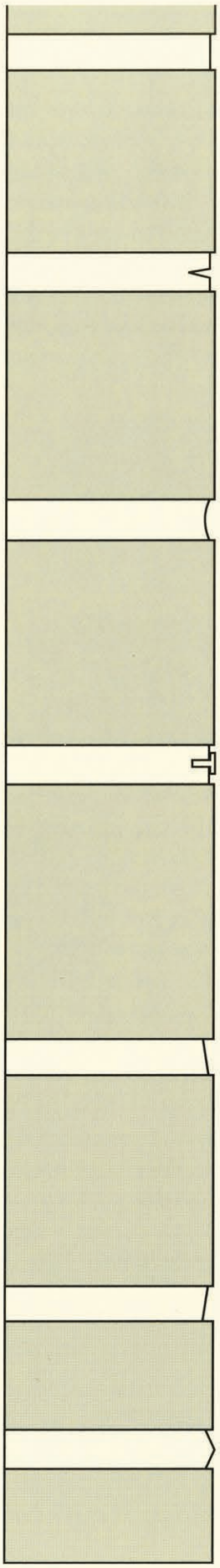
ANATOMY OF A BRICK

SOME OF THE TERMS used in brickwork may be rather confusing. Here is a quick glossary of some of the more frequently-used terminology.

POINTING TYPES

(by kind permission of Hertfordshire County Council)





FLUSH JOINT
The most common traditional form of pointing, where the mortar is finished flush with the brick bee.

FLUSH SCRIBED JOINT
Often seen in eighteenth century work. The flush pointing is scribed with a rule and trowel end shortly before the mortar sets, producing a near lined-out appearance in otherwise relatively irregular work.

KEYED JOINT
Not to be confused with the rather exaggerated modern raked joint. The mortar is pressed into the joint, originally with a metal tool, but usually today with a bucket handle or similar curved tool to give a slightly concave section. Useful in some cases for repointing old work where the bricks arc irregular.

TUCK POINTING
An elaborate technique used particularly in the second half of the eighteenth century. Where the effect of fine brickwork was required from otherwise ordinary-quality work, the joints were flush-pointed with coloured mortar to match the bricks. Before setting, a groove was cut into the mortar to receive thin lines of lime putty. This putty was made from chalk quick lime, slaked to a powder and sieved, then mixed with silver sand and a little water and worked to a stiff plastic consistency.

STRUCK POINTING
Commonly used in modern brickwork, with hard mortar sloping inwards from the bed joints to cast off the rain. This type of pointing produces a hard line emphasised by the deep shadow where the mortar is most deeply recessed and is rarely suitable for restoration purposes.

OVERHAND STRUCK POINTING
Struck pointing with the slope reversed is sometimes used in old brickwork.

BEAKED JOINT
A kind of double-struck pointing more usually associated with stonework but occasionally used in brickwork where the sharp line achieved was thought desirable.

CLOSER Brick cut to half a header. A 'Queen Closer' is a quarter brick cut from a half header throughout the length of the brick; a 'King Closer' has one corner lopped off obliquely.

RUBBED BRICKS Soft bricks, easily cut or rubbed to specific sizes.

GAUGED BRICKS Accurately measured bricks, used in combination with rubbed bricks for precise bonding. Both gauged and rubbed bricks were generally bonded with white lime putty.

PERPEND Vertical edge joint of a brick.

VITRIFIED BRICK A brick with over burnt surface beginning to fuse to give a glass-like finish of a silvery-grey, blue or purplish colour; used widely in certain parts of the country to form 'diaper' patterns with regular red bricks.

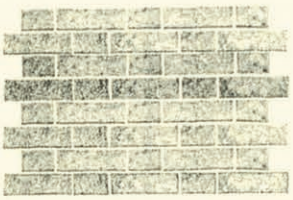
MARL Pale yellow or white brick used in some areas during the Georgian period, containing a high proportion of light-coloured clays and chalk.

BONDING

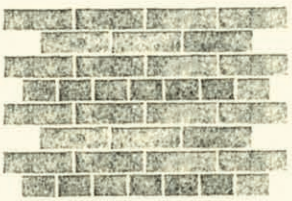
ENGLISH BOND

A 'BOND' is the pattern in which the bricks are laid in a wall. 'Pointing' refers to the protective finish to the joint; the mortar is not a glue for bricks, which can hold together simply through the force of gravity, but is an agent used to fill the gaps in the joints and spread the weight load.

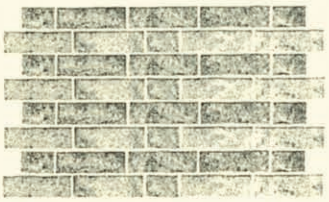
Georgian brick walls were generally constructed of header, English or Flemish bond. Later during the eighteenth century new, more economical bonds such as English Garden Wall and Flemish Garden Wall were introduced; by 1800 the cheap Rat-Trap bond was widely used, together with the variation known as Dearne's Bond, where courses of stretchers on end alternated with courses of headers laid in the usual fashion. Both Dearne's and Rat-Trap are structurally weaker than regular bonds; however, given the rarity of these patterns it is important to retain them where they survive.



FLEMISH BOND

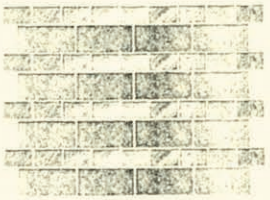


ENGLISH GARDEN WALL BOND



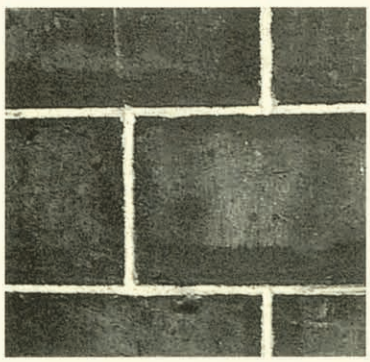
FLEMISH GARDEN WALL BOND

HEADER BOND



DEARNE'S BOND

TUCK POINTING



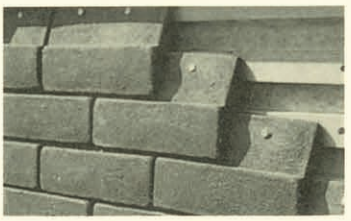
TUCK POINTING PROPERLY EXECUTED

RUBBED OR GAUGED BRICKS were used from the late seventeenth century onwards to form neat, straight brickwork with thin joints. Yet by no means all walls were constructed in this exemplary manner. Gauged or rubbed bricks were, after all, costly; far cheaper was the traditional device used to mimic exact brickwork using poor quality bricks - 'tuck pointing'. This involved surrounding badly-cut or worn bricks with a base mortar the same colour as the brick itself, then inserting a white tucking mortar in a straight line between the bricks, to simulate neat jointing. Tuck pointing was a sham, but although it is to be avoided when laying wholly new courses, knowledge of the process is useful if tuck-pointed Georgian brickwork is in need of restoration. An excellent step-by-step technical guide to the intricacies of tuck pointing can be obtained from the SPAB (see 'Further Reading').

MATHEMATICAL TILES

MATHEMATICAL TILES - tiles which when laid give the appearance of brick courses - were not, as is often alleged, invented simply to combat the Brick Tax of 1784, but actually originated in the late seventeenth century. These tiles varied in colour in the same way as bricks, and by the end of the eighteenth century were remarkably popular, particularly in Regency Brighton. The tiles were bedded into mortar or were fixed with nails into wooden boards. Tiling around corners proved far more difficult than joining two brick surfaces: the solution usually adopted was to apply a wooden board or imitation stone quoins over the angle. Such features often provide the only obvious indication that tiles, and not bricks, have been used in a wall.

Mathematical tiles are not easily obtainable, and finding the right size or colour of tile for restoration may unfortunately be a lengthy and costly process. Some literature is available on the subject, however, and the tiles themselves can be purchased from a few outlets, principally in Kent and Sussex.



MATHEMATICAL TILES IN A FRAME (*KEYMER BRICK AND TILE*) AND BELOW, BLACK, GLAZED MATHEMATICAL TILES AT BRIGHTON'S ROYAL CRESCENT OF 1798-1807

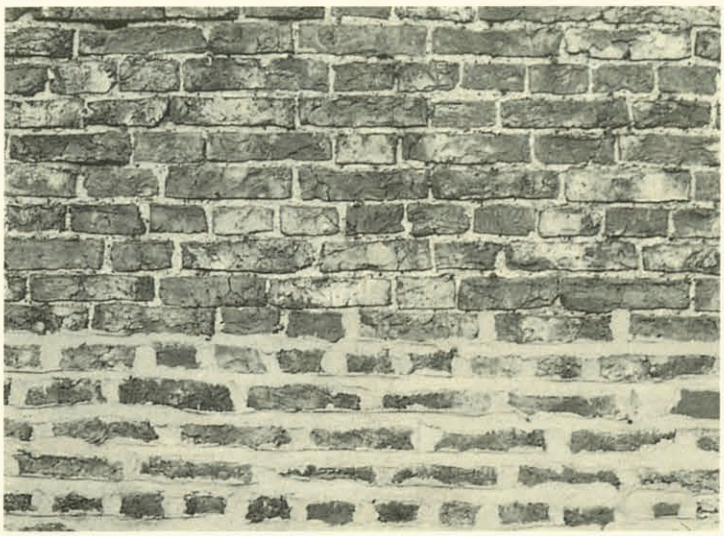
GOOD AND BAD REPOINTING

REPOINTING is a process requiring considerable skill and experience. In dealing with a historic building, it is vitally important to employ craftsmen who are able to produce a first rate job. Many fine buildings have been permanently impaired by well-intentioned but poorly-executed amateur repointing.

Bad repointing of walls can not only ruin the aesthetic appearance of the brickwork but, more importantly, can promote the erosion of the wall through the action of rainwater and soluble salts.

The two principal caveats in repointing are: (i) avoid any method of pointing that encourages water to penetrate between the bricks, and (ii) avoid using cement-rich mortars when pointing or repointing. For most domestic pointing, mortars based on lime (calcium oxide) are always to be preferred over those based on cement. Lime-based mortars are flexible and porous - two qualities which are essential for the preservation of a brick wall, since rainwater should be allowed to evaporate through the mortar into the air and not be trapped inside the fabric of the brick itself. (See the SPAB leaflet, *The Need for Old Buildings to Breathe* - address given below.) Cement-rich mortars, while they set harder and quicker than lime-based putty, spell disaster for a brick wall. Key disadvantages of such mortars are that they are too hard, remaining intact during any movement of the wall and thus tearing the bricks which surround them, and also that they encourage water and harmful salts to evaporate

WHAT REPOINTING WITH A STRONG CEMENT MORTAR CAN DO TO A BRICK WALL

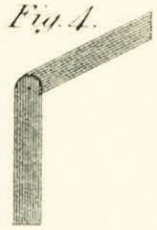


EXAMPLES OF APPALLING MODERN POINTING: LEFT, UNSIGHTLY REPOINTING OF THE LOWER HALF OF A GEORGIAN WALL (LAID IN ENGLISH GARDEN WALL BOND); RIGHT, RIBBON POINTING, PROVIDING RIDGES WHERE WATER CAN COLLECT AND SUBSEQUENTLY PENETRATE INTO THE VULNERABLE BRICK.

through the bricks, rather than through the impervious cement, causing deterioration of the brickwork.

Owing to the reactivity of lime, it is best to let an expert make the lime-rich mortar mix. Do check, however, that your workman really is using a genuine lime mortar for the pointing, and that he does not substitute a cement-based product on the ground that its curing time is shorter. If it is necessary to gain strength a little more quickly a hydraulic lime and sand mix can be used. It is generally best to ensure that the proportion of cement accounts for no more than one-twelfth of the whole mortar mix, the rest of the mortar largely comprising of sand and lime.

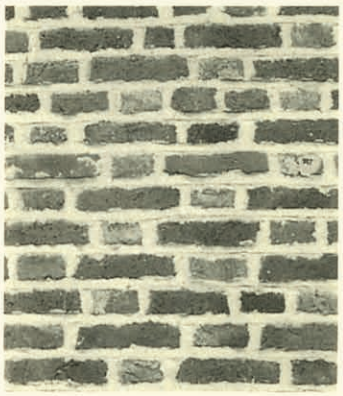
Repointing should not be attempted in frosty weather: the water content of wet mortar is high, and freezing conditions cause this water to expand and the curing mortar to crack. Note that whilst ivy trailed over a brick wall may look attractive to the passer-by, it is a cause of numerous structural problems, since the plant's roots develop in the soft lime mortar in the joints and thus seriously weaken the whole wall. It is also worth remembering that some mortars were traditionally blackened by the addition of ash in the mix, in order to direct attention to the face of the bricks; this type of walling can be continued if wished - simply ensure that the finished brickwork is at very least consistent with that already existing, both in terms of the colour of the bricks themselves and the shade and texture of the surrounding mortar. New bricks that are far brighter than the surrounding courses can be toned down by using a wash of fresh cow dung and yogurt to encourage the migration of lichens onto the new work. It is generally better, though, to avoid artificial colourants for the brick surfaces or mortars, since these arc liable to fade or discolour rapidly.



Details of repointing methods and of correct mortar compositions can be found in the SPAB's Technical Pamphlet No. 5.

PAINTING BRICKWORK

SPOT THE DIFFERENCE: ABOVE - WELL-LAID, THINLY-JOINTED VITRIFIED HEADERS WITH RED BRICK DRESSINGS; BELOW - GEORGIAN BRICKWORK RECENTLY REPOINTED, LEAVING OVERSIZED, UNSIGHTLY MORTAR JOINTS



IN VIRTUALLY EVERY CASE it is preferable to leave brickwork *unpainted.* Paint layers do not allow the brick wall to 'breathe', trapping moisture inside the brick itself. The bricks, particularly those with a high salt content quickly deteriorate. This is caused by the movement of salts in solution to the surface and the expansion of salt crystals disrupting the fabric of the brick.

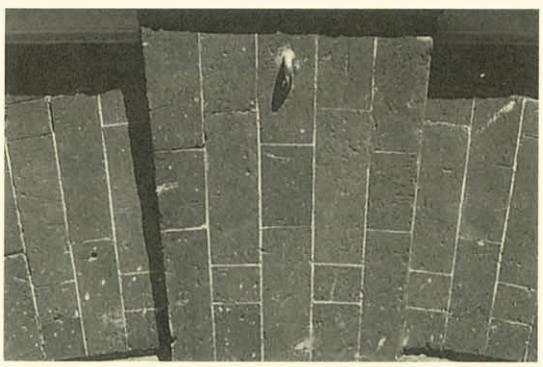
In addition, most brickwork has firing inconsistencies. This gives varying absorption rates, which can cause rejection of paint coatings in some areas. This results in an uneven and unsightly finish that will require regular repainting.

CLEANING BRICKWORK

SIMPLE WATER WASHING - either by hand or with sprays -is always the best method of cleaning brickwork, and is best performed by specialists. High-powered dry or wet sand blasters or water lances will remove much of the surface of the brick and mortar as well as the dirt. Hydrofluoric acid in dilution can be used to clean heavily soiled bricks; again, this is not for the amateur, as even in solution the acid is heavily corrosive. Other chemical cleaners are not recommended, since they generally contain soluble salts which accelerate the erosion of the brickwork; alkaline cleaners should be avoided.

In recent years specialist cleaning systems have been developed to minimise the damage caused to the surface of the brick. These usually involve the use of sophisticated commercial equipment employing high temperature steam or oscillating low pressure air abrasive systems. Poultices, specifically formulated for the particular task, are also used for paint removal.

Generally, it is extremely difficult to remove most modern exterior paints, emulsions and historic oil paints without also removing the surface of the brickwork itself. Indeed, any removal of paint from brickwork may inevitably damage the surface of the wall to some extent. In some cases the damage caused by an attempt to remove the impervious layers of unsuitable paint may far outweigh the potential erosion resulting from leaving the paint in place. In all cases of cleaning or restoring brickwork, please do consult an expert; the Conservation Officer of your local District or Borough Council can advise on appropriate cleaning systems and local specialists who can be trusted. You may also need to apply for consent to undertake the work if your property is a listed building or in a conservation area.



FURTHER READING

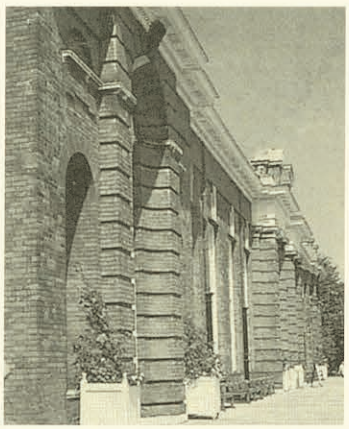
Practical Building Conservation vol. 2: Brick, Terracotta and Earth John and Nicola Ashurst (English Heritage, 1988)
The Conservation of Brick Buildings - The Repair, Alteration and Restoration of Old Brickwork T.G. Bidwell (1977)
The English Farmhouse and Cottage M. W. Barley (1961)
Brick Building in Britain K. W. Brunskill (1990)
Brickmaking Alan Cox (Bedfordshire CC, 1979)
The Brick Book Robert Hayward (1978)
Bricks and Brickmaking M. Hammond (1981)
A History of English Brickwork Nathaniel Lloyd (1925, reprinted 1983)
Brickwork: History, Technology and Practice Gerard Lynch (1994)
Gauged Brickwork Gerard Lynch (1990)
Brickwork Repair and Restoration W. G. Nash (1985)
Conservation of Brick J. Warren (1999)
Conservation of Historic Brick Structures: Case Studies and Reports of Research Baer, N. S. Fitz, S. Livingston eds. (1998)
English Brickwork Details 1450-1750 T. Small and C. Woodbridge (1920)
Bricks to Build a House John Woodforde (1976)

Publications available from The Society for the Protection of Ancient Buildings, 37 Spital Square, London El 6DY, Tel: 020 7377 1644
The Need for Buildings to Breathe (Information Sheet No. 4), Philip Hughes
Removing Paint From Old Buildings (Information Sheet No. 5), Adela Wright
Tuck Pointing in Practice (Information Sheet No. 8), Jonathan Carey
Pointing Stone and Brick Walling (Technical Pamphlet No. 5), G. B. A. Williams

SOURCES OF INFORMATION

Bursledon Brickworks Conservation Centre, Coal Park Lane, Swanwick, Southampton, SO31 7GW, Tel/Fax: 01489 576248
Offers advice and technical information
The British Brick Society, 9 Bailey Close, High Wycombe, Buckinghamshire, HP13 6QA, Tel: 01494 520299
Brick Development Association, Woodside House, Winkfield, Windsor, Berkshire, SL4 2QX, Tel: 01344 885651
Promotes the role of bricklayers and brickwork contractors

The Georgian Group is grateful to Kevin Stubbs of the Bursledon Brickworks Conservation Centre for advice in the preparation of this guide



The Georgian Group exists to save Georgian buildings, townscapes, monuments, parks and gardens from destruction or disfigurement and to stimulate public knowledge of Georgian architecture and Georgian taste. The Group offers a yearly programme of visits and educational events.
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