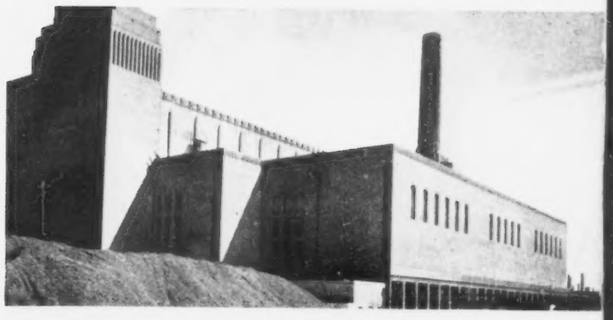
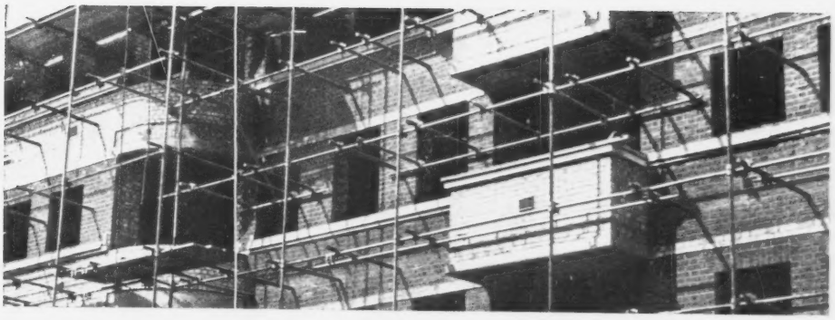
THE ARCHITECTURAL REVIEW

BRICK
SPECIAL ISSUE





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THE

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BRICK

Plates

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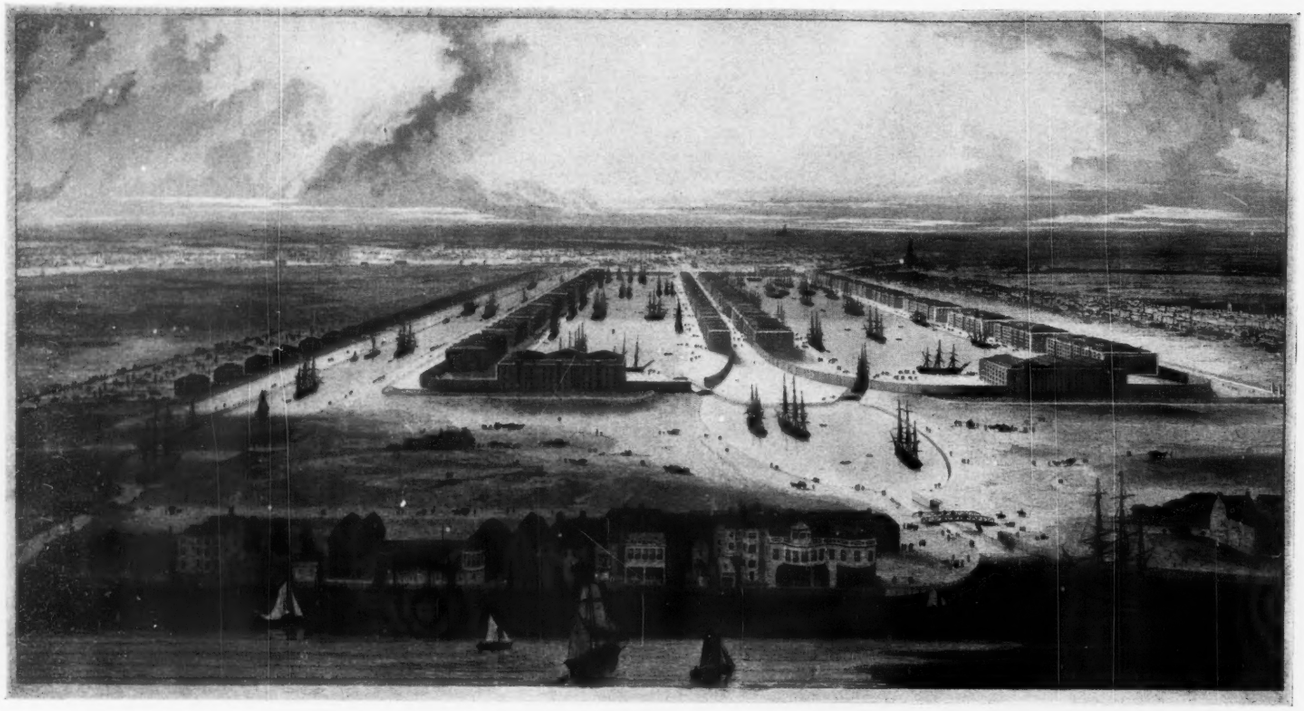

The docks in the Port of London contain some of our finest examples of brick building. This engraving by William Daniell shows what the West India Docks system with its immense brick warehouses looked like when it was finished in August 1802. The centre range of buildings was burnt out in the great Rum Fire of 1933.

PLATE i *May 1936*

The Arms
OF THE WORSHIPFUL COMPANY OF
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FOREWORD

By the Editor

BUILDING construction in the second third of the twentieth century tends to resolve itself into the reasoned manipulation of a number of standardized pre-fabricated units. That is a definition that covers all the idealized constructional systems that are imagined in prophecies of distant architectural Utopias. It is also a definition of brickwork—which perhaps explains the persistent importance of brick: at the same time a material perfectly in tune with modern technological ways of thinking and the traditional, primitive building method; in the form of the box of bricks providing the average person's first experience of building materials. The brick might be said to be the first important example of standardization in the building industry. It is probably, together with the page of a printed book, the most important example of standardization in the whole of civilization.

In its standardization lies one of the brick's two essential characteristics. The other is its size: the definition of a brick is that it is of a size entirely determined by the size of the human hand and the power of the human arm. Naturally, the larger the size the simpler the building job, so the standardized brick size, which has hardly changed since the brick's first historic appearance, is the maximum in weight and dimension that the human hand can comfortably hold—and one human hand only, it should be noted, so that the other is left free to manipulate the trowel. The brick, therefore, is wholly different in kind, not merely in scale, from other and more recently evolved varieties of pre-fabricated building units—concrete blocks, terra-cotta blocks and the like, which involve a different system of team labour, an entirely different operative process.

The exact proportions of a brick, inside these limitations of weight and volume, are of course determined by further constant considerations: the geometry of bonding and the constructional necessity of breaking joint. Thus we have established that the primary characteristics of the brick are of a permanent nature, unalterable by the fluctuations in social habit and outlook that determine the course of architectural design. The secondary characteristics of the brick are the materials from which it is made and the physical properties it acquires therefrom. Brickmaking materials have varied as widely as the available raw materials, which comprise almost any that are capable of being moulded in the way the nature of the brick demands. They have also

varied according to the regional distribution of raw materials and according to climate. In this country and in Northern Europe generally the traditional material has been clay, and the method of manufacture (in our temperate climate) artificial baking to the desired hardness. As an alternative must be added other earths, unburnt but hardened by chemical reaction.

These are the traditional materials. Modern technology and the demands of modern architecture have added more: concrete bricks, the natural sequel to the ubiquity of concrete construction; glass bricks, a very typical modern walling material, and others of a synthetic kind whose use, like that of glass bricks, has been made possible by recent fundamental changes in the principles of building construction—by the development of the structural framework which ceases to demand weight-carrying qualities in the walling materials.

However, in this special issue of THE ARCHITECTURAL REVIEW we are concerning ourselves only with bricks made from the traditional brick-making materials; with burnt-clay bricks and sand-lime bricks—comprising all that the man in the street normally means by a brick; the two brick materials being, incidentally, in his eyes seldom differentiated. This definition keeps us within our classification of building methods according to materials, and allows this issue to take its place in the series of special issues that the REVIEW is publishing dealing with one material and the architectural problems and achievements relative to it. Steel and concrete have already been dealt with; timber was dealt with early this year. This brick issue is the next in the series.

THE ARCHITECTURAL REVIEW'S point of view about materials as such had better be clearly stated. Each material has its own appropriate uses and occasions; also its own limitations. It provides its own æsthetic opportunities. And in isolating one material for purposes of study, that material is not being exclusively recommended. Descriptions of brick houses cast no aspersions on timber houses or concrete houses. The latter are only irrelevant to the subject of the issue. THE ARCHITECTURAL REVIEW is interested in modern architecture; in a contemporary solution to contemporary problems. But in many of its aspects the contemporary problem is the same as the old one—there are constants in architectural *desiderata* that form the continuous thread of tradition, running through the whole history of architecture. Novelty-fanatics and over-conscientious advertisement copy-writers notwithstanding, there is no such thing as the "New Living"; architecture's essential problems of shelter are many of them almost unchanging. There is only the new and improved response that scientific advancement enables us to make to the traditional demands; there are minor changes in these demands; there are a few entirely new architectural problems—those set by long-distance transport, for example—there is the changing problem of assimilation into the contemporary formal background. But fundamentally the tasks of architecture do not change.

Neither do the well-tried materials become obsolete, provided they are used in a rational spirit, with full advantage taken of all modern possibilities; though there is a quite unfounded belief about that modern architecture means the exclusive use of the so-called "modern" materials, such as steel, glass and concrete. This misconception strikes, of course, at the whole root of the modern architectural idea; that it is an architecture without prejudice, without academic rules, without a stock of ready-made solutions.

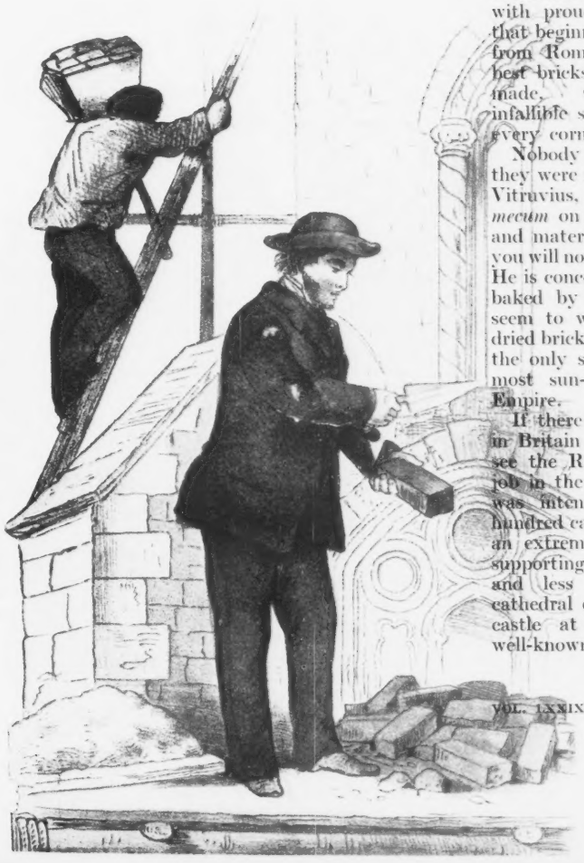
A study of brick in architectural use may do something to show that, scientifically used, it is as "modern" a material as any. Which is more "modern" than the other: the great East London warehouses in stock brick of the early nineteenth century, or the thin brick curtain walls of the latest welded factory? Brick is a particularly appropriate material with which to illustrate the inseparability of tradition and modernity because of its significant characteristic, inherent in its traditional nature, of being a standardized pre-fabricated unit. Brick as a beautiful material needs no apology.

Christopher Hull laying 809 bricks in one hour at Treeton, near Sheffield, on November 24th, 1924. This record has since been broken. Below, the bricklayer and his mate, 1850.

Those Oblong Morsels*

THE PROGRESS OF THE BRICK THROUGH ENGLISH HISTORY

By R. P. Ross Williamson



LET us start at the beginning. And in the case of our brick, as it is with our law, our roads and everything else that once raised us from the status of miserable savages to a nation with proud traditions, we owe that beginning to our conquerors from Rome. They made the best bricks that have ever been made. One finds them, the infallible seal of the Roman, in every corner of the Old World.

Nobody seems quite sure how they were made. If you consult Vitruvius, the traditional *vademecum* on the building methods and materials of classical times, you will not find him very helpful. He is concerned only with bricks baked by the sun and doesn't seem to worry about the kiln-dried brick which must have been the only sort made in this, the most sun-less province of the Empire.

If there are not many places in Britain today where you can see the Roman brick doing its job in the building for which it was intended you may see a hundred cases where it still plays an extremely useful purpose in supporting buildings of a later and less secure age. The cathedral of St. Albans and the castle at Colchester are two well-known examples where the Norman builder has used Roman materials in his more important works, but up and down the country there are many churches of pre- and post-Conquest date where the re-used Roman brick is about the most substantial thing about them; churches, for instance, like Brixworth in Northamptonshire and St. Peter-on-the-Wall at Bradwell in Essex.

But if you want to see what the Roman brick looked like when it was quite new you should see the bit of the second century walling which they have just discovered under No. 19, Tower Hill. The wall was made of Kentish Rag throughout but every few feet there were two or three courses of bricks running right through the wall from side to side for binding and levelling the rough masonry of the core. This Roman use of brick for binding purposes has persisted through Norman and later mediæval times and become part of the building tradition peculiar to the chalk country;

* "Fields of good clay were never given us to be made into oblong morsels of one size. They were given us that we might play with them, and that man who could not handle a chisel might knead out of them some expression of human thought."—Ruskin: The Stones of Venice.

the walls of nodule flint which are common to the downland of southern England are invariably laced with a single course, or sometimes with two courses, of brick every few feet. Without them, the flint walls would not hold up. It is one of those useful tips we learnt from the Romans and have not forgotten through many centuries.

Eight hundred years is a pretty long time, yet no bricks, they say, were made in Britain from the day the Romans left us to our dark and unpleasant fate, and the sudden appearance, about the year 1220, of an entirely new sort of brick used in the quoins, window dressings and internal mouldings of the Abbey buildings at Little Coggeshall in Essex. But this was an isolated example, a forerunner of the first all-brick dwelling-house in England at Little Wenham in the neighbouring county, which was built forty years later. In fact, we may say that brick architecture in mediæval England began properly at Little Wenham Hall in the year 1260.

The bricks were of a new sort, rather like those in use at that time in the Low Countries. They measured $9 \times 4\frac{1}{2} \times 2$ in. Now, the standard minimum size of a brick in the South of England today, as laid down by the Royal Institute of British Architects in 1919, is $8\frac{7}{8} \times 4\frac{5}{16} \times 2\frac{5}{8}$ in. The comparison is impressive. To have lost an eighth of an inch in length and three-sixteenths in width and to have gained five-eighths in thickness are not remarkable changes to have taken place in nearly seven hundred years. It is almost safe to say that the brick came to these shores in the 13th century as a perfectly developed unit so far as size and shape were concerned. What slow and painful evolutions were necessary before this finished state was reached, have nothing to do with the story of brick in these islands. It almost looks as though some balance had decided to atone for the eight uninventive centuries which had gone before by introducing the brick to England ready, in all its perfection of size and shape, so that her people might begin building master-pieces and rival with their genius what other nations had attained by perseverance.

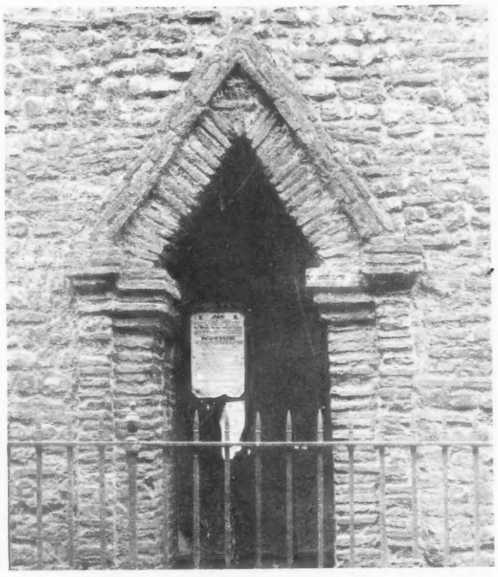
This comparison of the relative sizes of bricks in the thirteenth and twentieth centuries is not to suggest that the dimensions have been constant all that time. It is only an attempt to show how occasionally man, in spite of popular belief, has been able to realise when he has achieved something perfect and has not been foolish enough to try to go one better. The size of bricks has, as a matter of fact, been anything but constant during this long period. It has deviated many times from what we may call the "ideal" dimensions, but this has been caused as often by the exigencies of taxation and the demands of legislation as by the lack of a uniform standard applying to the whole country. It was also sometimes caused by carelessness in the making of the moulds.

But to go back to Little Wenham Hall. The bricks, as we have seen, were of the kind used in the already highly-developed brick buildings of the Low Countries. If they were not actually brought in from Flanders they were certainly copied from them. The quibble as to whether they are English

LATERARIUS—the Brickmaker, circa 1568. . . . *"All things I lay to my kiln, I, the Brickmaker, and prudently and with ease and skill I cook my bricks."*

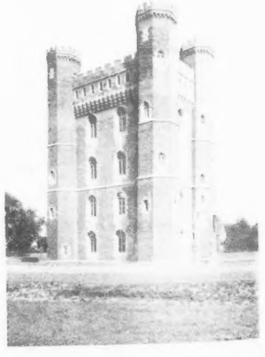
PICTORIAL SURVEY OF

How the Romans used their bricks; a binding course in a wall of rubble. Colchester.



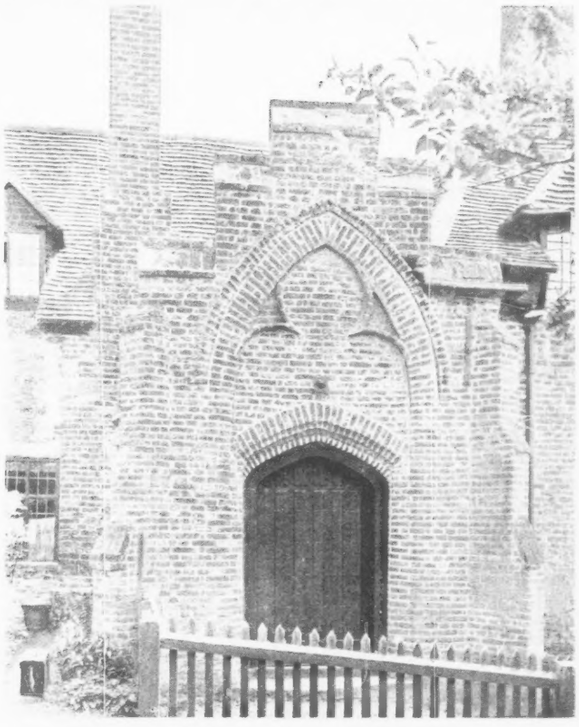
How the Saxons re-used the Roman bricks after the Legions had gone: tower of Trinity Church, Colchester.

1260 **The first brick house in England: Little Wenham Hall in Suffolk of Flemish type brick.**



1431-49 **Post-100 years War: English castles copied from French models: Tattershall Castle.**

ENGLISH BRICK BUILDING



1436-46 The other influence on early English brickwork was due to the Flemings who taught us to make bricks again. This is at Ewelme, in Oxfordshire—not in a Flemish béguinage.

c. 1470 The pantiled roofs of the eastern half of England increase the similarity between the brick buildings on either side of the North Sea: Gainsborough Old Hall.

bricks, i.e., baked in an English kiln from English clay, is unimportant. The thing that even the staunchest patriot must face is that a great many of the really important brick buildings in this country are not really English in spirit. Nor were they meant to be. The reason is quite simple. Brick was the medium in which new architectural fashions found their first expression in this country. That is why our brick buildings look first of all as though they had come from Flanders, then, very soon afterwards, from France, then from Renaissance Italy and finally from late seventeenth century Holland. Not until we come to the middle of the eighteenth century can we exclaim in all truthfulness, as we love to do on every possible occasion, "how typically English" such and such a building is. And then at the end of the century and in the beginning of the nineteenth, no longer susceptible to foreign influence because we are fighting the whole world, we at last produce some of the finest brick buildings that have ever been put up in any country in any age: the mills and warehouses of the early industrial era. They are entirely English and have not looked abroad for inspiration. They are not least, if less noticed, among our architectural possessions.

Brick then, we must remember, was a fashionable material during most of its English history.

In the thirteenth century Flemish refugee weavers introduced the art of brickmaking into East Anglia and it is very probable that the bricks at Wenham were made by them. From the geological point of view it was about the most propitious part of the country for such an introduction; the eastern counties were the richest in England and they possessed practically no good building stone.

Another influence from the Low Countries was at work, too, in those early days of brick building, and this was the Hanseatic League, that immensely powerful combination of the trading cities of North Germany, the Low Countries and England which lasted from the twelfth century for two hundred years at least and was an important means of disseminating Flemish influence and fashions in East Anglia. One has only to go to ancient towns like King's Lynn and Norwich to see how pronounced this influence must have been.

But in the middle part of the fifteenth century an influence responsible for much more spectacular results was abroad in England. This time it came from France. The Hundred Years' War ended in 1453 and the English knights, who had been spending a great part of their lives in France as their fathers and grandfathers had done before them (the war had been going on for well over the nominal Hundred Years), came home filled with French ideas on architecture, home-sick for the grand French castles in which they had lived for so long. Returning to their own ancient castles they found them small and wretched. They were disgusted with them and turned to and rebuilt them on French lines—in the new fashionable material, brick.

The most notable of these castles are Tattershall in Lincolnshire and Hurstmonceaux in Sussex. Nobody, travelling in the almost unknown county of Lincoln, could help being surprised at his first view of Tattershall even if he had already experienced the unique surprise which Woodhall Spa can offer him—that woe-begone outcrop of southern English suburban development encountered casually in this little-visited piece of our island. There it stands, four square and enormous, with no feature in that monotonous landscape to challenge it or even to give it scale, the prototype of all the romantic barrack "keeps" of Victorian garrison towns. The reticulations of the brickwork are deceptive. It is difficult to believe that a brick is the unit by which one must judge this immensity. It is a building whose effect would seem to demand stone blocks of huge dimension. It is, there is no denying, the most un-English building to look at.* And very much the same can be said of Hurstmonceaux. Here the wide moat and the exaggerated machicolations have a stage-scenic look about them. This is not, one feels, a real English castle, built to meet English needs. It is somebody's conception of what an ideal castle should be. It is excessively romantic and must have been very much the talk of the day when it was finished. Its builder, Sir Roger de Fiennes, fought at Agincourt. Caister Castle near Yarmouth is another of these Frenchified brick castles and has a story connected with its building which is interesting even if it isn't strictly to do with our subject. Sir John Falstaff was, as the Shakespeare editors have told us often enough, a real man. Only his name was spelt Fastolf. He was at the siege of Rouen and distinguished himself in many other engagements in

*The late Lord Curzon bought Tattershall, restored it, and presented it to the National Trust for safekeeping. Together, with the late Mr. Avray Tipping, he investigated this question of French influence on English brickwork and came to the conclusion that its importance was much over-rated. This ought to be borne in mind because the question is still not settled, although the late Mr. Nathaniel Lloyd believed that there are good reasons for supposing the French influence was a strong one.

the French wars. In 1424 he was created a knight-banneret after the battle of Verneuil for having captured the Duc d'Alençon. This nobleman was held to ransom by Sir John and the price of freedom was that the Duc should build a castle at his own expense at Caister just like his own castle at Verneuil. And there it stands to-day. Rambures, in Picardy, the finest surviving example of a north French brick castle, must have been familiar to the English knights. They would pass it on their way to Agincourt as they went through Normandy into Picardy. Its owner and defender, André de Rambures, was captured in 1429 and brought back to England and he, too, may have been made to do some castle building while he was over here.

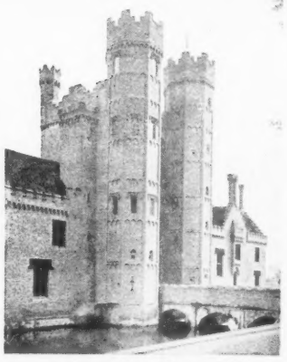
The French influence brought at least one important decorative feature in its train: the arrangement of contrasting coloured bricks to form a pattern on a surface of plain ones. This is called "diaper work." It never happens in the Low Countries, but it is common in France. It was introduced rather tentatively at Hurstmonceux (1445), more bravely at the Bishop's Palace, Hatfield (1480) and by 1508 the walls of Farnham Castle were covered with diamond patternings. The original purpose of the diaper was to give scale to a building. (It is precisely what is lacking in Tattershall.) But the skill with which these patterns came to be worked in later Tudor times is only properly realised on seeing what a modern attempt at the same thing is like. In theory they consisted of dark, vitrified bricks arranged uniformly. In practice they were much more subtle than this may sound; they were often of very varying colours: blue, grey and purple and even of deep red or brown—any shade, in fact that would contrast with the background. Nor are the lines of a pattern always consistent; sometimes they vanish altogether and re-appear again later on. The whole success of a piece of diapering work depended upon the sensibility of the builder. It is quite patent that it was an art which could never be taught. Either a craftsman had it in him to do it or he had not. There was no compromise. The richest examples of this sort of work can be seen in the Elizabethan sky-scraper of Layer Marney in Essex and Leigh's Priory, also in Essex, where zig-zags, crescent-moons and chequers augment the conventional diamonds. This practice persisted until the eighteenth century but its application became much changed: no longer are the contrasting bricks subsidiary to the background; they have become of equal importance. That is to say, a chequered effect is aimed at. They were usually blue "headers" built in with red "stretchers." Such an arrangement is familiar to everyone who has troubled to look at the houses in practically any eighteenth century English High Street. It may be seen, totally misunderstood, used in a parody of its original purpose, in many of the theological and educational establishments of the last century.

Another result of the French fashion was the importation into this country of what is known as the English Bond—a paradoxical enough happening, but true all the same.

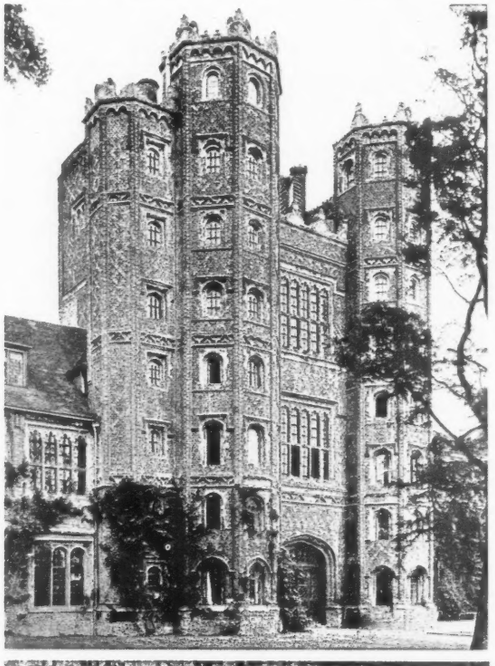
We have seen how the Flemings revived and fostered the art of brick construction in England and we have seen how France had contributed by supplying the models of the new brick castles and the new fashion of decorating plain walls with ornamental patterning. Now we must see the part that Italy played in the formation of a style which, essentially heterogeneous though it was, is now looked upon as peculiarly English. Yet, at the beginning of the sixteenth century, we must remember, brick was still a comparatively rare material. It was used increasingly in important buildings, but the great majority of the houses were timber-framed and the panels filled in with lath and plaster. And in the stone-bearing districts stone as a building material was, of course, still unchallenged, and was to remain unchallenged for a long time yet. Brick, then, a "smart" material because it was still a rare one, was naturally the medium to be selected for the introduction of Renaissance motifs into this country. And again, like its predecessors, this influence came first to the east of England—the brick-producing area. (It is an example, simple enough, of how geological formations may affect the culture of a country.) Brick was the obvious environment in which to introduce terra-cotta. It is so like brick that the one may be called a finer variation of the other. So we find terra-cotta medallion heads and shields-of-arms of pure Renaissance type appearing on buildings which are still Gothic at heart. It was the thin end of the Renaissance wedge so far as architecture was concerned. There are not many examples of terra-cotta work, but what there are make an important group. Sutton Court, near Guildford (1523–7), was done by Girolamo da Trevizi, the well-known roundels in the Clock Court of Hampton Court (1520) containing the busts of Roman emperors, by Joannes Maiano (he received £2 6s. 0d. for each of them), and then the windows over the north entrance of the gate-house at Layer Marney were

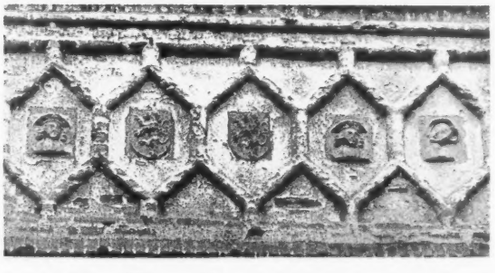
PICTORIAL SURVEY OF

c.1480 **The Roman method of bonding with brick courses persists in the Middle Ages; Thanet.**



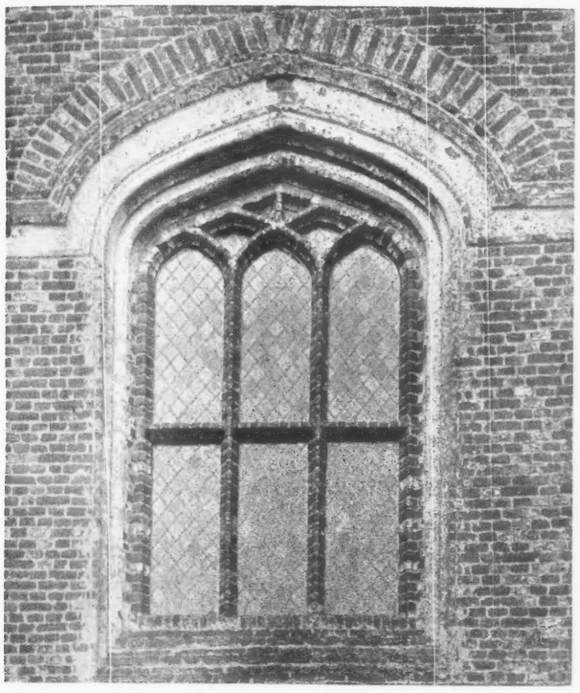
1482 **The Flemish crenellated panel becomes anglicized: Oxburgh Hall.**



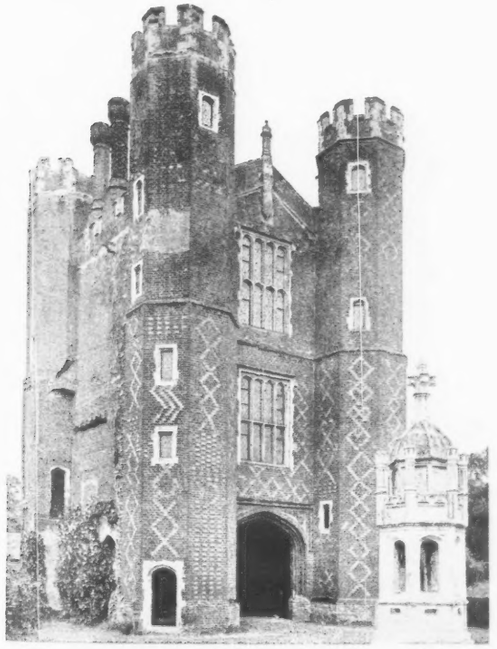


1520 **The Renaissance: Italians imported to make terra-cotta transom windows and parapets at Layer Marney Hall. This terra-cotta work, was copied by English workmen in moulded bricks; detail from East Barsham Manor.**

ENGLISH BRICK BUILDING



1520 This window at Layer Marney Church, with hollow-chamfered mullions and transom, is typical of the delicate way in which moulded brick was used at this time.

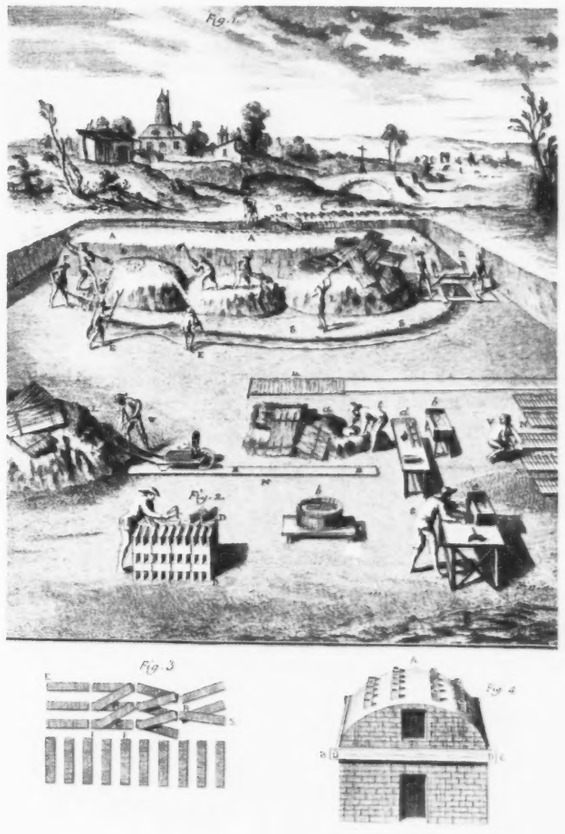


1536 Diaper work, the arrangement of contrasting-coloured bricks to form a pattern on a surface of plain ones, was probably brought from France: Leighs Priory, Essex.

done by Italian workmen about the same date. The parapets of the tower, too, are of foreign workmanship, and very odd they look against the mass of English work. At Great Cressingham in Norfolk the last piece of terra-cotta work in England was done in 1545. The use of the actual material had lasted only fifty years, but the fashion was set and the genuine article was to be copied a great deal in moulded brick. East Barsham Manor and Great Snoring Rectory, both in Norfolk, are good examples of the copying, in another material, of the sort of ornament which was so suited for terra-cotta.

It is odd why we never adopted to any extent the logical and Italian method of casting their units of decoration in blocks (until, of course, the Venetian revival of the eighteen fifties and sixties), but preferred to go on, all through the Tudor and Stuart periods, with our own system of building up the ornamental features—often exceedingly elaborate—bit by bit from the common unit of a single brick. Cornices, pillars and capitals are all made in this way—from the moulded brick. There are two ways of doing this: beforehand, by making a mould to the required shape, or afterwards, when the brick is made, by cutting or rubbing it down. From the beginning of brick-work in this country right up to the middle of the last century this cutting was done with a brick-axe, similar to those displayed in the arms of the Tylers' and Bricklayers' Company. This long practice was yet another instance of conservatism in brick matters. But the scutch, or scotch, has now quite taken its place, although the hack-saw, a plumber's tool by rights, threatens this monopoly. "Skilled workmen, however," writes Mr. Nathaniel Lloyd, "endeavour to keep this and other methods of brick-cutting secret, and are especially jealous that new recruits to bricklaying other than regular apprentices should not see them use these tools." Rubbing, the other method of shaping the burnt brick, was formerly done on a sharp piece of Yorkshire millstone grit, but carborundum now takes its place.

These were the simple methods by which all the prodigalities of Tudor chimney stacks, corbelling and doorways were achieved. The virtuosity of the men who designed the chimney stacks is a matter for wonder, and their products, masterpieces of ingenious design, were perfectly fitted to become ambassadors



What a brickyard in Northern France looked like in 1761.

of brick into the country of stone. Bricks for the making of chimneys travelled far and wide and it would be interesting to discover exactly how far these importations of superb pieces of craftsmanship, standing high above the country-side, were responsible for the spread of brick as a building material in early Tudor times into those districts, particularly the South Midlands, where it had hitherto been unknown. It was the beginning of a great time for brick architecture. The very word "Tudor" suggests the dark red bricks of St. James's Palace and the older parts of Hampton Court, and a score of other well-known and typical buildings of the period.

"Brickmaking is one of the manufactures in which women and children take an active part: the whole process is very laborious. It is common to meet with a family composed of a father and mother and four or five children of both sexes, from eight years of age to eighteen or twenty, busily employed at the same shed, whose joint labours produce a great deal of money during the season for making bricks, which is from the month of March to the month of September." (*From "The Costume of Great Britain," by W. H. Pyne, London*, 1808.)

Some idea of the new importance gained by brick at this time is shown by the foundation of the Tylers' and Bricklayers' Company in the tenth year of Queen Elizabeth's reign. The Charter of Incorporation was confirmed later in her reign by another granted in 1571, and further strengthened, and its powers augmented, by James I. and James II.

"These charters gave the Company full jurisdiction, within the boundaries of the City, over the manufacture of bricks and tiles used for building within the City, also over the journeymen, bricklayers and tylers employed in the craft. The Company's authority extended to the suburbs and within a radius of 15 miles from the city and included power to inspect work already completed or in process of building, and to levy fines for bad work. The Company was also given power to bind apprentices."*

In the same charter was drawn up the constitution which now holds: "that henceforth they be . . . one body and one perpetual society incorporate of one Master and two Wardens . . . and the society of free men of the same mystery or art of Tylers and Brickleyers of London." But the test of the Company's power came with the Fire of London in 1666. The re-building of the City meant an enormous and immediate demand for bricklayers. The small bodies of craftsmen entitled to work as freemen for this and for other City guilds would have been totally inadequate to deal with such an emergency, so a special Act of Parliament was passed to liberate workmen from the customary obligation of joining one or other of the ancient guilds before they were allowed to practise their trade. It is quite easy to see the disastrous effect such a piece of legislation was bound to have on a Company like the Bricklayers. Its authority, once challenged, never recovered. (Nevertheless, with the nineteenth century recoup of some of its former wealth, it does good work today. It supports almshouses and general charities in or near London, and maintains, in conjunction with other City Companies, a technical school in Great Titchfield Street.)

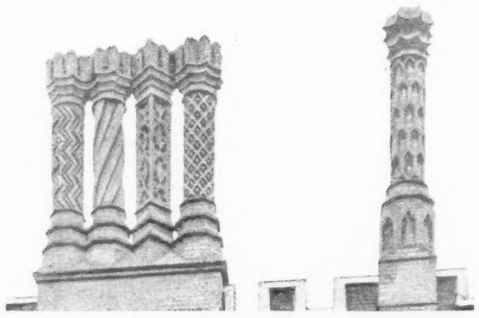
If 1666 was the year which saw the collapse of the mediæval system of building control it was undoubtedly the most important date in the whole history of bricks in this country—with the possible exception of the opening of the Bridgewater Canal abou a century later. From then on, bricks became the staple building material in the country—always excepting, of course, the stone districts like the Cotswolds. A new London had to be built immediately. The old timber-framed house with, very probably, its highly inflammable thatched roof, was doomed. The Commissioners of 1667 responsible for the new city urged that it should be built in brick. "Brick," the Act begins, is both "comely and durable." The full potentialities of its virtue of comeliness were realised by the City authorities in the same year, when the surveyors were instructed by an Order in Council that they should

"encourage and give directions to all Builders for ornament sake, that the Ornaments and projections of the Front-Buildings be of rubbed bricks: and that all the naked part of the walls may be done of rough Bricks neatly wrought, or all rubbed, at the discretion of the Builders, or that the

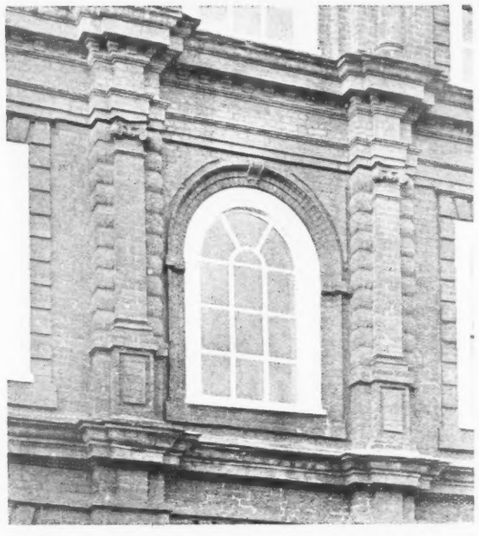
[continued on page 207]

* From information very kindly supplied by the Assistant Clerk to the Company.

PICTORIAL SURVEY OF ENGLISH BRICK BUILDING



1520 **Tudor virtuosity: chimneys at Hampton Court.**



1631 **The beginning of the Dutch influence: also the introduction of "gauged" brickwork in England. Kew Palace is a most important building in the history of English brick. The close-up shows better how the detail was carefully built up out of the new "gauged" bricks, cut with a precision formerly unknown.**

1

Georgian sea-power expressed in Georgian brick. These great ranges of sail lofts and warehouses for ships' stores in Portsmouth Dockyard were built in 1771. With their warm-coloured Hampshire bricks, Portland stone dressings, dormers and white-painted window-frames, they have a decidedly domesticated look about them. They are notable examples of the sort of official, utilitarian, but highly civilized buildings to be found all round the English coast, chiefly in the smaller harbour towns like Poole, Boston and Kings Lynn.

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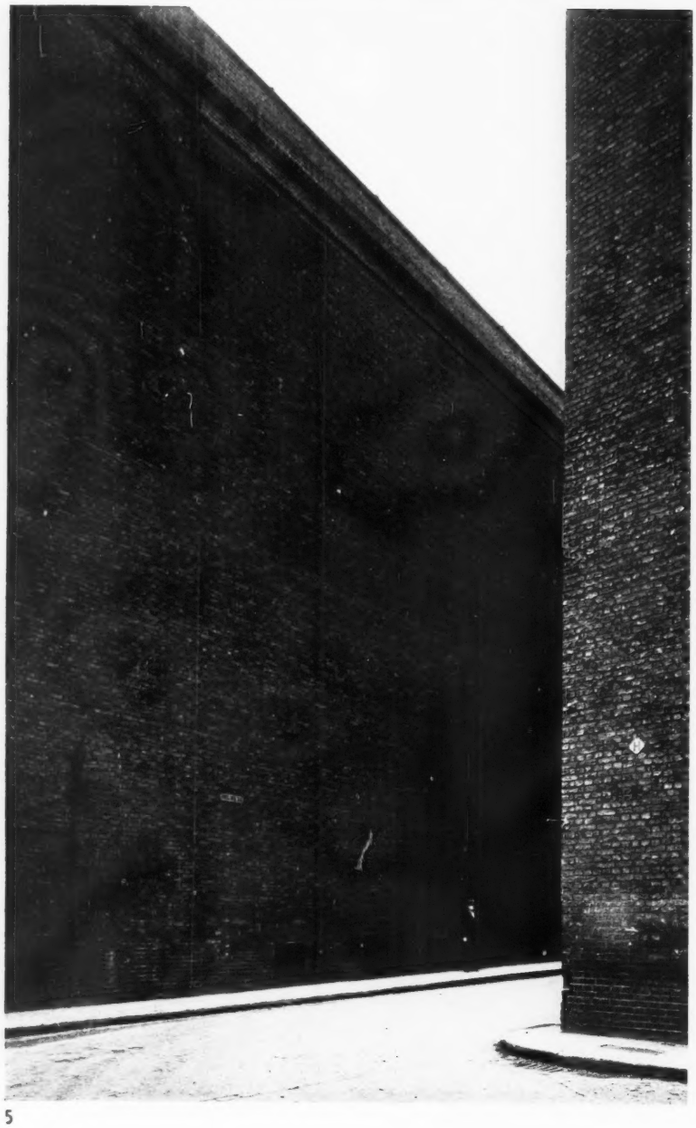

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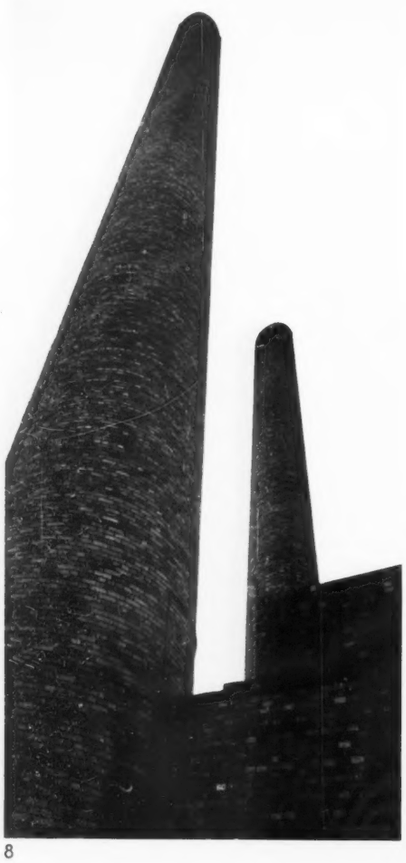
Early in the nineteenth century the "warehouse tradition" (illustrated by examples from Portsmouth on the preceding page) produced some of the best brick buildings we have, in the immense new docks which were being constructed in the east of London to cope with the enormous expansion of our overseas trade. 3, 4, 5 and 6 show St. Katharine's Dock, built by Telford and finished in 1828. 7 shows a warehouse in the London Docks. Note the success with which the Brick, smallest of building units, lends itself to the formation of massive architecture. The familiar London Stocks were used for all these dockyard buildings.

7

7



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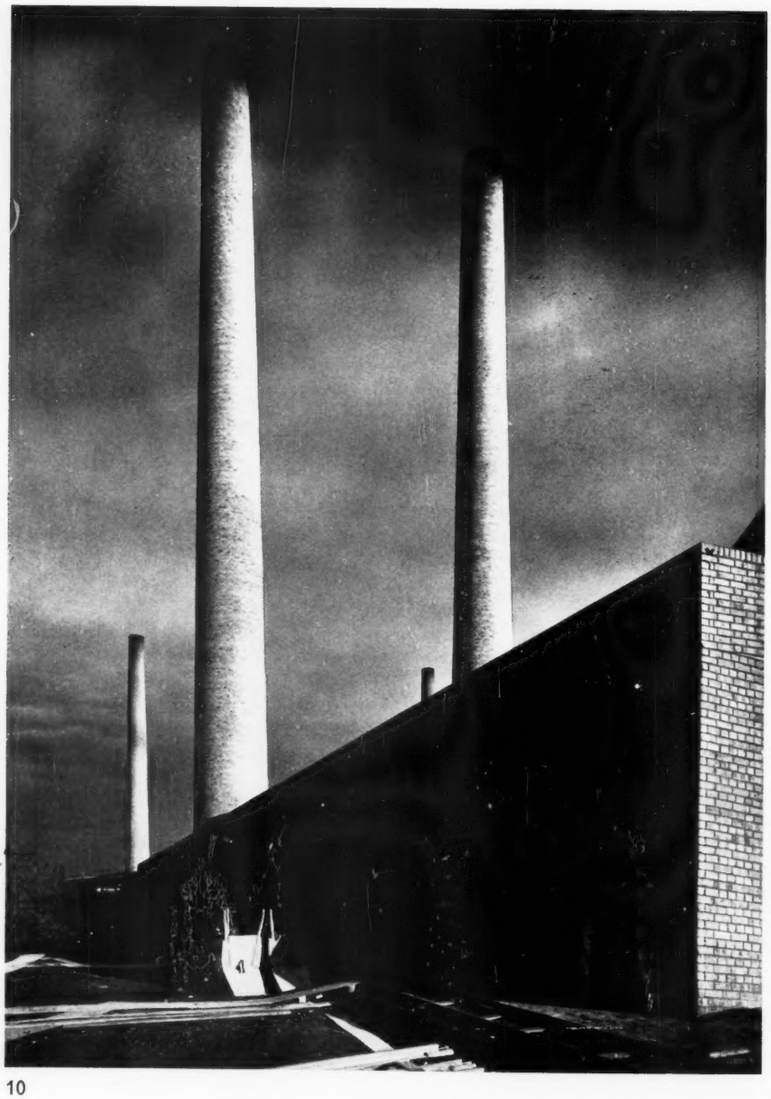
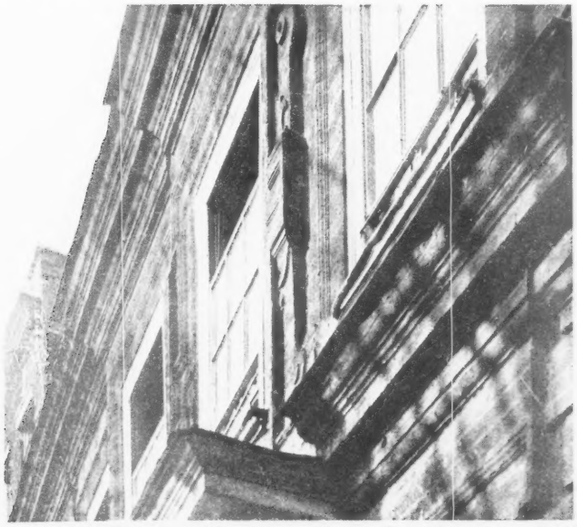


10

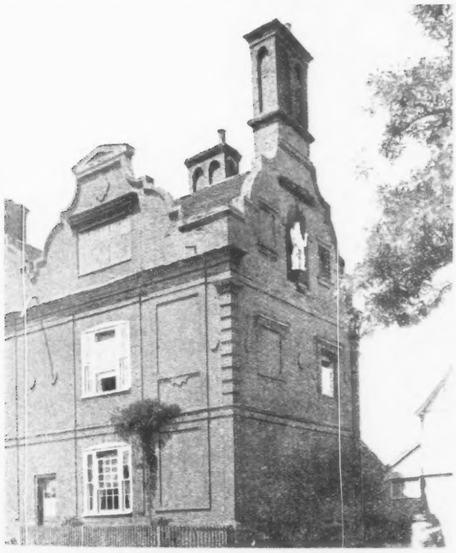
8, 9 and 10, modern examples of brick in industry : a brick-yard near Bedford in the "Fletton fields." Note the plain caps to the chimney stacks and compare them with such Victorian excesses as those illustrated on pages 212 and 214. Plain, unadorned brickwork once again appears in the industrial world, and helps to give industrial scenes their own special beauties. These pictures, and those of early industrial buildings, show how impressive brick can be when it is employed with that severe directness of purpose which, in itself, supplies the decorative element.

PICTORIAL SURVEY OF ENGLISH BRICK BUILDING



1650 Eventually gauged work, when applied to mouldings, reached the pitch of refinement seen at Cromwell House, Highgate.

1635 Another of the great "Dutch" houses. The richness and variety of the gable pediments at Broome Park are unrivalled.



1655 The influence of the greater "Dutch" houses on the lesser: "The White Hart" at Scole.

Builders may otherwise inrich their Fronts as they please."

Two other results of the Fire, although delayed, had a direct bearing on the use of brick. In 1707 a London Building Act was passed forbidding the use of the timber eaves-cornice on houses. Gradually these wooden features disappeared, and their place was taken by the brick parapets which are so characteristic of our later eighteenth century architecture. In the following year an ordinance was issued forbidding that any door, frame, or window frame of wood should be fixed on a house in the cities of London or Westminster nearer than four inches to the outside face of a wall. It further forbade that any brickwork should either carry timber or be placed upon timber. This precaution resulted in the set-back window with a stuccoed and white-painted reveal, and the introduction of segmental tops to the window openings to take the place of the customary beam. It is easy to see the difference which this fear of a repetition of the disaster of 1666 made to the exterior appearance of the town house; although these regulations did not apply to the provinces, their effect was felt everywhere, both on the grounds of fashion, and because the London Acts presented a set of standards, as those of the L.C.C. do today, which it was found useful to adopt in districts where the contracting systems were arbitrary ones; and when more specific standards of workmanship were required by clients in the more business-like age which had succeeded the rule-of-thumb atmosphere of the Middle Ages. It was the first big step in the standardization which was eventually to usurp local peculiarities of style all over England.

From the Great Fire, right on to the reign of George I, a great many of the houses on the outskirts of London, in the Home Counties and, more particularly, in East Anglia, where the ground was already well prepared by long tradition, took on a decidedly Dutch look. For some time Englishmen had been familiar with the architectural treatises of Dutchmen and, since the Dutch have always been the greatest masters in brick construction, the cause of brick in England quite naturally received an academic stimulus which was later on to be socially reinforced by the English friendliness with Holland when Marlborough was fighting France, and by the accession of "Dutch William" to the throne. It was the fourth wave of foreign influence to affect the course of our brick architecture.

Long before the Great Fire several very grand houses had been built in the Dutch style, notably Kew Palace (1631), to be known for 150 years as the "Dutch House"; Broome Park in Kent (1635); and Inigo Jones' Raynham Hall in Norfolk, built about the same time. And as a very beautiful example of a lesser house there is the gabled inn at Scole, just over the Norfolk border. These big houses set the fashion, and all over the eastern half of England thousands of smaller houses owe their inspiration to them. With their borrowed motifs—especially the pedimented gable—and their pantiled roofs, they do manage to give a remarkably Dutch effect to many districts. The pantiled roofs, often glazed to shades of metallic blue or gunmetal, are very common in East Anglia.

How many of these pantiles, especially in Essex, were supplied by Daniel Defoe? It isn't often that one encounters a personality in this waste of bricks and mortar, but at Tilbury, at the beginning of the seventeen hundreds, we do find a real personality in the author of "Robinson Crusoe" in the capacity of secretary to a brick-making company, later on to become the owner. This was the first time that pantiles had been made in England; they had always been brought over from Holland. He did very well out of it, we are told, before he was arrested for debt in 1703, and the yard shut down. If we go back a bit we find another personality in close contact with bricks: a Ben Jonson, bricklayer, was working on the gateway into Lincoln's Inn, which still guards the entrance from Chancery Lane. He held a copy of Horace, it is said, in one hand, and his trowel in the other. We are not told who put the bricks into position for him.

About thirty years before the Fire a change of great importance began to make itself noticeable in the character of brickwork. Up to 1630 the bricks used for every purpose were hard ones, and if any particular shape was wanted it was obtained by one of the three methods used with such success by the Tudor designers. It had to be purpose-moulded, cut with the brick-axe or else rubbed into shape by hand. But now a new type of brick appeared which, by developing a new technique and introducing a new æsthetic, was to result in the apogee of English brick building in the second half of the seventeenth century and the first half of the eighteenth. It all arose from a new carefulness taken over the mortar joints between the bricks. In Tudor work the joints are, generally speaking, at least half an inch thick. The very nature of mortar makes it an admirable arbitrator between irregularities of shape in neighbouring bricks. Given an elastic enough joint the necessity for strict accuracy is

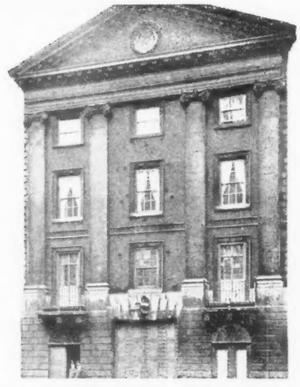
considerably lessened in the surfaces of two adjoining courses of bricks. Inequality in size or carelessness in laying are both concealed in a lavish bedding of mortar. This was all very well in the early days of brick manufacture in England, but with their gradual improvement and the increasing certainty of regularity in size this excessively wide joint became unnecessary. By 1670 it was often less than an eighth of an inch in thickness. The progress towards perfection was a gradual one, until finally it was decided that if, after all, the ordinary bricks were inevitably inclined to a certain degree of irregularity, then special ones must be made; ones with more sand in them so that they were softer, and might be carved like cheese or rubbed down to within the last fraction of an inch of the dimensions required. And so what is called "gauged-work" came into the field. The shape of every brick in a façade could be exactly marked out by the cutter beforehand, and a mathematical precision was used to obtain the very finest of joints. This kind of work was favourable to the carving of the classical detail which was coming more and more into vogue as the full Renaissance completed its control over English architectural ornament. Columns, piers, capitals, cornices and coved niches offered an inexhaustible field for gauged and rubbed work. We can forget former surprise that the art of terra-cotta was so short-lived in present thankfulness that it was so, because we should never have had these marvels of virtuosity in carved work had it been possible to satisfy the demand for ornament by the cast and pre-moulded methods of the Italian craftsman. Kew Palace has some beautiful examples of the sort in the Ionic capitals and key blocks of the façade. They are early instances; others are the two gauged gateways at Chesterton in Warwickshire (1632), and at Forty Hall, Enfield (1633), both accredited to Inigo Jones. By the time Wren was at his prime gauged work was all the rage. We have seen how the City Fathers advocated its use in the rebuilding of London. The Middle Temple gateway and Hampton Court Palace are specimens of Wren's own work, but for quite the finest piece of its kind we must go again to the Victoria and Albert Museum to see the window pediment from a house at Enfield. But nobody wants to go inside a museum if he can see good things outside, and Cromwell House on Highgate Hill, and the exquisite Unitarian Chapel at Bury St. Edmunds ought to be seen by everybody.

Before and after the discovery of the Street: Henry VIII's Palace of St. James', built, it is said, from the designs of Holbein, and Portland Place—noble brick façades by the Adam brothers.

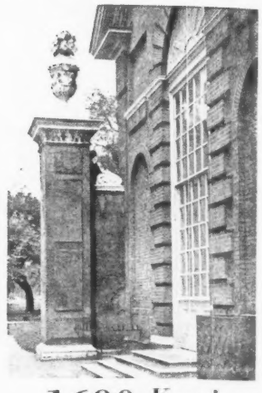
Another result of this gauged work was the opportunity it gave for the consideration of a plain brick surface as a spatial entity rather than as a mass of tiny units each separated and made independent of its neighbours by the broad frontiers of mortar. Texture produced by this emphasis on the individual brick, is not, after all, a strictly architectural quality, however pleasing it may be. But the consideration of spatial effect is a very important one, and by subordinating the single unit to the whole this uniformity in brickwork was an enormous help to our late Renaissance architecture in arriving at a correct relationship between the more important features of a building.

No longer is the eye teased by a thousand distractions as each brick, framed separately, so it seems, for one's especial contemplation, jostles its neighbour for prior attention. One's eye naturally rests on the cornice, the quoinings, the lines of fenestration, the entrance, and so on, and it is these parts of a building which are to come in more than ever for elaborate yet formalized ornamentation. It was this new spatial treatment which was to give to the Portland stone dressings their full effect as decorative features. Stone had been used as quoins and cornices from Tudor times, but it was Wren who realized its real potentialities when used as a foil to brickwork. Another result was the use of large panels of a different coloured brick from the surrounding work, and the employment of

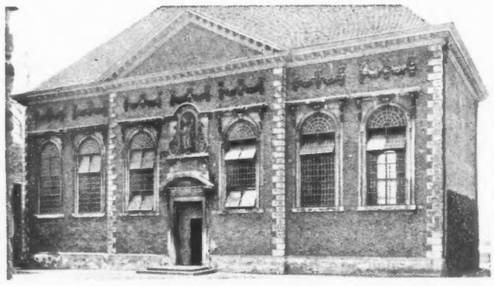
PICTORIAL SURVEY OF



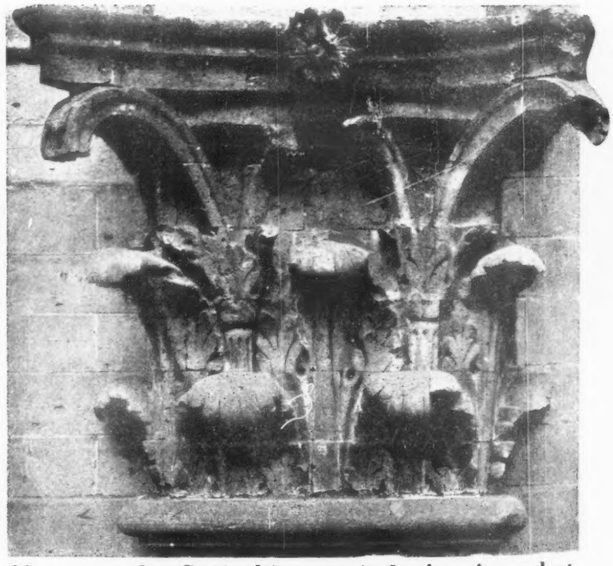
1684 **With the fine joints of gauged work the spatial importance of brickwork was enormously increased: Middle Temple Gateway.**



1690 **Kensington Palace Orangery. See Isaac Ware on its colour: page 210.**



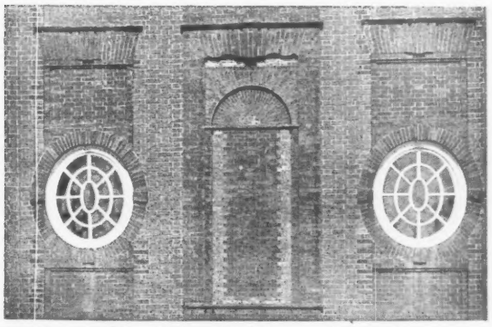
1684 **Although the texture of the brick in the School at Winchester is unsurpassed this shows also how the use of gauged work had increased the importance of stone dressings.**



Close up of a Corinthian capital, showing what could be done with gauged and carved work.

ENGLISH BRICK BUILDING

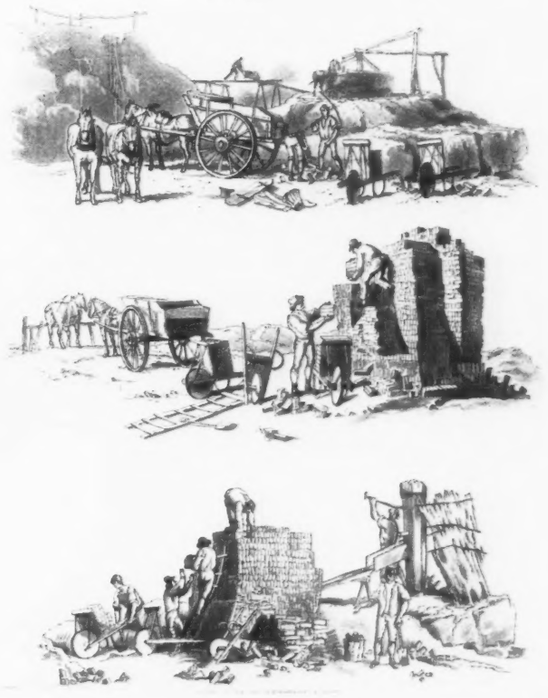
1720 **Another example of gauged and carved work in the early 18th century. The soft sandy bricks used in work of this sort have withstood even London's atmosphere and weather: a doorway at Hertford.**



1714 **English brickwork at its very best; colour used to give full effect to the panels forming part of the spatial treatment, made possible by gauged work. The walls of Larkfield, at Bradbourne, are of pinkish stocks, but many mauve, green, yellow and buff ones are among them. The dressings are of bright red.**

one sort round the window openings to contrast with the rest. It is an exceedingly effective artifice, as can be seen at Bradbourne in Kent, for instance.

This rise of Portland stone as an element of decoration was to have a profound influence on a colour scheme which had lasted for a long time, and had provided a vivid and almost unchanging back cloth—or so it seems to present imagination—for the performance of so much of the drama of English history. Up till the year 1720 the red brick had held undisputed sway. The peculiar richness of Tudor brick, a dark and comforting shade of red, is one which we are inclined to get sentimental about today. It is a "period colour." The word "Tudor," when translated into colour, is a deep plum red. And red, although with not quite the same depth, continued to be popular right through the seventeenth century and the first part of the eighteenth. But after 1720 this popularity waned. The grey and yellow of "stock" bricks began to take its place, and eventually they became supreme. Red brick, except in the provinces, was not seen again until the so-called "Queen Anne" revival in the middle of the following century. Two reasons are given for this. Either or both of them may be correct. The first is a question of æsthetics, the second of economic geology. Wren, in raising the status of Portland stone as a decorative feature in brick buildings to its highest pitch, established it as a primary element in that unique colour scheme which we have just mentioned, and which seems to us still today so typically English. The red of the brick, the blue-white of the stone, the cream-white of the window frames and openings, and the climax of a dark green or a dark brown front door, gave a gay and pleasant discipline to the Queen Anne and early Georgian house. It was a discipline of colour perfectly suited to that discipline of scale which was so important in an age concerned with "order" in all its forms. But the role which it was intended that brick should play in this combination was altering. Hitherto, stone, plain and uncarved, had been used to display the brick. Now brick was being used to show off all the elaborations of the finely wrought limestone from Dorset. Once that change had been more or less recognized it wasn't very long before people began to think that perhaps brick of a rich, red colour was not, after all, *quite* the best of shades to go with Portland stone — especially with those subtle tones it assumed in the London atmosphere. Contrast



Top: "Brick-field. Loading a cart with bricks. In the background the mill for grinding the clay." Centre: "Loading barrows from a brick-kiln." Bottom: "Taking down a kiln. In the background a man pumping the water out of a clay-pit." From Pyne's "Picturesque Groups for the Embellishment of Landscape, 1845."

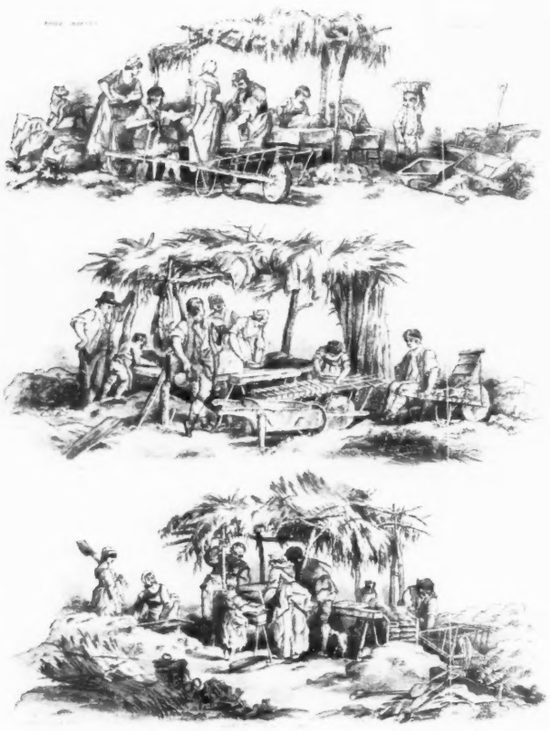
was not what was wanted. Harmony between the constituent parts of a design was felt to be as necessary in colour as in scale. And the yellow stock bricks from the Thames Estuary *did* seem to go better with stone than the red ones had done—or so the architects who followed Wren believed.

This is what Isaac Ware, writing in 1756, thought about it:—

"Of the manner of using bricks. We see many beautiful pieces of workmanship in red brick; and to name one, the front of the greenhouse in Kensington Gardens will be sure to attract every eye that has the least curiosity; but this should not tempt the judicious architect to admit them in the front walls of buildings In the first place, the colour is itself fiery and disagreeable to the eye; it is troublesome to look upon it; and in Summer it has an appearance of heat that is very disagreeable; for this reason it is the most improper in the country, though the oftenest used there, from the difficulty of getting grey. But a farther consideration is that in the fronts of most buildings of any expense, there is more or less stonework; now, one would wish that there should be as much conformity as could be between the general naked of the wall and these several ornaments which project from it, the nearer they are of a colour, the better they always range together . . . There is something harsh in the transition from red brick to stone, and it seems altogether unnatural; in the other the grey stocks comes so near the colour of stone that the change is less violent, and they sort better together. For this reason also the grey stocks are to be judged best coloured when they have least of the yellow cast; for the nearer they come to the colour of stone, when they are to be used together with it, always the better. Where there is no stonework there generally is wood, and this being painted white, as is commonly the practise, has yet a worse effect with red brick than the stonework; the transition is more sudden in this than in the other; but, on the other hand, in the mixture of grey bricks and white paint, the colour of the brick being soft there is no violent change."

This is quoted at some length because all the æsthetical reasons are set forth and the change-over

[continued on page 211]



Top: "Group of brickmakers reposing themselves." Centre: "Placing the bricks upon the barrow, previous to exposing them to dry in the air." Bottom: "Brickmakers at work under their shed."

"It is pleasing to see with what rapidity each branch of the labour is performed. Every one has a certain part assigned, and they supply one another without confusion, or intermission. The materials are frequently mixed in a mill turned by a horse. One puts a quantity in a wheelbarrow, another brings back an empty barrow, and takes away the full one. A girl prepares a quantity about the size of the mould. A man, perhaps the father of the family, with a constant activity and exertion, bending forward moulds it, and then puts it aside. It is now placed on a long barrow; and when a cargo of these wet bricks is made up, they are carried and placed in rows to dry. When dried, they are piled for burning." From Pyne's "Picturesque Groups for the Embellishment of Landscape."

PICTORIAL SURVEY OF ENGLISH BRICK BUILDING

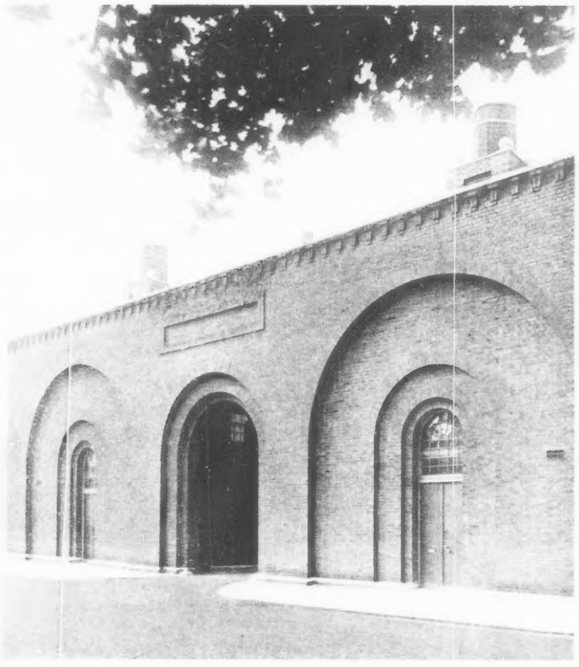
1718 **An entire façade of cut and moulded work, carried out in rich red bricks. Note the mouldings of window architraves: Willmer House, Farnham.**

1762-72 **Adam dignity in handling large masses of brickwork: Mersthamle-Hatch, Kent, in which 2½ million bricks are used.**

What the ordinary run of English street architecture in the provinces looked like in the eighteenth century: Owen Street, Hereford.

Brick in the Black Country. An aerial view of Stoke-on-Trent, a town which lives on the exploitation of clay. The pottery kilns, like the oast houses of Kent, are some of the simple, satisfactory architectural forms which industry has evolved in its utilization of brick.

PICTORIAL SURVEY OF ENGLISH BRICK BUILDING



1807 Spatial effect is everything: the stables at the Royal Hospital, Chelsea, designed by Sir John Soane.

1771 The eighteenth century type of warehouse, seen to perfection in Portsmouth Dockyard, gave way to—

1828 this in the early nineteenth century: St. Katharine's Dock, London, built by Telford.

from the red to the yellow, determining, as it did, the entire appearance of most of London, seems to be too important an event to pass over casually. A lot of people continued to believe as Ware did, and quote him in their encyclopædias well into the nineteenth century.

It may have been due to these æsthetical reasons, or it may have been, as some people have suggested, that the sort of clay in the brickfields along either side of the Estuary, from which the red bricks were made, and from which London drew her main source of building material, became exhausted. The yellow, cream and grey bricks which come from the Estuary to-day are known, as they were then, as "malms"—a corruption of "marl," a name given to a particular sort of clay containing a large percentage of chalk—sometimes as much as 40 per cent.—of which they are made. The natural deposits of those clays are practically worked out, and a synthetic "malm" is manufactured nowadays. So this meagreness on the part of Nature may be the reason why the greater part of London is built of yellow brick instead of the traditional red, or it may not. In any case, what London did, the country copied and, until fashion became ashamed of brick whatever its colour was and ordained stucco as a decent covering for its crude nakedness, these tones of ochre, sulphur and buff were to predominate alike in town and country—except in obscure places where there was no pretence to be in the London fashion. The story is told of how George III on one of his periodical visits to Weymouth went over to see Mr. Morton Pitt at Kingston Maurward. Mr. Pitt was proud of his house (it had been built between 1717 and 1720), and expected that His Majesty would comment on its beauty. "The King, however, with his well-known iteration, did nothing but utter the words, 'Brick, Mr. Pitt, brick.' The impression that they made upon his host may be judged of from the fact that before King George made his appearance again in the neighbourhood of Dorchester the quarry-men and masons had made theirs; and Mr. Pitt, at a vast expense, had contrived, between the visits, to effect the wished-for alteration."*

Apsley House, or "No. 1, London," as our grandfathers liked to call it, was built in 1771–78 of brick, but in 1828 it had to bow before the fashion and apply to itself a facing of Bath stone. And, in many fine houses all over the country, wherever there was enough money to save the sensitive owners from the disgrace of being out of fashion, the same thing happened.

Nevertheless, very soon an enormous acreage in the newly awakening industrial districts was covered with plain, undisguised brick, and in the early part of the nineteenth century even fashionable houses arrived at a compromise and were content to be stuccoed up to the level of the first floor only. Moreover, the extreme practicability of the Englishman of this time—a natural good sense which was to make him an immense fortune before the century was out—began to be offended by the useless veneer of stucco. This was written by Bakewell in 1834 in his book, "Observations on Building and Brick-making":—

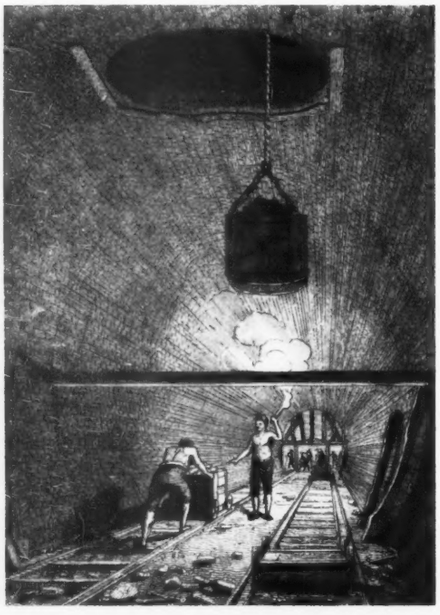
"Gentlemen . . . who construct houses for the purpose of residing in themselves cannot be charged with parsimony, and scarcely with economy, otherwise the *artificial*, *temporary* and *expensive* practice of daubing over their fronts with mortar (fashionably styled stucco) would not so generally prevail; and although it must be acknowledged that houses of this description look handsome for a while, yet, comparatively, in a short time they become mean and shabby in the extreme, and require to be almost continually patched or repaired, and even when most perfect, we know it to be a deception, and intended to hide deformity and worthlessness; and the defects above-mentioned can be only partially amended by incurring the enormous expense of periodical painting, at short intervals; but to perform that operation on the beautiful and durable bricks that are raw manufactured, would be as preposterous and absurd as that artist who should disgrace himself by covering over even with the most delicate pigments, those beautiful and inimitable specimens of the fine arts, the Laocoon, Apollo Belvidere or Venus de Medicis."

But before following the successes of brick through the nineteenth century we must go back a bit and record the second most important date in its English history. It may seem quite impossible to pick on any date at all to mark the beginning of the phenomenon known as the Industrial Revolution, and therefore prevaricative to put forward the opening of the Bridgewater Canal in 1761 as a possible claimant for this distinction. But in the case of brick something very extraordinary did happen in the later part of the eighteenth century which virtually divides its history into two parts, and the Canal was in many ways responsible for this change. Up to this date brick, as a building material, was strongly localized. This is how matters stood on the eve of Britain's transformation from mediævalism into industrialism.

It had always been the mainstay of architecture in East Anglia, as we have already seen, from the time of its reintroduction into this country onwards, because of the absence of stone in those parts. The southern piece, the greater portion

* Quoted in Mr. Arthur Oswald's "Country Houses of Dorset."

of the county of Essex, lies within the London Basin, the great clay valley which lies between the opposing chalk formations of the Chilterns on the north-west and the Surrey downs on the south. This vast V-shaped area, with its apex just over the border of Wiltshire, contains a variety of clays peculiarly suitable for the manufacture of brick, and in Essex we find that the industry had been steadily advancing for three centuries. It was one of the



In 1793 a tunnel had to be driven under Islington for the Grand Union Canal. The bricks lining its three quarters of a mile today are the original ones.

main sources of London's brick supply, and used the Thames barge solely for transport purposes. The rival source, and possibly the better known of the two, lay on the other side of the river, and along the Medway creeks, whence came the famous "London Stocks." It, too, depended on barge transport for its prosecution. Ascending the valley, past the Metropolis into Berkshire, we find that Reading has been the centre of another localized area of manufacture since the early fourteenth century. The beds from which the clay is won lie on either side of the River Kennet. It had built Reading and all the surrounding villages. In neighbouring Buckinghamshire brick-making had been going on for just as long. (There are brick-fields now along the route of the Brill Tramway, closed, alas, to passenger traffic last December, which have been working since the seventeenth century.) Bedfordshire, Hertfordshire, Cambridgeshire also made use of their clay. Parts of Hampshire and Dorset are in a geological "basin," very similar to that of London, composed of drifts and alluvium deposits particularly fitted for burning into bricks, a fact which the inhabitants seem early to have realized. (In 1575 the civic post of Town Brickmaker at Southampton was brought into disrepute because its holder was supplying bricks to the county gentlemen at the expense of the citizens, and the gain to his own pocket.) Fareham had been famous for "Fareham Reds" for over a century and, over the Dorset border, Poole had been celebrated much longer than that for the quality of her clays, and because of her port she had the advantage over inland brick-producing centres in being able to ship her goods by sea. Hence the widespread fame of her clays. At Blandford Forum a grand new town was building after a fire had mercifully and completely devastated the old one, and the excessive demands put upon the arts of both burning and laying bricks in the building of a whole new town developed a local technique—an aesthetic, one might call it—which is among the most successful brick accomplishments in this country. In the neighbouring Somerset the "Moors," i.e., the fenlands south of the Mendips, had a brick tradition separate from the rest of the county. Here the villages, like those in the low-lying parts of Norfolk, have gabled roofs with dark red or black glazed pantiles. It is curious to see how similar these two fen districts are, even architecturally. In Sussex a boom in the trade was just beginning; in 1792 Arthur Young saw a kiln at Petworth "lately constructed for supplying the West Indies." In those counties of the Midland Plain, Leicestershire, Nottinghamshire, Warwickshire and Worcestershire, where the Keuper Marls occur, bricks were being made in many localities; Staffordshire was already famous for its clay products of all kinds; and the tongue of these midland deposits which strikes south along the Severn Valley supplied Gloucestershire with building material when she wasn't drawing it from the stone measures of the Cotswolds.

Such, approximately, were the areas in which brick-making was pursued at the beginning of the Industrial Era. But it was still a highly localized trade. The varieties of clay to be found in the stoneless parts of England made it unnecessary for builders to go

[continued on page 213]

PICTORIAL SURVEY OF ENGLISH BRICK BUILDING

c.1820 **A "Commissioner's Church": London stock bricks used for 174 Gothic churches in the new areas: St. James', Walham Green.**

1845 **The functional tradition of early industrial building lasted until mid-century: a Mill at Leeds.**

c.1860 **But the Great Exhibition changed all that; eclecticism at Doulton's, Lambeth.**

1849 **The beginning of the red-brick revival in London; Lincoln's Inn Hall.**

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THE GEOLOGY OF BRICK COUNTRY

This map does not pretend to show all the places where brick is made, but it is an attempt to show the more important sites where clay is dug, "got," or " won "—as they say—for brick-making in south-eastern England.

This district has been chosen in preference to others because it is the richest part of the country in deposits of clay of various kinds, but it is not the only part, by any means, which produces brick. There are, for instance, the great fields of the " Fletton " district of Bedford-Peterborough (whose southern area is interrupted by the northern edge of our map), of Staffordshire, of the Lancashire plain with its centre at Accrington, and lesser fields in South Yorkshire, in Nottinghamshire, and in Suffolk. But it is hoped that this map will give some idea of the variety of clays over which we live and to what extent the brick-maker is able to make use of them.

THE LOWER GREENSAND, the outermost formation on our map, was laid down by the sea. You can trace it at intervals from the Isle of Wight to Cambridgeshire. The cliffs between Hythe and Folkestone are formed of it, and a great crescent of it borders the Weald, supplying the chief view points on its northern side : Haslemere, Hindhead and Leith Hill. It finally runs into the sea near Eastbourne.

GAULT is just another name for clay. In colour it is usually blue or bluish-grey. Although the Lower Greensand appears to tower above it, the Gault is actually the later formation.

THE UPPER GREENSAND sweeps round the Wealden oval between the Gault and the chalk.

THE CHALK is unmistakable. It was, of course, water-laid too. How long did the 1,750 ft. which constitute the chalk layers of England take to form ? These four deposits belong to the same geological period, called the Cretaceous, i.e., chalky, because the chalk is the most important member of the series.

THE RED CRAG, menacing Suffolk at the top of our map, belongs to a much later period, the Pliocene, the first of the four groups of drift deposits which came after the rock formations. A more unsuitable name to apply to the chief contributing factor in the appearance of the East Anglian countryside it would be hard to imagine. Crag is not rock as one, unknowing, might expect, for the name, again, is a local one, signifying a mass of shelly sand, gravel and clay.

THE READING BEDS belong to the Eocene series. The Eocene deposits occupy two distinct areas of southern England, the Basins of London and Hampshire : " Reading," because the beds are much exploited near there ; " Woolwich Beds is " an alternative name, for a similar reason.

LONDON CLAY is 500 ft. thick. It was laid down by a sea which, they say, must have been a hundred fathoms deep to have caused a deposit of this thickness.

THE BAGSHOT BEDS overlie it and form the great stretches of low-hilled sandy heaths and commons of Surrey and Hampshire, so useful to the military.

THE WEALD CLAY belongs to the same series of " rocks " as the Chalk, i.e., the Cretaceous. It is stiff, wet, cold, and for long supported an impenetrable barrier of forest and marsh. Domesticated, it makes bricks of a pleasing warm red.

THE HASTINGS BEDS form the hilly country in the centre of the Weald, with Crowborough Beacon as its highest point. They are mostly sand, but contain bands of clay.

THE BEMBRIDGE BEDS, as the small outcrops of the Oligocene period in the Isle of Wight and the Hampshire Basin are known, are not very extensive. You can see what they look like at Alum Bay.

May 1936

THIS MAP UNFOLDS

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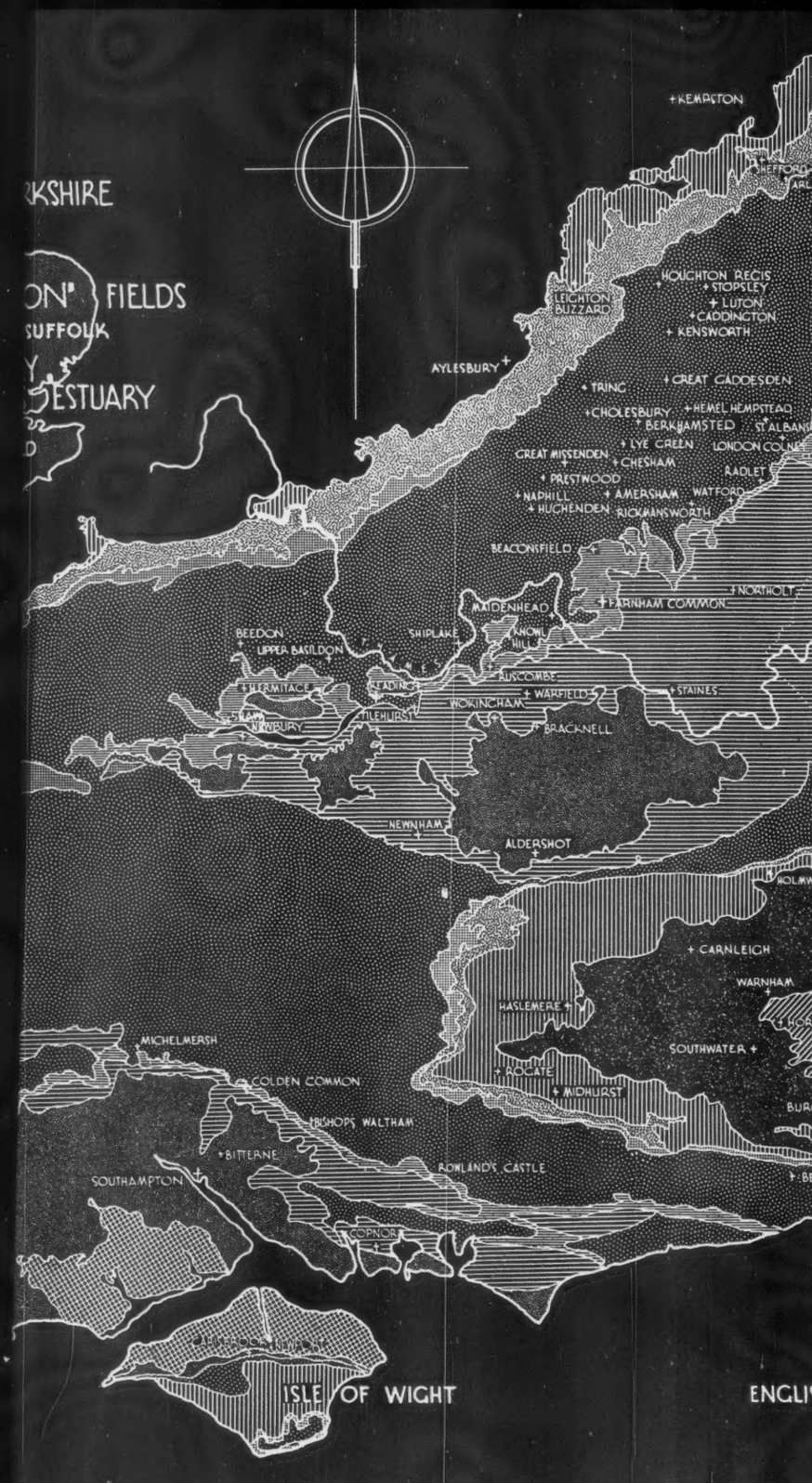
THE GEOLOGY OF BRICK COUNTRY


+KEMPSTON
RKSHIRE
ON" FIELDS
SUFFOLK
ESTUARY
HOUGHTON REGIS
+STOPSLEY
LEIGHTON BUZZARD
+LUTON
+CADDINGTON
+KENSWORTH
AYLESBURY+
+TRING
+GREAT GADDESDEN
+CHOLESBURY
+HEMEL HEMPSTEAD
+BERKHAMSTED
+LYE GREEN
GREAT MISSENDEN
+CHESHAM
RADLET
+PRESTWOOD
+NAPHILL
+AMERSHAM
WATFORD
+HUGHENDEN
RICKMANSWORTH
BEACONSFIELD
+NORTHOLT
+FARNHAM COMMON
MAIDENHEAD
BEEDON
UPPER BASILDON
SHIPLAKE
+HERMITAGE
READING
+WARFIELD
+STAINES
WOKINGHAM
TILEHURST
NEWBURY
+BRACKNELL
NEWNHAM
ALDERSHOT
+CARNLEIGH
WARNHAM
HASLEMERE
MICHELMERSH
SOUTHWATER
COLDEN COMMON
+MIDHURST
BISHOPS WALTHAM
+BITTERNE
SOUTHAMPTON
ROWLANDS CASTLE
COPNOR
ISLE OF WIGHT
ENGLI


CAMBRIDGE
SUDBURY
CHILTON
BRAMFORD
IPSWICH
HADLEIGH
CONNARD
WHERSTEAD
SAFFRON WALDEN
CASTLE HEDINGHAM
COLNE ENGAINE
MARKS TEY
COLCHESTER
BISHOPS STORTFORD
GREAT HALLINGBURY
WELWYN
NORTH SEA
BILLERICAY
HOCKLEY
RAYLEIGH
ROMFORD
OCKENDON
NORTHOLT
THAMES
PLUMSTEAD
GRAYS
CLIFFE-AT-HOOE
PINDEN
BORDEN
AYLESFORD
DUNTON GREEN
MERSTHAM
GODSTONE
HOLMWOOD
CROWHURST
TONBRIDGE
WESTWELL
WYE
PLUCKLEY
ASHFORD
SOUTHBOROUGH
PEMBURY
TUNBRIDGE WELLS
SHORNCLIFFE
FOLKESTONE
WARNHAM
HORSHAM
CROWBOROUGH
BURGESS HILL
HORSHAM
BEEDING
CROWHURST
HOLLINGTON
BEDDINGHAM
BERWICK
ENGLISH CHANNEL
10 5 0 10 20
SCALE OF MILES
1. LOWER GREENSAND
2. GAULT
3. UPPER GREENSAND
4. CHALK
5. RED CRAG.
6. READING BEDS
7. LONDON CLAY.
8. BAGSHOT BEDS.
9. WEALD CLAY
10. HASTINGS BEDS
11. ALLUVIUM.
12. BEMBRIDGE BEDS
PURBECK &
13. PORTLAND BEDS

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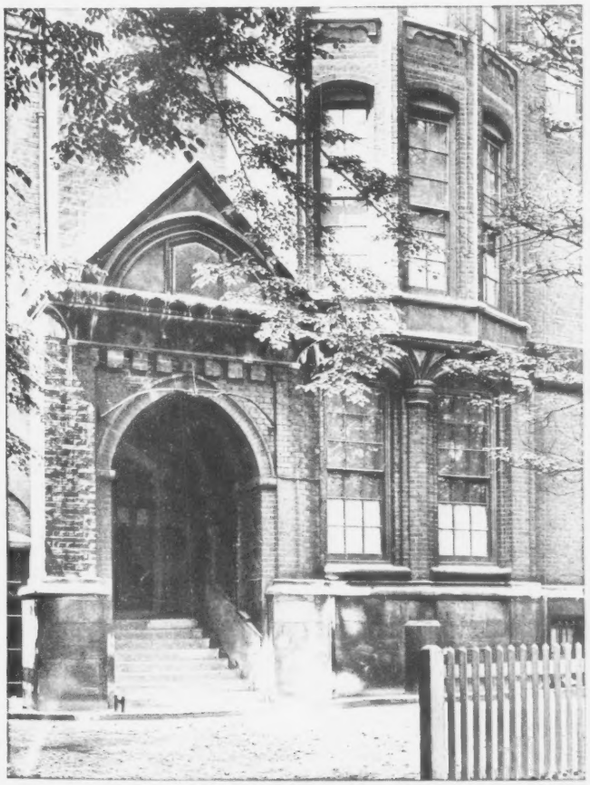
PICTORIAL SURVEY OF ENGLISH BRICK BUILDING

c. 1860 Another example of Victorian eclecticism—the resurrection of romantic mediævalism: the county gaol at Worcester.



1868 This house claims to be the first brick-built house of the "Queen Anne" Revival; No. 1 Palace Green, Kensington, by Philip Webb.

far afield in search of material for their bricks—an impossible contingency, in any case, considering the condition of the roads before the time of Telford and Macadam. So there was very little overlapping of the products of the various districts.

When a large brick house was to be put up it was the custom, if at all possible, to dig the clay locally, usually on the estate itself. When Hatfield House was built in 1607–11 the bricks were made specially for it in the vicinity, and when, toward the end of the same century, the Earl of Nottingham was building his great house at Burley-on-the-Hill (a brick interpolator in stone Northamptonshire), he had to send to Middlesex and Nottinghamshire for men skilled in brickmaking. In Kent at Mersham-le-Hatch, Robert Adam used two and a half million bricks from the estate on the house, and in 1878 Philip Webb had a brick pit dug near the site of Smeton Manor, in Swaledale, on which he was then engaged. (This has now been made into a pond.) This custom of digging for local bricks when there was a big job on hand persisted in England down to about forty years ago, and is now to be revived in the case of the new Guildford Cathedral, which will be raised, quite literally, from the ground on which it stands. It was a custom which, occurring in a trade that was in any case very scattered, and consequently highly territorialized, helped to preserve that "regional" aspect of the English Scene — a scene whose characteristics vary considerably from county to county, and whose distinguishment is one of the chief delights of the observant traveller. The "warm" bricks of the Sussex Weald could not be confused with the rich purple bricks of East Dorset, nor the pale tones of the Fens with the bright reds of the Midlands. The greys of Bedfordshire were as distinct from the yellows and brimstones of the Thames Estuary as, later on, the bright blue products of Stourbridge were to be from the white clays of the Severn Valley outcrops which, containing no iron and a lot of silica, provide bricks of whiteish hues as subtle as those in porcelain.

But all this was soon to alter. Brindley's magnificent feat of bringing the Duke of Bridgewater's coal from his mines at Worsley into Manchester by means of an artificial waterway began an epoch of canal building throughout the country. Altogether over three thousand miles were made, and for the first time in our history it became possible to transport heavy goods inland, far from the coast ports, as a profitable, rather than as a ruinous, undertaking. It was, beyond all fear of further challenge for at least another century and a half, the greatest triumph of the Brick. No longer was it confined only to those parts of the country which were naturally able to produce it. It could be taken now practically anywhere where there was building to be done; right into the heart of the stone countries themselves, in fact, supplying the clay-barren lands, or acting as missionary in those districts where it already existed, but had been allowed to lie idle. The enormous amount of industrial undertakings of every sort which were springing up all over the country demanded immense quantities of material for their buildings, and bricks were cheap to make and cheap to carry.

The sixties, seventies and eighties form a great period for the building of brick churches. This is a typical one: St. Andrew's, Plaistow, by James Brooks.

It is to this period, the first half of the Industrial Era, from 1775 to 1840, or thereabouts, that so many of our finest buildings belong. It was perhaps the first time that we did not look abroad for ideas. Strong in our unchallenged commercial supremacy—there was no need to look abroad for anything but new customers. That is why those early canals, those docks, the huge mills of the north, and, later on, the first railway buildings, are so peculiarly English. More often built of

brick than not, the smoke of prosperity has given to them a sombreness of tone, more properly associated with masonry, which admirably becomes their majesty of proportion. One of the first tunnels made in England lies under North London, and the brickwork which lines it is in as perfect a condition today as it was in 1793 when it was first built. It carries the Grand Junction Canal for three-quarters of a mile under Islington. And Brunel's Thames Tunnel, begun in 1826, was lined with brick. Then the great series of docks which serve the Port of London are magnificent examples of what can be done with brick in a big way. The West India Docks were finished in 1802, the East India, four years later. In 1808 Rennie completed the London Docks, and twenty years after them came St. Katharine's, by Telford. They form a tremendous range of brick construction which is probably unrivalled.

The Wharncliffe Viaduct over the Brent which Brunel built for the Great Western Railway was begun a hundred years ago last February. It has been widened but otherwise is in as good a condition as on the day when it was finished, the first piece of contract work let out by the newly formed company. Further down the line there is an even more famous example of brick bridge building: the viaduct over the Thames at Maidenhead. The two main arches, each with

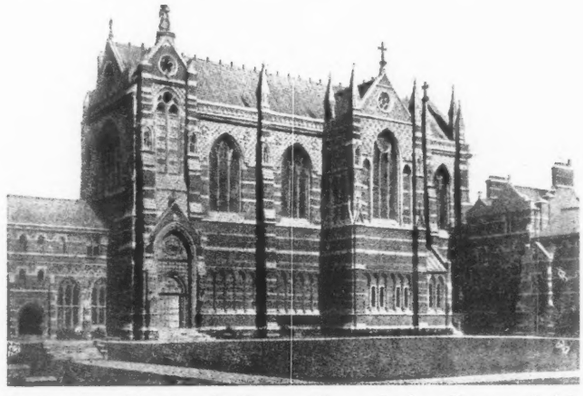
The two largest arches ever constructed in brick: Maidenhead Great Western Railway Bridge, by Brunel.

its elliptical span of 130 ft., are still the largest arches (and the flattest in proportion to their span) ever made in brick. The early waterworks, like the ones at Hammersmith and Pimlico, are other good specimens of London's industrial buildings done in brick, but all over the country you can find plenty more just as well built, as well suited for the jobs they perform, and as pleasing to the eye as these. It is true that the later nineteenth century was responsible for a lot of strange buildings but it excused them under the plea of Education. Carpet factories modelled on the Alhambra, furniture depositories which hoped to be mistaken for Gothic cathedrals and earthenware manufacturies disguised as Florentine or Siennese palaces were all part of the enlightening movement begun by the Great Exhibition of 1851. They were a projection of that eclectic impulse which had attempted to arrange under one immense glass roof a survey of the artistic output of all nations at all times. The following year was important for another reason: Ruskin published his "Stones of Venice" and showed sufficient moral cause why all brick buildings for the next thirty years at least should, wherever it was at all possible, be adorned with string-courses, cornices and labels in brick of the brightest blue or the shiniest red or the most bilious yellow.

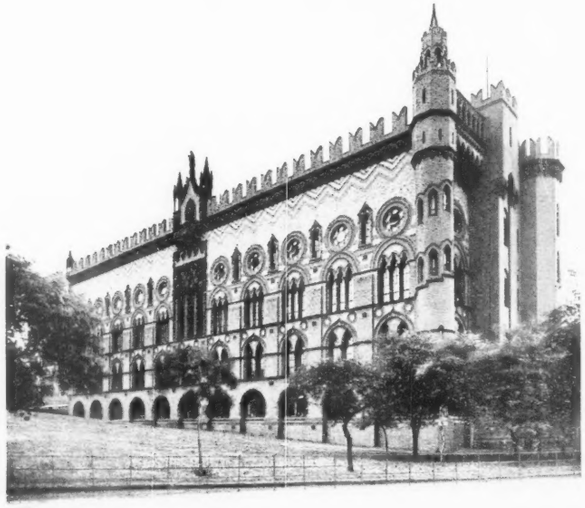
In the domestic sphere the reign of stucco was still at its height when factory buildings at the beginning of the nineteenth century had reached a stage of "functionalism" which has scarcely, if ever, been surpassed in this avowedly functionalistic age. The great awakening of domestic and ecclesiastical architecture to the æsthetic potentialities of brick did not come before the middle of the century. It was impossible that such a practical age should not have realised how very *useful* brick was but it took a few years more to discover how *beautiful* it was as well, how eminently suited for homes and churches as well as for factories and warehouses. As a matter of fact its usefulness in church-building *had* been realised on one big occasion fairly early in the century. This was in 1818 when an Act of Parliament granted a million pounds sterling for the building of 214 churches in the rapidly growing districts of

PICTORIAL SURVEY OF

1859 **Also by Philip Webb: a famous architectural landmark; the house at Upton built for William Morris.**



1870 **Keble College Chapel, by Butterfield, showing the strength of Ruskinian influence, particularly in the banded brick-work.**



1889 **Brick as an Educator. Always a sensitive medium for the introduction of new ideas, brick became eclectic to an extraordinary degree for many years following the Great Exhibition: a carpet factory in Glasgow by William Leiper.**

ENGLISH BRICK BUILDING

1879 Its missionary labours over, brick rejoices in its own picturesque magnificence: the Prudential, Holborn, by Alfred Waterhouse.

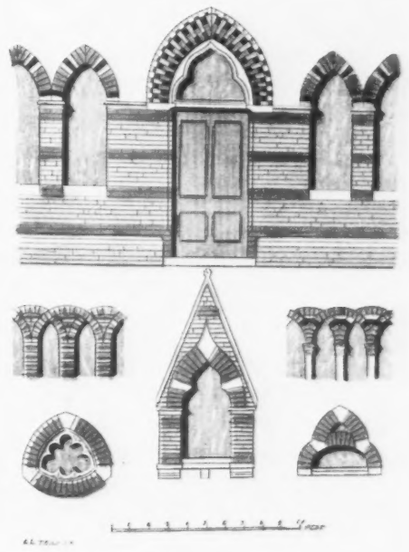
1895 The Picturesque was brought to a very high pitch by Norman Shaw: the White Star Offices, Liverpool.

1907 Scholasticism breaks out again. A Siennese tower reminiscent of Doulton's factory half a century before: Birmingham University, by Sir Aston Webb.

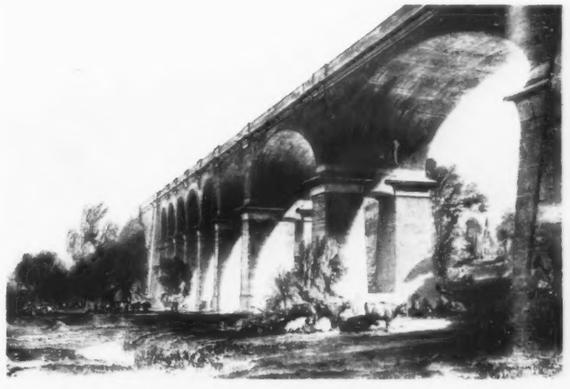
London. The great concern of the Commissioners responsible for the carrying out of this campaign was economy, and the cheapest sort of building that could be put up was in the Gothic style simply because it was felt that a Gothic church could be decently made of brick and a Classical building could not—it would use too much stone for the minimum required for the cornice and the pediment and the other essential features. The result was that 174 of these churches were built of brick in the style which passed for Gothic at that period.* Most of them, alas, have disappeared.

The Great Exhibition and Ruskin between them helped a lot in this discovery but ten years before Philip Hardwick, who had not yet Euston Station to his credit, built the Library at Lincoln's Inn. It was of brick, with dressings in stone. *And the bricks were red.* It is quite impossible for us today to realize the courage required for such an act.† Twenty years at least had to pass before Bodley built his group of brick houses at Malvern. There were five of them, and their roofs were tiled. Then he built the brick vicarages of Pendlebury and Scarborough, the prototypes of hundreds of those dank, laurel-esconced parsonages which stand in their brick Gothic as grim guardians of the Protestant faith the length and breadth of the country. In 1868, Philip Webb built Lord Carlisle's house in Palace Green. It was the first house, so Lethaby says, where "cut-and-rubbed brick-work forming moulded and dentilled cornices was used in recent times."‡ It became "a pattern book of features for architects who designed by compilation from cribs." There was a tremendous row before it was allowed to be built at all, as it was on Crown property. Originally it had been designed wholly as a brick house, but it was only allowed to go up on condition that more stonework was included to make it presentable. Philip Webb was the first leader of modern house builders and the influence of "The Red House" he built for William Morris at Upton is upon us yet.

Then two years after No. 1,



Patterns of brickwork from a handbook for the Practical Builder published soon after "The Stones of Venice."



Wharncliffe Viaduct, by Brunel, was being built exactly a century ago. It was the first contract let on the G.W.R., and, except for later widening, is just as it appears here.

* See Kenneth Clark's "Gothic Revival."

†Probably Costessy Hall, in Norfolk, built in the Tudor manorial style in 1825, was the first of the red-brick revivals. But it was in the depths of the country.

‡ "Philip Webb and His Work."

Palace Green, Norman Shaw startled the world, let alone Kensington, with Lowther Lodge, and the new style of house was launched. It was promptly christened the "Queen Anne style"—presumably because of the red brick, the white sashes to the windows and the jettisoning of plate glass in favour of smaller panes.

The irregularity of plan, the romantic outline, the terra-cotta finials and the barge-boards were all, of course, a travesty of the architecture of Queen Anne's age, but the name stuck. The Battle of the Styles, Classical versus Pointed, was ended in a combined turning movement to destroy this disgraceful new outbreak. But it was no good. The church builders had given brick a new spiritual value by using it in the new churches, and Butterfield, Bodley and Street, its first exponents, were powerful men in their day. And then finally, Bentley was to capture all the loose Romanticizm which was floating about by building his great Arabian Nights phantasy of a Westminster Cathedral in brick.

And in the domestic sphere, in Wimbledon, in Hampstead, in Hove and Bournemouth, in fact wherever late Victorian and Edwardian fortunes effected a compromise with gentility, you will find houses of rather shiny red bricks relieved with too much salmon-coloured terra-cotta work and griffin terminals to the ridge tiles, which their designers truly believed to be in the proper tradition of the English Gentleman's House. They are nearly always very well built. That is the Queen Anne Revival, Period I.

Period II is still with us. "Queen Anne" is still our most popular style today. The Englishman in Tudor times, as incurable a romantic then as he is now, loved to create the illusion that he lived in the darker periods of the Middle Ages by battlementing his house and pretending that it was a castle when castles were no longer wanted, and by his pre-occupation with the ancient orders of chivalry in an age remarkable for the growth of a new mercantile class. He is not very unlike his descendant today who thinks sentimentally of early eighteenth century England. Fine manners, spacious days, prosperity—it is a comforting background, even if it isn't altogether an accurate one. Let us, then, many have said, build houses like they built in those days; perhaps the old magic will return.

This is not to suggest, however, that the duties of brick in the nineteen thirties have been relegated to those of comforter, a sentimental reminder of past greatness and a talisman to greatness yet to come.

Nothing could give an unfairer idea of the part it fulfils in the architectural life of England today. In recent years we have found once again—for the fifth time*—its inherent quality of sensitiveness being used as a channel for the introduction of new ideas from the Continent. They have come, this time, from those regions on the other side of the North Sea, Holland, Scandinavia and North Germany, which have always maintained a supremacy in the art of building in brick, and from where, in the days of the Hanseatic League, came so much of that incentive to build in brick ourselves which helped to lay the firm foundation of a brick tradition of our own.

Buildings like the Battersea Power Station and the Guinness Brewery (now nearly finished) at Park Royal are impressive examples of the mingling of this foreign influence with the native style of industrial architecture which we established early in the nineteenth century.

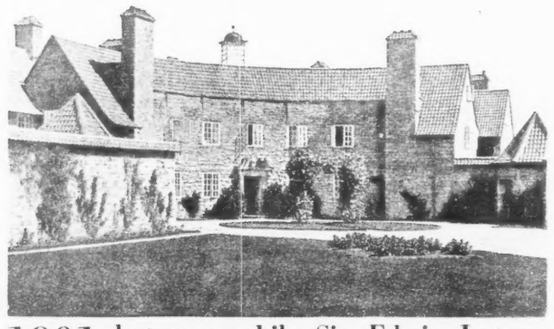
Brick today in England plays a great part also in the economic life of the country. There are, at the moment, about eighty thousand men between the ages of 16 and 64 engaged in making bricks and tiles and fireclay goods (it is difficult to separate the various branches of the clay-winning trade) in Great Britain and Northern Ireland. And there are about fifty-five thousand men between the same ages engaged in laying bricks in these same countries. Bricks can be made practically everywhere today. But in spite of that it is not surprising perhaps to find that the greatest output still comes from the areas where suitable clays are most abundant. Of the common bricks possibly one half come from the Peterborough and Bedford district. Their market was formerly confined to an area north of the Thames, including London; today for use in all parts of the country no fewer than 1,200,000,000 Flettons are being made in a single year.

* We have already outlined four successive waves of Continental influence—the Flemish in the 13th century, the French in the 15th, the Italian at the Renaissance and the Dutch under Queen Anne.

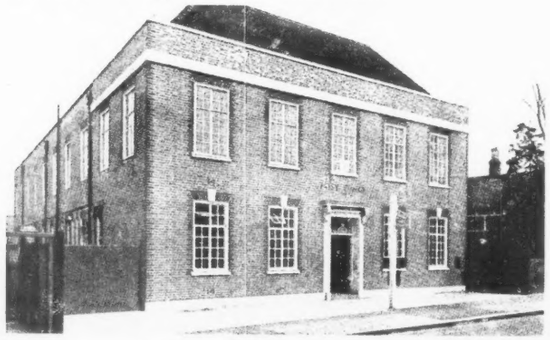
BIBLIOGRAPHY.—*These books or articles have been consulted and are useful to anybody who wants to know more about the subject:* 1, *"The History of English Brickwork" by Nathaniel Lloyd. (H. G. Montgomery)*; 2, *"Tattershall Castle," by Lord Curzon of Kedleston and Avray Tipping (Country Life)*; 3, *Mr. Geoffry Webb's chapter on architecture in "Johnson's England" (Oxford University Press)*; 4, *"A Dictionary of Architecture," by Peter Nicholson*: 5, *"Philip Webb and his Work," by W. R. Lethaby (Oxford University Press)*; 6, *"Gothic Architecture in the Nineteenth Century," (paper in the R.I.B.A. Journal), by H. S. Goodhart-Rendel*; 7, *The Victoria County Histories*; 8, *The Building Research Station's report on the "Economic and Manufacturing Aspects of the Building Brick Industries" (H.M. Stationery Office).*

PICTORIAL SURVEY OF ENGLISH BRICK BUILDING

1906 Typical late Victorian and Edwardian town architecture: The Mansions, Earls Court.

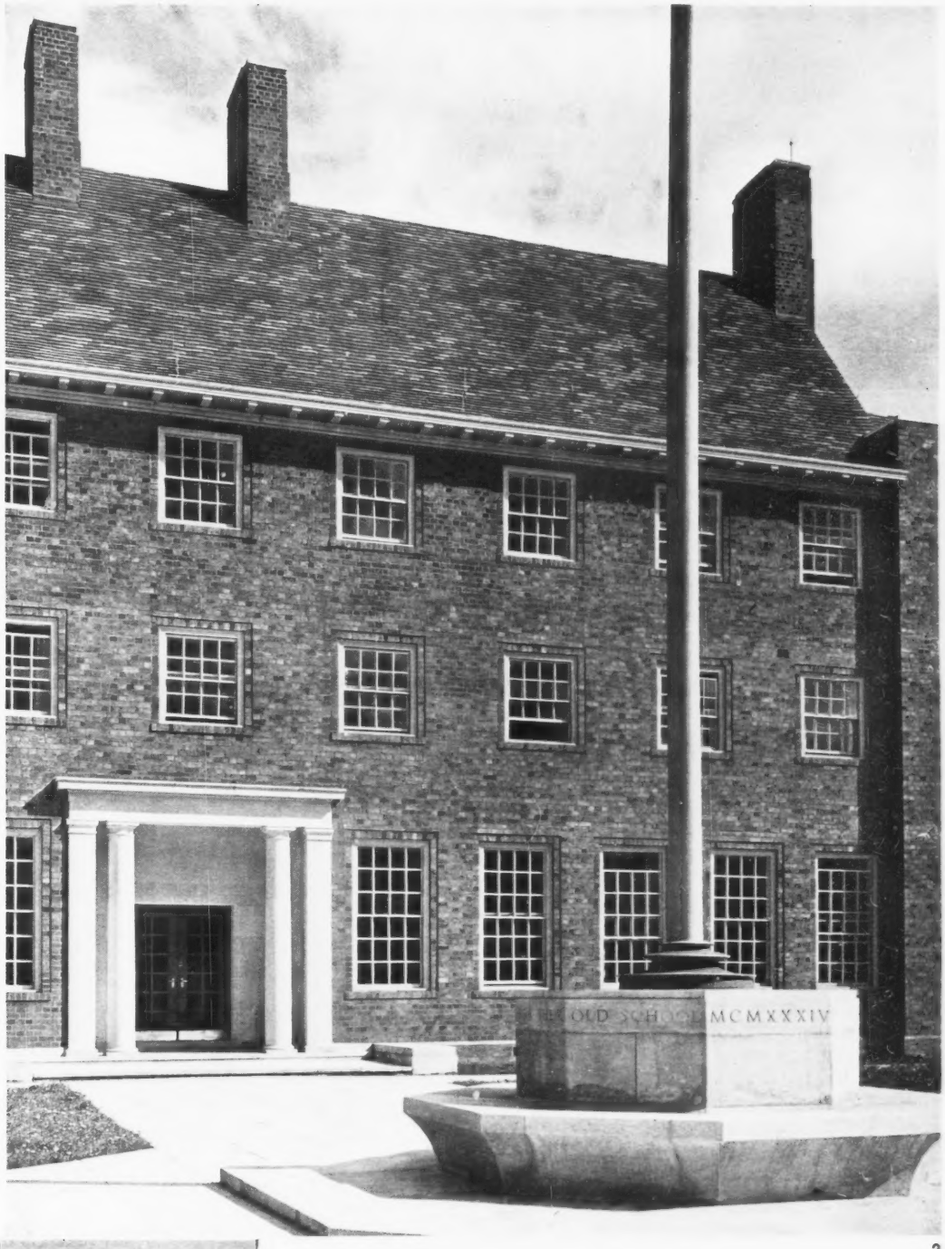


1901 but meanwhile Sir Edwin Lutyens had discovered a new beauty in brick: "Grey Walls," Gullane.



The new simplicity was maintained by H.M. Office of Works and Lloyds Bank in many buildings of the post-war Georgian style: as, for example, Leigh-on-Sea Post Office.

CONTEMPORARY BRICK BUILDING



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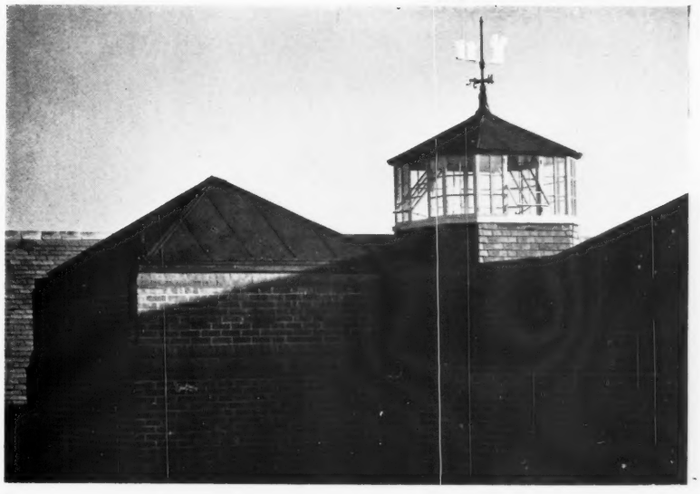


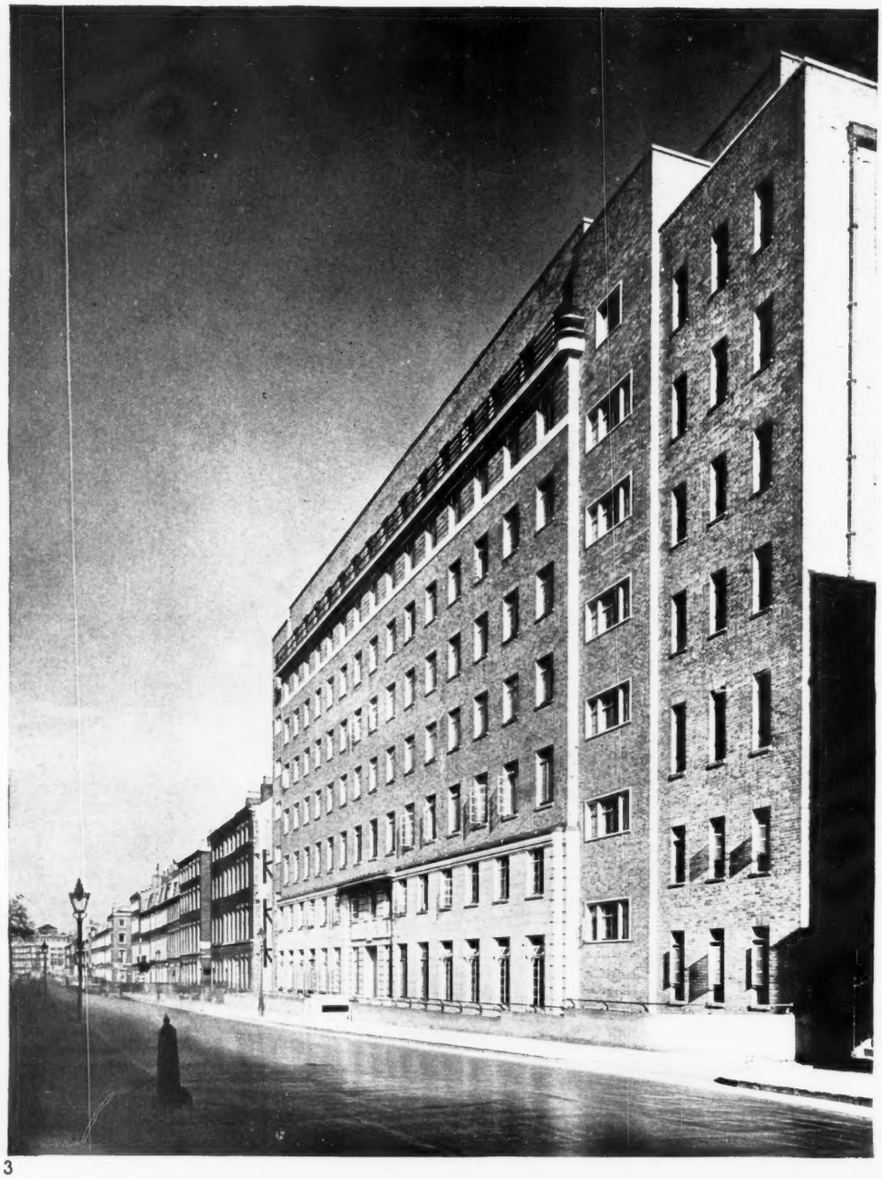
1

THE GEORGIAN TRADITION

The architectural form in which a large proportion of contemporary English brick buildings is cast, particularly buildings of a public or educational nature, is some version of the English Georgian or "Queen Anne" tradition; sometimes complete with all the period enrichment, sometimes only Georgian in the proportions of the openings, the crowning turrets and cupolas and the generally domesticated character of the whole. As by the Georgians themselves, effective use is made of simple masses of brick walling and adequate interest provided by the intrinsic qualities of the bricks themselves. 1 and 2 are two educational examples: 1, the Talbot High School for Girls, Bournemouth; J. H. Worthington, architect. 2, the Liverpool Orphanage, Woolton; Barnish, Silcock and Thearle, architects. Both buildings are faced with local rustic facing bricks, the Ravenhead bricks of the latter set in a brownish-coloured joint.

THE GEORGIAN TRADITION

The tradition of Georgian brick architecture is perpetuated in many notable contemporary buildings, even in those where the Georgian detail has been left off, in the proportions of door and window openings and the continued obedience, as regards size of openings, to the dictates of Georgian constructional methods. What might be called "amplified Georgian" has become an accepted domestic style and is here seen characteristically exemplified, with the qualities of brick well displayed, in buildings of a residential and educational kind. 3, the Nurses' Home at the Hospital for Sick Children, Guildford Street; Stanley Hall and Easton and Robertson, architects. It is faced in a grey buff Stamford brick. 4, Latymer Court, Hammersmith; Gordon Jeeves, architect; variegated red facing bricks. 5, Larkhall Flats; de Soissons and Wornum, architects; light brown Dutch bricks, pointed with white cement and sand. 6, the Merchant Taylors' School; W. G. Newton, architect; variegated brown facing bricks from Amersham, rising four courses to ten inches. The tower is decorated with projecting headers, and at the top with mouldings in purpose-made bricks. 7, Cambridge University Library; Sir Giles Gilbert Scott, architect; faced with thin bricks of a light brown colour. 8, Troy Court, Kensington; Michael Rosenauer, architect; Hollbrook sand-faced grey bricks.



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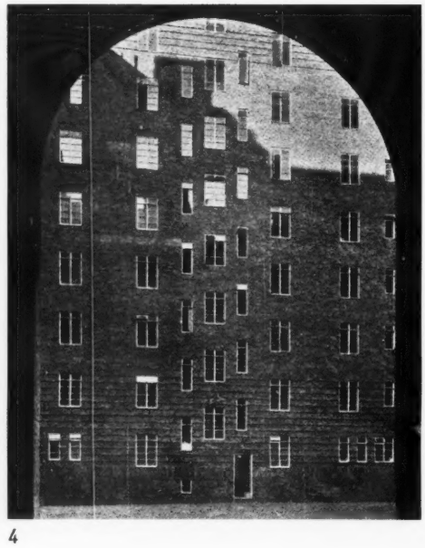

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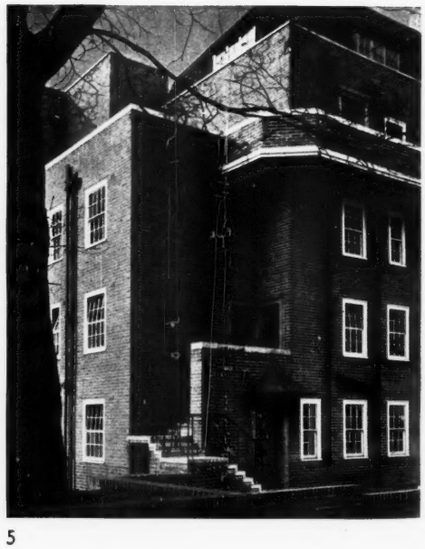

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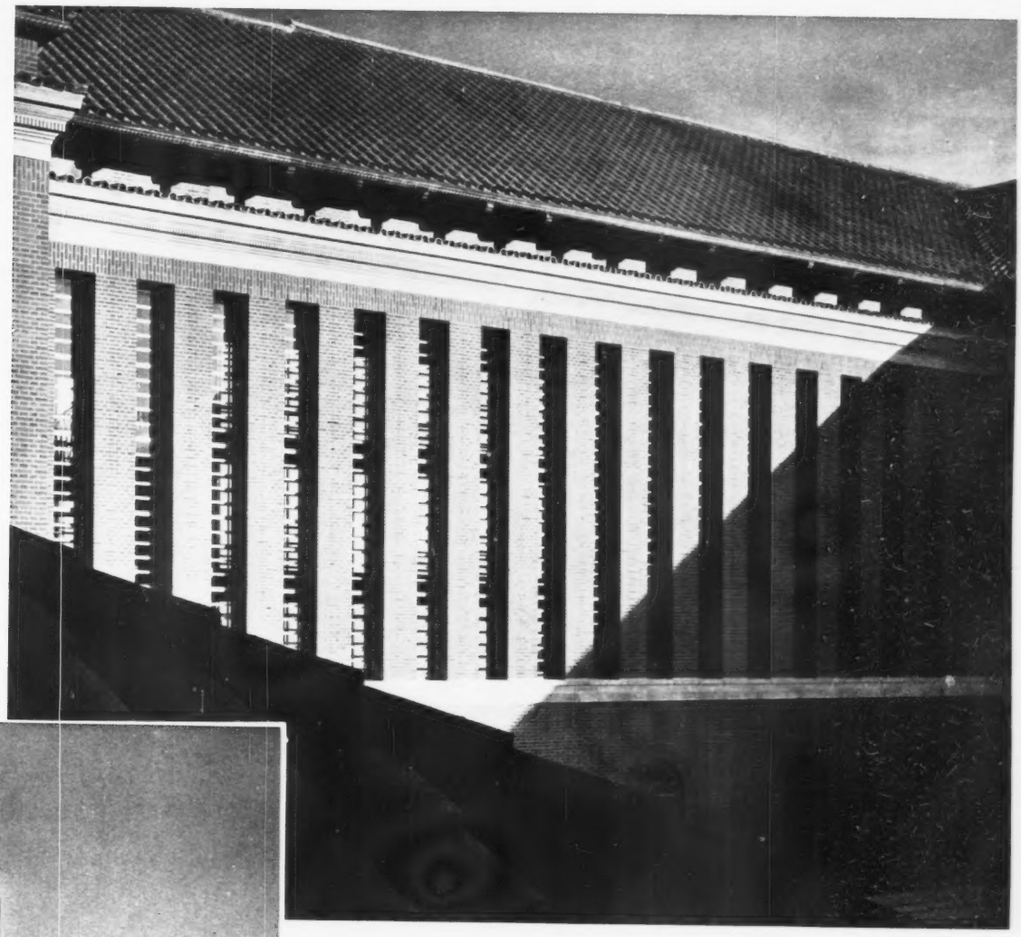

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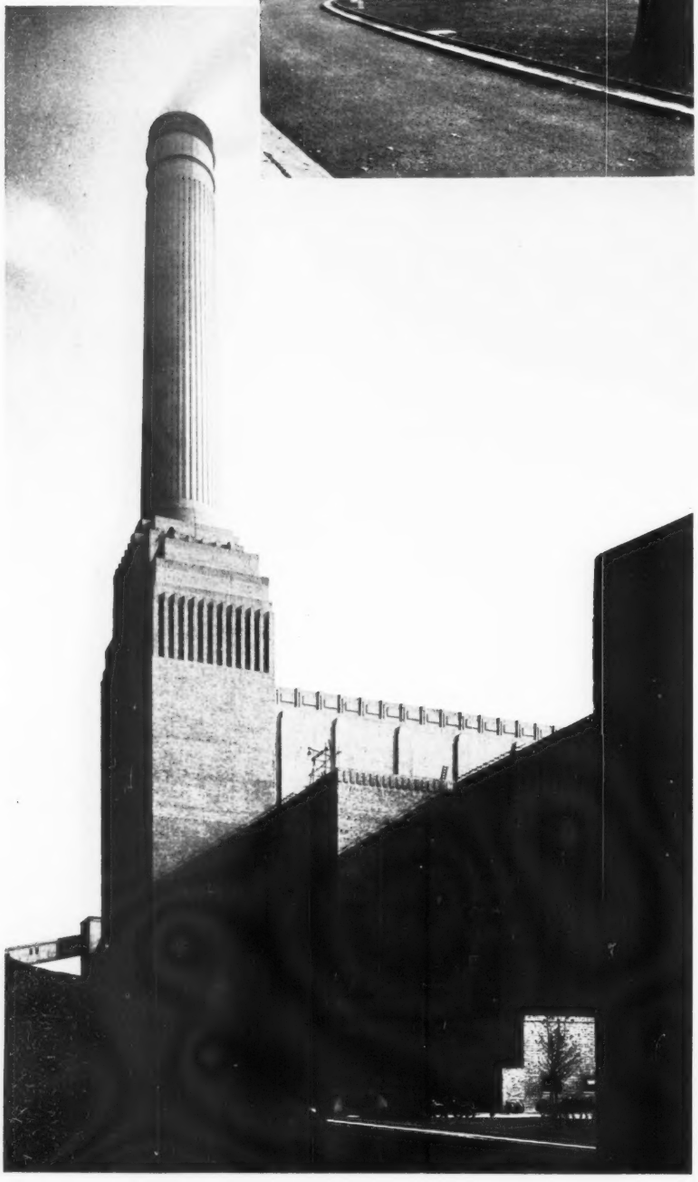

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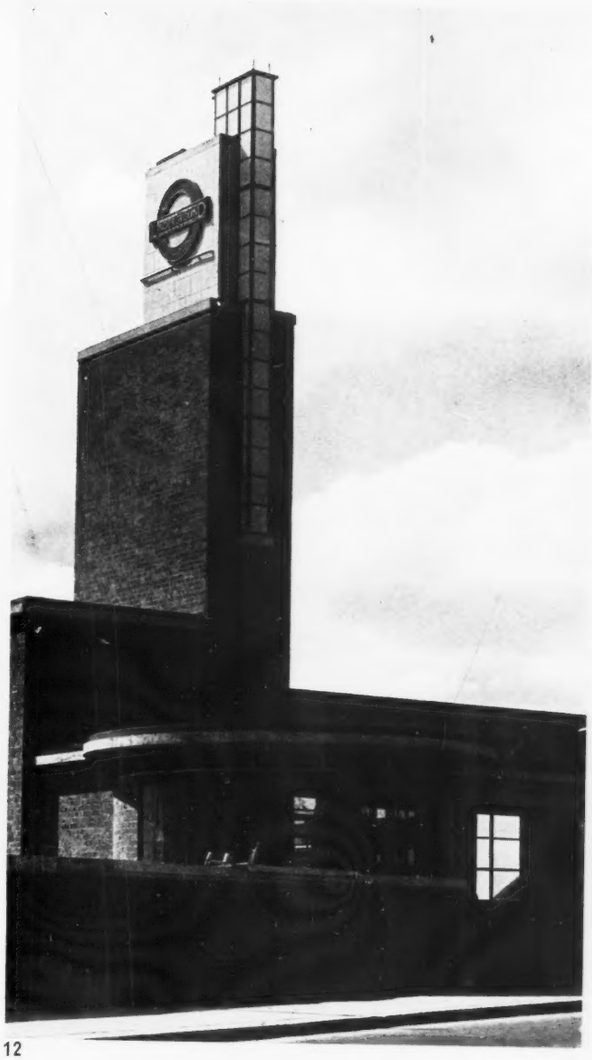
11

SCIENCE AND INDUSTRY

Except for 9, a semi-traditional design deriving from the Swedish-romantic instead of from the Georgian, and 15, an ecclesiastical building of unexpectedly uncompromising simplicity, all the brick examples on this and the facing page show that scientific and industrial buildings have in many cases acquired significant architectural form by liberating themselves from the Georgian conventions. These types of building, of course, lend themselves less easily to the conventional domestic characterization. Again the qualities of the bricks themselves are well utilized and displayed. 9, Hornsey Town Hall; R. H. Uren, architect; hand made variegated red facing bricks, $2\frac{1}{4}$ ins. deep, laid with a $\frac{3}{4}$ in. horizontal joint. 10, Battersea Power Station; Sir Giles Gilbert Scott, consulting architect; buff-coloured facing bricks from North Wales. 11, Zoological Laboratories at Cambridge; Stanley Hall and Easton and Robertson, architects; yellow Stamford facing bricks. 12, Boston Manor Underground Station; Adams, Holden and Pearson, architects; rustic red facing bricks. 13, Marine Colliery Pithead Baths, South Wales; W. M. Traylor, architect; brindled brown facing bricks. 14, Sidney Street Ventilation Station, the Mersey Tunnel, Liverpool; H. J. Rowse, architect; $2\frac{1}{4}$ in. multi-coloured wire-cut facing bricks. 15, St. Gabriel's Church, Blackburn; F. X. Velarde, architect; narrow, deep-orange Stamford bricks.



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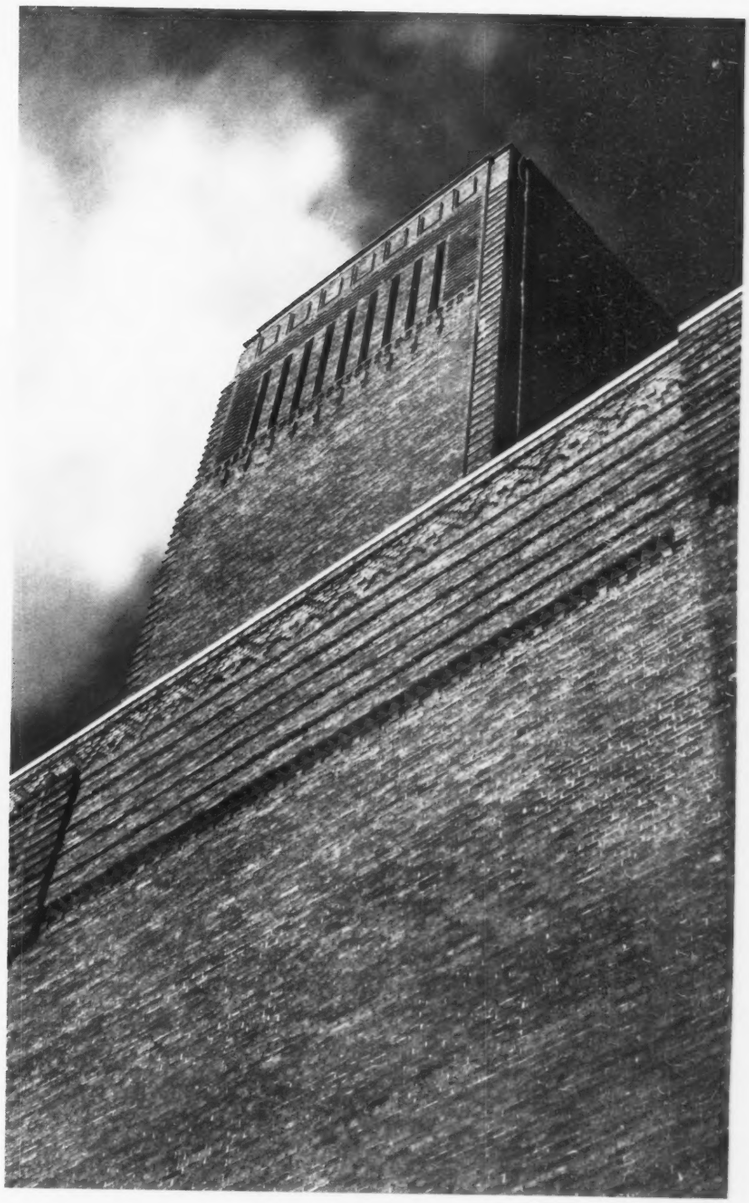

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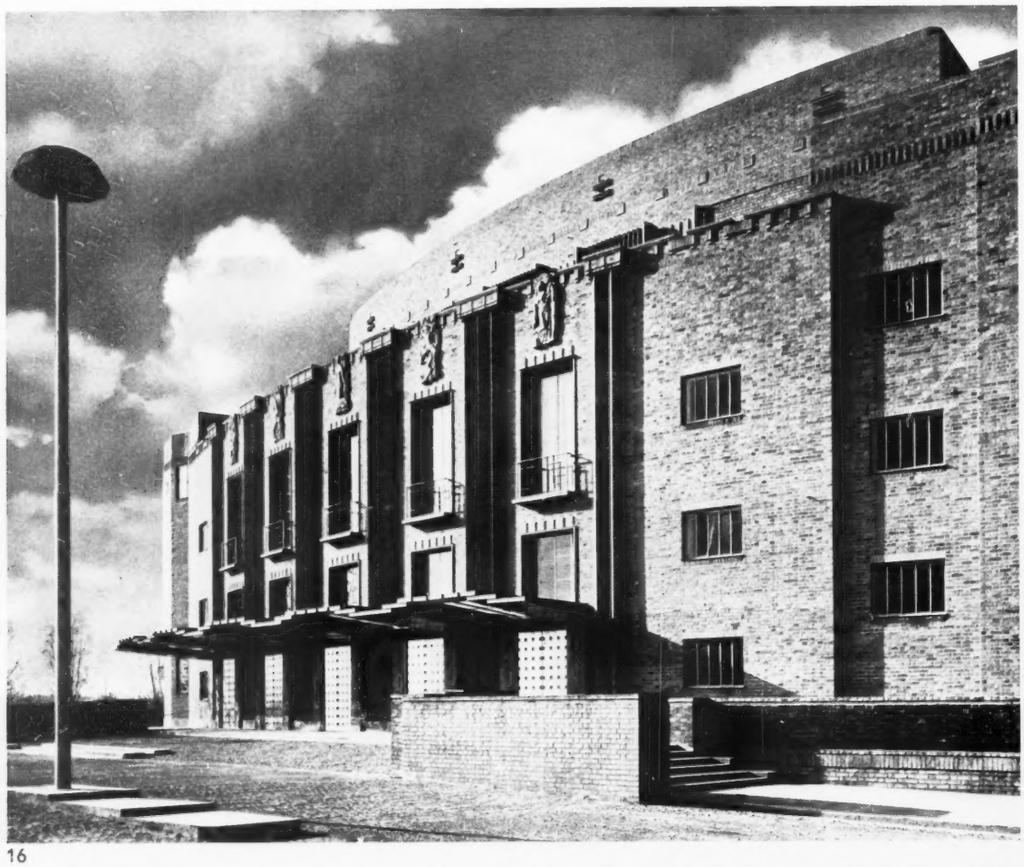
CONTEMPORARY BRICK



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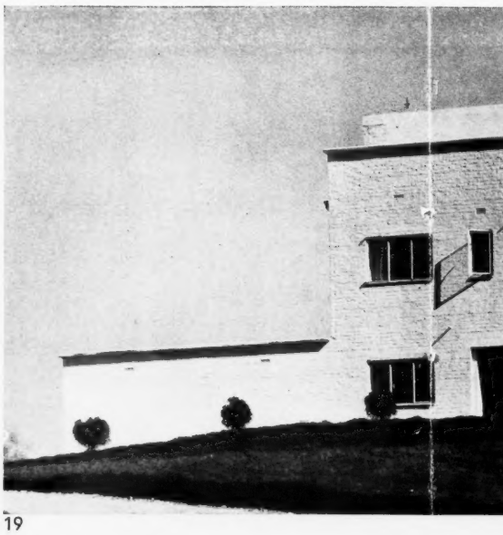

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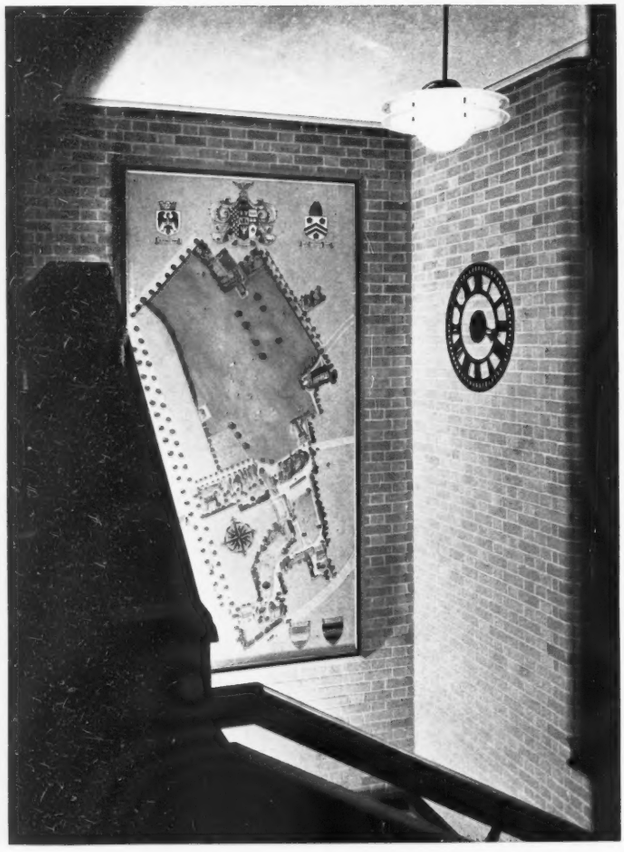

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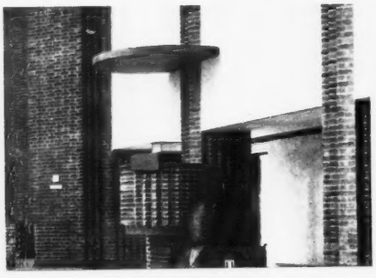
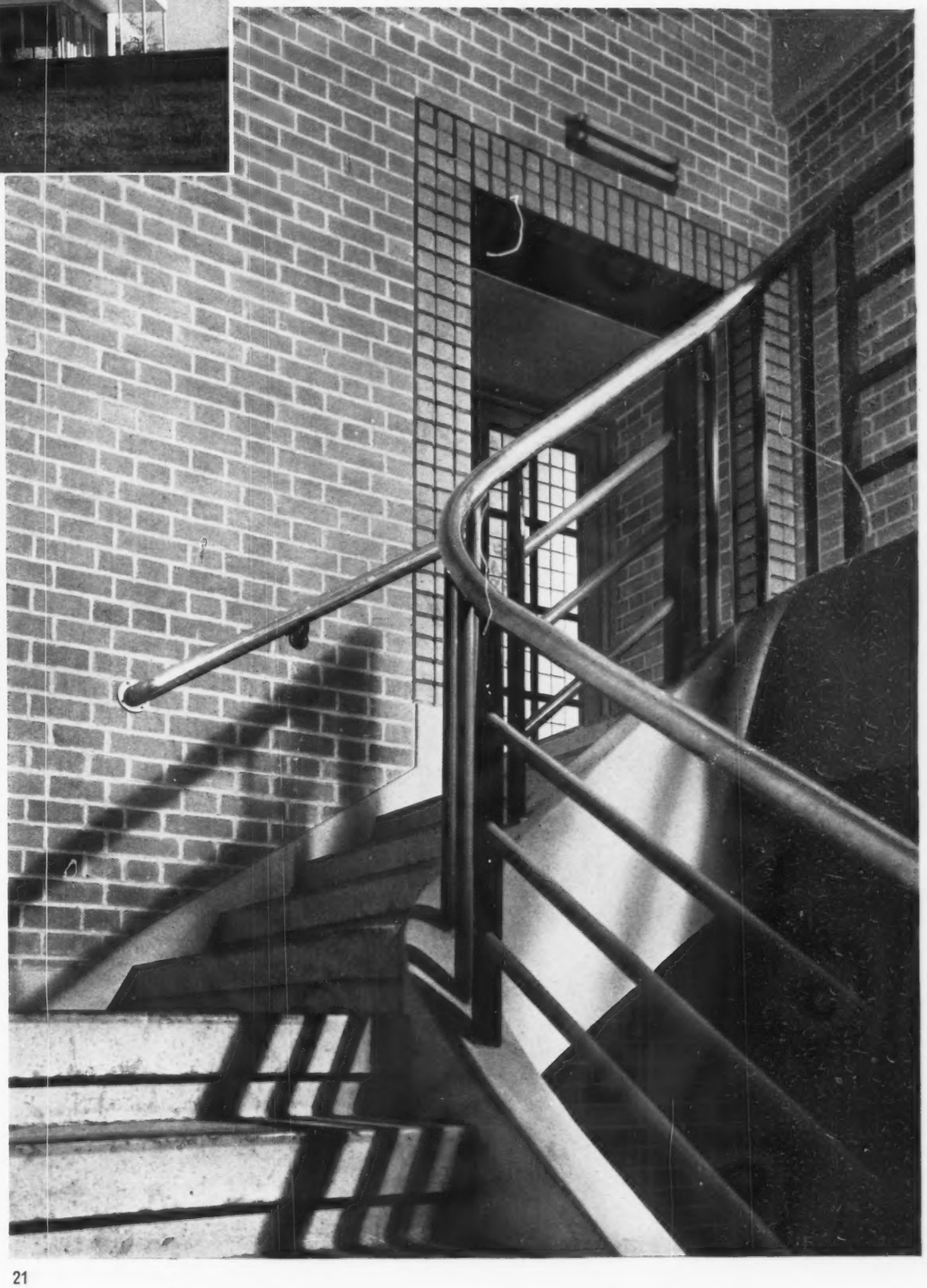


18

EXTERIOR AND INTERIOR

Probably the best known recent building in th
is the Shakespeare Memorial Theatre at Stratfo
and Shepherd, architects) in which both the m
ornament and relief are in hand-made sand-fac
facing bricks in the decorative parts of the
work, though brick is almost universally u
architects have often preferred to experiment w
some good modern small houses in brick ha
Jordans, Bucks., by C. R. Crickmay; the br
still showing their brick texture. 20 is one
brick buildings of recent years: the Royal Ma
Sir John Burnet, Tait and Lorne, architects. It
bricks, laid with wide joints. 17, 18 and
of brick for interior work: 17, a staircase wa
School; O. P. Milne, architect. The whole of
coloured sand-lime bricks. 18, St. Saviour's C
Day architect; rough-textured, variegated br
staircase in the W. H. Smith building, Alber
Clarke, architects.



RIOR

ilding in this country built entirely in brick
e at Stratford-on-Avon. 16 (Scott, Chesterton
both the mass of the structure and the applied
de sand-faced red brickwork, with some silver
rts of the façade. For small-scale domestic
iversally used in period designing, modern
xperiment with reinforced concrete. However
in brick have also been built. 19 is one, at
y; the brick walls are distempered, though
20 is one of the outstanding English modern
e Royal Masonic Hospital, Ravenscourt Park;
hitects. It is faced with 2 in. red Hertfordshire
18 and 21 are three examples of the use
staircase wall in the Science Buildings, Bedford
e whole of this interior is faced with cream-
Saviour's Church, Eltham; N. F. Cachemaille-
riegated brown facing bricks. 21, a brick
ding, Albert Embankment; H. O. Ellis and

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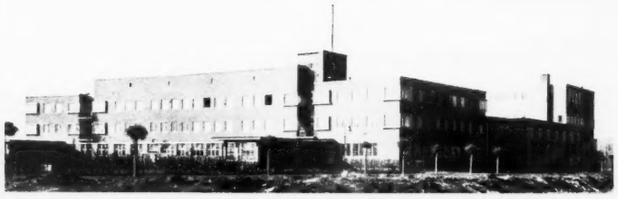

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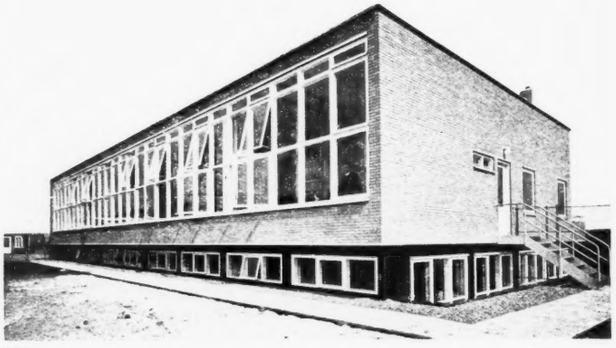

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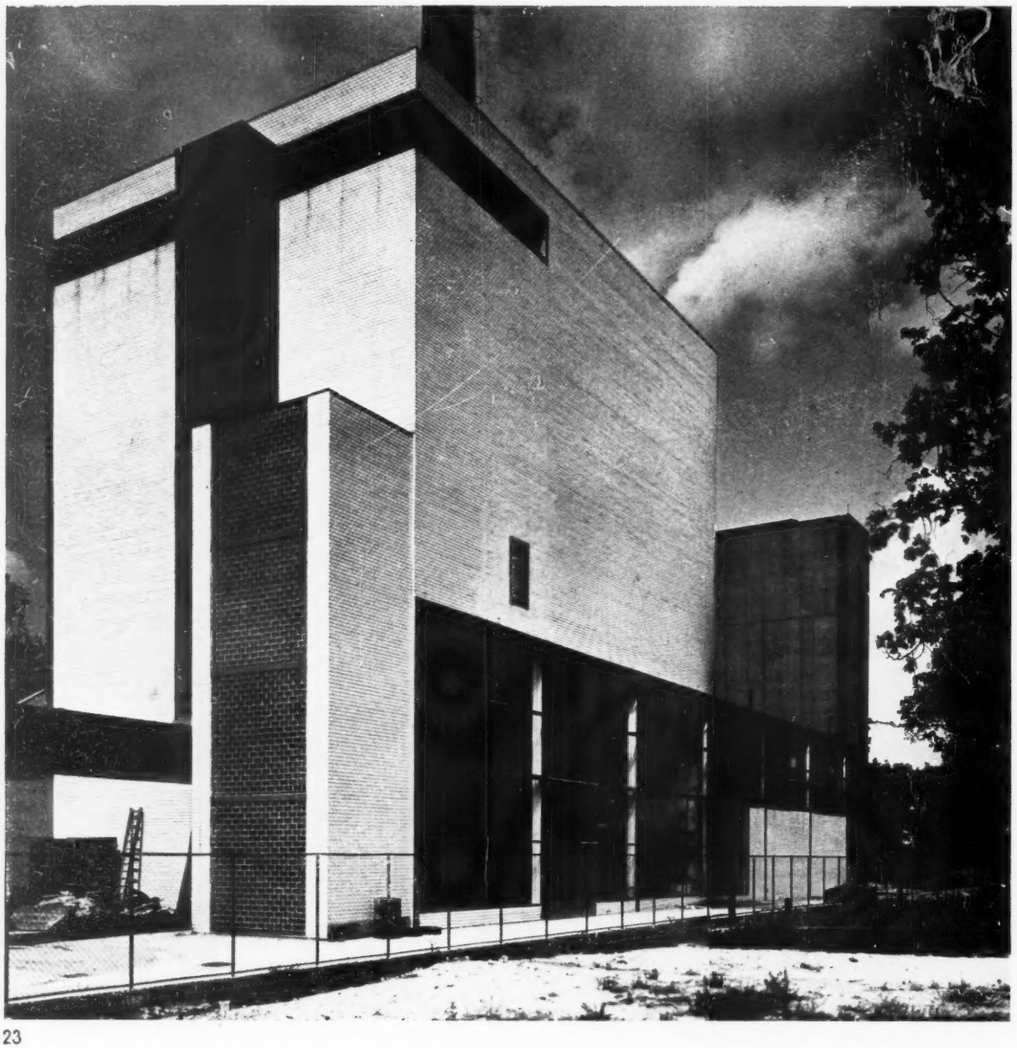
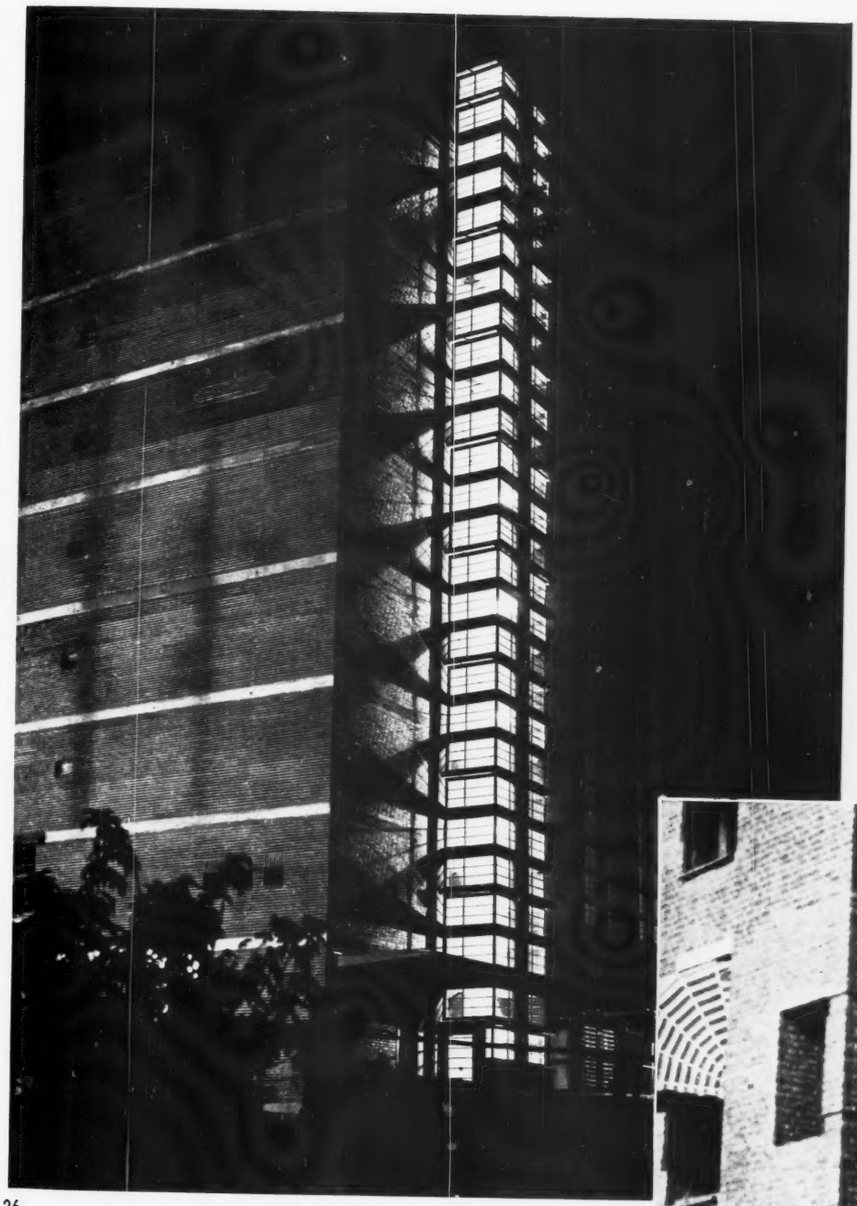


23

BRICKWORK ABROAD

The outstanding examples of modern brick architecture on the Continent are naturally in those countries with a tradition of brick: Holland, Germany and the Scandinavian countries. Characteristic of its modern use is that it is often used non-structurally, in combination with a steel or concrete frame. 22 is in Denmark, a solid brick building: a church at Ordrup: Edward Thomsen, architect. 23 is a factory in Germany, just south-east of Berlin: an industrial example of remarkable architectural virtuosity: Arthur Korn, architect. 24, a school at Frankfort: Martin Elsaesser, architect. 25, a small office building in Rotterdam: Brinkman and van der Vlugt, architects. 26, a detail view of the Great Market Hall at Frankfort: Martin Elsaesser, architect. 27, another imposing German example, the huge electrical station in Berlin: Hans Hertlein, architect. 28, an unusual use of simple brickwork in the interior of a church at Riederwald, Frankfort: Martin Weber, architect. 29, rustic bricks with raked-out joints used in a block of flats at the Hague, Holland.



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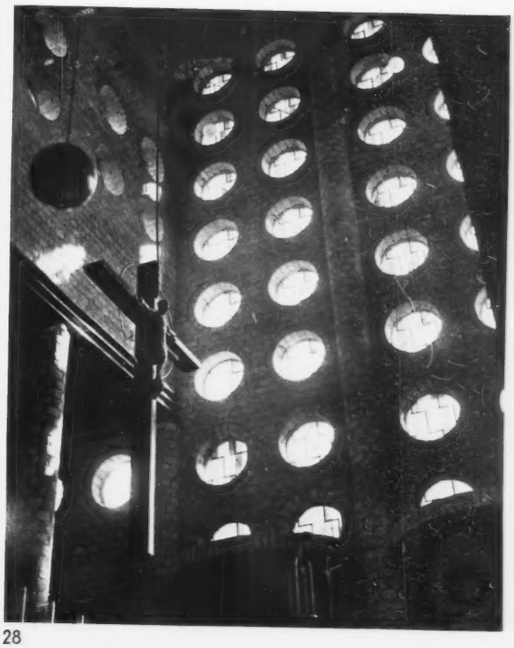

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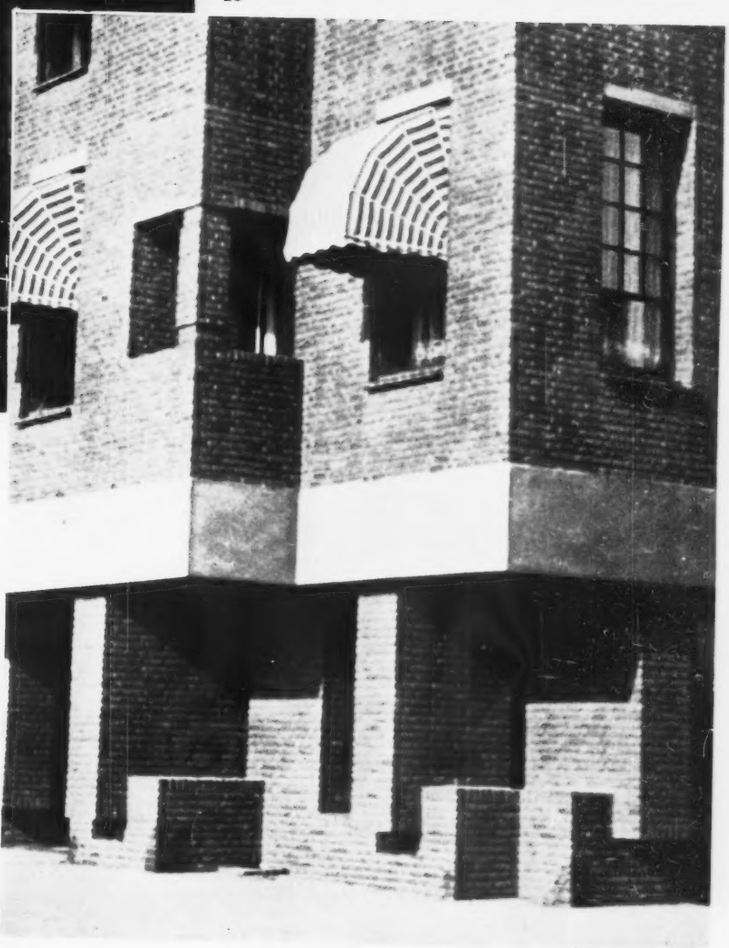

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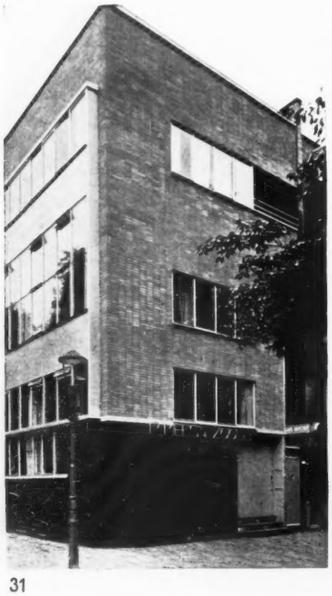

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34

BRICKWORK ABROAD

Four examples of modern Continental brickwork on the domestic scale, the brick used primarily as a facing and insulating material in combination with modern constructional methods. 30, a country house near Berlin; Ernst Freud, architect; surfaced Dutch facing bricks. 31, a bank building with residences above in Rotterdam; Brinkman and van der Vlugt, architects; note how the brick-joints run through in either direction, indicating the non-structural nature of the wall. 32, a block of flats in Hanover; Fritz Höger, architect; restrained use of decorative pattern obtained by slightly projecting bricks—the same method is seen more extravagantly used in 38. 33, a house in Austria; Lois Welzenbacher, architect; this house is in solid brick with a steel frame for the opening only; note how the bricks are bonded vertically over the wide-span opening. The bricks are laid with dark joints. In this house much of the internal finish is also exposed brickwork. 34, the new brick railway station at Glogau; Otto Beringer, architect.

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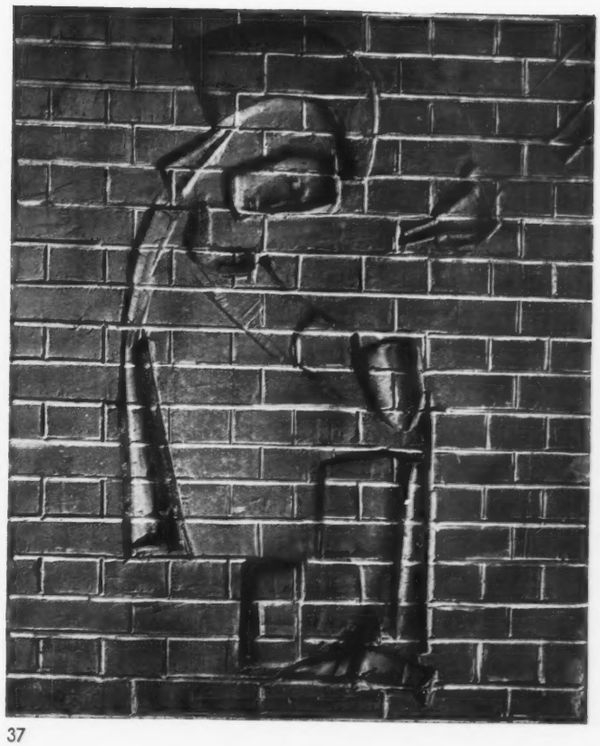

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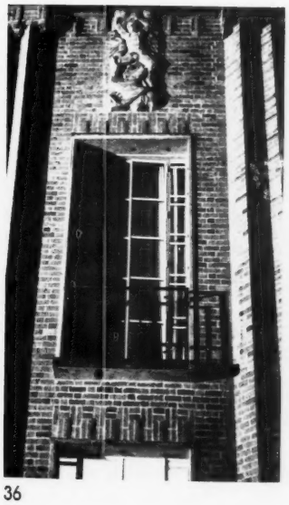

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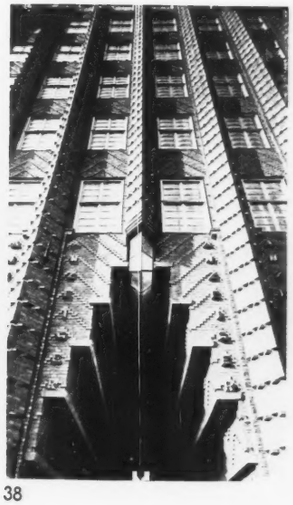

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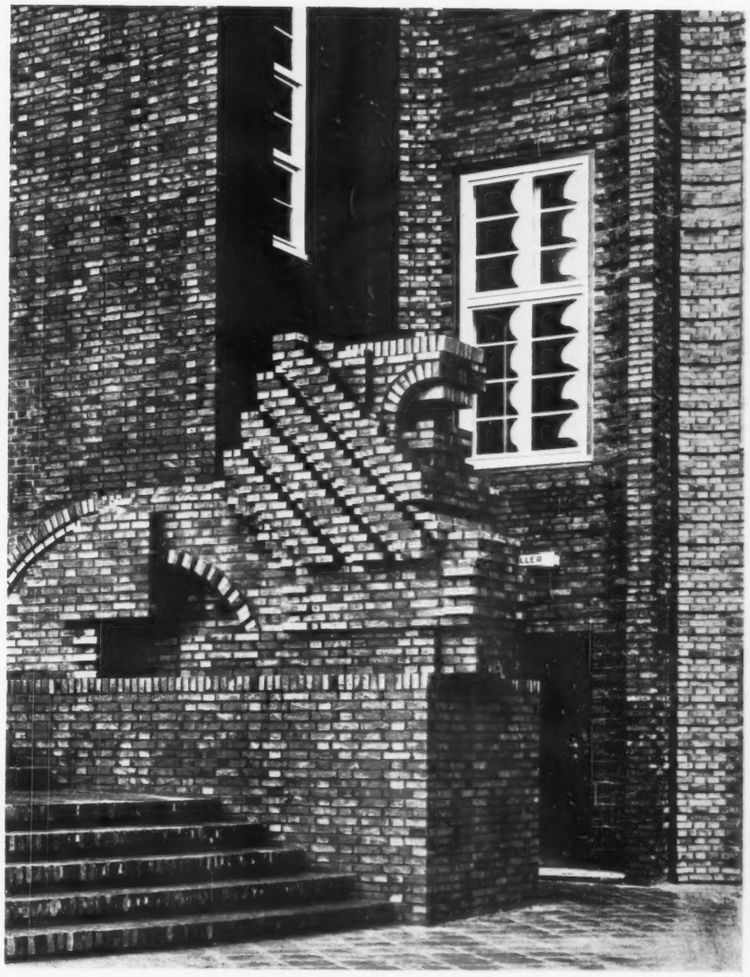
BRICK FOR DECORATION

In the Shakespeare Memorial Theatre, Stratford-on-Avon, (see also page 222) brick ribbing in the form of angular projections was employed to break up the plain wall surfaces, 36; also carved brick figures as decoration, seen above the window in 36 and in detail in 35. The sculptor of the five figures, which were carved in situ, was Eric Kennington. 37 is another detail of brick decoration, a figure of the Annunciation, a German brick carving by Karl Knappe. Also in Germany Fritz Höger has achieved some remarkable surface decoration in the many brick buildings he has designed in Hanover. 38 is the entrance archway of a block of flats, typical of the work of this architect, with projecting bricks forming elaborate decorative patterns. 39 is a piece of sculpture in a municipal building by the same architect, ingeniously formed from ordinary bricks without cutting or carving.



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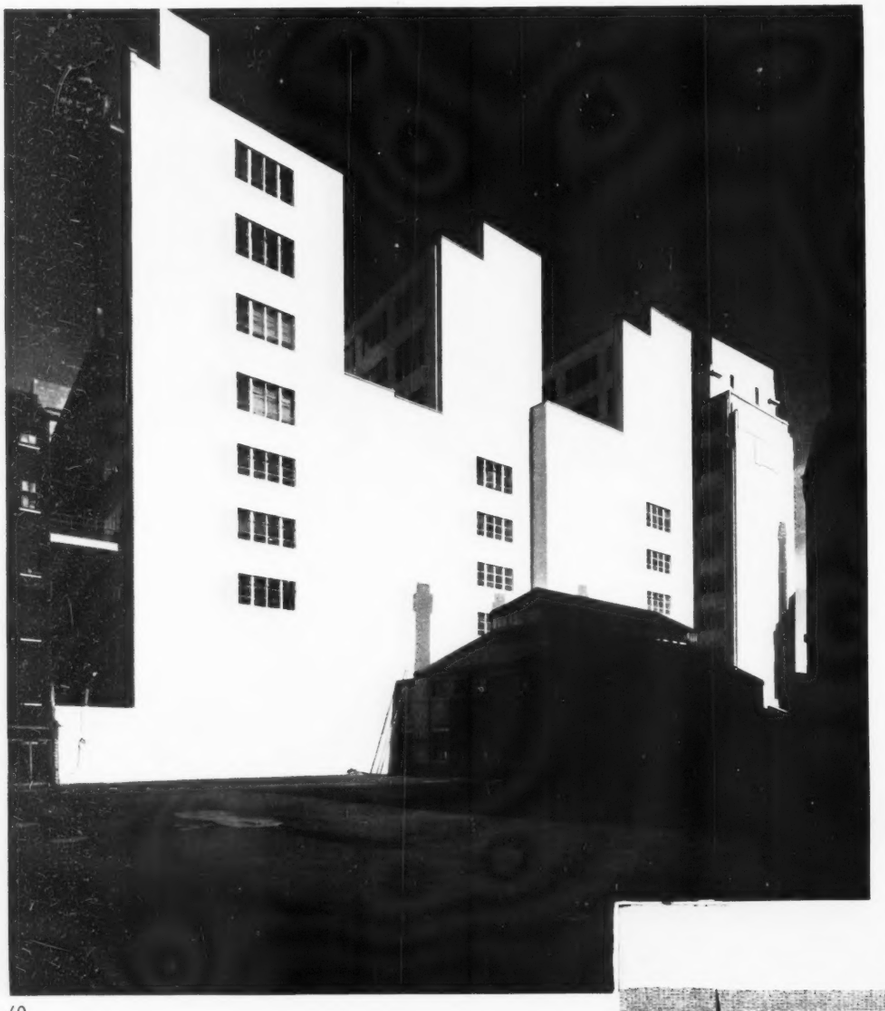

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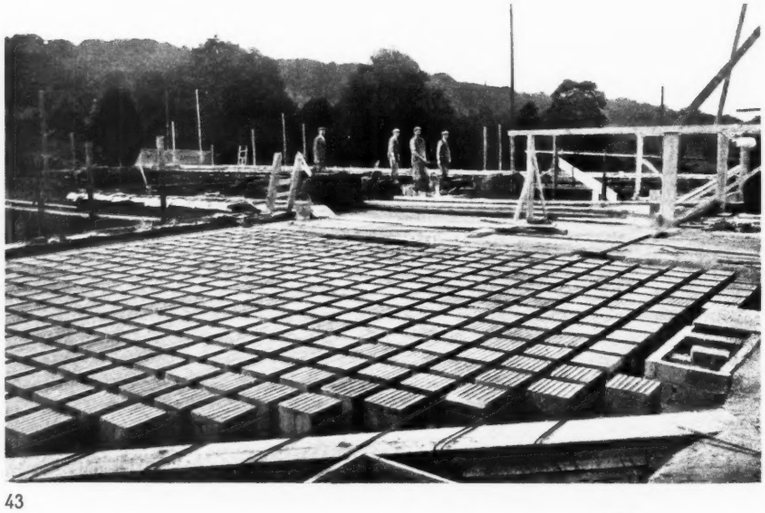
FURTHER USES OF BRICK

An important use of white-surfaced bricks is to provide a light reflecting face to the courtyard or area walls of office and such like buildings; sometimes with incidental dramatic architectural effect. 40, white glazed bricks used for the back of Unilever House, London; Sir John Burnet, Tait and Lorne, architects: J. Lomax Simpson, consulting architect: 41, light-coloured sand-lime bricks used in a similar way at Richmond House, Birmingham; H. O. Ellis and Clarke, architects. The engineering uses of brick should be mentioned, of which bridge-building is one of the most important. 42, Ilford Bridge, Bournemouth; W. J. Taylor, Hampshire County Architect; sand-faced multi-coloured Sussex facing bricks. 43, a further use of brick of great importance in building: hollow brick construction for floors, a method whose use has greatly increased in recent years.



43

In the "Fletton fields" near the Great North Road: a landscape of chimneys.

Varieties and Manufacture

By J. K. Winser

In England as in almost every other country, brick was the first artificial building material to be developed, and even today brick is still the commonest material for the structure of external walls in all classes of building.

The Size of Bricks

In Roman times bricks were made to very much larger sizes than is common today, some of those at Colchester being as much as 18 × 12 × 3 ins. Since then, however, sizes have been surprisingly constant, not only throughout this country but all over Europe. The Little Wenham brick is about 9 × 4½ × 2 ins., the Hull brick is about 9 × 4⅜ × 2 11/16 ins., and all the references in Charters and Acts between 1571 and 1776 vary only between 8½ × 4 × 2 ins. and 9 × 4⅜ × 2¼. A few exceptionally large bricks were made in the eighteenth century but these were only produced in an attempt to get round taxation, which was at that time calculated at a rate per thousand. This uniformity of size arises from the fact that the dimensions and proportions have always been determined by strictly functional considerations. A brick must not be wider than about 4½ ins. or it cannot be picked up and laid with one hand, and for the same reason it must not weigh, when wet, more than about 10 or 12 lbs., and should be only about half this. The length must be just a little over double the width, so that it can be made to bond properly when laid. The depth is limited partly by the question of weight, and partly by the fact that, with some clays at any rate, a greater thickness will cause difficulty in the drying process, and give rise to cracking and warping when the green clay is fired.

It will be seen that the depth is the least rigidly determined factor, and, as may be expected, greater variations occur in this dimension. Much of the early mediæval brick is only about 1½ ins. deep, the modern Dutch facing bricks are just under 2 ins., while the present custom in this country is 2⅝ ins. in the South and 3 ins. in the North. Widths however all lie between 4 ins. and 4⅞ ins. except for the quite unusual Klinker types, used in North Germany.

The Trend of Taste

The general trend of the market in relation to colour, type and size of bricks is fairly well marked. In the eighteenth century colours were practically limited to red and purple, although the yellow London stock became common towards the end of the period. The surface was always irregular, even with the slop-moulded bricks in the North, and was generally sanded.

The introduction of machinery in the nineteenth century seems to have popularized the smooth-faced brick and, particularly in the London suburbs, the gault became a very popular facing. This is a pleasant pale buff cream when first made, but seems to take on a rather cold grey as it weathers. In the North varieties of smooth vivid reds replace the gaults.

The work of the William Morris "Art and Craft" school and, more particularly in architecture, the work of Norman Shaw and Lutyens, focussed attention on the rougher sand-faced multi-coloured reds. Before the war practically all the architects of note were returning to the older types and demanding a degree of texture and colour which had not been seen for many years. After the war, in order to imitate the architects' work, the speculative builder took to the use of similar bricks, demanding an even greater degree of colour variation.

It is interesting to speculate on the next development of taste. At the moment any brick which is more or less grey or buff in colour, with a reasonable sand-faced texture, seems to be popular with the architect, but many people believe that there will ultimately be a return to the smoother faced varieties. The sand-faced varieties, although they weather excellently, are bound to pick up the dirt in any industrial area and so lose all their colour value. They are difficult to wash down, unless a certain amount of the surface, and with it the texture, is rubbed off. The architect, therefore, if he wants a building of a definite colour, would seem to be forced back into the use of something which is smoother and more easily washed.

Processes of Manufacture

During the eighteenth century simple horse-driven pug mills for tempering the clay were fairly common, but it was not until the middle of the nineteenth century that machines for actually moulding the bricks were in any way regularly used. The product, however, was not then comparable with the product of the hand bench, either in quality, durability or appearance. Largely for this reason, the manufacture of facing bricks in the South of England was still almost entirely unmechanized until the war, and even now the best facings are made in almost exactly the same way that they were in the seventeenth and eighteenth centuries. However, the quality of machine-made bricks has been greatly improved in recent years, so that most common bricks are now machine made, and there are many yards, particularly in the Midlands and North, producing facings by mechanical means.

Until the present century the raw material used was almost wholly limited to clay. The extraordinary variety in the composition of the clays occurring in England has permitted the production of an almost endless range of colours and textures in the finished brick, with only slightly varying methods of burning.

In the traditional brick-yards the clay

is dug during the autumn and winter, and laid up in heaps so that it may weather. In some cases it is necessary for the clay to be exposed in this way for a considerable period; in mediæval times this was done even for so much as five years. In the London yards thin layers of chalk and ashes are mixed with the clay as it is dug, and in other cases sand, or varying beds of clay, may be mixed together. There is no doubt that thorough weathering of the clay contributes directly to the quality of the resulting brick.

The weathered clay is next worked in the spring, generally through some sort of pug or mixing mill, to bring it to a suitable state of plasticity for the moulders. Each moulder has a table with a bottomless box on top of it, the shape of the brick to be made, but sufficiently over-size to allow for the inevitable shrinkage of the clay in drying and firing. A clot of clay of slightly larger volume than the finished brick is prepared, and thrown forcibly into the mould, pressed down to fill all hollow places, and the surplus scraped off with a wooden strike. The brick is then turned out on to a pallet and the two are placed on the hack barrow. To prevent the clay sticking to the box the surface is sanded before the next clot is moulded. The selection of a suitable type of coarse sand is of the greatest importance, because it is on this that the ultimate colour and texture of the brick depends.

As soon as the barrow is full the bricks are taken to the drying ground, where they are stacked in long rows through which the wind may blow. They are protected from the rain and from hot sun by loose wooden boards, great care being needed to prevent too rapid or partial drying which might cause cracking or warping. Such drying, dependent as it is upon the weather conditions, may take weeks or months. When dry the bricks are stacked into the kiln for the final firing process. Here again, for the actual firing, great skill and judgment are needed, for it is, even today, rare for the temperature to be judged other than by eye, and a slight change in the direction of the wind may make all the difference to the state of the fires.

Until very recently all the operations in the yards have been paid for on a system of piece work and before the war, despite the highly skilled nature of the work, the wages were desperately low, averaging through the year rather less than the agricultural rate. It was customary to organize the yard on a butty system, similar to that still common in some of the less well-organized coal fields. The leading hand contracted with the brick master to make the bricks at a certain price per thousand, and in turn offered a piece rate for each operation. The chief objection to the system, however, was that, as in the pottery trade at the time, all the payments were based on the number of good bricks taken from the fire. If, therefore, the fireman were unskilled, or a sudden storm came on, or a severe late frost occurred when the bricks were drying, all the labour of the clay getting, making and handling was lost. The hours in summer were the hours of daylight, but someone had also to be available at night in case a change of wind and weather made it necessary to shift the covers on the drying ground or attend to the fires.

Naturally today things are much better, but an account of the older conditions is worth while, if only to explain the considerable increase in the cost of brick making even in those yards which still keep to the old methods. Now where payment remains on a piecework basis the rates are such that a reasonable day can be worked, far fewer women and children are employed, and the system of paying only " good from fire " has generally disappeared.

While this description of the operations gives the main outline of the production methods in the traditional yards, it must be remembered that the details of the work in each yard vary considerably. No two clays weather, work, dry, or fire identically, and it will always take some time even for a skilled man to adapt himself to the conditions of a new yard.

There are two main variations in burning practice which are important. Throughout the North and Midlands all bricks, and in the South most facing bricks, are burnt in kilns. There are, of course, several shapes and types of these, but in the main they consist of one or a series of chambers into which the bricks are packed. The fuel is added through fire doors at the bottom, and in most cases the chambers are connected to a chimney. In the case of the stock bricks made in the South, of which perhaps the famous London yellow stock is the best known, no kiln is used in the traditional yards. Instead they are burnt in large stacks known as clamps. The clay is mixed with household ashes, or breeze, and so the brick itself creates its own heat. The bricks, when dry, are laid on a flat piece of ground, the first few layers alternating with layers of ashes. These are lit by means of small flues left in the bottom-most layers, and the whole stack, which may contain a very considerable number of bricks, ultimately reaches a sufficient temperature to burn the bricks. Naturally those on the outside are underburnt, and have to be discarded or else reburnt with the next clamp. The process produces bricks having a fairly irregular shape, rough texture, and a great variety of colour, partly owing to the unequal temperatures, and partly owing to the rubbish contained in the fuel. They will, however, invariably stand up to the most rigorous conditions of exposure.

In recent years, in order to reduce the loss arising from the irregular temperatures, one or two firms have introduced tunnel kilns for this class of brick. The manufacturing process is fundamentally the same, but instead of being piled in a clamp for firing the bricks are placed on a continuous chain of trucks, which move slowly through a long arch-shaped tunnel. Sufficient heat to ignite the breeze in the brick is applied as the trucks move through the kiln, and burning takes place equally throughout the load on each truck. As a result of the possibilities of improved control, there is a great reduction in rejects, and a more evenly shaped and, to a less extent, a more evenly coloured brick is obtained.

The methods of preparing, moulding and burning facing bricks have been considered first; but it must be realized, however, that such bricks form only a small part of the total production of bricks in England, perhaps as little as 10 or 15 per cent. The remainder are common bricks, made normally by machine.

The early machines introduced to do away with hand moulding were mainly for the so-called wire-cut process. In this the prepared clay is forced, by means of an archimedean screw or by other suitable means, through a die, emerging as a long continuous column. This is cut into lengths, equal to the height of a brick, by means of a series of wires stretched in a frame, much as a grocer cuts bar soap. These bricks are then dried and later fired in the ordinary way in a kiln. Provided the die is well designed so as to minimize the risk of the formation of internal cracks in the brick, the product is durable and quite strong; it must, however, always have a smooth face. It is generally of an unattractive colour, so that it is not often used for facing work. In order to improve this poor appearance, various devices are attached to the orifice of the die which tear up or roughen the two ends and one face of the brick. In other cases the surface may be brushed with a stiff broom, sand blasted, or otherwise treated to give texture, and the colour may be improved by the use of special sands or stains.

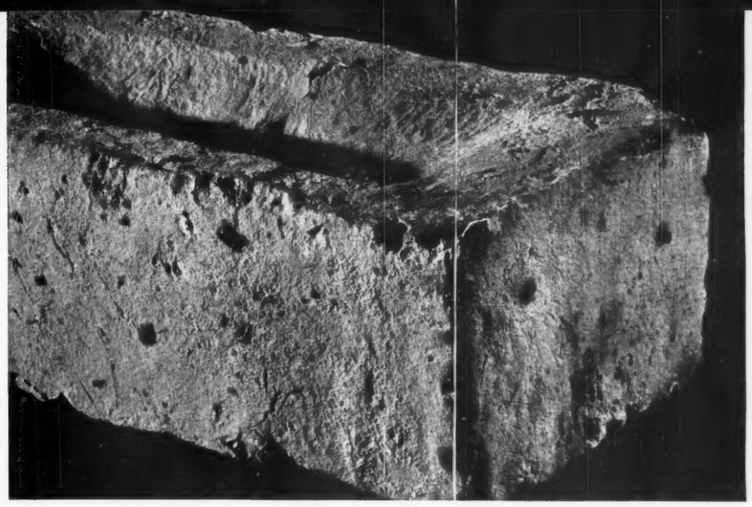
By far the greatest output of common bricks is from the yards in the neighbourhood of Peterborough where a rather different process of manufacture is used. The product is universally known as the Fletton brick from the village of Old Fletton where it was first made. These bricks are all made from the Oxfordshire clay, a hard shale-like material, and the whole of the work of clay getting and moulding is now mechanized.

The raw clay is delivered in a fairly dry state to the mill, where it is ground to a coarse powder, and moulded by extremely high pressure. After moulding the bricks require no further drying and can be stacked straight into the kiln for burning.

The Qualities of Bricks

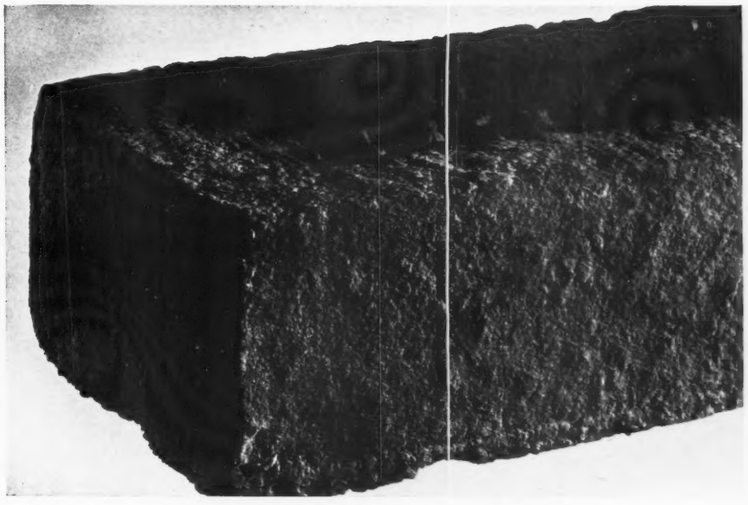
The last few years have seen a remarkable change in the accepted criteria of the qualities of bricks. For several generations the text books have stated that good bricks should ring when struck, and have generally given the impression that the denser and less porous the brick the better. As a result of work at the Building Research Station, it has been shown that moisture penetration through a wall almost always occurs at the joints. A capillary path is formed between the bedding mortar and the brick through which the water is literally sucked. Now such cracks are

[continued on page 233]

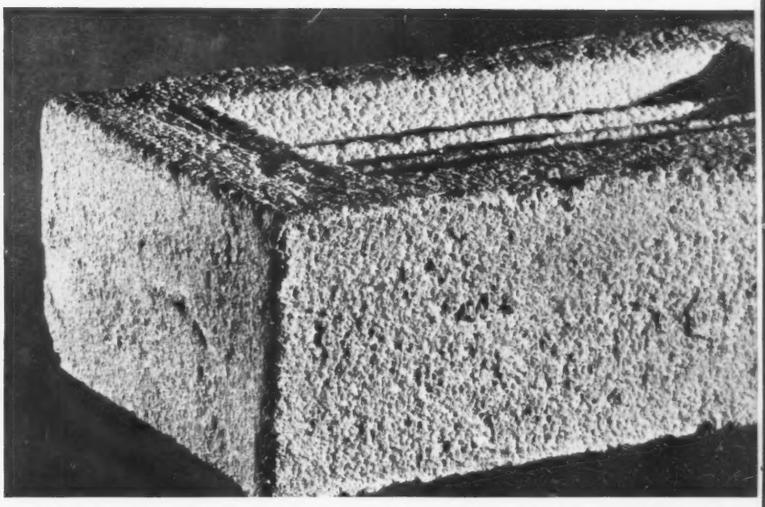


1 : London Stock.

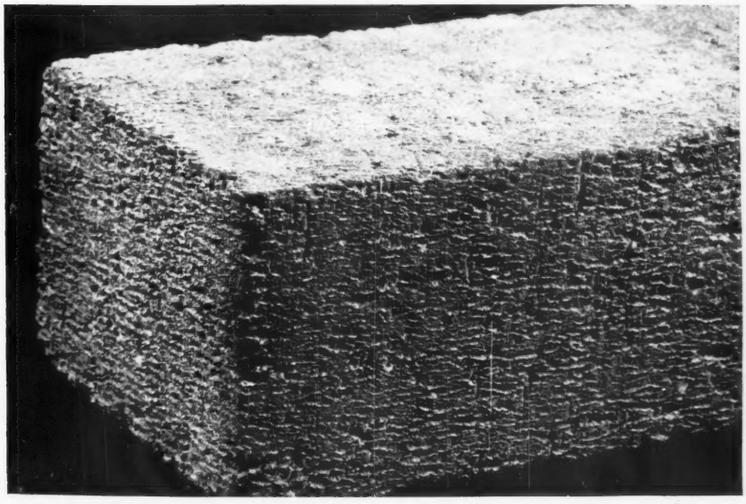
2 : Sussex Stock.



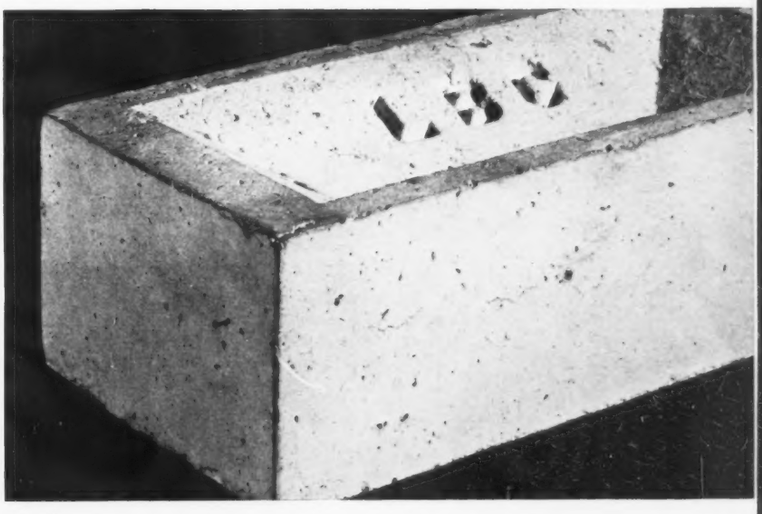
3 : Hand-made, kiln-fired, sand-faced South of England facing brick.



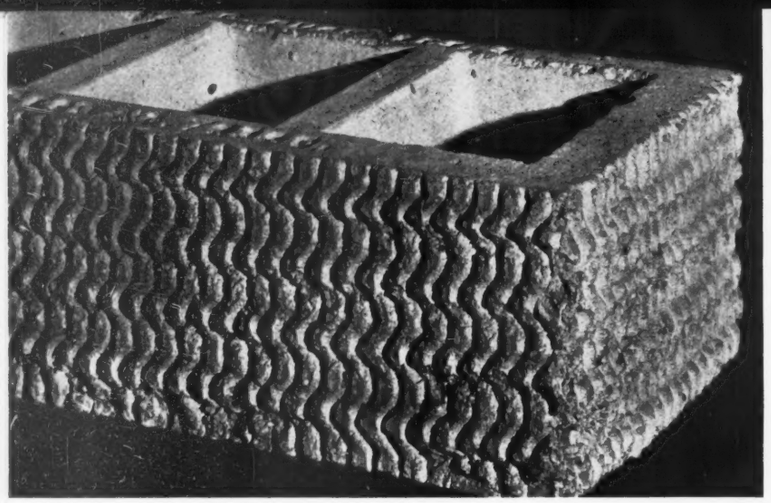
4 : Hand-made, sand-faced Cambridge yellow facing brick.



5 : Texture-faced wire-cut brick.

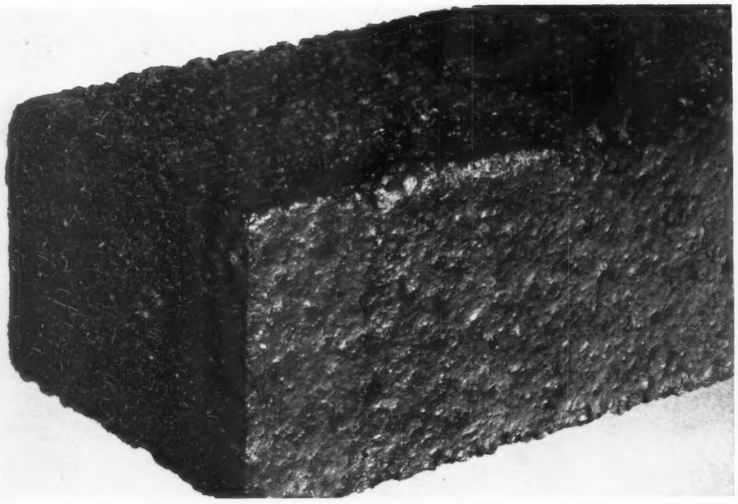


6 : Fletton.

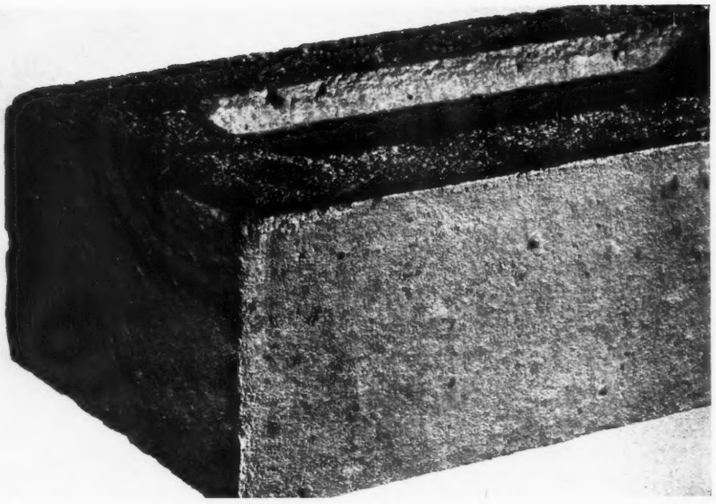


7 : Textured Fletton.

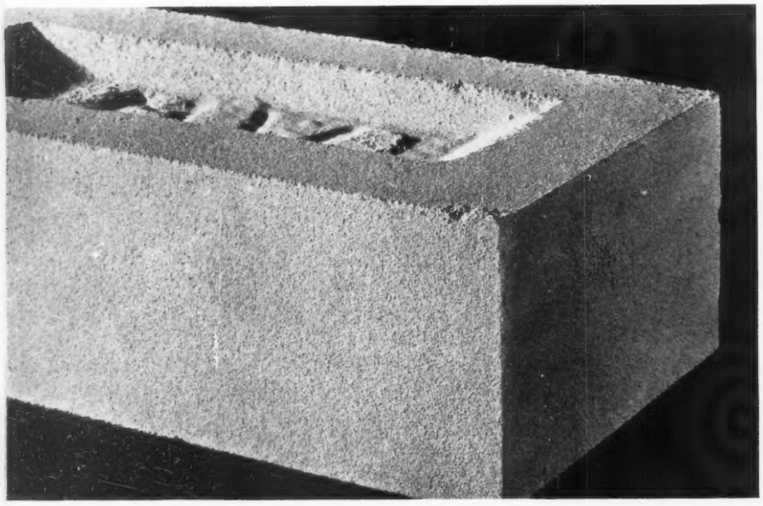
8 : Stamford Fireclay facing brick.



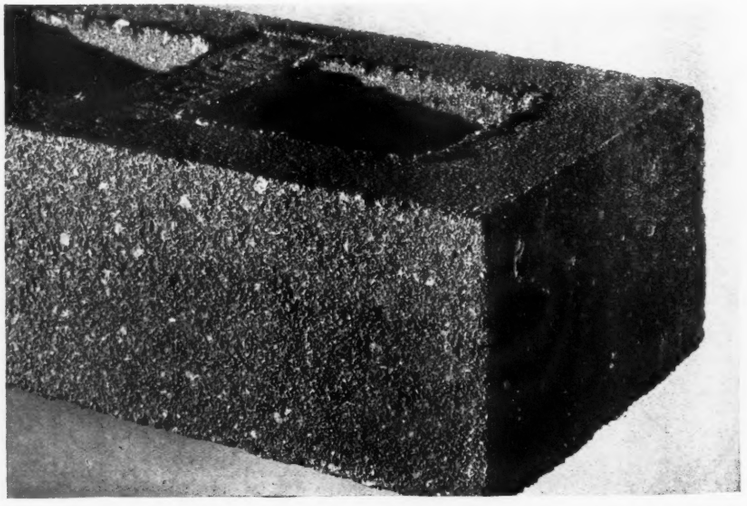
9 : Vitrified-face blue-brown engineering brick.



10 : Staffordshire blue engineering brick.



11 : Sand-lime brick.



12 : Concrete brick.

much more likely to occur in the case of a non-porous brick bedded in cement mortar, than, for instance, with a relatively porous brick like the London stock, bedded in lime mortar. Further, when once the wall has become saturated it will dry out far quicker if the generally porous structure of both bricks and mortar allows rapid interstitial moisture movement. Such porous bricks are also less likely to be damaged by frost. If water be trapped and frozen in a brick having only a very small pore space, it is quite possible that the whole face may be blown off when the water expands on freezing. No matter how often such a porous brick as the London stock is soaked and frozen, practically no damage is done.

While this change in outlook seems to have reduced the value of this part of the older specifications, far greater emphasis has been thrown on the often neglected clauses in relation to the presence of soluble salts. Many clays contain a certain amount of chemical impurities which, unless they are burnt at a high temperature, may remain in the finished brick. The salts dissolve in the water used in building operations, and tend to crystallize out as a white scum on the face of the work. In most cases this is not serious, but in some cases, either where the proportion of injurious salts is high, or where the pore structure is unsuitable, the formation of the crystals may take place within the body of the brick and lead to complete disintegration. Alternatively, when the work is to be plastered, the crystals may form at the point of contact between the brickwork and the plaster, causing failure of adhesion. The number of such cases occurring is not great, but it is a point which should not be overlooked. It should perhaps be added that in the majority of cases of efflorescence occurring on the outside of newly erected brickwork the salts derive from the bedding mortar, but whereas it is almost impossible for efflorescence due to salts from this source to be more than unsightly, salts deriving from the brick earth may occasionally be actually dangerous.

It may therefore be said that modern specifications tend to call for bricks of reasonable porosity which will have adequate "suction" to key with the mortar and prevent the brick sliding about when it is laid. They must be fully burnt and hard, although mechanical strength is perhaps of more importance to prevent damage in handling than to withstand weight in the ultimate structure, since in normal work the loads are only a fraction of what the brick will in fact carry. There must be virtually complete freedom from soluble salts and from lime in lumps, which, when wetted, might cause the bricks to burst. In most cases in England, frogs (the indentations on one or both beds of the brick) are required, but their value seems doubtful; the Dutch, who have a considerable reputation for good brickwork, hardly ever require them. Their chief value appears to lie in the laying operation, in which a frogged brick slips sideways less easily than a flat-bedded brick.

The Principal Varieties

At the end of the nineteenth century it was relatively easy to divide the bricks made in this country into classes, both by district, by type, and by method of manufacture. Recent developments, however, have made this more difficult, and in the following notes on the types of clay bricks available, grouping is only attempted in a very general way.

Stocks.—The term refers, at any rate in the South of England, to bricks, originally entirely hand-made, in which a proportion of the fuel used for the firing process is mixed with the clay before moulding. Originally fired in a clamp, without any surrounding kiln, they are now sometimes machine-made in a full plastic press, and may be fired in a tunnel or other kiln. The brick is generally irregular in shape, very variable in colour, and traces of the fuel used can generally be seen on the face as well as in the core. Provided they are fully burnt and not just dried out, they are among the most durable of all bricks for facing work, even in the most exposed situations. The strength is relatively low, but is more than ample for any ordinary work. This is proved by their use not only for the older railway work in London, but for much of the new viaduct work for the London Transport Board.

The London stock brick, 1, is perhaps the best known type in this class as it forms the traditional building brick throughout the whole of greater London. The general texture is fairly smooth, although the bricks may be misshapen and have adhesions arising from the fuel used. Colours vary from a rather pale yellow grey to a rich gamboge. They are still the cheapest of the traditional facing bricks on the London market.

It is difficult to select examples of brickwork in London stocks because there are so many, but probably the most impressive of the older ones are the bonded warehouses below the Pool, and King's Cross Station and, of recent work, the inside of Westminster Cathedral, before the marble work was commenced.

Other types of true stocks are made throughout Surrey, Sussex, Hampshire and Kent. On the whole these are very similar in texture to the London stock, but are almost always red or dark purple in colour. Certain of the Sussex stocks, 2, tend to show a more or less yellowish tinge on the surface, although they are almost always dark red or purple hearted. Some, particularly in the Crowborough district, are occasionally mistaken for a somewhat weatherstained London stock. In the main they are still all clamp burnt, but a few firms find that they can obtain a more regular output and less wastage if they fire them in kilns. In many cases a small proportion fire a bright cherry red, the bulk being very dark purple, and it is customary to pick out the lighter tones to use for quoins and dressings.

Traditional Hand-made Kiln Facings.—These are still made throughout the South and East of England. They are a well-shaped brick compared with the stock, but show a great variety of texture according to the nature of the sand used to prevent adhesion in the mould. The colours vary through all shades of purple and red, depending on the clay, the firing temperature, and the moulding sand. In the old days the product of any one area was fairly localized and constant, but recently many firms have been buying moulding sand from Farnham, even from considerable distances, so that it is almost impossible to determine the source of the brick from the face appearance alone.

Probably the most famous district for typical bricks of this type, 3, is from the area of the Bracklesham beds around Woking, but they are also made in quantity in the Thames Valley and in South Hampshire, as well as by many other yards in the south of England. Since the war the demand has favoured rather higher textures, and the maximum amount of colour variation. It is notable, however, that in some recent work very much less variation has been required, as, for instance, at Mount Royal in Oxford Street. How far this can be held to show a turning point in current taste is, of course, impossible to say.

An exceptional clay occurs on the borders of Hertfordshire and Buckinghamshire, which produces a great variety of colours, according to the temperature of the fire and the position of the brick in the kiln. The commonest is a sort of violet grey, but shades of brown and dark strawberry purple and a pale cherry red are all produced from the same source. The bricks have been widely used locally, and are popular for municipal and official buildings generally.

Certain yards produce special grey bricks, but these are considered together later owing to the wide variety of methods of production, and the exceptional popularity of bricks of this type at the moment.

A few yards still produce hand-made bricks in kilns which are fired with wood, notably in the Weald to the east of Hindhead. Generally the bricks are of a fairly dark purple but, because of the potash in the wood-ash, the headers which adjoin the flues in the kiln are generally slightly vitrified, giving a silvery or almost black surface. Such bricks are used for diaper pattern work, and are the only semi-glazed sand-faced bricks which are traditional in England. Similar bricks, with a much wider variation in colour, glazed both on the header and stretcher faces, were common in the early brickwork of the Hanseatic League towns, and are used to this day in Holland. They should be of interest to architects in England, because they certainly retain their colour even in soot-laden atmospheres, and appear less "hygienic" and mechanically accurate than the ordinary glazed bricks. They

can, of course, be produced nowadays by other means than by the use of wood fuel.

In Essex, around Marks Tey, certain yellow firing clays occur which can either be made into the traditional type of London stock, or into a pinkish yellow or buff kiln-fired facing. The bricks can also be stained before firing with manganese or other suitable permanent stain, and are then an extraordinarily accurate match for use on additions to old buildings in weathered London stocks. Further north, near Cambridge, the gault clays are used for a pale sulphur-yellow sand-faced brick, 4.

Grey Bricks.—At the moment there is a considerable demand for bricks of a more or less grey or buff description. Some of these have already been mentioned, notably the Buckinghamshire greys and the Essex greys. A number of the red kiln-fired sand-faced bricks from the Midlands and Yorkshire are now treated to give this colour. The surface, before firing, is dipped into a suitable mixture, so that on firing it will take on a more or less buff colour. In North Wales the heavy red clay is also sprayed before firing with a type of matt glaze of a neutral grey colour. Such bricks are only grey on the surface, but they appear to last indefinitely, provided of course that they are not chipped in handling or laying. Some of the Thames Valley clays when fired with wood give a traditional silver grey, which is very common in the old work in that district. The same effect can be obtained now that they are coal fired, by temporarily flashing the kiln towards the end of the firing process. A grey brick is made in the Luton area from pockets of clay appearing above the flint and chalk formations. The colour is really more purple than grey, although the general effect in the mass can be described as grey.

There is also a small output of a grey-brown brick in Cornwall, made from low grade china clay and a brown firing sand.

Textured Wire-cuts.—Almost throughout England there are works producing wire-cut bricks, the surfaces of which have been treated so as to provide a texture and some measure of colour variation, 5. There is practically no limit to the varieties of texture produced and, while the great majority are of a more or less multi-red colour, various shades of brown, buff or stone colour and grey are made. The bricks are without frog, are generally remarkably even in shape and, perhaps for this reason, the textures in some cases look artificial and exaggerated to those who are used to the natural sand-faced textures of the South. They are naturally cheaper to make than the fully hand-made types, and are the only local bricks available for facing purposes in many areas.

Flettons.—As has been said above, the greater part of the common bricks used in the Midlands and London are from the Fletton yards near Peterborough, 6. In fact the output is probably equal to between one-third and one half of all common bricks made in England. The colour, a pale salmon pink, is not considered attractive for facing purposes, and a great deal of ingenuity has been applied to the problem of producing a satisfactory texture, 7. Several varieties are now available, produced by pressing the clay in the mould against a wire mat, by sand-blasting, or by brushing or beating with wire brushes, all giving a good appearance in the mass. For some reason, as soon as the smooth surface skin is broken to form a texture, the colour of the fired brick is automatically improved and becomes, with the best of them, an attractive light red.

Fireclays.—In recent years firms in the Eastern counties have been using these clays to make most attractive facings, 8. The colour variation is exceptional, including greys, browns, stone and buff colours, black and orange. The texture is at least equal to that of the best of the old Southern hand-made bricks and the weathering properties are of the first quality.

Klinkers.—No mention of Continental brickwork is complete nowadays without reference to the Klinker bricks used in the North of Germany, which have been popularized by the work of the architect Fritz Höger. They are an extremely hard dense brick, varying in colour from rich brown to a dark blue, with a vitrified and almost glossy surface. Almost identical bricks are made in Bristol and in North Wales, and it is surprising that more use has not been made of them in this country for facings. They retain their colour even in very dirty situations, and withstand the heaviest loads and most severe conditions.

Lancashire Facings.—There was a considerable production before the war in Lancashire and North Wales of smooth bright-red dense even-coloured press-facings. Change in taste has made these much less popular, with the result that the companies have had to spend a good deal of time and money in producing a rougher textured brick from the same clays.

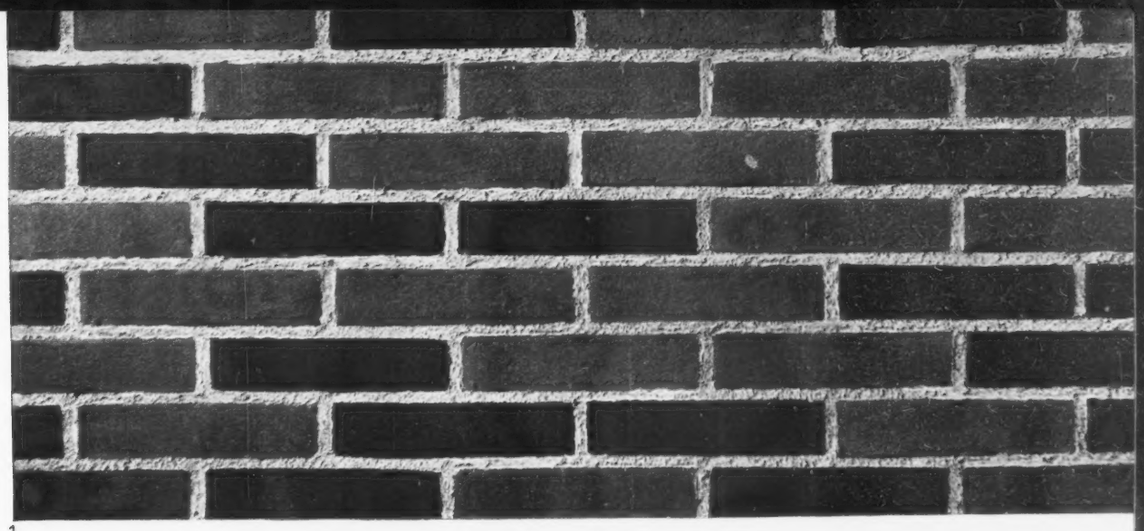
Engineering Bricks.—So far, attention has been chiefly limited to facing bricks, but there is of course a large production of engineering bricks for use where it is necessary to take exceptionally heavy loads. These will all be machine made, and generally have smooth or even glossy faces. The first to be made specially for this purpose were the Staffordshire blues, 10, from the heavy marls occurring in the potteries district. Generally they are a red-hearted brick, the typical blue-black colour deriving from the method of damping down the fires at the close of the burning period. Somewhat similar blue bricks are made in the Bristol area, 9, and both this area and North Wales produce a brown engineering brick. Lancashire and Sussex both produce well-known red engineering bricks, the former even having been used in recent years in the London area, despite the long haulage.

Glazed Bricks.—Glazed bricks, used for light wells and sanitary work, are made in Bristol, the Midlands, Yorkshire and Scotland, almost invariably from fireclays. The glazes are of two types. First, a clear glaze generally of a brownish tint, produced by treating the face of the bricks during firing with common salt; secondly, enamels. The glazes are similar to those used in the pottery trade, and can be obtained in almost any colour. White enamels in particular are used for light reflection purposes owing to the ease with which the walls may be washed down.

Sand-lime Bricks.—So far only clay bricks have been considered, but since the war there has been an increasing interest in other raw materials. It has, for instance, been known for a long time that a mixture of sand and lime could be made to combine chemically in the presence of steam to form calcium silicate. For many years little progress was made in England, but the value of the process was realized after the war by one or two firms, and their success has encouraged a flood of competition during the last four years. The bricks, 11, are cheaper to make than almost any fired-clay-types except perhaps the Fletton, and they weather well. The normal colour is a white or pale buff, but reds, browns and greys can be produced. They are being largely used now in industrial areas as a substitute for the more expensive white glazed bricks, and for ordinary facing and backing purposes. The type is especially valuable for light wells, etc., owing to its light-reflecting surface. So far it has not proved possible to make a highly textured brick in this way, but for some reason it appears to be less necessary for a brick of this type than for the ordinary red or purple facing.

Hollow Bricks.—In order to reduce the weight of the final structure, a great variety of hollow bricks and blocks are now made. In the Fletton area a cavity brick of the customary $9 \times 4\frac{1}{2} \times 2\frac{5}{8}$ ins. size is made, having a deep frog on one side. In most of the plastic clay areas hollow blocks, generally about 12×9 ins., by any thickness from $1\frac{1}{2}$ ins. to 6 ins., are made on extrusion machines of the "wire cut" type. Generally these are only used in this country for floor construction and internal partitions, but custom abroad suggests that they will ultimately be adopted here for external walls.

Concrete Bricks.—During the last two years concrete bricks, 12, of the customary sizes have also become more popular. They can now be made with a good surface texture, and in a wide range of colours. In some districts, where sand and other suitable fine aggregates are cheap, and clays difficult to obtain, it is obvious that they are able to compete in price. It has been found, however, with the latest machinery that they can be made to compete with even cheap clay bricks in much less favourably situated districts.



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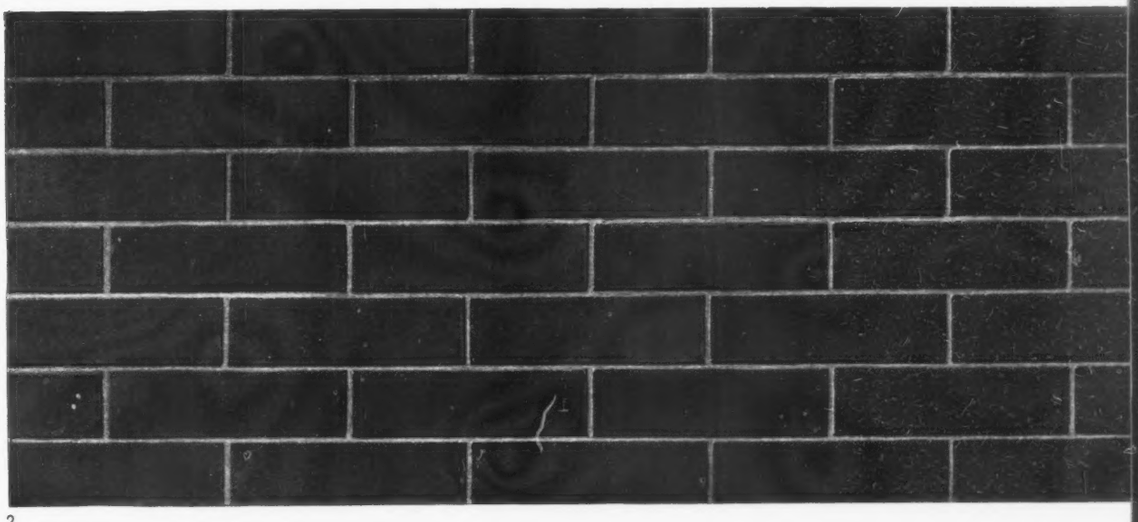

2

VARIETIES OF FACING BRICKS

LANCASHIRE. 1, Sand-moulded multi-coloured facing bricks; sizes from 2 in. to 2¾ in.; 2, pressed red facing bricks; sizes from 2 in. to 3 in.

The great variety of clays available in this country make it possible to obtain bricks of almost any colour without the use of artificial dyes or stains. Certain colours are of course rare and a few, more particularly the green and pure blue range, are almost non-existent, but in such cases they can, if necessary, be obtained by the use of surface applications, which, because they are burnt in, are as permanent as the natural colours of the untreated clay.

The tendency in recent years has been to copy the natural multi-coloured red hand-made facings of the South of England. Such bricks as 9, 10, 7, 11 (overleaf) have become the forerunners of a wide range of bricks made somewhat differently throughout the North of England. 18 is an example of a mechanically made multi-red of this type. Where a rather less strong colour is required, but at the same time considerable variation and texture, the Sussex, Surrey and Kent stocks (8 and 14) form a good alternative.

The type of the well-known yellow London stock, 13, has not for some reason been widely copied, and it is very rare to see buildings in this particular brick outside the home counties. The nearest approach to a regular use of this colour would be in the Cambridge gault clay area. The clay there, however, fires to a much paler and more sulphur yellow tint and lacks the warmth of the London stock.

Recently there has been considerable interest taken in grey and stone coloured bricks. Originally, these were produced by wood firing processes in the Thames Valley but, particularly nowadays, the supply is insufficient for the demand and a great many other types of brick have been produced in this range of colour. 15 is an example from Lincolnshire, but this differs from the old Thames Valley greys in that it is

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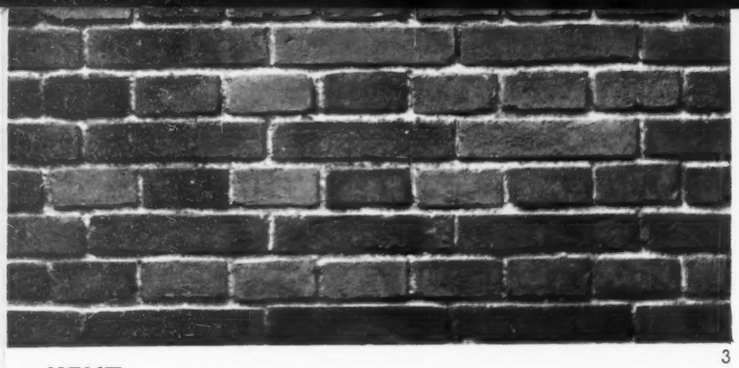
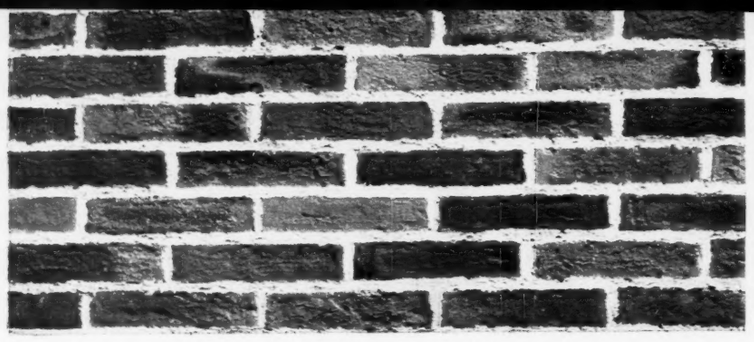


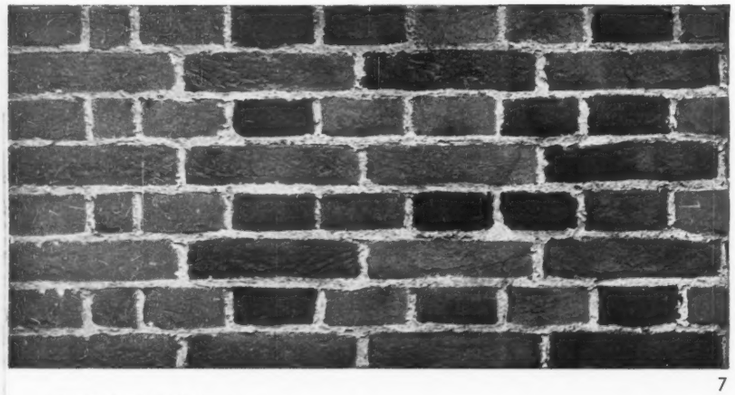
3

KENT. Varied coloured 2 in. rough-surface red bricks.



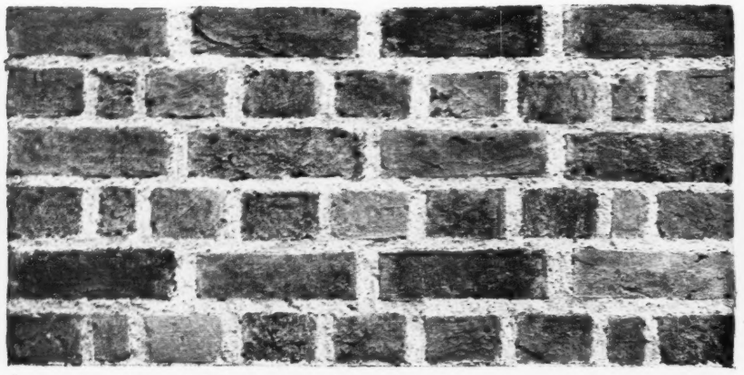
4

NORTH WALES. Multi-colour sand-faced facing bricks. Sizes 2 in., to 2⅞ in.



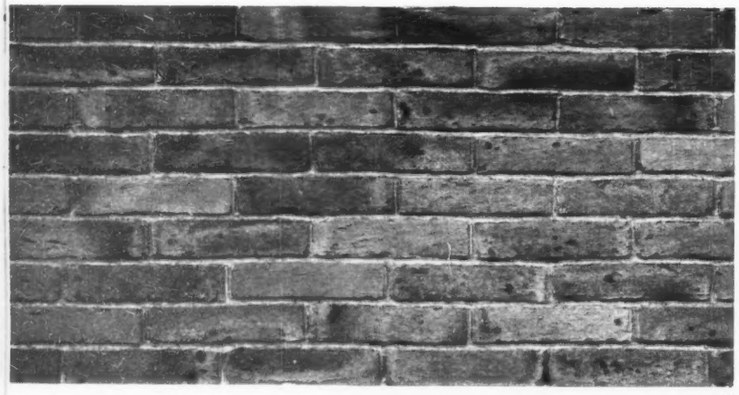
7

BERKSHIRE. Old English facing bricks, mixed colours. Sizes 2 in., 2¼ in. and 2⅝ in.



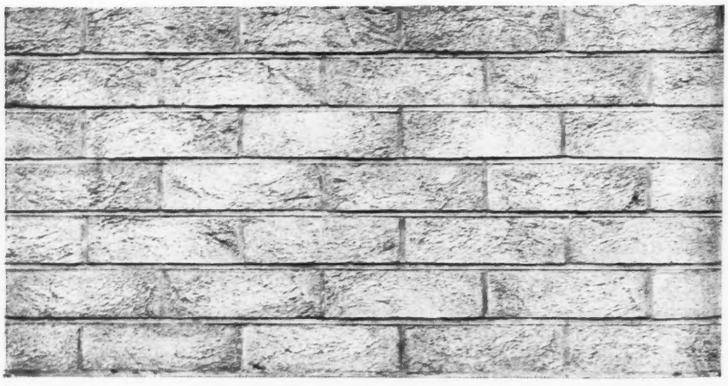
8

SURREY. Multi-coloured stock facing bricks made in 2½ in. size only.



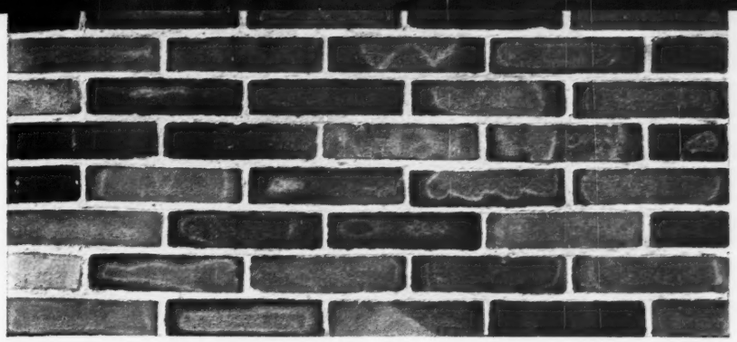
11

SURREY. Kiln-fired hand-made purple bricks. Sizes 2 in., 2¼ in. and 2⅝ in.



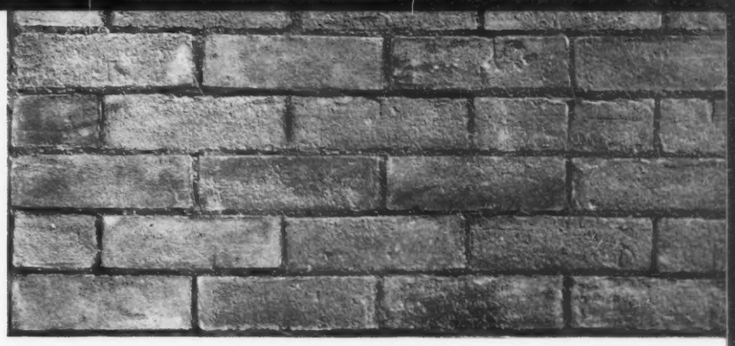
12

LEICESTERSHIRE. Silver-grey facing bricks. Sizes 2 in. and 2¼ in.



5

NORTH STAFFORD-SHIRE. Hand-made sand-faced integral-coloured facing bricks. Sizes 2 in., 2½ in. and 3 in.

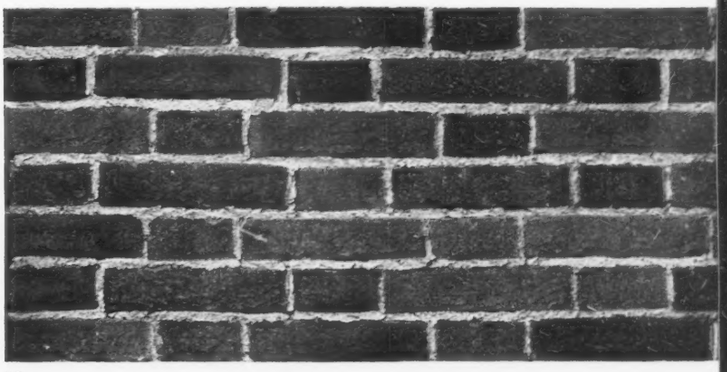


6

YORKSHIRE. Moss green sand-faced bricks. Sizes 2 in. and 2½ in.

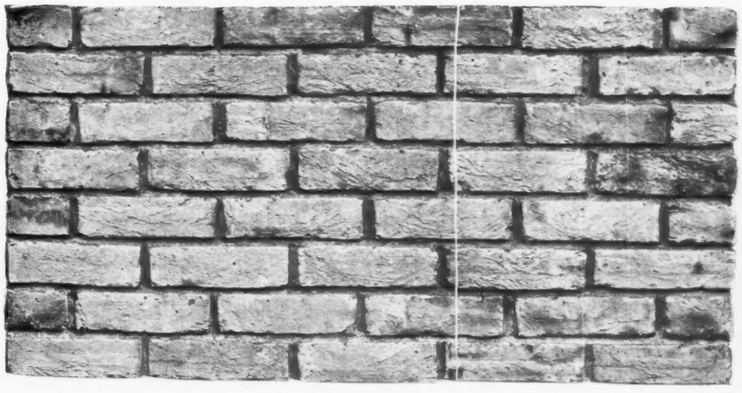
9

SUSSEX. Wealden flared red bricks. Sizes 2 in. and 2½ in.



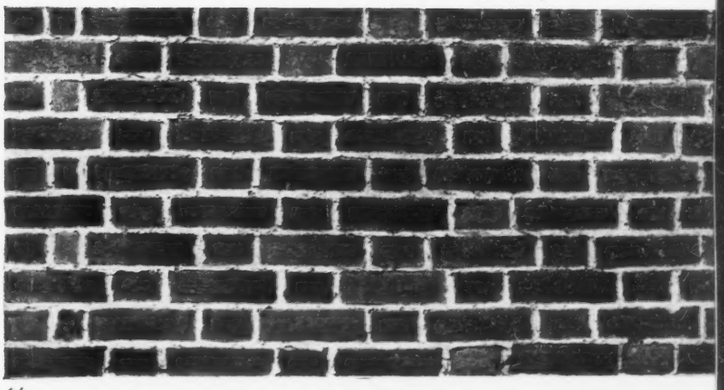
10

BERKSHIRE. Mixed bright purple and red coarse sand-faced facing bricks. Sizes 2 in. and 2½ in.



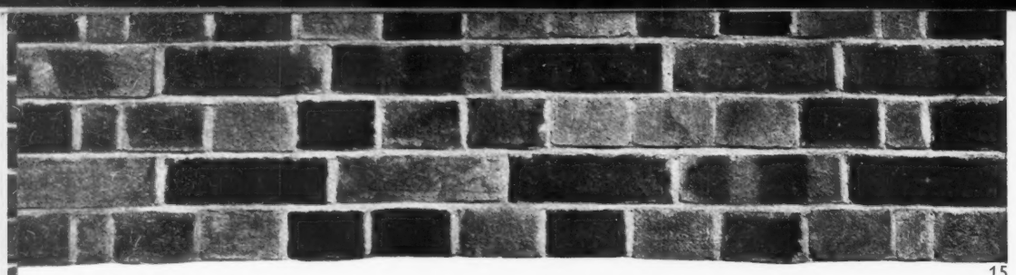
13

NORTH-EAST KENT. Dark yellow stock facings. Sizes 2½ in. to work four courses to the foot.



14

KENT. Hand-made purple stock facing bricks. Sizes 2 in. and 2½ in.



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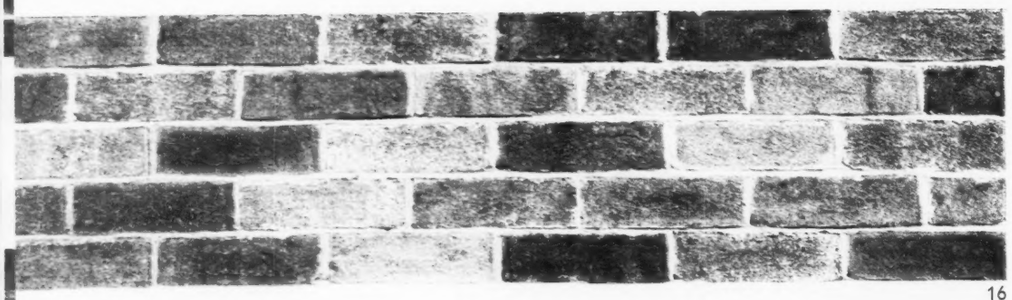
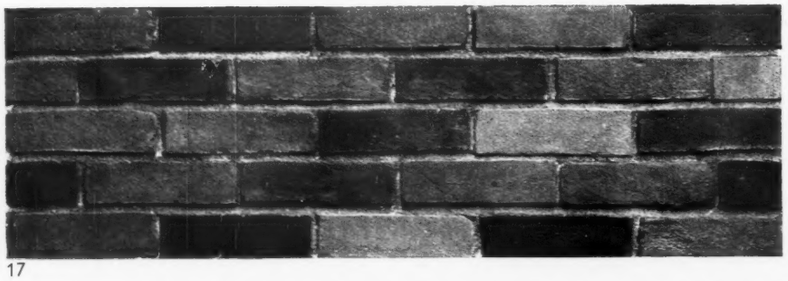
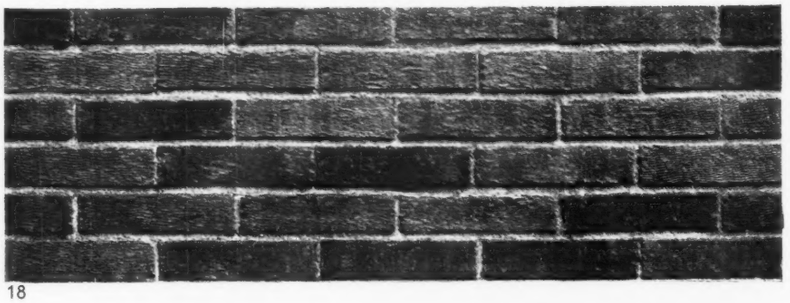


16

LINCOLNSHIRE. 15, grey facing bricks, mixed shades; 16, mixed grey and brown. Sizes from 1 in. to 3 in.



17



18

YORKSHIRE. 17, hand-made, sand-faced, multi-coloured facing bricks; 18, rustic facing bricks. Sizes from 2 in. to 3 in.

made from fireclay, and is the same colour throughout.

In the Midlands the ordinary red bodied hand-made, or even machine-made, brick has been surface treated before firing in order to give a grey, as for instance, 12; or a greenish grey, as 6.

In the North of England until before the War the most popular brick was a smooth textured red, as brilliant and even in tone and shape as possible. This brick had undoubtedly very definite advantages for it did at least retain its original colour even in the dirtiest atmospheres; an example is seen in 2. Change in taste, however, demanded more texture and greater colour variation, such as is possessed by the more recent production from the same clay, 1. Of course in many cases the effect depends very largely upon the type of jointing used; a contrast in jointing being shown by the same two examples.

In many cases collieries now produce a very cheap buff brindled brick which might well become popular among those who are tired of the multi-red type of brick. With very little additional care in the firing, a great range of colour is possible, and in most cases the bricks are in every way sound. The effect is very similar to 5.

BRICK MANUFACTURE: HAND AND MACHINE

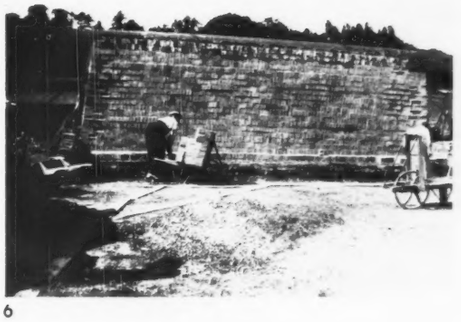
1

2

3

4

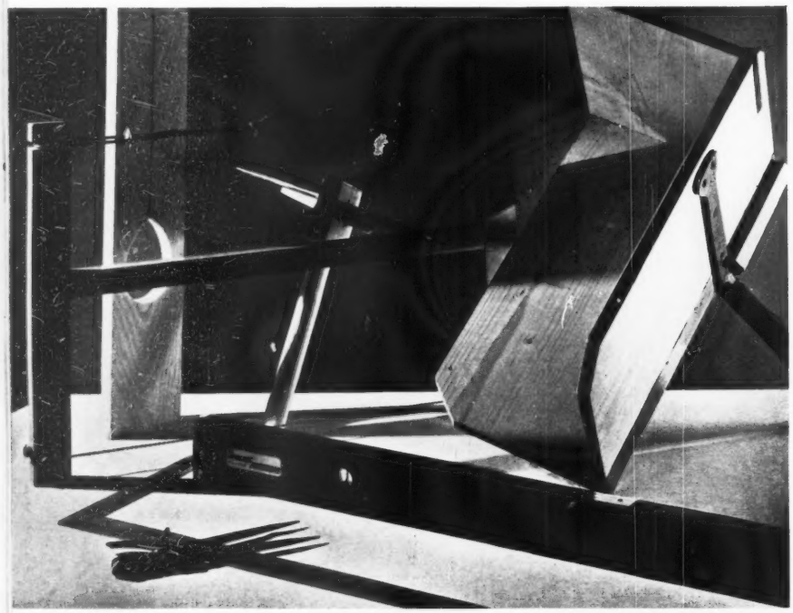
5

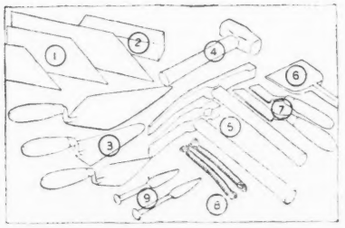


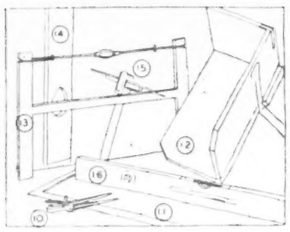
6

7

The traditional hand processes of brick manufacture are still the rule in a very large number of yards where both facing and other bricks are made. 1–6 show typical stages in the traditional process : 1, Clay-getting in a typical South-country brick-yard ; 2, "Soiling," the mixing of breeze with the clay for the manufacture of stock bricks ; 3, Hand moulding ; 4, "Hacking," stacking the green bricks to dry ; 5, Bricks stacked for firing in a modern kiln ; 6, "Clamping," stock bricks stacked ready for burning in a clamp. The large illustration, 7, is given by way of contrast to illustrate the high degree of mechanization that has been introduced in the great machine-worked brick yards. It shows a mechanical excavator at work in the Fletton brick fields, working on a clay face 80 feet high.







THE BRICK-LAYER'S TOOLS

The tools used by the bricklayer have changed very little during a great many years. Examples of the principal items in his equipment are illustrated in the two photographs; their names and uses are as follows: 1. *Bevels*, for drawing the soffit lines on bricks before cutting them. 2. The *Rubbing Stone*, made of carborundum, for smoothing bricks that have been axed, and for rubbing brickwork in returns. 3. *Trowels*. The largest tool has an edge that can be used for cutting bricks. The rounded nose of the middle trowel enables it to carry more mortar to inaccessible spots than a pointed one. The smallest one is used for pointing work. 4. The *Club*, or *Lump Hammer*, of the pattern used in London and the South of England generally. 5. *Bricklayers' Hammers*, for cutting brickwork. 6. The *Bolster*, a long-edged, cold chisel used for cutting bricks and also for cleaning joints; although 7, *Jointers*, are the proper tools for this job. 8. The *Line*, held in place by 9, the *Line-pins*, is stretched along the wall to keep the courses of brickwork level on the bed and straight along the face. 10. *Compasses*, for setting-out gauged work. 11. The *Square* which "tries" the bedding of the bricks. 12. The *Hod*, used by the bricklayer's labourer for carrying mortar and bricks. 13. The *Brick-saw* with its entwined strands of wire, used for cutting the soffit lines to allow the *Scutch* or *Brick-axe*, 15, to enter without splitting the brick. It can cut right through a brick as well. 14. The *Plumb-rule*, about four feet long and, furnished with its line and plummet, is used for carrying the work upright. 16. The *Level*, a guide for correct horizontal working. (Tools lent by William Marples and Sons.)

THE BONDING OF BRICKWORK

By P. M. Stratton.

In thinking of the appearance of common things, the mind is brought quickly to the need of definitions. Bond, then, in architecture is the form which binds or joins two or more separate portions of material (as two or more bricks) to make one thing (for instance, a wall).

The purposes of bond are (*a*) unity of effect; (*b*) maximum strength; (*c*) economy of construction. These three purposes should be combined, but each has predominated in turn, to form a separate type of bond; thus (*a*), unity of effect, has resulted in Flemish bond through the choice of the architect; (*b*), maximum strength, has been provided by the engineer in English bond, and (*c*), economy of construction, has given stretcher bond to the cheap-jack's use.

Flemish bond has the happiest unity of effect because the bricks retain so clearly their two individual shapes, one of which is half the size of the other; and each header is clearly related to its corresponding stretcher by its axial position in resting centrally upon it. These vertical axial lines resolve the horizontal complex due to the inevitable bed lines. The resulting pattern of joint and brick has a beautiful content, and ensures to the most vulgar brick in the least worthy building some faint memory of design. Perfection has a challenge in even the frequent things, in the " flower in the crannied wall " and in the wall itself; and a man might well wish to give half the suburbs to know whence and how this perfect bond arrived—whether by long experiment in sizes and arrangement, or suddenly by the fluke of some merry journeyman which reached an architect's eye. In any case it is now the normal use in good English building.

Flemish bond has, however, a definitely static appearance because the arrangement of header and stretcher suggests the forces of dead weight and resistance. It is the proper bond for buildings in which the wall takes or appears to take the weights of floors and roofs in contradistinction to the cantilever motif of some modern architecture. Thus the great red damask-like walls of Wren's Hampton Court Palace are threaded with the pale mortar lines below each course of brick and between each course, so that the separate brick is stitched into the design, and becomes part of the minute workmanship which sustains the whole; stone cornices, entablatures, pillars and frames stand out from this pattern which yet contains them and holds them in its bond. With not less happy success some small house in a brick-built town of South England is, on analysis, only proportion and a capable handling of brick walls; its openings are bridged with gauged arches, quoins are emphasized with a brick of lighter colour than the ground colour of the interspaces, or grey headers enliven the whole pattern of the bonding and insist on the vertical axes of the diaper which they make.

The use of header with closer at the angles in Flemish bond has been criticized as a weakness, and in some modern buildings special quoin bricks up to 16 ins. long have been made. The result shows a pleasant variation, and gives a proper strength where the end pier is of considerable width. But these strong angles seen in perspective break up the pattern and detract from the bonding when the corner pier is but little wider than the window unit. It is necessary to be strict with Flemish round the skew-back of a flat arch, as shown in the illustration (page 245.)

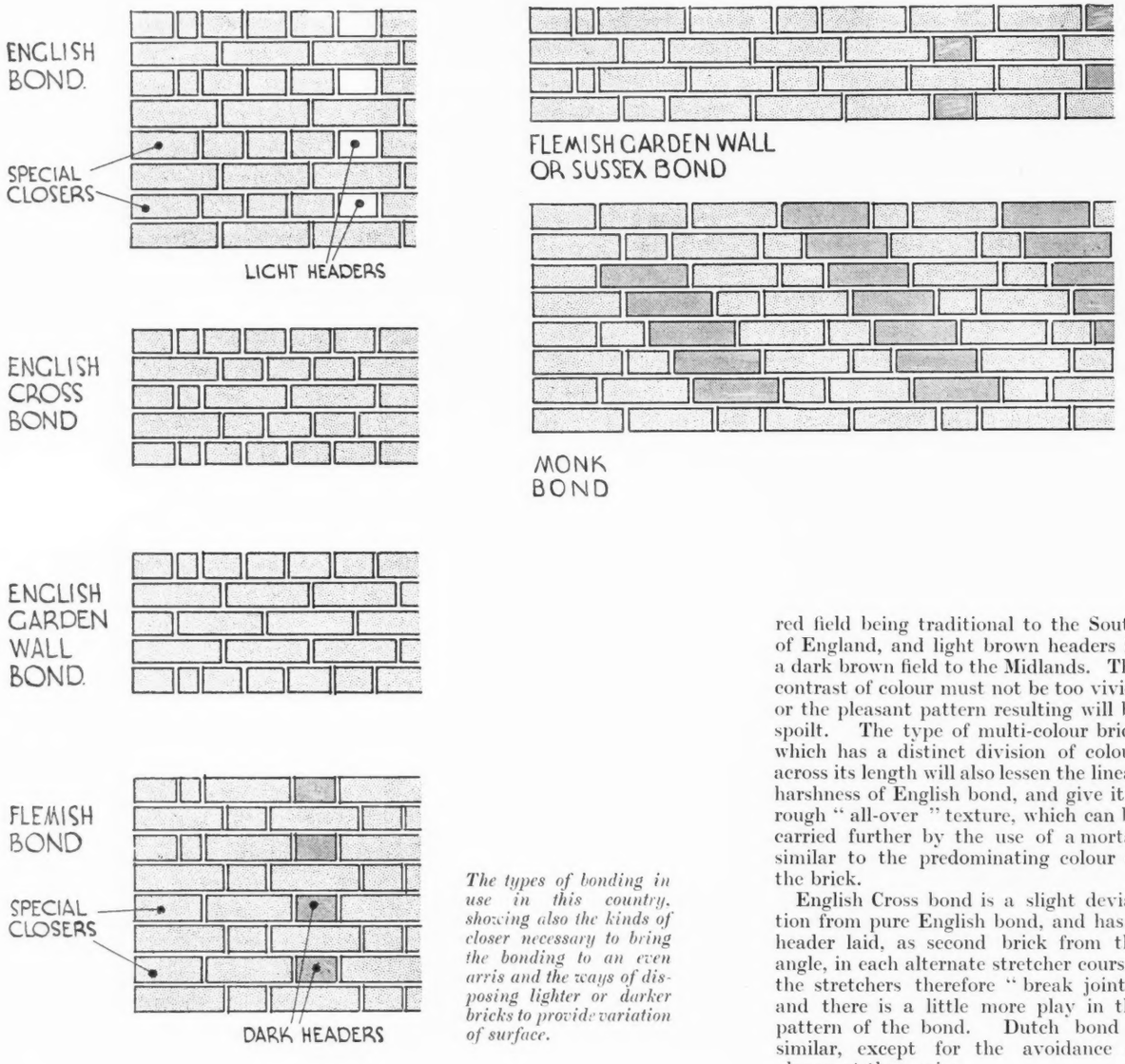
So good a thing as Flemish bond was certain to have either variations or imitations. The most traditional of these is Sussex, or Flemish Garden Wall, bond. It consists in laying three stretchers (sometimes reduced to two stretchers) to one header in every course, so that the headers are axially over one another alternately with stretchers. The quoins are stretcher-header and header-closer-stretcher, or special $6\frac{3}{4}$-in. closer-stretcher, and the effect is a pronounced verticality at 18-in. centres, not at the 9-in. centres of pure Flemish. This Sussex bond gives the eye much satisfaction on a long wall, such as a garden wall, which is unbroken by voids and has piers spaced widely; it is indeed highly suitable in building broad spaces and, economical, though less strong than Flemish. Its use in Georgian façades limits the freedom of window spacing. There are occasions in buildings of modern design where it can be used appropriately in the broad areas over ribbon windows and in spinal towers. Brickwork has been laid in this bond in the Curzon Cinema, Mayfair, in the Royal Masonic Hospital, Ravenscourt Park, and in Hornsey Town Hall.

Another substitute for Flemish bond, shown by Mr. Nathaniel Lloyd as Yorkshire or Flying bond, is not believed to be widely used. It is strong, but makes an indefinite pattern, and gives the impression of a succession of broken bonding. A bricklayer using this arrangement would be continually " getting his hand out."

Monk bond, which is a better ordered arrangement than Yorkshire or Flying bond, is popular in the North of Europe. Two stretchers are followed by one header in every course, the headers being so disposed that verticality of their axial lines is little apparent, and a striking result is obtained of diagonal lines of stretchers, which look like a series of corbels or cantilevers embedded in the wall. Of course, Monk bond does not appear to be so strong as normal Flemish bond owing to the preponderance of stretchers over headers. There are reasons, however, why its use is compatible with the best modern design. Even the layman understands that brickwork today is often in the nature of a veneer over reinforced concrete, and of a panel to fill the spaces between beams and columns. Monk bond, by its emphasis on stretchers and the preponderance of them, gives the impression of such veneering and panelling. It is the already mentioned effect of cantilevering, however, which seems most desirable in the case of buildings exploiting the cantilever *motif* in their main lines and masses. The idea of a building as a dynamic organism rather than a static symbol involves, as some architects now realize, the evolution of the plan into the elevation. Before the plan is laid down at all the problem of the feature of maximum importance must be resolved, so that in the elevation that feature may be properly defined, and the subsidiary parts, as it were, cantilevered from it; just as the wings and tail and beak or nose of a bird or aeroplane are cantilevered from the body, or as the beams of a tree are hung from the trunk. Monk bond has the power of suggestion that the building is held by a series of corbelling stretchers and connected to a central body or trunk.

It must be remembered that Monk bond has not its own self-contained beauty like Flemish bond, but its value relates only to the design of the building; moreover, it is not strongly marked, though there seems no reason why its character should not be brought out by the corbelling stretchers being laid with a different coloured brick. The credulous believer in bonding must be warned that this excellent bond cannot give a modern appearance by itself; it can only reinforce the main *motif* of a design.

The introduction of extra headers into Monk bond will break into and diminish



The types of bonding in use in this country, showing also the kinds of closer necessary to bring the bonding to an even arris and the ways of disposing lighter or darker bricks to provide variation of surface.

the cantilever effect. Either the horizontal or the vertical line then predominates. An extra cost over Flemish has to be met for labour on Monk bond and its derivatives, because the process is not so straightforward as Flemish, and the bricklayers have to stop and think more frequently.

The second type of bond in my classification is that which emphasizes the horizontal or bed line; English bond is the best example, and consists of a row of headers over a row of stretchers. Although easy to lay, it takes more facing bricks than Flemish, and the difference in cost is not often substantial. Bricklayers prefer it for rough uneven bricks of irregular size, as the inaccuracies in the perpends are less noticeable. The pattern of English bond itself suffers from over-simplicity; the rows and rows of headers and stretchers give it the stern monotony of a barracks. This strength of effect, which engineers so value in their works, shows character rather than comeliness, and the emphatic header courses convince the mind of the thickness and solidity of the wall.

The disadvantage of English bond in appearance, therefore, is the longitudinal monotony, and this can be mitigated in several ways. Alternate headers can be singled out in a separate colour to the rest of the wall, blue-grey headers in a red field being traditional to the South of England, and light brown headers in a dark brown field to the Midlands. The contrast of colour must not be too vivid, or the pleasant pattern resulting will be spoilt. The type of multi-colour brick which has a distinct division of colour across its length will also lessen the linear harshness of English bond, and give it a rough " all-over " texture, which can be carried further by the use of a mortar similar to the predominating colour of the brick.

English Cross bond is a slight deviation from pure English bond, and has a header laid, as second brick from the angle, in each alternate stretcher course; the stretchers therefore " break joint," and there is a little more play in the pattern of the bond. Dutch bond is similar, except for the avoidance of closers at the quoins.

English Garden Wall bond has the header course laid over three courses of stretchers. The pattern is rather pleasing, and is economical to build, but it is the weakest of the English bonds, and to the eye more proper for execution in stone. The three stretcher rows, if a large-scale effect is sought, can be made to " read " as a single course by laying headers of a slightly different colour, as has been done in the Golders Green Club; for these three courses, in chalk districts, flint is often substituted; the headers then form lacing courses.

Although Heading bond is not a variety of English, it should be classed with English because of the definite feeling of strength in its compact pattern. Closers are not used, but a three-quarter brick starts each alternate course at the quoins. The town of Lewes in Sussex has many small buildings made notable by their blue colour

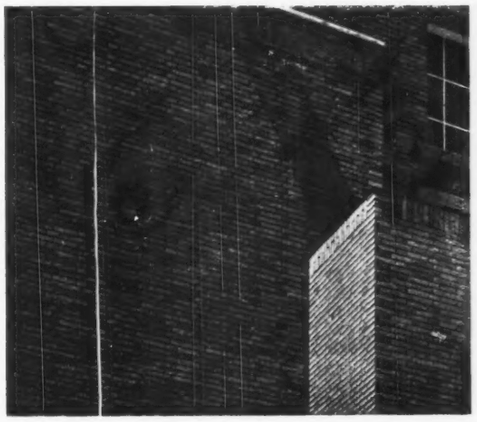
[continued on page 245

1 : ENGLISH BOND

used in a Kensington office building ; H. Austen Hall, architect.

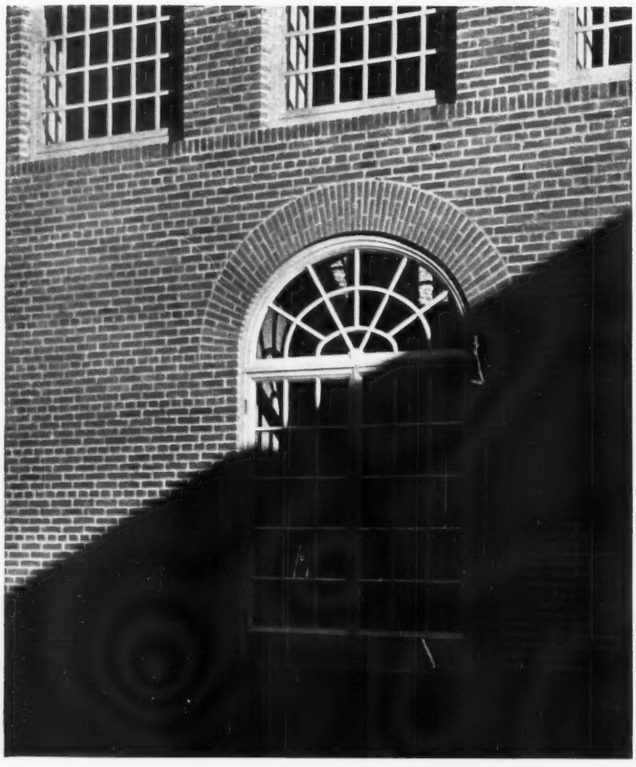
2 : FLEMISH BOND

used (with variations, in the case of the portion above the windows) in a Nurses' Home, Guildford Street ; Stanley Hall, and Easton and Robertson, architects.

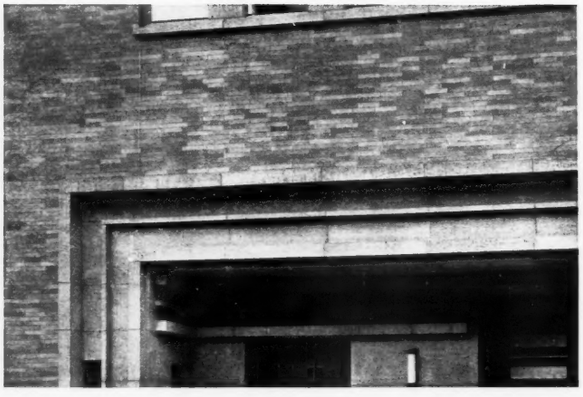


3 : FLEMISH GARDEN WALL (OR SUSSEX) BOND

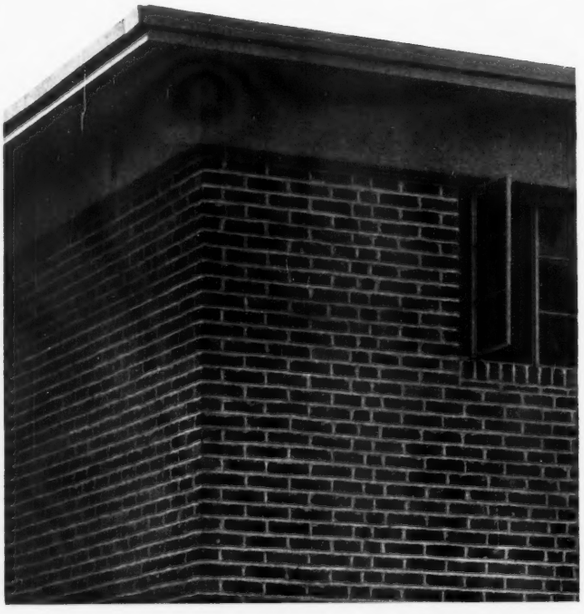
two variations : left, with three stretchers to the header, used with narrow bricks and raked-out joints, in the Royal Masonic Hospital, Ravenscourt Park ; Sir John Burnet, Tait and Lorne, architects. Right, with two stretchers to the header, in the New University at Oslo ; Bryn and Ellefsen, architects.



4 : ENGLISH GARDEN WALL BOND
used at Whitelands College, Putney ; Sir Giles Gilbert Scott, architect.



5 : HEADER BOND
used for curved piers between the windows of a house in Hampstead ; C. H. James, architect.



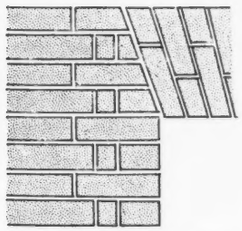
6 : STRETCHER BOND
used in the upper example in Berlin with narrow, thin-jointed bricks, and in the lower example for facing a small English house. Note the effect of breaking joint.

and vitrified surface, which the curious will find to be built up of blue headers. The joints are naturally rather thin, and so it must be the multiplicity of joints which gives such a pleasant idea of texture. A man is tempted to go home and specify only headers in all future glazed brick walls. Heading bond is also used in panels, and the smallness of the unit comes then to add a special charm to the design, as of mosaic or East Anglian flint work.

There remains the third category, Stretching bond, whose only virtue is economy. Nothing so well gives the illusion of a brick house being bought over the counter of a cheap bazaar as this bond, in which all bricks are stretchers except the alternate headers at the quoins, and these are stretchers round the corner. The pattern is as insipid to the eye as a lukewarm ice to the tongue. Moreover, the length of unit, combined with the dullness of pattern, makes any broken bond, such as is illustrated in figure 6 (page 244), rather distressing.

There is no doubt that the best substitute for this bond is the Flemish Garden Wall or Sussex bond already described, and the extra expense is very little if anything. It is unfortunate that the better made the brick, the more mechanical is the appearance of the "all-stretchers"; in fact, this bond should only be used with irregular and multi-coloured bricks, when the lines of the joints tend to become "blinded out," a result which dull-coloured pointing assists.

The various bonds have been considered in comparison to one another, and their various merits assessed accordingly. It remains to make the point that there *is* an argument in favour of bond at all. Any plea for stucco as the facing material par excellence for "modern" design, because of its monolithic appearance, must include in its apology a note on the absence of bond pattern (the only bond pattern of stucco being, presumably, erasing). The clean sweep of the classic orders, used either whole or dismembered, in industrial and commercial buildings, is generally welcomed; these things have become the plutocratic fur coats of architecture when so used. But there is something radically English in having, on a building, subdivisions and "features," however small. All mouldings and modelling having been merged into one flat totalitarian or proletarian surface, bond pattern is more desirable than before, and has become more important. For here in the stone or brick wall are units of construction, small individual blocks of material, whose appearance and work, in relation to adjoining blocks, adds something, a little or much, to the whole effect. Stones and bricks are, from both the craftsman's and the onlooker's point of view, materials liked by free men.



BONDING FOR A FLAT 12" ARCH IN FLEMISH BOND

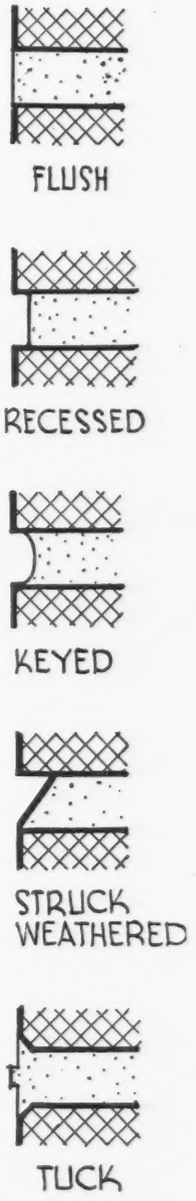
Jointing and Pointing.

Patterns of bond are emphasized or dimmed, enhanced or weakened, by the variations of the jointing or pointing materials. To use the jointing mortar to fill up the joint flush with the face and then just strike it off flush, not rake it out, is the most workmanlike finish to brickwork when a first-class team of bricklayers is employed. Unfortunately there is a large dilution of amateurish men in all except the very best work, so that the safe course is to rake out all joints at least $\frac{1}{2}$ in. and point down at the end by men picked for their aptitude at the task. There are the further advantages in this procedure that the pointing material can be coloured to the tint required, and sufficient sand of one colour and grading all through is not difficult to get.

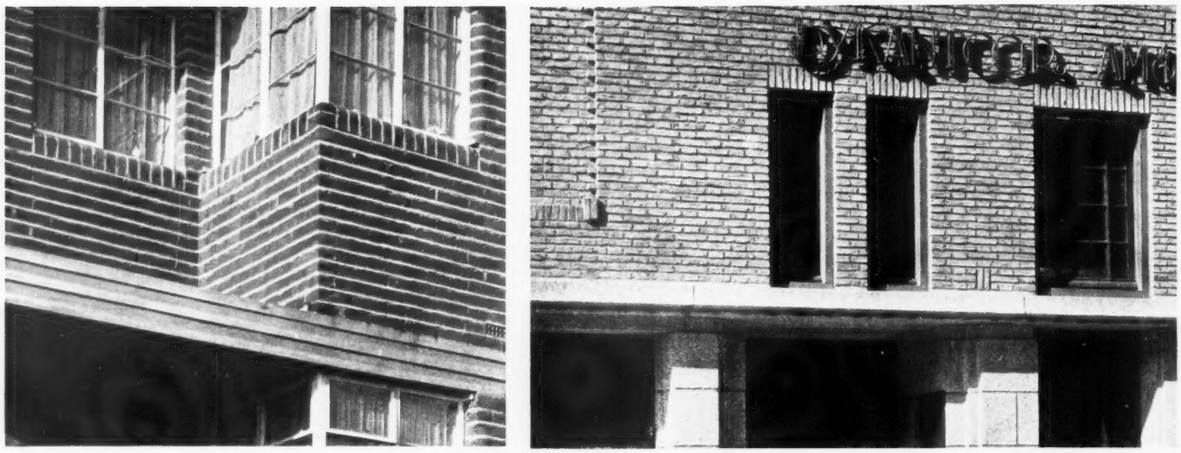
The texture of the pointing should be of similar roughness to that of the brick face; generally to obtain this a coarse sand must be used (a small percentage of $\frac{1}{4}$-in. grit will give it a glitter), and the joint can be further roughened by rubbing along it a small piece of deal or a piece of sacking. It must not be "ironed out" smooth with the point of the trowel unless a hard mechanical effect is required.

The flush joint, $\frac{3}{8}$ in. wide with $2\frac{5}{8}$ in. bricks, is, on the whole, the most generally appropriate for the presentation of bond; this joint neither exaggerates nor diminishes the importance of bond. The tuck joint was, however, very useful in getting the last ounce of effect from the coarse and common brickwork of the early suburban houses built about 1800. The garden wall of No. 10 Downing Street is an example of this pointing. But the effect on a large surface is as restless and irritating to the eye as the early "flicks." The pointing is executed by overflushing the open joints with mortar approximating the bricks in colour, but rather darker; on this surface, slightly raised, a line of white putty, about $\frac{1}{8}$ in. square, is run. A thin network of white lines is thus laid over the raised part of a coarse surface. When the sun is on such a wall at a very oblique angle, the light and shade give it a champagne half-hour, in strange contrast to its tiresome superficiality at other times.

The weathered joint, horizontally cut in below the upper brick and sloped out to the face of the lower brick, betrays an engineer's mind intrigued with the idea of throwing water off a building. The vertical joint does not mitre with the horizontal, but is left "in the air," and the undercutting of the brick



Types of mortar joint, shown in section to about half full size.



Two examples showing the surface effect of different treatments of mortar joints: left, a small English house with the horizontal joints only pointed in white; right, a bank in Middelburg, Holland, in Dutch bricks with the joints deeply raked out.

courses gives a hard effect against the light-catching slope of fat mortar below.

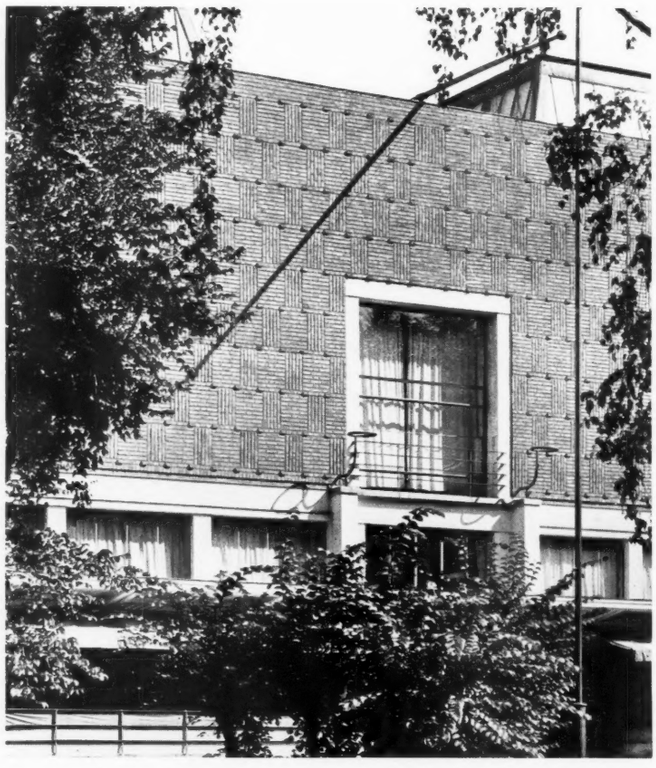
If, however, the pointing is kept back everywhere equally, so that all joints are like superficial channels, the effect can be very pleasing; this recessed joint should be not less than $\frac{1}{16}$ in. deep, or more than $\frac{1}{8}$ in., and is appropriate only with regular and well-arrised bricks. The keyed joint is similar but concave, formed by pressing a rounded shape as mould into the fresh joint. A hard appearance must be avoided.

The Continental trick of pointing the horizontals and raking out the verticals has been properly scorned here as "un-English."

The colour of pointing has become more difficult since red bricks have lost so much of their popularity, and "multis" and pale shades have been used instead. A joint coloured cream (but not white, which is too staring) was always correct twenty years ago. Black ash joints were often used but were always wrong except with yellow stocks. In London yellow and brown bricks, as near the colour of old gold as possible, should be chosen in nine cases out of ten, as these colours alone warm the dim and blue atmosphere. A white or grey joint makes these bricks look cold, a brown or yellow pointing disintegrates the colour of the brick; a pale mud tint or dirty ivory is the most satisfactory colour for the joint until London redraws the lines with her own charcoal.

When the thickness of the brick is only 2 ins., it is customary to increase the thickness of the joint to $\frac{3}{4}$ in. or even 1 in., in order to maintain the scale of the building. The colour of the pointing is then more important, as it greatly affects the colour of the wall as a whole; as these thin bricks are practically always red, the result is a much paler red than the brick alone, if the usual cream pointing is used.

Again and again a man is led to the conclusion that there is no rule about the colour and texture for pointing, only an exasperating problem recurring with every fresh job. Therefore he specifies that "the mortar for pointing shall be composed of half part of Portland cement, half part of coloured cement (or one part hydraulic lime), and four parts of clean, sharp, coarse pit or river sand, all properly mixed, and that 3 square yards of facing bricks shall be built as a sample for his inspection at three weeks after the sample has been erected or at such other time as the work may need to dry down to its final colour."



An example of a decorative wall surface obtained entirely by the bonding of the bricks: the Artists' Building, Oslo; Blakstad and Munthe-Kaas, architects. Small panels of stretcher bond run alternately vertically and horizontally and single projecting headers give additional relief.

ANTHOLOGY

The Simple Blue Country

Now, the matter-of-fact business-like activity of the simple blue country has been already alluded to. This attribute renders in it a plain palpable, brick dwelling-house allowable; though a thing which, in every country but the simple blue, compels every spectator of any feeling to send up aspirations, that builders who, like those of Babel, have brick for stone, may be put, like those of Babel, to confusion. Here, however, it is not only allowable, but even agreeable for the following reasons:

Its cleanness and freshness of colour, admitting of little dampness or staining, firm in its consistence, not mouldering like stone, and therefore inducing no conviction of antiquity or decay, presents rather the appearance of such comfort as is contrived for the enjoyment of temporary wealth, than of such solidity as is raised for the inheritance of unfluctuating power. It is thus admirably suited for that country where all is change, and all activity; where the working and money-making members of the community are perpetually succeeding and overpowering each other; enjoying each in his turn the reward of his industry; yielding up the field, the pasture, and the mine, to his successor, and leaving no more memory behind him, no further evidence of his individual existence, than is left by a working bee in the honey for which we thank his class, forgetting the individual. The simple blue country may, in fact, be considered the dining table of the nation; from which it provides for its immediate necessities, at which it feels only its present existence, and in which it requires, not a piece of furniture adapted only to remind it of past reflection, but a polished clean, and convenient minister to its immediate wishes. No habitation, therefore, in this country, should look old: it should give an impression of present prosperity, of swift motion and high energy of life; too rapid in its successive operation to obtain greatness, or allow of decay, in its work. This is the first cause which, in this country, renders brick allowable.

Again, wherever the soil breaks out in simple blue country, whether in the river shore, or the broken road-side bank, or the ploughed field, in nine cases out of ten it is excessively warm in its colour, being either gravel or clay, the black vegetable soil never remaining free of vegetation. The warm tone of these beds of soil is an admirable relief to the blue of the distances, which we have taken as the distinctive feature of the country, tending to produce the perfect light without which no landscape can be complete. Therefore, the red of the brick is prevented from glaring upon the eye, by its falling in with similar colours in the ground and contrasting finely with the general tone of the distance. This is another instance of the material which nature most readily furnishes being the right one. In almost all blue country, we have only to turn out a few spadefuls of loose soil, and we come to the bed of clay, which is the best material for building; whereas we should have to

The Editor wishes to make the following acknowledgments for assistance kindly given in compiling this issue: to Mr. H. Greville Montgomery for several illustrations lent, and particularly for very kind permission to reproduce a large number of illustrations from Nathaniel Lloyd's *History of English Brickwork*; to the Port of London Authority for the loan of the aquatint of the London Docks that forms the frontispiece; to the Geological Survey; to Mr. E. R. Jarrett for photographs of Dutch and Norwegian brick bonding, reproduced on pages 243 and 246; to the Grand Union Canal Co. for the loan of the engraving of the Islington Tunnel that appears on page 212; to the Worshipful Company of Tylers and Bricklayers for historical information supplied and for permission to reproduce their Coat of Arms; to the Admiralty Library; to the Great Western Railway Co. for the lithographs of Brunel's viaducts, reproduced on pages 214 and 215; to William Marples and Sons for the loan of the bricklayer's tools, photographed on page 240; to the Oxford University Press (Humphrey Milford) and "The Builder" for permission to reproduce the illustration of No. 1 Palace Green, Kensington, from *Philip Webb and his Work*, by W. R. Letherby, on page 213; and to a number of brickmaking firms who have been good enough to lend photographs and blocks and to supply information; in particular the following: The London Brick Co., the Accrington Brick Co., the Bedford Brick Co., the Dorking Brick Co., the Leeds Fireclay Co., the Midhurst Brick Co., and the Sussex Brick Co.

MARGINALIA

The Folly Tower, Faringdon

Lord Gerald Wellesley writes to say that his firm, Gerald Wellesley and Trenwith Wills, were the architects for the Folly Tower, instead of one of the partners only, as was stated on page 169 of our April issue.

Eighty Years After

"Lord Crawford and Balcarres switched on in the old debating hall, now the library of the Union Society, this evening, in the presence of a large gathering, a special light illuminating the famous Pre-Raphaelite wall-paintings, the restoration of which, under the direction of Professor Tristram, has just been completed. The only one present at the ceremony who knew all the Pre-Raphaelites was Mr. H. M. Cundall, formerly Senior Keeper of the Victoria and Albert Museum, but the company also included descendants of Burne-Jones, Rossetti, and William Morris and Pollen . . .

"Lord Crawford and Balcarres, an ex-president, said that the wall paintings were quite invisible in his day. He would remind them how great was the triumph of this great work, and how profound was the effect of the work of the men who carried it out on the aesthetics, the history, and the art of their day. He rejoiced at the restoration of these pictures to Oxford and the world . . .

"The pre-Raphaelites were not today very much

travel hundreds of miles, or dig thousands of feet, to get the stone which nature does not want, and therefore has not given.

Another excellence in brick is its perfect air of English respectability. It is utterly impossible for an edifice altogether of brick to look affected or absurd: it may look rude, it may look vulgar, it may look disgusting, in a wrong place; but it cannot look foolish, for it is incapable of pretension. We may suppose its master a brute, or an ignoramus, but we can never suppose him a coxcomb: a bear he may be, a fop he cannot be; and if we find him out of his place, we feel that it is owing to error, not to impudence; to self-ignorance, not to self-conceit; to the want, not the assumption, of feeling. It is thus that brick is peculiarly English in its effect: for we are brutes in many things, and we are ignorami in many things, but we are NOT coxcombs . . . . The brick house admirably corresponds with this part of English character; for, unable as it is to be beautiful, or graceful, or dignified, it is equally unable to be absurd. There is a proud independence about it, which seems conscious of its entire and perfect applicability to those uses for which it was built, and full of a good-natured intention to render everyone who seeks shelter within its walls excessively comfortable; it therefore feels awkward in no company; and, wherever it intrudes its good humoured red face, stares plaster and marble out of countenance with an insensible audacity, which we drive out of such refined company as we would a clown from a drawing room, but which we nevertheless seek in its own place, as we would seek the conversation of the clown in his own turnip field, if he were sensible in the main.

Brick is admirably adapted for the climate of England, and for the frequent manufacturing nuisances of English blue country: for the smoke, which makes marble look like charcoal, and stucco like mud, only renders brick less glaring in its colour; and the clement climate, which makes the composition front look as if its architect had been amusing himself by throwing buckets of green water down from the roof, and before which the granite base of Stirling Castle is mouldering into sand as impotent as ever was ribbed by ripple, wreaks its rage in vain upon the bits of baked clay, leaving them strong and dry, and stainless, warm and comfortable in their effect, even when neglect has permitted the moss and wall-flower to creep into their crannies, and mellow into something like beauty that which is always comfort. Damp, which fills many stones as it would a sponge, is defied by the brick; and the warmth of every gleam of sunshine is caught by it, and stored up for future expenditure; so that both actually and in its effect, it is peculiarly suited for a climate whose changes are in general from bad to worse, and from worse to bad . . . .

Brick never should be used in large groups of buildings, where those groups are to form part of landscape scenery: two or three houses, partly shaded with trees, are all that can be admitted at once. There is no object more villainously destructive of natural beauty than a large town of very red brick, with very scarlet tiling, very tall chimneys, and very few trees; while there are few objects that harmonize more agreeably with the feeling of English ordinary landscape than the large, old, solitary brick manor house, with its group of dark cedars on the lawn in front, and the tall wrought-iron gates opening down the avenue of approach . . . .

It will generally be found to agree best with the business-like air of the blue country, if the house be excessively simple, and apparently altogether the minister of utility; but, where it is to be extensive, or tall, a few decorations about the upper windows are desirable. These should be quiet and severe in their lines, and cut boldly on the brick itself. Some of the minor streets in the King of Sardinia's capital are altogether of brick, very richly charged with carving, with excellent effect, and furnish a very good model. Of course, no delicate ornament can be obtained, and no classical lines can be allowed; for we should be horrified by seeing that in brick which we have been accustomed to see in marble. The architect must be left to his own taste for laying on sparingly and carefully, a few dispositions of well-proportioned line, which are all that can ever be required.

JOHN RUSKIN.

Early Prose Writings, Volume 1. (George Allen and Unwin.)

admired or studied in this country—they were more studied by the foreign critics—but that did not mean that the day would not come when they would again receive the study and admiration which were their due. The paintings would deteriorate again unless the society could provide more adequate heating of the upper part of the room, but if that could be done it would preserve them for all time . . .

"Sir William Rothenstein said it was one of the most moving days of his life. A great inheritance which Oxford had not deserved had come back to her. Oxford was no longer the home of lost canvases. These men were not only great painters, but they were great men, and the roof which Morris had left to them was such that no church in his country had a finer roof painting."

THE TIMES

Coventry Patmore, writing of the time when this Great Work was in progress, says....

"Oxford, in addition to certain other and more important steps of a somewhat startling but very commendable character, has recently made — or rather is at this moment making—some remarkable experiments in architecture and architectural painting. The names of Mr. Woodward, Mr. Butterfield, and Mr. D. G. Rossetti are guarantees, not only of merit, but of novel merit in the works committed to their execution; and to these gentlemen, and their disciples and associates in art, have been entrusted works which cannot fail before long to attract a considerable amount of public and artistic attention. . . . a number of painters, consisting of one or two of the leaders and several of the more promising disciples of the pre-Raphaelite school,

have undertaken to adorn the walls of the Union with a series of paintings on subjects from the Arthurian Romances . . .

"These paintings, which are in distemper, not fresco, promise to turn out novelties—and quite successful novelties—in art. We have not seen any mural painting which at all resembles, or, in certain respects, equals them. The characteristic in which they strike us as differing most remarkably from preceding architectural painting is their entire abandonment of the subdued tone of colour and the simplicity and severity of form hitherto thought essential in such kinds of decoration, and the adoption of a style of colouring so brilliant as to make the walls look like the margin of a highly-illuminated manuscript. The eye, even when not directed to any of the pictures, is thus pleased with a voluptuous radiance of variegated tints, instead of being made dimly and unsatisfactorily conscious of something or other disturbing the uniformity of the wall-surfaces. Those of our readers who have seen any of Mr. Rossetti's drawings in water-colours will comprehend that this must be the effect of a vast band of wall covered with paintings as nearly as possible in that style of colouring. Those of our readers who have not had that pleasure—and Mr. Rossetti's odd crotchet of refusing to exhibit has made these the majority—must be content with a less perfect idea; for this painter, who has necessarily given his tone to the whole work, is, among painters, what Mr. Butterfield is among architects—that is to say, about the most startling original living . . .

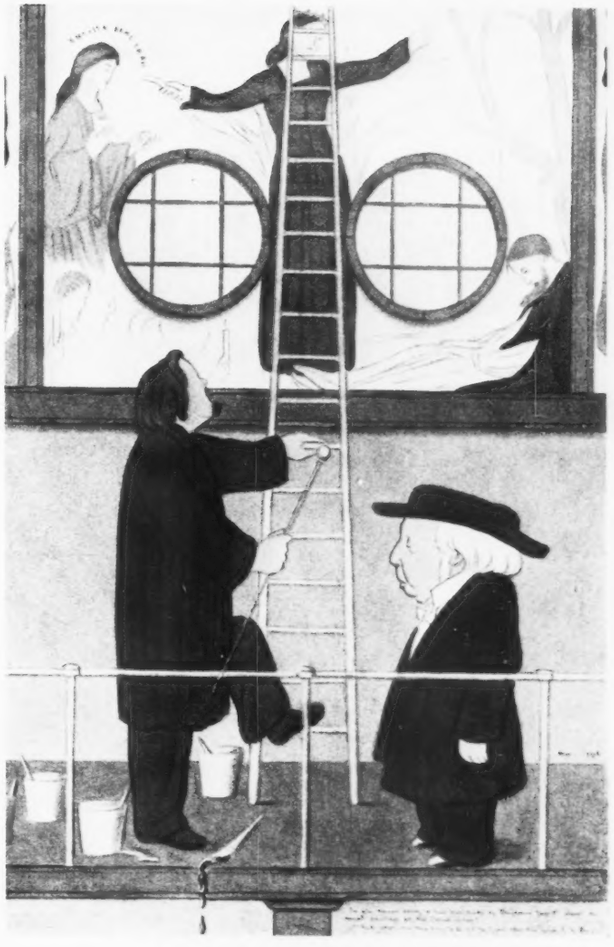
"The apparition of the 'Damsel of the Lanegrael,' surrounded with angels on the wall of the Union, is 'like a stream of rich, distilled perfumes,' and affects the eye as much as one of Mendelssohn's most unwordable 'Lieder ohne Wörter' impresses the ear. The colour is as sweet, bright, and pure, as that of the frailest waif of cloud in the sunrise . . .

"An indefiniteness of outline—by no means implying any general dissolution of form—is a necessary result of Mr. Rossetti's manner of colouring; but this result is one which seems to us to render it all the better suited for architectural painting. Architecture, being itself characterized in all its leading features by the strongest definiteness of outline, ought to be relieved—not, as hitherto, emulated—in this respect, by mural painting. . .

"Mr. Rossetti and his associates have observed the true conditions and limitations of architectural painting with a degree of skill scarcely to have been expected from their inexperience in this kind of work . . .

"We must not forget to mention that the painting of the Union Room is, on the part of all persons concerned, entirely a labour of love. As is often the case with such labours, its success will probably render it, in the long run, a good investment of time and pains."

COVENTRY PATMORE in an unsigned article in the Saturday Review *for Dec. 26th,* 1857.



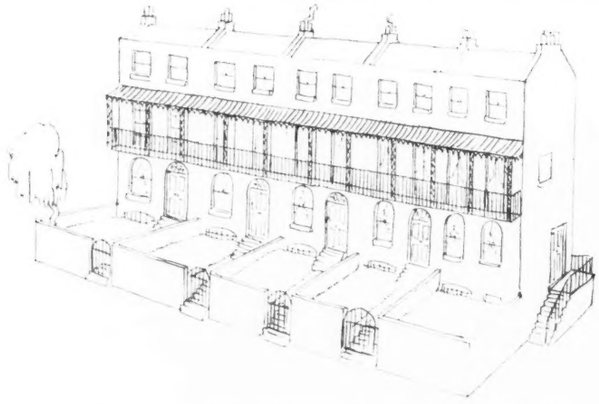
The sole remark likely to have been made by Benjamin Jowett about the mural paintings at the Oxford Union. "And what were they going to do with the Grail when they found it, Mr. Rossetti?" (from "Rossetti and His Circle," by Max Beerbohm.)

How It Happened

"The story of these paintings, of which the mouldering and undecipherable remains still glimmer like faded ghosts on the walls of the Union Library, is one of work hastily undertaken, executed under impossible conditions, and finally abandoned after time and labour had been spent on it quite disproportionate to the original design. A scheme of mural decoration which was practically new in England, and which involved the most careful preparation and the most complete forethought, was rushed into with a light heart; all difficulties were ignored, and many of the most obvious precautions neglected. None of the painters engaged in it had then any practical knowledge of the art of mural painting, nor do they seem to have thought that any kind of colour could not be applied to any kind of surface. The tradition of the art of fresco painting was then so wholly lost that paintings in distemper on a naked wall were commonly spoken of as frescoes, and were expected to last as a fresco painting would. The walls were newly built, and the mortar still damp. Each of the spaces to be painted over was pierced by two circular windows, and the effect on the design as well as on the lighting of the pictures may be imagined. No ground whatever was laid over the brickwork except a coat of whitewash: and on this the colour was to be laid with a small brush, like water-colour on paper.

"Morris set to work with his usual energy. Before

HINTS FOR A MODERNIST GLOSSARY



RESIDENCE. The dreary uniformity of urban standardization

Drawn by Osbert Lancaster.

HOME. The pleasing variety of imaginative individuality

either of the others had made a design, he was in Oxford and had begun his painting. Presently Rossetti and Burne-Jones joined him there, and for the rest of the vacation they lived together in lodging in the High Street, in a house now pulled down to make room for the new Schools. The other four painters came later, and the work, at first carried on with happy diligence through long hours day after day, became more intermittent as winter advanced, and trailed on into the following spring. . . .

"It was entitled 'How Sir Palomydes loved La Belle Iseult with exceeding great love out of measure, and how she loved not him again but rather Sir Tristram.' All of it that now traceably survives is the faded gleam of sunflowers with which part of the foreground was covered. On the profusion of these sunflowers Rossetti was a little sarcastic, and suggested that he should help another of the painters out of difficulties by filling up the foreground of that bay with scarlet runners. . . . "Faulkner, now Fellow and Mathematical Tutor of University, came pretty regularly in the afternoons to help. 'Charley comes out tremendously strong on the roof with all kinds of quaint beasts and birds,' Burne-Jones wrote home in October. . . .

"The day's work began at eight o'clock and went on as long as daylight lasted. 'If we needed models,' Sir Edward Burne-Jones writes, 'we sat to each other, and Morris had a head always fit for Lancelot or Tristram. For the purposes of our drawing we often needed armour, and of a date and design so remote that no examples existed for our use. Therefore Morris, whose knowledge of all these things seems to have been born in him, and who never at any time needed books of reference for anything, set to work to make designs for an ancient kind of helmet called a basinet, and for a great surcoat of ringed mail with a hood of mail and the skirt coming below the knees. These were made for him by a stout little smith who had a forge near the Castle. Morris's visits to the forge were daily, but what scenes happened there we shall never know; the encounters between these two workmen were always stubborn and angry as far as I could see. One afternoon when I was working high up at my picture, I heard a strange bellowing in the building, and turning round to find the cause, saw an unwonted sight. The basinet was being tried on, but the visor, for some reason, would not lift, and I saw Morris embedded in iron, dancing with rage and roaring inside. The mail coat came in due time, and was so satisfactory to its designer that the first day it came he chose to dine in it. It became him well; he looked very splendid. When it lay in coils on the ground, one could lift it with great difficulty, but once put on the body its weight was so evenly ordered that it was less uncomfortable than any top coat I ever wore. I have the basinet still, and the sword that was made by the same smith.' "

J. W. MACKAIL in The Life of William Morris (*Longmans Green and Co.*)

Trade News and Reviews

By Brian Grant

Olympian Excerpts

Some Items of Architectural Interest from the Ideal Home Exhibition at Olympia

On the occasion of the "Daily Mail" Ideal Home Exhibition at Olympia the architect pays his visit not as a "professional" personage but as "one of the crowd"—he goes in search of entertainment rather than education.

• • •

The exhibition this year was much the same as it has always been in previous years and, judging by the multitudes of people that were present on the afternoon I made my detour, its popular appeal is as great as ever.

All exhibitions in this country are received with a hail of criticism. As a nation we are not good "exhibitionists"; but I award high marks to the "Daily Mail" and, more particularly, to their architect, Ian Jeffcott, for putting on annually a show which compares more than favourably with any of the other large scale exhibitions held in England.

• • •

"Exhibition atmosphere" might be defined as "an aesthetic allusion for a commercial end." It is something which can be a background to commerce and at the same time a foreground of the Show. A frame to the picture, which is yet the picture itself. The commercial problems of space and available finance, sizes of stands, the problems set by the authorities, such as the London County Council, a convenient classification and organized grouping of exhibits, the disposition of gangways so that there shall be lucidity and ease of circumnavigation—these are some of the main problems that confront the exhibition architect, and if exhibition atmosphere is to be successfully achieved the various solutions have to be harmonized so as to give a coherent spectacle.

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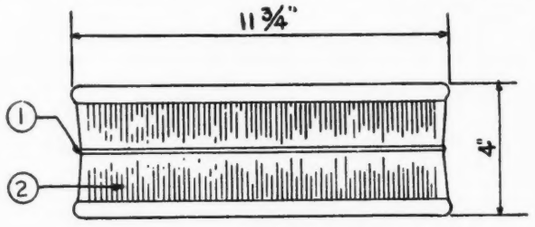
It is not difficult to imagine the trials and tribulations that beset the exhibition



Plan of glass construction unit. 1. *Glass seal.* 2. *Corrugations to ensure bond between mortar and glass.*

architect in his dealings with the many hundreds of individual exhibitors. Ian Jeffcott has found a short cut to peace and harmony by a firm insistence upon standardization.

• • •

In the decoration of the Grand Hall, 24,000 yards of dark coloured velveteen, containing 6 miles of stitching, were draped across the entire glass roof area giving the effect of a night sky. The main feature in this Hall was the Band-stand tower surmounted upon an arch constructed entirely of glass bricks. I made enquiries regarding these bricks and was informed that they had been brought 3,000 miles especially for the exhibition, but that they are now being manufactured in this country and that full particulars concerning them may be obtained from Holroyd (Glassware & Lighting), Ltd., of Imperial Court, 2 Basil Street, S.W.3.

• • •

Corning Glass Bricks

These glass construction units are, I am told, used fairly extensively by architects in the United States for exterior building construction. Each unit is $11\frac{3}{4} \times 11\frac{3}{4} \times 4$ (*see* plan on previous page) and the average weight is approximately 14 pounds. The unit is partially evacuated and completely glass sealed so that it

The Tower and Band Platform in the Grand Hall, Olympia, surmounted upon an arch of Corning glass bricks.

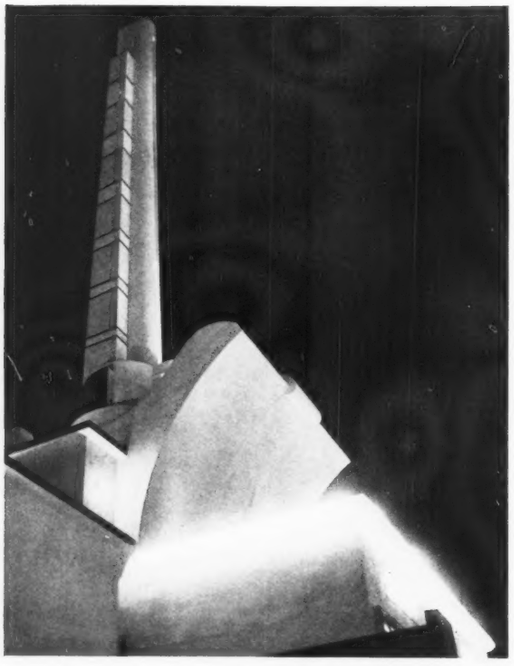
is not possible to have condensation on the inside surface. Optical diffusing quality has been obtained by placing scientifically designed fluting on the two faces of the units — on one face this fluting runs in a vertical direction, on the other the fluting is horizontal. The glass arch at Olympia and the pedestal in the Film Stars feature, both constructed with these units, were illuminated from behind with tri-coloured neon tubes and the play of light through the fluting was most decorative and scintillant in effect. More about these bricks anon, when some bold spirit has put them to constructional purpose in a modern structure of concrete and glass.

• • •

Electricity

The exhibit of the Electrical Development Association was the best that they have yet produced at this particular exhibition. It was comprehensive and full of movement and the introduction of an amusing little marionette show was a bright idea on somebody's part.

The "all electric kitchen" with dining recess, designed by Walter Goodesmith, provided an interesting and compact solution of the domestic "work-room" problem. The various switches controlling the equipment, heating, lighting, hot water, electric washer, &c., were



A worm's-eye view of the Tower. Constructed entirely of wooden structural members faced with fire-proofed plywood, the Tower acts as an anchorage for the cantilevered sounding board immediately in front. The outside is rendered in special paint having the quality of reflecting only ultra-violet light with a luminous glow, thus permitting the Tower to be strongly floodlit without any danger of the spill of light on the black velvet destroying the illusion of a night sky. The height from ground level to the top of the Tower is 92 feet, and the Tower itself is 54 feet above the top of the orchestral sounding board.

grouped together in a single control panel, thus conveniently centralizing the whole of the electrical working operations. In the dining room recess was a similar but smaller control panel also incorporating a wireless speaker. The problem of the removable draining board, wash boiler and wringer was solved in an original manner—the wringer, permanently fixed, revolved round a centre pin, being housed out of sight when not in use, the whole operation taking but a few seconds. I understand that this kitchen, together with two other kitchens, are to be shown as an all-electric kitchen *ensemble* designed by Walter Goodesmith at Charing Cross Underground Station from 27th April to the 9th May.

• • •

An all-timber House

In the housing section was an all-timber house erected by the British Columbia Timber Commissioner from a design by William Tatton Brown. Western Red Cedar boarding and shingles were used for the outside walls and the roof, the carcassing and flooring were carried out in Douglas fir. The house had a frontage of 30 ft. 9 ins. On the ground floor was a large living room (28 ft. × 12 ft.) with dining recess, hall, cloakroom and kitchen; on the first floor, a bathroom and four bedrooms with access to a garden balcony from two of the bedrooms. Approximate cost only £350. The Hampton Timber Company were responsible for the construction of the house.

• • •

The G.P.O. and the Homes of the Film Stars

The Post Office exhibit was well conceived and the girl with the golden

voice was busily engaged telling everybody the correct Greenwich time. H.M. Government Departments seem, at long last, to have decided that good advertising does pay. About the reproductions of rooms from the homes of famous film personalities the least said the better. They were, I understand, exact replicas of the originals and were erected and decorated in the amazingly short time of four weeks. Of the 18 rooms exhibited only one was of modern character—the combined bathroom and dressing room from the home of Claudette Colbert, the reproduction of which had been entrusted to W. N. Froy & Sons.

Through the Letter Box

Ruberoid Solka Roofing

The Ruberoid Company send me particulars of a new flexible and practically untearable roofing material. It is being sold under the trade name of Ruberoid Solka Roofing. In appearance it is the same as ordinary standard Ruberoid and is manufactured from the same weatherproofing materials, but with the fundamental difference that the base consists of Solka fibre which gives greatly increased tensile strength.

"Solka" is a highly purified cellulose fibre which by laboratory control can be manipulated to give a new basic felt to Ruberoid. This new base absorbs about 40 per cent. more bitumen than ordinary felt; the increased bitumen content gives greater durability and prolongs the life of the roofing. The manufacturers claim that "Solka" roofing has a much higher initial tearing resistance than any other roofing material of similar weight, and that its pliability is such that it may be bent at right angles without any risk of the weather-coating being fractured.

It is marketed in two grades or plys—the 2-ply with an average weight of 42 lb. per roll and the 3-ply with an average weight of 52 lb. per roll and is packed in 12 yard rolls, 36 ins. wide, sufficient to cover 100 square feet of roof surface.

Samples, prices and full details may be obtained from The Ruberoid Company, Ltd., of Lincoln House, High Holborn, W.C.1.

• • •

The Clay Products Technical Bureau of Great Britain

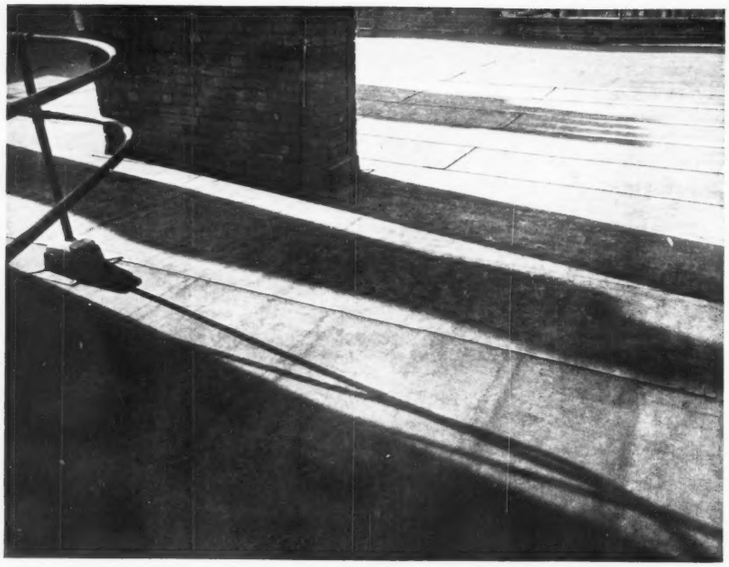
The formation of the Clay Products Technical Bureau of Great Britain should prove of interest to all readers of the "Review."

The Bureau points out that all over the country houses are being built to let. As the estates are completed and fully let up they are offered to investors. Many of these investments show a very remunerative return, but such a high yield often indicates that the materials used in the construction of the houses are of questionable durability and in a few years' time may involve the owner in entirely disproportionate depreciation costs. While good housing is one of the safest investments possible, it is not always realized that a high return and absolute safety seldom go together. The Bureau urges investors to consult a qualified surveyor or architect before purchase, to insist on seeing a specification and to have a careful preliminary survey made, with special attention to the roofs and walls.

A booklet compiled by the Bureau has been issued as a useful general guide both to the investor and to the individual house purchaser. In explaining the points that go to make a soundly constructed house, it performs a valuable public service.

On the technical side the Bureau will collect all information about clay products so that there may be in existence an authoritative source of information on every aspect of building construction where the use of clay products is involved.

A staff of qualified technicians and consultants under the direction of Oscar



A flat roof on a London building covered with ordinary Standard Ruberoid.

A. Bayne and L. W. Burridge (the latter recently resigned his post at the Building Research Station in order to concentrate solely on the work of the Bureau) will prepare technical information on bricks and brickwork, partition blocks, hollow floor tiles and roofing tiles and arrange that this information shall be usefully distributed.

The registered office of the Bureau is at 19, Hobart Place, London, S.W.1 (Telephone Sloane 7805).

• • •

'Nori' Building and Engineering Bricks

The Accrington Brick & Tile Company of Accrington, Lancashire, have recently issued a new catalogue and will be pleased to forward copies to architects and builders upon request. Until recent years the company concentrated mainly upon the production of smooth-pressed bricks of a uniform red colour, but today their products comprise a complete range of bricks, textured and multi-coloured, smooth-pressed and uniform-coloured, suitable for all building and engineering purposes. The present output of the Company's works is approximately one million bricks per week.

The Catalogue is a simple and pleasing presentation of the complete range of clay products made by the Company and includes ten reproductions in colour showing some of the varieties of facing bricks.

• • •

The London Brick Company Ltd.

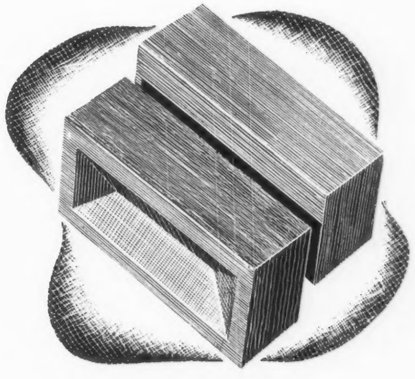
The London Brick Company and Forders, Limited, ask me to give notice of the fact that as from the 1st April last the title of their Company has been changed to *The London Brick Company, Limited*.

A SYNOPSIS OF BRICK

prepared by

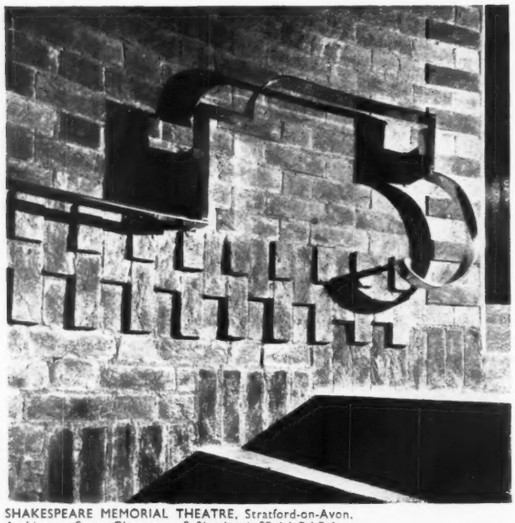
CLAY PRODUCTS TECHNICAL BUREAU OF GREAT BRITAIN

19 HOBART PLACE, EATON SQUARE
LONDON, S.W.1



SOME EXAMPLES OF BRICKWORK

MOUNT ROYAL.
Architects: Sir John Burnet, Tait & Lorne, F.R.I.B.A.



SHAKESPEARE MEMORIAL THEATRE, Stratford-on-Avon.
Architects: Scott, Chesterton & Shepherd, FF AA.R.I.B.A.

SHAKESPEARE MEMORIAL THEATRE, Stratford-on-Avon.
Architects: Scott, Chesterton & Shepherd, FF AA.R.I.B.A.

A SYNOPSIS OF BRICK

The last half-century has seen immense developments both in manufacturing technique and transport organisation. Whereas the older school of architects was forced, by considerations of cost, to limit itself to the use of local products, the modern architect can express his creative instinct in a range of materials of consistent quality unthought of by his precedessors a century ago. The privilege of using new and improved media is, however, accompanied by increased responsibility, so that the modern architect must acquire a very much wider knowledge of the properties of materials than did his older colleagues, who used local craftsmen familiar with the idiosyncrasies of local material.

At first sight no building material could be considered by the architect as more traditional than brick. The application of modern machine-technology and methods of scientific control to brick manufacture, coupled with the widely increased economic range of modern transport have revolutionised the brick industry. Today it is certain that there is no other type of accepted building material, a wider knowledge of the varieties and properties of which would enable the architect to give a more complete expression to his æsthetic and professional instincts.

BRICK NOMENCLATURE

No systematic nomenclature for bricks has so far been evolved, and the designations used today are based on at least six different and unrelated modes of classification, viz. :—

I	Place of origin	eg.	Leicester red, Luton grey, Staffordshire blue.
II	Raw Material	eg.	Marl, gault, blaes.
III	Method of manufacture	eg.	Hand-made, wire-cut, pressed.
IV	Use	eg.	Facing, engineering, common or stock.
V	Colour	eg.	Often associated with origin, (See I) also yellow, multi-coloured, brindled.
VI	Surface texture	eg.	Sand-faced, rustic, glazed.

Whilst considerations of space preclude any attempt to present a comprehensive glossary of bricks under these several headings, it is hoped that the following résumé of brick types will be of sufficient use to the architect to warrant its retention as an *aide-memoire*. Comments on the general properties of brick of importance in construction are also included.

CLASSIFICATION I : BY PLACE OF ORIGIN

This basis of designation has its roots in the older tradition of using local products, the particular qualities of certain of which, like Buxton lime, were outstanding enough to gain a wide reputation. Its acceptance today as a sole criterion would, however, be inadvisable since, because of imitation of successful products of one locality by makers in other districts, the geographical term has, in some cases, lost the implicit recommendation of being produced from the original clay.

Nevertheless this system of classification is sufficiently widespread to warrant closer analysis of some typical examples.

Accrington, Leicester, Ruabon and Weald bricks

These are examples, chosen at random from a number of topographically-named bricks, which have a wide reputation as products of beautiful red colour and high strength. Like the Staffordshire blue brick, the Accrington and Weald engineering bricks are of such immense strength and durability that they stand in high favour with the engineer as a structural material. Further consideration of this point is given under "Engineering bricks." In addition, owing to their rich red coloration and resistance to weathering, the Leicester and other reds have an excellent reputation all over Great Britain as facing bricks.

CLASSIFICATION I. (Continued)

Fletton Bricks

These bricks are made from a clay-shale which occurs in the Fletton area close to Peterborough. Produced on an enormous scale, with all the advantages attainable by the use of modern plant and scientific control, these bricks, now made in a variety of forms, are extensively used as a general purpose brick. Their cheapness is to be attributed to an intelligent large-scale exploitation of two factors, viz.: (1) the raw clay-shale, from which the "Fletton" is made, contains combustible matter in sufficient quantity to reduce to a very low figure the amount of additional firing necessary to burn the bricks, and (2) the adoption of the high-pressure method of moulding the semi-dry clay, whereby large expenditures of time and money on drying are eliminated. The brick is reddish to salmon pink in colour with occasionally a yellowish tinge. The ordinary Fletton brick is eminently suitable for all purposes where a common brick is required. To overcome the difficulty of securing a good plaster key with all normally-shaped pressed bricks, many manufacturers of Fletton bricks now produce as a standard product, grooved Flettons for use where renderings or plaster are to be applied.

London Stock Bricks

This designation is paradoxical since London Stock bricks are not actually made from London clay, but from deposits of limey clay which occur in Kent and Essex. This clay is mixed with a proportion of combustible matter, and after suitable preparation is either hand or machine-moulded, dried, and fired either in clamps or kilns. The bricks are of yellow hue, hard and strong. As their name indicates, they are usually employed in and around the metropolis on account of their very high resistance to the London atmosphere. Their surface and texture are such as to create an excellent bond with jointing mortar, plasterwork, etc. They are marketed in six recognised grades, viz.: I. Yellow Facings (where a uniform colour is required): II. First Hard Stocks (varied colour facings): III. Second Hard Stocks (very hard, somewhat irregular shape, for foundations or cheaper facings): IV. Mild Stocks (for subsequent rendering): V. Rough Stocks (foundations, garden walls, etc.): VI. Third Stocks (backing brick).

The white efflorescence occasionally noted on London Stock masonry during the first few months after erection is of no permanent significance, and is rapidly washed away for good by the first onset of steady rain.

Suffolk Bricks

This term, originally applied to the white or very pale yellow bricks originally made exclusively in Suffolk from mixtures of chalk and clay, is now often used to describe bricks of similar hue produced in adjacent counties. Much used as facing bricks, Suffolk bricks, owing to their high reflecting power, can be used with advantage in enclosed courts, etc.

Luton Grey Bricks

are still hand-made in the Luton area by the good traditional slop-moulding process. The product is much used in the South of England as a facing brick.

Staffordshire Blue Bricks

are made from a deposit of clay rich in iron and peculiar to Staffordshire. They are extremely hard and are vitrified to such an extent that they are practically non-porous. Of very high strength, they are widely used as engineering bricks and wherever complete immunity to attack or low porosity is essential. (*See* "Engineering Bricks.")

Space does not permit detailed treatment of other geographically-named bricks such as Fareham reds, Reading silver greys, Yorkshire reds, Lancashire greys, etc.

SOME EXAMPLES OF BRICKWORK

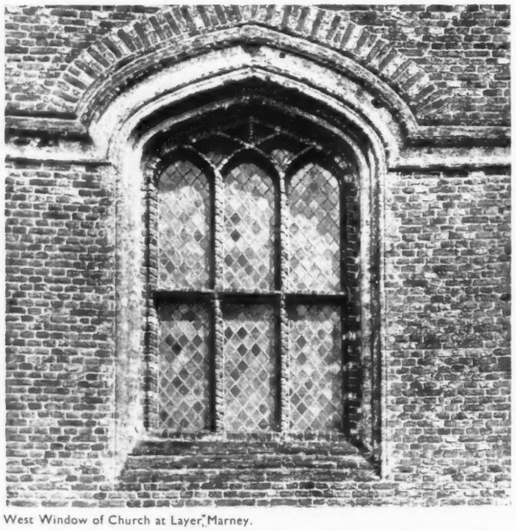
ROYAL MASONIC HOSPITAL, Ravenscourt Park.
Architects: Sir John Burnet, Tait & Lorne, FF.R.I.B.A.

THE CHURCH OF ST. ANSELMS, Kennington.
Architects: Adshead & Ramsay, FF.R.I.B.A.

HOUSE at Little Thurlow, Suffolk. Date 1614.

SOME EXAMPLES OF BRICKWORK

16th Century Chimney Shafts, Hitcham, Suffolk.



West Window of Church at Layer Marney.

CURZON CINEMA, London.
Architects: Sir John Burnet, Tait & Lorne, FF.R.I.B.A.

CLASSIFICATION II: BY RAW MATERIAL

Gault Bricks

Usually white or cream in colour and often made with circular perforations, gault bricks are made from the black or dark blue gault clays which occur below chalk.

Marl Bricks

Except in South Staffordshire and a few other places, the term " marl " or " malm " is applied to all clays which contain an appreciable amount of finely divided chalk or limestone particles. In preparing such clays for brick manufacture it is customary to adjust the proportions of clay to lime by suitable additions. Owing to the presence of such lime, marl or malm bricks are frequently yellowish in colour. Such a variety of bricks, however, can be made from marls that the term is of too general application to be of much service.

Blaes or Colliery Shale Bricks

Such bricks are made from clays recovered by mining deep-seated deposits as distinct from quarrying from the surface. Such clays, admixed with coal, are usually secured as a by-product of coal mining and roughly burnt at the pithead to make bricks for cheap local use. Unless carefully manufactured they are of very variable quality and, strictly speaking, are not to be classified as true clay bricks.

CLASSIFICATION III: METHOD OF MANUFACTURE

Originally all bricks were hand-moulded one at a time by manual labour. With the advent of machinery various methods of producing moulded bricks mechanically have been developed. Some of these mechanical processes are reflected in the designations applied to types of brick, e.g., wire-cut, re-pressed wire-cut, semi-dry pressed.

HAND-MADE BRICKS

The traditional method of hand-making, if carried out by capable operatives, still produces the best possible type of brick. The clay, after being dug, is weathered for some time and then mixed with water and ground until it is smoothly plastic and soft. Suitable portions of this soft mass are then thrown by the hand-moulder into a brick-shaped box, the sides of which have either been wetted by water or covered with sand to enable the mould to be easily removed. The resultant " green " brick is then dried slowly and carefully to remove the water which was added to enable the clay to be moulded. As a result of the intimate mixing of water and clay, the clay particles in the resultant brick are very closely knit together to form a good close texture of great uniformity and durability.

MECHANICALLY-PRODUCED BRICKS

The essential difference between the various mechanical processes of brick production lies in the amount of water mixed with the quarried clay to enable the bricks to be shaped by machinery.

Wire-cut Bricks

are made from clays which, by suitable treatment, are rendered sufficiently plastic as to allow them to be forced, by a series of rotating blades or screws, through a rectangular orifice. The plastic clay comes out in a continuous column, which is cut across by stretched wires to form rectangular prisms of suitable size. After careful drying these prisms are fired to produce smooth-faced wire-cut bricks which, if properly made, should have sharp arrisses and show no signs of lamination.

Re-pressed Wire Cut Bricks

In the production of this type of brick, which normally bears an impress indicative of the maker, and is indented so as to produce a frog, the drying process of the wire-cut prism is interrupted whilst the clay is still semi-plastic. The partially-hardened prisms are passed under a press which serves to compact the structure still further as well as to impress such marks and frogs on the brick as may be required.

CLASSIFICATION III. (Continued)

Pressed Semi-Dry Process Bricks

In the production of this type of brick, of which the modern "Fletton" is an example, the expenditure of time, fuel and labour in plasticising the clay and drying the resultant moulded clay prisms is obviated. The clay, as it comes from the quarries, is reduced to fine granules and just sufficient water is added (by automatic apparatus) to give it a moist-earth consistence. In this state, it is compacted under very high pressure in special moulding machinery, from which it passes without further drying direct to the kilns. In recent years highly-organised manufacturers of this type of brick have so far improved the process as to eliminate, to a very large extent, the disadvantages originally attendant on the somewhat granular texture exhibited by earlier examples of brick produced by the semi-dry process. This process is capable nowadays of producing a variety of bricks of high uniformity, shape and application, and has lately been adapted to the production of various types of cellular brick.

CLASSIFICATION IV. BY USE

Facing Bricks

Any type of brick which combines attractive appearance and colour with high resistance to exposure falls into the category of facing bricks. To meet considerations of cost many varieties of facing brick are obtainable in reduced thicknesses. Well-known varieties of brick suitable for facings have already been mentioned and others are dealt with in succeeding sections on colour and surface texture.

Engineering Bricks

This category of brick is probably the best example of rational brick classification, involving as it does the possession of definite properties ascertainable by test. With the advent of the machinery age the civil engineer demanded structural material of immense load-bearing capacity. This was instantly forthcoming in the form of the engineering brick, such as the Accrington, Staffordshire blue, etc. Owing to their very low porosity (usually less than half per cent.) and their vitreous character, the civil engineer and architect have extended the application of this class of brick to such jobs as sewers, engine pits, power houses, and today, because their maintenance costs are nil, they are again replacing their more modern rivals which, owing either to their moisture movement or sensitivity to corrosion or chemical attack, have failed to stand the test of time.

Damp-proof Coursing in Bricks

Properly laid up in a suitable mortar, engineering bricks constitute an ideal damp-proof course of infinite durability and, properly chosen, of decorative value. It is understood that the subject of issuing a British Standard Specification covering the use of engineering bricks as damp-proof coursing materials is under consideration by the appropriate Committee of the British Standards Institution.

Common Bricks

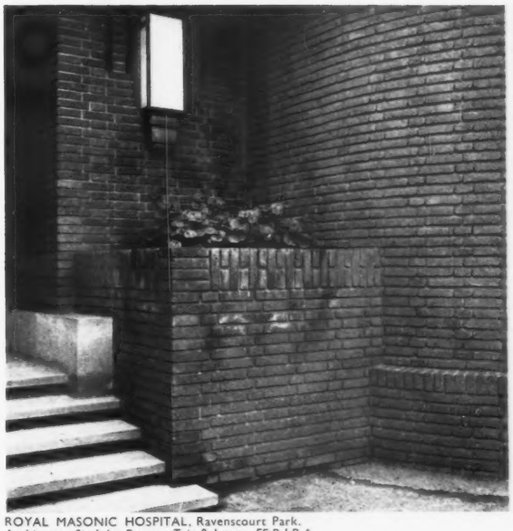
This term is applied to the multifarious varieties of brick which constitute the major output of most brickyards, and which are used for general domestic and similar load-bearing construction above damp-proof course level.

Stock Bricks

Inasmuch as these represent the "stock" always available in the ordinary brickyard, this term represents the quality of ordinary brick normally used in any area with the exception of the Home Counties, where it is usually assumed to mean the particular class of brick already described under "London Stock bricks."

SOME EXAMPLES OF BRICKWORK

Porch Detail at Rayleigh.



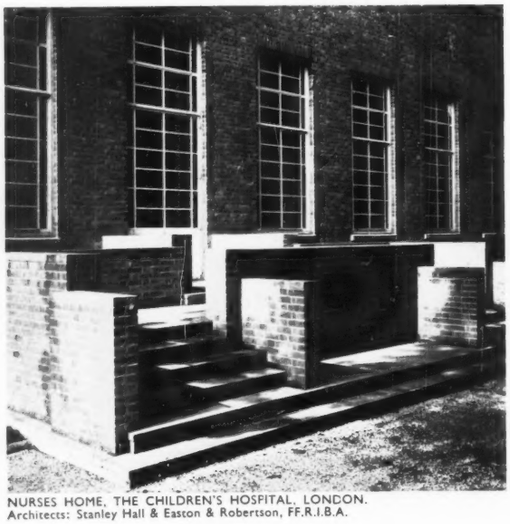
ROYAL MASONIC HOSPITAL, Ravenscourt Park.
Architects: Sir John Burnet, Tait & Lorne, FF.R.I.B.A.

CAMBRIDGE UNIVERSITY LIBRARY.
Architect: Sir Giles Gilbert Scott, R.A., F.R.I.B.A.

SOME EXAMPLES OF BRICKWORK

KEMSLEY VILLAGE CLUB HOUSE.
Architects: Adams, Thompson & Fry, F.A.R.I.B.A.

NORTHFIELDS STATION BOOKING HALL, Southgate Extension (L.P.T.B.)



NURSES HOME, THE CHILDREN'S HOSPITAL, LONDON.
Architects: Stanley Hall & Easton & Robertson, FF.R.I.B.A.

CLASSIFICATION V. BY COLOUR

This method of describing bricks is often associated with the original place of origin, of which examples have already been given, e.g., Leicester red, Staffordshire blue, Luton grey, etc. Colour can rarely be used as a criterion of quality except when light coloration is frequently associated with underfiring. In judging an unknown variety of brick, evidence regarding its other qualities should be demanded, however attractive its colour. There are, however, certain colorations frequently met with which are known to be mere surface effects.

Brindled Bricks

Bricks made from certain clays undergo a complete change of colour, usually from red to blue, during the final stages of the burning process. Where this is not complete a brindled effect is produced, a well-known example of which is the blue brick which is occasionally found to have red markings here and there. This change of colour takes place after the brick is fully burnt, and unless the full monochromatic appearance is of importance, the brindled brick is equally as satisfactory as the single-hued product. In point of fact certain architects have secured very striking results by the judicious use of brindled brick.

CLASSIFICATION V. AND VI. COLOUR AND TEXTURE

Multi-Coloured Bricks

These bricks of very pleasing surface coloration are produced in two ways: (1) by scattering over the surface of the unfired brick during making, a small proportion of finely divided mineral pigment, which serves to produce purple tones on the finished brick; and (2) the manipulation of kiln fires towards the end of the firing so that, as the result of lack of oxygen, the normal red coloration is changed just at the surface of the brick to browns and purples. Here again the effect is purely superficial and the properties of the brick as a whole remain unchanged.

Sand-Faced Bricks

By pressing a thin coating of sand into the surface of the clay prism during moulding a pleasing rough texture can be produced on the finished brick. In addition, by the use of specially-selected sands, pleasing colorations can be produced. This method of producing a surface texture by sand-facing is frequently applied to wire-cut bricks which are subsequently to be re-pressed, when the designation " sand-faced wire-cut " really means " sand-faced re-pressed wire-cut."

Rustic Bricks

This term is applied both to those bricks which have been suitably sand-faced and to machine-made bricks, the original smooth surfaces of which have been die-pressed or indented by reciprocating pins or wires so as to exhibit a rough texture closely resembling the traditional local hand-made brick.

Smooth-Faced Bricks, Glazed Bricks

From the architect's point of view, too smooth a surface is occasionally unwelcome, and the various treatments already mentioned as accorded to wire-cut and other mechanically-produced bricks represent successful endeavours to overcome this objection. Where lodgment of dust, soil, etc. is to be obviated or frequent washing down is desirable (as in dairies, etc.) one smooth surface is necessary. The glazed and enamelled brick has been produced to meet this need.

Glazed Bricks

Usually the output of special works, two types of glazed brick are available. The brown salt-glazed brick used widely for sanitation purposes is produced by throwing ordinary salt on the brickware during the final stages of the burning, whereby a high-resistant mottled-brown glazed surface of great durability is secured.

CLASSIFICATION VI. (Continued)

Enamelled Bricks

The second type of glazed brick is actually an enamelled brick usually produced by covering one face or end of special clay (often fire-clay) brick with an enamelling glaze. The production of such enamelled brick, both white and coloured, has reached a high pitch of perfection nowadays, despite the difficulties of producing a surfacing material which, after firing, shall have the same thermal properties as the main body of the brick. The crazing sometimes seen on earlier examples of this type of product was due to the presence of thermally-induced strains between the glaze and the underlying brick material.

Note

Throughout this synopsis, attention has been confined solely to the normal structural unit and no attempt has been made to discuss those special forms of brick made for specific purposes, such as channel bricks, air bricks and specially-moulded bricks for plinths, copings, cornices, etc.

STRENGTH OF BRICK AND BRICK MASONRY

Although some attempts have been made in the U.S.A. and other countries to classify bricks according to their crushing strength, such classification is of doubtful value, except in large-scale engineering construction, and the extension of the " strength complex " to the common structural brick is both difficult and unnecessary. Used normally, as in domestic architecture, etc., even the weakest types of brick have a crushing strength at least forty to fifty times greater than any stress they will be called upon to carry in such a structure. An interesting and reasonably comprehensive investigation of the mechanical properties both of representative British bricks and of masonry walls and piers built with such bricks was carried out recently at the Building Research Station, Watford. The results have been published through H.M. Stationery Office as Building Research Special Report No. 22. (The Mechanical Properties of Bricks and Brickwork Masonry.) This publication is the only reliable record at present available as regards the strength of modern British bricks.

DURABILITY AND OTHER PROPERTIES OF BRICK

The durability and resistance to weather or chemical attack of properly-fired clay products is so high, that despite years of systematic investigation, no method of test correlatable with service behaviour has yet been evolved for the rapid assessment of durability. From such results of investigations as have been published certain generalisations of practical import can, however, be made.

I. For positions of extreme exposure to frost, only bricks of very close texture (low microporosity) should be employed, since, where there is a large proportion of pores easily filled with water by simple contact, a series of hard frosts following days of continuous rain may produce enough ice in those pores to damage the brick.

II. The use of cheap, underfired brick is extremely unwise. Such underfired ware, which is never allowed to get on the market by reputable brick manufacturers, is quite liable to contain appreciable proportions of soluble salts such as magnesium sulphate (Epsom salts) and sodium sulphate (Glauber's salt).

When present in excess these salts will not only give rise to unsightly efflorescences on external brickwork, but may, if the latter be covered with a rendering of plaster, in certain circumstances either dislodge or destroy such applied finish, or by travelling through the plaster, discolour and destroy ordinary wall paints.

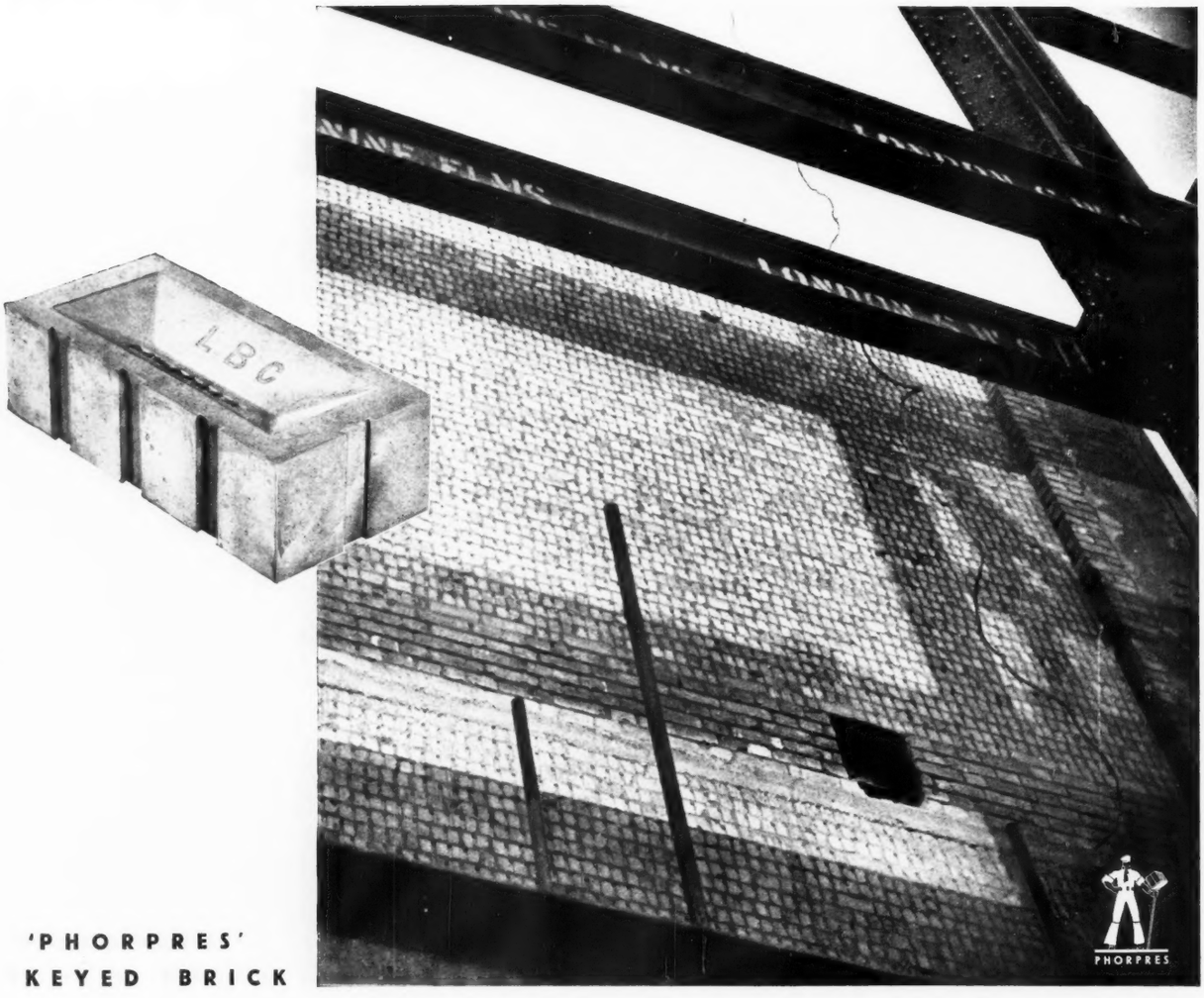
Issued by CLAY PRODUCTS TECHNICAL BUREAU OF GREAT BRITAIN,
19, HOBART PLACE, EATON SQUARE, LONDON, S.W.1

SOME EXAMPLES OF BRICKWORK

THE MERCHANT TAYLORS' SCHOOL, Sandy Lodge.
Architects: W. G. Newton & Partners F.R.I.B.A.

FLATS for the Duchy of Cornwall.
Architect: Louis de Soissons, S.A.D.G., O.B.E., F.R.I.B.A.

HOUSE at Gerrards Cross.



'PHORPRES' KEYED BRICK

USE

For reinforcement of normal mechanical bond developed during setting of plaster and renderings.

WEIGHT

113 lb. per cubic foot in 1 : 3 cement mortar.
102 lb. per cubic foot in 1 : 3 lime mortar.

SIZES

2", 2⅝" and 3".

FACES

Obtainable keyed on one stretcher and one header face.

CELLULAR

'Phorpres' Keyed bricks may also be obtained in the 'Phorpres' Cellular type described elsewhere in this Supplement.

LONDON BRICK COMPANY LIMITED

'PHORPRES'
RUSTIC FACING BRICK

Hillside Court, Finchley Rd. Architects: Henry F. Webb & Ash, LL.R.I.B.A. Contractors Rowley Bros. Ltd.

USE

For Facing work where attractive texture—either plain or limewashed—and the high performance of the standard 'Phorpres' Brick is required at a very low cost.

WEIGHT

113 lb. per cubic foot in 1 : 3 cement mortar.
102 lb. per cubic foot in 1 : 3 lime mortar.

SHAPES

83 Standard special shapes are produced: other shapes made to order.

FACES

Obtainable with rustications on any face or faces.

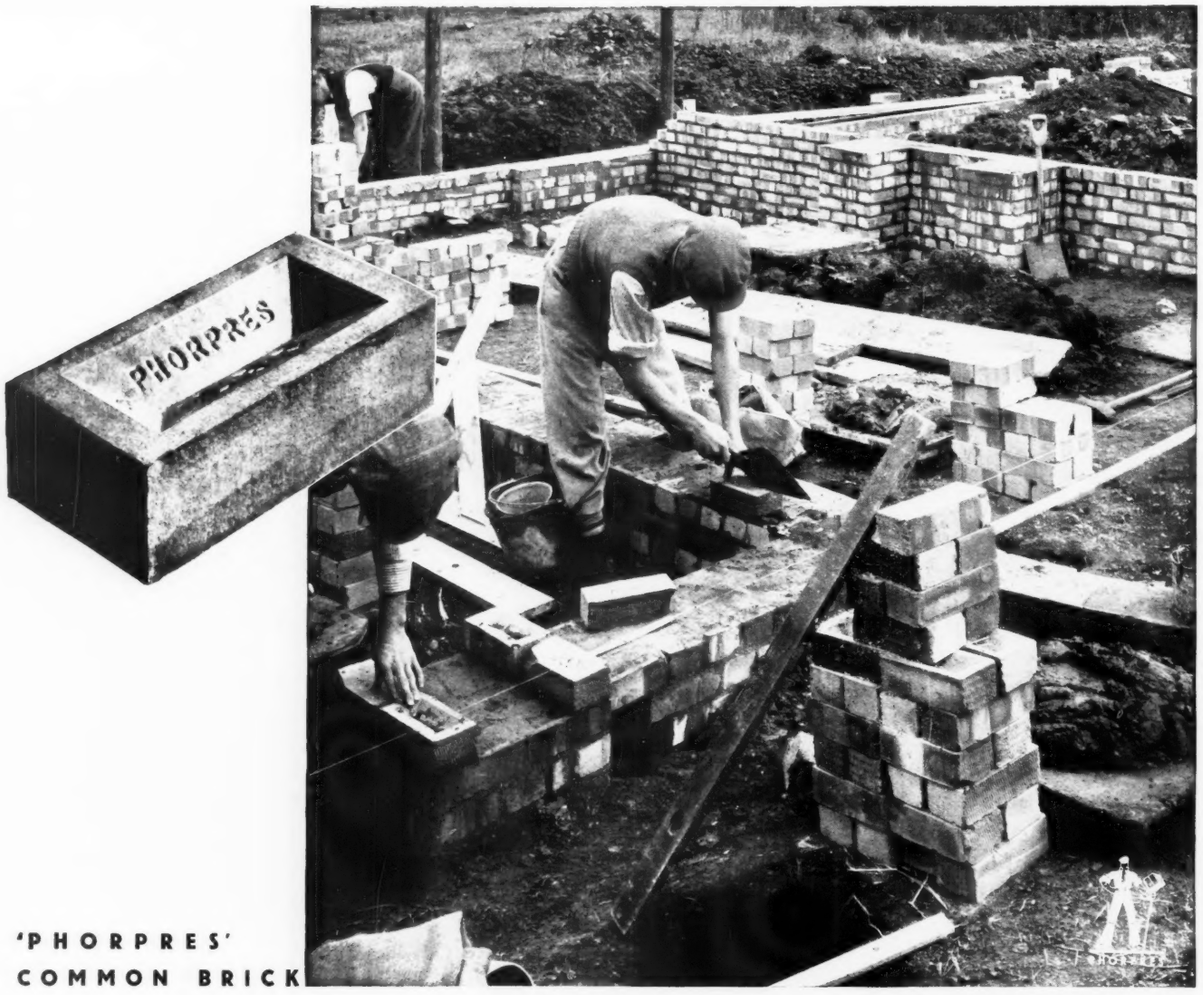
SIZES

2", 2⅝" and 3".

CELLULAR

Rustic Facings are also made in the 'Phorpres' Cellular type brick, described elsewhere in this Supplement.

LONDON BRICK COMPANY LIMITED



'PHORPRES'
COMMON BRICK

USE

For foundations and general structural purposes.

CRUSHING STRENGTH

5,115 lbs. per square inch, 328.9 tons per square foot (Tests by David Kirkcaldy & Sons). After saturation with water and twenty 12-hour alternated periods of freezing and thawing: 4,820 lbs. per square inch, 80.3 tons per square foot (Tests by David Kirkcaldy & Sons).

WEIGHT

113 lb. per cubic foot in 1 : 3 cement mortar.

102 lb. per cubic foot in 1 : 3 lime mortar.

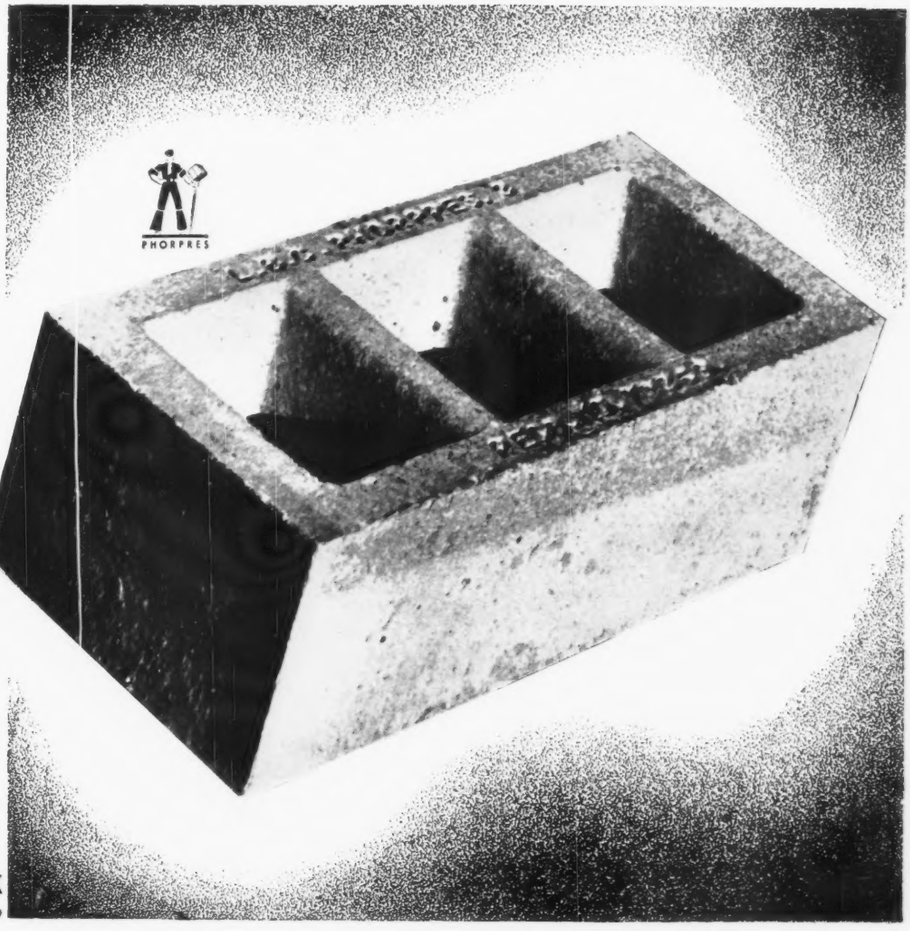
SHAPES

83 Standard Special Shapes are produced; others are made to order.

SIZES

2", $2\frac{5}{8}$" and 3".

LONDON BRICK COMPANY LIMITED



'PHORPRES' CELLULAR BRICK

Patent No. 73369

USE

A new type of brick designed to overcome a defect in most building materials—excessive weight in relation to strength. It is particularly valuable for use in steel-framed buildings, and in special cases where a saving in weight is not only an economy but a necessity. This new brick is nearly 25% lighter than the common brick without any loss of structural strength, whilst its cellular characteristics give much improved insulation of heat, sound and moisture. The design is in accordance with the regulations laid down by the London County Council.

WEIGHT

87 lbs. per cubic foot in 1 : 3 cement mortar. 76 lbs. per cubic foot in 1 : 3 lime mortar.

SIZES

$2\frac{5}{8}$" and 3".

FACES

Obtainable with keyed faces for plaster or renderings. Can also be obtained with rustications for facing purposes.

LONDON BRICK COMPANY LIMITED

AFRICA HOUSE, KINGSWAY, LONDON, W.C.2. Telephone: Holborn 8282-89

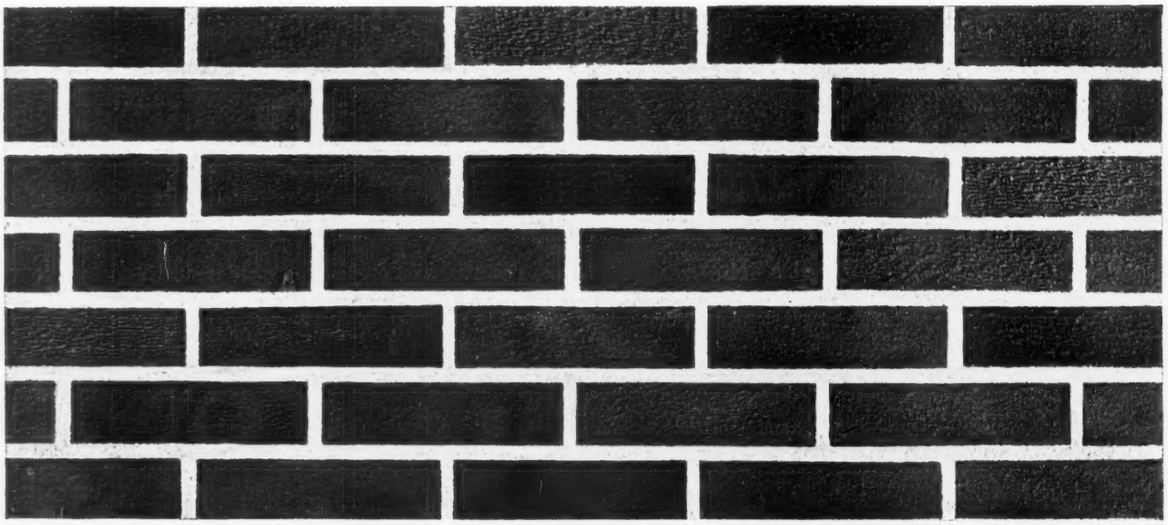
VIVEX-LINKED

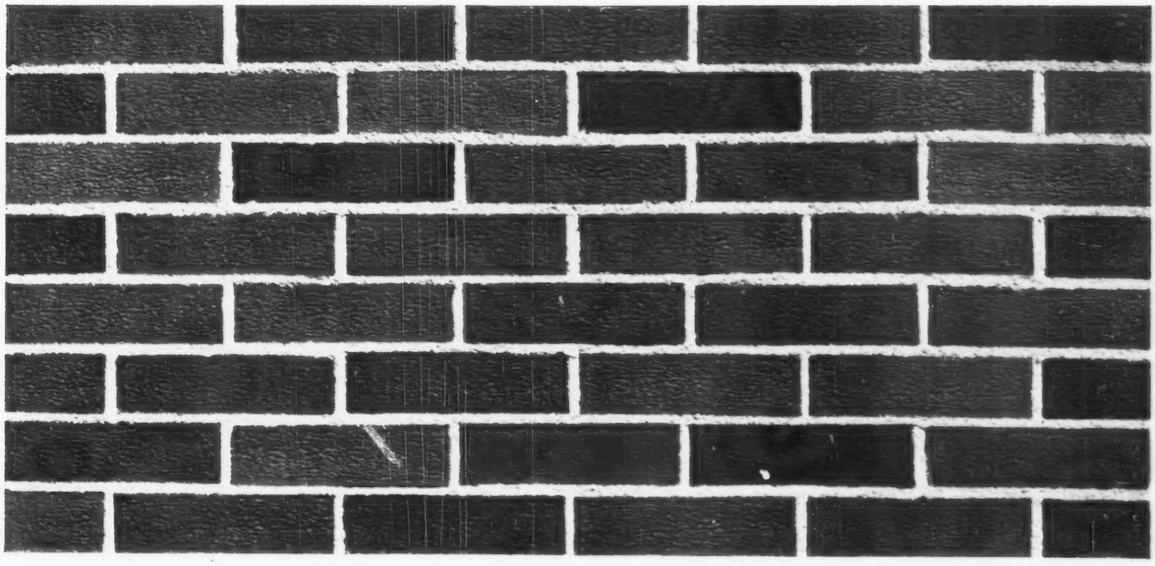
Facings with the Strength of Engineering Bricks

Exceptionally tough . . . . pleasingly varied . . . . Made by the same thorough methods and from the same durable material as the famous Accrington "Nori" Engineering Bricks, which, under independent tests have withstood the enormous

CRUSHING LOAD OF 1028·8 TONS PER SQ. FT.

Available in an interesting range of textures, and really permanent colours. Despite prolonged exposure, these superior facing bricks may be relied upon to retain their excellent appearance, whilst from a structural standpoint they will be found to meet the most exacting requirements. They may be specified with confidence.





THE FOLLOWING ARE ILLUSTRATED IN THIS ISSUE:

"DUCAL" SAND MOULDED (illustrated on page 235). Combining the old-world appearance of hand-made sand-faced bricks with exceptional toughness. Available in multi-colours in red, brown, yellow, purple, or varying shades of one colour.

WIRE-CUT RUSTIC (illustrated on left). An excellent rustic for general use. The rough surface is sufficiently irregular to avoid a patterned result. Available in multi-colours in red, brown, yellow or purple, or varying shades of one colour.

RIPPLE RUSTIC (illustrated above). Particularly suitable for use where smoke and dirt are prevalent. Although rippled, the surface is unbroken and dirt will not adhere to it. Available in multi-colours in red, brown, yellow, purples or varying shades of one colour.

SMOOTH-FACED WIRE CUT (illustrated on page 235). A very serviceable facing, giving a rather softer effect than the pressed brick and offering a certain latitude as regards colour. Made in shades of red only.

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