Issued by

The British Stone Federation

70 Victoria Street S.W.1

Telephone VICtoria 6018/9

Architectural Engineering Monumental

STONE

information on current stone practice. No. 11: March, 1957

Hardness with charm– from Yorkshire

Britain is fortunate in the richness and variety of its stone. The product of each stone-bearing region has its own special qualities and charm to offer to the builder and architect.

ONE of the first things a stranger notices in Britain is how frequently the landscape changes. It is hard to put one's finger immediately on what gives a region its distinctive character, but influencing all that meets the eye—even the trees and what grows in the fields, the industries, the shape of the buildings—are the chances of geology. The land's texture, its softness, its hardness, exert a continuous effect on how men live and go about their business. Such things as the volcanic upheaval of a distant age, the growth and decay of lush primeval forests, the slow passage of a glacier, have helped to decide the different lives of a South Wales miner, a Suffolk farmer, a foundry hand in the Midlands.

As we travel by car, sometimes the change from one region to another is gradual, at other times it is sudden, dramatic. The contrast is, of course, more marked when we pass from a region of hedges and bricks-and-mortar to one of stone walls and stone houses. The impression of the local stone is immediate. We can tell at a glance that we are in the Cotswolds, in say, Royal Crescent, Bath, or Union Street, Aberdeen.

It was the improvement of transport in the 17th and 18th centuries which led to the finest stone being carried freely to all parts of the country. Nowadays, though there is everything to be said for employing a good local stone where it is available and, of course, transport costs still have to be considered, the builder and architect are able to choose the stone most suited to the job in hand—wherever it may happen to be quarried. The distinct and rich variety of Britain's natural stone is theirs to command.

In this and the next few issues we plan to devote space to some of the chief of Britain's stone-bearing regions. One of the most extensive and most interesting is Yorkshire, and it is a good one to start with.

YORK STONE, NOTED FOR ITS HARDNESS AND DURABILITY, WAS USED FOR THE STEPS AROUND PICCADILLY'S EROS

LOCAL STONE WAS EMPLOYED WITH PLEASANT EFFECT IN THE JOHN BURRELL HOMES AT YORK ITSELF

York, or Yorkshire, stone is a sandstone and is mostly found in the West Riding. The quarries are generally small and are mainly scattered over a wide area around Bradford, Halifax, Huddersfield, Leeds, and Brighouse. Quality and characteristics vary considerably from one quarry to another; textures range from very fine to comparatively coarse; colours from dark blue to a warm brown; though most York stones are hard, some are harder than others. Most occur as homogeneous blocks, but some are highly laminated.

The basic constituent of York stone is silica; in some varieties it amounts to 96 per cent. of

the whole. A typical analysis of York stone works out like this:

Silica	83 per cent.
Alumina Iron oxide Lime Magnesia	17 per cent.

An important characteristic of York stones is their load-bearing capacity, quite a number of them having a crushing strength of 500-1,000 tons per square foot. For this reason they are almost invariably used for templates, padstones, and bedstones.

Some York stones are extremely durable and hard, without being brittle. They are often specified for steps and pavings where an ability to resist continuous wear is needed. Their high silica content gives them a non-slip surface and they are frequently used for street kerb, particularly in the North of England. Good examples of the use of York stones in these forms are the steps around Eros in Piccadilly Circus and the pavings and steps for the war memorials at Runnymede, Plymouth, Chatham, Portsmouth and elsewhere.

The less hard varieties, most of which weather well and are acid-resistant, are dressed for use as ashlar sills, string-courses, plinths, copings, lintels, and so on.

The laminated stones are cleft or split (instead of sawn) into paving flags which are very popular with landscape gardeners for paths, crazy pavements, and dwarf walls. The laminated stone is also used in 'shoddy' walling for domestic architecture.

A practical recommendation is the large size of block—comparatively free from cracks and vents—obtained from many Yorkshire quarries.

Methods of quarrying vary considerably, but generally it involves baring overburden and then drilling and blasting.

The quarries are often found high up on the hill-side. Some go down as far as 120-150 ft. from the surface, though in others the stone, particularly where it is laminated, appears almost as an outcrop.

As one would expect, York stone is used more extensively in the North Country than in the south, and numerous churches and public buildings are built of it. Many of the nation's most famous buildings—the Tower of London, the Royal Palaces, the Bank of England—incorporate it in sills and copings, steps, spandrel staircases and other forms. Westminster Hall, the Temple, and the rebuilt Guildhall have floors of York stone. Wherever decoration needs to be combined with hardness and durability, York stone is likely to be very much in evidence.

COUNCIL HOUSES IN NORTH YORKSHIRE BUILT OF THE LOCAL STONE

'SNECKED' WALLING IS VERY ATTRACTIVE WHEN CARRIED OUT IN YORK STONE

YORK FLAGS WERE USED FOR THE PAVING LEADING TO THE BELFAST WAR MEMORIAL

RANDOM COURSED WALLING IN YORK STONE AT ST. HILDA'S CHURCH, WHITBY

Stones for skyscrapers

Jottings from a diary kept by Mr. Eric Wettern on a recent visit to the U.S.

NEW YORK was full of surprises. The greatest, perhaps, to me was the prevalence of natural stone in the facings of the skyscrapers and other buildings. My guess is that over half the buildings in that famous skyline have at least a granite plinth. Many are faced with granite or marble up to the first floor, others—such as the Rockefeller Centre—up to the fourth. Above these levels the facings are mainly limestone or brick. A few of the newer skyscrapers have metal facings. In central New York I did not observe a single building in stucco nor with any form of concrete facing.

* * *

I was taken to see the older part of the city. The old city centre has a good group of granite buildings, all of it dressed, not polished. The New York Municipal Building—classical style, probably about 1910 vintage—has some twenty-two storeys up to the tower, all of them in granite. The City Hall has recently been re-faced—the bottom dozen or so courses in Missouri Pink and the rest in marble.

* * *

American granites are very varied, both as to types and colours. The chief quarrying centres are in New England, Minnesota, and Carolina. In New York perhaps the most prevalent is a coarse pale pink from Deer Island, Maine—it is not unlike our own Light Shap. They also import Bonaccord Grey: Blacks and Reds from Canada: Pearls and Reds from Norway, Sweden and Finland.

* * *

Most existing work is "in the solid" or bedded. Thin slab facing is incidentally as new a development with them as it is with us, but plenty of it is now going up. Veneers are often 2 in. thick and in some cases down to 1 in.

* * *

Washington is a spectacular city—impressively planned and devoid of skyscrapers. Marble is lavishly used, also limestone, and a varied selection of granites.

The Bureau of Standards at Washington is roughly equivalent to our Building Research Station. It is interesting to note that according to statistics published by them the annual production of building and monumental granite in the U.S.A. is of the order of four million cubic feet.

* * *

In the granite quarries which I visited in New England the methods of quarrying and of production have been mechanized to an extraordinary degree. The tremendous scale of recent additions to the plant and equipment emphasizes the industry's confidence in the future.

Stonework for new St. James's Park bridge

An anonymous bequest of £23,000 is being used to rebuild the footbridge across the lake in London's St. James's Park. Mr. Buchan-Hepburn, when Minister of Works, told the Commons that the donor made a condition that work must be completed in 1957.

The new bridge will be lighter than the present 99-year-old iron structure. It will have three spans with pre-stressed arches of the balanced cantilever type. These will be faced with stone and the bridge will also be decked with natural stone. The handrail will be supported by stone bollards.

'More stone than ever before'

Some time ago a survey in *The Financial Times* drew attention to the work of the British Stone Federation and discussed new developments in the industry. 'Shops and commercial buildings are using more stone than ever before', wrote the correspondent, 'and there is now a perceptible return in some areas of the kingdom to the use of local stone instead of brick, particularly for schools and housing'.

After describing some of the leading varieties of building stone quarried in Britain, the article has a word for the growing mechanization of the stone industry, particularly on the masonry side. Plants are referred to where 'everything is geared to transform the raw blocks into standard shapes and sizes entirely automatically, and on a continuous production line'. It points out that Portland now possesses the three largest sawing machines in the world, all of which are electronically controlled. It also has the world's largest circular saw—11 ft. 6 in. in diameter.

In conclusion it states that brick and artificial stone are the industry's main competitors, but probably 80-90 per cent. of the facings now being constructed in London are of natural stone. 'There is no re-pointing necessary, and maintenance costs are low, although the initial costs are in many cases higher than for other materials. Stone has the asset of natural beauty and weathering'.

Location of principle quarries throughout England Scotland & Wales

Trevor Granite

SOURCE Trevor, Caernarvonshire, North Wales.

GEOLOGY Granite Porphyry.

COLOUR Medium Grey.

CHARACTERISTICS Medium grain and uniform in colour. Will take sharp arrises.

AVAILABILITY To suit demands.

SIZES Practically any size in blocks up to 8 tons. Larger blocks also can still be supplied by special arrangement.

FINISH Rock face; fine-axed; fine-punched; punched; eggshell and polished.

PHYSICAL PROPERTIES Weight per cubic foot is 167 lb.

ABSORPTION OF WATER 0.36 (weight of water absorbed per cubic foot in lbs.)

CRUSHING STRENGTH 48,200 lb. per sq. in.

WHERE USED Trevor Granite has been used in many buildings and for monumental work in various parts of the British Isles: also for stones for lock caisson slideways at Liverpool, for the Mersey Docks and Harbour Board.

ADVISORY SERVICE

The British Stone Federation has made a close study of all the problems relating to the use of stone, and has set up an advisory panel, which is freely at the service of architects and others, to give advice and help on stone matters. Inquiries should be addressed to the Secretary, The British Stone Federation, 70 Victoria Street, S.W.1.

CONSTRUCTION NOTES

Stonework Fascia and Soffit Courses

ALL FRAMED STRUCTURES, WHETHER FORMED OF steel or reinforced concrete, tend to impose the outline of their functional members on the architectural design of buildings. Under these conditions the functional value of arches no longer exists, and large openings between vertical members are conveniently spanned by horizontal framing members which carry the superimposed loads.

The desired architectural expression can be effectively obtained by clothing the structural member with a veneering of stonework. Success in the achievement of this result depends very largely on the manner in which the facing stones are attached to the structural framework. When veneering processes are adopted, in order to form facings for fascia courses which span openings in combination with deep reveals, it often becomes necessary to separate the soffit portion of the fascia stones from the front portion—to save material and labour in extensive notching. The best position, then, in which to place the horizontal joint between the front of the fascia and the soffit, is at the underside of a fillet, if this can be arranged.

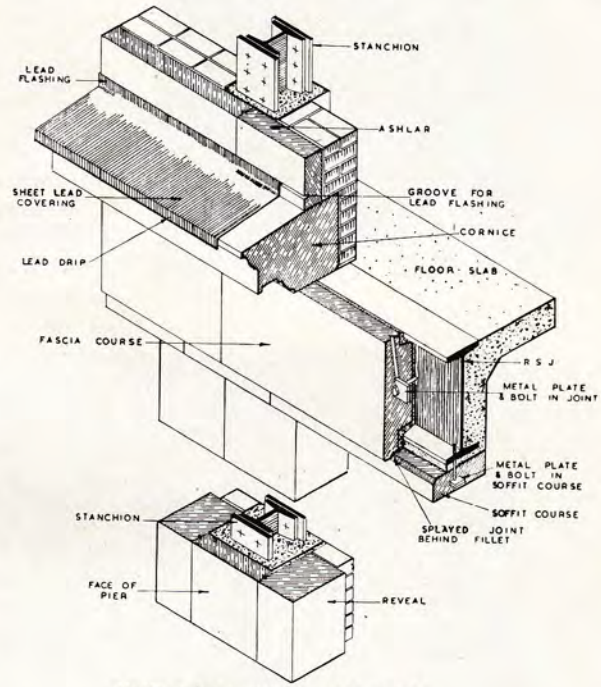
A thick soffit course can be usually obtained by introducing a splayed joint instead of a horizontal one. The soffit course is suspended from the structural member through the medium of metal plates and bolts, which are inserted in the joints of the soffit stones and threaded through the bottom flange of the R.S.J. Ultimate success of the soffit course, when so constructed, will depend very much on the conditions prevailing at the time the soffit course is constructed.

It is essential that a rigid head-tree, or centre, be provided for the support of the stones during the constructional period, and until the completed course has been cement-grouted and the grouting material allowed to set hard. The top surface of the head-tree should be situated about two inches below the soffit level, to allow each stone to rest on two pairs of folding wedges, used as the medium for the correct adjustment of the stones.

When the stones have been placed in their correct position and the course is complete, the interstices between the stones are filled with cement grout and allowed to remain in this condition until the cement has begun to set.

Chocks of material should be inserted between the underside of the structural member and the upper surface of the soffit stones. This will prevent any upward movement of the soffit stones when the suspending-bolts are tightened, and the weight of the stones is transferred to the connecting devices.

The construction of a typical fascia course and soffit course is shown in the accompanying sketch. It also shows a suitable arrangement for the bonding of the stonework which surmounts the fascia course.



CONSTRUCTION OF FASCIA & SOFFIT COURSE

ODD CHIPPINGS

A stone removed from the bomb-damaged part of the Houses of Parliament will be embodied in the extensions now being added to Bradford Cathedral. Stone for the Parliament buildings came from Anston, near Sheffield, so this looks like a case of Yorkshire getting a bit of its own back!

* * *

The Queen's Limner in Scotland, Mr. Stanley Cursitor, recently declared that architects should resort more readily to local stone for housebuilding. In the past, where 'Scottish housing has grown out of local material, it has taken a place in the landscape in a way that concrete never does'.

* * *

Seven-hundred-and-fifty-year-old King John's bridge over the Avon at Tewkesbury is to be reconstructed with a carriageway 24 ft. wide. It is interesting to hear that some of the stones from the old bridge will be preserved and used in the new structure's facade.

PRINTED BY KENNERLEY PRESS LTD., LONDON, N.1—5136