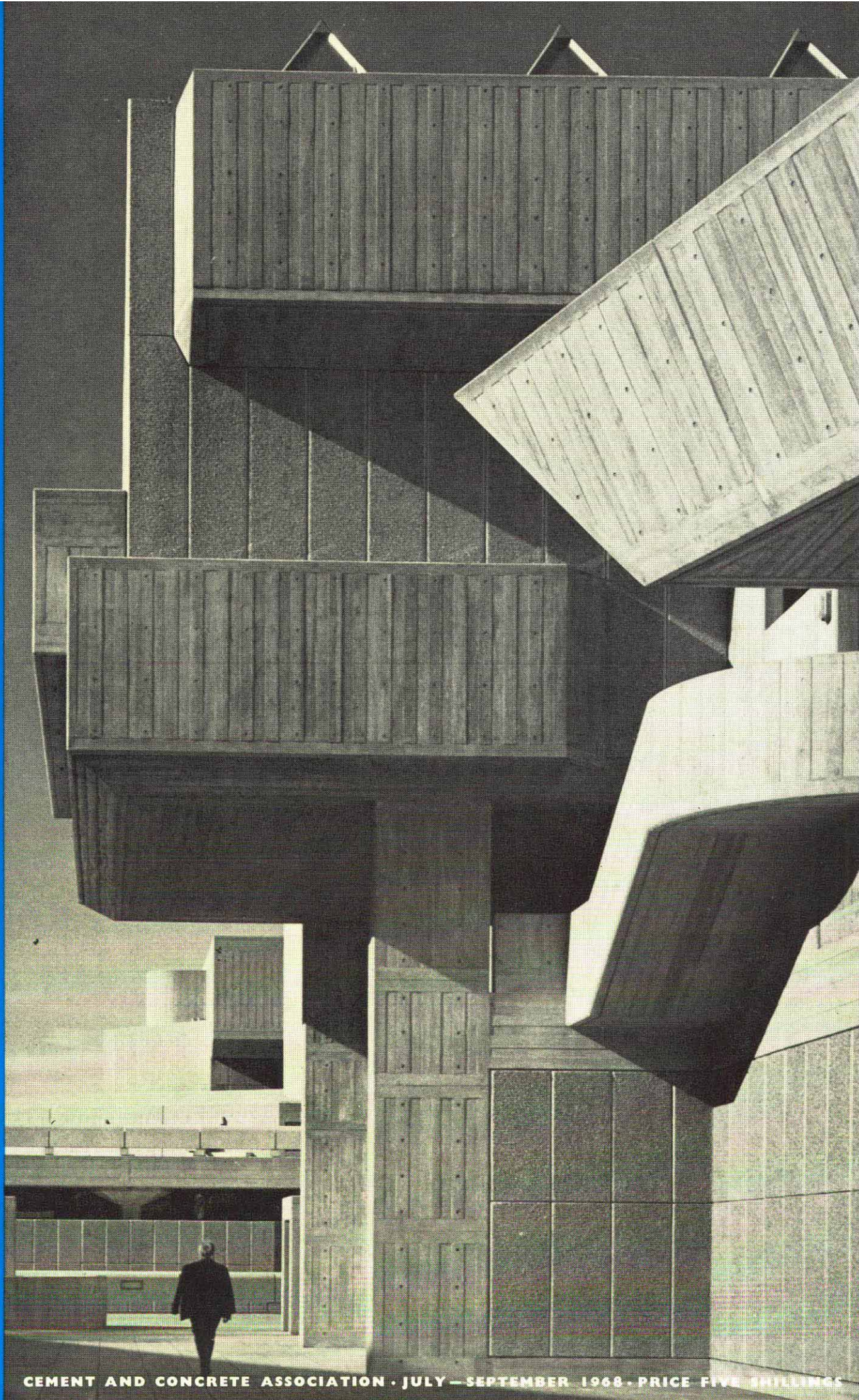
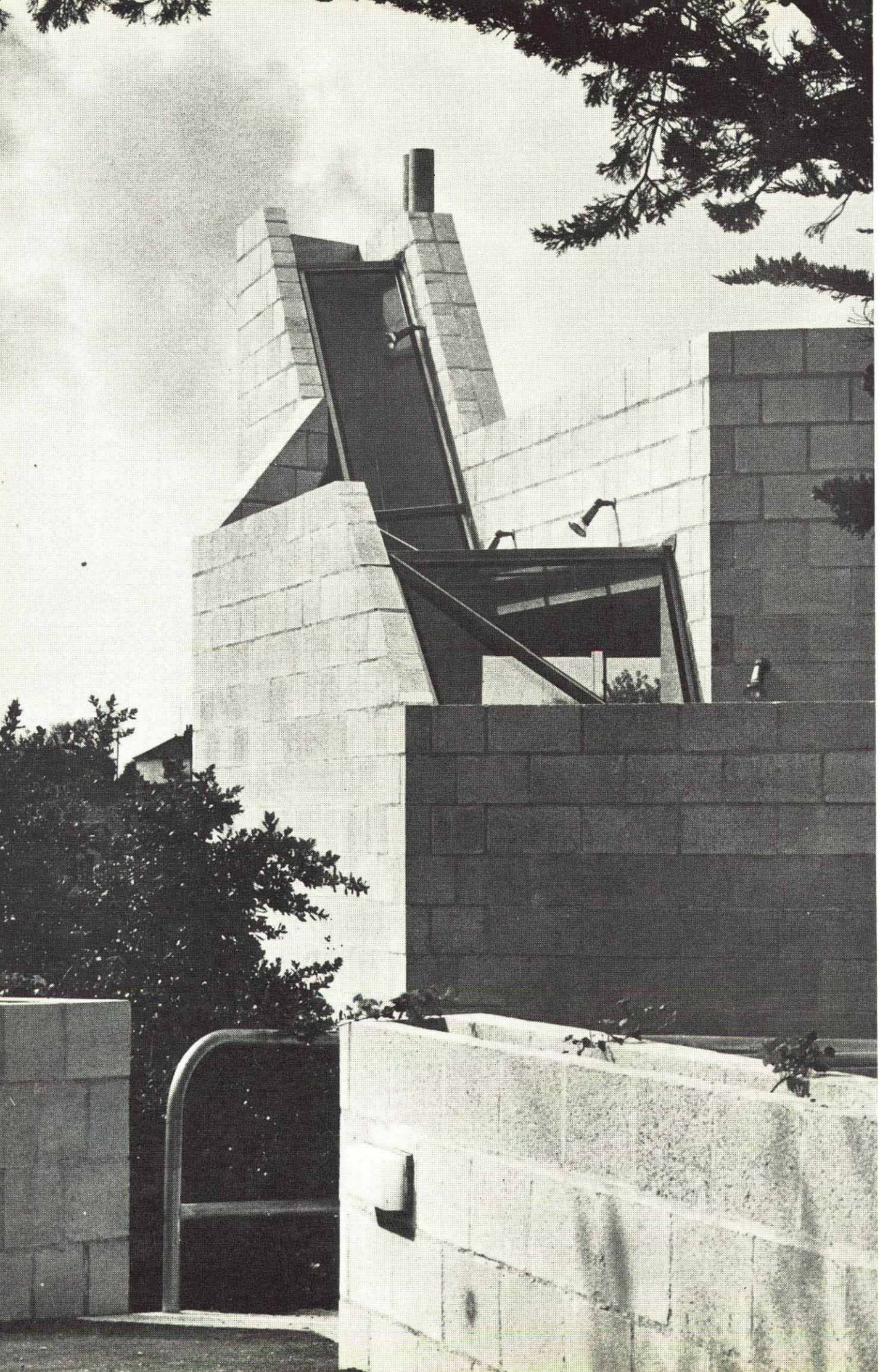
Concrete Quarterly 78



CEMENT AND CONCRETE ASSOCIATION · JULY—SEPTEMBER 1968 · PRICE FIVE SHILLINGS



Concrete Quarterly

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Contents

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FRONT COVER: *The Hayward Art Gallery, South Bank Arts Centre, London (page 2). The photograph shows the remarkably high standard of concrete finish achieved.*
Photograph: Richard Einzig.

FRONTISPIECE: *Concrete blocks used in the house at Feock, Cornwall (page 30).*
Photograph: Richard Einzig.

TOWN PLANNING is possibly going to be the vital issue of the coming years. With such important schemes afoot as the Greater London Development Plan, now in its final stages of preparation, influencing the way millions of people will live in the 1970s, it is crucial that we get fundamental principles right. And surely there is something to be said for us being much more mixed up than we are at present. Meaning – not that we should all behave more oddly than we do at present, if that were at all possible. But rather that we might mix up our activities, our types of people, our age groups, our various kinds of buildings much more than we do at the moment. When we think of town planning, we tend to think in terms of segregation: areas for housing, areas for shopping, areas for schools, areas for recreation, areas for industry, even areas for the old. It is all very neat and tidy and logical. But then, of course, people aren't like that, and the question one would like to ask is: Does it work? Taking a close look, for instance, at our new towns and housing estates, the one type of segregation that seems really desirable is that of the pedestrian from the car, and even that can be taken too far.

For what is the one depressing aspect about so many of our otherwise worthy housing areas? Surely the fact that there is nothing but housing there. What is wrong with so many ingeniously planned shopping areas? Surely the fact that they contain nothing but shops. (Is not London's Oxford Street one of the most monotonous in the capital?) The same could be said of areas given over to offices or embassies or entertainment or anything else. One is reminded of the man who visited a new town and was asked afterwards what it was like there. "There?" he replied. "But there isn't any there there." We have all experienced this in newly built areas where a certain sameness of activity and building type completely deprive a place of vitality.

In one small London street not far from Paddington Station there is a terrace containing shops of all kinds, a pub, a church, a school, a restaurant, a café, a launderette, a dance club (sound-insulated in a basement), various offices, a range of flats on the top floors, and one or two private houses – all adjoining a green square with chestnut trees and lawns. The place has immense vitality and interest at all times. And because of the varied building types, the users tend to be varied too. There is a mingling of all age groups, which is good for the old, and a wide divergence of income groups: a mixture, in fact, of class, colour and creed. Could this not be a criterion of planning schemes in the late twentieth century?

View towards Big Ben and the Houses of Parliament from a pedestrian terrace alongside the Hayward Gallery. The fine detailing of the board-marked in situ concrete and the high quality of the precast facing slabs can be clearly seen (see also front cover).

South Bank complex

London's finest art gallery

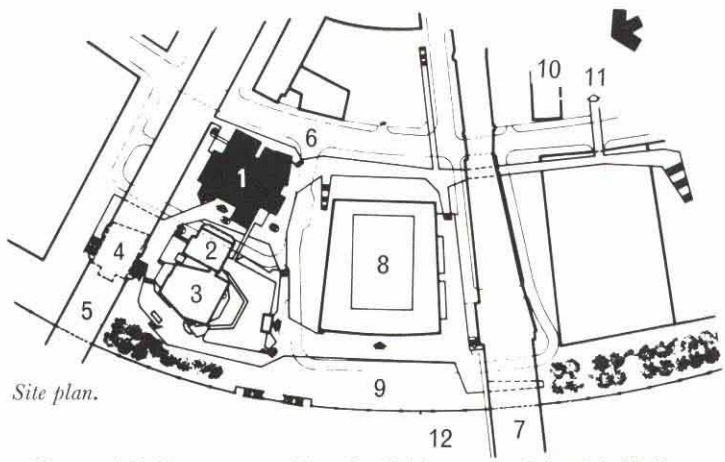
by George Perkin

Photographs by Richard Einzig

Architect to the Greater London Council:	Hubert Bennett
Deputy Architect:	Jack Whittle
Group leaders:	E. J. Blyth N. Engleback
Job architect:	J. W. Szymaniak
Structural engineers:	Ove Arup and Partners (P. Dunican)
General contractors:	Higgs and Hill Limited

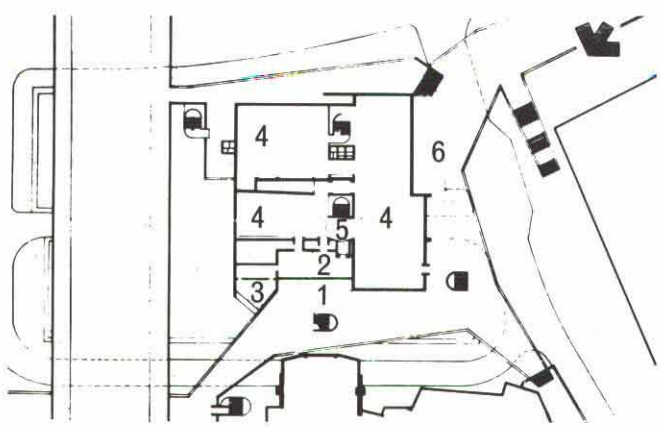
THE WORD 'COMPLEX' is a popular architectural term, although nobody quite knows what it means. However, when you look at the South Bank Arts Centre, with its newly opened Hayward Art Gallery, the word seems purpose-made. This is a proper complex. It is rather difficult to find your way in, and when you come out you feel strangely disorientated. Viewed from the outside as a whole, the Centre is very complex indeed, with its mass of cantilevered concrete cubes, jutting balconies, terraces and linking walkways – all piling up like a cubist painting by Braque. It does, however, form a consistent and unified whole – a particular triumph for the architects. It is also true that the Hayward Art Gallery is without doubt the best-equipped art gallery in London (one is tempted to go further afield). And, in common with its predecessors the Queen Elizabeth Hall and Purcell Room next door, of which the gallery is really a continuation, the exposed in situ concrete has been designed and executed with the greatest care and is among the finest to be seen in this country.

Inside, the building houses three artificially-lit and two naturally-lit galleries – very cool and spacious – interconnected on two main floors by ramps and stairs, and three sculpture courts. Parking space for 150 cars is provided underneath. Opened by the Queen on 9 July, the gallery started with a flourish and a splendid Matisse exhibition, the public being welcomed by a series of giant mauve nudes opposite the entrance lobby. Certainly the lower galleries were given a chance to show their capacity for very large pictures. Up above, the two galleries on the top floor showed to advantage the ingenious devices for subdividing spaces with screens and for producing evenly distributed top light of the right intensity under all conditions. The building is, in fact, as scientifically designed as a laboratory and as much care has been

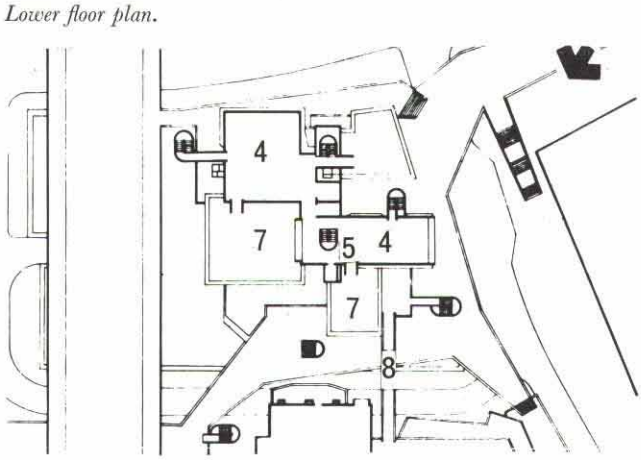


Site plan.

1 Hayward Gallery
2 Purcell Room
3 Queen Elizabeth Hall
4 National Film Theatre
5 Waterloo Bridge
6 Belvedere Road
7 Hungerford Bridge
8 Royal Festival Hall
9 Riverside Walk
10 Shell Centre
11 To Waterloo Station
12 River Thames

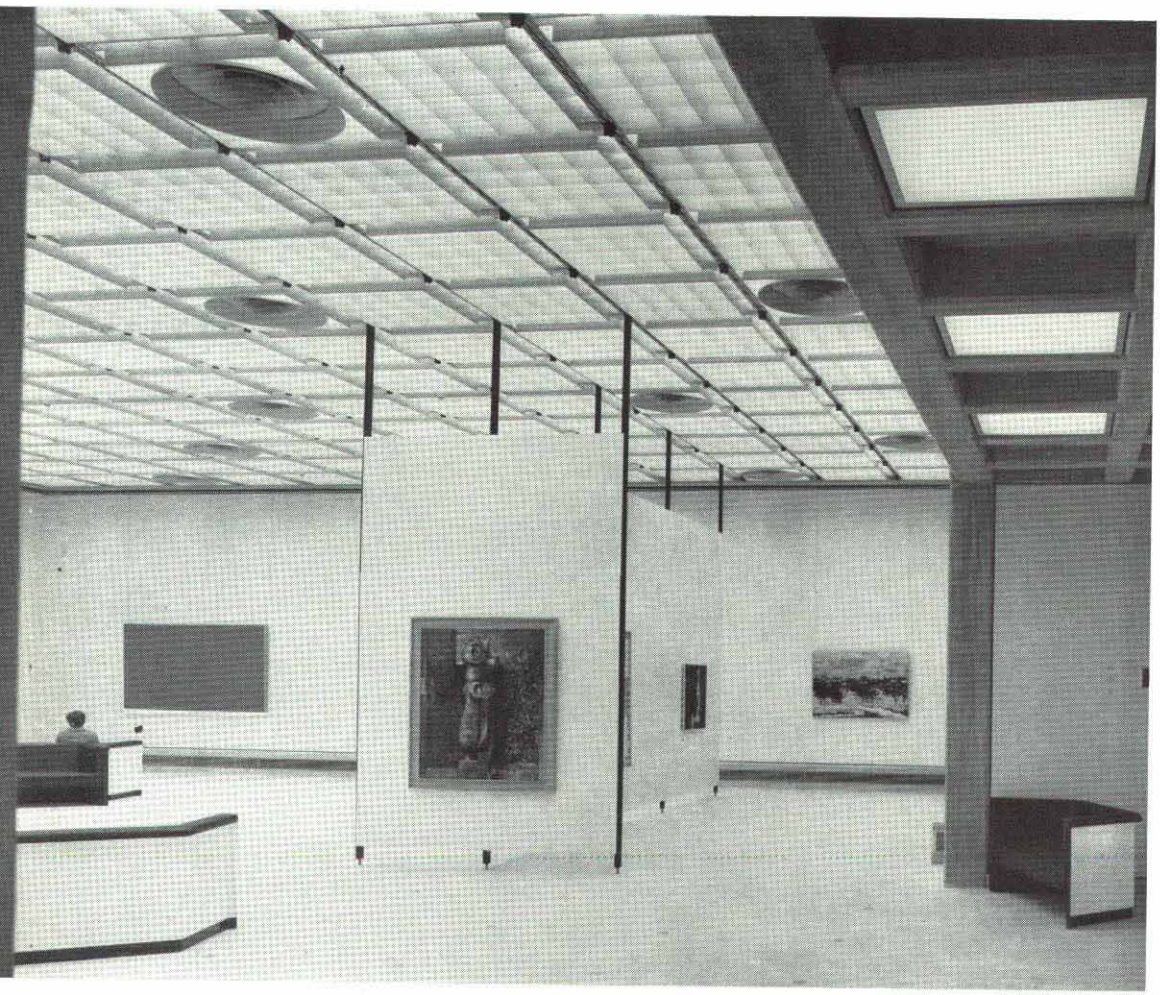


Lower floor plan.

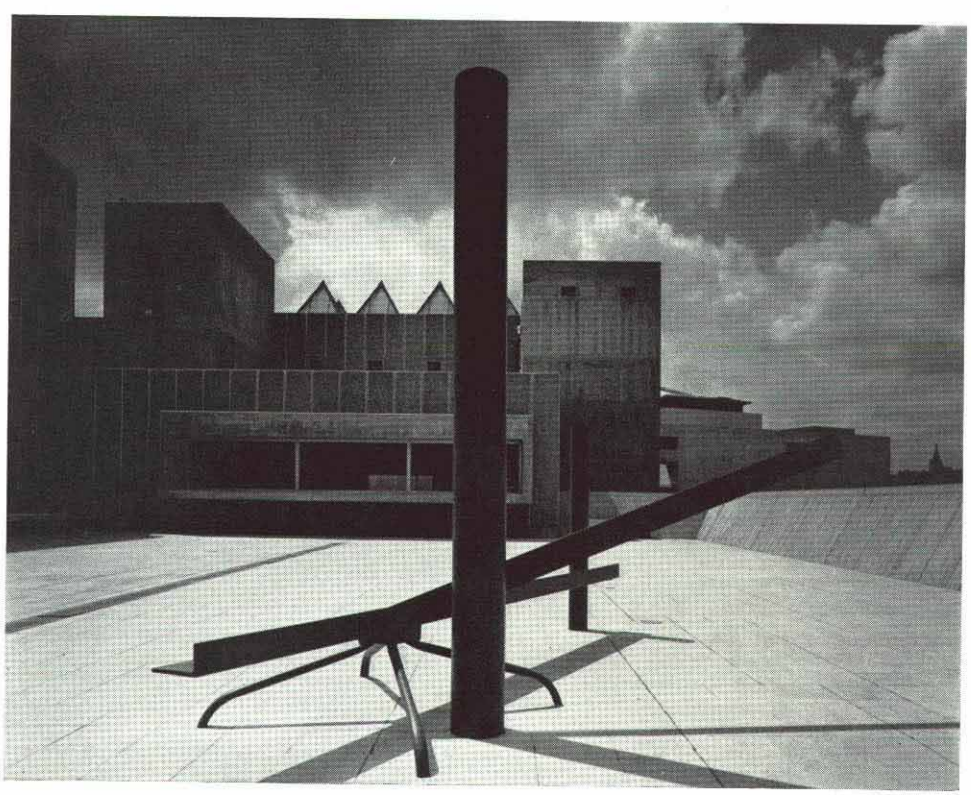


Upper floor plan.

1 Main entrance
2 Foyer
3 Director's suite
4 Gallery
5 Lift
6 Pedestrian terrace
7 Sculpture court
8 Bridge



One of the upper galleries with natural top lighting. The grid for positioning screen supports can be seen in the ceiling and floor.



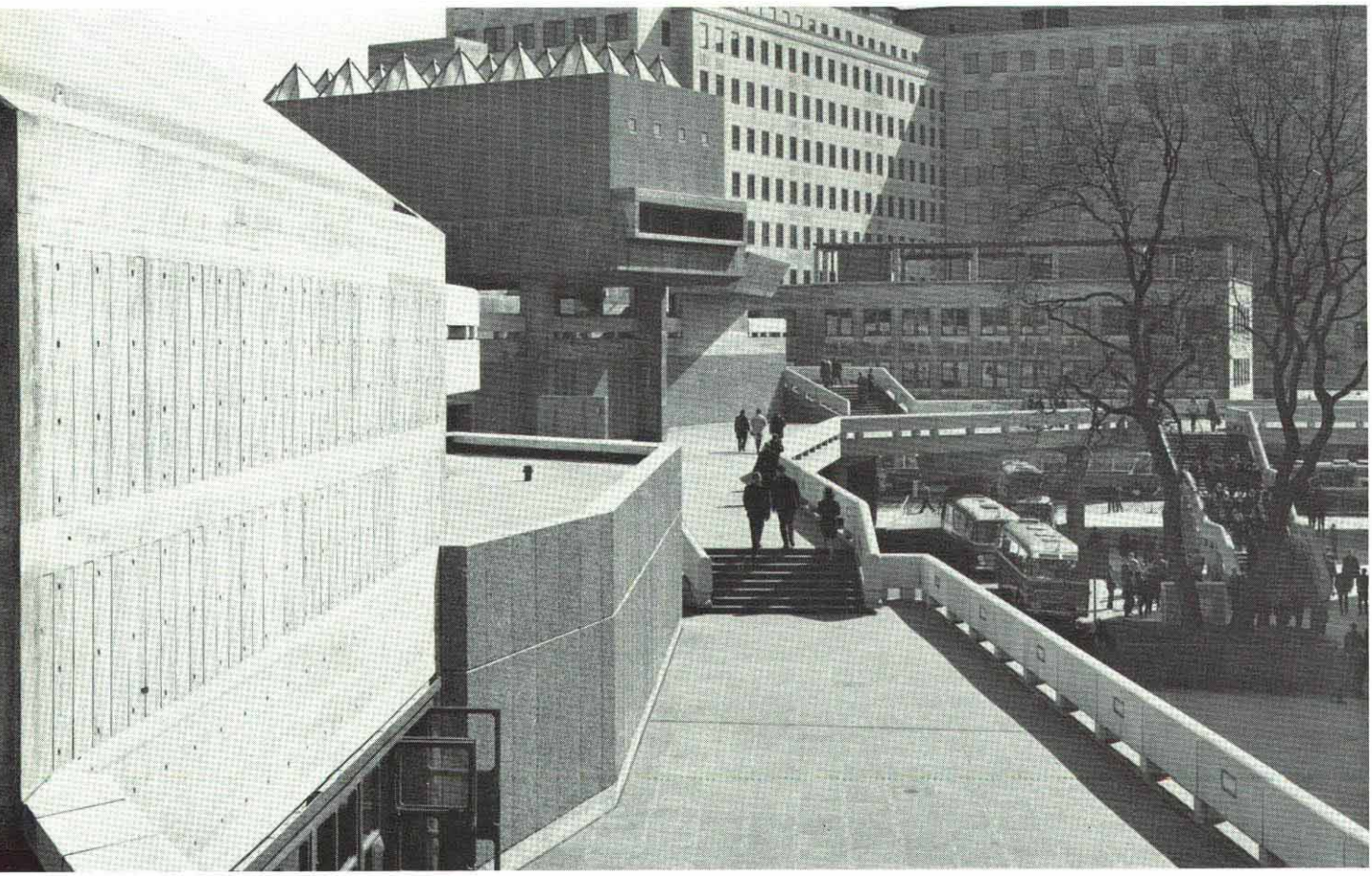
One of the sculpture courts with views over the river to the right.

Pedestrian terrace flanking the Hayward Gallery, with the Shell Centre in the background.

expended on achieving technically perfect conditions for the display and conservation of the pictures as on anything else.

The building is leased to the Arts Council who point out that until the completion of the Hayward Gallery, London was not properly equipped to deal with temporary art exhibitions. In fact, exhibitions of international importance have had to be turned down on occasions for lack of space. The five galleries (17,600 sq. ft. of floor space) and the three sculpture courts (7,000 sq. ft.) will now make it possible to hold two or even three exhibitions at the same time.

As is by now well known, the building is concrete to the core, and it is when going up the stairs in the core, with their curved end walls, that one can see just how good the board-marked concrete is. There has been criticism, of course, of this highly accomplished use of the material. Naturally, we think it is mistaken. The cool greys of the concrete do, in fact, seem a very suitably muted background for colour in pictures, and the material has a certain dignity about it which would have been destroyed by the superficial application of finishes. Also there is a quality of permanence and a lack of triviality about it which seem absolutely right for what may well turn out to be one of Europe's major art galleries for a long time to come. (The casting of the concrete against vertical boards of Baltic pine, varying in thickness, was described in *Concrete Quarterly* 72.) Externally, the concrete looks well against the greys of the riverside buildings and is



View towards the Hayward Gallery with its pyramidal rooflights. The Queen Elizabeth Hall is in the left foreground.

SOUTH BANK: *continued*

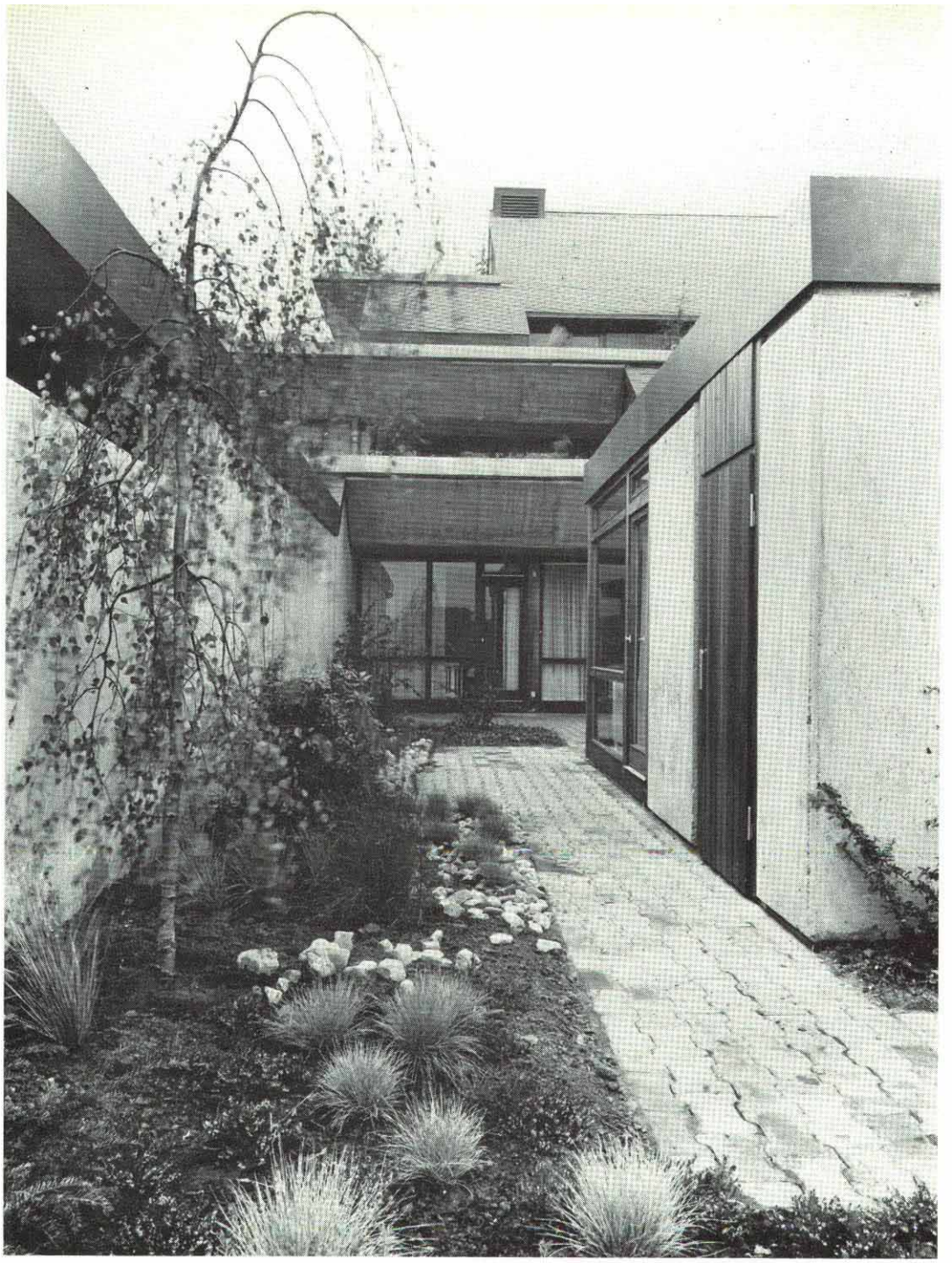
enlivened by some excellent precast cladding panels made with crushed Cornish granite aggregate by John Ellis and Sons Limited.

There is, all the same, a principle to be observed in the use of exposed concrete internally. Generally it looks best when contrasted with and set off by richness of colour and texture. Deep pile carpets look well against it. So do brilliant shining materials such as mirrors to offset the matt surfaces. And if there is one place in the gallery where something of this kind might have been done to advantage it is in the entrance foyer where a touch of *panache* – perhaps a bright carpet or hangings – would have been an improvement.

The sculpture 'courts' as they are called, although really they are balcony terraces, have marvellous views embracing a great sweep of buildings from Millbank to the City of London. One would think that sculpture would look fine against such a backcloth, in spite of the school which says that sculpture should be viewed in isolation against blank walls.

As regards construction, the basic plasticity of concrete has been used to shape the structure around the complex requirements of the building. The resulting membrane construction is well suited to the function of the gallery, and has been used consistently throughout the South Bank Arts Centre. The walls of the box structure act as beams. The central part is stiffened by two lift shafts and the main vertical services shaft. Where a large span was required, such as the unobstructed floor span of 72 ft. by 42 ft. over the loading bay, a two-way coffered slab has been used. Above this level, floors of ribbed construction are used spanning up to 52 ft. between the walls of the box elements. The floor of the larger of the top galleries has a main span of 54 ft. and closely-spaced T beams. The open sculpture courts are cantilevered over the supporting walls and are designed to carry loading of 200 lb. per sq. ft. with allowance for point loads of 5 tons for single outsize exhibits. All the service ducts, internally and externally, are of reinforced concrete and clearly expressed.

As with most buildings that take a positive line, the South Bank Arts Centre will not be everyone's cup of tea. But the integrity of the design, with the object of providing a serious, honest and lasting accompaniment to music and painting – a building which is neither trivial, nor transient nor even fashionable – should not be overlooked. The Hayward Gallery deserves the same success as the Queen Elizabeth Hall and Purcell Room have already enjoyed.



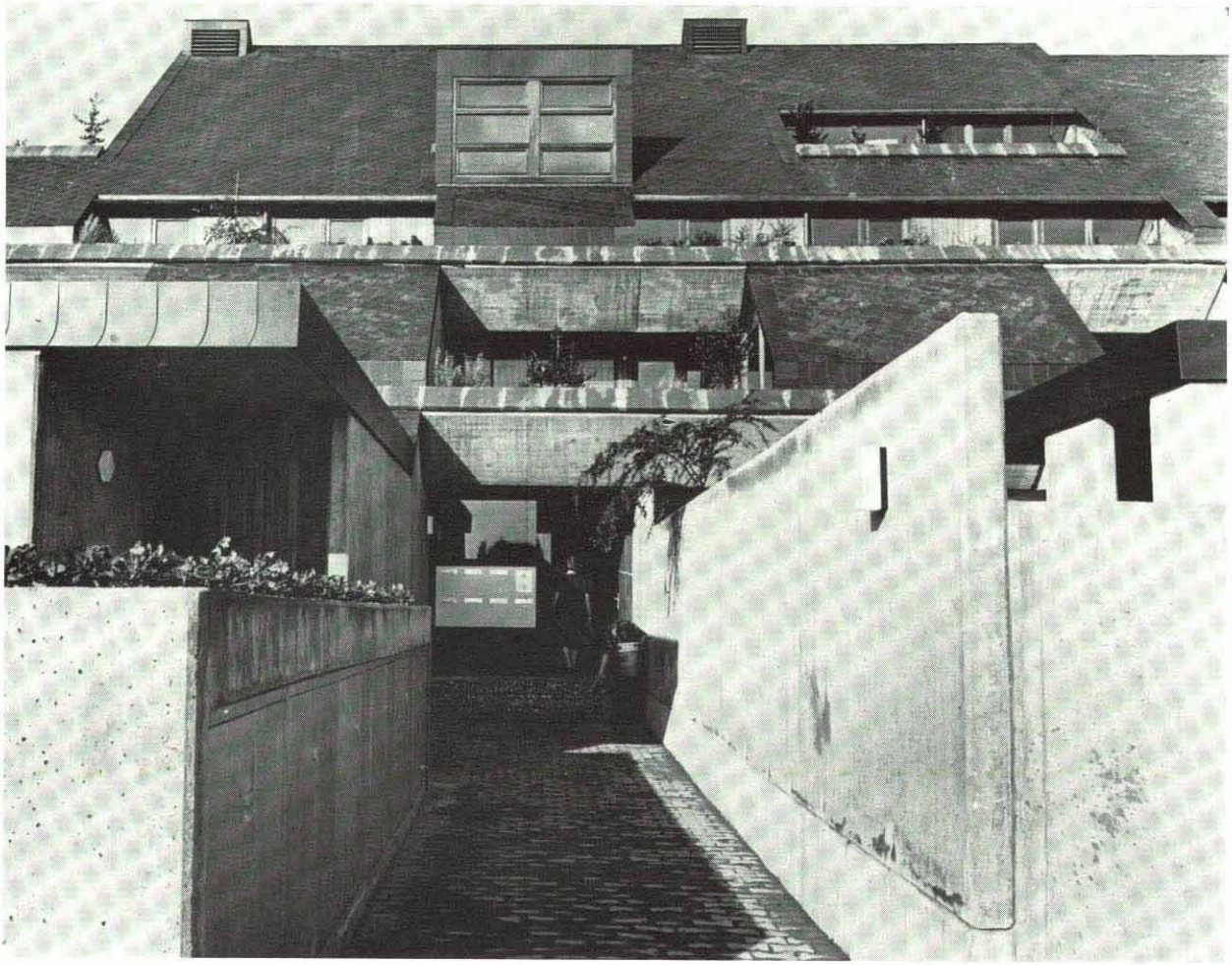
One of the spacious lower garden terraces.

Housing at Marl, Germany

Low-rise with a difference

Architects: Roland Frey, Hermann Schröder, Peter Faller

WHETHER YOU FEEL that housing in this country should be high or low, new ideas on the subject will probably be welcome. This German 'hill-house' at Marl, on the northern fringe of the Ruhr, provides an alternative to the slab block of flats. Its aim has been to offer city dwellers in an industrial area, where land is expensive and scarce, the most individual and private kind of homes possible, with plenty of outdoor terrace space. The 'traditional' multi-storey block was rejected simply because it lacked these advantages. Forty-six families and their cars live in this four-storey building which is about 160 ft. wide (at the base) by



The entrance approach at ground level.

HOUSING AT MARL: *continued*

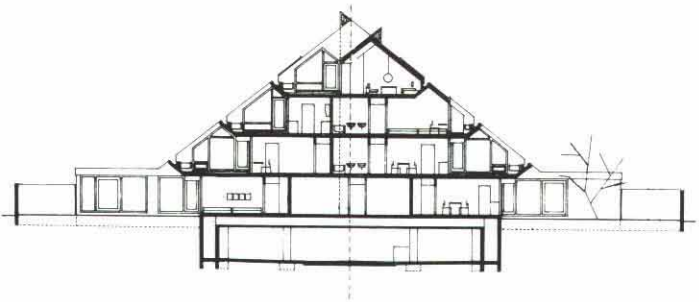
A corner of one of the upper garden terraces.

270 ft. long. In section it is triangular with stepped terraces like a ziggurat.

The architects Roland Frey and Hermann Schröder used as their starting point the changing requirements in housing today, flexibility for different sizes of family and the ever-increasing presence of the car. Their design won first prize in the Stuttgart-Neugereut competition in 1963, and in 1966 the Marl Development Corporation agreed to build it.

The hill-house is aligned in a north-south direction, and each flat is L-shaped enclosing a large open terrace – the equivalent of a garden in an ordinary house. Parking space for each flat is provided underneath or inside the building. Larger structures of this type could include various amenities which do not require direct daylight such as cinemas, shops, department stores, meeting halls and the like. The arrangement is very economical in space, and could allow a highly desirable mingling of living and shopping areas – surely an aspect of town-planning which deserves more attention (see editorial).

The advantages of the Marl hill-house have been summed up as follows. Every flat possesses a spacious



Cross section.

garden terrace which is concealed from the view of neighbours. The occupants can appreciate the changing seasons. Flowers can be grown under the open sky. Children can play, and washing can be hung out to dry. All windows can be easily cleaned from the outside. Children cannot fall out of the window. Even where the building is, in fact, quite high, there is no sensation of height and top-floor dwellers do not suffer from vertigo. Because of the L-shaped plan, every living room has a window facing south which receives direct sunlight. Prospective tenants have a wide choice of size and type of flat, and if necessary can move to another later on to suit the size of their family. The living area of every flat on the ground floor is extended by walled gardens affording a good deal of privacy. Every flat has a parking space within the building, in the communal garage which is directly accessible from the staircases. If buildings of this kind were to be built near each other, the dwellings would still receive ample sunshine because of their triangular section.

As regards the planning details of the four storeys, the ground floor has eighteen flats similar in size and character to single-storey terrace houses. Twelve of the flats are three-bedroomed and six are four-bedroomed. Each has its own garden forming an extension of the living area. The gardens are all placed higher than the surrounding streets so that tenants can see over the walls but prying eyes from outside cannot. Only the very ends of the gardens can be seen from the upper storeys.

The first floor has sixteen flats – four to each staircase. Of these, eight are two-roomed flats, six are three-roomed flats and two are four-roomed flats. The living-room of each faces south onto a projecting terrace. Kitchens are also arranged with access to and views over the terraces so that children at play can be supervised.

Each of the staircases on the second floor gives access to one four-roomed flat and one five-roomed flat taking up the whole width of the building. These flats are much the same in plan as those on the first floor, but practically all the bedrooms are on the east side and have balconies.

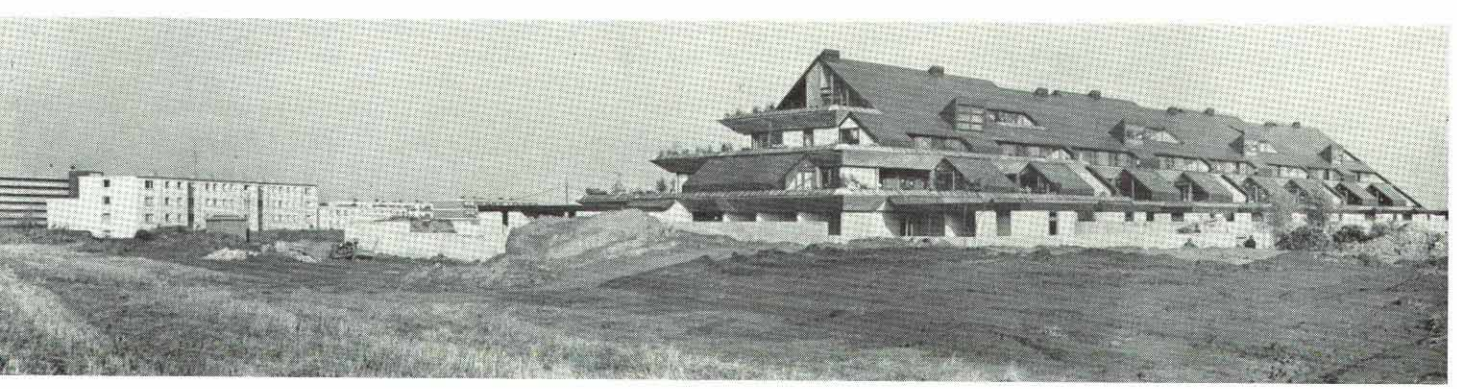
On the third floor, each staircase leads to one four-roomed flat, the plan of which is like that of a detached house.

Access to the flats is by way of four staircases on the east side. Tenants can drive from the street into the underground garage from a ramp on the north side. The garage has one parking space for each flat, the bays being separated by loadbearing walls. The staircases can be reached from the garage by lift so that the motorist can get to his flat under cover. A visitors' car park is provided near the garage entrance. Pedestrians enter the building from the residential streets on either side. Every flat has its own separate store room on the ground floor, averaging 118 sq. ft. There is also common storage space off each staircase for bicycles and prams.

As regards construction, the loadbearing structure is of in situ reinforced concrete. Solid floor slabs $5\frac{1}{2}$ in. thick and spanning about 10 ft. are supported on concrete loadbearing walls 6 or 7 in. thick. Internal walls were cast against concrete forms and painted on both sides. On the terrace sides, the concrete walls have a board-marked finish externally, and three layers of insulation internally. Partitions are either of 5 in. plastered brick, or 4 in. plastered pumice concrete. A good deal of timber boarding is also used as a finish on walls and ceilings internally. Roofs are of timber and covered with shingles when pitched, or gravel when flat.

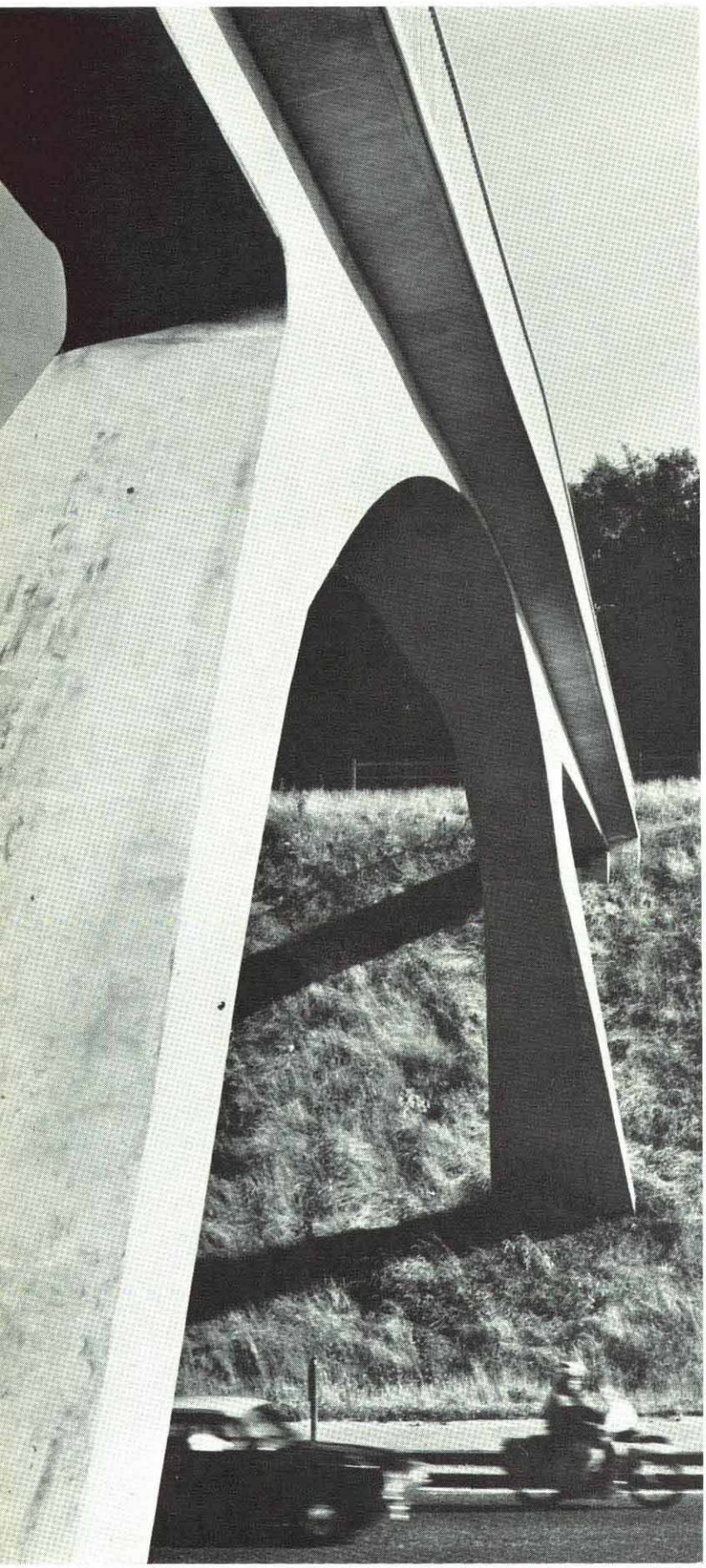
In the entrances, walls, ceilings and staircase soffits are of painted concrete. Stair treads are precast, and landings are paved with precast concrete slabs. Handrails are of wood mounted on solid concrete balustrades. Terraces are paved with small precast concrete interlocking slabs bedded on sand. Edge beams and sloping parapets are faced with concrete blocks to form wide flower boxes.

The Marl hill-house was built as an experiment. But as a means of providing individual and spacious homes with outdoor terraces for city dwellers, it deserves very close attention.



General view of the Marl 'hill-house' with earlier blocks of multi-storey housing visible on the left.

Kent footbridges



OVER THE last few years, eleven concrete footbridges have been designed and constructed to cross existing and new trunk roads in Kent. Many are of slender appearance and of varied construction. Some of the bridges are temporary and were precast. Other permanent ones are either completely of in situ concrete construction or partly precast. Design and construction were under the direction of the County Surveyor, Henry Bowdler, CEng, FICE, MIMunE, FInstHE, MIStructE.

Probably the most beautiful of these footbridges crosses a hilltop on the A2 at Swanscombe Cutting, with a sweeping arch that frames a vista of the Kentish countryside. The bridge is of in situ concrete, the road being kept open to traffic during construction. The structural form of the bridge is a three-hinged arch with cantilevered side spans. The structural depth is 14 in. at the hinges and bank seats, the rise 26 ft. and the span between bottom hinges 100 ft. The structure is fully post-tensioned. The design of the handrail for this bridge and the Trunks Alley bridge has received special attention and consists of a continuous base plate and top rail cast onto the deck, thereby avoiding heavy supporting posts which would otherwise have spoiled the lightness and continuity of the balustrade.

For the Trunks Alley footbridge there was insufficient rise for an arch, and a simple cantilever and supported-span construction have been used with inclined legs. This bridge also has a graceful simplicity. The superstructure is again fully post-tensioned, with a span between hinges at the leg tops of 121 ft. and a construction depth at mid-span of only 19 in.

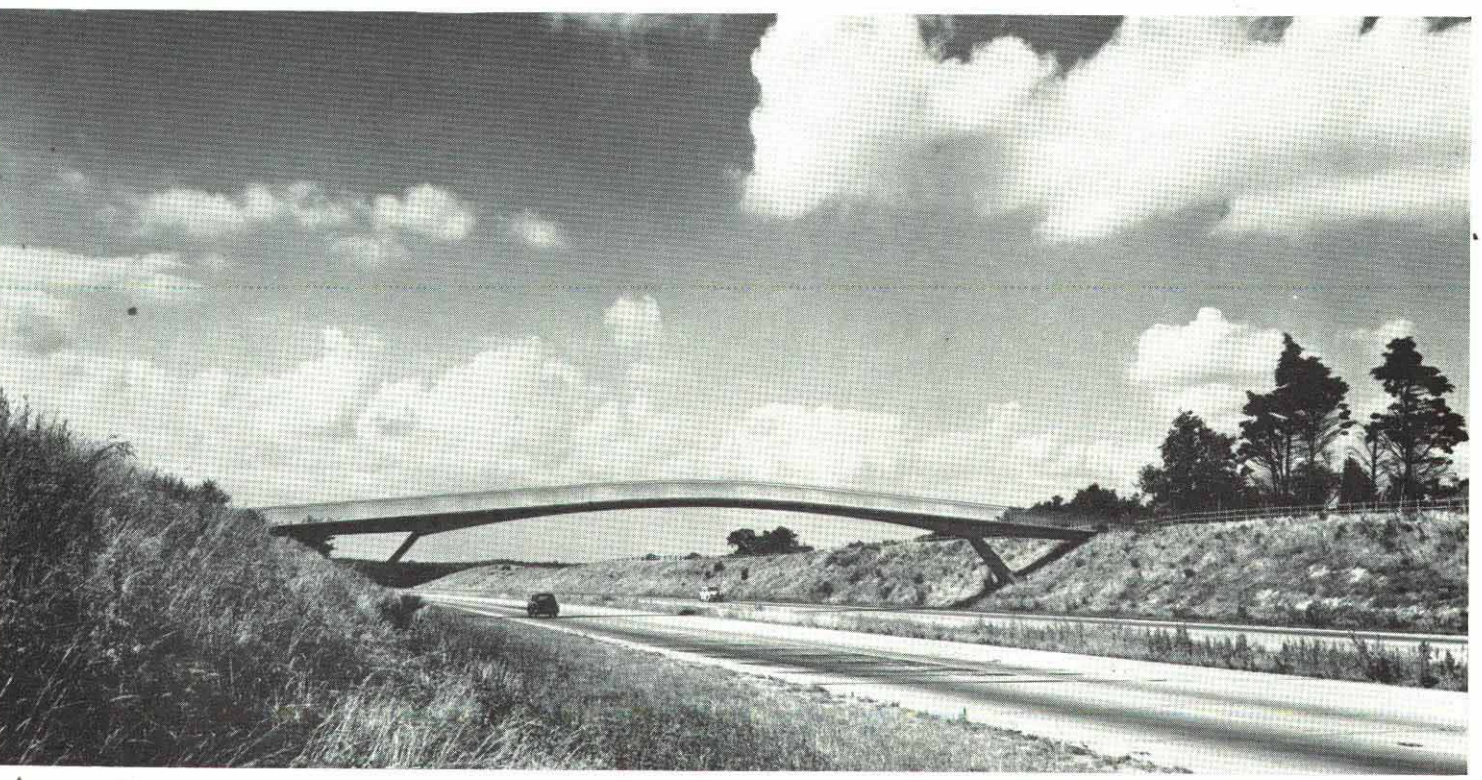
Several of the Kent footbridges have an in situ substructure with a precast superstructure. Notable among these is the one that crosses the A2 improvement scheme at Bexley to enable pedestrians to pass over to the golf course. Owing to the fact that there is to be only a 6-ft. central reserve between the carriageways, a central pier was impossible. The deck therefore clears this heavily trafficked trunk road in a single span formed with post-tensioned precast units.

The short piers project from the top of a retaining wall on each bank. These long walls are patterned and have a facing of white concrete cast onto the mass concrete at the back against chequerboard formwork.

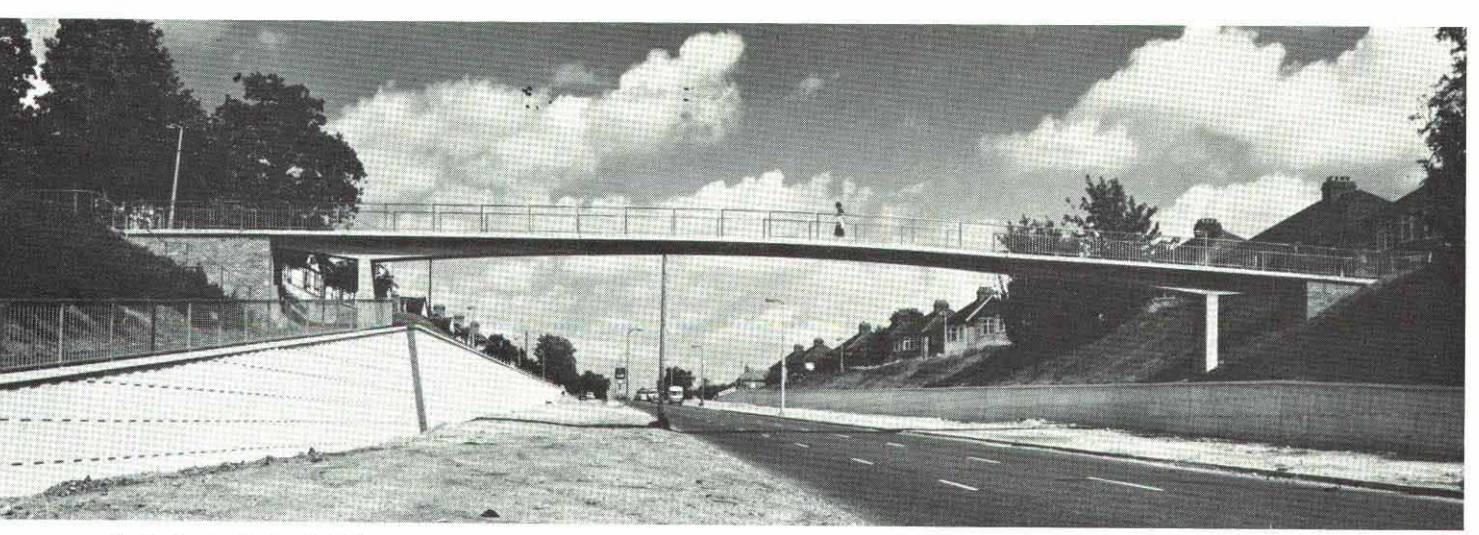
The bridges were designed by J. A. Bergg, BSc, MICE, AMIMunE, AMIHE. Leonard Fairclough Limited were the main contractors for the bridge at Swanscombe Cutting. The Trunks Alley footbridge was built by Cleveland Bridge and Engineering Company Limited. Bexley Golf Course footbridge was built by J. L. Kier and Company Limited. All the precast concrete units were made by Anglian Building Products Limited.

An oblique view of Swanscombe Cutting footbridge.

Swanscombe Cutting footbridge.



Trunks Alley footbridge.



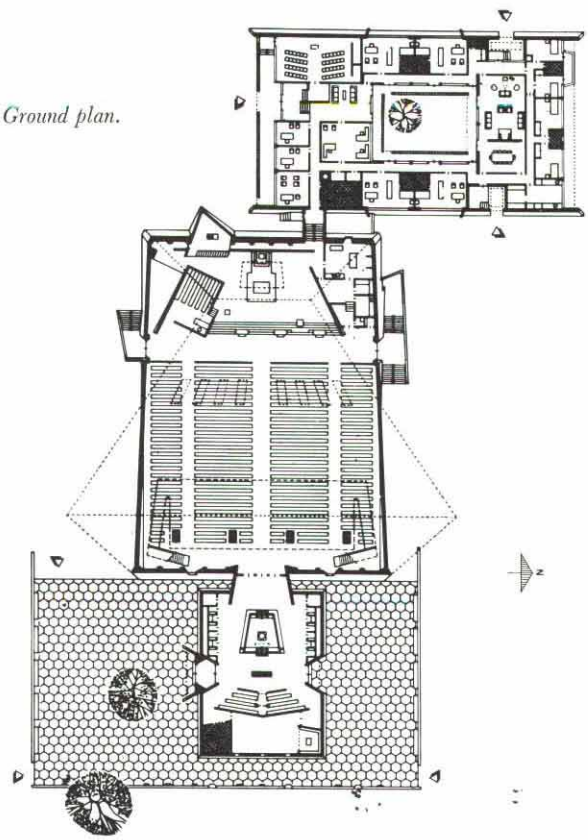
Footbridge to Bexley Golf Course.

Photographs by Colin Westwood.

Marcel Breuer.

St. Francis de Sales church Muskegon, Michigan

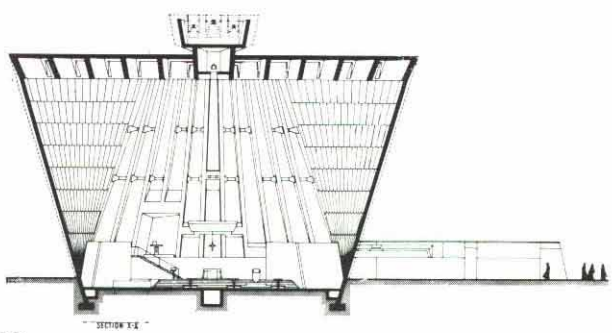
Architects: Marcel Breuer and Herbert Beckhard



Ground plan.

Drawings by courtesy of *Architectural Record*.

Cross section through nave.

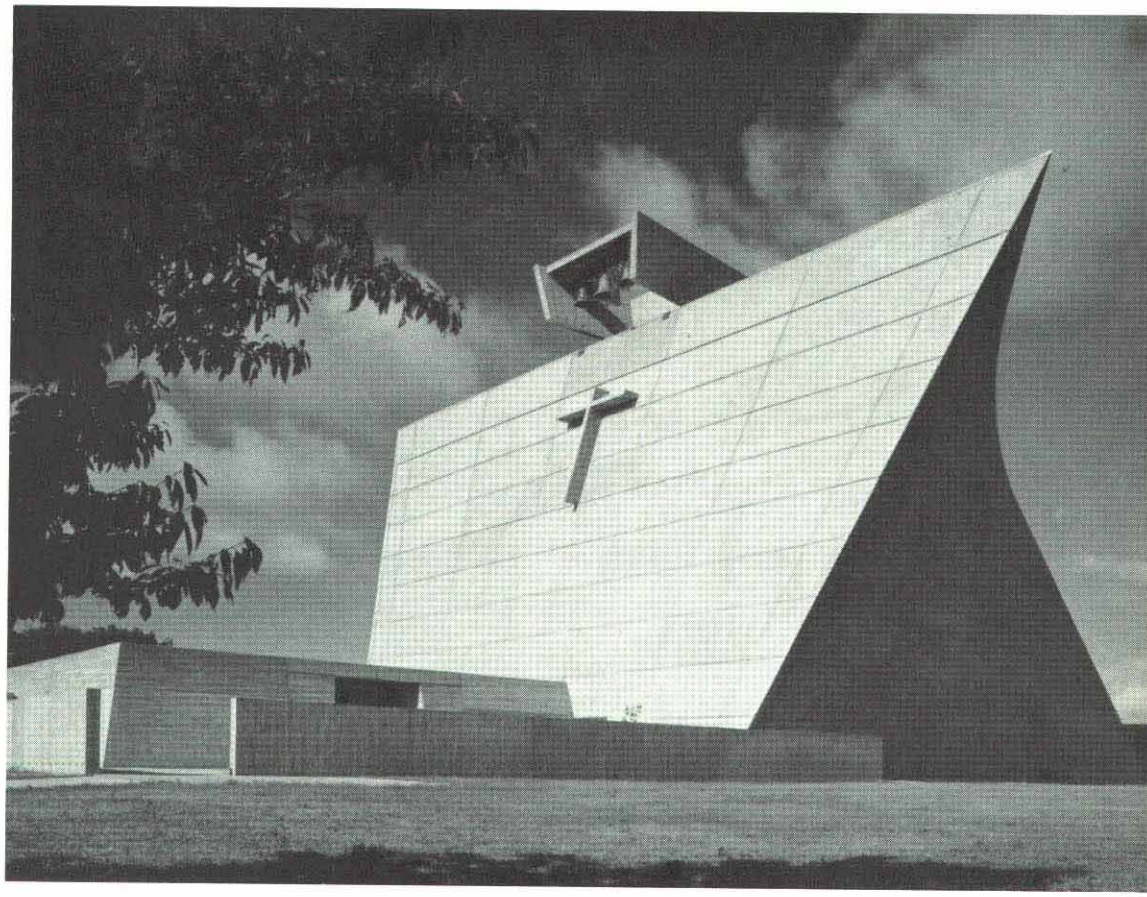


THE WORK OF Marcel Breuer – one of the original Bauhaus team and awarded this year's Gold Medal by the American Institute of Architects – is familiar as fairly strong stuff. His church and monastery at Collegeville, Minnesota; his IBM Research Centre at La Gaude, France; his Whitney Museum of Modern Art, New York and, of course, the Paris UNESCO building for which he was part of the design team – all suggest a designer who is not accustomed to mince his words. He has just been commissioned to design the tower of offices over Grand Central Station, New York. (As a matter of historical interest, perhaps some will remember the 'Garden city of the future' designed by Marcel Breuer and F. R. S. Yorke in 1936 at the invitation of the Cement and Concrete Association. See *The Architects' Journal* 26 March 1936.) Breuer seems to prefer in situ concrete, chunky, clean-lined, massively cantilevered, strongly sculptured. He understands very well the possibilities of this material.

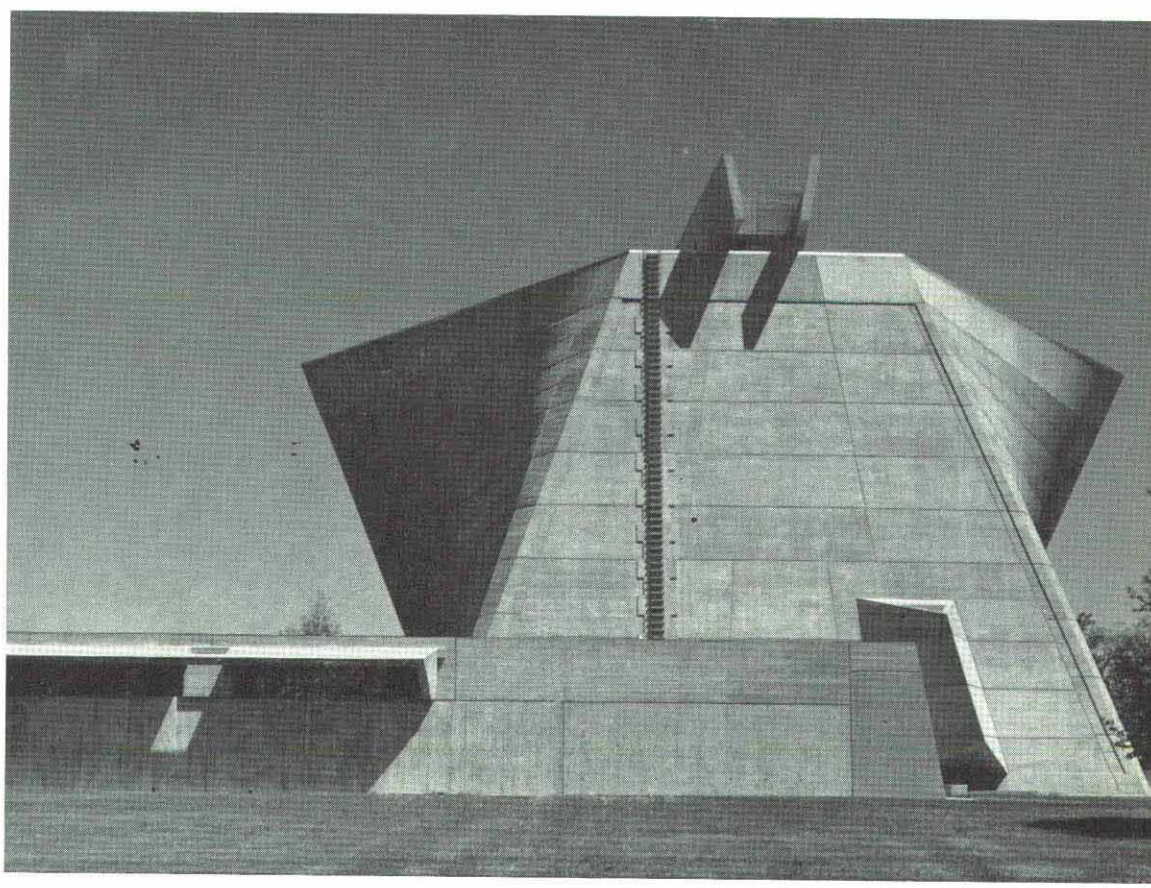
The Church of St. Francis de Sales, Michigan, USA, follows in the tradition. Appearing like some huge oversailing tent, the ground plan of the nave is a conventional rectangle from which the in situ reinforced concrete side walls rise as hyperbolic paraboloids, turning and twisting to meet the roof. The space enclosed is wide at the back and narrow at the front, so that the eye is naturally drawn towards the sanctuary and altar. The front and rear walls, are, in fact, inclined flat planes which, together with the warped sidewalls, are expected to give good acoustics.

The main body of the church is 100 ft. by 142 ft. on plan and 75 ft. high. The structure is topped by a concrete trough which houses the ventilation system and the bells – these last visible from below. Natural lighting is from skylights in the nave, and artificial lighting from a slot running the length of the roof. All exterior surfaces are of exposed board-marked concrete, with the lift marks emphasized. The strong texture of the side walls is the result of an arrangement of regular-sized boards on a surface of double curvature. Interior surfaces are mainly of exposed concrete and acoustic plaster – a neutral background for dark

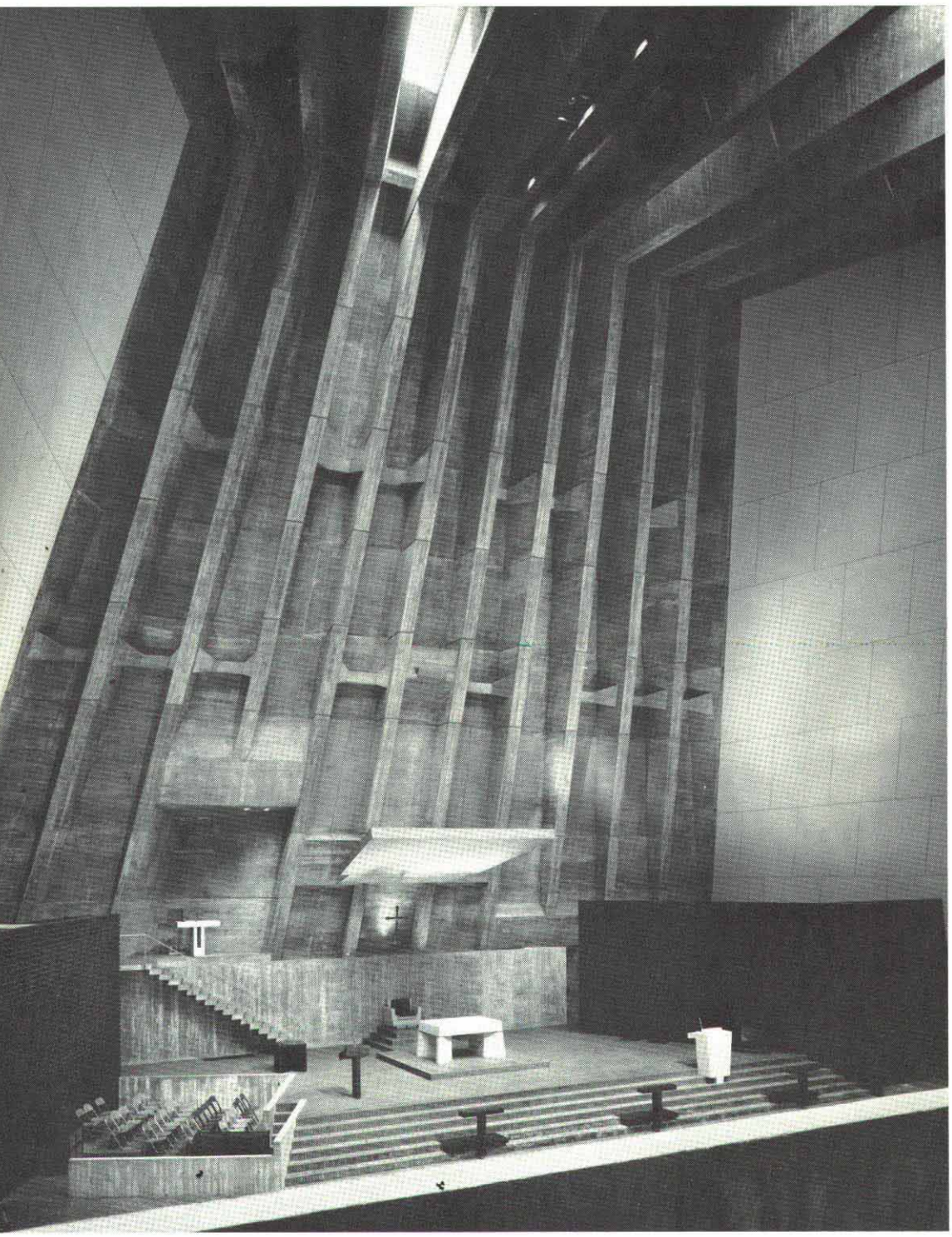
Photographs by Hedrich-Blessing.



View of the church from the north-east, showing one of the oversailing hyperbolic paraboloid side walls of the nave (in shadow). The rear nave wall, with the cross on it, is an inclined flat plane.



Rear view of the church from the north-west. The concrete structure is exposed with lift marks accentuated.



ST. FRANCIS
DE SALES CHURCH:
continued

Interior view of St. Francis de Sales Church, showing the altar and the closely spaced concrete frames which span from front to back.

oak pews and screens, rough-tooled white granite and waxed brick floors.

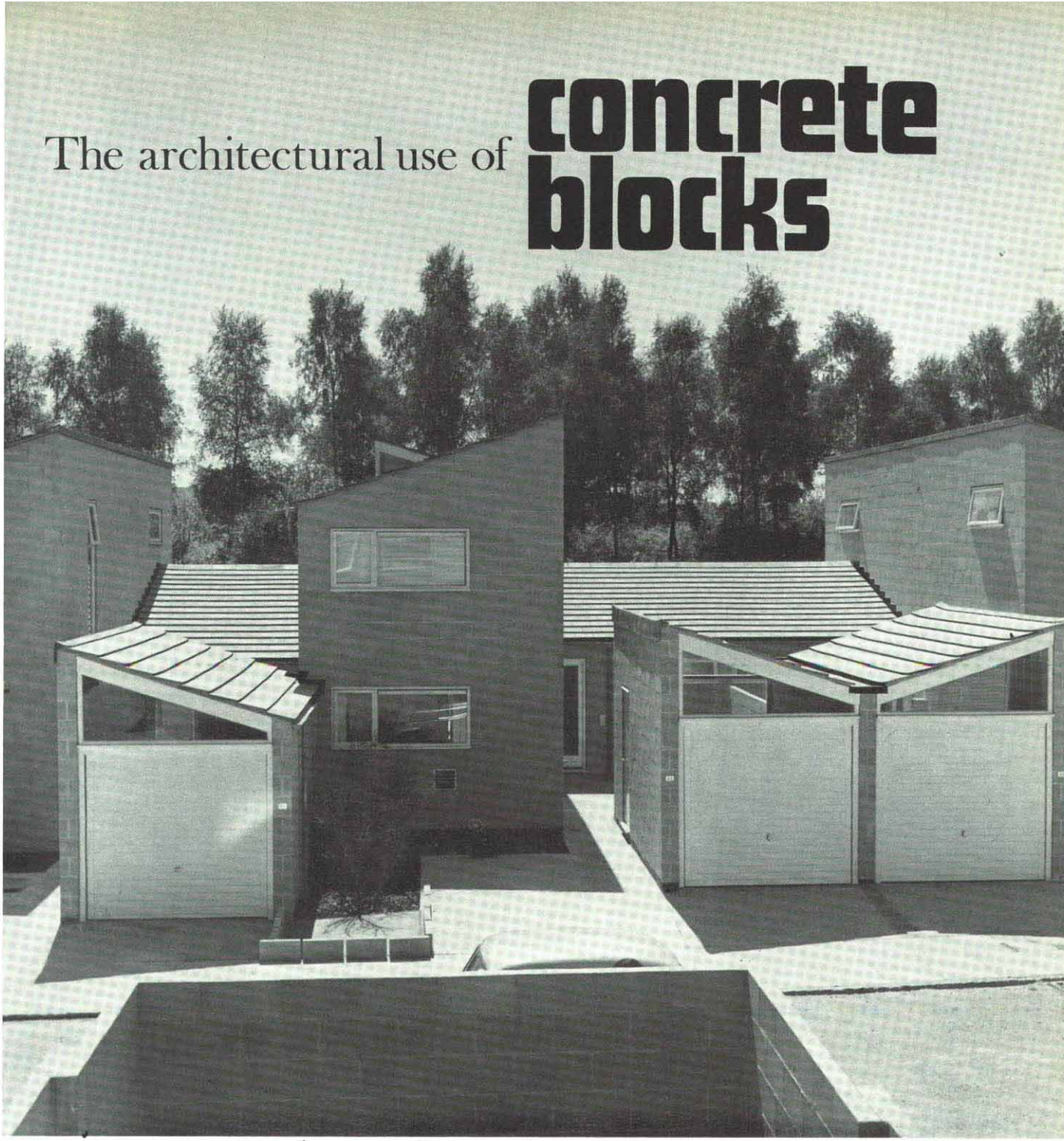
The nave seats nearly 1,000 people on the ground floor and 231 in the balcony. Visibility of the altar and lectern is helped by a 5 ft. slope to the nave floor.

The concrete structure comprises a series of rigid concrete frames spanning some 140 ft. from front to back and connecting three trapezoidal planes – the front wall, the rear wall and the roof. The hyperbolic paraboloid side walls are self-supporting, enclosing the space and stabilizing the structure.

The main body of the church is linked with two lower structures, the narthex and the refectory. The narthex is approached through a paved atrium forecourt which is surrounded by 5 ft. 6 in. high concrete walls. These lower structures again have external walls of in situ concrete, and roofs of concrete ribs and flat slabs. Internal partitions are of load-bearing concrete blockwork.

The architects say that their aim in this church has been an age-old one: 'to defeat gravity and to lift the material to great heights, over great spans. . . .' The building seems to be a successful and masterly accomplishment of this aim.

The architectural use of concrete blocks



A general view of Shrublands, Crawley (page 17), built throughout of honey-coloured concrete blocks.

Photograph: Sam Lambert.

ARCHITECTURALLY, the possibilities of the concrete block have still to be more fully exploited – in this country, at any rate, although in countries such as the United States and Finland it has for some time been part of the general scene. The reasons for our reluctance to make the most of this sound, convenient, versatile and relatively cheap building unit are difficult to understand.

Aesthetically, it has much more to recommend it than is generally supposed, with a wide range of facing blocks available. As is common in this country, the objections may have more to do with social prejudice than anything else. Associated in its plainer form with the garden shed, garage or other utilitarian structure, and in its more textured form with the bridge

CONCRETE BLOCKS:
continued

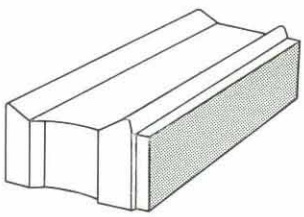
abutment or flower border in the municipal gardens, the concrete block has not yet had a fair run for its money which, as already mentioned, can be little.

Particularly does this apply in the field of housing – especially housing up to four storeys where concrete blockwork can now be very suitably and economically used as a loadbearing and facing material. And if lightweight blocks are used there will be the added advantage of excellent thermal insulation. Building with blocks is, of course, a relatively easy operation, requiring no special plant or equipment. As with many other materials, however, it requires care in laying because the appearance of a concrete block wall is entirely ruined by ragged and untidy mortar joints. On the other hand, a concrete block wall can be built about twice as quickly as, say, a brick wall, with obvious economies in labour, and a recent report puts its relative speed higher still. A further economy lies in the fact that good blocks are very accurately dimensioned in thickness and can therefore be fair-faced on both sides, obviating the need for any plaster work.

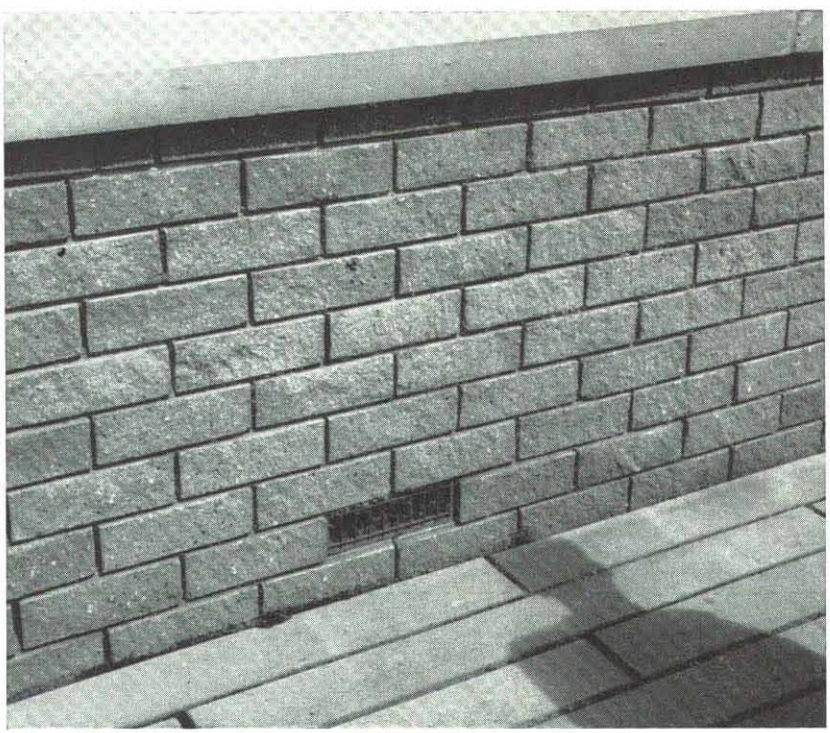
One of the main snags lies in the continuous control joints which will be necessary in large unbroken areas of block walling, to prevent cracking due to the inherent shrinking qualities of blocks. This, it is true, needs a bit of thought to decide where in a structure they are best placed from the practical and aesthetic points of view. But this is all part of understanding how to use blockwork which, like other materials, has its special properties, and the solution may well lie in avoiding the necessity for such joints as much as possible. In this country we are not yet very used to coping with this problem. For instance, the architects of the outstandingly good housing scheme at Crawley, illustrated in this article, say that their main difficulty in this respect was to find someone with design experience of this type of housing whom they could consult.

As mentioned, the choice of concrete blocks for structural and facing purposes is wide, ranging in texture from the glassy smooth to the rugged, and in colour from white to black with a useful range of greys in between (the Cement and Concrete Association will be pleased to advise on availability and types of block, and issues two data sheets *The design of loadbearing concrete blockwork to CP 111:1964* printed in two parts – *General information, ds2a* and *Basic compressive stresses, ds2b*). Broadly speaking, the types of facing block available are the plain block, the exposed aggregate block and, for special purposes, the profiled block. More generally, concrete blocks may be dense, lightweight, aerated, solid, hollow or cellular. Standard sizes. conforming to the new BS 2028 (the 1968 edition replaces those of 1947 and 1953) are commonly 18 in. by 9 in. by 3, 4, 6 or 8⅝ in. thick. Blocks can, however, be obtained in other sizes, the most important variant being the modular block designed to the standard 4 in. module. This has face dimensions of 16 in. by 8 in. and is lighter to handle than the larger size. Blocks are also made to give course heights of 4, 8 and 12 in., in lengths of 16, 20 and 24 in. A wall with a 4 in. course height will naturally be more expensive than a wall with an 8 in. course height.

The following are among the most interesting recent examples of concrete blockwork from the architectural point of view.

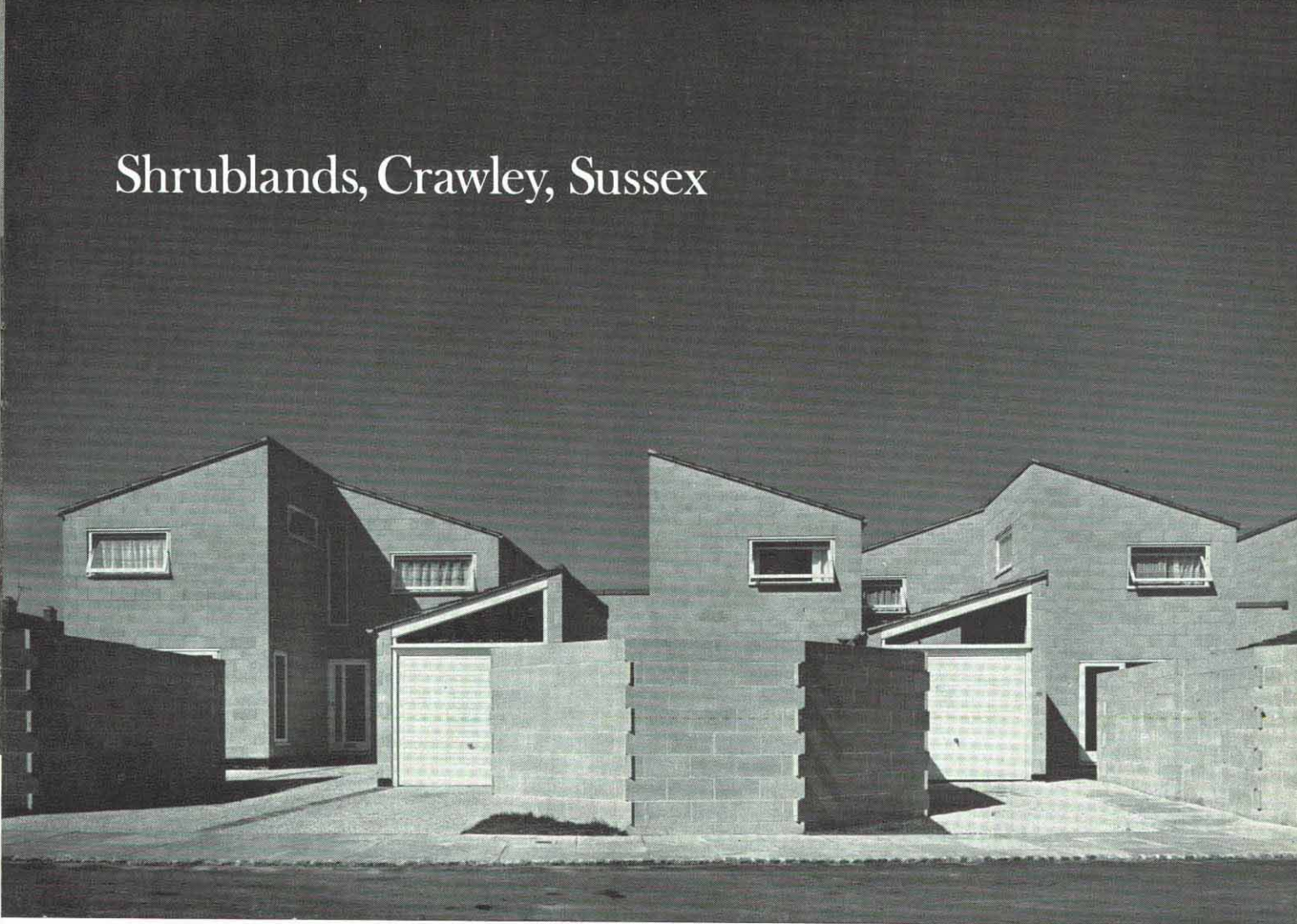


Left: Sketch of a Norwegian type of split block which is profiled on its contiguous surfaces so that mortar is trapped and cannot escape to the outer face. The vertical and horizontal joints then appear recessed.



A section of walling using this type of split block, at the School for Dumb Children, Bretvedt, Oslo (Concrete Quarterly 74). Note the clean appearance of joints.

Shrublands, Crawley, Sussex

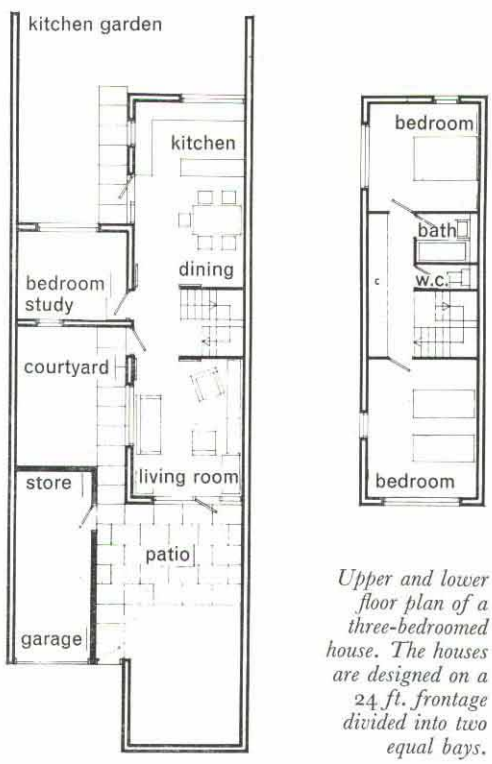


Photograph: Colin Westwood.

A terrace of houses at Shrublands, Crawley, showing the variety given by the placing of garages and garden walls, and the monopitch roofs. The use of a single facing material – concrete blocks – is a strongly unifying factor.

Architects: Phippen/Randall and Parkes
Contractors: Saunders (Contractors) Limited

The factors uppermost in the architects' minds when they designed this ingenious housing scheme were flexibility and low cost. Shrublands is a successor to The Ryde, Hatfield (*Concrete Quarterly* 72), which is a single-storey group of houses also built of concrete blocks and designed by the same architects. At Crawley the houses are mostly two-storey, with some three-storey, and are again built entirely of honey-coloured concrete blocks made by Lignacite (South Eastern) Limited. Construction was relatively cheap and therefore allowed a spaciousness which is unusual in this type of housing. As at Hatfield, planning has resulted in a close-knit arrangement of partly enclosed courtyards through which the houses are entered, giving a sense of individuality to each living unit. From the street, the houses – although terraced – appear almost to be detached because of the deeply indented plans and the general principle of placing garages so as to shield front doors and to create small entrance courtyards, many of which have been delightfully paved and planted. The degree of design flexibility in the houses is unusually high. There are

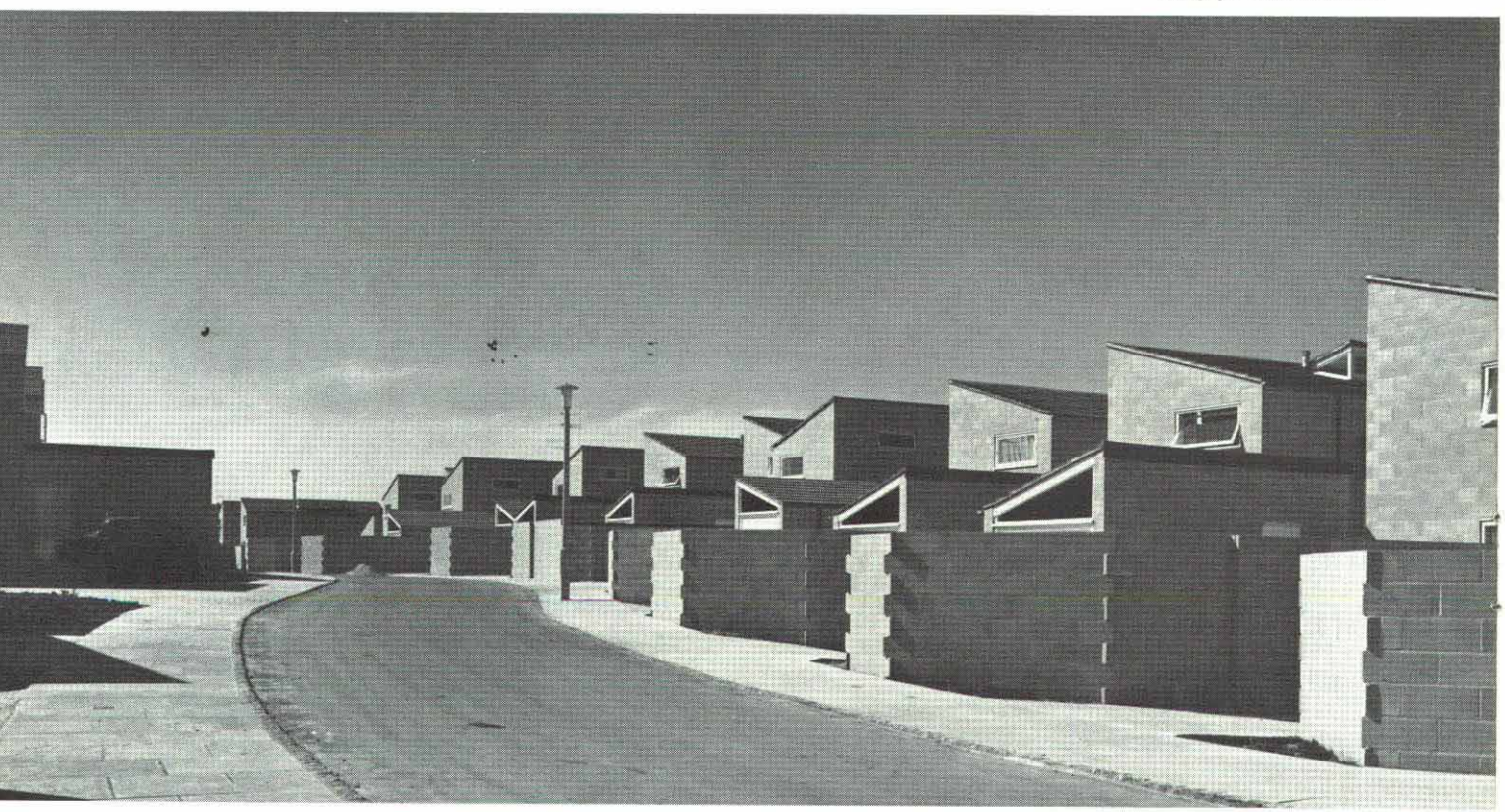


Upper and lower floor plan of a three-bedroomed house. The houses are designed on a 24 ft. frontage divided into two equal bays.

Site plan.

A street at Shrublands, Crawley.

Photograph: Colin Westwood.



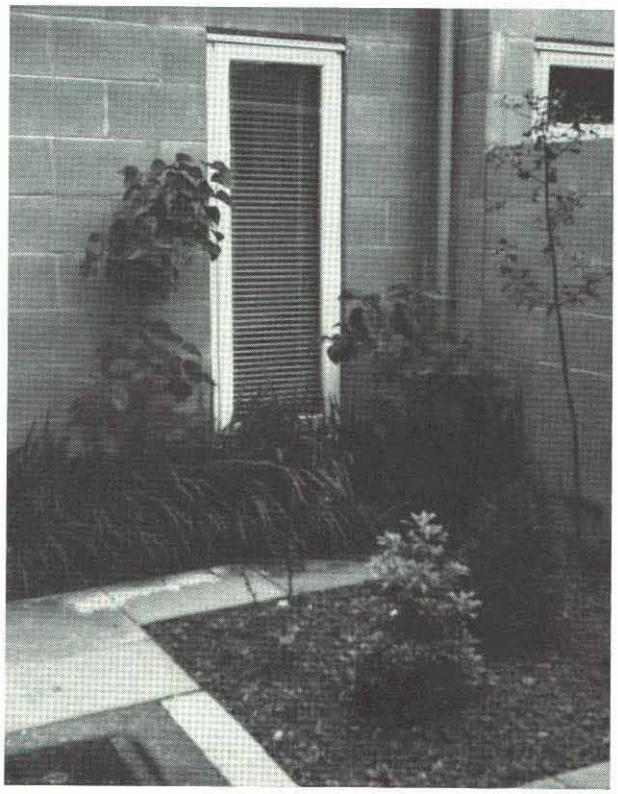
eleven different types of house plan, with from two to four bedrooms, and there were in some cases 27 optional extras with variations in planning. All the sitting-out areas have been arranged to face south, and the direction of roof slopes has also been varied to suit the orientation, allowing smaller or larger windows according to aspect. Garden walls are generally of the same concrete blocks as the houses, forming an extension of them; less permanently, fencing between gardens (which are small and manageable) is of Norfolk reed. Inside, planning is sufficiently open to give a feeling of space, at the same time allowing rooms to be closed off if required. Particularly attractive are the views from inside – sometimes through tall narrow windows at an upper level down into the garden courts, or across a vista of rooftops. Ceilings, generally, follow the pitch of the roofs, making the rooms seem extra spacious. There is an urban quality of neighbourliness about the scheme, but more important, the occupiers have been given a measure of individuality and privacy such as most of us need – and at very reasonable cost.

Shrublands is a product of the increasingly favoured housing association – in this case the Crawley Co-partnership Housing Association Limited, whose task was to develop a site of $6\frac{3}{4}$ acres with seventy-one houses and a residents' club and day nursery. Houses are acquired on a leasehold basis. The cost of a house varies from £3,610 to £5,175, according to type; the rent is combined ground rent and maintenance charge, fixed at £26 per house a year. The Association holds a 99-year lease on the site from the Commission for the New Towns and houses are bought by occupiers on a corresponding lease. The Association is also responsible for the upkeep of the club and nursery and all landscaped areas.

With the exception of the three-storey type, all houses are based on a 24-ft. frontage divided into two equal bays: one long bay two storeys high, and one short bay one or two storeys high. The short bay produces setbacks at the front and back and means that the length of party walls and sound transmission are reduced. It also means that part of the outside of a house can always be seen from inside, which increases its apparent size.

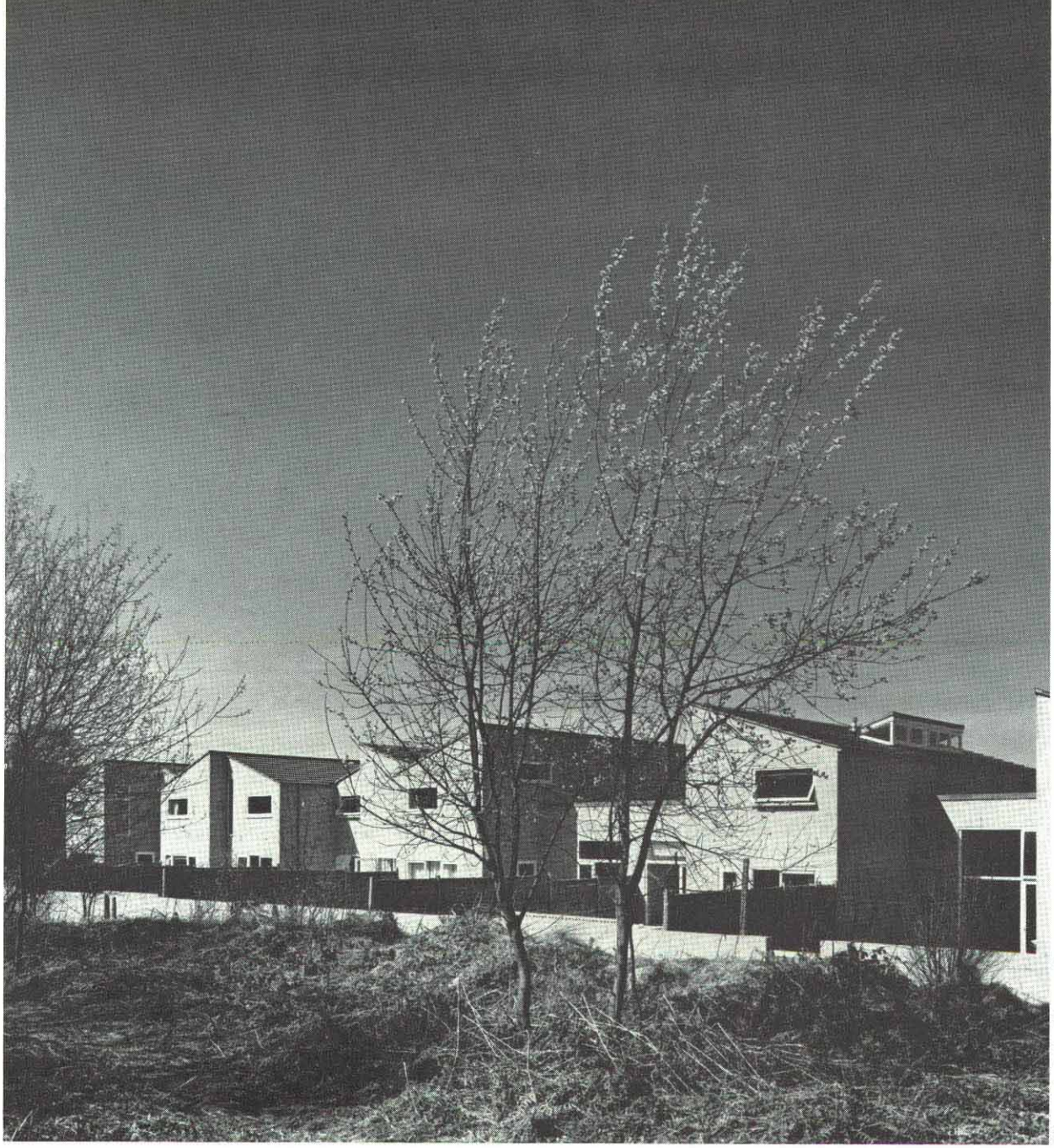
External walls are mainly 10 in. thick with a 2-in. cavity between the outer leaf of honey-coloured facing blocks and the inner leaf of lightweight concrete blocks. Partitions are of 3-in. blocks plastered. Externally, blocks are mainly 9 in. by 18 in. on the face, and openings have concealed metal lintels on the inside, so that doors and windows appear simply as holes punched in the blockwork. Window and door frames are of white-painted timber. Roofs are covered with dark blue-grey tiles.

Continuous vertical crack-control joints are provided in the centres of the long external walls and are concealed by rainwater pipes; elsewhere they are



One of the small partially enclosed entrance courts showing the care taken over planting.

Elevation of one of the Shrublands houses. Note the liveliness given to wall surfaces by the slight colour variation in the blocks.



Photograph: Colin Westwood.

Rear view of a group of houses at Shrublands, Crawley.

CONCRETE BLOCKS: *continued*

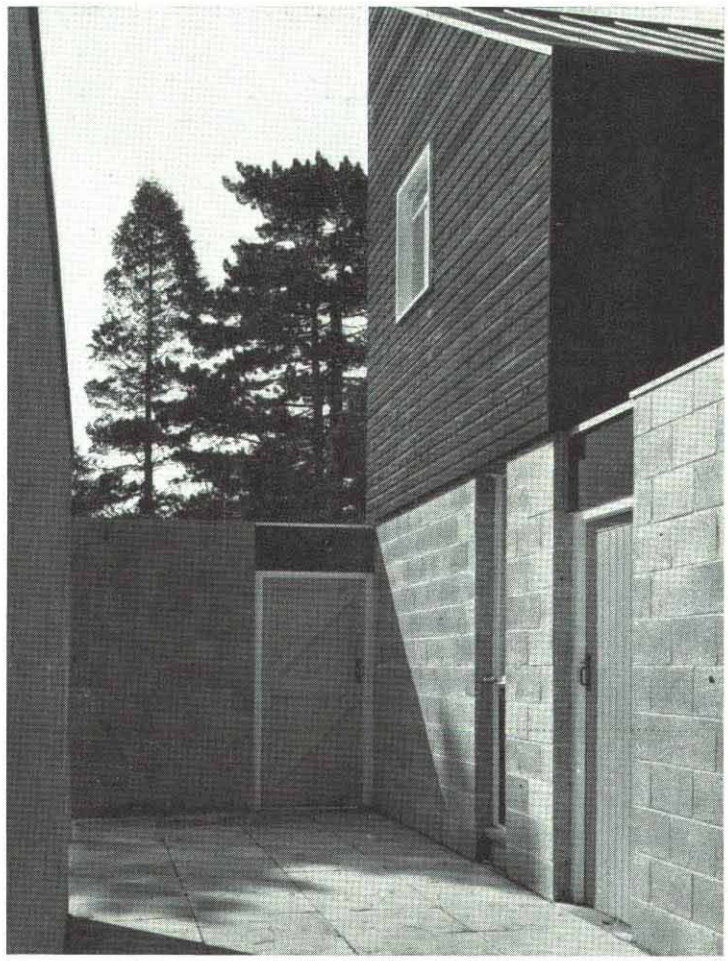
placed in corners at the junctions of intersecting walls. Joints are $\frac{3}{8}$ in. wide, the mortar being raked out externally to a depth of $\frac{3}{8}$ in.

When looking round the estate, a number of houses were inspected and owners seemed genuinely delighted with them. In some cases, standards of decoration, furnishing and garden maintenance were very high, and the sense of pride very apparent. As a lesson in the use of concrete blockwork for housing, Shrublands is one of the best yet in this country. And it seems clear that without the use of the blocks, the prices could not have been kept so low for the generous amount of space provided. Building costs worked out at about 57*s*. 6*d*. per sq. ft. But materials apart, this is surely the type of housing that would suit many of us in this country.

Staff houses, Lancaster Industrial Centre for the Spastics Society

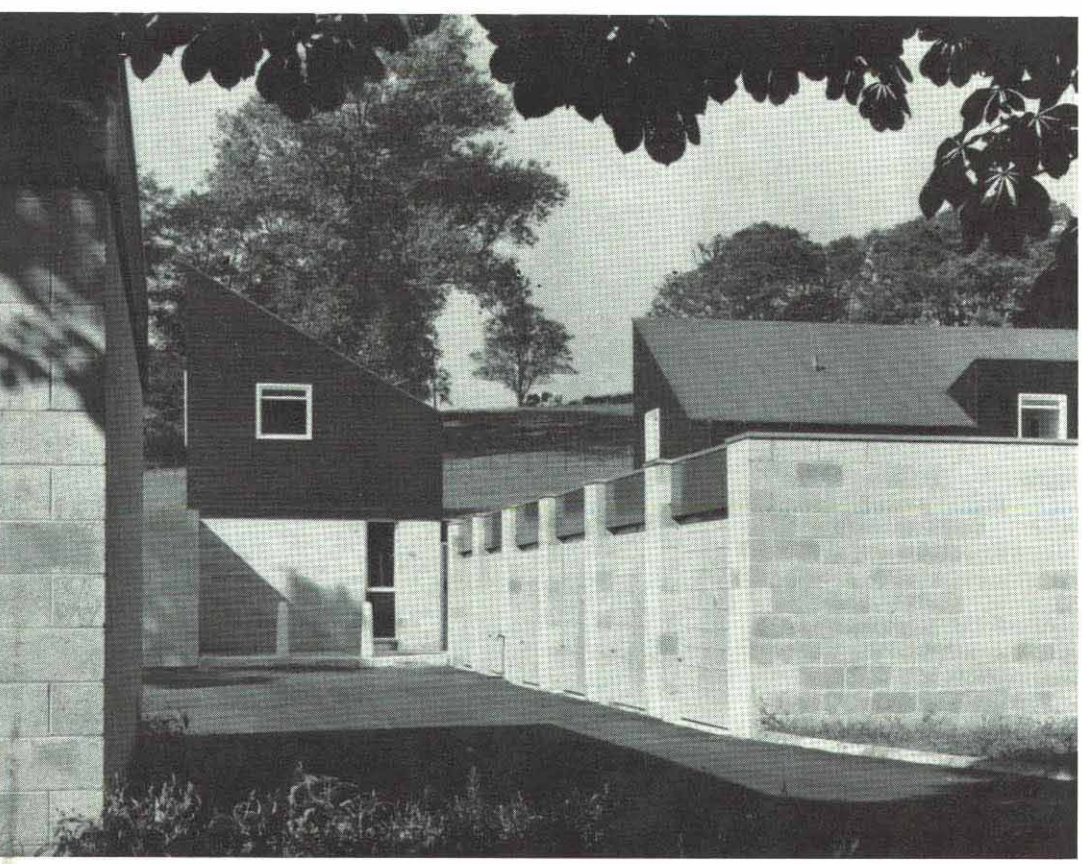
Architects: Charles B. Pearson, Son & Partners
Contractors: Charles R. Price

This small group of staff houses and lock-up garages adjoins the new residential training centre for spastics in Lancaster. It is particularly interesting as regards the use of materials, with 16 in. by 8 in. light-grey facing blocks used on the lower parts of the houses, contrasted with black horizontal boards treated with preservative in the upper parts and steeply pitched copper-covered roofs. Door and window frames are painted white. Walling is of cavity construction with an outer leaf of dense blocks and an inner leaf of lightweight concrete blocks, all made by Forticrete Limited. The harmony of colour and texture of facing materials is here very successful and might well be appropriate for many rural parts of this country.



Walled courtyard.

Photographs by E. A. Mason.



End elevation of a staff house with the lock-up garages on the right.

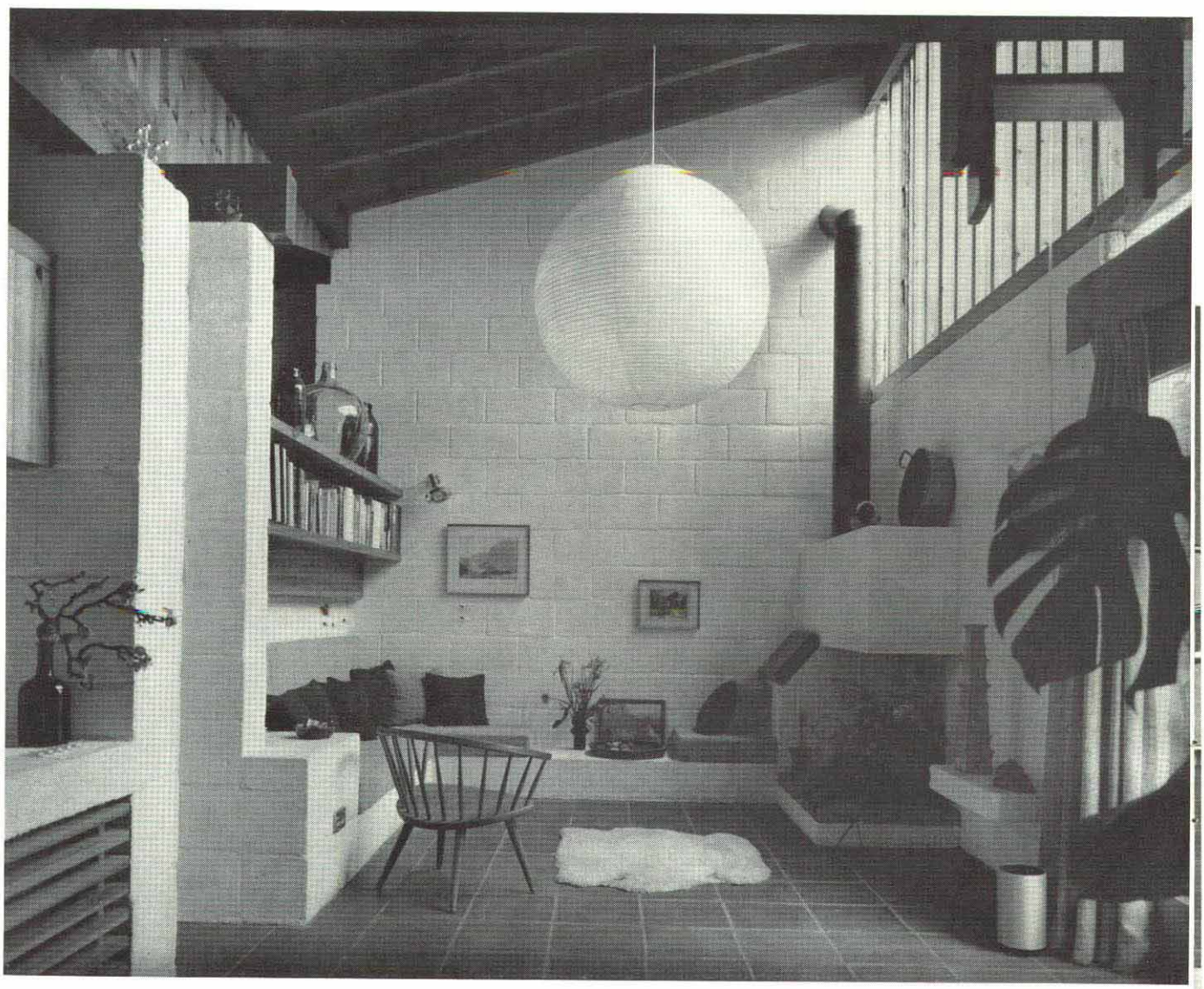
Group housing, Townside, Haddenham, Bucks

Architect: P. J. Aldington

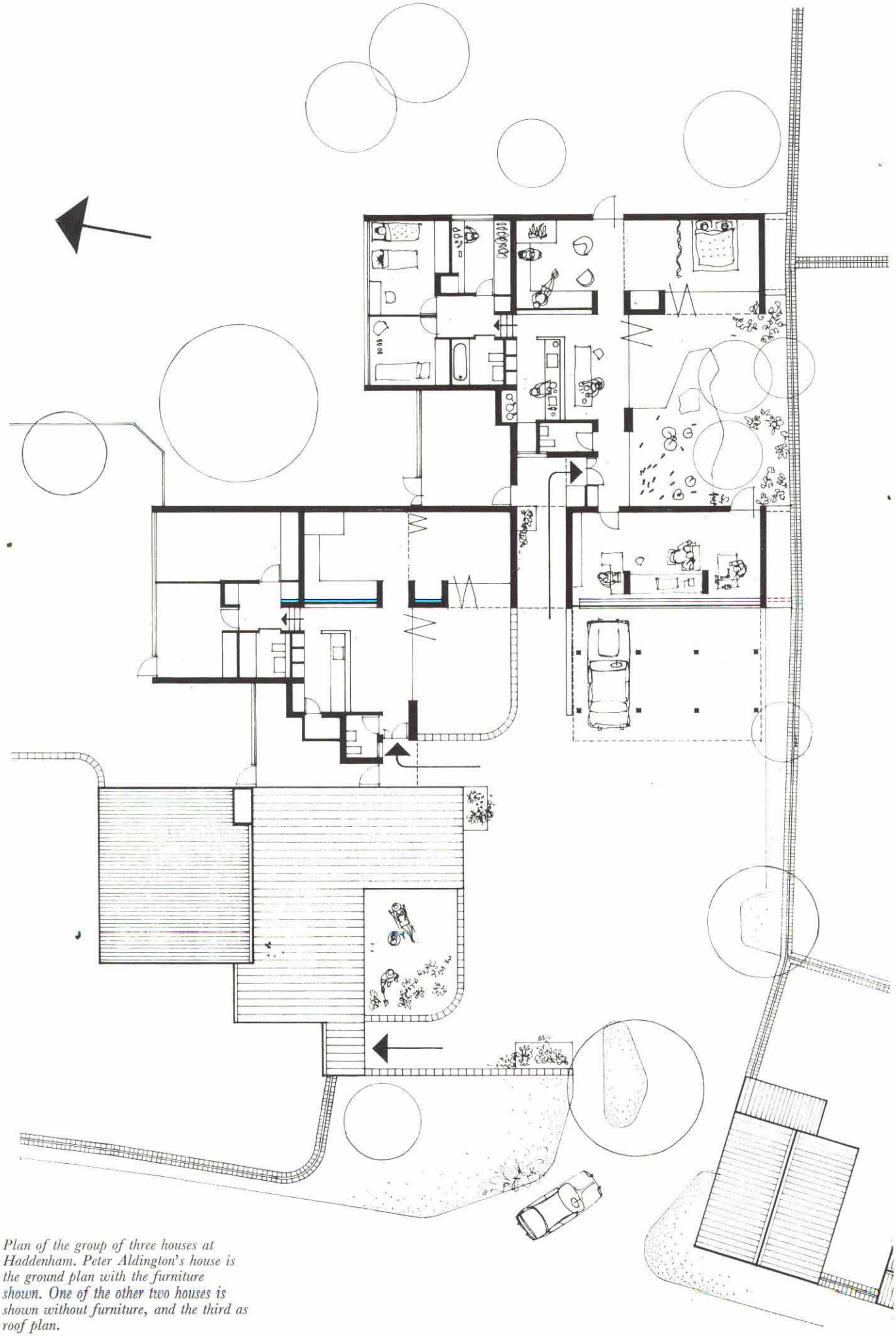
This group of three houses were designed as an integral whole, while allowing full privacy for occupants. One of them is lived in by the architect and his wife who, in fact, built it largely themselves. They put in the foundations and drainage and the concrete blockwork up to just above ground level. The upper parts of the block walls in this house were then laid by a builder, but they made all the joinery themselves and installed the timber roof members on the blockwork.

The whole is an intensely personal group of houses based on the traditions of the village. Unlike so many modern buildings which you feel might be anywhere, these houses are firmly rooted in their neighbourhood and it is refreshing to meet an architect who has respected regional characteristics – not in an eclectic way, but as a starting point for design. The idea of a group of houses sprung from his belief that in villages one ought, when possible, to build houses in groups rather than as detached units. This village has managed to retain its original character. It was originally built of local clay called 'wychert', which was puddled with straw and made into 15 in. thick walls – not only for the houses, but also for garden and link walls. The walls were then rendered. This then was the basis for these houses, and it was the

Photographs by Richard Einzig.

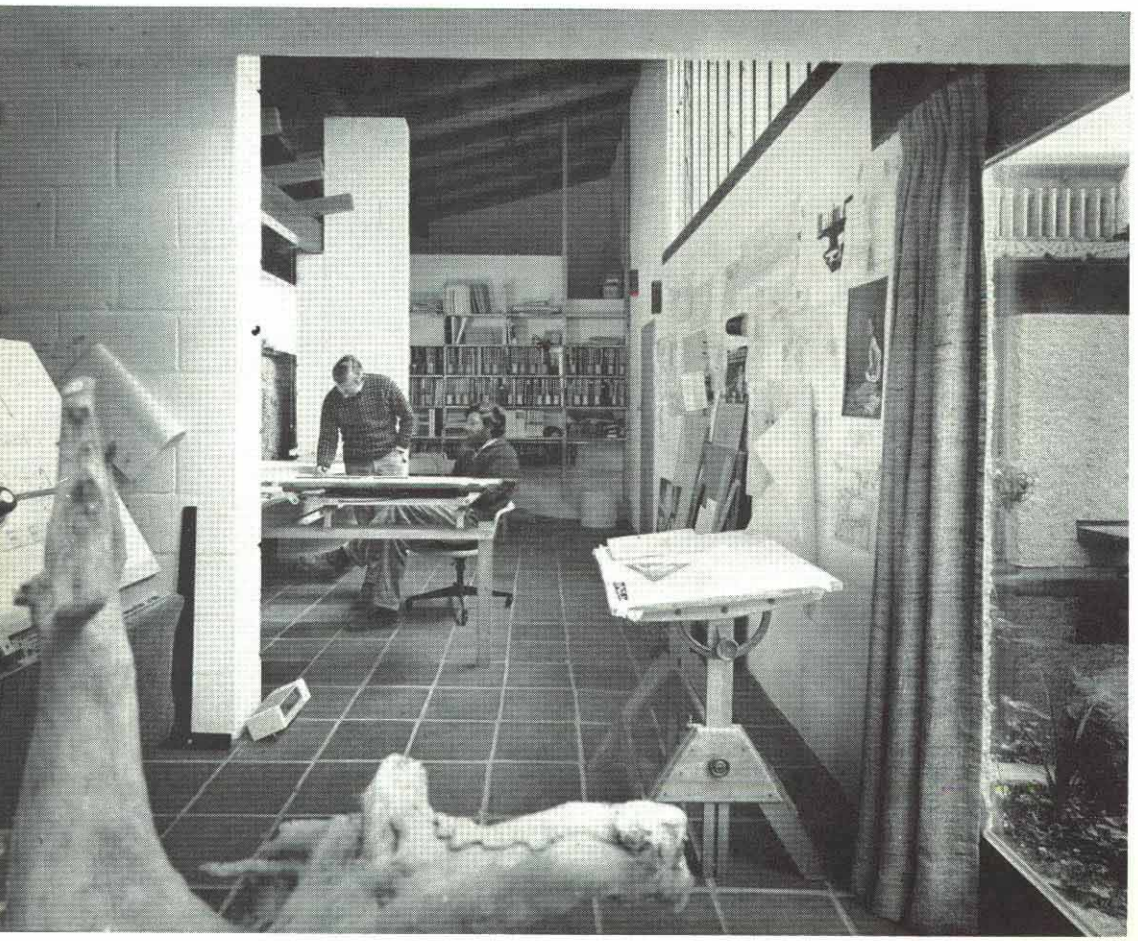


Peter Aldington's house – view of the sitting area. Concrete blocks are exposed throughout internally and painted white.

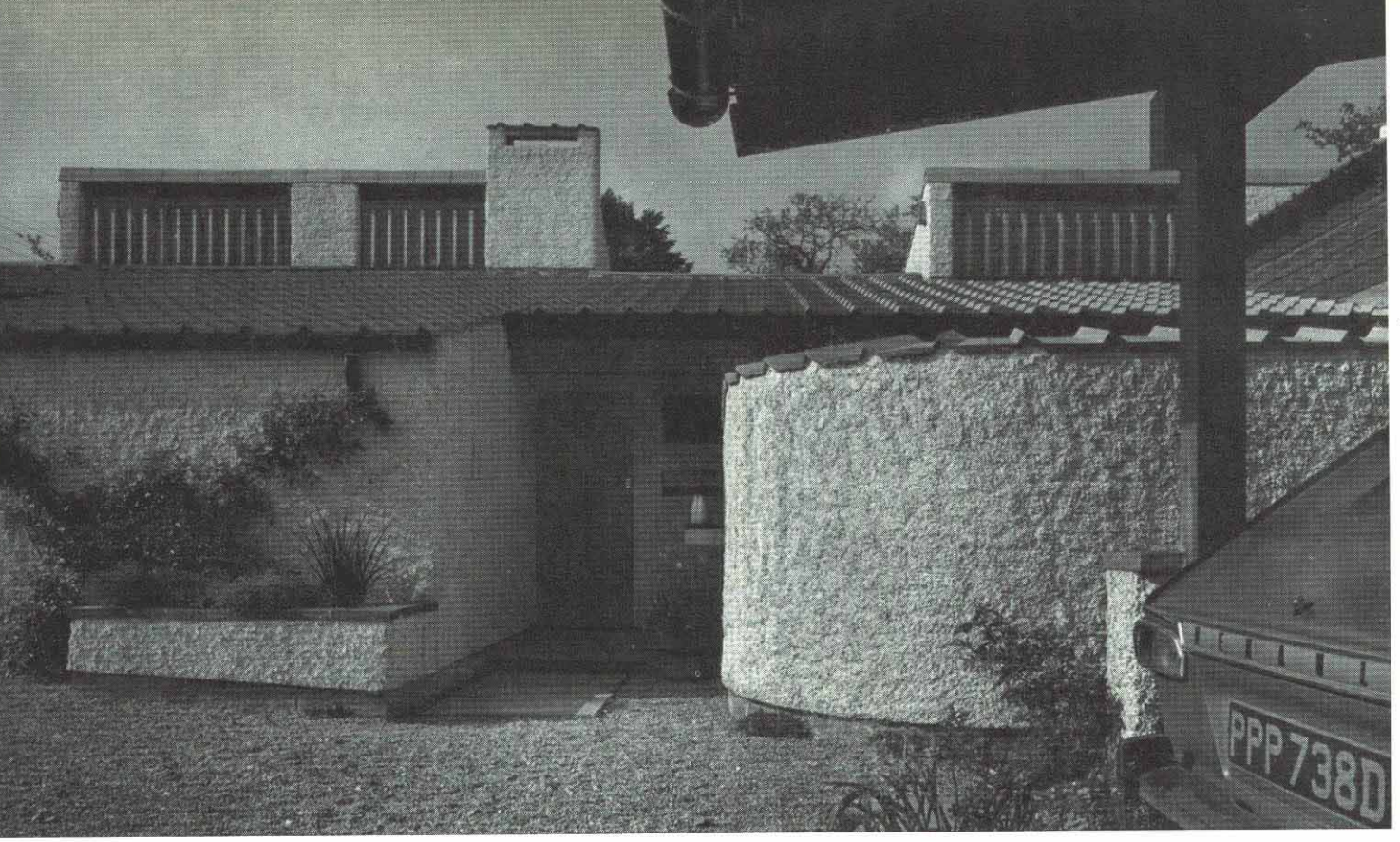


Plan of the group of three houses at Haddenham. Peter Aldington's house is the ground plan with the furniture shown. One of the other two houses is shown without furniture, and the third as roof plan.

House at Haddenham – view from the sitting area looking towards a bedroom. An existing original wall is preserved at the far end, lit from above. The loft can be used as another 'room', or for storage. Exposed white-painted concrete block walls can be seen on the left and right.



Peter Aldington (seated) in his drawing office which is separated from the main part of the house by double doors. Walls are of white-painted concrete blocks, ceiling of natural timber, floor of red quarry tiles. A glimpse of the water garden can be seen through the window on the right.



The concrete block walls of the Haddenham houses have a strongly textured rendering externally which is in keeping with the local vernacular.

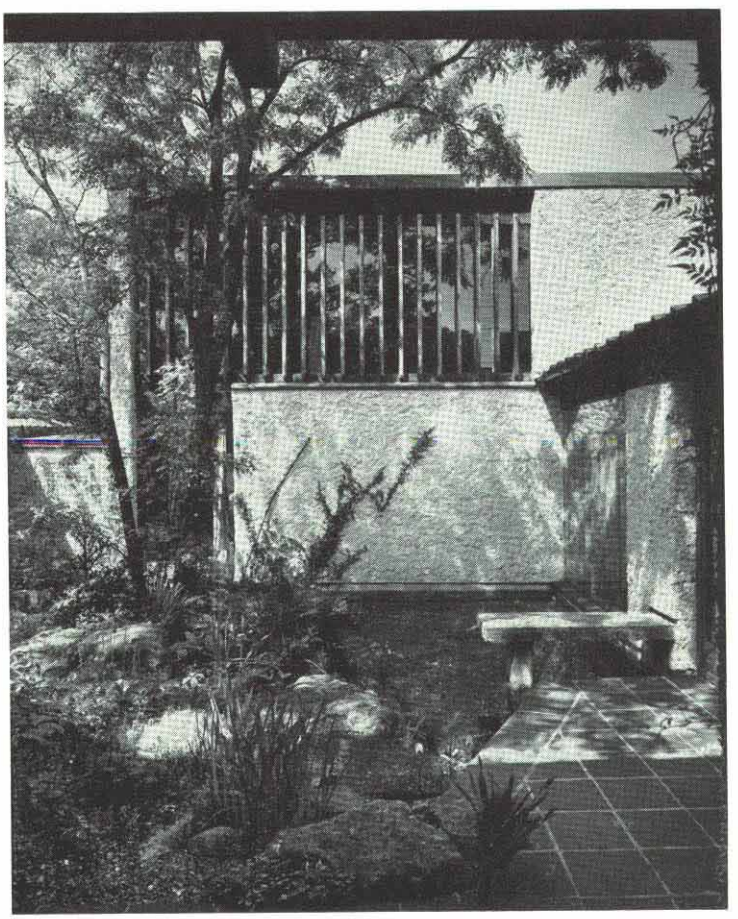
architect's desire to choose materials which had some real affinity with these traditional materials that led him to use concrete blockwork exposed within and rough-rendered on the outside in a way that evokes the neighbouring wychert walls.

The external walls and many of the internal load-bearing walls are of solid 9 in. aerated concrete blocks made by Durox Building Units Limited. The external rendering has a positive function in protecting the blockwork from the weather and is very strongly textured. The rendering was made up of two initial coats of 1 : 6 cement/sand with a plasticizer, and a final coat made up of $\frac{1}{4}$ in. shingle, lime and cement thrown onto the second coat while wet. The result is a rough slurry dash which was then sprayed with near-white emulsion, partly to prevent the rendering from absorbing unsightly patches of moisture. Inside, the blockwork is exposed and painted white. Structural roof timbers are also exposed and treated with a clear lacquer. Roofs are tiled with Redland 'Delta' tiles in a terracotta colour which will eventually mellow with the growth of moss and algae, as have the old corrugated pantiles of the district. Floors are mainly 12-in. square red quarry tiles.

The planning of Peter Aldington's house is as personal as its expression, and the kitchen is treated as another living room at the centre of the house, off which all rooms open. A small but delightful enclosed water garden adjoins the entrance hall, and there is also a fine sweep of open garden at the rear with an old walnut tree around which part of the house was planned.

This group of houses represents an honest straightforward use of concrete blocks related to the materials of the neighbourhood. They are economical in construction, and warm – an aspect which the owners of the houses notice particularly.

The delightful water garden, with the entrance hall adjoining on the right.



House at Groton, Massachusetts, U.S.A.

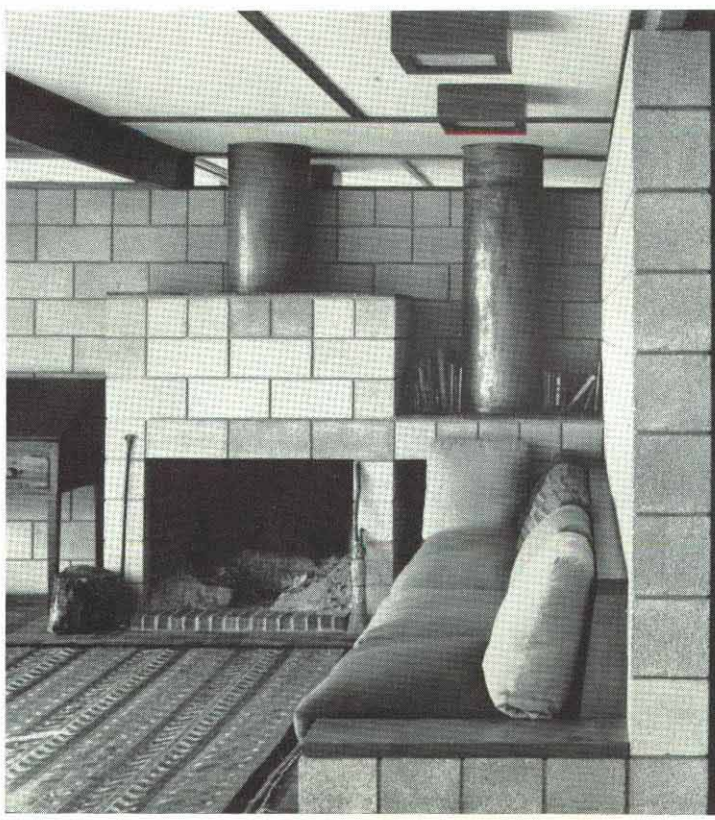
Architect: Maurice Smith

All the examples of blockwork in this article are British, except for this American example, included because – after all – more has been done in the United States with blockwork than any other country in the world. Also this seemed an interesting example of plain standard blockwork used in a house in an uncompromisingly frank manner. In some ways, there are similarities between this house and Peter Aldington's houses, in the way that the material is used for built-in furniture and fireplace surrounds as well as walls, giving an integrated appearance to the house as a whole. Here, however, the blockwork is not painted inside nor rendered outside, but is fairfaced on both sides, lightly textured and has dark contrasting joints (very clean it should be noted) which are an important factor in the appearance of the walls. The concrete blocks are used with timber framing. The house was built for a family and a special point about the planning is that the concrete block walls have been used to divide up the interior space into flexible loosely defined areas rather than rigid self-contained rooms.

Photographs by John Donat.

Above: The exterior of the house at Groton, Massachusetts.

Above: A corner of the sitting room.



Left: Note the integrating effect of concrete blocks in walls, fireplace surround and built-in furniture.

Interior view of the house at Groton. The concrete blocks are used to form dividing 'screens' rather than rigidly defined rooms.

Lecture Theatres, Essex University

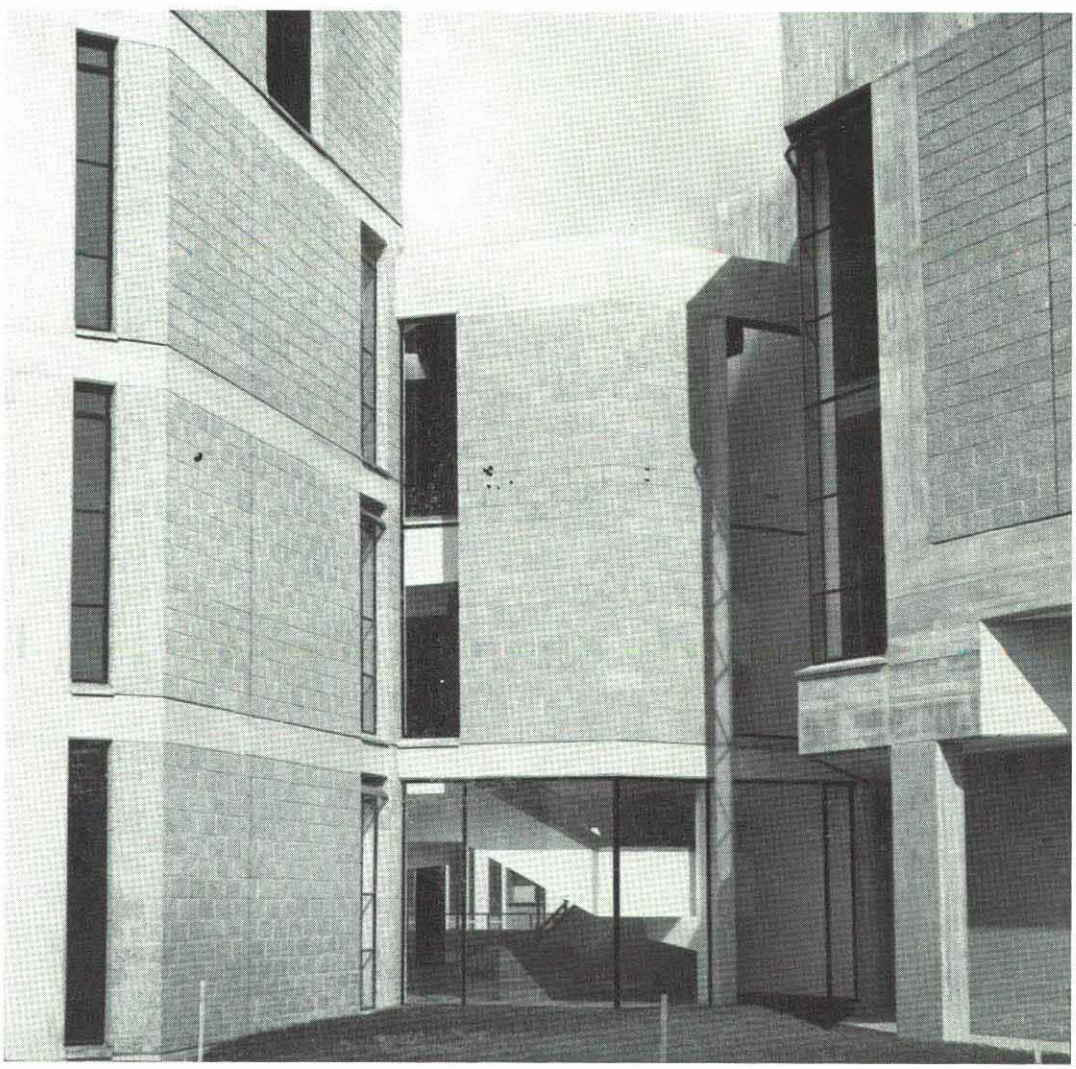
Architects:	H. T. Cadbury-Brown and Partners
Structural engineers:	Clarke, Nicholls and Marcel
Contractors:	Richard Costain (Construction) Limited

So far we have shown loadbearing blockwork for domestic purposes. The use of concrete blocks for infilling panels in framed structures is, of course, another important use of the material. Perhaps there is some special advantage in doing this when a concrete frame is exposed, because of the like materials. And there is still the vital question of thermal insulation.

One of the best recent examples of concrete blockwork used in this manner is the lecture theatres at Essex University. This central lecture-theatre building serves the whole of the new university designed by the Architects' Co-partnership. The lecture theatres are reached by a bridge from a raised platform which enters the building at second-floor level. The building houses nine lecture theatres with seating for 1,800. The largest of these seat 300 and 450, the remainder each seating 100–150, which are placed in two towers. The space between these theatres is top-lit and has a free arrangement of stairs, lifts and balcony approaches. This is altogether a very interesting building and it seems a pity for the purposes of this article (and for lack of space) to single out the one aspect of the concrete blocks. All the same, the contribution that these have made to the building as a whole is worth noting. The infilling panels are formed of cavity construction with an outer skin of lightweight concrete blocks which have a $\frac{3}{8}$–$\frac{3}{4}$ in. exposed aggregate of pinkish-grey Cornish granite, made by Flynn Brothers (Concrete) Limited; joints are raked. The inner skin is of lightweight concrete blocks painted white internally. The walls are carried at each floor by the in situ reinforced concrete frame.

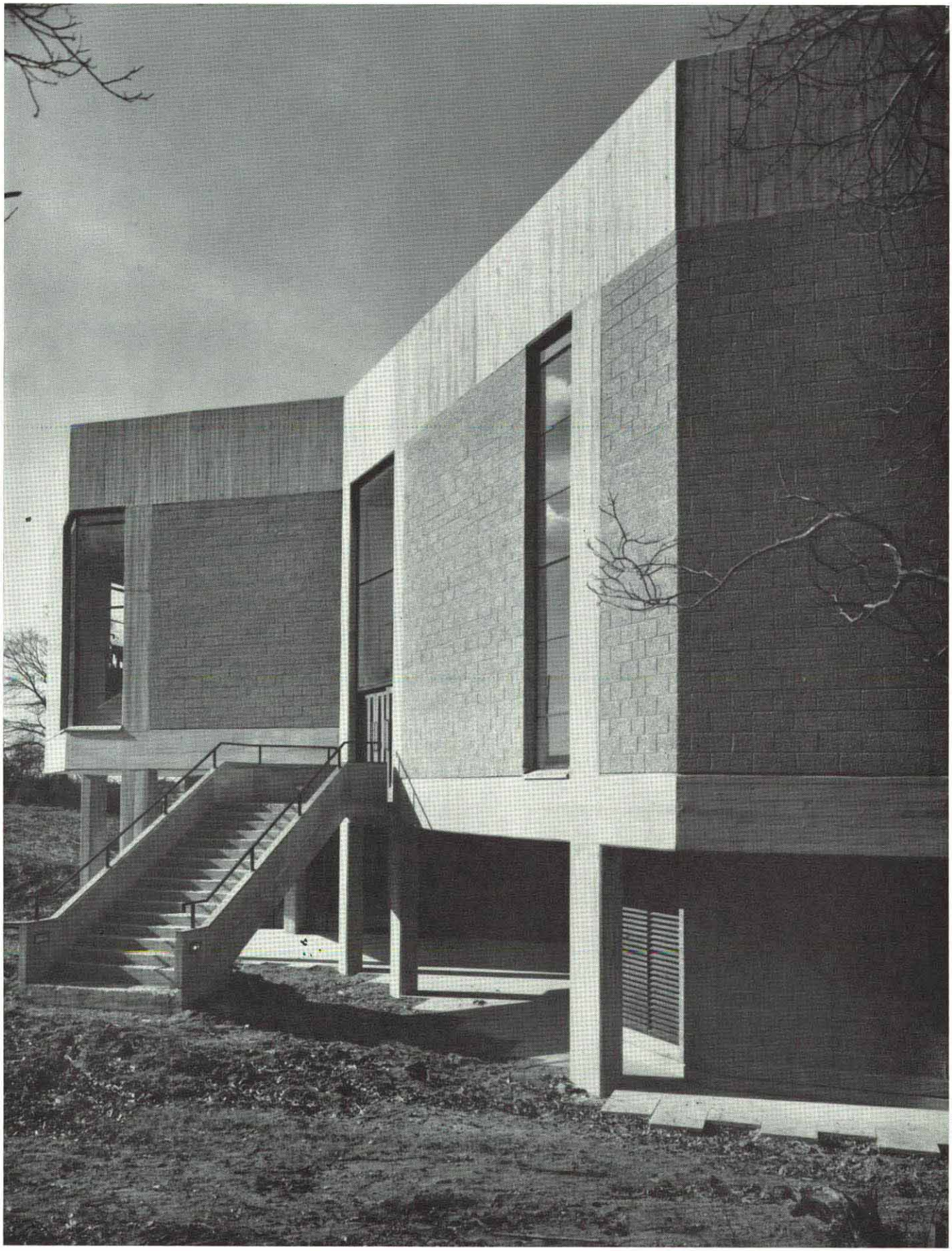
From the outside there is a quiet harmony about the building which seems to arise partly from the affinity of materials in the blockwork and the exposed frame.

Photograph: H. T. Cadbury-Brown.



Lecture theatres, Essex University. View of the junction of the entrance and circulation area with the higher lecture-theatres. The continuous vertical joints in the blockwork allow for contraction or expansion.

Photograph: The Architectural Review



External view of the Essex University lecture theatres showing the infilling panels of concrete blocks which have a pleasant exposed aggregate of pinkish-grey Cornish granite.

Photograph: The Architectural Review

The hall, stairs and access gallery to the lecture theatres, Essex University. Lightweight concrete blocks internally are painted white.

House at Feock, Cornwall

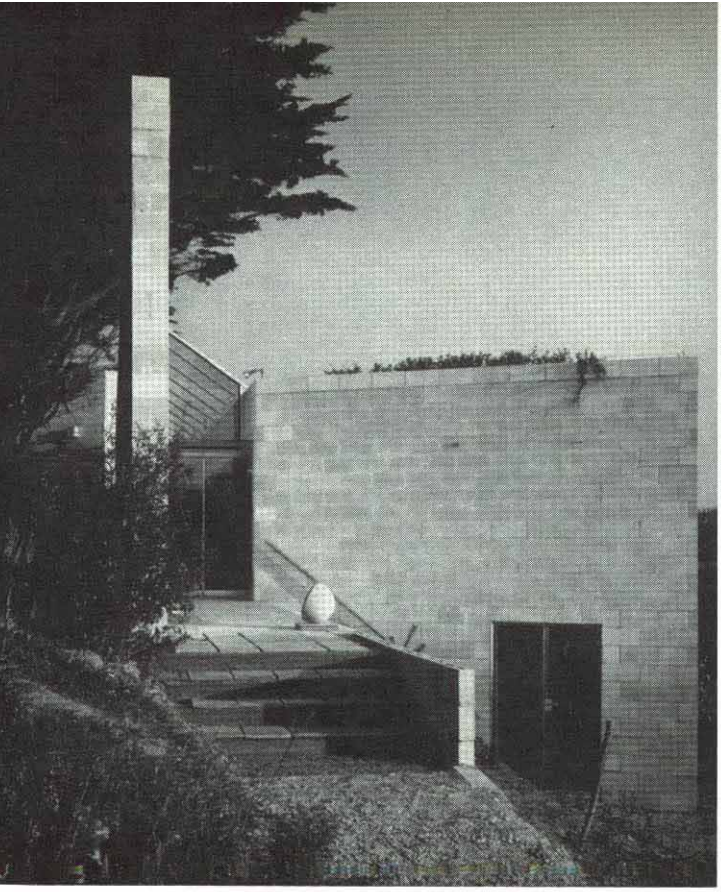
Architects: Richard Rogers, Norman and Wendy Foster

Contractors: Percy Williams and Son Limited

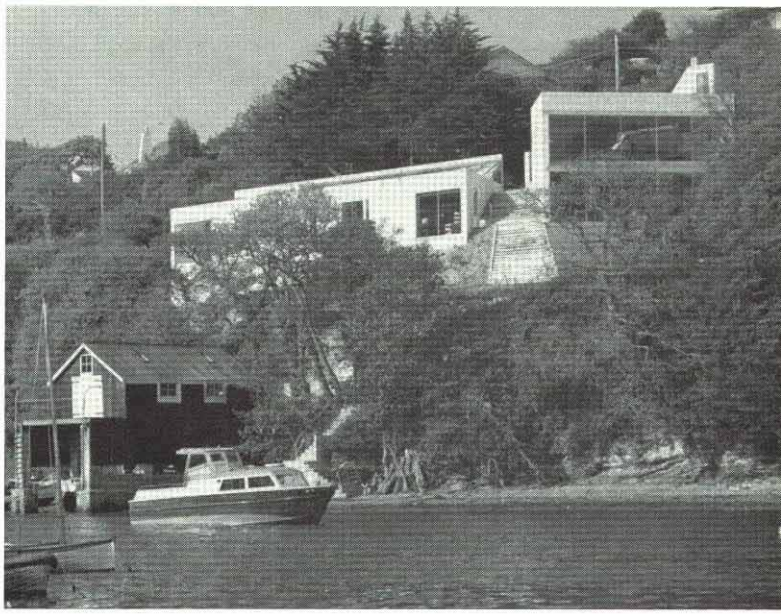
This seaside house, built into the cliffs overlooking Pill Creek in Cornwall, has a magnificent outlook. The plan is roughly L-shaped with a flight of steps to a boathouse partly dividing the house at the corner of the L. The house is built on two levels and includes a long top-lit picture and sculpture gallery which connects all the rooms. At the top of the site, the house is shielded from the road by an 18 ft. high blank wall which runs the 145 ft. length of the house. The two-storey wing with living-room and dining-kitchen faces south across the sea. The main part of the roof is earthed over and planted with creepers which will eventually trail over the house.

All the walls are of light buff-coloured modular concrete blocks, exposed inside and out, made by Forticrete Limited. The plain natural walls are used as a neutral background for paintings and sculpture. These are dramatized by the ingenious planning which makes space flow into space and gives vistas down through a void and along the gallery.

The block walls are complemented by floors of blue Welsh slate and frameless sliding windows with aluminium or stainless steel fittings. The choice of materials seems absolutely right both for the Cornish setting and as a natural background for the display of works of art.

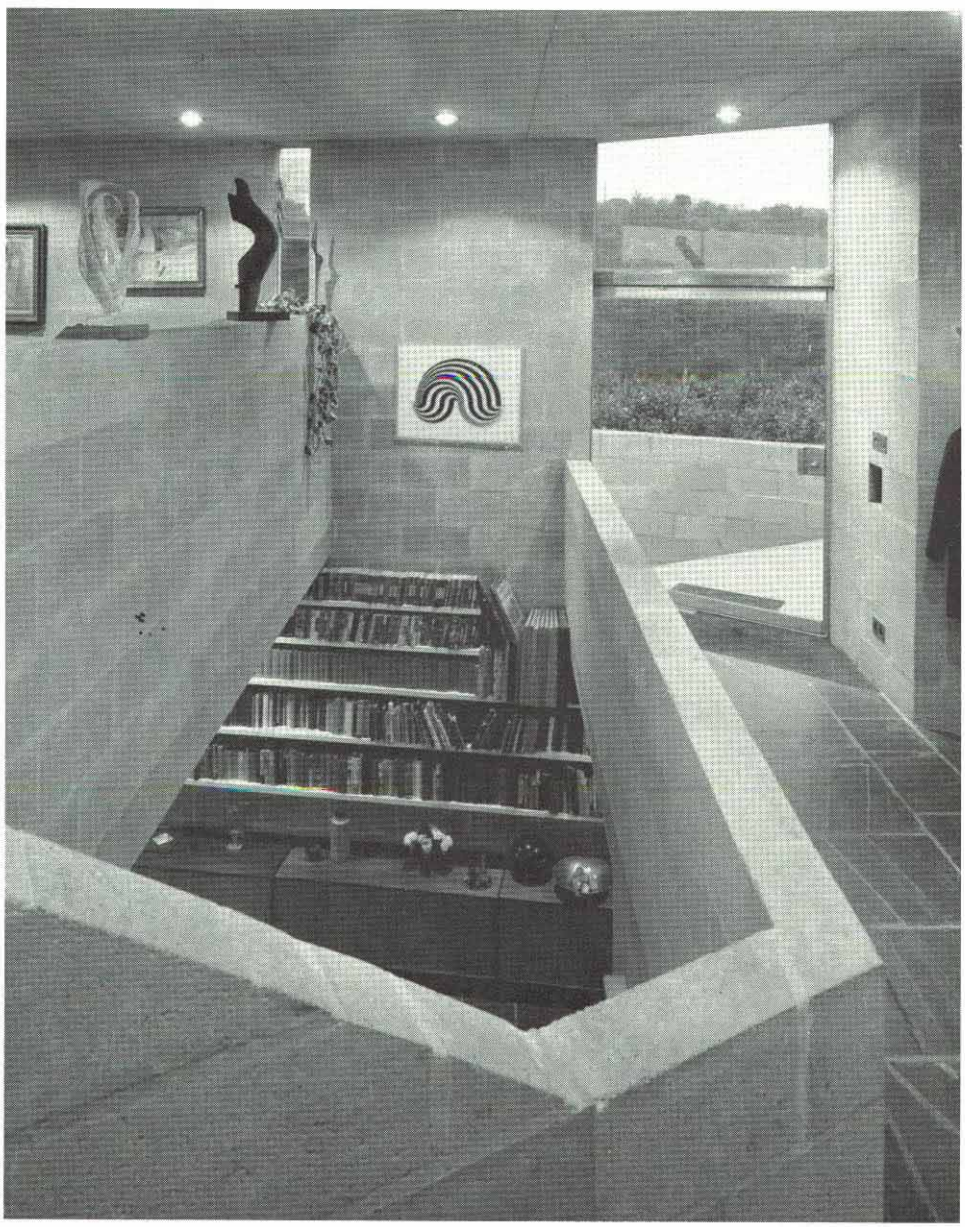


Entrance approach to the house at Feock, Cornwall. Walls are of light buff-coloured modular concrete blocks. See also frontispiece.

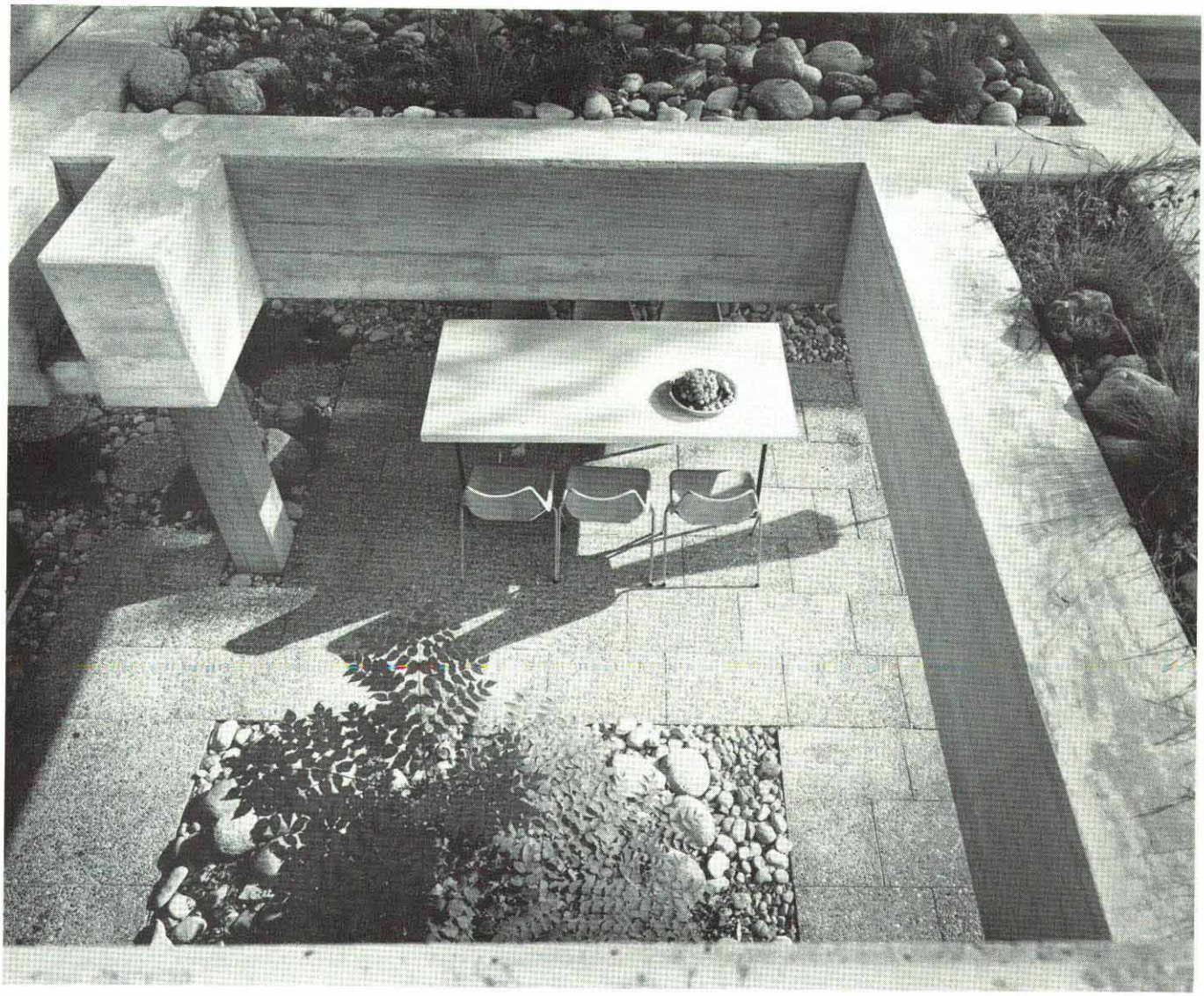


General view of the house from the water.

Photographs by Richard Einzig.



The concrete blocks are exposed internally and form a neutral background for pictures and sculpture.



Photograph: Richard Einzig.

THE TOWN GARDEN

WHAT DO town-garden owners want from their gardens? Probably more than anything a retreat – a place to get away for a while from the turmoil of the town. It is a place to relax, to be quiet and private – and perhaps to entertain.

So, what is wanted? A place to sit, which won't be damp, where such sun or shade that there is can be caught; an extension to the house, where people can eat, drink, chat, and read.

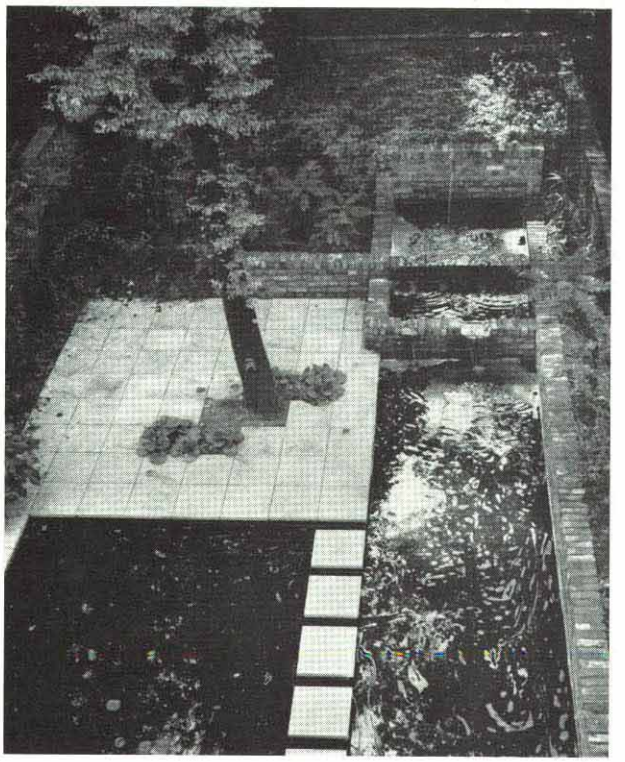
Town gardens are usually small, so a simple treatment is generally the most effective, with uncluttered, quiet-coloured hard areas and permanent features, letting the plant material provide the variety. Planting is, of course, the most flexible, the most easily changed of the ingredients and its range can be extended by the cunning use of pots and containers. Even in a London garden, if a riot of colour is wanted, it can be had.

Water is an essential part of the eastern courtyard garden and even in our damp climate, it almost invariably enhances a small garden. It is the most soothing of companions. A small pool, or fountain –

Photograph: Richard Einzig.

Left opposite, and above: Garden in Stuttgart, Germany. The architect Wilfried Beck-Erland has designed this house, office and garden for himself on a busy corner site. Because of the sloping site, the garden terrace (opposite) could be level with the living area of the first floor, with a good south-west aspect. So it becomes a delightful extension to the house as a sunny dining terrace. The exposed aggregate paving and pebble-strewn beds are easy to maintain – note the infill planting. Also easily maintained is the narrow garden strip (above) down the side of the house.

Photograph: John Brookes.

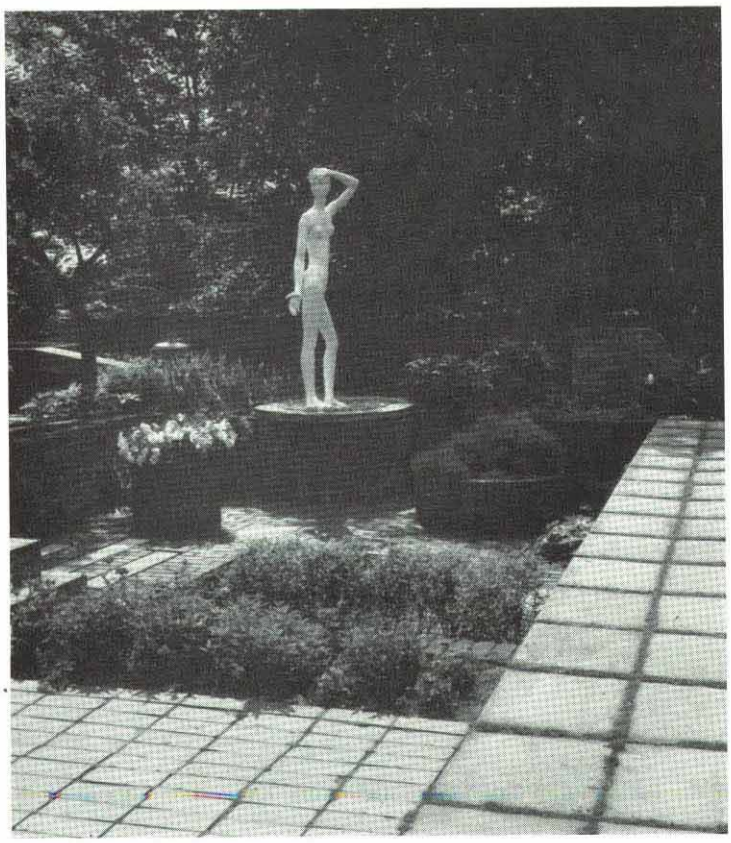


Garden in Shepherd's Bush, London. As raw material this is a typical London town garden – long, narrow, surrounded by brick walls and with one large tree. The designer, John Brookes, has made it almost entirely a water garden with an 'island' of concrete paving under the shade of the tree, and a waterfall in the corner. Stepping stones of concrete slabs on piers of 4½ in. brick link the house and island. The shade-tolerant planting forms a subdued background.

and perhaps a piece of sculpture – are all agreeable additions.

Making a town garden a real asset in one's life isn't daunting. With common sense and inventiveness it can be done cheaply, without too much effort and without requiring much upkeep. Concrete is very useful in all these respects. Paving is nearly always wanted and the range of size, shape, colour and texture obtainable from precast concrete products manufacturers is now very wide indeed. There are various sizes of small concrete walling units, including a good range of concrete facing blocks for building walls of one sort or another, and, of course, numerous patterns of pierced concrete blocks for open screen walls. Some of these – particularly the simple patterns – make good dividers, giving an impression of greater size, and mystery in small areas. Concrete plant containers come in all sorts of shapes and sizes and fountain units are also available. Small pools are not difficult to make.

The handful of gardens illustrated show some of the ways in which a town garden can be made into a real delight.

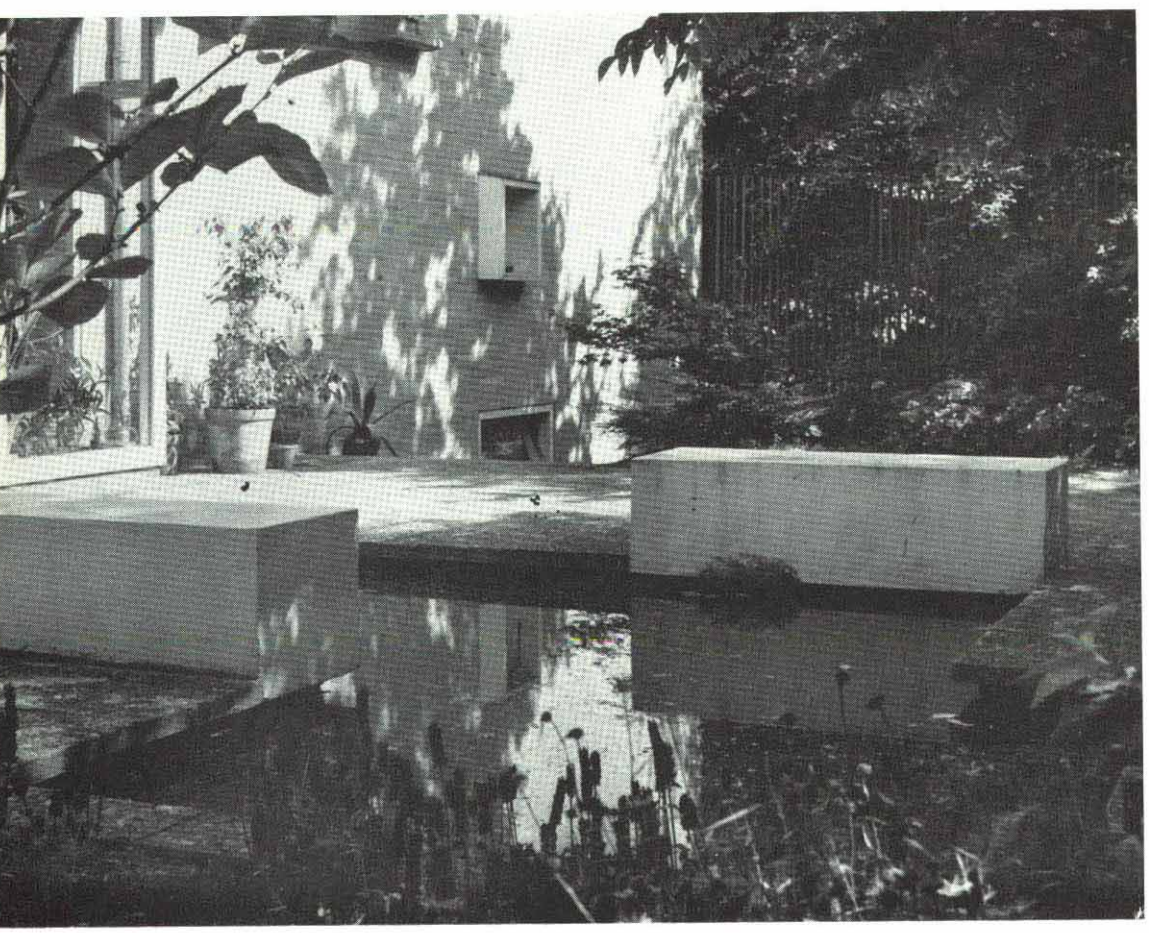


THE TOWN GARDEN: *continued*

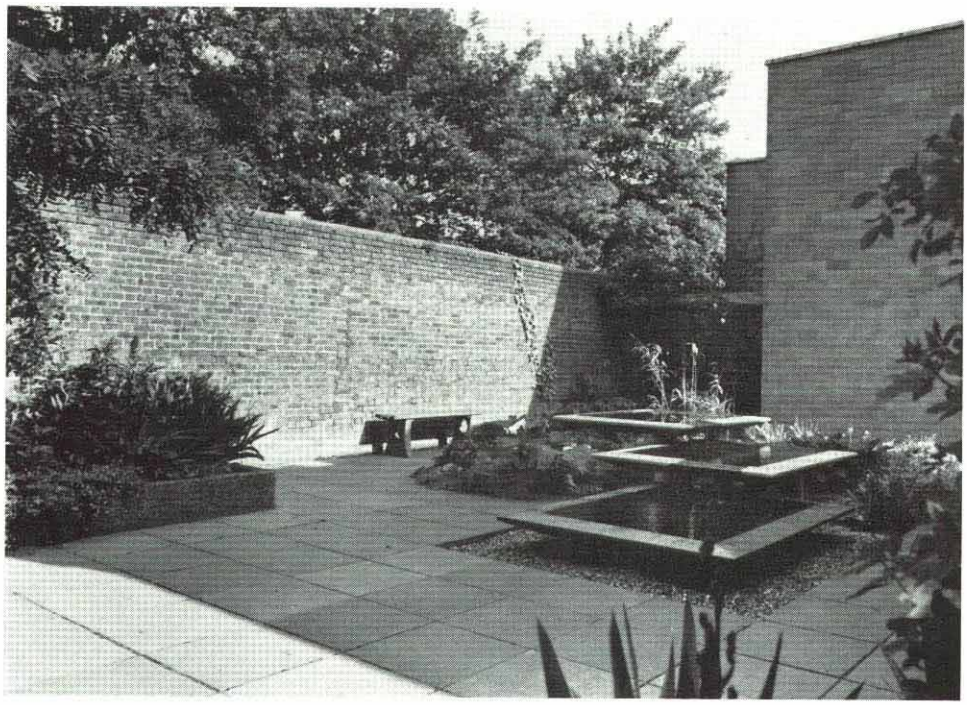
Garden in Highgate, London. Hard areas and small beds are combined in the garden of the architect Leonard Manasseh. Daphne Hardy-Henrion's sculpture – a pale figure, arresting against the dark green background – acts as a focal point for the garden.

Opposite right: Town garden at Wexham Springs, the Research Station of the Cement and Concrete Association. This small garden is 28 ft. by 70 ft. – about the size of many town gardens – and was designed by Sylvia Crowe PPILA. Its main elements are standard concrete paving, raised concrete pools and raised flower beds. These are simply combined to provide a peaceful area with a seat in the sun, and water to watch as it gently trickles from pool to pool. The three pools, supported on low fluted columns, are of precast concrete cast with Lee Moor sand and bush-hammered to expose the Cornish de Lank granite aggregate. Stone chippings, differently coloured for variety, cover the bottom of each pool. The flower bed surrounds are precast with the Clee Hill granite aggregate exposed by brushing. The paving is 2 ft. square 'Texitone' slabs. The skilful planting concentrates largely on easily maintained perennials.

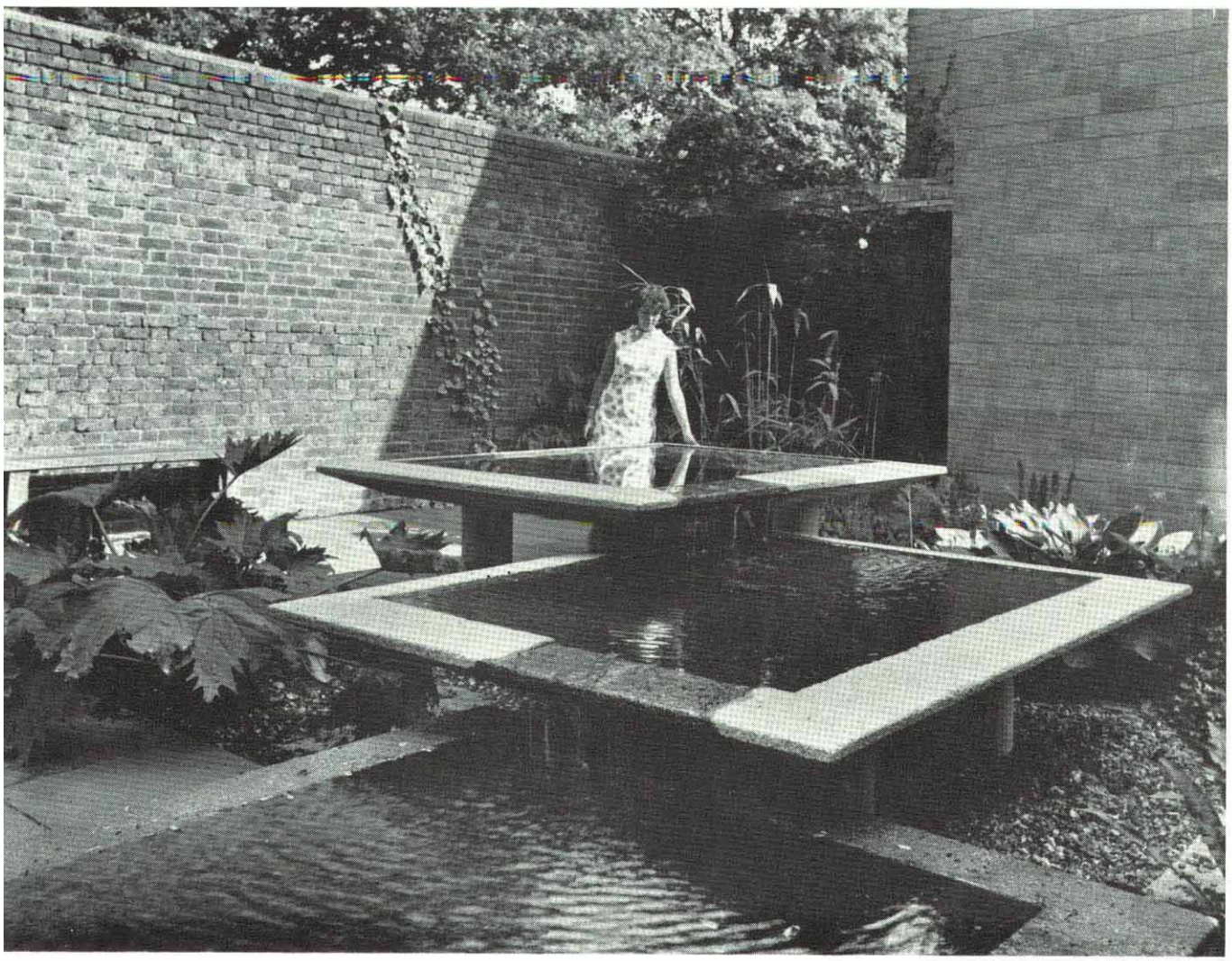
Photographs by Abelard-Schuman Limited.

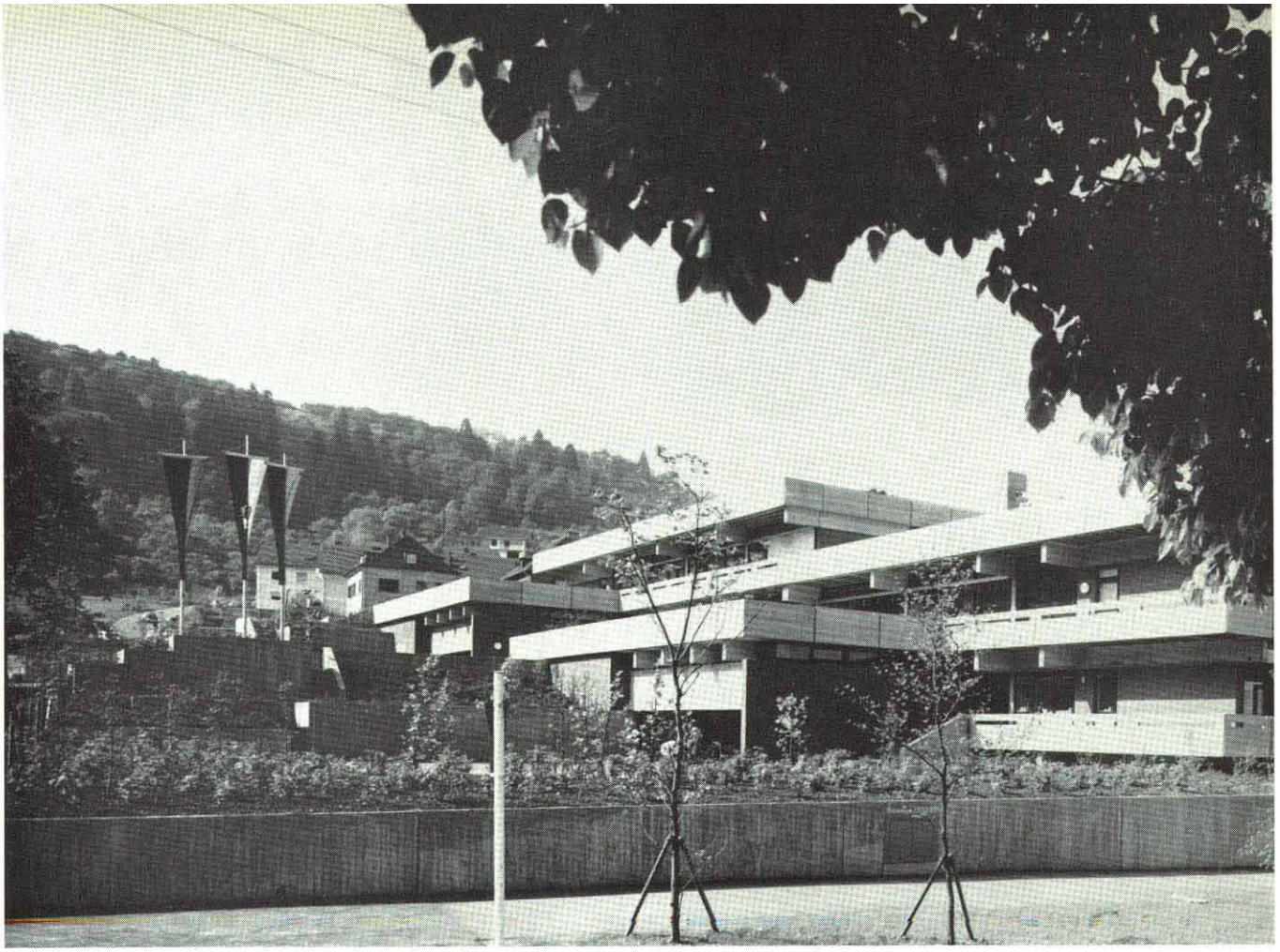


Garden in Amersfoort, Holland. Once again the tranquillity of water. The pool is surrounded by exposed-aggregate paving slabs; solid concrete benches provide definition to the pool as well as seats.



Photographs by
S. W. Newbery.



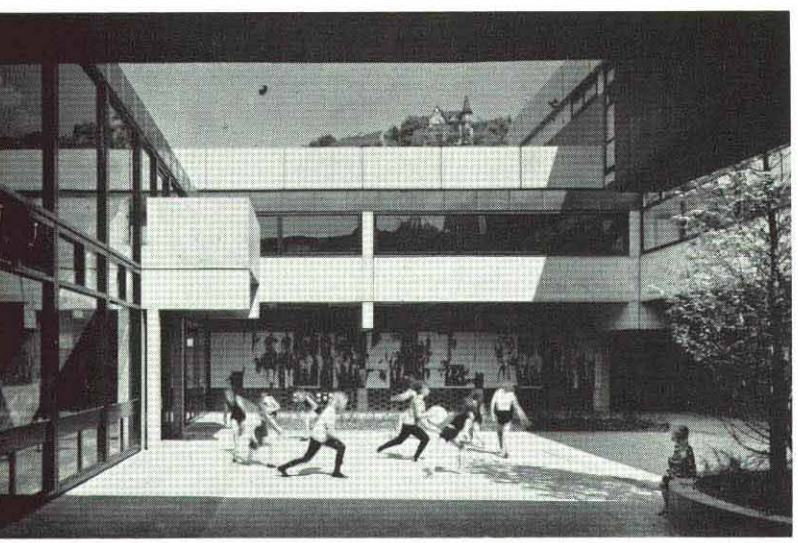


Cantilevered floors and roofs are of in situ reinforced concrete. Balcony fronts and roof fascias are precast.

Stuttgart schools

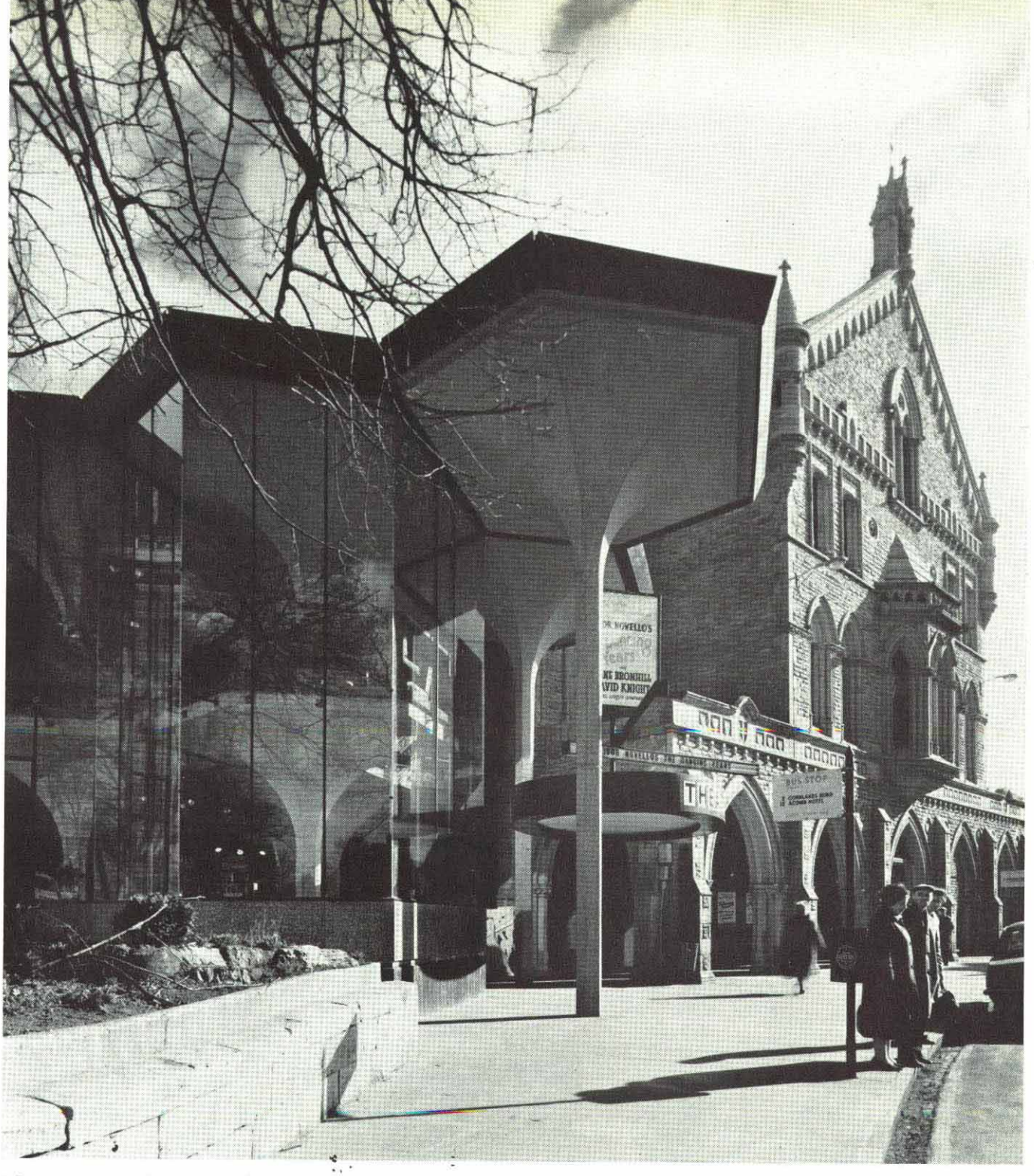
Photographs by Richard Einzig.

One of the secluded interior courtyards.



Architects: Hans Kammerer and Walter Belz

AMONG THE RECENT crop of new buildings in Stuttgart is one housing two schools on a steep north-facing slope not far from the town centre. The two schools – one for backward and the other for physically handicapped children – are entirely separate, each with its own interior courtyard, although they form one building. Each school is two storeys high, but where the one overlaps the other there is a three-storey part. The site is in a high-density residential area, bordered on three sides by roads, and has a drop of nearly 40 ft. One of the main planning requirements was that there were to be few stairs and that classrooms should, if possible, be on one floor. All classrooms are, in fact, on the first floor around the courtyards and surrounded by balconies. Each school has a gymnasium which is fitted under the lowest part of each school and leads to a level play area outside. The entire structure is built on a system of retaining walls and beams of in situ reinforced concrete. The balcony fronts and roof fascias are of precast concrete fixed to the cantilevered floor and roof structures. Both courtyards have concrete sculpture – one designed by the architects, the other by Dieter Bohnet.



The new two-storey foyer extension is sheltered by reinforced concrete umbrellas.

Photographs by Henk Snoek.

THEATRE ROYAL, YORK

An extension with concrete umbrellas

The two-tier concrete umbrella structure at night.

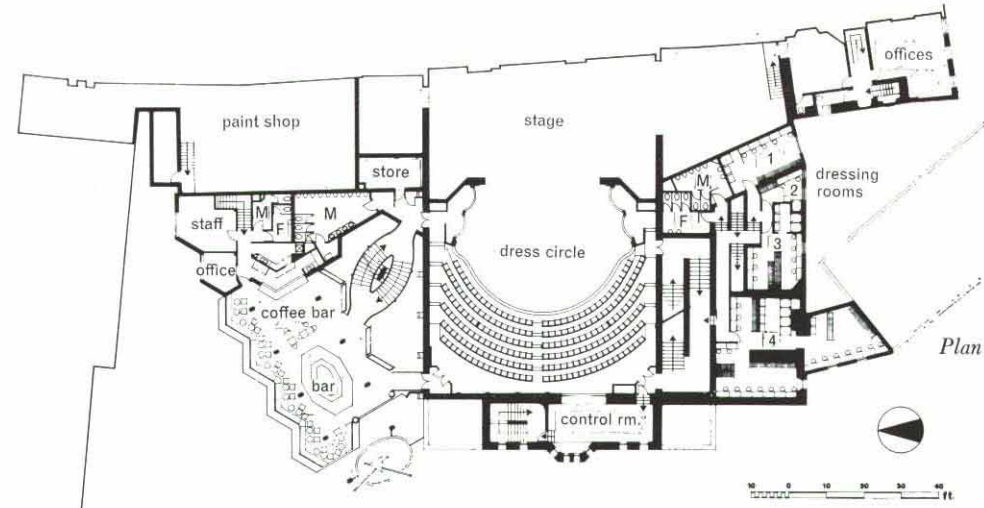
THEATRE ROYAL, YORK: *continued*

Architect:	Patrick Gwynne
Structural engineers:	Jenkins and Potter
Contractors:	Simons of Lincoln Limited

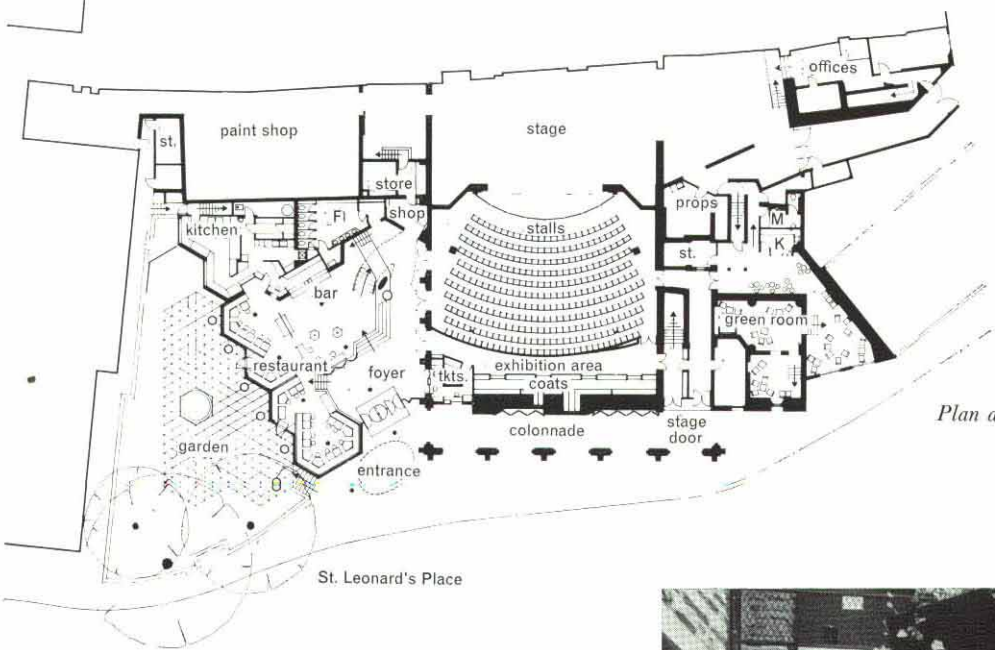
THE VICTORIAN GOTHIC Theatre Royal in York now has a delightful addition. This is a two-storey extension down one side with a foyer, bar, restaurant and kitchen on the ground floor, and a bar and coffee lounge upstairs. It is a light, airy, theatrical structure made up of a series of hexagonal reinforced concrete umbrellas linked with each other and partially enclosed by sheets of glass. The umbrellas make a perfect companion to the Gothic arches of the original theatre. There is also a small paved garden at ground level. Those who know the Serpentine Restaurant in Hyde Park (*Concrete Quarterly* 62) will recognize that this is a development of the same structural theme – designed, of course, by the same architect.

The original building had rather a charming Victorian auditorium housed in a bold 1880 Gothic exterior. However piecemeal additions, planning and amenities were poor, and when the Corporation made available the garden site down one side for the new wing, it was a good opportunity to improve all the amenities, provide new dressing rooms and a green room on the south side, remove the later additions which spoiled the main façade, and open up the Gothic arch feature of the front, providing a colonnade open to the street and linked to the new wing.

The problem then was one commonly met in our historic cities: a twentieth century design to marry up with the old. A glass-walled building was thought essential to dramatize the activities inside from the pavement, and to give good views out from the foyers and staircase. The two-tier concrete umbrella construction leaves the perimeter free for glazing which is handled in the lightest possible manner and allows the new structure to be kept clear of the side of the old building. A linking roof is provided at high level. The umbrella units are hexagonal so that they can connect with each other in a straight line. The upper units are wider and oversail the lower ones, allowing full-height glazing through two storeys without the interruption of a floor edge. Although the umbrellas are formed from a single arc, their profiles when linked are seen as pointed arches which have an

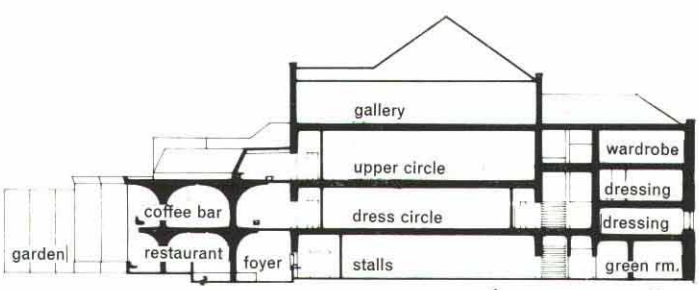


Plan at dress circle level.



Plan at stalls level.

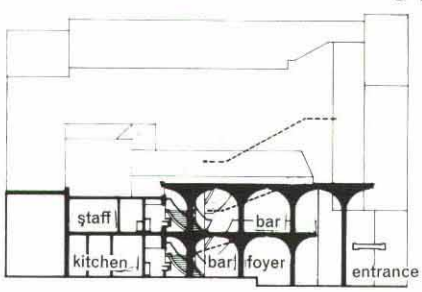
St. Leonard's Place

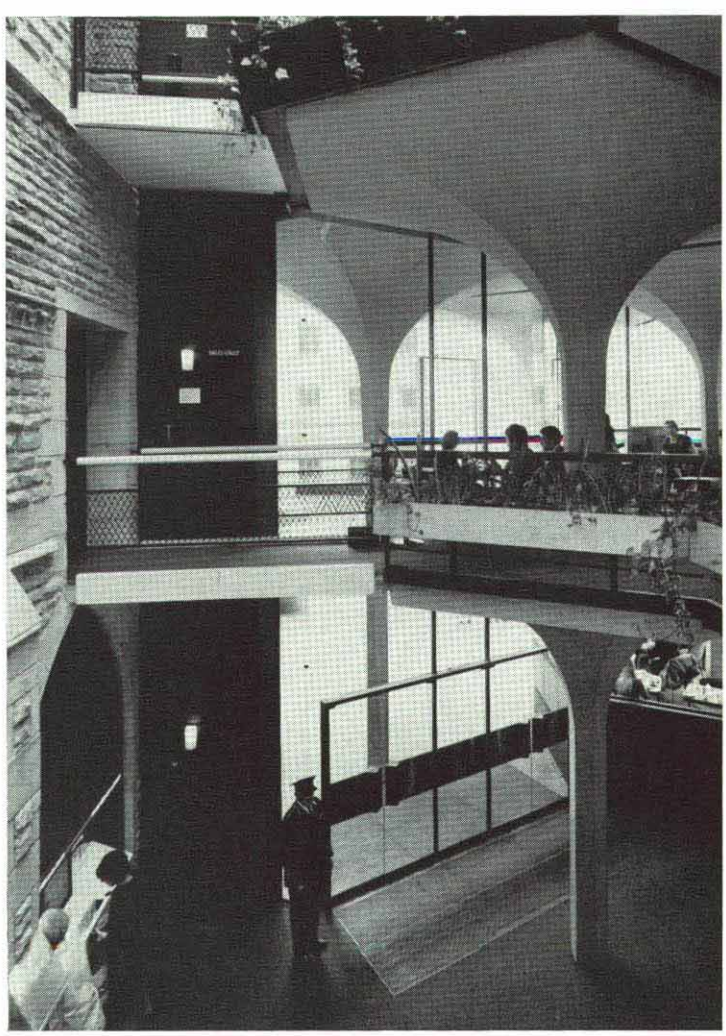


Cross section through foyer and theatre.

10 0 10 20 30 40 ft.

Longitudinal section through foyer.

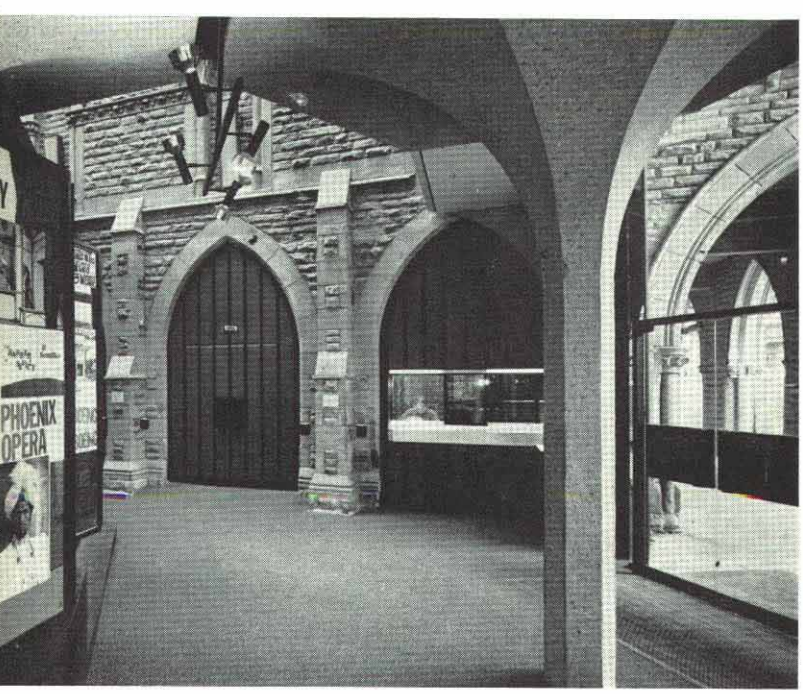




Foyer interior.

The curving foyer stair.

The exposed concrete umbrella units have an affinity with the Gothic arches of the original structure.

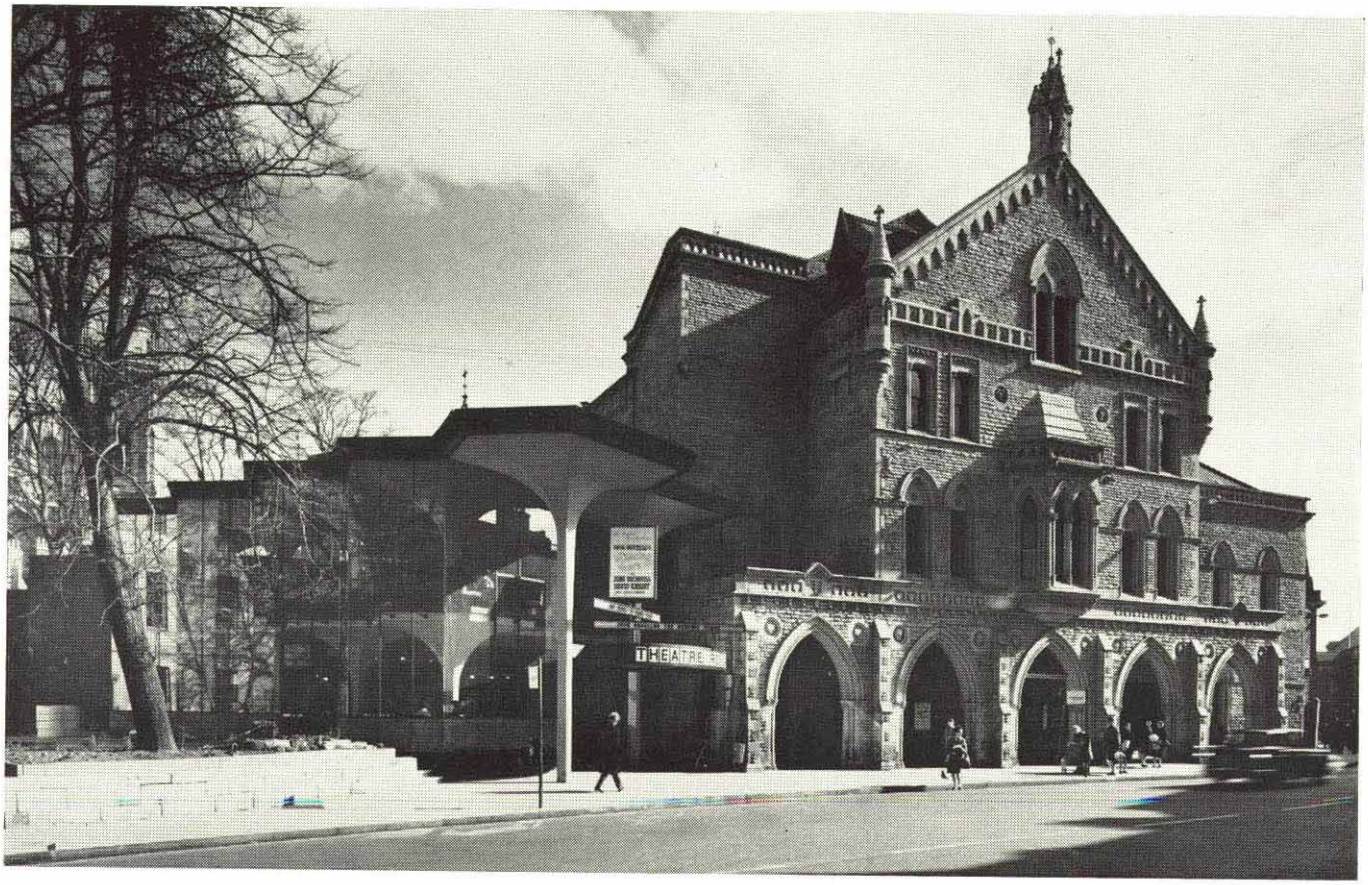


affinity with the Gothic arches of the old building.

The main part of the interior space is undivided apart from occasional screens, and is interrupted only by the seven columns of the interior umbrella units. The exterior units, with stems of double height, serve partly to give shelter over the entrance and to give dramatic emphasis and a framework for the entrance canopy and signs.

The concrete, which was cast in situ with local aggregate in plastic-lined forms, was grit-blasted. The resulting surface matches well with the cleaned York stone of the old building. These subtle tones of concrete and stone are seen against a new rear wall faced with dark bronze-coloured slate planks and against carpets and upholstery in varying shades of green. The interior is strongly lit by day from the glass walls and especially from dome lights in the roof link at high level. These last are fitted with spotlights to retain the effect at night, supplemented by local spotlights to emphasize points of interest.

This small extension should prove a notable piece of twentieth century design in this ancient city, not yet endowed with many good modern buildings.



General view of the restored theatre front and the foyer extension.

Training Courses for Architects

Special courses for architects are held at Fulmer Grange, the Cement and Concrete Association's residential Training Centre in Buckinghamshire. The courses deal with the various aspects of concrete design and construction most likely to be useful to architects. Details are given in the publications listed below. Most of the courses last five days, but there are also some which are shorter. The courses are designed to give architects and their staffs a deeper understanding of the material concrete and to help them make the best use of it. Fulmer Grange is a pleasant 40-acre estate adjoining the Association's Research Station at Wexham Springs, near Slough, and participants each have a private room with bathroom. These courses also provide an excellent opportunity for mutual discussion with other designers and members of the construction industry.

Publications

The following recent publications are now available:

TRAINING COURSES FOR ARCHITECTS

Ce. 20 *C&CA courses on concrete.* 1968–9. Free of charge
Ce. 21 *C&CA courses for architects and their staff.* 1968–9. Free of charge

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Cj. 137 *International recommendations for the design and construction of large-panel structures.* £5

CONCRETE SOCIETY TECHNICAL REPORT

TRCS 2 *The detailing of reinforced concrete.* £1
(This Report should be used in conjunction with BS 1478:1967 *Bending dimensions and scheduling of bars for the reinforcement of concrete*, and for the convenience of users there is a pocket inside the back cover to hold the British Standard which may also be ordered at a cost of 6*s*.)

All these publications may be obtained from:
Literature Requests, Cement and Concrete Association, 52 Grosvenor Gardens, London SW1.

The Concrete Society

THE CONCRETE SOCIETY welcomes to membership all those concerned with the design, manufacture or use of concrete. Society activities cover every aspect of concrete, from practical on-site work to advance research. Conferences, symposia, lecture meetings and technical site visits are organized on a national level, and also locally throughout Britain by the Society's branches. There are branches in Wales, Scotland and Northern Ireland, and in the Economic Regions of England, with a full programme of activities designed to cater for the needs and interests of local members. The Society also publishes a monthly journal, *Concrete*, and a wide range of technical publications. Those based in the British Isles are eligible for ordinary membership. Special classes of membership are provided for those outside the British Isles, for students and for companies and organizations concerned with concrete, including local government and statutory authorities, contractors, manufacturers of materials or plant, and professional consultants. Further information and membership application forms may be obtained from: The Secretary, The Concrete Society Limited, Terminal House, Grosvenor Gardens, London, SW1.

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