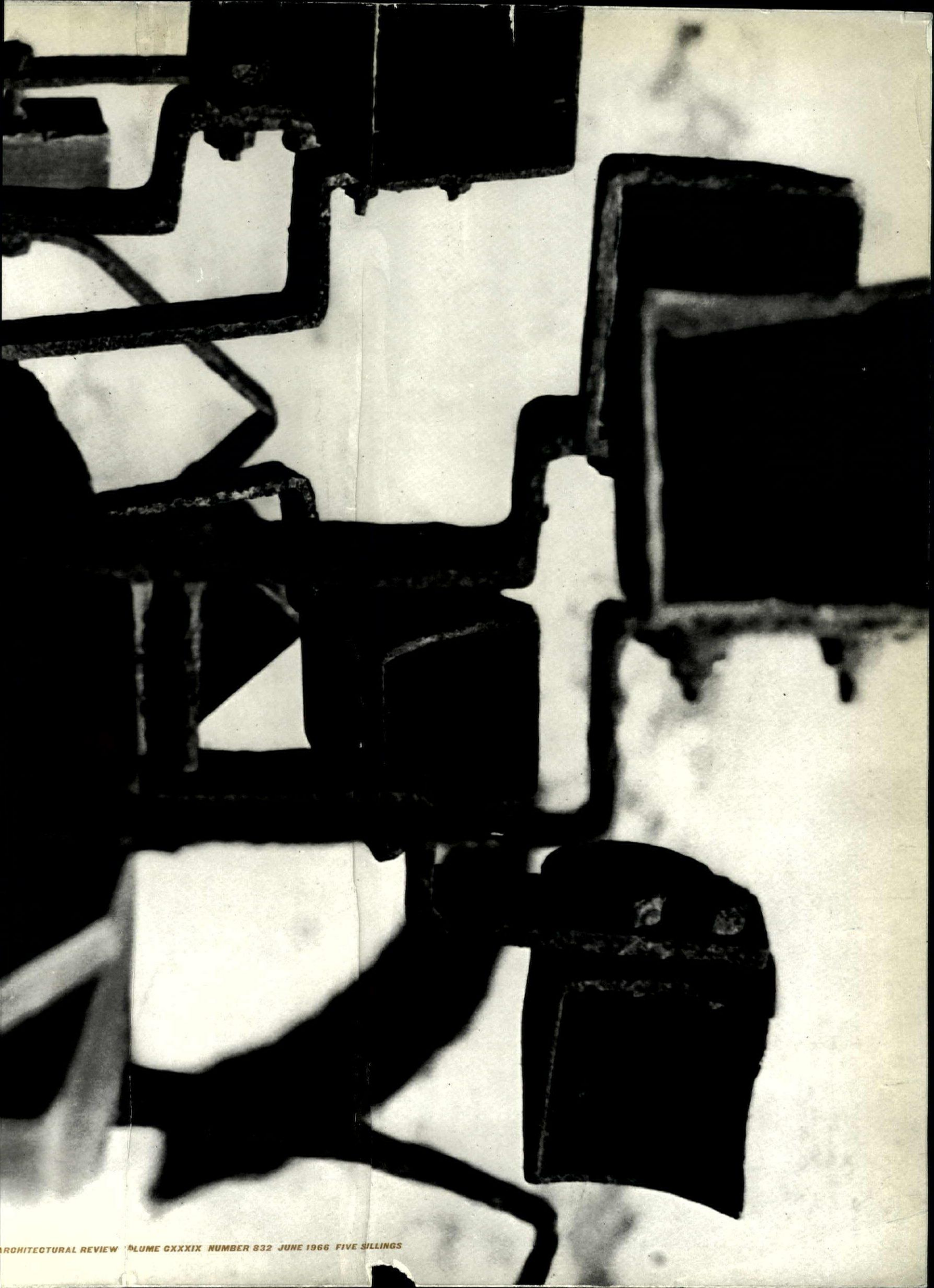
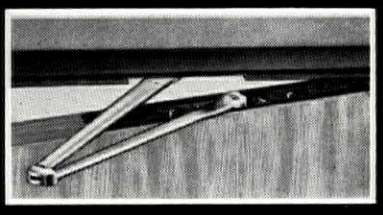


ARCHITECTURAL REVIEW VOLUME CXXXIX NUMBER 832 JUNE 1966 FIVE SHILLINGS

concealed within the rotunda

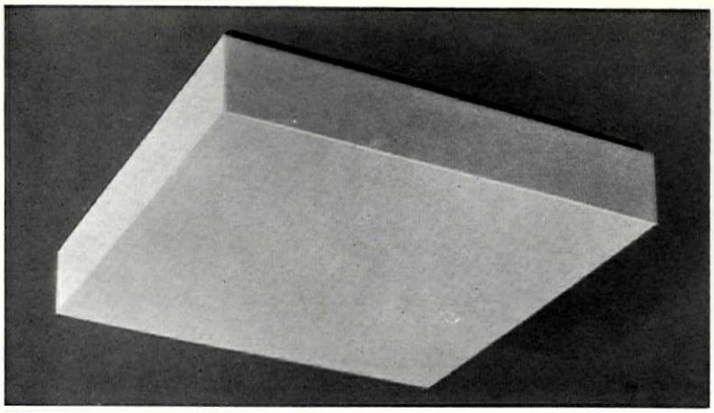
THE BRITON 500



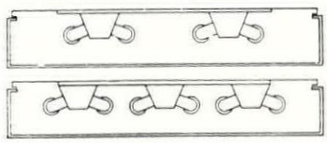
The Rotunda building designed by James A. Roberts, A.R.I.B.A., is part of the City Centre of Birmingham redevelopment plan. As good design and appearance of fittings was a first consideration, the interior doors throughout the building were fitted with the Briton 500 concealed overhead door closer. The closer which measures only 13" long x $1\frac{3}{8}$" wide x $2\frac{5}{8}$" deep, is mortised within the thickness of the doors leaving only the slim arms showing (see small illustration). It is suitable for interior single action doors weighing up to 112 lbs. and is provided with a hold open device which may be brought into action if required. The Briton 500 which was supplied for the Rotunda by Parker Winder & Achurch & Co. Ltd., is one of a fine range of door closers and other Architectural fittings manufactured by:
WILLIAM NEWMAN & SONS LTD.,
Hospital Street, Birmingham.

NEWMANS

The Rotunda Building:
Developer: Property & General Investments Ltd.
Structural Engineers: Charles Weiss & Partners.
General Contractor: George Wimpey & Co. Ltd.

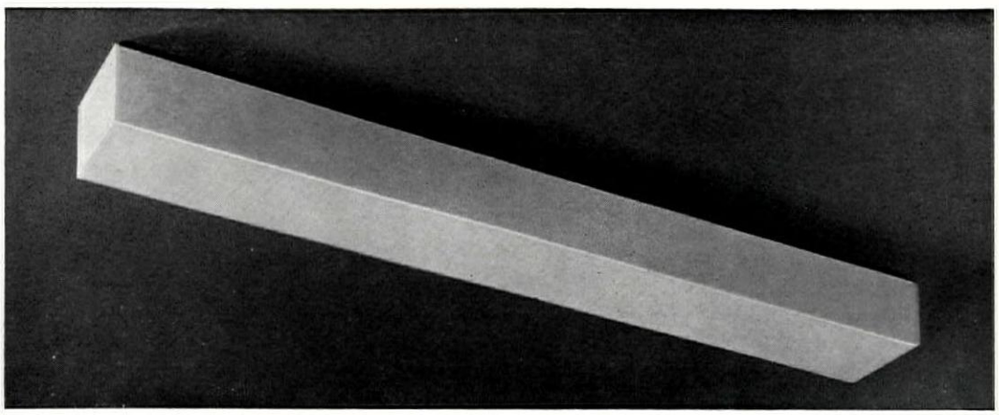


swedish lighting



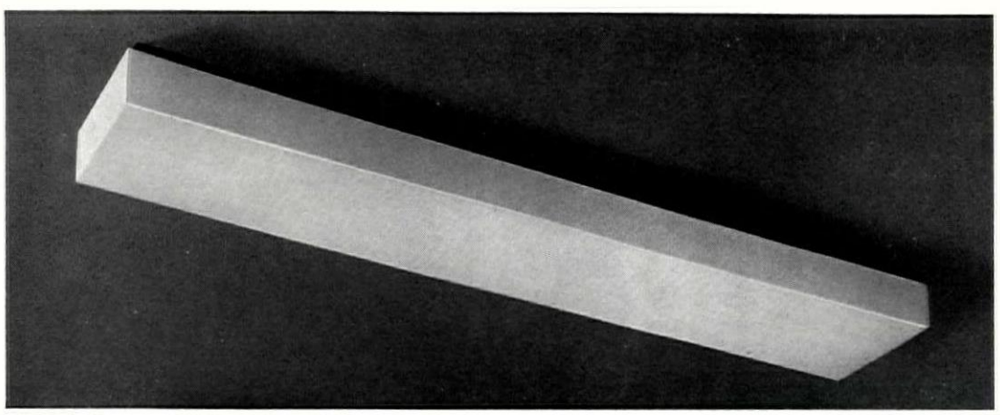
CODE NO.	WATTAGE	LENGTH	WIDTH	DEPTH
G 524 SD18	4 x 20	26″	26″	4½″
G 526 SD18	6 x 20	26″	26″	4½″

Patent Pending



G 520 SD15	1 x 20	26½″	4″	4½″
G 540 SD15	1 x 40	50½″	4″	4½″
G 565 SD15	1 x 65	62″	4″	4½″

Patent Pending



G 522 SD17	2 x 20	26½″	8″	3½″
G 542 SD17	2 x 40	50½″	8″	3½″
G 567 SD17	2 x 65	62″	8″	3½″

Patent Pending

The New SWEDALUX Range is of simple and pleasing design to meet the latest trends in lighting. A shallow rectangular spine manufactured from aluminium and finished in matt black houses the all British control gear. Special features include a single arm quick release device and a foam plastic gasket ensures an effective seal. The forming of the perspex diffusers with their crisp right angled corners provides a highly functional and aesthetic appeal to the discriminating architect.

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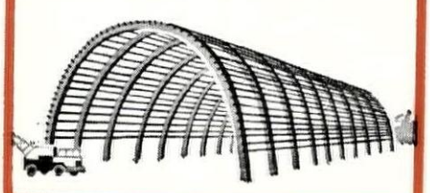
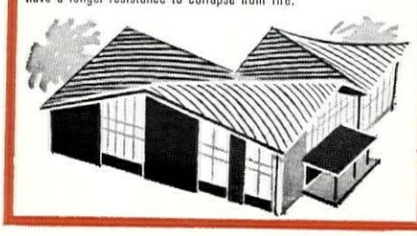
Laminated timber beams in 206-ft diameter sports hall at Newcastle-upon-Tyne Lightfoot Centre. Architects: Williamson, Faulkner Brown & Partners. Structural Engineers: Cooper, Higgins & Partners.

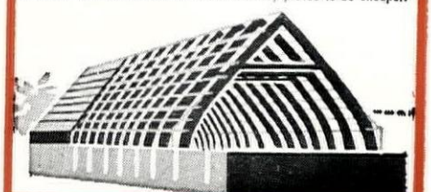
Strength and versatility Wood is stronger pound for pound than any other structural material and permits foundations of low mass. Timber is the ideal material for temporary or permanent, small or large buildings.



Scope and safety The range of design systems is so wide that almost any combination of architectural style and functional requirement can be met economically. Timber-framed structures have a longer resistance to collapse from fire.



Speed and economy Timber structures can be produced in shorter time than those of other materials and are easier and quicker to erect. Its naturally-attractive appearance normally obviates internal cladding. When the total cost of a building is considered, timber construction is invariably proved to be cheaper.



The wide world of Timber Engineering brings so many advantages

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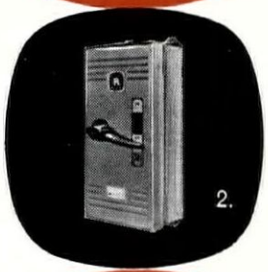

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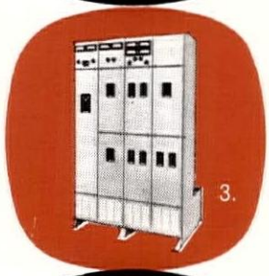

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4.

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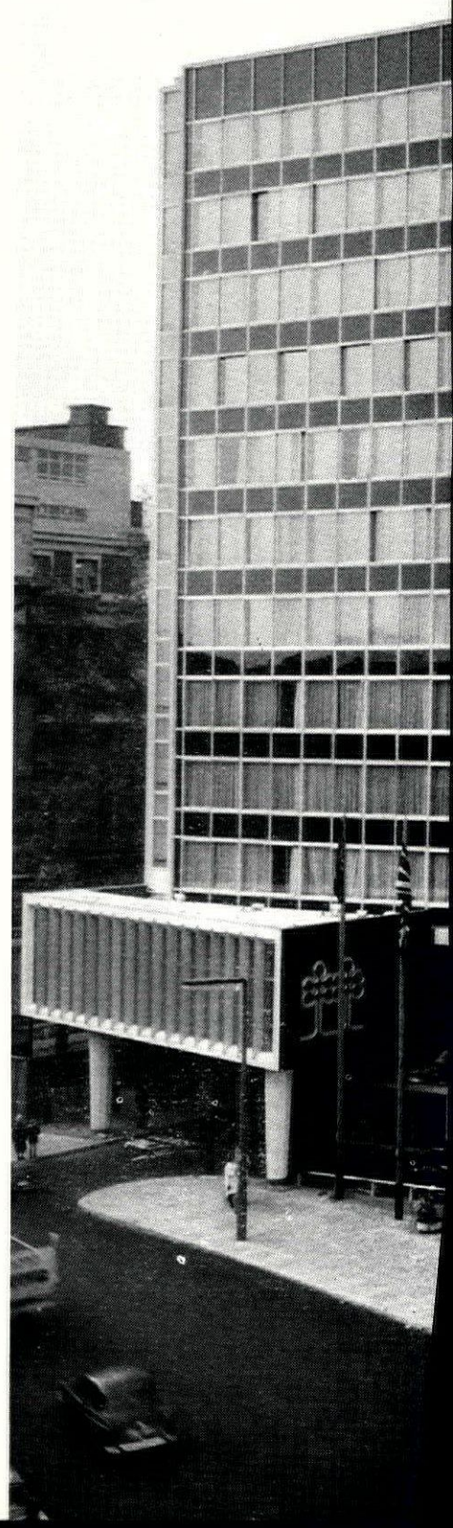
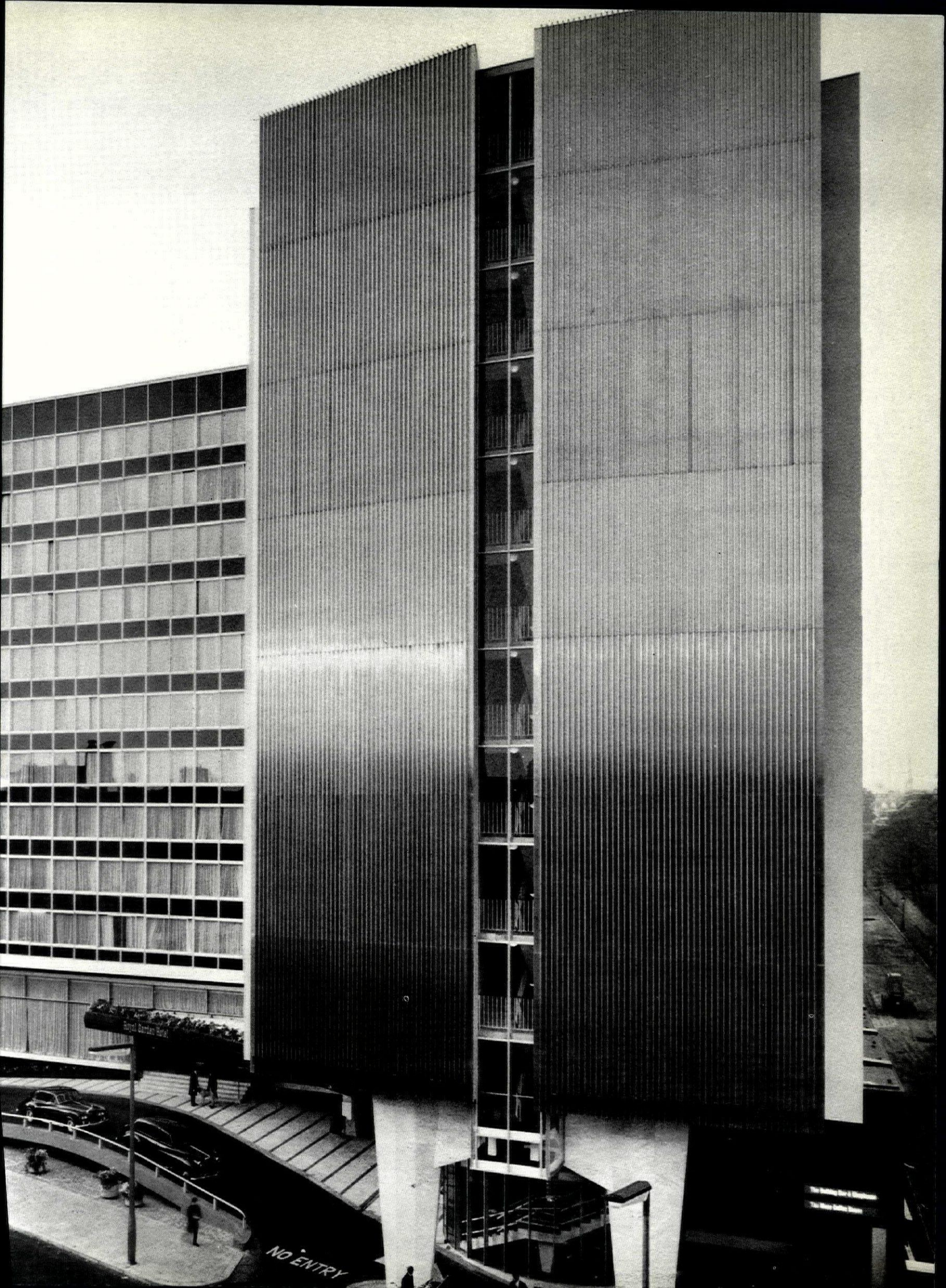
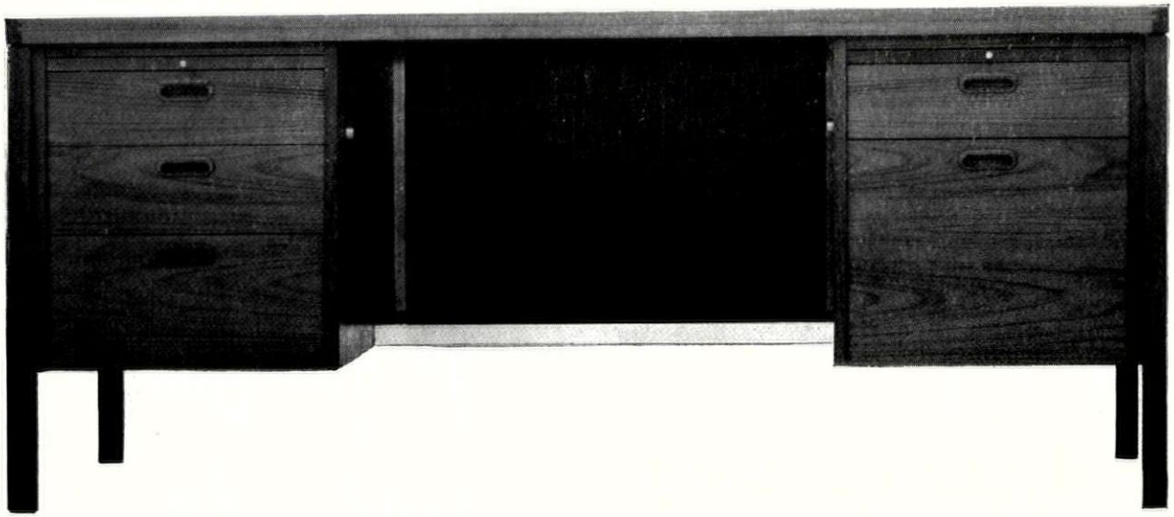
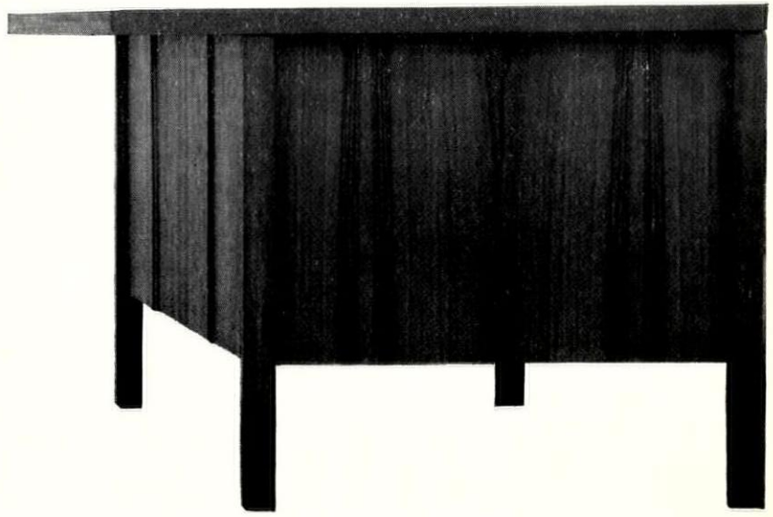


Royal Gardens Hotel, Kensington. Architects: R. Seifert & Partners. Main Contractors: Tersons Limited


Royal Garden Blvd
NO ENTRY





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HOLOFORM

The British Petroleum Company's new headquarters building, Moorfields, London.

GENERAL DATA:
Height of building: 395 feet. **Curtain walling:** by Morris Singer using 'Holoform' units formed of 'Silver Fox' 316 stainless steel supplied by Samuel Fox & Co. Ltd. **Total weight of stainless steel** 180 Tons. **Architects:** Joseph, F. Milton Cashmore & Partners.

REFER TO BARBOUR INDEX FILE SfB(21)

A LANDMARK IN THE PROGRESS OF STAINLESS STEEL CURTAIN WALLING

This impressive tower block, now nearing completion is totally enclosed with HOLOFORM curtain wall units formed of stainless steel. The long-term cost-saving advantages of simple maintenance over large exterior surfaces, coinciding with normal window cleaning operations, is a vital factor when considering initial installation costs.

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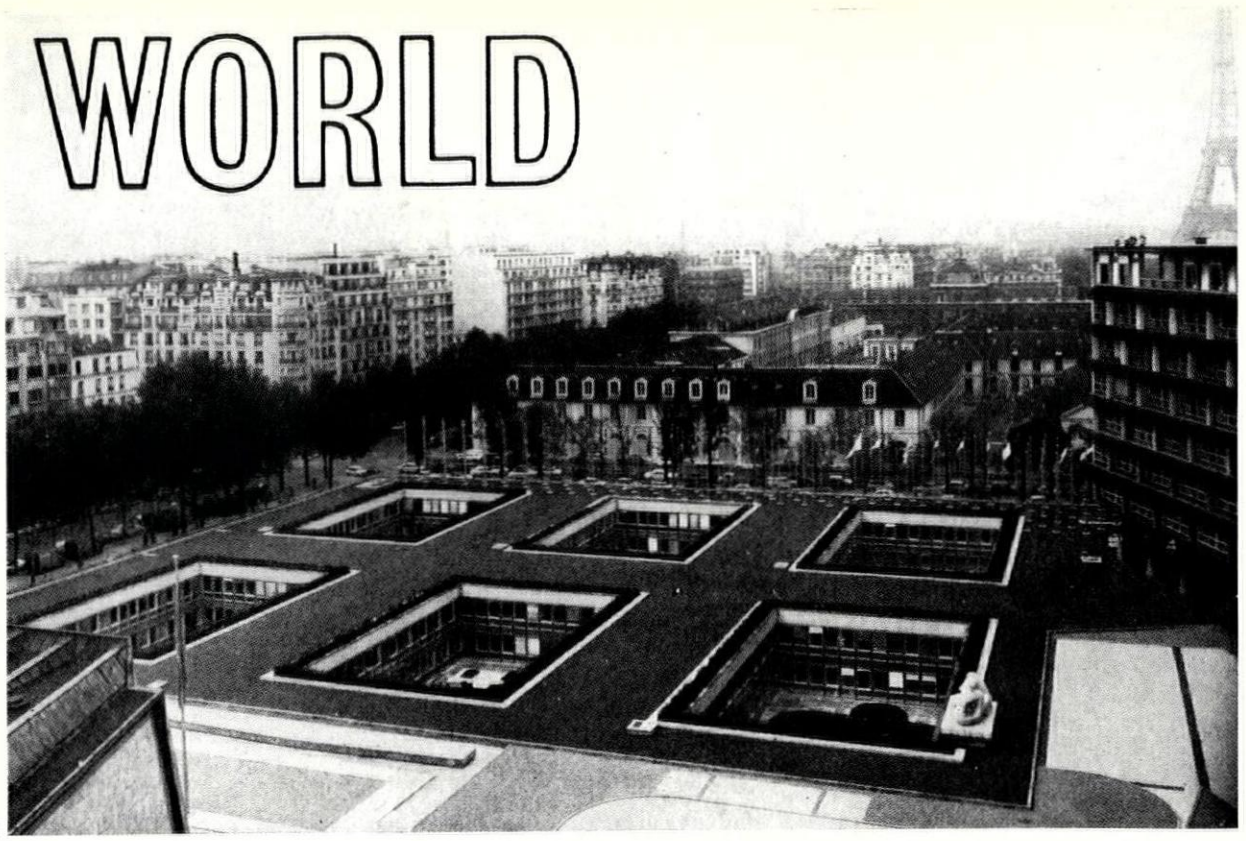
WORLD



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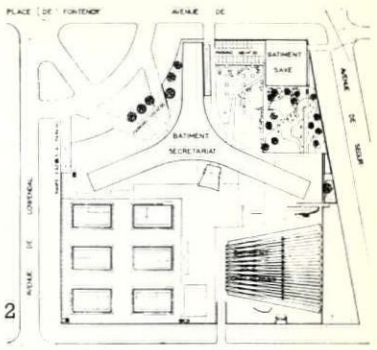


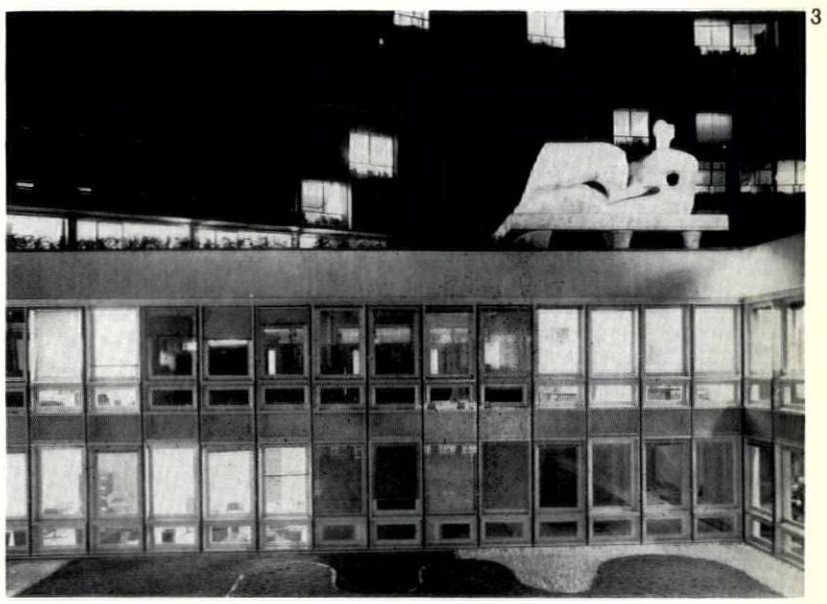
2

ANTI-PLACE

Ionesco gave us the anti-play. Unesco now gives us the anti-building, 1—or, more accurately, the anti-*place*, for the fourth building in the Breuer-Zehrfuss-Nervi complex, 2, is an attempt, by digging holes in the lawn, forcibly to maintain the fiction that the original composition is rigid and inviolate, within the corset of the Parisian tradition of street-lines and open *places*. It illustrates the long-foreseen folly of choosing a prestige historic site for a youthful and expanding organization. Moore's reclining lady totters on the edge of Zehrfuss's humdrum facades, 3.

acknowledgments

COVER: Edwin Johnston. WORLD, pages 413–416: 1, *Bauwelt;* 2, 3, *Techniques & Architecture;* 4, 6–9, 11–16, 38, *l'Architecture d'Aujourd'hui;* 5, 25–27, *Architectural Record;* 10, 37, *Deutsche Bauzeitung;* 28, *The Architectural Forum;* 29, 30, 32, Max Dupain; 31, Bird; 33, Ken Woolley; 34, David Moore; 35,36, *Arts & Architecture;* 37, 39, *Architect and Builder*. VIEWS AND REVIEWS, pages 417–419: 1, Louis Checkman; 2–4, Rex Wailes; 5, Edwin Johnston. FRONTISPIECE, page 420: National Monuments Record. OFFICE DEVELOPMENT, TOWER HILL, LONDON, pages 425–431: Galwey Arphot. CRITICISM, pages 432–438: 1, 3, 6, 7, *The Canadian Architect*. THE EXPLORING EYE, pages 439–441: Edwin Johnston. TOWNSCAPE, page 442: Browne Arphot. THE INDISPENSABLE F.O., pages 448–450: 1, Galwey Arphot; 2, Eric de Maré; 3–7, National Monuments Record. CLUB HOUSE, DURHAM UNIVERSITY, pages 451–461: John Donat. STONES AND LONG GRASS, pages 462–466, Kenneth Lindley. GALLERY, pages 469–472: 1, 3–5, 7, Brompton Studio; 2, 6, Marlborough Fine Art. DESIGN REVIEW, pages 473–474: Galwey Arphot.



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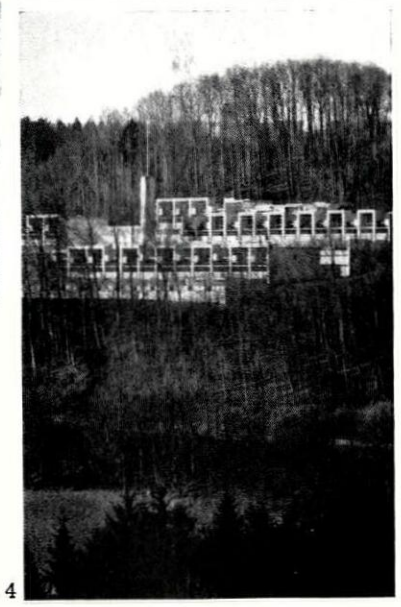
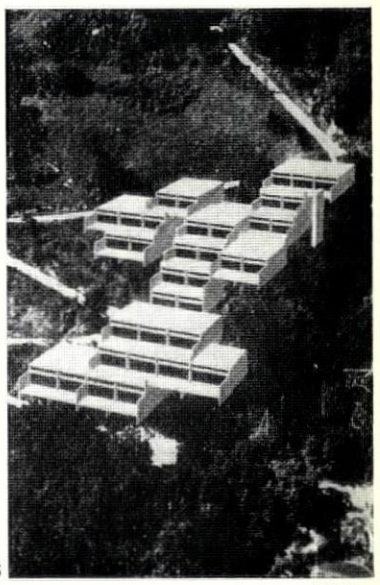


4

LEDGE DISCIPLINE

It is no doubt the flatness of most suburban sites which provokes the multi-coloured rash of materials on most conventional housing estates. In mountainous countries, not only do the sites themselves offer more than enough of immediate visual kicks, but the exigencies of construction can encourage an organic discipline that makes a powerful statement of form without cosmetics. The current trend in Britain towards high density, low rise building, to be discussed in next month's AR, can learn a good deal from mountainside forms which achieve a mean between cottage and

5



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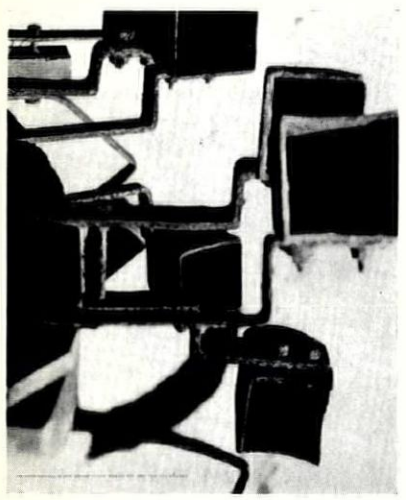

This month's cover, *from a photograph by Edwin Johnston, shows a piece of machinery in the Basset Mines, Cornwall. Other photographs by Mr. Johnston of tin mines appear on pages* 439–441 *of this issue, and they are preceded* (*on pages* 421–424) *by a general article on the growing interest in industrial monuments and the work of the recently established Industrial Monuments Survey under Rex Wailes.*

THE ARCHITECTURAL REVIEW

9-13 QUEEN ANNE'S GATE, WESTMINSTER, SW1 WHITEHALL 0611 FIVE SHILLINGS

VOLUME 139 NUMBER 832
JUNE 1966

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HIGH DENSITY HILLSIDE HOUSING

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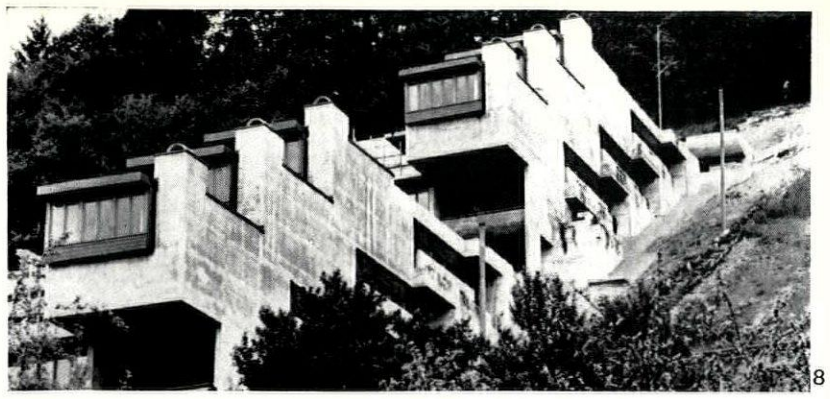
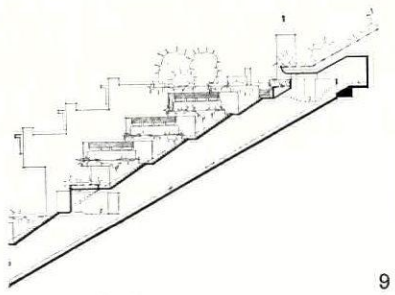


8

point block without the obvious disadvantages of either.

Atelier 5's Halen estate at Berne, 4, provides perhaps the most heroic image, with its serrated studio windows silhouetted against the forest. It is also on a much less extreme site than such typical mountain estates as Olav Selvaag's housing at Ullernas near Oslo, 5, with its fifty-four flats in six separate tiers, or Erwin Mühlestein's flexibly planned houses of different



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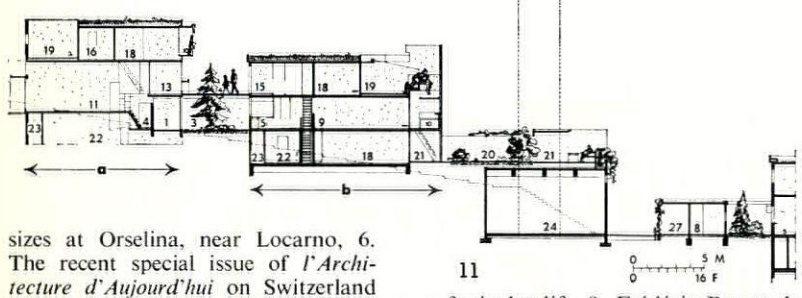


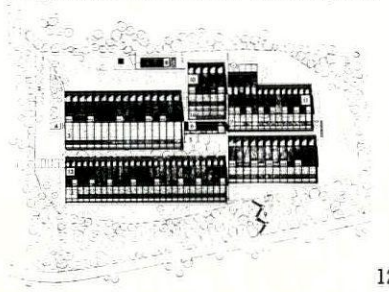
11

sizes at Orselina, near Locarno, 6. The recent special issue of *l'Architecture d'Aujourd'hui* on Switzerland contained an interesting article on stepped housing (the subject of Max Ernst's fantasies of Cities, as an illustration neatly suggested) by Lucius Burckhardt, who discussed its evolution from Stucky and Meuli's pioneer terraces at Zug, 7, to such relatively sophisticated newcomers as Team 2000's housing at Muhlehalde au Bruggerberg, 8, in which the outside steps at the side of the scheme conceal

10

a funicular lift, 9. Frédéric Brugger's Mittelschule at St. Imier, 10, is an elegant example of recent terraced school building.

Berne-Halen undoubtedly was the most sophisticated scheme illustrated by *A/A*. Its pleasure ranges from the crispness of the window detailing, 13,



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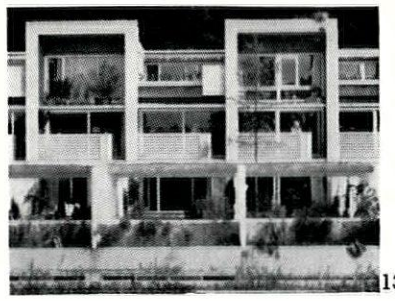
to the visual as well as intellectual excitement of the plan (there could be a danger in designing for these 'aerial views'), 12, and the sectional treatment of the two main housing types, 11. A general view from the north, 16, gives some idea of the high density and privacy combined, the density being tempered by sensitive planting, 14, and the privacy being balanced by the hierarchy of public spaces around the central square, 15.



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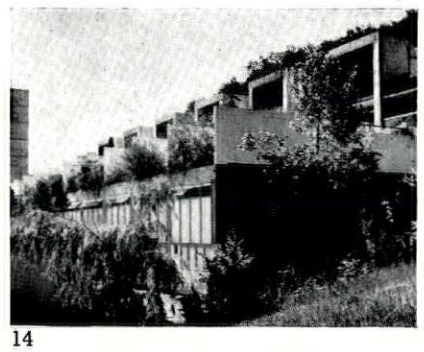

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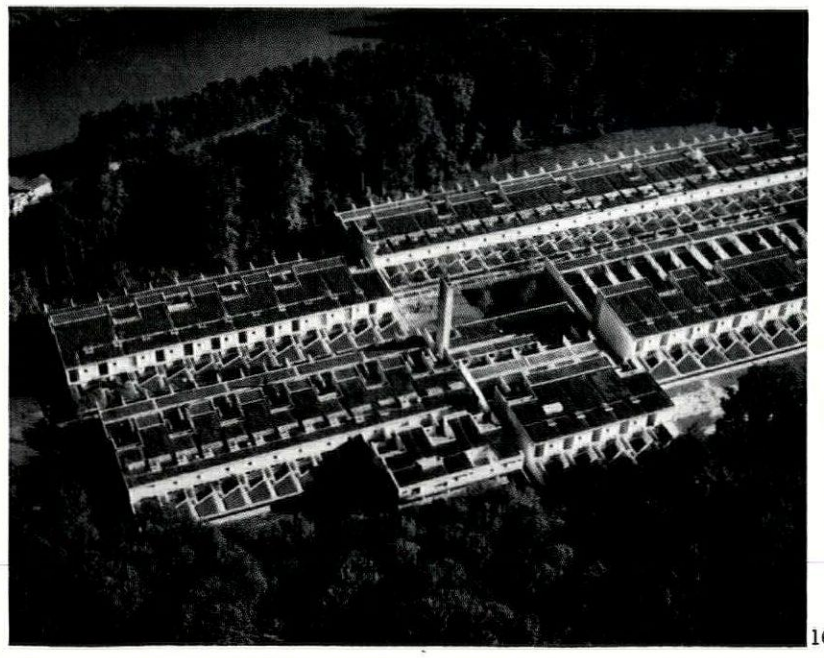

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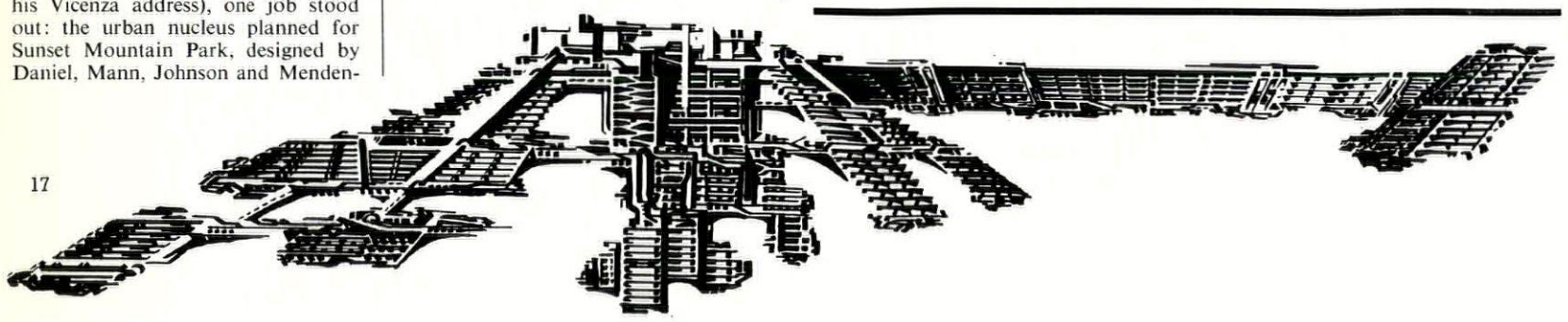
BIG ROCK SUNSET MOUNTAIN

In *Progressive Architecture's* 1966 Design Awards Program, apart from the submission of Palladio's unexecuted design of 1566 for the Ponte di Rialto (in a parchment envelope from his Vicenza address), one job stood out: the urban nucleus planned for Sunset Mountain Park, designed by Daniel, Mann, Johnson and Mendenhall (director of design, Cesar Pelli). This display of cliff-hanging on the grand scale—17 shows the south elevation—rightly convinced the jury



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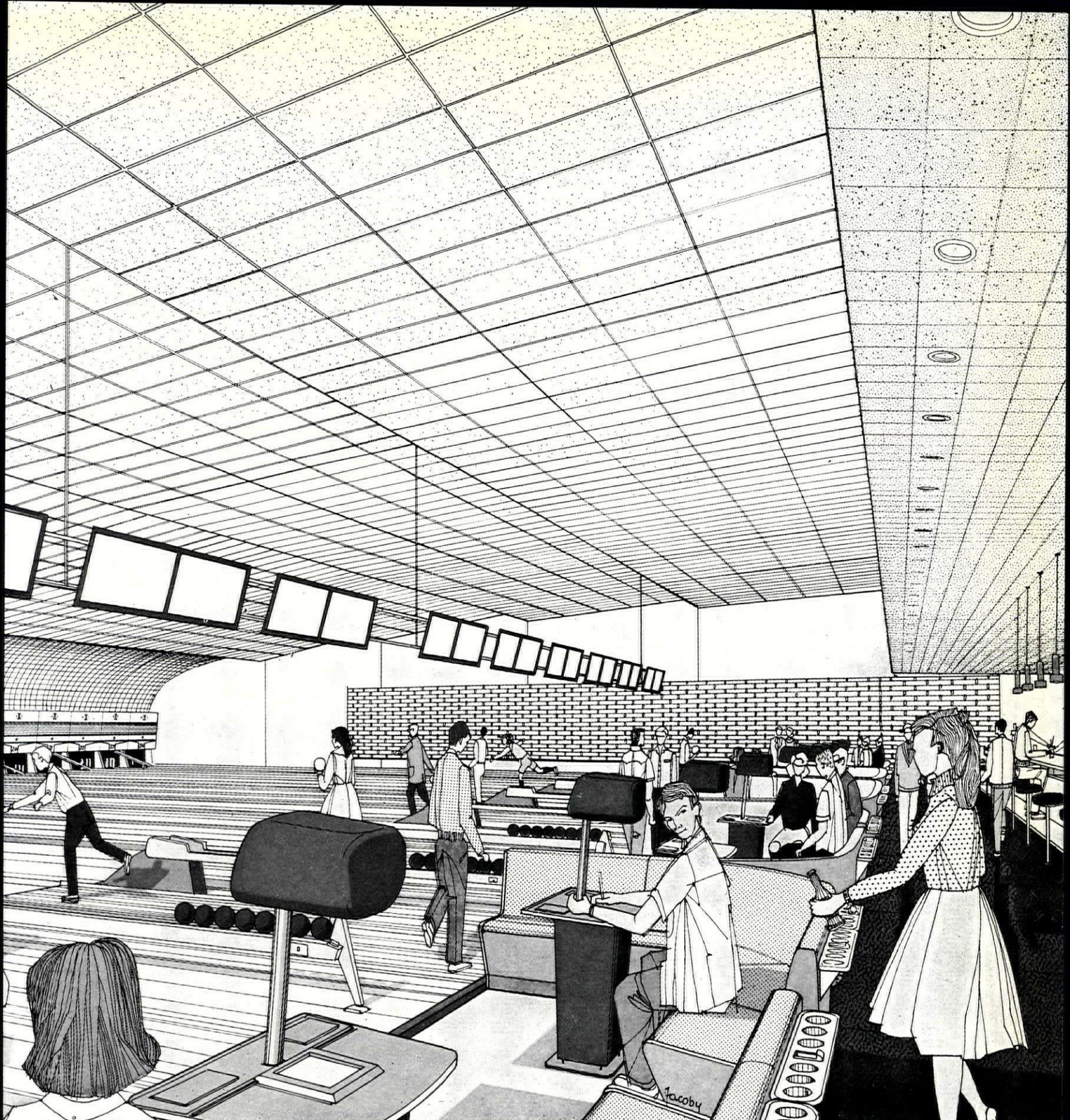

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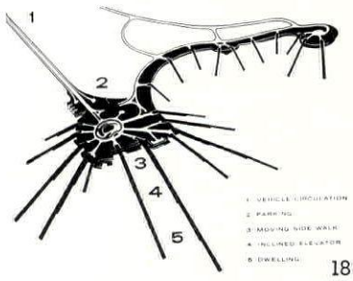
SUNSET MOUNTAIN

(Scully, Roche, Bassett of SOM, Conklin and Komendant) by reason of its respect for nature rather than simply for its mechanical virtuosity and its Futurist nostalgia. The site, owned by the Sunset oil firm, is 3,550 acres of mountainside inland from Santa Monica, 20, with a density allowed of less than two houses per acre (7,200 in all). The clients already wanted some 'town houses' and had set up a planning advisory committee under Pietro Belluschi; Pelli persuaded them to concentrate everything on a kind of Corbusian Machupechu, 19, in which mechanical means of transit enable conformity to the organic



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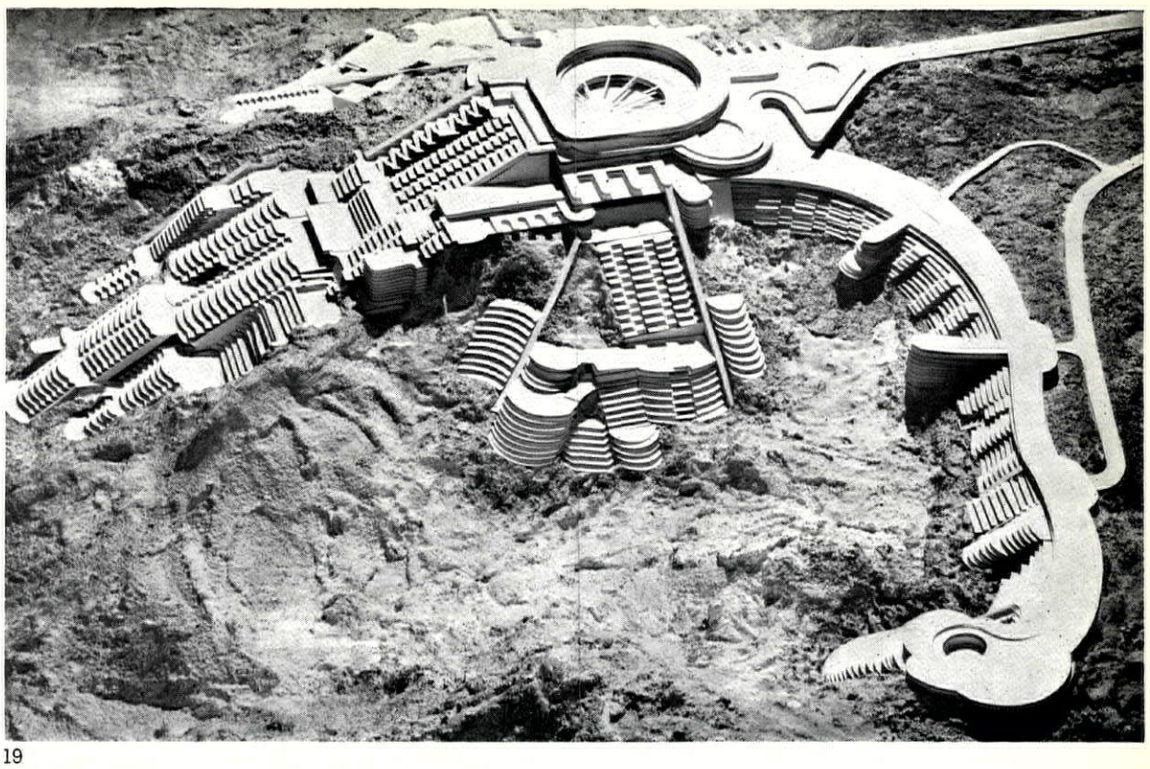
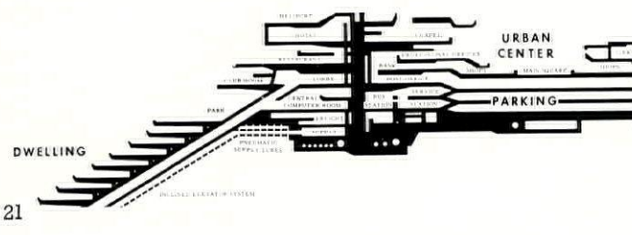

19

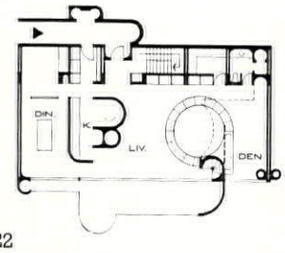
lines of the site, defying gradients.
In the circulation diagram, 18, travelators lead from the parking space on the upper level to funicular cars, on a rack and pinion system, which plummet to the dwellings. Special cars cover longer distances and carry furniture and freight. A massive bed of services, 21, underlies the three floors of parking, together with the bus station, servicing, post office and central computer room. Above it there is a top dressing of



21

shops, offices, library, school, theatre, medical centre, chapel, hotel, restaurant and club house. From the urban sophistication of closed-circuit TV shopping, pneumatic tube deliveries and so on, there is a gradual movement downwards to solitude and wildness, with distant views of the Pacific down Santa Inez Canyon. The concrete platform structure is largely hung by reinforced ties from a diaphragm system at garage level.
Of the actual houses, typical floor plans, 22 and 23, reveal that Pelli's preoccupation with curves is carried ominously through the whole scheme. There have been too many post-Wright projects simulating naturalness in broad curves and denying it in detail. The part section, 24, is not entirely reassuring.


20



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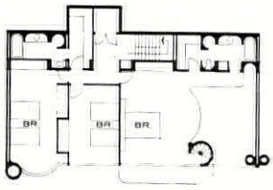

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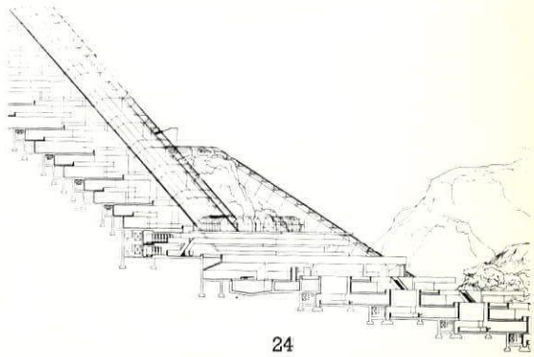
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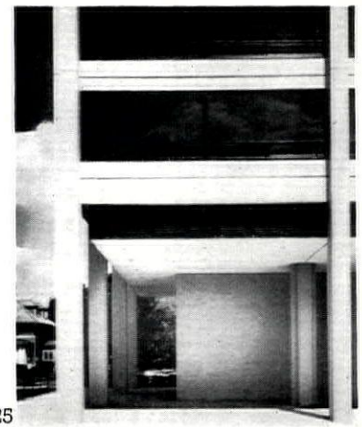

25

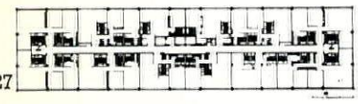
SUPERIOR

Old man Mies, eighty this year, would seem almost to welcome the characterless suburban site as an opportunity to prove his superior virtue—and, in Highfield House at Baltimore, 25, he manages also to prove that a concrete frame, with spandrel panels and lift towers in buff brick, can be made to look just as awesomely sleek as his more familiar palaces of steel. Containing luxury flats double-banked, with their service rooms forming a thick buffer to the central corridor (as in an hotel),


26

HIGHFIELD HOUSE

Highfield House presents an uncompromisingly Chicago-style elevation, 26, to North Charles Street, which leads direct to Mies's Charles Center offices. The plan makes clear, 27, that there is in fact a great variety of flat sizes within the rigid control. The whole block is set on a parking podium, which, at a central point level with the glazed entrance lobby, is broken into by a sunken court, 28, on to which a recreation room opens.



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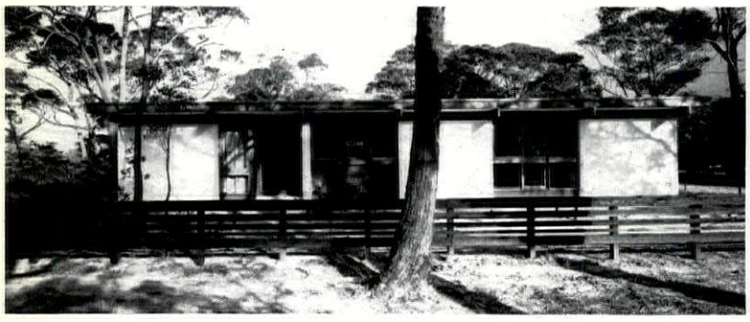

29

SYDNEY PATTERN BOOK

The English architect recoils from the builder's pattern book, yet the Georgians used them well enough. At Sydney, NSW, two young builders, Pettit and Sevitt, have joined forces with an equally youthful architect, Ken Woolley, to play the market. Through off-site assembly, Woolley has cut costs, improved finishes and reduced construction to 4–8 weeks. Timber framing accommodates easily movable partitions, many optional accessories and extensions in multiples of 3 ft. Each individual house (already more than three a week) is fully supervised by the architect. Prices range from £4,500 to £8,160.

Given the Australian suburban plot (and P-S terraces are on the way), Woolley combines admirable clarity of expression, 29, with the friendliness of clinker brick and natural wood, 31. Space is the secret of P-S's attraction: internally in the 15 ft. high dining space, 30, of the split-level Mark II, and externally in the 6 ft. loggias of the two-storey Mark V, 32. As with the Swiss, the experience of hills has been salutary: Ken Woolley's own house at Mosman, 33, is a nice self-infliction of the space standards, 34, he is now mass-producing.

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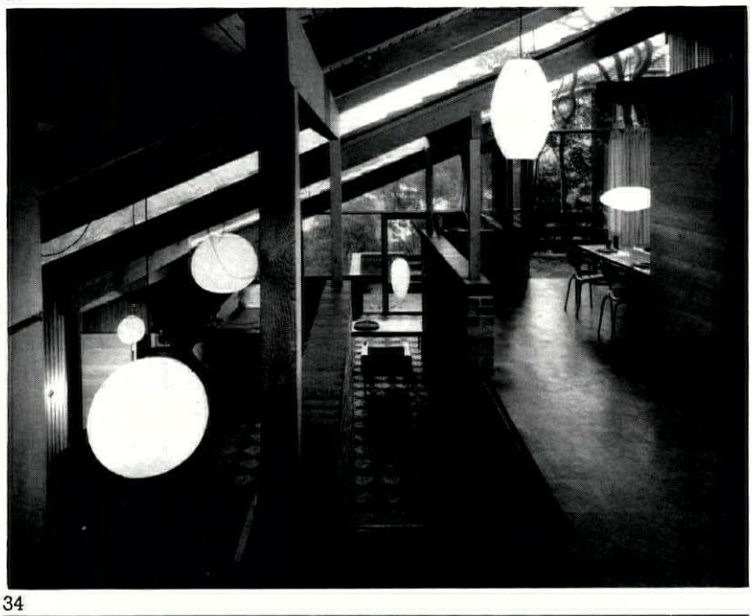


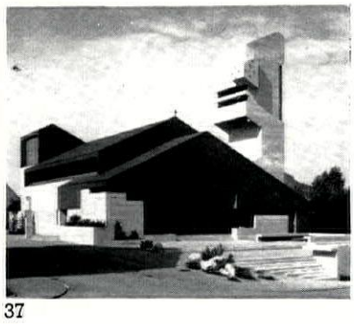
34

DAHINDEN

Exigencies of siting do not necessarily impose consistency. The Swiss architect Justus Dahinden has had a bewildering variety of designs published in the past year: delightful timber chalets in a forest of chestnut scrub in Tresa Valley towards Italy, 35; prefabricated lakeside cottages in the Trigon scheme suggested for the Lac des Quatre Cantons, Brunnen, 36; a massively sculptural concrete and weatherboarded church at Arlen, Südbaden, 37; crisply glazed linked rectangles for the Ventilator offices near Zurich, 38; and twenty different 'native' varieties of domed shrine to commemorate the Christian martyrs of Uganda, 39. What next?

36

35



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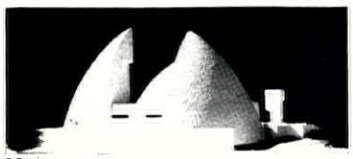

39

Three ways of keeping up to date

See page 96

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VIEWS AND REVIEWS

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THE UTZON STORY

The March AR, with its frontispiece photograph of the nearly completed shells of the Sydney Opera House, had just gone to press when the news came of the resignation of Jörn Utzon, the architect. It is important that the events leading up to this tragedy should be dispassionately known, so the REVIEW has pieced together the following account from the conflicting statements of the various parties involved.

The work is being carried out in three stages. Stage I, the base, has been completed and was let on a normal Bill with approximate quantities. Stage II, the roof structures, now about two-thirds complete, has been let on a cost plus fixed fee basis. Stage III, which includes all finishes, cladding and auditoria ceilings and walls, has barely started.

The client, the New South Wales Government, have formulated the programme through the Opera House Executive Committee, who have had a technical panel to advise them. These committees have been criticized for failing to provide a clear programme or to give authority for decisions, and correspondents have suggested to us that 'Utzon has, in some cases, been waiting eighteen months for decisions necessary to complete working drawings for certain portions of the work.' In fact, Utzon's method of working is unorthodox and he claims that through models and prototypes a number of the normal drawing office procedures are not necessary. To date, all working drawings have been prepared from Utzon's sketch plans by Ove Arup and Partners, the consulting engineers, who have used computers for the complex geometrical calculations.

Far more serious, however, has been Utzon's inability, rightly or wrongly, to furnish the client with the kind of information on the contract that a client normally expects. Last year there was a change in political control of the Government from Labour to a coalition of the Liberal and Country Parties (that is, Conservative). Although critical of the previous Government's handling of the Opera House, the new Minister of Public Works, Davis Hughes, is genuinely interested in completing it to Utzon's design, and it was his and his predecessor's and his department's eager, if possibly clumsy, demands for information which Utzon failed to satisfy. The previous Minister had appointed an elderly liaison architect, but this did not achieve its object and proved to be a tremendous irritant to Utzon. Meanwhile, costs continued to soar, so far to about £20 million.

In spite of the strained situation, an Act of Parliament would have been necessary to remove Utzon and this would have been unthinkable. Alas, he himself made such a course unnecessary by resigning—to the astonishment of everyone, including the Minister.

The by now famous report by Arup's on the structural impossibility of Utzon's acoustic ceilings was not, as some have implied, sent by the engineers to the Government behind the architect's back. It was, in fact, prepared for Utzon and then sent by Utzon himself to the Government with a statement that he refused to accept it. In addition he put in a claim for Consultant's fees (in addition to Architect's fees) for work done on stage techniques and machinery prior to 1960. The Government asked him to wait for a decision on payment to the end of the week, but he refused and resigned. The Institute of Architects, Arup's and other parties all tried to effect a compromise, but without avail. An injunction by a group of architects on the Government, restraining it from using Opera House lottery funds in violation of the Opera House Act which names Utzon as sole architect, has been refused in the Courts.

The unenviable job of completing the design has now gone to Peter Hall, a young former assistant to the NSW Government Architect (Ted Farmer). Farmer, incidentally, is an enlightened official architect; the NSW Government office building, detailed by another former assistant, Ken Woolley (for whose recent works, see page 416 of this issue), is one of Sydney's best new buildings. The crux of the case as it stood at the time of writing (May 19) seemed to be whether Hall would have the benefit of Utzon's brilliant Stage III sketches, which were held by his solicitors. It would be a thousand pities if these drawings were denied the new architect. Two other architects have been appointed to collaborate with Hall: Lionel Todd, of Hanson, Todd and Partners (working drawings and contract documents), and D. S. Littlemore, of Rudder, Littlemore and Rudder (administration).

A group of leading Australian architects, led by Harry Seidler, have submitted a memorandum to the Government, protesting against the treatment of Utzon and supported by nineteen distinguished foreign architects including Louis Kahn, Felix Candela, Richard Neutra, Alfred Roth, Kenzo Tange, Sven Markelius, Ernesto Rogers, J. Bakema, Aldo van Eyck and Ralph Erskine. A protest from America has been organized by Edward C. Bassett, designing partner of Skidmore, Owings and Merrill's San Francisco office.

ELLIS ISLAND RECLAIMED

When Adam Ritchie's photographs were published in the April AR of the derelict buildings that once housed the US immigration station on Ellis Island in New York harbour, mention was made of the appointment of Philip Johnson by the US Secretary of the Interior to the task of converting Ellis Island into a recreational park.

Philip Johnson's plans have now been disclosed. He proposes preserving as ruins and relandscaping two of the largest of the buildings put up in 1900, and adding a high ziggurat-like monument (shown on the right in the model, 1) to the 16 million immigrants who passed through Ellis Island, a restaurant and a viewing pyramid commanding the whole harbour.

The monument, which will be about the same height as the base of the Statue of Liberty not far away, will consist of a truncated hollow cone 300 feet in diameter, ringed inside and out by spiral ramps and with a pool in the middle. Between the vertical prestressed concrete ribs will be plaques listing the names of as many as possible of the immigrants dealt with by the immigration station during its sixty-two years of operation from 1892. The project will take eight to ten years to complete and will cost about twice the six million dollars already allocated by Congress for the purpose.

ICA: THE NEXT STEP

The long awaited move by the Institute of Contemporary Arts to the larger premises that will make an expansion of its activities possible is getting nearer, as recent correspondence in *The Times* made clear. The premises are to be in Carlton House Terrace, where the large podium facing the Mall seems ideally suited to conversion into an exhibition gallery and lecture hall.

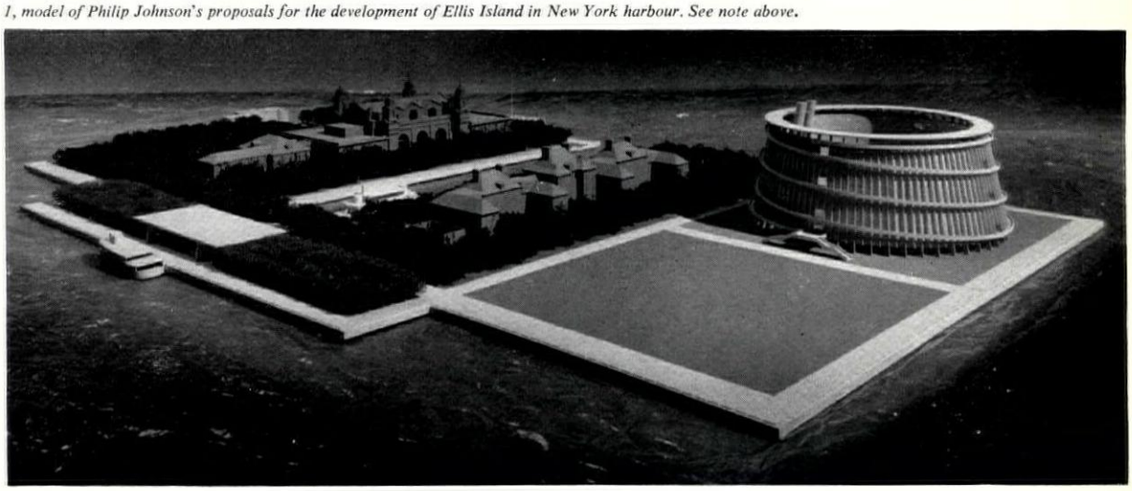
The space made available by the Crown Estate Commissioners (who rightly preferred as tenants a modern art institute to a Royal Air Force museum, which was the rival candiate for the accommodation) consists of the podium to the east of and alongside the Duke of York's steps, and one of the Carlton House Terrace houses—No. 12. This space will be shared by five societies: the ICA, the Society of Industrial Artists and Designers, the Design and Industries Association, the Designers' and Art Directors' Association and the Institute of Landscape Architects. Each society will however preserve its own identity. As well as the gallery and lecture hall within the podium there will be, in No. 12, a library, council chamber, club rooms and committee rooms, and there will be entrances both at the Carlton House Terrace level and at the lower level of the Mall.

The problem facing the ICA has been—and still is—to raise funds for converting and equipping these new premises. They are hoping for a substantial addition to the funds—to the amount of at least £100,000—from an auction that Sotheby's are holding on the ICA's behalf on June 23. This will be an auction of contemporary paintings and sculpture and it is an indication of the value the art world places on the work of the ICA that so many leading artists and collectors have given works to be sold. The artists represented include Picasso, Braque, Miro, Matisse, Moore, Sutherland, Bacon, Max Ernst, Gabo, Klee, Ben Nicholson, Giacometti and many others.

CONVERSION AT YORK

The proposed new machinery of the Church of England for dealing with the problem of redundant churches (AR, March, 1966) is already encouragingly being given a trial run. With a generous grant from the Pilgrim Trust to meet the administrative expenses, the Archbishop has appointed a York Redundant Churches Commission under the chairmanship of Marcus Worsley, MP. The secretary is John Harvey, the architectural historian. The commission's job is to consider new uses for the eleven churches, out of eighteen surviving in the city centre, which in 1964 were declared redundant by the Archbishop's working party on pastoral needs in the city. York already has a splendid example of the intelli-

1, model of Philip Johnson's proposals for the development of Ellis Island in New York harbour. See note above.

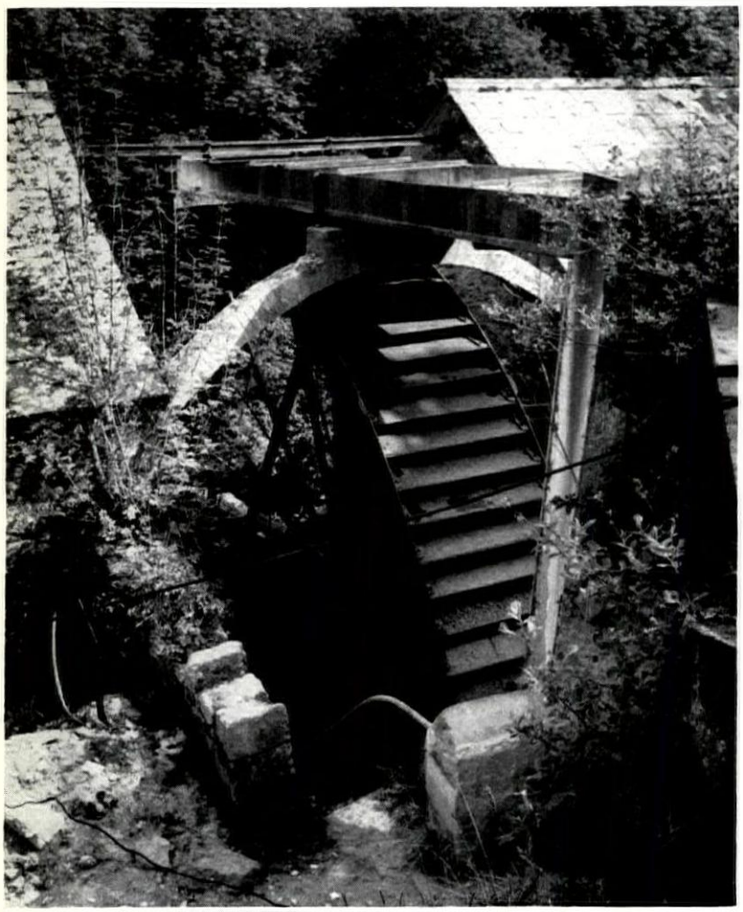


gent conversion of a medieval church for a modern need in the Institute for Advanced Architectural Studies, formerly St. John's, Ousebridge. All those concerned by the problems of mingling the best of the old with the best of the new, so as to promote vitality within the levelling tendencies of modern city centres, will wish the York venture success and look forward to its first report.

WAILES'S SURVEY

With the successful launching of the Industrial Monuments Survey (discussed on pages 421–424 of this issue), the richness and diversity of England's industrial past is gradually being uncovered: not just the buildings in the Functional Tradition or classical survival, but the neglected engines they housed, often in the most remote places. Tregargus in Cornwall, for example, was the site of five water mills, with giant wheels ranging from twenty-two to thirty-five feet in diameter, 2, grinding chinastone for the pottery industry. When Rex Wailes photographed them last September for the Survey, it seemed probable that they would soon be completely dismantled. Less remote, but completely overlooked when Max Lock's plan for Brentford's riverside was prepared (see AR, September, 1965), is the superb series of pumping engines of the Metropolitan Water Board close to Kew Bridge. Two of them were built by Boulton, Watt & Co in 1820, resplendent in masculine Doric, 3; the others date from 1846, 1858 and 1871. Equally unexpected on Wailes's travels was the discovery of early industrial traditions perpetuated unselfconsciously; the lifting bridge shown here, 4, on the abandoned Quinna Brook branch of the Shropshire Union Canal dates from *c.* 1962, not *c.* 1812 as might be supposed. It was completely renewed in the traditional manner at the Canal Workshops at Ellesmere. Art historians may find this more baffling than a technologist would.

3



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Three illustrations from the Industrial Monuments Survey: 2, water wheel at Tregargus, Cornwall. 3, pumping engines of the Metropolitan Water Board, Brentford. 4, lifting bridge of 1962 on the Shropshire Union Canal.

4

HUNGARIAN RELIEF

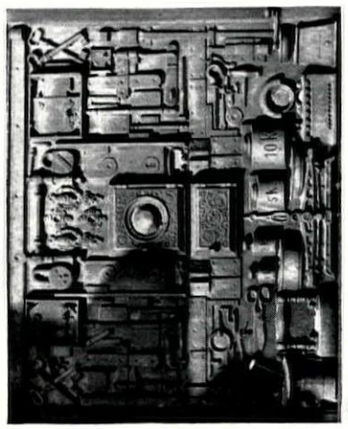
The cover of the August, 1965, AR showed part of a remarkable cast-iron relief, 5, photographed by Mr. Edwin Johnston when he came across it outside a museum at Szeged in Hungary. He believed it to have been made as a sign for an ironmonger's shop. The AR eventually reached Hungary and was seen by Miss Bea Lajta, who has written to Mr. Johnston confirming the origin of the relief and saying that she recognized it as one commissioned by her grandfather, Mr. Varga Derso, owner of the ironmongery shop it was designed to decorate.

Miss Lajta sends also a cutting from the South Hungarian newspaper *Del-Magyarorszag* for October 7, 1965, in which the appearance of the relief on the AR cover is noted. The following are some extracts from the newspaper article, translated by Dr. Gyoro Csorgor.

'The relief was brought to the museum about eight years ago. Until that time it was at the entrance to Varga's ironmongery shop in Hed Street, with a slogan, "We buy iron and iron goods." The relief was made at Pecs before the turn of the century.

'Our town museum was offered the care of the relief, but answered that it was well placed in its original position and that the museum had no department of industrial history, nor accommodation for such large and heavy objects. However, it was carried to the museum (eight men could scarcely lift it) and placed against the wall. There it remains today. At the same time they placed there two iron plates with lions' heads supporting the national arms which belonged to the relief, but these were stolen.

'The relief itself still stands in the same place, the only drawback being that it cannot be well seen because of some radiators that have been standing in front of it for three years—to our regret; also to the regret of Mr. Edwin Johnston, an honest Englishman who visited us during the summer and who photographed the half-covered relief. He did not mention it to us, but it must have pleased him because the relief appeared on the cover of THE ARCHITECTURAL REVIEW. Mr. Johnston criticized the placing of this memorial outside the museum and hoped this was provisional and that in a short time we would bring it inside. But



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we have to disappoint him. The relief will not be accommodated in the museum, but will be placed on the facade of a new building, as we are informed by our friend, engineer Bela Borvendig, whom we have also to thank for noticing it in THE ARCHITECTURAL REVIEW. It seems that Hungarian people have to learn even from foreigners what is of value in their own country.'

correspondence

DISS

To the Editors.

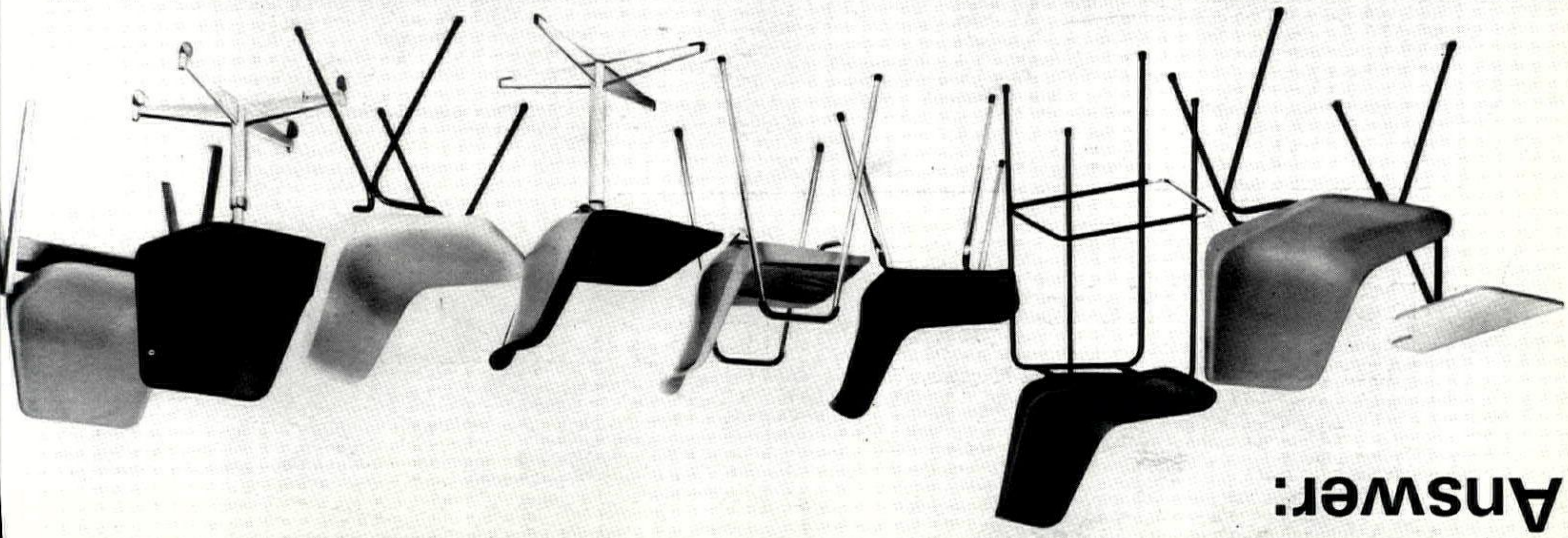
SIRS: I have read Mr. Kenneth Browne's article on the townscape of Diss in your February, 1966, issue, and as joint managing director of the company which owns the garage marked with an 'X' on the map as 'Garage Squalor Here' I would like to draw your attention to the development which is at present taking place on this site.

This development, planning permission for which was obtained from the council in the middle of last year, includes a Mereside garden with a small paved terrace and seats backed by trees. This will provide a pleasant and attractive frontage to the edge of the water which the public may use. Furthermore garage buildings which previously existed on the site have been demolished, the whole of the area levelled and resurfaced so that cars can be properly and tidily parked. The whole of the garage premises are being redecorated in a colour scheme agreed with the Norfolk county council architect and considerable expenditure is being put into the whole site to achieve an appearance in keeping with the attractive features of this small town.

I am surprised that you should have seen fit to publish this article and criticize our premises without checking either with us or with Diss council as to our plans for this development. You will appreciate that when one is expending considerable time and money to carry through a develop-

What has 44 legs but is very light on its feet, a weatherproof shell yet wears many different covers, sometimes has arms – sometimes hasn't, works alone, or in large groups, can be seen all over the world but is only three years old?

Answer:



The Hille Polypropylene Chair Programme. A multi-purpose range of tough, comfortable, attractive low-cost chairs which, since its relatively recent introduction, has achieved tremendous success all over the world. We show some examples of the wide variety of chairs that make up the range which includes stacking versions, linking devices (for continuous rows) and floor-fixed types. In fact most seating problems have been solved in these designs—hence their very wide use in all working and domestic environments. Shells come in light grey, charcoal or orange vermillion, they can be fully upholstered in a special range of Hille fabrics, or a slip-over apron which covers the whole front of the chair is available (the pedestal chair, above, is wearing one). Bases are finished black nylon coated, black stove enamelled or bright chrome. The chairs are shipped in boxes and are easily assembled by anyone. Hille Polypropylene seating can be seen at:

London: 41 Albemarle Street, London, W1. Telephone: Hyde Park 9576-9. **Watford:** 134 St. Albans Road, Watford, Herts. Telephone: Watford 42241. **Birmingham:** 24 Albert Street, Birmingham 4. Telephone: Midland 7378. **Edinburgh:** 25a South West Thistle Street Lane, Edinburgh 2. Telephone: Caledonian 6234. **Manchester:** 50 Sackville Street, Manchester. Telephone: Central 6929.

hille

The Calculon C5

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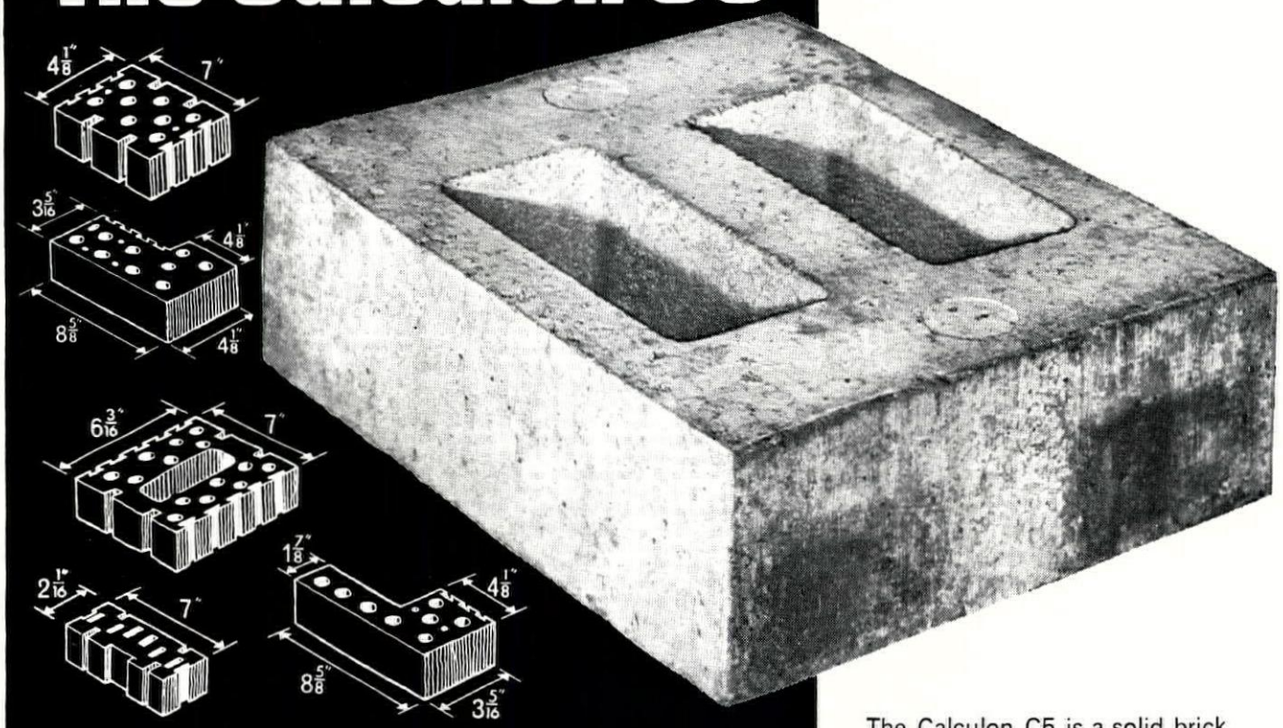
Barbour Index



These specials are applicable particularly to the use of A10 and B75, but are available for use in conjunction with Calculon C5 for highly stressed brick work where cutting is inadvisable.

TECHNICAL DATA

SIZE
Nominal dimensions 9 x 7 x 3 in., actual $8\frac{5}{8}$ x 7 x $2\frac{5}{8}$ in. subject to normal standard tolerances.

COMPRESSIVE STRENGTH
Averages 5,000 lb. per sq. inch.

WEIGHTS
Average weights are 9·5 lb; per brick, 2 cwt. 13 lb. per pack of 25 bricks, 4 cwt. 8 lb. per yard of 48 bricks and 4 ton 4 cwt. 92 lb. per 1,000.

RATES OF LAYING
Results of trials carried out by our own staff indicate a 30% increase in the speed of laying when compared with 9 in. solid walling.

MEASURED RATE
The measured rate for Calculon C5 in the London area is 46/- per yard super, which compares with 68/6 per yard super for a 9 in. wall of 5,000 lb. per square in. in standard pressed bricks with one frog. For more detailed information on measured rates refer to the schedule at the back of booklet LB6 on calculated brickwork.

The Calculon C5 is a solid brick designed to meet requirements for highly stressed brickwork. It can be used to advantage for most internal loadbearing walls, both cross walls and spine walls or a combination of both. Where necessary for design considerations, it can also be used as an internal skin to a cavity perimeter wall. It incorporates an adequate hand hold to aid speed of laying. Sound transmittance 51.4 decibels.

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Redland

RB 11

ment of this sort one becomes a little upset to have a criticism of this nature levelled at one.

Yours, etc.,

P. N. GARNER

Diss, Norfolk. (Director, Sheffield-Garner Ltd.)

Kenneth Browne writes: I saw the mess on the edge of the Mere and assumed it was there to stay; garage messes usually are. If in this instance I was wrong I'm delighted to hear it. I only hope that in the scheme proposed, parked cars will be really hidden from the Mere by a good wall, not just prettified by flowering shrubs in front of a chicken-wire fence.

book reviews

MONUMENTS OF INDUSTRY

INDUSTRIAL ARCHAEOLOGY OF SOUTHERN ENGLAND. *By Kenneth Hudson. David & Charles in association with Ward Lock & Co. 45s.*

Southern England for the purposes of this book (the first of a series intended to cover the British Isles) extends from Gloucester to Portsmouth. The hard urban core of this variegated region is Bristol, always among the top English commercial cities, with an astonishing industrial versatility; cloth, wine, glass, ships, pottery, soap, sugar, tobacco, cotton, paper and aircraft are among the products of its varied trades which have at different times risen and, in many cases, fallen. It retains surprisingly little commercial architecture of any value from before 1800, but its Victorian commercial heritage is still impressive (more so than Mr. Hudson suggests), although far too much has disappeared during the last ten years without even being properly appreciated.

Bristol ceased to be an important cloth-making centre in the late Middle Ages; from then the industry was spread over a myriad of small towns and villages from the Cotswolds to Dorset. In earlier times the cloth trade was largely domestic, and its most impressive architectural monuments are churches and clothiers' houses. Factories became general around 1800, by which time the industry had become concentrated in the well watered valleys about Stroud (where Stanley Mill, of 1813, is one of the finest industrial buildings in Britain), and around Trowbridge, Bradford-on-Avon and Frome. After about 1830 the West Country textile industries declined sharply (apart from a few firms) against competition from Yorkshire. Many of the fine early nineteenth-century mills have gone, but some are used in connection with products as varied as milk (Chippenham), bacon (Trowbridge), pianos (Woodchester), rubber (Bradford, with a splendid addition of 1875, built as a rubber factory, beside the Avon) and champagne perry (Shepton Mallet). Further south the textile industry declined earlier, or continued on a domestic basis into the nineteenth century, leaving little trace; few people would imagine today that Sturminster Newton and Shaftesbury were fairly busy industrial centres 150 years ago, or that Blandford people made buttons in their homes (an 1875 Dorset directory says curtly that 'Birmingham has engrossed nearly the entire trade of button-making'). But Bridport's long-established rope and twine industry, still flourishing, has left some fine buildings.

Lead, iron and coal were mined from Roman times onwards in the Mendip area, and industries associated with them (or using water power from local streams) flourished. In a valley south-west of Bath local archaeologists have recently unearthed coal workings with associated wagonways, a canal, ironworks, a paper mill, a logwood mill, dyeworks, breweries, lime kilns, quarries and a whole village, which all existed in the eighteenth or nineteenth centuries; now the valley has relapsed into rurality. Quarries and brickworks were widespread right up to the present century, and brickworks at least (as Mr. Hudson suggests) need more investigation—local building materials were used far more in Victorian times than is sometimes supposed. Only a few very special building materials, like Bath stone and tiles and terracotta from the Poole Architectural Pottery, were sent out of the region in large quantities. Breweries were once as widely distributed as brickworks; they have likewise suffered from recent centralization and plenty of country town breweries, some of them interesting architecturally, stand empty or converted—Mr. Hudson thinks that few may survive much longer.

The Hampshire end of the region is very different from the rest; it was intensely rural until the present century, apart from the ports. Of these Southampton declined from its medieval heyday (from which survive numerous wine vaults and a warehouse splendidly restored by the City Architect as a maritime museum) to be revived by the railway; and Portsmouth has accumulated in its dockyard a magnificent series of what may fairly be called industrial buildings (more varied and impressive even than Mr. Hudson suggests), ranging from Georgian functional to Victorian Vanbrugian, and including several remarkable early examples of cast-iron construction as well as the block-making machinery designed by Sir Marc Brunel (the elder). Civilian dock architecture is best seen at Gloucester and Sharpness; at Weymouth some fine warehouses have recently been demolished.

This is classic country for railways; Mr. Hudson rightly suggests that Joseph Locke's London-Southampton line (1838–40), with its huge earthworks and long but easy gradients, is just as impressive a piece of engineering as Brunel's more glamorized Great Western. But why are the towns that grew beside the great railways —Swindon and later Eastleigh—so lacking in distinctive features?

The sheer volume of material collected and analysed by Mr. Hudson—who was an Industrial Correspondent to the BBC and now holds a post in the University of Bath—is astonishing, especially as so much is the result of pioneering work. Inevitably much has been overlooked, and the author says he would be pleased to know of significant omissions. This reviewer will begin with Portland Harbour (breakwater *c.* 1847), the Solent tide mills, the Fareham Red brick industry, the seventeenth-century Gilkicker landmark (for ships) at Gosport, senselessly destroyed in 1965 to straighten a road, the Gas Column in Southampton (1829), the Hayling Island salterns, and Brunel's Poundbury tunnel at Dorchester, constructed in order to avoid mutilation of the ancient earthwork above in response to strong public feeling—just as he modified the line of the railway further south to avoid going through prehistoric Maumbury Rings. These were early examples of successful preservationism; is it too much to hope that Kenneth Hudson's book, by stimulating interest, will be indirectly responsible for saving some of the monuments he so feelingly describes?

DAVID LLOYD

WATER WORK

BRITISH WATER-MILLS. *By Leslie Syson. Batsford. 55s.*

The writing and joinery of this book is not very skilful, its price is high and, although many of the photographs and old prints are attractive in themselves, their layout is dull. That is a pity because the market has now been spoiled, at least for a time, for a better book on a subject which does not appear to have previously been covered fully in a single volume and which, being visually attractive, calls for a more handsome production than this.

All the same, the book does contain much interesting information and useful documentation to add to the growing material on the important new discipline of Industrial Archaeology. It is divided into two parts: 'The History and Importance of Water-mills' and 'The Craft of Water-milling,' and these are followed by an appendix on Domesday Mills, another on Smeaton water-mills, a glossary of terms, a generous bibliography and an index.

We learn, through Vitruvius, that water-mills existed in Asia Minor some centuries before Christ and that the earliest known picture of one appears in an early fifth-century Byzantine mosaic. Exactly when they were introduced to Britain is not known, but it was probably in the later decades of the Roman Occupation. A clear reference to a water-mill occurs in a document of A.D. 762, while the Domesday Book records over 5,000, many of whose sites have remained in continuous use for the same purpose up to modern times. The first reference to windmills does not occur until 1191 so it seems that water-mills preceded wind-mills by many centuries.

The book describes the social importance of the manorial mill and the effects of its egregious 'soke right' which rendered the miller an unpopular figure, typically described by Chaucer:

'He was a thief as well of corn and meal
And sly at that; his habit was to steal.'

The arrival of printing in the fifteenth century helped to spread the knowledge about, and stimulate the development of, mills, but the great age did not arrive until Smeaton improved the water-wheel in the eighteenth century and so helped it to play an important part in the early years of the industrial revolution, not least in the new textile 'mills,' such as Arkwright's factory at Cromford. Then, just as General Poncelet had made the wheel really efficient, steam power in the towns began to replace the water-power of the countryside. (The first flour-mills run by steam were, in fact, erected beside London's river as early as 1784.)

As the author shows, the water-mill has had many other uses than grinding cereals. It was probably first used for irrigation but later purposes included cutting and polishing of marble, cloth fulling, dye crushing, ore stamping, mine pumping and ventilating, wire drawing, pin and needle making, timber sawing, grinding of gunpowder, hair-powder and tobacco, paper-making, boring guns, cylinders and water-pipes made from tree trunks, pumping of domestic water supplies, running textile machines, and, in modern times, generating local electricity.

The second part of the book is confined mainly to describing grain mills with their weirs, dams, dressed stones, gearing, buildings and wheels —overshot, undershot, pitch-back or breast. A brief chapter is devoted to tide mills.

At their peak period 20,000 water-mills may have been at work in this country, and the number indicates their economic importance in the past. The water-mill has now reached retiring age, but it has at least sired the modern turbine and can continue, here and there, to serve a useful and picturesque purpose, perhaps as a romantic country dwelling, or even to continue grinding rich, brown, stone-ground wholemeal for the food fads who still prefer it to the insipid white paste of the modern iron rollers. Long may such sweet relics last.

ERIC DE MARE

LENINGRAD STORY

LENINGRAD: HISTORY, ART, ARCHITECTURE. *By Nigel Gosling, with photographs by Colin Jones. Studio Vista. 6 gns.*

This has the format and lavish presentation of the fashionable coffee-table volume, but deserves to be taken more seriously. The splendidly reproduced illustrations are chosen for the information they convey as well as to look well on the page, and the text is written from first-hand knowledge of the subject—a subject incidentally on which there are surprisingly few books available considering the fame of Peter the Great's 'window on the west' as a city that rose from nothing in little more than a century and preserves its unity to this day.

As the volume's subtitle suggests, this is a portrait of Leningrad in its most important aspects. Its history is fascinatingly illustrated, though the historical text is somewhat spasmodic and gossipy. Thereafter are chapters on its architecture (again beautifully illustrated and knowledgeably described), its art treasures, the country palaces that surround it and the literature, music and ballet that have flourished in it. Finally there is a chapter called Leningrad Today, too brief and perfunctory, however, to give much of a picture of life as it is lived from day to day in a city that is modern Russia's second metropolis as well as a great museum of her pre-revolutionary culture.

At the opposite end of the Victorian panorama from the industrial monuments discussed below is the opulence and pomp displayed in the grand staircase of the Foreign Office  *though even here an iron girder, decorated with ceramic roundels, is frankly exposed beneath the distant flight of stairs. On pages 448–450 the superb interiors of this seriously underrated building are illustrated and described, and suggestions are put forward as to how the best parts of Sir Gilbert Scott's and Sir Matthew Digby Wyatt's colossus could be preserved, without adopting a rigid preservationist line and without damaging the Martin plan. In view of the need for a trade and conference centre, there seems no reason why exporters should not take the place of ambassadors here.*

The Editors

INDUSTRIAL ARCHAEOLOGY TODAY

Of recent attempts to reconcile the urbanized Englishman to his self-made surroundings there have been few more encouraging than the promotion of 'industrial archaeology.' The phrase itself was first used in print in 1955 in an article in *The Amateur Historian* by Michael Rix, a Birmingham University extra-mural tutor, and his own article in AR, May 1960, still introduced the subject as though it were in its birth pangs. Progress since then has been amazingly rapid. From the start the Rix connection with 'amateur history' (in the best sense) and with extra-mural adult education has proved to be symptomatic. Like ekistics or sociology, the study of the physical remains—buildings, machines, products, environment—of what a commissar might call Britain's Great Leap Forward has broken the bounds of traditional university disciplines. Already in the field was one private association, the Newcomen Society, founded in 1920 as a forum for academic research into the history of engineering and technology, plus a rather vague body of architectural opinion, which was codified by J. M. Richards and Eric de Maré under the title The Functional Tradition.* There were also the Science Museum, the Birmingham Museum of Science and Industry, and three railway museums, which inevitably tended to preserve objects divorced from their original settings. The spectacular 'firsts' of Britain's industrial revolution that survived *in situ*—steam engines, cotton mills, iron bridges, railway lines and metal-framed buildings, to name but a few—were mouldering quietly away, regarded as much less 'historic' than the fragments of a third-rate priory.

The crucial initiative, reported as hot news by Rix in his AR article, was the setting up, by that conveniently *ad hoc* body the Council for British Archaeology, of a Research Committee on Industrial Monuments. This has been evangelistic from the start, organizing conferences and week-end schools to awaken interest in the universities and in adult education, and—the major *coup*—persuading in 1963 the then Minister of Public Building and Works to open up the whole field through an Industrial Monuments Survey, run by a full-time consultant on a two-year contract. The man chosen was an engineer, Rex Wailes, well known as the expert on windmills; he had taken his first photographs of industrial archaeology at Corby steelworks as a schoolboy in 1919. Last month, on May 4, in the Dickinson Memorial Lecture to the Newcomen Society, he was able to paraphrase in satisfyingly precise terms the contents and conclusions of his report to the Minister on his first two years' work (he was reappointed in 1965 for a further term of one year, and this year for a final term of three years under the CBA only).

Wailes was given a threefold brief: to advise on a national survey of industrial monuments, to enable a quick assessment of the steps needed to record and preserve such monuments, and to advise on immediate action in urgent cases. Monuments were defined as objects which could not be moved (to museums) without destroying their foundations or their housing—beam engines but not railway locomotives.

* *The Functional Tradition in Early Industrial Buildings.* By J. M. Richards (photographs by Eric de Maré). London: The Architectural Press, 1958.

Industry, as against craft, was defined as the employment of skilled men from outside the narrow group of family and/or apprentices. The first essential, in order to round up the sporadic efforts of enthusiasts in different parts of the country, was to start the national survey, with a system of standard record cards for central filing. An attack on specific types of monument has made the most of the patchy knowledge available. Wailes himself, for the sake of experiment, has carried out a general survey of North Shropshire, a study of specific monuments in South-East Shropshire, and a national survey of stone grinding mills. The progress of this work has been paralleled by a rapid increase in interest and activity throughout the country.

Besides a great deal of recording by regional groups of the Council for British Archaeology, a new breed of specialized industrial archaeology societies has been born. Manchester, Southampton, Merthyr Tydfil, Gloucestershire, Lincolnshire and Yorkshire all have recently founded groups. More important, perhaps, because more permanent, has been the work begun officially under a few local authorities. Staffordshire led the way as early as 1959 by appointing R. J. Sherlock as full-time archaeology officer in the county planning department; his job is not by any means wholly devoted to the recent past, yet he has already completed a survey of industrial monuments in the entire county outside the county boroughs. As a fully completed part of the national survey this was preceded only by Wailes's own earlier work on windmills and tide-mills. Hertfordshire followed suit in 1964 by appointing an archaeology officer, but for only two years and without the use of a car. So long as the county concerned provides proper facilities, appointments of this kind seem by far the best way to inject the necessary urgency; the incidental activities of area planning officers, even in sympathetic county planning departments, cannot be relied on.

By fortunate coincidence, Wailes started his survey of South-East Shropshire at the very time that the new town of Dawley was designated, incorporating the eighteenth-century industrial areas of Coalport, famous for its china, Coalbrookdale, where Abraham Darby in 1709 pioneered the coke-fired blast furnace, and Ironbridge, where Darby's grandson in 1779 built across the Severn the spectacular 'first' of its name. The consultant planners to Dawley Development Corporation, John H. D. Madin and Partners, prepared an historical survey of the area, with a graded list which Wailes was able to amend and enlarge.

An increasing amount of recording work is likely to be done under local authorities by local museum staff. Some museums, in particular Leicester under T. A. Walden, have shown considerable initiative in preserving machinery *in situ*. To the existing specialized science museums at London, Birmingham, Belfast (transport) and Newcastle, will soon be added others (in preparation now) for County Durham (at Bowes Castle), Staffordshire, Worcestershire, Bristol (perhaps using Brunel's Temple Meads shed), Leicester, Nottingham and Manchester. The Glasgow Transport Museum was opened in the spring of 1964. The Inland Waterways Museum, established in 1963 on an attractive site at Stoke Bruerne in Northamptonshire, is going to be expanded; and there is now an enterprising tramways museum in a disused quarry at Crick in Derbyshire. Only the British Railways Board seems to be backsliding with its open threats under Beeching to the 'unprofitable' railway museums (of which Clapham is the most recently established, poorly publicized third).

Yet another source of recording and study is in the universities. Industrial archaeology experts are now ensconced at a number of them, including Birmingham, Bristol, Cardiff, Edinburgh, Glasgow, Keele, Leicester, Manchester, Nottingham and Sheffield. Swansea University College has initiated a remarkable combination of surveying, rehabilitation and landscaping in the Lower Swansea Valley Project, directed by Kenneth Hilton, which is transforming the derelict Landore area. A centre for the study of the history of technology—the first university department in the subject—has been established at the new University of Bath, under Dr. R. A. Buchanan. Equally important has been the launching in 1964, under the editorship of Kenneth Hudson, of the *Journal of Industrial Archaeology*, which has already set a high standard of scholarship and information. Hudson, the BBC Western Region's industrial correspondent, is the author of *Industrial Archaeology—An Introduction** (1963), the basic primer on the subject, and also of *The Industrial Archaeology of Southern England*† (1965), the first of a series of regional books published by David and Charles of Newton Abbot in association with Macdonald's. The second, by Dr. David Smith on the East Midlands, came out earlier this year. In Ulster the Belfast Stationery Office in 1963 published Dr. Rodney Green's study of *The Industrial Archaeology of County Down*.

There are in addition the 'conventional' methods of recording: the Ministry of Housing's and Scottish Development Department's lists, the Ministry of Public Building and Works' scheduling, the National Monuments (ex-Buildings) Record's photography, the Royal Commission on Historic Monuments' copious volumes. Staffordshire County Council, as a 'public' method of recording, has even borrowed the LCC's design for plaques fixed to buildings, changing the familiar blue to green; the first two have been put up in memory of James Brindley and Richard Arkwright.

Finally, there are the individual firms themselves. In spite of the conventional reluctance of 'progressive' firms to be associated too much with saving the past, industry has proved generally co-operative. Contrary to previously received impressions, there is in existence a large number of individual archives and museums—the *Journal of Industrial Archaeology* has published an impressive list—but not enough of them are made easily available to researchers or to a more general public.

Besides preservation of buildings and machinery, there is the all-important first-hand evidence of plans and engineering drawings. These can be appallingly bulky and complex: the North British Locomotive Company, for example, when it closed down gave to the Science Museum an estimated one million drawings, weighing

* Recently republished at 18s. in Methuen's series of University Paperbacks.
† Reviewed on page 419, of this issue.

seven tons, which would probably take a full-time researcher three years to sort and classify. The preservation of such first-hand records needs active assistance of labour and therefore money. Obviously seven tons cannot be kept from each firm, so selection must take place. There is bound to be the danger of repeating the kind of error made in 1945 when the RIBA had to select from the mass of drawings left in Lutyens's office: pretty perspectives, however irrelevant, were generally preferred to working drawings, however unattractively relevant to a real understanding of Lutyens's approach to design. Wailes recommends for industrial drawings that area panels should be established of retired engineers, working part-time, rather than handing over selection to the unqualified staff (in engineering terms) of county records offices (but there could be unnecessary friction here). Central archives, largely of microfilm, would make available duplicates to museums and record offices in interested areas.

Another basis of recording, bordering on preservation, is photography. Contemporary photographs of products have often been thrown away, because of the weight of the old glass negatives. No less interesting are photographic records of the processes invented within the last generation, such as plastics and synthetic fibres, where the turnover of obsolescent plant is growing ever more rapid. Present-day photographic techniques are of vital importance in recording threatened buildings swiftly by photogrammetry. Measuring up in the traditional way takes far too long, while other buildings disappear unrecorded; if a central bank of photogrammetric records can be established, as in Belgium, it will provide an inexpensive basis for future scale drawings, working and isometric. Also in the central records, Wailes suggests, there should be a sound archive, portable tape recorders having recently reached a sufficiently good standard to give an adequate impression of vintage power plants likely to go out of use. A film archive could be established initially from copies of films already made by television and by industry.

However much recording is done, however, it must not divert attention and effort from the positive preservation of important buildings and machines with their environment unspoilt. Wailes has admirably stressed that in this urgent situation recording and preservation must be carried out simultaneously. He has attacked the curious academic snobbery which insists on surveying the whole country before selecting the few masterpieces; this attitude is taken by public authorities and private firms as an excuse for their failure to act now, using their eyes. Overall, it is vital for the Ministry of Housing to 'list' industrial monuments as fast as possible—and there have been welcome signs of willingness to do this.

Meanwhile, positive preservation has recently had some encouraging beginnings. Helped by a massive Ministry of Public Building and Works grant, work has, after several years' delay, nearly been completed on the restoration of Abbeydale Works at Sheffield; it has been done at a cost of some £40,000 under a private body, the Council for the Conservation of Sheffield Antiquities, after the owners, Sheffield Corporation, decided not to undertake the work themselves. The Ministry are contemplating assistance to the restoration of Bonawe Furnace, near Oban in Argyllshire. The National Trust have given a lead in the conversion of early industrial buildings to other uses in turning the Quarry Bank Mills of 1784 at Styal, Cheshire, into six flatted factories for light engineering. Another important piece of preservation, similar to Abbeydale in its relationship of private funds to municipal inaction, will be the preservation of the Abbey Park sewage pumping works at Leicester, which is likely to become the nucleus of the city's new science museum. The joint move of private enthusiasts and public bodies to preserve Robert Owen's model industrial settlement of New Lanark has been one of the first initiatives in the neglected field of planned industrial housing, with its particular problems of comprehensively installing modern services and amenities. In the transport field the pioneering work of the Tal-y-llyn Railway in keeping old engines running for holidaymakers' pleasure has been successfully followed by the Bluebell Line in Sussex; and calmer, more reflective holiday travel on canals, for the development of which the Inland Waterways Board still has insufficient resources and energy, has been given a fillip by the National Trust's successful reopening of the Stratford Canal in 1964. The overriding consideration in the work of preservation must be that one live, working engine is worth twenty dead ones—however romantically attractive ruins may be to aesthetes.

In listing and preservation of live industrial plant, there is one serious snag, which shows the need for revising the law. Engines and machines are at present classified as 'chattels' separately from the buildings which house them—and only on the buildings can preservation orders be imposed. The Newcomen Society and the Cornish Engines Preservation Society have preserved actual steam engines, but the Ministry cannot officially do so. This is a ridiculous division, for house and engine should be regarded as inseparable. Even without legislative anomalies there is always present the insidious danger of the scrap value of engines—not large, but often sufficient for them to be devoured. Local authorities could assist financially, by derating and by direct financial assistance under the 1962 Local Authorities (Historic Buildings) Act. It must be recognized that firms are not in business to preserve their past and may need considerable coaxing to do so, though some realize the fine advertisement that excavation and museum display can be. Allied Ironfounders' 1959 exhibition of early blast furnaces and equipment at Coalbrookdale remains a model of its kind.

There is no doubt, however, that many industrial monuments are of national and not merely local importance. The National Trust can take them over only with a substantial endowment: £17,000 is being raised by the Cornish Engines Preservation Society for them to take over five Cornish pumping engines. The Historic Buildings Council, which has already shown itself sympathetic (a recent grant was given to Rennie's Dundas aqueduct at Claverton), still has only £500,000 per annum to dispense. Wailes urges that an additional and separate grant should be set aside each year specially for industrial monuments,

and that a separate panel of experts should advise on its apportionment. Particularly outstanding examples should be taken into Ministry of Public Building and Works guardianship. One of the first of these should be the Iron Bridge itself, which has been rapidly decaying structurally within the last five years, but has been shuttled back and forth between the Ministry of Transport and the Shropshire County Council, without grants from either of them. Perhaps some monuments in working order could be superintended by travelling inspectors from the Science Museum, on the model of the Victoria and Albert Museum's relationship with the collections at Ham and Osterley. The problems of 'controlled decay' and hooliganism (and public safety) are still more difficult than those which face redundant churches (AR, March 1966). Overall control of the whole field of industrial archaeology could probably best be entrusted to standing joint advisory committees for England, Scotland and Wales, with representatives from the Ministries, the CEA, the Historic Buildings Councils, the National Monuments Record, the Royal Commissions on Historic Monuments, the Science Museum and the Newcomen Society.

In spite of all the energetic work that is in progress, there is still a great need for educational work, in three directions particularly. First, it is too easy to assume optimistically that, to quote Rix in 1960, 'these are the monuments that generations yet unborn will look back on as the symbols of their emancipation from industrial poverty.' It would be more true to say that at present for most of the middle-aged and older generations of working men (and of Labour councillors) the words 'industrial archaeology' conjure up a list of exactly the symbols of enslavement which with good reason they wish to be rid of.

Unless earnest researchers understand this, they will be in for some shocks. Take Sarehole Mill, for example, a derelict group of buildings with a rare continuity of agricultural and industrial processes, which is pleasantly situated in a recreation ground in an inner suburb of Birmingham. Last October the Lord Mayor, with support from both officials and amateurs, appealed for £30,000 so that the mill could be restored from private funds as one of the city's museums, to house the Pinto Collection of Wooden Bygones. On this scene of enthusiasm appeared in person the leader of England's second largest local authority, Alderman H. Watton. 'As to buildings of alleged aesthetic appeal,' he wrote subsequently to the *Birmingham Post*, 'I do not accept that the self-appointed experts are necessarily right when they criticize those of us who say, "Away with these ugly, crumbling and insanitary relics, be they Georgian or Victorian". . . . I am still of the same opinion as was the City Council in 1960 and 1962: that to spend public money in restoring this heap of old mixed junk would be wrong. . . . A spoonful of plaster or the mummified body of a spider in some crevice are perhaps the only original things left. It should be pulled down now.' He added revealingly if irrelevantly: 'It is interesting to note that it is only the houses of the "master class" with the bells in the drawing-room to summon the footman and the servants that we are asked to preserve. What was provided for the mass of the people, either Georgian or Victorian—the slums—can go. Why not keep these relics?' This muddled bitterness deserves some sympathy. It is easy (and justifiable) to feel romantic nostalgia for the late Coal Exchange or the late Euston Arch or the late Crumlin Viaduct, or to campaign for the Iron Bridge—while forgetting, for example, that 41 per cent of the land surface of the equally historic Dawley New Town site has been ravaged by soil disturbances, pit shafts, pit heaps and other impediments.

More specifically educational can be the role of museums. However many embalmed monuments are scattered round the countryside, it will always be difficult in the remoter areas to have more than a few open in working order. The museum will still remain a vital place for the kind of imaginative projection of machinery noises, smells and flashing diagrams described by Donald Insall in connection with railways (AR, February 1966). It is easy to forget that the interest of the majority of the public is likely to be technological rather than aesthetic—not in textured brick piers and soaring arches but in fascinating revelations as to how machinery works. An excellent example of the way to put this over, elegantly but modestly, is given by Robert McKinstry's work at the Ulster Folk Museum near Belfast (AR, May 1965). There is said to be a grave national shortage of technologists, and if industrial archaeology can appear to have inspired a few recruits, it will (putting things at their lowest) find it easier to open official coffers. Educational broadcasting has been slow to exploit the subject, and the series of ten programmes on the BBC last autumn, edited by Brian Blake and Prof. Jack Simmons, was a welcome innovation.

There is, however, a third and overriding educational or academic doubt about the present state of industrial archaeology. What are the accepted criteria for judging the monuments? For all Mr. Wailes's exemplary patience and diligence, the national survey still looks, by European standards of historical scholarship, amateurish in the extreme—particularly in visual matters. Is it perhaps worth giving a special distinguishing asterisk to those among the listed monuments that are not only technologically interesting but also visually satisfying? More serious is the overall tendency to list objects only rather than environmental areas. Michael Rix has recently suggested in the *Journal of Industrial Archaeology* that 'national parks of industrial archaeology' should be designated, starting with the Dawley area. If this sounds excessively rustic, then at least some effort might be made to designate significant areas of industrial townscape. In its recent arbitrary list of over 300 'historic towns' submitted to the Minister of Housing, the Council for British Archaeology showed some signs that its medieval right hand is unaware of its industrial left hand. Newcastle and Glasgow were listed—but not a single Yorkshire woollen town, not a single Lancashire cotton town. It is not just the planned settlements like Saltaire or New Lanark that need special treatment; at least one medium-sized woollen town (say Halifax) and at least one small one (say Bingley) should be selected. It is important that industrial archaeologists should see their work in the whole context of the urban environment.

1

OFFICE DEVELOPMENT, TOWER HILL, LONDON | *architects* **GEORGE, TREW AND DUNN**

(in association with the architects of the City of London Real Property Co) | *photographs by H de Burgh Galwey*

COMPANION TO THE TOWER

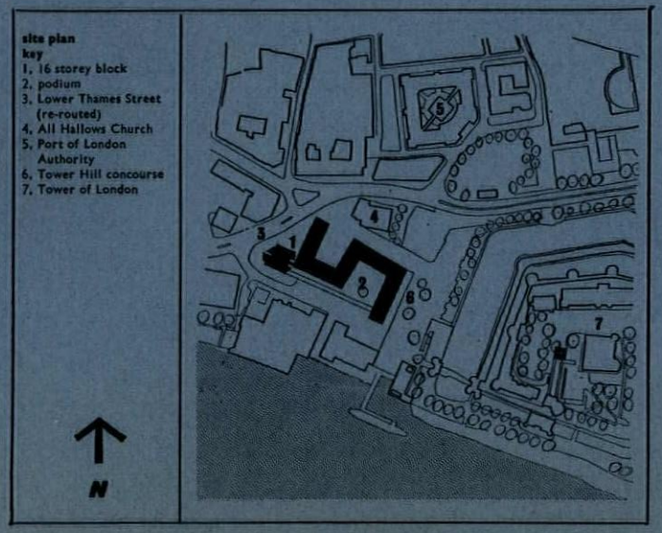
2

1 (previous page), the lower level on the south side, with the parking garage on the right. 2, looking in the same direction as 1, but from the podium level; the ground floor of the lower block is occupied by a restaurant.

OFFICE DEVELOPMENT, TOWER HILL, LONDON

3. aerial view of the development from the west. Beyond is the River Thames and Tower Bridge and, to the left, the Tower of London.

This development, west of the Tower and north of Lower Thames Street, consists of offices, shops, a restaurant, a public house and a large parking garage. It is called Tower Place and occupies a site that was densely covered before the war by miscellaneous buildings but which has since been replanned by the City Corporation following the Corporation's acquisition of this and neighbouring property. The replanning has involved the re-routing of Lower Thames Street in a north-easterly direction and the closure to through traffic of the eastern part of that street and of Great Tower Street. This will allow Tower Hill to become a pedestrian concourse and the raised terrace along the east side of Tower Place to be linked with the gardens to the east of All Hallows church. The layout of the new building is designed to take advantage of, and contribute to, this comprehensive replanning of the area and in particular to ensure that existing views of the Tower and of All Hallows church are maintained and create new views where possible. It was worked out in conjunction with the City Corporation (the planning authority as well as the freeholders), the London County Council, the Royal Fine Art Commisson, the Port of London Authority, the Guardians of the Tower and others. At this stage Sir Basil Spence acted as consultant.



The layout provides extensive pedestrian spaces, open to the public, in the form of two open-sided paved quadrangles formed by the main S-shaped office block. These are linked by a colonnade beneath the building and because of the slope of the ground the southernmost quadrangle is at a high level overlooking Lower Thames Street from which the main level of the parking garage, beneath the podium, is reached. A second office block, to the west, takes the form of a 16-storey tower. This is called Vincula House, and four floors of it are occupied by the City of London Real Property Company. They were joint promoters of the scheme with C. T. Bowring and Company who, with their subsidiary companies, occupy most of the S-shaped block.

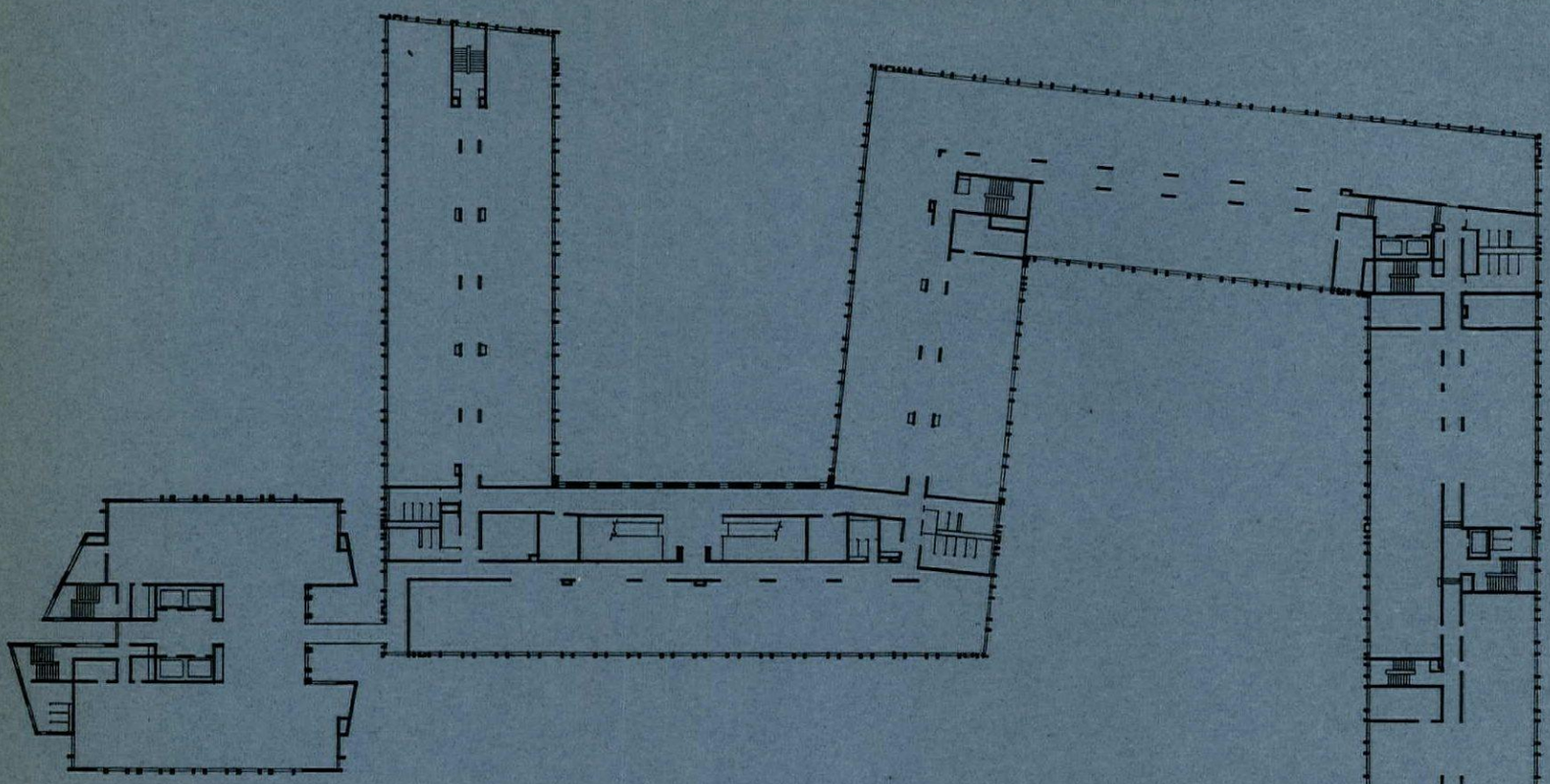
The ground floor of the latter block contains the seventeen shops, fronting on to the pedestrian terraces on the east and north sides, and the restaurant. At its south-eastern corner, on three levels, is the public house —the Tiger Tavern which has occupied buildings on the same site since the sixteenth century. The three lower levels of the building, beneath the podium, provide covered parking for sixteen tourist coaches (for visitors to the Tower—such coaches used previously to clutter Tower Hill), public parking for 200 cars and parking for 100 office cars.

The structure of the building is reinforced concrete, partly precast and partly insitu. To avoid obstruction internally, the columns in the centre are contained within corridor walls and those at the perimeter have the form of precast mullions forming part of the external wall system. The mullions are arranged in pairs, at 6 ft. 8 in. and 3 ft. 4 in. intervals, which allows a greater variety of offices sizes as well as a more interesting rhythm on the facade. There are additional mullions at the corners, where odd dimensions have to be taken up. Where vertical pipe-ducts occur, the cladding spans between two mullions.

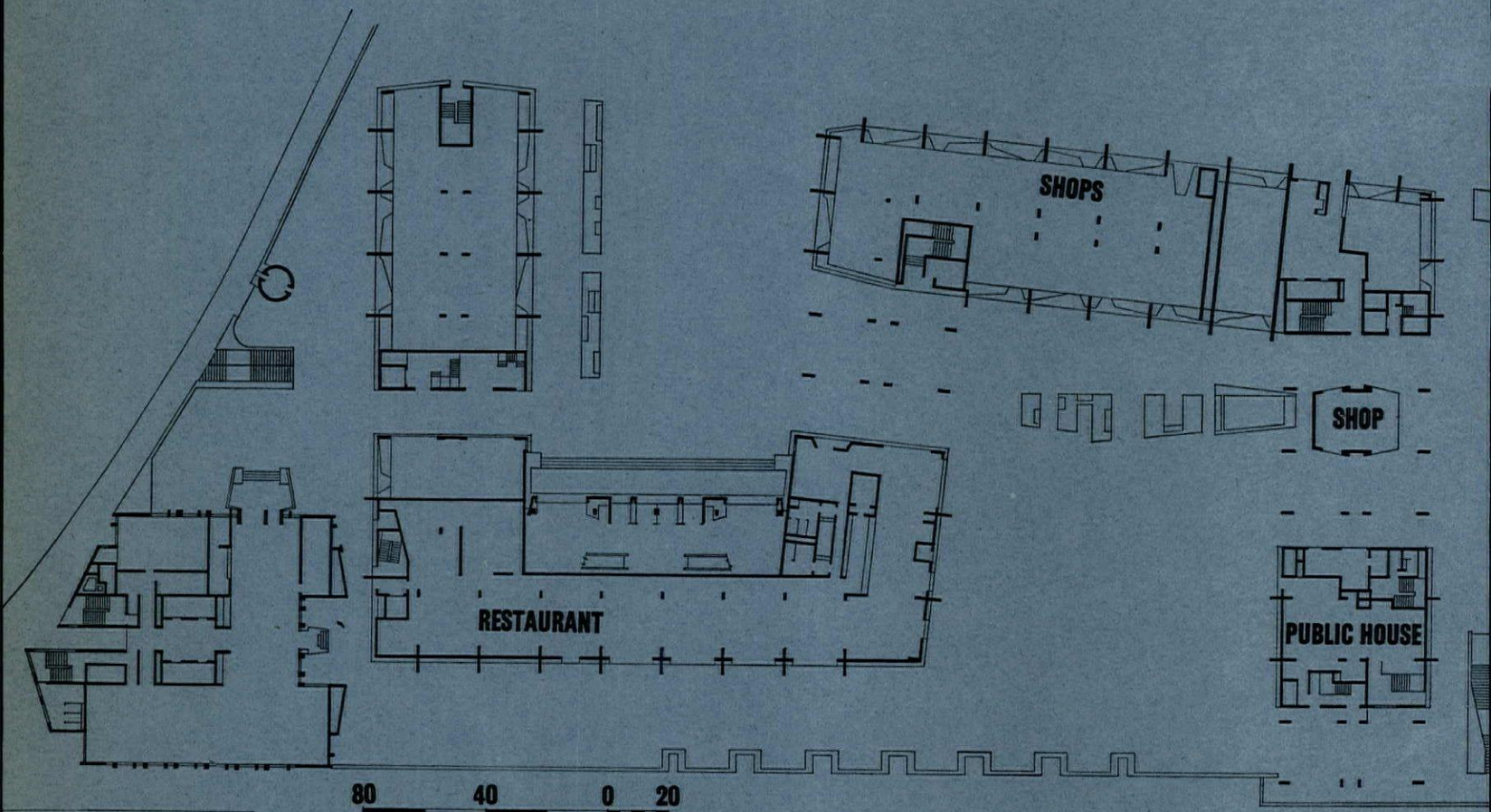
In view of its proximity to historic buildings, a simple external treatment was aimed at, but one vigorous enough to make its own contribution to the townscape. The colour has been kept fairly dark, the precast mullions getting their silver grey colour from a mixture of Cornish granite, silica sand and the ordinary grey of Portland cement, and the window spandrels being a darker grey mineralite. The spandrels are cut back at their vertical edges to give a line of shadow. The podium wall, facing Lower Thames Street, is of deeply coursed rusticated granite. Shop fronts and entrances are aluminium sprayed to a black-bronze finish. The lighting along the fronts of the shops and elsewhere in the pedestrian area has been specially designed by the architects. Office space is air-conditioned, the air being distributed from the suspended ceilings through perforated tiles. Satisfactory functioning of the air-conditioning depends on the use of sun-blinds. These have vertical slats and are grey in colour.

Structural engineers, Ove Arup and Partners. Quantity surveyors, Northcroft, Neighbour and Nicholson.

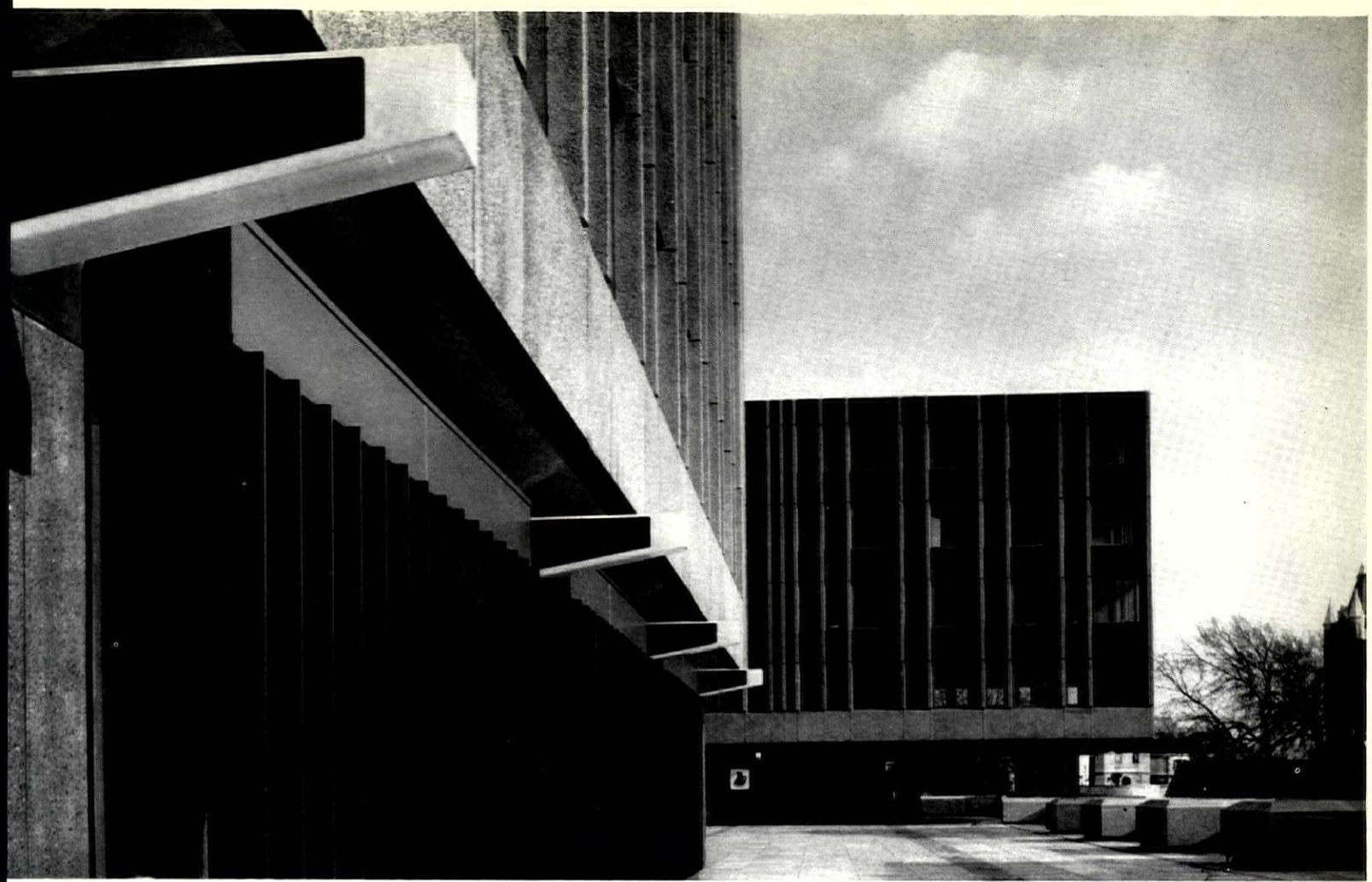
OFFICE DEVELOPMENT, TOWER HILL, LONDON



typical upper floor plan (offices)



plan at podium level



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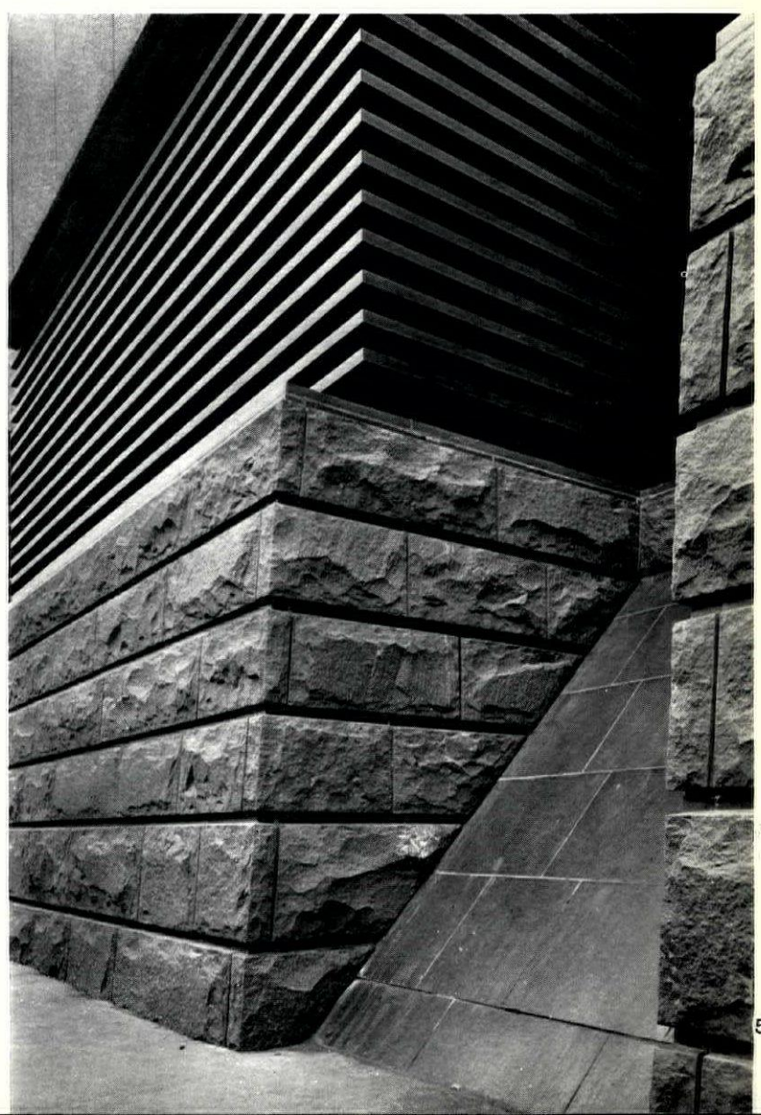
4, looking east along the south side of the lower blocks at podium level; the light fittings were designed by the architects. 5, detail of the podium wall on the south side.



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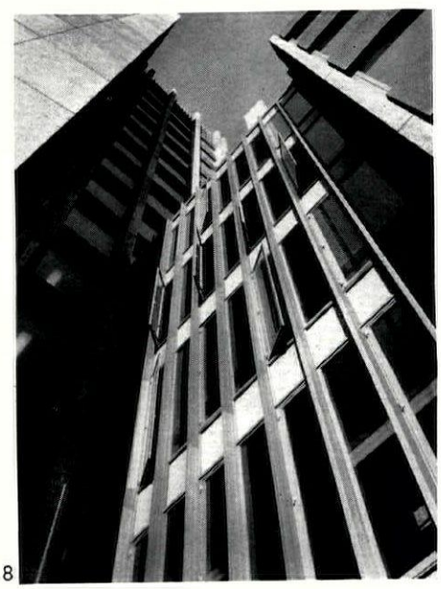

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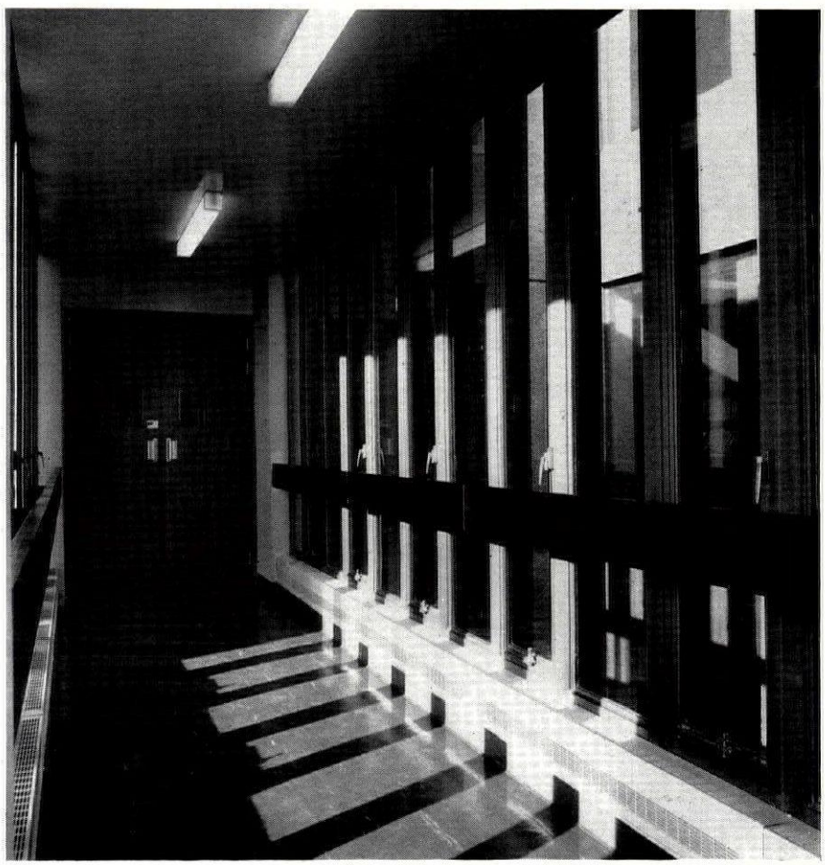
6, upper floor corridor in the main four-storey block. 7, one of the escalators connecting the floors. 8, the link between the four-storey block and the tower block.

9



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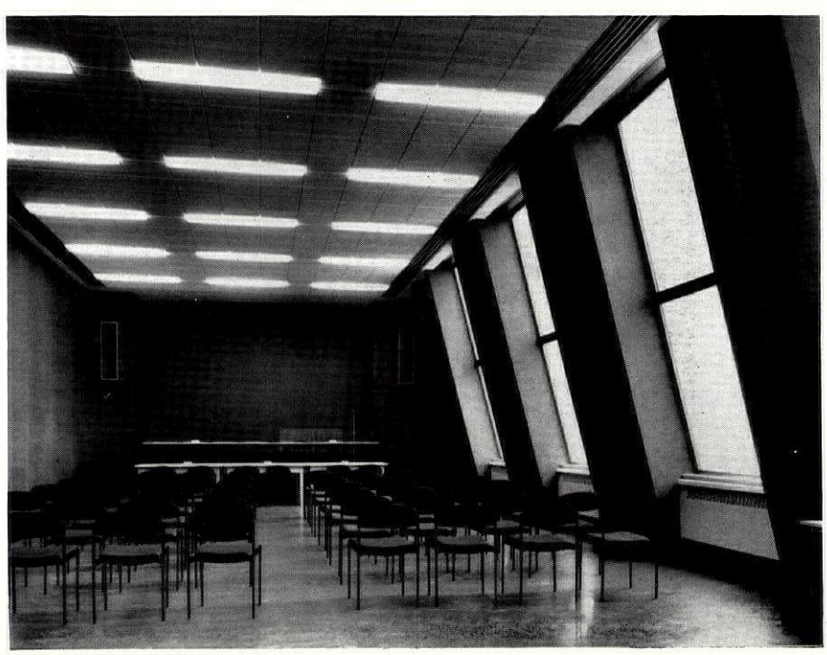

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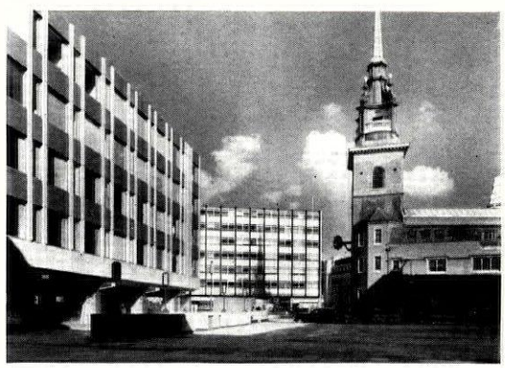
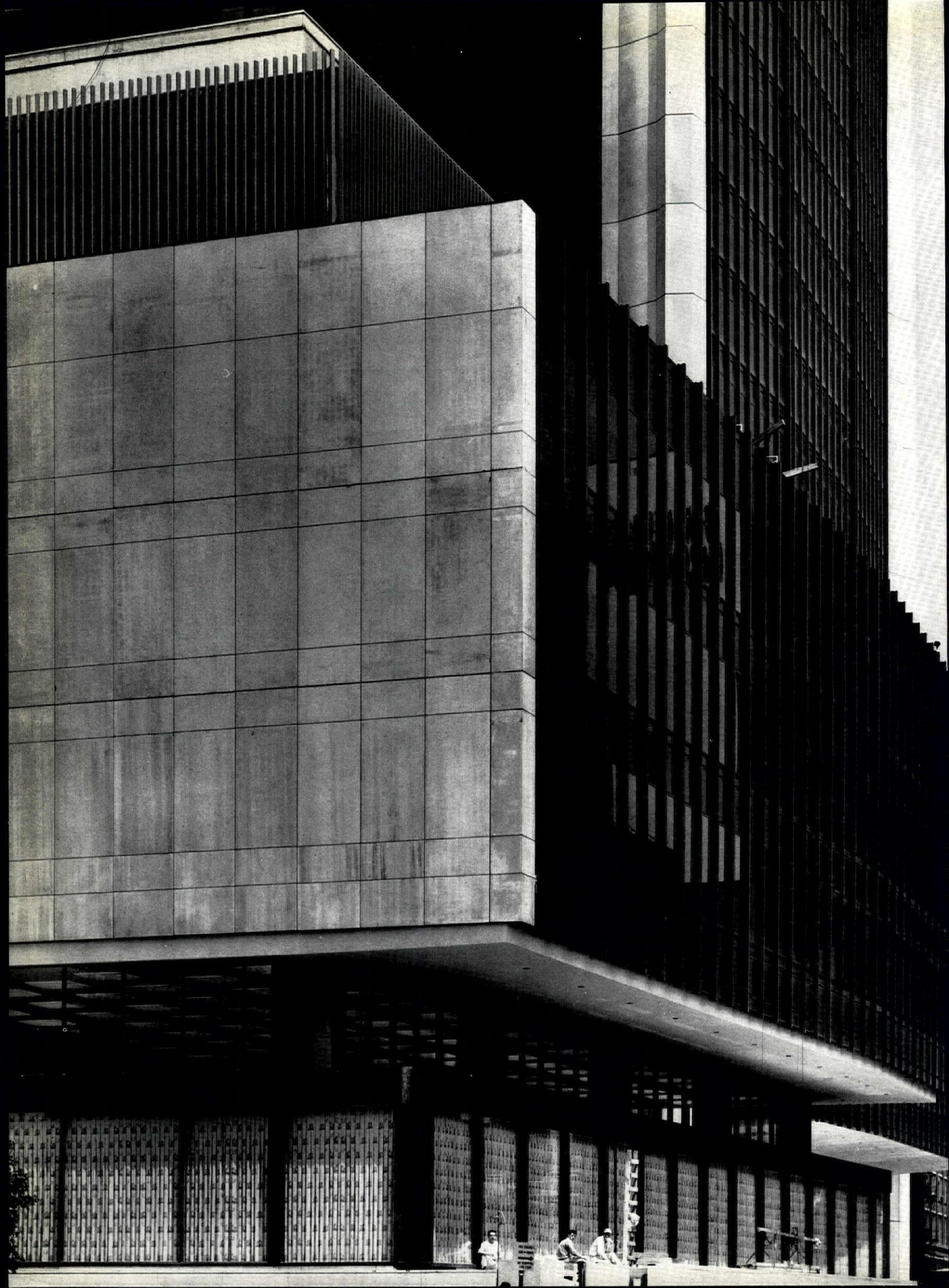


12

9, the ground floor entrance lobby of the four-storey block. 10, one of the corridors in the link between the tower block and the main four-storey block. 11, conference room on the top floor of the tower block. 12, looking west with one of the four-storey blocks on the left and All Hallows church on the right.



1 (*facing page*), *the five-storey block seen from St. James's Street with the 47-storey tower block rising behind.* 2 (*below*), *perspective by Luigi Moretti showing his original scheme with three tower blocks around Victoria Square.*

criticism

Peter Collins

Architect: Luigi Moretti
*Structural engineer: Pier Luigi Nervi**

Stock Exchange Tower, Montreal

This new building, officially opened on October 17, 1965, is commonly referred to as the Place Victoria—presumably by analogy with another magnificent tall office-building built recently in the heart of Montreal: I. M. Pei's Place Ville Marie. But whereas the most striking feature of the latter is its provision of a spacious open-air pedestrian plaza at street level within the boundaries of the site chosen for development, the Montreal Stock Exchange Tower adjoins an existing plaza (i.e. Victoria Square) which it was simply intended to complement and enhance.

That it does enhance it is incontestable; but it does so in a manner probably quite unforeseen by Luigi Moretti when working on the initial project four thousand miles away. As actually built, with its four facades parallel to the surrounding street-pattern, this single tapering prismoidal shaft, shooting 624 feet into the sky, forms a superbly dominant focal point to Victoria Square—a small and previously insipid rectangle occupied by a dismal garden surrounding the two symbols of French and English civic pride respectively: a statue of the then reigning monarch and a public convenience.† But it should be noted that Victoria Square measures only about twice the area occupied by the tower now constructed beside it. The original scheme was for *three* such towers, set diagonally and contiguously, whereby the longitudinal axis of the complex would have been at right angles to Victoria Square. To my mind, this solution, though financially lucrative in its provision of three million square feet of rentable office space, would have disastrously overpowered its setting; for though the perspective published by Moretti, 2, seems to imply, with a kind of Piranesian *bravura*, that this massive cliff of zig-zag curtain-walling would have formed the boundary to a vast plaza at least 600 feet wide extending northward, in fact only the end corner would have faced Victoria Square, which is to the east and constitutes merely a minute fragment of the space implied by the sketch.

So far only one tower has been built, though a second is unfortunately intended to occupy the rear extremity of the site.

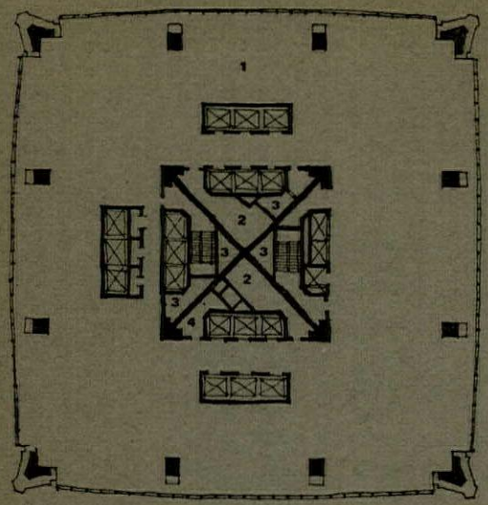
2

The internal planning of the tower is not original except in so far as it relates to the novel structural system employed; but this is one of its virtues as compared with Nervi's earlier Pirelli Building which, despite its many real merits, was conceived by the client (according to Reyner Banham's appraisal in AR, March, 1961) more in terms of publicity than of functional efficiency. The economic problems of tall office buildings—such as the ratio of elevator shafts to the total subdivisible rentable floor area, and the optimum qualities of perimeter walling—were solved many years ago, wherefore originality in this domain is only likely to be achieved at the expense of values extraneous to the basic problem. Not that there is anything intrinsically wrong with this kind of originality. On the contrary, when the shape of a skyscraper is conceived in terms of, say, the peculiar configuration of the site, or of the dominant character of its immediate environment, it would seem to be of particular interest and merit. But clearly such special conditions make the resultant building less useful as a model for buildings elsewhere, and it is precisely because such restrictive conditions did not radically influence the structural design of the Montreal Stock Exchange Tower that it can be regarded as a paradigm of universal validity.

Since the original concept of the building was produced by Nervi and Moretti, and since Nervi is uncontestably the greatest designer of reinforced-concrete structures who has so far graced this planet, it will be tempting for future historians to attribute all the merits of the structure to them, and any jarring qualities to the Canadian architects, engineers and contractors who built it. It would, however, be most unfair to take such a prejudiced approach, especially as some of the most attractive features of the design, such as the visible diagonal trusses of the 'mechanical floors,' and the bowed curtain walling cantilevered in front of the structural columns, do not appear on Moretti's published perspective. Moreover, if Nervi had been allowed by Quebec law to take full personal responsibility for this £10m. structure, it is by no means certain that he would have persisted with his original plan for leaving the structural concrete of each corner shaft exposed. I myself wish he had. But in a city where the outdoor temperature often drops to fifty degrees below freezing point, the

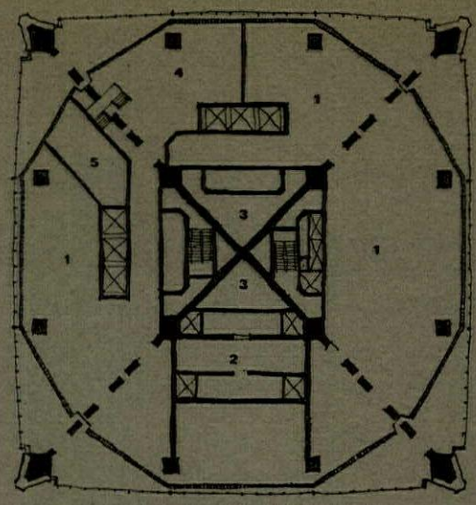
* Others concerned in the design were: associate architects, Greenspoon, Freedlander and Dunne; consulting architect, Jacques Morin; structural engineers, D'Allemagne and Barbacki; consulting engineers, Letendre and Monti; mechanical and electrical engineers, James P. Keith Associates.

† It is, however, characteristic of the bi-culturalism and bi-lingualism which has haunted the Province of Quebec for over a century that the statue—the characteristic central feature of French urban squares—is inscribed 'Queen Victoria,' whereas the monumental public convenience is inscribed 'Vespasiennes.'



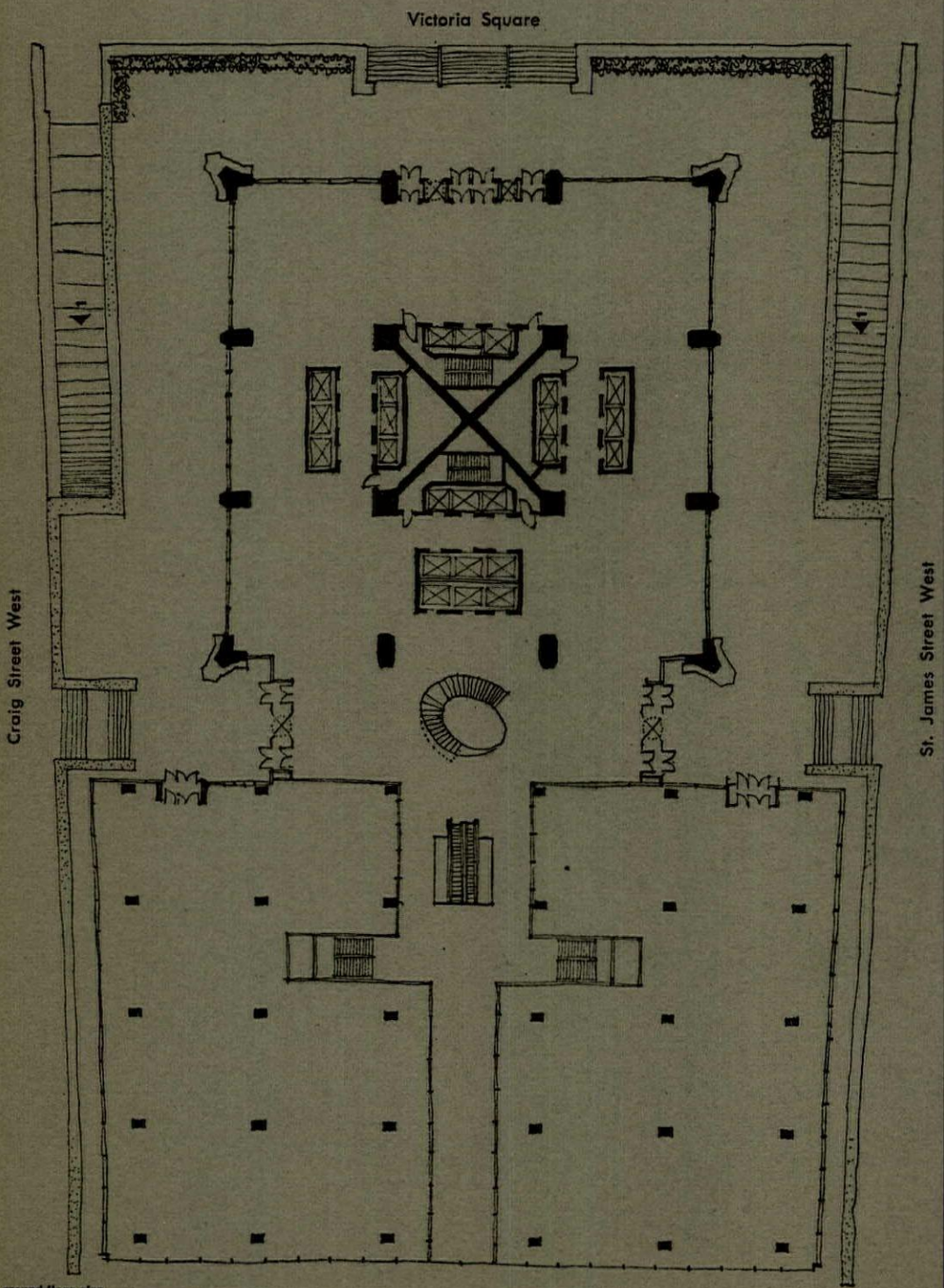
typical tower floor plan

1, office space
2, w.c.
3, duct
4, electrical



plan of second mechanical equipment floor (nineteenth level)

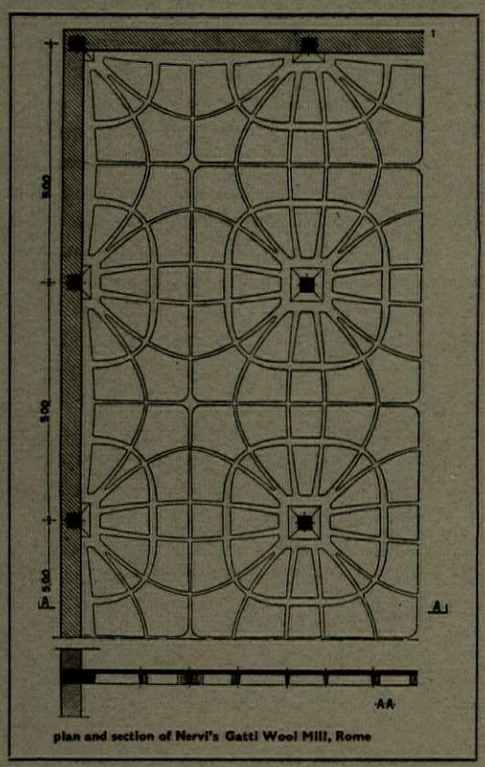
1, mechanical area
2, lift motor generator
3, duct
4, transformer
5, switch room



ground floor plan

possibilities of thermal distortion in the four monolithic shafts, each half as high again as the Pirelli Building (where the structural concrete was also encased externally, despite the temperate climate) are such that any engineer, however intrepid, might be forgiven for not taking a risk of a kind which few clients and even fewer lawyers would ever be likely to condone if anything went wrong.

There is, however, another important, though perhaps more controversial, reason for being cautious in assessing the extent, if any, to which Nervi and Moretti's original concept has degenerated as a result of their enforced association with local architects and engineers. It is now common for art-historians (whose views on these matters are, according to Nervi himself, extremely unreliable*) to assert that Nervi is essentially a designer of thin shells and folded slabs; a notion which derives partly from the tendency of his biographers to emphasize—very properly—his long-span single-storey structures, but mainly from one of the Neo-Plasticist dogmas enshrined in *Space, Time and Architecture*†. In fact, it is apparent from an inspection of Nervi's various short-span multi-storey structures, such as the Bologna Tobacco Factory,

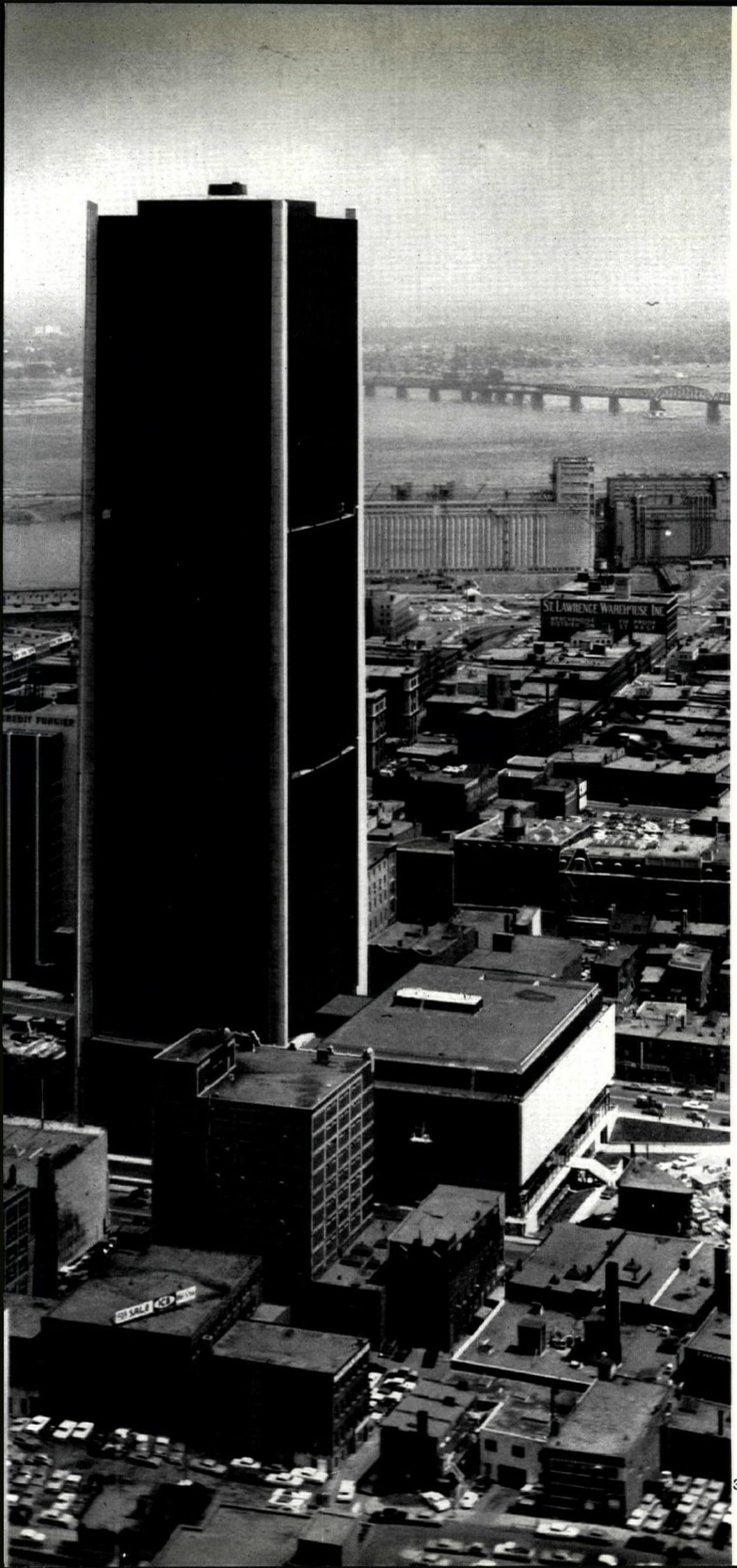


plan and section of Nervi's Gatti Wool Mill, Rome

that he not only uses what some writers derisively dismiss as 'post-and-lintel concrete structures' but that these buildings are essentially refinements of the system

* See, for example, the article he published in *Architecture d'Aujourd'hui*, No. 99 (December, 1961-January, 1962), of which the following is a translated extract: 'The fact that art criticism is thought out by non-technicians who, in most cases, are led to examine painting, sculpture and architecture from the same point of view, has certainly contributed in deflecting the analysis and interpretation of the constructive elements of a work of architecture, and in causing such analyses and interpretations to concentrate on strictly formal characteristics.'

† The fact that the forthcoming fifth edition of Giedion's famous book will include a chapter on Jörn Utzon without any mention of Nervi's scathing criticism (published in *Casabella*, July, 1959) of the Sydney Opera House (effusively praised by Giedion, though it will not even be completed, let alone tested acoustically, for at least another four years) would seem to support this assumption.



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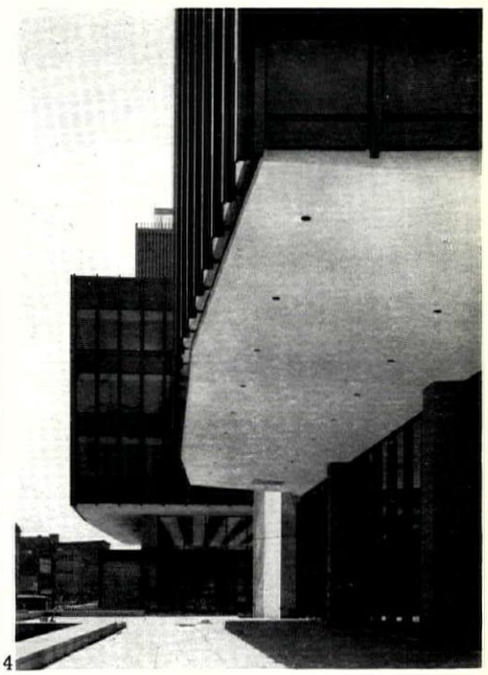

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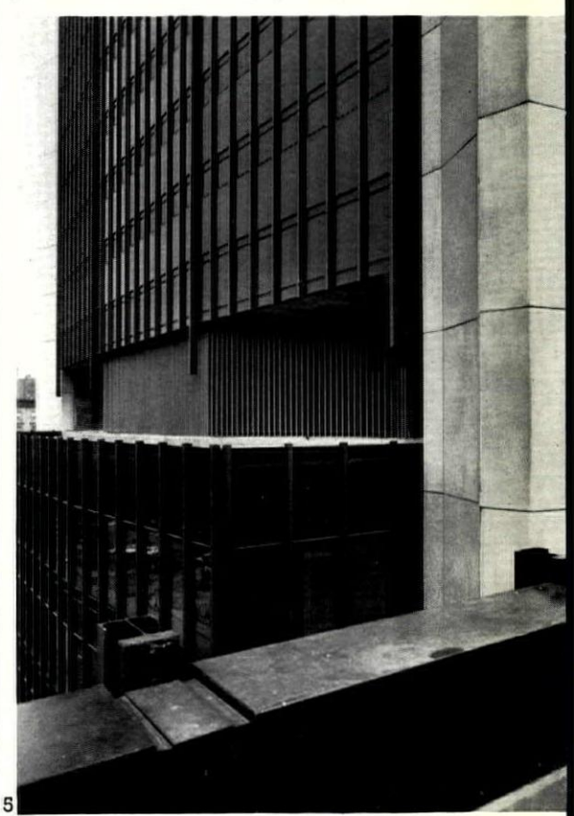

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3, general view of the 624 ft. tower with the St. Lawrence River beyond. 4, looking under the tower block towards the St. James's Street entrance of the low block. 5, the base of the tower block showing the first set-back mechanical equipment floor.

6, *junction between the five-storey block and the tower block; the corner columns of the tower are clad with a precast reinforced concrete shell to provide even thermal insulation.*

patented by Hennébique in 1892, i.e. rectangular columns, haunched beams, and ribbed plates for the floors.*

Admittedly, Nervi's plates usually have ribs which span in two directions instead of one, to produce intersections of extraordinary beauty. Moreover, at the suggestion of Aldo Arcangeli, who was one of his assistants involved in the design of the Gatti Wool Mill, Rome, he elaborated these ribs further by making them follow sinuosities ostensibly representing the isostatic lines of the floor's principal bending moments. But such refinements are not only of questionable structural authenticity; they can only be justified aesthetically when the soffit is left visible. Thus in those of his buildings which require, by their function, the inclusion of complex electrical and mechanical gadgetry in the ceilings, simple ribbed-plate floors based on a standardized rectangular grid are evidently considered by him to be most correct.

This issue of ribbed plates versus slabs was of crucial importance in the design of the Montreal Stock Exchange Tower, because whereas in steel-framed skyscrapers, the decisive factor in designing the floors is usually their depth, here it was their weight. In other words, it was not only considered more economical, but was structurally mandatory, to design a floor of minimum weight rather than of minimum depth. For the spans and live loads given it would doubtless have been possible to make all the floors of simple solid slabs; i.e. of constant thickness throughout. But the enormous weight of forty-seven such floors would have required so many wasteful and elaborate structural devices to resist the instability to be anticipated in the event of an earthquake, that any solution of this kind was out of the question. The floors, as built, therefore consist of 3-inch plates combined with 18-inch ribs, the latter being spaced at intervals of approximately six feet. It should be noted that this was the type of floor always envisaged by Nervi, although his initial project was later modified by the local engineers, who changed the positions of the pairs of intermediate columns (superimposing them behind the curtain-walling on each of the four facades), and suppressed the beam originally conceived as spanning between the corner supports.

The two most striking elements of the overall concept are, first, the so-called 'mechanical floors' and, secondly, the corner supports themselves. The 'mechanical floors' at the seventh, nineteenth and thirty-second levels do indeed contain a certain amount of mechanical equipment and ducts; but they are essentially a means of joining the central core (consisting of

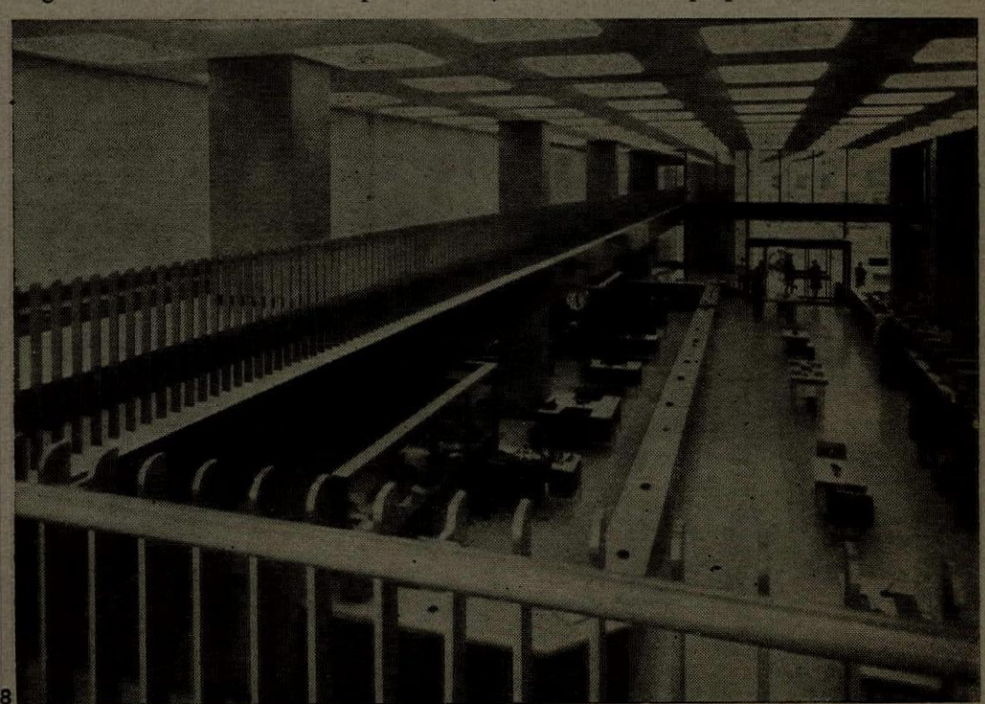
7

7, the elliptical staircase in the five-storey block in which hangs a glass chandelier (consisting of 3,000 hand-blown elements) designed by Moretti. 8, hall of the Bank of Montreal.

X-shaped sheer walls of solid reinforced concrete, which house the escape stairs and most of the lifts) to the corner shafts on the exterior. By this means the tower, which stands on a site as liable to earthquake tremors as San Francisco, is given the fullest possible rigidity. The three great pairs of diagonal trusses, each about 23 feet deep, which link the central core to the corner shafts, are partially visible from outside, and they undoubtedly give the tower a variety and novelty which is all the more attractive, to me at any rate, because they are structurally needed.

The corner supports of the tower taper gradually from the ground to the top storey with an entasis which greatly contributes towards the elegance of the building's silhouette. Admittedly, the visible surface is simply a veneer; indeed, the space between each monolithic structural shaft and the pre-cast slabs which encase it is so large that a man can climb up between the two faces for periodic inspections. But the veneer follows faithfully the shape of each structural support, which consists of a continuous prong of roughly triangular section, diminishing in thickness towards the top.

Nervi first seems to have put forward this concept when collaborating with Ponti on the Pirelli Building; but in Montreal it achieves a far nobler, authentic and more eloquent expression, and the importance of its evolution cannot be too enthusiastically stressed. The traditional concept of multi-storey reinforced-concrete buildings—valid enough when the height of the building does not greatly exceed its width—has been that of a series of superimposed standardized floors supported by simple cylindrical or prismatic columns. These columns normally decrease in cross-sectional area at each successive floor, since the total superimposed load naturally becomes less in proportion to the distance



8

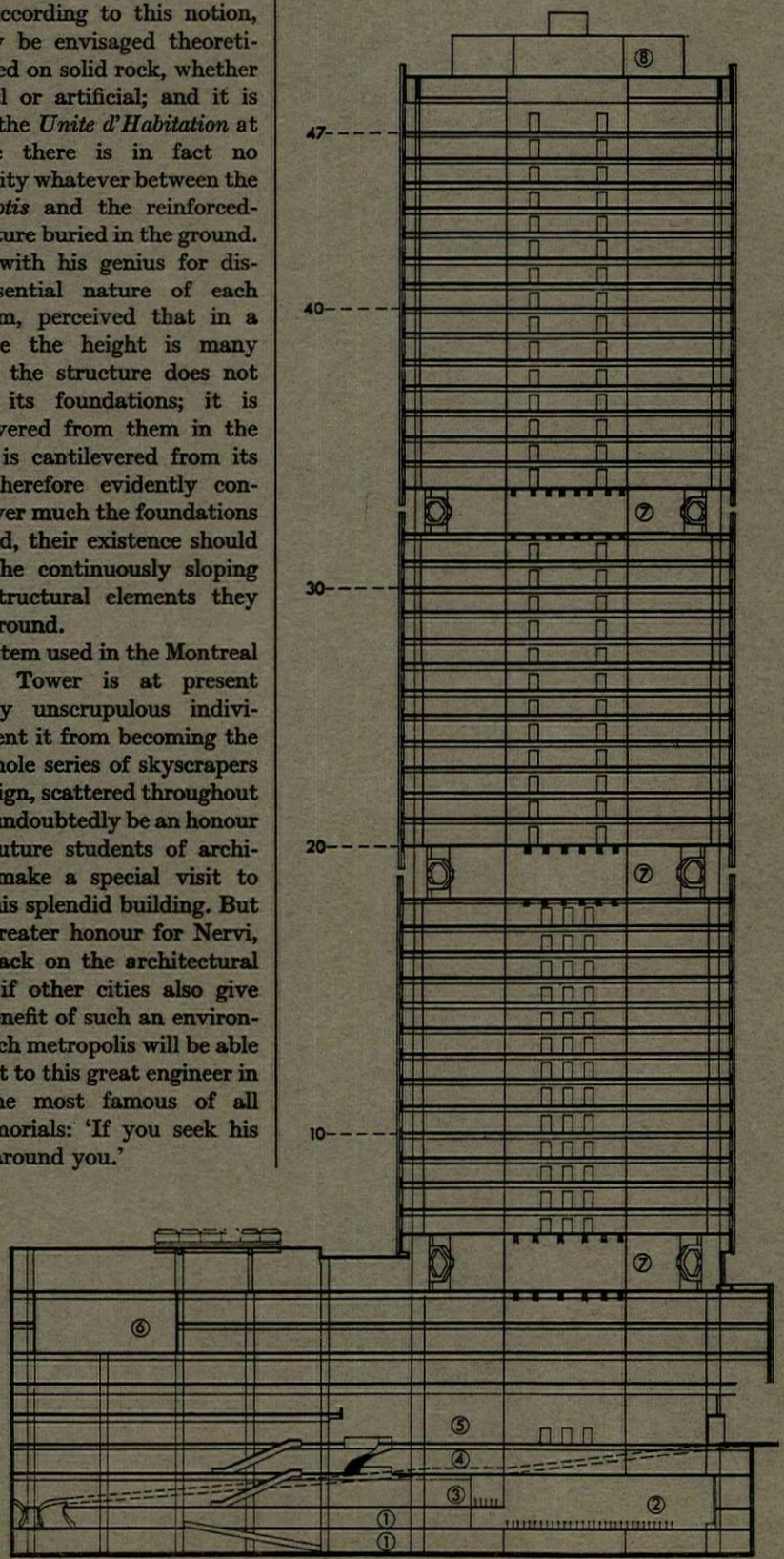
* I tried to show in my book on *Auguste Perret and his Precursors* that Perret also simply took Hennébique's system and refined it. But Perret, of course, had no training or mathematical competence as an engineer, and relied entirely on consultants, such as Louis Gellusseau, for structural analyses.

of each floor from the ground. The system is in itself perfectly logical, since it not only corresponds to the statical requirements of vertical loading, but allows all the faces of all the columns to be vertical—an advantage which is evident whenever the intervening spaces have to be partitioned or glazed. But such a concept relies, for its ultimate justification, on the assumption that a building is something that stands on the ground: an assumption which therefore regards the soil-condition as an independent problem, to be solved after the initial design for the building has been accepted. According to this notion, all buildings may be envisaged theoretically as constructed on solid rock, whether the 'rock' be real or artificial; and it is well displayed in the *Unite d'Habitation* at Marseilles, where there is in fact no structural continuity whatever between the bases of the *pilotis* and the reinforced-concrete substructure buried in the ground. Nervi, however, with his genius for discovering the essential nature of each structural problem, perceived that in a skyscraper, where the height is many times the width, the structure does not simply rest on its foundations; it is vertically cantilevered from them in the way that a tree is cantilevered from its roots. And he therefore evidently concluded that however much the foundations may be submerged, their existence should be attested by the continuously sloping profiles of the structural elements they engender above ground.

The structural system used in the Montreal Stock Exchange Tower is at present unique; but only unscrupulous individualism can prevent it from becoming the prototype of a whole series of skyscrapers of comparable design, scattered throughout the world. It will undoubtedly be an honour for Montreal if future students of architectural history make a special visit to that city to see this splendid building. But it will be a far greater honour for Nervi, reflecting glory back on the architectural profession itself, if other cities also give themselves the benefit of such an environment, whereby each metropolis will be able to boast of its debt to this great engineer in the words of the most famous of all architectural memorials: 'If you seek his monument, look around you.'

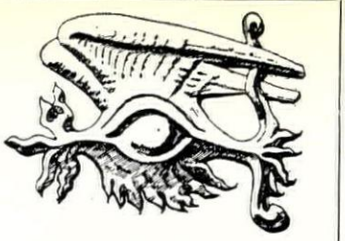
And as few buildings are beautiful unless every line and column of their mass have reference to their foundation, and be suggestive of its existence and strength, so nothing can be beautiful in art which does not in all its parts suggest and guide to the foundation, even where no undecorated portion of it is visible; while the noblest edifices of art are built of such pure and fine crystal that the foundation may all be seen through them. . . .

RUSKIN: *Modern Painters* (1843)



cross section

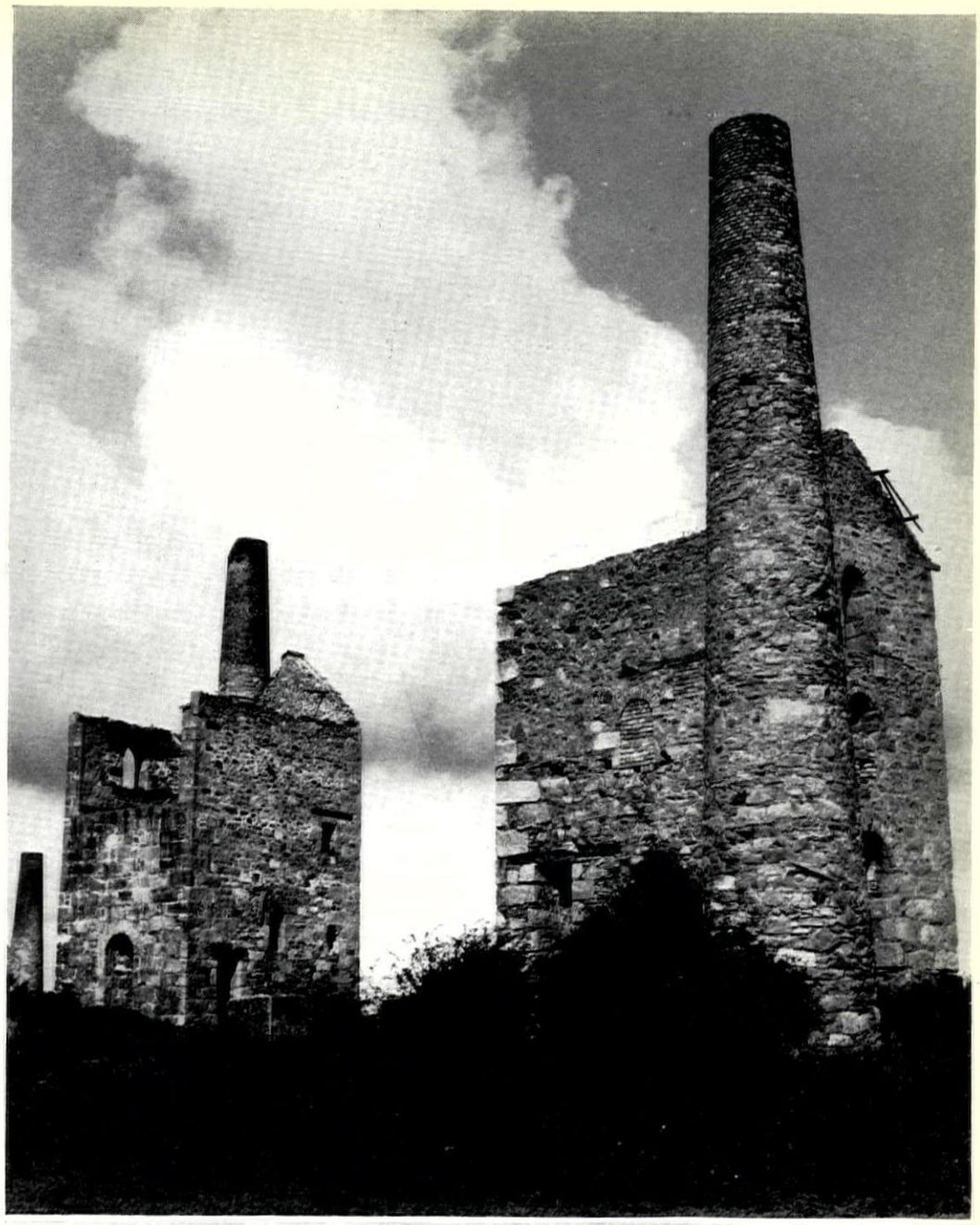
1. garage parking
2. theatre auditorium
3. shopping arcade
4. promenade
5. main lobby—Plaza St. Jacques
6. stock exchange trading floor
7. mechanical equipment floor
8. penthouse



the exploring eye

The derelict engine houses, dating from the rapid industrial expansion in the tin and copper mining belts in Cornwall in the early nineteenth century, make an important contribution to the functional tradition as well as creating ruins of outstanding beauty. They were designed to accommodate pumping, winding, and man-engines. The man-engine, first introduced into Cornwall in 1842 at the Tresavean Mine, conveyed the men to the mines—notorious for their hell-like temperatures, and at the end of the day provided their salvation from an exhausting daily climb up ladders extending 1,800 feet to the surface. These utilitarian buildings are strikingly bold

1

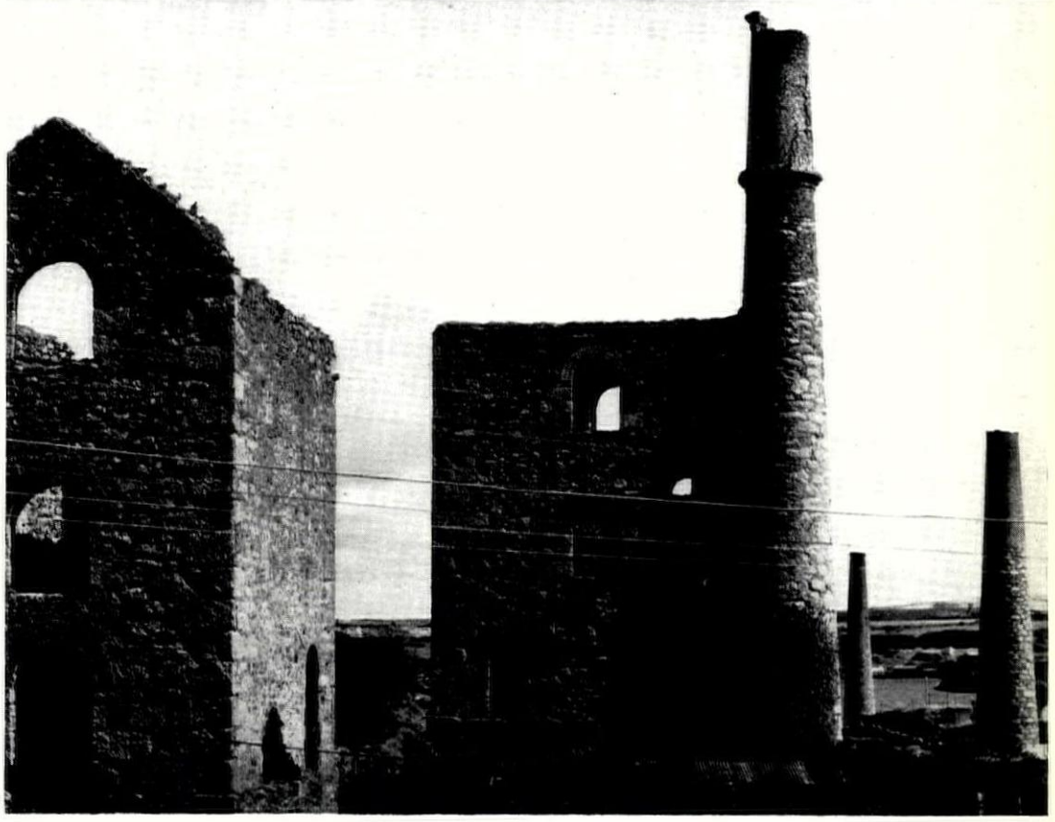


2

1 and 3, the derelict Basset Mines at Carnkie. 2, the Whee Peever Mine near Redruth.

and simple. The textured surface of the massive structure, solidly built of local granite, is punctured by a random and vigorous composition of voids. Clusters of stacks and engine house ruins frequently stand poised on the horizon or rise from sites overgrown with gorse and heather, much reduced from their former height yet always maintaining a close relationship with the landscape. Splendid examples are to be found on the south-west coast: Pendeen Consols; Levant; St. Just United; Cape Cornwall; and Botallack Mine. At Botallack, a tin mine perched high on the cliff edge which achieved immense popular fame—visited on three occasions by royalty, and at the height of its prosperity in 1816 providing employment for 500 people—are the ruins of two formerly magnificent engine houses abandoned in 1914.

EDWIN JOHNSTON



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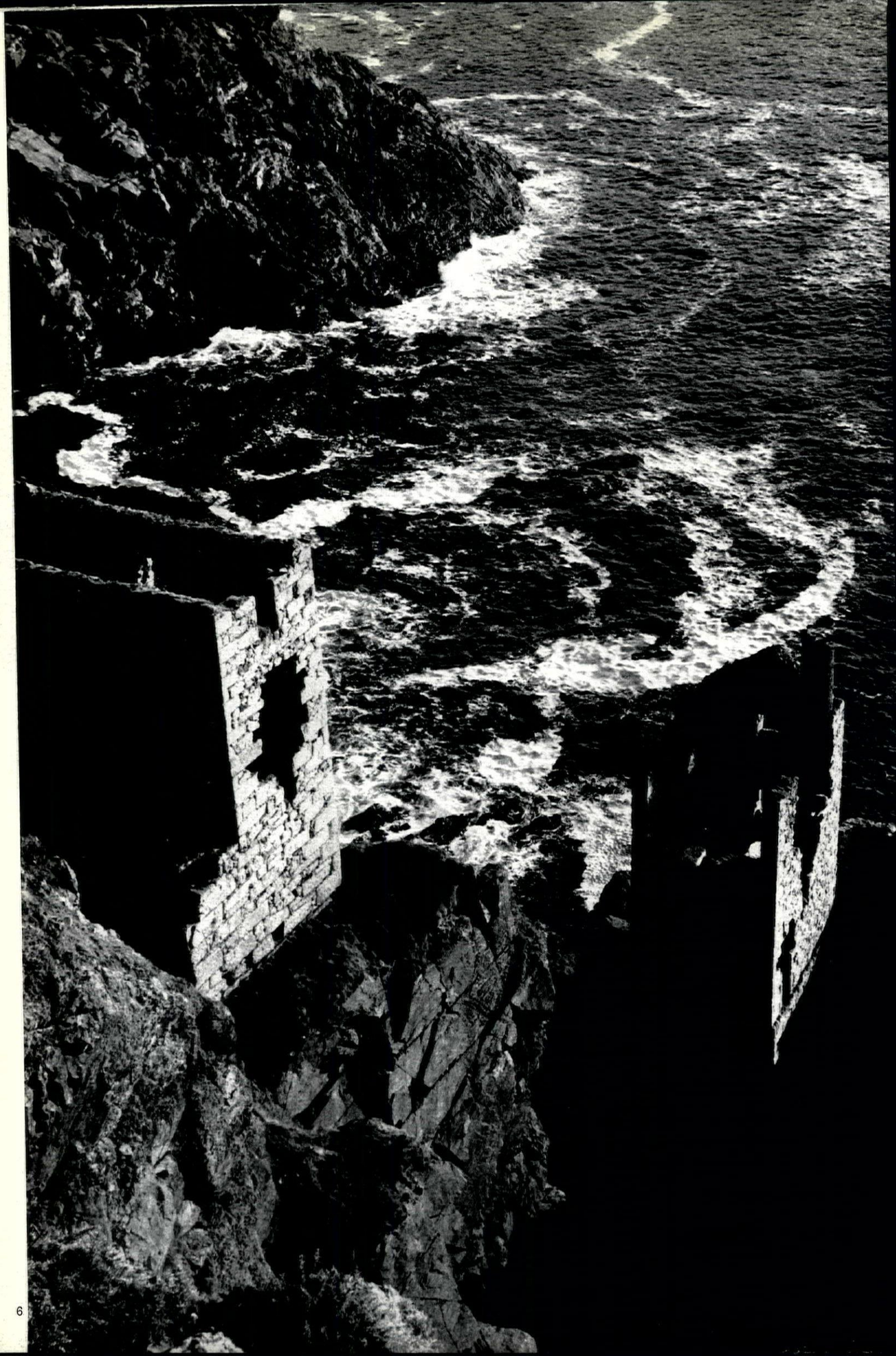
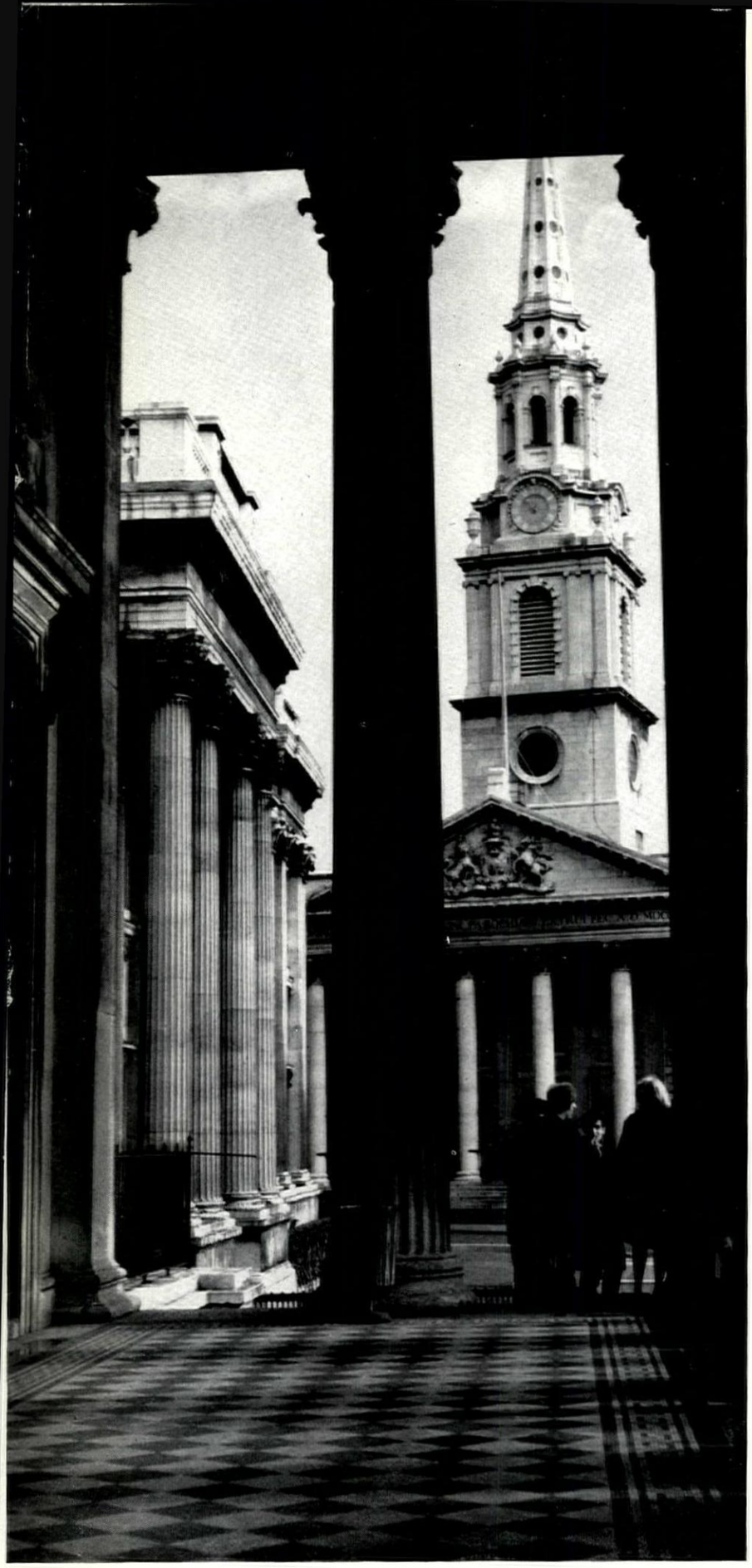


4

4-6, *ruins of the two engine houses of the Botallack Mine, on a cliff edge of the south-west Cornish coast near St. Just. The mine was abandoned in* 1914.

5



Trafalgar Square

London's great civic space. Two famous views from the portico of the National Gallery sum up its character. Left, St. Martin in the Fields; right above, the view across the square and down Whitehall. Add fountains, statues and pigeons, right below, and you have all the props. But, as the article opposite says the stage itself needs drastic rethinking.

TOWNSCAPE

Kenneth Browne

WEST END

The first of a series on the townscape of London's West End

Map of the West End of London showing the main areas of distinctive character. PC=Piccadilly Circus; TS=Trafalgar Square.
(Based upon the Ordnance Survey Map with the permission of the Controller of HM Stationery Office. Crown Copyright reserved.)

One of the main points stressed by the authors of *Traffic in Towns** was that, in built-up areas, major roads should run between areas of homogeneous character, never through them. Where this proves impossible, then they must run above or below pedestrian level so that continuity is not broken. The result will then be a road network serving, not disrupting, the environment.

It follows that it is fundamentally important to define the boundaries of such areas as soon as possible; also to treat any particular trouble spots such as, in the case of the West End of London, Piccadilly Circus, Trafalgar Square, Parliament Square, etc., not as isolated problems, which is the present way, but as aspects of one big problem. On the map above, the West End is shown roughly parcelled off into areas of distinctive character, and in a series of studies, of which this is the first, the REVIEW proposes to re-examine them as urban landscape and try to find the significant connections between them.

Traffic surveys now in progress will determine the desire-lines of vehicles, but it is essential and urgent that they should be paralleled by environmental surveys. These should be in considerable detail and define what are the townscape qualities worth keeping and also the inherent possibilities in human and spatial terms. This means no less than mapping and recording all good groups of buildings, good spaces, good views; adding up to an appreciation of present environment and potential to set against the requirements of traffic. It then boils down to making clear what is important about each place, its essence, for if this is not comprehended before replanning starts, then character is bound to go; there can be no continuity and everything will become anonymous mush.

Today, and with some justification, emphasis is on easing the traffic, but in human terms—in terms of town rather than ant heap—the opposite approach of safeguarding good environment is equally important. The way things are going no good environment will be left by the time we wake up to the importance of protecting it. The City of London is a dreadful warning in this respect. There the abysmal failure to grasp the great opportunities provided by the blitz, and the haphazard scattering of huge office blocks, show the vital need for a more imaginative, if belated, attitude to urban values elsewhere in the capital.

In limited space, the REVIEW can only outline the sort of townscape surveys which are needed if irreplaceable things are not to be swept away, as often by accident as bloody-mindedness. Its object is to make people look again at places whose image has been dulled by familiarity and see how they could be improved and related; for townscape is particularly this art of seeing the connections. These studies are not intended as one more 'solution' to the traffic problem but as investigations into environment.

In practice, each area needs a painstaking check-list defining: 1 present character; 2 what is good (buildings, shapes, etc.); 3 what is bad; 4 important viewpoints; 5 pointers (levels, etc.); 6, where traffic is acceptable and at what density; 7 any suggestions arising from all this.

In his traffic report for the recent Whitehall study† Professor Buchanan suggested workable routes for a primary road network for London. These presented some fearful problems of environment, particularly in the Trafalgar Square area (TS on map) where two primaries would cross. 'In fact,' he said, 'the Trafalgar Square area presents so many problems that it requires a special study of its own.'

* *Traffic in Towns*. A study of the long-term problems of traffic in urban areas. HMSO, 1963.

† *Whitehall*. A Plan for the National and Government Centre. HMSO, 1965.

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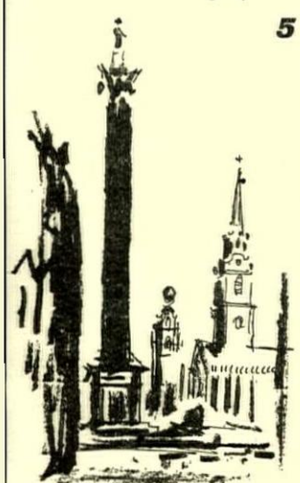


6

It seems logical then to take Trafalgar Square, London's main pedestrian concourse, its centre and one of its four busiest traffic intersections—a place where, as Buchanan says, 'the conflict between traffic and environment is acute'—as the first in this series of brief townscape studies.

Trafalgar Square

DESCRIPTION

London's great civic space, its forum; the base of Nelson's column a ready-made platform for public oratory. Though once described by Sir Robert Peel as 'the finest site in Europe,' it is sadly disappointing by comparison with other great spaces of Europe. The steep fall from north to south seems to throw the whole thing disturbingly off balance and except on the north side, massive chunks of building stand around as unrelated to each other and the square as a lot of bulky sideboards pushed out of place for the decorators. Immensely popular with tourists just the same; but the fact that the square could be greatly improved as a space should be recognized when plans are laid to untangle the traffic. Care must be taken not to jettison the good things with the bad.

GOOD THINGS

***a* Interest:** plenty to look at; constant movement of swooping pigeons, fountain jets and swirling red buses. Also purposeful statues well raised up against the sky, especially the finely silhouetted equestrian George IV (Chantrey) and exquisite Charles I (le Sueur). Change of level from road and terrace to square well handled on north side with strong flights of steps angling round the statue plinths and lines of giant bollards (Barry).
***b* Scale:** Suitably large, giving the right sense of a special public space and culminating in the soar of Nelson's column from its enormous base, guarded by Landseer's huge but friendly lions. The column also serves to pin down the square. Space defined by lines of monumental bollards.
***c* Variety of Surroundings:** Church, theatre, art gallery, shops (though not accessible enough), shipping line offices, views to Parliament.
***d* Buildings:** Only the north side of the square is well defined; by the long facade of the National Gallery and centred by its portico and dome. The steeple and side-on view of the portico of St. Martin-in-the-Fields (Gibbs) splendidly hold the north-east corner. Facing the north side of the church (and therefore out of sight from the square) the fine clean cut stucco facade of St. Martin's National School (Taylor) must be kept. Otherwise only Canada House (former Royal College of Physicians—by Smirke) on the west side of the square has any merit.
***e* Views:** listed later.

BAD THINGS

a Square now isolated by a sea of traffic (see ***8***), giving no feeling from the outside of being usable public space. The great scrimmage of traffic at the top of Whitehall (Charing Cross) particularly daunting. The 'full tide of life' admired here by Dr. Johnson has become a lethal tide of metal.
b Nelson's column is uncomfortably placed on the very edge of the traffic stream.
c Angled down roads to east and west sides distort perspective.
d Square loses shape at south end where space slides away.
e It is a huge, draughty space with inadequate feeling of enclosure. No shelter from weather except down the subways, therefore often bleak and inhospitable.
f Nowhere to get even a sandwich without braving the traffic. Completely isolated from shops, restaurants, pubs.
g Lacks trees—those on north side have been cut down—revealing the National Gallery which, seen whole, is a rather uninspired building.
h Surrounding buildings generally poor save for north side. Their irregular skyline, lack of relationship, and poor design make an unsatisfactory wall to the square. S. Africa House particularly clumsy.

VIEWPOINTS

1 Very good approach down St. Martin's Lane stopped by the spire of St. Martin-in-the-Fields, the projecting portico hinting at the unseen space that faces it.
2 Closer view on same approach—note the way the entrance to Trafalgar Square is 'pinched' between the church portico and the National Gallery. (They are not parallel on plan.) Trafalgar Square itself announced by the sudden exclamation mark of Nelson's column, rising from spray of fountains.
3 Several framed views from the National Gallery portico which is a very special vantage point, particularly:
The splendid view down Whitehall to the spires of Westminster—the ceremonial way—where the tower of Big Ben answers Nelson's

← Some views to safeguard

Trafalgar Square as it could be
— View looking North

7

Suggestions

column. Note curve of Whitehall which is very important as it ensures that the fine backcloth of towers changes as you go down the street—any suggestion of blocking this Whitehall vista or straightening it should be resisted.

4 Also the fine visual link between the Gallery and St. Martin's church—another portico at right angles (see page 442).

5 Exit from Grand Arcade giving framed view of National Gallery. Not so much to keep, but as a pointer to the sort of thing needed in any new scheme.

6 The exciting concentration of verticals; Nelson's column, St. Martin's spire, Coliseum tower, statues, fountains—especially concentrated from the Admiralty Arch. Also (not illustrated), the view in from Pall Mall with three porticos, starting with that of Canada House on the right.

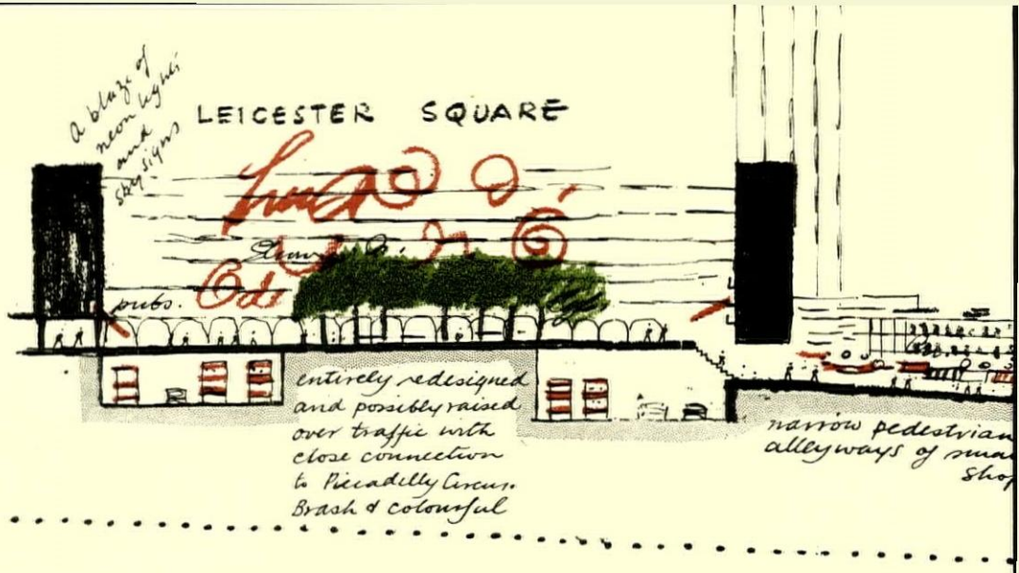
POINTER Steep groundfall across the square from north to south, continuing for some way down Whitehall.

What this suggests is traced on the following pages

8

Today Trafalgar Square is isolated on all sides by hurtling traffic.

as it could be



SECTION from North to South as it could be

9

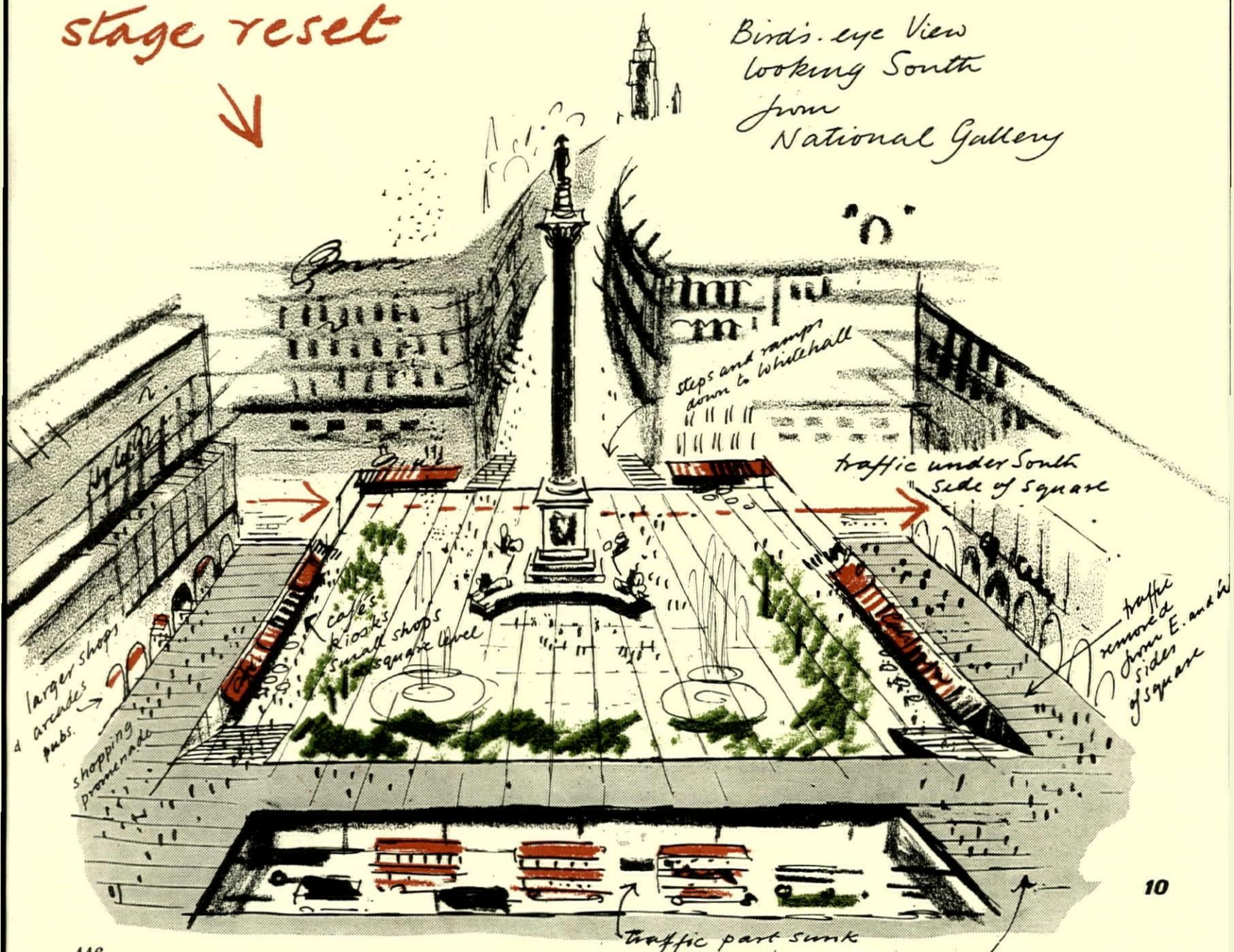
SUGGESTIONS

a **Sink traffic in front of National Gallery* so that it and St. Martin's church appear to be on a podium above the traffic, with bridges over it and monumental steps down to the square, *7*. From the National Gallery link north via pedestrian alleyways of small shops to Leicester Square, *9*. The level of the latter might be raised above that of the traffic to facilitate connection with the suggested double-decked Piccadilly Circus to the west. To the east a pedestrian route could be carried over the traffic of Charing Cross Road to connect with Covent Garden.**

b **Make use of the steep fall in levels down to Whitehall. Sink traffic on**

* As suggested in W. K. Smigielski's second prize-winning scheme in the 'New Roads for London' competition. See 'The Traffic Plan—Enemy or Ally,' AR, September, 1960.

stage reset



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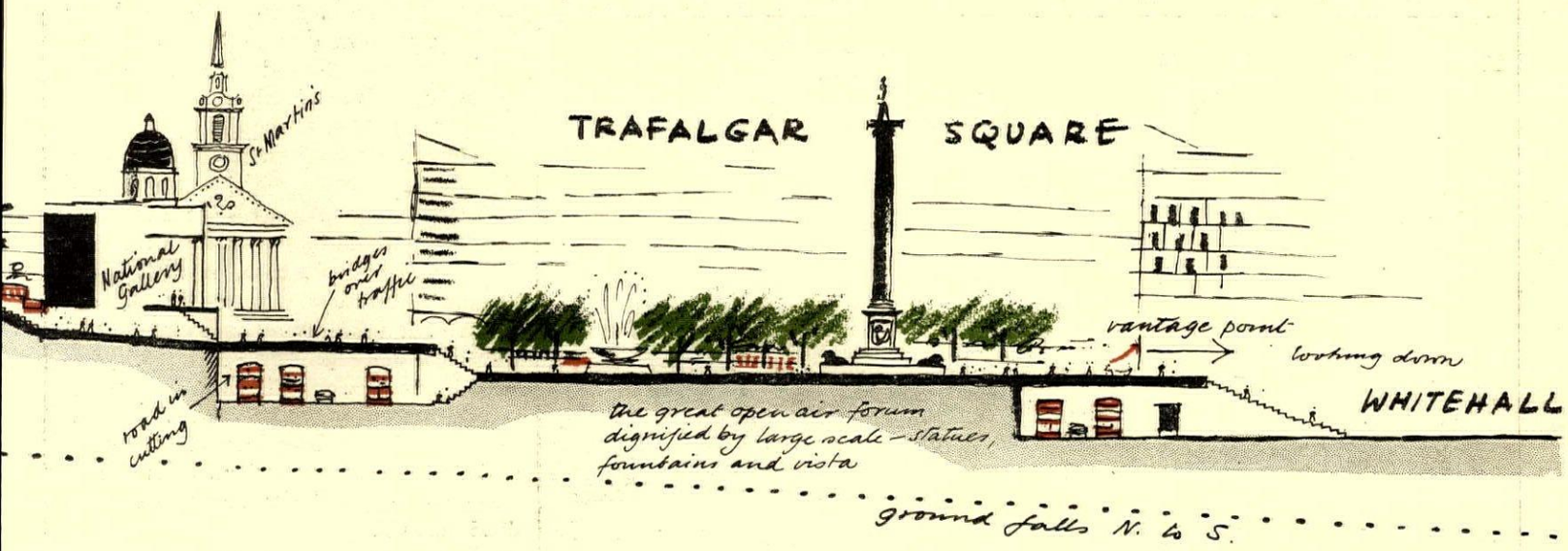

south side of square (Charing Cross) to general level of Whitehall and continue existing floor of the square over it, bringing Nelson's column more comfortably into the square itself. Provide steps and ramps down to Whitehall.

c Re-route traffic to remove it from east and west sides of square and form an upper promenade on both sides with small shops, kiosks, cafes and pubs underneath (also entrance to Underground). These would help to humanize the space. Large shops would face on to the promenade itself overlooking the square.

d Plant more trees. Rebuild the sides of the square, save for north side and perhaps Canada House, and provide arcade links, on the lines of the existing Grand Arcade, opening out to sudden dramatic views of the square, ***11***.

e The National Gallery is really too low to properly contain the top of the square. Suggest that this might be helped by controlled high building in regular line behind it on the south edge of Leicester Square, but it would need very careful handling.

f Link to Covent Garden area† through a series of pedestrian squares and passageways, starting off with a pedestrian square between St. Martin's and the National Portrait Gallery. The present space is cut up by the traffic and needs humanizing by the introduction of shops on the north side.

† See 'Covent Garden,' by Kenneth Browne, AR, March, 1964.

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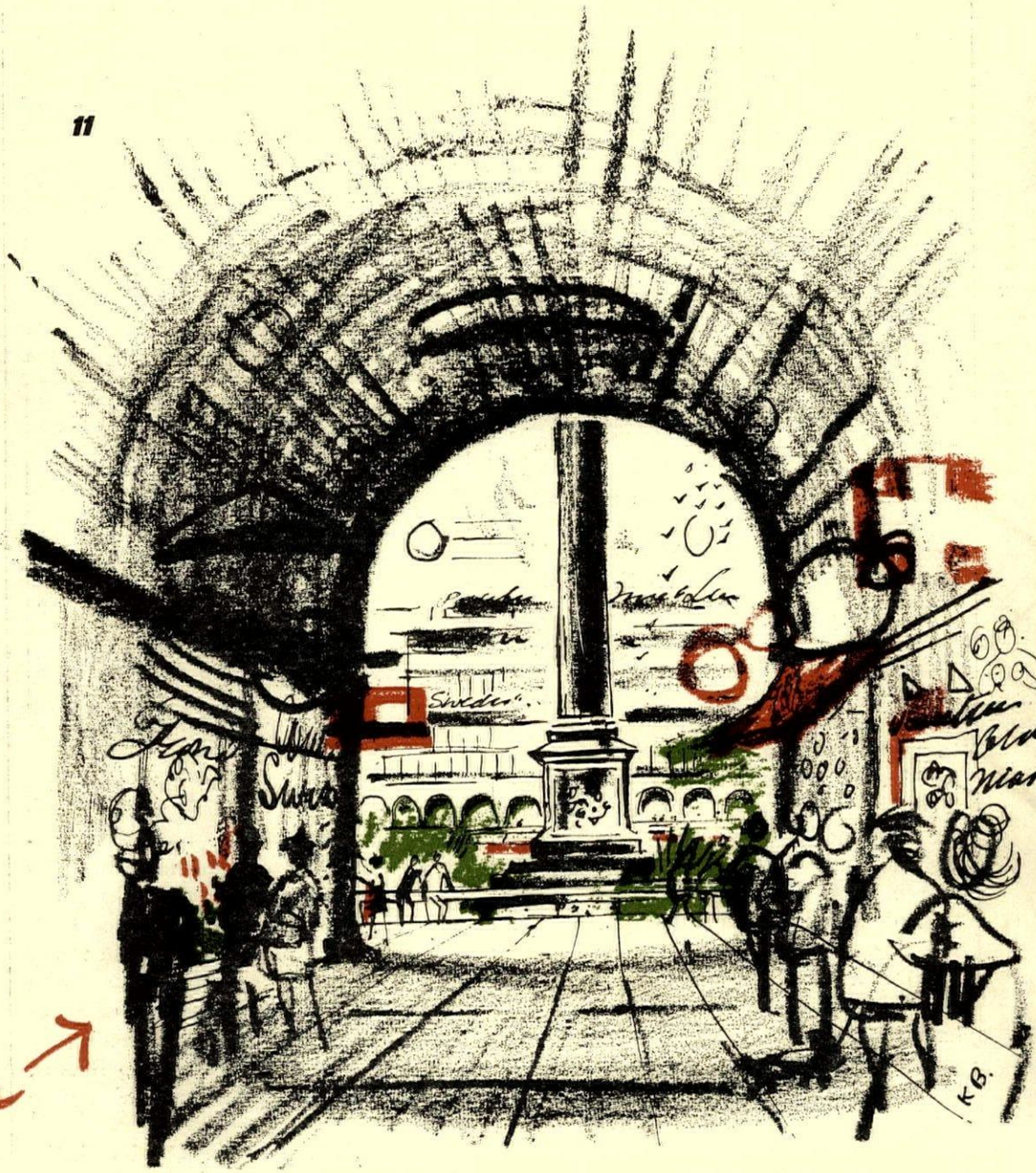


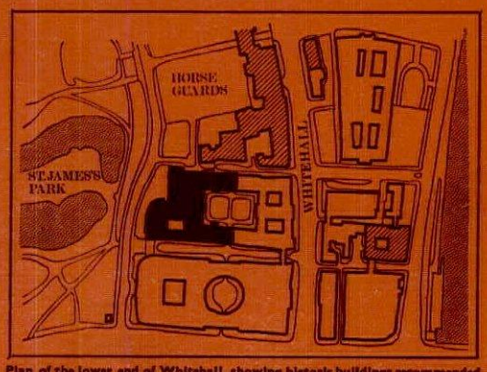
space explosion

Arcades would lead into the square at promenade level / connected to other pedestrian spaces.

THE INDISPENSABLE F.O.

Everyone who *reads* about architecture knows the Foreign Office and the former India Office as the backdrop in 1858–61 for the Battle of the Styles, a popular Victorian melodrama with its scenario adapted and set to criticism from Sir Gilbert Scott's own *Recollections*. Act I, Scott gets himself appointed although his design has been placed third; Act II, his Gothic style, enthusiastically approved by the Tories, is rejected by Palmerston and his Whigs when they return to power; Act III, poor Scott, after trying on a Byzantine compromise, is forced to buy a set of expensive copybooks and brush up his Italian in concert with Sir Matthew Digby Wyatt. But who actually bothers to *look* at the magnificent result which is now threatened with wholesale demolition? First, there is the view from St. James's Park, 1, in which the Foreign Office adds the necessary balance of solid realism to the magical skyline of the Horse Guards and Whitehall Court. Could a modern replacement afford the luxury of an equivalent skyline? Could any present architect be trusted to provide one? The other sides of the park suggest not. From close quarters, too, Scott provides an object lesson in picturesque composition, giving exact expression to the functional hierarchy of the two Ministries within: a corner pavilion over the Foreign Secretary's Room, a line of repetitive windows for his aides' offices, a high tower announcing the India Office, and a quadrant for the rooms of the India Council, ending in a Sansovinesque palazzo of offices, 2. The interior is divided exactly in two, Scott designing the FO and Wyatt the IO. For the exterior Scott said 'the grouping and outline' were suggested 'by a sketch of Mr. Wyatt's, whose drawing, however, had done but little justice to the conception.' It is customary to laugh at these bland assumptions of Scott's, but here he surely spoke the truth. For while Wyatt's interiors are an elaborate melange of bric-à-brac, extremely interesting but only as a period piece, Scott's interiors are superb by any standards. At the age of twenty, in 1831, he had been chief assistant to Henry Roberts for the exquisite neo-Grec interiors of the Fishmongers' Hall, and here he consciously recalled the style, evidently influenced by the more recent work of Hittorff and Duc (Scott went to Paris, ostensibly to study the Louvre, while preparing his final design).

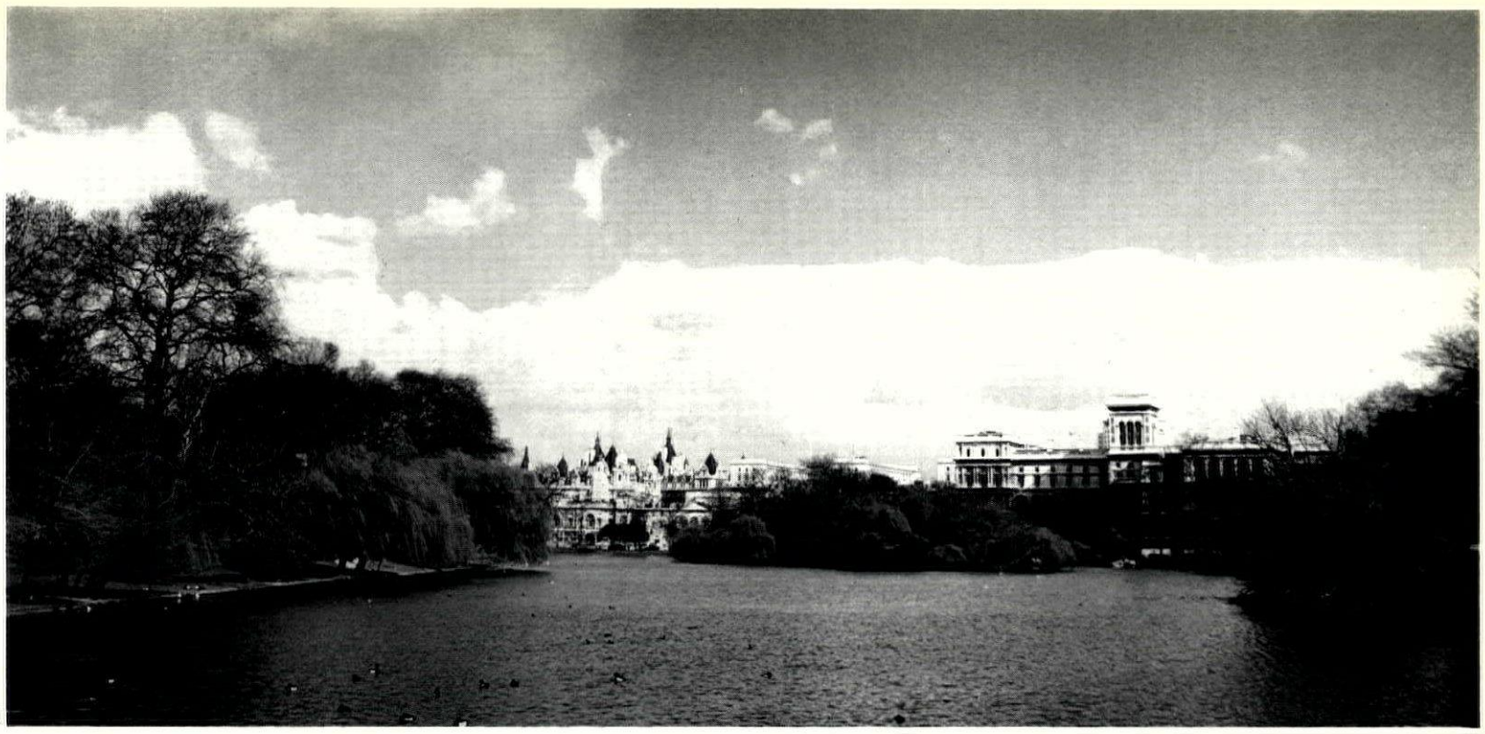
There are three main elements in Scott's interior: the corridors with their mosaic floors and disciplined module of transverse-arched bays; the grand staircase, 3, with its inlaid marble panels, Imperial Roman domed roof, and Gothic sense of diagonal space through the giant Corinthian columns of the corridors and landings—see also the frontispiece, page 420; and the suite of principal rooms which at first floor level encloses the other three sides of a small central court. The Foreign Secretary's room, 5, its windows glazed to floor level behind the protecting balconies, is preserved almost intact. The most exciting feature is the two great iron roof girders, their shape and that of the iron wall brackets, 4, being candidly expressed and clad in a crisp 'industrial' finish of gold and white glazed ceramic. On the south and east sides of the court are the three great conference halls, now known as the Locarno Rooms, which have suffered the ignominious fate of having typists' cubicles in hardboard inserted under false ceilings, although the original magnificence, 6, is only dormant. The India Office is less important. Digby Wyatt as Slade Professor, as historian and critic, and as a user of new materials (as at Paddington Station), is smothered here by his own disregard for detailing. Certainly the Round Room in the quadrant, 7, is extremely pretty, intellectually of c. 1910 in its exquisitely composed plan of interlocking circles, decorated in the Adam manner with fireplaces and doorcases in neo-Wren (Adam and Wren in 1867!)—but in its thinness of execution it harks back to *c.* 1845. Wyatt's many elaborate staircases explode the classical idiom with a free use of iron girders, and upper corridors have interesting skylights with Moghul tracery. The most spectacular spaces are around the central Durbar Court, with its three storeys of loggias and arched windows resplendent in Minton tiling and peppered with the busts of long-dead nabobs.



Plan of the lower end of Whitehall, showing historic buildings recommended for preservation in the Martin Report (hatched) and the half of the Foreign Office block which this article urges should be kept (black).

These two Ministries (1862–68) originally formed the western half of the site, with the Home and Colonial departments (1868–73) occupying the Whitehall half. In spite of the skilful Louvre-derived modulation of the long sides to Downing and King Charles Streets, the rich sobriety of the central courtyard (spoilt by a later attic), and the very pretty sculpture by H. H. Armstead on the Whitehall facade—in spite of these qualities it is in this second phase that the Scott complex became a bureaucratic afflatus, looking grimly forward to the hulks of Brydon next door (1898–1912) and Vincent Harris opposite (1913–59). Among his even larger offices, Sir Leslie Martin proposes one major non-bureaucratic 'building of international significance' to go on the Broad Sanctuary side of Parliament Square, a trade and conference centre. But why spend millions on such a scheme when the Foreign Office's grand conference rooms cry out to be reclaimed?

The REVIEW therefore makes the following suggestions: that in view of its supreme townscape value as seen from the Park, the Foreign Office and India Office should be preserved externally up to and including the King Charles and Downing Street entrances, forming a three-sided *cour d'honneur* to the east; that the principal rooms of the Foreign Office should be restored to their original splendour as the reception rooms of a Government trade centre; that most of the other interiors, except for one or two in the India Office, should be gutted and rebuilt within the existing envelope (as has been done to Gabriel's buildings in the Place de la Concorde); and the 'Home and Colonial'—more than half the whole site—should be razed to the ground and built entirely anew as part of the Martin plan. The preservation of the FO and IO exteriors would make a dent only in one corner of Martin's layout, and could make as appropriate a symbol for the Common Market as they did for 'gunboat diplomacy.'



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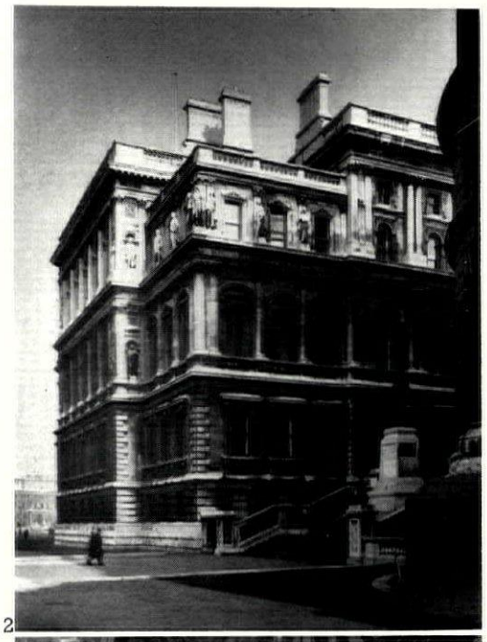
1, *the view eastwards from the St. James's Park bridge, showing how the Foreign Office (right) 'adds the necessary balance of solid realism to the magical skyline of the Horse Guards and Whitehall Court.'* 2, *the south-west corner of the former India Office (statues by Theodore Phyffers).* 3, *the grand staircase of the Foreign Office, including a statue of Lord Salisbury, a frankly exposed girder beneath the upper flight, and murals in the distance by Goetze* (1912-20). 4, *one of Scott's superb iron girders in the Foreign Secretary's room, its underside painted, its flanks clad in glossy ceramic.*



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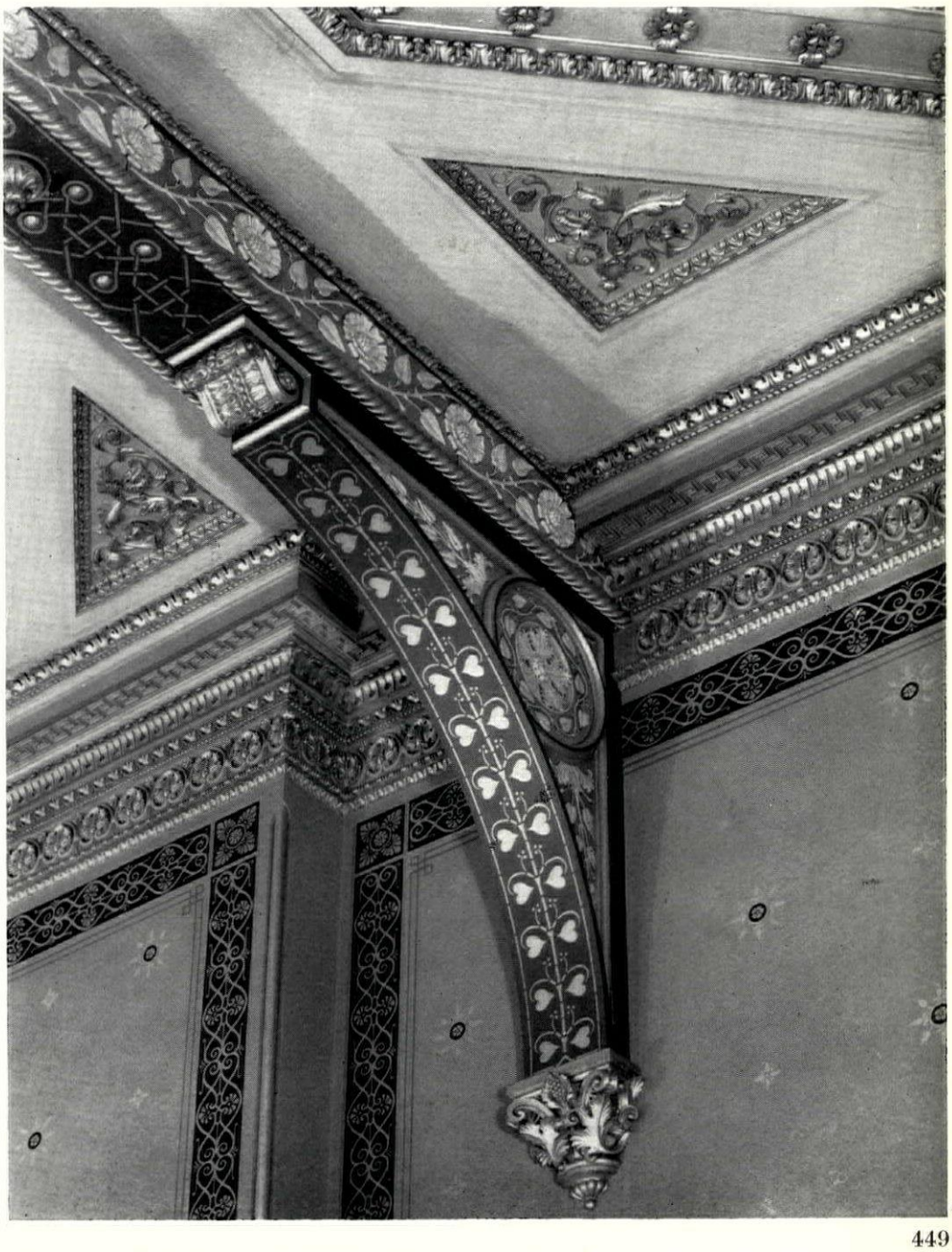

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6

5, general view of the Foreign Secretary's room. The colours are paler and gayer than the chocolates and deep reds of the grand staircase. The walls are blue-green in colour, with frames of black and gold; the ceiling is pale buff delicately stencilled in light blue, with the raised ribs in pink and gold. The decoration is in exceptionally good condition. The fireplace is one of several taken from the old East India House. Similar ~~iron brackets~~ and girders but now with deeply coffered ceiling panels, 6, can dimly be seen (also in excellent condition) in the typist's rabbit-warren which has since the last war invaded the Locarno Rooms. Some wall decoration has been white-washed or cream-painted away; much more survives intact under hardboard. It is the AR's contention that the admitted need for a new Government trade and conference centre could be met by returning these rooms to the purpose they served until 1939. The rest of the St. James's Park end could be gutted and rebuilt within the existing facades, keeping one or two rooms of particular merit, such as Digby Wyatt's charming pastiche, 7, in the India Office quadrant; neo-Wren woodwork, neo-classical exedras, neo-Adam plasterwork.

7

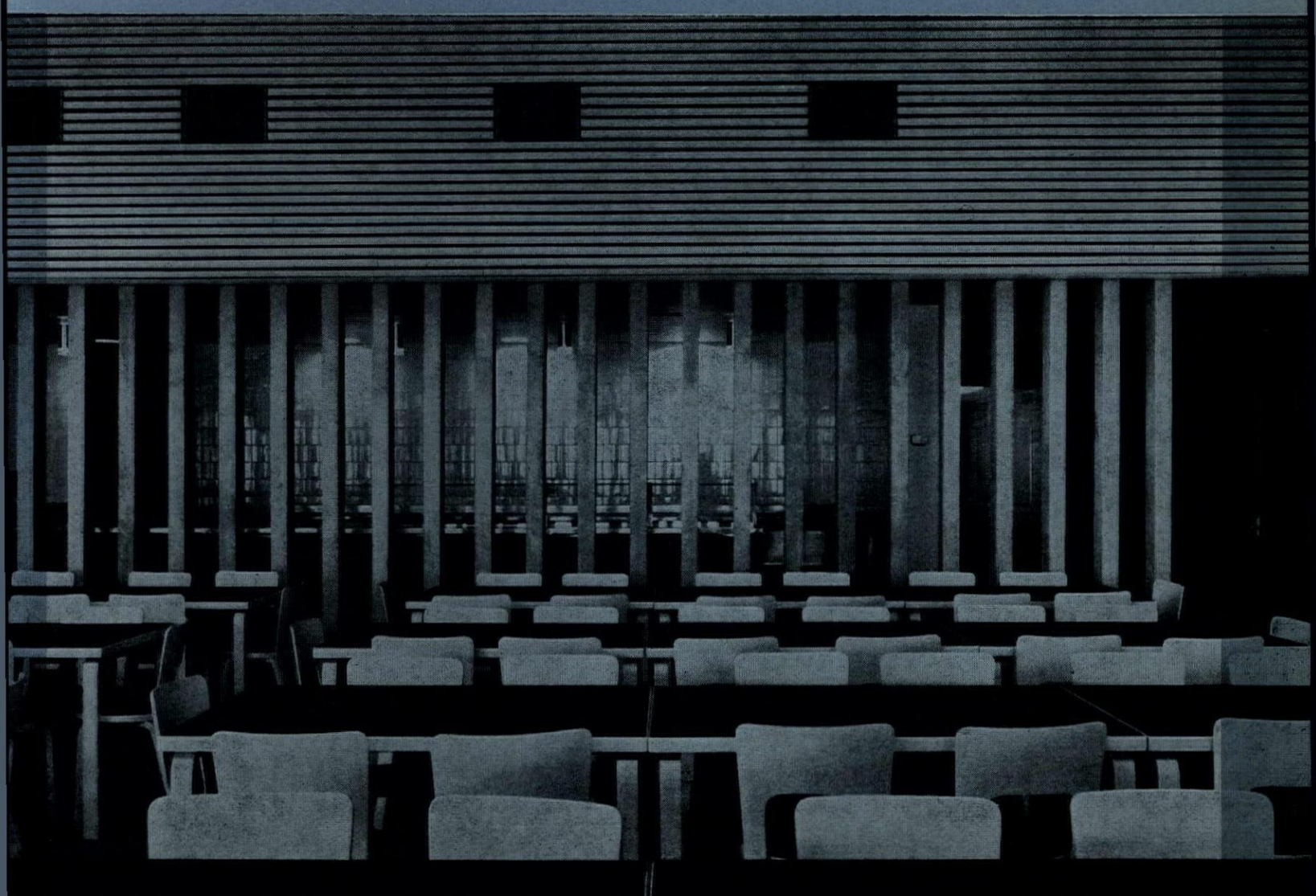
DUNELM HOUSE DURHAM

Dunelm House, which houses the Student Representative Council's club and the University staff-house, is situated more or less at the centre of gravity of the university, adjoining Kingsgate Bridge, the reinforced concrete footbridge by Ove Arup (see AR, April 1964), which links the older part of the university on the cathedral peninsula to the newer development south of the city. The very dramatic site slopes steeply from east to west down the gorge-like bank of the River Wear, and almost equally steeply from south to north. New Elvet, the street forming the east boundary of the site, has no distinction; a small public garden to the south was dedicated after the last war as a permanent open space and this has been relaid out to give access to the building and to Kingsgate Bridge. From it there is a fine view of the east end of the cathedral on the other side of the river.
The sectional form of the building closely follows the

CLUB HOUSE, DURHAM UNIVERSITY

architects **ARCHITECTS' CO-PARTNERSHIP**

photographs by John Donat



1, the two-level cafeteria on the main floor of the building.

contours of the site. Its total bulk—relatively small as seen from New Elvet—is more apparent from the bridge and the opposite side of the river, but even from there it is impossible to appreciate the amount of accommodation that has been pushed back into the hill. The main staircase acts as a stepped spine, descending from the main entrance at high level with rooms off at each landing as it goes down and ending up finally in the dance hall. This is the largest room in the building—some 4,500 square feet—but has been kept subdued in the plan form because of its proposed relative infrequency of use. The only link between the student and staff accommodation is at the level where the kitchen serves both the student cafeteria and the staff dining rooms. At this level there is also a link from the kitchen service area to the staff guest rooms.

The structure consists essentially of a series of concrete boxes tucked into the hillside. At the rear (east side) the walls rest on rock, and on the river front on bearing piles. The problem of two-directional cantilevers is solved in some cases by suspending floors from walls and in others by putting the structural mullions in tension rather than in compression. Lightweight (foamed slag) concrete is used as the only practical means of providing fairfaced board marked finish to both sides of insulated load-bearing external walls, matching dense board marked concrete which sometimes even forms part of the same wall. The walls are 10 inches thick.

The roofing material was designed originally as zinc (to keep down costs) but this was disapproved of (in the architects' view correctly) by the Royal Fine Art Commission, who suggested 'pitched paving' instead. The final choice was precast giant concrete tiles, the extra cost of which the UGC allowed as an 'abnormal.' These roof units (made in three lengths, 16 ft., 12 ft. and 8 ft. with an average width of 4 ft. and a minimum thickness of 2 in.), were designed to behave like tiles on a large scale, being lapped above one another so as to be free to expand and contract—the top units in each case being fixed along the upper edge only. The exposed aggregate finish is pink Shap granite.

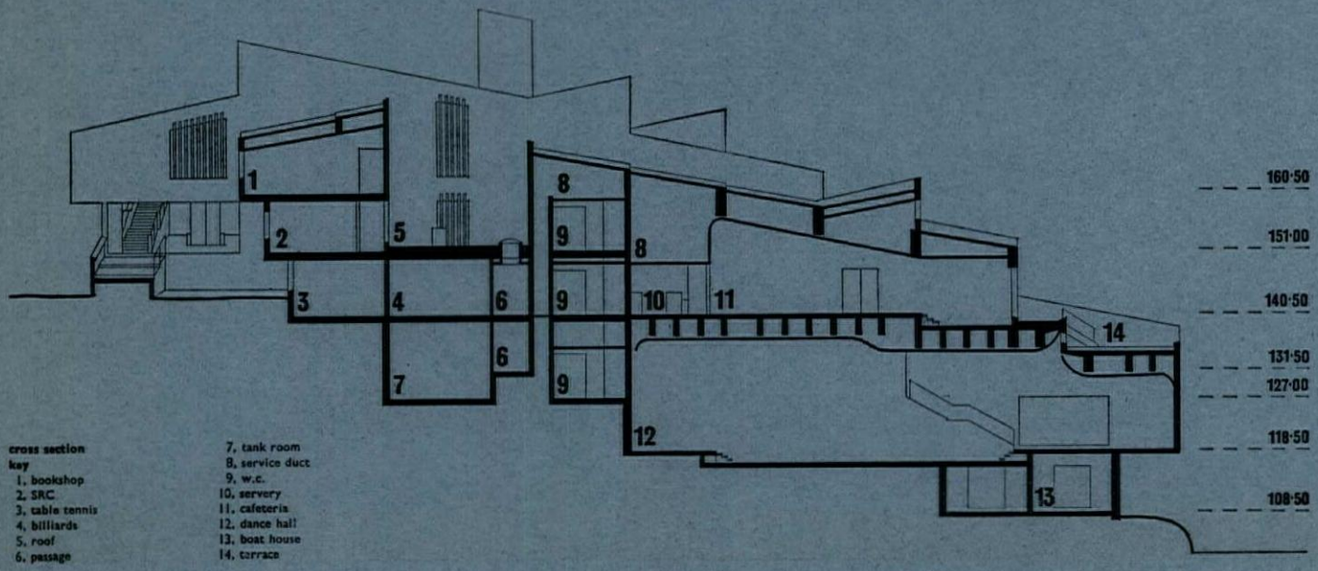
Internal finishes have been kept as robust and simple as possible, with extensive use of fairface concrete and quarry tiles. Doors throughout are pivoted, not hinged, run from floor to ceiling and have no linings, architraves or other trims. Rooms are mostly plastered and, where practical, carpets for the floors have been laid straight on to the screed. In certain rooms, where acoustics are a problem, the ceilings are formed of suspended white painted softwood battens with absorbent material above, covered with black hessian. Much of the artificial lighting and all ventilation grilles have been integrated with the structure. A great deal of the furniture is built in and was purpose-designed for the building, even to the billiard table which has a standard top fixed to a concrete pedestal.

Oil fired boilers provide domestic hot water and skirting heating. In the larger areas, all lavatory accommodation and other internal rooms, there is mechanical ventilation with warm air convector heaters and high level extracts.

Structural consultants, Ove Arup and Partners. Electrical, lighting and acoustical consultants, Engineering Design Consultants. Mechanical Services consultants, E. Wingfield-Bowles and Partners. Graphic consultants, Crosby, Fletcher, Forbes and Gill. Quantity surveyors, G. A. Hanscomb Partnership.

2

2, the lower-level entrance hall. 3 (facing page), the west side of the club house seen beyond the Kingsgate footbridge over the River Wear.



cross section
key
1. bookshop
2. SRC
3. table tennis
4. billiards
5. roof
6. passage
7. tank room
8. service duct
9. w.c.
10. servery
11. cafeteria
12. dance hall
13. boat house
14. terrace

4, part of the elevation facing the River Wear; the solid end wall of the main hall with the cafeteria and roof terrace above are on the left; the students' representative council hall with the coffee bar above are on the right. Facing page : 5, part of the main hall over the riverside terrace. 6, 9, Durham cathedral and Kingsgate footbridge seen from the terraces of the club house. 7, the whole building seen at night from the opposite bank of the Wear. 8, the terrace outside the cafeteria.

CLUB HOUSE, DURHAM UNIVERSITY

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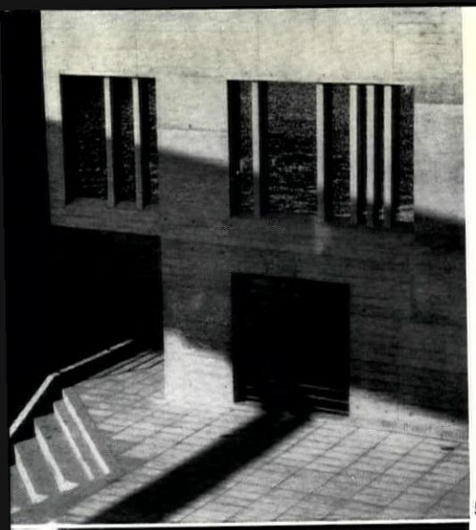

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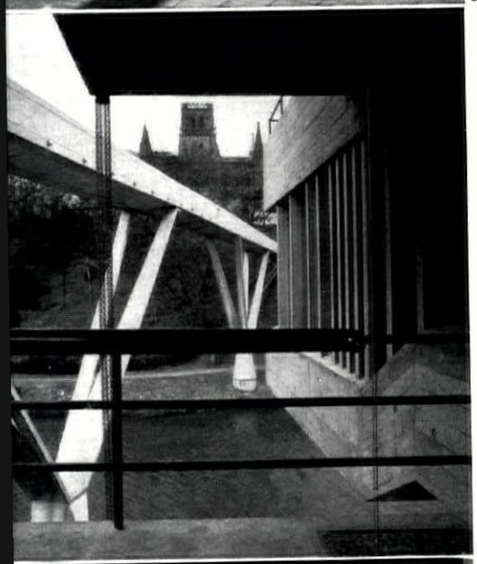

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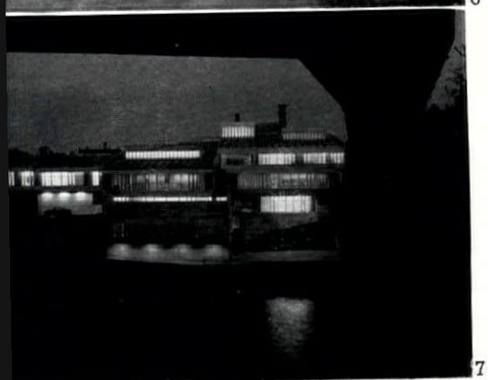

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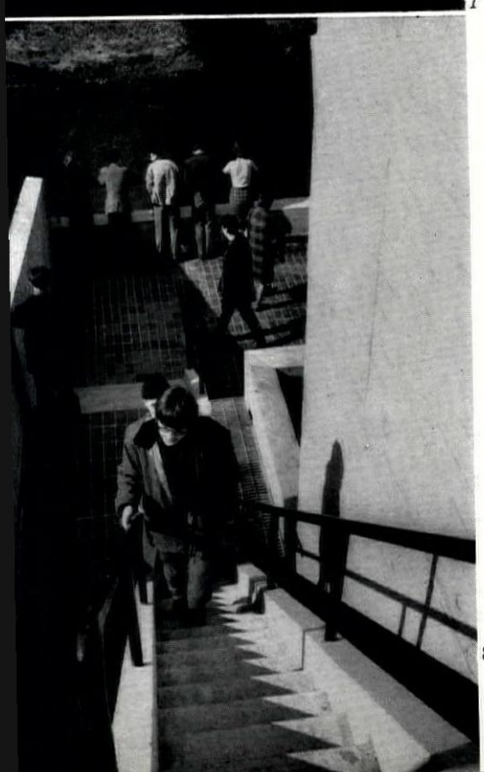

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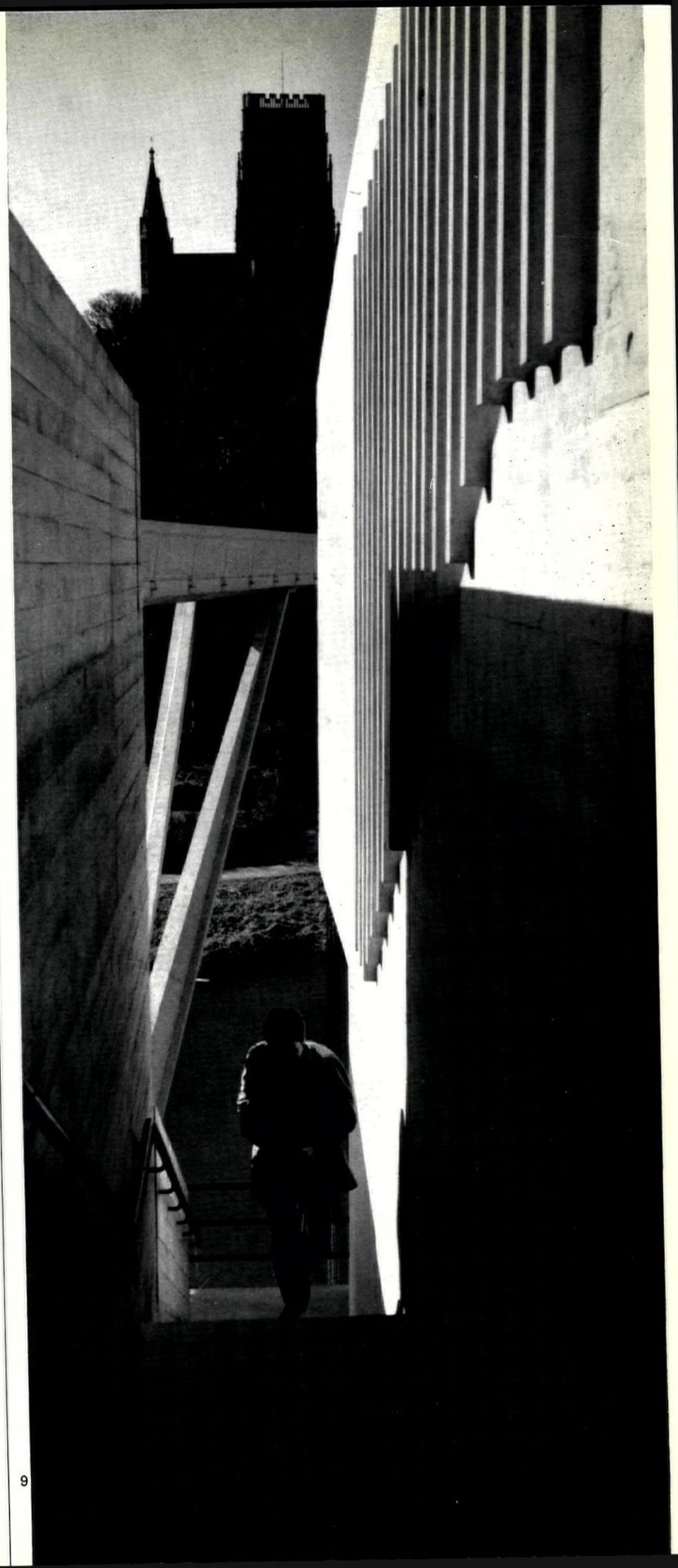

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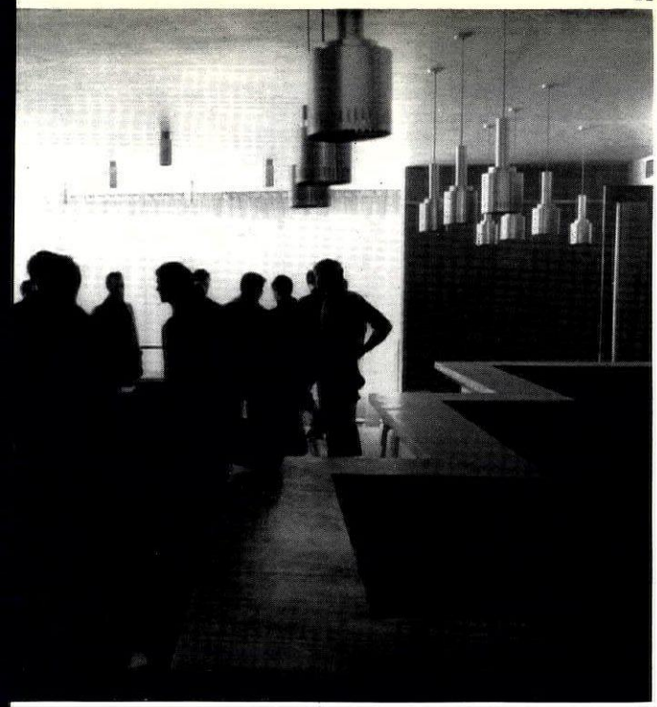
10

CLUB HOUSE, DURHAM UNIVERSITY

10, the flight of steps on the south side of the club house, leading to the upper level entrance which is on the right; in the centre is the boiler house stack and beyond is silhouetted the cathedral. Facing page: 11, the coffee bar. 12, the stairs from the main hall up to the students' council hall. 13, the main hall seen from the stage; it has board marked concrete walls and a slatted timber acoustic ceiling.

11



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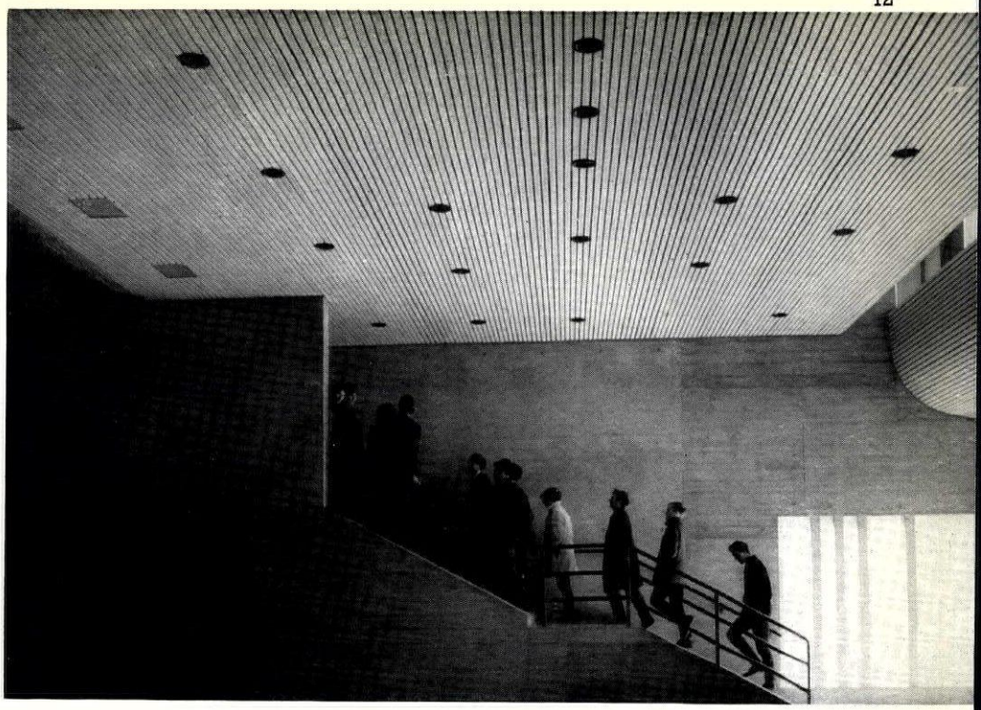
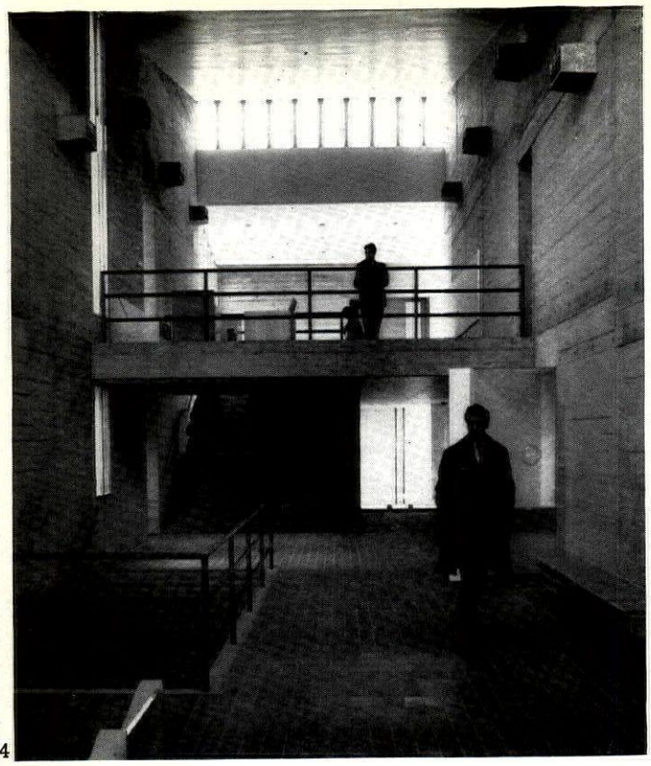
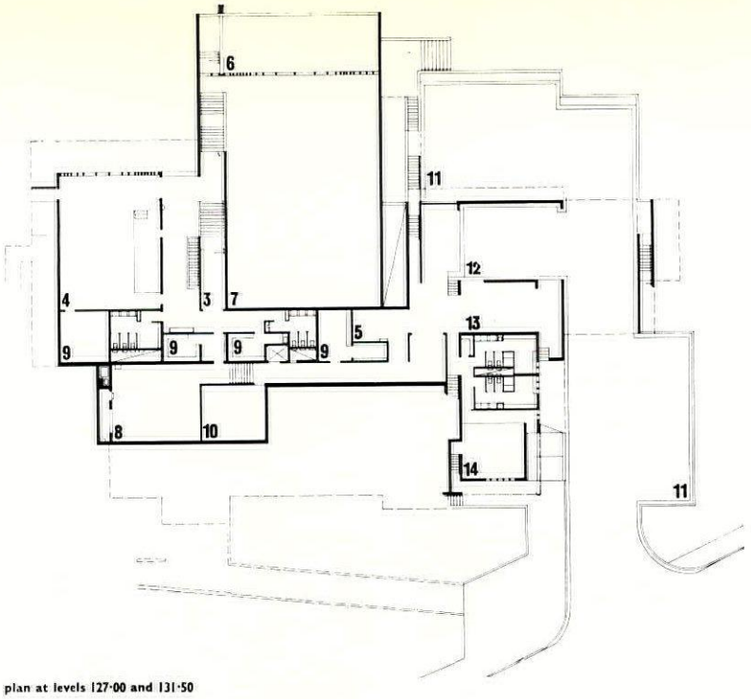


13

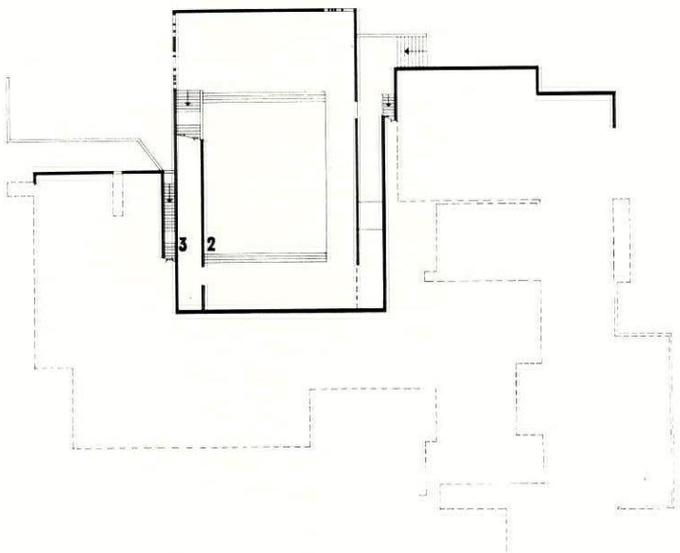
CLUB HOUSE, DURHAM UNIVERSITY



14, the lobby looking towards the lower and upper level entrances. 15, the upper level entrance with pivoted glass door.



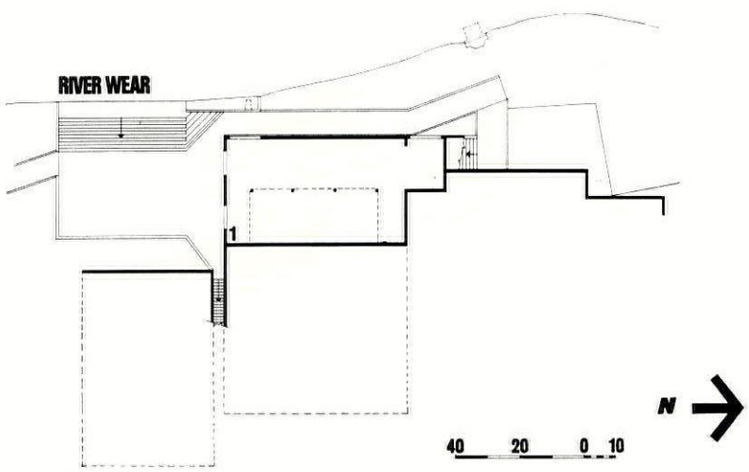
plan at levels 127·00 and 131·50



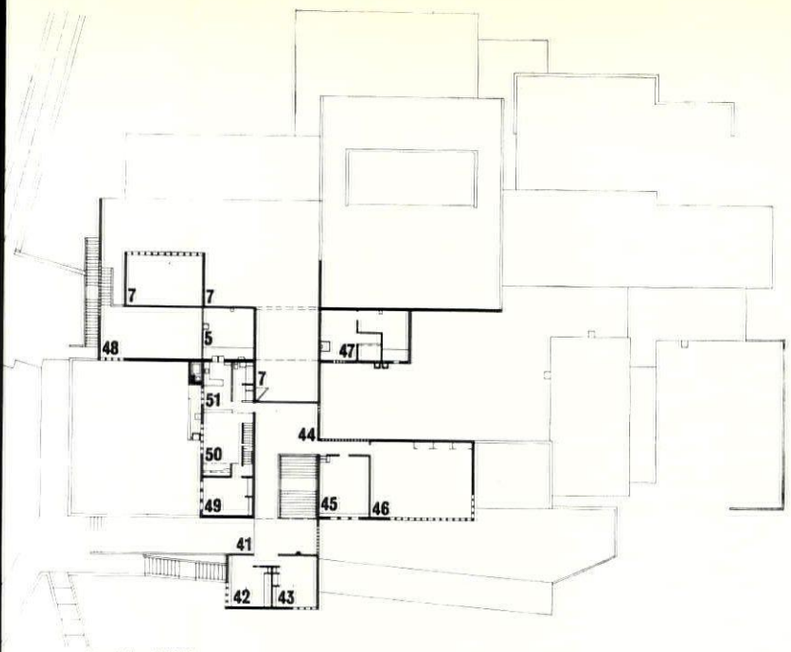
plan at level 118·50

key

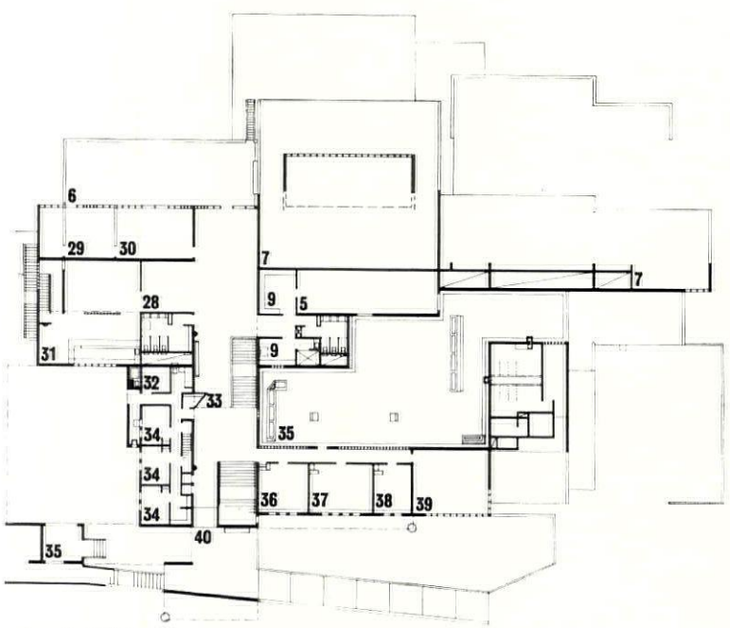
1. boat house
2. main hall
3. chair store
4. SRC hall
5. plant room
6. terrace
7. void
8. boiler house
9. store
10. oil store
11. parking
12. service area
13. loading bay
14. domestic staff lounge
15. cafeteria
16. coffee bar
17. servery
18. kitchen
19. billiards
20. preparation
21. cloak room
22. table tennis
23. staff dining
24. office
25. domestic staff dining
26. guest bedroom
27. staff bar
28. lounge
29. bridge
30. reading
31. bar
32. switch room
33. tickets
34. bedroom
35. sub-station
36. athletics club
37. student representative council
38. president
39. committee
40. lower entrance
41. upper entrance
42. porter
43. steward
44. lobby
45. students' newspaper
46. bookshop
47. lift motor
48. upper bar
49. caretaker's bedroom
50. living room
51. kitchen



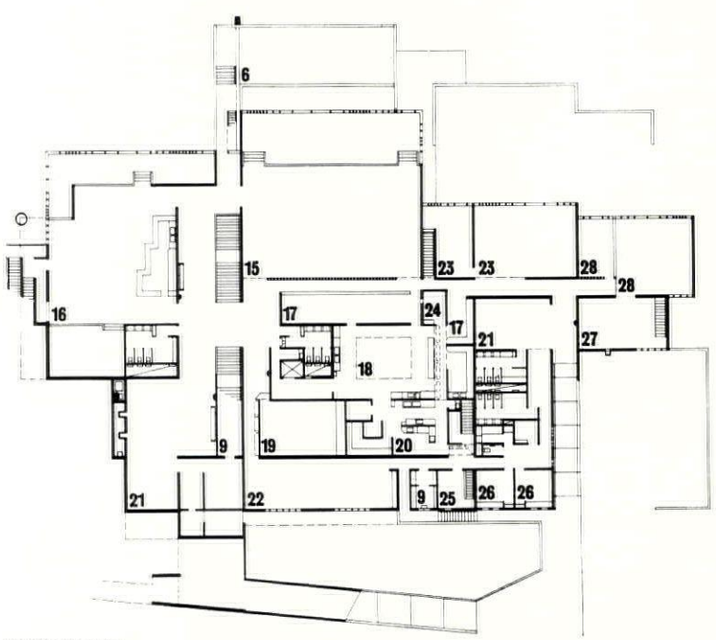
plan at level 108·50



plan at level 160-50



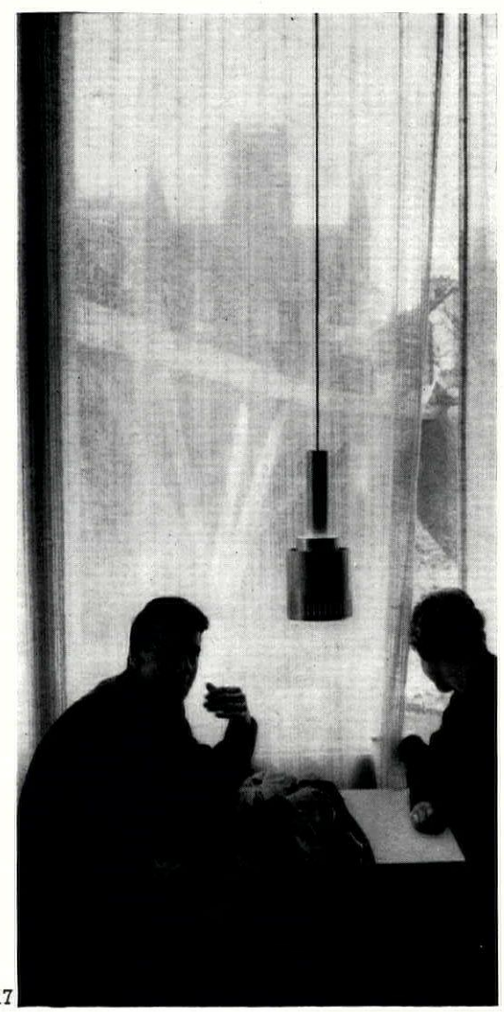
plan at level 151-00



plan at level 140-50

16

16, the precast concrete roof tiles which are of 16ft., 12ft. and 8ft. lengths and lapped above one another. 17, window in the coffee bar overlooking the river and cathedral.



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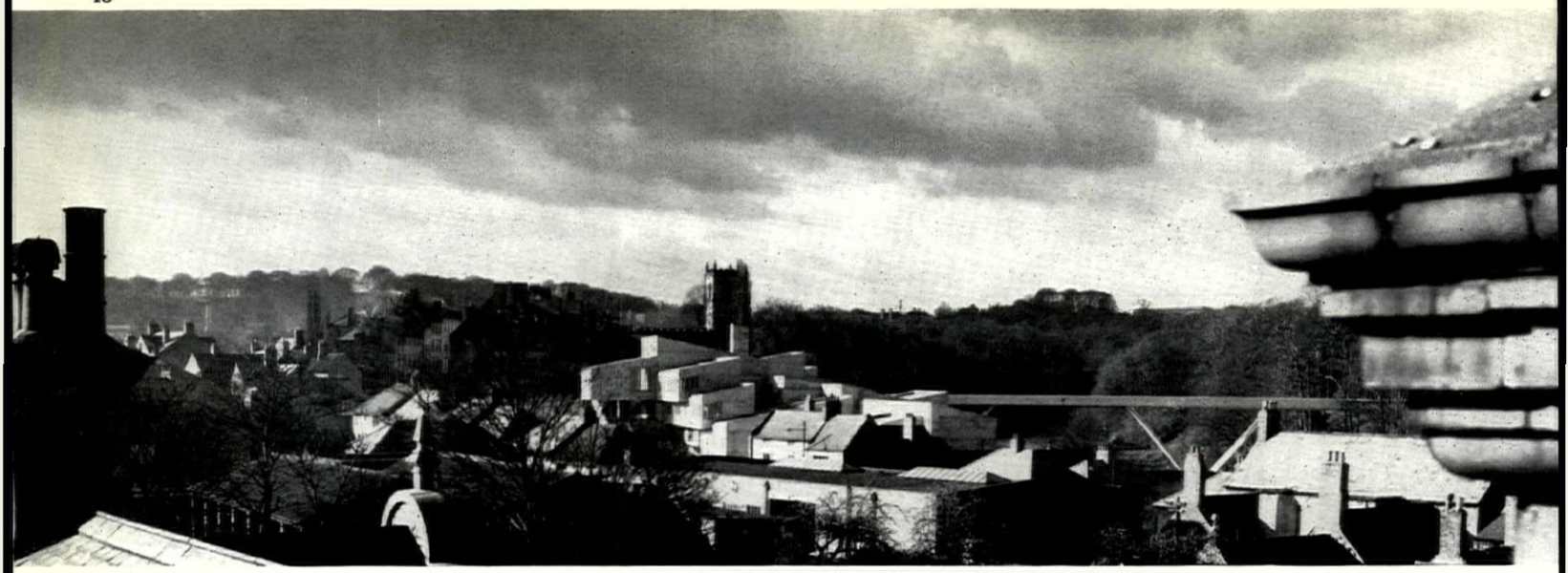
18



CLUB HOUSE, DURHAM UNIVERSITY

18, the club house seen across the roof-tops of Durham, with the tower of St. Oswald's church beyond and the Kingsgate footbridge on the right. 19, the road approach to the club house; the steps on the left lead to the students' entrances, and those on the right to the staff entrance. 20 (facing page), an example of the 'medieval knitted texture' of Durham, referred to by John Donat in his appraisal of the building.

19

criticism

We owe some of our best buildings to the rogues and renegades in the big name offices who manage to slip something through the net of corporate anonymity that is unmistakably individual. The architect in charge of Dunelm House is a young American, AA-Smithson trained, now working for ACP. In fact, this is Dick Raines's first building—some rusk to cut your teeth on! The Union (as it will be called for brevity) has enjoyed the benefit of an unchanged team of architects throughout design and construction, plus the added bonus of a constant team of labour on the site. Both teams have seen the job right through together and both have obviously taken it to heart, right down to the joiner-apprentices who nailed up 60,000 feet of softwood battens for the acoustic ceilings.

Following the tenuous Smithson link, one could describe the building in terms of love and doorframes: love, because it has been lavished on every detail and shows; doorframes because they have been eliminated and don't show at all. The door-opening details are worth study, even though occasionally embarrassed by the need for fire stops or the appearance of side panels with a sheet of glass eight feet high and only about an inch wide.

Durham itself, with its two great gestures, castle and cathedral, its marvellous topography, deep river gorge, steep slopes and medieval-scale town, is the British Holiday and Travel Association's ideal of England. The Union, given one of the most challenging sites in the country, has met the challenge head-on, satisfying en route *the UGC, Royal Fine Art Commission, City Engineer, County Planner, Wear and Tees River Board and a building committee that included the Dean of the Cathedral. The Union is at the centre of gravity of the university. Ove Arup's superb footbridge links town and gown with newer university buildings to the north and south. Bridge and building should really be judged together. Ove Arup, the consulting engineer, took a personal interest in the design, particularly of the precast roof 'tiles' now referred to by the locals as 'the graveyard.' John Martin the job engineer, who also worked with Arup on the bridge, produced 126 drawings for the Union: '. . . quite a lot, but then we don't usually have to produce concrete drawings for ashtrays and light fittings.'*

The site on the east bank of the Wear slopes steeply in two directions, down the hill on the roadside and with a drop of fifty-six feet from road to river. The design begins as a structural answer to its dramatic cliff-hanging situation: boxes of reinforced concrete retaining walls step down the slope in two directions and erupt out of the river bank to become the enclosing volumes of the buildings itself. The domestic scale of a nondescript street had to be reconciled with the heroic scale of the Wear gorge. These two scales have been brilliantly resolved, as has the problem of fitting what is in fact an extremely large building into the medieval knitted texture of the city. It has been achieved by grouping minor small-scale spaces on the road side, and major large-scale spaces on the riverside, with a substantial amount of accommodation buried, cave-like, in the hill. There are no less than seven descending levels, although on the road side the building is never more than three storeys high.

As a counterpoint to the complex masses and volumes, details and materials are rigorously disciplined. The concrete (lots of it) is fairfaced without special shuttering, floors are quarry tile, windows are glazed direct to precast mullions without frames,

20

services are integrated with the structure. The essence of the discipline is to be direct and clear, and it certainly seems to have been understood and respected by the men on the site—which is saying something. But the architects' will to simplify is matched by an almost equal will to complicate. The block model was already a complex affair, but in the final building each space has been further elaborated and manipulated in its own right: changes of level are introduced into an elaborate section, reverse-pitched dormer rooflights are added on in order to back-light deep spaces, ceilings are moulded with curved surfaces of softwood battens for acoustic control, special corner conditions are created to take advantage of diagonal views on the riverside, and so on. Regular windows produced a 'weak' effect —hence the baldly derivative 'harmonic' mullions to achieve greater solidity. Most of these are structural; some are not; some are even in tension. Such inconsistencies are a product of sheer complexity, but even if the Wagnerian orchestration doesn't always come off, the building produces such a triumphant blast of sound that occasional off-key notes are comparatively inaudible.

You reach the Union from the old university across the bridge, from the north you come through a public garden, and from the town up a long stepped ramp along the roadside. From within the main entrance there is a shock view right down through the whole building. The main staircase is a point of orientation and acts as a stepped spine on descending levels. All the major spaces, lounging areas and roof terraces open directly off this spine. Everywhere are glimpsed views of cathedral, river and bridge. The interiors, in spite of a background of tough materials, are surprisingly luxurious—even too soft! It was tragic to have to take pictures before the students have moved in and turned it into their own. The building cries out to be used—*even abused; it can stand it—and longs for its complement of life and people.*

At the same time that the Union design was approved, ACP were given an Arts building on another site just down the river. In this case the site was flat, the programme different and building had to be very quick; it is disappointing nevertheless that the Arts building is almost wilfully unrelated to the Union, and now ACP have been given the third site, between two buildings; so the office is faced with the unenviable job of reconciling two of its own designs! It is said that the head of one of the women's colleges, admiring the Union, said to one of the partners: 'What a pity ACP didn't design the Arts building as well. . .'

JOHN DONAT

A romantic view c. 1850. (Drawn by F. W. Hulme and engraved by T. Bolton.)

STONES AND LONG GRASS

THE CHURCHYARD AS LANDSCAPE

KENNETH LINDLEY

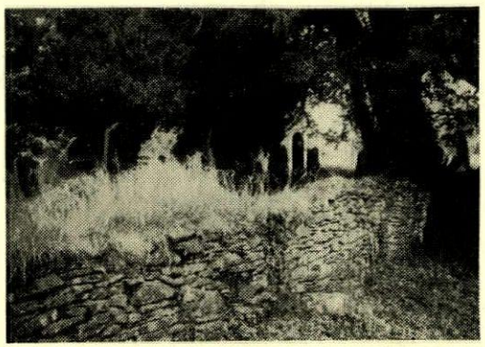
Churchyards, unlike cemeteries, are not just places in which the dead are buried: they have visual and symbolic qualities which commend them to the attentions of a wider public than professional morticians or monumental masons. Without them the church is denuded architecturally, losing not only an outward and visible sign of its concern for the protection of its parishioners after death but also a characteristic part of its own special environment. Churches without graveyards have a tendency to look (and therefore to become) like ancient monuments stripped of their ivy; museum exhibits deprived of much of their meaning and most of their attraction.

This is particularly true of medieval country churches, although those in towns or of a later period frequently have graveyards which serve very real functions unconnected with burial, functions which are all too often ignored in the mania for tidying up which seems to be almost an epidemic in some areas. The most important of these functions are (i) the quality of scale derived from the relationship between the church building and the pattern of vertical slabs of memorial stones; (ii) the moat-like effect of a churchyard which provides a necessary interval between the church and its immediate surroundings without in any way isolating it (insulation, not isolation) an effect not achieved by mown lawns from which the stones have been removed; and (iii) the creation of a visually exciting composition of a kind which is not to be found elsewhere.

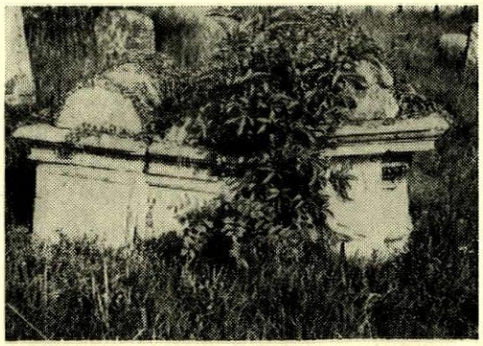
The ingredients of this composition are simple and comparatively few. They include chiefly stone, iron and natural growths, with such local inclusions as wood, or artificial stone, coming together to form a recognizable pattern in which no two repeats are ever identical. Although the individual design of monuments frequently achieved a high level of imagination and skill this adds to but does not necessarily form the main attraction of a good churchyard. Good local stone, weathered and lichened over a period of anything from fifty to three hundred years, plant growths, preferably slightly rampant, paths in a local tradition, well-laid and lovingly (rather than efficiently) maintained, ironwork from the local smith and the whole design evolved under the influence of such factors as the prosperity of the neighbourhood at various periods or the nature of the site; these are the components of a good churchyard. They are also the first to suffer when the tidying up process begins.

Plants are essential to any churchyard, but there is little virtue in treating churchyards as gardens, to be kept trim and tidy and stocked with neat little flowering shrubs and nurserymen's specialities. Ivy is traditionally associated with mourning and nothing is more appropriate than a mountain of it over some crumbled monument. There are few more pleasurable sights than stones emerging from long grass like rocks in a green sea.

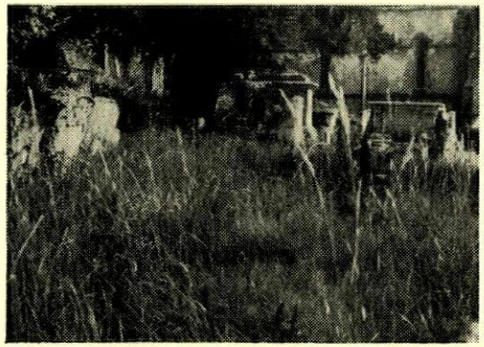
The real villain of the piece is the motor-mower, at whose appearance whole graveyards are cleared of their monuments and transformed into bowling greens (without the functional justification) which has been done, for example, at Loughborough, as well as in many other places. Total neglect is a preferable alternative, for at least it has considerable visual appeal, but a happy compromise is usually possible. In some churchyards, in Leicestershire and



Kilpeck, Hereford. A mysteriously inviting prospect . . .



Bourton-on-the-Water, Glos. Stones that grow from the grass.



Taynton, Oxon. Slight neglect and reasonable maintenance . . .

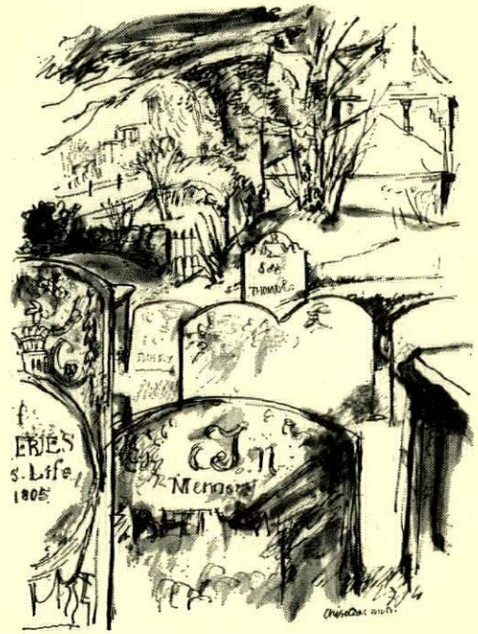
Shrawley, Worcs. Beyond the trimmed edge, a tantalizing jungle.

Twyford, Derby. A man working more for love than money, and a scythe—still the best way to deal with churchyard growth.

elsewhere, this is achieved by mowing a border of about a yard's width along the edges of the paths and allowing the remaining areas to grow as they will. In early summer, when the white fool's parsley is in abundant bloom, the commonsense rightness of such a solution can be seen to full advantage. The trim edges impart a quality of well-being whilst the infinite variety and constant movement of tall grasses and common weeds is a delight all too rare in this age of intensive farming and chemical weed-killers. Above all, the colour of grass, ivy and white parsley against the deep blue-grey of the local slate does more than anything else to give character to both the graveyards and the villages in which they are situated. Take out the slates and cut down the parsley and the loss is irredeemable. You have only to visit Loughborough to discover this.

Although many of the original sources of local material are now worked out (as, for example, the Swithland slate quarries in Leicestershire) the churchyard is frequently one of the last remaining strongholds of local character. There may be some excuse on practical grounds for replacing Cotswold stone-built cottages with reconstructed-stone bungalows in order to give the occupants the benefit of a damp-course, but no such practical considerations offer excuse for changing the character of churchyards. Slate is pre-eminent in this respect because of its distinctive colour and its almost total resistance to weather and the encroachments of lichen. A churchyard full of slates possesses an immediately recognizable character, whether it is in some Midland mining village, on a Cornish moorland or by a Welsh mountain lane. Blaenau Ffestiniog may be an extreme example, but a graveyard there (not strictly a churchyard, although it does by coincidence surround a monumental chapel) packed with row upon row of dark slates and white ceramic artificial wreaths seen against the quarry workings, the rows of cottages and the surrounding mountains, constitutes one of the finest landscapes in North Wales. In a similar, but less spectacular, way slate memorials create their own miniature landscapes in many delightful church and chapel-yards in those areas where it is found in abundance.

Particular varieties of local stone have frequently been found suitable for tombstones, although not particularly good as building material, and so the local churchyard gains character from its repeated use. Swindon stone is a good example, occurring particularly in the villages along the Vale



Chiseldon, Wilts. Drawings (and on page 466) are by the author.

Hoarwithy, Hereford. Trees (including Chile Pine), tall grass and a few tombstones, make an excellent setting for the strange red Romanesque church (by J. P. Seddon, c. 1885).

STONES AND LONG GRASS

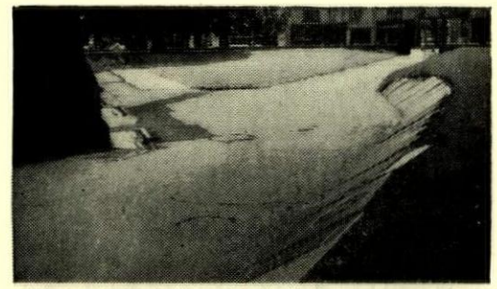
of the White Horse where its peculiar attraction for lichens (unlike slate) introduces rich colour into an area where the traditional building material was chalk, roofed with thatch. Where they survive in quantity, as at Chiseldon, they produce an effect which has little to do with the design of the individual stones (excellent though this often is). These particular stones were traditionally painted over completely in red, blue, yellow, green and black, and it is interesting to consider what the impact of a yard full of these very gay monuments must have been like. A mason at Great Bedwyn has restored three to their original splendour and thus produced a convincing argument for the re-introduction of painted memorials.

The importance of iron in churchyards is often overlooked, even when the stones are sympathetically treated. Some of the finest eighteenth-century ironwork was used to rail individual monuments or family enclosures, and in addition to this a wealth of locally produced work still exists in the form of railings, gates, etc. Some of these are beautifully simple in design and the quality of workmanship is proved by their continued existence, often in spite of decades of neglect. The unpretentious gate into the churchyard at Capel Curig is so much nicer than the cumbersome lych-gates popular as memorials in the present century, and there must be thousands like it, rusting in obscurity. Lydeard Tregoze possesses a boundary rail composed of the simplest of elements and yet comparable to the most sophisticated design of its period. It is seen at its best in winter, when the plants of the previous summer have dried and bleached and when snow adds contrast to the pattern of rigid iron and tangled growth. In churchyards such as these the precarious balance between pleasing decay and destruction by neglect is well maintained, and the result is harmony between natural and man-made objects both on the scale of landscape and in the microcosmic detail of flaking stone, worn paving or wild flowers in the crevices and among the grass. Lichens, moss, creepers, even fungoids can be viewed objectively as components of a pleasing picture, not with the gardener's eye for weeds and their ultimate extermination. Where else can such things be seen together to so much advantage?

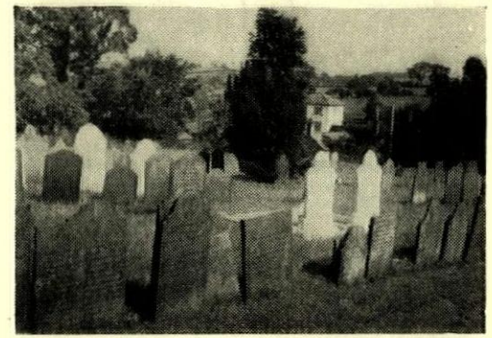
Iron is common enough in the form of gates or rails, but in some parts of the country it figures prominently as a material for the construction of monuments, producing a local character as distinctive as that created by slate, or by wood in such areas as the Chilterns. This character is particularly evident in villages near the Coalbrookdale Ironworks in Shropshire, where some of the most distinctive iron monuments were produced. The character of many Chiltern churchyards is still dominated by the odd wooden 'bed-board' memorials which were used in areas where stone was scarce and wood plentiful. Unfortunately most of these are decayed almost to the point of collapse, and some of the best, as at Fingest, owe their survival to enlightened intervention. Old prints reveal what some of these Chiltern graveyards were like when the wooden monuments were more plentiful and when sheep were allowed to graze among them, and the area as a whole will suffer noticeably if they are allowed to disappear.

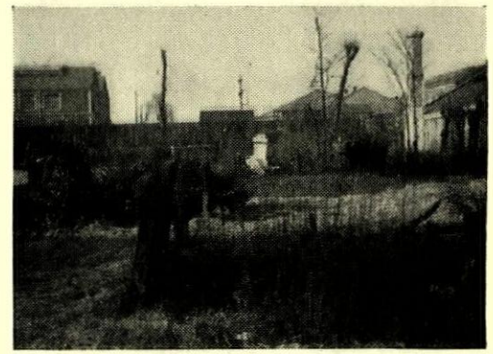
An occasional mausoleum, like that at Fawley, reveals by contrast the essential relationship in scale between church and churchyard. Few English churches are large by comparison with other buildings

Capel-y-ffin, Brecon. The contribution of a good churchyard to a church remarkable only for its diminutive size.

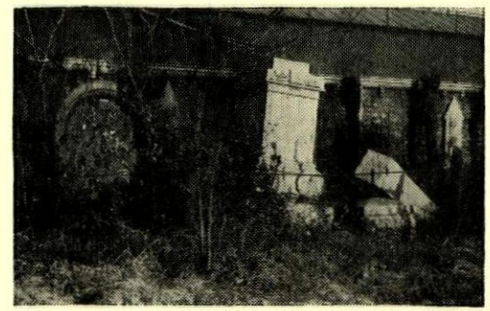


Above, Loughborough, Leics. Ruthless clearance of the finest collection of Midland slates. A notice here reads: 'This churchyard is consecrated ground and the resting place of the departed. Please keep to the path. . . . This land is Private. No public right of way.' Below, Great Dalby, Leics. Good local slates spoilt by the intrusion of white stones.

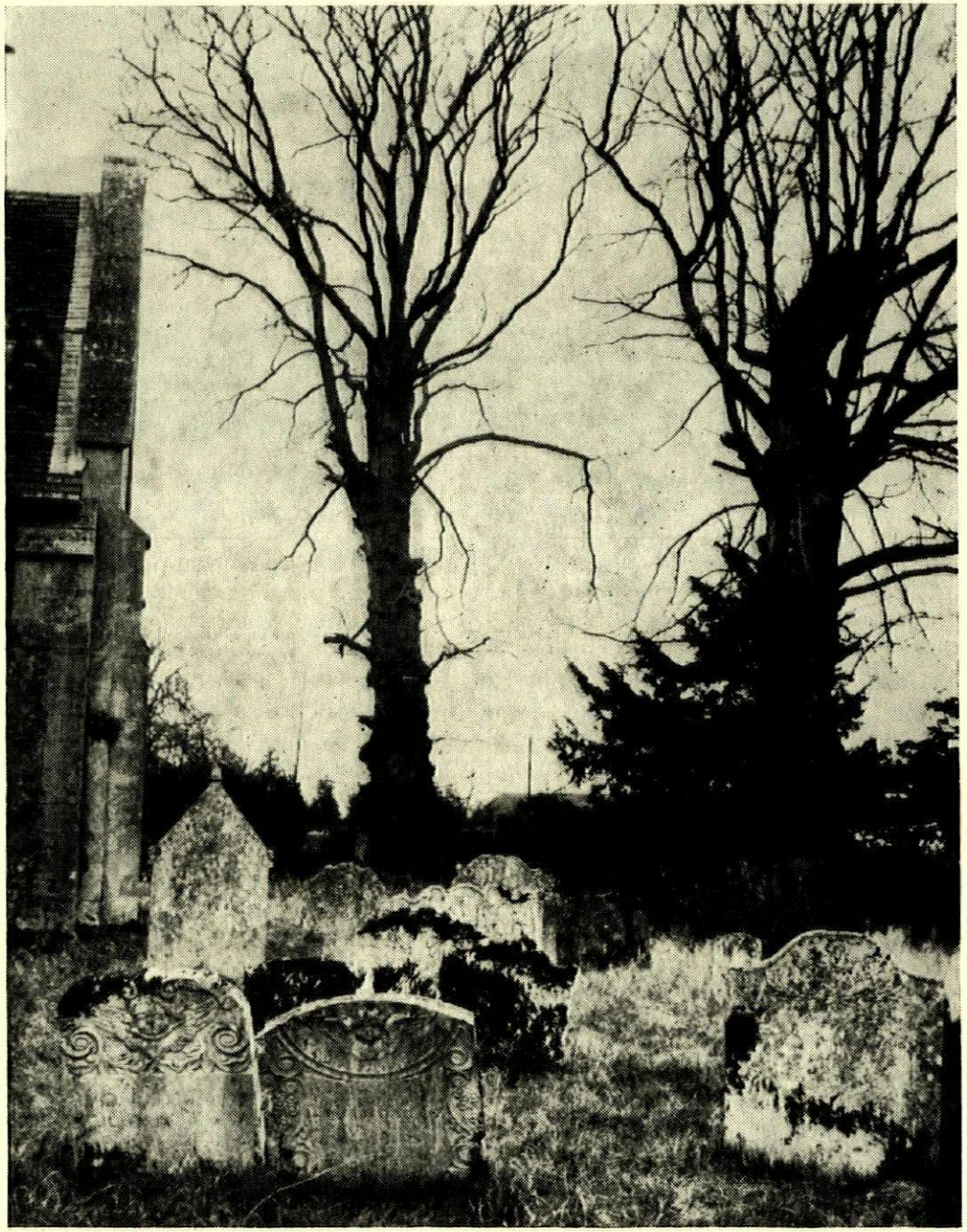




St. Mark's, Swindon, Wilts. The results of total neglect. Above, mutilated trees, planted no doubt as a screen to the adjacent railway workshops. Below, toppled monuments.



STONES AND LONG GRASS



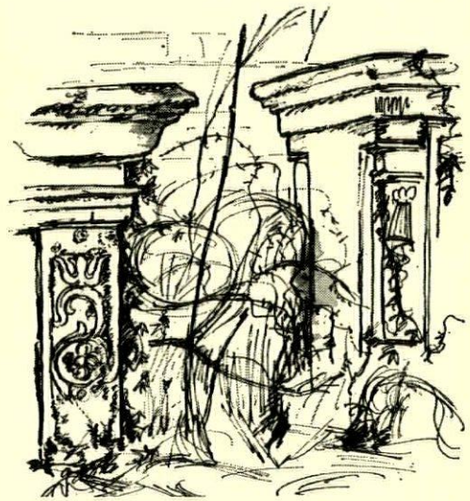
Fawley, Bucks.

(particularly those of our own age) and yet they are nearly always in scale in a way which makes mere size an irrelevancy. In achieving this the churchyard plays an essential part, rows of headstones giving added dignity to the building by their own comparative smallness. Remove the stones and the comparison can no longer be made. The value of churchyards in this respect may also be lost if they are allowed to become too large to relate visually to the church itself. This has happened at Brightlingsea, where the graveyard sprawls away from the church its boundaries lost to the eye and its white marble monuments strewn like paper from a burst bag.

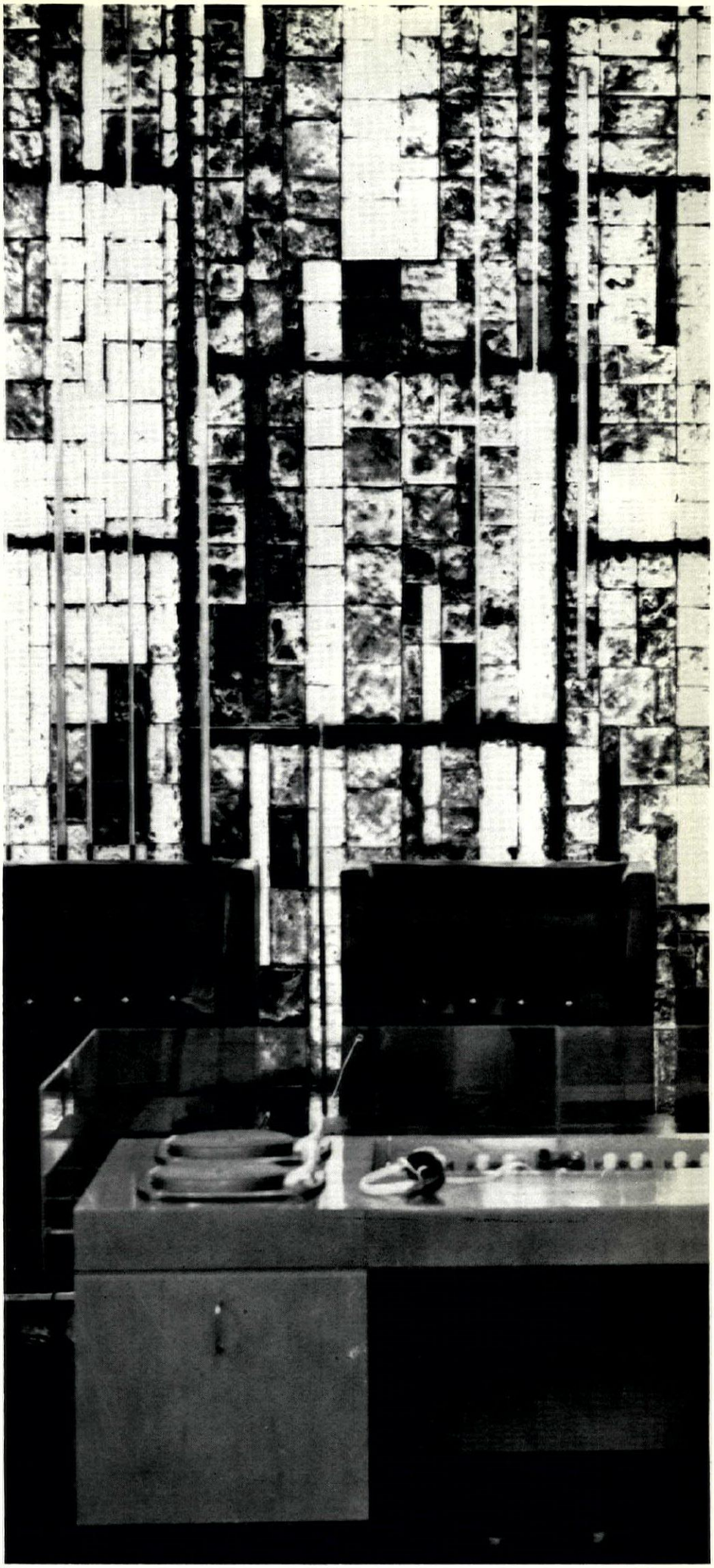
The limits of a churchyard should be well defined so that it remains a 'readable' composition which relates positively both to the church and the surrounding landscape. Within these limits is an interval of quiet at the centre of which stands the church. The size of headstones is such that the churchyard is divided and sub-divided without any one part being totally segregated from any other. Occasional larger monuments merely emphasize the scale and add variety to the pattern. The view of the church, too, is constantly changed by the varied pattern of monuments and foliage, allowing the eye to be surprised and the senses delighted. The possibility of visual surprise, the juxtaposition of richly varied surfaces and materials, even, perhaps, a suggestion that there may be forgotton places, overgrown with ivy, and ancient stones hidden beneath overgrown yews or hollies; these are the qualities of churchyards, making them *places* in the sense in which Paul Nash used that word. Neglect may cause some structural damage to the more ambitious memorials, but it seldom destroys character. 'Restoration' as it is all too often practised by bulldozer and motor mower does greater harm than anything the Victorians did to church interiors. It not only destroys the churchyard, it breaks the relationship between the church and its surroundings and destroys one of the most characteristic and important features of the English landscape.

Hardenhuish, Wilts.

Clyffe Pypard, Wilts. A superb example of a churchyard path in one of the best of country churchyards.



Clyffe Pypard, Wilts.



ID

Interior Design

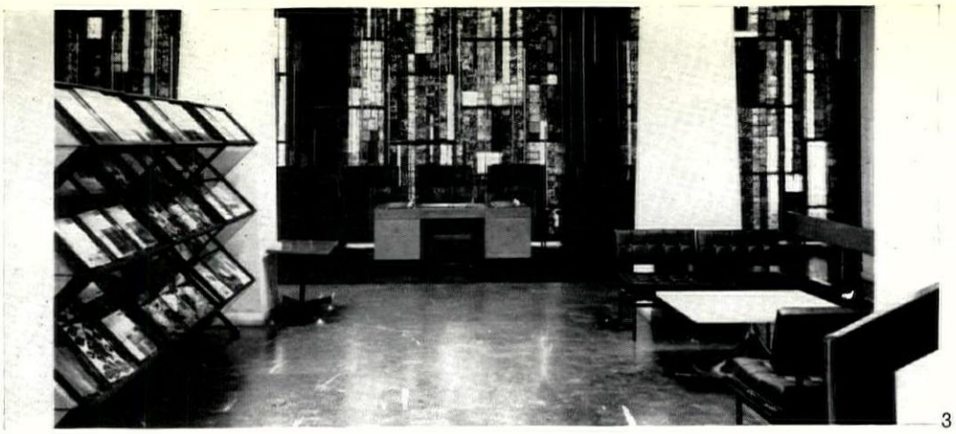
Music Shop, Bucharest

Architects: Vasile Cantuniari and Edgar Walter. Interior designers: Ion Oroveanu and Mircea Coradino.

1, *the stained glass rear wall of the ground floor showroom.*

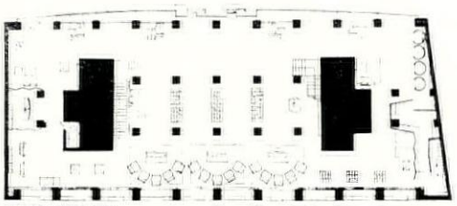
1

2



3

This shop selling instruments, records, record players, scores, etc., is situated on one of Bucharest's main streets. Conceived as a glass wall, the shop front allows a view into the entire interior. On the ground floor are the main display area, sales counters and three console tables and sets of chairs equipped with earphones. Two open-riser staircases lead to the half-floor above, where scores and books are displayed and sold. Storage rooms, offices and a small audition room are in the basement.



ground floor plan

2, detail of mosaic on the first floor. 3, ground floor view, showing record display racks and one group of console table and listening chairs. 4, seating area on first floor. 5, general view of first floor display area. The floor is black marble, the pillars light coloured concrete.

4

5

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GABO AND CONSTRUCTIVISM

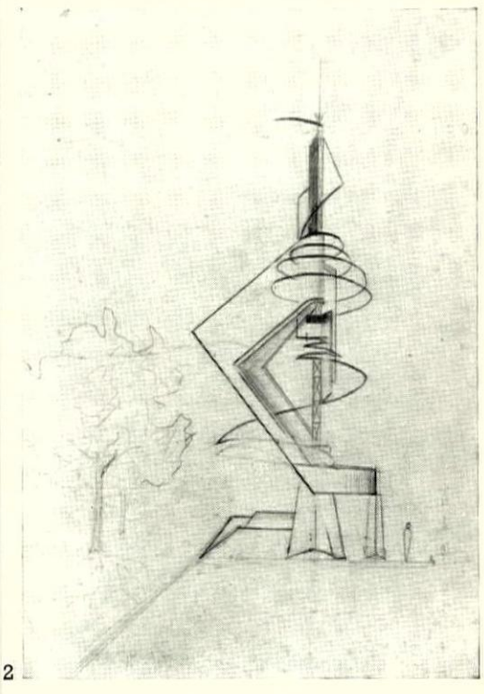
Frank Whitford

Naum Gabo is the architect's artist. 'The Constructivist principle leads into the domain of architecture,' he once declared. 'Art formerly reproductive has become creative. It is now the spiritual source from which future architects will draw.' Constructivism is based on the architectural principle. A Constructive work is built up element by element. It is not an object surrounded by space and understood from its surfaces, but, like a work of architecture, defines limits and encloses spaces. Throughout his career Gabo has produced projects for monuments and buildings, projects which, with the exception of the monument for the Bijenkorf building in Rotterdam (1954–57), were never realized. This work, in its visual description of the interpenetration of forces, owes more to Paxton and the Eiffel Tower than to any specifically sculptural models. Gabo is an architect manqué.

1

Does this mean that Constructivism can only be understood as a sort of architecture in miniature, aesthetically indistinguishable from it in intention if not in effect? The recent exhibition at the Tate Gallery surveyed Gabo's career and provided an opportunity to make some general conclusions, not only about Gabo's work itself, but about the nature of Constructivism in general. According to Sir Herbert Read, its most lucid explainer, Constructivism is 'the most revolutionary doctrine of art ever pronounced in the modern world.' Since 1920, when its arrival was announced by the *Realist Manifesto* (pasted to the walls of Moscow and accompanied by an open-air exhibition in the gardens and the bandstand of the Tverskoy Boulevard), the general public has been less impressed by Constructivism than by any other modern movement in art. But it remains revolutionary.

Certainly Gabo was an innovator at the simplest level. As early as 1920 he made a kinetic sculpture powered by an electric motor. He was one of the first to use modern industrial materials in a work of art and to realize the powerful effect technology was having on our consciousness: 'we realized that every engin-



2

1, *Head No.* 2, 1916. 2, *Sketch for a Square in Moscow*, 1919.

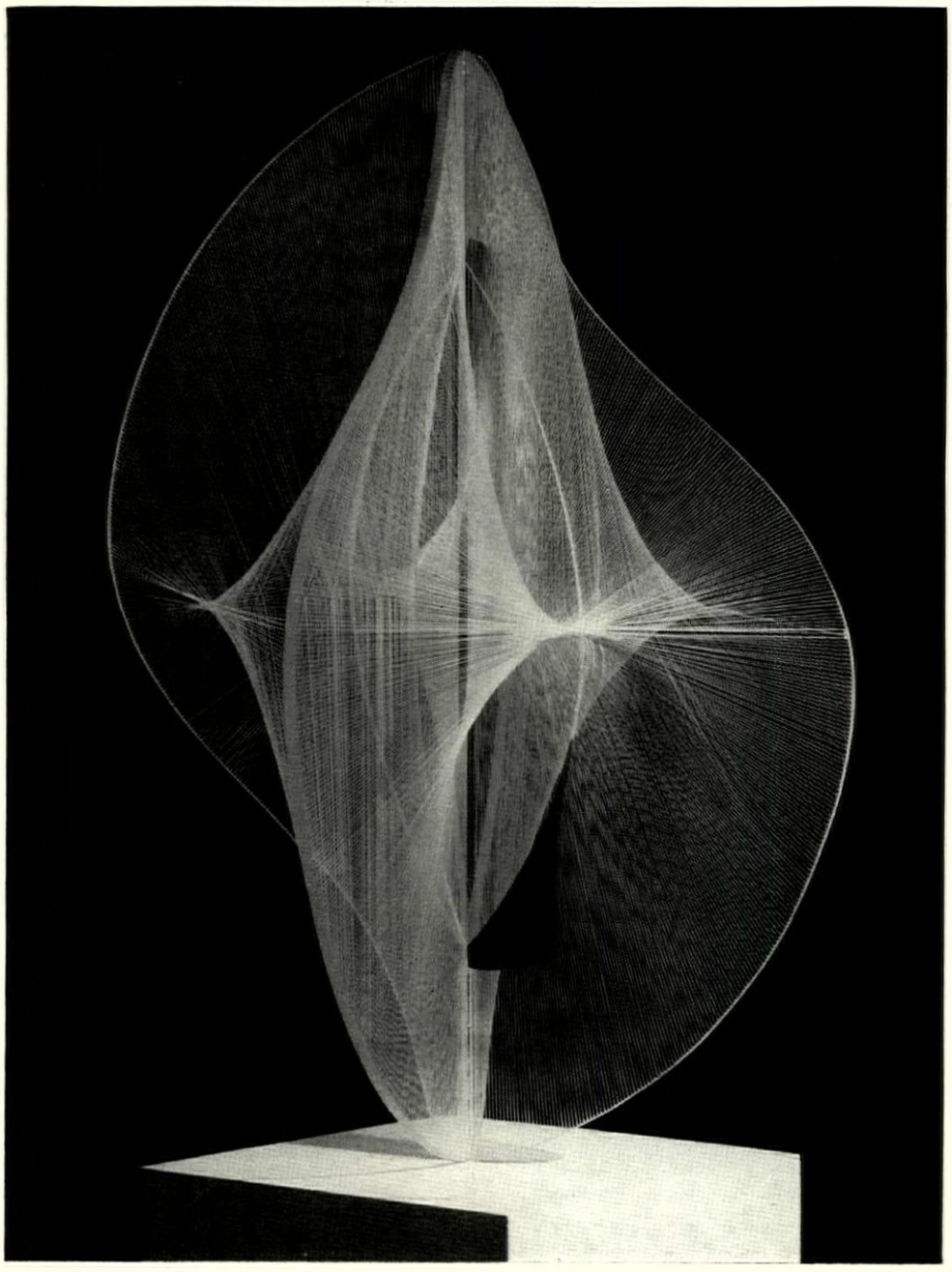
eering object is, apart from its functional character, acting on us as an image.' The ideas which Gabo formulated in 1920 ('above the tempests of our weekdays. Across the ashes and cindered homes of the past. Before the gates of the vacant future') have, for Gabo himself, remained valid. He still holds fast to his original principles, and the work itself, except for a measured progression toward greater economy and lucidity, remains essentially the same. He is concerned in the *Manifesto* with the same issues which concern him in numerous later essays and in the Mellon Lectures (*Of Divers Arts*) of 1959.

In 1920 Gabo and Pevsner claimed that the Cubists and Futurists were already out-of-date. For all its apparent originality even the newest sculpture was still firmly hitched to a set of outdated principles. It was in contemporary scientific and philosophic thought that the true innovations were taking place. The concepts of space and time and the related ideas of flux and impermanence were dominant, and the artists, if they were to speak with a modern voice needed to take account of them. 'The philosophic events and the events in science at the beginning of this century,' Gabo wrote, 'have definitely made a crucial impact on the mentality of my generation. Whether many of us knew exactly what was going on in science does not really matter.'

Gabo introduced space as a vital aesthetic element in his work. 'Sculpture from its beginnings,' he claims in *Of Divers Arts*, 'dealt with closed volumes and compact materials alone, so space was of no concern to the sculptor since the solid had a space in which it stood, and that was the whole function of space in the plastic arts up to very recent times.' Space needed to be assigned 'the same importance that lines, shapes and colours have, as a basic means in the structure of a visual image.'

'Head No. 2,' made four years before the *Manifesto* was written, is a sculpture which already exhibits many of those qualities which the *Manifesto* was to celebrate. It is sculpture without mass. Space has become a vital aesthetic element. Defined, directed and manipulated by an arrangement of intersecting planes it has become active. Moreover it describes with extreme economy. Why use an unwieldy solid to define area and volume, particularly if it gives you only an external, superficial conception of it? More can be said with less, and the final statement can come closer to perfection. This is to achieve fulfilment of an idea with the least possible energy.

The same preoccupations are revealed by a much later work, the 'Linear Construction No. 2.' Space must not only describe and



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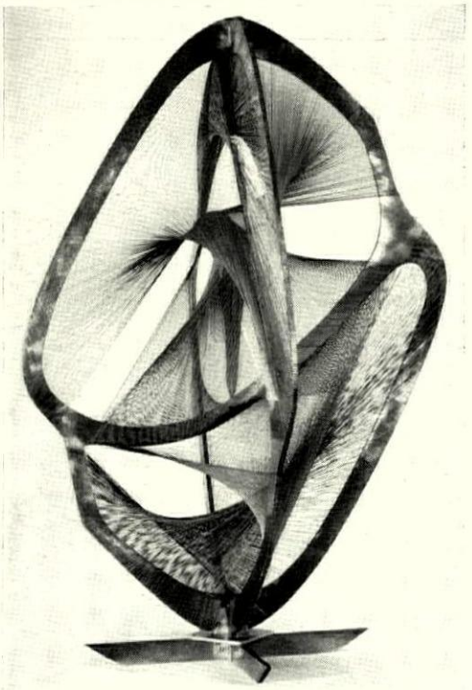

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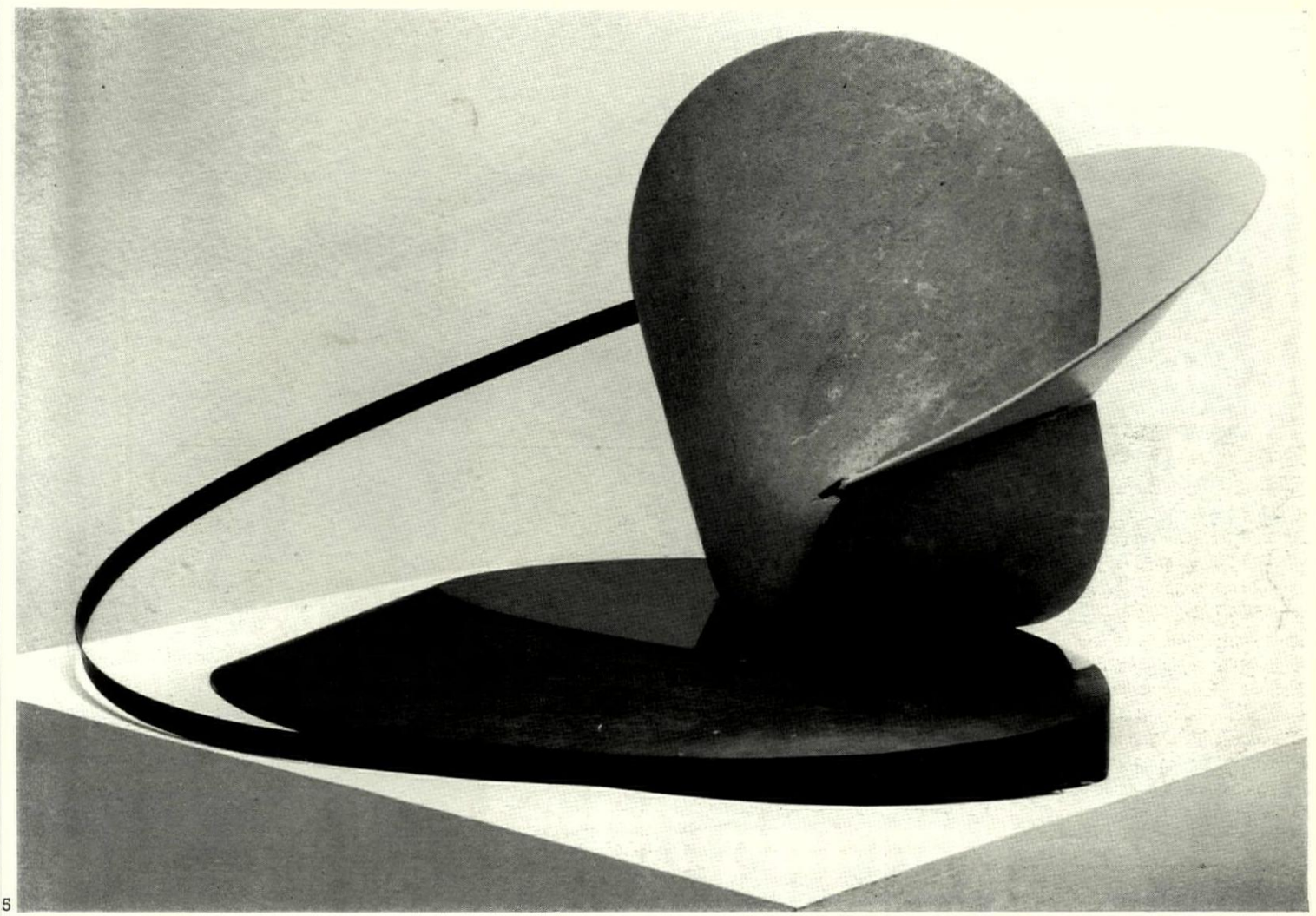
3, *Linear Construction No.* 2, 1949-1953. 4, *Linear Construction No.* 4, 1962.



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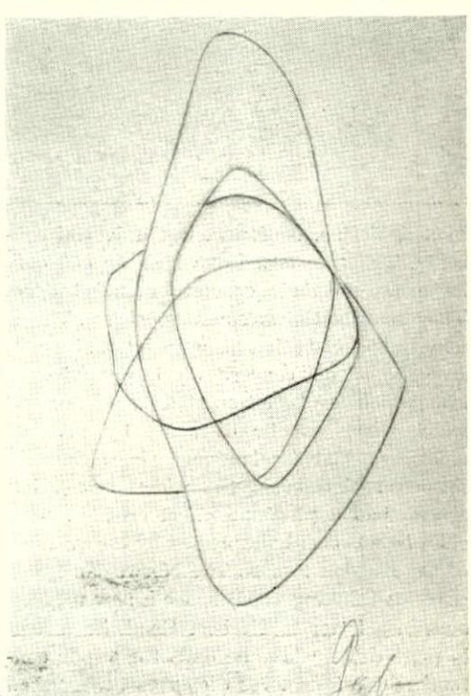
5, *Stone with Collar*, 1933. 6, *Pencil Sketch*, 1949.

define; it must also be organized. 'The elements of art have their basis in a dynamic rhythm, static rhythms are not sufficient to represent the true reality of 'time.' Space must therefore be orchestrated. Silhouette and surface must describe space and capture light, and yet not contain or restrict them. The work must be penetrated from all sides. It has to be transparent yet clearly visible. Space cannot be expressed through a 'monolithic volume,' for space, the 'continuous depth' is infinity. Space must be caught at one point, one aspect of it crystallized into an ordered construction, described and then released. The visual image must be balanced and self-sufficient and yet capable of continuous and infinite expansion'. There is about Gabo's work an apparent perfection and inevitability which is both clinical and scientific. Many who recognize the science fail to perceive the art and remain unmoved by something which seems to them too close to Euclidean geometry. '. . . I have to defend my own art,' wrote Gabo 'from the accusation which I often hear—that my sculptures are mathematical formulas—and to insist that I can quite well use a rectangle or a circle whenever I need these shapes in my image without paying a heavy toll and tribute to the scientist for them, and that I do so on my own inherited right of vision.' If there is, as many critics claim, 'poetry' as well as science in Gabo's work, in what does this 'poetry' consist, and how does it relate to the science?

Gabo's attitude to science is as important as it is complex, and the sharp defensive jab just quoted is misleading, for it suggests that, for Gabo, science and art are irreconcilable opposites and that art is the more important. Gabo in fact thinks that the scientist is also an artist. Both are concerned with the 'ultimate reality'—the discovery and formulation of those laws and forces which they believe lie at the heart of the universe. These are not simply those general rules to which science,



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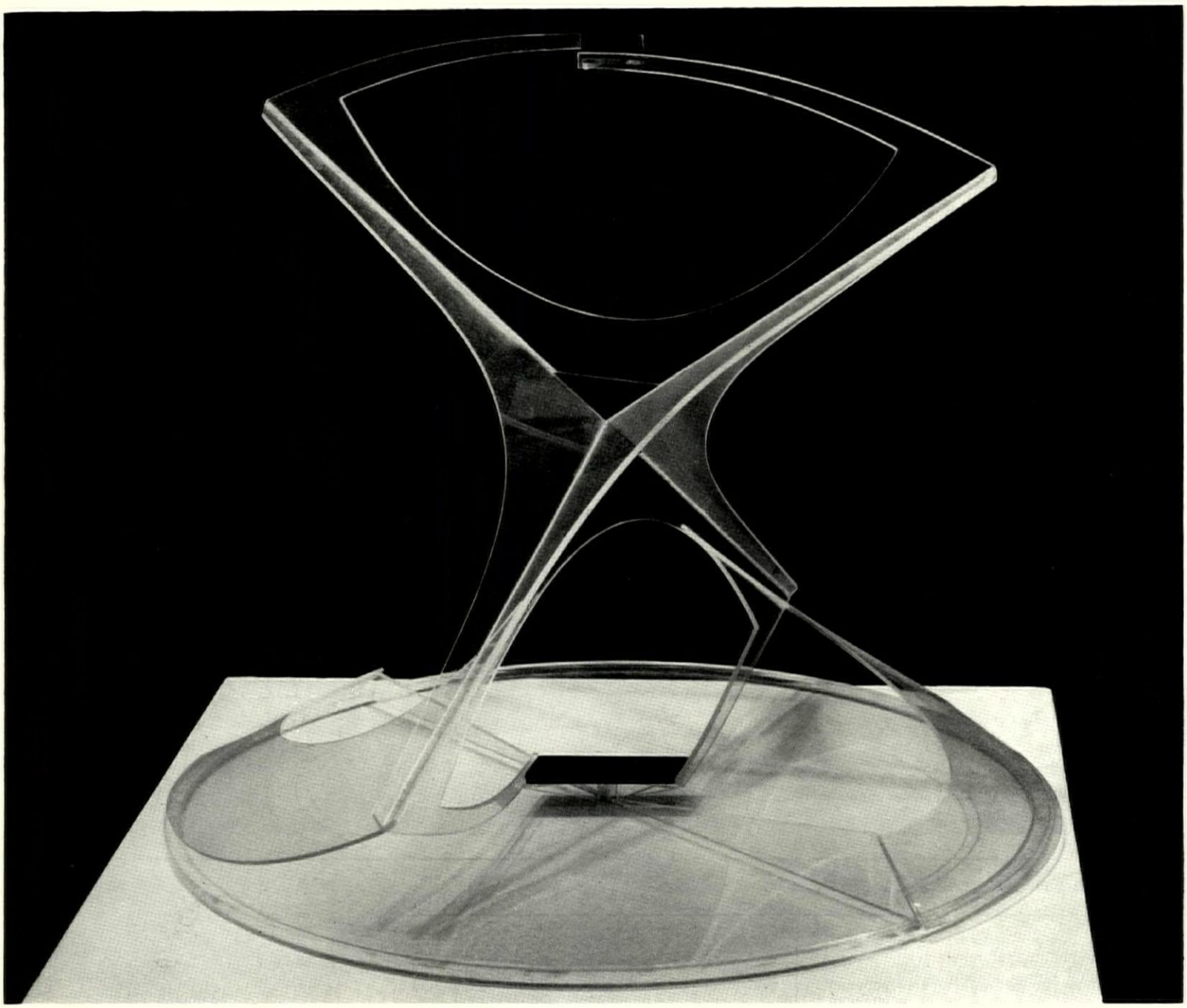


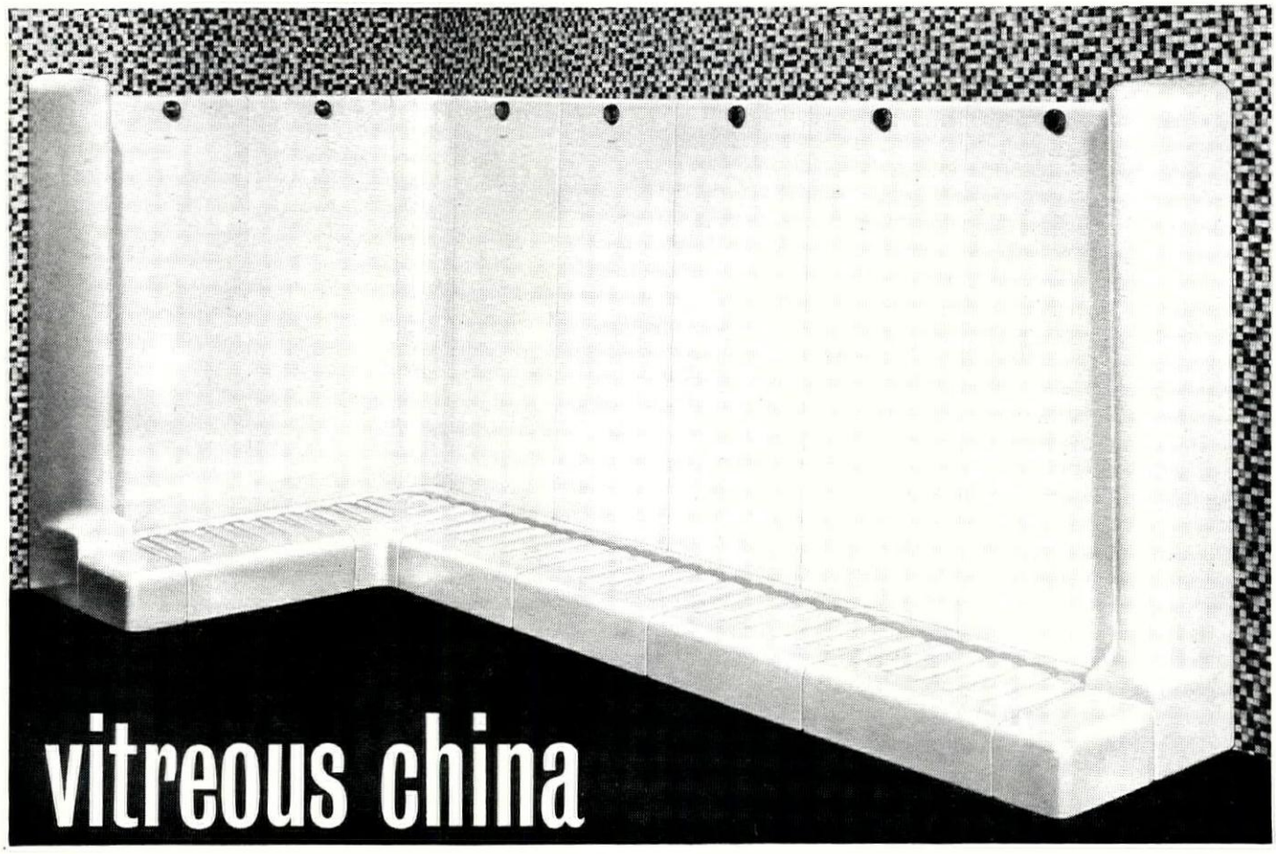
7, *Torsion*, 1929.

as a discipline, conforms, but universal concepts. They are forms of which we can only be aware in their concrete manifestations. They describe the way matter *behaves*. This is why Gabo insists that his work is not abstract. In spite of his concern for those universal laws which can be formulated by science and which must not be distorted by personal emotions, Gabo's language is ultimately intuitive. Nature, in the widest sense, has always had a profound effect on him. As a child he was deeply impressed by the vastness of the Russian forests. The Norwegian fjords gave his thinking about space a new urgency and, in a letter to Herbert Read, he reveals in more detail where he finds the 'crude content' of his forms. He discovers them 'when and where I want to find them . . . in a torn piece of cloud carried away by the wind . . . in the naked stones on hills and roads . . . in the bends of waves on the sea between the open-work of foaming crests; their apparition may be sudden, it may come and vanish in a second, but when they are over they leave me with the image of eternity's direction.' The forms are thus derived from an apprehension of nature closer to that of Leonardo or Blake than to Constable or Keats—'to see a world in a grain of sand, and heaven in a wild flower.' But Gabo believes that because Nature can be apprehended only through the individual mind and that the mind therefore is the only ultimate reality. 'There is in Nature Chaos and order, and all that we make of it is not itself; it is an image of our own making, a work of art produced by our consciousness, a product of our talent, to make images not *of* Nature, but *on to* it.'

This is where humanity, the artist's personality, enters the work, and what makes a Gabo or a Pevsner (both equally Constructive), personal and distinctive. Although Gabo's vision is informed by an understanding of physics, mathematics and geometry, although these disciplines give him an intellectual insight into the world, the concrete manifestation of his perception is not formed of rules and laws alone, but is in the end a personal metaphor. It is both personal and universal.

BARBOUR INDEX 386

the "Vitural"



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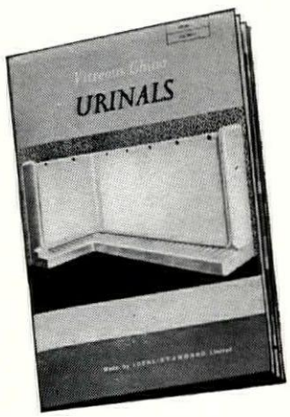

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Design Review

New products chosen and annotated
by Ronald Cuddon

DR

Tables

A table is so fundamental a concept that it would be fair to assume that the problem of producing an elevated and horizontal working surface, with its possible variations, would have been finally resolved long ago. But in fact designers still attempt to extend the table's functional possibilities whilst searching for ways of expressing new and traditional materials and methods of construction. There are contradictions, however, inherent in the problem of table design; for instance, although stability is essential, it is also desirable to reduce support to a minimum to provide unrestricted movement for legs and feet and freedom of seating positions. The increasing use of metal, and the introduction of welding and modern die-casting, have helped to resolve this conflict by enabling supports for the top to be more rigid or jointless.

The round or oval table is perhaps the most satisfactory shape for general purposes since it gives the necessary flexibility in seating arrangement. It can be more easily isolated from the walls and adjacent furniture, and it satisfies the structural concept of a central pedestal and base, eliminating the usual four legs. All but one of the tables illustrated here come into this category.

Designed and manufactured in Norway and imported by Heal's, 1 is a reasonably successful attempt at providing a variable height table with a maximum of 28½ in. for formal occasions, lowering to 21 in. for informal use. The screw action by which the height is adjusted is slow in operation, though the movement is mechanically excellent. Unfortunately impatience or haste have been known to cause a sherry glass with contents to be spun off its surface by the centrifugal force that builds up when the table is rotated. This defect could be a tempting and delightful exercise for children, but a minor irritant to the adult. However the table can be easily locked at any height between the two extremes by means of a locking screw on the support column. The folded metal technique employed in the construction of the feet of the quadruped tends perhaps to give a heavy appearance to the base which is extremely stable and rigid. The table top is teak-veneered with an oiled finish and the pedestal and base are chromium plated.

2, designed by Jolgen Hoj and manufactured in Denmark, is also imported by Heal's. It is essentially traditional in character, reflecting the image of the club table in modern terms. Probably at its best when fully extended, it is finely conceived and made. The cantilevered extension leaves are segmented, and tongued into each other, and the fixed Rio rosewood centre-piece, 3, is supported on a well engineered underframe of anodized aluminium sections. The leaves are faced with white plastic and fulfil the function of place mats for hot plates and wine glasses, but the weakness of this ingenious design is that it might become a chore to reduce or extend the table's size and to find adequate storage space for the four segmental leaves when they are not in use. The fixed centre is 45¼ in. in diameter and with the leaves the overall diameter is 69¼ in.

4 and 5 were designed and manufactured in this country by Merrow Associates and

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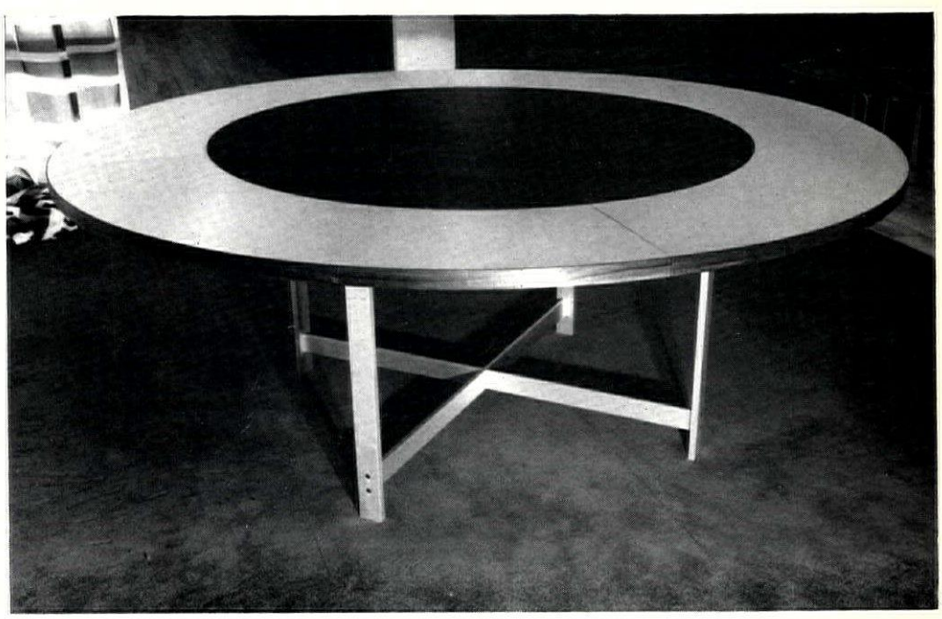

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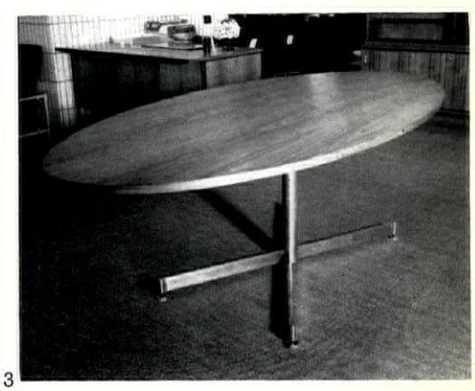

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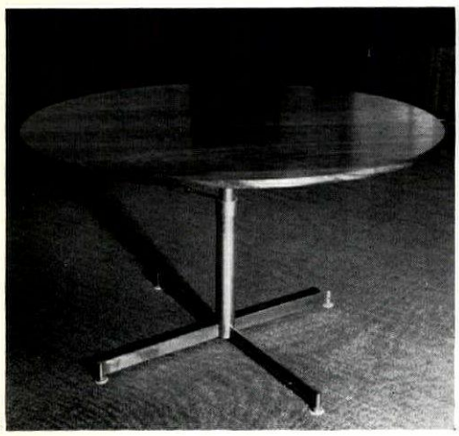

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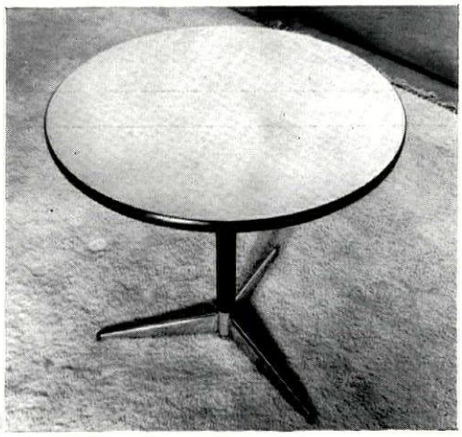

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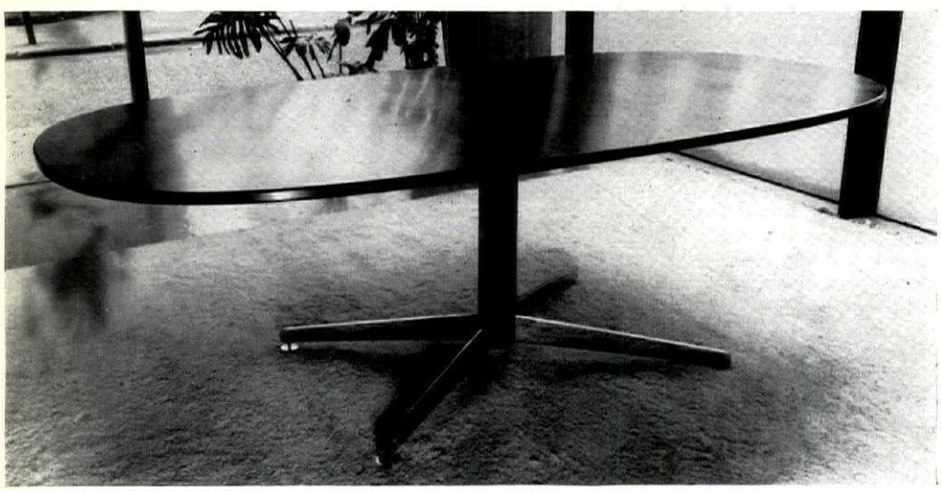

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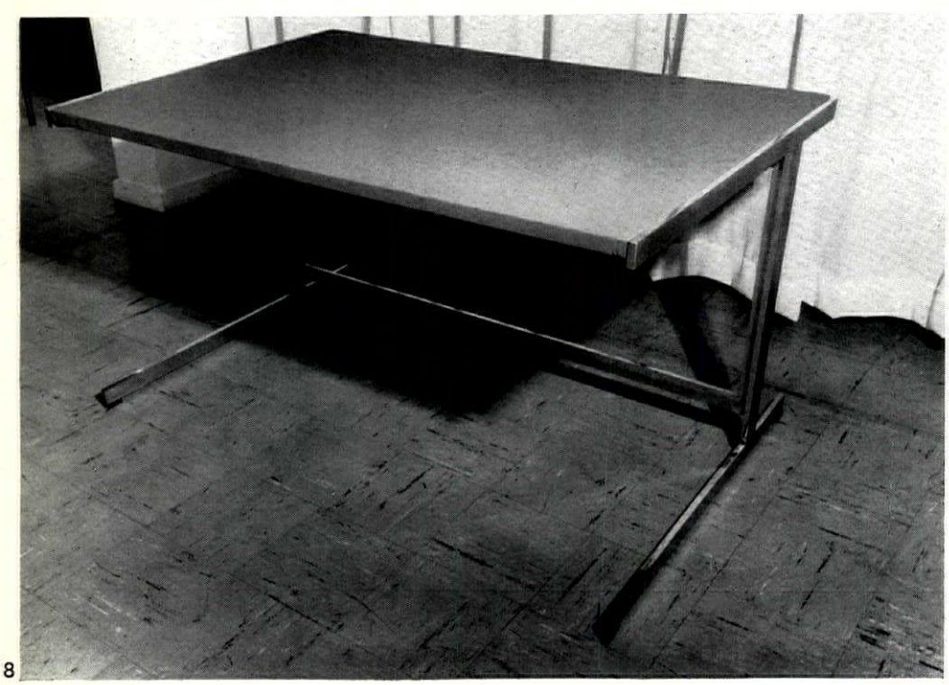
are retailed by Ryman's. The large oval-shaped table, 4, measures 6 ft. 3in. by 3 ft. 6 in. at its longest and widest points and is supported on a fixed chrome pedestal. The top can be obtained in teak or rosewood veneers. Of excellent appearance it is versatile in use, though the sharpness of the oval on the longitudinal axis does not allow for a comfortable sitting position at the table-ends. The adjustable height table, 5, can be obtained with either a 43 in. or a 48 in. diameter top in solid Rio rosewood with a chrome base. In this table the compression spring action is controlled by a lever on the support column. From the maximum height the table can be lowered by the application of gentle hand pressure on the table-top and locked at the required height. If released the table top will automatically return slowly to the maximum elevation unless the movement is arrested. The principle is sound and difficult to fault.

Two new tables have been introduced by Hille, a small round pedestal sofa table, 6. named Discus, and a large oval table, 7, both designed by Robin Day. The Discus has a 24in. diameter top of white melamine or teak supported on a black stove-enamelled pedestal with three-pronged base and chromium plated finish. Its height is 23 in. It is knock-down and packed singly or in pairs for ease of transport. It is of robust design and would be suitable for the tough usage expected in pubs and other public places. The maximum dimensions of the oval table are 7 ft. x 4 ft. It is veneered in Rio rosewood, and the pedestal is formed by a stout black stove-enamelled tubular column on a cruciform base made from flat steel sections finished in bright chrome. The elliptical shape of the top is blunted on the longitudinal axis and provides comfortable and generous seating positions at each end of the table.

The only rectangular table shown here is the drawing table, 8, designed by Robin Cruickshank for Design Associates. It is carefully detailed in satin and bright chromed steel and the adjustable top is covered with Swedish Galon p.v.c., paper and drawings being secured to the surface with masking tape to prevent puncture damage. It measures 32 in. by 48 in. and can be supplied with a Din-Graph parallel motion for draughting purposes. Whether used as an ordinary table or in an inclined position as a drawing board, 9, this piece of furniture retains its elegant appearance.

Product: Tables.
Manufacturers: Heal's (imported), Merrow Associates Ltd., Hille, Design Associates.



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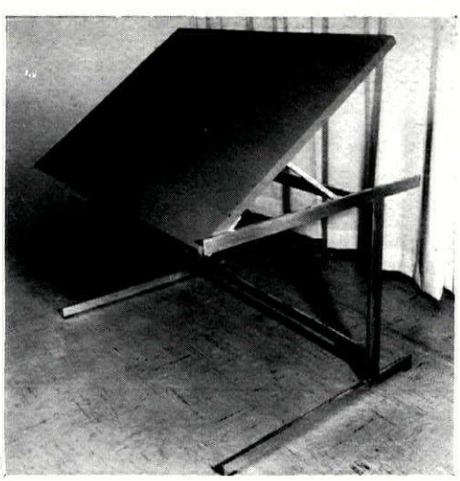

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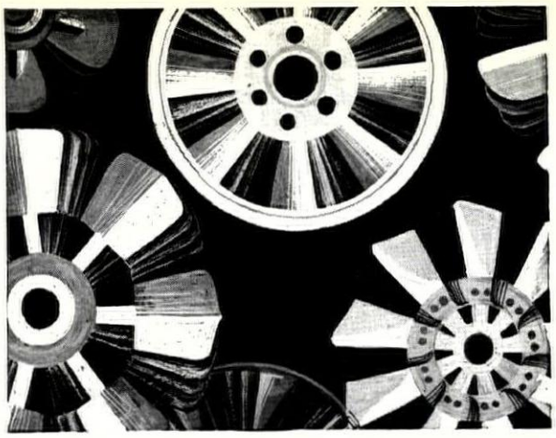

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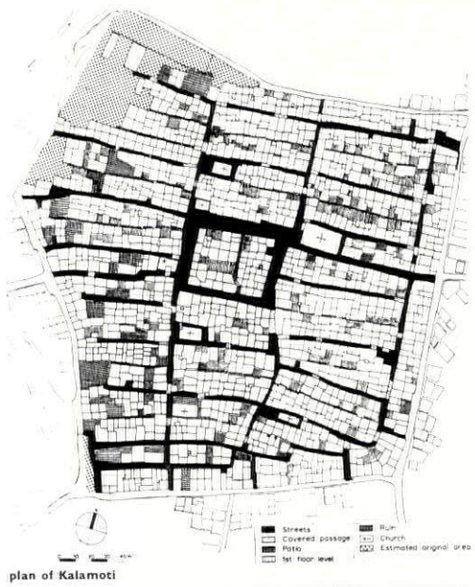
town planning: order out of

CHIOS

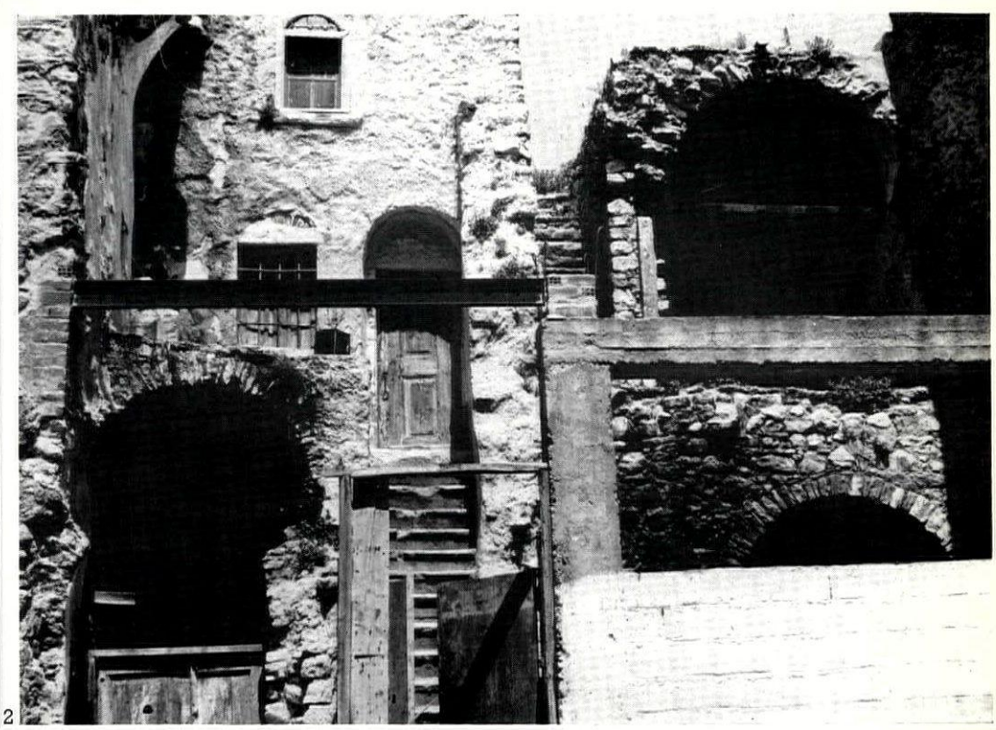
1

Mesta, Olympoi, Pyrghi and Kalamoti are four of the best preserved fortified villages on the large Aegean island of Chios.* They are exceptionally interesting to modern eyes for their compact but flexible urban megastructure, for their separation of different functions on different levels and for their single community centres. They are known as the Mastichochoria (the mastic villages) because of the large-scale cultivation of gum mastic in the southern part of the island, where many of the other villages were destroyed in the disastrous earthquake of 1881. These settlements are said to have been first established in Chios by Greeks from the mainland just after the Trojan War, and to have been named after the home towns of the settlers (Mesta from Meskia, Pyrghi from Pyrgos and Kalamoti from Kalamai—all in the Peloponnesus—and Olympoi from Elymia in Boeotia). Their most prosperous period was a 200-year stretch under Genoese rule from 1346 to 1566. Though these four best withstood the 1881 earthquake, they are now in considerable disrepair on account of depopulation following the earthquake and the decline of the gum mastic trade.

The compact unity of these villages, does not simply consist in their being built within a stout stone wall, like most medieval walled towns, for the outer wall, 1, is not a separate element but a constituent part of a unified structural system, based on the barrel vault, 2. Everything is built of stone, and the outer walls are in fact only the back walls of a continuous line of houses, being doubled in thickness and originally having no openings to the outside. Each section was built individually (by the householder ?). The span of the barrel vault (conditioned by masonry techniques) is seldom greater than five metres—usually less—and this determines the width of all spaces, 3, whether used for passageways, stabling, storage, living rooms or open patios. However, there is no such structural



plan of Kalamoti



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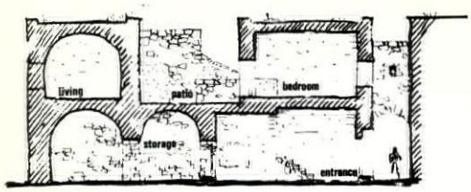
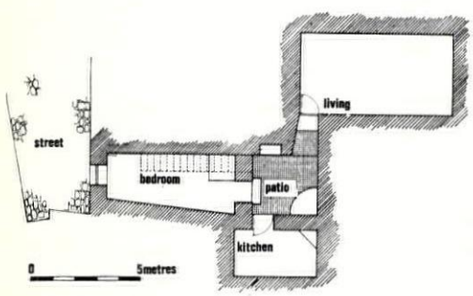
* This study was carried out under the author by an independent group of architects and planners from the Athens Centre of Ekistics, including M. Bogdanou, G. Lavas, K. Nagashima, G. Papageorgiou, J. Papaioannou and D. Saikia. Among books consulted were A. Smith, *The Architecture of Chios*, 1962, G. Zolotas, *History of Chios*, 1921, and Philip Argentis, *The Occupation of Chios by the Genoese*, 1346–1566, 1958.



section of typical house

limitation to the depth of any of these elements, nor thus of the depth of the building blocks, which vary from about twelve to about thirty metres.

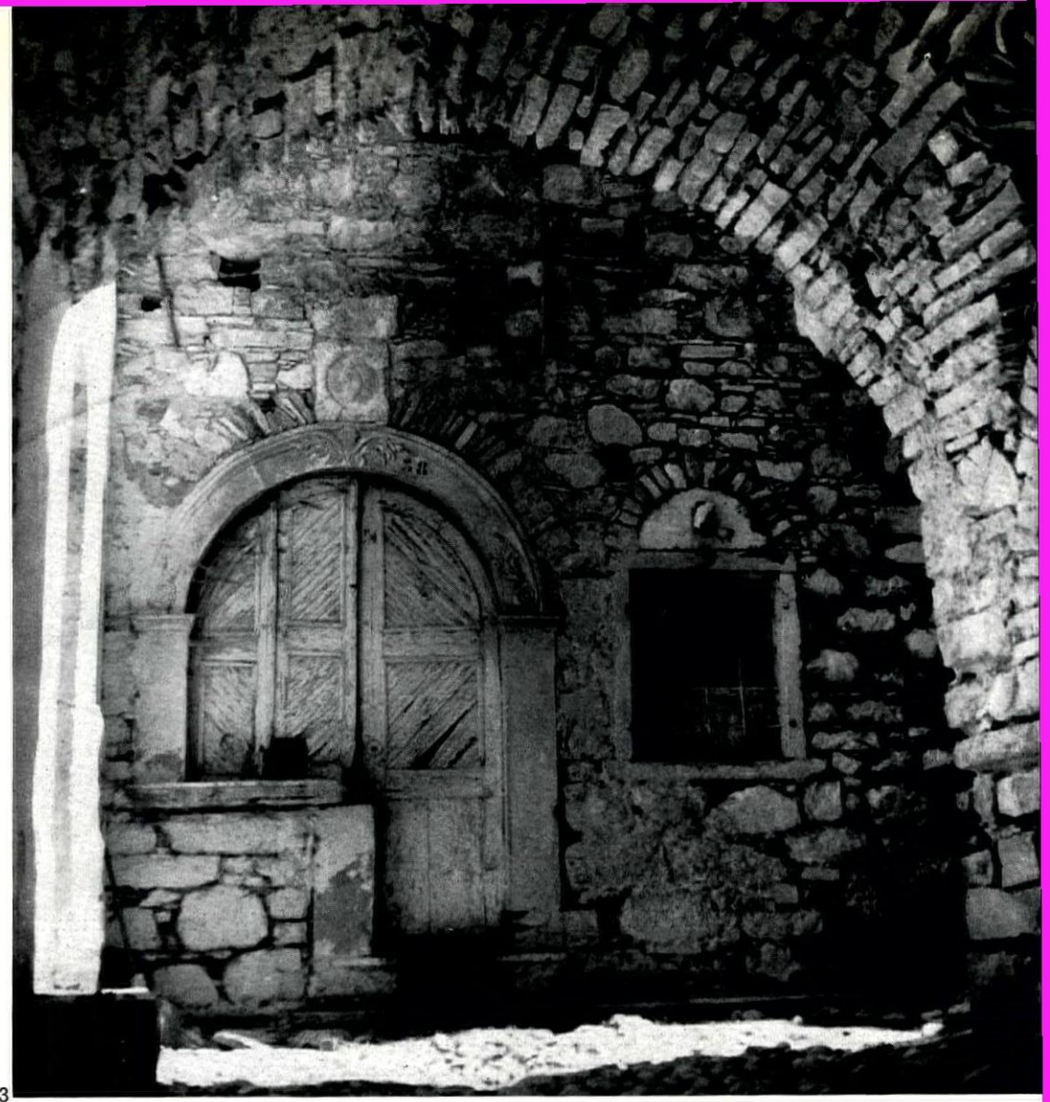
The height of the upper floor and the width of the streets seems to have been more or less standardized—probably more by custom and 'the human scale' than by decree: the upper floor three to four metres from the ground and the streets two to three metres wide, 4. This height and width sufficed, and still suffices, for the passage of a laden pack-mule with its driver, along the streets and beneath the arches supporting the upper floors. Consistent use of the barrel vault results in elements of rectangular shape, and repetition of these rectangular elements naturally results in a more or less regular gridiron pattern of buildings and streets. This is systematic only at Kalamoti.



typical first floor plan

The ground floor is never used as a living area by the people. Except for the shops and cafés surrounding the central building (see below), it is entirely occupied by stables and storerooms, which open directly on to the narrow streets that are often in tunnels. Stairways leading up to the next floor start from inside the buildings. Lighting is often dim but the thick stone walls and stone arches keep the interiors cool and dry. The barrel vaults invariably run at right angles to the streets. But, in the centre of many of the house blocks, they often turn to run parallel with the streets. The stone stairways flank the walls near the entrances, and usually run straight up to the next floor, 6, where they emerge into charming open patios invariably containing pot plants and a stone sink built into the wall, 7.

From this centre, rooms radiate in various directions. Again, they are built with stone walls and barrel vaults and often bridge over the streets. They obey no rigid rules of ground plan. Indeed, it seems unusual for the plan of the upper floor nowadays to correspond with that of the



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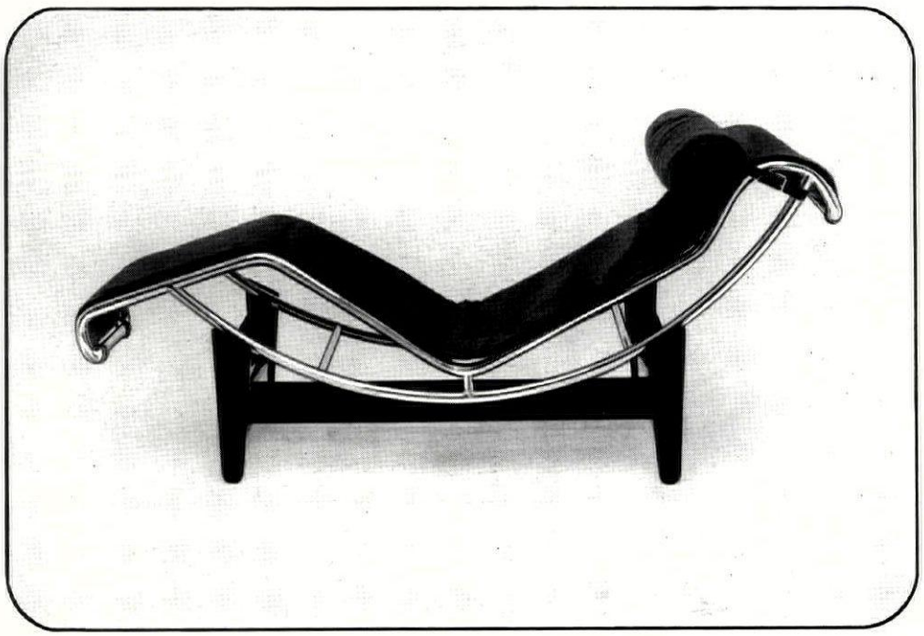

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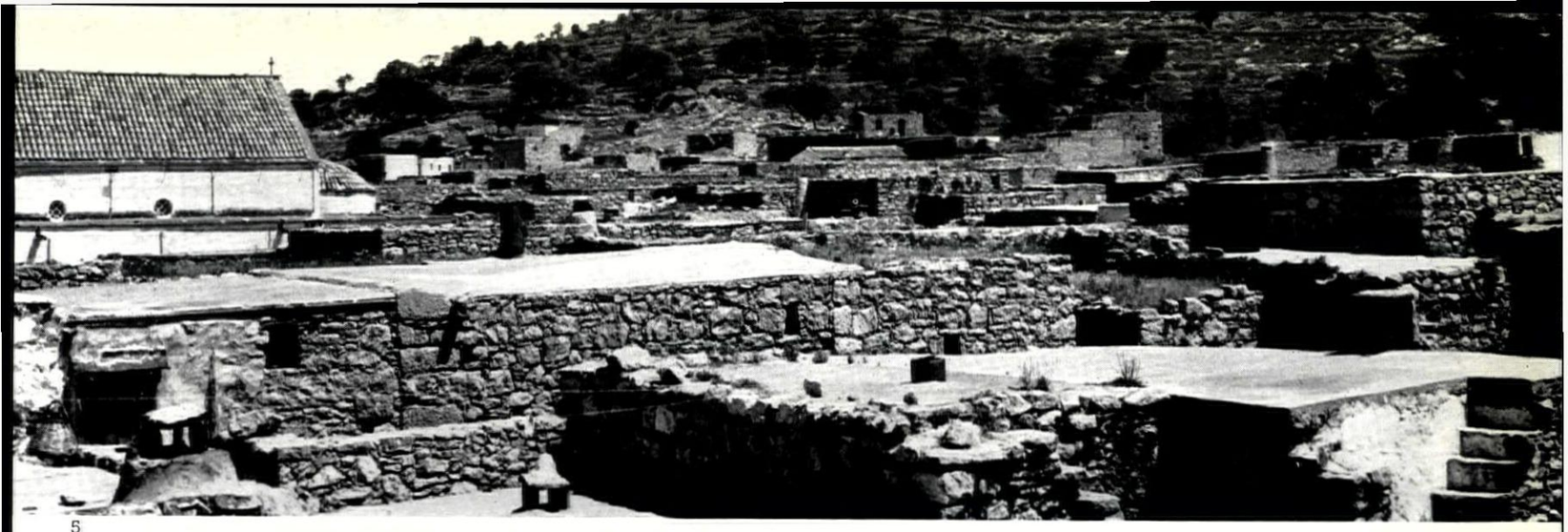

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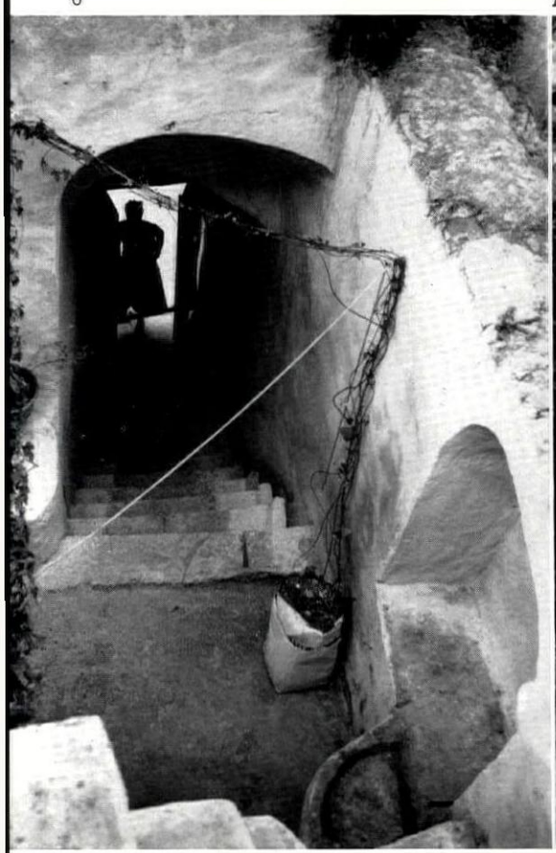
ground floor. This may have become more common since the 1881 earthquake, but it is a natural corollary of the methods of construction and division of functions. This free plan is also the outcome of a house whose starting point is an open court-patio or peristyle—from which the rooms extend out as they will (as in the Hellenistic villas of the island of Delos, which seldom have rectangular ground plan). This is in sharp contrast to the type of house whose starting point is a rectangular circumferential wall. From the patio another, steeper, stairway (sometimes more like a ladder) leads up to the roof; and here a wonderfully free and open vista is disclosed, 5. These flat roof-tops provide an extensive space for the children to play, the women to hang their laundry and the whole community to gossip in the evenings. Originally it is said the roofs were left clear so that the people could run quickly across them to take refuge in the central tower.

plan of Mesta

Each village had a tall central tower, built as a fortress. Its remains are commonly used for government offices, but in Mesta its place is now taken by a large church (left in 5). This tower was always separated from the general structure of the village and, surrounded by a relatively wide space, 8—now flanked by shops, workshops, coffee houses and tavernas, 9. This is the busy community centre of the village, the place where the market is held and where the men gather in coffee

8

6



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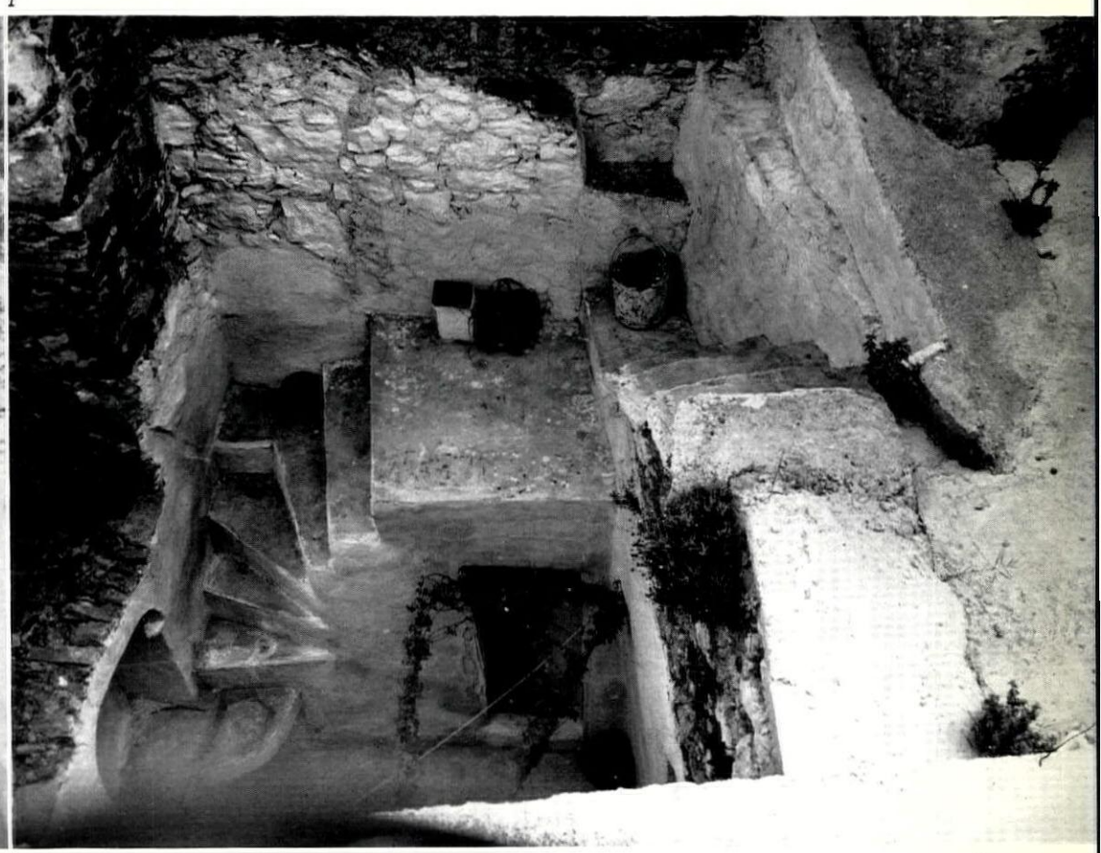

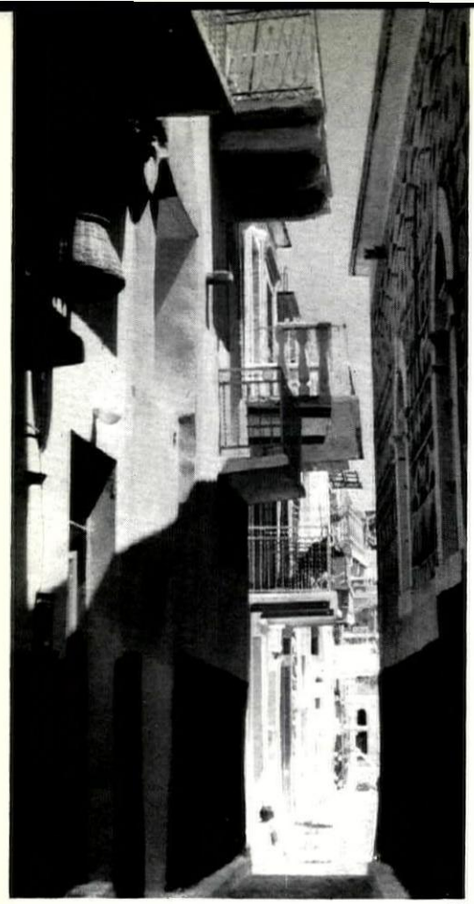

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11

9

houses to discuss the current prices of gum mastic and other business affairs. Its sunny openness is in sharp contrast, 10, to the dim and narrow streets, 11.

The general system of construction of these villages seems to be of great antiquity, as is shown by excavations on the small Cycladic island of Saliangos, 100 miles south-west of Chios, carried out in 1965 by Professor John Evans and Colin Renfrew for the British School of Archaeology in Athens. Foundations of house walls found within the rectangular area of the Neolithic settlement on Saliangos seem to show that the defensive wall served as their own back wall, as at Chios, construction also being of stone. The upper part of the Saliangos buildings may have been of clay rather than arched.

The use of the upper floor for living and the lower for animals and storage is common throughout the Aegean and is sometimes thought to be related to the climate, there being more breeze on the upper floors. Another more remote origin can perhaps be found in the prehistoric subterranean settlements now being discovered all around this part of the Mediterranean, as at Chatal Huyuk in Anatolia and some small settlements near Beersheba in Israel. In all these settlements the houses were entered by traversing a continuous platform of flat roofs, which alone projected above the ground.

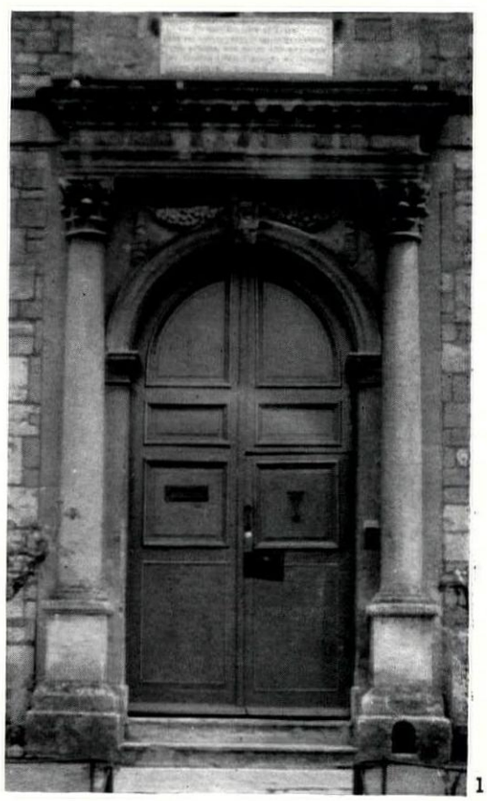
It was the two hundred years of prosperity under the Genoese that produced the architecture we now see. Almost all of the Mastichochoria villages incorporated several smaller villages which had suffered severely from pirate attacks. This regrouping was ordered and enforced by the Genoese, but the local populace seems to have been responsible for construction work. The Genoese insisted only upon the exclusive use of stone, a continuous outer wall and a large central tower. The use of the barrel vault was almost certainly introduced long prior to the advent of the Genoese, but its systematic use and the prohibition of all use of timber in the building structures was required by them to lessen risk of fires from lighted brands thrown into the town by invaders. Construction of the central towers almost certainly originated with the Genoese, at a time when the cult of centralized structures and of optical perspective was at its peak. Indeed, here on Chios it would seem that new Renaissance notions of an ideal city and age-old traditions of building and of living were joined.

The resulting form has a striking similarity to recent projects which have begun on a small scale to develop an urban megastructure on several levels. Study of recent schemes by Michael Neylan for Harlow (see next month's AR), by Ulrich Franzen in the USA (*Architecture d'Aujourd'hui*, April, 1965) and Masato Otaka at Sakaide (*Japan Architect*, March, 1965) give hope that the example of the ageless Aegean prototypes will soon be followed on a comprehensive scale.

JAQUELINE TYRWHITT

history

DOORWAY BY WREN



1

The Lord Weymouth School, Warminster, Wiltshire, the minor public school for boys which was founded by the first Lord Weymouth in 1707, still uses the original School House, built at that time, as the focal point of its buildings. The name of the architect who designed this dignified Queen Anne building is not known, but what is of interest is the fact that the main doorway,

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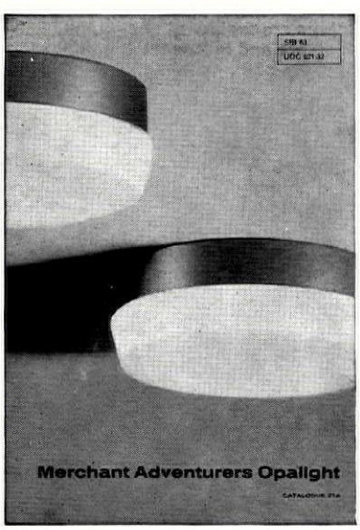

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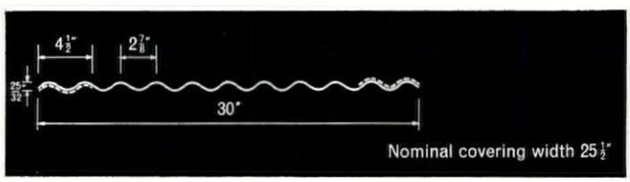

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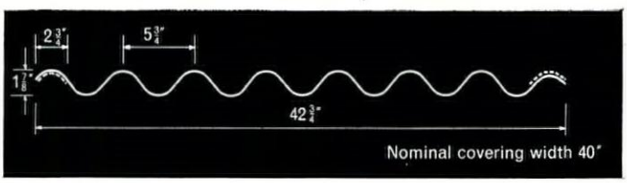

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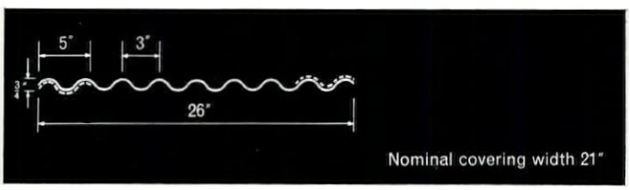

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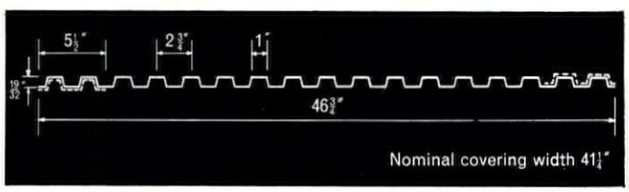

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1, is by Sir Christopher Wren, designed originally as the main entrance to Longleat, five miles distant, which was then, as now, the home of the Thynne family.

Sir James Thynne, who died in 1670, employed Wren on certain alterations at Longleat which are known to have included the doorway in question, as well as a main staircase. An entry in the first Lord Weymouth's memorandum book at Longleat reads: 'Sir James Thynne son of Sir Thomas . . . made ye (Hall) Door by ye directions of Sir Chr. Wrenn, now taken away, & placed at ye School House in Warmr.' This entry is not dated, but as the School House was building between 1705 and 1708, and as Lord Weymouth died in 1714, it must have been written sometime between these dates.

The present main doorway at Longleat was almost certainly made to the design of the Burgundian sculptor Claude David, as two bills, dated 1704 and 1708 respectively, refer to his work on 'ye dor' and 'ye figuers'; in addition, two designs for this doorway are in existence. The Wren doorway must therefore have been removed from Longleat about 1704 and placed aside ready for its re-erection at the School House, Warminster.

The exact year in which the Wren doorway was originally erected at Longleat is not known, but it was certainly in position in 1676, as it appears in a painting of Longleat house by Jan Siberechts of that date; how much earlier it was designed can be guessed from certain additional facts. Sir James Thynne who employed Wren at Longleat died in 1670. A letter*, dated May 6, 1669, is in existence at Longleat, written from London by Sir James Thynne's agent, in which he writes that be had called on Doctor Wren '& spake with him, who is reddy to send you a Stone Carver hence when you please, But thinks it will be more for your service if you hold your hand yet a littell while, he intending very shortly to visit your partes again in Person, and then more niscely Considder better what is to be done, for I find your great Civillety hath obleiged him to take paines in your service & therefore he seemes to desire to have a second thought of your bewsiness, before you begin.' This suggests that Wren had visited Longleat at some earlier date, perhaps when he was making his report on Salisbury Cathedral for Dr. Seth Ward in 1668. It is a great pity that the 'bewsiness' is not stated. But the doorway may well be yet earlier.

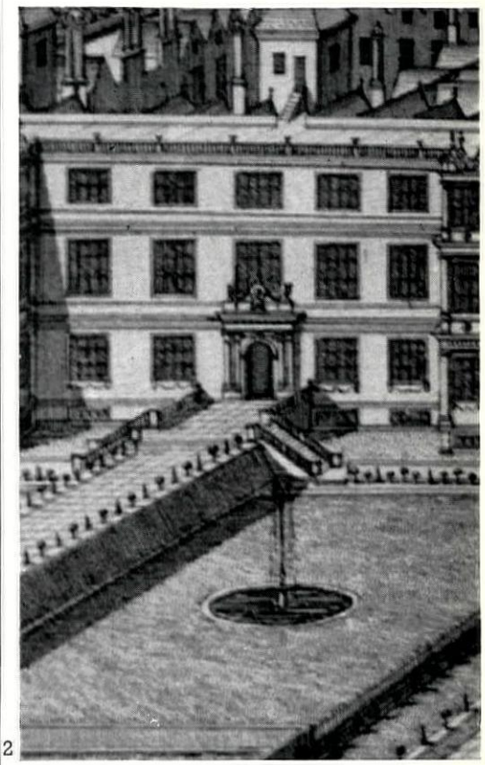
Mr. H. M. Colvin states that Thomas Strong was working at Longleat shortly before his father's death in November, 1662, and suggests that this may have been in connection with the reconstruction of the staircase which took place soon after the Restoration. It is tempting to suppose that the doorway was erected at the same time, and if so, it is Wren's earliest work. Charles II and Queen Catharine visited Longleat in 1663, and Sir James Thynne may have wished to impress his royal visitors with this new doorway and the staircase. The staircase was removed in 1808 by James Wyatt and replaced by the present one of his own design.

When in position at Longleat, the Wren doorway had twin columns on single pedestals each side of it, but when re-erected at the School House it became necessary to reduce these to a single column on either side to make the whole more in keeping with the much smaller size of the new school building. The width of the cornice was reduced at the same time. Careful comparison between the doorway as it is today, 1, and as it appears in an engraving of Longleat, 2, by Johannes Kip *ca.* 1700, suggests that the rise and span of the archway are the same now as they were then. The present dimensions are, rise 10 ft. 11 in., span 5 ft. 4 in. The lion's head carving on the keystone and the carved swag on either side of it are certainly part of the original design. When at Longleat, the doorway had carving above the cornice, probably displaying the Thynne coat-of-arms. This was not retained when the doorway was moved to the school, and was replaced by an inscription which reads:

TO THE GLORY OF GOD
AND THE ADVANCEMENT OF RELIGION AND LEARNING
THIS SCHOOL WAS BUILT AND ENDOWED BY
THOMAS, LORD VISCOUNT WEYMOUTH
ANNO DOMINI MDCCVII

It may be thought that the style of the doorway is reminiscent of that of Inigo Jones, and this would corroborate an early date. Thomas Strong, who has already been mentioned as working at Longleat in 1662, belonged to a family a branch of which settled in Warminster as masons, and it was more than a coincidence, therefore, that when renovations were being made to the doorway in 1957, to mark the School's 250th anniversary, another Thomas Strong was employed. Signs of the adaptations that had been necessary to fit the doorway into the smaller building were then observed.

Two other letters exist at Longleat in which Wren is mentioned; the first, written by the first Lord Weymouth to his brother, Henry Frederick Thynne, 'at Mrs. Coventres in the Hay Markett, Piccadilly,' is dated 'March ye 12th, 1683,' and reads: '. . . but desiring a little better advise than either my owne or Mr. Taylers: I send you a draught of yt side of ye House, as it is now, and as wee designe to alter it, wch I pray shewe Sr. Chr. Wren, & beg his advise in it, he partly knowes ye House & he is better able to judge of it, than another; it is ye side next ye Garden.' Lord Weymouth continues by explaining how he wishes to open out rooms to make a Long Gallery, and concludes: '. . . but if Sir Christopher can continue it better having ye dimensions all before him I shall be thankfull to him, either in money



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if he will take it, or send him a Bucke in ye Sumer. . . .' In the second letter, dated March 24, 1683, Lord Weymouth writes: '. . . I cannot begin my Gallery till I knowe Sr. Chr. Wrens opinion, wch my hand being in, I would willingly doe, my Chappell is halfe done. . . .' Whether, in fact, Wren did assist Lord Weymouth, as he had asked, appears not to be known, for no further letters have been found on this particular subject, at least none in which Wren is mentioned. It is quite clear, however, from the first of the two letters that Wren had been to Longleat at some earlier period and that Lord Weymouth was aware of this.

Finally, it becomes necessary to speculate why Lord Weymouth had the doorway removed from Longleat, when it could only have been in position there for forty-two years at the longest. The most likely reason is that, although impressive enough, the actual entrance through the archway was not sufficiently wide for a building as large as Longleat. The present doorway, which must be the third one that Longleat House has had, is considerably higher and wider. Whatever the reason, however, Longleat's loss was the School's gain.

ROBERT HOPE

* I am indebted to the Marquess of Bath for kindly granting me permission to use extracts from letters at Longleat.

The Sponsorship of Building Systems

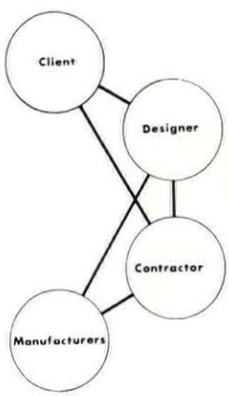
This article by C. R. Honey, of the Building Research Station, discusses the changes in organization which accompany the changes in techniques when building systems replace traditional building methods. The duties of the sponsor are considered and descriptions are given, with examples, of the principal types of sponsorship occurring in the United Kingdom. The factors which influence the suitability of particular building types and techniques to particular types of sponsorship are briefly discussed. The article is published by permission of the Director of Building Research.

Skill

Departures from traditional methods of building involve changes both in technique and in relationships. Where new methods have taken the form of building systems there has arisen a variety of types of organization. An understanding of these, their differences and how procedures for system building differ from those of traditional building is important in considering possible consequences of these developments. For the purpose of this outline, the term 'system' is used to cover any departure from traditional methods of building in which there is a significant degree of standardization or systematization, including the use of ranges of standard components in the form of *building methods* or *open* systems. System building does not necessarily imply prefabrication or pre-assembly and individual systems contribute in widely varying degrees to the industrialization of building.

TRADITIONAL BUILDING

Traditional building normally involves three main parties: the client, the designer and the contractor. The client (or building owner often acting with particular occupants or users in mind) engages the designer (normally an architect, in association with a quantity surveyor and specialist consultants) to interpret his requirements, prepare a design and be his agent in executing his intentions. The contractor who will sub-contract some of the work to specialists either of his own choice or on the architect's nomination, usually selected on the basis of competition, enters into a contractual relationship with the client and the designer is required to act impartially in applying the conditions of that contract. The designer and the contractor are also concerned with a fourth party formed by the manufacturers or suppliers of the materials or components used. While the contractor may choose the source of some of these, the designer will often nominate the suppliers of particular manufactured items and the contractor then becomes responsible for their delivery and performance. Provided the products are satisfactory for the particular project in respect of design, quality, price and delivery, the main parties are not concerned with the organization or capacity of the manufacturers, 1.

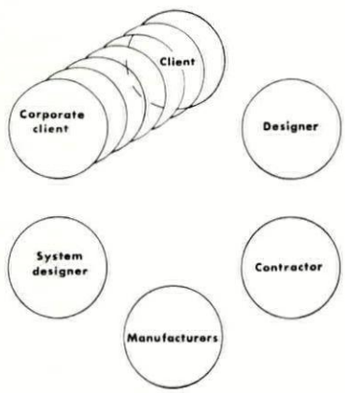


1, traditional building

SYSTEM BUILDING

Additional Parties

System building involves additional parties and calls for the performance of additional duties. The essence of system building is the preparation of standard solutions to meet the requirements of a number of users and the organization of measures for having these solutions executed efficiently. The multiplicity of users results in a number of separate projects occurring over a wide and indefinable period of time, and it may tend to an increase in the range of requirements to be satisfied. Whether or not they combine in a formal organization, this multiplicity of users or the owners acting for them constitutes an additional party, the 'corporate or multiple client.' The number of manufacturers or suppliers often increases because the techniques generally involve manufactured components in place of craft work. The system itself (as distinct from the individual buildings) requires a designer who is concerned with the system as a whole and its essential components, but not necessarily with individual buildings, 2.



2, the parties in system building

Changed Roles

There are changes in the roles of the traditional main parties:

The *client* loses the opportunity of commissioning a completely unique design and assumes more of the role of the purchaser of a completed building. He must accept limitations in the range of available solutions to his requirements, and the selection of these solutions and possibly of the contractor, may not be on the basis of competition. When the client does not engage the designer there is no agent for his dealings with the contractor nor is there an impartial body acting between client and contractor. The *building designer* (who may or may not be engaged by the client) must also accept some limitations. He may have the duty of advising on the selection of a system and must therefore consider the degree to which particular systems can meet his client's needs. He yields to the system designer responsibility for the design of some of the work and the roles of other professional members of the design team are correspondingly changed. His role in supervising construction may also change if quality control becomes concerned more with delivered components (possibly exercised best at the point of manufacture) than with craft work done on site. The role of co-ordinating specialists and suppliers sometimes assumed by architects becomes much more the concern of the contractor. There is a reduction (or elimination) of the work included in supervision which is in practice the providing of further details or the making of further decisions, e.g. selection of fittings and finishes.

[continued on page 482

'M'-section column covers on Winchester House –in 'Silver Fox' stainless steel

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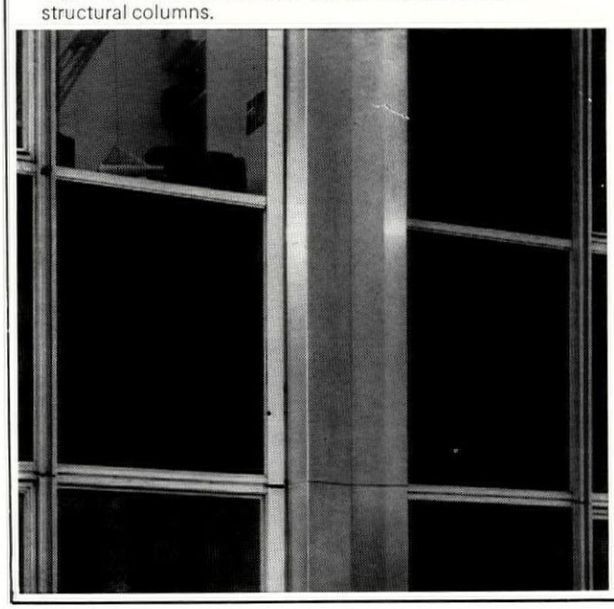
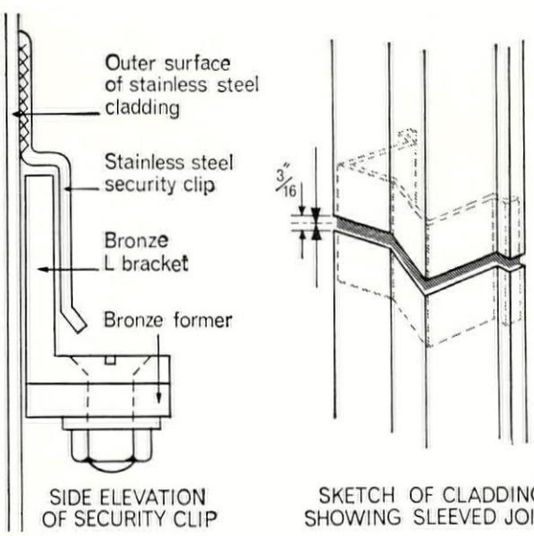


The stainless steel covers are secured by connecting cleats, spot welded to bronze angles and tees, which are in turn bolted to the concrete columns.



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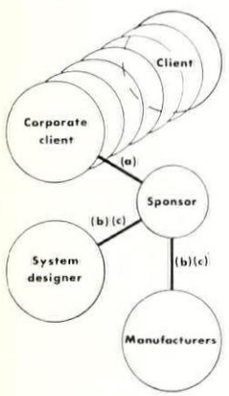
continued from page 480]

The *contractor's* role changes to the extent that the work to be executed changes from a craft process to an assembly process requiring a finer appreciation of particular aspects such as programming accuracy and stability during erection. Failure to appreciate these factors can have serious consequences in delays or in extra site work in making good damage or cutting to fit. He becomes more directly concerned in the quality of components since rejection can affect the construction programme more seriously. In types of organization where another party (e.g. the client or his agents) pre-orders components or specialist services, the proportion of the work over which the contractor has effective control is reduced, wherever the contractual responsibility may lie.

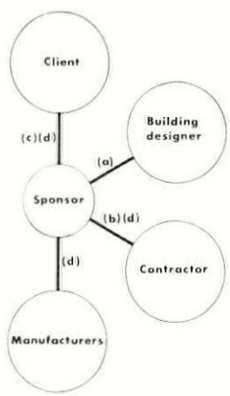
The *manufacturers* or suppliers of certain special items assume greater importance, being concerned with an increased proportion of the total value and having a greater influence on the contractor's performance.

Additional Duties

The additional duties associated with system building are of two types—concerned respectively with initiation and with operation. From a study of a number of systems it appears common for all these duties to be undertaken by the one party, who might be termed the '*sponsor*.' (There are some exceptions: e.g. where systems initiated by a central government authority are subsequently operated by local authorities or by commercial interests.) The sponsor is usually, but not necessarily, one of the parties already considered, or an alliance of two or more such parties.



3, the duties in initiating a system



4, the duties in operating a system

For the sponsor, the duties connected with the initiation of a system, 3, are:

(a) The assessment and rationalization of user requirements for the type of building for which the system is to be produced. This exercise may extend no further than the acceptance of traditional standards, including price levels, but will nevertheless produce a range of limitations held to be consistent with user-acceptance. It may, however, extend to detailed consideration of measurable factors including room dimensions, floor loadings, physical performance (e.g. in relation to thermal insulation, sound insulation, robustness and fire grading) and building form (e.g. numbers of storeys and degree of articulation). Other factors which are not measurable include environmental character and the determination of materials appropriate to the type of building and the region. Depending on the relationship with the multiple client, the exercise may give the opportunity for reappraising the validity of some of the stated requirements which may lead to significant changes in existing standards. For example, this process has led to the acceptance of combined activity and circulation spaces in primary schools.

(b) The commissioning of the design of the system for the range of requirements thus rationalized. In practice these two stages overlap with the designer taking an active part in both. The briefing of the designer is likely to indicate the preferred range of techniques and materials.

(c) The provision of development capital required to meet the costs of initial design, prototypes and promotion, and in some cases plant and initial operation. Design costs can take the form of professional fees, licence fees or salaries to employed staff. The sums involved for one client-sponsored school building system have been given as of the order of £50,000 and for another, including for successive phases of further development, £100,000. For one manufacturer-sponsored steel framed housing system design and promotion costs have been given as £25,000 and tooling costs as a further £75,000. For contractor-sponsored concrete panel housing systems, plant costs alone of £100,000 and upwards are quoted for a capacity of one dwelling per day to which must be added design costs. Some of these development costs, though real, may be hidden in the use of design staff already employed, or of plant already installed. The ability to command resources of development skills, including experience acquired in related fields and plant adequate for the intended purpose is therefore a significant element in development capital.

The duties connected with the operation of a system, 4, are:

(a) The provision of design and cost information for individual building designers, in the form of manuals, standard details, advisory work and assistance in using the system to the best advantage.

(b) The provision of erection or assembly information for use on site. This may include recommendations on procedure, plant, temporary works and safety measures.

(c) The control of the application of the system, including the checking of proposals from structural and economic viewpoints. It is important for the success of a system that it should not be used for a purpose for which it is unsuited or in association with unsuitable materials or details, or modified in a manner which might bring it into disrepute. When the building concerned is not of the type for which the system was originally designed the sponsor must examine the structural design in detail.

(d) The promotion of the system and the programming of the work in relation to demand. The programming must co-ordinate the aspects of manufacture and delivery of components with the site erection and finishing processes and specialist installations for individual projects and for long-term operation.

Adequate co-ordination aimed at continuity of work is vital to the efficient use of the resources demanded by a system, particularly the capital invested in manufacturing and erection plant. In some circumstances a sponsor may be able to programme the demand for actual buildings, e.g. as a public authority formulating its school building programme. If this is not possible the sponsor must attempt to influence demand by promotional activities in order to ensure that the production resources which are committed to the system are well utilized.

(e) The subsequent development of the system: The sponsor must evaluate the technical and economic performance of the system as a basis for further development.

At the present stage of system development, procedures for undertaking these duties are themselves still being developed and there is little uniformity between various sponsors in the way they are handled or the attention given to them.

TYPES OF SPONSORSHIP

It is now possible to consider the main types of organization that have arisen according to the quarter from which they are sponsored and to note the types of alliances between parties which occur. Examples are given to illustrate organizations typical of the relevant category of sponsorship—there is *no other* significance in the choice of these particular systems.

Client-Sponsored

A client or authority involved in a substantial volume of building in a continuous programme and in which some degree of standardization is feasible might be in a position to initiate the development of a system. All such systems developed to date in the United Kingdom have been sponsored by public authorities (or groups of authorities) for programmes largely consisting of school buildings. They are in a position to exercise considerable control over the phasing of their programmes although in practice the flow of work is sometimes less regular than desired. They are uniquely in a position to ascertain in detail the requirements of individual users and to influence their rationalization. They are particularly anxious to be independent of the effects of local shortages of critical materials and skills in order to keep to their programmes. The nature of the technical solution and the degree of prefabrication is important to the authority only insofar as they contribute to satisfying user requirements and meeting programmes and cost limits.

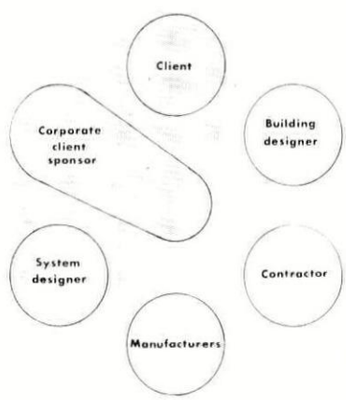
Prefabrication increases the proportion of the work for which bulk purchasing arrangements are possible, generally by the inclusion of the structural elements. The advantage of this may lie as much in the possibility of developing special ranges of components, the opportunities for quality control and the assurance of prompt delivery as in its effect on prices.

Development costs have generally been covered by the salaries of the authority's existing technical staff, 8, and small projects within their actual programmes are used as prototypes. In some cases the work has taken the form of the refinement and co-ordination of a number of established components on which development had originally been undertaken by the manufacturers.

These systems have generally been associated with an outlook which favours 'open' systems or 'methods' and which rates highly independence of any one manufacturer, of any one material and, to a lesser extent, of the particular requirements of any one building type. The formation of client consortia has, among other factors, the purpose of achieving a size and diversity of programme to obtain this independence. This increase in size generates more development capacity but it calls for additional effort in co-ordination and compatibility of outlook among member authorities is important. In all the significant examples construction is of the frame-and-infill type using a number of different materials and involving a number of different manufacturers. The systems thus depend on adequate measure to co-ordinate the design, supply and pricing of these components.

Client sponsored systems are in a position to benefit from the emphasis that can be placed on satisfying user-requirements, and their acceptability to date is as much a reflection on the opportunities for ascertaining and rationalizing these as on any technical features of the system. A potential weakness is the restricted opportunity to draw upon field experience of construction to the extent possible with contractor-sponsored systems with a succession of projects, but several studies of site operations have been initiated by client sponsors and some authorities use serial-contracting.

It is probable that a number of large commercial clients have in effect initiated 'systems' through rationalization of their requirements, standardization of important details, organized programmes and special arrangements for the supply of components.



5, client-sponsored system (the shading represents the extent of the sponsor's control)

EXAMPLES:

SEAC (South Eastern Architects' Collaboration): A development for educational and local authority buildings arising from the long established school building system developed by Hertfordshire County Council, originally on the basis of a light steel

[continued on page 484

How the original Teleflex chain trick *changes the air!*

The unique Teleflex Clearline window control features a special "push-out" chain which is rigid for all window opening positions up to maximums of 10" or 15"–yet will fold up into an unobtrusive, low-projection head unit. A rigid push-out member is vital with today's high buildings, large windows, and therefore higher gust loadings. Up to 16 windows can be controlled from one operator. Clearline window gear can also be supplied for the control of louvre vents and sliding sash windows.

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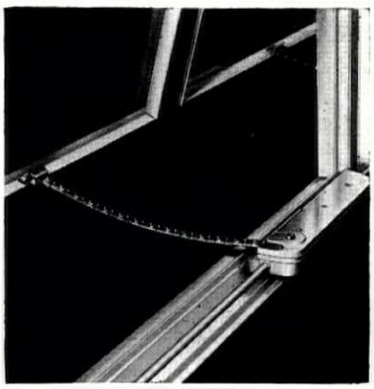

The push-out chain and head unit

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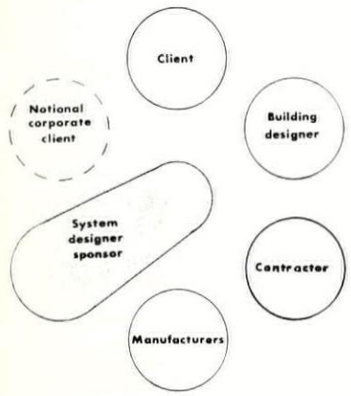
frame. In its present form the range of cladding and finishing components can be used with structural elements of either steel, precast concrete or load-bearing brickwork. Herts, Kent, Essex and the Ministry of Public Building and Works now participate in the programme of work and in the development.
Midland Housing Consortium: A group of local authorities whose Development Group has prepared a range of one and two storey house designs in rationalized traditional construction. The main components are manufactured under term contracts for which the Consortium invites tenders, and member authorities place contracts for erection in any of the normal ways. The Consortium also conducts user surveys, directs further development and undertakes bulk tendering for items such as floor tiles, flush doors and ironmongery for use throughout members' programmes, including housing not built to MHC designs.

Designer-Sponsored

The development of a building system normally involves the services of an architect either as employee or consultant of the sponsor, but it is unusual for an architect in private practice to sponsor a system, 6.



6, designer-sponsored system

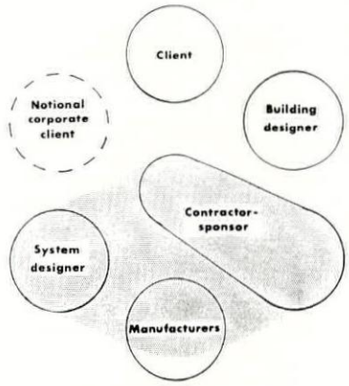
He is unlikely to be able to command the physical resources for development which are available to a contractor or manufacturer or to be able to control a continuous building programme in the manner of the client sponsor, but he may, in effect, undertake the 'initiating' duties of sponsorship by standardization where appropriate within his own office. It could be considered that systems developed by central government authorities without executive responsibilities are architect-sponsored and it is probable that the initiative in some client-sponsored systems came from the architects employed by them.
Systems sponsored by designers typically resemble client-sponsored systems in the use of frame-and-infill techniques and in the attitudes of their sponsors towards independence of particular manufacturers and their emphasis on satisfying user-requirements. The designer-sponsor, however, lacks the opportunity available to the client-sponsor in influencing the rationalization of requirements of individual users.
There are professional restraints on the extent to which an architect can play a significant part in the development and operation of a commercially available system other than as a consultant. These do not apply in the same way to engineers wishing to develop systems around a structure of their own design but only two such cases are known.
In several current developments in both the public and the private sector, designers are developing ranges of components to a common dimensional discipline in collaboration with selected manufacturers, although the full duties of sponsorship may not be undertaken nor may the intention be to produce 'systems' in the current sense.

EXAMPLES:

5M: A low rise housing system using frame-and-infill construction initiated by the Development Group, of the Ministry of Housing and Local Government which undertook the design and prototype work. In the operation of the system, groups of local authorities collaborate in bulk tendering for components.
Grid: A development for schools, hospitals, etc. in concrete construction and for housing in frame-and-infill construction, sponsored by the Independent Research and Design Group, comprising architects, quantity surveyors and structural and mechanical engineers, and available for use on projects designed by other architects. Arrangements are made for co-ordinating the supply of other components. The sponsors have been associated with the design of building systems sponsored in other ways and can draw upon considerable experience.

Contractor-Sponsored

Many systems have been developed on the initiative of contractors already engaged in a certain field of work (or wishing to enter such a field) in the expectation of being able to benefit from the economic and operational advantages of prefabrication or standardization. They are normally in a position to command the development capital required, which in respect of design costs sometimes takes the form of licence fees in connection with the adoption of a foreign system of their choice.
Because there is no identifiable 'corporate client' the system design must be based on an assessment of user requirements depending largely on published information and the sponsor's own experience. Contractor sponsors are able to draw on their own pool of management and craft skills, costing information and purchasing experience and they may have facilities for manufacturing certain components, at least on a pilot scale, e.g. precast concrete units and joinery.
In some cases, being able to offer a system to a client (frequently a local authority) gives a contractor access to a market he might not have had under normal arrangements for selective tendering and satisfactory performance on one project can give expectations of continuity.
The benefits to be expected from contractor-sponsorship are those arising from integrating design and production under one control and from continuity of operation, and in some cases these hopes are realized. Because of the direct interest in productivity a contractor sponsoring a system is likely to prefer simplicity of form and detail to complexity and a narrow rather than a wide range of component types and materials, and this has been construed as indicating a lack of appreciation of amenity values. The contribution of complexity and variety to the environment is difficult to assess and a client's interests may be well served in some cases by simplicity particularly if benefits flow from it by reduced prices, improved standards or earlier completion.
Contractor-sponsored systems necessarily offer no choice of organization to execute the work (other than the initial selection of the system itself) but they are 'open' to varying degrees in the choice of building form and the choice and source of materials not essential to the system. In many cases the design of the building and the site layout are in the hands of the client's architect working within the limitations of the system, 7. In other cases the sponsor offers an all-in service, undertaking these duties himself, 8. To some users the attraction

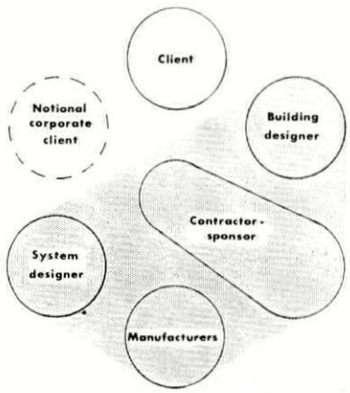


7, contractor-sponsor making some components; building design by client's architect

of this lies not in the technical or design aspects but in the simplicity of liaison. Such a service can appeal to small authorities with limited design staff.
This is the predominant type of sponsorship for systems using precast concrete units, special in situ concrete processes or rationalized traditional methods. The systems have been developed almost entirely for housing (particularly high rise housing) the few exceptions being for schools and offices. In two of these cases development was initiated by the then Ministry of Education.

EXAMPLES:

Taylor-Woodrow-Anglian: A large-panel precast concrete system for medium and high rise housing sponsored by a contracting company within the Taylor Woodrow Group in association with a manufacturer of precast concrete components, on the basis of the Larsen and Nielsen system originally developed in Denmark. A related system for two-



8, contractor-sponsor offering 'all-in' service

storey housing has been developed in collaboration with the Greater London Council. The sponsor offers a complete design service if required; but where the design of a project is undertaken by the client's architect, the sponsor's design staff will assist in matters of detailed design.
Intergrid: A concrete frame-and-infill system originally developed in collaboration with the then Ministry of Education. The duties of sponsorship, including subsequent development, have been undertaken by Gilbert-Ash Ltd., who also offer a full or partial service for the preparation of working drawings. In addition to schools, it is now being used for hospitals and military buildings.

Manufacturer-Sponsored

The manufacturers or distributors of some building materials or components have found it to their advantage to develop them to form the essential features of building systems. The items concerned commonly form the structural elements and in some cases such as steel frames for schools and low-rise housing, representing less than 10 per cent of the total cost of the building. Significant savings in site labour and construction time depend on the full integration of these elements and on efficient arrangements for programming and executing the whole work.
Manufacturers and distributors can be in a position to command substantial development capital and management skill and it is common for them to associate with building contractors in order to gain knowledge of building procedures, 9. The resultant systems thus closely resemble contractor-sponsored systems in the range of choice offered and the advantages and disadvantages which might be expected from them. They can differ from them according to the extent to which an individual sponsor's interests lie outside rather than inside the building industry. While this may bring them valuable knowledge of production and economic factors it also makes them very dependent on the quality of the advice they must necessarily obtain on building matters. This is especially important when the product concerned has not previously been used widely in building. Nevertheless this may be the means by which any invasion of the building industry by a technically advanced and capital-intensive industry will occur.
In cases where a manufacturer-sponsor's interests lie wholly within the building industry (especially wholly within his system) he is the most jealous of all sponsors to preserve his system from disrepute. Some such sponsors have extended their organization to cover design, manufacture and erection in order to ensure that the systems are used to good advantage and that the building design and the erection methods are compatible with the nature of the system.
Sponsorship by manufacturers has most commonly occurred with systems using timber as the main structural and cladding material or using light steel frames with other types of infill. They are almost equally as numerous as contractor-sponsored systems for low rise housing and more numerous for school-building. This form of sponsorship is almost universal for systems for industrial and agricultural buildings and 'hutted' offices and classrooms, where building forms and require-

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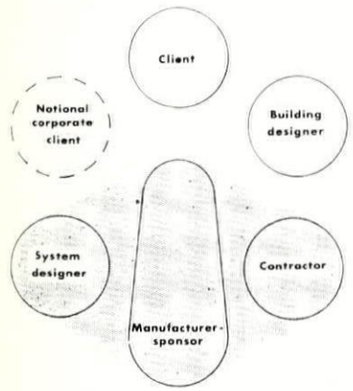

9, manufacturer-sponsor in association with a contractor

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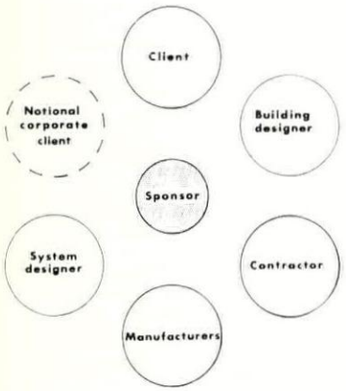
ments are relatively simple and considerable standardization is possible.

EXAMPLES:

Bison Wallframe: A precast concrete panel system for all types of housing, sponsored by Concrete Ltd., who supply and erect precast concrete units in collaboration with associated contractors, with freedom of choice for the client's architect in layout and non-structural elements. The Bison Preferred Dimension Frame is available under similar arrangements for offices and similar framed buildings.

Hawthorn Leslie: A system for low-rise housing using a steel frame with a sandwich type light infill panel, sponsored by Hawthorn Leslie (Buildings) Ltd., a member of a group of shipbuilding and engineering firms. The essential components are manufactured within the group and erection is undertaken by the sponsor.



10, *sponsor outside normal relationships*

Sponsorship by an Outside Party

It is possible, although unusual, for sponsorship to be undertaken by an 'outside' party not directly concerned as client, designer, contractor or manufacturer, 10. Where this has occurred in the United Kingdom, the sponsor has provided the capital needed for the design of the system (and in one case the tooling costs incurred by a manufacturer in connection with an essential component), maintains a loose form of consortium arrangement with a number of suppliers and in some cases makes the system available only through certain contractor-associates. The outsider-sponsor is necessarily dependent on the quality of advice obtained on briefing, design and operational factors and on his own skill as a co-ordinator. The current systems of this type are for low-rise housing and for schools and they use frame-and-infill techniques.

EXAMPLE:

A75: A frame-and-infill system suitable for schools, offices, etc., sponsored from outside the building industry by A. H. Anderson Ltd., who collaborate with manufacturers in the development and supply of components, and who control the design, development and promotion of the system. The company act as nominated suppliers or sub-contractors for the system components to general contractors selected by the client and his architect in the normal way.

BUILDING TYPES AND TECHNIQUES

All sponsors, of whatever type, are dependent to some extent at least on experience, skills and information from sources outside their control. Some may, however, be in a more favoured position to undertake those duties of sponsorship for which the parties concerned are allied under the sponsor's control. Thus the sponsors of proprietary systems (contractors, manufacturers and outside parties) lack the opportunity open to client sponsors to influence the rationalization of user requirements, although they may be well placed regarding erection or manufacturing expertise. A study of current building systems suggests that sponsors concern themselves with the building types and techniques which they are in the best position to handle.

Table 1 shows the types of sponsor associated with building systems classified according to the building type for which they were developed and the constructional techniques *or* the principal materials used. These are systems currently available or recently used in the United Kingdom but those under initial development (e.g. not yet at prototype stage) and foreign systems not yet used in this country are excluded*. Also excluded are the systems for single-storey buildings of simple outline such as garages, farm and factory buildings and hutted offices and classrooms, which are mainly manufacturer sponsored. Precise classification into type of sponsorship is difficult in cases where a concern has interests in manufacturing as well as contracting and where a client authority undertakes development work jointly with a manufacturer or contractor. Where a sponsor has distinct systems for different building types these are included in each category.

The selection of a type of sponsor is one which in fact never occurs. The choice which is actually exercised is that of the potential sponsor in deciding whether or not to proceed with the development of a building system for a particular building type and using a particular technique. Several factors appear to influence the suitability of such building types and techniques for particular types of sponsorship.

There is first the character of the building programme (or market) concerned—its size and diversity, the quarter from which continuity of demand is controlled and the extent to which the intending sponsor is already engaged in that field. For example, housing offers a large contractor a substantial market with many separate outlets and the opportunity of achieving a measure of continuity through his own speculative activities to complement other orders. These advantages for a contractor do not apply with school buildings where the outlets are fewer, the range of detailed building types is extensive, the programmes are subject to fluctuation and to annual peaks and the size of individual contracts may be smaller than a large contractor can economically handle.

There is also the degree of complexity of the user-requirements associated with the particular building type and the extent to which major changes are occurring in that field. Related to this is the importance of facilities (including documentation) for considering user-requirements and for obtaining authoritative information rationalizing the requirements of individual clients. For example, systems for the structures of light industrial buildings where requirements can readily be standardized have proved to be a field attractive to manufacturer sponsors. Client sponsorship has been successful in the more complex and changing field of school building. The lack of significant progress in the development of systems for hospital and university buildings may be, in part, a reflection on the difficulty of rationalizing the requirements of individual users.

Finally, there is the nature of the techniques likely to suit the particular building types and the resources which are most critical to the development and operation of the system. For example, clients, designers and outside parties have ventured into the development of systems using frame-and-infill construction in which the great amount of detailing involves considerable resources in design and the investment of capital in product development may be made by individual manufacturers. Contractors and manufacturers have been more closely associated with the heavier types of construction which may call for large investment in production equipment and in which the most critical skills required may be for the management of production and site processes.

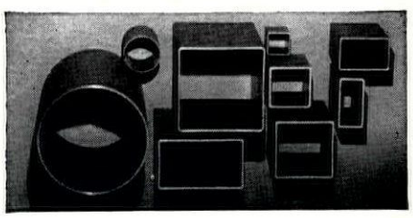
The essential contributions of the sponsor are capital, in order to command the appropriate resources for development at the initiation stage (and for further development in the light of experience) and co-ordination in order to control the use of the system at the operating stage and by vigorous promotion of the system to achieve a scale of production which adequately utilizes the resources employed. Good relationships and efficient formal links between the various parties (even those parties allied under the sponsor's control) are important for adequate development and efficient operation. Where these links represent duties which do not occur in traditional building, there may be a need for the development and encouragement of new procedures.

* Current systems are listed, and their main features outlined, in the Systems Directory of the National Building Agency, Arundel Street, London W.C.2.

Table 1. Building systems by type of sponsorship in relation to building types and techniques

	Type of sponsorship				
	Contractor	*Manufacturer*	*Client*	*Designer*	*Outsider*
Principal building type for which system developed:					
Housing, high rise	22	5	2	1	—
Housing, low rise	24	23	2	3	2
Schools	4	7	4	2	1
Other	2	1	1	1	—
	52	35	9	7	3
Techniques or major materials:					
Precast concrete	26	7	1	2	—
In situ concrete	9	1	1	—	—
Aerated concrete	1	—	—	—	—
Rationalized traditional	5	3	1	—	—
Timber	3	15	1	—	—
Composite (e.g. frame and infill)	8	9	5	5	3
	52	35	9	7	3

SHS balustrading makes miles of goodlooking safety-sense



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Office Development, Tower Hill, London. *Architects:* George, Trew and Dunn. *General contractors:* Taylor Woodrow Construction Ltd. *Sub-contractors: Signs:* Arrow Plastics Ltd. *Break out concrete:* AS Industrial Demolitions & Construction Contractors. *Glazing works, observation panels to doors:* Archway Glazing Co. *Paving slabs to podium:* Atlas Stone Co. *Aluminium screens to escalator halls:* A. Arden & Co. *Garage servicing equipment:* Brown Bros. *Kitchen equipment:* Benham & Sons. *Ceiling access panels:* B & H Engineering Co. *Galon cloth to walls and columns:* British Werno Ltd. *Mirrors:* John Bolding & Sons. *Chequer plates, gratings and frames:* Broads Mnfg. Co. *Joinery:* Builders Supply Co. (Hayes). *Painting:* A. Bagnall & Sons. *Fix glass to windows to Tiger public house:* Clarke & Co. (Hoxton). *Window frames and glazing:* Crittall Mfg. Co. *Black granite cladding and polystone cladding:* Cooper Wettern & Co. *Durasteel panels and screens:* Harold V. Cooper Ltd. *Cleaning windows and frames:* Commercial & Industrial Cleaners Ltd. *External maintenance equipment:* Cradle Runways Ltd. *Demountable partitions:* Cunic Partition Systems, Holland & Hannen & Cubitts (Southern) Ltd. *Acoustic tile ceilings:* Clark & Fenn Ltd. *Fireproof ceilings:* Durasteel Ltd. *Sanitary fittings:* Eastwoods Froy Ltd. *Fire-resisting removable screen, wire mesh rope guards, access ladder (basement level):* Evans, Turner & Co. (Engineering). *Waste disposal unit, electric cooker:* Froylectric Ltd. *Clocks:* Gibson Time & Electronics Ltd. *Plussaire heavy duty fixed louvres:* Greenwood Airvac Ventilation Ltd. *Lightning conductors:* J. W. Gray & Sons. *Expansion joint filling:* Gun Applied Mastics Ltd. *Car park and coach park signs:* Hills (Patents) Ltd. *Bailing press:* Heenen & Froude Ltd. *Recirculating air spigots:* JSR Engineering Co. *Sewer connections:* Edward H. Jackson Ltd. *Reconstructed stone facings, external cladding:* KBS Ltd. *Paviours:* John Lelliott Ltd. *Balustrading and cat ladders:* Light Steelwork (1925) Ltd. *Paving smoke vent breakout panels:* Lenscrete Ltd. *Terrazzo:* Alan Milne (Flooring) Ltd. *Plastering and granolithic works:* Alan Milne (Plastering) Ltd. *Computer room floor:* Metal Castings Doehler Ltd. *Paviours:* R. Meadows. *Emulsifying works to sprinkler system, sprinkler installation:* Mather & Platt Ltd. *Service, valve key and meter:* North Thames Gas. *Catering equipment:* Oliver Tom's Catering Equipment Ltd. *Lifts and escalators:* Otis Elevator Co. *Wall tiling:* Parkinsons (Wall Tiling) Ltd. *Musak equipment:* Planned Music Ltd. *Prodorglaze:* Prodorite Ltd. *Ironmongery:* N. F. Ramsay & Co. *Auto-intercommunication telephone system:* Reliance Telephone Co. *Blinds and winch control:* Stilsound Vertical Blinds Ltd. *Scaffolding and sky climbers (external):* Stephens & Carter Ltd. *Shop fronts and entrances:* J. Starkie Gardner Ltd. *Steelwork for m.s. tank stand:* Smith & Jewell Ltd. *Cladding to escalator sides:* Spreckley, Charles & Co. *Concrete vent duct pipes:* South Wales Concrete Pipes Ltd. *Waterproof granolithic screed:* Sealers (Ldn) Ltd. *Fire-resisting steel rolling shutters:* Shutter Contractors Ltd. *Precast concrete columns:* Stent Precast Concrete Ltd. *Electrical installation works:* Troughton & Young Ltd. *Lavatory partitions and doors:* Wm. Verry Ltd. *Asphalte and screeding works:* Val de Travers Asphalte Ltd. *Mirralite mirrors:* Ward Brooke & Co. *Floor tiling:* Limmer & Trinidad Co. *Heating and ventilation:* Ellis (Kensington) Ltd. *Plumbing:* Ellis (Kensington) Ltd. *Light fittings, telephone pedestals:* Allom Heffer & Co. *Motorized roller cine screen:* Andrew Smith Harkness Ltd. *Electrical cables:* Associated Electrical Industries. *Automatic doors:* Automatic Doors Ltd. *Taps:* Barking Brassware Co. *Light switches:* Britmac Electrical Co. *Glazed wall tiles:* Carter Tiles Ltd. *Full scale mock-up:* Cement & Concrete Association. *Cable trunking:* Craval Ltd. *Water pressurization sets:* Drysdale & Co. *Finvectors and convectors:* Dunham-Bush Ltd. *Metal lathing, access panels, ceilings:* Expanded Metal Co. *Mastic sealers:* Evomastics Ltd. *Battery operated clocks:* Gent & Co. *Hose reels:* General Fire Appliance Co. *Disposomatic units:* Haigh Engineering Co. *Stone fixing devices:* Harris & Edgar Ltd. *Hot water storage cylinders:* Hartley & Sugden Ltd. *Weather window equipment:* Hickmans (Storefitters) Ltd. *Computer installation:* Honeywell Controls Ltd. *Soap dispensing equipment:* Horton Mnfg. Co. *House signs:* Hurst Franklin & Co. *Billingham plaster:* ICI Ltd. *Furniture executive areas:* Interiors International Ltd. *Sanitary fittings manufacturer:* Ideal Standard Ltd. *Roof screed:* Isocrete Co. *Glazing:* James Clarke & Eaton Ltd. *Air conditioning equipment:* Luwa (UK) Ltd. *Staircase balustrading and handrails:* Light Steelwork Ltd. *Bricks:* London Brick Co. *Hand driers (lavatories) Siemens:* Londor Ltd. *Smoke detectors:* Minerva Detector Co. *Weather window instruments:* Negretti & Zambra. *Glass doors:* Pilkington Bros. *Veneers:* Richard Graefe Ltd. *Office furniture:* Sankey Sheldon. *Granolithic paving:* Suarts Granolithic Co. *Blockwork:* Thermalite Ytong Ltd. *Switch and distribution gear:* Varielectric Ltd. *Flue ducting platforms, etc.:* Vauxhall Boiler Co. *Gullies:* Wade International Ltd. *Electrical conduit:* Walsall Conduits Ltd.

Club House, Durham University *Architects:* Architects' Co-Partnership. *General contractor:* John Laing Construction. *Sub-contractors: Mechanical services:* W. G. Cannon & Sons. *Electrical services:* F. H. Wheeler & Co. *Windows:* Hinchliffe & Co. *Lifts:* Keighley Lifts Ltd. *Kitchen equipment:* Modern Metal Products Ltd. *Window cleaning gear:* Palmers Travelling Cradle Co. *Balustrading:* Selbornne Engineering Ltd. *Bar roller shutters:* Dean's Blinds Ltd. *Plumbing:* Frederic Dennison & Co. *Plastering and screeds:* G. W. Dixon & Co. *Glazing:* G. M. Dryden Ltd. *Asphalt:* Durastic Ltd. *Metal:* Expanded Metal Co. *Painting:* Good Bros. *Piling:* Holmpress Piles Ltd. *Quarry and ceramic tiling:* Syd Long & Co. *Cork and vinyl floor tiling and tarmacadam:* Limmer & Trinidad Asphalt Co. *Timber flooring:* A. M. McDougall & Co. *Zinc bar tops:* Moffet & Son (Coppersmiths) Ltd. *Landscaping:* Simpson Bros. *Terrazzo:* Zanetti & Co. *Steel lockers:* W. B. Bawn & Co. *Built-in furniture:* Design Furnishing Contracts. *Cooking shelves:* Gaskell & Chambers Ltd. *Ironmongery:* Rycrofts & Co. *Boat racks:* George Wright & Co. *Iron and steel:* Whitehead Iron & Steel Co. *Fabric reinforcement:* Square-grip Re-inforcement Co. *Sand and aggregate:* Hargreaves Quarries Ltd., Redmirers Sand & Gravel Co., A. Braithwaite & Co. *Lightweight aggregate:* Foamslag (Tees-side) Production Ltd. *Cement:* Wilson & Wylie Ltd. *Precast concrete:* Ebor Concretes Ltd. *Precast paving slabs:* Craig Bros. *Shuttering and carcassing timber:* John P. Waddle Ltd. *Finished joinery fittings:* ESK Manufacturing Co. *Bar fittings:* SB Woodworking Ltd. *Timber doors:* Leaderflush (Doors) Ltd. *Armour plate doors:* Pilkington Bros. *Concrete blocks:* Thermalite Ytong Ltd. *Common bricks:* NCB Brickwork. *Loose furniture:* Finnish Designs Ltd., Design Furnishing Contracts Ltd. *Carpets:* Wittrup Carpet & Co., Hugh McKay & Co. *Curtain and furnishing fabrics:* Hille of London Ltd., Tretford Carpets Ltd.

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District heating by coal allows local authorities to offer the best heating standards to their tenants and is an important selling point for private developers. Modern coal-fired boilers are virtually automatic and the attention needed is minimal. They comply entirely with the Clean Air Act.

Rowlatts Hill Estate, Leicester

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This is a new local authority development on the outskirts of Leicester, and includes multi-storey flats, terraced houses of all sizes and single-storey homes for the elderly and infirm. Altogether there are 507 homes spread over 18 acres, all heated from one boilerhouse. This has four 5 million Btu/h Dansk boilers which are fired automatically by underfeed stokers and which burn low-cost local coal. The heat is distributed by a hot-water system serving radiators, and the mains are laid in ducts with cellular concrete insulation. Charges are based on individual consumption measured by Clorius meters.

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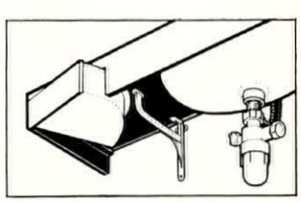

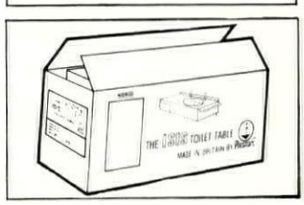

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Ian Nairn

STOP PRESS

A monthly anthology from all over Britain of townscape problems, outrages and opportunities, compiled by Ian Nairn with drawings by G.J.Nason.

SOS

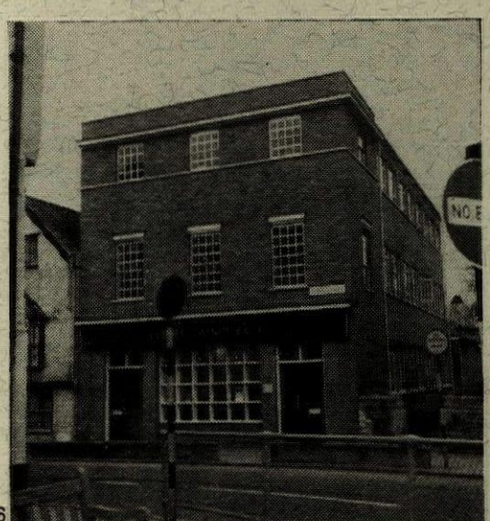
POCKLINGTON, YORKSHIRE, E.R.
The kind of building 1, that is not likely to be on anyone's scheduled list but adds enormously to the character of the town. It looks to be in a bad way.

MANCHESTER
S.O.S. and, of all things, for the Albert Memorial, which antedates the specimen in London and provides the perfect example of what Manchester thinks today, South Ken. will take up tomorrow. Now the pinnacles are chopped off, the arches strutted, 2; the base is filled with legitimate pigeons and useless concrete boxes with shrubs in, 3. This is the way that things get demolished, in about ten years, by soft committee decision; and the monument is good enough to keep.

OUTRAGE

5

ARCHITECTURE AS SHE IS SPOKE
Before, 4, and after, 5, Shipley, in the West Riding.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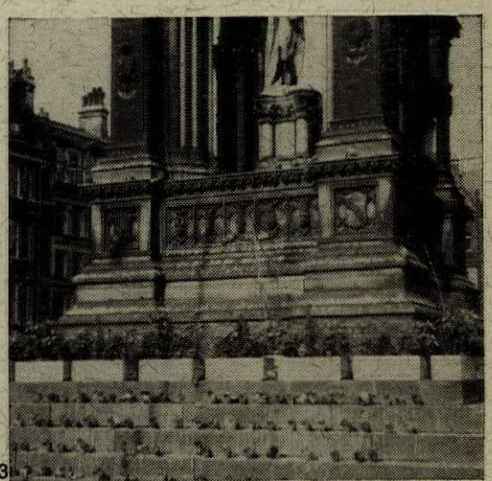
ABINGDON, BERKSHIRE
A new bank, 6. It may be a fine trustee

1


2


3

4

for your savings, but where was the trustee for the town's character?

STRATFORD-ON-AVON
From the *Church Equipment Digest*: "facing the church of the Holy Trinity,

7

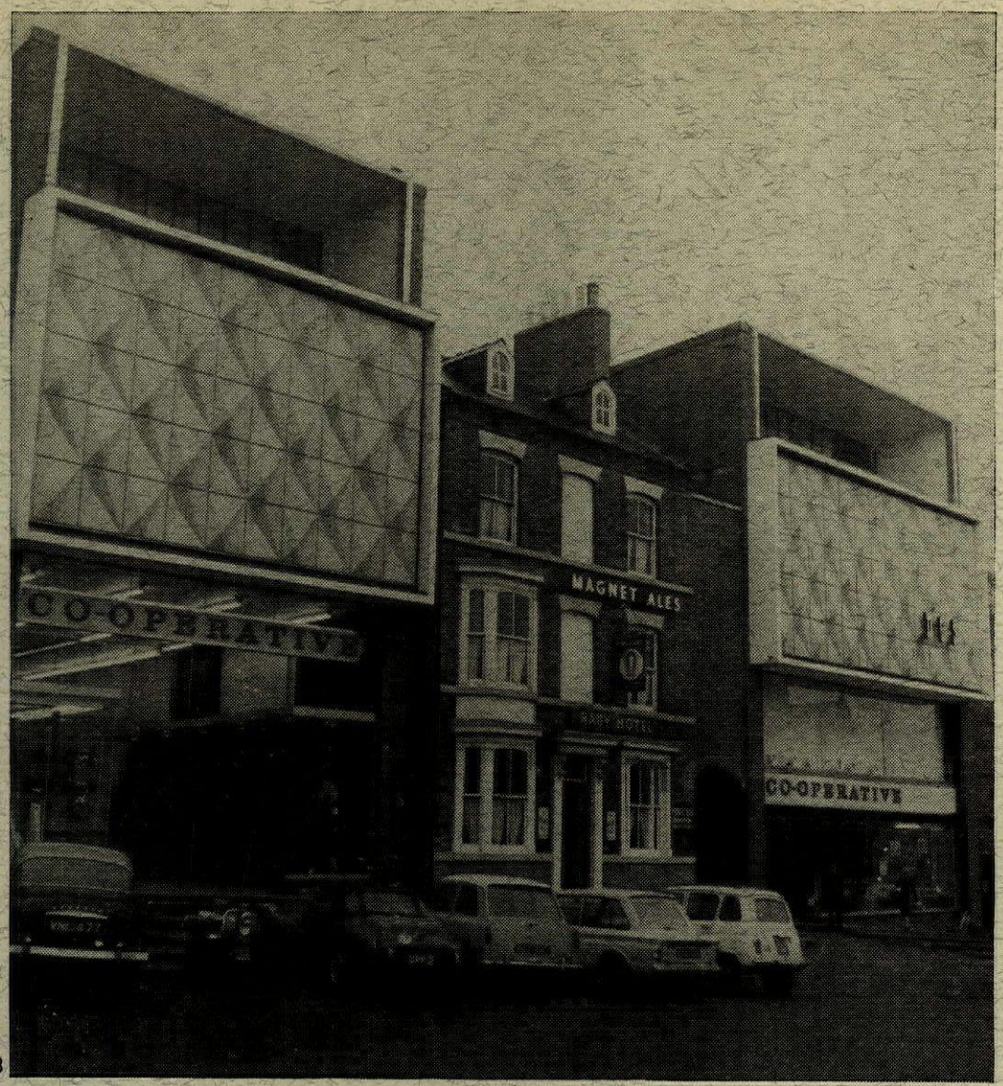
where Shakespeare lies buried, there now stands the new Methodist church of Stratford-on-Avon dominated by a space-age symbol of everlasting peace," 7.

DARLINGTON
Another strange building from the Co-op, 8.

CREDIT

9

MUNDFORD, NORFOLK
Another of those buildings not likely to be on anyone's scheduled list, this time re-used to everyone's advantage, 9. But, oh, the wee lettering.



8

OPPORTUNITY

OWSTON FERRY, NOTTINGHAMSHIRE
One of the unknown and splendid villages beside the Trent north of Gainsborough. Ten years ago it was complete; now the village street, 10, is half full of holes. It must not go by default, because nobody bothers to go there; with the right kind of redevelopment it could become a show-place. Notts is now a go-ahead county; this would be a fine place to start.

10

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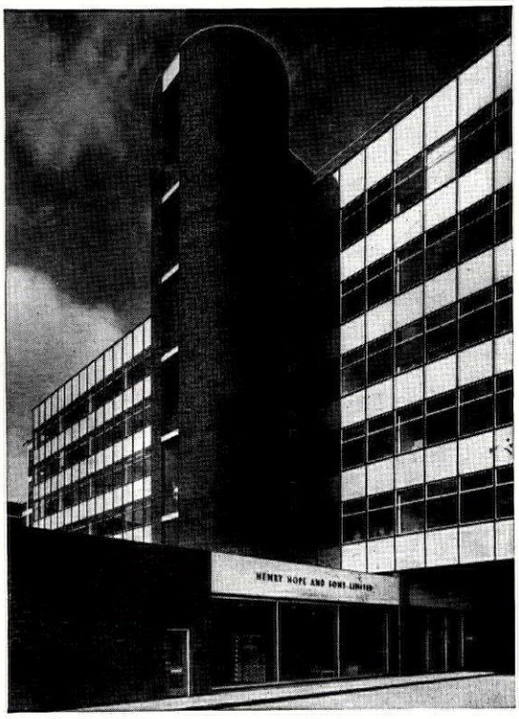
For further information consult any of the Association Members listed below:—



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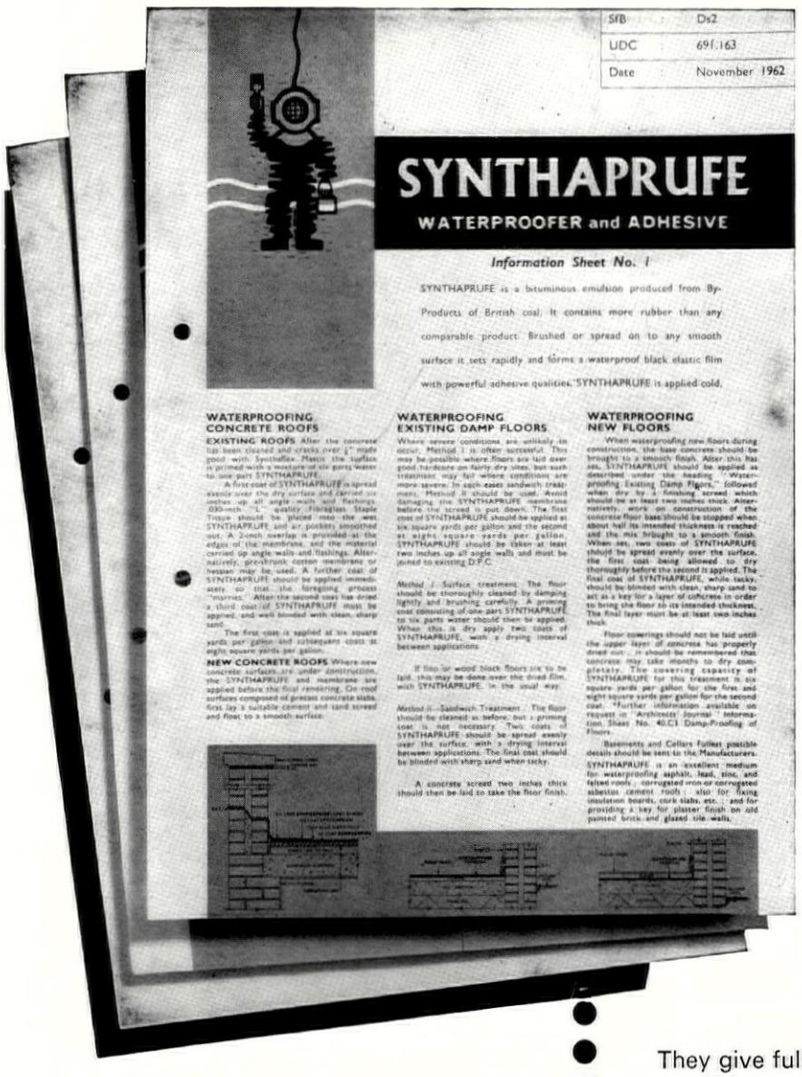

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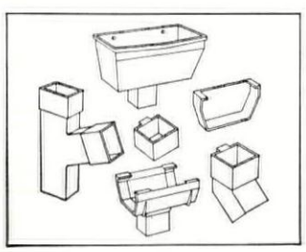

Limpet

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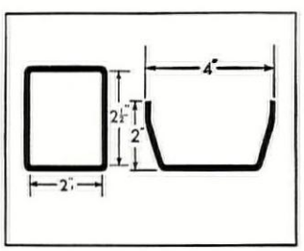

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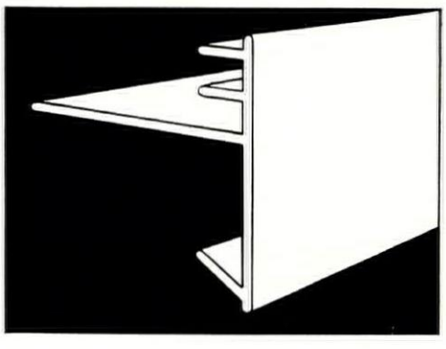

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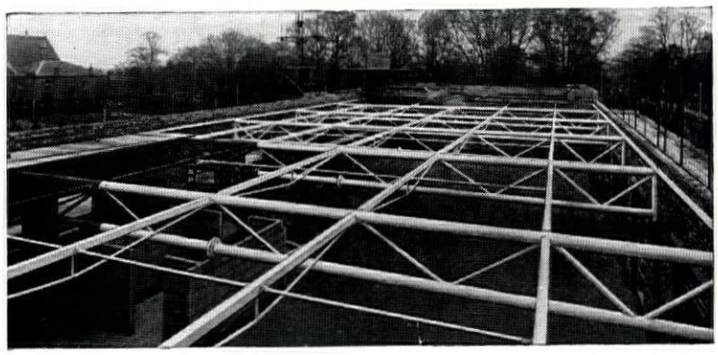

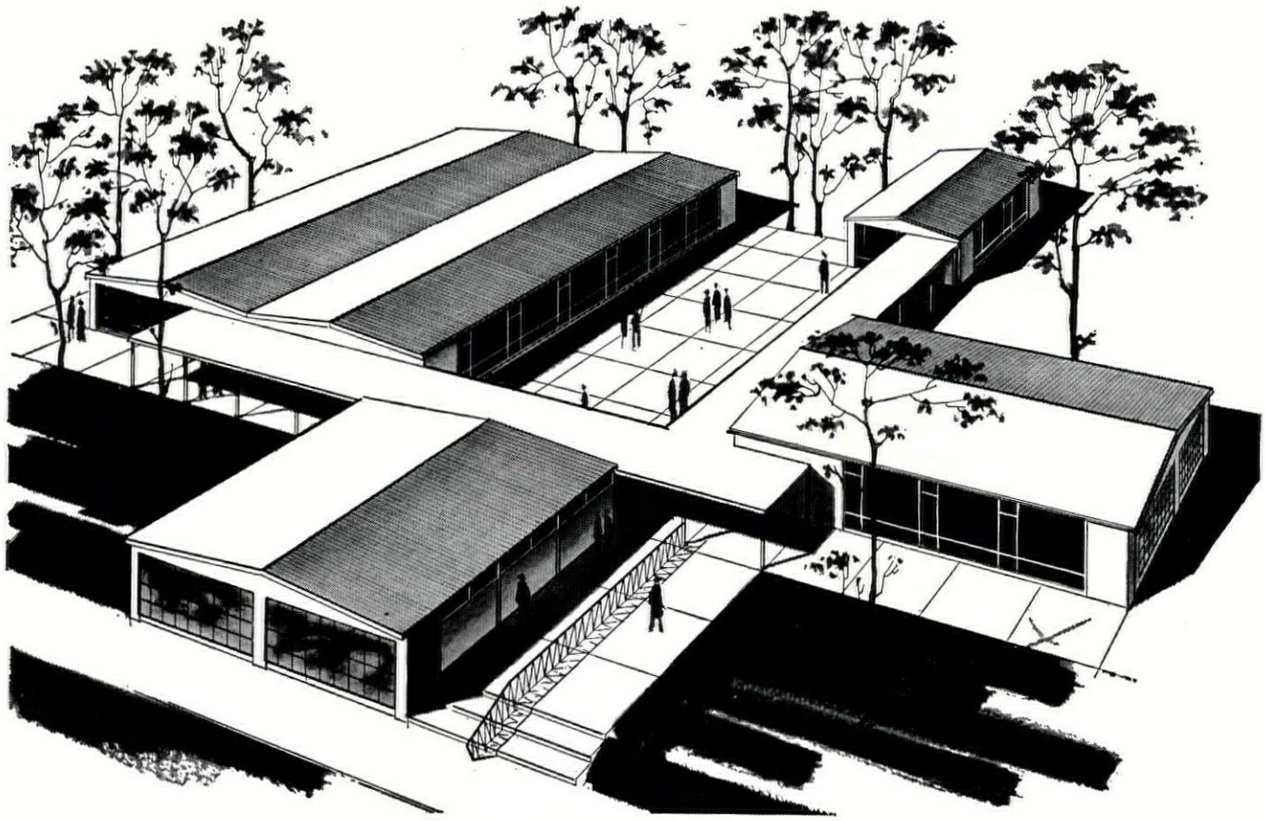

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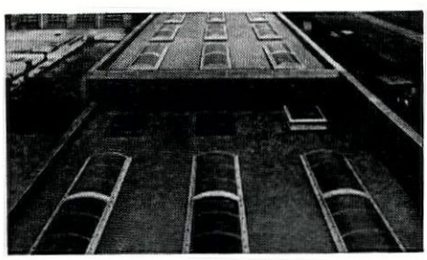

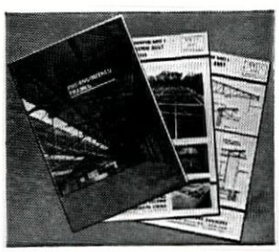

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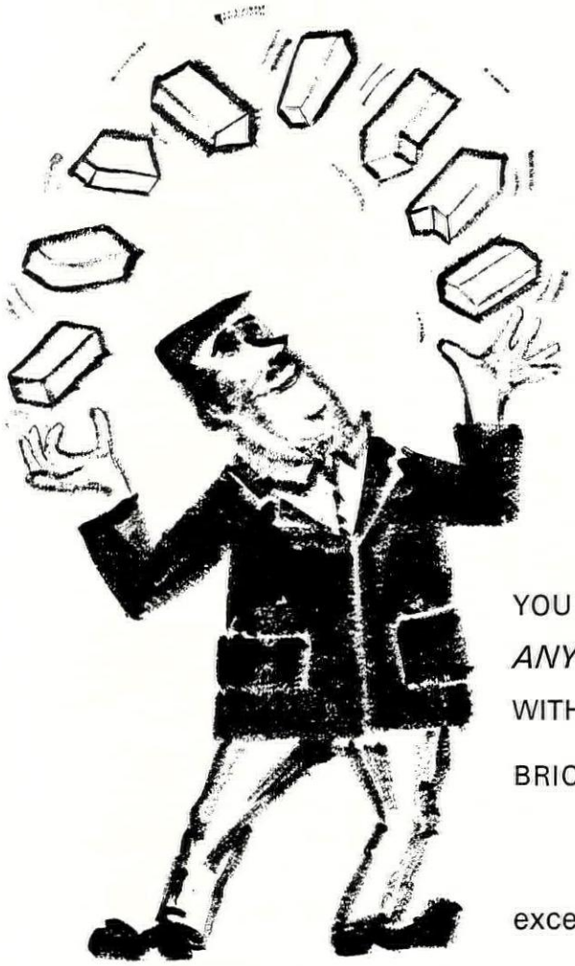

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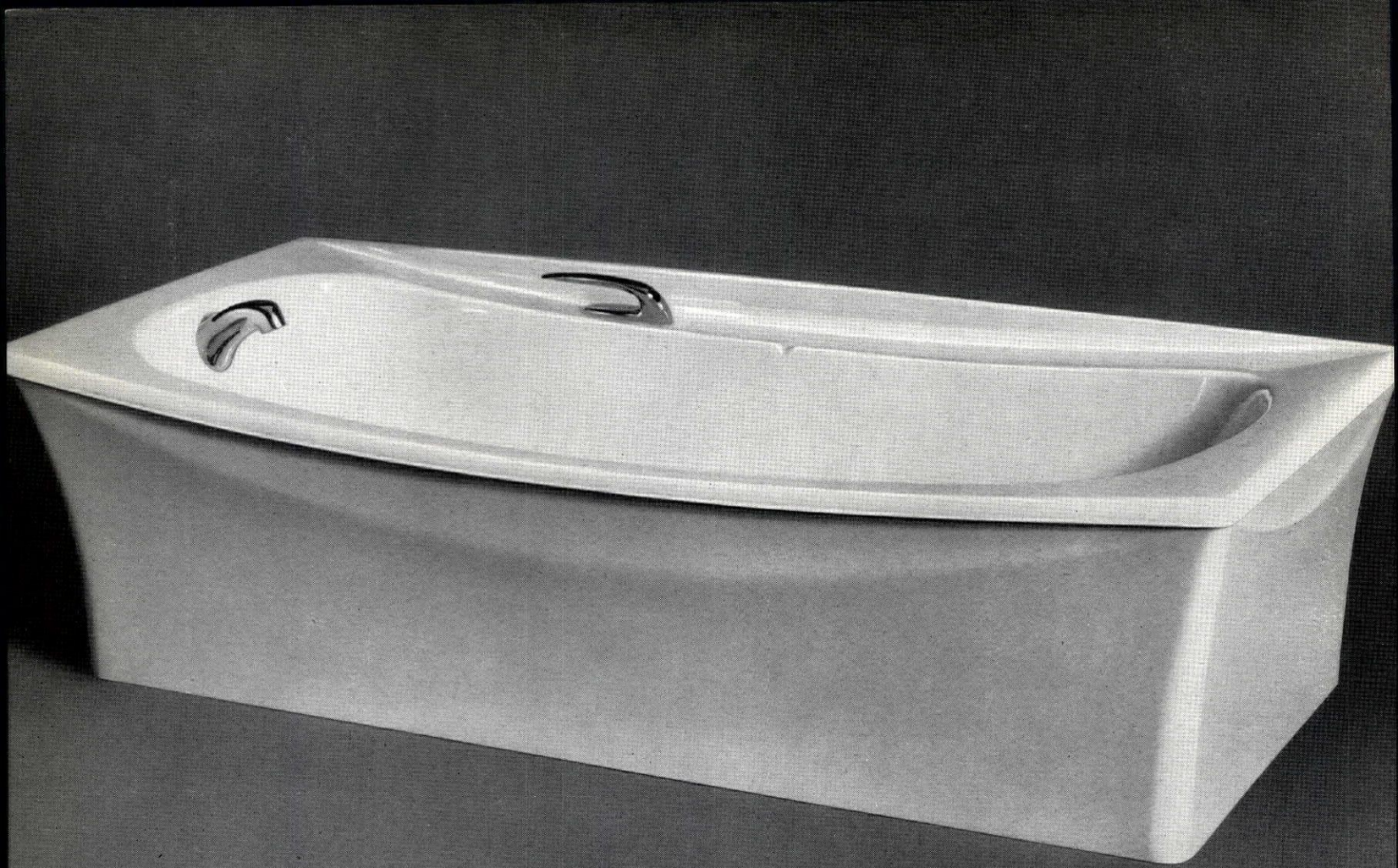

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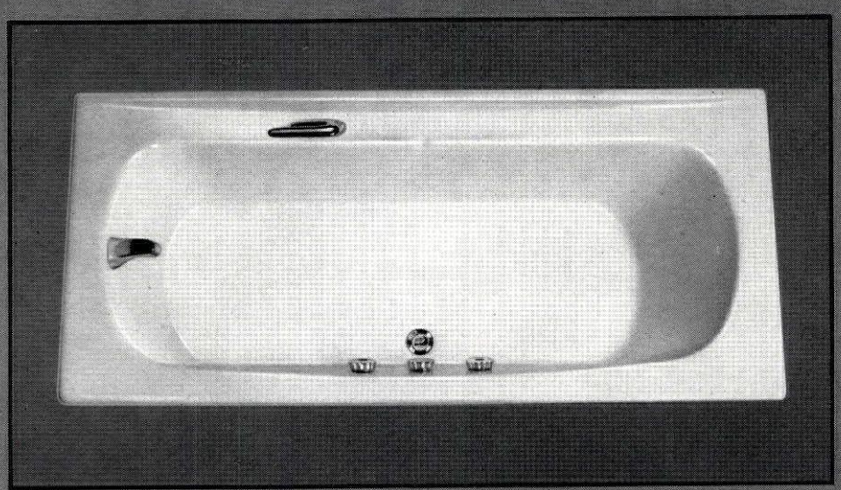
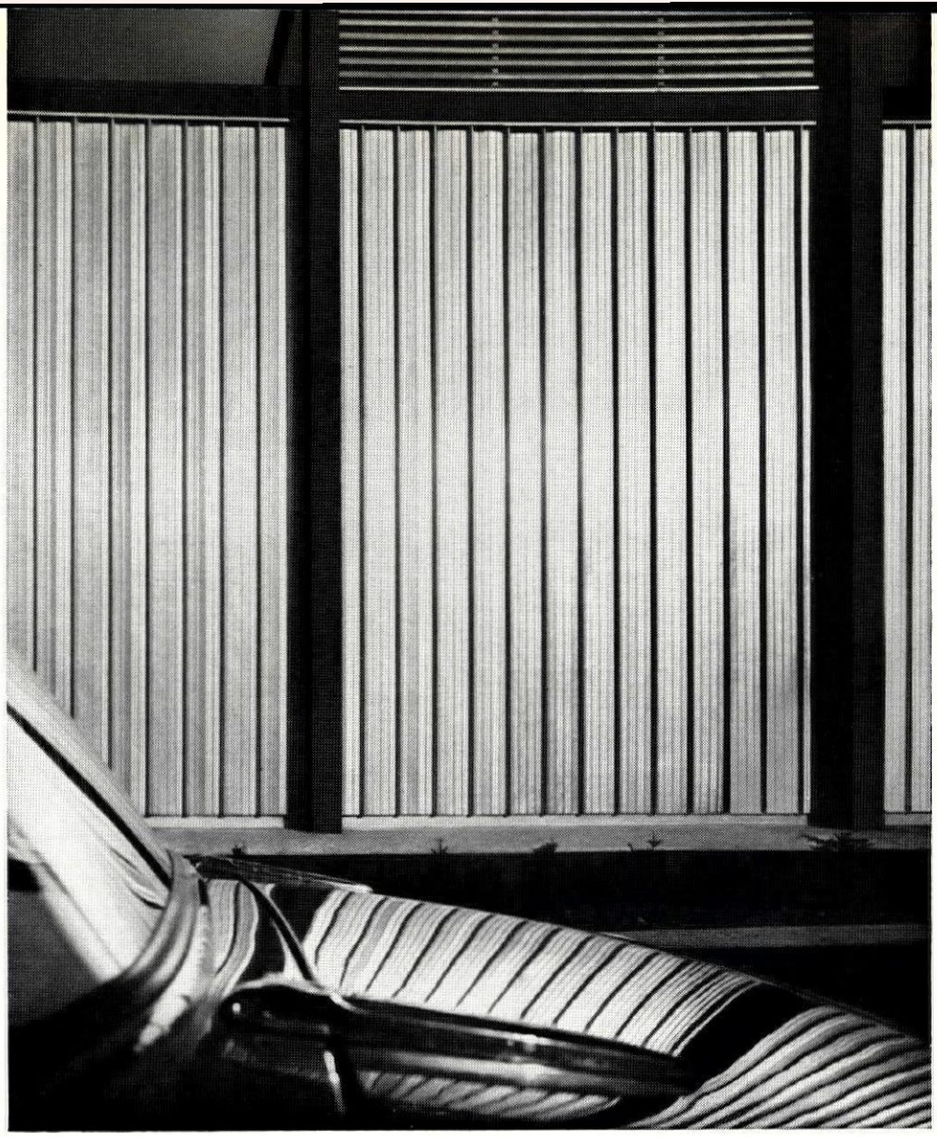




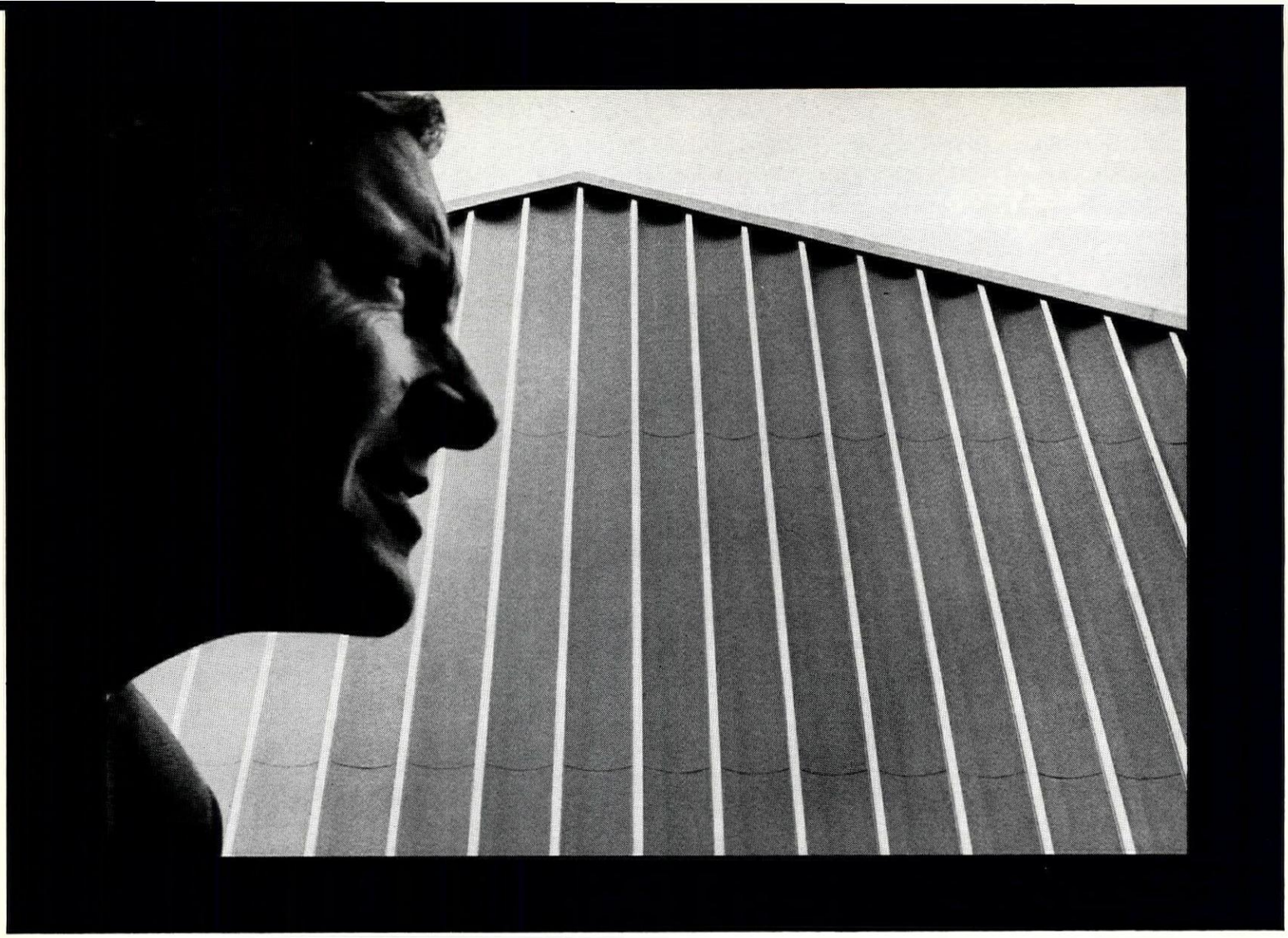
The crisp, clean line of Snaprib aluminium cladding gives authority and style to industrial buildings. Because all fastenings are concealed, and no end-laps are needed, Snaprib is not only elegant but really weathertight and maintenance-free. It is easy to erect and has a full range of flashings. • In the photograph above, you can see how Alcan Snaprib secret-fix aluminium cladding provides an elegant, durable finish for the new steel-framed workshop buildings at the Printing, Packaging and Allied Trades Association's laboratories near Leatherhead, Surrey. (Architects: Michael Manser Associates.) • The Snaprib system is covered by patents held by Cookson Sheet Metal Developments Ltd. • Like to know more? Why not write to us–or give us a ring?

Alcan Snaprib provides the perfect finish

ALCAN INDUSTRIES LIMITED
Banbury, Oxon. Telephone: Banbury 4444
Supplying Britain's architects and builders with *more* than aluminium

ALCAN

A TOWN CALLED ALCAN
is the title of the continuing series of studies on urban planning which has already introduced the Circuit Linear Town and The Scanner. It is part of a two-way traffic in ideas which we regard as an integral part of our business. We are interested in the problems facing architects and builders because we are well equipped to help in solving them. Our own team of building specialists is backed by the experience of Alcan companies all over the world and by the facilities of Aluminium Laboratories Limited, Europe's leading aluminium research organization. On this page we present one product that has grown from this traffic in ideas.



That's what Arcline gives to large industrial or commercial buildings. Its tough, striking look makes a complete break with traditional methods of double-skin cladding—yet it compares with them favourably on cost. Alcan have taken the sound practical qualities of aluminium—light weight, versatility, corrosion resistance—and fashioned them to a bold, uncompromising design. • But Arcline isn't just a pretty face. It has other qualities below the surface. Its fastenings are hidden, and its double aluminium skin, enclosing polystyrene, gives impressive thermal insulation. • Arcline's handsome "built-in" finish needs no on-site painting and no maintenance. Panels can be plain, Alcancolour prepainted sheet, or finished with Alcanodox self-colour anodising. Contrasting ribs can be natural or coloured, plain or anodised. • And Arcline is swift and simple to install. • Like to know more? Why not write to us—or give us a ring?

The bold, clean cut look

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Conran Contracts *Newsletter*

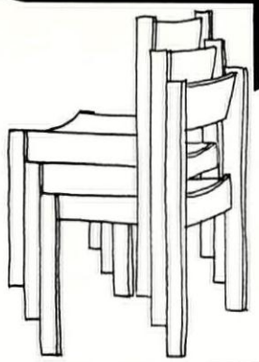
Conran Contracts is specifically organised to supply the entire range of furniture and furnishing needs of public authorities, universities, colleges and schools, executive and general offices, hotels and restaurants and clubs. We undertake the complete cycle of furnishing – from assisting our clients in the preliminary selection of merchandise, preparing specifications and tenders through to the supervision of deliveries and installation on site. To do this as effectively as possible we work in close collaboration with the client and his architects and when required we can draw on the services of Conran Design Group for the detailing of interiors and special furniture. In addition to the very large range of standard Conran furniture, fabrics and carpets, we are able to supply specially designed and made furniture and augment our own ranges with supplies from most other manufacturers – at realistic prices. We hope that the examples that follow will provide an indication of the scope and versatility of Conran Contracts' activities.

Wakefield against the Crime Wave

West Riding Architect's Department have just completed a spectacularly good building at Wakefield as a training centre for the Criminal Investigation Department. The Centre has been built using entirely industrialised methods, something of a breakthrough. Conran Contracts, firm believers in industrialised methods themselves, are providing chairs, tables, side-tables, beds and seating for the coming wave of new Criminal Investigation Department men whose thoughts one hopes will be on their coming struggle with crime.

BELFAST, Seat of Irish Wit

Seats for the students at The Queen's University of Belfast, apart of course from having to suit the contours of every shape, size and sex of keen new undergraduate, had to be made on a shoe-string. Belfast is not splashing money about on its material comforts, and every bit of furniture had to meet the most stringent requirements. Conran Contracts stacking chairs made the running, some in beech, some upholstered and some specially made in afrormosia for the refectory.



How to run the Country in Comfort

The House of Lords may be steeped in tradition as far as proceedings are concerned but they draw the line at sitting in good old fashioned discomfort while they work on our problems. The chairs they now sit in are C100 swivel chairs. A spokesman says the swinging helps him to overcome his hangover in the morning.

The Prime Minister speaks

Mr. Harold Wilson, that well-known television personality requested that the television company should provide him with a large executive-style desk at which he, and sometimes Mr. Brown, could appear before the cameras, high-powered, efficient and in control. The T.V. company rang Conran Contracts and two hours later they had a Modular Optimus desk for a Maximum Optimist politician.

FINCHLEY ROAD - GATEWAY TO THE WORLD

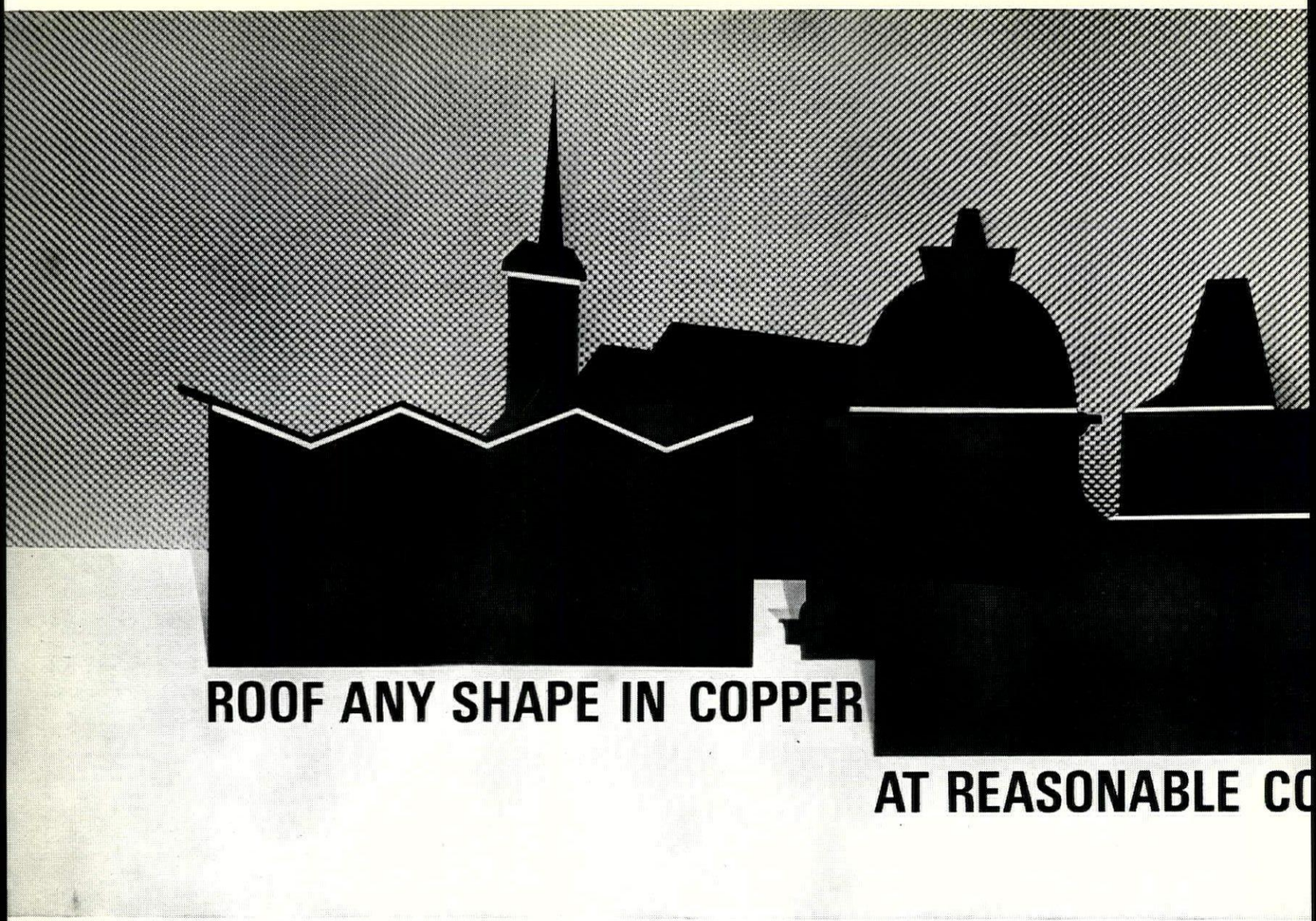
It probably hasn't occurred to many people toiling up the Finchley Road in a solid jam of commuters and au pair girls that this is much of a place for romance. But, if travelling and aeroplanes are romantic then so is the Finchley Road.

Autair Air Terminus is here, from which scheduled flights or charter planes can be taken, via Luton Airport to the North, the U.K. and the Continent. Conran Design Group did all the work on the terminal, and Conran Contracts made leather seating for the passengers.

W.C.B. in New Container

W.C.B. Containers, who make the plastic and fibreglass containers currently transporting goods all over the country, have expanded so fast that their old offices can no longer contain them. They have built themselves instead a complete new office-block. For their furniture they contacted Conran Contracts direct, who furnished the entire block from the typists chairs to the chairman's desk.

5 Hanway Place London W 1 LANgham 4233 3 Smithy Lane King Street West Manchester 3 Blackfriars 4558



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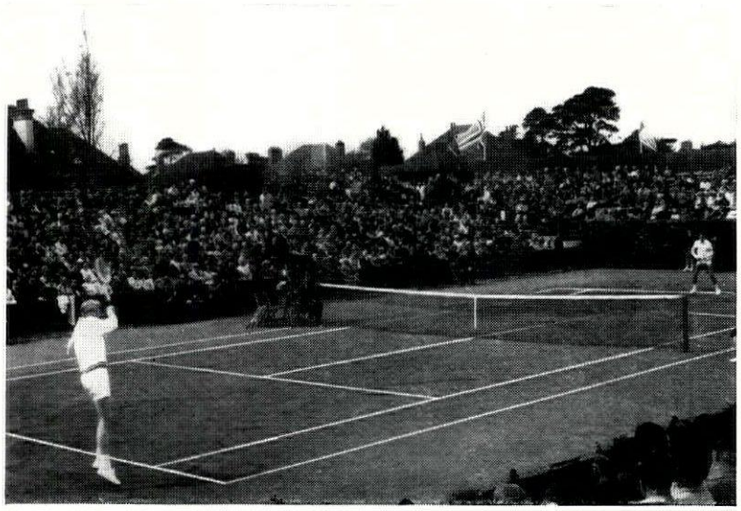
EN-TOUT-CAS are now stockists of the famous range of athletic equipment manufactured by the Athletic Equipment Manufacturing Co. Ltd., sold under the label of A.E.M. Please send for price lists, etc.



Men's Singles, British Hard Court Championships, Bournemouth 1965, on 'En-Tout-Cas' Court

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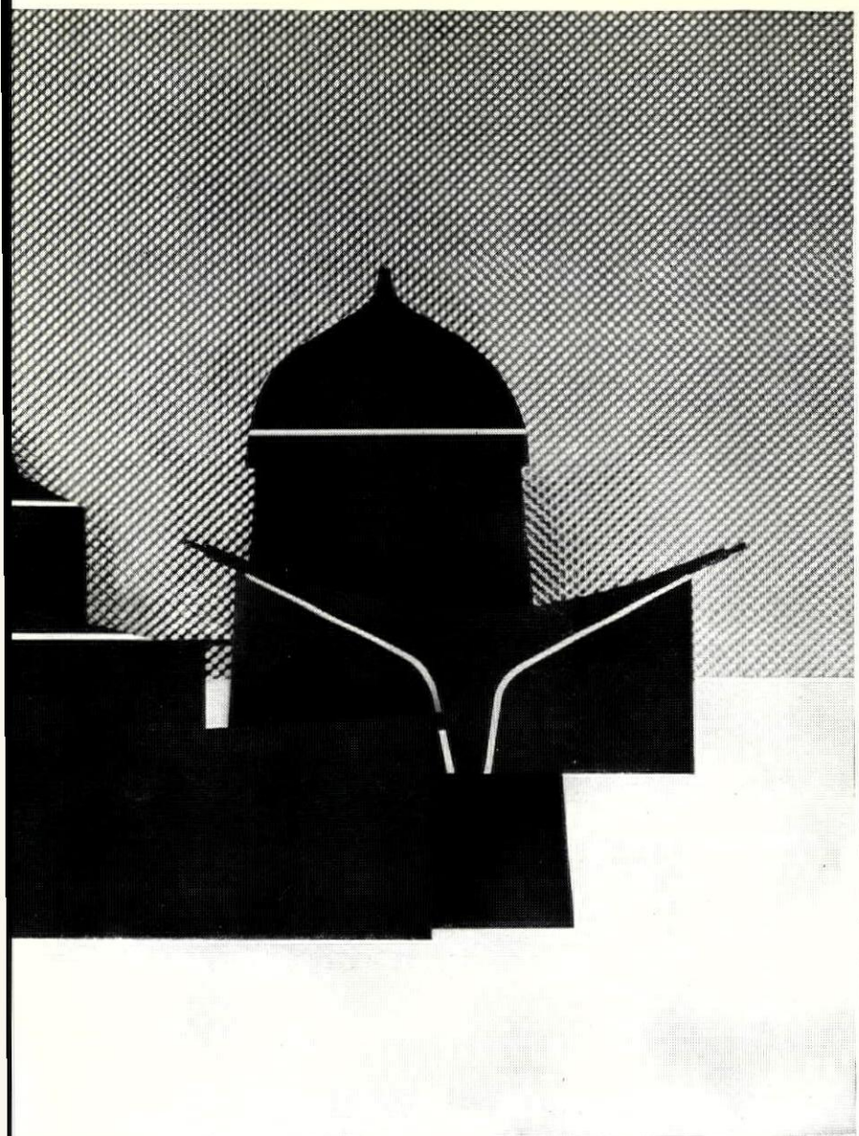

Ruberoid Copper Roofing, the perfect marriage of sheet copper and bitumen, can be laid on any type of substructure. No special provision is required—not even for fixing to concrete. The result is not just a roof that looks like copper. To the admirable appearance and durability of traditional copper, the bitumen backing adds the benefits of hermetically sealed laps and full bonding, which eliminates wind drumming.

Best advantage of all—the cost is realistic. That's why there are Ruberoid Copper roofs everywhere, including the Elephant House at the London Zoo. (Architects: Casson, Conder and Partners). Are the details of Ruberoid Copper Roofing on your files? If not, your local Ruberoid Office will gladly post a copy of publication no. 1713 to you today.

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multiscreens

PAT No. 972,458

If you are in any way involved with the problems of portable exhibitions or demonstrations we suggest that you regard this simple system. Basically, Multiscreens are just frames and linking blocks. The round pegs on the frames fit into the round holes in the blocks, you can build up—build out. Pegboard and copy panels spring clip into frames—it's as simple as that. Drop-on literature dispensers, shelving and spotlighting are available to make Multiscreens a complete and comprehensive system.

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ARCHITECTURAL APPOINTMENT VACANT

LONDON—Landscape Office requires assistant interested in Landscape—from July 1966. Draughting ability essential. Office and public relations experience desirable. Salary by arrangement according to experience. Consideration given to training requirements. Stage age, experience. Box VT41.

MISCELLANEOUS

London house designed by architect for own family. Interior of Parana pine and Jarrah. Grass, trees and carport. 1 min. Bromley South Stn. 16 mins. Victoria and City. £7,100. Phone WIDmore 4953 or Box No. VT42.

Wanted. Architectural Review 1949, Jan., Feb., Mar; 1956 April. Ring Hodgkinson AMB 9460.

The Arts Council of Great Britain has set up an Enquiry into Opera and Ballet in Great Britain. Its terms of reference are:—

"To consider the existing and to estimate the potential public demand for opera and ballet in different parts of Great Britain; and to consider how far, under existing policies these demands are being or are likely to be met; and to make proposals regarding future policy, indicating the scale of financial support, both in respect of capital and recurring expenditure, which might be required to give them effect." Both written and oral evidence will be taken. Memoranda and applications to give oral evidence should be addressed to The Secretary, Opera and Ballet Enquiry, The Arts Council of Great Britain, 4, St. James's Square, London, S.W.1. by 30th June, 1966.

COMPETITION

An open competition for the design of a system of office signposting in stainless steel. Full details of this competition, for which the prize is £500, are available from the sponsors, the Stainless Steel Development Association, 7 Old Park Lane, London, W.1. Last date for entries, noon, September 30th, 1966.

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