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THE ARCHITECTS' JOURNAL

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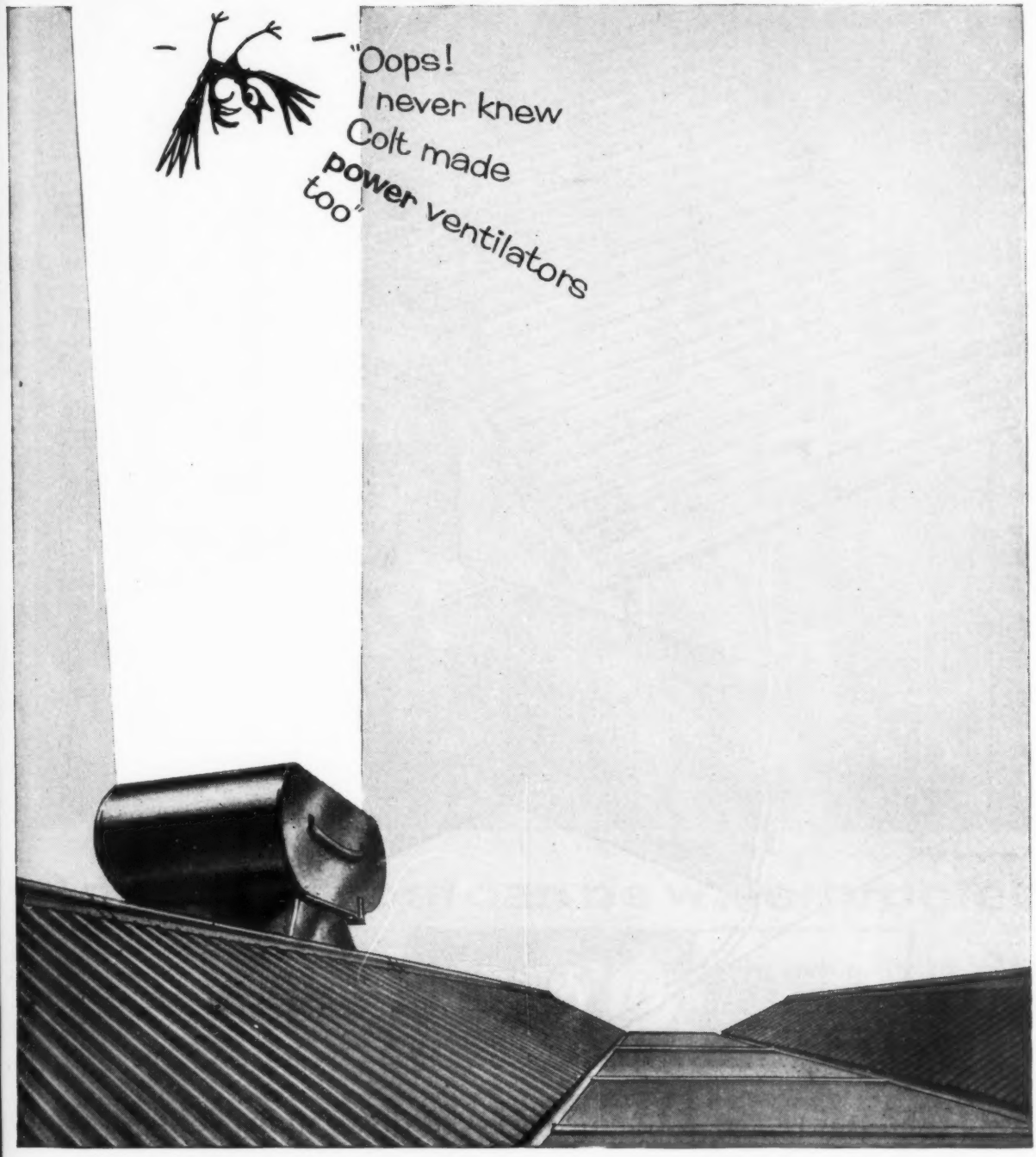
★ A glossary of abbreviations of Government Departments and Societies and Committees of all kinds, together with their full address and telephone numbers. The glossary is published in two parts—A to Ii one week, Il to Z the next. In all cases where the town is not mentioned the word LONDON is implicit in the address.

AA	Architectural Association, 34/6, Bedford Square, W.C.1.	Museum 0974
AAI	Association of Art Institutions. Secy.: J. H. Holden, College of Art, Cavendish Street, Manchester 15	
ABS	Architects' Benevolent Society. 66, Portland Place, W.1.	Langham 5533
ABT	Association of Building Technicians. 156, Waterloo Road, S.E.1.	Waterloo 5427
ACGB	Arts Council of Great Britain. 4, St. James's Square, S.W.1.	Whitehall 9737
ADA	Aluminium Development Association. 33, Grosvenor Street, W.1.	Mayfair 7501/8
ARCUK	Architects' Registration Council. 68, Portland Place, W.1.	Langham 5861
BAE	Board of Architectural Education. 66, Portland Place, W.1.	Langham 5721
BC	Building Centre, 26, Store Street, Tottenham Court Road, W.C.1	Museum 5400
BCC	British Colour Council. 13, Portland Square, W.1.	Welbeck 4185
BCCF	British Cast Concrete Federation. 105, Uxbridge Road, Ealing, W.5.	Ealing 9621
BCIRA	British Cast Iron Research Association. Alvechurch, Birmingham.	Redditch 716
BDA	British Door Association. 10, The Boltons, S.W.10.	Fremantle 8494
BE	Building Exhibition. 11, Manchester Square, W.1.	Hunter 1951
BEDA	British Electrical Development Association, 2, Savoy Hill, W.C.2.	Temple Bar 9434
BIA	British Ironfounders' Association. 145, Vincent Street, Glasgow, C.2.	Glasgow Central 2891
BID	Building Industries Distributors. 52, High Holborn, W.C.1.	Chancery 7772
BINC	Building Industries National Council. 11, Weymouth Street, W.1.	Langham 2785
BOT	Board of Trade. Whitehall Gardens, Horseguards Avenue, Whitehall, S.W.1.	Trafalgar 8855
BRS	Building Research Station. Bucknalls Lane, Watford.	Garston 4040
BSA	Building Societies Association. 14, Park Street, W.1.	Mayfair 0515
BSI	British Standards Institution. British Standards House, 2, Park St., W.1.	Mayfair 9000
CABAS	City and Borough Architects Society. C/o S. A. G. Cook, A.R.I.B.A., Borough Architect and Director of Housing, Town Hall, High Holborn, W.C.1.	Holborn 3411
CAS	County Architects' Society. C/o S. Vincent Goodman, F.R.I.B.A., Shire Hall, Bedford.	Bedford 67444
CCA	Cement and Concrete Association. 52, Grosvenor Gardens, S.W.1.	Belgravia 6661
CDA	Copper Development Association. 55, South Audley Street, W.1.	Grosvenor 8811
COID	Council of Industrial Design. 28, Haymarket, S.W.1.	Trafalgar 8000
CPRE	Council for the Preservation of Rural England. 4, Hobart Place, S.W.1.	Sloane 4280
CUC	Coal Utilization Council. 3, Upper Belgrave Street, S.W.1.	Sloane 9116
CVE	Council for Visual Education. 13, Suffolk Street, Haymarket, S.W.1.	Reading 72255
DIA	Design and Industries Association. 13, Suffolk Street, S.W.1.	Whitehall 0540
EJMA	English Joinery Manufacturers' Association (Incorporated). Sackville House, 40, Piccadilly, W.1.	Regent 4448
EPNS	English Place-Name Society. 7, Selwyn Gardens, Cambridge.	
FAS	Faculty of Architects and Surveyors. 68, Gloucester Place, W.1.	Welbeck 9966
FASS	Federation of Associations of Specialists and Sub-Contractors, 14, Bryanston Street, W.1.	Welbeck 1781
FBBDO	Fibre Building Board Development Organization Ltd. (Fidor), Stafford House, Norfolk Street, W.C.2.	Covent Garden 3008
FBI	Federation of British Industries. 21, Tothill Street, S.W.1.	Whitehall 6711
FC	Forestry Commission. 25, Savile Row, W.1.	Regent 0221
FCMI	Federation of Coated Macadam Industries. 37, Chester Square, S.W.1.	Sloane 1002
FDMA	The Flush Door Manufacturers Association Ltd. Trowell, Nottingham.	Ilkeston 623
FLD	Friends of the Lake District. Pennington House, nr. Ulverston, Lancs.	Ulverston 201
FMB	Federation of Master Builders. 33, John Street, W.C.1. Tel.: Chancery 7583 (6 lines)	
FPC	The Federation of Painting Contractors, St. Stephen's House, S.W.1.	Whitehall 3902
FRHB	Federation of Registered House Builders. 82, New Cavendish Street, W.1.	Langham 4341
GPDA	Gypsum Plasterboard Development Association. 11, Ironmonger Lane, E.C.2.	Monarch 8888
GC	Gas Council. 1, Grosvenor Place, S.W.1.	Sloane 4554
GG	Georgian Group. 2, Chester Street, S.W.1.	Belgravia 3081
HC	Housing Centre. 13, Suffolk Street, Pall Mall, S.W.1.	Whitehall 2881
IAAS	Incorporated Association of Architects and Surveyors. 29, Belgrave Square, S.W.1.	Belgravia 3755
ICA	Institute of Contemporary Arts. 17-18, Dover Street, Piccadilly, W.1.	Grosvenor 6186
ICE	Institution of Civil Engineers. 1, Great George Street, S.W.1.	Whitehall 4577
IEE	Institution of Electrical Engineers. Savoy Place, Victoria Embankment, W.C.2.	Temple Bar 7676
IES	Illuminating Engineering Society. 32, Victoria Street, S.W.1.	Abbey 5215
IGE	Institution of Gas Engineers. 17, Grosvenor Crescent, S.W.1.	Sloane 8266
IHVE	Institution of Heating and Ventilating Engineers. 49, Cadogan Square	Sloane 1601/3158
IIBDID	Incorporated Institute of British Decorators and Interior Designers. 37, Soho Square, W.1.	Gerrard 5056



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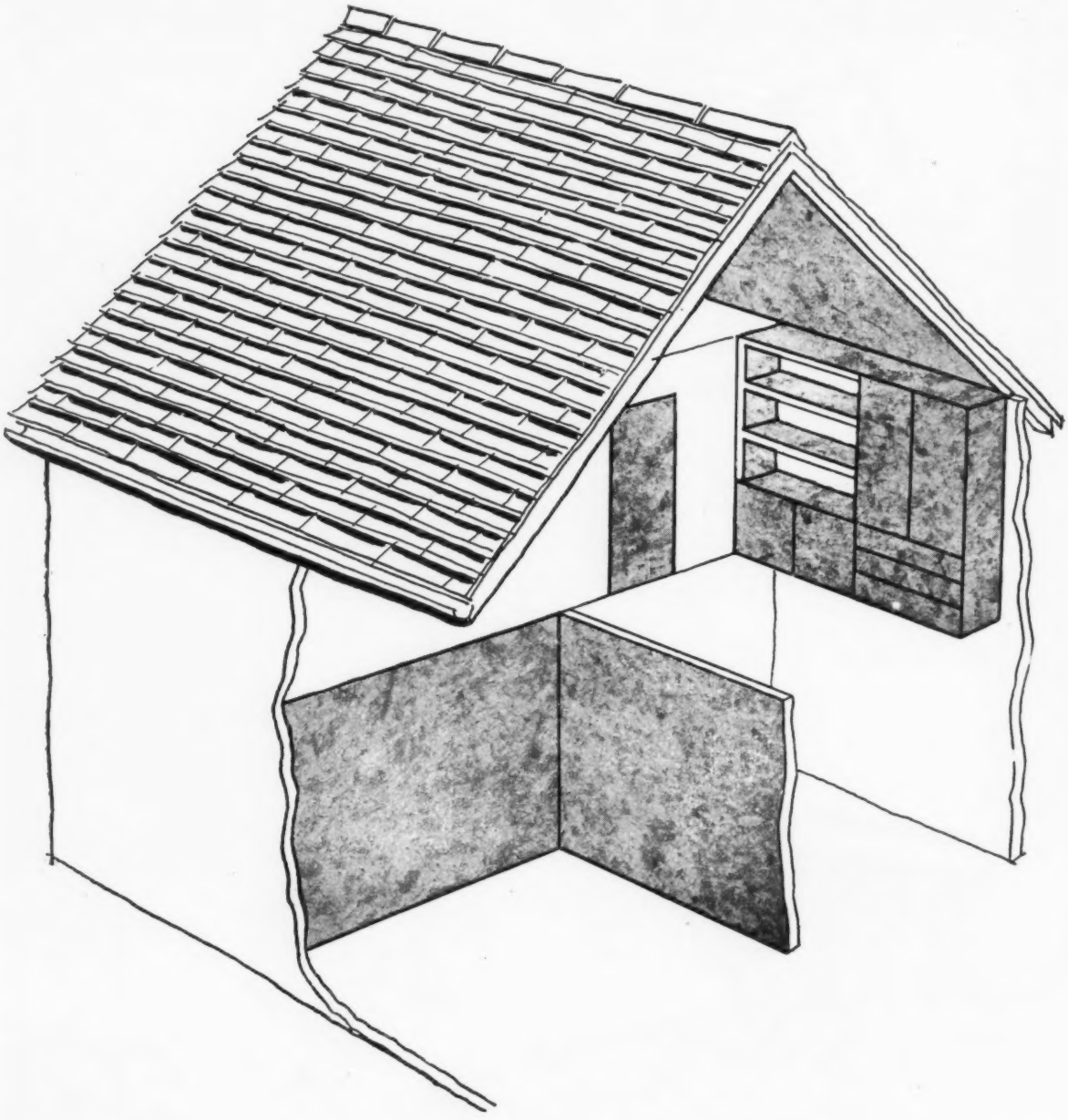

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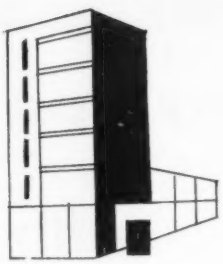

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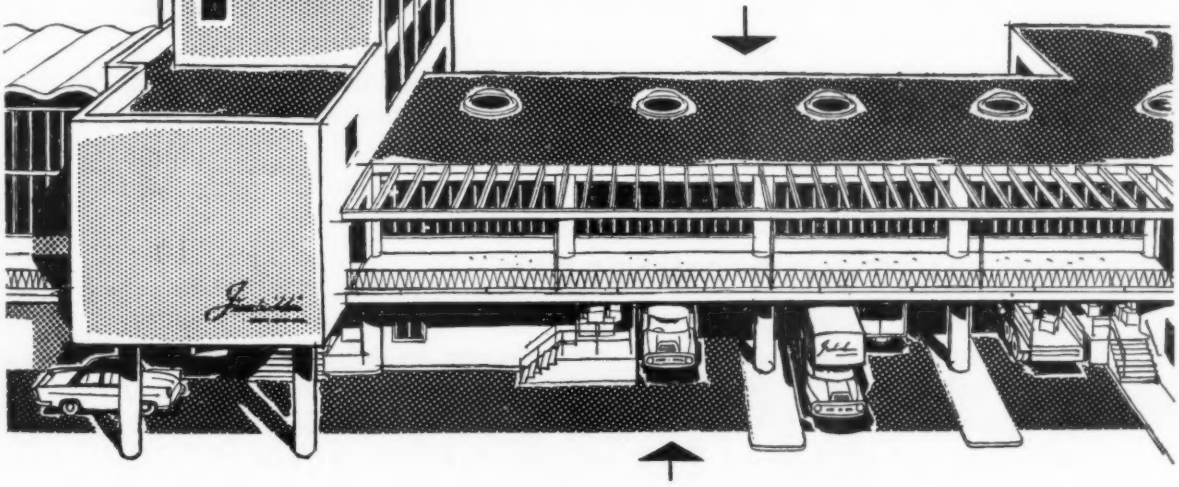

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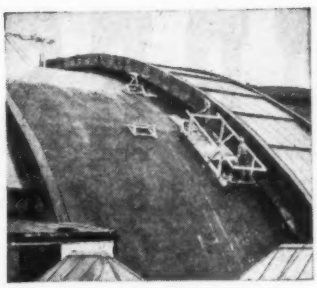

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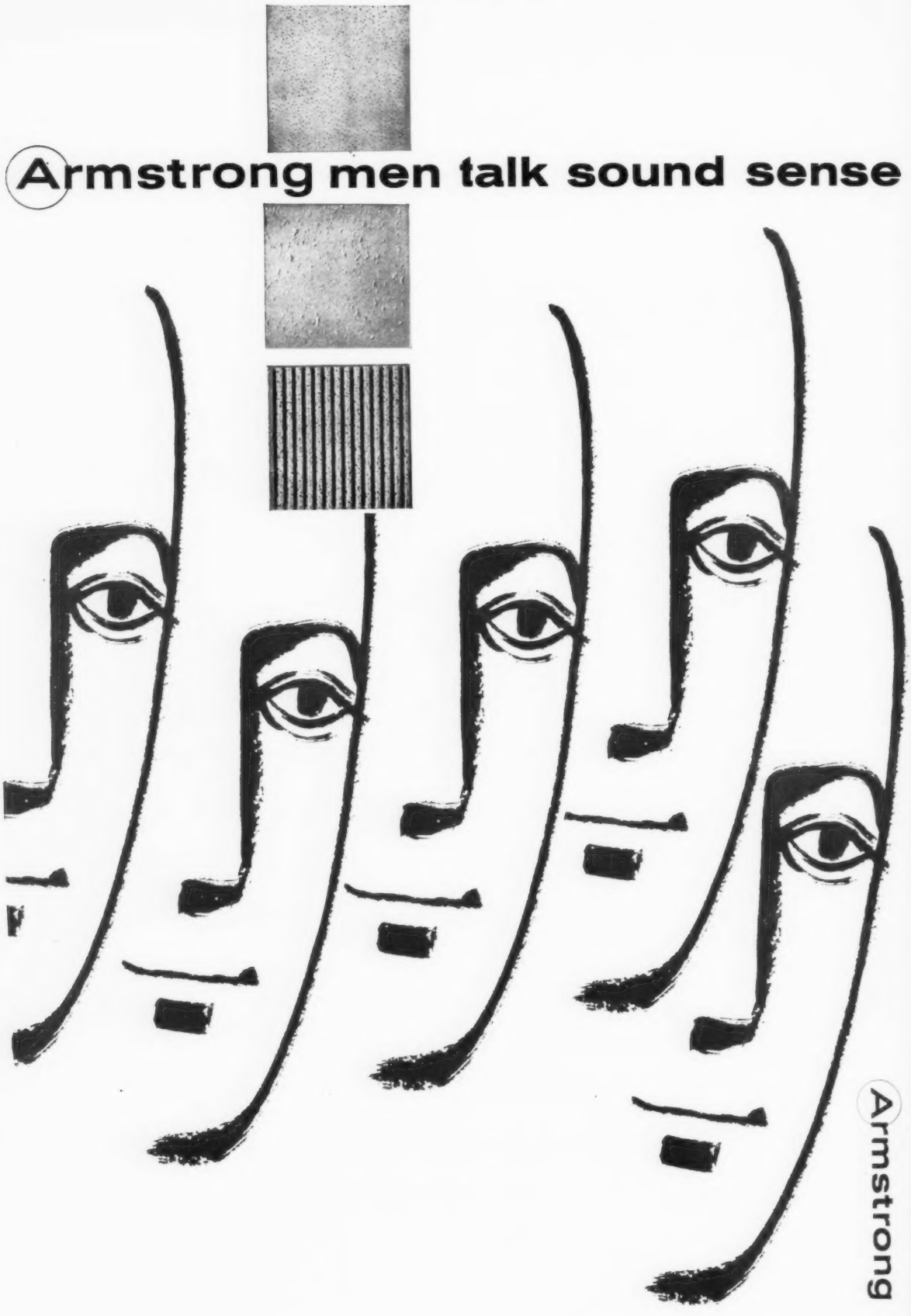
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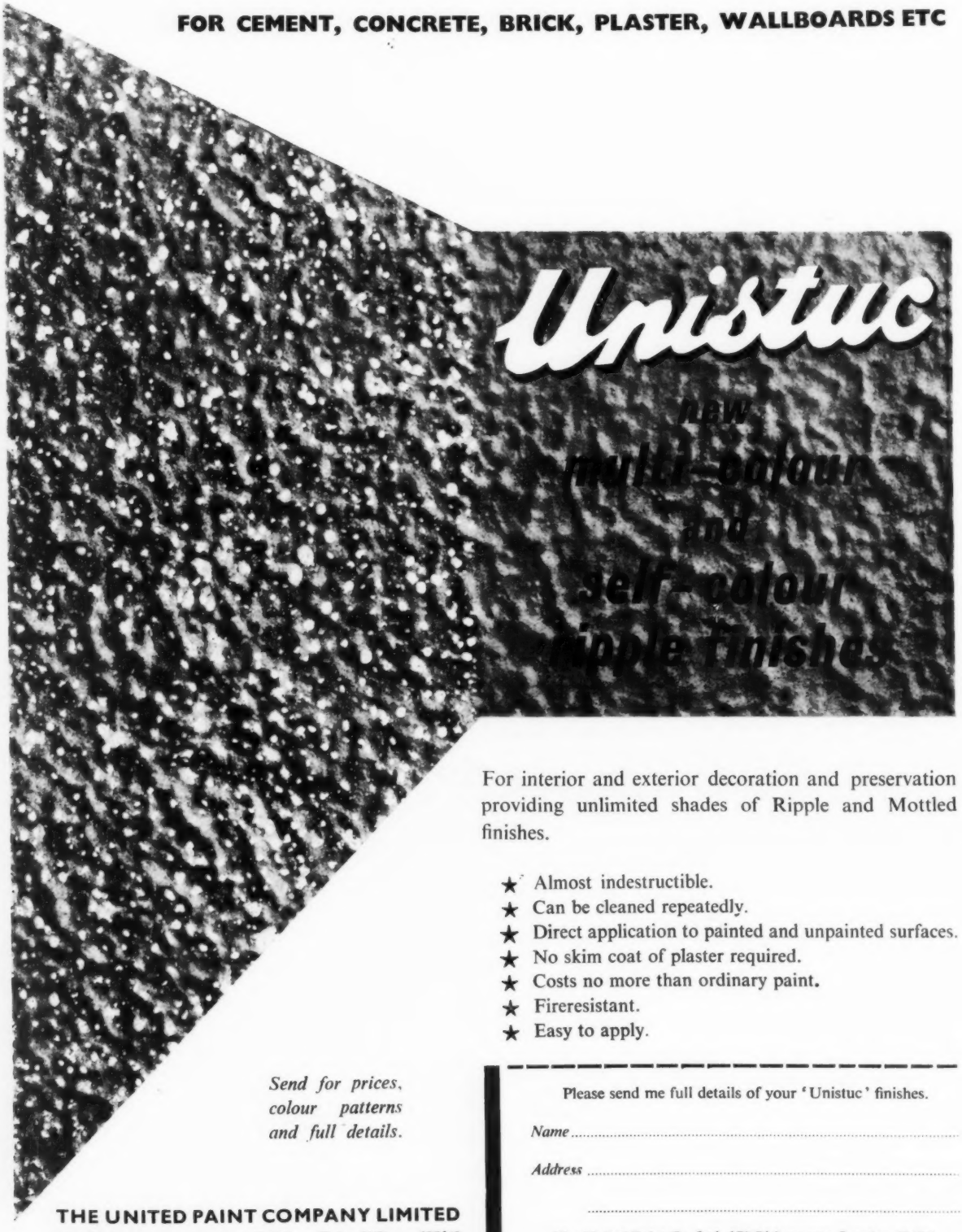

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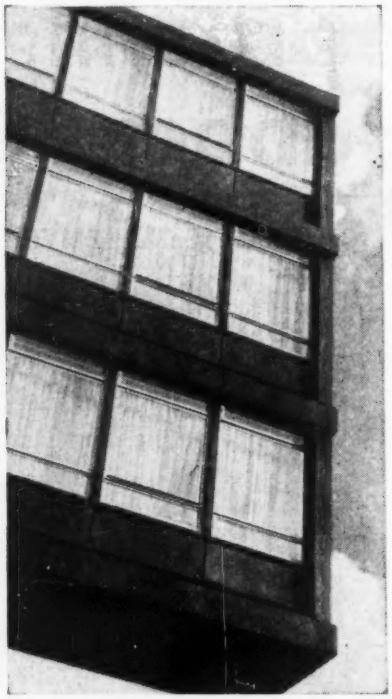
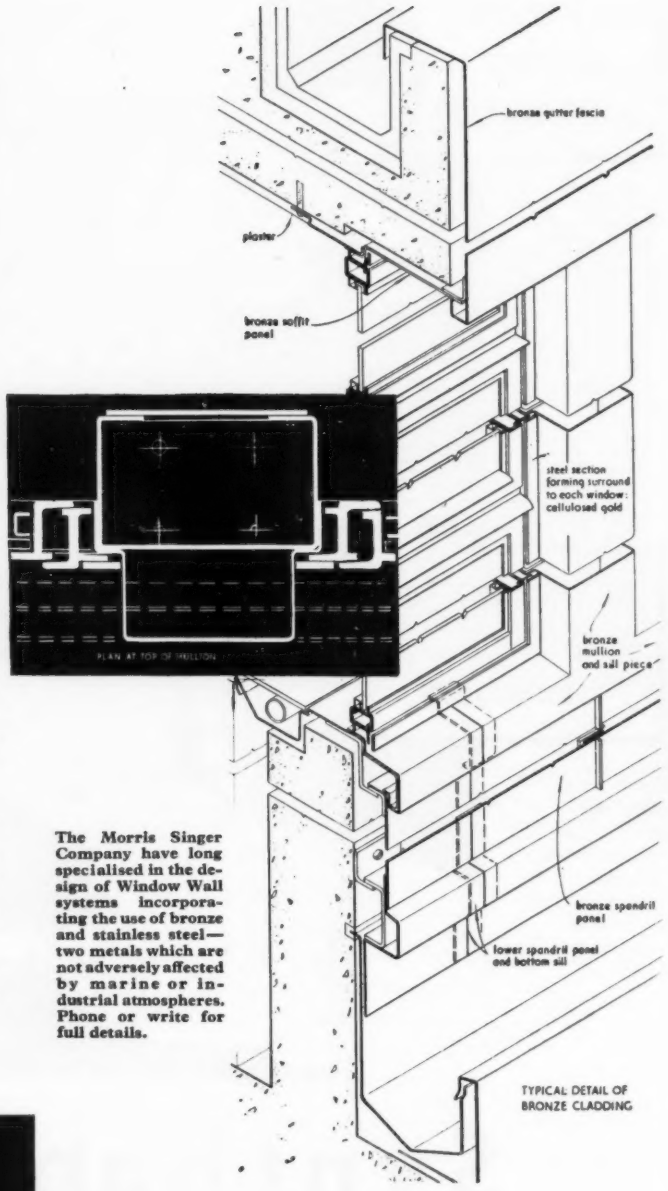


BRONZE CLADDING



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Architects: Denys Lasdun & Partners

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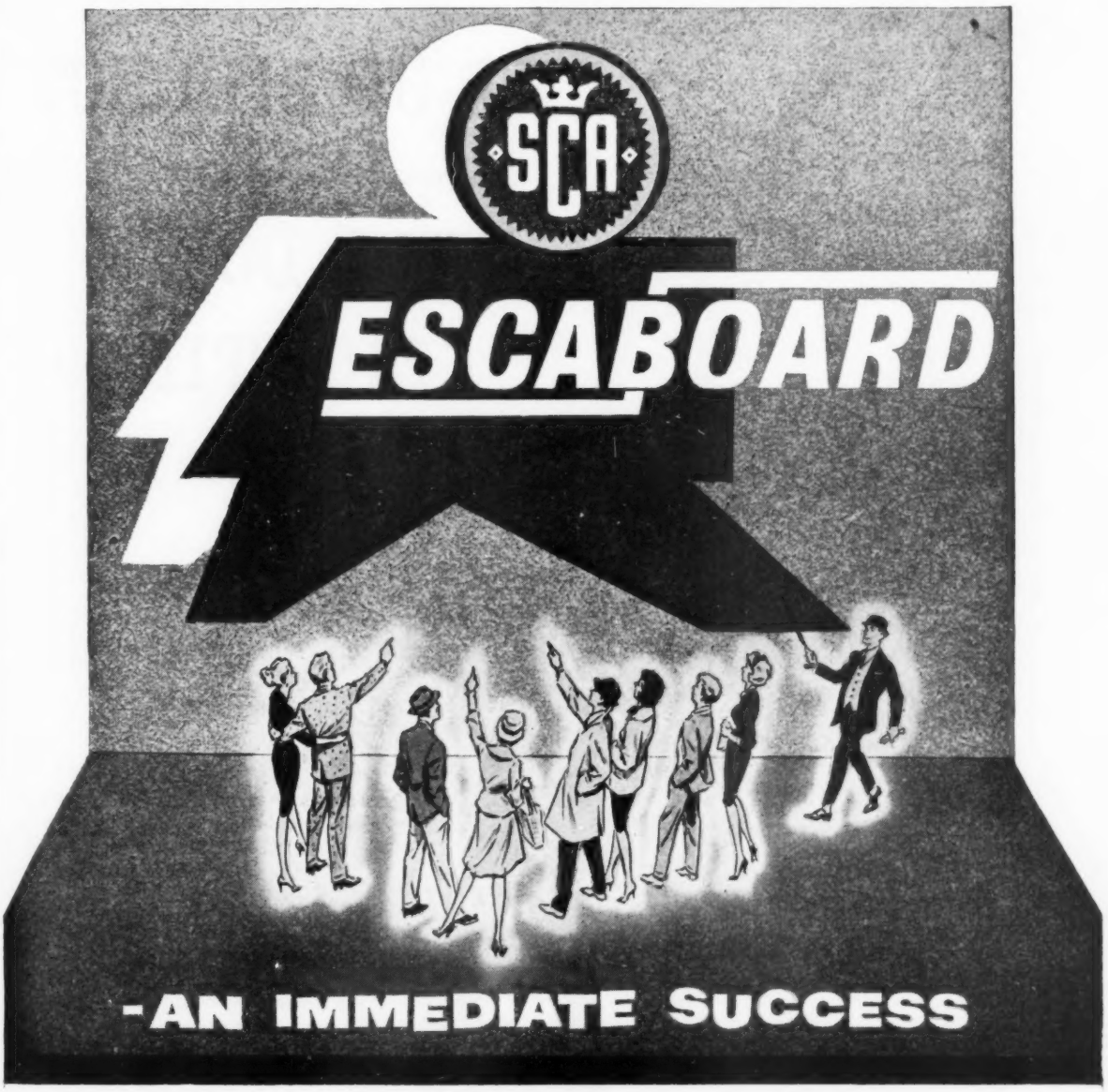

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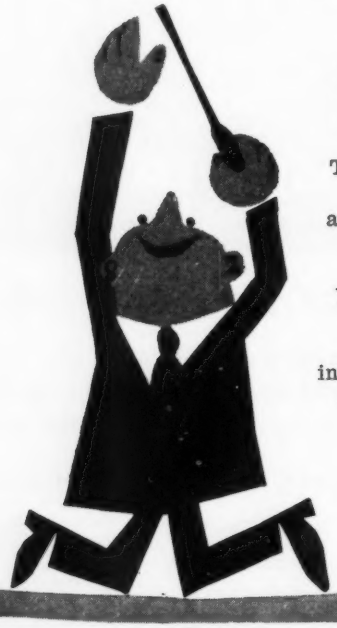

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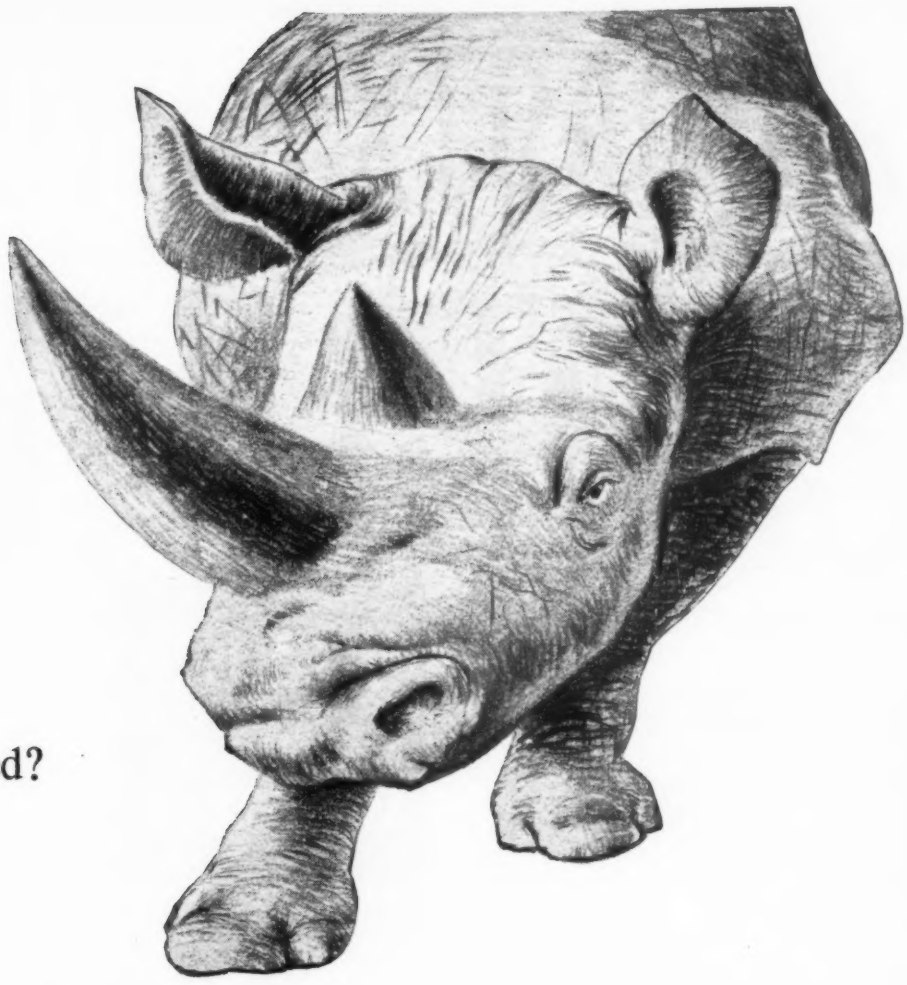

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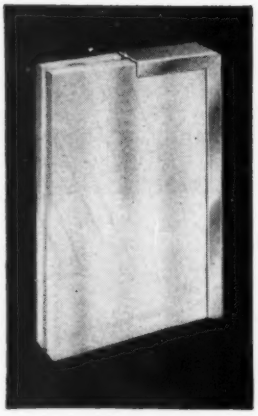

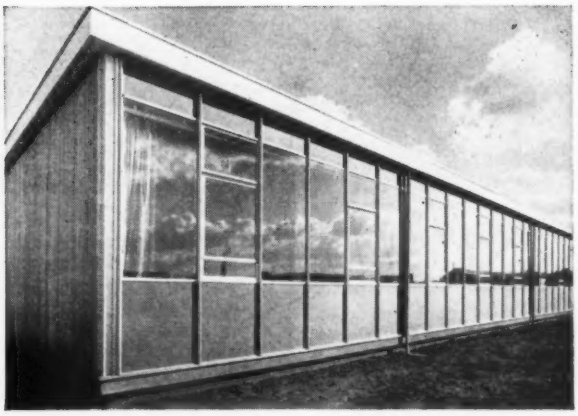

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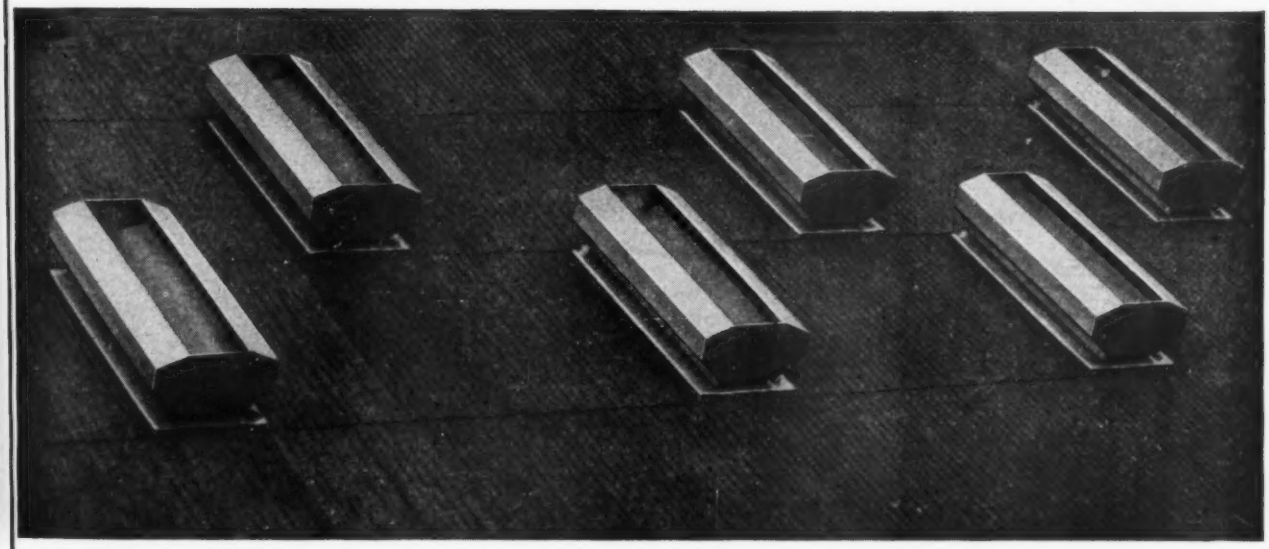

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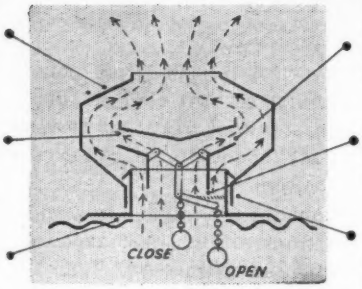

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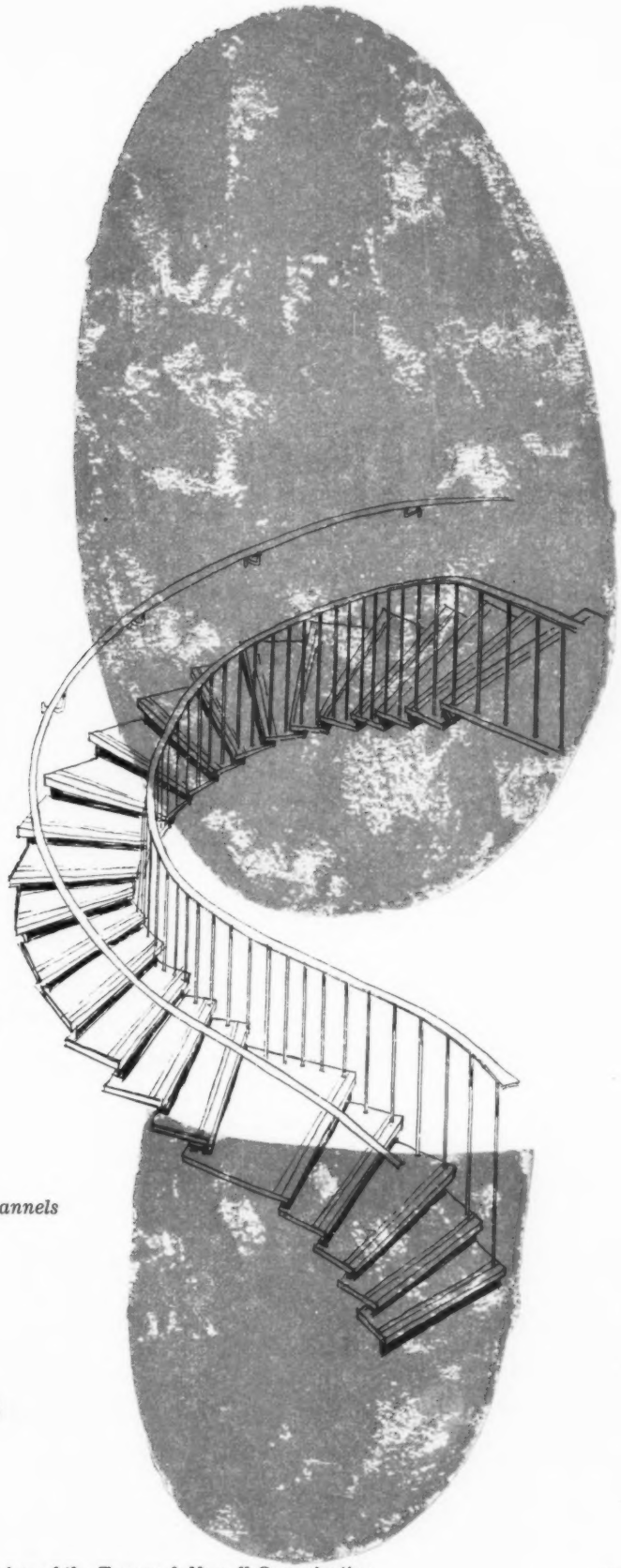

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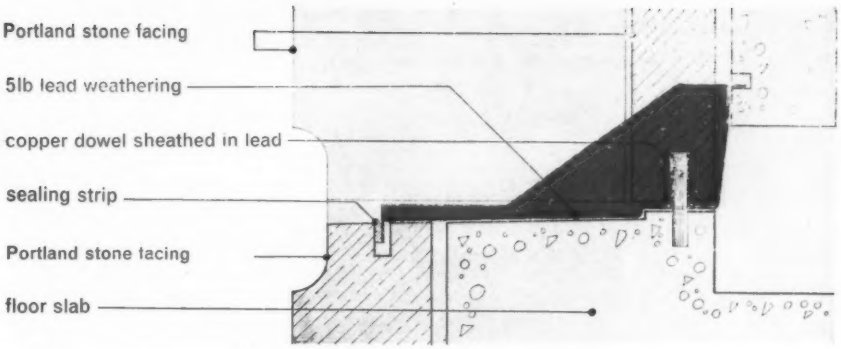

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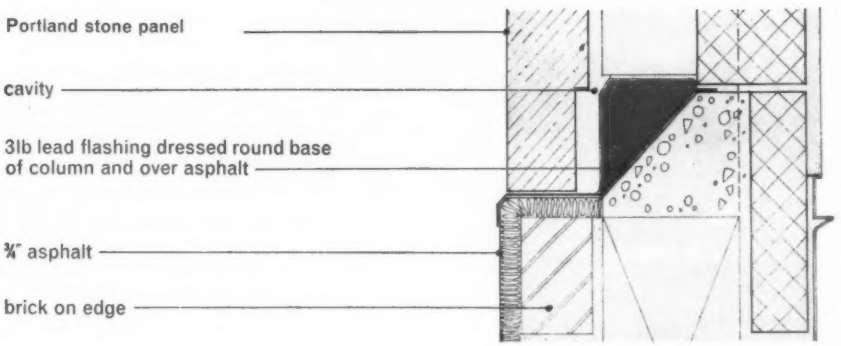
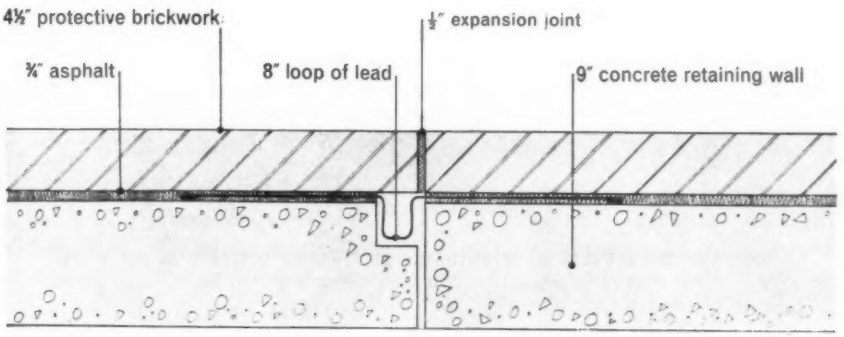


SECTION THROUGH FLASHING AT FOOT OF EXTERNAL WALL TO PENTHOUSE



HORIZONTAL SECTION THROUGH VERTICAL SETTLEMENT JOINT

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THE WASH-DOWN PAN Available in white Keramic ware (or coloured to match cistern). 'Hydromatic Action' system of ducts and channels directs water to right places for controlled maximum efficiency. Trap to BSS.1213 dimension eliminates risk of blockage.

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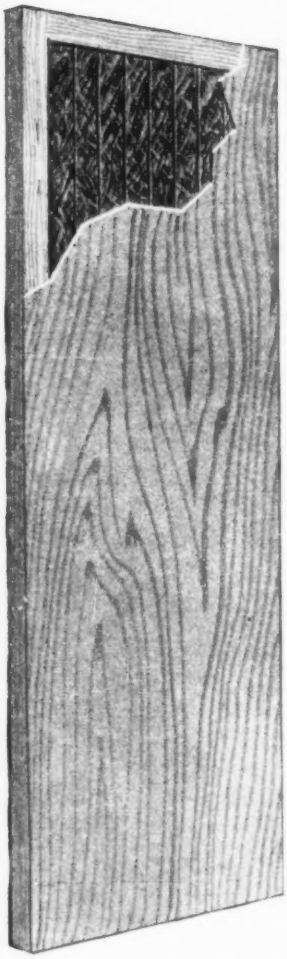

It is agreed everywhere that tomorrow's buildings must be protected against fire. How best to achieve this? The use of factory-hung Lindoco Fire-Check doorways is an obvious starting point. These craftsmen-built doors have a core of solid Stramit which defies fire vigorously. They are available, complete with frames, in two types, Half-Hour and One-Hour. Both can be supplied in any size to suit individual requirements. Please write to us for further details.

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Lindoco patent factory-hung doorways are highly-efficient fire-barriers which fulfil all Fire-Check requirements as laid down by B.S. 476—1932 and BSS.459, Part III, 1946. Tests by the Department of Scientific and Industrial Research and Fire Offices Committee Joint Research Organisation indicate that the "half-hour type" door also passed for the GRADE "E" fire-resistance.

National Physical Laboratory tests show that the Lindoco Fire-Check door, with its core of solid Stramit, provides better insulation against airborne sound than a solid timber door Official test report forwarded on request.

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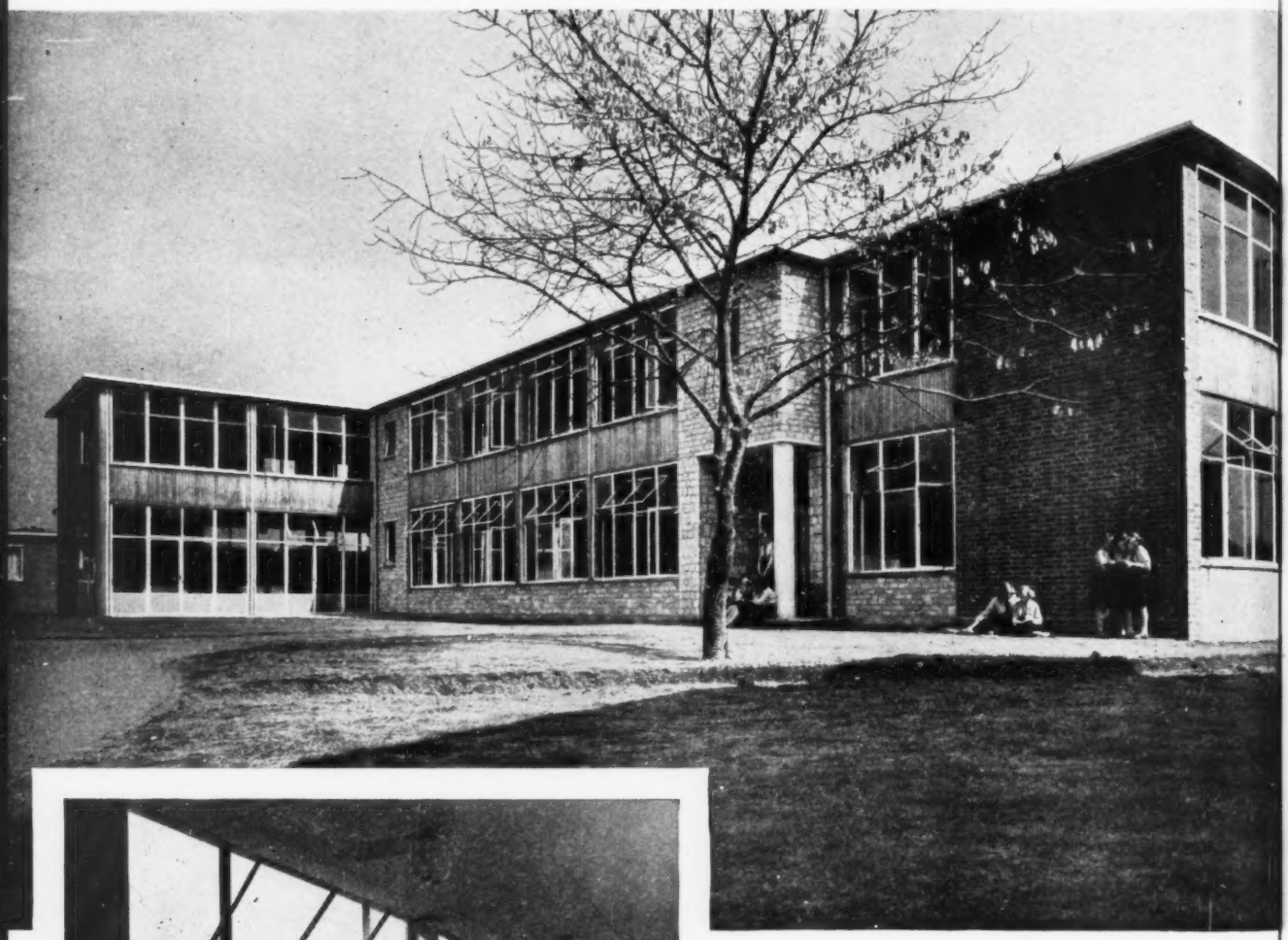

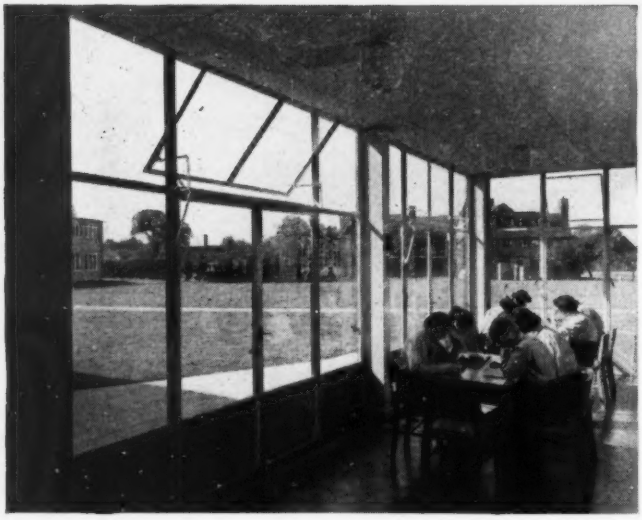

Buildings of today...

The Girls Grammar School, Stratford on Avon, is a fine example of contemporary architecture, blending with an existing traditional building. This can be seen on the interior view, where another point worthy of note is the neat and unobtrusive appearance of Newman's Window Opening Gear.

John P. Osborne & Son F/A.R.I.B.A. Architects
in collaboration with
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INFORMATION SHEET **1**

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Electrical contractors · Williams Brothers (Electrical) Ltd.

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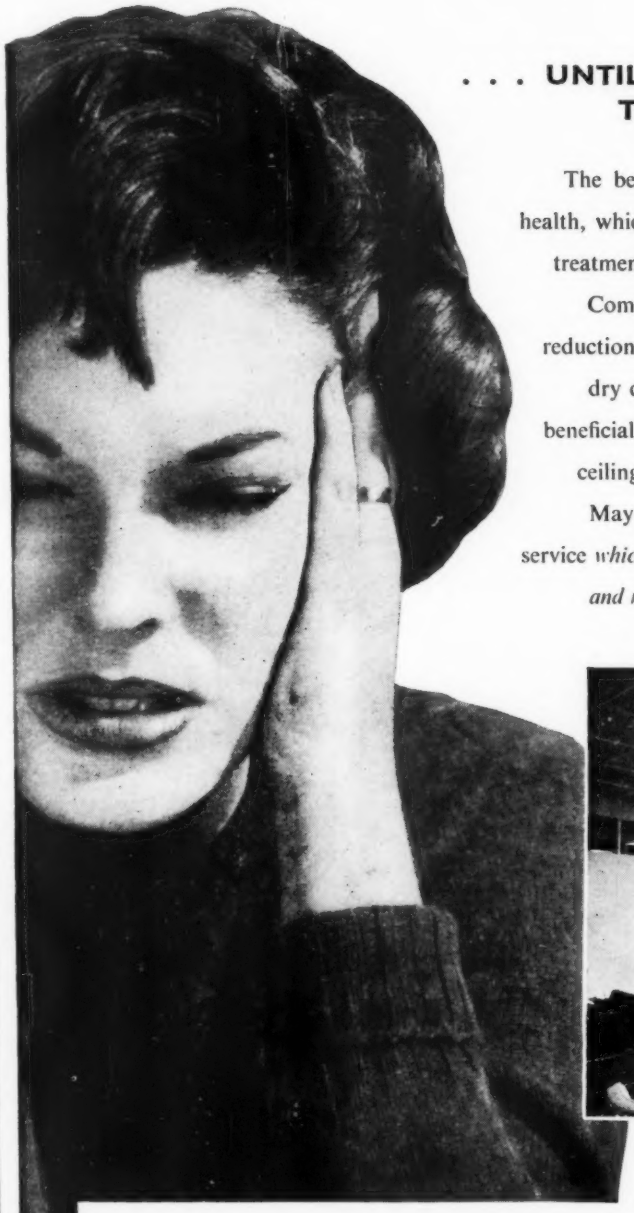

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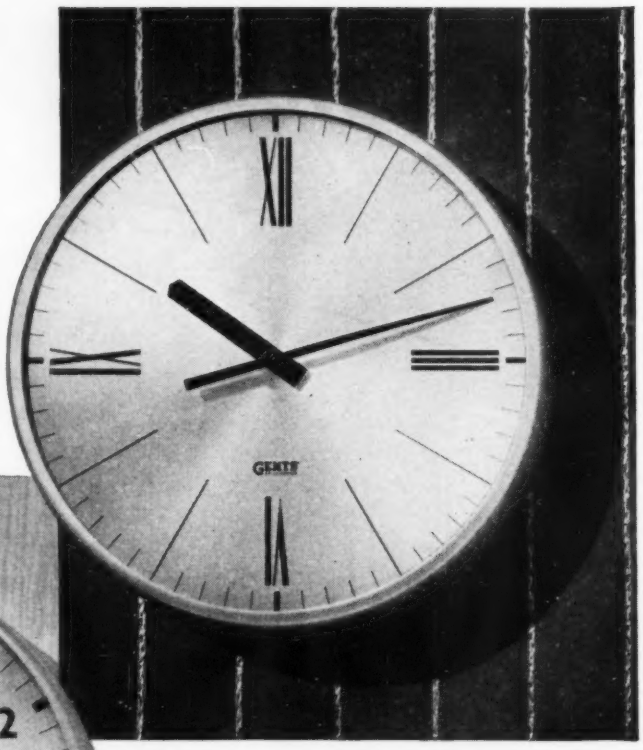

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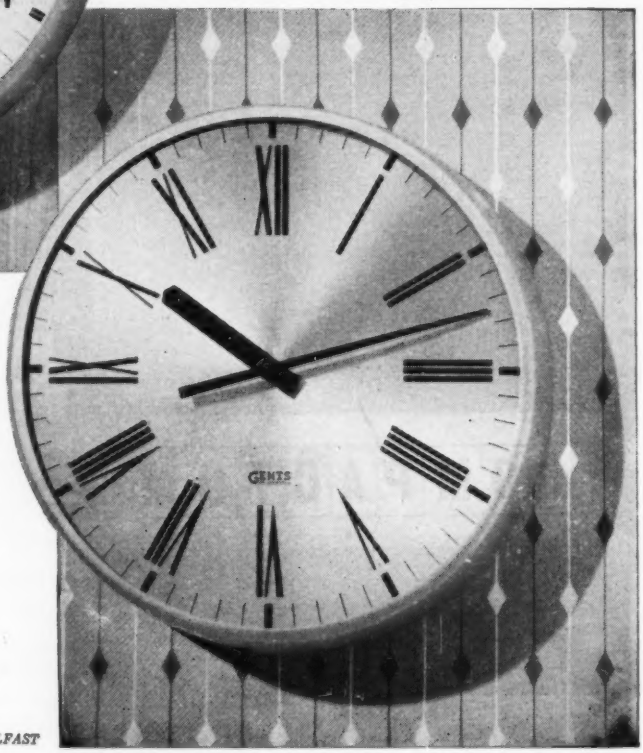

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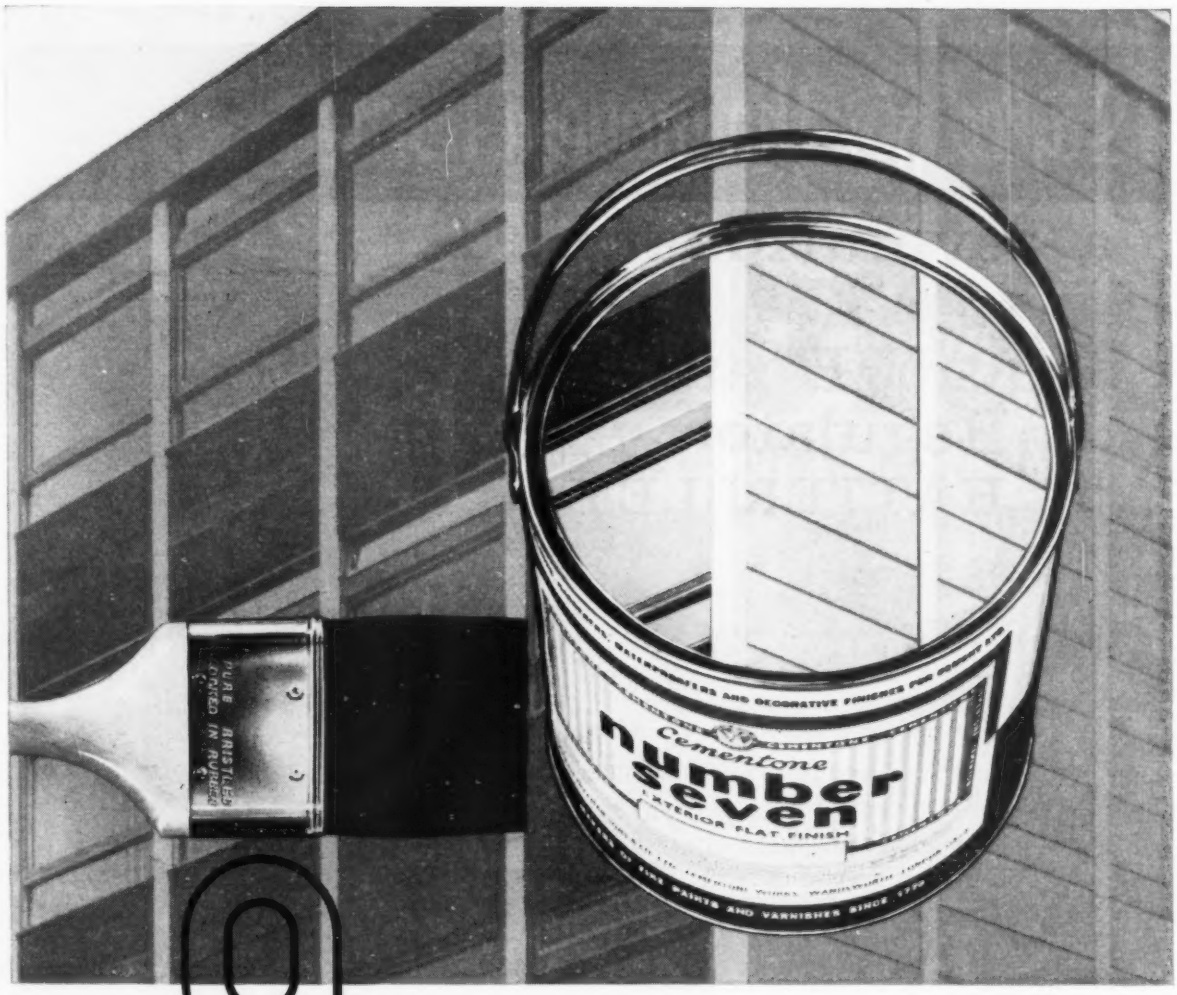

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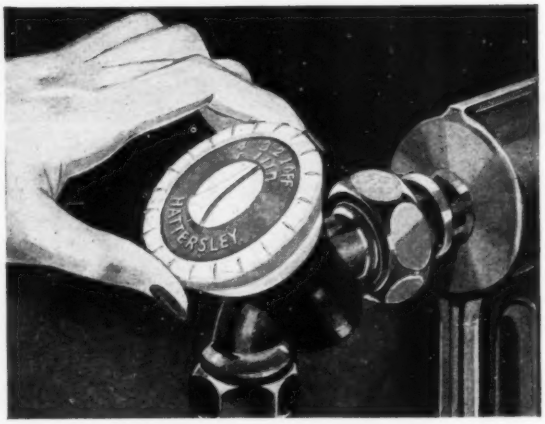

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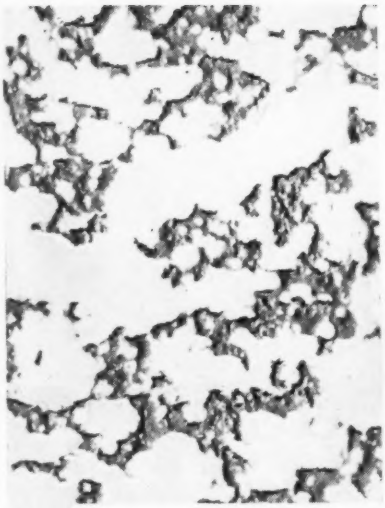

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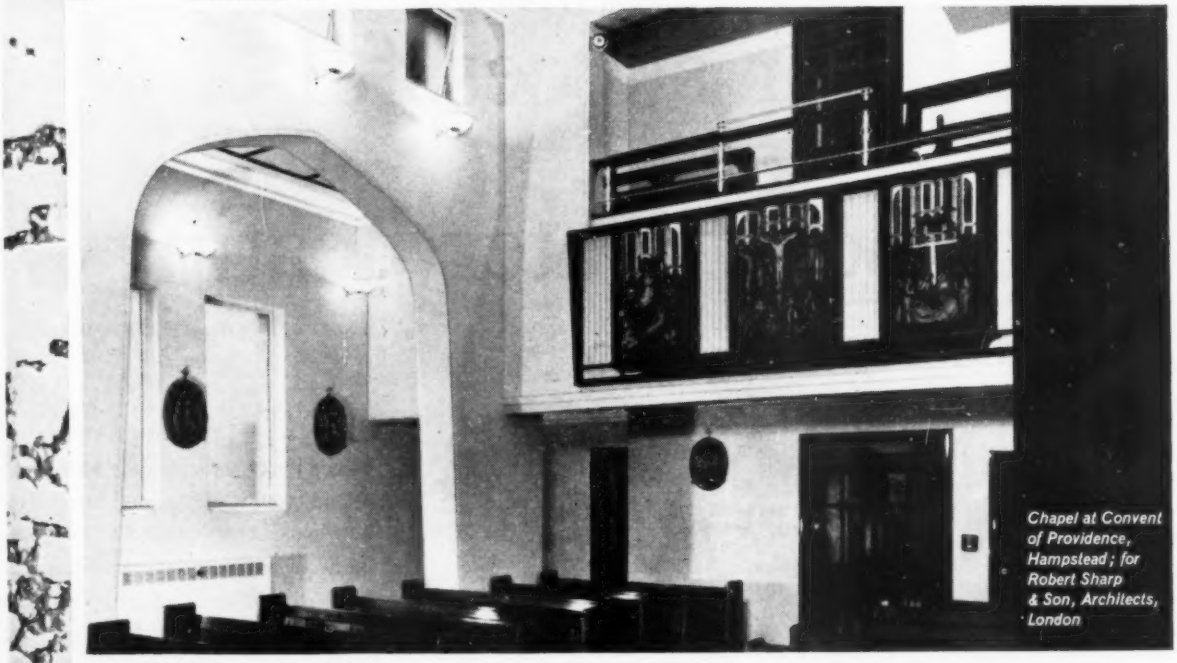
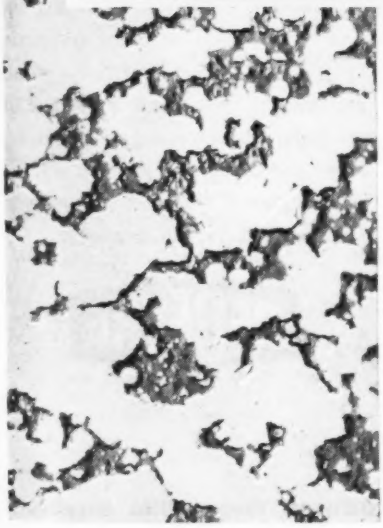


Chapel at Convent of Providence, Hampstead; for Robert Sharp & Son, Architects, London



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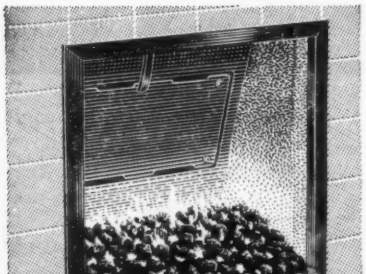
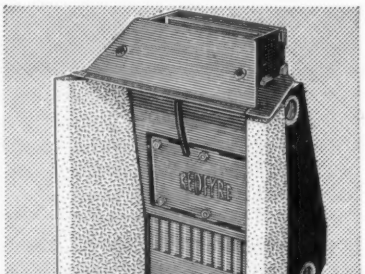


Redfyre 60



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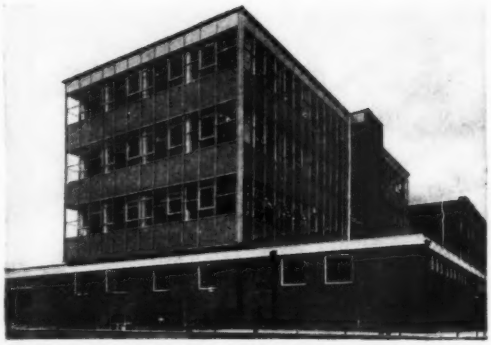

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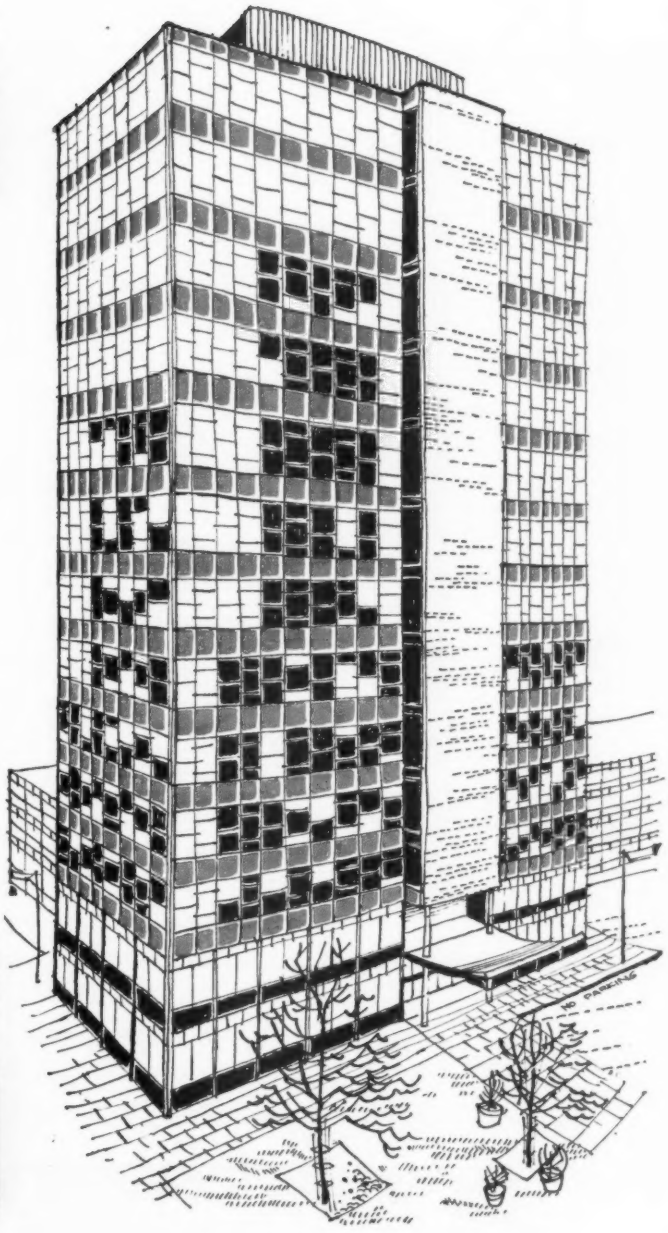

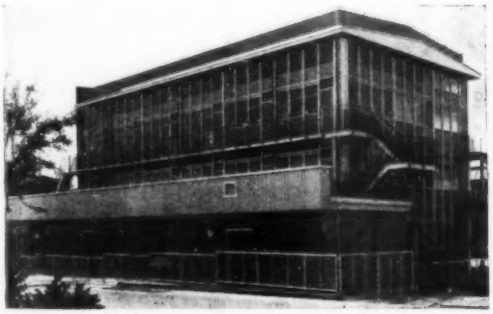

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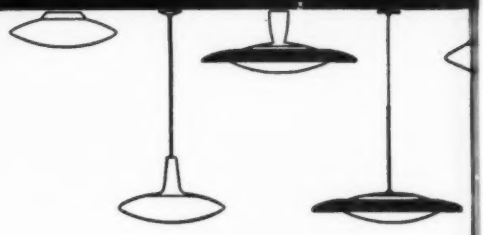
Registered Design Nos. 888702 and 888738.
Designed by Paul Boissevain, Dip. Arch. M.S.I.A.

elegance



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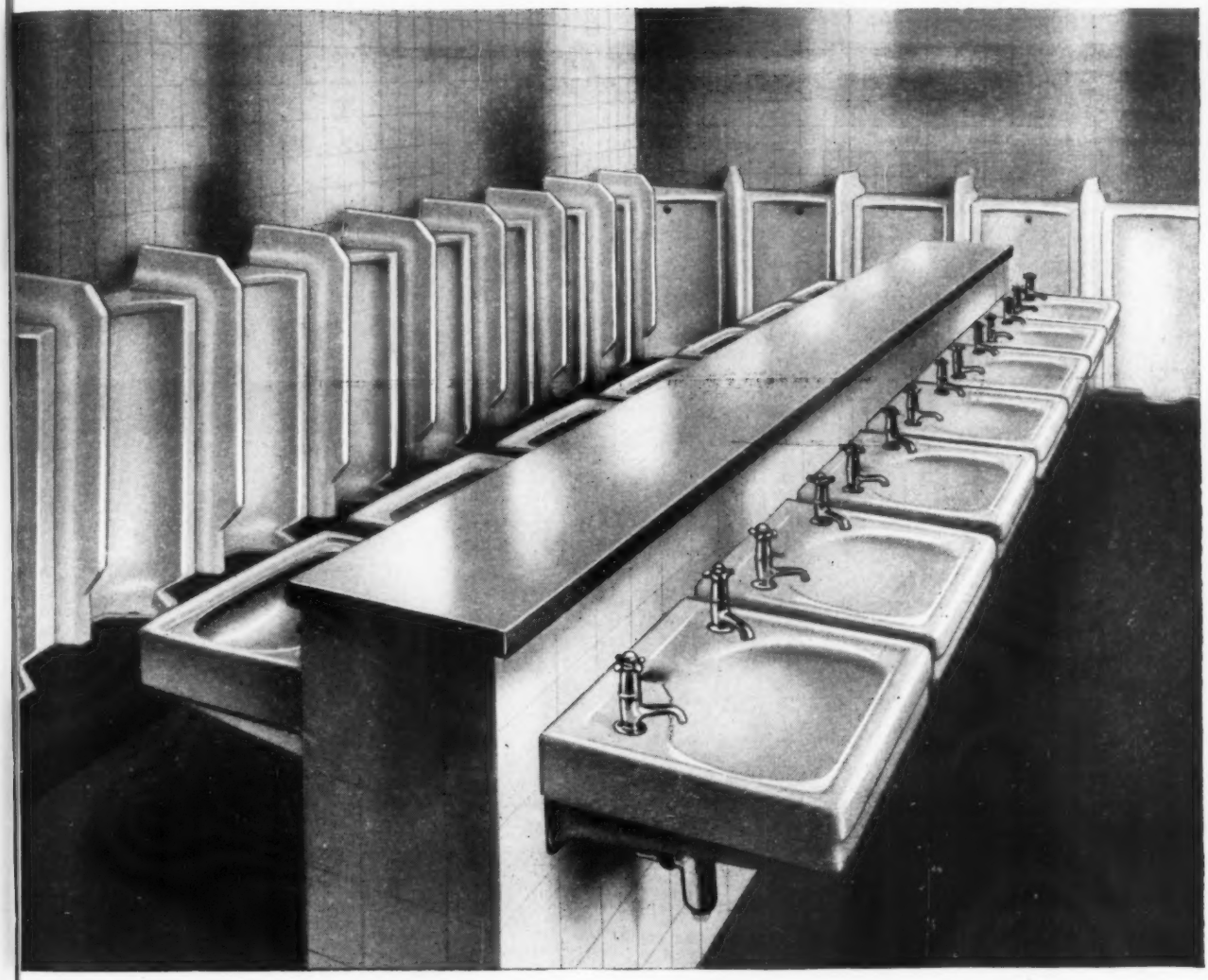
**FORMICA is a registered trade mark*



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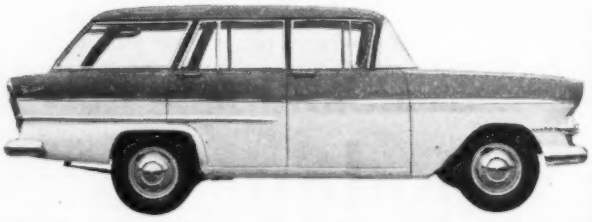

VICTOR ESTATE CAR

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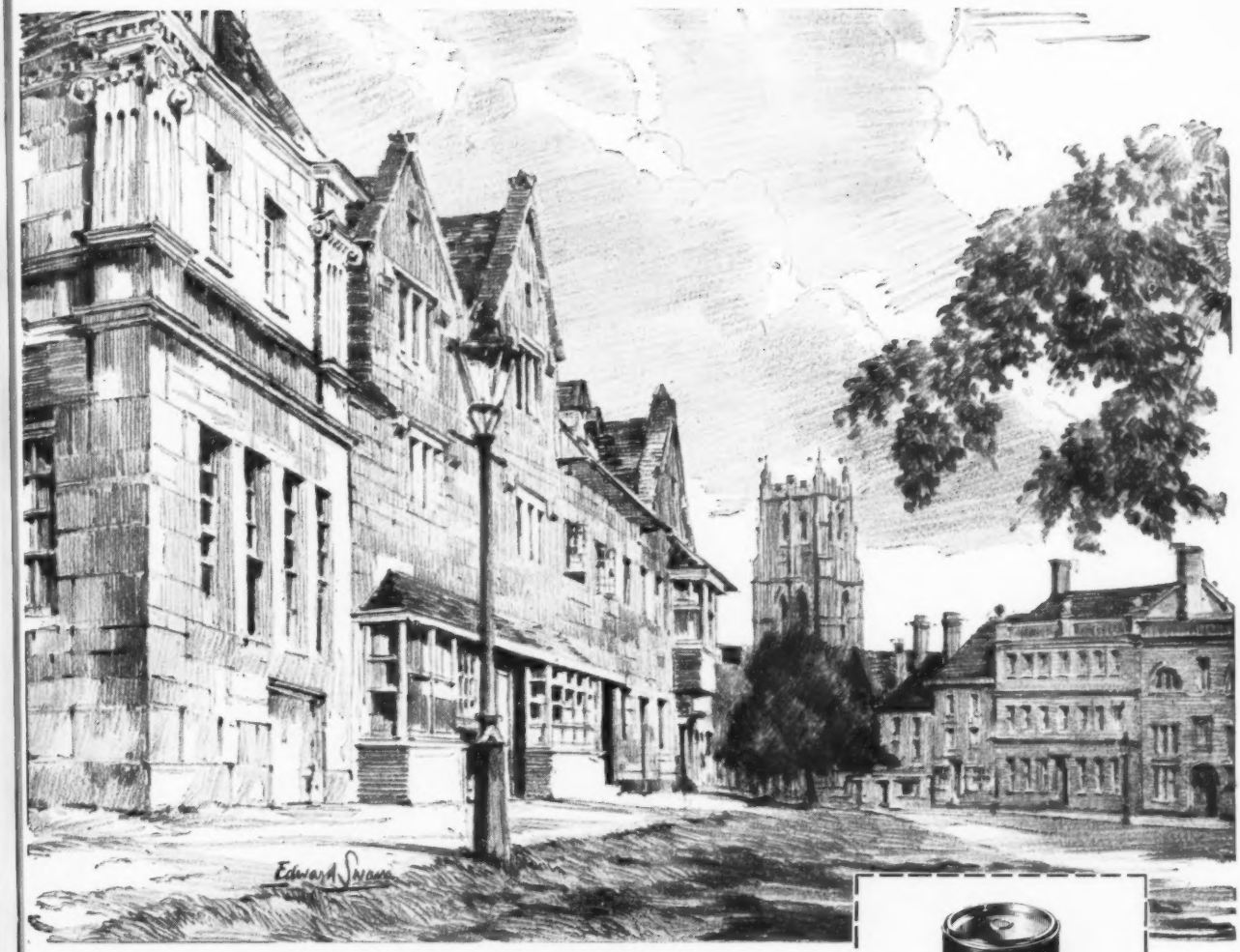

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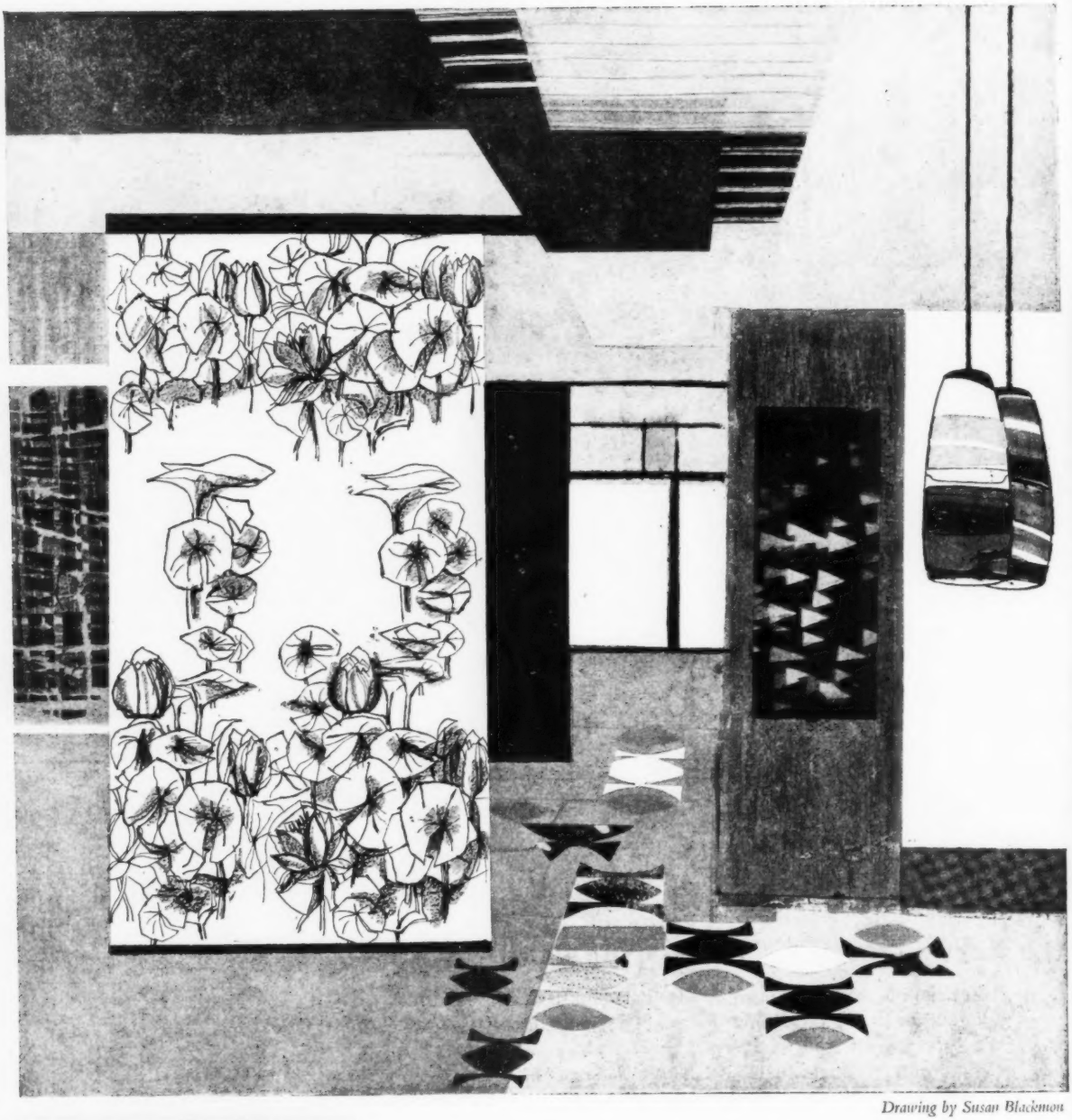

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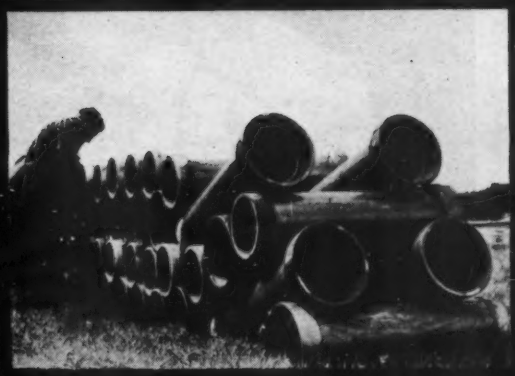

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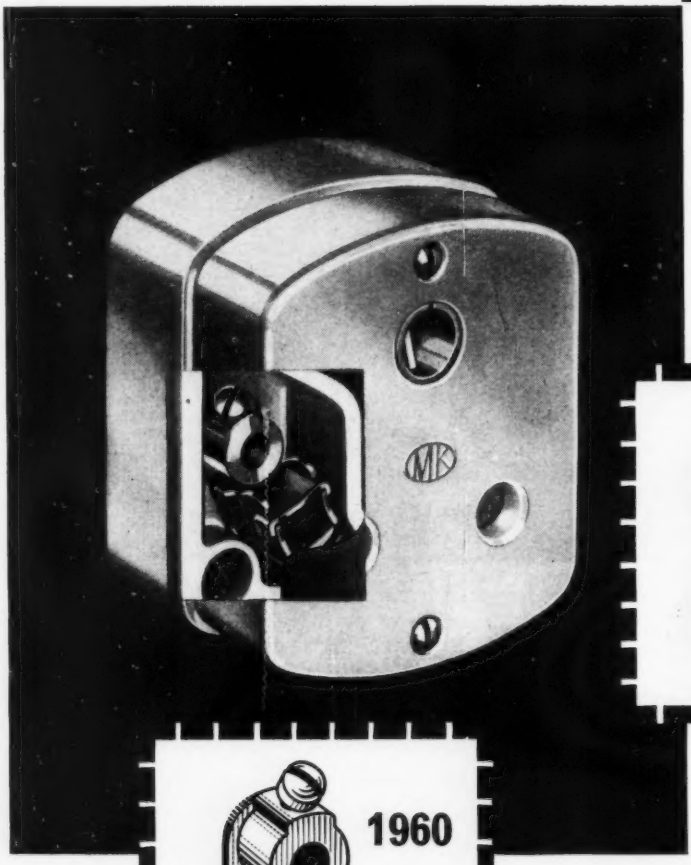

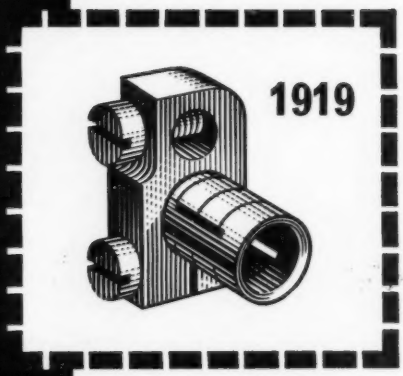

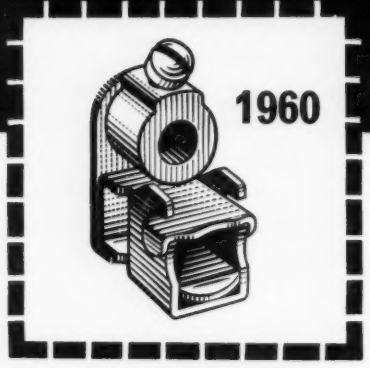

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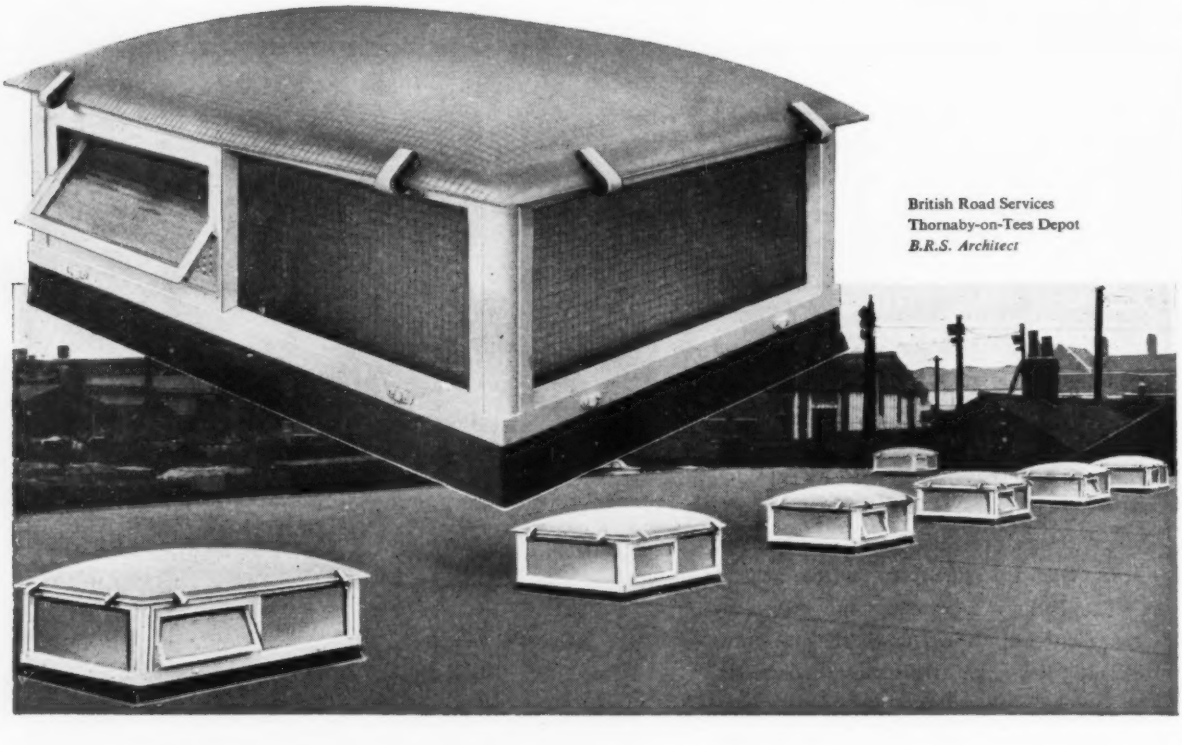

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To lighting fitting designers

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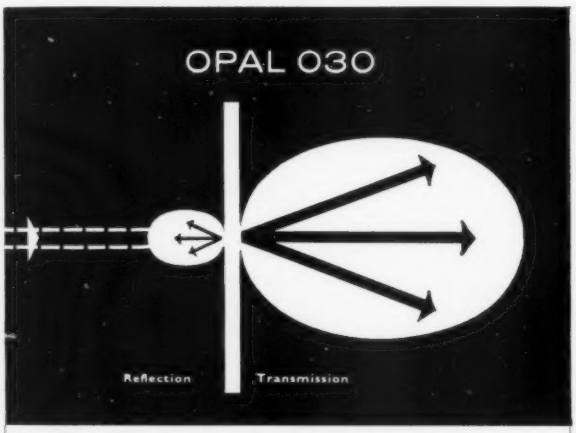
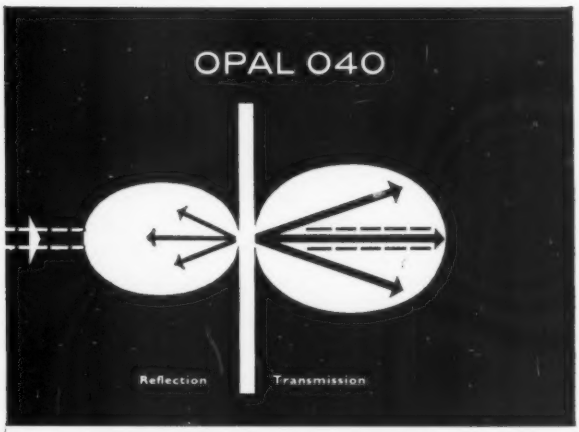
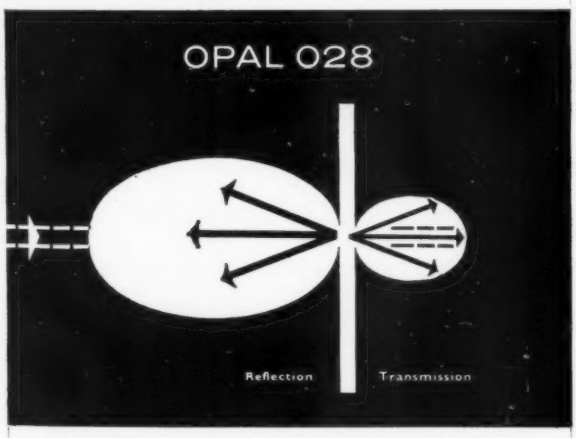


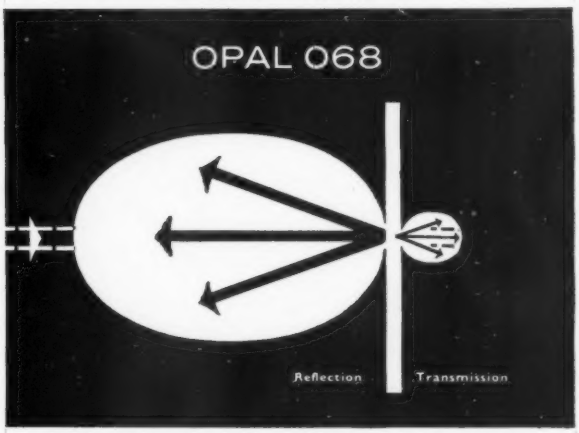
030 Transmission factor 0.78 Reflection factor 0.17
Diffusion factor 0.41



040 Transmission factor 0.55 Reflection factor 0.41
Diffusion factor 0.87



028 Transmission factor 0.28 Reflection factor 0.67
Diffusion factor 0.89



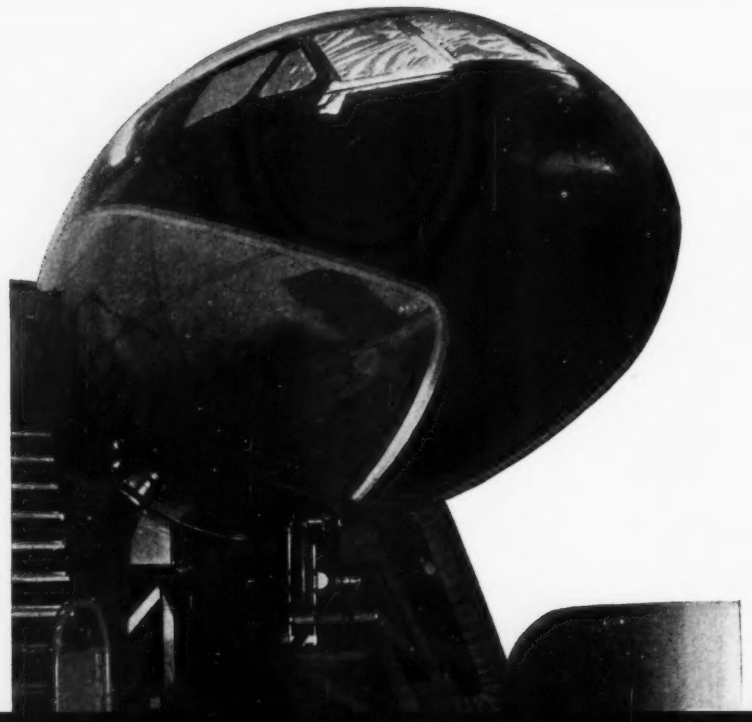
068 Transmission factor 0.08 Reflection factor 0.83
Diffusion factor 0.89

'PERSPEX'

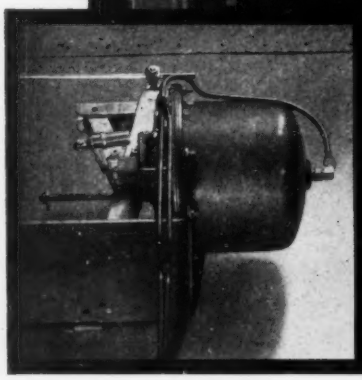
'Perspex' is the registered trade mark for the acrylic sheet manufactured by I.C.I.

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

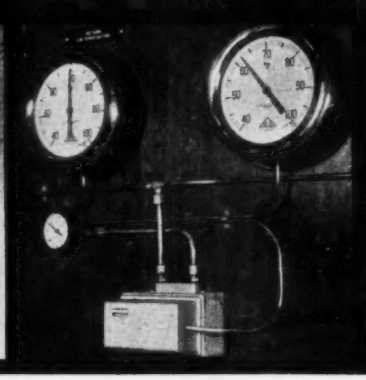
FP73



BOAC rely on Honeywell Non-Bleed Pneumatic Controls



The Honeywell Grad-U-Motor, for damper operation, with positive positioning feature.



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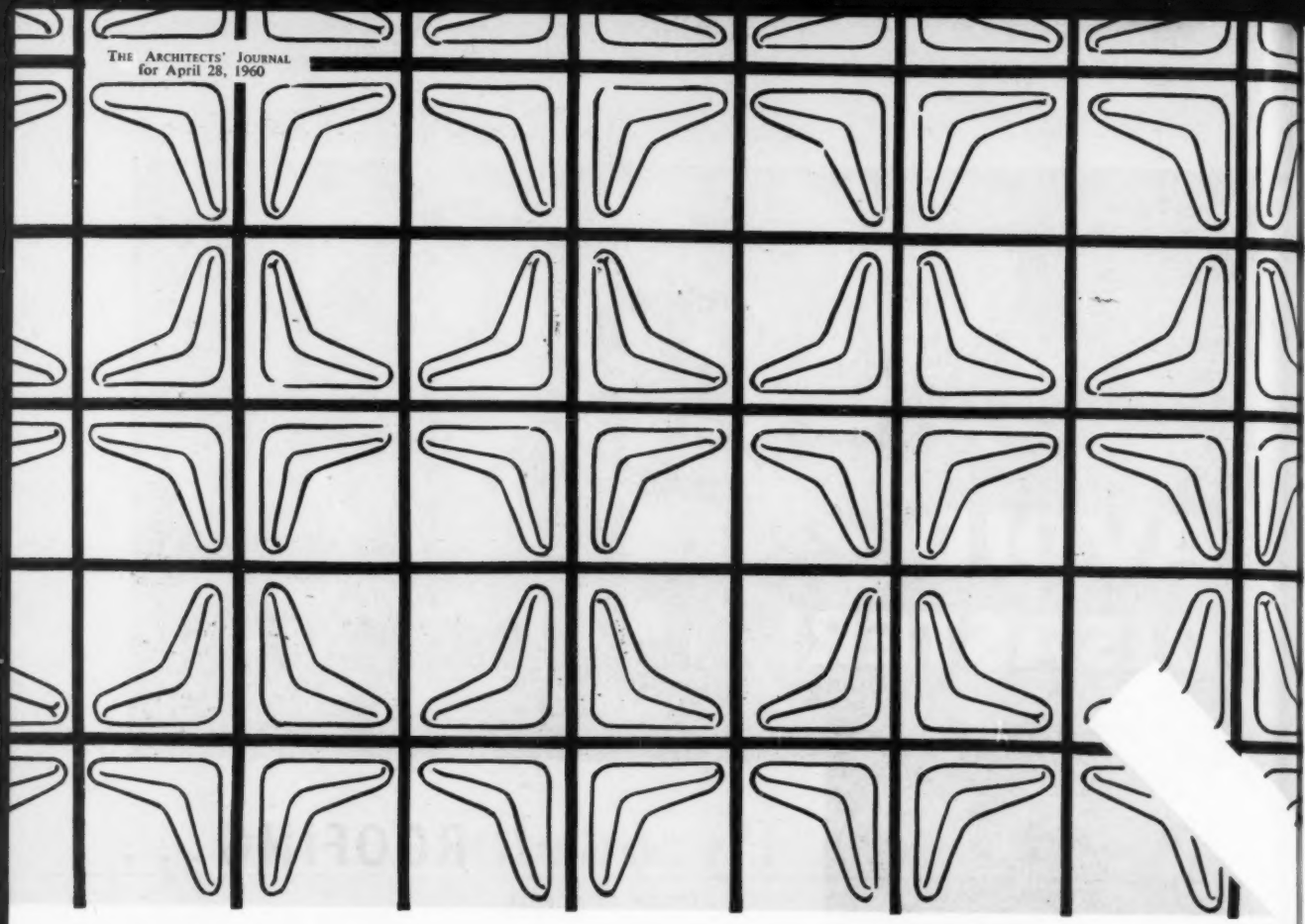
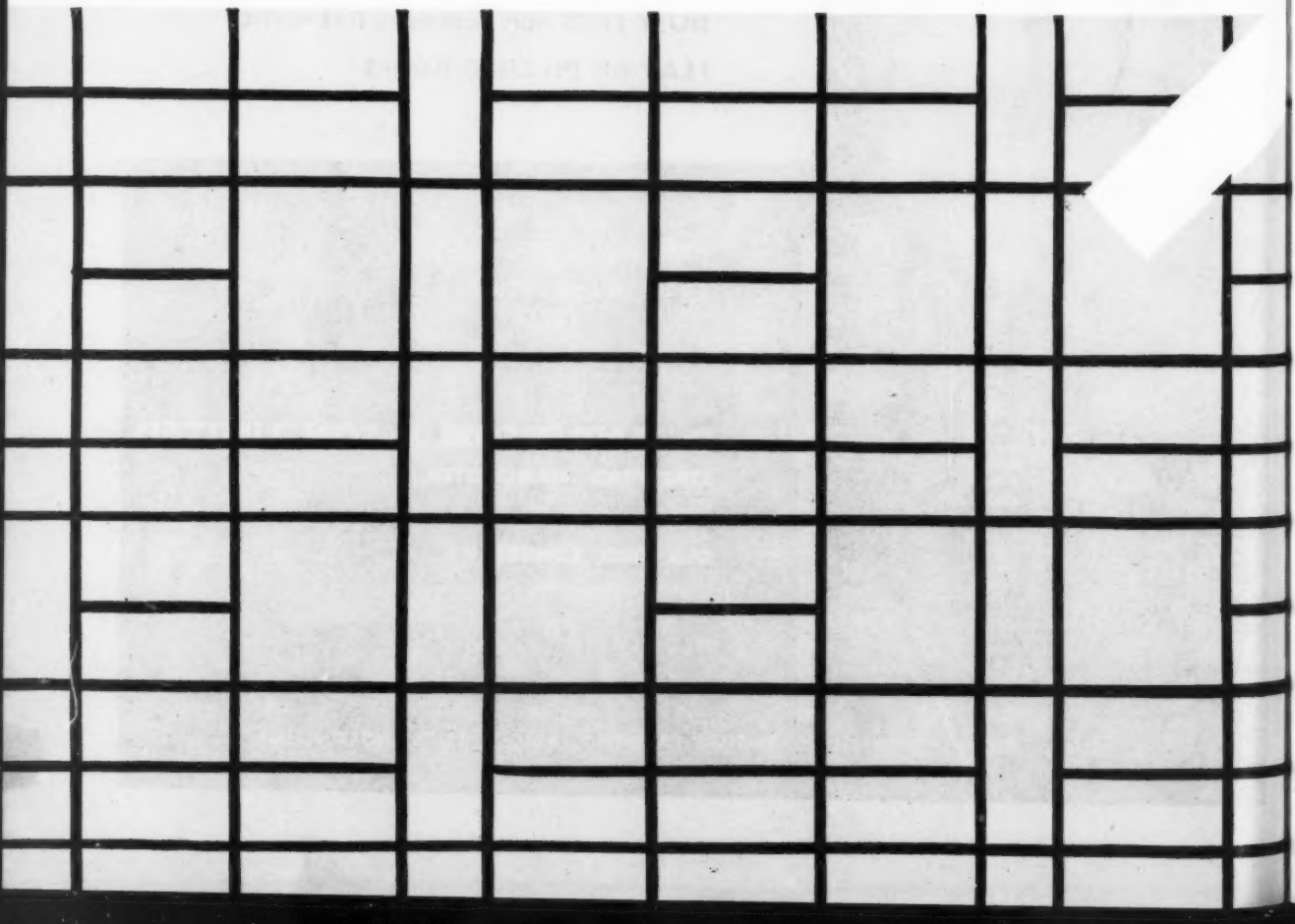


Walls of light come to life with 5 new 'Insulig



Now the modern designer can use Pilkingtons' 'INSULIGHT' Hollow Glass Blocks to build walls of light which add as much to the appearance of a building as they add to its efficiency. New 'INSULIGHT' Hollow Glass Blocks provide the elements for an unlimited variety of design patterns and, of course, these new blocks retain all the well-tried benefits of heat and sound insulation; deep light penetration; easily cleaned hygienic surfaces; fire resistance.

For full details of 'INSULIGHT' Hollow Glass Blocks in both standard and new types, write to the manufacturers, Pilkington Brothers Limited.

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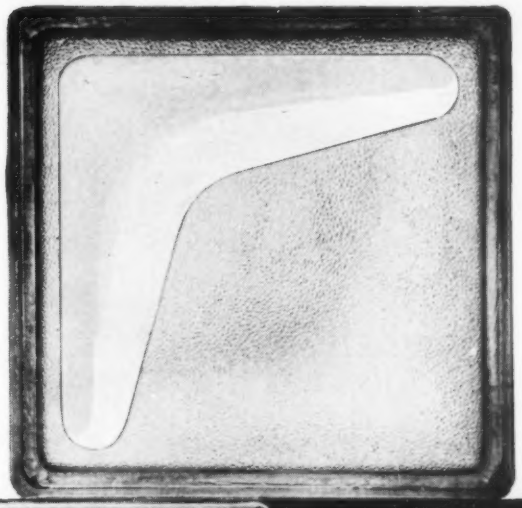
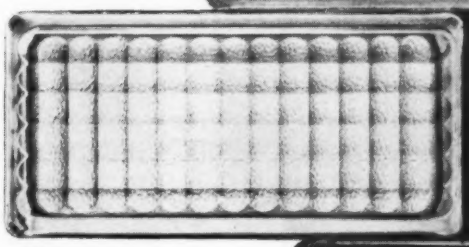
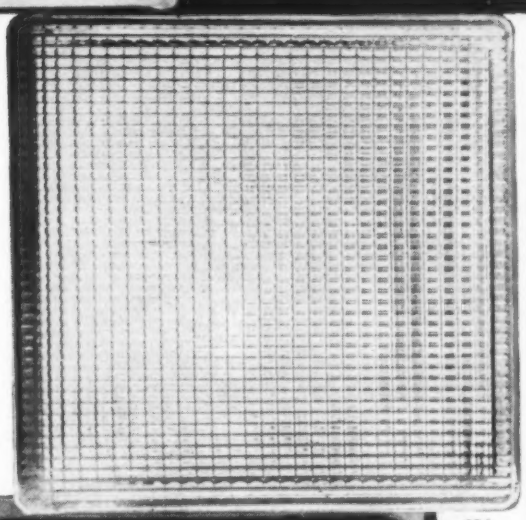




the 5 new patterns

ligHollow Glass Blocks



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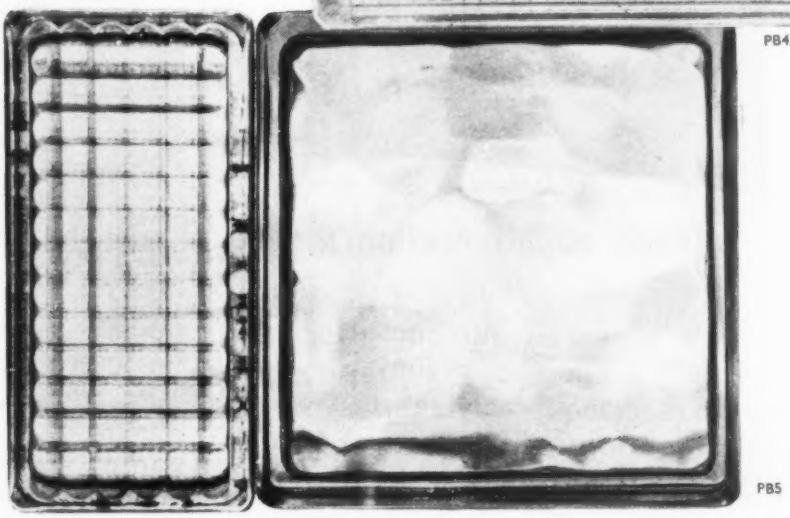
The new P.B.32 Half Size Block (in both standard and light diffusing patterns) can be fixed in various combinations, horizontally and vertically with full size blocks. Size: $7\frac{3}{4}$" x $3\frac{3}{4}$" x $3\frac{7}{8}$" thick.

P.B.5. FLEMISH The outside faces are smooth; the internal surfaces incorporate a 'Large Flemish' pattern. Size: $7\frac{3}{4}$" x $7\frac{3}{4}$" x $3\frac{7}{8}$" thick.

PB32

P.B.6 BOOMERANG A clear glass 'boomerang' shape stands out in relief on each of the outer faces. Capable of being built into many designs, one of which is shown opposite. Size: $7\frac{3}{4}$" x $7\frac{3}{4}$" x $3\frac{7}{8}$" thick.

P.B.4 PRISMATIC This Block combines all the advantages of Hollow Glass Blocks and Prismatic Glass. Light is refracted, reflected and uniform. Size: $7\frac{3}{4}$" x $7\frac{3}{4}$" x $3\frac{7}{8}$" thick.



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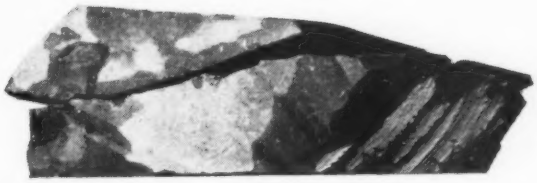

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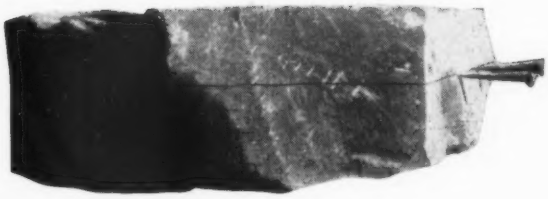

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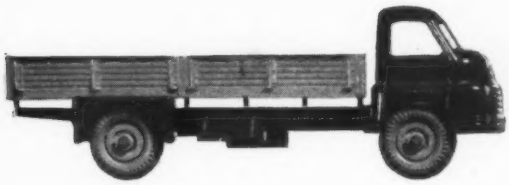

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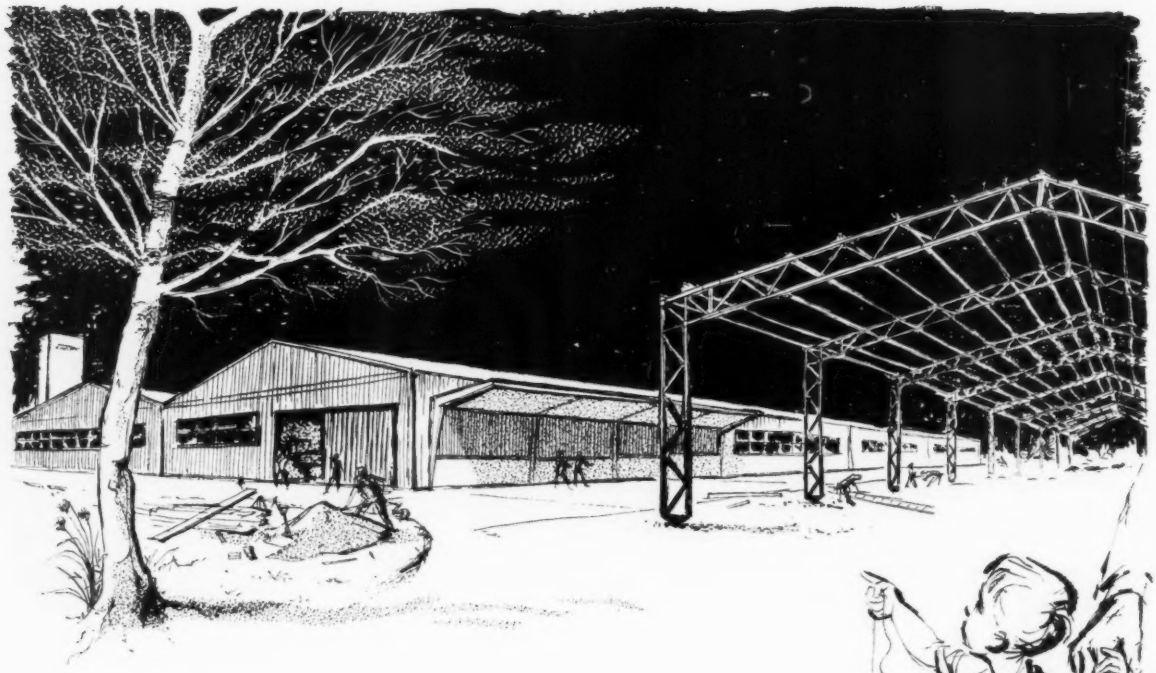

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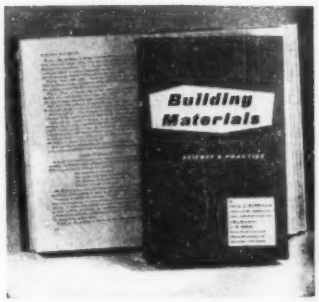
building materials by CECIL C. HANDISYDE, A.R.I.B.A. Foreword by A. H. MOBERLY.



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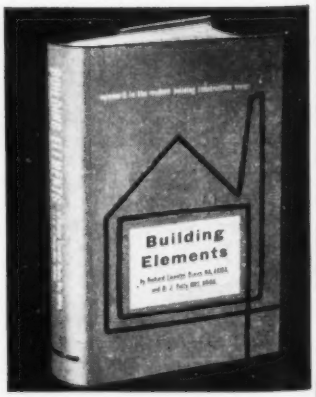

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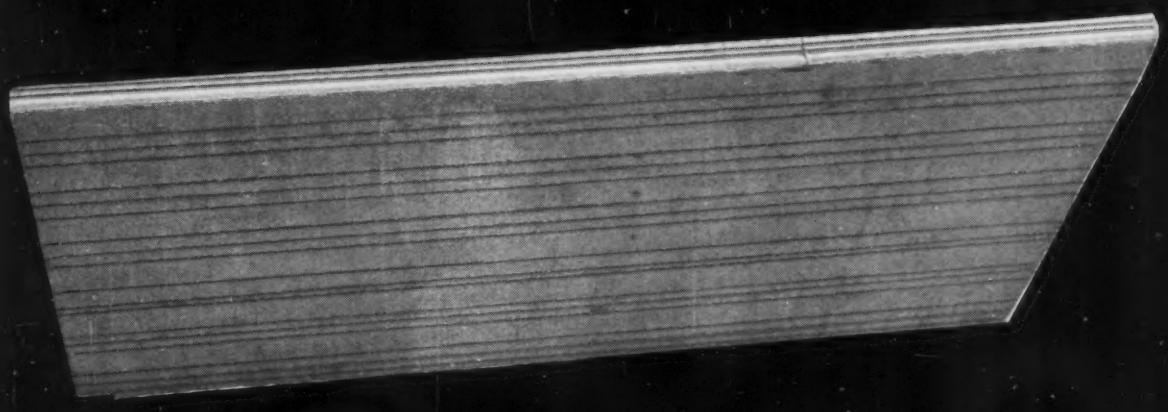

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NOT QUITE ARCHITECTURE

Models—Undraped

The architect lit his pipe and pointed at a haphazard heap of plans "Make a model of that," he said. I blanched. "How?" "You've got a penknife, haven't you, and go and buy some cardboard," he retorted.

I knew that as queen bee secretary in an architect's office I was supposed to draw, pacify clients, sort sub-contractors, place orders, keep books, deal with schedules, write letters, scrub floors, make tea, answer the phone and make myself generally useful, but models were an unknown quantity.

Needless to say, the one at issue was a masterpiece of a church, with a S-shaped roof and a delicate steel rod steeple. I took penknife boldy in hand and sharpened it smartly on the doorstep. I bought the cardboard—and paint, glue and wire and string and elastic bands and paintbrushes and a hacksaw blade. I ruined a perfectly good tee square, drawing board and set square and produced a slightly cockeyed but most realistic representation of the building in question.

All this happened some years ago and my life is a far cry from those days. Now I have found myself in command of a real firm of model-makers and more of a queen bee than ever. My staff are gentle with me and allow me to play with the circular saws and spray guns. This I do with a healthy respect both for them and the machinery. They are kind too when I give orders, as most of them are years older and male to boot, but they pander to my youth with good natured indulgence. Before this venture, the people I met had been comparatively normal—if unconventional—but staffing a modelmaking studio has taught me that this is not always the case. My extremely well integrated staff today includes architectural assistants, a woodcarver, a sculptor, a painter, the South London Yo-Yo Champion, a technical illustrator, a

Celestial Brollies

Architects have always sought inspiration from plant form, and it is a quixotic situation that now, when materials and techniques are enabling us to approach something near the refinement and economy of material of organic growth, that stringent building regulations, and a reasonable fear of too much elasticity, keeps our powers of emulation in check. These airy parasols, so clumsily if lovingly imitated, it would appear, in Caracas, at the Brussels exhibition and elsewhere are, of course, the familiar old lotus, the symbol of purity, the plant of Buddha, the fragile source of those ponderous Egyptian columns. . . . They are growing in the Kyoto gardens, Japan, and they have been photographed by Werner Bischof. An exhibition of Bischof's work is on view at the Building Centre, London, until May 11.

pattern-maker, two furniture designers, a girl who inconveniently faints at the sight of blood and a secretary who cooks.

The studio I found is a cellar in the West End. It is a condition of the lease that the words "The Basement" appear on the writing paper in letters of equal size to that of the rest of the address. If feeling depressed, it is just possible to regard this as a rather arty affectation.

Architects pop in and out with ever increasing regularity. Some just come to play, others to work and the remainder on the recommendation of their assistants to see for themselves the extraordinary life we lead. Two large rooms, one small noisy office and a left over bit that houses the mod-cons, cooker, crash helmets, buckets and what one would imagine were enough gumboots to last a healthy millepede for life.

The extract fan from the Italian restaurant next door pumps a really horrible smell, compounded of garlic and parmesan cheese, into our little well, and if we turn on our own extract fan diesel oil fumes are sucked in from the street traffic. Our own smells aren't so hot either—mainly chloroform, cooked rubber, scotch glue and varieties of paint, mingled with delicious ones of bacon, fried onions or roast beef. The latter occur when we decide to eat—which could be at any time of the day or night. One unsuspecting architect was recently handed some pink instant whip to finish up, and the window cleaner a bowl of liver gravy and mashed potato.

*

Some of the problems we encounter are formidable, especially when one is always working against time. A client requiring a model of the reconstruction of a particular Greek theatre had to depart for the U.S.A. before carrying out all the necessary research. This unenviable task fell to me. It involved reading two books at the British Museum; one written in 1879 in Greek and the other in 1891 in French. The first contained weird survey drawings annotated with obscure Greek measurements and the second was in metres. The answers to problems like these have to be found, and quickly too, and one's interest is continually maintained and general knowledge greatly increased by each new model constructed.

*

The difference in standard and durability of the professional model and that in an architect's office is considerable. Cardboard, paper and plaster are replaced by Perspex, Fibreglass and epoxy resins, and metal and timber play a large part.

There is much to be said for both types of model. That made in the office will certainly *seem* cheaper, and the professional job has the disadvantage that a reasonably complete set of drawings is required but the finished product has far more uses, is lasting, and with the infinitely greater range of materials used in its construction can give a much more realistic impression of the finished building.

The architect lights his pipe. "Make a model of that" he says. "We shall be delighted" I reply.

GILLIAN WORNUM

The Editors

WHERE'S THAT TIGER?

WE asked that the RIBA make stringent enquiries about the RIBA-Ideal Home Small House scheme in the JOURNAL of March 31. What we have learned since does little to reassure us.

Our complaint was that the prices of the RIBA-Ideal Home Houses being advertised were much greater than those published in the original *Book of Small Houses*: increases, in fact, of from 20 per cent to 60 per cent. Such increases, we said, suggest three things: extortionate prices of land, high builders' profits, inaccurate estimating. What we have been told by builder D. G. Howard (A.J., April 21, page 604) confirms our first and last points. A letter published this week (page 640) from the Press Officer of the NFBTE throws interesting light on the second. The builders are, he claims, making "substantial additions" to the original specifications, and he lists the extras: landscaping, additional rooms, higher standard fencing, wood block floors, additional equipment, larger stores and so forth. (The last point is not correct, incidentally, of the Baines house built by Mr. Howard, where the garage and store are 29 sq. ft. *smaller* than in the original design.)

Now all this may be reasonable endeavours on the part of the builders to produce a more saleable article, but the fact remains that substantial increases of standards have put these houses into the price range for which a large number of small architectural firms have hopes of obtaining commissions. And even more important, it means that there are no designs available, priced at the £2,000-£3,500 level, which is the type of spec housing most in need of good design. The main object of the RIBA's largely altruistic endeavours have been frustrated. The sooner the RIBA and the Ideal Home produce a second scheme the better. Let it be aimed more precisely at the low-cost housing market, and with safeguards to prevent such action by builders as referred to above which, however well intentioned, abuse the objects of the RIBA's scheme.

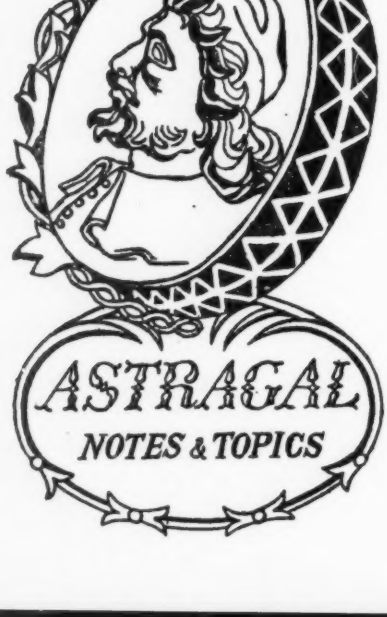
FIRM PRICE TENDERING

Is firm price tendering a success? To try and find an answer, *The Contract Journal* made a survey amongst official architects. Their views were published in the issue of March 29. According to the survey these architects, with one exception, are satisfied that firm price tendering is a success because (*a*) it can be achieved at the cost of only 1 per cent increase over rise and fall tenders and (*b*) it reduces administrative costs to both architect and builder by simplifying the process of settling the final account. Is this enough? In the first place any saving in administrative costs to the architect could be cancelled out by the extra cost of "pre-contract planning" which the NFBTE rightly considers an essential ingredient of firm price tendering and seems to think is not sufficiently practised by architects.

The real object of firm price tendering surely is to *reduce* costs, not increase them by 1 per cent. This is done by increasing the efficiency of all concerned in the building industry (architects and builders alike) by *forcing* them to plan. For the architect this means providing all documents *at tender stage*. For the builder it means obtaining quotations from subcontractors and suppliers at tender stage, then settling subcontractors, ordering materials and preparing a site progress schedule *as soon as the contract is let to him*.

The call to architects by a former president of the NFBTE for full documentation before work starts on site is clearly to the point, though it would be more effective if everyone was agreed on what is meant by this term. Clause 7 of the Code of Procedure for Selective Tendering is not sufficiently explicit. Only one architect questioned in the survey attempted to clarify it. All, of course, agreed that, whatever is meant by it, it is desirable; though two quite justifiable excuses were put forward time and again to explain why it is not always achieved. The first is the shortage of qualified staff and the second the failure of Government departments (with the exception of the MOE) to announce their programmes sufficiently far in advance.

Of course it is necessary to know, as the survey has shown, that firm price tenders are generally only one per cent higher than rise and fall. But this is only half the story. It is now necessary to compare the finished cost with the tender of a number of rise and fall contracts over the past two or three years and see whether the increase is greater than one per cent. If it proves to be so, then, and only then, can we really say that firm price tendering is a success.



BUILDERS' LOSS

Do builders get smaller profits when they employ architects? Last week we published a letter from D. G. Howard, the managing director of a house-building firm, who said many builders believed this to be true. It wouldn't surprise me. The good architect wants to see the user getting the best possible value for money, so he may well be responsible for profits not being as unreasonably high as they might be. I was appalled to hear from an architect in a major spec. house-building firm of the superficial way gimmicks are advertised to promote sales and boost profits. If a cheap dishwasher or similar gadget is installed a house can be advertised as ultra-labour-saving and thus produce a profit of hundreds of pounds. This is not roguery; it is simply good business. But it is contemptible, nevertheless, and I can't imagine a good professional man condoning such a practice.

ARCHITECTS' GAIN

An interesting side issue on the matter of the RIBA/Ideal Home small house costs on which readers and Editors comment this week is the matter of the *architect's* profits. Grenfell Baines says that if sales of plans go on (AJ, April 14) " this job will pay us as well as any other part of our work ". A cautious phrase, perhaps, but innocent enough until Mr. Baines' builder states (AJ, April 21) that he is paying the new RIBA scale of fees to Mr. Baines—£250 for the design plus £50 for each house. I suppose with both the RIBA fee and the Ideal Home fee Mr. Baines should be able to keep a small wolf from the door.

GADGETS-FOR-LIVING-IN

While we're on the subject of not-so-cheap houses, let me call your attention to 44 really glossy homes you can find in America's *Second Treasury of Contemporary Houses**. I use the word " home " in spite of Miss Nancy Mitford, because it is the American word for " house." But as you plough through this book, admiring luxurious finishes and ingenious detailing, you discover that homes are what these houses are not. They are as homely (though less solid) as Blenheim and remind you of the writing lounges in the best appointed airports. The titles are frightening: " Patio Splits Two Zone House," says one of them. And it certainly does: bedrooms in one zone, day rooms in the other, and 40 degrees of Connecticut winter frost in the open patio between!

*

For the student of Organization Man this lavish book is well worth the $7.75 his public library will have to pay for it.

CLASP IN THE CINEMA

Last week I mentioned Britain's first official contribution to the Milan Triennale—a three-class primary school designed by Notts CC Architects Department in CLASP construction. I have now seen a film which shows the construction of a typical CLASP school. This film, which is available to schools of architecture, was made by the manufacturers of the school's steel frame (Brockhouse Steel Structures Ltd.) who have collaborated closely with the architects on all CLASP projects. Other

* F. W. Dodge Corporation.

firms please copy. But when you do, don't leave any facts out. In showing us, with sound and colour, the building of Tuxford Secondary Modern School, Brockhouse have omitted progress shots of column seatings, beam connections and other things that would have made their film a really valuable instructional work.

BUILDING PLANT

After H. Taylor had spoken to the Institute of Landscape Architects about the work of his profession the other day his audience discussed the question of collaboration between horticulturists and landscape architects. It was clear that some of the landscape architects present felt they were not doing their jobs properly unless they knew all about horticulture. But Dargan Bullivan sensibly suggested that the horticulturist had a similar part to play as the technical specialist in architecture. Just as an architect had to go to organizations such as BRS or to manufacturers with specific skills, so the landscape architect had to consult horticulturists and nursery men specializing in particular groups of plant material. The Institute's president summed up by pointing out that while the horticulturist was concerned with the plant for its own sake, the landscape architect was interested in it as an element in the landscape.

LET'S BE DIFFERENT

We've been asking for it, of course, with all those requests for standard paper sizes and easy fileability. At last a trade paper has kicked over the traces and gone from near-conformity in paper size to outrageous nonconformity and is being printed square: 11½ in. by 11½ in. The name of the paper, and there is a certain irony about it, is *The British Clayworker*, the journal of the brick and tile industries. The editor firmly defends the change (it is common in America, apparently—shades of FLW) as "appropriate to a technical journal such as ours." And it enables the type size to be larger, gives the editor a freer hand with illustrations, and, by some unexplained miracle, enables him to devote more space to editorial content.

*

Now who was saying brick sizes should be changed . . .?

INSPIRED TECHNICIANS

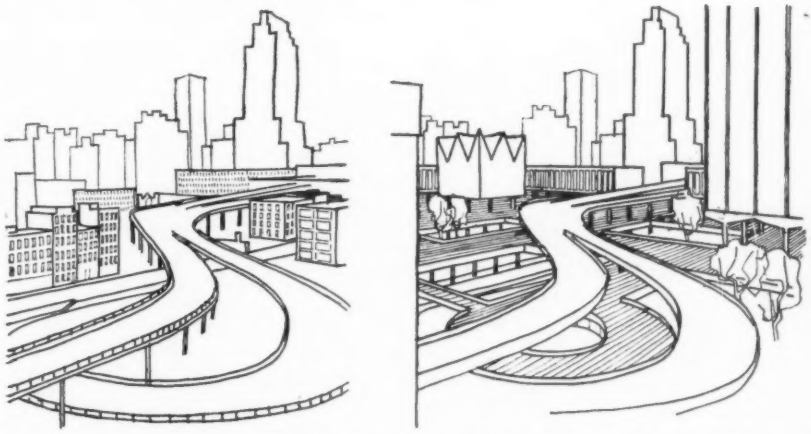
That extraordinary body ABT, so long dead and so blissfully unaware of it, has produced a most lively article

Architects fascinated by photography, and they are legion, are recommended to visit the all too-small exhibition of Werner Bischof's work now on view at the Building Centre. The reproduction above does not do justice to the original which, by the quality of the print, emphasizes the snow flakes settling round the Shinto priests as they struggle across a courtyard of the Meiji Temple, Tokyo.

on the subject of roads and urban renewal in its winter number of Keystone. The illustrations below are from the article. They show the approaches to New York's Central Bus Station as they are, left, and as they might be, and are intended to demonstrate that substantial associated redevelopment, related to the scale of the new road, is essential if the motorway is not to disrupt the urban scene. And also that a pedestrian deck as a complement to the road works, "can humanise the scene by giving the human being as much visual, practical and financial importance as the machine."

*

The authors also make the sensible suggestion that in conurbations, expensive motorways should have comple-



Approaches to New York Central Bus station redesigned by ABT, see "Inspired Technicians," above.

mentary tracked transport (tubes or monorails) provided alongside, to ensure maximum advantages for both public and private transport.

REGARDY LOO

Which English tyrant placed a heavy tax on soap? Which English king declared that if he were not a prince he would like to be a plumber? Which French King granted audiences from his splendidly upholstered Royal Stool? Who, when reprimanded for the grubbiness of her hands, remarked: "Ah, Madam, if you were to see my feet"? To whom do we owe the expression "spending a penny"? How many water-flushed public latrines did Rome possess in AD 315? When were night clothes first worn in England, and when was "teeth brush" first mentioned? In whose reign was it good manners to yell "Gardy-loo!" (*Gardez l'eau*) when emptying pots from windows?

*

You will find the answers in *Clean and Decent: the Fascinating History of the Bathroom and Water Closet*, published by Routledge and Kegan Paul at thirty bob. It is the work of architect Lawrence Wright, who, you may recall, organized and designed that memorable *Clean and Decent* feature at the Building Exhibition. The AJ is involved and the author gives "special acknowledgment" as "the frame work from which the book grew" to H. A. J. Lamb's historical survey of sanitation in the AJ for 4.3.37. Unlike the late Reginald Reynold's well-known *Cleanliness and Godliness*, which, though extremely witty, had the serious didactic intent of the compost crank, Mr. Wright's sole purpose is "to entertain, even if scholarship does keep breaking through."

*

There is one thing on which I disagree with Mr. Wright. He says that we have nothing to surprise our grandfathers in the bathroom. This may have been true when the book was being written, but in the last few months there has been a small revolution in the design of bathroom equipment. In fact we are already hearing about the "new sculptural form" of washbasins. These new basins are not only better to look at than the usual squared-off standard product; they are also easier to keep clean.

ASTRAGAL

LETTERS

William D. Bryant,
Public Relations and Press Officer, NFBTE.
Richard J. Nichol, A.R.I.B.A.
Arthur M. Edwards, A.R.I.B.A., A.M.T.P.I
Ed Lewis, A.R.I.B.A.

Higher Standards, not Profits, increase Small House Costs

SIR: Your leading article of March 31 on the RIBA/Ideal Home small house competition states baldly that clients who have bought the first houses put up under this scheme are, to use your own words, being made to pay through the nose and that the builders who built them are, again using your words, making fat profits in the process.

In view of these statements I have done what I should have expected any responsible journal to do, namely, asked the builders concerned for a full explanation of the differences between the initial published prices of the competition houses and the prices at which they were sold. The replies show that substantial additions were made to the original specifications on which the estimated prices were based. For example, such extras as landscaping, additional bedrooms and bathrooms, fencing to higher than normal standards, cork and polished wood block floors, larger patios and stores, covered side entrances, additional kitchen equipment and components, built-in wardrobes, warm-air heating systems, etc., were not allowed for in the initial estimates and were responsible for the alleged inflation of costs.

In addition, such items as road charges and legal fees were not initially included and nothing was allowed for the cost of the sites, which is a substantial item on its own, particularly in the more favoured areas.

When these factors are taken into account, it will, I think, be established that your statements—which have caused a considerable amount of unnecessary annoyance and distress to a number of reputable house-building firms who had gone to much trouble and extra expense to make this scheme a success—are misleading, if not mischievous.

One has come to expect higher standards of fairness and journalistic competence from the building journals than from less responsible sections of the Press. Your leading article does not, I feel, measure up to these standards.

WILLIAM D. BRYANT

London

Mr. Bryant precedes his argument by misquoting us. We made no assertions about builder's profits, only surmised them. And we note that Mr. Bryant, even after making enquiries, does not deny either a fat profit or confirm a reasonable one. The main argument of this letter is referred to in this week's leading article on page 637.—THE EDS.

Higher Royalties for Architects

SIR: There are two questions raised in your leading article on the small house scheme: firstly, is the price to the public reasonable? Secondly, is the architect getting a fair crack of the whip?

We have no observation on the first question. The builder's costs depend on the cost of building, land, services and overheads. The final price depends on these items, together with the pressure of local demand. It is impossible to make an intelligent comment on the prices charged without carrying out a detailed analysis of these matters. For such an analysis it is necessary to know the facts. No business can be expected to publish such information.

On the second question, we feel that the royalties offered are unreasonably low so far as the speculative builder is concerned. They are acceptable in the case of the first job. (If they were placed any higher the individual purchaser would not be attracted.) But a charge of £8 for repeats, of which the architect gets £6 is surely too low. The architect ought in all conscience to receive more than approximately 0.11 per cent. of the sale price. We doubt whether authors or pop singers would agree to such an arrangement. (One of us has recently signed a contract with a publisher in which royalties vary from 10 per cent. to 15 per cent. according to the number of books sold.)

We suggest that there should be no reduction in the £15 charge for repeats of any one design, but that within this figure the amount released to the architect by way of royalty should be increased. The sponsor's overheads reduce after the first issue of drawings, and this reduction should be passed on to the architect.

RICHARD J. NICHOL
ARTHUR M. EDWARDS

Welwyn Garden City

A New World Order

SIR: In a month the Summit will be meeting, and it may well be asked in what practical way architects and town planners from both sides of the Iron Curtain may make their own contribution towards peace and progress.

At the International Architects Conference held recently in Moscow, which I attended, and more recently still when Russian architects and town planners were visiting Britain under the aegis of Lord Attlee's Anglo-Friendship Association, interest was shown by both sides in a project for joint Anglo-Russian Architectural Co-operation in the underdeveloped countries, it being held that since East and West worked well together to beat Hitler, the quicker a revival of this war-time co-operation could be started in order to beat world poverty and help create the beginnings of a new world order, the better for all concerned.

May I therefore request the courtesy of your columns in order to invite architects and town and country and regional planners interested in joining a committee for this purpose to be kind enough to contact me at the address below.

5, Lambolle Road, ED LEWIS
London, N.W.3.

LONDON TRAFFIC

The "B" Ring Revived

In the long-ago of 1943, the Abercrombie County of London Plan proposed three ring roads for London. The "A" ring, roughly ten miles long, was to consist of improved existing streets, linked by tunnels under the Thames and under Hyde Park; while the "C" ring was to comprise the North Circular Road and an improved South Circular Road—linked by a Thames tunnel near Woolwich.

The "B" ring, however, was to take the form of a limited-access road—or in other words of an expressway or motorway. (So was the "D" ring proposed in Abercrombie's Greater London Plan.) The "B" ring was to be about 25 miles in length.

Although the "B" ring motorway proposal was supported by the Architect's Department of the L.C.C., it evidently never found favour with the Engineer's Department. In 1955, F. A. Rayfield, the L.C.C. Deputy Chief Engineer, presented a paper to the Institution of Civil Engineers outlining a proposal for an "A" ring motorway encircling Central London. This was to be only 11 miles in length, but was then nevertheless estimated to cost, with connecting spurs, about £130,000,000. This estimate has since risen to £150,000,000.

In his paper Mr. Rayfield criticized the authors of the County of London Plan for their "B" ring motorway proposal, which they claimed "would serve as a by-pass to central London, warding off the through traffic some distance away." "The Plan gave no estimate of the proportion of such traffic to the whole," he says, "and its authors, despite engineering advice that it would be small, seemed to have assessed it as high." The "B" ring motorway proposal—or rather something very much like it—has now been revived by the British Road Federation in a memorandum entitled "London Road Programme Proposals" which they have submitted to the Minister of Transport. This was revealed to the world at a recent press conference.

The B.R.F.'s "B" ring would be 25 miles long. It is estimated to cost, in the form proposed, some £83,500,000—of which £21,000,000 would be for the tunnel under the Thames close to the Rotherhithe tunnel. A small section of it coincides with the Abercrombie "B" ring; and most of the Western and Northern segments of it coincide with the route of a motorway proposed by the Association of Metropolitan Borough Engineers and Surveyors. The A.M.B.E.S. proposed that much of their motorway should be built on stilts over railways; and they estimated that a 6-lane motorway built in this way would cost only £2,500,000 per mile—an estimate which the B.R.F. has accepted.

If this figure is accepted, the B.R.F.'s "B" ring would cost very much less than Mr. Rayfield's "A" ring motorway. However, he may be right in asserting that a "B" ring motorway would serve less traffic than the "A" ring which he proposed. The B.R.F. is unable to produce any traffic figures to show how much traffic would use the motorway.

It is apparently envisaged that there would be only 11 interchanges on their ring—an average spacing of one every 2¼ miles. This wide spacing would certainly reduce the value of the motorway.

Both proposals—the B.R.F.'s and Rayfield's—in fact leave wide open the question of what would happen inside the ring motorways. The B.R.F. apparently accepts (for the time being at any rate) the proposals for the central area of London proposed by the London Roads Committee. This seems strange considering that these proposals are for roundabouts and immensely costly road widenings; and one of their spokesmen has said, in a letter published in the *Daily Telegraph*, that "it is far less costly to build from scratch an urban motorway over 'backyard' lines and maybe over a railway than it is to push back the expensive frontages of existing streets to provide a road wider, but little less congested, than before." This implied criticism of the L.R.C. proposals for the central area does not seem to have been followed up consistently in their own proposals to the Minister. Their own spokesman said at the press conference that it would be necessary to alter the entire road pattern within the central area; but they have not told the Minister this. Their scheme is at best a half-baked one.

NIGEL SEYMER

BID

President Supports Standardized Trade Literature

Kenneth J. Fisher, chairman and managing director of Sharpe & Fisher, a Cheltenham firm of builders' merchants, was invested as president of the Building Industry Distributors on April 6. The significance of this to architects is that Mr. Fisher is a keen believer in improving the standard and format of trade literature, and he feels that the BID could, and should, work on the problem together with architects and builders.

OFFICE LIGHTING

PSALI further developed

Our specialist editor for Lighting (15) writes: A paper on this title, given on the 12th of April by L. H. Hubble of AEI to a joint meeting of the Association of Supervising Electrical Engineers and the Illuminating Engineering Society, was essentially the product of practical experience in the lighting of new office buildings, and the remodelling of existing installations. From this experience Mr. Hubble had one or two salutary things to say which were of interest to architects.

After dealing with the fundamental basis for lighting design in terms of both quality and quantity, he briefly considered the BRS work on permanent supplementary artificial lighting, that is to say the technique of "topping up" daylight with fittings left switched on in the daytime. His own personal view went far beyond that of BRS; he believed that since the case for such supplementary lighting had now been made, it was difficult to disregard any longer the concept of lighting as a single function, with choice of source being either natural or artificial, depending both upon the requirement and availability. In other words, he saw no reason for sticking to daylight on amenity grounds. He then showed that the standard practice adopted by many electrical engineers in the design of office lighting layouts could in fact lead to poor working conditions in the typical interior, due to the setting out of fluorescent fittings in a rigid pattern, causing unwanted shadows and glare. He suggested that a more fluid type of layout, with fittings set alternatively at right angles, could overcome the problem. The case, therefore, he was implying, was for electrical engineers to pay much more attention to detailed design, and to avoid the set solution.

The final part of Mr. Hubble's paper, however, concentrated upon practical ways and means of achieving good office lighting. In this, he was very much concerned that there should be a proper integration of the various elements within the ceiling, including structure, heating, ventilation and lighting. He was well aware that such integration was essential so as to reduce the non-usable volume occupied by these services to a minimum. But how could this be achieved? By a closer fusion, said Mr. Hubble, of architect and engineer, or perhaps we might see the emergence of a "co-ordinator". Some of the best work in this respect, he claimed, came from the large contractors, whose design staffs consist of closely knit teams led, significantly, by a co-ordinator. The first reaction of the architect to this is that Mr. Hubble has come to the wrong conclusion for the right reason. But on reflection you might regard Mr. Hubble's remarks as really being yet another occasion when it has been recognised that the traditional function of the architect no longer suffices in the face of current technology; he must become that co-ordinator or disappear.

HOUSING CENTRE

'The Nottingham-Derby Urban Area—a planned Conurbation'

A project for the planned conurbation of the Nottingham-Derby Urban area was presented by students of the department of Town and Country Planning of Nottingham College of Arts and Crafts at the Housing Centre on April 5.

John Toon introduced the project on behalf of the group of eighteen senior students who had co-operated in the design. He explained the background to the scheme and the ideas which had stimulated it.

Both Derby and Nottingham are expanding towns in key positions in Britain's network of communication, and the land between them, 14 miles of it, is being slowly but surely converted to urban use, except for a green belt two miles wide. The further growth and spread of this now semi-conurbated area is inevitable and the design group decided to accept and rationalize this growth. They discarded planned dispersal as a solution.

John Moreton, a member of the group, described the existing industry in the area and the changes to be expected over the 50 years of the plan period. (A 20-year plan period was considered too short for such an enterprise). There is diversity of industry in the area, fuel and power are available and most major industry borders the rivers Derwent and Trent, which form the southern boundary of the conurbation. New demands on land for industry are anticipated with the general expansion of population, and with the introduction of automation. And automation, too, it was thought, would lead to more shift work and more leisure.

In effect, Nottingham and Derby are retained as the main poles of attraction of this proposed linear conurbation, and between the two main towns, a series of half a dozen "cells" of 80,000 to 100,000 population were envisaged, based on existing villages with green open spaces between them. There was to be an 8-lane motorway from Derby to Nottingham passing through the centre of each "cell," and in addition a public transport system, probably a tube, running parallel. The existing railway line along the Trent Valley was to be part of the communication system with Trent Junction, the ideal location for goods re-distribution and marketing.

Rapid public and personal transport was the key to success. It was suggested that shift work in the linear conurbation would lead to the optimum use of public transport throughout the 24 hours. Since both Derby and Nottingham are large sources of employment and since the new industries were to extend at intervals along the 14 miles between the towns there seemed every prospect of balancing passenger loads moving in opposite directions—something difficult to achieve in a concentric conurbation such as London.

Under the Chairmanship of D. S. Kilner, A.M.T.P.I., A.R.I.B.A., comment was invited from the sadly small audience, and most criticism centred round the idea of the motorway passing through the centre of the "cells." With the need for an overhead system to obtain pedestrian segregation, and in order not to split each "cell" into two, why not, it was suggested, route the motorway to the south between the "cells" and the industrial bone and let spurs feed into the "cells"?

The project was supported by plans for the redevelopment of the central areas of Nottingham, Derby and Breaston. These were bold plans indeed and the project for central Nottingham was splendidly conceived on a city scale—though perhaps with too little concern for phasing and keeping the body alive during the operation.

GERALD F. SHEARD

CHURCH DESIGN

Churchmen do or don't brief architects

A large-scale get-together between clergymen and architects sounds like being either impossibly solemn or impossibly hearty. And there were moments when the recent conference which Gilbert Cope organized at Birmingham, "Churchmen brief Architects," did become preposterous—as when two busloads of people were dumped in a dreary new church in a dreary new suburb of Coventry and spent an hour or so popping in and out of pews, pulpits, fonts etc., trying to find out what they were doing there at all. Such a situation is preposterous because so few new churches in this country have a thing to be said for them in any way: hence the need for conferences of this kind and for the existence of the New Churches Research Group. After one conference, one member at least has realized something of what is wrong: that, despite all the eagerness of the ecumenical movement, more or less no clergyman has the faintest idea of how to brief an architect to build a new church, that in fact architects just aren't presented with briefs—they simply have to turn a few hints, thrown at them in idle conversation, into a building as they go along. And in fact one of the things that became clear as we saw and discussed churches, models and pictures is that the only tolerable designs come when the architect briefs the churchman: then perhaps there exists a chance of coherence at least. Unfortunately in such vague conditions architects are quite likely to build churches out of their own head without paying the slightest attention to a programme. Consequently we have what Peter Hammond calls the Maufe-Spence pictorial approach, a matter of compositions, of "spontaneous architectural expressions of religious feelings" of architecture seen as decoration. But "artistic symbols, however contemporary, are no substitute for architecture," as Mr. Hammond said: the architect's job is to provide a church which will work as a setting for the liturgy in the particular place where it is to be. For this a three-stage programme needs to be worked out—firstly, a general liturgical brief (similar to those produced by Catholic churches in Germany and America) in which the function of the church building can be clearly marked out; secondly, a study into the particular problems of the community to be served; and thirdly, with the architect in sole charge, the architectural solution of the crystallized local issue.

At present in this country there are no general liturgical directives from any of the churches, there are virtually no clergymen aware of the kind of briefing which an architect requiries and virtually no architects capable of responding to it if produced.

Consequently the discussion between the incumbent (Peter Vowles) and the architect (Robert Maguire) on the genesis of the proposed new church at Perry Beeches on the edge of Birmingham was remarkable and encouraging. Here is a case of a lot of hard thinking going into the programming, of a long and continued collaboration between a clergyman who knew what he wanted and an architect who understood and sympathized with him and had the talent to respond in a genuinely architectural manner. The result looks like being one of the tiny handful of new churches in Britain which are not only notable buildings in their own right but also work as churches. "There is no substitute for talent," as Aldous Huxley observed, but it must be a talent that can be used, not one for producing unworkable masterpieces like Notre Dame de Royan, which Peter Hammond in the most memorable *mot* of the meeting referred to as "a rather belated attempt to build the Sainte Chapelle in reinforced concrete."

ANDOR GOMME

DIARY

Urbanisation in the Tropics—Causes and Methods of Control. International Centre for Regional Planning and Development, British Group, Study Day at the London School of Economics (Room 237). 10 a.m. —4.30 p.m.

APRIL 30

The Redevelopment of Decayed Areas. Talk by H. F. Alston at the RICS, 12, Great George Street, S.W.1. 5.45 p.m.

MAY 2

RIBA Annual General Meeting. At 66, Portland Place, W.1. 6 p.m.

MAY 3

Symposium on the London/Birmingham Motorway. At the ICE, 1, Great George Street, S.W.1. 2.30 p.m.

MAY 3

The World of Bischof. Exhibition of photographs by Werner Bischof. At the Building Centre, 26, Store Street, W.C.1.

UNTIL MAY 11

Concrete for Architects. Two five day courses organised by the Cement and Concrete Association at their training centre at Wexham Springs. The courses are identical and include lectures and demonstrations on mix design, formwork, prestressing, concrete finishes and the construction of roads and paved areas. Details from the Secretary, C & CA, 52, Grosvenor Gardens, S.W.1.

JULY 11—15 AND 18—22

HOW MUCH TRAFFIC SHOULD LONDON HOLD?

By Nigel Seymer

Mr. Marples, the Minister of Transport, plans to set up a "Study Group" composed of architects, planners and others who, free from day-to-day responsibilities for keeping traffic moving, will examine long-term measures for dealing with the traffic problem: the construction of new roads and parking facilities, and how these can be integrated with existing and future development.

These long-term measures cannot, of course, be considered in isolation from the short-term measures adopted for traffic regulation. That is why the traffic engineer (a rare bird as yet in this country) must be consulted on both types of measure. Nor for that matter can the provision of facilities for private cars be isolated from the problem of public transport. As Europe's leading traffic engineer, Professor Feuchtinger, has written:

"As the traffic crisis in towns grows more acute, arrangements for moving vehicles, parked vehicles and local public transport —which are interdependent—tend to merge into one central problem."

In grappling with this central problem in its long-term aspect, the "Study Group" will have to start by answering this question: "How much traffic should we attempt to cater for in Central London?"

The answer to this basic question will determine (or at any rate ought to determine) both the capacity that should be provided for moving traffic—whether this is entirely in the form of normal streets, or whether the streets are supplemented with urban motorways—and also the parking capacity that should be provided in the area. For the parking capacity in the central area—whether this is in the form of large garages serving many buildings, or small garages serving individual buildings, or kerb parking, or a combination of all of these forms —must be related to the capacity of the streets in the area to carry moving traffic. If this balance between parking capacity and street capacity is not maintained, the effect of building more parking garages in the central area could well be to aggravate congestion instead of curing it.

Developers are henceforward being required by the LCC to provide one car space for every 2,000 square feet of floor space in office buildings. What will the effect of this regulation be as more and more sites are redeveloped in central London?

Sir William's second thoughts

Nearly five years ago Sir William Holford, in a paper read at the RIBA,* remarked that he had himself, with Dr. Holden, proposed that one car space should be provided per 5,000 square feet of office space in the City of London. In theory he thought this was a reasonable requirement. "In fact, however," he added, "the streets most affected have not been improved; so far the main result has been not so much the removal of standing vehicles off the street, but the inducement to a few more owners to enter and manœuvre their cars within an already congested area. It would, I think, have been more satisfactory to require allocated parking space on the same scale, either within the curtilage or within a garage or open-decked car park within a quarter of a mile of the new building."

These second thoughts have not perhaps received the attention they deserved. They are in line with the stand taken in the USA by the Urban Land Institute, which is opposed to legislation compelling developers to provide parking space in central areas for the following reasons:

"1. The prohibitive cost of land and building involved to the individual owner.

"2. The traffic congestion created by mid-block turning movements.

"3. Destruction of the continuity and compactness of business frontage.

"4. The improper location and scattered nature of the parking facilities which would result from such requirements."

These objections seem equally cogent when applied to conditions in London, and certainly give us cause to doubt whether the present LCC policy on parking provision is a wise one. When applied to sites on main streets it is surely liable to create, in effect, new intersections, with cars performing right-turn movements into or out of the various parking spaces which may be hazardous and which will certainly disturb the flow of traffic, both vehicular and pedestrian.

A lesson from Chicago

But apart from creating such local hazards and disturbances—which, repeated at intervals along a main street, could seriously disrupt the flow of traffic—the creation of new parking spaces, whether scattered or concentrated, may well have the effect of attracting more cars into the central area than the streets in the area can comfortably carry, thus aggravating congestion in the area, especially during the peak hours when the car commuters are on the move.

According to one American consulting engineer,* this is exactly what happened in Chicago after that city embarked on a large programme of providing municipal parking garages within the central area of the city. During a single year (1953-4) the number of cars entering the central area during the morning peak hour increased by 14 per cent, while the number entering the area between 10 a.m. and 4 p.m. increased only 4·8 per cent. During the morning peak hour, private cars constitute 81 per cent of the vehicles entering the area, compared with only 55 per cent during the midday hours (comparable figures for central London in 1954 were 37 and 53 per cent).

As a cure for congestion he proposed:

1. Raising all-day parking fees in the area from about $2 to $3·50.
2. Reducing the cost of short-period parking.
3. Conversion of the ramp garages from attendant to self-parking so as to decrease available parking capacity.
4. "The development of new off-street facilities for all-day parking at lower rates in adjacent areas where expressways or other adequate street capacities for the ingress and egress of commuters' cars exists or can be provided."
5. "The enactment of zoning regulations which would relate permissible off-street parking spaces in congested areas to the traffic volume capacities of the area street pattern."

"Rationing by price"

It is interesting to note that a definite policy aimed at securing "the exodus of the automobile commuters" from the central areas of large cities, with consequent reduction of peak-hour volumes, by means of "rationing by price" is thus being actively canvassed in the USA.

Adoption of such a policy for central London would of course entail revising the present regulations on the provision of parking space in conjunction with new buildings; and an end to the present agitation for subsidized garages to be provided for the car commuters, numbering perhaps 30,000, who have been in the habit over the past few years of garaging their cars all day free of charge on the streets, and who will be displaced as the meters are installed and the traffic wardens appear to enforce the law.

A policy of this kind is often condemned as being "defeatist" or "negative"—in contrast with the "positive" policy of providing "adequate" facilities for ever-increasing traffic, at all times and in all areas. But the Americans are now coming to realize that the "positive" policy has its limitations, at any rate as far as the central areas of existing cities are concerned.

The Hounsfield approach

We can gain some idea of what applying the "positive" policy to central London would entail from the late R. B. Hounsfield's thesis *Engineering Aspects of the Transport Problem in London* (published posthumously in 1951). Hounsfield took the total volume of traffic which crossed a cordon line drawn around central London in an outward direction during the peak hour in 1937. This volume was 24,000 vehicles. He then multiplied this figure by two factors—a "frustration factor" and a "future growth factor" —and thus arrived at a figure of 76,000 vehicles per hour which he took as his design volume to be catered for crossing his cordon line outward bound during the evening peak hour.

Hounsfield argued that existing streets should not be required to carry more peak-hour traffic that they did in 1937, but rather less. The additional 53,000 vehicles per hour

* "Conditions of Building in City Centres," *RIBA Journal* for June, 1955.

* R. Gilman Smith: "The Urban Traffic Problem and the Automobile Commuter: a suggested plan for alleviation of the former and the control of the latter," *Mass Transportation*, September, 1955.

should, he said, be catered for by a network of Relief Highways. These were to take the form of Urban Motorways—or "Freeways" or "Expressways," to use the American names for such roads—passing over or under all existing streets. He estimated that no less than 16 six-lane motorways would be needed crossing the cordon; and these would have to be linked right across the central area, thus forming a grid pattern with motorways roughly a mile apart.

Hounsfield's cordon embraced a roughly rectangular area of about 16 square miles. The same area was shown in the drawings issued to competitors in the recent *New Ways for London* competition, together with the 1954 volumes and "estimated design volumes" calculated after the Hounsfield manner—they are about treble the 1954 volumes.

One might assume from the fact that they agreed to act as assessors for this competition (which was devised by C. P. Andren, who was working with Hounsfield at the time of his death) that Sir William Holford and C. D. Buchanan believe that we ought to plan to cater for such volumes of traffic in central London. But it is hard to believe this of them; particularly of Mr. Buchanan, who spoke nearly five years ago of "the danger that we shall go stumbling along in desperate efforts to catch up with the motor-car, and in the rush and turmoil of the chase may destroy most of the things that make our cities worthwhile without ever really solving the problems of congestion."

Hounsfield claimed that his network of motorways would provide for "relatively congestion-free" movement within the central area, even for his huge design volumes; but only at the cost of driving six-lane motorways right through the central area. Are we really prepared to do that?

If we are *not* prepared to do that, then we had better accept far lower design volumes for central London than did the competition. For without additional capacity in the form of motorways it will not be possible to feed much more traffic into the central area than we are doing now.

The Dead Central Area

This can best be illustrated if we take a much smaller area than Hounsfield's central area, a curved band one mile across and four miles in length (from Marble Arch to Gardiner's Corner)—and therefore about four square miles in area—which might be called the "dead central" area of London: the area of highest land values and most concentrated development. (If we enlarge this area on three sides we take in all the main line terminals; if we extend this enlarged area about another mile-and-a-half to the south-west, we take in the Knightsbridge and Kensington Hight Street shopping centres, the Kensington museums and the Earl's Court exhibition hall—a very important traffic magnet in October.)

The winner of the recent competition pointed out that, if the "highly developed areas" of central London were ever completely redeveloped according to present LCC plot ratios, with one car space per 2,500 sq. ft. of office space, there would eventually be parking space for 33,000 cars to the square mile (and incidentally one car space for every 14 workers). With the new standard of one car space per 2,000 sq. ft. there would eventually be over 41,000 car spaces per square mile (and one to every 11 workers).

Even with the old standard, he points out that the density of car spaces per square mile required by the LCC in redevelopment is greater than that suggested by the competition sponsors—which works out at 22,500 spaces per square mile in the "highly developed areas" (one for every 20 workers).

Peripheral capacity

If even this lower figure were ever attained throughout the four-square-mile area, it would mean about 90,000 cars being parked off the street within the area—plus perhaps at least 10,000 on the streets, making 100,000 altogether. Of these at least half would be in the western half of the area (west of Gray's Inn Road/Chancery Lane). Of these 50,000 cars perhaps half would be leaving (or attempting to leave) the area during the evening peak hour.

Of these 25,000 cars probably at least half would be wanting to leave the area on the south and west sides. It is interesting, therefore, to study the street capacity available for outbound traffic at the periphery of this area on these two sides—from the Temple round to Marble Arch—even on the assumption that one-way operation is introduced where it is feasible (*e.g.* on Northumberland Avenue and Whitehall) and that the improvements now proposed have been carried out.

If we assume that one lane-width has a capacity of 1,250 vehicles per hour of green time at signal-controlled intersections, and that 3,000 v.p.h. is a feasible maximum volume on very large weaving sections such as will be provided at Marble Arch and at the two roundabouts at Hyde Park Corner, and that a single lane-width crossed by pedestrians can take 800 vehicles per hour, then this "peripheral capacity" may be estimated as follows:

Norfolk Street	800 v.p.h.
Lancaster Place	800 v.p.h.
Savoy Street	Negligible
Villiers Street	100 v.p.h.
Whitehall	1,700 v.p.h.
Mall (Admiralty Arch)	800 v.p.h.
Marlborough Gate	800 v.p.h.
Hyde Park Corner Southern roundabout (east side)	2,700 v.p.h.(*)
Hyde Park Corner underpass	600 v.p.h.(†)
Hyde Park Corner Northern roundabout (south side)	1,500 v.p.h.(‡)
Marble Arch roundabout (south side)	2,750 v.p.h.(§)
Total	12,550 v.p.h.

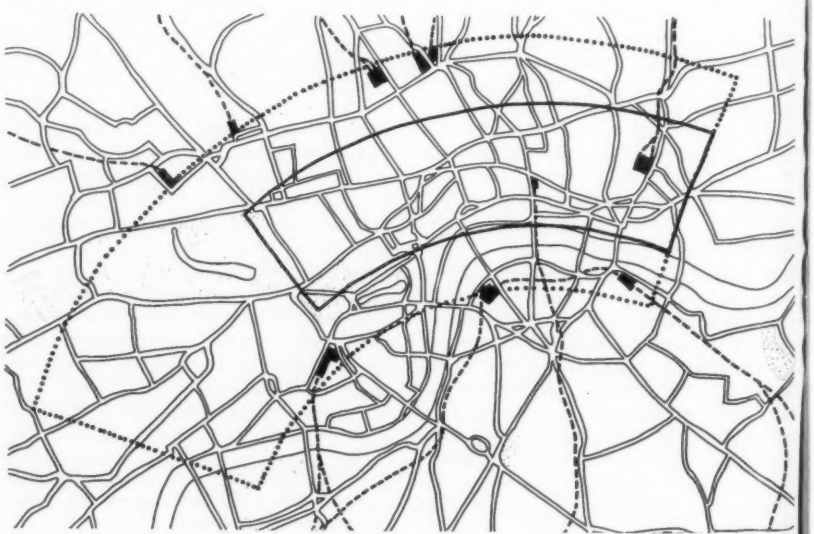
* 3,000 less 300 from west into Constitution Hill and Grosvenor Place.
† Limited by capacity of Piccadilly.
‡ Half of 3,000 v.p.h.
§ 3,000 less 250 from south turning east into Oxford Street.

Thus it will be seen that the total capacity for outbound traffic on this part of the periphery might just about suffice for the car traffic alone—leaving none over for buses, taxis and goods vehicles!

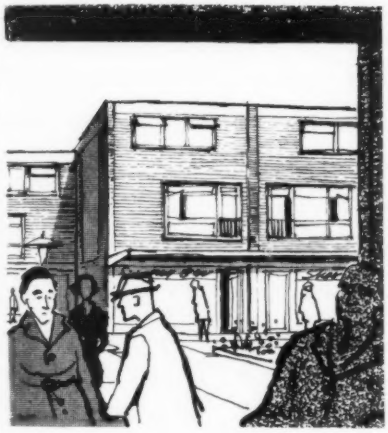
The moral of this is that we must either plan to provide new capacity for moving traffic within the "dead central" area—and, if we are to do this, it would have to be in the form advocated by Hounsfield—or else we must accept that this area can never be adapted to take appreciably more traffic than it does now, least of all car commuter traffic.

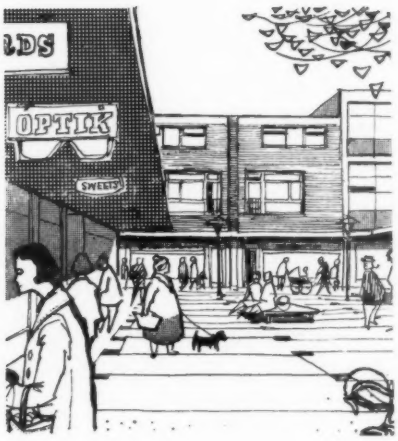
If we choose the second course, then we should reconsider the present LCC requirements on parking space. Parking capacity must be related to street capacity. If it is not there is a grave danger of providing excessive parking capacity—luring more and more car commuters into the central area, and thus aggravating congestion during the peak hours.

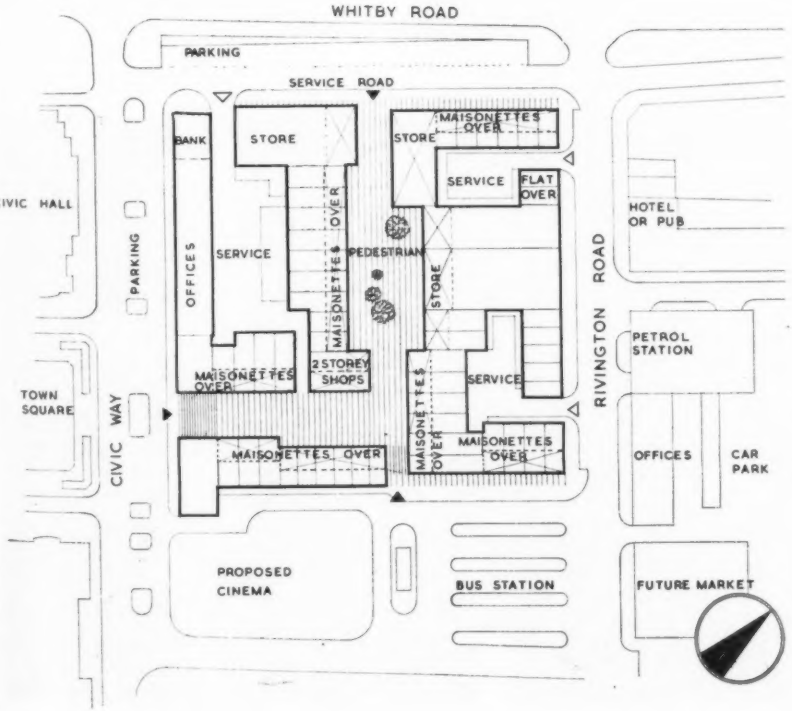
Nigel Seymer's "dead central" area of London for which he estimates present traffic capacity.



PROPOSED SHOPPING CENTRE IN CHESHIRE





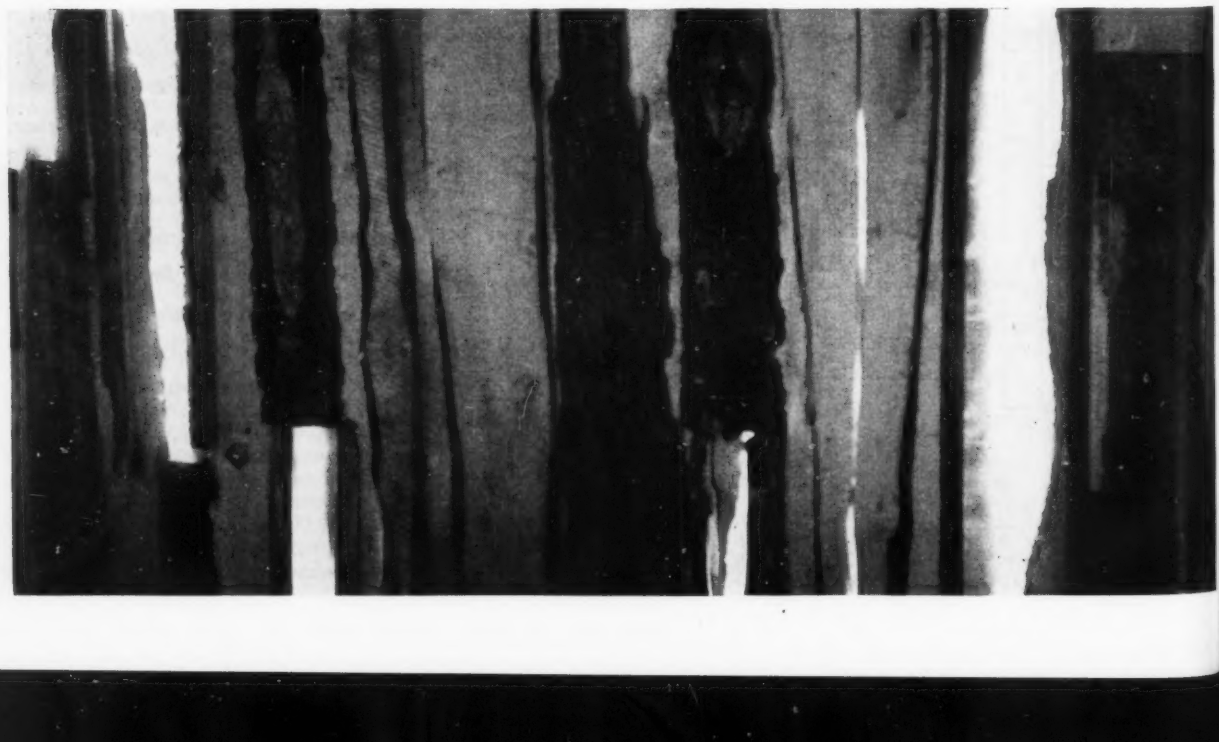


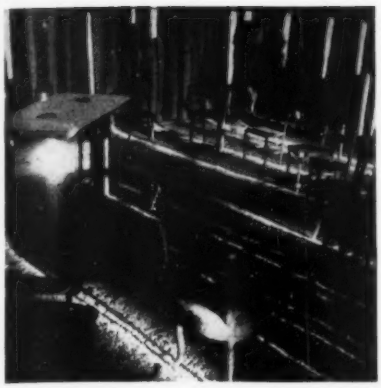
At Ellesmere Port in Cheshire, Lancaster Group Developments Co. Ltd. propose to build a new shopping centre. The design for it by Edmund Wilford (assistant: Michael Wilkinson), of C. Edmund Wilford and Son, is interesting mainly because it shows another attempt to overcome the problem, inherent in all these schemes, of what to do with the backs of the shops with their service areas. These often become eyesores, viewed across bleak bus stations and car-parks. In this scheme the service areas are, in the majority of cases, contained in "pockets" in the general layout, entered by narrow openings. The external appearance of this project is further improved as the enclosing buildings are fairly tall (varying in height between 30 and 38 ft. high). The extra height above that of normal shops is achieved by the inclusion of maisonettes above. The only part of the centre where the backs of the shops are visible is (on plan below) in the bottom left hand corner of the site. The importance of this defect will be considerably lessened when a proposed cinema is built on the irregularly shaped piece of ground immediately to the south-east of it.

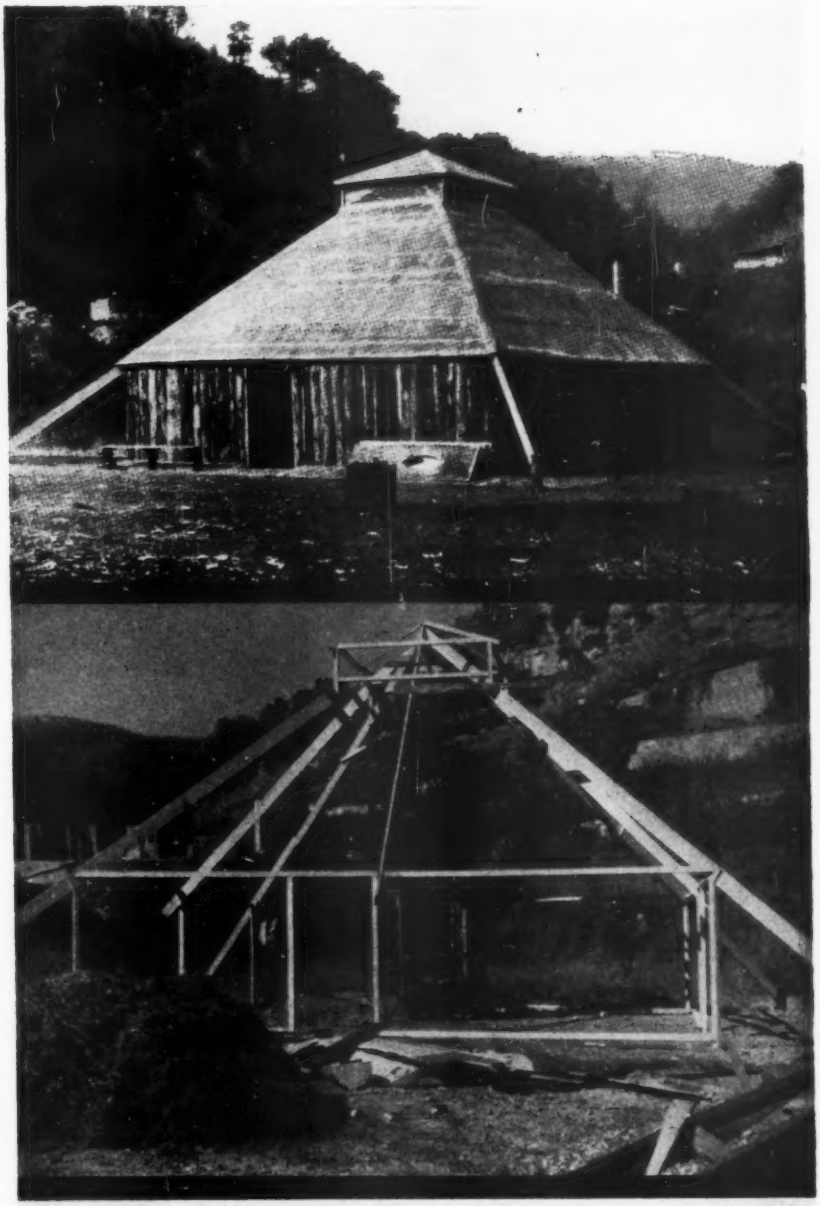
The internal, wholly pedestrian, concourse is roughly "L" shaped and although the site is sloping has been kept level and is approached from three openings in the peripheral buildings. The difference in levels is overcome by ramps at two of these. Two of the entrances are "closed" visually by the canopies which run along the shopfronts being carried across them. The architects evidently feel that the third, and widest, opening should be left open to give on to the existing town square.

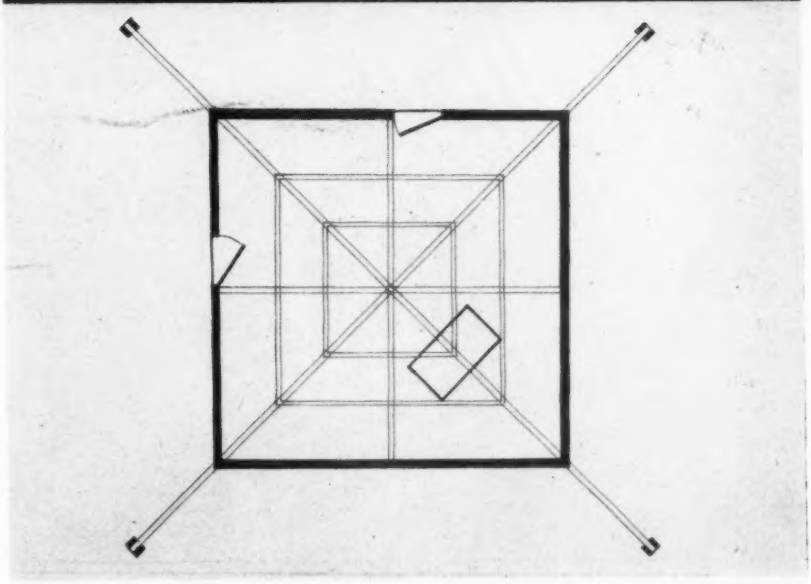
THE CHURCHES OF RAINER SENN

Rainer Senn is a Swiss architect, still in his twenties, whose first church, a wooden chapel for one of the Abbé Pierre's communities of rag-pickers, cost barely fifty pounds. Shortly after the chapel was finished he was asked by Canon Lucien Ledeur, secretary of the Besançon commission for sacred art, to explore the possibilities of an inexpensive prototype church which could be erected simply and rapidly to keep pace with new housing developments in the diocese. The outcome of these researches was the church at Pontarlier, consecrated last September, and this has been followed by a series of projects, all for churches, in France and in the French Antilles, and all revealing the same basic preoccupation with the centralised plan based on a square, with economy, simplicity of construction and the carefully studied use of light. In the architect's own words: " My various projects are based on the same fundamental idea; the church building is the place where a community takes shape: a community having a common centre. What preoccupies me is the assembly orientated towards this centre. This is shown, on the one hand, by the disposition of the seating; on the other, by the way in which I have given prominence to the centre spatially and by means of the lighting." The churches and projects illustrated represent four years of continuous research and experiment. They may well prove to be something of a landmark in the development of modern church architecture.



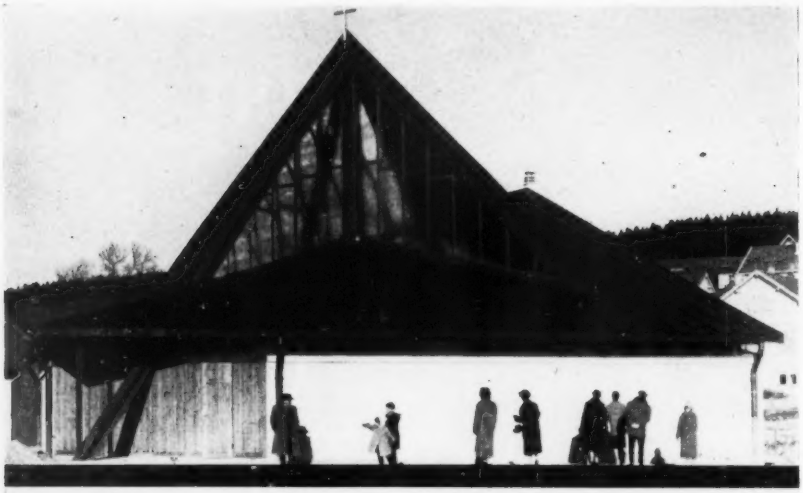


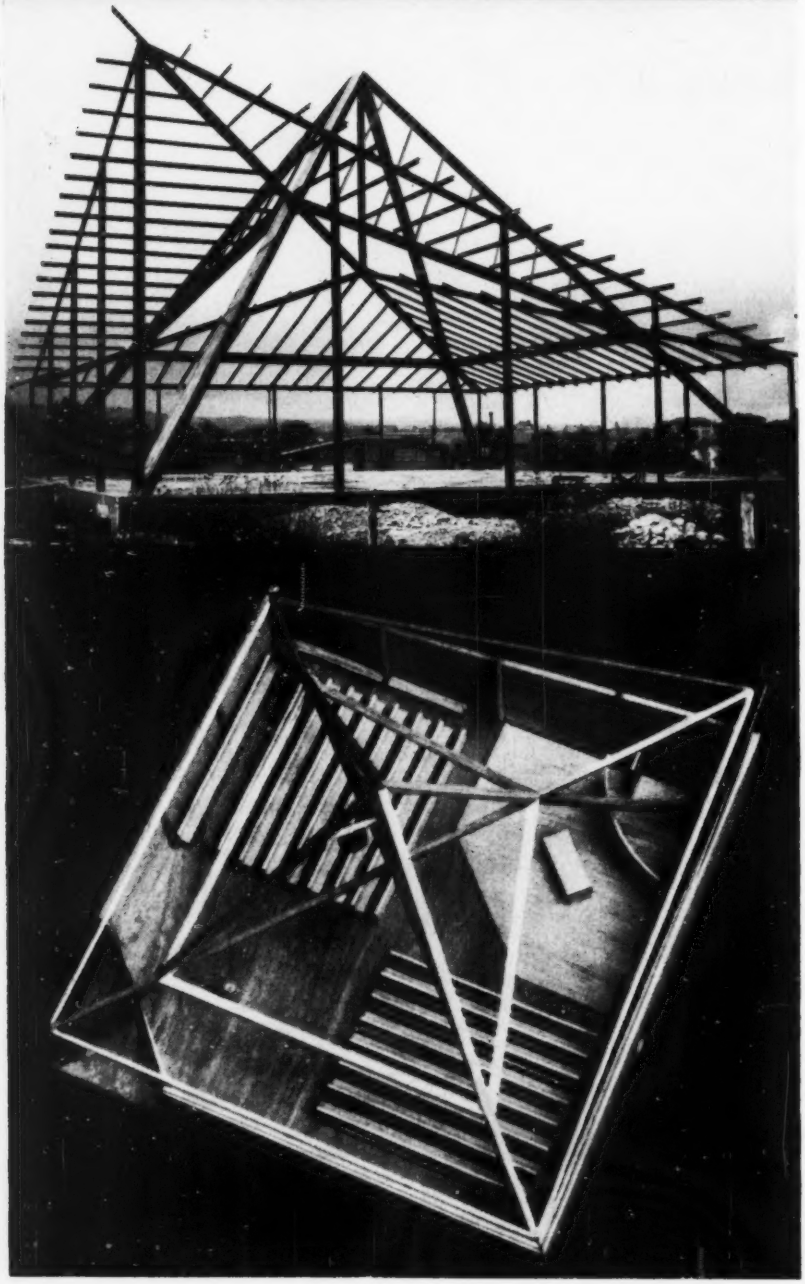




Chapel at Saint-André, near Nice

In October 1955 *Rainer Senn was asked to build a chapel for the Companions of Emmaus, one of the Abbé Pierre's communities of rag-pickers. The community required a building in which the laity could gather around the celebrant at the altar. The form of the chapel was governed by this stipulation and by the fact that neither skilled labour nor elaborate equipment was available and that the total cost had to be limited to fifty pounds. Undeterred by so exacting a programme, Senn designed a chapel* 12 *metres square, constructed of four massive beams in the form of a pyramid* 6 *metres in height, with the altar free-standing on a diagonal axis. The main source of light is at the apex of the pyramid, though there are also irregularly spaced apertures in the plank walls (for detail of this, see opposite page, bottom). The roof is covered with bituminised paper. The chapel was built in a fortnight by the architect and two Spanish assistants and the only scaffolding available consisted of two box-spring beds. An earlier project for a slightly larger chapel, with a sacristy behind the altar, was based on a pentagonal plan.*

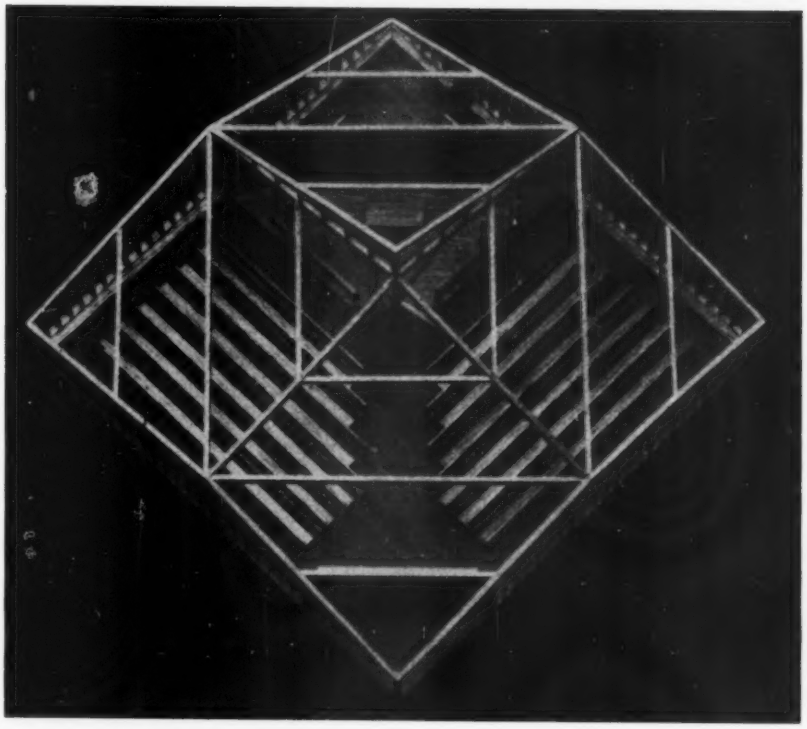




THE CHURCHES OF RAINER SENN (continued)

Church of our Lady of Lourdes, Pontarlier (Doubs)

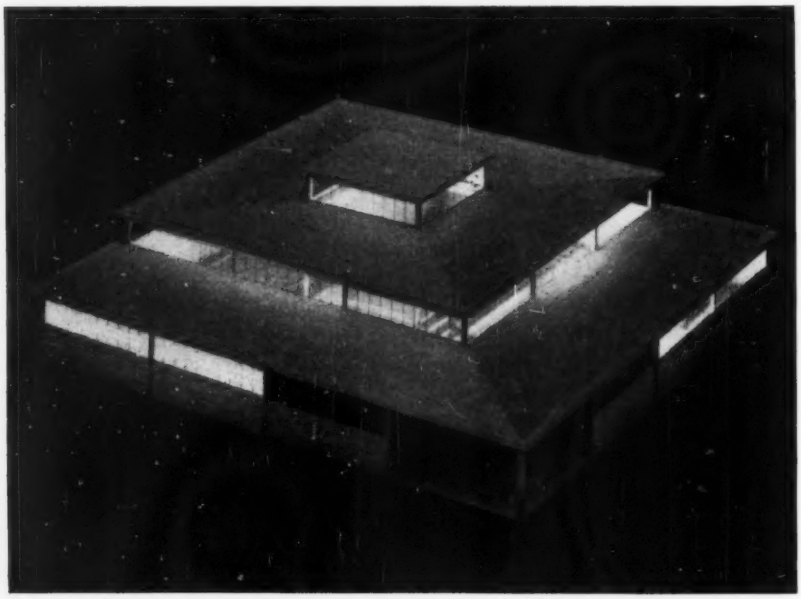
A church for a new parish on the outskirts of Pontarlier on the road to Morteau (N.437). The need for economy was again a primary consideration. Like the chapel at Saint-André, this church, which was consecrated in September 1959 (though permanent furnishings have still to be installed), is based on a square plan with the altar set on a diagonal axis. Construction is of steel throughout, the principal feature being a pyramid of four massive girders spanning a space 18m. square. The roof, with its vertical supports, is tilted up along the axis of the building from the entrance to its highest point above the sanctuary. The whole of the steel structure is visible within the building. The surrounding walls are of limewashed masonry. The timber roof is covered externally with copper and a bell will eventually be hung just below the apex of the pyramid. Below the church are the salles de catéchisme. *The architect has sought to define the sanctuary by means of light. The total cost of this church, including furniture and heating, was in the region of £12,000. The building is capable of accommodating 450 people when necessary. The whole of the steel skeleton was erected in two days.*



Project for a chapel at Ferette (Haut-Rhin)

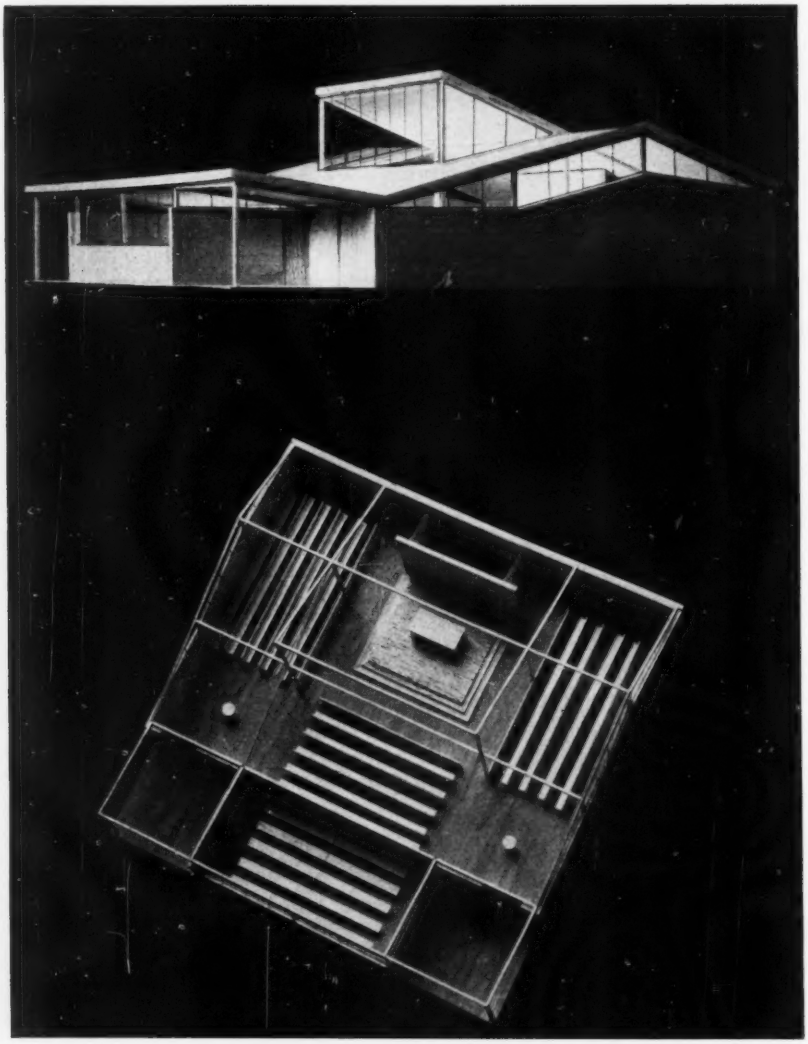
A project for a wooden chapel with seating for 250 people for a summer resort a few miles to the south-east of Altkirch. Again, a square plan with a diagonal axis, and, as at Pontarlier, a carefully studied use of light for purposes of definition. Here, however, the pyramid type of structure is replaced by a single central support and the walls are to be glazed almost to floor level. This project dates from 1958. The chapel will probably be built in 1960, though there are at present certain difficulties in regard to the site.

THE CHURCHES OF RAINER SENN (continued)



Project for a prefabricated church

Another project dating from 1958 *for a large, inexpensive, easily constructed church suitable for new housing developments. The building is divided into sections each* 8m. *square. The altar, with the pulpit behind it, is again placed on the diagonal axis of the square plan. The church is capable of accommodating* 800 *people. An alternative arrangement, made possible by the use of sliding screens, would provide a large space for the Sunday liturgy, with seating for* 520 *people, as well as a week-day chapel, seating* 144, *and two additional rooms each* 8m. *square for other purposes. Construction of steel; ceiling of laminated wood panels; roof-covering of aluminium. Estimated cost in the region of* £21,000.

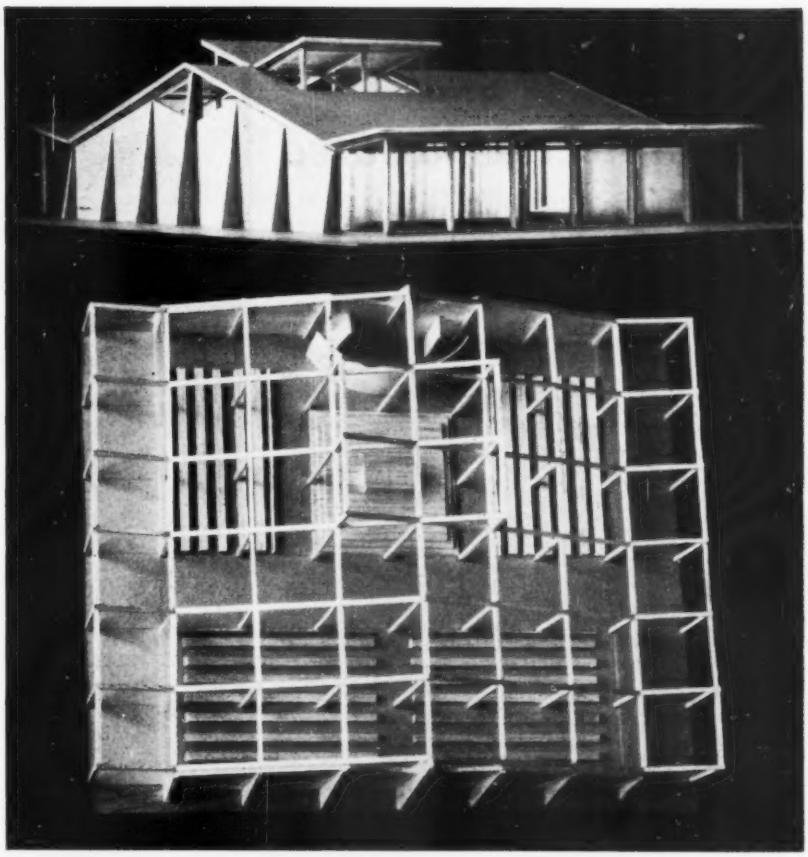


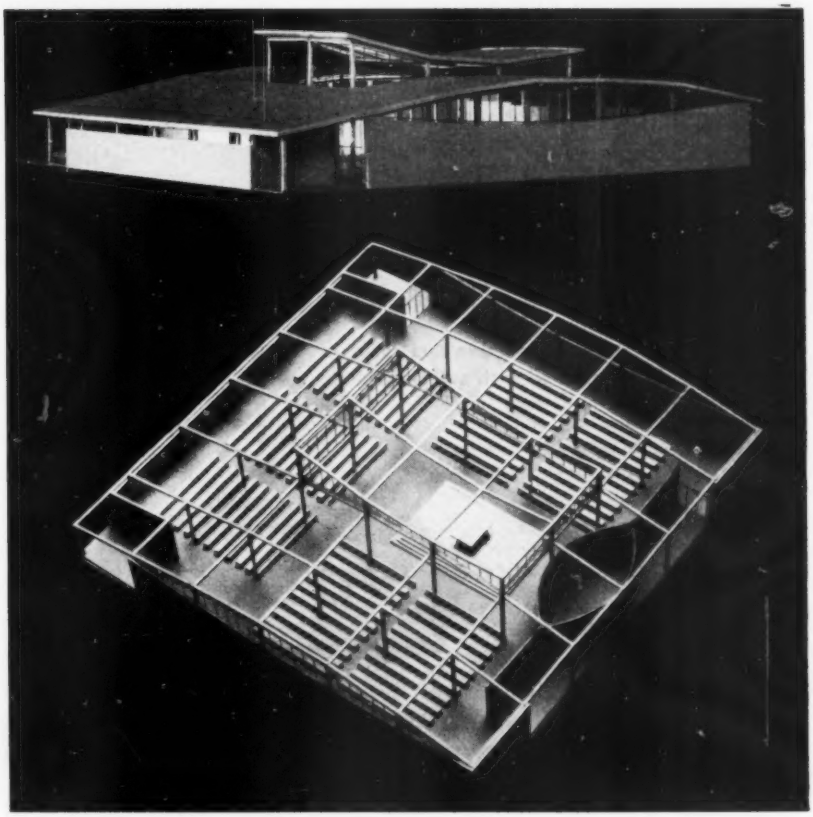
Project for a school chapel at Versailles (1959)

A timber chapel with seating for 300 *children designed for the* Ecole Saint-Exupéry *at Versailles. The school is housed in a number of temporary buildings and, as in earlier projects, Senn has been compelled to work within an extremely limited budget. He retains the square plan but here, for the first time, the diagonal axis is abandoned and the seating is grouped on three sides of the sanctuary. Between the two porches there is a* salle de catéchisme, *separated from the rest of the building by a folding screen, which can provide additional seating when required.*

Project for a chapel in the French Antilles

Another project of 1959, *for a church accommodating* 500 *people to be constructed at Grand-Bourg on the island Marie-Galante. The plan is similar to that of the Versailles chapel, apart from the placing of the entrances. Construction is to be of timber throughout, with the exception of the buttressed walls at either end. The sides of the chapel are left open.*





Project for a large church at Villejuif, Paris

A project for a large but inexpensive church constructed of steel. This is a development of the two projects of 1959 *and the layout is similar. This first model provides seating for* 1,000 *people. A revised project, now under consideration, will be slightly smaller.*

technical section

THE INDUSTRY

This week Brian Grant describes a new range of sanitary fittings, a gas cooker for the handicapped, samples of international paper sizes, and an electric sealer for flooring.

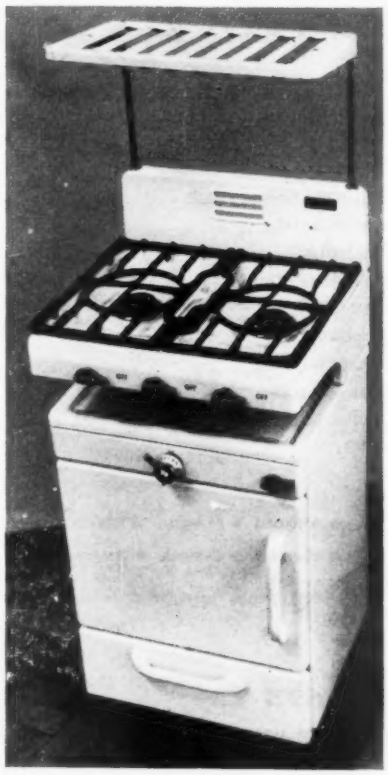
Armitage Nu-Flo mixer spout.

Sanitary fittings

Catalogue N of Armitage Ware lists the Nuastyle range of plumbing and sanitary fixtures and fittings, the majority of which are on the COID's approved list. Fittings are produced to the appropriate BS and the illustration above shows a Nu-Flo mixer spout, a patented twin supply device in which the water mixing takes place at the outlet, eliminating the possibility of back flow into the mains and thus overcoming the principal objection of Water Boards to fittings of this kind. (*Edward Johns & Co. Ltd., Armitage, Rugeley, Staffs.*)

Cookers for the handicapped

The Gas Council has designed a cooker, to be made by Flavels, specially for handicapped people who may have defective sight or lack the full use of their hands. It should also be suitable for elderly people living alone. The National Assistance Board and the Society of Medical Officers of Health have both agreed to recommend to the Gas Boards people to whom the cookers will be of help, and as initial production is limited, these arrangements should make sure that the right people have them. On recommendation the cookers can be hired for 2s. 6d. a week, including fixing, otherwise they cost about £30. The illustration shows the G.C.1 model, G.C.2 being the same design with the oven at the side of the hot plate. Each burner is self lighting with its own pilot and a safety device to prevent gas flow if the pilot is out. The gas taps have lever extensions so that they can be turned with an elbow or the back of the hand if fingers won't grip, and the oven thermostat settings operate with a marked click, a useful aid for anyone with defective sight. This seems to me quite an enlightened thing for the Gas Council to have done, for while the old or disabled often have suitably planned housing, there isn't much in the way of special equipment for them. (*The Gas Council, 1, Grosvenor Place, London, S.W.1.*)



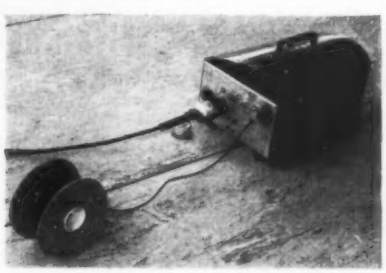
Gas Council cooker for the handicapped.

International paper sizes

When the BSI recommended the A4 size for manufacturers' publications quite a number of printers disapproved on the grounds that British papermakers would not supply it. While this state of affairs has been remedied, it is interesting to find one of the country's largest papermakers, Bowaters, going to some considerable trouble to encourage its use. To refer to Continental papers as A sizes is not strictly accurate, as there are also B and C sizes produced for envelopes and posters, but Bowaters have considered at the moment the A range, and have just issued a most interesting folder showing letterheads in two different sizes, envelopes, compliment slips, internal memo forms, variation orders, clerk of works report forms, certificate cover, and sundry other documents for a non-existent firm of architects at a non-existent number in Bloomsbury Square. There is also a leaflet describing the Continental sizes and suggesting appropriate uses. The folder is intended to be a demonstration of stationery printing and is not intended only for architects, but it is good to find a papermaker pushing the sizes which architects want, for publications as well as letterheads. (*Bowaters Sales Co., Ltd., Bowater House, Knightsbridge, London, S.W.1.*).

Laying plastic flooring

The illustration below shows a portable electric machine which has been developed by the makers of Phenco flooring. The machine moves along automatically and seals the edges of the flooring with a heated strip of plastic from a drum which it tows along behind itself. The process is automatic as the machine guides itself and also provides the necessary heat. (*Phœnix Rubber Co. Ltd., Slough, Bucks,*)



Phenco floor sealer.

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Fittings. The Atlanta is supplied with or without overflow . . . with or without hand grip. The feet can be adjusted to accommodate all types of trap, including the Bilston 'Wasteflo' prefabricated waste, trap and overflow unit. *Also available with the Bilston O.P. Hand Grip helpful to the elderly or infirm.*

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BILSTON the bath *SPECIALISTS*

Bilston Foundries Ltd., Bilston, Staffordshire. Illustrated literature available on request.

technical section

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17 CONSTRUCTION: GENERAL

light cladding, 6: the joint

R. Michael Rostron resumes his series of articles* on light cladding by considering the problem of jointing. After listing the many functions the joint must perform, he describes each solution which has been tried so far—sealing compounds, gaskets, cover tapes and spring stops—he then records our experience with each and deduces from this rules to be followed in practice.

It has been said with considerable justification that the success or failure of any type of cladding is dependent on its joints, and it is on the joint that most experimental work has been carried out. This is hardly surprising when it is realised that the joint has to carry out many complex functions under extremely severe conditions, which have few, if any, precedents in traditional construction.

The joint has three basic functions to perform. It must make a visually and practically satisfactory connection between similar or dissimilar materials; it must tolerate thermal, moisture and structural movements; it must correct dimensional and alignment variations between shop and site work. To perform these functions competently, the joint must exclude water, air and dust from the building at all times during its life. It must preserve the insulation properties of the wall and withstand working loads, and it must be easily assembled, maintained and (if necessary) renewed. In addition the ideal joint must be easily dismantled to allow for maintenance or repair of adjacent components.

Such a joint does not at the present time exist. Many combinations of joint and seal come close to satisfying these remarkably severe conditions, and it must be only a question of time before complete satisfaction is attained. Until then, the architect has a twofold responsibility; he must choose the type of joint and seal which satisfies the greatest number of requirements under the conditions expected. and he must use his choice in a manner which will encourage satisfactory performance.

Excellent detailing is vital. Many joint failures are attributable, not to poor joint types or seals, but to improper use of the materials and methods chosen.

In order to present a clear picture of the very complex subject, further discussion is divided into three considerations:

1. External forces acting on the joint.
2. Joint types and seals.
3. The complete joint.

External Forces Acting on the Joint

Wind: In 1955 the BRAB* survey carried out in America reported that 38 per cent. of the curtain walls examined allowed some air infiltration and 25 per cent. allowed dust to enter the building through joints. Such leakage is caused solely by wind which may account for a pressure differential of 30 lb. per sq. ft. between interior and exterior surfaces. This differential will tend to equalise itself at the weakest part of the wall—the joint—and any of the following phenomena may result:

1. Increased risk of water penetration.
2. Draughts and resulting ingress of dust and fumes.
3. Reduction in thermal transmittance of wall by leakage of air and heat outwards when pressure is negative (on leeward face of building).
4. Noise produced by vibration of panel and reed effect of air passing over thin sheeted materials or through small apertures.
5. Weakening of seal caused by rubbing action of vibrating panel and eroding action of wind and rain or dust.

Rain: It has been calculated‡ that during a heavy rainstorm, approximately one gallon of water per minute runs down each hundred square feet of exposed wall. Although a porous material will absorb and later evaporate much of this water, in a typical impervious cladded wall, the whole of the flow must be accounted for, firstly on the wall surface, and secondly at the base of the wall.

The tendency for this volume of water to penetrate the wall will be greatest at joints, and it should be remembered that the combination of wind and rain may drive water into or through joints which will usually shed water. Pressure differentials will cause water to be sucked into weak joints, and severe conditions may cause water to flow up, down or across the wall surface. The well-known example of the United Nations Secretariat in which water was forced upwards through weepholes should remind architects of this further hazard on exposed sites.

Air, Light and Heat: tend to affect the properties of many sealants. Natural rubber loses elasticity when exposed to light and heat and most compounds progressively harden with exposure to air and ultra-violet radiation.

Joint Types and Seals

For the purpose of examination, the joint may be divided into two parts: the end treatment of the members

* Previous articles in the series were as follows: Heat Transmission, February 25, 1960; Stability, March 3; Condensation, March 10; Fire Resistance, March 17; and Sound Insulation, March 31.

‡ Building Research Station Digest No. 98, "Light Cladding," H.M.S.O., May, 1957, p. 2.

*Building Research Advisory Board, a department of the National Academy of Sciences.

technical section

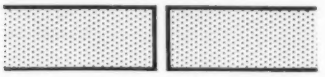


Fig. 1. Joint type 1: butt joint.

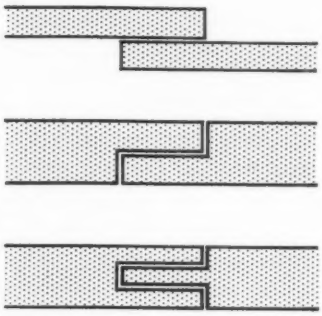


Fig. 2. Joint type 2: lap and mated joints.

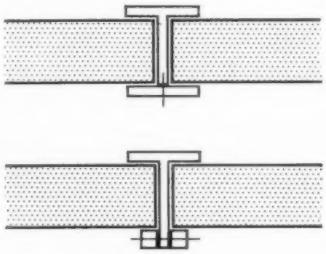


Fig. 3. Joint type 3: accessory joint.

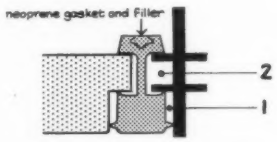


Fig. 4. Air pockets in joint.

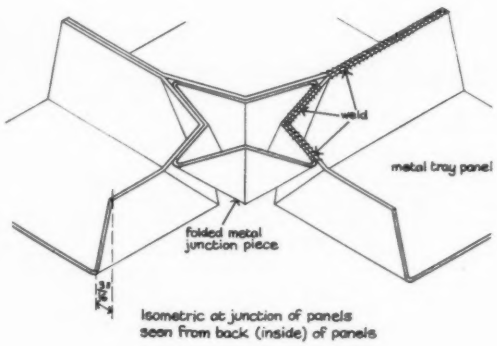


Fig. 5. Rigid welded joint.

to be joined (joint type) and the method of sealing these members to prevent ingress of moisture and air.*

The simplest joint type is the butt joint (Figure 1). This places the whole burden of water exclusion on the sealant which has little protection. Experience shows that it is necessary to give the non-rigid sealant every protection in order to obtain a weatherproof joint, and for this reason the butt joint is not recommended except where it is possible to use a rigid seal (e.g. welding).

A development of the butt joint is the joint where the two parts overlap or are shaped to receive each other (Figure 2). This has the advantage over the butt joint of providing tortuous paths through the panel and allowing a degree of protection to the sealant. It is cheap, quick and easy to erect and is best used on large wall areas with few openings. Its principal disadvantages are the difficulty of making the joint airtight and of aligning panels to ensure a smooth surface. In some joints of this type there is also little allowance for tolerance and movement.

The most satisfactory, versatile, flexible and expensive joint is the type which incorporates some form of accessory (Figure 3). It offers the greatest freedom in design in that it may accommodate materials of varying thicknesses in the same wall, and allows easy removal and replacement of panels. Apart from cost its major disadvantages are the concentration of metal at the joint, producing through conductivity, the necessity to allow for movement of the accessory and (in most cases) two joints to seal instead of one. In spite of these drawbacks it remains the most satisfactory joint type so far developed.

Apart from allowing for movement of panels, a suitably designed joint may alleviate the problem of air leakage caused by pressure differentials, by the provision of air pockets (Figure 4). Such air pockets will serve the dual function of transforming high pressure in a confined space to a reduced pressure in a greater space and of providing capillary breaks. The use of air pockets and a drained joint will thus reduce the possibility of airborne rain being forced or sucked through the joint.

The design of the junction of panels to allow for movement, erection and maintenance is not a difficult operation. The difficulty occurs when we attempt to exclude the elements from the joint, and in practice the actual form of the joint is dictated by the method and type of seal. The artificial division of the joint into joint type and joint seal should not, consequently, exist in practice: they should be thought of and designed as one element—the joint. Unfortunately there exists the fallacy that the various seal types are interchangeable and it must be stated again that this is not so. Each method of sealing the joint requires special and well-considered detailing of the joint in order to fulfil its purpose.

Two basic types of joint seal are recognised: rigid and non-rigid.[1] The rigid seal comprises metallic and non-metallic bonding and includes welding, chemical adhe-

*This is based, with modifications, on the classification developed by Wayne Koppes, of Princeton University and presented to the Architectural Metal Curtain Wall Conference held in Washington in October, 1956.

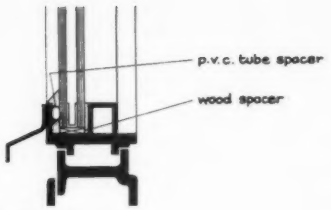


Fig. 6. Spacers.

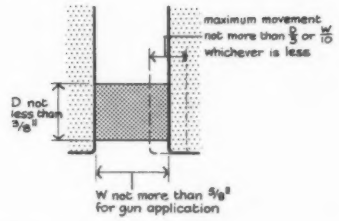


Fig. 7. Volume of mastic.

Fig. 8. Protection of mastic joint by reducing area of exposure.

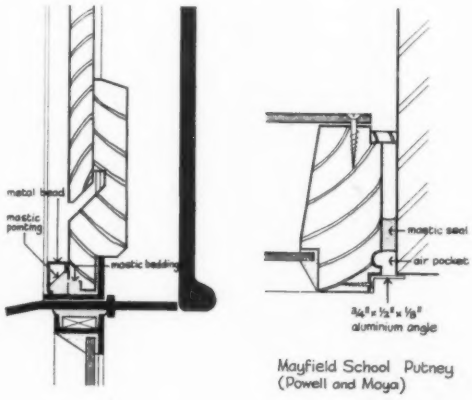


Fig. 9. Protection of mastic by cover strips.

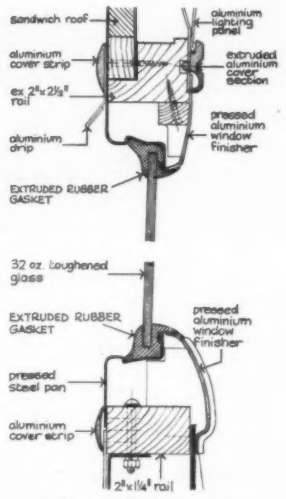


Fig. 10. Rubber gasket in coachwork.

sives and chemical bonding. Such seals require that the panel itself must absorb any movements by means of folds. (Figure 5.) By their very nature they form a completely weatherproof seal, but the restriction on panel design and the specialised fabrication of the joint preclude its use on site except in special circumstances. The greatest use of the rigid joint seal may well be in the manufacture of large prefabricated wall units.

The most common seals are those which are non-rigid and it is this type of seal which produces the majority of problems. Four separate forms are apparent:

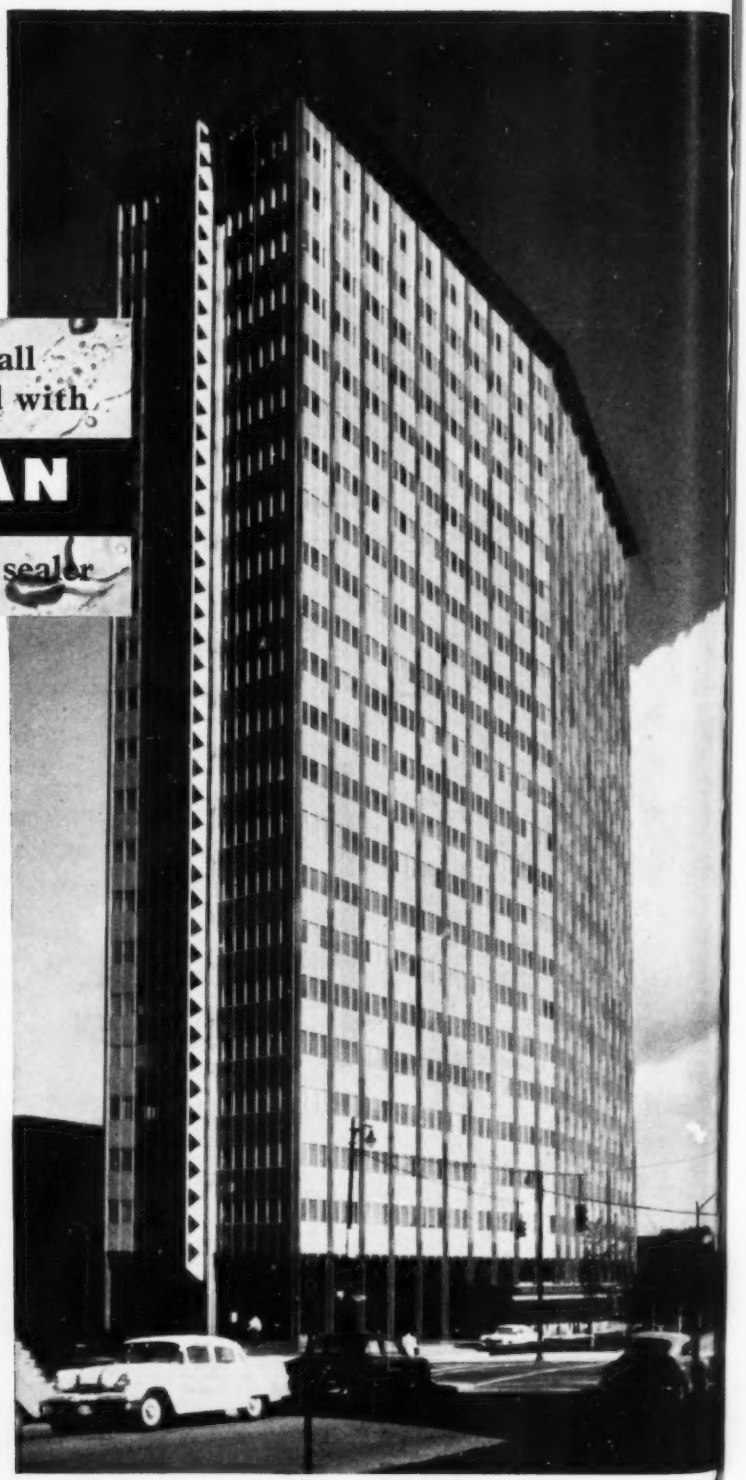
1. Sealing compounds, shop or site applied.
2. Gaskets of plastic or synthetic rubber.
3. Cover tapes.
4. Metallic strips, spring or interlocking.

By their nature the non-rigid seals are able to fill joints of varying size which are not subject to appreciable movement in order to exclude air, dust and moisture and also to seal at all times joints subject to movement. The efficiency with which these functions are performed depends equally upon the correct choice and the proper use of the sealant.

Sealing Compounds: Oil-based mastic is perhaps the most common and least satisfactory sealant in use today, although it has for long been used in traditional construction, generally for filling joints not subject to a great deal of movement. In such positions linseed oil putty gave satisfactory results provided the exposed surface was protected by a layer of regularly renewed paint. The need for reduced maintenance costs together with the rather more severe requirements of a dimensionally unstable joint produced the need for a sealant which would retain a high degree of plasticity without maintenance and protection, and compounds based on bitumen, tar, resin, rubber and oils have been produced with varying degrees of success. The majority of building mastics used as sealants today are based on vegetable oils with inert fillers of powder or fibre and may be integrally coloured if required. Such mastics are expected to fulfil a series of exacting requirements with little or no maintenance, a severe test for any building material. They must be easy to apply in all temperatures, readily assuming the shape of the joint and adhering strongly in direct tension, compression and shear to the joint surfaces without staining. Once in position, the mastic must deform readily and without flow and must not slump in a vertical joint in the hottest sun. It must resist normal building acids and alkalis and present a suitable surface for painting if necessary. In addition the ideal mastic is expected to retain these properties indefinitely and without maintenance against the action of water, wind, heat, light, ozone, ultra-violet radiation, erosion and mechanical attack by birds. Such a material does not exist in isolation. With excellent workmanship and careful detailing, however, it is possible for a good mastic to fulfil the majority of these requirements for ten or twelve years.* Attention to these points is vital for successful performance, and the current loss of faith

* American manufacturers have stated that it is possible to produce a mastic which will retain its properties for 50 years. Until the appearance of such a material, 15 years should be regarded as the maximum life of mastics in use today.

ARCHITECTS:
Thomson, Berwick & Pratt, Canada
GENERAL CONTRACTOR:
John Laing & Son (Canada) Ltd.
GRID MANUFACTURER & APPLICATORS:
Williams & Williams (Western) Ltd.
JOINT SEALER:
3M Weatherban



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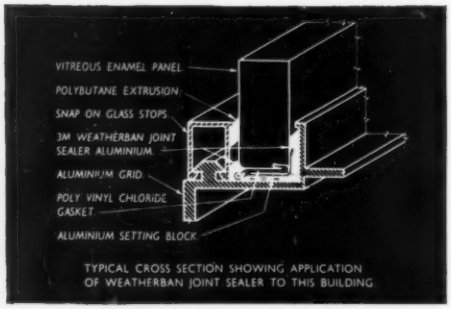
Some 500 gallons of "Weatherban" brand Joint Sealer (Aluminium colour) were used to seal the curtain walls which consist of prefabricated porcelain enamelled steel panels with fibreglass insulation, and 50,000 sq. ft. of double glazing units.



TYPICAL CROSS SECTION SHOWING APPLICATION OF WEATHERBAN JOINT SEALER TO THIS BUILDING

"WEATHERBAN" is one of the range of 3M adhesives and sealers for the building industry

3M APPROVED CONTRACTOR SERVICE *is available for the application of Weatherban where required. Copies of the full specification for the sealing of curtain wall structures can be obtained from 3M.*

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technical section

in mastics is attributable mainly to shortcomings in this direction.

Mastic used for sealing may be gunned or applied by knife or trowel. Since greater oil content generally ensures longer life, and the consistency of oilier compounds requires gun application, this method is usual. In addition adhesion is assisted by forcing into position under pressure. Joint surfaces must be dry, dust free, non-bituminous and free of grease and for gun application not farther apart than $\frac{5}{8}$ in. Untreated porous materials allow air and water to penetrate into the joint and tend to absorb the oil base. To prevent this, the exposed edges of such materials should be primed in all cases. The plastic nature of sealant mastics makes them unable to accept either dead loads of panels or imposed wind loads. To avoid extrusion, spacers of wood, p.v.c. tubing or hemp rope are necessary (Figure 6).

The volume of mastic applied to the joint is directly related to its life. The ability to accept constant deformation can only be guaranteed by providing sufficient depth—$\frac{1}{4}$ in. below the surface skin should be regarded as a minimum and to compensate for the shortcomings of workmanship it may be wise to increase this to $\frac{1}{2}$ in. or even $\frac{5}{8}$ in. The mastic should not be expected to accept movement greater than one-third of its depth or one-tenth of its width (Figure 7).

It is frequently expected that a mastic will retain its properties indefinitely, but changes are inevitable. Initially the oil base oxidises quickly to form a surface skin and subsequently more slowly. The result of this slow oxidation, together with accompanying complex chemical changes, is a progressive hardening and shrinkage of the mastic which thus loses its most important properties, those of plasticity and adhesion. The rate at which these changes take place depends primarily upon the degree of exposure to air and sunlight which in turn is related to the surface area of exposed mastic. Even under ideal conditions it is unlikely that a useful life of more than 10 years can be expected. Expensive renewal of mastic sealing in America after only two years has been experienced.

To ensure a satisfactory life, the limitations of the material must be recognised and accommodated. Two points emerge:

1. Renewal or repair of the sealant must be considered during the life of the building. Of 67 buildings examined by the author in only 7 cases were recommendations given to the client about suggested maintenance of mastic sealed joints. In many of these buildings, renewal will be a complicated and expensive operation and in a not inconsiderable number impossible without removal of the cladding. It was obvious that in all but a handful of cases no positive thought had been taken about maintenance of the mastic. The practice of forcing mastic into subsequently inaccessible nooks and crannies is to be deprecated in the strongest terms. Like paintwork, mastic should be in all cases readily accessible for periodic renewal and maintenance.

2. Whilst providing sufficient bulk of mastic to satisfy the requirements of the joint, as small an area as practicable should be exposed to the air (Figure 8). A further recommended precaution is the provision of easily removable cover strips or beads to give the mastic added protection against sunlight and weather (Figure 9). Figure 9B shows one detail from an extremely thoroughly detailed school at Putney by Powell and Moya. Two points worthy of note here are the well-protected yet accessible mastic seal and the air pocket which discourages suction through the joint and acts as a capillary break.

Although it has been suggested that oil-based mastics, properly used can form a suitable joint sealant, the poor weathering qualities of exposed surfaces and the necessity for frequent maintenance and renewal detract from their obvious advantages of cheapness and ease of application. The reverse is true of the synthetic rubber sealants, which have been used with considerable success in America for a number of years.

Sealants based on synthetic rubber formulations possess few of the disadvantages associated with oil-bound mastics or natural rubber. They have excellent weathering

TABLE 1. Relative properties of natural and synthetic rubbers

		NATURAL RUBBER	BUTYL	THIOKOL	NEOPRENE
RESISTANCE TO	ozone	fair	excellent	excellent	excellent
	oxidation	good	excellent	good	excellent
	sunlight ageing	poor	very good	excellent*	excellent
	flame	poor	poor	poor	good
	heat	good	excellent	fair	excellent
	cold	excellent	good	fair	good
	acid	fair to good	excellent	fair	good to excellent
	oil	poor	poor	excellent	good
	animal and vegetable oils	poor to good	excellent	excellent	good
adhesion		excellent	good	good to excellent	excellent
tear resistance		good	good	excellent	good
compression set		good	fair	poor	fair to good
abrasion resistance		excellent	good	poor	excellent
resilience		excellent	poor	fair to good	very good
gas permeability		fair to good	excellent	fair	excellent
electrical insulation		good to excellent	good to excellent	fair to good	fair to good

* externally.

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by allowing a screeded roof deck to breathe and move

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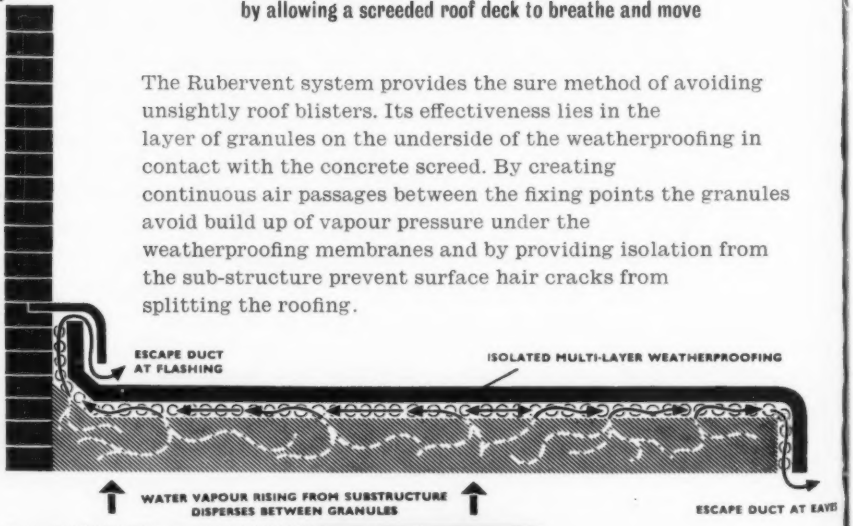

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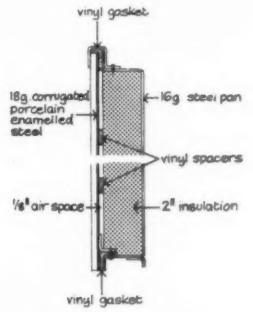
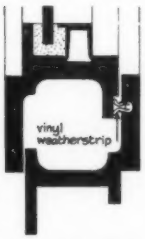


R.C.A. Cherry Hill Project, Camden, New Jersey (Vincent G. Kling)

Fig. 11. Protection of vinyl gaskets.



CRITTALL ALUMINIUM WINDOW

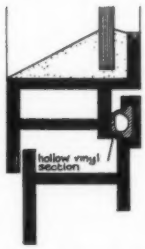


Fig. 12. Vinyl weather stripping.

neoprene gasket before and after insertion of filler strip

Fig. 13. Neoprene gasket and filler strip.

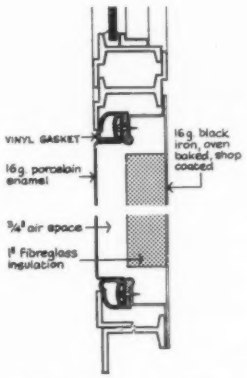


Fig. 14. Hollow tubular gasket.

properties, are chemically inert and are unaffected by acids, alkalis, vegetable oils or ultra-violet light. In addition, because they contain no oil, they can be used on unprimed absorbent surfaces without fear of staining.

The two most important synthetic rubber sealants are those based on polysulphide synthetic rubber, commonly known as "Thiokol,"* and those of co-polymerised isobutylene (butyl). Thiokol is a two-part polysulphide rubber in paste form consisting of a rubber medium and a catalyst, which are mixed together on site and remain usable for about 4 hours. The resulting mix is sticky and elastic and is gunned into position in a similar way to mastic. Under normal temperatures it sets slowly to a soft rubber with excellent properties. It is extremely flexible and capable of extension to twice its original size and is completely non-absorbent. Weathering tests indicate a life of at least 30 years. When properly applied and cured it has good adhesion to most building materials although experience has shown that it is difficult to ensure satisfactory adhesion to glass, particularly on façades facing south. It has also been found, both in the laboratory and in practice that Thiokol is unable to withstand ultra-violet radiation at a glass-Thiokol interface when the radiation is striking this through the glass from outside. It would therefore appear to be unwise to use Thiokol on the room side of transparent glass.

Thiokol is not easy to use. Considerable care must be taken in mixing and application if advantage is to be taken of its properties and for this reason it is unwise to employ other than skilled labour. The technique is described in some detail in BRS Digest No. 105 and manufacturers' instructions should be rigidly adhered to. The presence of moisture, corrosion, dust or grease will seriously affect adhesion and it is recommended that glass and metal surfaces be wiped with a sponge or cloth dipped in carbon tetrachloride or acetone before the sealant is placed. Brick and stone should be sanded down and brushed, and masking tape used to obtain straight, clean lines. The rate of curing is closely allied to temperature and takes 7 to 10 days in temperatures of 50° F to 60° F and longer in cold weather, full elasticity and adhesion requiring up to 4 weeks. Joints must be so designed that no load is taken by the compound during this time, and it is unwise to use Thiokol when large fluctuations of temperature may produce stresses set up by thermal movement.

The thickness of sealant should not be less than ⅛ in., but it is unnecessary to limit the area exposed to air, due to the excellent weathering properties of Thiokol. In fact the only limitations which need be placed on joint design are those dictated by the need to relieve the sealant from strain during curing and to limit the quantity of material used, for Thiokol is very expensive (about 10d. per cubic inch at the time of writing). Although Thiokol possesses weathering and ageing properties far superior to those of oil based mastics, its cost, two-part nature and necessity for careful site mixing and quick placing, limit its use to particularly

* "Thiokol" is the registered trade mark of the Thiokol Chemical Corporation. Butyl is not a trade name.

technical section

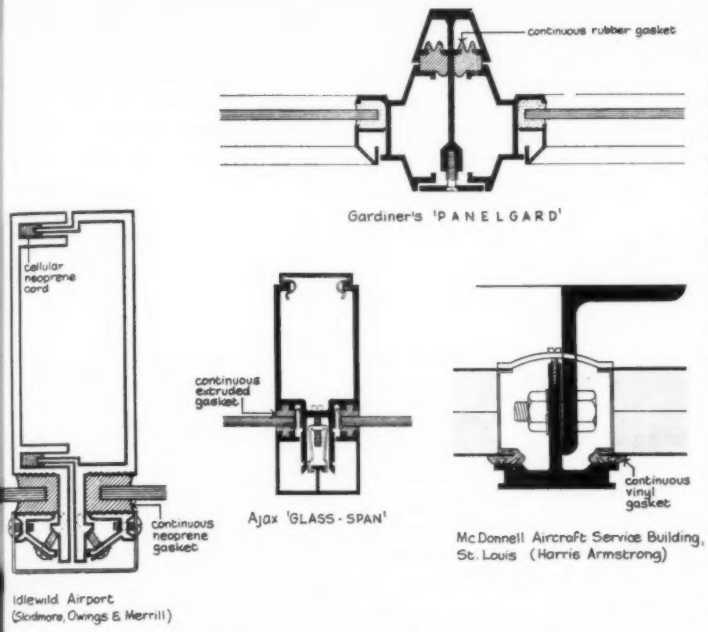


Fig. 15. Sealing by continuous gasket and applied pressure.

Fig. 16. Lap joint sealed with tape.

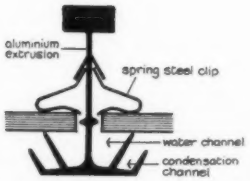


Fig. 17. Patent glazing dry joint.

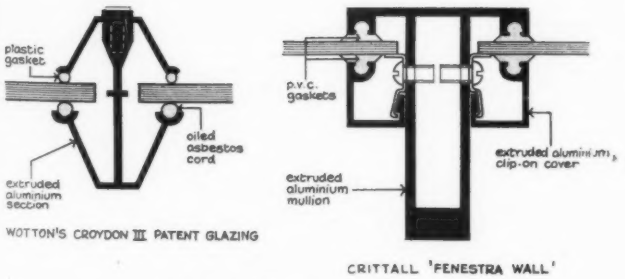


Fig. 18. Dry jointing to glass.

critical points and for pointing-up joints which have been sealed with a cheaper material. Butyl, whilst possessing all the weathering properties of Thiokol, is only about one-tenth the price and, since it is a one-part compound, is easy to place. Butyl can be supplied in cured or uncured states, the cured type behaving like vulcanised rubber and used for preformed gaskets, whilst the uncured type remains permanently plastic and deformable and is used as a sealant.

The one-part nature of uncured butyl gives it a long shelf life and also enables it to be supplied in preformed strips for easier placing, which eliminates the need for knife trimming due to extrusion from glazing rebates. It is, consequently, as easy to place as oil mastic and almost as cheap. It has the weathering qualities, but not the exceptional adhesion, of Thiokol, its bond lying somewhere between Thiokol and oil mastics.

Gaskets: The principle of the gasket is extremely simple: a specially shaped strip grips the panel edge and excludes moisture and air by close contact with adjacent surfaces. The gasket material is firm enough to support the panel against its dead weight and imposed wind loads and resilient enough to allow some degree of movement. Such seals have been used for bedding windows in aeroplanes and cars for many years, and in view of the extreme conditions in such positions, have provided a remarkably weatherproof joint (Figure 10). Unfortunately, buildings are required to last many times longer than aeroplanes or even cars, and until recently no material possessing the necessary resilience and firmness as well as resistance to age and permanent deformation was available for use in buildings.

Such requirements appear to have been met in the recent use of synthetic rubbers, such as neoprene and butyl and, to a lesser extent, plastics such as p.v.c. The vinyl plastics appear to have the shortest life and manufacturers are unable to give guarantees of more than about 7 years when p.v.c. is used in exposed positions. At present, therefore, its use should be confined to positions where it is protected from direct exposure to weather (Figure 11), or where replacement could be easily carried out (Figure 12). Although butyl possesses adequate resistance to ageing caused by heat and sunlight, it has a tendency to develop permanent set. Neoprene has excellent resistance to weathering, having been used outdoors for more than a quarter of a century, and will retain its resilient characteristics. It would therefore appear to offer the best all-round performance. Neoprene has been successfully used in America, in particular by Saarinen at General Motors and the International Business Machines Building at Minnesota and has a claimed minimum life of 40 years. A comparison between these and other synthetic rubbers is given in Table 1, which has been based mainly on American experience of these materials. Extrusion die costs for gaskets are relatively low and quite complicated shapes may be extruded. Three methods are now in use for ensuring close contact between the gasket and joint surfaces:

1. Filler Strip. This ingenious method of gripping

technical section

panel edges was developed by Saarinen for the first large scale use of gaskets in building at the General Motors Technical Centre, Detroit, after the initial mastic seal had failed. A similar form has been used in the Administration Building for General Motors at Warren, Michigan (Figure 13), pressure being exerted on the panel by means of a neoprene strip " zipped " into a groove in the gasket by special tools.

2. Hollow Sections. Hollow tubular gaskets are compressed against projections and cushion the panel against movement (Figure 14).

3. Pressure from cover beads or enclosures (Figure 15). When such compression fittings are not used and the gasket is not under pressure, it is necessary to seal the joint with mastic or Thiokol.

At angles, the unwillingness of architects to employ radiused corners, as in automobile detailing, has necessitated alternative means of continuing the seal around angles. The ends of p.v.c. gaskets may be fused by cutting with a hot knife on the mitre, but neoprene requires preformed or shop welded corners. Both methods appear to be equally satisfactory, although such joins must necessarily be the weakest part of the seal.

The use of preformed gaskets around glazing units makes it impossible to use the ordinary fixing technique of glaziers' slings and setting blocks to place the glass in position. Either special cut-aways have to be made in the extrusion for these slings or hand or mechanical suckers have to be used.

Because gaskets, properly used, are the only method of ensuring a vapour proof edge seal, they are ideal for use in conjunction with vapour barriers to prevent internal condensation.

Cover Tapes: Impregnated fibre tapes and cords and tape mastics based on polyisobutylene compounds are easy and convenient to apply and skilled labour is not required. They have little adhesion, and their use is limited to lap joints which can be made watertight by pressure (Figure 16). In such positions they form an extremely effective and cheap seal.

Spring Stops: So called "dry" jointing techniques employ quite different principles. Penetration of water into the joint is anticipated and suitably shaped sections collect and direct the water to designed outlet points. In its simplest form, this type is illustrated by the numerous patent glazing techniques (Figure 17) highly developed in this country with remarkable success, but little known in America. A spring steel clip holds the glass in place and allows for thermal movement. Behind this clip twin channels drain away penetrating water and condensation to horizontal weatherings which direct it to the outside. The system is simple, cheap, easy to erect, but too crude to be generally used. The horizontal joint is necessarily unsealed, and it is impossible to employ panels thicker than about $\frac{1}{2}$ in.

An alternative type of patent glazing has been adapted in the Crittall Fenestra system illustrated in Figure 18. Glass and panels are bedded on p.v.c. gaskets by means of variable clip-on beads, allowing a maximum panel thickness of $1\frac{1}{2}$ in. In view of the doubtful life of exposed vinyl plastics, a synthetic rubber gasket would, perhaps, ensure longer life, but otherwise the system offers a number of advantages over the more conventional gap-and-mastic joint.

The Complete Joint

Most principles of jointing are based on one of two widely opposed concepts. The first of these is to create a completely weatherproof barrier to water and air and the second is to allow water to enter the joint and provide means for drainage. At the present time neither of these concepts seems to give a complete answer. Our present limited knowledge of jointing methods leads one to assume that it is not practicable or even possible to design an economically feasible joint which will be an effective and complete barrier to the elements, and the failure of a joint based on this idea may prove disastrous to internal linings or even to the structure. On the other hand any joint which allows water freely to enter the wall provides an extremely difficult detailing problem in efficient drainage if wind-driven rain is to be excluded.

Present experience suggests that all *economically practicable* steps be taken to exclude water from the joint by means of two separate and accessible lines of defence, and provision be made for the drainage of any small quantities of water which may penetrate the seal. The most effective type of double seal consists of a mechanical outer barrier protecting and giving access to an internal air-tight seal of mastic, vinyl or synthetic rubber which allows for movement of components. Drainage of such a joint could take place at the foot of mullions and through carefully positioned weepholes at frequent intervals on transomes, possibly combined with an anti-condensation cavity.

It is likely that such a joint would not be inexpensive, but jointing is the last place where false economy should be practised. It is some years since agreement was reached that " sealants should not be the final answer against infiltration of air, dust and general leakage "* and much progress has been made in joint design since then. The combinations of good joint design, intelligent use of sealants and efficient detailing are necessary to overcome the problems inherent in the weakest part of light cladding.

* Architectural Metal Curtain Wall Workshop Conference Report, p. 11.

FLATS

in	CAMBERWELL GROVE, LONDON, S.E.
designed for	CAMBERWELL BOROUGH COUNCIL
borough architect	F. O. HAYES
deputy borough architect	H. C. CONNELL
senior assistant architect	B. D. ATKINSON
quantity surveyor	G. D. WALFORD & PARTNERS
engineering consultants	JOHN LIVERSEDGE & ASSOCIATES

SfB File No. (98)

UDC No. 728·1

This small housing scheme in Camberwell Grove is an example of constructing new dwellings on a small site in an area of considerable character and attractiveness without interrupting the scale of the surrounding buildings, and preserving as far as possible the existing trees which line this particular grove.

View of the northern blocks across the lawns that cover the railway tunnels. A fenced-in ventilation shaft can be seen behind the tree on the left.

APPRAISAL: Camberwell Grove is a street of great interest containing many fine houses, most of them lying to the south of the railway. The houses to the north are mostly in less attractive, outworn Victorian terraces. Inevitably much of this area will be redeveloped within the next few years and some demolition is already under way. How far should preservation go? Will the architects of the next scheme be asked to keep "in scale" with these recently completed flats?

The site also adjoins Grove Lane, which is of similar character but dominated by the huge tower of the William Booth Memorial College. The presence of that fine tower is, perhaps, a stronger reason for not altering the scale of the surroundings.

The presence of the railway has been a major factor in the development of this scheme—and incidentally it is sad to see the skill of the architects in preserving the trees on the site offset by the ruthless treatment of many once fine trees on the adjoining railway cutting, by British Railways. The railway has precluded continuous development along the building lines. The site is L-shaped with the upright alongside Camberwell Grove containing one block, mostly of maisonettes. The base of the L is parallel to the railway and the two other blocks are placed on the narrow strip of land between the tunnel and the northern boundary of the site. Of these the west block contains 16 flats and the other, 14 maisonettes. The placing of the blocks on the edges of the site has left a large and pleasant grassed area in front of them, and this contains two ventilation shafts for the tunnel. These are constructed of white-painted brick and make an agreeable foil for the flats.

The blocks are of simple, four-storey brick cross-wall construction, with in-situ concrete floors and roofs. Generally the exposed parts of the cross walls are in dark, almost black, brick and the infilling panels are of yellow brick. This has been used as a means of defining the dwelling rather than the construction, for in the block which contains the flats only the cross walls which divide dwellings have been expressed. Both types of brick are new to the district, but they fit in reasonably well, although it is interesting to compare the simplicity of the pre-war block in nearby Lettsom Street, by F. R. S. Yorke and Arthur Korn, where the restrained use of local brick achieved a more successful integration with the surrounding buildings (shown on p. 668). The concrete slabs are exposed and painted grey and the remaining elements are white-painted timber windows with the glass panels below backed by aluminium-faced fibreboard. This is the same material as is used at Sceaux Gardens, but here it is more acceptable as there is sufficient colour in the brickwork to provide contrast.

The two northern blocks are joined by a single-storey link, which contains the tenants' laundry and a separate single-storey block contains seven garages and a transformer chamber. Tenants' stores are provided at several points and communal refuse disposal is, surprisingly, provided separately from the blocks.

A refuse chamber is included in each of the three groups of tenants' stores, one for each block, measuring internally 4 ft. 10½ in. × 3 ft. 4½ in. × 6 ft. 9 in., and accommodating a refuse container. Rubbish is deposited into this through a hopper at high level approached by steps. The architects claim that this method works "reasonably well" but agree that it is not "preferable" to refuse chutes, and they consider that the problem of refuse disposal is one that should be thoroughly investigated.

The presence of the railway tunnel accounts for the abnormally high cost of the foundations, as the concrete columns which carry the ground beams, which in turn support the cross walls, had to be taken down to below the track level to prevent the possibility of side pressure on the walls of the tunnel. Temporary strutting was erected inside the tunnel to absorb stresses during the construction of the foundations and constant checks on the levels were made, much of this work having to be done after traffic on the line had stopped.

Almost half the dwellings have two bedrooms and of the remainder there are equal numbers of one-bedroom and three-bedroom dwellings. The internal planning of the flats and maisonettes is orthodox, with heating by continuous burning fires which also provide hot water. Cupboards are provided to most bedrooms and floating timber floors have been used over all the in-situ concrete floors.

CLIENT'S REQUIREMENTS

To develop a site for housing purposes, with tenants' stores, garages and a communal laundry, in a way which would fit in with the lineal character of a handsome early nineteenth century street.

SITE

A bombed site over a railway tunnel which bisects it into two zones, and the existence of which led to considerable extra difficulty and cost in the work below ground floor level.

Building was restricted to the areas clear of the tunnel, and provides accommodation at a rate of 136 persons per acre to the north and 70 per acre to the south of the tunnel.

PLANNING AIMS

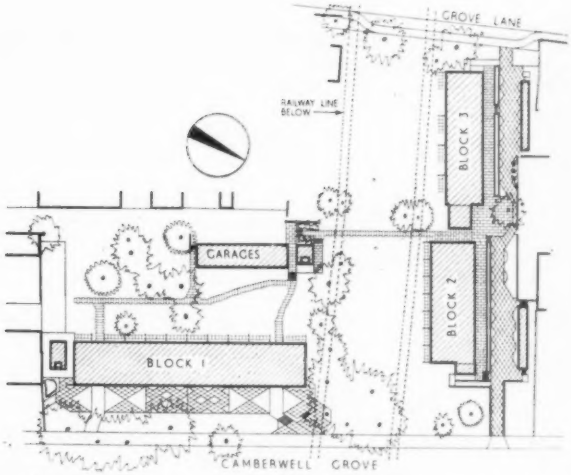
1. To preserve the existing trees, which form part of a wide avenue.
2. To design a form of development which would be in harmony and scale with the adjoining listed buildings.
3. To provide a form of mixed development.
4. To continue the street frontage of the Grove, within the limitations imposed by the railway tunnel.

SUMMARY

Ground floor area: 11,950 sq. ft.
Total floor area: 48,075 sq. ft.
Net (habitable) floor area (including private balconies): 38,071 sq. ft.
Type of contract: RIBA standard form with quantities.
Tender date: September, 1955.
Work began: November, 1955.
Work finished: August, 1959.
Tender price of foundations, superstructure, installations and finishes: £113,560.
Tender price of external works, including drainage, and ancillary buildings: £30,145.
Total: £143,705.

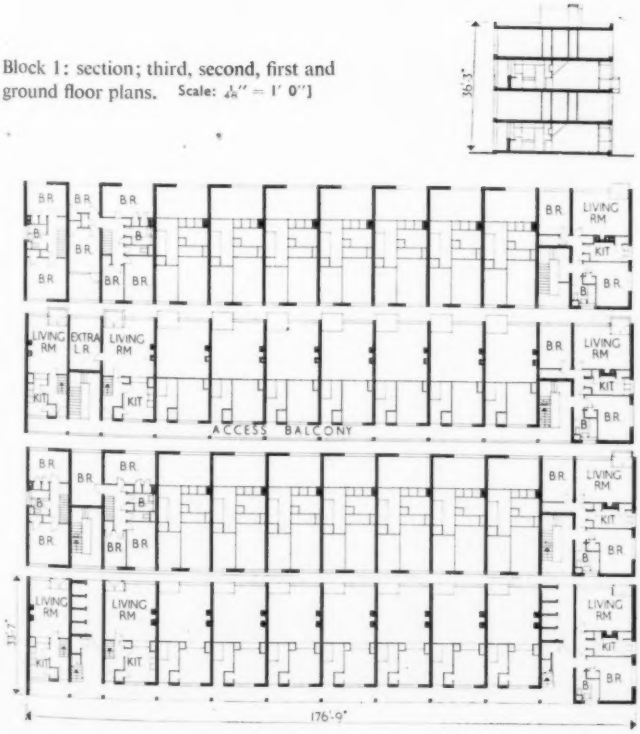
The west front of block 1 (centre), which consists mainly of maisonettes, having their living rooms facing this side, overlooking private lawns. The unsightly fencing will be removed when the grass has grown. The standard two-bedroom maisonettes have been supplemented by larger flats and maisonettes which use the spare space in the staircase bay for an extra bedroom.

Site plan

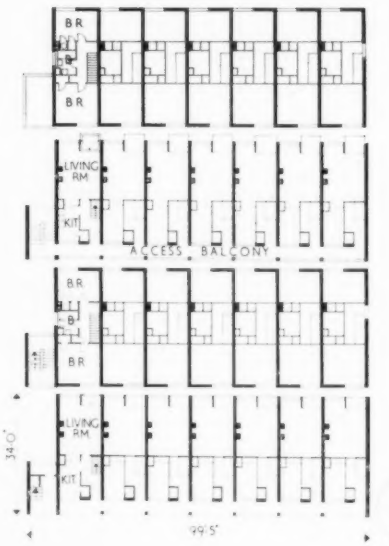


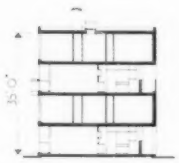
Below: entrance and access balcony of block 1. The hollow tile screen marks the staircase and while this looks attractive from outside and is the only emphasis given to the staircase, it makes the stairs gloomy from within even on a sunny day.

Block 1: section; third, second, first and ground floor plans. Scale: $\frac{1}{16}$" = 1' 0"]



building illustrated



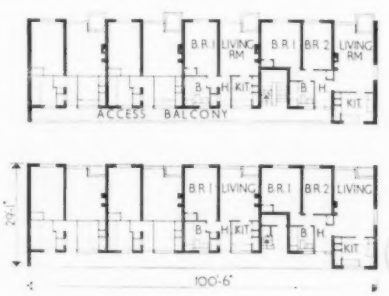


Block 2: third, second, first and ground floor plans; section [Scale: 1/16" = 1' 0"]

Opposite, top: the south side of blocks 2 and 3 running parallel with the railway. The nearer block contains four floors of flats, and the two blocks are linked by the laundry, just visible between them.

Opposite, bottom: this view is very unfair to the scheme, but shows the relationship of the railway, which divides the site in two. The end of block 1 can be seen at the left, b'ocks 2 and 3 in the centre.

Block 3: upper and ground floor plans [Scale: 1/16" = 1' 0"]



Schedule of Accommodation

	Maisonettes				*Flats*	
Block	*2-bed*	*3-bed*	*4-bed*	*5-bed*	*1-bed*	*2-bed*
1	2	14	1	1	1	3
2	14	—	—	—	—	—
3	—	—	—	—	12	4
Totals	16	14	1	1	13	7

32 maisonettes, 20 flats = 52 dwellings.

Preliminaries and insurances 1 11

Contingencies 1
This is a fixed allowance calculated on the basis of £5 per dwelling.

Work below ground floor level 11 7
The foundation design was based on:
(*a*) information from a soil investigation of the site;
(*b*) conditions imposed by the British Transport Commission regarding the stability of the tunnel;
which resulted in
(*c*) reinforced concrete continuous strip footings and bases connected to the ground floor construction by reinforced concrete columns, beams and bracing for blocks 2 and 3;
(*d*) and normal strip footings for block 1, except adjacent to the tunnel, where the foundation design is as in (*c*) above.
The maximum depth of foundations is about 20 ft. to 25 ft. below ground floor level.
A subsoil analysis revealed mainly clay subsoils.
Of this element cost, 6s. 6d. per sq. ft. of floor area was due to abnormal site conditions.

STRUCTURAL ELEMENTS

Frame or load-bearing element and external walls 8 8
The structure consists of longitudinal beams with load-bearing brick cross walls.
Brick infill panels to side elevation are included here: where timber, the cost is given under "windows and external doors."

$$\text{Ratio: } \frac{\text{solid walls}}{\text{floor area}} = \frac{0{\cdot}821}{1}$$

Windows, screens and external doors 1 10
Softwood glazed doors with sidelights and windows forming screens. All painted.

$$\text{Ratio: } \frac{\text{windows and doors}}{\text{floor area}} = \frac{0{\cdot}35}{1}$$

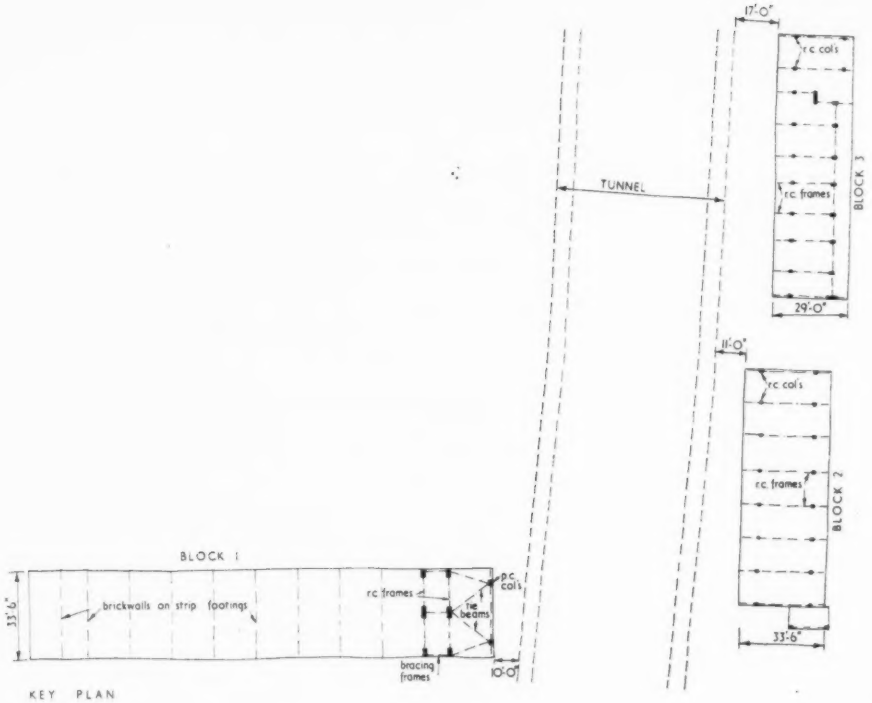
Upper floors 5 10
Between dwellings: solid concrete construction, with maximum span of 15 ft.
Intermediate floor, of maisonettes: timber except above access balconies.
Superloads: 40 lb./sq. ft.

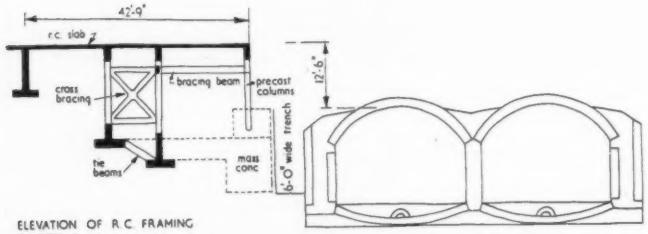
Staircases 1 0
R.c. communal stairs with metal balustrades.

Roof construction 2 0
All concrete flat roofs, with small concrete upstand round edges.
Total area, 12,300 sq. ft. approx.

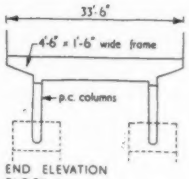
Rooflights 3
14 lights, with total area of approximately 90 sq. ft.

building illustrated



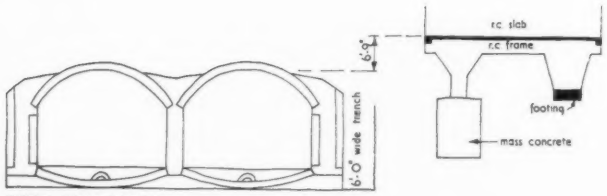


ELEVATION OF R.C. FRAMING
BLOCK 1

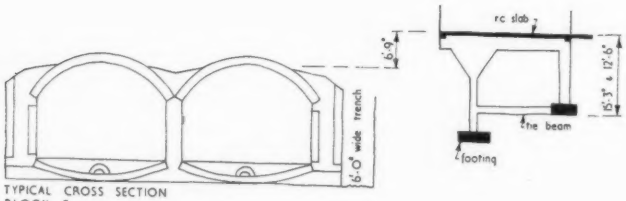


END ELEVATION
BLOCK 1

These engineers' drawings show the special foundations which had to be provided to ensure the stability of the railway tunnel which divides the site.



TYPICAL CROSS SECTION
BLOCK 2



TYPICAL CROSS SECTION
BLOCK 3

Glazing s d 11

24-oz. and 26-oz. clear sheet, ⅛-in. obscured and ¼-in. georgian wired cast glass.

Total of structural elements: 20s 6d

PARTITIONS AND FITTINGS

Internal partitions 1 1

Clay blocks, keyed as necessary for plaster.
Area: 2,830 sq. yds.

Screens 1 0

Softwood screens within dwellings separating hall from living room and kitchen.

Internal doors 1 11

630 single doors, flush finished softwood.
(Cost includes decorations.)

Ironmongery 11

Anodized aluminium furniture generally.

Fittings 2 0

Timber stairs and balustrades in maisonettes, 3 ft. wide, with 9 ft. total rise.
Metal fuel doors and hoppers; external lettering; softwood trap doors, fireplace surrounds; shelving and kitchen fittings. (Cost includes decorations.)

Total of partitions and fittings: 6s 11d

FINISHES

Floor finishes 3 0

Type of finish	*Area in sq. ft.*	*Price per sq. yd.*
Tongued and grooved boarding on fillets	33,420	14s. 1½d.
Granolithic, 1-in. and 1½-in.	2,050	8s. 5d. and 11s. 0d.
2-in. p.c.c. slabs	2,090	17s. 0d.

Wall finishes 2 0

2 coats thistle plaster. A small amount of rendered work.

Ceiling finishes 7

2 coats thistle plaster and a small amount of rendered work.

Roof finishes 1 2

Cellular concrete screed finished three layer felt.
Area: 12,000 sq. ft.

Decorations 1 3

Emulsion paint generally.

Total of finishes: 8s 0d

SERVICES

External plumbing, hot and cold water and heating installation 4 9

R.w.p.s and soil and waste stacks of cast iron.
Back boilers and hot water cylinders with copper services and lead mains within building from tank on roof.

Sanitary fittings 1 4

Each of the 52 dwellings has 1 bath, w.c., lavatory basin and sink.

Ventilation s d 1 10

It was originally intended that natural ventilation should be provided to internal bathrooms and w.c.s, but because waivers could not be obtained without it, mechanical ventilation has been installed in which each vertical pair of bathrooms/w.c.s is connected to an extract unit, with automatic change-over, mounted on the roof.

Gas installation 3

5 points per dwelling, for gas cooker, gas poker, sink water heater, boiler and refrigerator.

Electrical installation 1 10

Type of point	*Number of each type*
Lighting	389
Switches	375
Power	201
Cooker	52
Immersion heater	52
Fire point	1

Total of services: 10s 0d

Drainage 1 6½

1,340 ft. of stoneware drains and approximately 380 ft. of cast-iron drains. 38 manholes.

OTHER ELEMENTS 8

Balcony balustrade panels and supports. Metal frames with glass panels.

Cost per sq. ft. of floor area.

£113,560 (net cost excluding external works) / 38,071 sq. ft. (measured inside external walls) = 59 8

COST COMMENTS

There cannot, of course, be too many published analyses of housing costs. They are particularly useful for local authority dwellings of a similar size and similar internal layout. Four storey flats and maisonettes are a much used type. Unfortunately, however, these particular figures are of little direct help in making cost comparisons with other schemes.

The proximity of the railway tunnel dictated the structural considerations. The figures therefore show the result of these particular needs. As we see, the scheme was very expensive and took a long time to build for this reason. The analysis is however an indication of the costs which can be expected when ground conditions are specially exacting.

For more useful statistics on four-storey work we must refer back to West Ham (A.J., 17 October 1957) and more recently to the LCC scheme at Roehampton (5 November 1959). The latter was a most economical development. The district heating and hot water scheme, however, being shared by 1,500 dwellings, was produced for a figure too low for direct comparison elsewhere.

With regard to the Finishes. The Camberwell Grove figures are almost identical with Roehampton—about £275 per dwelling. This at any rate supports the view, suggested by a study of the details, that Camberwell has designed economically wherever they have had the opportunity.

CONTRACTORS

General contractor: Henry Boot & Son Ltd. *Sub-contractors—Felt roofing:* McCartney Ltd. *Asphalt:* F. J. Prater Asphalte *Gas:* South Eastern Gas Board. *Electricity:* Archibald Saville & Co. Ltd. *Cellular screeds:* Plastering Ltd. *Balustrades:* R. Smith (Horley) Ltd. *Plumbing:* D. F. Wiseman & Son Ltd. *Turfing:* Knowles & Weller Ltd.

technical section

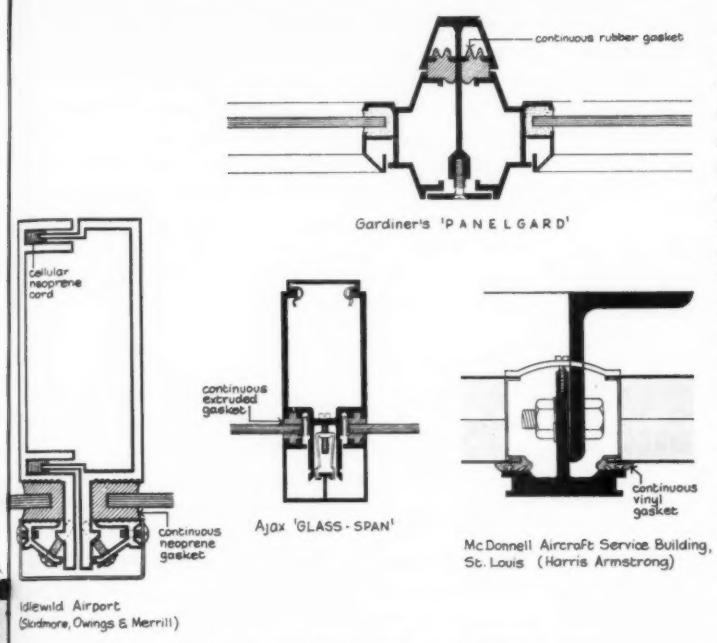


Fig. 15. Sealing by continuous gasket and applied pressure.

Fig. 16. Lap joint sealed with tape.

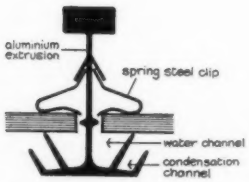


Fig. 17. Patent glazing dry joint.

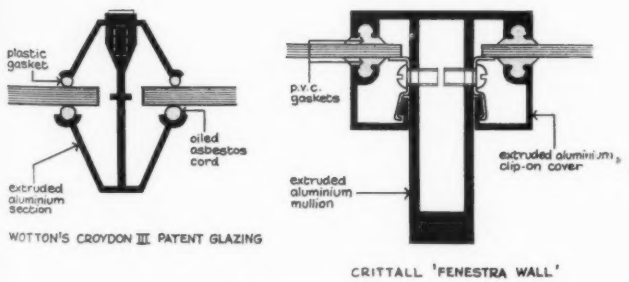


Fig. 18. Dry jointing to glass.

critical points and for pointing-up joints which have been sealed with a cheaper material. Butyl, whilst possessing all the weathering properties of Thiokol, is only about one-tenth the price and, since it is a one-part compound, is easy to place. Butyl can be supplied in cured or uncured states, the cured type behaving like vulcanised rubber and used for preformed gaskets, whilst the uncured type remains permanently plastic and deformable and is used as a sealant.

The one-part nature of uncured butyl gives it a long shelf life and also enables it to be supplied in preformed strips for easier placing, which eliminates the need for knife trimming due to extrusion from glazing rebates. It is, consequently, as easy to place as oil mastic and almost as cheap. It has the weathering qualities, but not the exceptional adhesion, of Thiokol, its bond lying somewhere between Thiokol and oil mastics.

Gaskets: The principle of the gasket is extremely simple: a specially shaped strip grips the panel edge and excludes moisture and air by close contact with adjacent surfaces. The gasket material is firm enough to support the panel against its dead weight and imposed wind loads and resilient enough to allow some degree of movement. Such seals have been used for bedding windows in aeroplanes and cars for many years, and in view of the extreme conditions in such positions, have provided a remarkably weatherproof joint (Figure 10). Unfortunately, buildings are required to last many times longer than aeroplanes or even cars, and until recently no material possessing the necessary resilience and firmness as well as resistance to age and permanent deformation was available for use in buildings.

Such requirements appear to have been met in the recent use of synthetic rubbers, such as neoprene and butyl and, to a lesser extent, plastics such as p.v.c. The vinyl plastics appear to have the shortest life and manufacturers are unable to give guarantees of more than about 7 years when p.v.c. is used in exposed positions. At present, therefore, its use should be confined to positions where it is protected from direct exposure to weather (Figure 11), or where replacement could be easily carried out (Figure 12). Although butyl possesses adequate resistance to ageing caused by heat and sunlight, it has a tendency to develop permanent set. Neoprene has excellent resistance to weathering, having been used outdoors for more than a quarter of a century, and will retain its resilient characteristics. It would therefore appear to offer the best all-round performance. Neoprene has been successfully used in America, in particular by Saarinen at General Motors and the International Business Machines Building at Minnesota and has a claimed minimum life of 40 years. A comparison between these and other synthetic rubbers is given in Table 1, which has been based mainly on American experience of these materials. Extrusion die costs for gaskets are relatively low and quite complicated shapes may be extruded. Three methods are now in use for ensuring close contact between the gasket and joint surfaces:

1. Filler Strip. This ingenious method of gripping

technical section

panel edges was developed by Saarinen for the first large scale use of gaskets in building at the General Motors Technical Centre, Detroit, after the initial mastic seal had failed. A similar form has been used in the Administration Building for General Motors at Warren, Michigan (Figure 13), pressure being exerted on the panel by means of a neoprene strip "zipped" into a groove in the gasket by special tools.

2. Hollow Sections. Hollow tubular gaskets are compressed against projections and cushion the panel against movement (Figure 14).

3. Pressure from cover beads or enclosures (Figure 15). When such compression fittings are not used and the gasket is not under pressure, it is necessary to seal the joint with mastic or Thiokol.

At angles, the unwillingness of architects to employ radiused corners, as in automobile detailing, has necessitated alternative means of continuing the seal around angles. The ends of p.v.c. gaskets may be fused by cutting with a hot knife on the mitre, but neoprene requires preformed or shop welded corners. Both methods appear to be equally satisfactory, although such joins must necessarily be the weakest part of the seal.

The use of preformed gaskets around glazing units makes it impossible to use the ordinary fixing technique of glaziers' slings and setting blocks to place the glass in position. Either special cut-aways have to be made in the extrusion for these slings or hand or mechanical suckers have to be used.

Because gaskets, properly used, are the only method of ensuring a vapour proof edge seal, they are ideal for use in conjunction with vapour barriers to prevent internal condensation.

Cover Tapes: Impregnated fibre tapes and cords and tape mastics based on polyisobutylene compounds are easy and convenient to apply and skilled labour is not required. They have little adhesion, and their use is limited to lap joints which can be made watertight by pressure (Figure 16). In such positions they form an extremely effective and cheap seal.

Spring Stops: So called "dry" jointing techniques employ quite different principles. Penetration of water into the joint is anticipated and suitably shaped sections collect and direct the water to designed outlet points. In its simplest form, this type is illustrated by the numerous patent glazing techniques (Figure 17) highly developed in this country with remarkable success, but little known in America. A spring steel clip holds the glass in place and allows for thermal movement. Behind this clip twin channels drain away penetrating water and condensation to horizontal weatherings which direct it to the outside. The system is simple, cheap, easy to erect, but too crude to be generally used. The horizontal joint is necessarily unsealed, and it is impossible to employ panels thicker than about $\frac{1}{2}$ in.

An alternative type of patent glazing has been adapted in the Crittall Fenestra system illustrated in Figure 18. Glass and panels are bedded on p.v.c. gaskets by means of variable clip-on beads, allowing a maximum panel thickness of $1\frac{1}{2}$ in. In view of the doubtful life of exposed vinyl plastics, a synthetic rubber gasket would, perhaps, ensure longer life, but otherwise the system offers a number of advantages over the more conventional gap-and-mastic joint.

The Complete Joint

Most principles of jointing are based on one of two widely opposed concepts. The first of these is to create a completely weatherproof barrier to water and air and the second is to allow water to enter the joint and provide means for drainage. At the present time neither of these concepts seems to give a complete answer. Our present limited knowledge of jointing methods leads one to assume that it is not practicable or even possible to design an economically feasible joint which will be an effective and complete barrier to the elements, and the failure of a joint based on this idea may prove disastrous to internal linings or even to the structure. On the other hand any joint which allows water freely to enter the wall provides an extremely difficult detailing problem in efficient drainage if wind-driven rain is to be excluded.

Present experience suggests that all *economically practicable* steps be taken to exclude water from the joint by means of two separate and accessible lines of defence, and provision be made for the drainage of any small quantities of water which may penetrate the seal. The most effective type of double seal consists of a mechanical outer barrier protecting and giving access to an internal air-tight seal of mastic, vinyl or synthetic rubber which allows for movement of components. Drainage of such a joint could take place at the foot of mullions and through carefully positioned weepholes at frequent intervals on transomes, possibly combined with an anti-condensation cavity.

It is likely that such a joint would not be inexpensive, but jointing is the last place where false economy should be practised. It is some years since agreement was reached that "sealants should not be the final answer against infiltration of air, dust and general leakage"* and much progress has been made in joint design since then. The combinations of good joint design, intelligent use of sealants and efficient detailing are necessary to overcome the problems inherent in the weakest part of light cladding.

* Architectural Metal Curtain Wall Workshop Conference Report, p. 11.

FLATS

in	CAMBERWELL GROVE, LONDON, S.E.
designed for	CAMBERWELL BOROUGH COUNCIL
borough architect	F. O. HAYES
deputy borough architect	H. C. CONNELL
senior assistant architect	B. D. ATKINSON
quantity surveyor	G. D. WALFORD & PARTNERS
engineering consultants	JOHN LIVERSEDGE & ASSOCIATES

SfB File No. (98)

UDC No. 728·1

This small housing scheme in Camberwell Grove is an example of constructing new dwellings on a small site in an area of considerable character and attractiveness without interrupting the scale of the surrounding buildings, and preserving as far as possible the existing trees which line this particular grove.

View of the northern blocks across the lawns that cover the railway tunnels. A fenced-in ventilation shaft can be seen behind the tree on the left.

APPRAISAL: Camberwell Grove is a street of great interest containing many fine houses, most of them lying to the south of the railway. The houses to the north are mostly in less attractive, outworn Victorian terraces. Inevitably much of this area will be redeveloped within the next few years and some demolition is already under way. How far should preservation go? Will the architects of the next scheme be asked to keep "in scale" with these recently completed flats?

The site also adjoins Grove Lane, which is of similar character but dominated by the huge tower of the William Booth Memorial College. The presence of that fine tower is, perhaps, a stronger reason for not altering the scale of the surroundings.

The presence of the railway has been a major factor in the development of this scheme—and incidentally it is sad to see the skill of the architects in preserving the trees on the site offset by the ruthless treatment of many once fine trees on the adjoining railway cutting, by British Railways. The railway has precluded continuous development along the building lines. The site is L-shaped with the upright alongside Camberwell Grove containing one block, mostly of maisonettes. The base of the L is parallel to the railway and the two other blocks are placed on the narrow strip of land between the tunnel and the northern boundary of the site. Of these the west block contains 16 flats and the other, 14 maisonettes. The placing of the blocks on the edges of the site has left a large and pleasant grassed area in front of them, and this contains two ventilation shafts for the tunnel. These are constructed of white-painted brick and make an agreeable foil for the flats.

The blocks are of simple, four-storey brick cross-wall construction, with in-situ concrete floors and roofs. Generally the exposed parts of the cross walls are in dark, almost black, brick and the infilling panels are of yellow brick. This has been used as a means of defining the dwelling rather than the construction, for in the block which contains the flats only the cross walls which divide dwellings have been expressed. Both types of brick are new to the district, but they fit in reasonably well, although it is interesting to compare the simplicity of the pre-war block in nearby Lettsom Street, by F. R. S. Yorke and Arthur Korn, where the restrained use of local brick achieved a more successful integration with the surrounding buildings (shown on p. 668). The concrete slabs are exposed and painted grey and the remaining elements are white-painted timber windows with the glass panels below backed by aluminium-faced fibreboard. This is the same material as is used at Sceaux Gardens, but here it is more acceptable as there is sufficient colour in the brickwork to provide contrast.

The two northern blocks are joined by a single-storey link, which contains the tenants' laundry and a separate single-storey block contains seven garages and a transformer chamber. Tenants' stores are provided at several points and communal refuse disposal is, surprisingly, provided separately from the blocks.

A refuse chamber is included in each of the three groups of tenants' stores, one for each block, measuring internally 4 ft. 10½ in. × 3 ft. 4½ in. × 6 ft. 9 in., and accommodating a refuse container. Rubbish is deposited into this through a hopper at high level approached by steps. The architects claim that this method works "reasonably well" but agree that it is not "preferable" to refuse chutes, and they consider that the problem of refuse disposal is one that should be thoroughly investigated.

The presence of the railway tunnel accounts for the abnormally high cost of the foundations, as the concrete columns which carry the ground beams, which in turn support the cross walls, had to be taken down to below the track level to prevent the possibility of side pressure on the walls of the tunnel. Temporary strutting was erected inside the tunnel to absorb stresses during the construction of the foundations and constant checks on the levels were made, much of this work having to be done after traffic on the line had stopped.

Almost half the dwellings have two bedrooms and of the remainder there are equal numbers of one-bedroom and three-bedroom dwellings. The internal planning of the flats and maisonettes is orthodox, with heating by continuous burning fires which also provide hot water. Cupboards are provided to most bedrooms and floating timber floors have been used over all the in-situ concrete floors.

CLIENT'S REQUIREMENTS

To develop a site for housing purposes, with tenants' stores, garages and a communal laundry, in a way which would fit in with the lineal character of a handsome early nineteenth century street.

SITE

A bombed site over a railway tunnel which bisects it into two zones, and the existence of which led to considerable extra difficulty and cost in the work below ground floor level.
Building was restricted to the areas clear of the tunnel, and provides accommodation at a rate of 136 persons per acre to the north and 70 per acre to the south of the tunnel.

PLANNING AIMS

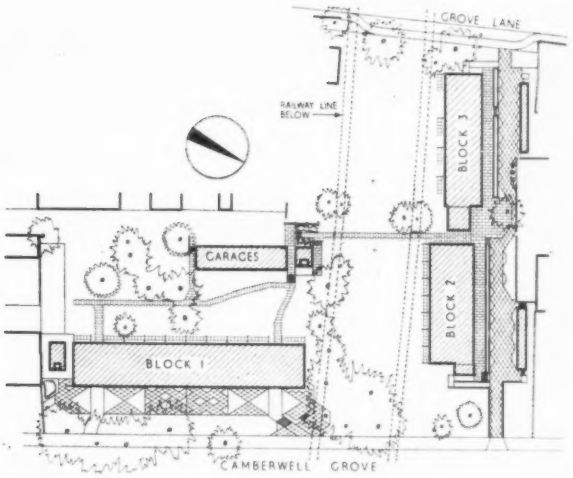
1. To preserve the existing trees, which form part of a wide avenue.
2. To design a form of development which would be in harmony and scale with the adjoining listed buildings.
3. To provide a form of mixed development.
4. To continue the street frontage of the Grove, within the limitations imposed by the railway tunnel.

SUMMARY

Ground floor area: 11,950 sq. ft.
Total floor area: 48,075 sq. ft.
Net (habitable) floor area (including private balconies): 38,071 sq. ft.
Type of contract: RIBA standard form with quantities.
Tender date: September, 1955.
Work began: November, 1955.
Work finished: August, 1959.
Tender price of foundations, superstructure, installations and finishes: £113,560.
Tender price of external works, including drainage, and ancillary buildings: £30,145.
Total: £143,705.

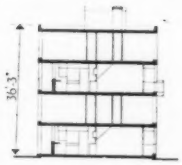
The west front of block 1 (centre), which consists mainly of maisonettes, having their living rooms facing this side, overlooking private lawns. The unsightly fencing will be removed when the grass has grown. The standard two-bedroom maisonettes have been supplemented by larger flats and maisonettes which use the spare space in the staircase bay for an extra bedroom.

Site plan

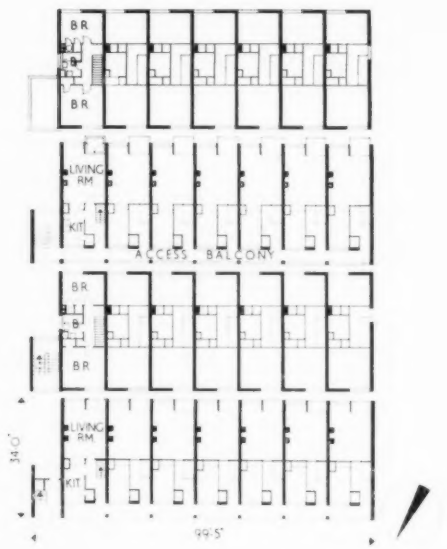


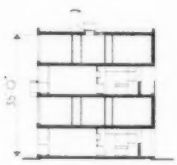
Below: entrance and access balcony of block 1. The hollow tile screen marks the staircase and while this looks attractive from outside and is the only emphasis given to the staircase, it makes the stairs gloomy from within even on a sunny day.

Block 1: section; third, second, first and ground floor plans. Scale: $\frac{1}{16}$" = 1' 0"]



building illustrated



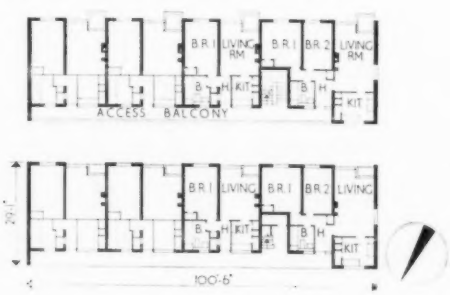


Block 2: third, second, first and ground floor plans; section [Scale: 1/16" = 1' 0"]

Opposite, top: the south side of blocks 2 and 3 running parallel with the railway. The nearer block contains four floors of flats, and the two blocks are linked by the laundry, just visible between them.

Opposite, bottom: this view is very unfair to the scheme, but shows the relationship of the railway, which divides the site in two. The end of block 1 can be seen at the left, b'ocks 2 and 3 in the centre.

Block 3: upper and ground floor plans [Scale: 1/16" = 1' 0"]



Schedule of Accommodation

	Maisonettes				*Flats*	
Block	*2-bed*	*3-bed*	*4-bed*	*5-bed*	*1-bed*	*2-bed*
1	2	14	1	1	1	3
2	14	—	—	—	—	—
3	—	—	—	—	12	4
Totals	16	14	1	1	13	7

32 maisonettes, 20 flats = 52 dwellings.

Preliminaries and insurances **1 11**

Contingencies **1**
This is a fixed allowance calculated on the basis of £5 per dwelling.

Work below ground floor level **11 7**
The foundation design was based on:
(*a*) information from a soil investigation of the site;
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which resulted in
(*c*) reinforced concrete continuous strip footings and bases connected to the ground floor construction by reinforced concrete columns, beams and bracing for blocks 2 and 3;
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The maximum depth of foundations is about 20 ft. to 25 ft. below ground floor level.
A subsoil analysis revealed mainly clay subsoils.
Of this element cost, 6s. 6d. per sq. ft. of floor area was due to abnormal site conditions.

STRUCTURAL ELEMENTS

Frame or load-bearing element and external walls **8 8**
The structure consists of longitudinal beams with load-bearing brick cross walls.
Brick infill panels to side elevation are included here: where timber, the cost is given under "windows and external doors."

$$\text{Ratio: } \frac{\text{solid walls}}{\text{floor area}} = \frac{0{\cdot}821}{1}$$

Windows, screens and external doors **1 10**
Softwood glazed doors with sidelights and windows forming screens. All painted.

$$\text{Ratio: } \frac{\text{windows and doors}}{\text{floor area}} = \frac{0{\cdot}35}{1}$$

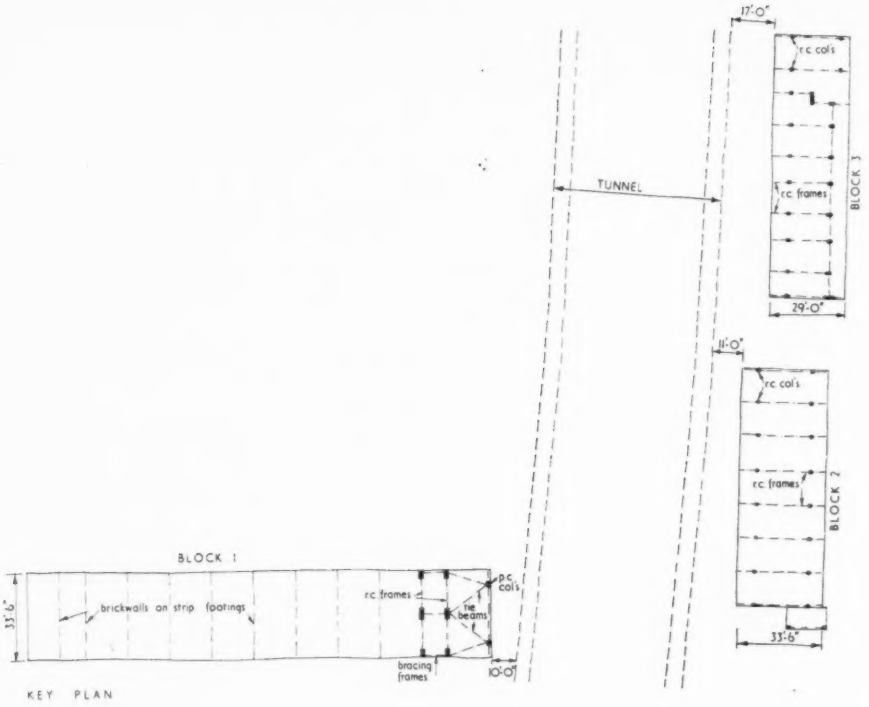
Upper floors **5 10**
Between dwellings: solid concrete construction, with maximum span of 15 ft.
Intermediate floor, of maisonettes: timber except above access balconies.
Superloads: 40 lb./sq. ft.

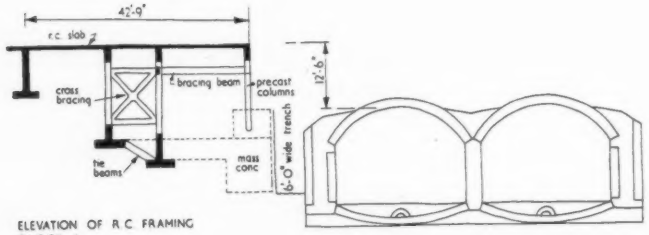
Staircases **1 0**
R.c. communal stairs with metal balustrades.

Roof construction **2 0**
All concrete flat roofs, with small concrete upstand round edges.
Total area, 12,300 sq. ft. approx.

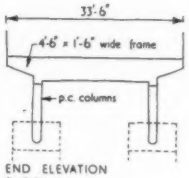
Rooflights **3**
14 lights, with total area of approximately 90 sq. ft.

building illustrated



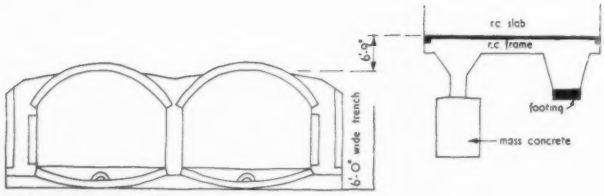


ELEVATION OF R.C. FRAMING
BLOCK 1

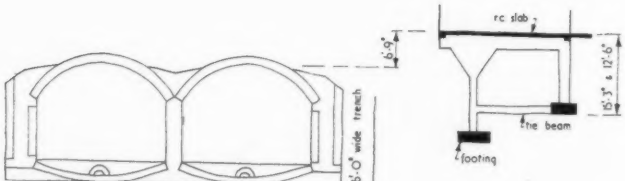


END ELEVATION
BLOCK 1

These engineers' drawings show the special foundations which had to be provided to ensure the stability of the railway tunnel which divides the site.



TYPICAL CROSS SECTION
BLOCK 2



TYPICAL CROSS SECTION
BLOCK 3

Glazing — s d 11

24-oz. and 26-oz. clear sheet, ⅛-in. obscured and ¼-in. georgian wired cast glass.

Total of structural elements: 20s 6d

PARTITIONS AND FITTINGS

Internal partitions — 1 1

Clay blocks, keyed as necessary for plaster.
Area: 2,830 sq. yds.

Screens — 1 0

Softwood screens within dwellings separating hall from living room and kitchen.

Internal doors — 1 11

630 single doors, flush finished softwood.
(Cost includes decorations.)

Ironmongery — 11

Anodized aluminium furniture generally.

Fittings — 2 0

Timber stairs and balustrades in maisonettes, 3 ft. wide, with 9 ft. total rise.
Metal fuel doors and hoppers; external lettering; softwood trap doors, fireplace surrounds; shelving and kitchen fittings. (Cost includes decorations.)

Total of partitions and fittings: 6s 11d

FINISHES

Floor finishes — 3 0

Type of finish	*Area in sq. ft.*	*Price per sq. yd.*
Tongued and grooved boarding on fillets	33,420	14s. 1½d.
Granolithic, 1-in. and 1½-in.	2,050	8s. 5d. and 11s. 0d.
2-in. p.c.c. slabs	2,090	17s. 0d.

Wall finishes — 2 0

2 coats thistle plaster. A small amount of rendered work.

Ceiling finishes — 7

2 coats thistle plaster and a small amount of rendered work.

Roof finishes — 1 2

Cellular concrete screed finished three layer felt.
Area: 12,000 sq. ft.

Decorations — 1 3

Emulsion paint generally.

Total of finishes: 8s 0d

SERVICES

External plumbing, hot and cold water and heating installation — 4 9

R.w.p.s and soil and waste stacks of cast iron.
Back boilers and hot water cylinders with copper services and lead mains within building from tank on roof.

Sanitary fittings — 1 4

Each of the 52 dwellings has 1 bath, w.c., lavatory basin and sink.

Ventilation — s d 1 10

It was originally intended that natural ventilation should be provided to internal bathrooms and w.c.s, but because waivers could not be obtained without it, mechanical ventilation has been installed in which each vertical pair of bathrooms/w.c.s is connected to an extract unit, with automatic change-over, mounted on the roof.

Gas installation — 3

5 points per dwelling, for gas cooker, gas poker, sink water heater, boiler and refrigerator.

Electrical installation — 1 10

Type of point	*Number of each type*
Lighting	389
Switches	375
Power	201
Cooker	52
Immersion heater	52
Fire point	1

Total of services: 10s 0d

Drainage — 1 6½

1,340 ft. of stoneware drains and approximately 380 ft. of cast-iron drains. 38 manholes.

OTHER ELEMENTS — 8

Balcony balustrade panels and supports. Metal frames with glass panels.

Cost per sq. ft. of floor area.

£113,560 (net cost excluding external works) / 38,071 sq. ft. (measured inside external walls) = 59 8

COST COMMENTS

There cannot, of course, be too many published analyses of housing costs. They are particularly useful for local authority dwellings of a similar size and similar internal layout. Four storey flats and maisonettes are a much used type. Unfortunately, however, these particular figures are of little direct help in making cost comparisons with other schemes.

The proximity of the railway tunnel dictated the structural considerations. The figures therefore show the result of these particular needs. As we see, the scheme was very expensive and took a long time to build for this reason. The analysis is however an indication of the costs which can be expected when ground conditions are specially exacting.

For more useful statistics on four-storey work we must refer back to West Ham (A.J., 17 October 1957) and more recently to the LCC scheme at Roehampton (5 November 1959). The latter was a most economical development. The district heating and hot water scheme, however, being shared by 1,500 dwellings, was produced for a figure too low for direct comparison elsewhere.

With regard to the Finishes. The Camberwell Grove figures are almost identical with Roehampton—about £275 per dwelling. This at any rate supports the view, suggested by a study of the details, that Camberwell has designed economically wherever they have had the opportunity.

CONTRACTORS

General contractor: Henry Boot & Son Ltd. *Sub-contractors—Felt roofing:* McCartney Ltd. *Asphalt:* F. J. Prater Asphalte *Gas:* South Eastern Gas Board. *Electricity:* Archibald Saville & Co. Ltd. *Cellular screeds:* Plastering Ltd. *Balustrades:* R. Smith (Horley) Ltd. *Plumbing:* D. F. Wiseman & Son Ltd. *Turfing:* Knowles & Weller Ltd.

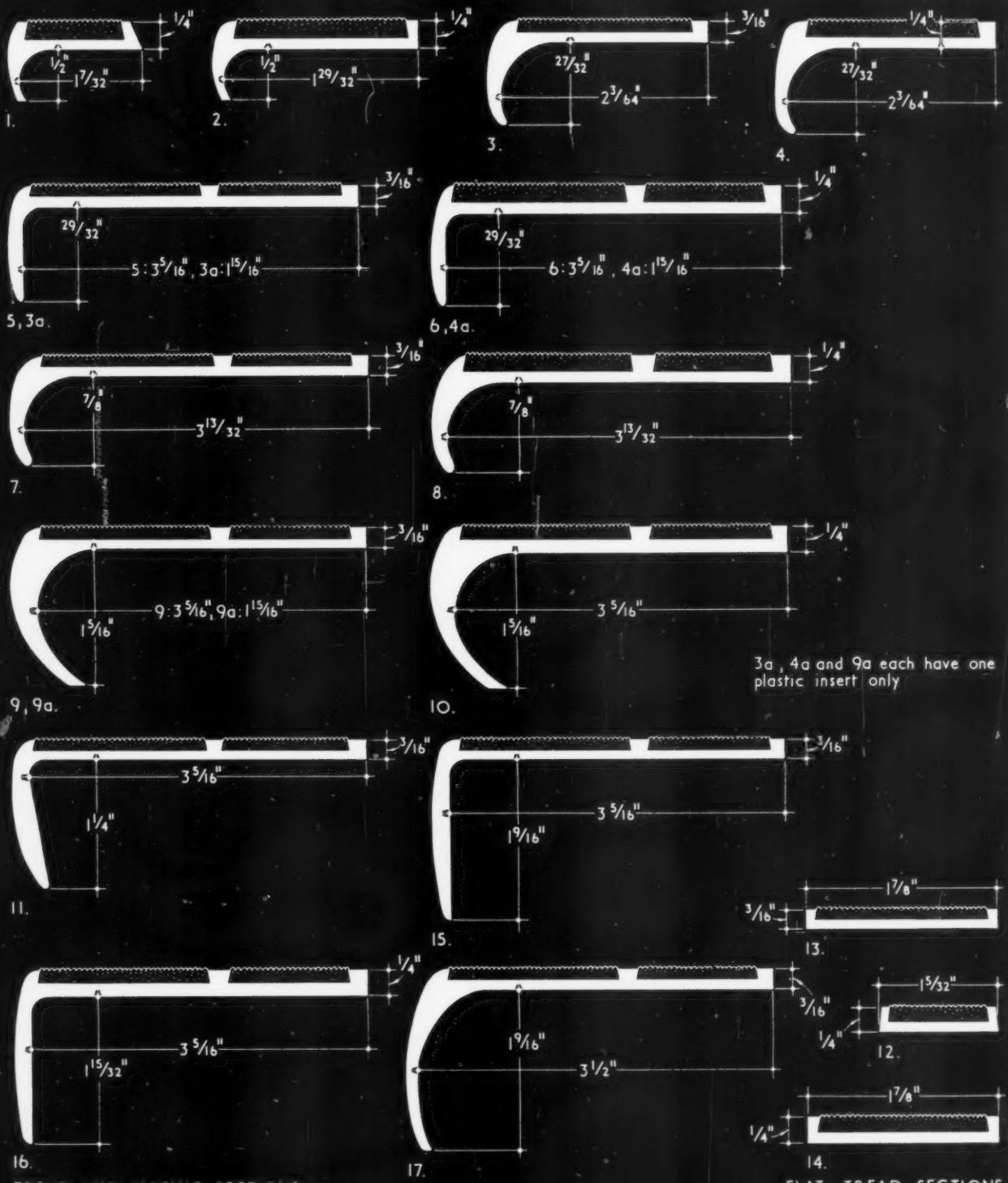
building illustrated

Lettsom Street, a pre-war block of great simplicity where the use of local brick has achieved successful integration with surrounding buildings, is worth comparing with the new blocks.

The east elevation of the block facing Camberwell Grove. Future plans include parking bays.

STAIR TREADS | ALUMINIUM AND PLASTIC

The Architects' Journal Library of Information Sheets 763. Editor: Cotterell Butler, A.R.I.B.A.



·DON· ALUMINIUM PLASTIC-FILLED STAIR TREADS. (scale 3/4 full size) Manufacturer: Small and Parkes Ltd.

19.Z10 ·DON· ALUMINIUM PLASTIC-FILLED STAIR TREADS *(Patent No. 645569)*

This Sheet describes a range of aluminium stair-nosings which are available fitted with specially compounded plastic inserts in a selection of pure colours. Where a wider tread is required than that provided by the tread-and-nosing section, flat tread sections may be added to make up the required width. Should the step not be brought up to the level of the tread by the stair covering, special feather-edged strips can be fixed at the back of the treads.

Sizes

The drawings on the face of this Sheet show, to a scale of $\frac{3}{4}$ full size, the various sections which are available. Special sections can be supplied if the order is sufficiently large to justify the manufacture of the dies. All sections may be supplied drilled and cut to specification; alternatively, standard undrilled lengths of 12 ft. 1 in. may be obtained. Curved lengths are supplied to drawings or templates and are available with the nosing on the inside or outside of the curve.

Aluminium Sections

These are extruded from pure aluminium and nosings are buffed to give a highly polished finish.

Plastic Inserts

Material: The plastic used is of the thermoplastic type and is a special grade of polyvinyl chloride.

Characteristics: The insert is extruded, has a ribbed surface, is stable in shape, non-slip and hard wearing. Under the influence of heat (in excess of 120° F.), combined with mechanical stress, it can become distorted, but these conditions are unlikely to arise when the material is in service.

The compositions used are not affected by water, acids, alkalis or oils with which they may come in contact under normal circumstances. They are not inflammable and do not support combustion.

Colours: The colours are blended throughout the material and cannot, therefore, wear off. They may also be regarded in practice as unaffected by light and heat. All sections are available with inserts of white, silver, blue, maroon, red, green, black and two shades of brown.
Double channel sections may be obtained with inserts in a combination of any of these colours.

Fixing

Plastic-filled stair treads are drilled to take $\frac{3}{4}$-in. or 1-in. No. 6 or No. 8 wood screws and are countersunk to take No. 6 or No. 8 screw-caps; these fittings may be brass or cadmium-plated. Alternatively, the treads can be supplied with holes counter-bored through to the aluminium base, these holes being fitted with plastic plugs after the treads have been fixed.

Wood stairs: Care should be taken to ensure that the stair treads bed down evenly. Where the steps are badly worn it may be advisable to chisel out and fit the tread flush with the remainder of the step. Where the step is only partly worn it may be built up level and the tread fitted to the top.

Concrete stairs: With new stairs the treads may be cast in when making the steps or, alternatively, timber fillets may be cast in to take the fixing screws. With existing stairs the steps can be drilled and plugged to take the fixing screws. When it is required to fix the stair treads with an adhesive instead of screws the manufacturer should be consulted.

Metal stairs: The treads should be fixed with $\frac{3}{16}$-in. brass countersunk screws and steel nuts with washers, the steps being drilled accordingly.

Fabric-Filled Stair Treads

All treads on this Sheet can be supplied with the more common type of fabric insert in place of the coloured plastic type if required.

Compiled from information supplied by:

Small and Parkes Ltd.
Head Office : Hendham Vale Works, Manchester, 9.
Telephone : Collyhurst 2511.
Telegrams : Packless, Manchester.
London Office : 251, Kingston Road, London, S.W.19.
Telephone : Cherrywood 3806/7.

SOUND INSULATION 2: COMPOSITE AND CAVITY STRUCTURES

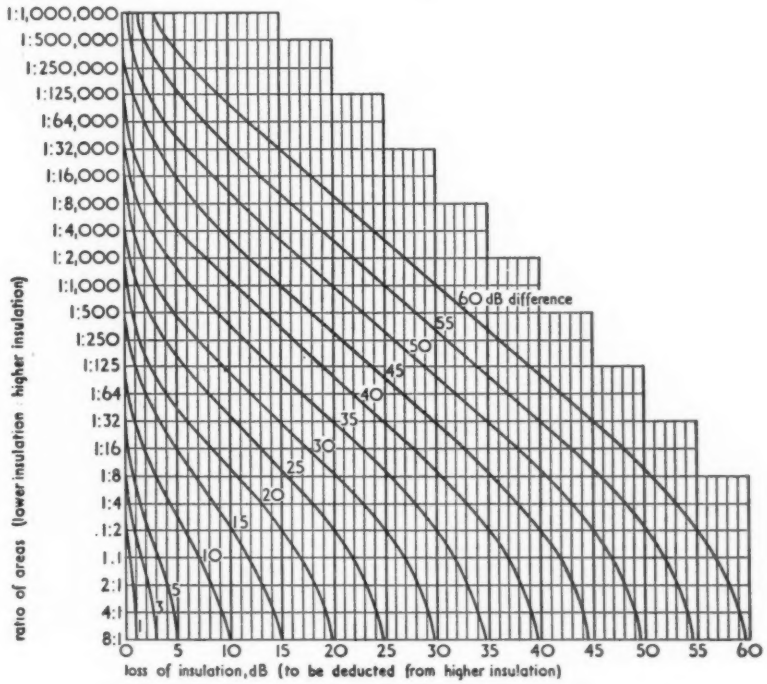
This Sheet is the second of a series on sound insulation and gives the method of calculation for composite and cavity structures. Other Sheets in the series deal with single-leaf structures; impact insulation; sound absorbents; design of auditoria.

Principle

The overall sound insulation between two locations depends on a large number of factors, including the acoustic conditions (amount of reverberation) prevailing at both the location of the sound source and the sound receiving one. Without considering the variation due to this cause, which in many practical cases is not very large, the resultant overall insulation value is often affected by the contributions of the many routes which the sound can take. For example, between two adjoining rooms on the same floor level, the sound can travel directly through the dividing wall and through any cracks, gaps or weak places in it. It can also travel via any side walls, floor or ceiling common to both rooms (indirect or flanking transmission).

To assess the overall insulation value is, therefore, a difficult matter and even when a measurement is made (in an actual building, rather than a sound measurement laboratory where conditions are artificial) it is often impossible to decide more than roughly what proportion of the insulation value is attributable to the various routes.

One very common situation is open to simple calculation. This is the overall value resulting from a barrier having two parts of different sound insulation, for example, a brick wall with a door or window in it, or a partition with cracks round the edges. The formula is reduced to simple graphical form below and some examples of its uses follow.



Walls with Doors

A plastered 4½-in. brick wall dividing two rooms is 16 ft. 0 in. by 9 ft. 0 in. and has a 6 ft. 6 in. by 2 ft. 6 in. flush hollow-core door in it with normal cracks at the edges, i.e., with no special form of sound sealing. The area of the door is approximately 16 sq. ft. and of the wall 128 sq. ft. The average insulation of the door is 15 dB and of the wall 45 dB. The ratio of areas (lower to higher insulation) is 1 : 8 and the insulation difference is 30 dB. Reading from the graph it will be seen that there is a loss of 20 dB to be deducted from the higher insulation, giving an overall value of 25 dB.

If the door were 2 in. thick solid timber with all edges well sealed (insulation 30 dB), the overall value would rise to 38 dB.

It should be further noted that, for the overall insulation of the wall not to be noticeably impaired (loss not exceeding 2 dB), the door insulation must be at least 38 dB: this value can be attained only by heavy special doors with excellent sealing.

Walls with Cracks or Gaps

The use of demountable dry-built constructions inevitably leads to the presence of cracks of some size, unless very special precautions are taken, such as the provision of gaskets. A typical demountable partition dividing two rooms is 10 ft. 0 in. by 12 ft. 0 in. and has an average insulation of 25 dB. A crack with an average width of $\frac{1}{16}$ in. exists all round the partition where it abuts the wall, floor and ceiling surfaces which are not true. The area ratio is thus 1 : 600 and the crack can be assumed for practical purposes to have no insulation (0 dB). The overall insulation from the graph is, therefore, 23 dB. Thus there is a significant loss of insulation due to this quite normal crack. No allowance has been made for cracks between the units of the partition: where these exist to any great extent the overall insulation will be even less.

2 E2 SOUND INSULATION 2: COMPOSITE AND CAVITY STRUCTURES

Where the partition has a higher insulation, e.g., 40 dB, the loss due to the crack is more serious (28 dB overall).
Finally, it is obvious that a partition between two rooms which is incomplete, i.e., does not extend to the ceiling or wall or has large holes in it for heating pipes, etc., can provide practically no useful sound insulation between the rooms, however good the insulation of the partition itself may be.

Walls or Roofs with Windows

The graph can also be used to determine overall insulation of walls or roofs with windows, but a correction must be made to the answer because of the particular acoustic conditions involved, namely, non-reverberant open air outside the building and reverberant rooms inside. For insulation against sound originating in the open air and passing into the building, the value obtained from the graph should be reduced by 6 dB. On the other hand, for sound originating inside the building and passing out to the open air, the value given by the graph can be increased by 6 dB. This last will give a rough estimate of the insulation, assuming that the receiving position is very close to the building. If it is at some distance, then many other factors must be taken into account and reference should be made to a text-book to obtain information on these.

Indirect or Flanking Transmission

The transmission of sound by indirect or flanking paths can reduce the overall insulation to something less than that of the dividing element. However, this reduction can safely be ignored for elements having an insulation of 40 dB or less. Where the dividing element has an insulation greater than 40 dB, an overall insulation somewhat lower than the laboratory figure for the partition or floor must be expected: how much lower will depend on the nature of the flanking paths and also on how the dividing element is built into the flanking elements.
A typical example is a wood joist floor with floating board finish and 10 lb. per sq. ft. sand pugging. In the laboratory, this floor gives an average insulation of around 55 dB, but when built into a normal practical building, the value is reduced to about 45 dB when the floor is supported on thick walls (at least 9 in.) or 40 dB when the floor is supported on walls 4½ in. thick or less. It is noteworthy that the thin walls give more indirect transmission and that the loss in overall insulation is high, as it is not possible to make a good connection between the joist floor and the flanking walls. In fact, there is hardly any connection at all (except by the ceiling plaster) to the walls which run parallel to the joists.
It is generally better to bond all walls and floors solidly together as a means of reducing indirect transmission, because none of the normal resilient layers, such as cork, felt, etc., have been found effective in these circumstances.

Cavity Constructions of High Insulation

The following table sets out the average insulation value of a number of typical wall and floor constructions which have usually been found to yield insulation above the mass law value by virtue of their cavity construction.

Element	Construction	Total weight as built (lb. sq. ft.)	Average Insulation (dB)
Wall	¼-in. plywood both sides of 2½-in. timber studs, 2-in. glass or rockwool in cavities	2·8	30
Window	Double window of 24-oz. glass, spacing 4 in., tightly sealed, with absorbent in reveals	3	35
Wall	Double wall of 2-in. woodwool slabs, plastered ½ in., 2-in. cavity, light wire ties	16	40
Floor	Joist floor with floating wood raft finish; ⅜-in. plasterboard and skim coat ceiling	8	
Window	Double window of 24-oz. glass, spacing 8 in., tightly sealed, with absorbent in reveals	3	
Door	Special door of two sheets of 14-s.w.g. sheet steel, 3-in. rockwool in cavity, special pressed steel frame and sealing at edges	7	
Wall	3-in. lightweight concrete blocks plastered ½ in. one side, other side 1-in. woodwool slabs fixed to battens and plastered	22	45
Wall	Double wall of 2-in. clinker blocks, plastered, 1-in. minimum cavity, light wire ties	32	
Floor	Joist floor with floating raft finish; lath and plaster ceiling, 3-in. rockwool or similar pugging directly on ceiling; floor supported on thick walls	14	
Floor	Joist floor with t. and g. boards, lath and plaster ceiling, 2-in. sand pugging directly on ceiling	27	
Wall	Double wall of 2-in. clinker blocks, plastered ½ in. on outer faces, 6-in. cavity, no ties	32	50
Wall	Double wall of 3-in. clinker blocks, plastered ½ in. on outer faces, 3-in. minimum cavity, wire ties	44	
Floor	Joist floor with floating wood raft finish, lath and plaster ceiling, 2-in. sand pugging directly on ceiling; floor supported on thick walls	28	
Window	Double window of ⅜-in. plate glass, spacing 12 in. minimum, tightly sealed, with absorbent in reveals	12	

Compiled by H. R. Humphreys, A.R.I.B.A.

working detail

GLAZED WALL: TECHNICAL SCHOOL IN DERBY

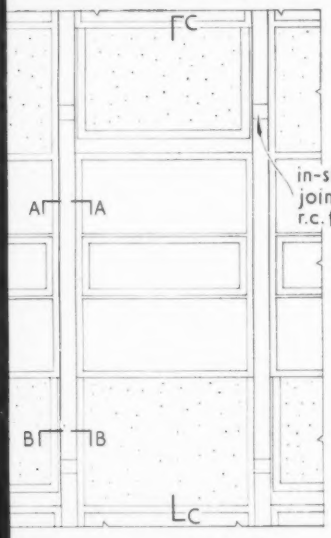
Grenfell Baines and Hargreaves, architects.

This version of the non-loadbearing wall uses precast concrete H-frames. These H-frames have four cross bars of which only the topmost breaks through to the facade. The dark nicks which appear between each frame in the vertical sequence are in-situ joints which have been purposely emphasized as it was found impossible to conceal them. Although this principle of emphasizing what you cannot hide is a respectable one, it may be questioned whether the effect of discontinuity and spottiness produced here is altogether fortunate.

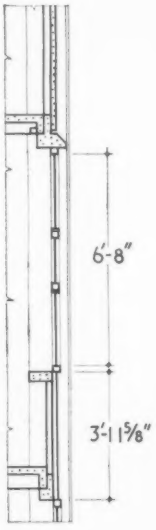
working detail

GLAZED WALL: TECHNICAL SCHOOL IN DERBY

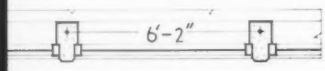
Grenfell Baines and Hargreaves, architects.



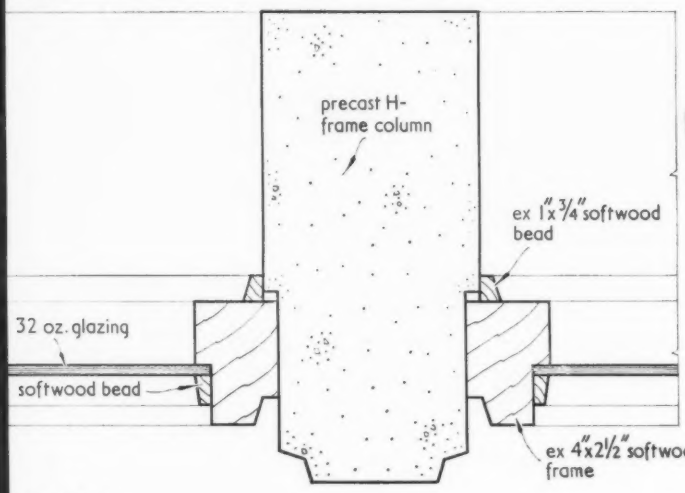
ELEVATION. scale 3/16"=1'-0"



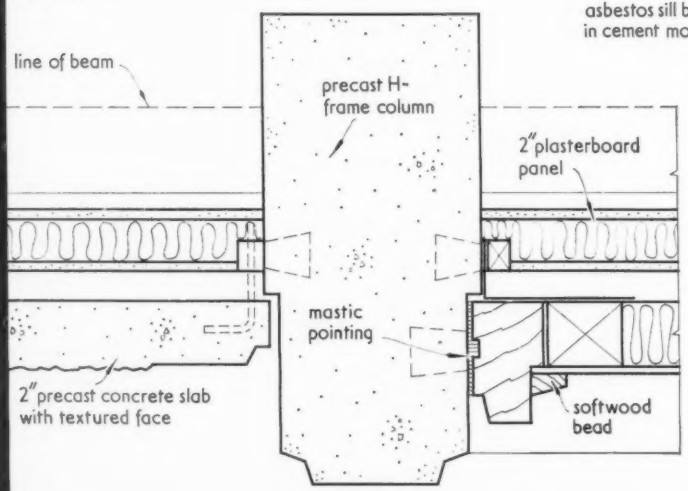
SECTION.



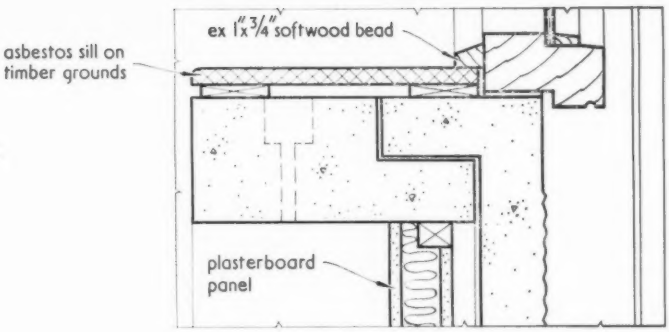
PLAN.

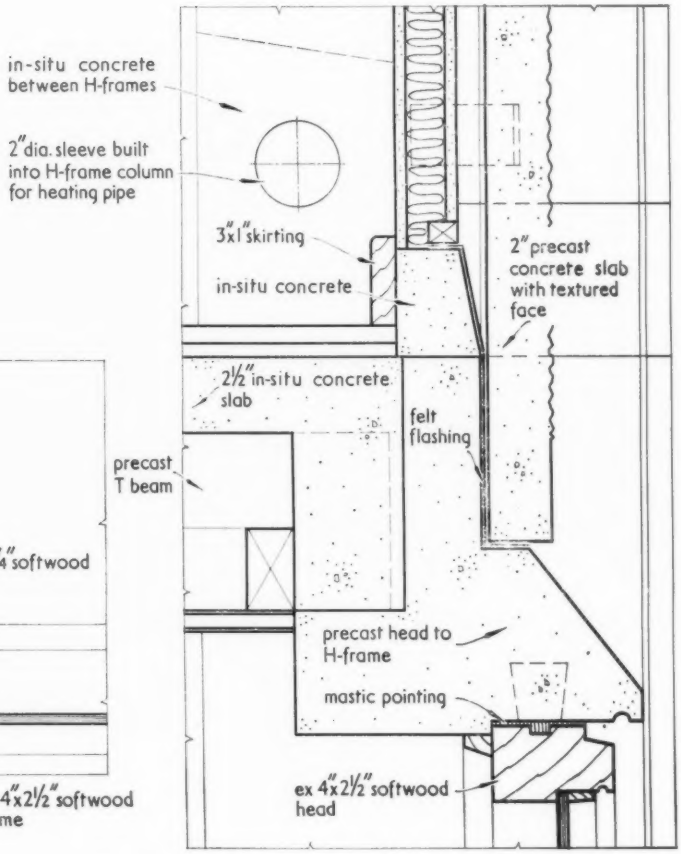


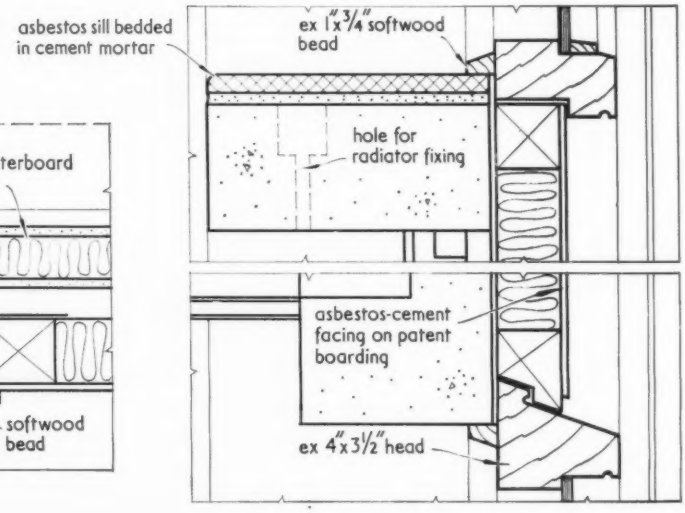
PLAN A-A.



PLAN B-B. scale ½ full size







SECTION C-C. scale ½ full size

BROUGHTON MOOR OLIVE GREEN SLATE RIVEN FINISH

RUTHERFORD COLLEGE, NEWCASTLE-UPON-TYNE
Architect: George Kenyon, A.R.I.B.A.
Contractors : Messrs Leslie & Co Ltd., London and Darlington

Ideally suited for internal and external facings, Broughton Moor Green Slate can be supplied in a variety of finishes– and remains sound for centuries. These characteristics made it an ideal choice for the Rutherford College of Technology, Newcastle-upon-Tyne, architect: George Kenyon, A.R.I.B.A., City Architect. For this contract, Broughton Moor Olive Green naturally riven slate was used, approximately 16,000 square feet being supplied in the form of Ormecraft panels, to which the Broughton Moor Olive Green Slate was cramped and bonded. About 5,000 square feet of the same slate was fixed traditionally.

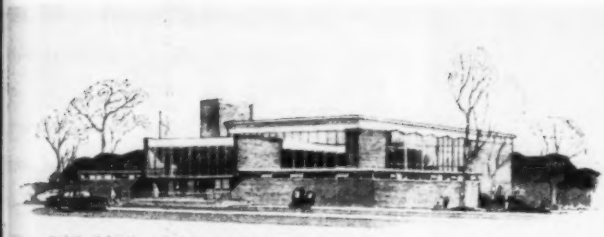
An example of Broughton Moor Green Slate showing the naturally riven finish. Finely rubbed, sanded and frame sawn finishes are also supplied and all available in three distinct colours: Light Sea Green, Olive Green and Pale Green Barred. Technical pamphlets showing typical methods of fixing are available as follows:

1. *Flooring.* 2. *Facing.* 3. *Coping.*
4. *Cills.* 5. *Riven Face Slabs.*

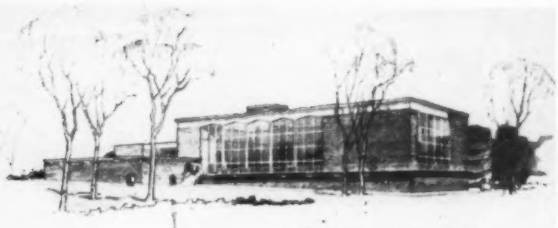
Broughton Moor
GREEN SLATE QUARRIES LTD

CONISTON THE LAKE DISTRICT · LANCASHIRE · TELEPHONE: CONISTON 225

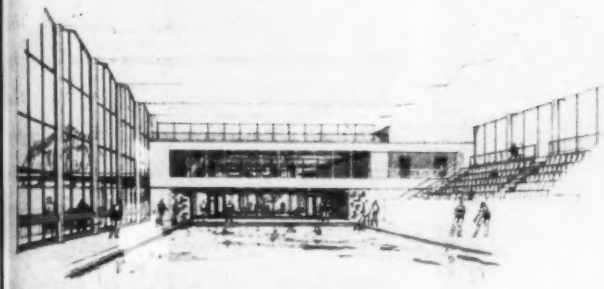
SWIMMING BATHS AT STECHFORD, BIRMINGHAM



VIEW FROM SOUTH WEST



VIEW FROM SOUTH EAST

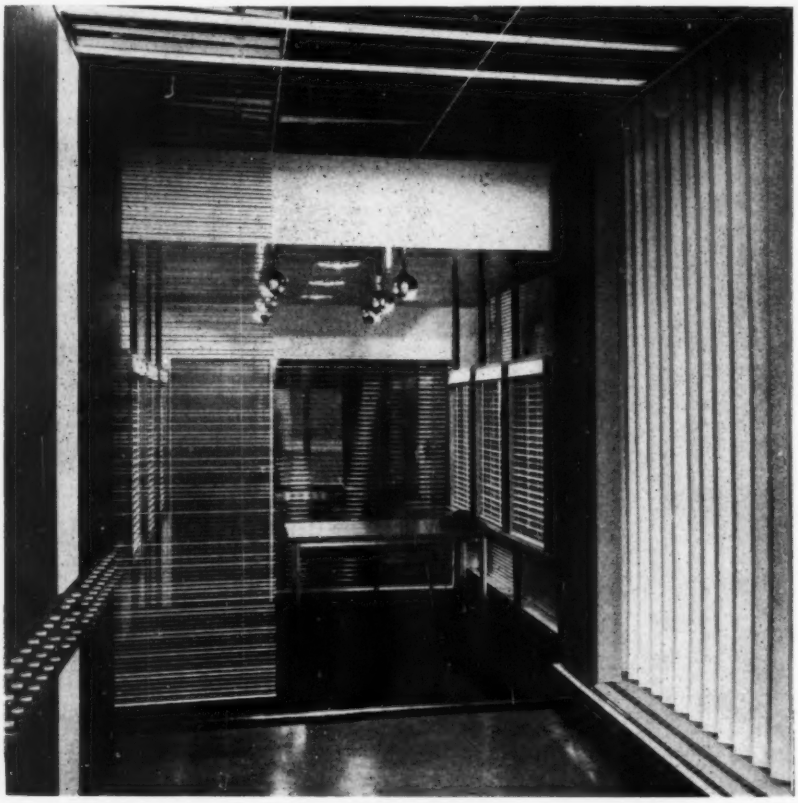


MAIN POOL AND RESTAURANT

MAIN ENTRANCE

Building started earlier this year of Birmingham's new swimming baths, designed by the city architect, A. G. Sheppard Fidler. The baths stand on an open site with a number of mature trees, and have been designed to make the most of this outlook, with glazed walls surrounding the main pool. A cafe on the first floor forms a bridge over the entrances from changing rooms and divides the main pool from a small learners' pool behind.

SHOWROOM FOR VENETIAN BLINDS LTD.



John and Sylvia Reid have designed this small showroom at 179 Tottenham Court Road, London, at which all kinds of venetian blinds, in all their ninety colours, can now be seen, compared, selected and ordered. The window on the right is covered by samples of the new, American, vertical blinds, which are composed of tension-mounted fabric slats. These are said to be easier to keep clean than the horizontal slats, but require a runner at the bottom as well as the top. The knobs on the left wall release from the ceiling sample blinds in every available colour. The showroom also presents one new development—an internal blind for rooflights operated by a photo-electric cell, said to be useful in drawing offices. This is not visible in the picture alongside, being incorporated in the ceiling just above the entrance.

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Less jointing cuts material costs

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Flexpipe is available NOW in both 4" and 6" internal diameters—and costs no more than other pitch-fibre pipes.

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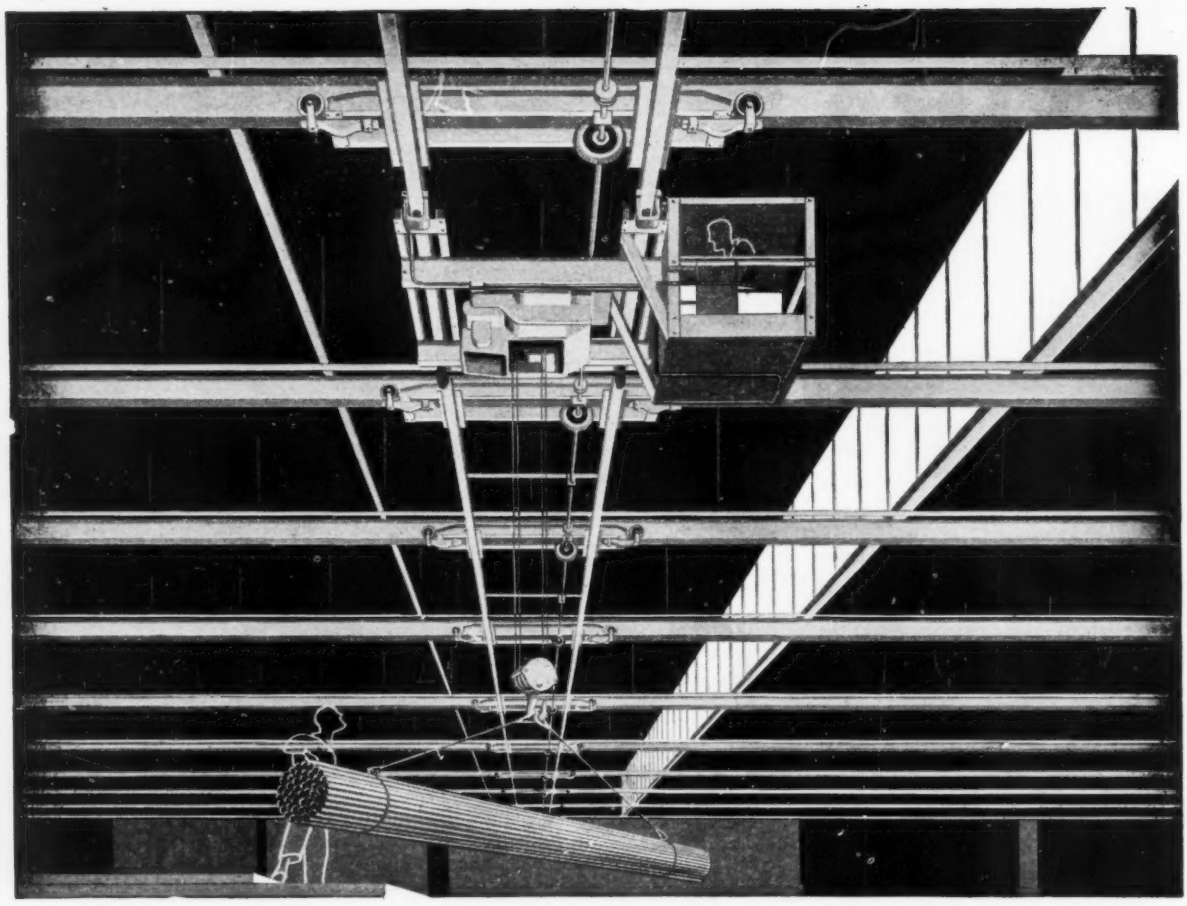

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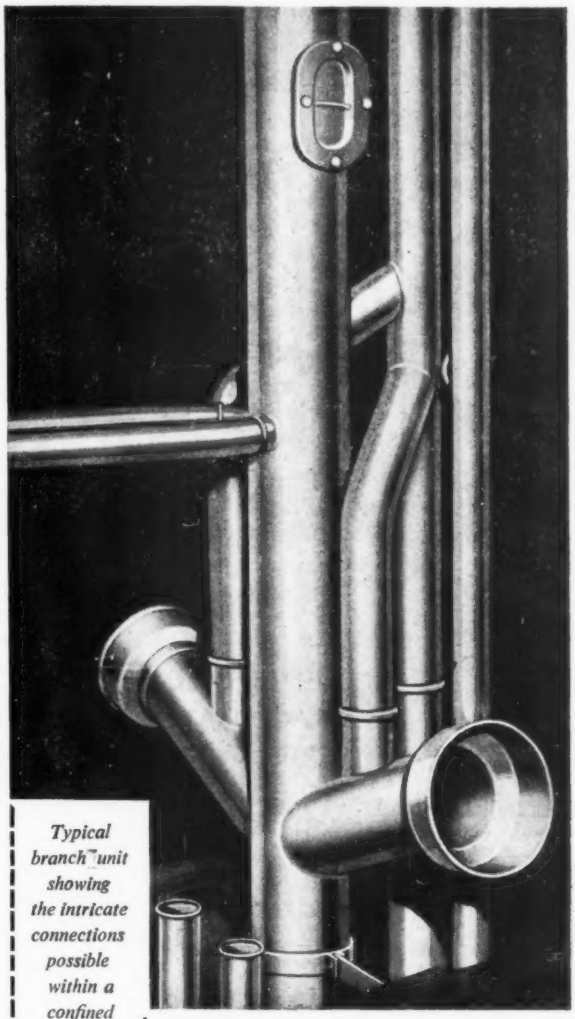

Typical branch unit showing the intricate connections possible within a confined space.

Nicolete Gray

LETTERING ON BUILDINGS

THIS IS THE FIRST BOOK to deal with lettering as applied to all kinds of buildings. The author, an internationally acknowledged authority on the history of letter forms, breaks new ground in this study of the relationship between lettering and architecture itself: her aim is no less than to create a new approach to the subject, to get away from doctrinaire ideas. She first examines and illustrates the history and development of letter forms from Roman times to our own day. This examination leads her to outline a comprehensive theory of lettering which may serve as a starting point, a new way of looking at problems and possibilities for the present and the future. Her theoretical approach is illustrated by, and throws light on, many existing nineteenth- and twentieth-century examples of all kinds of lettering *in situ;* and she thus demonstrates how present-day architects and designers can successfully tackle the task of integrating lettering on and in all kinds of buildings. 'My hope for this book', says the author, 'is that it may help to bring lettering back into the full life of the modern movement. . . .'

Size of book 9 x 5¾ *in.* 192 *pages with* 270 *halftone and line illustrations.* 25s. *net, postage* 1s. 2d.

The Architectural Press, 9-13 Queen Anne's Gate, S.W.1

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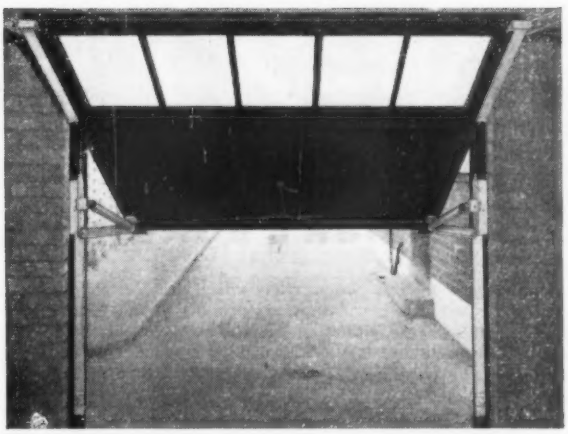

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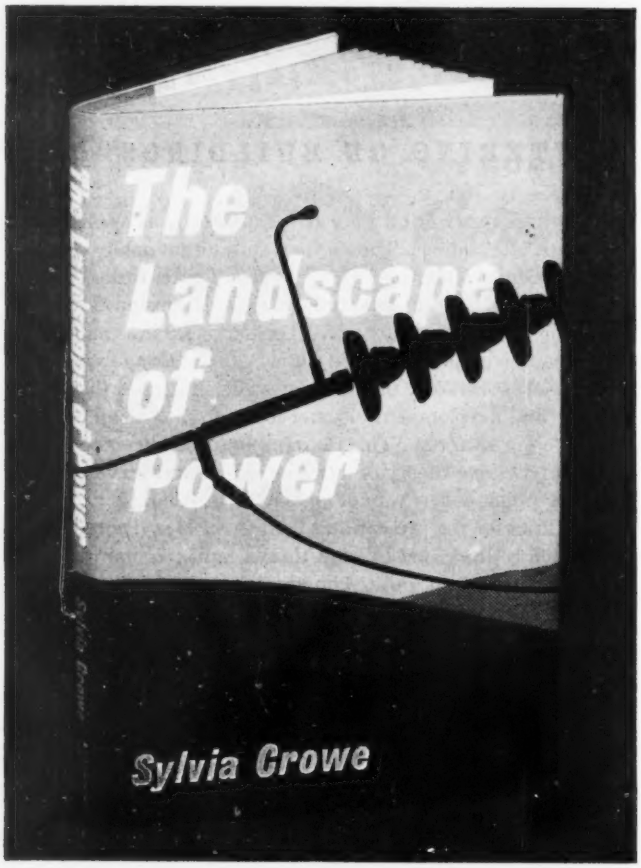

The Landscape of Power
by Sylvia Crowe P.I.L.A.

THIS BOOK *is addressed to everyone who cares about Britain's landscape. Sylvia Crowe, the eminent landscape architect, is not a preservationist. She accepts the fact that you cannot put the clock back; she accepts the essential need for the construction of immense oil refineries, nuclear reactors, power stations, and the network of the electricity grid. 'This network of power' she says, 'opens up a prospect of future wealth for the country, of clean industry and more efficient agriculture.' What she will* not *accept is that the introduction of these vast new structures into the landscape need necessarily ruin it, and in this practical, lucidly written handbook she calls for more thoughtfulness among those who are responsible for their construction. She shows, with text, photographs and diagrams, that giant buildings and their accessories can be incorporated in the landscape without destroying it—indeed, that given skilful design and sensitive siting they can in some circumstances enhance the natural scene.*

There are nine chapters in the book and they deal with The New Industrial Age; Power and National Parks; Nuclear Power Stations; Hydro-Electric Power; Electric Transmission; Oil; Airfields; New Industries in Old Areas; Conclusion. Size 8¾*in.* × 5½ *in.* 116 *pages including over* 70 *diagrams and halftone illustrations.* 16*s. net, postage* 10*d.*

The Architectural Press 9 Queen Anne's Gate, SW1

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CLASSIFIED ADVERTISEMENTS

Advertisements should be addressed to the Advertisement Manager, "The Architects' Journal," 9, 11 and 13, Queen Anne's Gate, Westminster, S.W.1, and should reach there by first post Friday morning for inclusion in the following Thursday's paper.

Replies to Box Numbers should be addressed care of "The Architects' Journal," at the address given above.

AIR-MAIL SERVICE available on request.
In response to requests from a number of Overseas subscribers for air-mail delivery of Public and Official Appointment details and Other Appointments Vacant, we have been pleased to arrange that cuttings of all such classified advertisements appearing in the A.J., shall be despatched by air-mail on Wednesday of each week (one day prior to A.J. publication date). The cost of this special service to Overseas subscribers will be 5s. for four weeks (1s. 3d. for each additional week) and prepayment should be sent by subscribers wishing to take advantage of this service. The charge we are making represents only the actual cost of the postage involved.

Public and Official Announcements

36s. per inch; each additional line, 3s.

BOROUGH OF ENFIELD
BOROUGH ENGINEER & SURVEYOR'S DEPARTMENT

Applications are invited for the post of ARCHITECTURAL ASSISTANT, Grade A.P.T. I (£610—£765 per annum, plus a London Weighting Allowance of £10—£30 per annum according to age).

Applicants must have had experience in the preparation of plans, specifications, etc., including the maintenance of public buildings.

Saturday mornings are normally free of duty.

Application forms obtainable from H. D. Peake, M.Sc.(Eng.), M.I.C.E., Borough Engineer & Surveyor, 7 Little Park Gardens, Enfield, Middx., returnable to the undersigned.

CYRIL E. C. R. PLATTEN,
Town Clerk.

Public Offices,
Enfield, Middx. 8454

BUILDING SURVEYORS

Architect's Department, L.C.C., has vacancies in Building Regulation Division and District Surveyors' Service for work in connection with applications under London Building Acts and byelaws. District Surveyors' Offices are located in Metropolitan Boroughs and work involves negotiations with developers and supervision of works in progress.

Up to £1,135 (under review) commencing according to qualifications and experience. Application form and particulars from Hubert Bennett, F.R.I.B.A., Architect to Council (EK/AJ/494/4d), County Hall, S.E.1. 9076

ADMINISTRATIVE COUNTY OF LEICESTER

(*a*) SENIOR ASSISTANT ARCHITECT, £1,075—£1,220.

(*b*) ASSISTANT ARCHITECT, £785—£1,070.

Candidates for (*a*) must be chartered members of the R.I.B.A., have had considerable experience and be capable of taking charge of contracts from inception to completion; for (*b*) must have passed Parts I and II of the R.I.B.A. Final and be capable of executing working drawings.

Lodging allowance and removal expenses may be paid to a married man.

Apply to County Architect, 123, London Road, Leicester. 9655

BUCKINGHAMSHIRE COUNTY COUNCIL
APPOINTMENT OF DEPUTY COUNTY ARCHITECT

Applications are invited from Fellows or Associates of the Royal Institute of British Architects for the appointment of Deputy County Architect, at a salary of £2,225 per annum, rising by three annual increments of £90 to £2,495 per annum.

The appointment is superannuable and subject to medical examination.

Further particulars and forms of application may be obtained from the undersigned, to whom applications must be delivered by Tuesday, 10th May, 1960.

R. E. MILLARD,
Clerk of the County Council.

County Hall,
Aylesbury.
April, 1960. 9632

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

ARCHITECT/PLANNERS required. Tasks include three-dimensional planning in Comprehensive Development Areas and all other important areas of new development throughout London, including those associated with road improvements. Up to £1,135 (under review) according to experience and qualifications.

Application form and particulars from Hubert Bennett, F.R.I.B.A., Architect to the Council (EK/AJ/527/4d), County Hall, S.E.1. 9077

LONDON COUNTY COUNCIL

ARCHITECTS (up to £1,135) (under review) required for Housing, Schools, General and Special Works Divisions. Full and varied programme of new work including schools, multi-storey flats and Town Development. Starting salaries according to qualifications and experience.

Particulars and application form from Hubert Bennett, F.R.I.B.A., Architect to Council (EK/AJ/496/4b), County Hall, S.E.1. 9075

COUNTY BOROUGH OF SOUTHEND-ON-SEA
BOROUGH ARCHITECT'S DEPARTMENT

Applications are invited for the following posts:—

ASSISTANT ARCHITECT—Special Classes Scale (£785 × £40 (6) × £45—£1,070).

TECHNICAL ASSISTANT (ARCHITECTURAL)—Grade A.P.T. II (£765 × £25 (1) × £30 (3)—£880).

ASSISTANT QUANTITY SURVEYOR—Special Classes Scale (£785 × £40 (6) × £45—£1,070).

A flat is available for a suitable candidate.

Candidates must be suitably qualified and experienced.

The appointments will be subject to the provisions of the Local Government Superannuation Acts and the National Joint Council's Scheme of Conditions of Service so far as adopted by the Council. Medical examination.

Applications, stating age, qualifications and experience, with the names of two referees, should be submitted to the Borough Architect, 30, Alexandra Street, Southend-on-Sea, forthwith.

Canvassing will disqualify. Any candidate who is related to member or officer of the Council is required to disclose the fact.

ARCHIBALD GLEN,
Town Clerk.
9654

BOROUGH OF BASINGSTOKE

A SENIOR ASSISTANT is required in the Architect's Department for housing and general work in this rapidly expanding town.

Applications are invited from Associates, R.I.B.A., who have had considerable housing experience; salary range £785—£1,070 according to experience. House or flat available. N.J.C. conditions. Post pensionable. Medical examination.

Details giving age, training, experience, etc., and names and addresses of three referees to be sent to the Borough Architect, Eric Almond, Dipl.Arch., A.R.I.B.A., Municipal Buildings, Basingstoke, Hants, by the 2nd May, 1960.

L. WOMERSLEY,
Town Clerk.
9522

CORPORATION OF GLASGOW
ARCHITECTURAL AND PLANNING DEPARTMENT
ASSISTANT ARCHITECTS
ASSISTANT QUANTITY SURVEYORS

Vacancies exist for a number of qualified assistants as above. Salary scale £795—£1,240 with placing according to experience.

Applications should be addressed to the City Architect and Planning Officer, 20, Trongate, Glasgow, C.1. Those who have submitted applications during the past 12 months should not reply to this advertisement.

A. G. JURY,
City Architect and Planning Officer.
9015

WARWICKSHIRE COUNTY COUNCIL
COUNTY PLANNING DEPARTMENT
SENIOR PLANNING ASSISTANT—Grades A.P.T. IV/V (£1,065—£1,375 per annum).

The post is in the Development Plan Section at Warwick and the appointment is superannuable and subject to the National Scheme of Conditions of Service. Consideration will be given to the granting of financial assistance towards removal expenses.

Applicants should be Chartered Planners with all-round planning experience and especially of development plan work.

The successful applicant will be required to provide and maintain a motor-car. Travelling and subsistence allowances will be in accordance with the National Scale.

Applications, together with the names of two referees, should be sent to J. J. Brooks, County Planning Officer, Northgate, Warwick, not later than Saturday, 7th May, 1960.

Canvassing will be a disqualification.

L. EDGAR STEPHENS,
Clerk of the Council.

Shire Hall,
Warwick. 9695

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT
ARCHITECTS and BUILDING SURVEYORS required for improvements, alterations and extensions. Jobs up to £20,000. Selected candidates will be responsible for surveys, schemes, working drawings, specifications and supervising contracts. Up to £1,135 according to qualifications and experience. (Salary scales at present under review with probable maximum of £1,250.)

Form and particulars from Hubert Bennett, F.R.I.B.A., Architect to Council (EK/AJ/910/4b), County Hall, S.E.1. 9627

AIR MINISTRY require Junior and Senior WORKERS UP in Quantities Division in London. Must be fully experienced and competent to work up entire Bills of Quantities. Candidates must hold O.N.C. or C. & G. (Quantities) or equivalent technical qualification. Financial assistance and time off given for recognised courses of study. Promotion and pension prospects. Five-day week with 18 days paid leave a year initially. Salary ranges (Junior) from £720 (at age 26) to £900 and (Senior) £794 (at age 26) to £1,065. Applicants, who must be natural born British subjects, should write stating age, qualifications and experience to the Manager (P.E.1934), Ministry of Labour, Professional and Executive Register, Atlantic House, Farringdon Street, London, E.C.4. No original testimonials should be sent. 9542

COUNTY BOROUGH OF SUNDERLAND
PUBLIC WORKS DEPARTMENT

Applications are invited from suitable persons who are experienced in site measurement of building and Civil Engineering New and Maintenance Work for—

(1) SENIOR MEASURING AND BONUS SURVEYOR, Grade A.P.T. II (£765—£880).

(2) ASSISTANT MEASURING AND BONUS SURVEYOR, Grade A.P.T. I (£610—£765).

Some experience of negotiating and running incentive bonus schemes would be an advantage. The posts are permanent and superannuable.

Further particulars and Forms of Application may be obtained from the Public Works Manager, "Ivor House," 1 and 3, Otto Terrace, Sunderland, and applications, suitably endorsed, should be returned to the undersigned not later than 7th May, 1960. Canvassing will disqualify.

G. S. McINTIRE,
Town Clerk.

Town Hall,
Sunderland. 9729

CITY OF WESTMINSTER

JUNIOR ARCHITECTURAL ASSISTANT (Male), permanent and superannuable, A.P.T. Grade I, £610—£765 p.a. (plus London weighting maximum £30 p.a.).

Applicants should be good draughtsmen with some experience of working drawings for minor building works and must be studying for the R.I.B.A. Examination. Applications stating age, qualifications and experience, with names, etc., of two referees, to Town Clerk, Westminster City Hall, Charing Cross Road, W.C.2, by 4th May, 1960. 9724

BOROUGH ARCHITECT'S DEPARTMENT, FULHAM BOROUGH COUNCIL (housing, libraries, baths, etc.). Assisted training and promotion schemes. Minimum qualification two years' continuous drawing office experience. Commencing salary according to qualifications and experience. Salary range: Architectural Assistants or Assistant Architects A.P.T. I, II and Special Scale (£630/£1,100). Principal Assistant Architect (A.R.I.B.A. or Regd. Architect), A.P.T. IV (£1,095—£1,250). Details from Town Clerk, Town Hall, Fulham, S.W.6. Closing date 16th May. 9731

BOROUGH OF HENDON
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT
SENIOR ASSISTANT ARCHITECT
GRADE A.P.T. V

Applications are invited for the above appointment in the Architectural Section at a commencing salary according to experience within Grade A.P.T. V (£1,220 to £1,375) plus London weighting.

Applicants must be Associate Members of the Royal Institute of British Architects and should have experience on housing and redevelopment work, schools and general building works, and modern design and construction methods. The person appointed will be directly responsible to the Chief Assistant Architect and must be able to act as a group leader with enthusiasm and initiative.

Pensionable post; subject to National Scheme and medical examination. The Council is prepared to consider assistance with housing.

Applications with full details and names and addresses of two referees, must reach the Borough Engineer and Surveyor, Town Hall, Hendon, N.W.4, by Monday, 9th May, 1960.

R. H. WILLIAMS,
Town Clerk.

Town Hall,
Hendon,
N.W.4. 9738

EAST KILBRIDE DEVELOPMENT CORPORATION

The Corporation invite applications for posts of DRAUGHTSMEN

Salary scale, £610—£765 per annum. Candidates should have general experience of drawing office procedure and a particular ability in drawing maps and plans. The work will include compiling and maintaining statistical records for the Architectural Department. Commencing salary in accordance with experience, etc. Superannuation. Medical Examination. Five-day week. A house or flat will be made available if required. Application forms from the General Manager, Torrance House, East Kilbride, to whom completed forms should be returned not later than 11th May, 1960. 9735

CITY OF BIRMINGHAM EDUCATION COMMITTEE
COLLEGE OF ART AND CRAFTS
Principal:
MEREDITH W. HAWES, A.R.C.A., A.R.W.S., N.R.D.

Applications are invited for the post of LECTURER IN TOWN AND COUNTRY PLANNING, from 1st September, 1960. Applicants must be corporate members of the Town Planning Institute, and preferably should hold a university degree. Teaching experience preferable but not essential. Further qualifications or experience in landscape architecture and/or civic design would be useful. The successful candidate would be expected to undertake some administrative work in the Department.

Salary in accordance with the Burnham Scale for Teachers in Establishments of Further Education, Lecturer (Man) £1,370, × £35 + final increment of £40 to £1,550 p.a.

Forms of application and further particulars may be obtained from the Principal, College of Art & Crafts, Margaret Street, Birmingham, 3 (s.a.e.).

Closing date: 10th May, 1960.

F. L. RUSSELL,
Chief Education Officer.

April, 1960. 9778

COUNTY BOROUGH OF TYNEMOUTH
BOROUGH SURVEYOR'S DEPARTMENT

Applications are invited for the following posts:—

(1) SENIOR ASSISTANT QUANTITY SURVEYOR (must be professionally qualified), A.P.T. IV, £1,065—£1,220.

(2) ASSISTANT ENGINEER, A.P.T. II, £765—£880.

(3) JUNIOR ASSISTANT ARCHITECT, A.P.T. I, £610—£765.

Application forms together with Conditions of Appointment can be obtained from D. M. O'Herlihy, Esq., O.B.E., B.Sc., M.I.C.E., 16, Northumberland Square, North Shields, to whom they should be returned by the 14th May, 1960.

The Corporation may be prepared to assist with housing in the case of appointment No. 1.

FRED. G. EGNER,
Town Clerk.

9754

CITY OF ROCHESTER
ARCHITECTURAL ASSISTANT
(Grade A.P.T. II, £765—£880)

Applications are invited for the appointment of Architectural Assistant in the City Surveyor's Department at a salary in accordance with Grade A.P.T. II (£765—£880).

Candidates should have general experience, including the preparation of drawings and specifications for Municipal Housing Schemes, and should have passed the Intermediate Examination of the Royal Institute of British Architects or hold a qualification of equivalent standard. The commencing salary will be according to qualifications and experience.

In an appropriate case the City Council will provide the successful candidate with suitable housing accommodation and will be prepared to refund removal expenses after twelve months' service.

The appointment will be subject to the National Scheme of Conditions of Service, the Local Government Superannuation Acts, and a satisfactory medical examination. One month's notice is required on either side.

Applications, stating age, training, qualifications, present and previous appointments and experience, together with the names and addresses of two persons to whom reference may be made, should be delivered to J. A. Peel, A.M.I.C.E., A.M.I.Mun.E., City Surveyor, 66, Maidstone Road, Rochester, not later than Wednesday, 18th May, 1960.

PHILIP H. BARTLETT,
Town Clerk.

Guildhall,
Rochester.
14th April, 1960. 9750

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Applications invited for position of ASSISTANT SENIOR ARCHITECT (Development) in Housing Division. £1,535—£1,915 (under review—probable new maximum £2,050). Duties include responsibility for:—

(1) Research and development in connection with planning, constructional and component standards of mainly high density Housing.

(2) Control of a small group engaged in experimental schemes.

(3) Research into Cost Planning Methods in collaboration with the Principal Quantity Surveyor.

(4) Direction of the Materials and Information Section.

Particulars and application form, returnable by 7th May, 1960 from Hubert Bennett, F.R.I.B.A., Architect to the Council (EK/AJ/992/4), County Hall, S.E.1. 9749

JUNIOR ARCHITECTURAL ASSISTANT required by Wandsworth Borough Council. Salary for holders of G.C.E. in three specific subjects £380 at age 18 rising to £760. Opportunities for training and learning municipal architecture and surveying. Forms from Borough Engineer, returnable by 4th May. J. Noel Martin, Town Clerk, Municipal Buildings, S.W.18. 9732

CITY OF BIRMINGHAM

Applications are invited for appointments as ASSISTANT ARCHITECTS in the CITY ARCHITECT'S DEPARTMENT at commencing salaries, according to experience and capabilities, within the following grades:—

(*a*) A.P.T. IV, £1,065—£1,220 per annum.
(*b*) Special Scale, £785—£1,070 per annum.

A large new Exhibition Hall with multi-storey car park and other public buildings, forming part of the new Civic Centre plan, are included in a building programme which also comprises Schools, Technical Colleges, Colleges of Further Education, and Schemes of Comprehensive Housing Development, including tall blocks of dwellings, Shopping Centres and ancillary buildings.

A great opportunity exists for enthusiastic and imaginative Architects who wish to assist in work of such architectural importance.

Candidates should have passed Parts I and II of the Final Examination of the R.I.B.A. or hold equivalent qualifications.

Pension Scheme. Five-day week. Medical Examination.

Applications stating appointment applied for, age, present position and salary, qualifications, experience and two referees, to reach the undersigned by 13th May, 1960.

A. G. SHEPPARD FIDLER,
City Architect.

Civic Centre,
Birmingham, 1. 9747

NORFOLK EDUCATION COMMITTEE

Applications are invited for the post of ASSISTANT ARCHITECT. Candidates should have experience in the planning and erection of large buildings.

Salary scale, Special Grade (£785 to £1,070) or A.P.T. III (£880 to £1,065).

Forms of applicatio from the undersigned to be returned within 14 days of the date of this advertisement.

F. LINCOLN RALPHS,
Chief Education Officer.

County Education Office,
Stracey Road,
Norwich, Norfolk.
NOR. 49A. 9752

SURREY COUNTY COUNCIL

Applications invited for appointment of ASSISTANT ARCHITECTS in the salary range of £785—£1,220 p.a. plus £30 p.a. London Allowance.

Commencing salary will be in accordance with qualifications and experience.

Full details, present salary and three copies testimonials to County Architect, County Hall, Kingston, as soon as possible. 9839

BRACKNELL DEVELOPMENT CORPORATION

Applications are invited from Corporate Members of the R.I.B.A. for the post of SENIOR ARCHITECT, salary range £1,392×£57(4)—£1,620. The successful applicant will be required to take charge of the Section dealing with the erection of Industrial buildings, and applicants should, therefore, have had considerable experience in the design and construction of this type of building. Superannuation schemes, medical examination. Housing available. Apply by 18th May, 1960, giving age, education and qualifications, experience and appointments held (with dates and salaries) and names of two referees to General Manager (S.A.), Bracknell Development Corporation, Farley Hall, Bracknell, Berks. 9804

WANSTEAD AND WOODFORD CORPORATION
SENIOR PLANNING ASSISTANT A.P.T.IV
(£1,065—£1,220 plus London weighting)

Applicants must hold the Final Examination of the Town Planning Institute and additional architectural or engineering qualifications would be advantageous. Applicants will be preferred who have experience in urban redevelopment with a local authority in addition to routine development control. Starting salary will be fixed in accordance with the experience of the successful applicant. A casual user car allowance is payable. *Housing accommodation* will be made available but a subsistence allowance will be paid for a limited period pending the availability of accommodation.

Forms are obtainable from and are to be returned to L. S. Jeffery, Borough Engineer, Surveyor and Planning Officer, Municipal Offices, High Road, Leyton, E.10, by the 7th May, 1960. 9775

CITY OF NOTTINGHAM EDUCATION COMMITTEE
COLLEGE OF ART AND CRAFTS

Principal:
ROBERT LYON, D.A.(GLAS.), F.R.S.A.
Head of School of Architecture:
D. W. NOTLEY, B.ARCH. (HONS.) (LIVERPOOL), A.R.I.B.A.

Applications are invited for the post of full-time SENIOR LECTURER in the School of Architecture.

The School is recognised by the R.I.B.A., and the award of the College Diploma in Architecture provides full exemption from the R.I.B.A. Final Examination. Duties to commence on the 1st September, 1960, or nearest date possible thereafter.

Candidates must possess wide practical experience as Architects and hold the degree or diploma of a recognised School.

Salary to be in accordance with the Burnham Technical scale for Senior Lecturers.

Application forms and further particulars from the Principal, College of Art and Crafts, Waverley Street, Nottingham, to whom the forms should be returned within 10 days of the publication of the advertisement.

W. G. JACKSON,
Director of Education.

Education Office,
Exchange Buildings,
Smithy Row,
Nottingham. 9774

BOROUGH OF ROMFORD

Applications are invited for ASSISTANT ARCHITECTS in the salary range £1,095—£1,250 and £815—£1,100.

Applicants must be fully qualified. Interesting and varied work available. In appropriate cases housing accommodation will be provided and removal expenses paid. Car allowance: 5-day week.

Full particulars from Town Clerk, Town Hall, Romford, to whom applications are to be forwarded by the 14th May. 9771

COVENTRY

Imaginative ARCHITECTS required for several interesting projects. Posts within the salary ranges:—

(*a*) £1,065—£1,220
(*b*) £785—£1,070
(indicate for which applying)

Housing Accommodation in approved cases. Removal Expenses Loan available. Five-day working week. Application Forms from:—Department of Architecture and Planning, New Council Offices, Earl Street, returnable 10 days publication. 9770

BOROUGH OF LEYTON
(Municipal Borough in the County of Essex. Population approximately 100,000)
BOROUGH ENGINEER'S DEPARTMENT

Applications invited for appointment of ARCHITECTURAL ASSISTANT at salary within the scale of £575 per annum rising to £725 per annum (plus London weighting) in accordance with the provisions of Grade APT.I of the National Scheme of Conditions of Service for Local Authority Staffs.

HOUSING ACCOMMODATION will be made available to successful applicant if required.

5-day week is operated.

Apply by letter to Borough Engineer, Town Hall, Leyton, E.10 (giving names of two referees), not later than FRIDAY, 13th MAY, 1960.

D. J. OSBORNE,
Town Clerk.

Town Hall,
Leyton, E.10. 9773

ISLE OF ELY COUNTY COUNCIL
APPOINTMENT OF COUNTY ARCHITECT

Applications are invited from Registered Architects for the whole-time appointment of County Architect at a salary within the scale of £2,170 per annum rising by annual increments to £2,505.

Application forms and terms and conditions of appointment may be obtained from the undersigned by whom applications should be received not later than 6th May, 1960.

R. F. G. THURLOW,
Clerk of the County Council.

County Hall,
MARCH, Cambs. 9769

RICKMANSWORTH URBAN DISTRICT COUNCIL
APPOINTMENT OF ARCHITECTURAL ASSISTANT

Applications are invited for the above permanent appointment in the Engineer and Surveyor's Department. Salary on Grade A.P.T.II (£765—£880). Applicants must be experienced in the preparation of plans and specifications with particular reference to the design of Council Houses. Applicants must state whether they wish the Council to provide housing accommodation and any such request will be considered. Applications endorsed "Architectural Assistant," giving the names and addresses of two referees, to be delivered to the undersigned not later than Saturday, 7th May, 1960.

C. G. RANSOME WILLIAMS,
Clerk of the Council.

Council Offices,
Rickmansworth,
Herts.
14th April, 1960. 9768

BIRMINGHAM REGIONAL HOSPITAL BOARD

The Board envisage an expansion of their hospital building programme. A large proportion of the work will be designed and supervised by the staff of the Regional Architect's Department. Applications are invited for the following posts:—

(*a*) PRINCIPAL ASSISTANT ARCHITECTS
Salary scale £1,665 to £2,035.
Qualification: Registered Architect by examination.

(*b*) ASSISTANT ARCHITECTS
Salary scale £905 to £1,310.
Qualification: Registered Architect by examination.

(*c*) ARCHITECTURAL ASSISTANTS
Salary scale £625 to £900.
Qualification: Intermediate R.I.B.A.

(*d*) SENIOR ASSISTANT QUANTITY SURVEYOR
Salary scale £1,360 to £1,600.
Qualification: Corporate Membership R.I.C.S.

(*e*) ASSISTANT QUANTITY SURVEYOR
Salary scale £905 to £1,310.
Qualification: Corporate Membership R.I.C.S.

(*f*) QUANTITY SURVEYING ASSISTANTS
Salary scale £625 to £900.
Qualification: Inter R.I.C.S.

These posts are not necessarily restricted to those with previous hospital experience. They offer opportunities for gaining knowledge and experience of the whole field of hospital architecture, ranging from adaptation schemes to comprehensive new hospital projects, and including ward units, operating theatres, out-patients' departments, maternity units, X-ray departments, kitchens, boiler houses, staff housing accommodation and numerous other types of building.

It is anticipated that some candidates will be given the opportunity of attending a special post graduate training course at the R.I.B.A. from the 11th to 16th July, 1960, followed by other studies later in the year.

All posts superannuable. Five-day week. Generous annual leave.

Applications to Secretary, Birmingham Regional Hospital Board, 10, Augustus Road, Birmingham 15, by 16th May, 1960, stating qualifications, age, experience, present position and salary and names of two referees. 9801

LANCASHIRE COUNTY COUNCIL

Applications are invited from qualified ARCHITECTS of initiative, keen on design and modern constructional methods, for a large and varied programme.

Permanent posts in A.P.T. Grade V (£1,220—£1,375). Starting point according to experience. Previous applicants should not re-apply.

Application Forms and Conditions of Service from the County Architect, P.O. Box 26, County Hall, Preston, to be returned by 10th May, 1960, quoting reference A/AJ. 9746

BEDFORDSHIRE COUNTY COUNCIL

Applications are invited for the following permanent posts.

The County Architect's Department is being reorganised on a group basis to carry out an increased building programme. The programme of works includes a new County Hall, Training Colleges, Further Education and school buildings, Police and Fire Stations, and other public buildings.

(*a*) PRINCIPAL ARCHITECTS J.N.C. Scales "D" (£1,520—£1,755), "C" (£1,385—£1,620) and "B" (£1,250—£1,485).

(*b*) SENIOR ARCHITECTS A.P.T.V (£1,220—£1,375) and A.P.T.IV (£1,065—£1,220).

(*c*) ARCHITECTS Special Scale (£785—£1,070).

Suitable candidates will be appointed to grades and at points within grades in accordance with qualifications and experience.

Application forms obtainable from the County Architect, Shire Hall, Bedford, to be returned by the 9th May, 1960. 9767

LONDON COUNTY COUNCIL
QUALIFYING EXAMINATION FOR THE OFFICE OF DISTRICT SURVEYOR

An examination for the certificate of proficiency to perform the duties of district surveyor will be conducted in London in the week commencing 10th October, 1960. The minimum age limit for candidates is 25.

Possession of this certificate is necessary for appointment to positions as District Surveyor (salary scales £1,850 to £3,000 a year) or as Assistant District Surveyor (present salary scale £1,295 to £1,535 a year, plus £61 10s. a year).

Apply to the Architect to the Council (EK/AJ/1008/4), County Hall, Westminster Bridge, S.E.1, for application forms and further particulars. Completed applications to be submitted before 1st September, 1960. 9743

COUNTY BOROUGH OF EAST HAM
BOROUGH ENGINEER'S DEPARTMENT

Applications are invited for the following temporary appointment:—

SENIOR ASSISTANT ARCHITECT, Grade IV, £1,065—£1,220.

London weighting is paid in addition, and a salary in excess of the minimum may be paid according to qualifications and experience. The appointment is for work on a new Technical College and is expected to be for a period of not less than three years.

Further details and application forms returnable by 13th May, 1960, from the Town Clerk, Town Hall, East Ham, E.6. 9736

GOVERNMENT OF WESTERN NIGERIA

VACANCIES FOR ARCHITECTS

Applications are invited for the posts of Architects.

Qualifications: Candidates, who should be between 25-50 years of age, must hold a degree or diploma of a recognised School of Architecture and Associateship of Royal Institute of British Architects, and should have had not less than two years' practical experience since qualifying.

Duties: Design and preparation of working details of Building projects as directed, and supervision of drawing office staff in connection with these schemes. Site survey work and supervision of buildings in progress.

Terms of Appointment: On contract terms with gratuity for a minimum of two tours of 12-18 months each, in the first instance. Salary is within the range of £1,536—£2,286 per annum according to experience since qualifying plus gratuity at the rate of £37 10s. for each completed three months' service. Free first class passages for officer and his family on first appointment and when proceeding on leave; free medical treatment for officer and his family. Accommodation is provided at low rentals.

Applications should be completed in triplicate on the prescribed form obtainable from the Official Secretary (Recruitment Branch), Office of the Commissioner for Western Nigeria, 178/202, Great Portland Street, London, W.1, from whom further particulars may also be obtained.

Closing date: 4th May.

9733

JUNIOR DRAUGHTSMAN AND TRACER is required in the Architect's Department of the Milk Marketing Board. Applicants should be studying for the Intermediate examination of the R.I.B.A. and must be 17 years of age or more. The salary will be in the range £400 to £450 according to age and experience. Applications, giving brief details of qualifications and experience should be sent to the Personnel Officer, Milk Marketing Board, Thames Ditton, Surrey, Ref. 277. 9734

TECHNICAL ASSISTANT required by Divisional Surveyor for London and Home Counties, involving construction, alteration, and maintenance of transport and commercial properties. Knowledge of the London Building Acts desirable. Commencing salary £662 per annum. Written applications should be addressed to British Road Services Ltd., 238, City Road, E.C.1 (Ref. SWD/49). 9741

ARCHITECTURAL DRAUGHTSMAN required for London office: applicants must be able to prepare sketch designs, working drawings and details, be neat and accurate draughtsmen and have had some years' experience in an architectural drawing office. Salary within the range £827—£860 or £898—£973 per annum according to qualifications and experience. Applications giving age, experience and qualifications to Personnel Officer, (SV.115), British Road Services Limited, Melbury House, Melbury Terrace, London, N.W.1. 9809

BOROUGH OF RAMSGATE
TEMPORARY QUANTITY SURVEYING ASSISTANT

Applications are invited for the above-mentioned appointment at a salary in accordance with APT. Grade II (£765—£880).

Candidates should have experience in all types of work, measurements of variation and settlement of final accounts.

Applications endorsed "Quantity Surveying Assistant," giving details of qualifications, experience, and the names and addresses of two referees, must be received by the Borough Engineer, Municipal Buildings, Ramsgate, by not later than Thursday, 5th May, 1960.

Candidates must disclose whether or not they are related to any member of or the holder of any senior office under the Council.

Canvassing will disqualify.

K. F. SPEAKMAN,
Town Clerk.

Municipal Buildings,
14th April, 1960. 9830

COUNTY OF BERWICK

Applications are invited for the following posts in the COUNTY ARCHITECT'S DEPARTMENT.

(*a*) ASSISTANT ARCHITECT
£1,040 × £40 (4) to £1,200.
Candidates must be fully qualified.

(*b*) ARCHITECTURAL ASSISTANT
£915 × £25 (3) to £990.
Candidates must be qualified to Intermediate Standard.

Placings may be made on Salary Scales according to experience. House is immediately available for post (*a*).

Applications stating age, experience and qualifications and names and addresses of two Referees to be lodged with the undersigned not later than 12th May, 1960.

ROBERT MARTIN,
County Clerk.

County Buildings,
DUNS. 9828

BASILDON DEVELOPMENT CORPORATION
DEPARTMENT OF ARCHITECTURE & PLANNING

ARCHITECTS at salaries between £1,065 and £1,485 to work in groups on housing neighbourhood, Town Centre and factory projects which they will take through all stages, are required.

Basildon is being developed to a population of not less than 100,000. Its present population is 50,000, and the programme ahead involves designing for major development and redevelopment.

A house or flat can be provided. The posts are superannuable.

Applications, on forms obtainable from the Chief Architect/Planner to the General Manager, Basildon Development Corporation, Gifford House, Basildon, Essex, by Friday, 13th May, 1960. 9820

CORBY DEVELOPMENT CORPORATION
ARCHITECTURAL ASSISTANTS. There are vacancies on the staff of the Chief Architect for two Architectural Assistants.

The appointments will be made within APT Grade II (£765—£880). The commencing point within the Grade will depend upon qualifications and experience.

Candidates will be expected to have passed the intermediate examination of the Royal Institute of British Architects or an equivalent examination recognised by the Architects Registration Council.

The appointments are subject to superannuation under the Local Government Superannuation Scheme.

Housing is available, and removal expenses paid.

Applications stating age, education, training, qualifications, experience, appointments held and salaries, together with the names of two referees must reach the undersigned by Monday, 9th May.

R. F. Brooks Grundy,
General Manager,
Corby Development Corporation,
Spencer House,
CORBY, Northants. 9819

CITY OF WAKEFIELD
CITY ENGINEER'S DEPARTMENT
PRINCIPAL ASSISTANT ARCHITECT
GRADE A.P.T.IV (£1,065 × £55 × £50(2)—£1,220).

Applications are invited for the above superannuable appointment in the City Engineer's Department.

Applicants must be A.R.I.B.A. and preference will be given to those having municipal experience or experience in the design of educational projects.

The Authority has a full and interesting building programme and this appointment offers a good opportunity to qualified architects seeking to widen their experience in design and construction.

HOUSING ACCOMMODATION WILL BE PROVIDED IF NECESSARY.

Applications stating age, qualifications and experience, together with the names of two referees, to be sent to the City Engineer, Town Hall, Wakefield, by the 13th May, 1960. 9802

BRITISH RAILWAYS
LONDON MIDLAND REGION
EUSTON
ASSISTANT ARCHITECTS REQUIRED

Applicants are required for work on the comprehensive re-development of major stations. The developments will include offices, hotels, multi-storey car parks, shopping centres and many ancillary facilities of an industrial nature.

Wide scope will be given to imaginative designers with experience of the above types of buildings who are prepared to work at high pressure. All applicants must be qualified members of the R.I.B.A. and should preferably also hold the Diploma of a recognised School of Architecture.

Vacancies exist for:—

SECTIONAL ARCHITECTS
Salary range £1,475/£1,695 per annum.

SENIOR ASSISTANT ARCHITECTS
Salary range £1,200/£1,420 per annum.

LEADING ASSISTANT ARCHITECTS
Salary range £1,095/£1,200 per annum.

Vacancies also exist within the salary range £875 to £1,034 and applicants for these posts should be either qualified or have Intermediate and several years' experience.

Five-day week and concessionary rail travel.

Applications in writing quoting reference No. 103(AJ) and stating qualifications, age, experience and salary required to:—

W. R. Headley, A.R.I.B.A., A.A.Dipl.,
Regional Architect,
Chief Civil Engineer's Office,
British Railways, London Midland Region,
5a Euston Grove, London, N.W.1. 9813

BOROUGH OF HARROW

Applications are invited for the following appointment in the Department of the Borough Engineer & Surveyor:—

CHIEF TECHNICAL ASSISTANT (MAINTENANCE) A.P.T. Grade IV (£1,065 to £1,220 per annum, plus London weighting).

Applicants should be suitably qualified and experienced to organise both routine and long-term maintenance improvements and service installation works on approximately 5,000 dwellings, together with all municipal properties (except Schools).

The person appointed will be responsible for works carried out by direct labour (under a Works Superintendent) and by Contract.

Candidates who have previously applied for this post need not re-apply, as their original application will again be considered.

The commencing point within the salary scale will be in accordance with qualifications and experience.

Housing accommodation cannot be provided but a contribution towards removal expenses will be considered.

The appointment will be subject to the Local Government Superannuation Acts and to the National Joint Council's Scheme of Conditions of Service.

Application forms, obtainable from me, should be returned by Monday, 9th May, 1960.

D. H. PRITHCARD,
Town Clerk.

Town Clerk's Office,
Harrow Weald Lodge,
92, Uxbridge Road,
HARROW,
Middlesex. 9772

HUNTINGDONSHIRE
COUNTY ARCHITECT'S DEPARTMENT

Applications are invited for the following appointments:—

(*a*) ARCHITECTURAL ASSISTANT
Special Grade (£785—£1,070).

(*b*) ARCHITECTURAL ASSISTANT
Grade APT 2 (£765—£880).

The persons appointed will become members of small architectural teams engaged in projects of varying size. It is desired that the persons appointed shall be keenly interested in architecture with an up-to-date approach to both planning and design.

Application forms and further particulars may be obtained from S. M. Holloway, A.R.I.B.A., County Architect, County Buildings, Huntingdon, and completed forms should be returned to the undersigned by Friday, 13th May, 1960.

A. C. AYLWARD,
Clerk of the County Council.

County Buildings,
Huntingdon. 9803

BOROUGH OF DOVER

Applications are invited for the appointment of ASSISTANT ARCHITECT (Grades A.P.T. I/II, £610—£880) on the staff of the Borough Engineer, Surveyor and Water Engineer.

Preference will be given to applicants who have passed the Intermediate R.I.B.A. examination or its equivalent at one of the recognised schools of architecture, but experienced architectural draughtsmen will be considered.

The successful applicant will commence on a stage within the grades mentioned according to experience and ability.

Applications for assistance in regard to housing accommodation will be considered.

Applications, stating age, qualifications and experience, with the names of two persons to whom reference may be made, are to be delivered to the Borough Engineer, Brook House, Dover, by Monday, 16th May.

JAMES A. JOHNSON,
Town Clerk

New Bridge House,
Dover.
14th April, 1960 9835

WEST SUSSEX COUNTY COUNCIL
COUNTY ARCHITECT'S DEPARTMENT

Applications are invited for the following appointment:—

SENIOR ASSISTANT ARCHITECT, at a salary in accordance with Grade V (A.P.T.) of the National Scales of Salaries—£1,220 × £55 × £50—£1,375. Commencing salary will be according to experience.

Further particulars should be obtained from the County Architect, County Hall, Chichester, to whom all detailed applications must be submitted not later than 5th May, 1960.

T. C. HAYWARD,
Clerk of the County Council.

County Hall,
Chichester. 9798

THE METROPOLITAN BOROUGH OF HAMPSTEAD
TWO PLANNING ASSISTANTS

(1) Grade A.P.T. III/IV—£880 to £1,220 plus London weighting.
(2) Special Grade—£785 to £1,070 plus London weighting.

Applications are invited from suitably qualified persons for the above permanent appointments in the Borough Engineer's Department.

Candidates should have knowledge and experience of the T. & C.P. Acts and Building Regulations and Byelaws. The appointments are subject to the general provisions of the "Charter."

Medical examination is required.

Housing cannot be provided

Applications with full details and names of two referees should be forwarded to the Town Clerk (A.J.), Town Hall, Haverstock Hill, N.W.3, by Monday, 9th May, 1960. 9795

EDINBURGH CORPORATION
TOWN PLANNING DEPARTMENT

Applications are invited for the following appointments.

(a) ASSISTANT PLANNING OFFICER, salary scale £1,200—£1,400.

Applicants must hold the Final Examination of the Town Planning Institute and an architectural qualification. The post carries responsibility for the supervision of the preparation and processing of Town Planning work required in connection with the redevelopment of areas of bad layout and obsolete development in the city.

(b) PLANNING ASSISTANT, salary scale £795—£1,075.

Applicants must hold the Final Examination of the Town Planning Institute. The post will be in the redevelopment section and offers experience in all aspects of Town Planning reconstruction work.

Both posts are superannuable. Placing within the scales may be granted according to experience/qualifications.

Applications stating age, experience and qualifications, accompanied by two copies of recent testimonials, to the Town Planning Officer, City Chambers, Edinburgh, by 14th May. 9794

BOROUGH OF SWINDON
ASSISTANT ARCHITECT

Applications are invited for the undermentioned appointments. Applicants should have the qualification shown or an equivalent qualification.

The department is engaged in a large and varied development programme, including housing schemes, neighbourhood shopping centres, civic works and industrial buildings.

A five-day week is in operation.

Housing accommodation and removal assistance may be offered.

The commencing salary in each grade will be in accordance with experience. Candidates who are taking final examinations this year may be appointed in A.P.T. II and transferred to an A.P.T. Special Scale vacancy on qualifying.

(a) ASSISTANT ARCHITECTS, A.P.T. Special Scale (£785—£1,070) Final R.I.B.A.

(b) JUNIOR ASSISTANT ARCHITECTS, A.P.T. II (£765—£880) Intermediate R.I.B.A.

Applications, giving details of qualifications, appointments and experience should be submitted to the Town Clerk, Civic Offices, Swindon, within fourteen days.

Canvassing will disqualify. 9787

CITY OF STOKE-ON-TRENT
CITY ARCHITECT'S DEPARTMENT

Applications are invited from ARCHITECTURAL ASSISTANTS for appointments on Grade A.P.T. I (£610—£765). Commencing salary according to qualifications and experience.

Applications to J. R. Piggott, T.D., F.R.I.B.A., City Architect, Kingsway, Stoke-on-Trent, by Monday, 9th May, 1960.

HARRY TAYLOR,
Town Clerk.
9786

CITY OF STOKE-ON-TRENT EDUCATION COMMITTEE
COLLEGE OF BUILDING

Principal: C. KNAPPER, F.R.I.B.A., F.R.S.A., F.R.S.H., Chartered Architect.

DEPARTMENT OF PROFESSIONAL AND MANAGEMENT STUDIES

Head of Department: A. SYKES, A.R.I.C.S., F.I.Arb., Chartered Surveyor.

Applications are invited for the appointment of a full-time SENIOR LECTURER to teach Building Construction, and additional subjects included in the various professional examinations allied to the Building Industry (applicants should list subjects offered). The successful applicant will act as Deputy Head of Department, and will be responsible for organisation and development in the Department.

Applicants should preferably be members of the Royal Institute of British Architects, School trained, with previous professional and/or teaching experience. Only applicants having had a wide range of practical experience will be considered.

Salary in accordance with the Burnham Scale for Senior Lecturers in Establishments of Further Education, *i.e.*, £1,550 × £50—£1,750 per annum.

Application forms, which should be returned immediately, may be obtained from the Chief Education Officer, Education Department, P.O. Box No. 23, Town Hall, Hanley, Stoke-on-Trent.

H. DIBDEN,
Chief Education Officer.
9788

GLENROTHES DEVELOPMENT CORPORATION

Architect, with A.R.I.B.A., required for the design and construction of commercial and shopping premises, industrial buildings and housing. Salary grade rising to £1,375 per annum, with placing according to age and experience.

House to rent available if required. Medical examination under Superannuation Scheme. Application forms from Secretary and Legal Adviser, Glenrothes Development Corporation, Glenrothes, Fife, to be returned by 14th May. 1960. 9779

ARCHITECTS. BEA offers two permanent pensionable posts under the Chief Staff Architect on interesting and varied work with some travel in the UK and abroad. SENIOR ASSISTANT ARCHITECT (salary range £1,160—£1,480). Fully qualified with initiative and sound administrative ability; four or more years qualifying experience, sensitive contemporary design ability and a thorough knowledge of all stages in the production of working drawings. Shop fitting design experience an advantage. ASSISTANT ARCHITECT (salary range £860—£1,120). Preferably qualified or near to qualifying with full time training at a School of Architecture and at least two years' office experience. High design standard and a sound approach to production of working drawings and specifications. An interest in shop fitting design is desirable. Write for full details and application form to Personnel Officer, Head Office, British European Airways, Bealine House, Ruislip, Middlesex. 9785

BOROUGH OF SCUNTHORPE
(An expanding modern town of 61,000 population, 7,895 acres, R.V. £1,084,880).
BOROUGH ENGINEER & SURVEYOR'S DEPARTMENT

Applications are invited for the following appointments:—

(a) HEATING AND VENTILATION ENGINEER, A.P.T. III-IV (£880—£1,220 p.a.).

(b) QUANTITY SURVEYING ASSISTANT, A.P.T. I (£610—£765 p.a.).

Commencing salaries will be fixed according to qualifications and experience.

Housing accommodation available if required, approved removal expenses reimbursed in full, five-day working week.

Further information and application forms relating to the appointments may be obtained from the Borough Surveyor, Laneham Street, Scunthorpe. Completed forms should be returned to the Town Clerk, 34, High Street, Scunthorpe, not later than Monday, 9th May, 1960. 9832

ARCHITECTURAL DRAUGHTSMAN required for London office with general experience, but particularly of work of an industrial character and ability to undertake site surveys, levelling, etc. Commencing salary £662 per annum. Applications giving age, experience and qualifications to Personnel Officer, (S.V.116), British Road Services Limited, Melbury House, Melbury Terrace, London, N.W.1. 9810

CITY OF COVENTRY
will consider applications for qualified posts offering
UNIQUE OPPORTUNITIES
FOR CREATIVE TOWN PLANNING

1.	SCALE C	£1,385—£1,620
2.	SCALE B	£1,305—£1,485
3.	SCALE A	£1,230—£1,420
4.	A.P.T. V	£1,220—£1,375
5.	A.P.T. IV	£1,065—£1,220

for the following types of work:—

(i) Central & Comprehensive Development Areas.
(ii) Development Plan & Research.
(iii) Development Control & Outer Areas.
(iv) Landscape.
(v) Architectural aspects of the above.

HOUSING ACCOMMODATION IN APPROVED CIRCUMSTANCES
REMOVAL EXPENSES LOAN

Application forms from City Architect & Planning Officer, Council House, Coventry, returnable 14 days publication.

INDICATE SALARY AND WORK APPLIED FOR. 9710

BOROUGH OF BILSTON
HOUSING DIRECTOR'S DEPARTMENT

Applications are invited for the following appointments:—

(a) CHIEF ARCHITECTURAL ASSISTANT, Special Grade, £785—£1,070.

(b) ARCHITECTURAL ASSISTANT, A.P.T. Grade II, £765—£880.

(c) DRAUGHTSMAN (Male or Female), General Division, £206—£595 (according to age).

The appointments will be subject to the National Scheme of Conditions of Service, a medical examination and the Local Government Superannuation Acts 1937 and 1953.

Housing accommodation will be made available if required.

Applications in writing, stating the post applied for, age giving age, qualifications and previous experience including any services with a Local Authority, together with the names and addresses of two referees should be sent to the Housing Director, Municipal Buildings, Hall Street, Bilston, not later than Saturday, 7th May, 1960.

A. M. WILLIAMS,
Town Clerk.

Town Hall,
Bilston.
15th April, 1960 9713

COUNTY BOROUGH OF BARNSLEY
BOROUGH ENGINEER AND SURVEYOR AND PLANNING OFFICER'S DEPARTMENT
APPOINTMENT OF ARCHITECTURAL ASSISTANT (SPECIAL CLASSES)

Applications are invited for the following appointment:—

Architectural Assistant, Special Classes, A.P.T. I (£610—£765) or Special Grade (£785—£1,070) according to qualifications and experience. COMMENCING SALARY MAY BE UP TO £700 ON A.P.T. I OR £990 ON SPECIAL GRADE.

Previous experience in the design of houses and public buildings is desirable. Candidates requiring Special Grade must hold a recognised Diploma in Architecture or be A.R.I.B.A.

N.J.C. Conditions of Service. The post is superannuable subject to medical examination and one month's notice on either side.

HOUSING ACCOMMODATION CAN BE PROVIDED IF NECESSARY AND 50 PER CENT OF REMOVAL TRANSPORT EXPENSES WILL BE PAID IN APPROVED CASES.

Applications, stating age, present and previous appointments, qualifications, experience, etc., together with the names of two referees, should reach the Borough Engineer, Town Hall, Barnsley, by Thursday, 12th May, 1960.

Canvassing will disqualify.

A. E. GILFILLAN,
Town Clerk.

Town Hall,
Barnsley.
April, 1960. 9714

CITY ARCHITECT'S OFFICE
MANCHESTER

Applications invited for the appointment on the permanent staff of a SENIOR ASSISTANT ARCHITECT, salary A.P.T.IV £1,065—£1,220 per annum. Housing accommodation for a limited period may be provided. Five-day week. Removal expenses allowed.

Forms of application from the City Architect, P.O. Box 488, Town Hall, returnable by 9th May, 1960. 9805

KENT COUNTY COUNCIL
PLANNING DEPARTMENT

Applications are invited for the following appointments:—

(*a*) SENIOR PLANNING ASSISTANTS and
(*b*) ARCHITECTURAL ASSISTANTS.
Salaries in Special Grade (£785—£1,070) or if appropriate Grade A.P.T. IV (£1,065—£1,220).
(*c*) PLANNING ASSISTANTS.
Salaries in Grade A.P.T. I-II (£610—£880) or A.P.T. I (£610—£765).

Commencing salaries will be fixed according to qualifications and experience and the posts are superannuable.

Qualifications required: posts (*a*) corporate membership of the Town Planning Institute; posts (*b*) corporate membership of the Royal Institute of British Architects; posts (*c*) University degree or diploma or a recognised Intermediate professional examination related to any technical aspect of the work of a Planning Department.

The County Council is undertaking an extended programme in relation to the preparation of Town Maps and re-development of central areas in addition to the statutory review of its approved Development Plan, and several new posts are available in connection with this work.

The National Scheme of Conditions of Service applies and registered disabled persons will be considered. Five-day week.

Applications, with names of two referees, to County Planning Officer, County Hall, Maidstone, by 9th May, 1960. 9716

COUNTY BOROUGH OF CROYDON
ARCHITECTURAL AND QUANTITY SURVEYING STAFF

Applications are invited for the under-mentioned pensionable appointments for the Corporation's Housing and General Architectural Work, which includes a variety of interesting projects:

(*a*) ASSISTANT ARCHITECT (team leader), R.I.B.A. Final required.
(*b*) ASSISTANT QUANTITY SURVEYOR (team leader), R.I.C.S. Final required.

Salary for appointments (*a*) and (*b*) on the Scale A.P.T. IV, £1,095 to £1,250 per annum, commencing according to experience.

(*c*) ARCHITECTURAL ASSISTANTS.
(*d*) QUANTITY SURVEYING ASSISTANTS.

Commencing salary for appointments (*c*) and (*d*) according to experience between £630 and £795 per annum, or, with Intermediate Examination between £785 and £910 per annum, both progressing to £1,100 with Final qualifications.

Housing—where needed, advances up to 100 per cent of Borough Valuer's valuation will be made available for the purchase of suitable houses in Croydon by successful applicants.

Further particulars and application forms from the Borough Engineer, Town Hall, Croydon. Closing date 9th May, 1960.

E. TABERNER,
Town Clerk.
9715

THE SOUTH WALES ELECTRICITY BOARD

SENIOR ARCHITECTURAL DRAUGHTSMAN

Applications are invited for the position of Senior Architectural Draughtsman in the Chief Engineer's Department at Head Office, St. Mellons.

The salary for the position will be in accordance with Schedule "D". Grade 5 (£790—£890) of the National Joint Board Agreement for the Electricity Supply Industry, and applicants will be expected to have obtained, or be studying for, membership of the R.I.B.A.

Applications stating age, present position, present salary, qualifications and experience should be addressed to the undersigned at St. Mellons, Cardiff, so as to reach him not later than Saturday, 14th May, 1960.

Envelopes should be marked "Senior Architectural Draughtsman—20/60."

R. G. WILLIAMS,
Secretary.
9720

BOROUGH OF BURY ST. EDMUNDS
APPOINTMENT OF JUNIOR ARCHITECTURAL ASSISTANT
Grade A.P.T. I, £610—£765

Applications are invited for the above appointment in the Department of the Borough Engineer and Surveyor. Duties will include the preparation of working drawings and details for new houses and other buildings, and other architectural work in connection with the maintenance and upkeep of Corporate property.

Consideration will be given to the provision of housing accommodation.

Applicants for the post should be probationers of the R.I.B.A. preferably with not less than two years' experience.

Applications endorsed "Architectural Assistant" stating age, whether married, qualifications and experience, together with the names of two referees, to be delivered to the Borough Engineer and Surveyor (G. S. Standley, A.M.I.C.E., M.I.Mun.E.) at the address below not later than 5th May, 1960.

RICHARD R. HILES,
Town Clerk.

Borough Offices,
Bury St. Edmunds. 9718

COUNTY BOROUGH OF BLACKPOOL

Applications are invited for:—

ASSISTANT ARCHITECTS, Special Scale, £785—£1,070 p.a.

ASSISTANT QUANTITY SURVEYORS, Special Scale, £785—£1,070 p.a.

Forms etc. from Arthur Hamilton, B.Sc., A.R.I.B.A. (Borough Surveyor), P.O. Box 17, Municipal Buildings, Blackpool. 9745

Architectural Appointments Vacant

3s. per line; minimum 12s. Box Number, including forwarding replies 2s. extra.

TWO ARCHITECTURAL ASSISTANTS required—Intermediate R.I.B.A. standard—who have had good office experience. Salary £600—£1,000 according to experience. Housing accommodation could be provided. Reply, giving particulars of age and experience and salary required, to: Francis W. Keyworth, L.R.I.B.A., 20, Park Road, Melton Mowbray, and 31, Friar Lane, Leicester. 8776

ARCHITECTURAL ASSISTANT required, Intermediate/Final standard. Varied and interesting work. Good draughtsmanship, sound knowledge of construction and ability to manage jobs, essential. Five-day week. Apply, stating age, experience and salary required, to George Lowe & Partner, 79, George Street, CROydon 3608/9. 8645

ARCHITECTURAL ASSISTANTS required in busy Bloomsbury office with varied practice. Good salary and prospects for suitable applicants. Five-day week. Write giving particulars of age, qualifications, experience, etc., to Box 910, c/o 7, Coptic Street, W.C.1. 8815

ASSISTANT ARCHITECTS required by firm with offices in Middlesbrough and Billingham-on-Tees. The work is interesting and of considerable variety. Salary according to experience and ability. Elder and Lester, A./A.R.I.B.A., Grosvenor Buildings, 65, Albert Road, Middlesbrough. 8820

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W. H. WATKINS, GRAY & PARTNERS require ASSISTANTS of Intermediate and Final standard. Pension scheme and luncheon vouchers. Salary range £700 to £900. Apply 57, Catherine Place, London, S.W.1. 8720

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NORMAN & DAWBARN require experienced architects for interesting projects both here and overseas. Applicants should be interested in good design. Salaries from £900 upwards. 'Phone or write for an appointment to: 7 Portland Place, W.1 9504

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BRYAN & NORMAN WESTWOOD & PARTNERS urgently require JUNIOR and SENIOR ASSISTANTS. Salary will be according to experience. Please write or telephone for an interview. 21, Suffolk Street, S.W.1. TRAfalgar 4411. 9278

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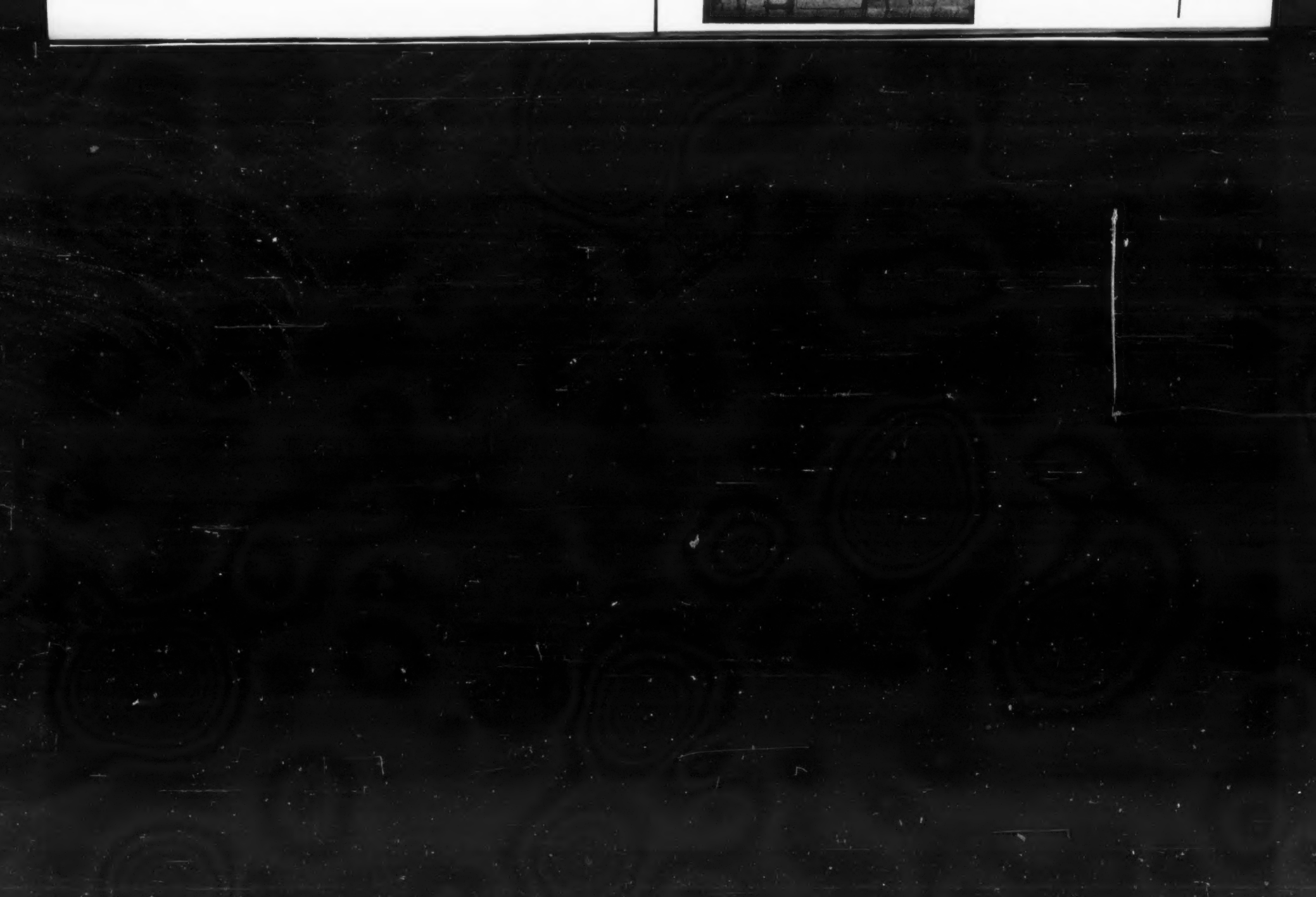

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