The Architects' Journal
December 13 1961 Vol 134 No 24 Price 1s

SfB (21)

This issue of the AJ should be filed as it contains part of a 50-part technical information library which the AJ is founding. Below are the most important elements from Table 1 of the sfb classification.

These are the key to our library production programme, and each week we publish, with the normal AJ, a supplement dealing with one of these elements. Headings in bold type are those dealt with in previous issues. This week's supplement covers part of sfb (21). The remaining headings will be published in subsequent issues.

This is a token preclassified file cover for the Element File Technical Studies, Element Design Guide and Information Sheets within and for all subsequent articles and digests on these subjects which an architect needs to keep. At the end of a year readers will have a design manual covering all the functional elements listed below and forming the nucleus of a technical library.

(11) Ground: General
(12) Drainage: General
(13) Retaining structures: General
(14) Roads and pavings: General
(15) Garden: General
(15) Garden: Fences, gates, walls
(16)-(19) Foundations
(2) Structures: General
(2) Structures: Concrete: General
(2) Structures: Sections, metal
(2) Structures: Sections, wood
(21) Walls: External load-bearing: General

(21)
Walls: External non-loadbearing: General

(22) Partitions: General
(23) Floors, ground: General
(23) Floors, structural: General
(24) Stairs and ramps: General
(25) Ceilings, suspended: General
(26) Roofs, structural, flat: General
(27) Roofs, structural, pitched: General
(30) Accessories, ironmongery: General
(31) Windows: General
(31) Windows: Sections, metal
(31) Windows: Sections, wood
(32) Doors: General
(34) Handrails and balustrades: General
(37) Roof-lights and traps: General
(38) Roof eaves, verges, gutters, rails: General
(41) Finishes, external: General
(42) Finishes, internal: General
(43) Finishes, floor: General
(46) Finishes, flat roofs
(47) Finishes, pitched roofs: General
(51) Installations, refuse disposal: General
(52) Installations, drainage and sanitation: General
(53) Installations, water, hot and cold: General
(54) Installations, gas, compressed air, steam, refrigeration: General
(56) Installations, heating: General
(56) Installations, heating: Equipment and fuel
(57) Installations, ventilation, air-conditioning: General
(63) Installations, electrical: Lighting and power: General
(63) Installations, electrical: Lighting equipment
(64) Installations, communications: General
(66) Installations, mechanical: General
(68) Installations, special: General
(72) Rooms, fixtures and equipment: General (fixed furniture)
(72) Rooms, fixtures and equipment: General (loose furniture)
(73) Kitchens, fixtures and equipment: General
(74) Cloakrooms, bathrooms, lavatories, fixtures and equipment: General
(75) Laundries, fixtures and equipment: General

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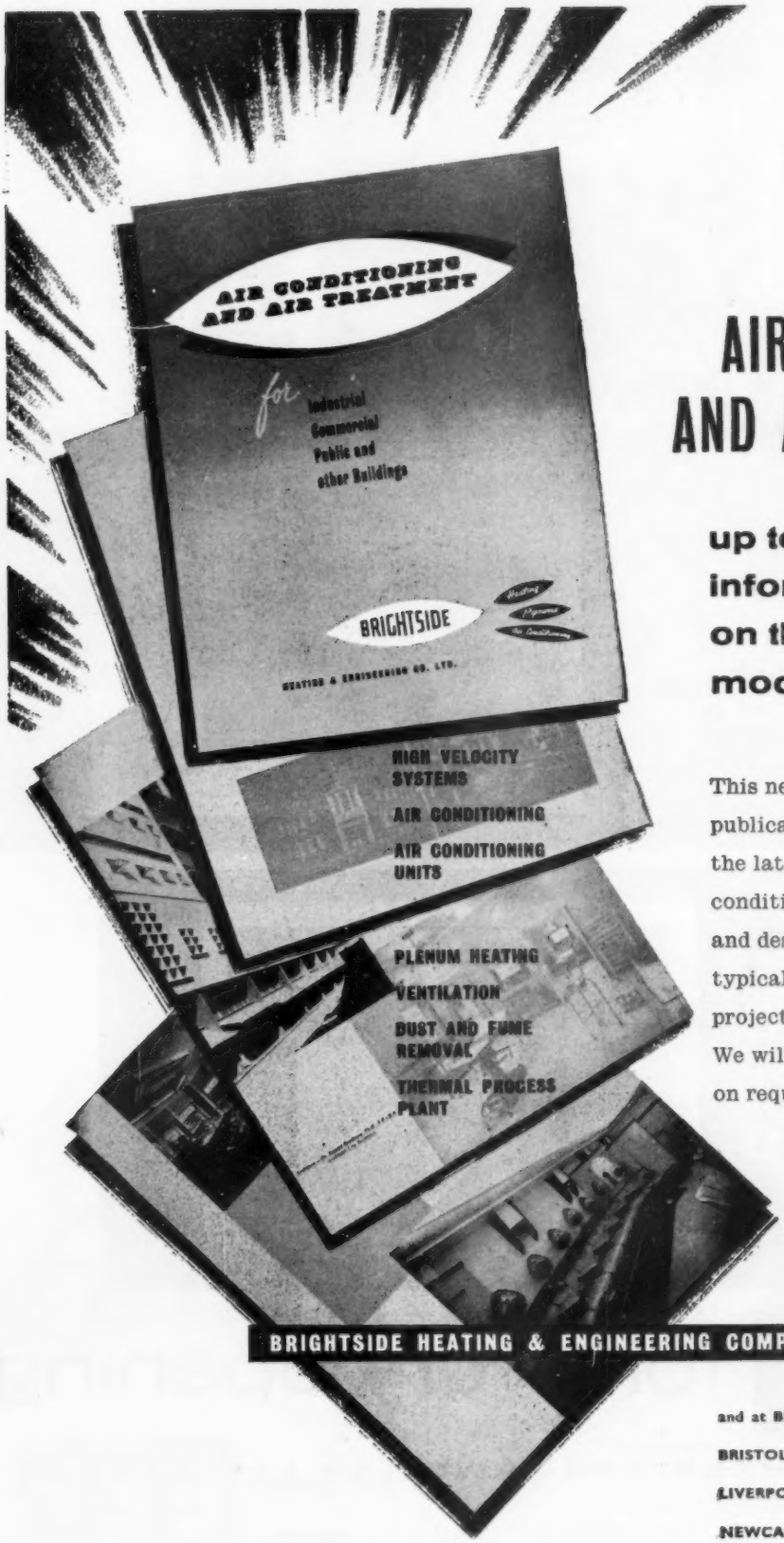

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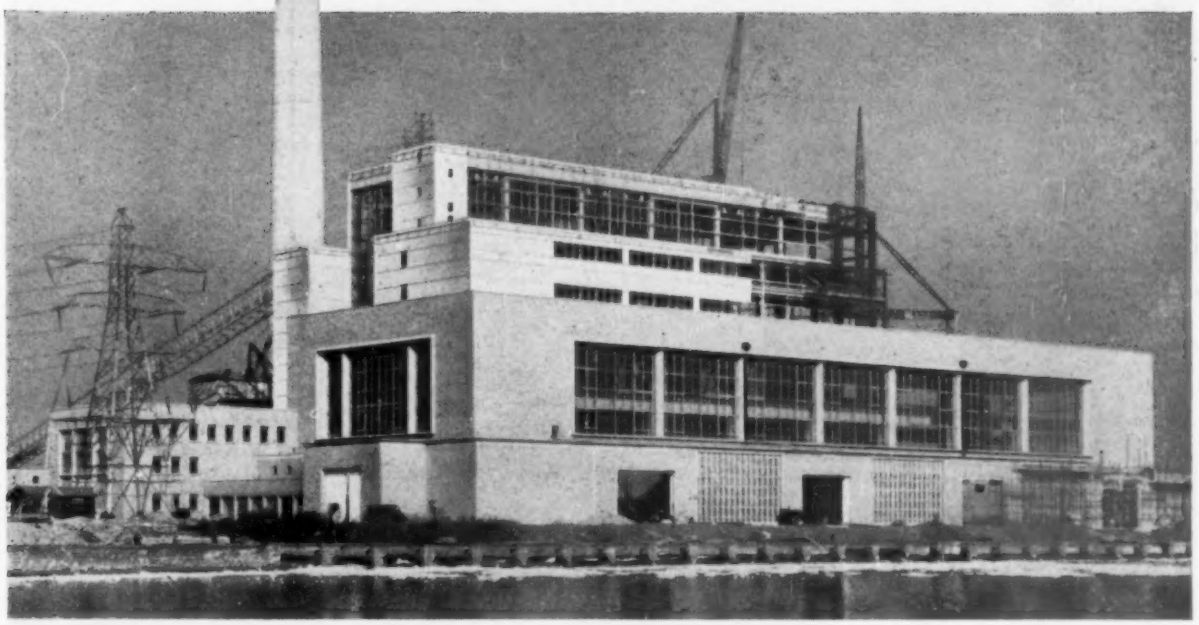

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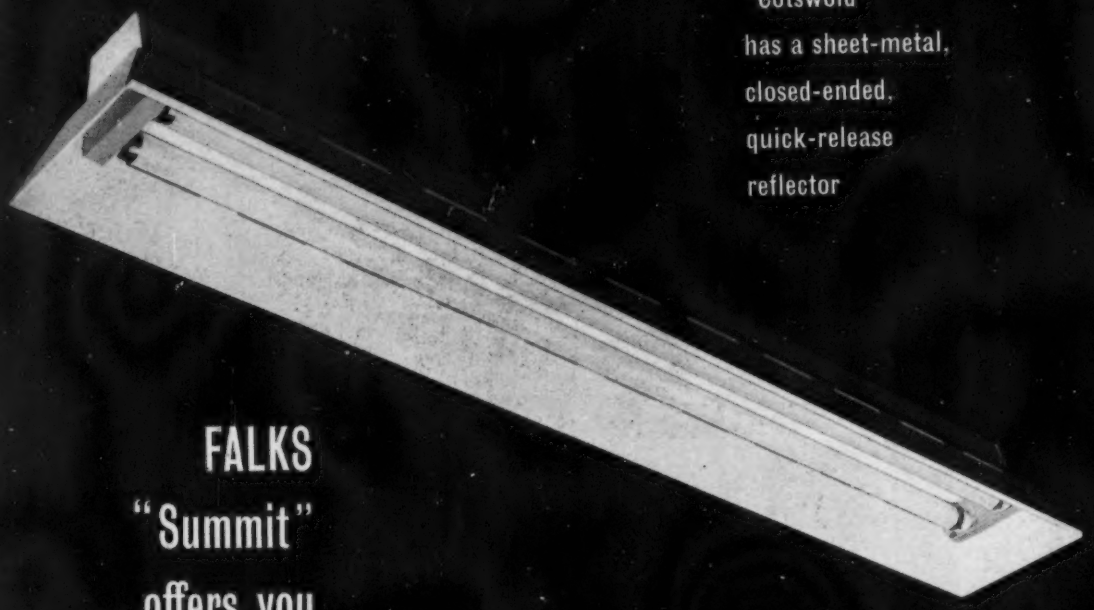

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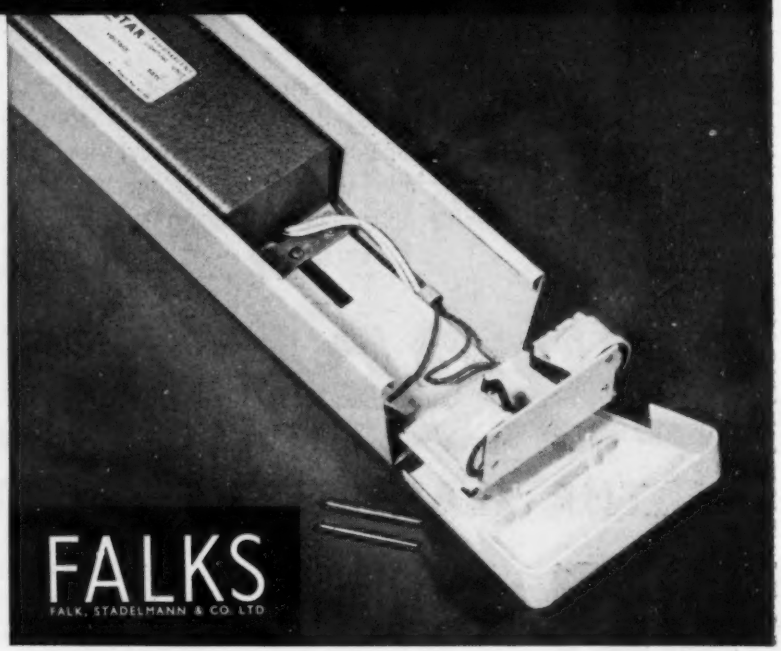

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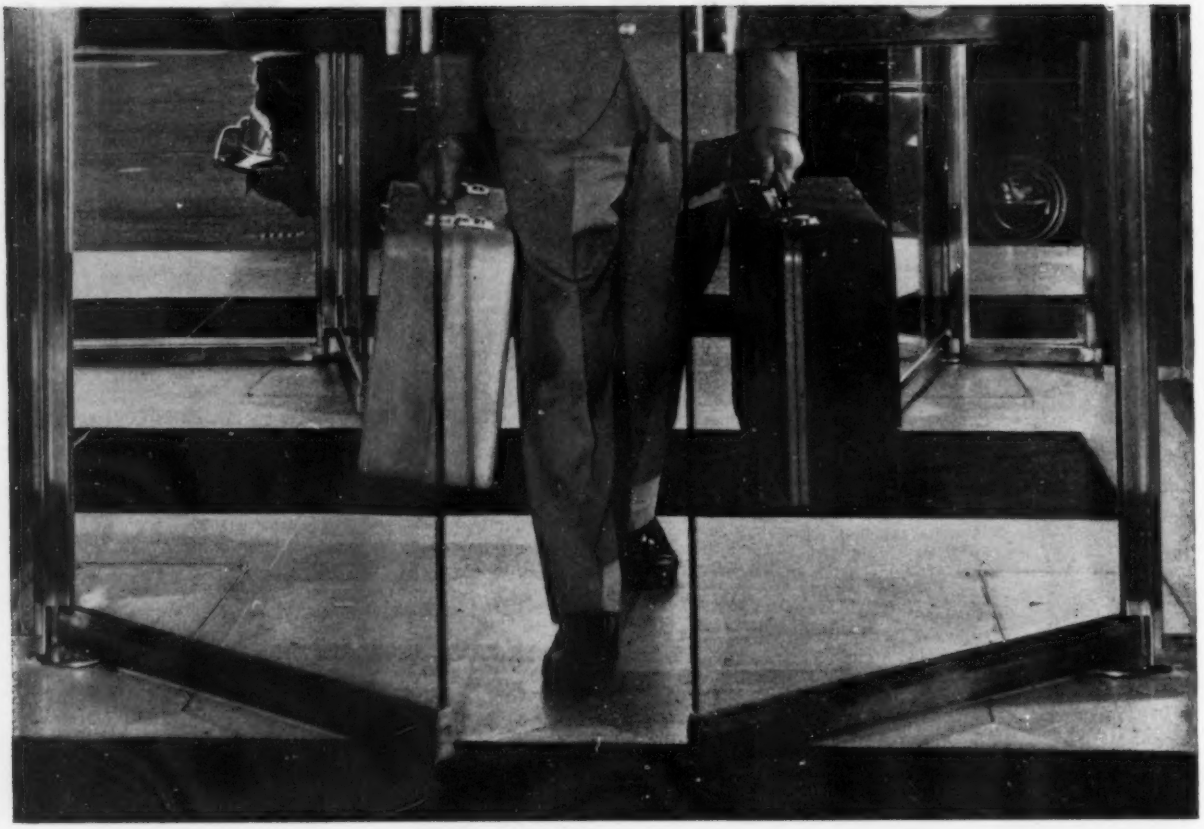

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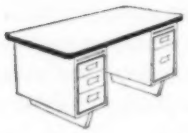

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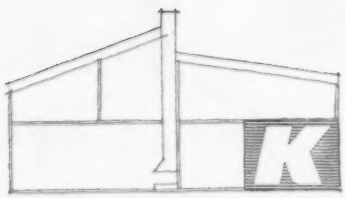

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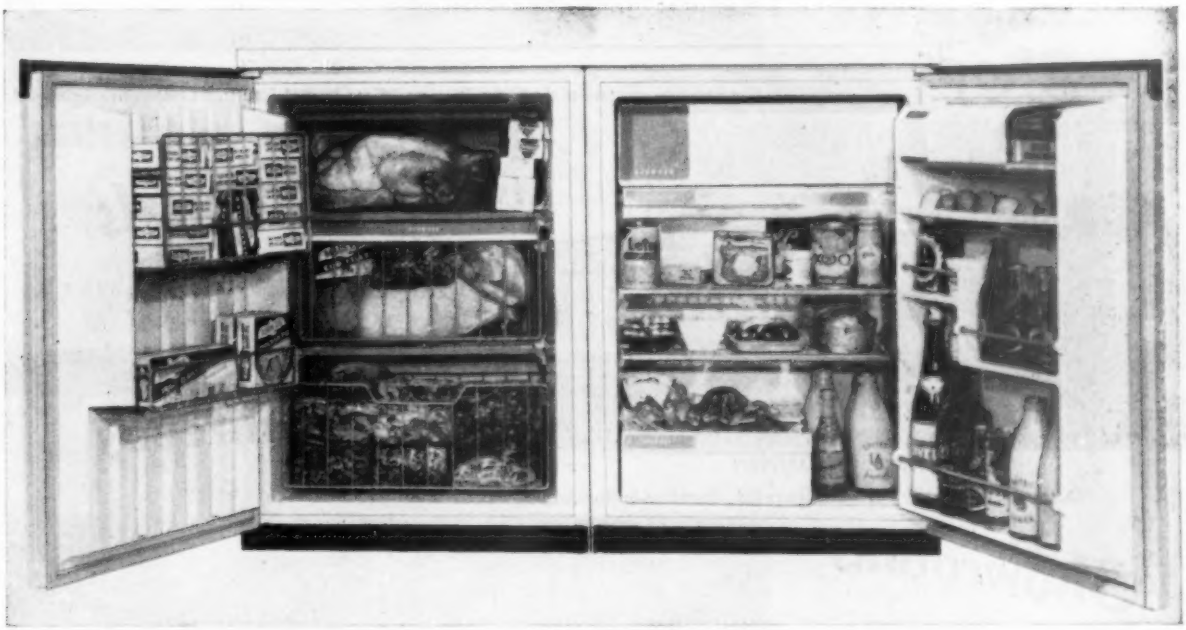

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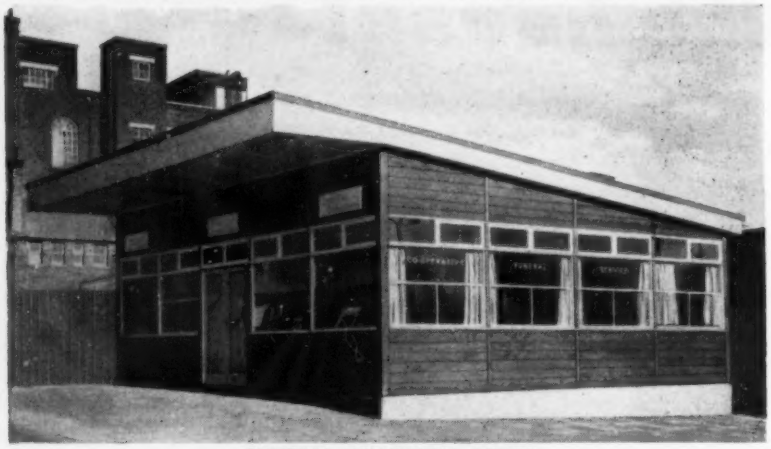

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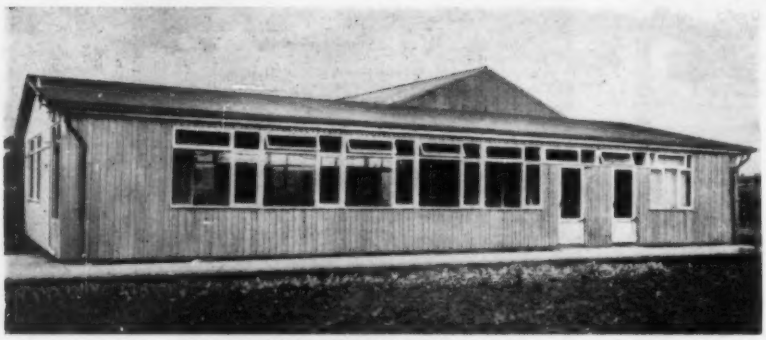

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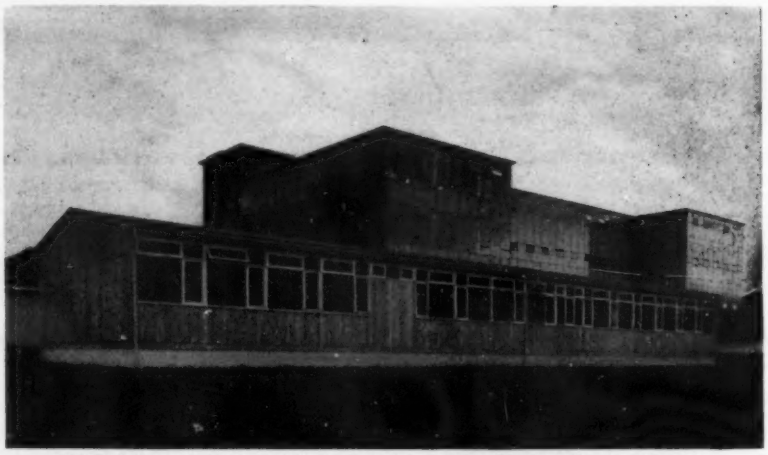

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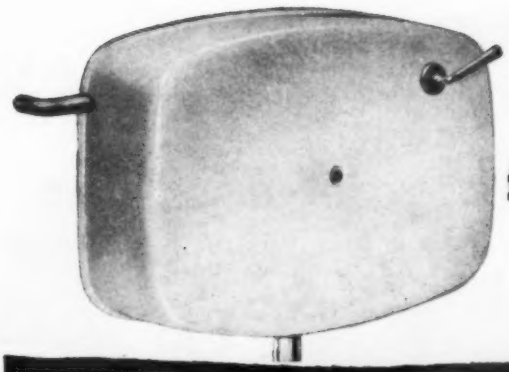

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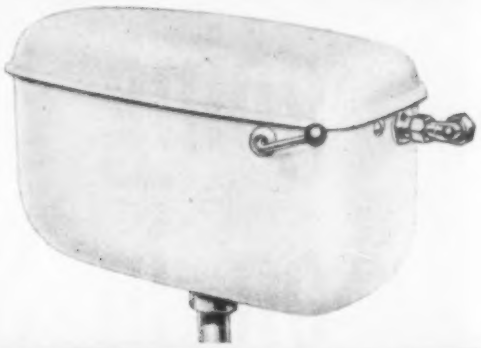

Fordham ' Cleanline ' low level Cistern

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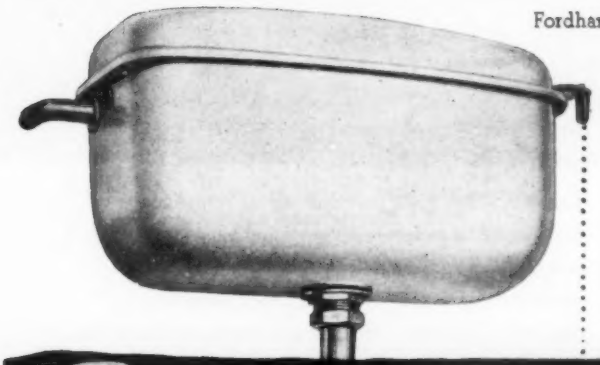

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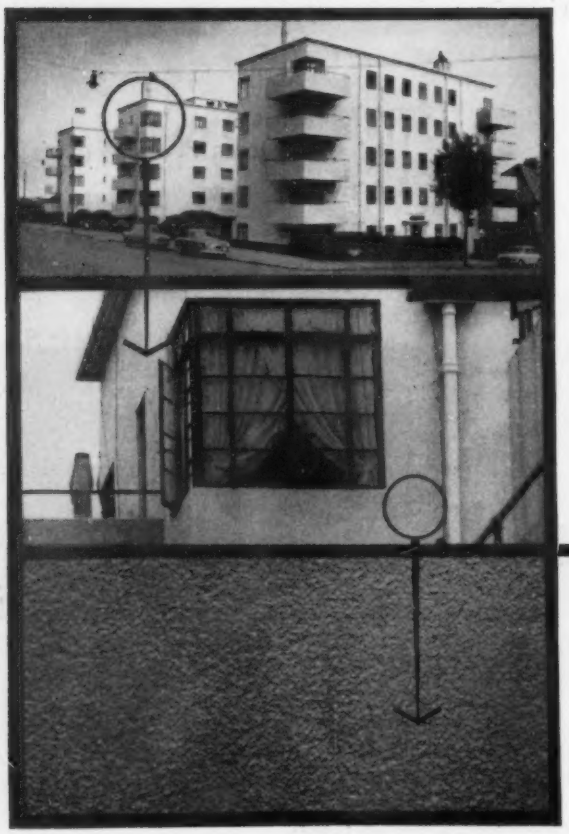

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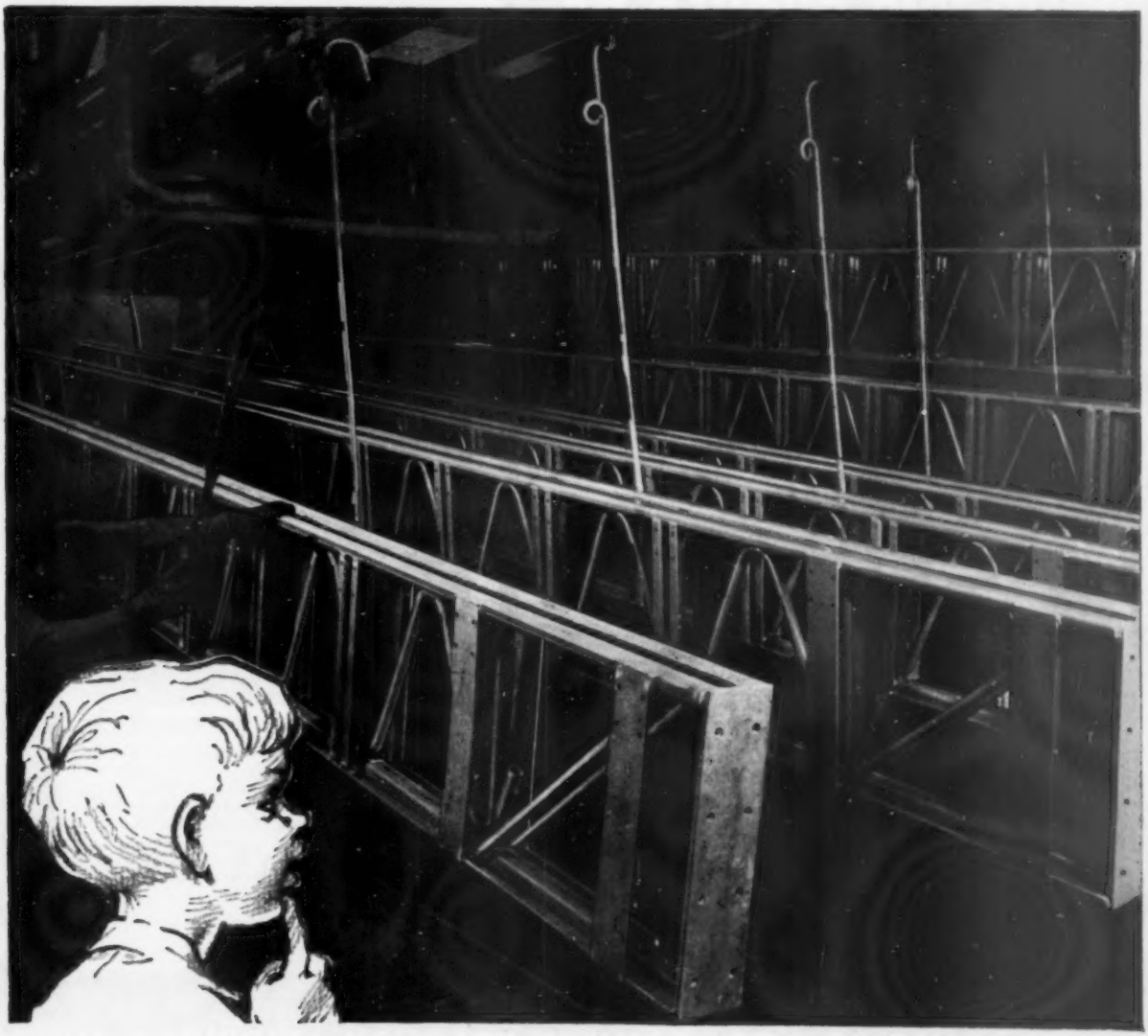

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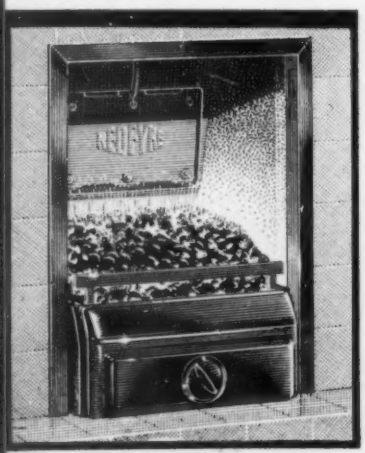
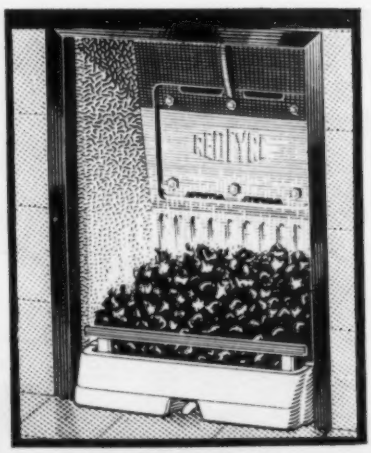
- ✳ One open fire provides living-room comfort *plus* hot-water and heating services in other parts of the house.
- ✳ Unrestricted choice of radiators.
- ✳ Also available with Hearth Redfyre (underfloor air feed).

REDFYRE BACBOILERS Heat rooms up to 1500 sq. ft. PLUS radiator surfaces up to 70 sq. ft. PLUS full hot water services. Supplied complete with one of these Redfyre controlled-burning fires



Redfyre 4a Bacboiler complete with Redfyre 55 controlled-burning fire from £18. 11. 6. (retail)

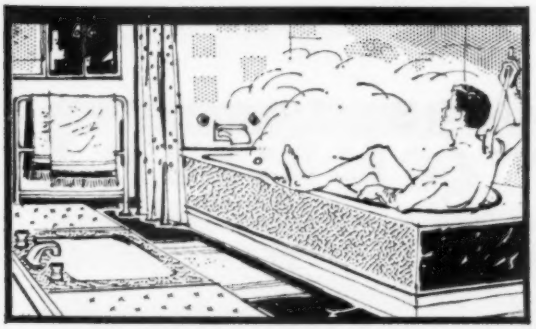
Redfyre 4a Bacboiler complete with Redfyre 60 controlled-burning fire from £17. 15. 7. (retail)

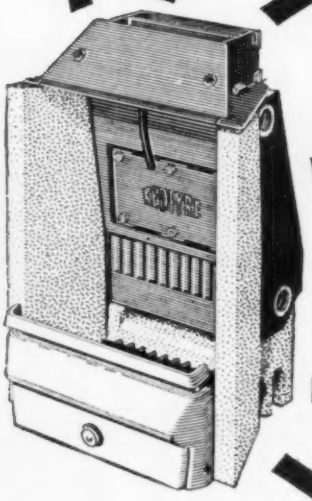


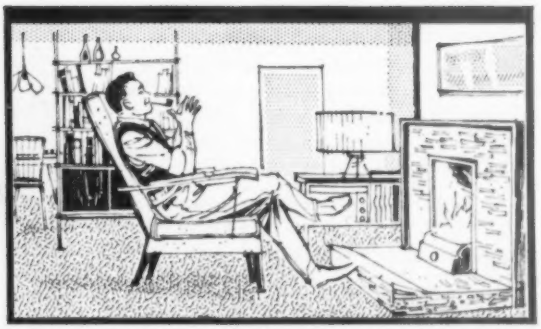
Redfyre 5 (or 5a) Bacboiler complete with Hearth Redfyre (underfloor air feed) from £23. 2. 3. (retail)

All Ministry-approved for grant under the Clean Air Act and suitable for installation in smoke-controlled areas.

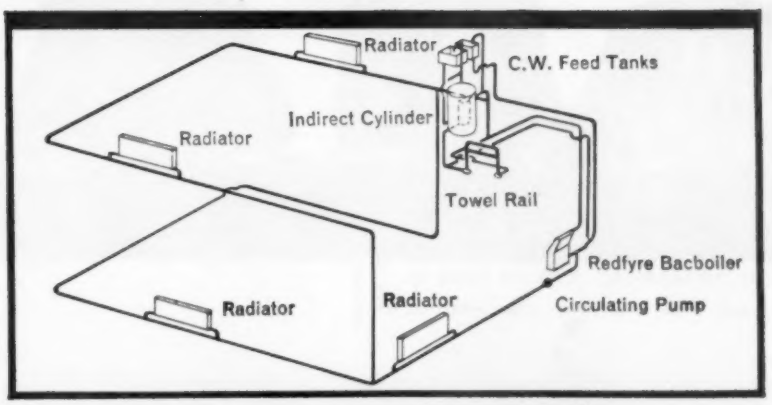
There are other Redfyre Bacboilers designed to burn house coal only.







A *typical* domestic hot water and background heating layout incorporating the Redfyre Bacboiler.



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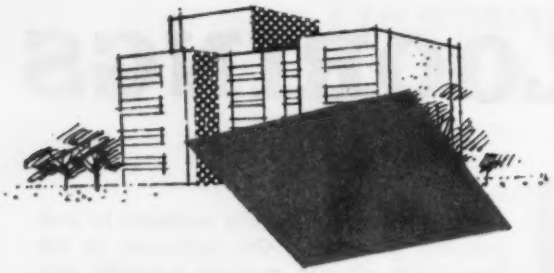
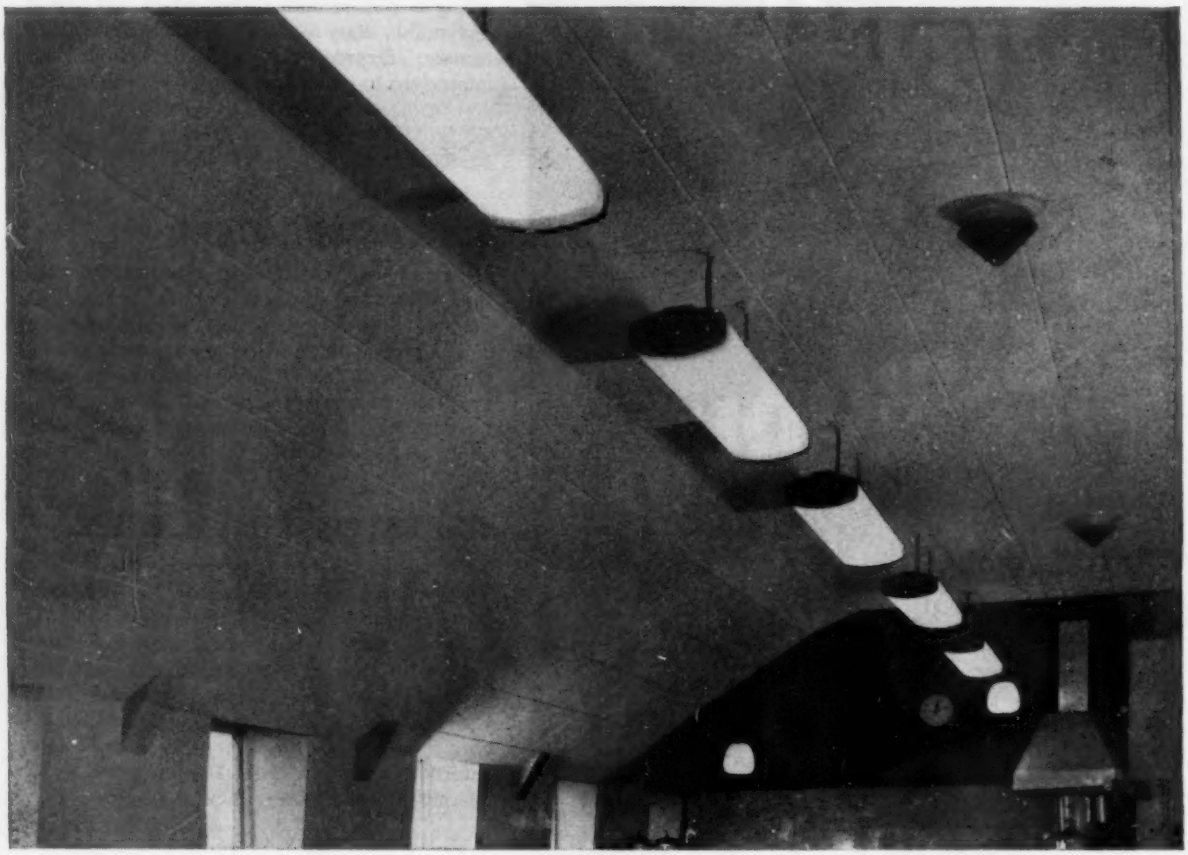


Canteen at the new Liverpool head-quarters of the Liverpool & London & Globe Insurance Co. Ltd. — acoustically insulated with NEWALLS PAXTILES (Regd. Brand)



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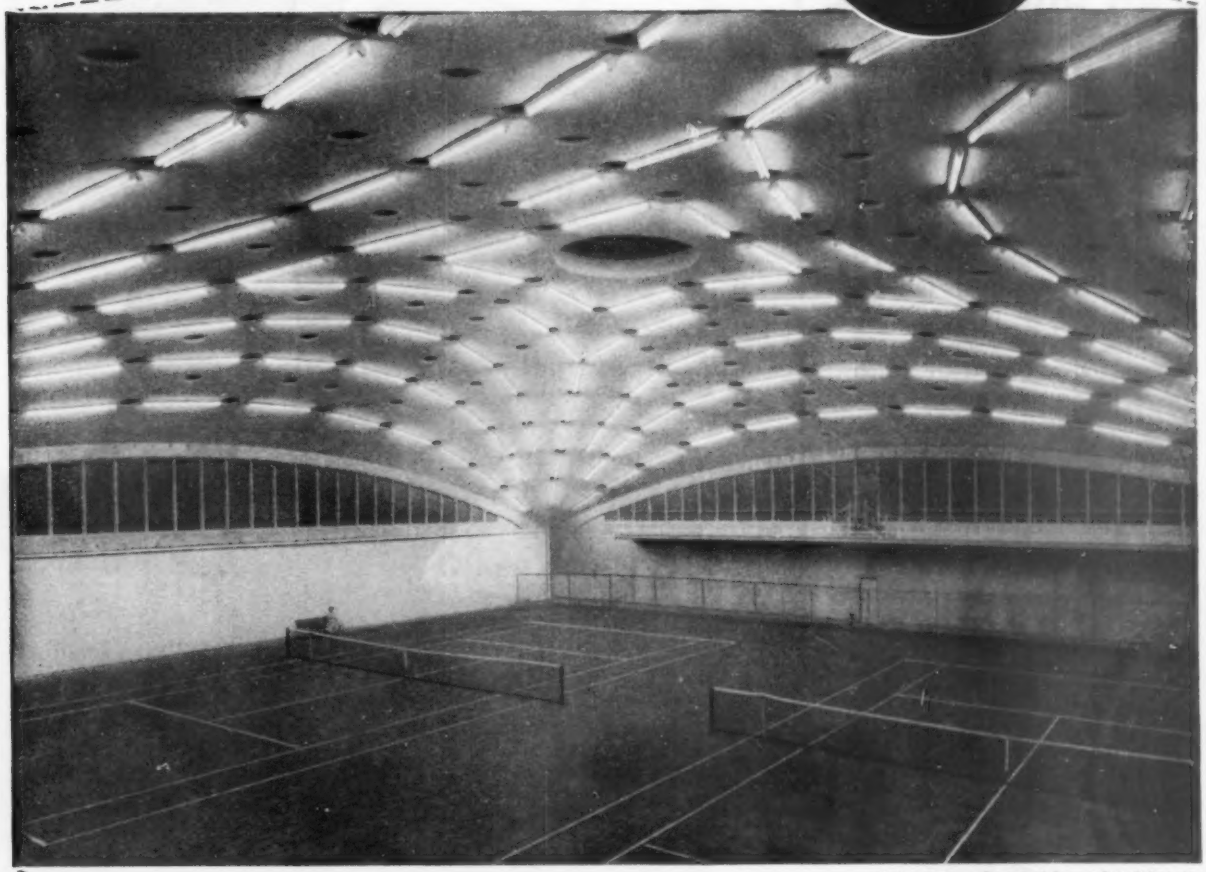

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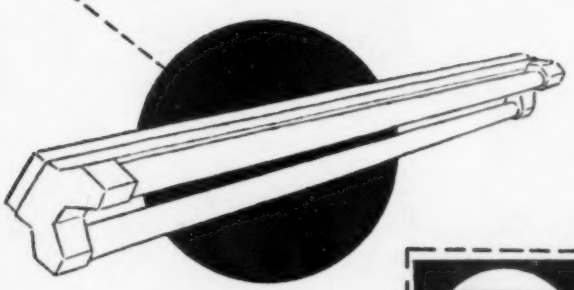

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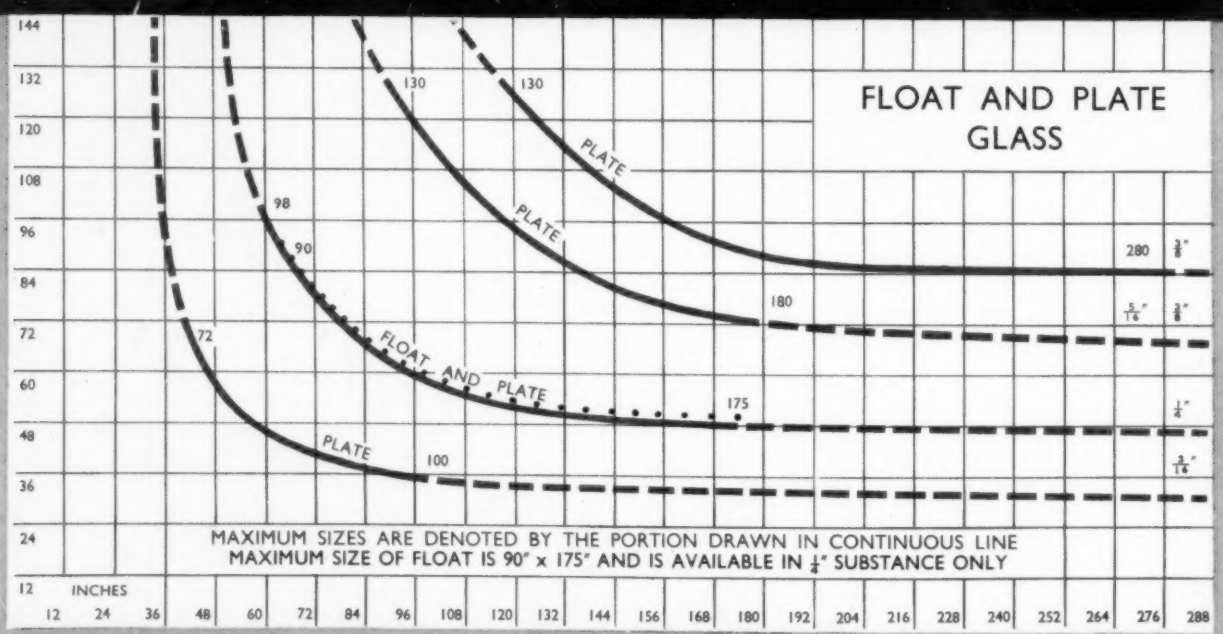

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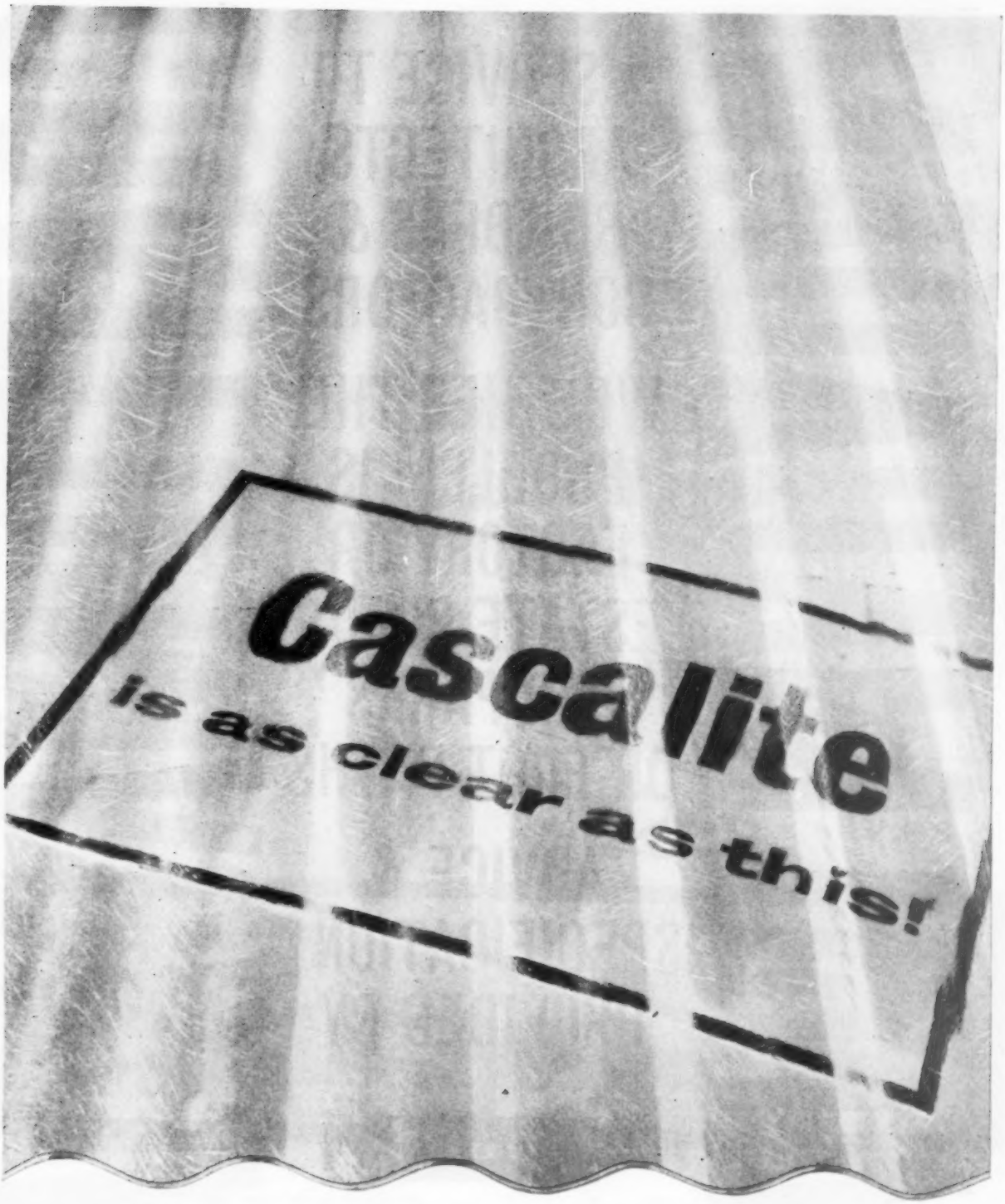

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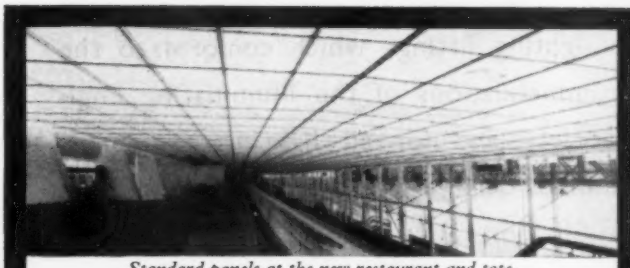
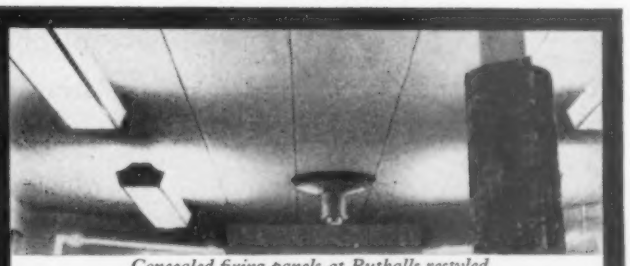


Standard panels at the new restaurant and tote, Olympic Enclosure, White City Stadium, London.



Concealed fixing panels at Ruthalls restyled furniture store, Redhill, Surrey.

* With the Grecon System there are no unsightly inspection panels to break the quality finish, whether it be Standard, Flush Face or Concealed fixing. Quality finish remains uniform throughout, yet any panel can be removed and replaced quickly and easily. You cannot afford to be without this safeguard, which is a unique feature of the Grecon System.

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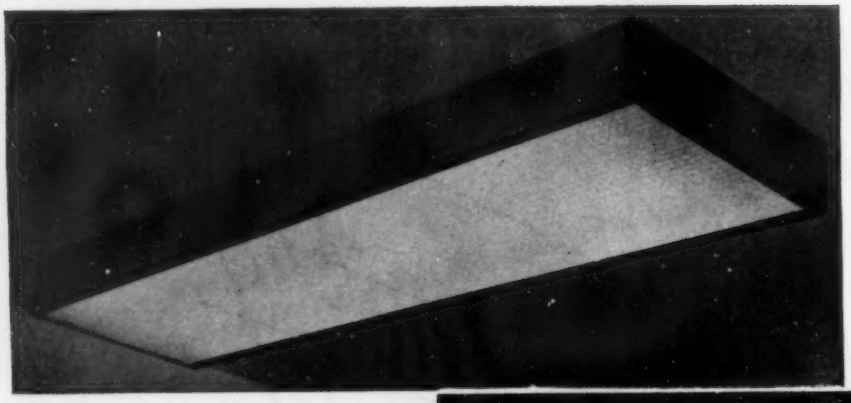

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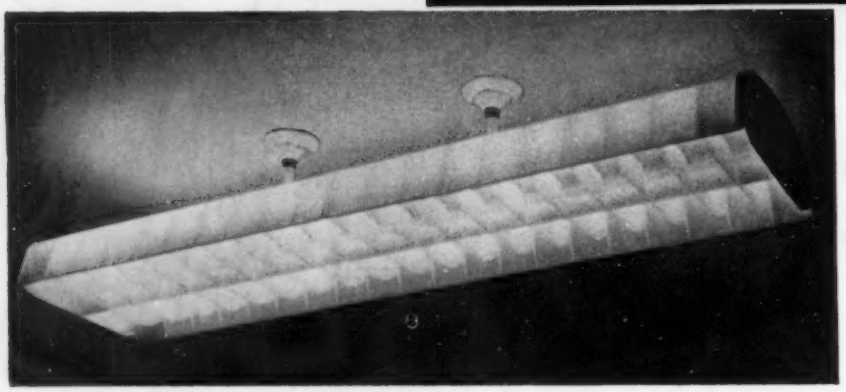

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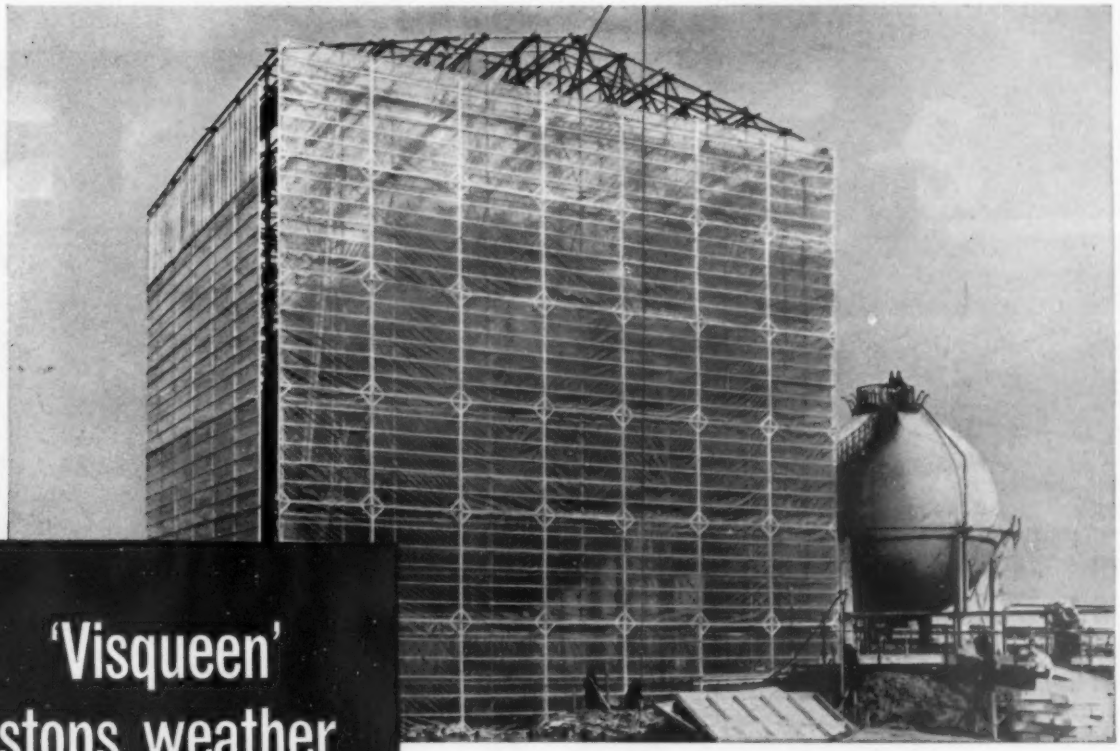
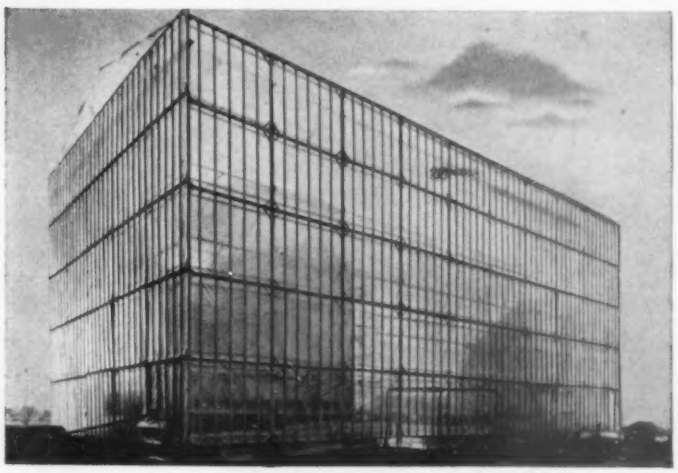


'Visqueen' stops weather stopping work

Reusable 'Visqueen' panels (7'6" x 9') fixed to scaffolding, in order to provide weather protection for men erecting butadiene storage spheres for I.C.I. at Wilton. The transparent sheeting also extended the hours of daylight working, avoided the need for artificial illumination and prevented welding sparks from causing possible damage around the site.

Although these Visqueen shelters were put up by Whessoe Ltd. for specialised construction requirements, they show clearly how effective weather protection can be provided on building projects whether large or small.

The reusable panels were made up by cladding timber frames with Visqueen 1000 (double heavyweight) sheeting, and then fixing them to the scaffolding. Once in position, they not only kept out the weather but provided the necessary draught-free surround for the Argonarc welding process. In addition, they isolated the welding sparks from the rest of the site.



A 'Visqueen' clad scaffold structure enabled welding work to proceed, unhindered by the adverse effects of moisture and air movement during the construction of aluminium oil storage tanks for I.C.I. at Severnside. The operatives were provided with reasonable working conditions in all weathers whilst at night, internal construction continued with the aid of the floodlighting already placed outside the structure to illuminate the surrounding site.

'VISQUEEN'
Polythene Building Sheet

FURTHER DETAILS of the several methods of using Visqueen for cladding temporary weatherproof structures are contained in the new Technical Bulletin No. 2. For samples, prices and the name of your nearest Visqueen stockist write now to British Visqueen Limited, Six Hills Way, Stevenage, Herts. Telephone Stevenage 1310.

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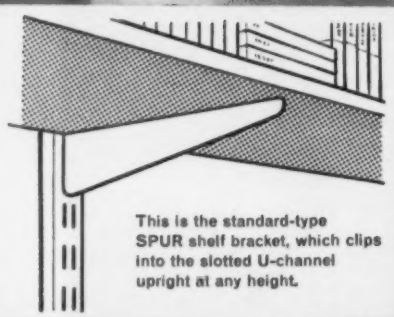
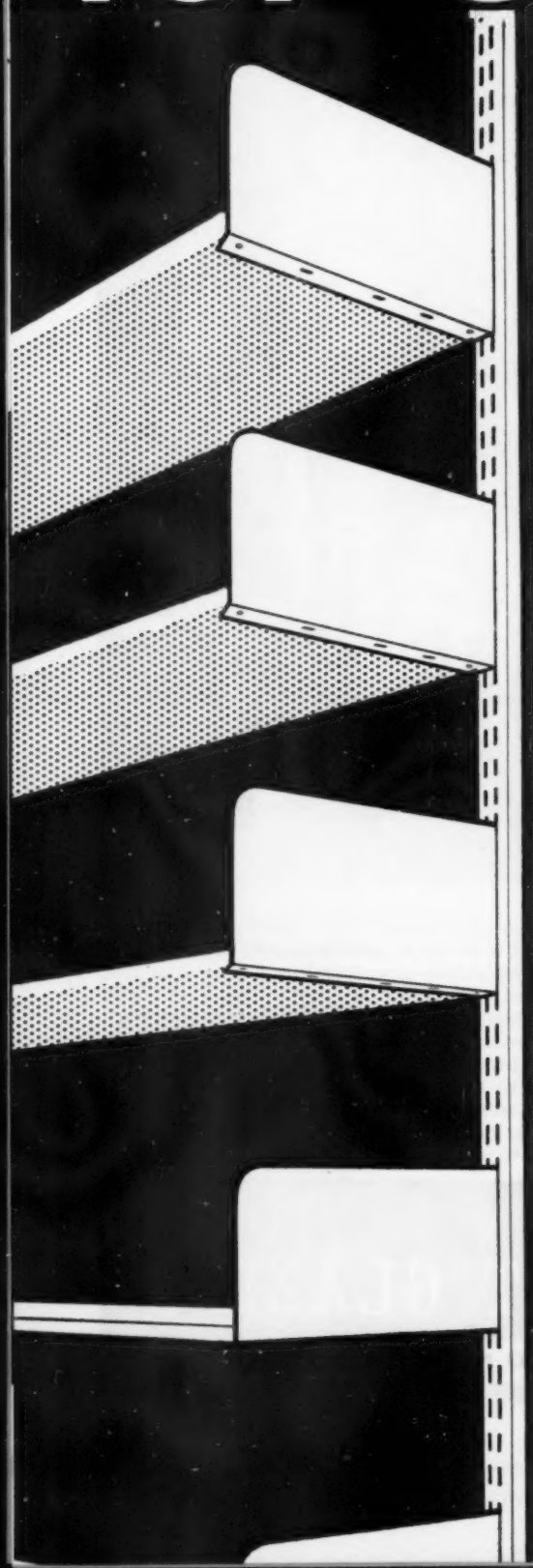


This is the standard-type SPUR shelf bracket, which clips into the slotted U-channel upright at any height.

for Offices



SPUR is today's most versatile shelving system —and the most efficient method of open shelf storage. It consists of precision-made brackets which simply clip into slotted uprights of U-channel steel. When your shelving requirements alter—you simply move the brackets to a new set of slots (as you will see from the drawing of the basic unit).

Spur is good to look at, neat, unobtrusive and strong. It fits superbly into modern decor. It gives you uninterrupted shelf space—and makes the most of all the space you have. Why not give *your* shelving Spur efficiency?

This is what you need

The Spur installation shown in the foreground of the left-hand picture provides a neat and spacious double-sided storage for files, stationery and documents. It comprises: 2 DOUBLE-SIDED UPRIGHTS (95½ in.). 4 FLOOR AND CEILING SOCKETS. 2 SINGLE-SIDED UPRIGHTS (94½ in.) in centre on either side. 20 SHELF ENDS (10½ x 6½ in.) which provide end-pieces for extra security and 10 SPUR 7 in. BRACKETS.

This is what it costs

2 Double-sided upright at 57/6d	£5. 15. 0d
4 Sockets at 10/4d	£2. 1. 4d
2 Single-sided uprights at 21/10d	£2. 3. 8d
20 Shelf-ends at 9/8d	£9. 13. 4d
10 Brackets at 3/0d	£1. 10. 0d

This is just one example of cost for part of a Spur installation. Other layouts can readily be designed to suit your own particular requirements.

TGA 51 17

This is what you do

Ask your ironmonger for further details of the Spur system or write for a fully illustrated booklet 'SPUR—THE PRECISION-BUILT SHELVING SYSTEM' to Savage and Parsons Limited, Watford, Hertfordshire, Telephone: Watford 26071.

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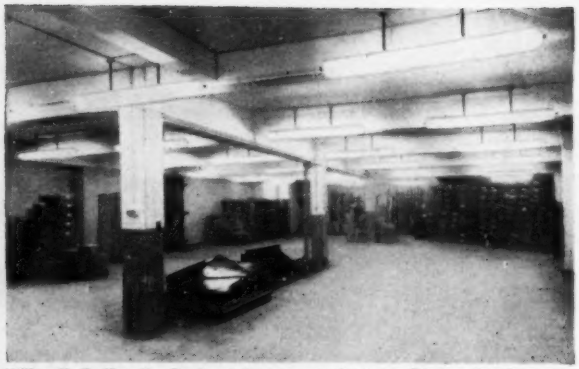
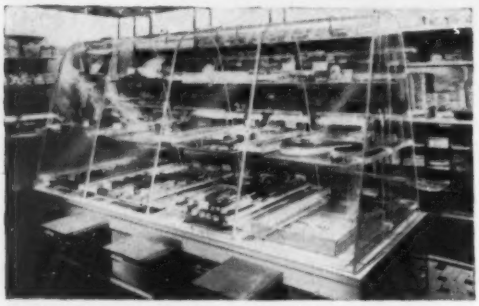
Illuminated sign made from 'Perspex' acrylic sheet by Neorec Neonlit, P.V.B.A. Lange Loboekstraat, Antwerp, Belgium, for a new Supermarket.



"Clenelite" Totally Enclosed Fluorescent Lighting Fittings by Crompton Parkinson Limited., Crompton House, Aldwych, London, W.C.2, with enclosures fabricated from 'Perspex' acrylic sheet by Wokingham Plastics Ltd., Denton Road, Wokingham, installed in the premises of Joseph Travers & Sons Ltd., Spice Mills, London E.1.



Food display cabinet with canopy and drawers made entirely from 'Perspex' acrylic sheet by N.V. Installatie Maatschappij P.M.A. Uiterwijk and Co. of Amsterdam.

'Cleopatra' bath made from 'Perspex' acrylic sheet by P. & S. Plastics Limited, Love Lane Estate, Cirencester.

"Esso", "Caltex" and "Mobil" signs, all made from 'Perspex' acrylic sheet by Colorlux, Denmark.

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- Available in clear or opal sheet and a wide range of attractive colours.
- Can be cut and drilled to suit the job on site.
- Simple shapes can be obtained by inexpensive methods.
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Technical literature on 'Perspex' can be obtained from any I.C.I. Sales Office.

'PERSPEX'

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

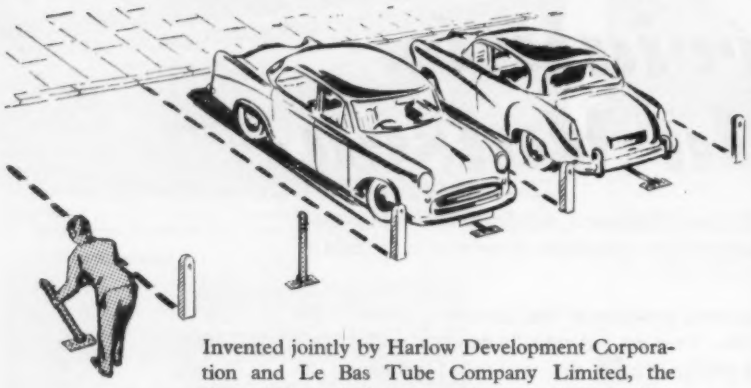
ICI

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

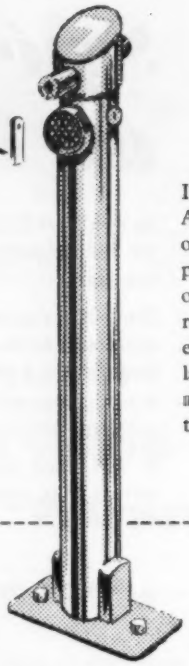
P851

78 domelights made from 'Perspex', 101 sheets of Flat 'Perspex' and 45 sheets of Curved Corrugated 'Perspex' installed on the roof of the Airport Building of 'Brussels National' Belgium, for Regie des Voies Aeriennes.

controlled reservation of parking space with AutopA* car park posts



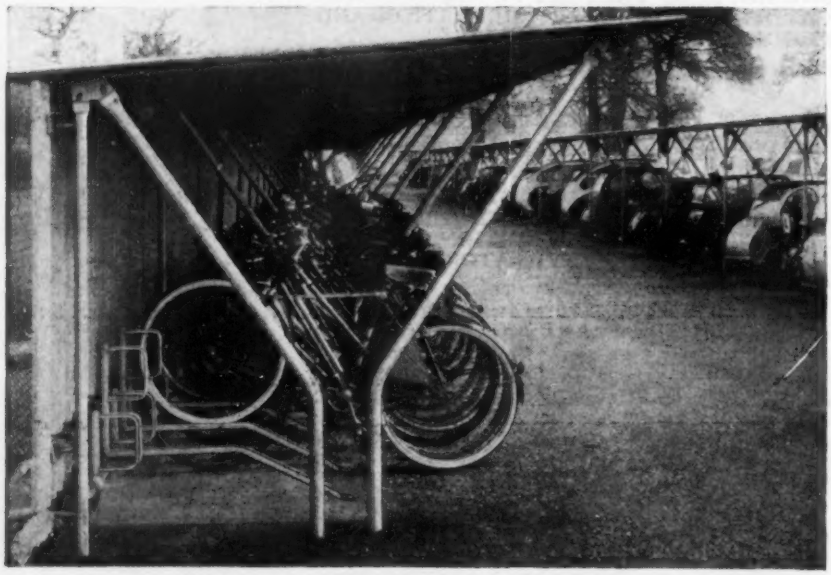
Invented jointly by Harlow Development Corporation and Le Bas Tube Company Limited, the AutopA is a foolproof mechanical device which dispenses with the need for on-the-spot supervision.



In the locked position, the AutopA is a rigid vertical post, obstructing entry to the parking space. A key, held only by the authorised user, releases the locking mechanism enabling the AutopA to be laid down horizontally so that a vehicle can be driven into the reserved space.

AutopA posts and VelopA holders are hot-dip galvanised.

modern bicycle parking and storage with VelopA* bicycle holders



Part of an installation of covered bicycle and motor-cycle storage equipment supplied to Kodak Limited, Stevenage

–supplied separately for fixing to ground, walls, posts or rails, or as complete units, covered or uncovered, for any required number of bicycles.

- **grip tyre only**
- **simple and effective**
- **unobtrusive**
- **easily installed**
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Telephone: MONarch 8822. Telegrams: Lebasco, Avenue, London

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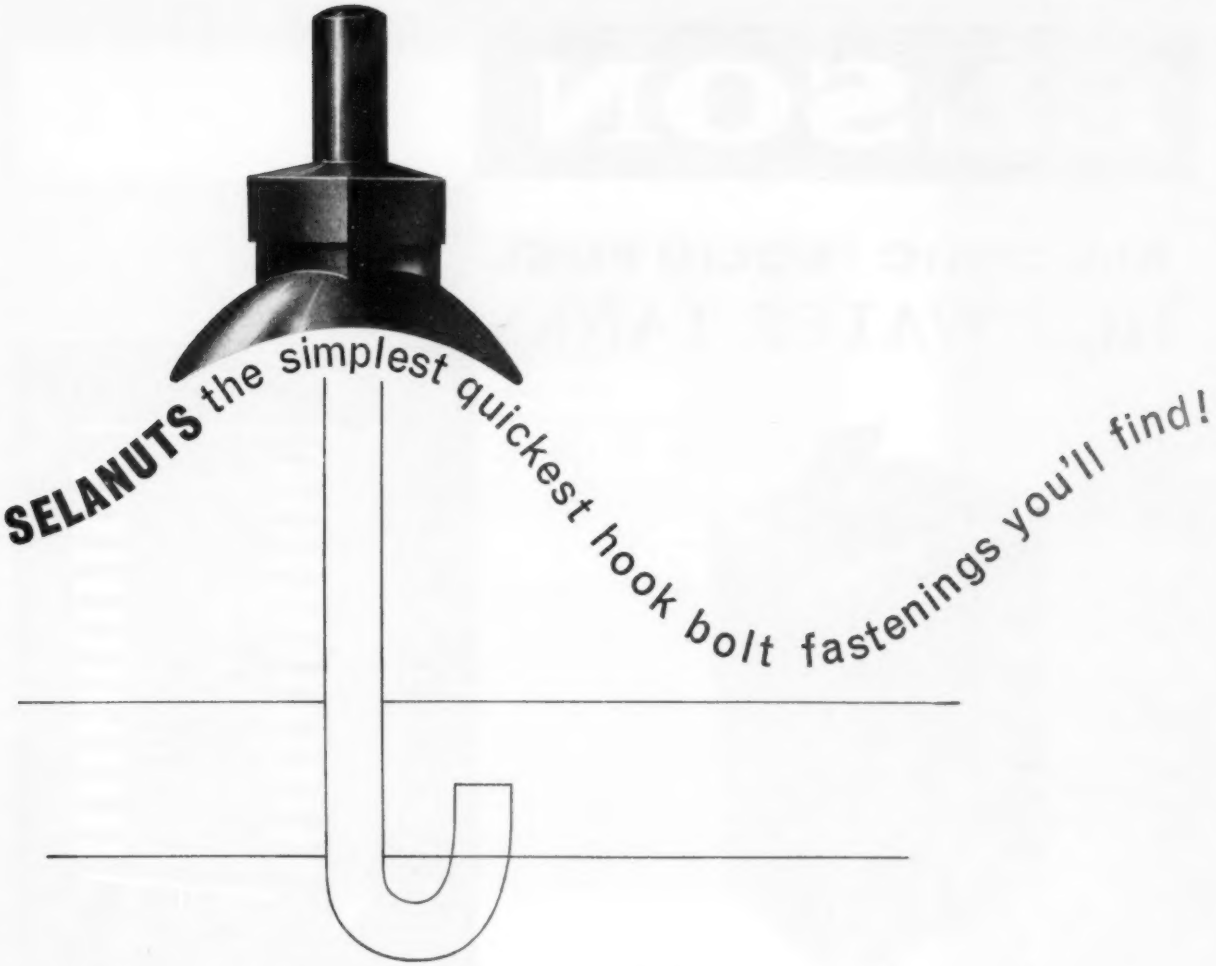

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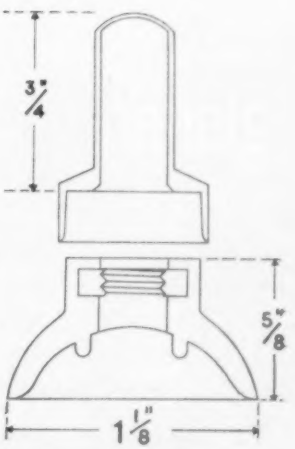

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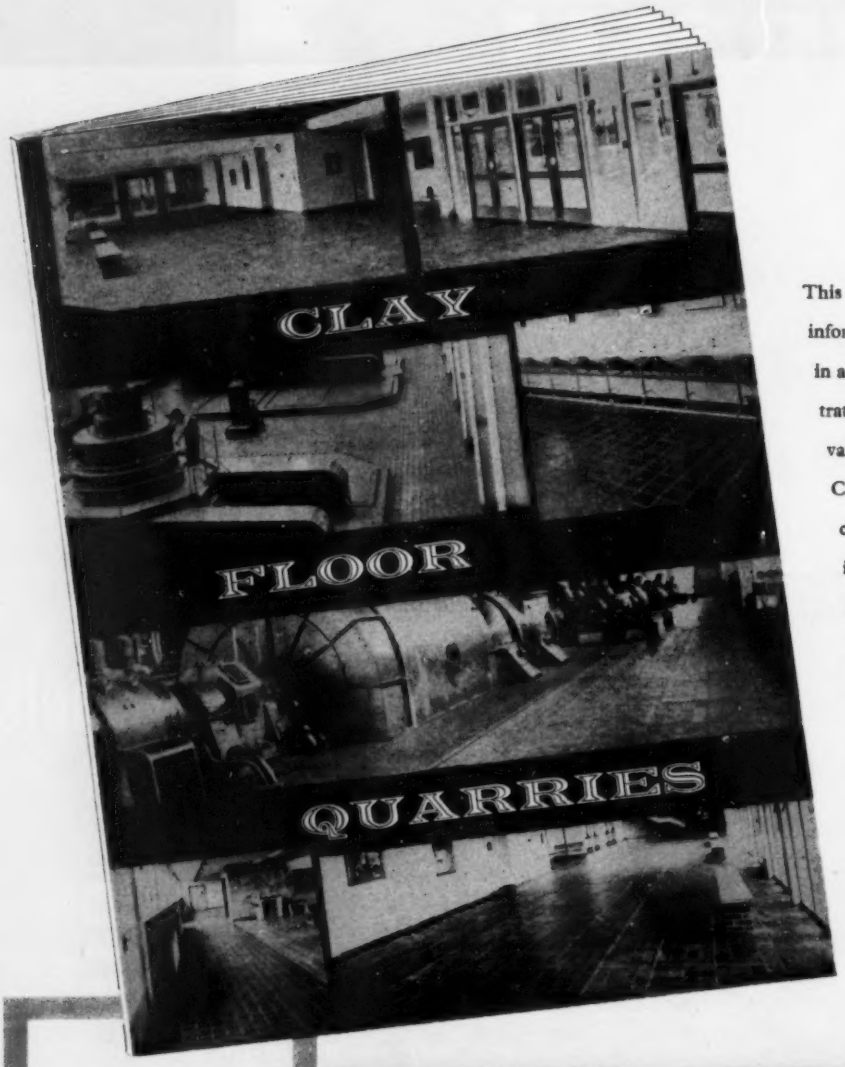

This accurate and informative manual in addition to illustrating in colour various types of Clay Floor Quarries, offers to all concerned with the building trade the latest information and fixing methods conforming to British Standard Specifications. Members of the FQA believe that the Clay Quarry, with it's low installation costs and intense hardness, is becoming increasingly important to those who have the responsibility of building with greater efficiency and stabilising costs. Write now for your free copy of the Floor Quarry manual to our address below.

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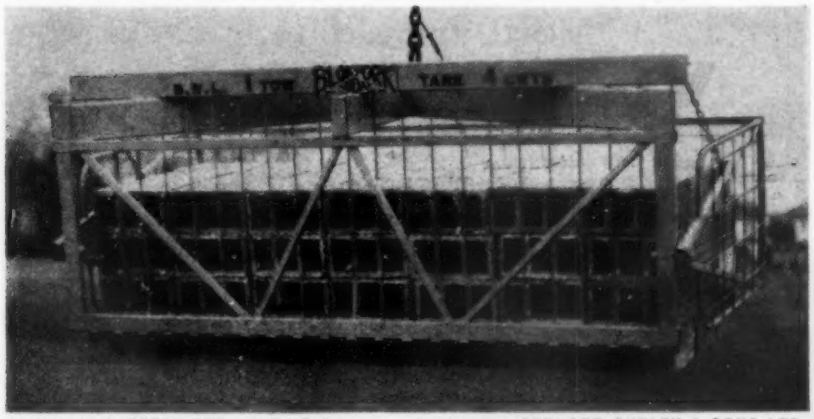

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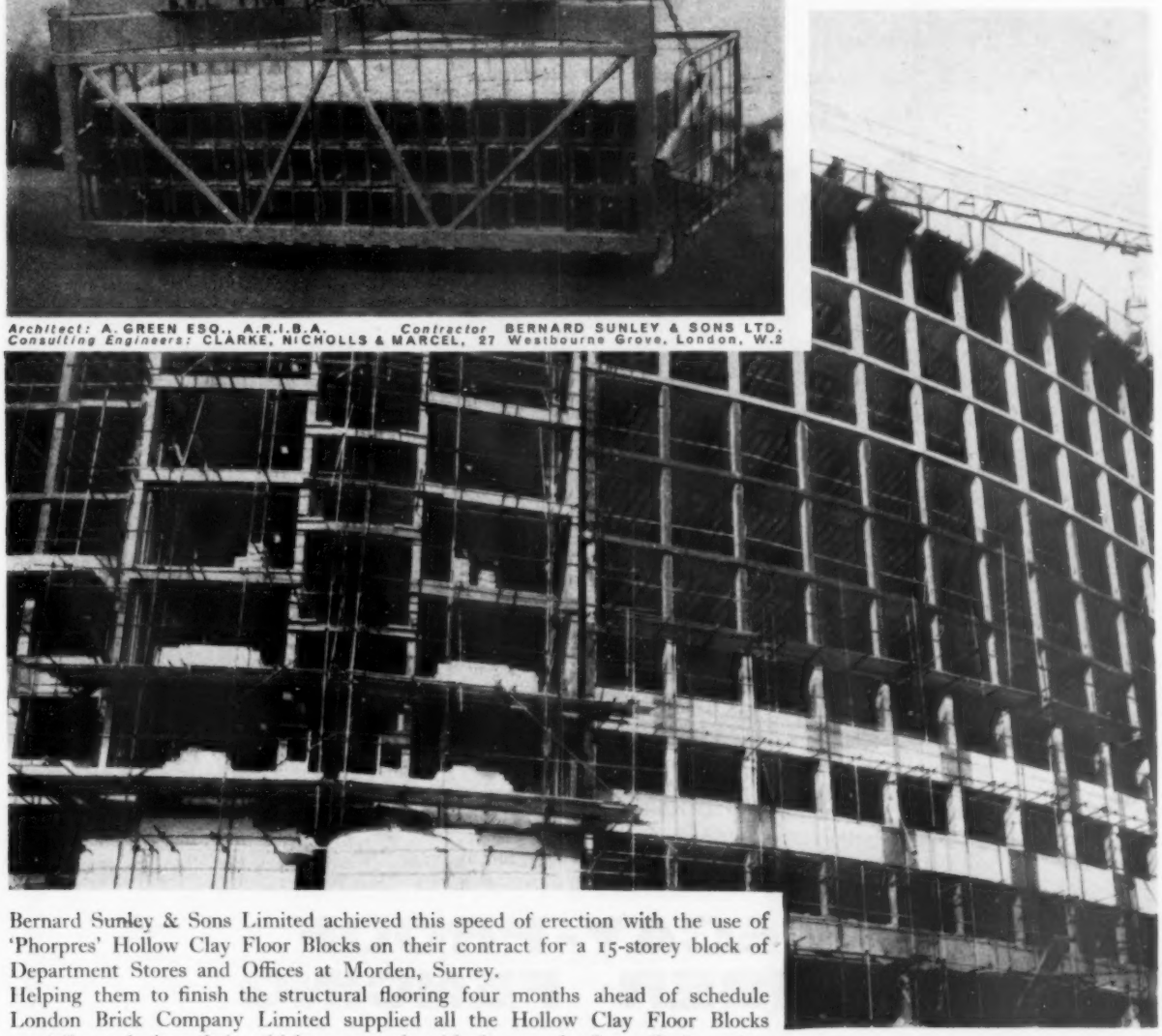

Bernard Sunley & Sons Limited achieved this speed of erection with the use of 'Phorpres' Hollow Clay Floor Blocks on their contract for a 15-storey block of Department Stores and Offices at Morden, Surrey.

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TO HER MAJESTY QUEEN ELIZABETH II
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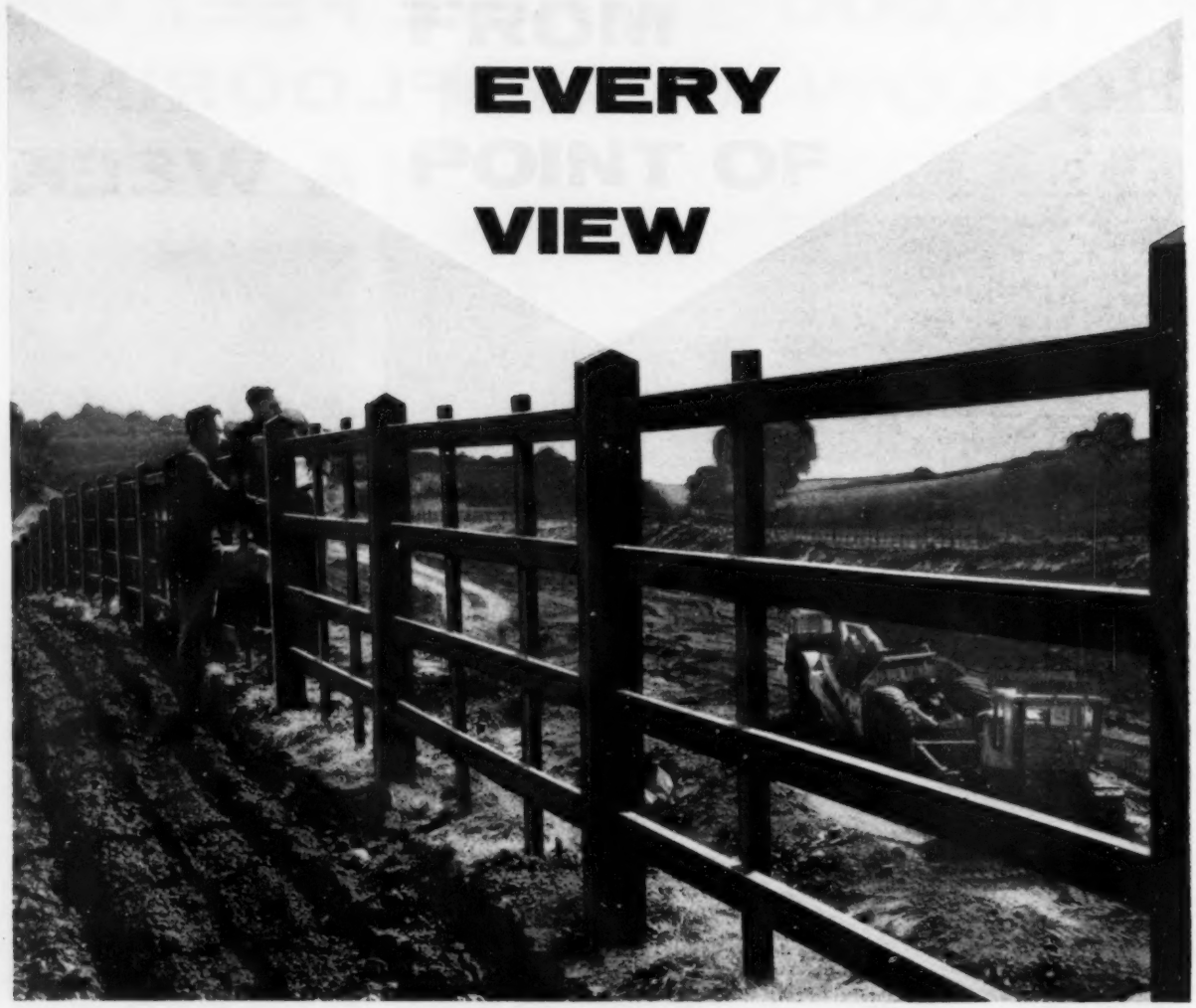

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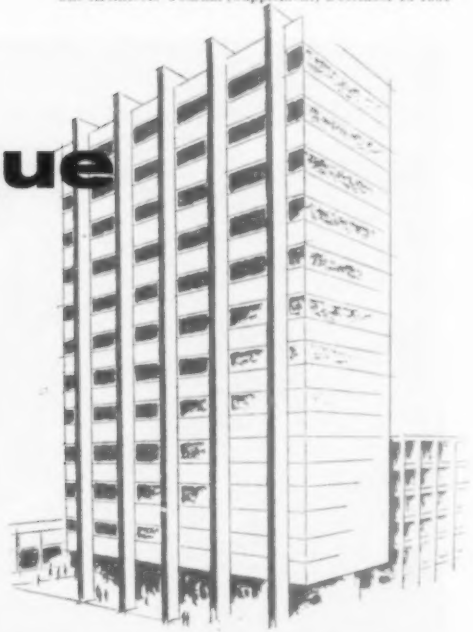

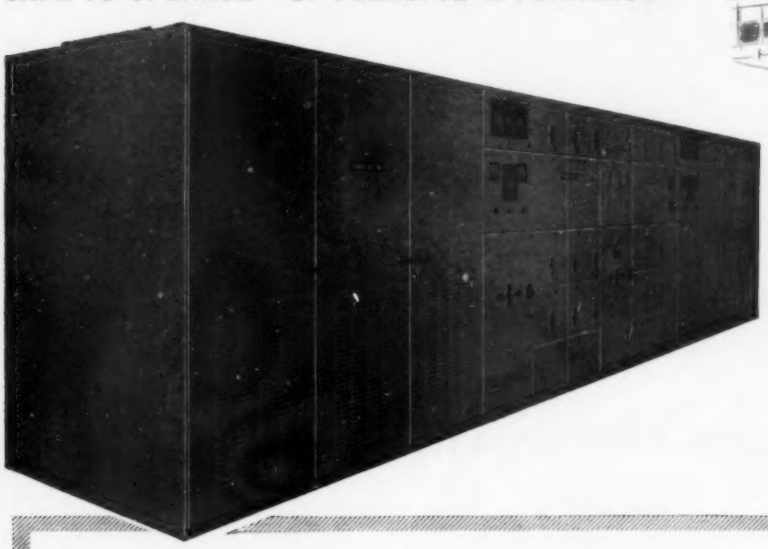

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'ENGLISH ELECTRIC'
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FG.55

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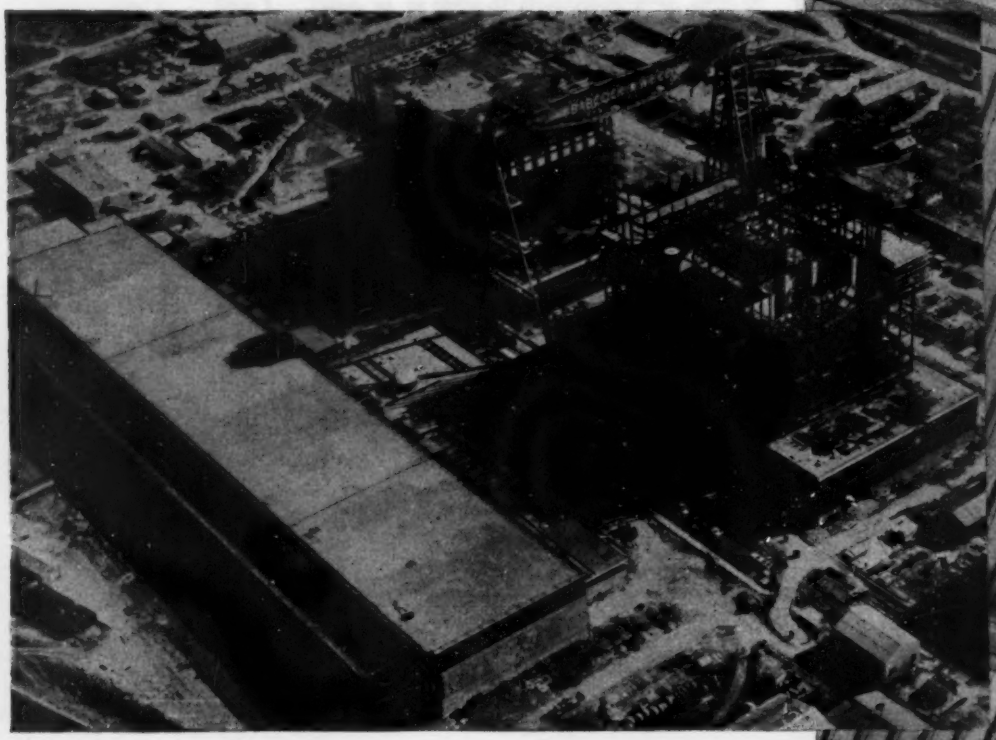

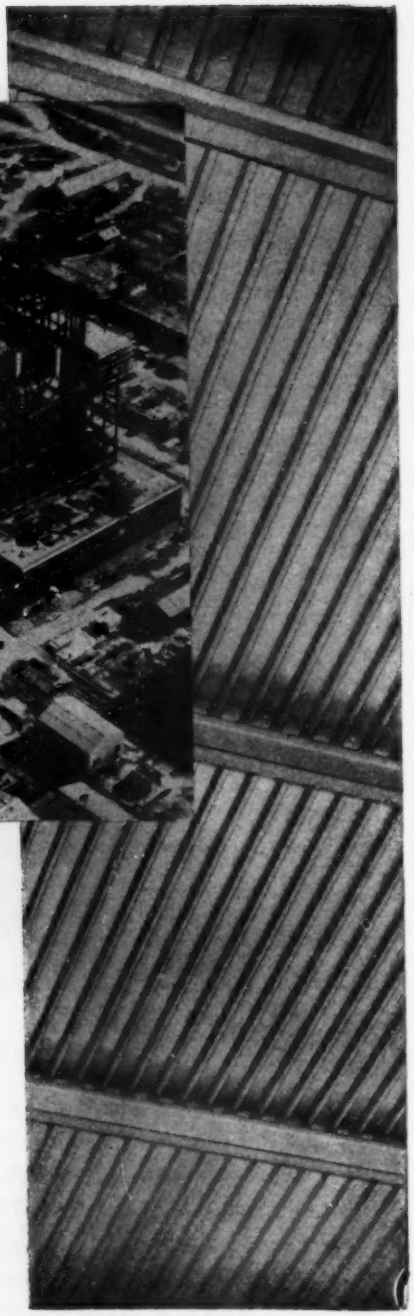

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Over 25,000 square yards of Galvanised Steel 'D' Decking will be used in the roof construction of Hinkley Point Nuclear Power Station.

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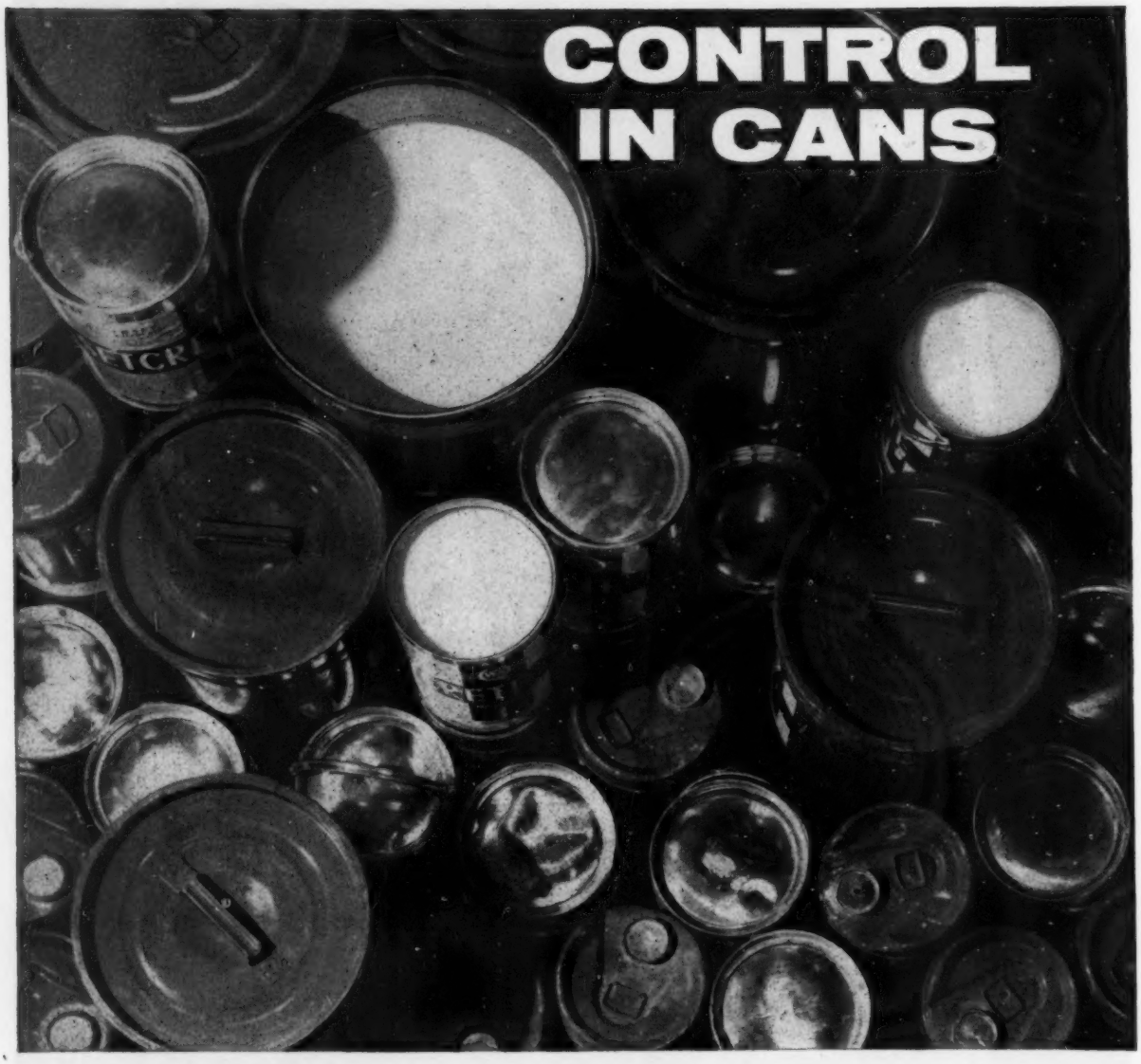

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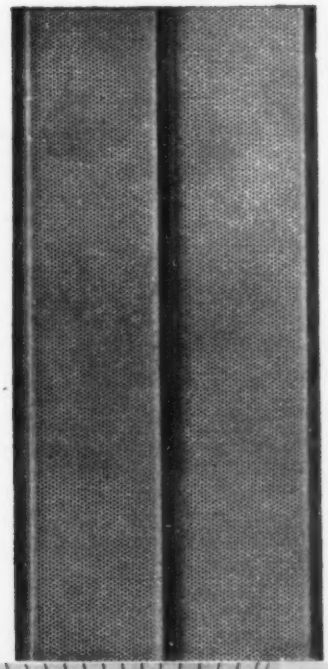

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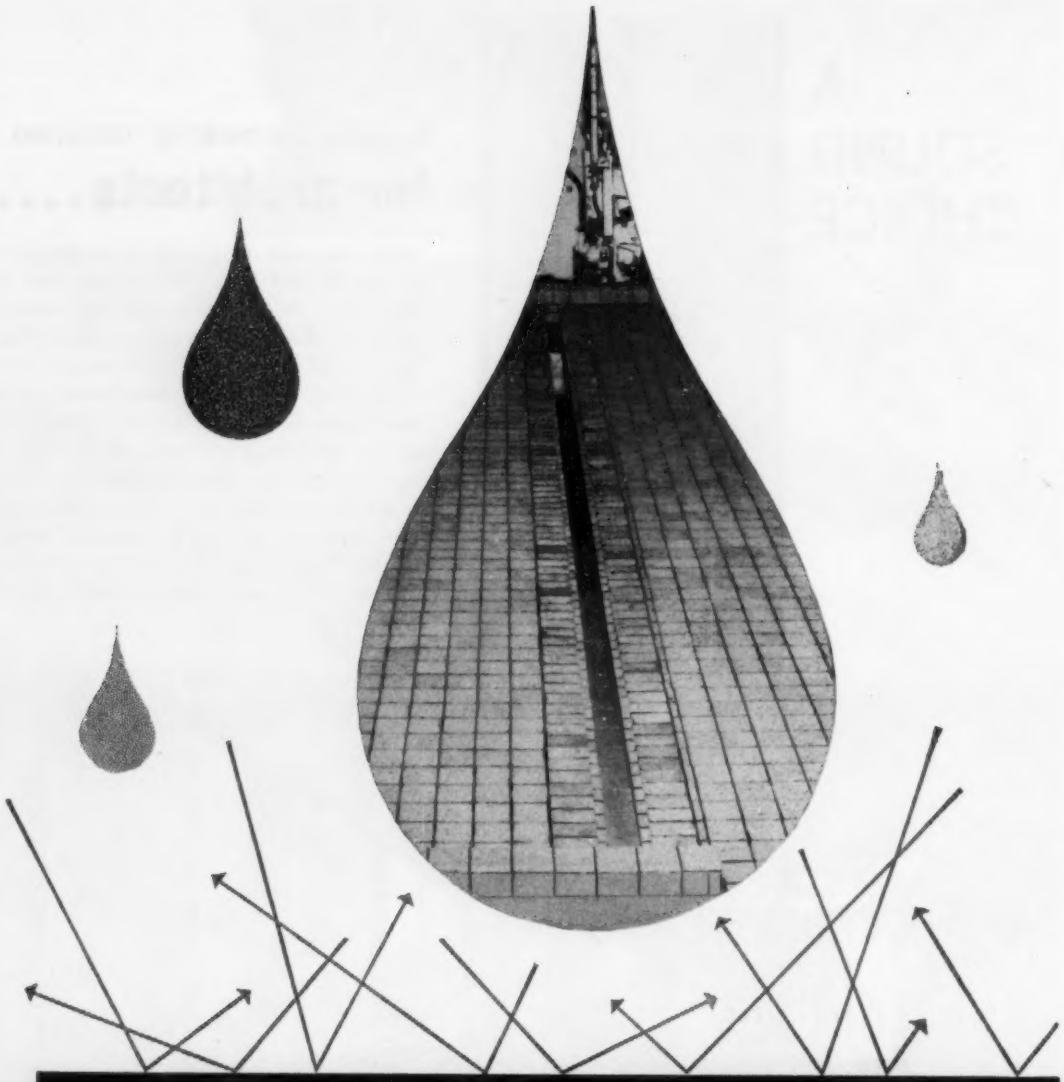

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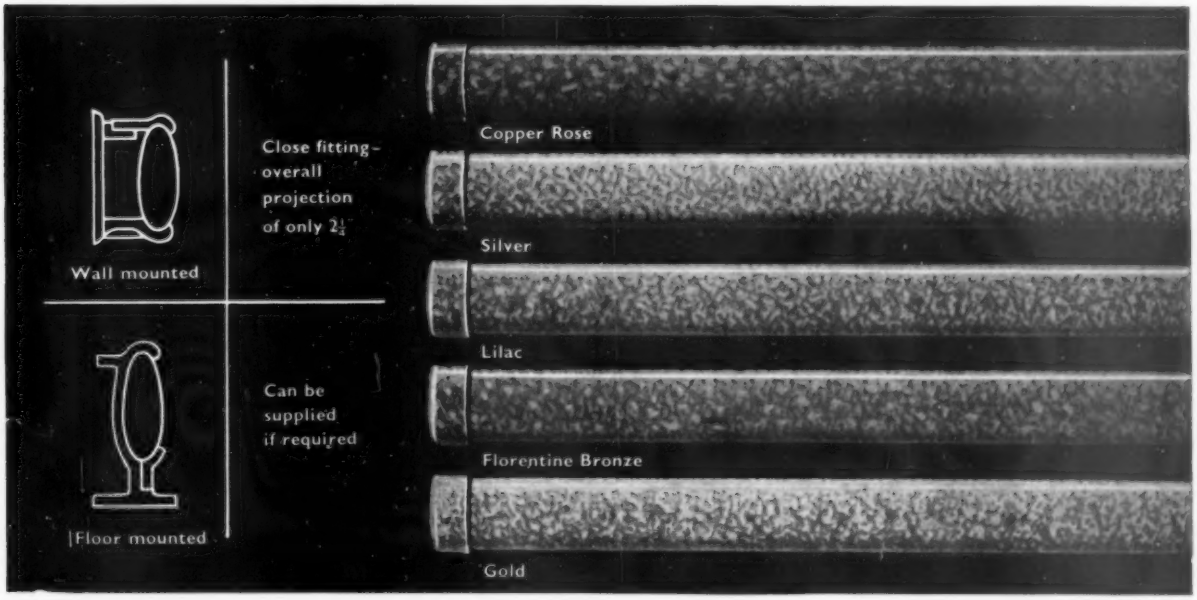

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A well-designed unit with a gilt-finished dust-tight cover mounted on a black base. Standard scale reading is 38°F—82°F but scales 8°F—52°F or 58°F—102°F can be ordered at no extra cost.

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Williamson Crestaline vinyl flooring *was chosen by the Sperry Gyroscope Company for this Super Clean Area in one of their Brentwood factories where Rotorace Gyros for military and civil aircraft are assembled. Crestaline is the ideal flooring for this 'special duty' application because it neither powders nor creates dust when walked on, and it can be butt welded at the joints to form a continuous surface with no cracks to harbour harmful dust particles.*
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Φ37

Williamson give you the pick of the vinyls with *Crestaline* sheet and *Crestalux* tiles

With Crestaline sheet and Crestalux tiles you have a range of vinyls for all flooring purposes . . . not just ordinary vinyls but the pick of the vinyls, unequalled in their price range for their **brilliantly creative colours, distinguished marbled effects, degree of flexibility and smooth, impervious finish.** You also get these added advantages with Crestaline and Crestalux:—

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VINYL FLOORING

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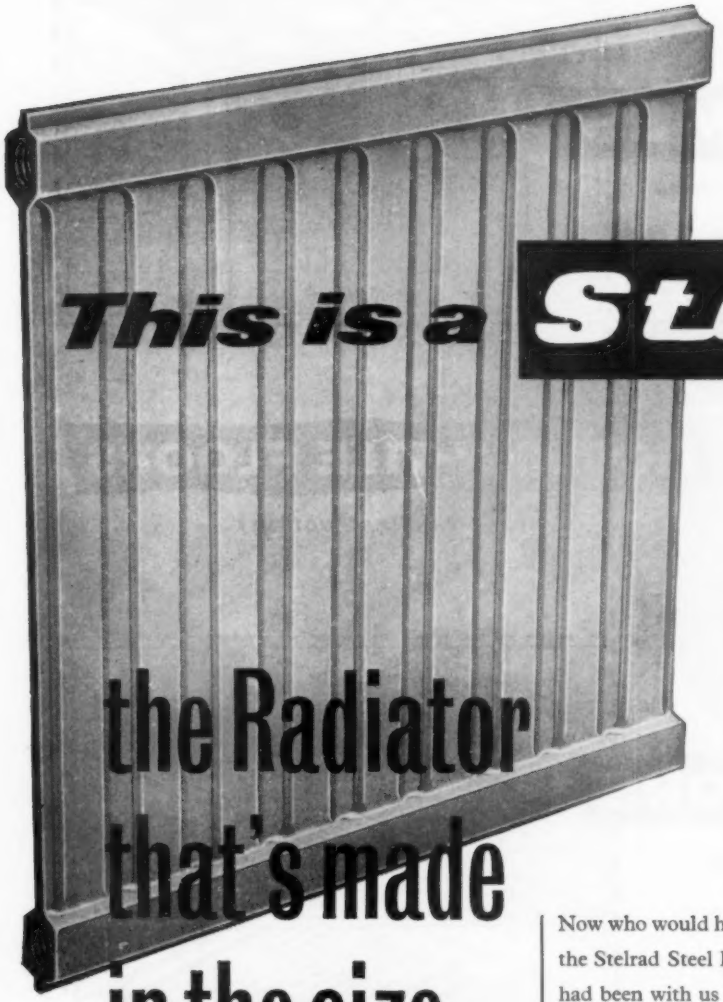

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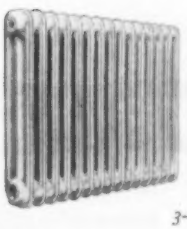
the Radiator that's made in the size you want, and in the shape your client likes

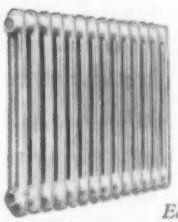
Double Wall

Angle-Wall



3-Column

Now who would have thought the Stelrad Steel Radiator had been with us for nigh on twenty-five years? Why, you can probably remember people telling about it at the time.



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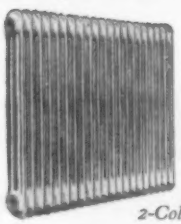
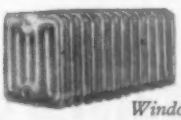


2-Column



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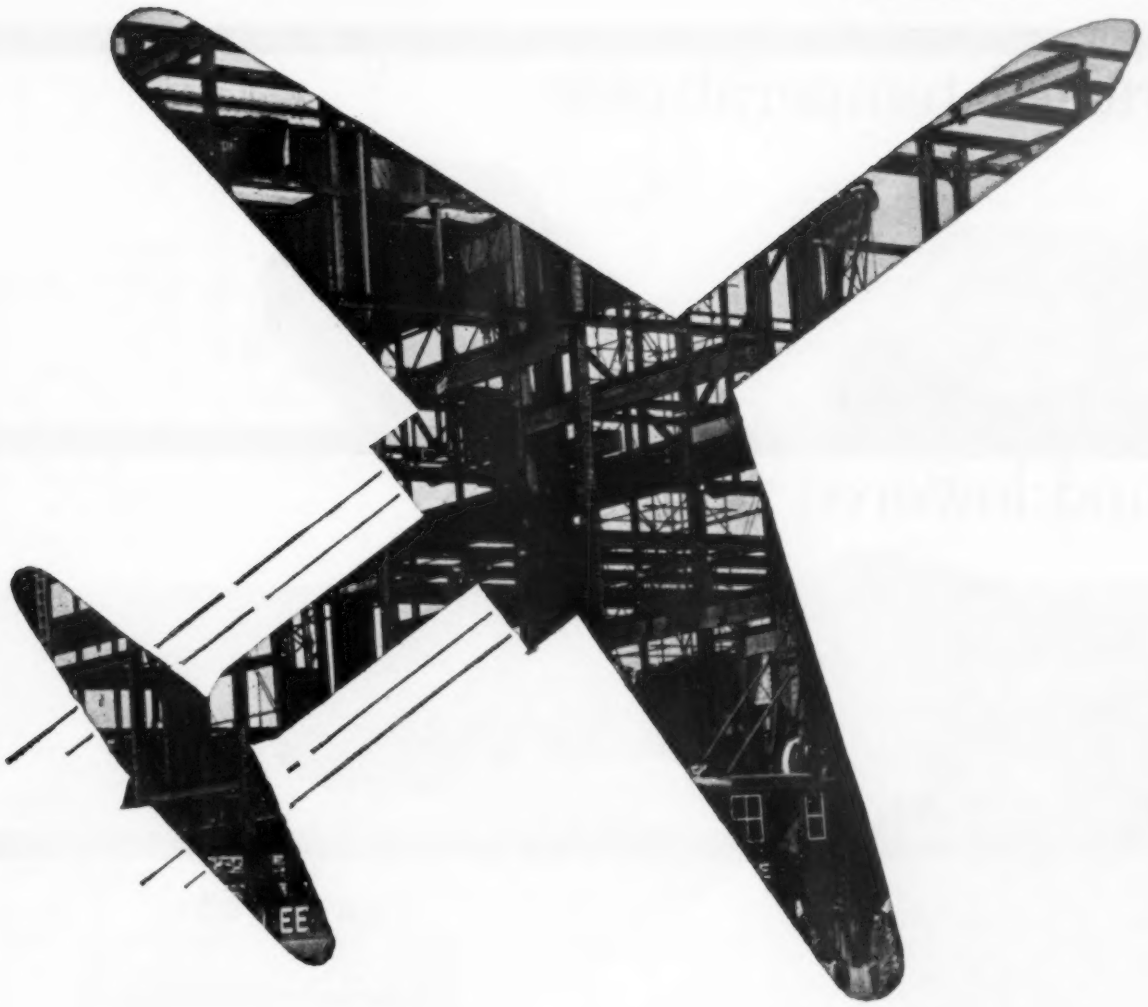

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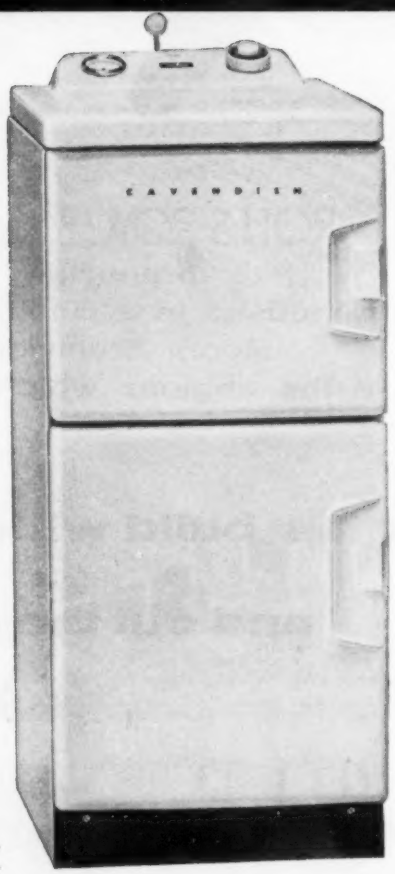

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The Greatly Increasing Use of Gas Warm Air Heating

. . . it emerges that the Gas Industry has more than doubled its sales of central heating and warm air units in the past 12 months, which is indicative of the great advantages which gas offers as a central heating fuel.

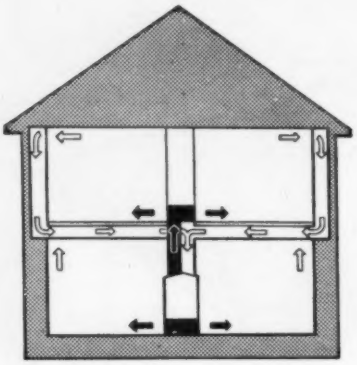
Central heating by warm air is an alternative to hot water central heating.

In this system air is drawn through a suitably placed heat-exchange unit, warmed and impelled by a fan along ducts to grille-outlets in the various rooms, these outlets being individually opened or closed as required. The air is filtered when it is returned to the heater from the rooms.

Warm air is becoming increasingly popular for installation in all types of new property, flats, bungalows and houses. The reason for this popularity is its generally lower capital cost, its exceptional flexibility and speed of heating. The output of heat is controlled by room thermostats; and as gas is quick to respond to changes of temperature it is a 'natural' fuel for such a system, particularly as regular servicing can be obtained for a small annual charge.

Warm air units can also supply a hot-water system either with a single heater serving both an indirect storage cylinder and a fanned water-to-air heat exchanger (a heat exchanger can be installed remote from the heating unit); or by incorporating two separately fired appliances in the same casing and sharing one flue and gas supply, thus making the best use of the flexibility of gas. Alternatively, hot water may be supplied by a separate gas water heater. There are many different methods available, each with its own particular advantages. One may choose either a 'whole-house' or a 'selective' standard of heating and the unit can also be installed in existing properties.

Reference is made below to 'Halcyon', 'Ductair' and 'Heatinaire' which are proprietary ducted warm air systems and to their use with multipoint ('Ascot' and 'Circulyn') gas water heaters.

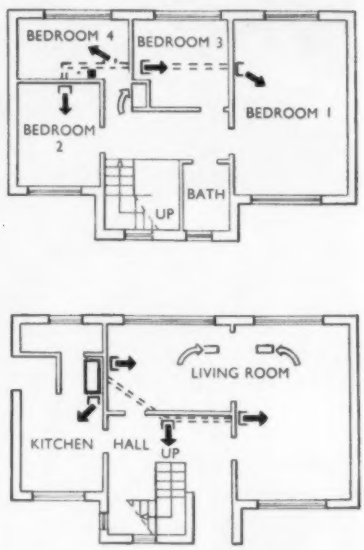


Sectional diagram illustrating warm air heating system with warm air discharging from the inner walls.

Technical notes have been published on gas warm air heating systems in the publication 'Gas Handbook for Architects and Builders' (1960), and other publications are available from the individual Area Gas Boards.

This system of whole house heating by warm air is sufficiently flexible and economic to make it attractive for every type of home. Its nation-wide success will be appreciated from a few examples of current installations.

The Southern Gas Board have installed 'Halcyon' systems both in 32 luxury flats in Lindsay Road and in 6 Corporation flats in Skinner Street, Poole. The latter, originally designed to be all-electric, use 'Ascot' balanced flue water heaters too. In Camberley two 22,000 Btu./h. 'Halcyon' heaters warm a contemporary style Canadian timber-framed house. The Renway Construction Company at Reading are incorporating 'Halcyons' in 200 houses and bungalows, each combined with a gas hot water system. At Bognor Regis 27 bungalows are fitted with the 'Ductair' system, the first phase of a large scale



First floor plan (top) and ground floor plan (bottom) of system illustrated on left.

development. Running costs will vary from about 25/- per week to 35/- per week, spread over the year, depending on the size of the premises, but will include all gas used, not only for heating and hot water but also for cookers, refrigerators, etc.

The South Eastern Gas Board will be supplying two 8-storey blocks of flats containing 64 flats at Wingate Crescent, Croydon, using 'Halcyon' warm air heating with 'Ascot' multipoint water heaters, and an 8-storey block of 32 flats at Mayday Road, Croydon is adopting the same system.

The North Western Gas Board at Preston have equipped two 11-storey blocks of flats with 'Halcyon' heaters and gas circulators for hot water and at Birkenhead a large scheme of four 14-storey, three 11-storey and eight 4-storey blocks of maisonettes will use the 'Halcyon' system with 'Ascot' multipoint gas water heaters. In Scotland 66 'Halcyon' and 'Heatinaire' units

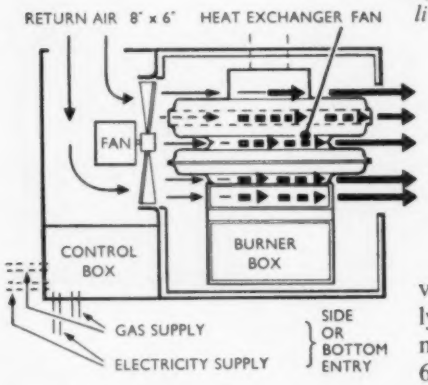


Diagram of 'Ductair' Warm Air Space Heater Unit

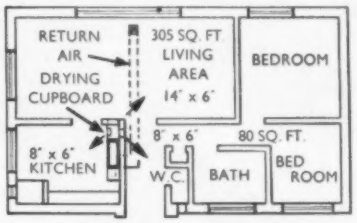
are being used for special purpose cottage type houses in Aberdeen.

Yet a different application is in the South Western Gas Boards' area where in addition to the very many installations in new private development of houses, flats and bungalows, a Regency house has been converted into six flats at Cheltenham, making use of 'Halcyon' heaters and 'Ascot' multipoint heaters for hot water.

The Ideal Home magazine and the R.I.B.A. recently organised a Small House Design Competition and the prize winning three-bedroom house at Windsor contained a 'Halcyon' warm air unit, domestic hot water coming from a 'Circulyn' gas circulator. Wates, builders of Dormy houses, are also using 'Halcyon' heaters.

230 houses and chalet bungalows being built by Hallmark Homes Ltd. at Angmering and Goring use 'Ductair' warm air heating units including a 'Circulyn' gas circulator for hot water.

It is thus apparent that throughout the country architects and builders, by making contact with their Area Gas Board, can see many examples of installations of warm air heating in a wide



Typical ducting layout serving main living rooms in a bungalow.

variety of buildings. Undoubtedly the difficult problem was in multi-storey dwellings more than 6 storeys high where solid fuel is often excluded for delivery and storage reasons. But here, the 'Se-Duct' flue system developed by the South Eastern Gas Board and made available to every other Area Gas Board has enabled the combustion products to be removed safely, cheaply and efficiently.

When one analyses the sales figures for central heating units (either by warm air or small bore low pressure hot water) it emerges that the Gas Industry has more than doubled its sales in the past 12 months, which is indicative of the great advantages which gas offers as a central heating fuel. In a recent survey by the Institution of Heating & Ventilation Engineers—'Central Heating in your Home' 1960—it was seen that when capital and running costs were compounded over a five-year period, gas turned out to be cheaper than kerosene for the small popular house and highly competitive with solid fuel.

The advantage of gas is that not only is it smokeless, thus complying with the Clean Air Act, but gas is always 'on tap' and by means of a clock control it can be turned on and off as required, giving complete flexibility to the user—for there is a wide spread in heating requirements from one household to another due to different family living habits, economic considerations and the use of supplementary appliances. In service and in performance gas is the perfect fuel for central heating and as most Area Gas Boards are offering attractive bulk tariff terms, this pre-eminent domestic fuel is obtainable at a competitive price. In fact, field tests have established that with present day tariffs (1961) warm air heating costs from 11/3 to 16/3 per average week, which is highly competitive with other fuels in relation to the level of service offered.

Indeed, the increase in gas sales over the last financial year to a record peak of gas usage in the U.K. has been attributed largely to the popularity of gas as a central heating fuel.

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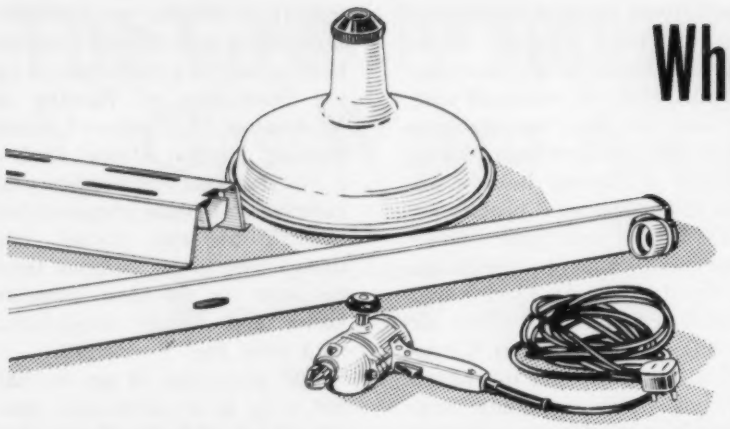

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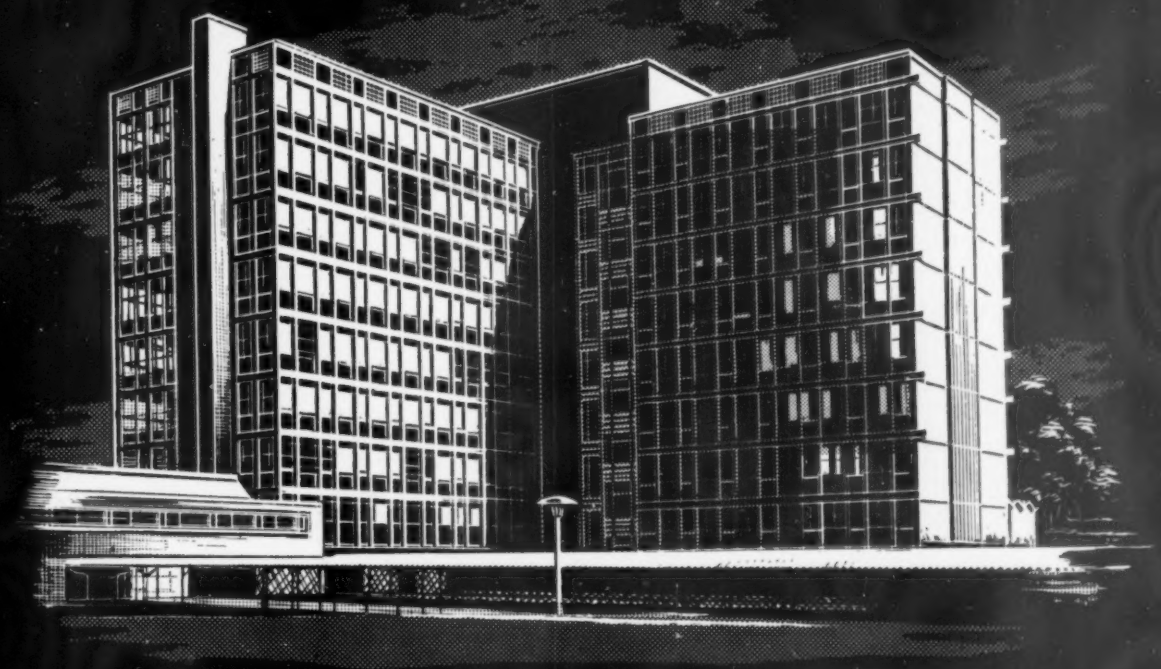

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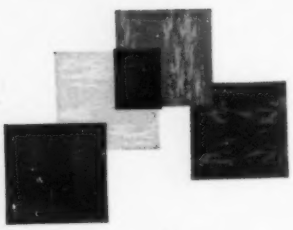

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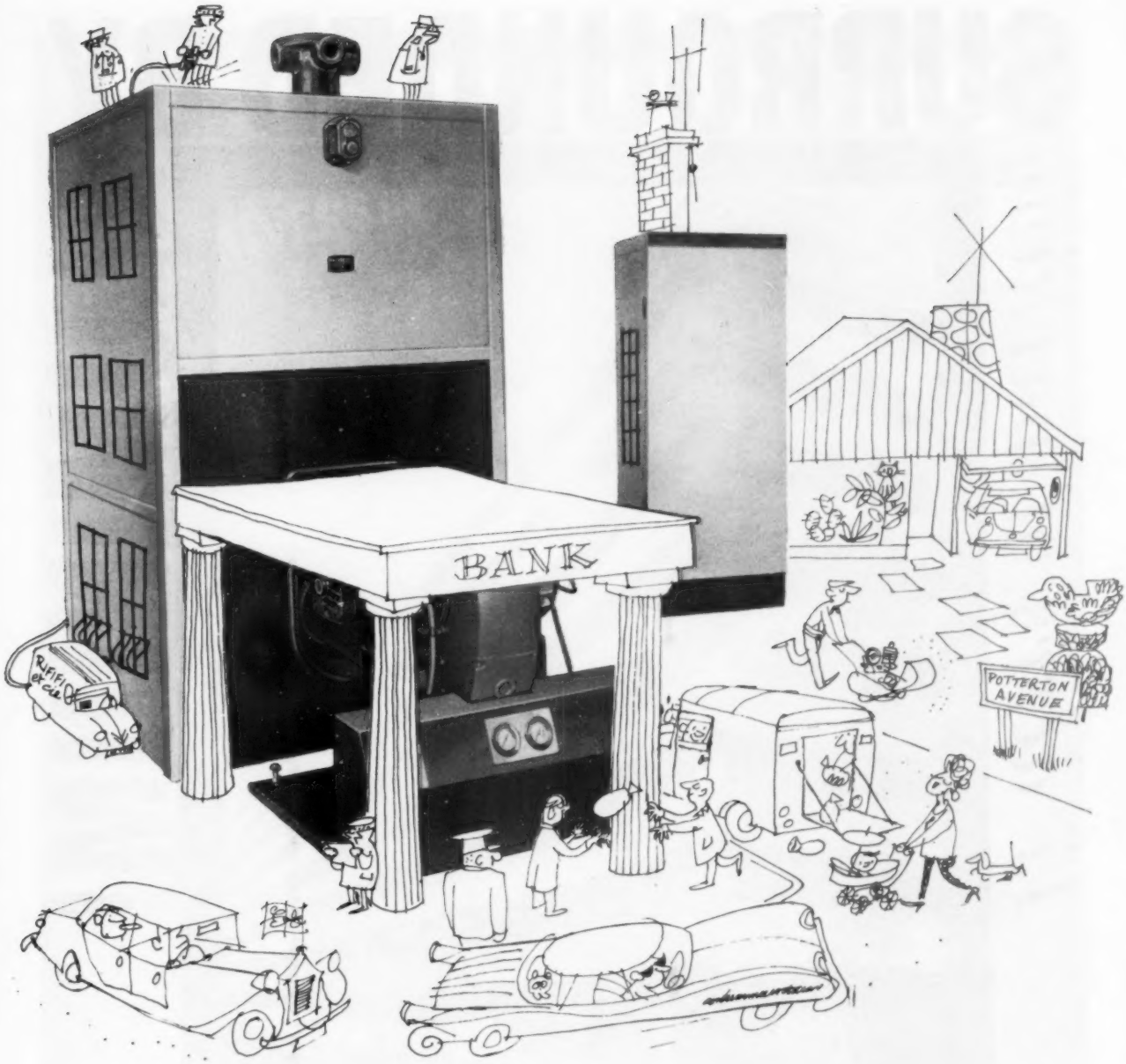

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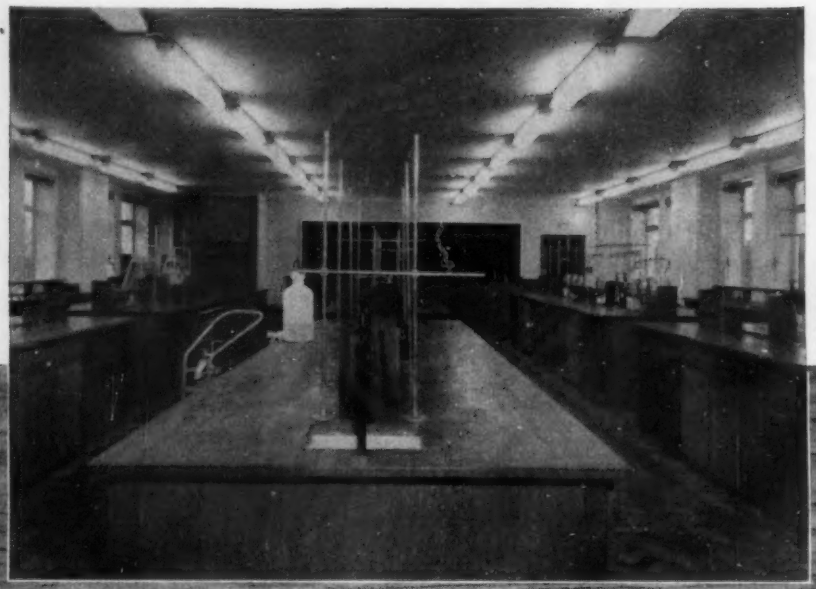

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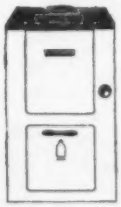

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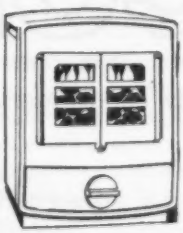

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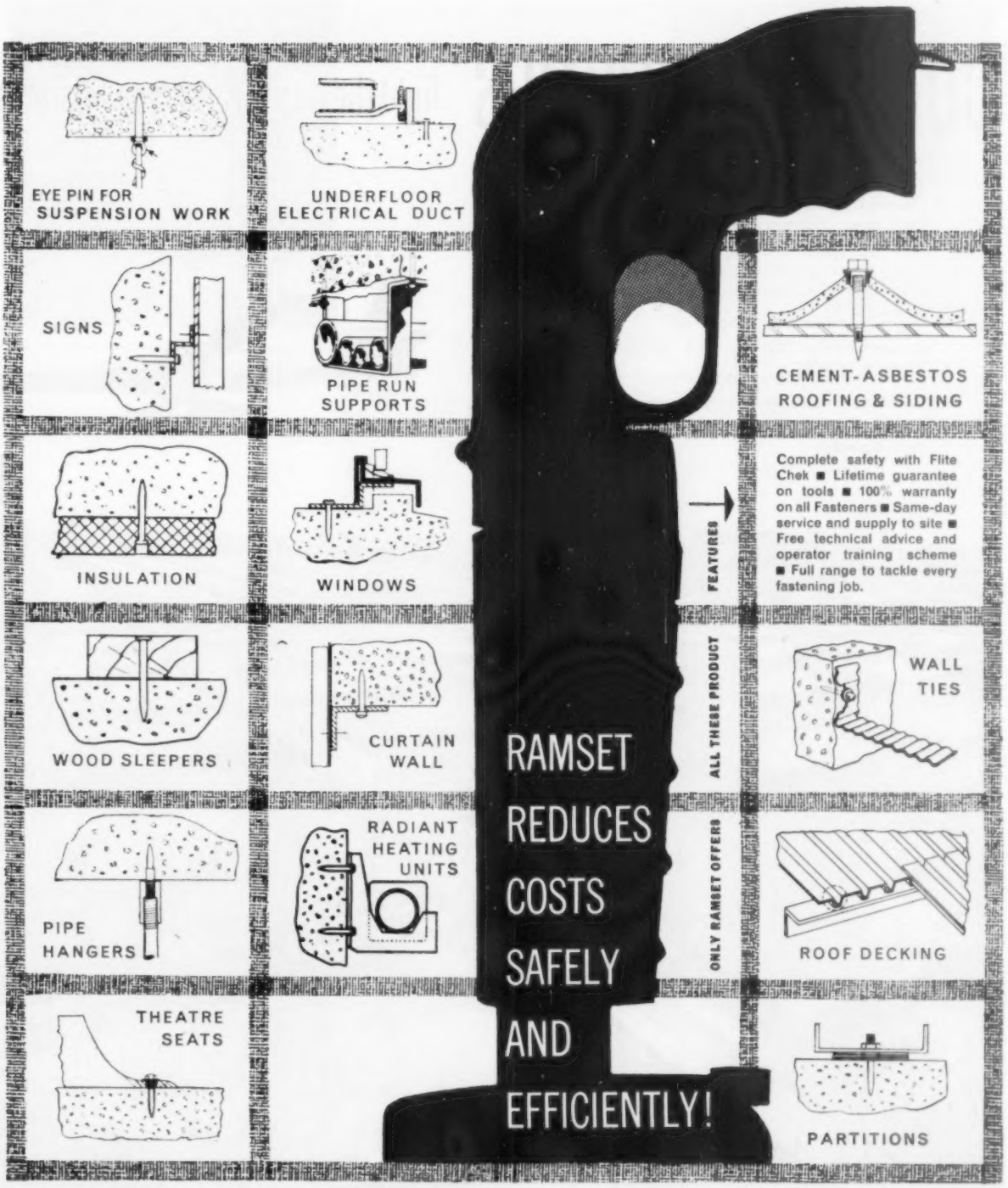

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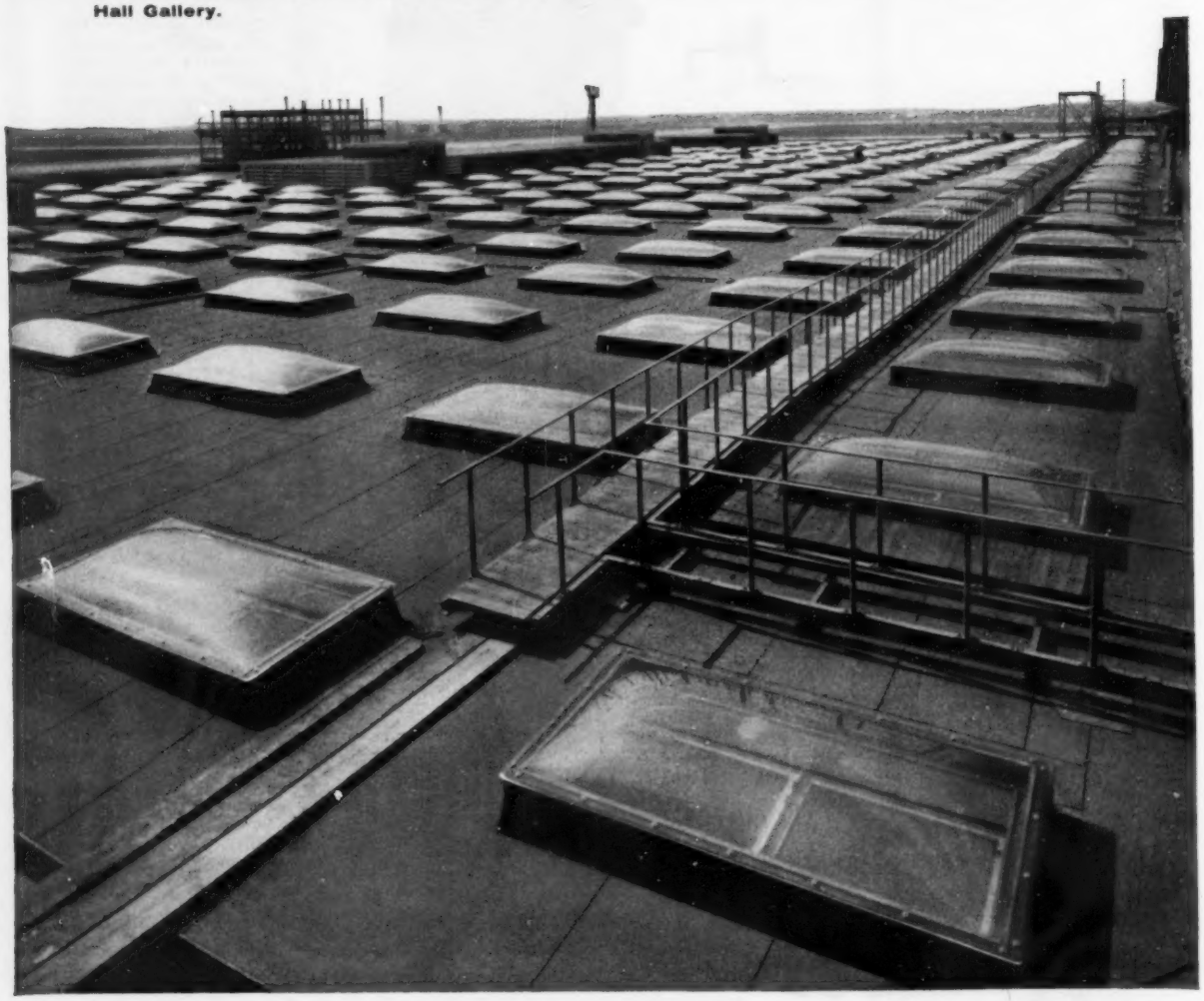

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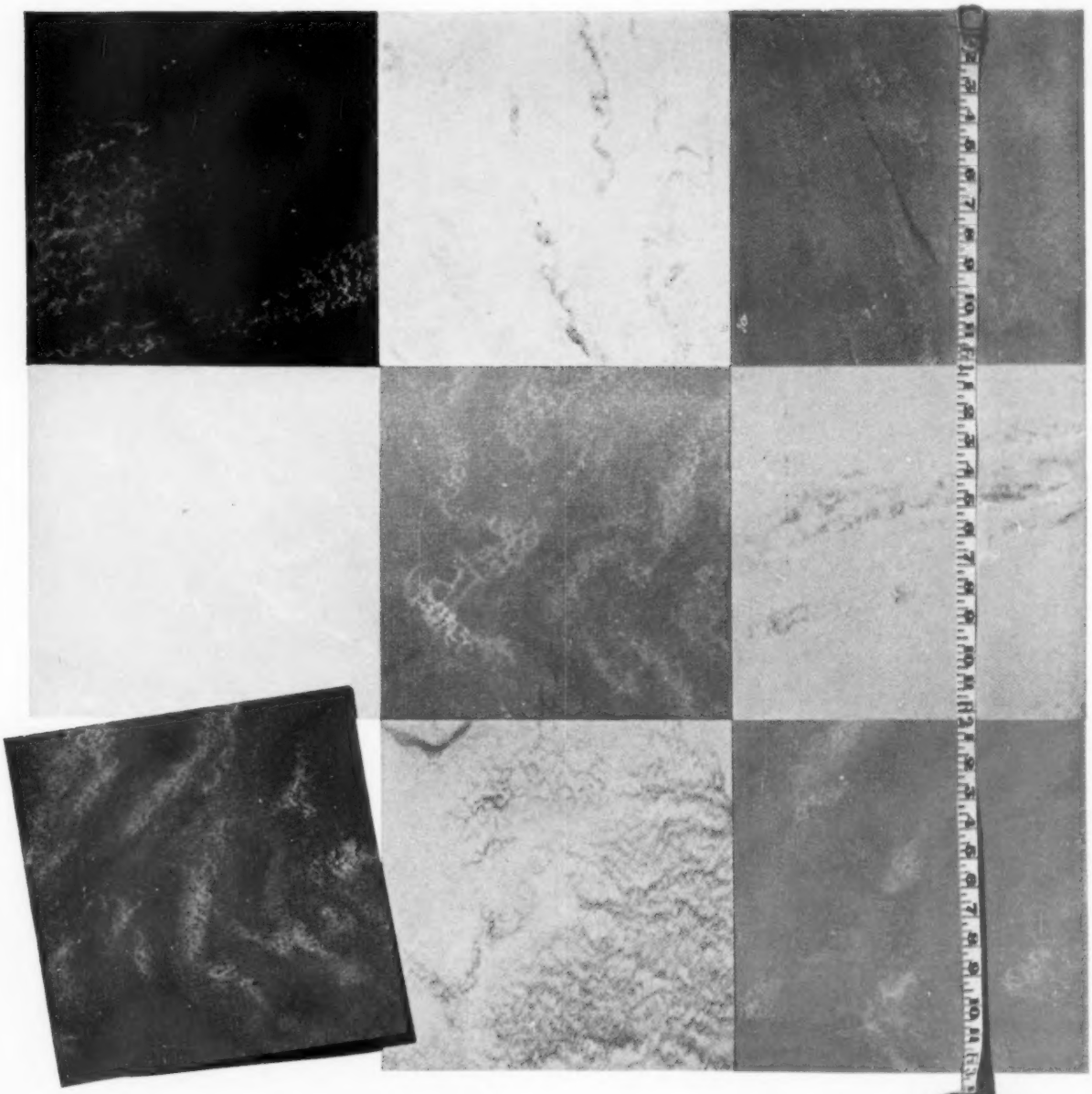

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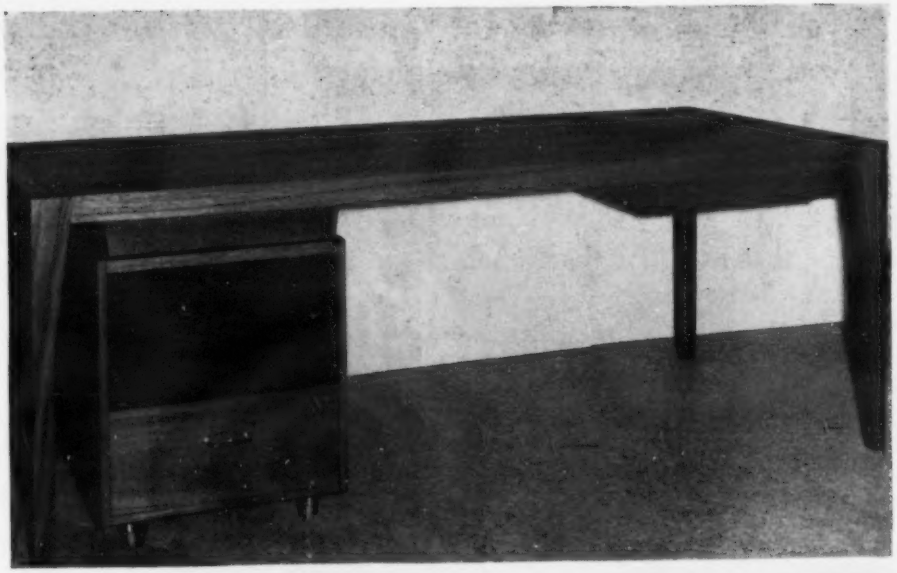
NOT QUITE ARCHITECTURE

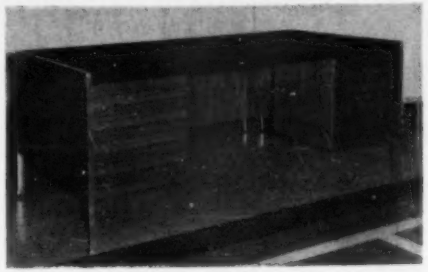
Fountain economics

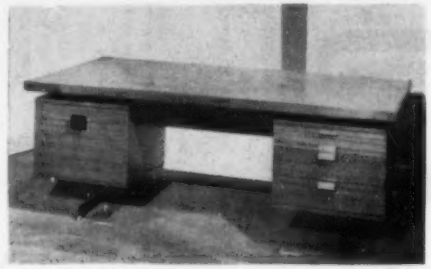
There are several public fountains in the city of Hull, but people only throw money into one of them.
The Plater Research Station has carried out a project aimed at finding out what design methods should be used to ensure such income. Preliminary investigations revealed eight fountains:
(1, 2) Sited on residential avenues and pimpled with Keep Left signs, these fountains originally stood in the middle of main roads until the coming of the trolleybus. They have a greenish Betjemanesque charm but the bowls are now filled with municipal earth and flowers and whether they are strictly fountains is open to question. No money is thrown.
(3) The largest of all, this pre-war two-tier rose bowl, is in the city centre, operating spasmodically. Royal visits, the termination of some hostilities and the ceremonial blessing of a new fountain represent the degree of importance required. The edifice rests on piled foundations, a normal precaution in a city built on sludge. The pavement has subsided, differentially but peacefully, and water is visible to a normal male adult only if he stands on a high bit.
(4) On the main axis of Queen's Gardens, remodelled by the celebrated F. Gibberd, stands a climactic pool, the backcloth of which is a relief by sculptor R. Adams; the theme of this is "sea forms"—reactionary local thought opines, unkindly, that he has portrayed chips instead of fish. Nevertheless, water spurts

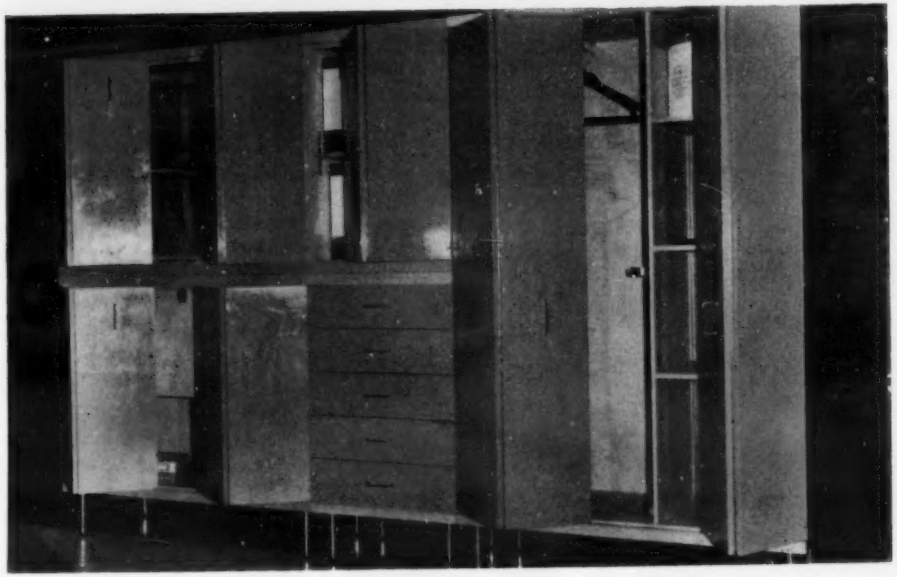
Office furniture

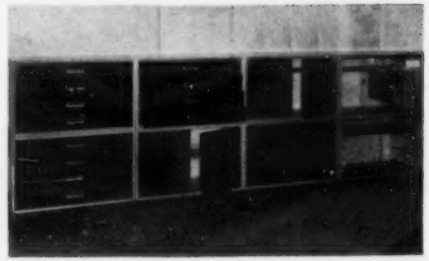
The Timber Development Association announces this week the results of the second of its series of two-stage office furniture competitions. Top left is the first-prize winning (£200) manager's desk (designers: Ditte and Adrian Heath (architect) and Ole Buhl; manufacturer Ernst Jensen, of Denmark) with teak framing and veneer. A variety of different trays and drawers can be fitted in the usefully separate storage unit. Joint second prizes of £100 each went to T. Karen (Manufacturer, G. W. Evans) and P. J. Metcalfe, C. N. Berry and D. G. Copeland (manufacturer, Harris Lebus) for the desks below left and right. The £150 prize-winning chair, bottom centre, by R. Milliner (manufacturer, Esavian Works) was the best of a poor entry. The first prize of £200 for office storage units went to Yorke, Rosenberg and Mardall (manufacturer, Bath Cabinet Makers) for the design bottom left. (This team won the desk prize in the last TDA competition.) A second prize of £100 was awarded to J. Willis (manufacturer H. S. Swan), for the design bottom right. Assessors: Professor Robert H. Matthew; Professor R. D. Russell, principal, RCA school of furniture design; O. G. Pickard, principal Ealing Technical College; Colin Boyne, editor, AJ; and S. N. Abbott and M. Carson of the Office Appliance and Business Equipment Trades Association.











gaily from the panel into the mosaic-lined pool. Following some nominal contributions during, and immediately after, the opening ceremony, a sharp decline in revenue has set in.

(5, 6) The garden layout is formal and therefore has a cross axis at each end of which is a fountain, smaller than (4) and deficient in applied art. There is clear evidence that pond-life is intended.

(7) In the centre of the gardens a small pool, in which children are said to paddle on sunlit Sundays, contained accidental vegetation and more pennies than would normally be anticipated from inefficient juvenile pockets. However, the subcommittee responsible for fountain revenue does not consider these contributions important enough to warrant official recognition.

(8) The golden waters are on one corner of a cross-roads in the middle of the new shopping centre. Standing on a small podium, surrounded by uncomfortable seats, liberally enhanced with vegetation by the ubiquitous parks department, annually adorned with Yuletide fairy lights, the fountain motivates charitable feelings sufficient to justify the committee previously referred to, and to alleviate partially the joylessness of some of the old people who so consistently get lost in the rush when the Affluent Society soup kitchen opens its doors. In considering the material success of this fountain, social implications are significant. Its site forms a natural oasis in a barren desert of . . . but this is another side-issue. It is ideally-placed "under-the-clock" and without letting romanticism blur the objectivity essential to research many of the projected coins must have been accompanied by a wish. Psychology, too, is involved; the podium, approached, must be stepped on (obsession); the money, observed, must be counted (wish fulfilment); the observer, conscious of passers-by must contribute (guilt complex). Traditionalists may sneer at such a theory but believe me, Jack, I know.

Conclusions

These are, for the most part, negative. It is clear that money will not be thrown where:

(a) The water is invisible (3) or non-existent (1 and 2). The contributor must see something for his money.

(b) There must be no competitive function, *eg* art (4), vegetation (5 and 6) or paddling (7). It may well be that ratepayers, seeing a fountain with no function feel the necessity to give it one.

Whether designers should feel it obligatory to make fountains into profit-making concerns is doubtful; it would be pleasant to think that fountains occupy a special, if lonely, position beyond the tentacles of commercial exploitation. The question, raised in some quarters, of a scale of commission for the profession where such projects are involved has not been considered because of the ethical implications.

ALAN PLATER

The Editors

THE HOUSING CRISIS

In terms of housing, this nation faces a crisis. As L. Needleman points out,* our stock of houses is one of the oldest in Europe. To demolish all houses built before 1880 by 1980 (assuming that most houses over 100 years old are obsolete) would need a demolition rate of 200,000 a year. (The current rate of slum demolition is 60-70,000 a year.) But in terms of heat insulation, heating, garaging, plumbing, and the total environment created, most houses up to the 1920s (apart from Georgian terraces and country houses and cottages restored by the wealthy) are not fit to live in by modern standards.

Post-war housing shows a steady improvement except in one vital feature, floor-space, which has actually gone down in recent years. The need at last to raise our standards has been recognised by the Morris committee in its excellent report† to the Ministry of Housing and Local Government. Its recommendations, which every thinking person will wholeheartedly commend to the Ministry for adoption, emphasise the point that we are building obsolescence into our houses at present. If we are not to make more trouble for ourselves in the future we must build to a higher standard which will not be out of date so quickly.

Any pleasure derived from this report, however, is damped by Mr. Needleman, who, assuming that a man spends no more than one quarter of his income on housing himself, has discovered that only 9 per cent of British families could afford to buy, and 23 per cent to rent, a three bedroom house costing £2,500.

So we are faced with a situation of needing to demolish more houses, and to build more houses (probably 80 per cent more than our present rate of 260,000 houses a year) of a higher quality at the same, or preferably a lower, price.

What chance is there? Well the first ray of hope is also announced this week (page 1153). J. L. Womersley, Sheffield's city architect, with J. R. Sheridan-Shedden of Leeds and D. C. H. Jenkin of Hull (formerly head of the LCC's general division) have formed the first housing consortium, a Yorkshire Development Group on the lines proved so successful in school building by CLASP. The aims are very similar: to develop new systems of building based on factory production; with long term programmes to facilitate bulk purchases, and to allow production continuity to the manufacturers so that costs can be reduced. The first step, however, and this is important, is to rationalise traditional design through developing a range of standard fittings and building components.

Here is a lesson for all local authorities. They should combine forthwith into large groups, discover (with Ministerial advice) which housing designs and programmes have proved success-

* A long term view of housing. The National Institute Economic Review. November 1961. 8s 6d.

† See last week's AJ and pages 1155 to 1158 this week.

ful, financially, functionally, and aesthetically, and then enter into large and long production runs.

There are far too many inconsequential variations in housing and flat designs today. Architects, public and private, over large, multi-county regions, should standardise designs to a limited number of proved quality and give builders and manufacturers programmes and orders of a size to enable costs to be radically reduced.

Architects and councillors will protest that the results will be monotonous. They need be no more monotonous than Georgian London, or Bath or Edinburgh. If the elements are good, the architects' skill in disposing them will ensure a varied and interesting townscape. What we want to see is structural components coming off production lines like armaments during war—but this time the war is against squalor and want. The lead is being given. Those who are in earnest about the shocking state of the nation's housing should ensure that all local authorities follow suit.

ARCHITECT'S TRIUMPH

A colleague who helped assess the Timber Development Association's competition for office furniture, reports that once again architects have triumphed over furniture designers (the winning entries are shown on page 1148) in this field. No prizes were awarded in the section for clerks' desks because the only satisfactory designs were over the price range, and of the seven chairs submitted (prototypes have to be made in this two-stage competition) three broke under normal inspection from increasingly nervous assessors who might well have been marked for life.

*

ASTRAGAL notes that designers often still fail to provide detail desks for telephone/dictaphone wiring, or to provide adjustable feet (particularly important if unit storage cabinets are to line-up well) and designers of wooden storage can still learn a trick or two from the steel boys.

NO NEED TO BE HOMELESS

Even ASTRAGAL could scarce forbear to cheer last week—a rare occurrence—when reading the "interim report on how our views are developing," issued by the Crown Estate Commissioners on the future of Carlton House Terrace (HMSO 8d). It is good news that the Terrace will not be converted to take the Foreign Office, and that there is no intention to use it for offices at all. Better still, the buildings are in much better condition than the Regent's Park Terraces, even though the floors in their present condition "would not support the weight of . . . a grand piano, filing cabinets or an evening cocktail party."

*

The houses will be modernised, conversion will be restricted to the replacing or strengthening of floors and the provision of lifts, and a suitable tenant will be sought for each house (ie people who can pay the heavy costs involved plus a large rent). Improvements will be made, to the tenant's requirements—either by the Crown Estate, or by an approved architect named by the tenant. It is interesting to see how much the houses differ inside: some have whole rooms that are worthy of preservation, others large basement areas which could be converted into a concert or lecture hall, a library or an art gallery. Even the provision of garaging for the Terrace is not a difficult problem, though it will be expensive. I shall be in touch with the agents within five minutes of winning the pools.

THE MERE IDEA

A Private Members Bill, which came up in Parliament on November 27, proposes that Manchester should take water supplies from the small and beautiful national lake, Ullswater, and build £5 million worth or so of water works in the Lake District. This proposal, to which I wish the most cordial bad luck, would mean fencing off and excluding the public from thousands of acres of lakeland. It seems incredible that this natural amenity, precious to Manchester itself and to many of the grimmest towns of the north, could be the subject of such incompatible demands. Yet there are also reports that greedy eyes are on Wastwater—this time as a source for Calder Hall.

*

Anyone who thinks Ullswater must have plenty of water to spare should see what has happened to Thirlmere and Haweswater since they were connected up to Manchester's water pipes. Large stretches of clay have now replaced much of what once were lakes. No doubt the Friends of the Lake District and other bodies less short-sighted than thirsty local authorities will put up a fight, and they deserve the fullest support. We can be optimistic if we remember how the uproar in East Anglia saved the Stour.

*

Nevertheless, any campaign to save the Lakes or rivers from water-thieves must bring to the fore the urgency of a national water plan.

This new office block, its glazed white Scandinavian tiles gleaming in the wintry sun, is a conspicuously successful design amongst its motley neighbours in the City of London. This is not so remarkable, considering that the architects are Yorke, Rosenberg and Mardall (leading furniture designers, as shown on page 1148). But what is remarkable is that this block in Greystoke Place, Fetter Lane, will be entirely occupied, from December 18, by Yorke, Rosenberg and Mardall, their associates and their staff of about one hundred. Astragal can recall no other architectural firm of note which has achieved this. Point of detail for the meticulous: how many of the tiles have had to be cut?

NO ORCHIDS FOR THIS BLANDISHMENT

Monitor's first return to architecture since the Lasdun interview has had an extraordinarily mixed reception. I must say it seemed a bit strange for the Weldon team to go through the motions of discovering Gaudi at this late date, but apparently someone on it was impressed by last year's Architectural Press book. The photography—all film, no stills—was very good, though it failed to persuade many lay viewers that Gaudi was a great architect. This may have been due to Huw Weldon's disappointing commentary (he could at least have done his homework and saved himself such howlers as " art nouveau, a style that we usually think of as prim and ladylike ") and some special pleading: practically all the rules of television debate are flouted when you illustrate rectangular, non-Gaudi architecture by the crummiest kind of spec-developer office blocks. Fair's fair Huw; your literary friends would soon have your blood if you tried to build up James Joyce by contrasting him with, say, James Hadley Chase.

TOWN AND GOWN

Television again. Good marks to the BBC TV for a series of school programmes, entitled " The Growing Town," in which Percy Johnson-Marshall and his post-graduate Planning Course at Edinburgh University co-operated with producer Peter Dunkley to present the changing town, from the Middle Ages to the near future, in a way that must have made history very real to sixth formers as well as telling them quite a lot about architecture and planning. I would award B+ to the Mediaeval town (York); A– for the Georgian town (Edinburgh); A to the Industrial Revolution programme, which proved that Oldham was a city much like Hell (some wonderful shots here of early steam engines, including one, consisting of a boiler on a platform with four wheels which was still in use in County Durham in 1920); A– for the modern town (Harlow) disfigured by a rather PRO approach, and B+ for the town of the future, which concentrated on the Berlin centre and Tokyo's lineal expansion over the harbour project. These didn't really seem in keeping with the preceding programmes, and it was a pity that Cumbernauld and the Hook project were not made the basis here.

*

It was interesting to watch the transformation of the commentator from a typical nervous young teacher in the first programme to a confident talker about something to which he was personally committed in later lessons. In fact, we didn't really need Mumford to rub in the social lessons towards the end. I hope the BBC will use young Calthrop again in future architecture and town planning programmes. By the way, the work of the Edinburgh School was not acknowledged in this series, although Percy Johnson-Marshall planned it, Eleanor Morris—one of his students—scripted it, and Michael Calthrop—one of Mr. Wood's post-graduates—commented.

THE MAYNE THING

Since rumour has it that *Uppercase* (*Architectural Design's* non-commercial baby brother) may disappear in the near future, it is nice to be able to say that the current (and maybe the last) issue is a good one, containing precisely the sort of thing that this sort of magazine ought to contain because it doesn't fit into any other. The first half includes a number of papers on studies undertaken by the Hochschule at Ulm, the second half has about sixty of Roger Mayne's remarkable photographs of the people of Southam Street in Paddington. The Ulm papers are not all easy to read (the English is a bit quaint) but they are extremely valuable in showing the sort of work that would be done in some English schools if the curriculum could be revolutionised in the way some students want: Roger Mayne's photographs have now grown out of the " Gosh, I'm brave; I'm photographing teddy-boys " phase and have acquired a penetrating but slightly idealised realism of the sort that underlines the slightly idealised social realism of projects like Park Hill at Sheffield. This will be a useful little volume to brandish in front of your grandchildren as you say, " this was how we felt in the Sixties."

ASTRAGAL

LETTERS

Denys Lasdun, MBE, FRIBA

Malcolm Quantrill

R. M. Davies, FIPA, MAA

K. Johns

Cambridge

SIR: Any project for a site in the centre of Cambridge is a matter of national concern and, therefore, deserves the fullest discussion. Such discussion ought, however, to be based on facts. Derek Senior's article on our proposals for the New Museums site was prepared without reference either to the university or ourselves. As a result, it contains numerous inaccuracies.

In spite of the rejection of the application for outline planning permission, the university has initiated discussions with the planning authority, having requested the Minister to hold its appeal temporarily in suspense. The publication of such an article is, therefore, not only premature but prejudicial to the discussions. In any event, while these are in progress, we are not in a position to comment, but the full facts will, of course, be published as soon as this is possible.

DENYS LASDUN

London, W2

Derek Senior's article was sent to Mr Lasdun before publication to enable him to reply in detail to any points he considered unfair or inaccurate and we greatly regret that he has not felt able to do so. It is also regrettable that the university authorities, having refused permission for the planning authority to issue montage photographs prepared to show the relation of the proposed tower blocks to other buildings in Cambridge, have not supplied a version guaranteed accurate for publication. This is to treat a matter of national concern as sub judice. *We do not accept this view but believe that central developments in a town like Cambridge are of the widest interest and deserve the most widespread discussion. It was for this reason that we published Derek Senior's highly topical article.*—THE EDITORS.

Technical Information conference

SIR: The AJ's new enthusiasm for a technical and immaculate conception of filing is oddly balanced by its slap-happy reporting. The latter does not come off favourably in the comparison.

Apart from mis-spelling both the "Eygard" of Agard Evans and the "Ingrar" of Ingvar Karlen there was an unhealthy partisanship and selectivity in the reporting. There was no mention, for example, of the well-deserved rap on the AJ's knuckles for encouraging "technical advertisements," and Neill Newsum's lucid and sparkling contribution (a bright spot in a dull day) was thoroughly played down. Perhaps the AJ is not interested in the manufacturer's point of view.

In spite of the AJ's comments I think it should go on record that John Brunton batted extremely well on a sticky wicket of his own making. Everybody present must have regretted the lack of a real theme—a focal point for the discussion—which you so rightly attacked. We all know that this was a problem of vested interests. Perhaps if the AJ had organised the conference we would have witnessed an unbiased exposition of the problem, but the standard of your reporting leaves me in some doubt.

MALCOLM QUANTRILL

London, SW5

As company architect of the Barbour Index, Malcolm Quantrill fails to mention that the "rap on the AJ's knuckles" was a perhaps not disinterested statement by Mr Barbour himself that informative advertising was of little value and distrusted by the architect because there was no means of judging how up-to-date the information was—the fact that all advertising carries a date and many catalogues do not, was so apparent to the conference as not to be worth mentioning. As for selective and partisan reporting, no mention whatsoever was made in the news item to an AJ research fellow's statement that manufacturers could experiment with methods of presenting information more economically by means of advertisements than by republishing expensive catalogues—a point which seemed to be well received by the conference but prompted the "rap on the knuckles" referred to. The errors in spelling are inexcusable and are regretted.—THE EDITORS.

SIR: Congratulations on your masterly, if too gentle, report on the technical information conference at the Building Exhibition. By mid-morning I began to wonder whether I had come to the right conference as, apart from the first speaker, the whole affair seemed to be nothing more than a promotion by Specifile.

It is to be hoped that the audience, which included representatives from industry with little, if any, experience in print design, were not misled by the comments of John Brunton. His obvious lack of practical knowledge in print design soon became apparent and I for one would have welcomed comment from a qualified print designer. As, wisely perhaps, the chairman allowed no opportunity for discussion, the audience was denied the chance of questioning some of Mr Brunton's very sweeping statements. "Blind leading the blind" would have been a fair summary of his contribution. The most disappointing feature was the lack of informed comment. With notable exceptions, the afternoon speakers all read from prepared typescripts and one could not help noticing that questions from the audience gave the main speakers the opportunity of introducing members of Specifile.

Could one hope that on a future occasion the organisers either state that such meetings are sponsored by a commercial organisation or have a more balanced platform composed of authoritative speakers?

From my point of view, it was not worth a 3d bus ride, let alone the £2 2s fee and the 120 mile journey I had to undertake to arrive on time.

R. M. DAVIES

Birmingham 13

New IES code

SIR: I note that Peter Jay, in his letter about the Illuminating Engineering Society's new code, suggests that the AJ might well be the right place for the information it contains to be published in a form suitable for architects. But there is one basic snag here. The code has very many admirable features, but through it the IES has unilaterally proposed substantial increases in levels of illumination.

It wants architects to adopt the code, thereby committing them and their clients to quite big increases, in some cases, in the cost of installations. And yet there is no evidence that the RIBA or important clients, such as Government departments, were properly consulted before the code was drafted.

The right answer would seem to be for the IES to take its code to the BSI, with the proposal that it be adopted as a BS code of practice. Then everyone can be properly consulted, and such doubts as Astragal has, particularly with regard to this very important uncertainty about the relationship between natural and artificial levels of illumination, can be resolved.

But perhaps Mr. Jay thinks that architects should accept the code as a *fait accompli*, but it would be difficult for the RIBA to do so and retain its general policy of strong support for the BSI as the right and proper organisation for the creation of codes and standards.

K. JOHNS

London SW1

NEWS

YORKSHIRE DEVELOPMENT GROUP

First consortium for housing

The chairmen of the housing committees of the three Yorkshire cities of Hull, Leeds and Sheffield have recommended their councils to set up a Yorkshire Development Group, the objects of which will be to achieve more quickly, better quality, more efficient and more economical housing. They have been meeting with their city architects to discuss co-operation and have issued a statement on the proposal in which they say, 'It is hoped that the Group will be able to emulate in the field of housing the achievements of CLASP—the Consortium of Local Authorities Special Programme in the building of Schools.'

'Starting with the exchange of information on building materials, methods of construction and costs,' says the statement, 'it is intended to rationalise traditional design through the development of a range of standard fittings and building components and later to develop new building systems which will make maximum use of factory production. Such a programme is expected to facilitate purchases on the basis of bulk quotations for the requirements of the three authorities and by giving continuity of production to the manufacturers should result in a lowering of costs.'

The city architects concerned are D. C. H. Jenkin, Hull, J. R. Sheridan-Shedden, Leeds, and J. L. Womersley, Sheffield, who made the following announcement of the scheme at the West Yorkshire Society of Architects' annual dinner on December 1:

'I am able to announce tonight the imminent formation of the first Consortium of Housing Authorities. Christened the Yorkshire Development Group, it will pursue the fundamental aim of greater production with all that it implies. It will by no means be exclusive—its ambition is to be a spearhead towards the solution of the housing problem in the industrial north; to help others with similar problems.

'You will, I think, welcome the fact that Yorkshire has taken the first step in this direction and I would like to pay a tribute to the chairmen of the three housing committees who have piloted the idea through their respective authorities, and to my colleague Sheridan-Shedden and David Jenkin.'

LCC

Wider control of office building

The London County Council at its November meeting accepted a recommendation of its town planning committee that the restrictions on office development should be extended from the central area of London to the whole of the outer metropolitan zone, until a full review has been made by the council. The ratio of permissible floor space to total site area is now reduced from 2:1 to 1:1 throughout the area.

It was pointed out at the meeting that the original development plan had zoned small areas throughout the county for offices, which were intended to serve local needs. Developers, however, had been buying up these sites for speculative development since the tightening up of restrictions in the central zone, and increasing numbers of applications for development were coming in to the LCC. By extending the restrictions the council aims to push major office developments further afield.

ILA

The Landscape of industry

The technical and visual problems of design created by the engineering upheaval created by the building of a large factory were the subject of an interesting paper by L. Milner White given at the Institute of Landscape Architects last month. Large-scale industrial building may well alter the nature of the soil, he pointed out; it gives rise to excess earth to be disposed of; there is compaction of the soil which interferes with natural drainage.

In addition to these profound changes in the nature of the site, there is often the necessity for ugly security fencing, large car and bicycle parks, outside storage spaces for materials such as empty crates and fuel, and all sorts of miscellaneous paraphernalia which make satisfactory landscaping extremely difficult.

Small factories can now be fitted quite easily into the industrial area of new towns but tend to be sited where there is plentiful space, since they must be able to expand and change easily. Landscape architects have had the sad experience, said Mr Milner White, of designing a scheme for such a factory and finding two years later that a new boiler house or substation has to be sited on the most undesirable spot from the point of view of the landscape scheme. Often expansion is so rapid that the original factory is completely overshadowed by additions, and any landscaping is thrown completely out of scale.

Mr Milner White could not offer solutions to those problems except that, on this question of scale, he put in a plea for the planting of large trees preferably when they are mature. The factory, he pointed out, is built quickly and replaced quickly; it cannot therefore wait for an effect for a hundred years, as was once the case of the large country house.

SHIRLEY ANDREWS

FAS

Thirty-fifth AGM

The annual general meeting of the Faculty of Architects and Surveyors on November 24, elected E. H. Turner, PFAS, ARICS, MRSH, president for the year 1961-62. Mr Turner, who was born in Suffolk in 1912, secured a post in the surveyors' department of Barclay Perkins & Co Ltd on leaving school, and is still employed by the same firm, today, as divisional surveyor in the architects' department.

MOHLG

New Towns Commission appointments

New Towns Commission appointments Dr Charles Hill, Minister of Housing and Local Government, has appointed Mrs B. F. R. Paterson, JP, a Hertfordshire County Council alderman, and Mr J. M. A. Smith, director of finance and assistant managing director of the Ford Motor Co Ltd, as members of the commission for the new towns.

NEW UNIVERSITY

Lancaster is chosen

Mr Henry Brooke, chief secretary to the Treasury, in a written reply to questions in the House of Commons on November 23, said that Lancaster has been chosen as the site for the fourth new university in Britain.

Diary

The New Housing Standards: Town and Country Planning Association symposium at Kingsway Hall.

Sherry party: Royal Institute of British Architects Library Group members' party, 66 Portland Place, London, W1, 6pm.

DECEMBER 13

Norwegian architecture: Exhibition sponsored by the Architectural Association, Edinburgh College of Art.

Until DECEMBER 16

Cure for headaches

Insulation headaches that is. This young man apparently with a load on his mind
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one of those clever and useful plastics that really belongs to tomorrow.
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It is comp!:tely rot-proof, has low water vapour permeability, is strong and fantastically light.
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S3

PARKER MORRIS REPORT

SfB (98)
UDC 728·3

Homes for today and tomorrow

The report of the Parker Morris Committee on housing standards has been published under the title " Homes for today and tomorrow " *(Ministry of Housing and Local Government, HMSO 4s).*
We have asked five experts for their views on the committee's conclusions, and these comments follow a summary of the report's recommendations. It is impossible in a short space to cover all the stimulating points made in the report, which should become compulsory reading for any architect concerned with housing, whether public or private, but below are those the committee has pinpointed as being the most important. These are likely to be of even more significance than the proposals in the 1944 *Dudley report, which has been such a major influence in housing since the war*

Summary of the report's recommendations

NEW PATTERNS OF LIVING

The social and economic revolution since the war, greater general prosperity, and easier and more varied home life now possible, make timely a review of the types of homes now built. These include private enterprise housing, now providing the major part of the output, as well as local authority housing.

There should be space for activities demanding privacy and quiet, for satisfactory circulation, for better storage generally; space to keep the new household machinery, and kitchens should be arranged for easy work with room in which to take at least some meals.

The family living in a flat or maisonette needs at least as much space as the family living in a house.

The present standards are in a form that puts emphasis on compliance with patterns of rooms of fixed areas.
The starting point for thinking about houses and flats must be the activities that people want to undertake in them.

This approach to the problem of design starts with a clear recognition of these various activities and their relative importance in social, family and individual lives, and goes on to assess the conditions necessary for their pursuit in terms of space, atmosphere, efficiency, comfort, furniture and equipment.

Our recommendations are not, therefore, based on minimum room sizes but on functional requirements and levels of performance, with minimum overall sizes for the dwelling related to the size of family. Our minima are not to be taken as maxima. Many desirable features which may come to be required may not be possible within them.

The proposals we make will cost more money. We believe that enough people are ready to pay more for the better article, and that the country already has sufficient houses and flats of standards below those that we have in mind.

HOMES FOR FAMILY NEEDS

There is no substitute for architectural advice. Our recommendations are made on the basis that architects must be employed and are framed so as to allow for the very wide variety of circumstances and site conditions confronting designers, and to leave them free either to develop conventional plan-forms or to explore new living arrangements to suit changing needs.

In all plans for residential building the main furniture should be shown; there is scope for co-operation between architects and the furniture industry.

The requirements of different families

Homes should be designed so that they fulfil the reasonable requirements of the way in which prospective occupiers are likely to want to live and work in them, furnish them and store their possessions.

We stress the wide variety of activities of which account must be taken in designing the family home and the widespread practice of taking at least some meals in the kitchen.

Very small houses sometimes put up by private enterprise can largely be dealt with by limiting the numbers built.

Table of recommended standards relating to floor space

A home to be built in the future for occupation by:

should be designed with a net floor area of at least:	6 people	5 people	4 people	3 people	2 people	1 person
	sq ft	sq ft	sq ft	sq ft	sq ft	sq ft
Three-storey house*	1,050	1,010	—	—	—	—
Two-storey centre terrace		910	800	—	—	—
Two-storey semi- or end				—	—	—
Maisonette	990	880	770	—	—	—
Flat				—	—	—
Single-storey house	930	850	750†	610	480	320
	900	810	720			

* These figures will require modification if a garage is built in
† 720 if balcony access.

and general storage as follows:

	sq ft	sq ft	sq ft	sq ft	sq ft	sq ft
Houses‡	50	50	50	45	40	30
Flats and maisonettes						
Inside the dwelling	15	15	15	12	10	8
Outside the dwelling	20	20	20	20	20	20

‡ Some of this may be on an upper floor; but at least 25 sq ft should be at ground level.

and wcs should be provided as follows:

(A) in one, two and three person dwellings, one wc is required and may be in the bathroom.
(B) In four person, or two- or three-storey houses and two-level maisonettes and in five person flats and single-storey houses, one wc is required in a separate compartment.
(C) In two- or three-storey houses and two-level maisonettes at or above the minimum floor area for five persons and in flats and single-storey houses at or above the minimum floor area for six persons, two wcs are required, one of which may be in the bathroom.
(D) Where a separate wc does not adjoin a bathroom it must contain a washbasin.

FACTORS IN HOME DESIGN

Heating the home

Better heating is the key to the design of the home and the demand for it is strong.

The minimum provision should be an installation capable of heating the areas used for work and circulation to 55 deg F and the living and dining area to 65 deg F when the outside temperature is 30 deg F. Wherever family requirements will demand it a more expensive installation capable of heating the bedrooms as well to 65 deg F will represent the greater value for money.

Whether the minimum installation is provided or something capable of heating more of the house there is a clear trend of demand towards systems which are clean and have little or no work associated with them.

The occupier should be able to control expenditure on heating.

Thermal insulation practice should be brought up to at least the level of the new Model By-law 51A.

Kitchens

Kitchens must be designed for efficient working and equipped with adequate drainers and worktops.

The design must provide for the housewife to keep washing machinery near the sink and space in or near the working area for additional machinery in the future.

Kitchens must have adequate storage which we put at 80cu ft for family houses. Almost as much is required in smaller homes.

Accommodation for the storage of food should be reconsidered. A cool cupboard is nevertheless required.

Condensation in kitchens is a widespread and serious problem to which there is no inexpensive answer.

Storage

Storage for garden equipment, bicycles and other purposes is required for four and five person houses at the rate of 50sq ft a dwelling, clear of refuse containers, fuel bins and access ways. The storage space need not all be on the same floor, so long as there is at least 25sq ft on the ground floor. Flats and maisonettes should have storage comparable with that in a house. Four or more persons require 15sq ft of general storage within a flat. There should be a separate store elsewhere of 20sq ft for each flat, whatever the size of family. If the dwelling has a garden, additional storage is required for garden tools.

The storage arrangements in private enterprise dwellings should be improved. For all except the main bedrooms, and preferably these as well, there must be clothes cupboards at the rate of 2ft of rail per occupier, not less than 21in deep internally to allow for clothes on hangers.

Every home must have a cupboard for the storage of linen that can also be used for airing or keeping dry.

Storage for solid fuel can remain at 12sq ft, 20sq ft for two appliances or in rural areas, and 9sq ft for flats.

Electric socket outlets

To cope with the increasing ownership of electrical appliances and to avoid the dangers of trailing flexes, we recommend at least fifteen electric socket outlets for the five-person house. The installation should be planned so that it can conveniently service future outlets. Research is needed into methods of doing this.

ASPECTS OF LIVING IN FLATS

The human problem for the future in the design of flats and maisonettes is to provide for people who live in them an environment as workable and as satisfactory as for people who live in houses. The economic problem is to reduce the costs.

Present practice indicates that a lift service should be provided in buildings in which the entrance to any dwelling is on the fourth storey or above. In buildings of more than six storeys two lifts should normally be provided. At least one lift should be large enough to take eight persons. Lift installations should be designed having regard to the capacity of the lift, the speed of travel, the arrangement of stops, the number of people living in the building, the peak traffic times and the frequency of maintenance. Insufficient information is available at present on lift installation design.

The cost of balconies should be carefully weighed against the costs of other things which could be provided for the same expenditure.

Noise nuisance between one flat and another causes much disturbance and friction. More electrical household and recreational equipment will increase it, and the matter requires more attention in future.

New forms of packaging for food and other goods are resulting in more refuse, and less is being burned by the householder. On existing estates of flats this is producing difficulties. The frequency of collection is unlikely to increase. The dustbin and dustcart are not in line with twentieth-century progress in other fields. Intensified research is needed in developing low-cost waterborne systems and individual or local incinerators. Meanwhile, the recent BSCP 306 provides a guide to good practice with well-known methods. Advance in this field generally is obstructed because of savings accruing to the local authority committees responsible for refuse collection do not accrue to housing committees and other developers on whom the extra expenditure would fall.

THE HOME IN ITS SETTING

The general appearance of the majority of layouts could and should be greatly improved. Most layout practice is out of date, failing to take proper account of the effect of vehicles. Prosperity is affecting the generally desirable size of gardens; the increasing proportion of flats calls for more attention to the needs of children's play.

Gardens are no longer generally relied on for necessary food. Other new interests take up more of people's leisure. But they must not be made so small as to detract from their usefulness, and arrangements for reasonable privacy must be made. Where gardens are small, space for children's play will be needed elsewhere nearby.

Terrace houses must be arranged to provide suitable access from one side of the house to the other. It should never be necessary for the coalman or the refuse collector to enter any part of the house.

Play space must be the first call on available space around flats where there are children and with some exceptions the present provision is inadequate, and unsatisfactory.

Estates should be planned from the start on the basis of one car per dwelling, and with provision for visitors. The visual effects of this must be carefully considered. Some small departure from this figure may be satisfactory on small schemes wholly or mainly designed for the accommodation of old people and estates in central areas where the density is over about 160 habitable rooms to the acre.

Estates should be planned for maximum segregation of pedestrians and vehicles in both low and high density development.

Research must be undertaken to devise a yardstick for preserving at the design stage the space around buildings (whether at ground level or as usable upper decks) against encroachment by car parking, and it would be helpful if the Ministry would devise a formula for this purpose.

Comments on the report

Margaret Willis, sociologist, well known for her research into housing needs

Homes for today and tomorrow—the title reveals the essence of the housing problem: how to relate social change to the normal length of life of buildings. Technical advances and social and economic changes have transformed our lives in many respects and have opened possibilities for new ways of living in the future. Yet the average householder and housewife seem to accept in apathy, conservatism or lack of interest, the conventional standards of house design—unimaginative furnishing and décor, restricted use of rooms, primitive heating arrangements (the advertisers are perhaps changing this)—and they seem unable to change customary behaviour even in response to the different needs of the members of their own families. This need for a real public opinion and interest in house design is, I feel, at the root of the problem of the improvement in the nation's homes. Although the report rightly emphasises the adaptability of the home to family needs and, most important, directs attention to privately built homes for the middle classes, public opinion should be actively formulating its own demands and crystallising its own needs instead of being behind. The middle classes, for example, apart from a small minority, are not contributing and leading the standards of taste, design and adventure in house demands which their position would at best require—as the group which is imitated by the aspiring working classes. Because of this, the report puts responsibility for the homes of tomorrow which are to reflect the new way of living, not on the demands made by an interested, intelligent and knowledgeable lay public—in fact, the users of the product, who are actively expressing their needs—but on the architect. It is here, I feel, that the danger lies. The architect is not likely fully to understand, or even worse, he may think he easily understands, the complicated social, economic and psychological factors affecting the needs and behaviour of the occupants. To him, it is likely that there are other priorities than the expression of the wishes of a vague "average family."

Most of the report, however, is concerned with raising standards in our homes for such things as space, heating, storage, kitchens. The comments and suggestions are sensible, practical and desirable. Such small items as weatherstripping of windows and particularly doors, and adequate space for kitchen equipment make a considerable difference to satisfaction with day-to-day living in a home. However, there are two points that might have been looked into further. First, rising standards of space and demands for extra storage, including one or even two cars, are conflicting with the pressure on land and the need to increase densities. In this connection a three-storey house could have the ground floor or semi-basement to accommodate cars, mopeds, etc., give ample dry storage, a way through to the garden, a playroom and space for a heating furnace. The main living room on the first floor has the advantage of greater privacy when sited, with its large windows, on to the public way. Secondly, I would have liked some mention of the needs of the "do-it-yourself" men who want to paint the house, put up loggias, do simple repairs, build cupboards or merely knock holes in walls with reasonable tidiness.

Living in flats presents many problems for the designer and if the report perhaps shelves some of the responsibilities by demanding comparable space standards as for a house, it is because so much of satisfactory flat living depends on pleasant relations with considerate neighbours. However, points that could be added include the popularity of the private balcony which opens off the kitchen, and the desire of mothers to see their young children playing down below the windows of their flat. This is a far more common type of supervision than sitting by their children at play. Playgrounds usually present headaches to designers of flats as well as to the residents round about. I suggest that more success for both may be possible if the playgrounds are planned first and the blocks of flats arranged afterwards instead of "fitting in" the playgrounds to a predetermined layout.

In conclusion I would like to praise this report wholeheartedly and particularly because it gives priority in the effects of social changes and rising standards of living. Its suggestions are practical, realistic and necessary for the future.

Jack Whittle, one of the LCC architects, speaks here in a private capacity on behalf of local authorities

This report marks the end of an era. It firmly closes the lid on "council housing" and looks at the requirements for new homes, whether to be provided by private or public developers, against the tremendous changes in the standard of living and in domestic habits and equipment which have occurred since the Dudley report was published some seventeen years ago. It sets a new and welcome approach to housing standards. These it defines in terms of minimum dwelling sizes and a clear statement of the activities to be provided for within the dwelling; the manner in which the space within the dwelling is allocated is to be left to the client and the architect. This approach, the committee hopes, will "release the creative energies of architects concerned with housing," and there is no doubt that the proposal to free the designer from the restriction of having to comply with minimum room sizes is one of the most important made. It should also prevent a repetition of the mistaken policy of *Houses 1952* when, in the face of an economic crisis and increasing demand, minimum room sizes were retained but circulation space reduced to an absolute minimum and, in fact, often thrown into the rooms themselves and calculated as part of the minimum room size.

This time it is different. In the face of the present economic crisis and great demand the Parker Morris Committee has advised that future dwellings should be some 60 sq ft to 80 sq ft larger (about the sizes recommended in the *Housing Manual 1949*), better heated with central heating to enable fuller use to be made of the space; better equipped and set in improved layouts, each dwelling with its own garage or parking space. Flats and maisonettes built to these new standards will have floor areas comparable with those of houses with storage facilities inside the dwelling and near to it. This acceptance that people living in flats need as much space as those living in houses reverses the present absurd assumption that they don't. The committee insists that its recommendations are to be taken as minima not maxima standards and confidently expects them to be exceeded in a number of cases. This, in relation to public housing with its strict financial control, seems rather naïve. Reading the

argument of the report is always interesting and often stimulating, and its conclusions are sound. The statement: "the belief that the design of homes is a job that anyone can tackle with success is entirely without foundation—it is one of the most difficult tasks in the whole field of architecture" should be widely publicised although it is a conclusion reached, by and large, three million houses too late. The section on the human needs to be met in housing is comprehensive and informed and shows a keen appreciation of the way ordinary families live. There are signs that the committee found this part of its work bewildering as well as absorbing: the cry *en passant* in paragraph 28 for the development of an adaptable house is one of them.

A good deal of space is devoted to the problems which arise particularly in areas of high density, if and when the recommended standard of one car space per dwelling is imposed. The decision to advise this standard was reached with reluctance, not only because of cost, but because the committee was also conscious of the dangers of the impact of this on the layout of high density areas. The committee has asked MOHLG to work out a formula which could be used by architects in designing layouts, to ensure the provision of an area of amenity open space comparable with that now achieved and yet accommodate car storage to this new standard. This formula is urgently needed. There are many other detailed recommendations on improved insulation (with doubts shown on the value of double glazing), more power points for electrical appliances, improved storage and cupboard space, private balconies, refuse collection, etc. The report covers a lot of ground.

All this has its price, and the committee has faced up to the extra cost. In the technical appendices estimated costs of implementing the main proposals are given. The new standards for dwellings will add anything from 5½ per cent to 10 per cent to their cost, depending upon the type, and car parking provision to the 100 per cent standard will add another £240 to £270 per dwelling. These last figures include not only the cost of garaging in one form or another, but also the extra housing costs due to the need to build more dwellings in tall blocks in order to free ground space for car storage.

These estimates, said to be based on the average costs of provincial local authority housing at mid-1961, appear very low. Indeed, the detail given hardly stands up to close examination and most certainly would not apply in the Greater London area, nor in the large provincial cities. To this extent these estimates are misleading. Although there are considerable difficulties in presenting estimates which are reasonably valid on a national basis, there are places in the build-up of these where experience seems to prove the figures very optimistic.

As the committee realises, the publication of this report is hardly well timed; but it rightly comments that the country has enough sub-standard housing and housing estates without continuing to add to them. It advocates that in times of economic stress, numbers of dwellings, not standards, should be reduced. Thus, when the Government is exhorting the nation to build less and reduce the load on the over-burdened building industry, we have a report which clearly shows we should spend more labour and materials on dwellings and layout, not to increase numbers, but to improve standards. Moreover, the slum clearance programme is making appallingly slow progress in those areas where the need for rapid redevelopment is most acute. This is the dilemma; we need more not fewer dwellings and we need better ones than we are building, but production in both the architectural and building sense cannot cope.

This problem, together with the freedom from minimum room sizes, presents a challenge to both the architectural profession and the building industry. Designing for rational production, and the imaginative assembly of standard units, with improvements in building techniques, may be the way. This is what the next advisory committee should consider, and consider immediately.

Elizabeth Layton, who leaped into prominence earlier this year for her masterly treatise on Building by local authorities*

In giving more space and better heating pride of place in its recommendations, the committee has got its priorities dead right. These are not original ideas: they are part of the standard criticism of current housing. But it is of first importance to have them stoutly advocated by an authoritative body, so that they can hardly fail to become integrated with the conventional wisdom of the next decade. It is particularly encouraging that the present space standards of flats should come in for such vigorous criticism. Flat life, particularly for children in tall blocks, suffers from so many other handicaps that it should not be further penalised by poor space standards indoors.

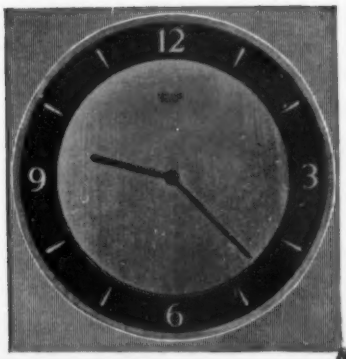
Almost as important is the form in which the committee has framed its space standards. In place of the old rigid pattern of sizes for individual rooms, the new minima apply to the floor area of the whole dwelling. This removes an outdated strait-jacket and gives designers far greater freedom to meet the many changes in the pattern of living which a more affluent society permits. It is also a really imaginative reform in the method of bureaucratic control over design. It is to be hoped that architects and builders will grasp the new opportunity and make the most of it. It is high time there was a breakthrough, for house design has hardly changed in any fundamental way for forty years, and few people can conceive of there being any other possible solutions.

Both consciously and unconsciously the report underlines the lack of fundamental thinking about housing. A committee is not the body to do research in depth about the relationship between human housing needs and their physical satisfaction. This kind of work will be better done by MOHLG's development group and other agencies. It is good news that the development group has already made a start on interpreting the committee's recommendations on a live housing scheme. More experiments along these lines, with really intensive investigations of alternative solutions, will be necessary before full advantage can be taken of the new standards.

Certainly, designers will need all their ingenuity in the face of the cost implications of the committee's recommendations. The committee calculates that the new *minimum* standards within the home will add something between nine and 11 per cent to the present *average* capital cost of houses and flats designed for four or five people and between 5s and 6s to the weekly rent or mortgage payments. Provision for better play spaces and garaging, up to the committee's standards, would add further capital and running costs. Smaller dewellings are also to have improved standards, but the costs are proportionately lower.

The question is bound to be raised: can the nation afford the additional capital investment or the occupier, or taxpayer, the extra annual outgoings. The first is partly a question of priorities and building efficiency. The nation will be ill-served if less essential expenditure, say on commercial development, is allowed to crowd out the attainment of better housing standards. But the challenge should also be met by improvements in building efficiency, so that part at least of the extra costs of building to higher space standards can be absorbed through greater productivity. Here both designers and builders have a vital contribution to make. What individual families can afford is again partly a question of priorities—personal priorities of expenditure on, say, gadgets, cars or house room. It can hardly be doubted that given the existing stock of cheaper and less satisfactory housing there are enough families who would be eager to pay the

* London 1961: Allen & Unwin: ((Aa6):352)



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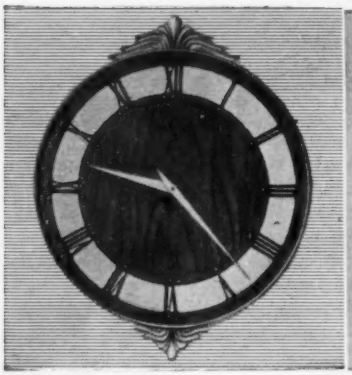

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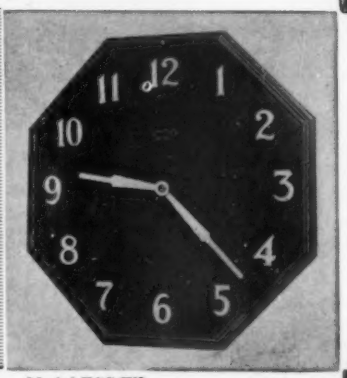

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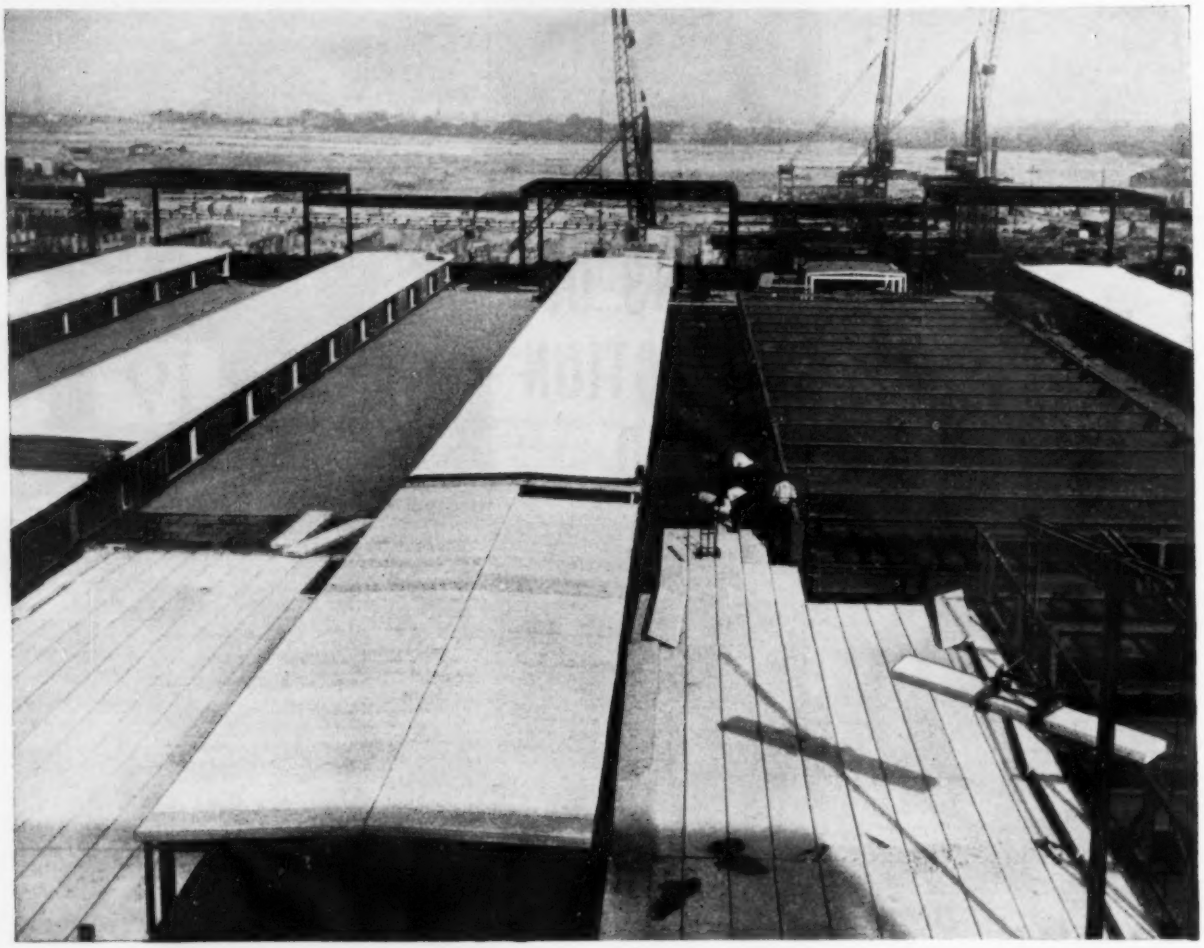
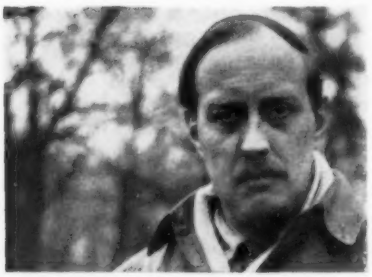


extra price of the better accommodation. It would be a national disaster to underestimate the potentialities of our wealthy society and to saddle this country with further millions of mean dwellings which are too small and too ill-equipped to be adaptable to changing needs. Unsuccessful car, TV, or refrigerator models can be discarded relatively quickly. An ill-conceived house will handicap at least three complete generations of human beings, and is a lasting reproach to the faith and humanity of its begetters.



Hugh Wilson, architect to Cumbernauld new town, who is leading the way in the second generation of new towns

In terms of development, housing has been the Cinderella of post-war building and in appearance too many housing schemes have adopted the role of the ugly sister. Perhaps the basic problem has been that housing became caught up in politics, quantity being preferred to quality, without any real consideration of whether or not the two are necessarily incompatible. With urban renewal just beginning, the need to produce large numbers of houses is as pressing as ever; indeed, just after the war, it would have been difficult to forecast that in 1961 the LCC would be talking about mobile homes for the homeless. The problem of building large numbers of houses at a reasonable cost requires a breakthrough in technology. At the same time it is vital to achieve housing environment which provides conditions worthy of a rising standard of living.

This report was therefore awaited with keen interest, since its recommendations could influence housing design over the next two decades. In the event the committee has rightly seen its task as one of pointing out the problems, and not of producing the solution: a job accomplished in a most satisfactory way. More space, better heating and housing standards expressed in terms of the activities of the occupant rather than of the number and sizes of rooms—this just about sums up the report. I believe it is one of the most important documents on housing to be produced since the war.

The committee's terms of reference were somewhat restrictive and thus its members were concerned mainly with the design of dwellings. Nevertheless, the importance of layout has been fully appreciated, and the report includes some useful reference to the problems of the motor car and the creation of a good environment.

The statement of a minimum standard of floor area related to size of family would seem to be a reasonable approach, and no one is likely to quarrel with increased provision for storage or the recommendation that flats should have a storage space comparable with that of houses. This is a reflection of the view that flats are not a second best form of living but should be acceptable in their own right. A welcome should also be given to the adoption of the RIBA suggestion that housing plans should show the disposition of furniture to ensure a proper functional basis for the use of the room. Reference to the adaptable house with the need for future research and development is another interesting point. We have found at Cumbernauld that it is possible to take some steps in this direction on the basis of a standard house shell, fixed plumbing units and a choice of methods of dividing up the remaining space.

The recommendation on improved heating standards is an important step forward for this is the key to the most flexible use of all the space in any house.

In dealing with the home in its setting, the committee comments with some justification on the "vast gap between the best housing schemes in the country and many of the others," and rightly emphasises the need for good layout and landscaping. Welcome reference is also made to the provision for cars and the need for the separation of pedestrians and vehicles. In the committee's praise for the pioneering Radburn scheme in this country, I was glad to note the reference to the adoption of the wider frontage house with a through-hall providing a good entrance on both sides of the house. I think this is vital to the satisfactory use of this access system and first indications of a large area at Cumbernauld designed on this basis are certainly encouraging.

The report quotes a number of useful appendices, particularly those concerned with heating of two-storey houses, and the cost of providing for one car per dwelling in higher density areas.

This report should open the eyes of people in authority to some of the possibilities in the field of housing. It is not concerned with the production of standard housing plans or detailed recommendations on the sizes of the rooms or the arrangements. All this is left to those involved in the implementation of schemes. The architect's plea for freedom to produce new ideas is fully recognised; his responsibility will be all the greater. I welcome the report and congratulate the committee on its accomplishment. I trust that the Minister of Housing and Local Government will act on the recommendations, and pass a copy of them to the Secretary of State for Scotland.

Eric Lyons, who has made a unique contribution towards a better standard of design in private-enterprise housing

Present local authority housing standards derive from the recommendations of the 1944 Dudley committee and are framed largely in terms of minimum room sizes and "standard" plans. As a result, experiment has been stifled and we are building to obsolescent ideas. This new report makes housing history. The committee has carried out an unbiased and meticulous examination and it confirms what many have believed for some time, that our standards are inadequate and that we must spend more money on our housing.

The committee has probed and brooded for two years, which seems a long time, but it has emerged with a list of important recommendations, the most significant of which are space (more of) and heating (some). All their recommendations apply to both local authority and private enterprise housing.

The report is perhaps over-long and at places, wordy. If some of its observations are obvious enough they are often words that we want to hear echoing around our town halls and speculative builders' offices. For example: "The starting point for thinking about houses and flats must be the activities that people want to undertake in them." The committee has approached the question of standards by looking at *needs* and setting a minimum *overall* size of houses or flats according to occupation rate. It may be a vain hope but it implores that its minima should not become maxima. There are no more recommended plans or schedules of minimum (*ie* maximum) room sizes and the architect is left to arrive at the best way of arranging the space and equipment. Indeed, it is pointed out that to use such plans is to lose the advantage of employing an architect! Of course, we have all known this for years. But it is an official committee that is saying that this approach of relating standards to the activities of *users*, and not to numbers and sizes of rooms, is a means of "releasing more of the creative energies of architects concerned with housing . . ." and leave them free "to explore new living arrangements to suit changing needs." One more quote I find irresistible: "The belief that the design of houses is a job

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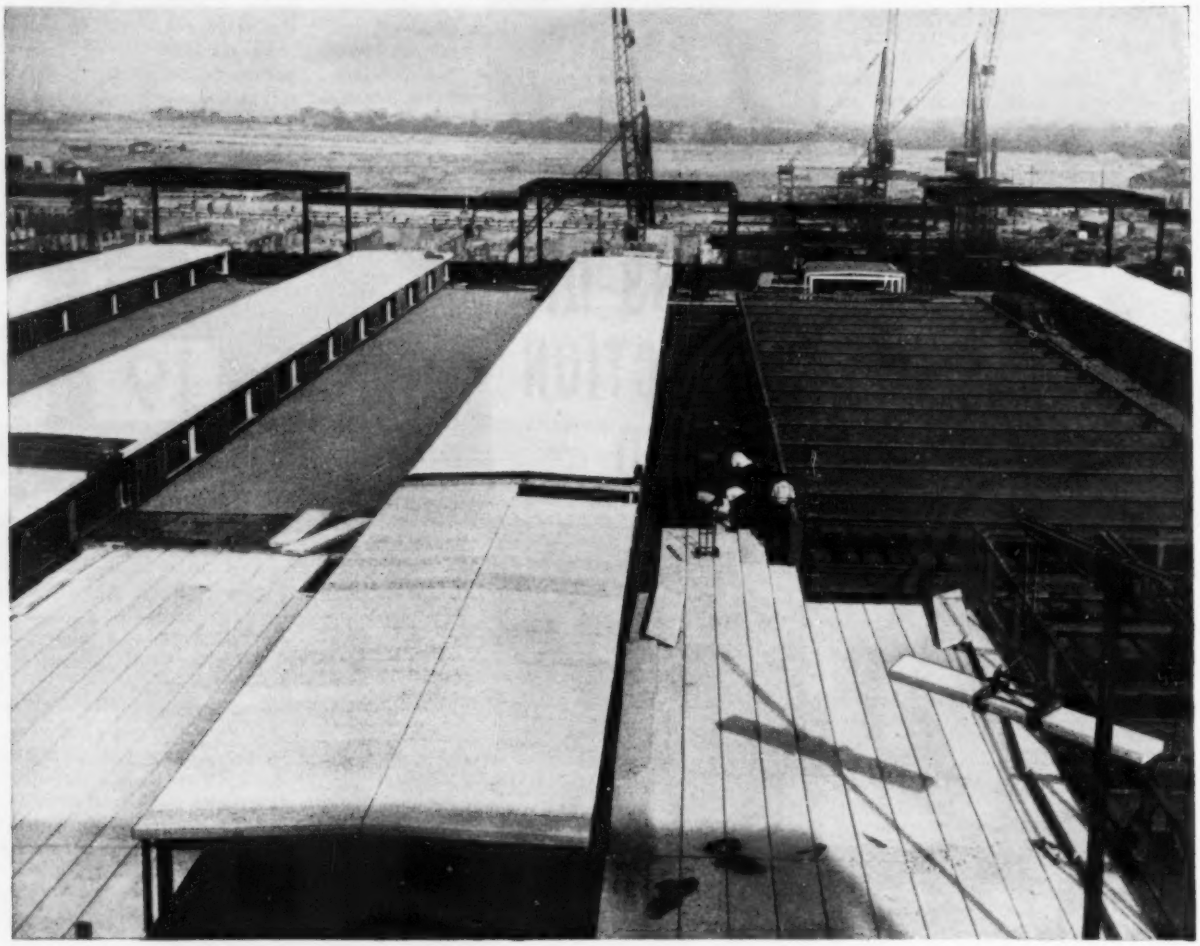

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extra price of the better accommodation. It would be a national disaster to underestimate the potentialities of our wealthy society and to saddle this country with further millions of mean dwellings which are too small and too ill-equipped to be adaptable to changing needs. Unsuccessful car, TV, or refrigerator models can be discarded relatively quickly. An ill-conceived house will handicap at least three complete generations of human beings, and is a lasting reproach to the faith and humanity of its begetters.

Hugh Wilson, architect to Cumbernauld new town, who is leading the way in the second generation of new towns

In terms of development, housing has been the Cinderella of post-war building and in appearance too many housing schemes have adopted the role of the ugly sister. Perhaps the basic problem has been that housing became caught up in politics, quantity being preferred to quality, without any real consideration of whether or not the two are necessarily incompatible. With urban renewal just beginning, the need to produce large numbers of houses is as pressing as ever; indeed, just after the war, it would have been difficult to forecast that in 1961 the LCC would be talking about mobile homes for the homeless. The problem of building large numbers of houses at a reasonable cost requires a breakthrough in technology. At the same time it is vital to achieve housing environment which provides conditions worthy of a rising standard of living.

This report was therefore awaited with keen interest, since its recommendations could influence housing design over the next two decades. In the event the committee has rightly seen its task as one of pointing out the problems, and not of producing the solution: a job accomplished in a most satisfactory way. More space, better heating and housing standards expressed in terms of the activities of the occupant rather than of the number and sizes of rooms—this just about sums up the report. I believe it is one of the most important documents on housing to be produced since the war.

The committee's terms of reference were somewhat restrictive and thus its members were concerned mainly with the design of dwellings. Nevertheless, the importance of layout has been fully appreciated, and the report includes some useful reference to the problems of the motor car and the creation of a good environment.

The statement of a minimum standard of floor area related to size of family would seem to be a reasonable approach, and no one is likely to quarrel with increased provision for storage or the recommendation that flats should have a storage space comparable with that of houses. This is a reflection of the view that flats are not a second best form of living but should be acceptable in their own right. A welcome should also be given to the adoption of the RIBA suggestion that housing plans should show the disposition of furniture to ensure a proper functional basis for the use of the room. Reference to the adaptable house with the need for future research and development is another interesting point. We have found at Cumbernauld that it is possible to take some steps in this direction on the basis of a standard house shell, fixed plumbing units and a choice of methods of dividing up the remaining space.

The recommendation on improved heating standards is an important step forward for this is the key to the most flexible use of all the space in any house.

In dealing with the home in its setting, the committee comments with some justification on the "vast gap between the best housing schemes in the country and many of the others," and rightly emphasises the need for good layout and landscaping. Welcome reference is also made to the provision for cars and the need for the separation of pedestrians and vehicles. In the committee's praise for the pioneering Radburn scheme in this country, I was glad to note the reference to the adoption of the wider frontage house with a through-hall providing a good entrance on both sides of the house. I think this is vital to the satisfactory use of this access system and first indications of a large area at Cumbernauld designed on this basis are certainly encouraging.

The report quotes a number of useful appendices, particularly those concerned with heating of two-storey houses, and the cost of providing for one car per dwelling in higher density areas.

This report should open the eyes of people in authority to some of the possibilities in the field of housing. It is not concerned with the production of standard housing plans or detailed recommendations on the sizes of the rooms or the arrangements. All this is left to those involved in the implementation of schemes. The architect's plea for freedom to produce new ideas is fully recognised; his responsibility will be all the greater. I welcome the report and congratulate the committee on its accomplishment. I trust that the Minister of Housing and Local Government will act on the recommendations, and pass a copy of them to the Secretary of State for Scotland.

Eric Lyons, who has made a unique contribution towards a better standard of design in private-enterprise housing

Present local authority housing standards derive from the recommendations of the 1944 Dudley committee and are framed largely in terms of minimum room sizes and "standard" plans. As a result, experiment has been stifled and we are building to obsolescent ideas. This new report makes housing history. The committee has carried out an unbiased and meticulous examination and it confirms what many have believed for some time, that our standards are inadequate and that we must spend more money on our housing.

The committee has probed and brooded for two years, which seems a long time, but it has emerged with a list of important recommendations, the most significant of which are space (more of) and heating (some). All their recommendations apply to both local authority and private enterprise housing.

The report is perhaps over-long and at places, wordy. If some of its observations are obvious enough they are often words that we want to hear echoing around our town halls and spec-builders' offices. For example: "The starting point for thinking about houses and flats must be the activities that people want to undertake in them." The committee has approached the question of standards by looking at *needs* and setting a minimum *overall* size of houses or flats according to occupation rate. It may be a vain hope but it implores that its minima should not become maxima. There are no more recommended plans or schedules of minimum (*ie* maximum) room sizes and the architect is left to arrive at the best way of arranging the space and equipment. Indeed, it is pointed out that to use such plans is to lose the advantage of employing an architect! Of course, we have all known this for years. But it is an official committee that is saying that this approach of relating standards to the activities of *users*, and not to numbers and sizes of rooms, is a means of "releasing more of the creative energies of architects concerned with housing . . ." and leave them free "to explore new living arrangements to suit changing needs." One more quote I find irresistible: "The belief that the design of houses is a job

that anyone can tackle with success is entirely without foundation—*it is one of the most difficult tasks in the whole field of architecture.*" (My italics; I am glad that somebody else has discovered this.)

The committee's investigations ranged far, wide and to some depth in places. There is a section on the "Requirements of different families" in which the facts of life are revealed about babies and interrupted nights, toys on the carpet, men in aprons, room for furniture, shopping, homework, hobbies and so on, all suggesting new kinds of houses and even *adaptable* houses. The committee retained an open mind about open-planning and examined various family eating and sleeping arrangements. There is mention of the possible dual use (given adequate heating) of bedrooms as study-rooms or for leisure activities. In recommending extra wcs it confirms the obvious and absolute necessity of all bedrooms (except bed-sitters or one-bed flats) having access to a wc without passing through another room (competitors and competition assessors, please note).

The recommended minimum space standards include special provision for extra storage. Clearly, storage has been sacrificed in the efforts to reduce size and cost of present-day housing, so this recommendation is a necessary corrective.

On heating, the report points to the exotic but well-known advantages of being warm in winter (or even the summer, I suppose) and this is its second priority, that is, second only to adequate space.

There are some sensible observations on kitchen planning, pointing to the elimination of the ventilated larder, the need for uninterrupted working areas (work-surface/cooker/work-surface/sink/work-surface) and the need for more storage and space for the ever-increasing pieces of equipment which every woman will not be able to be seen without. Overall dimensions are given of desirable arrangements, all based on the magic module of 21in which pre-supposes that it is possible to close-couple the various units. Unfortunately this is very rarely possible because cookers, fridges, etc, are designed for retail sale with rounded corners and in varying sizes, to say nothing of the tendency towards air-flow design which makes so much equipment more suitable as projectiles rather than elements in the kitchen production line. The report is critical of present provisions of electric points and recommends a considerable increase; for example, fifteen is the minimum number of socket outlets for a five-person house.

Aspects of flat design are dealt with in detail. Some guidance is given on lift installations, but it seems we can expect a publication from the Ministry dealing with lift service appropriate to various heights and planning arrangements. There is no enthusiasm for private balconies (45 sq ft balcony = £150 = 75 sq ft floor space!) and there is a searching examination of various methods of refuse-disposal. We used to design housing around the fireplace or flue-stack but as now we generally have to start with refuse-collection, the analysis of various methods is particularly interesting.

Finally the report deals with what is rather coyly called "The home in its setting". This is mostly about the problems of layout design, and I was surprised that the committee seemed to think that this was not strictly within its terms of reference. Of course it would have been futile to attempt any examination of housing standards without looking at this vital aspect. We must be thankful that the committee took the plunge because this section of the report covers the area of greatest failure in post-war housing. This is obviously the critical factor in the creation of residential environment and as the committee says, "Control of development by town-planning cannot by itself produce good layout and appearance." I think that the importance of layout and landscape is now widely recognised. But too many people, and this includes this committee, seem to think that we should not have to spend more money (capital and maintenance) than the miserable allocation made by local authorities and new towns, and the nil allocation of most spec-builders. The report is in favour of good layout but states that there are "not necessarily costly ways" of getting it, and there are no cost implications. This optimism may be flattering to architects, but it is not going to encourage those who know that "good layout and landscape" costs money for extra pavings, screen-walling, planting, etc, and this is particularly important when using the Radburn (or segregated off-road) layout technique, which, in fact, is recommended in the report.

On the provisions for cars, the committee has been realistic and thorough and it "with great reluctance" recommends that every new home should have space for one car (this is currently insisted on by most planning authorities) so we shall be providing storage for the *extra 10,500,000* cars expected by 1980 even if there will be no room on the roads to use them (in which committee's terms of reference is this one?). Higher density development means smaller gardens so there are some excellent recommendations for children's play-spaces, including the extra cost and space needed.

Altogether, the report is a most important document and the adoption of the recommendations should produce a big leap forward in housing design. I must confess to being worried about one point. It is difficult to think that the committee, in looking at so much recent housing, should not have observed the appallingly low standard of internal finishings: flooring, decoration, ironmongery and cheap-jack craftsmanship generally. Clearly, not enough money is being spent and this is an aspect of standards that should not be ignored, particularly on local authority work. This is a case where the minimum must *never* be the maximum.

Finally, it is worth mentioning that even if these recommendations were adopted, there still remains the obstacle of our out-of-date by-laws—particularly on space about buildings, ventilation and fire-protection—and it is to be hoped that the impending by-law review is not too far away.

PLANNING FORUM

Who will develop the developers?

Wondering planners got a glimpse of the mysteries of high finance last week when Trevor Donaldson, a partner in the firm of estate agents handling the redevelopment of Bradford's central area, talked to the Planning Forum on "the futility of plans without profits." He explained, for example, the simple formula by which penniless people made vast fortunes in the golden days of the early '50s. At that time it was possible to buy a site, develop it and let the building without putting up any money at all, because one could be sure of a yield so high that a mortgage on the completed development would cover its entire cost. That cost, in fact, was only about two-thirds of the value of the completed development, so one reaped the difference between, say, the interest on a £200,000 mortgage and the rent income from a £300,000 building, without having invested any capital oneself; and one could always cash one's harvest by "going public"—turning the equity into shares in a public company.

As more people caught on, of course, margins have gone down to a beggarly 9 or 10 per cent—though the developer will naturally try for 20 when he first approaches a planning authority. The developer, in fact, now actually has to put in some money. Further, institutional investors (such as insurance companies) and land-holders (for instance, British Railways) are demanding a share in the equity. Even local authorities are insisting on periodic reviews of ground rents. Does this mean, Michael Dower hopefully asked, that private developers will soon turn to the redevelopment of twilight areas, or of the centres of small northern towns, now that their cut from the killings has been trimmed? Far from it, replied Mr Donaldson: it means that developers will increasingly turn to

Australia, Canada and the United States, where conditions are still as they were here ten years ago, and where the clever Briton, being far ahead of his trans-oceanic cousins in financial technique, can still make a fast million bucks out of nothing. It also means that smaller developers, who have to borrow at current rates of interest, are going to be "seen off" by such brilliant practitioners as the Samuel who got £19 millions at 4½ per cent and can now well afford to accept a margin of 7 per cent. The result will be much fewer, but some bigger, redevelopments in this country.

The speaker's advice to local authorities was to let the developer make a "reasonable" profit—8 to 10 per cent—for otherwise the job would not get done. If possible, the local authority should make the developer do the least remunerative part of the job first, or he might "go bankrupt or something" before he got round to it. But it was no use trying to outsmart the developer: if he got trapped into a bad bargain there was no way of making him do anything he found unprofitable.

Planners and local people were always wanting things like blocks of flats or hotels in their central areas—things which it did not pay to provide outside London and Glasgow. The only way to get such profitless luxuries was to accept a low ground rent, or to offer the developer a *quid pro quo* in the form of a plummy planning permission.

And what did all this demand of the architect? That he should be "practical—willing to trim his sails according to the prevailing wind." And what of the quality of central-area development that was thus organised—at Bradford, for example, where it had been such a "terrific success" (financially speaking) for both developer and local authority? This question was raised from the chair by Dr Nathaniel Lichfield, of the Ministry of Housing and Local Government, in the course of his summing-up. But he did not stay for an answer.

DEREK SENIOR

RIBA

Scottish members' meeting

A meeting of members in Scotland is to be held in Edinburgh on Saturday, March 31 1962, at the North British Hotel at 2.30pm. This meeting will follow the lines of the very successful meeting held in Leeds last May for members in the north of England. The president and other honorary officers, chairmen of important committees and members of the Royal Institute of British Architects' staff will go to Edinburgh to meet the members and to discuss professional matters with them.

It is expected that there will be a full discussion on the report of the Office Survey, and there will also be time for members to raise other matters of special interest to them, and to question the representatives of the RIBA.

CRAMLINGTON

Private enterprise has a go at new town planning

Cramlington, Britain's first private enterprise new town under town and country planning, was born in 1958 at a public inquiry into the Seaton Valley Town Map. At that time Northumberland County Planning Department proposed it to developers complaining of a shortage of building land.

Since then Cramlington has been incorporated in a revised Town Map (now up for Ministerial approval) and is also the object of Comprehensive Development Area Plan due to be submitted shortly.

The new town is destined to straddle a small hill 8 miles north of Newcastle and will have excellent communications. The Great North Road passes a few miles to the west and the main London to Edinburgh railway runs in an arc across its south-west quarter. The proposed Northumberland industrial spine road providing direct access to the Tyne tunnel and its link roads will pass it on the east. The tunnel is now in the first stage of construction. Newcastle Airport is only ten miles away through open country.

The total acreage available at Cramlington is 520 acres for industrial and 1,591 for residential and other purposes. The county planning department has accepted responsibility for the industrial site. The remainder is the province of two Newcastle builders, Messrs Wm Leech and John T. Bell. Leech is primarily interested in housing and Bell in the commercial centre of the town.

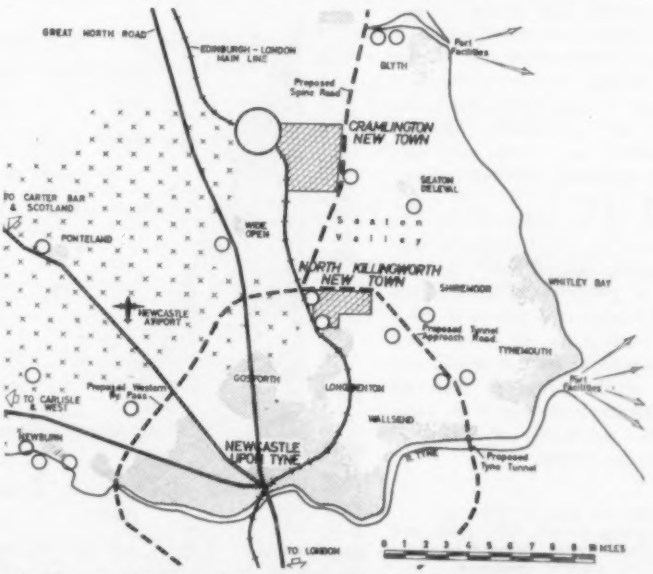
The former has retained a firm of town planning consultants, Mauchlen, Weightman and Elphick with Charles F. Reilly, now senior lecturer in town planning at King's College, Newcastle, who have produced the town plan and a written report from which the County Planning Department will prepare the Comprehensive Development Area Plan.

The existing village of Cramlington is on the edge of the declining Northumberland coalfield. Its only notable buildings are a black sandstone hall *circa* 1820 and a large Victorian parish church which is a prominent landmark for miles around. To the west lie fertile farming land and the Newcastle green belt. In other directions but particularly eastwards, is a mixture of fields and trees, overgrown mineral tips, and clumps of sporadic development—including recent council houses.

Almost the whole area has been undermined but mostly long ago and at depth. Northumberland builders are however accustomed to compensating for subsidence by building on concrete rafts. A few areas of restored opencast mining are embraced by the proposed site and also a couple of patches where undermining is too shallow to permit building at all. These have been ingeniously incorporated in the plan as parks.

The gross density for the whole town, including the central area and open spaces but excluding the industrial site, is set at present at 30 persons per acre with the the possibility of raising it to 35. The consultants' report however reflects the ideas of the clients in the statement that the higher density "would not exclude the type of housing that can readily be sold." At such densities the population of Cramlington is likely to be between 48,000 and 56,000.

The layout designed by the consultants provides for segregation of motor and



Sketch map showing relation of proposed Cramlington new town to Newcastle and the Northumberland CC's new town of North Killingworth

M

foot traffic and a road system that skirts the residential areas as far as possible. Through traffic will be routed outside the town. As detailed planning of the first two residential neighbourhoods is only now taking place it is impossible to comment on them. However, it appears the developers intend them to appeal to existing or prospective council house tenants. If they pursue this path of development single-mindedly there is a danger the town may not achieve social variety. The plan nevertheless proposes 16 neighbourhoods all with school sites and shops and is suitable for mixed development.

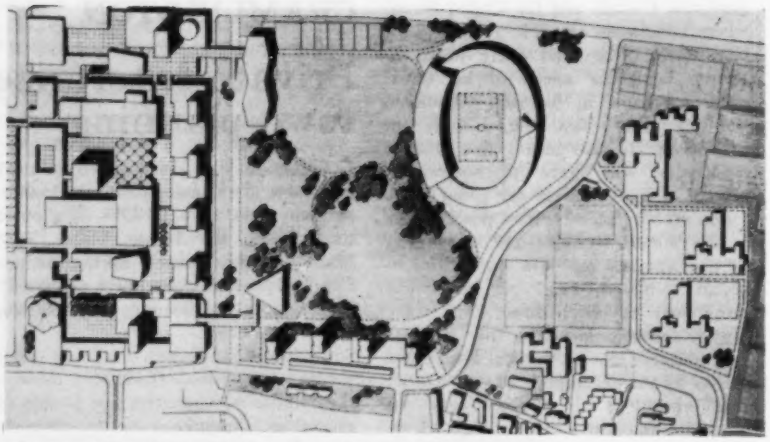
An elaborate town centre is planned comprising commercial and cultural amenities, a convenient landfall being used to achieve two level circulation. The adjacent centre of the old village is seen as an arts centre.

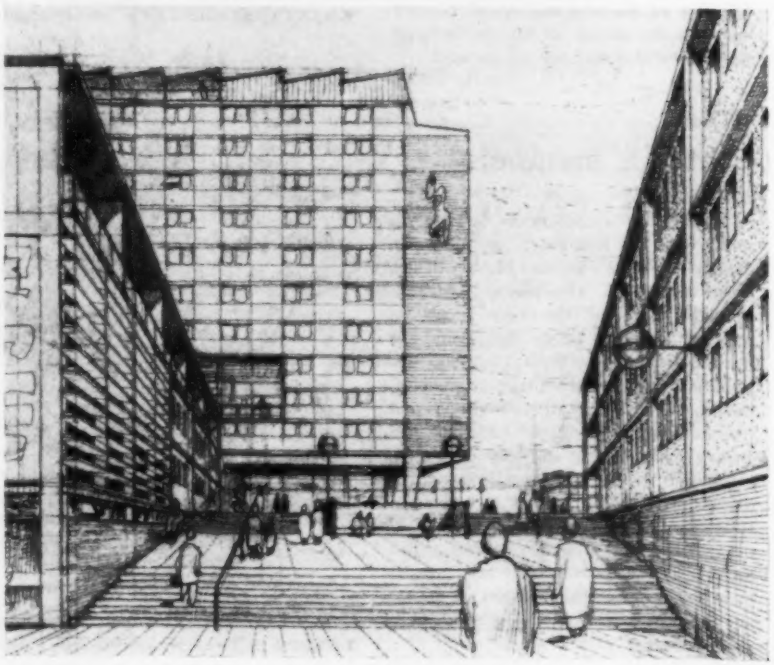
Although to a southerner the conical mineral tips of Northumberland are almost as romantic as Aztec pyramids in Mexico, in the North-East they are evil symbols. Tips on the site will therefore be removed for roadmaking and infilling where possible and landscaped elsewhere. A wirescape originating from nearby Blyth power station will also be tackled.

Sewage capacity is another problem, but plans are already being drawn up for a large new filtration plant to the north of the area. This will have capacity to process effluent from both industrial and residential sources. The provision of other services seems to present no great problem.

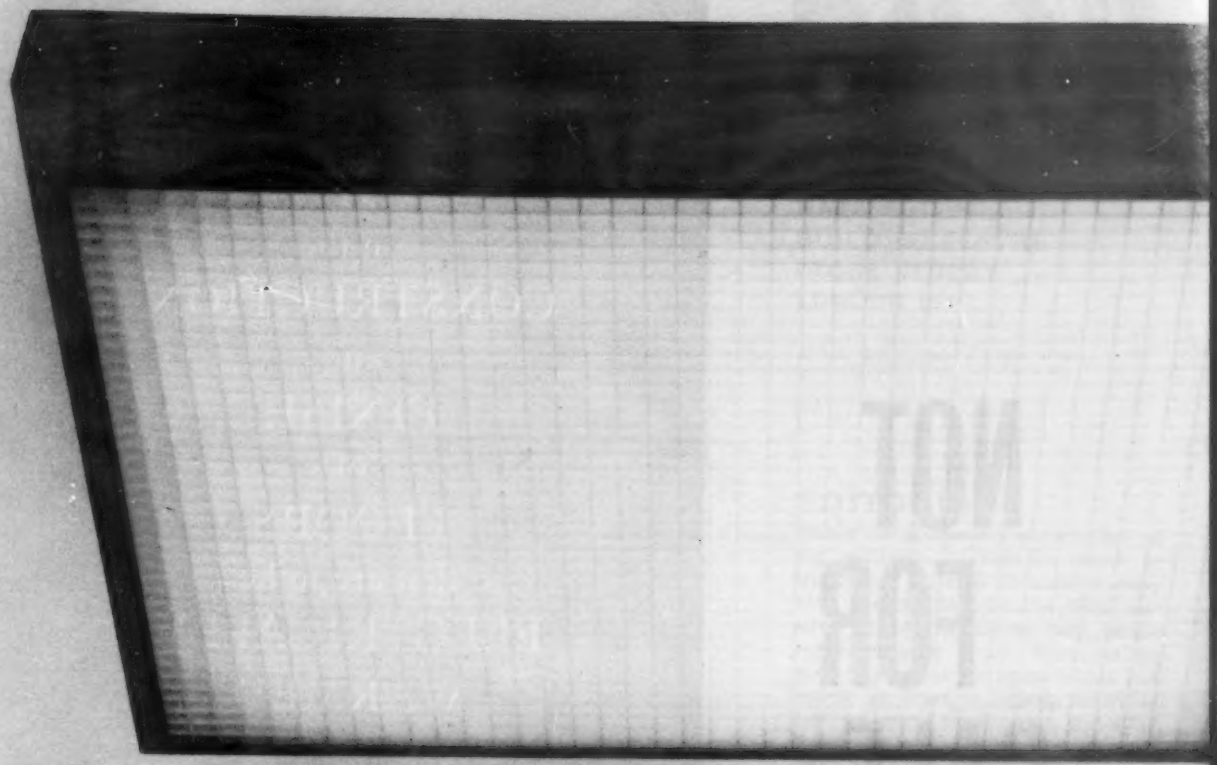
Whether Cramlington turns out to be a new small town which can attract and hold a varied population and provide jobs and social life in a style that can help to revitalise the depopulated North depends on several things to which there are so far no answers. We do not know whether the developers propose to carry through the proposals of their consultants; reputedly they intend to give the town a centre and are thinking in terms of flats, maisonettes and terrace houses, but whether they are prepared to pay for them is vague. And unless the development of Cramlington's industrial site is assured, the town can only develop as a dormitory, whether compact or sprawling.

Responsibility for the industrial side has been accepted by the Northumberland county planning officer, who has embarked on a publicity campaign, but whether the county is prepared to back this with expenditure on roads and sewers remains to be seen. It would certainly help if the proposed National Economic Council made one of its early objectives the redirection of industrial investment to the North.





Top, close-up of part of scheme, showing shopping centre, left, park and football ground; centre, general view of the site, with present scattered buildings; bottom, imaginative sketch of shopping centre



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BASA

BASA EDITOR
BUILDING CENTRE
STORE STREET
LONDON W1

EDITORIAL

Within the present-day parochialism of our profession, the need for validity in architecture has been discussed so many times that we have become blind ourselves as to the reasons why people require building at all. When are we going to examine the fundamentals, and accept our share in helping society to solve its many simultaneous problems? Building is only one contribution to the total formation of our environment. But to create better forms of environment calls for new methods of education. Only then can we, as participants in a building service, begin to be aware of the responsibility that society places in us. It is a tremendously complex, but nevertheless exhilarating, task. Because there is an almost complete absence of policy in architectural education today, most time spent on directing complaints against the present methods of teaching in our schools is wasted time. Only when we can ascertain why a building service is needed, and where its responsibilities lie, can we begin to form policies for education, and likewise the methods by which we may put this education into practice.

A new report on Architectural Education has just been completed by BASA's Executive Committee which will be available at the Sheffield conference. At previous conferences we have examined and formulated the aims of education: we now examine what is implied by "teaching." The papers to be read at this conference (Totley Hall, Sheffield, January 4, 5 and 6) inquire into the *idea of education*—the relationship between natural experience and collected information; the *Physics of environment*—an analysis of perceptive experience and its conditioning of us; the *Anatomy of judgment*—what does "choice" mean?; and *Machines for teaching*—can they provide the most objective method for passing on information?

circe

He is indeed an optimist . . . who thinks that the day of smooth and easy entry to university is at hand for members of our rapidly expanding sixth forms.

So wrote Sir Ronald Gould in his introduction to *University entrance: the basic facts*, one copy of which went to every secondary school providing entry to university.

The absence of some form of general clearing house for university entrants seems to be a conspiracy of those university officials who think in terms of "your first choice," etc. Even though some form of clearing house would not solve the manifold problems that face sixth formers, what chance are they given of judging the merits of the university they hope to attend? It would seem none which is of real use: a dowdy brochure, "so and so went there and look at him," a stuffy interview and, perhaps, a quick look round the social amenities. Many universities accept students without so much as an interview. Assuming that a student goes to university for academic and social reasons the method by which he selects his university seems somewhat arbitrary. University A may have suited his maths master or university B her English mistress, but this in no way indicates that he or she will be suited to either.

A great many universities seem to be doing very little to enlighten either would-be students or their parents as to their real merits.

Manchester University School of Architecture is to be congratulated on its initiative in holding a public exhibition of teaching methods. As our largest industry is building, an exhibition showing how architects are being trained is of interest not only to those involved in architecture, but to those thousands of people in a city such as Manchester who deal with it, either directly or indirectly, every day.

Would it not be possible for other schools of architecture to hold a triennial exhibition in their town or city? This would show, perhaps, that architectural students do not just draw "nice" shapes on pieces of coloured paper.

It is hoped that the Manchester school will make known the results of its exhibition.

Over 8,150 people have become homeless in London so far this year and this figure is expected to increase over the next ten years. The number of people without homes in other large towns seems to be considerable. Who is to blame? Could it be our antiquated building methods?

It appears that in some countries this problem is being solved more quickly by either permanent or temporary prefabrication.

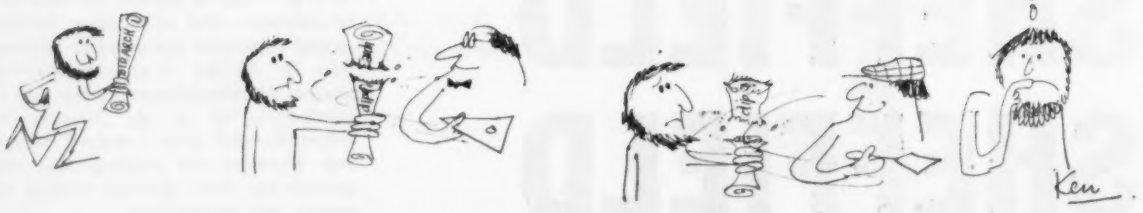
There seems to be something slightly wrong, when these homeless, yet still tax-paying, people cannot even get a furnished room, the War Office is buying for BAOR some 200 caravans "30ft long with a twin-bedded room with fitted wardrobes and electric fires, bathroom and separate lavatory, a kitchen with sink unit, electric cooker, refrigerator, cabinet and airing cupboard, lounge with electric fire, tables and chairs, a settee which can be converted into a double-bed and a cocktail cabinet."

The Smithsons let go quite a tip when discussing how they achieved the carpet-colour in the new showroom for Iraqi Airways in Piccadilly, by matching up to a colour slide of the desert. The editor would like to know which detergent they chose to determine the interior white finish.

The demolition of many residential properties and small offices in the central London area, to be replaced by office accommodation, is very disturbing. Where once perhaps a hundred people lived or worked now a thousand work only. The enormous office building erected to the west of Oxford Circus, already the busiest tube station in London at 5.30pm, can only contribute to the chaos of the rush-hour. Tube trains and buses serving this area are overloaded and no authority would allow livestock to be transported in such unhygienic conditions. The motor-car traffic hardly bears thinking about.

The implications of such apparently unrestrained office construction are terrifying. Could not the Cottons and Clores of this world put their enormous financial resources to a better end—the erection of flats to meet the pressing housing problem mentioned on this page? One can only suppose that the monetary returns would not be great enough.

Happy Christmas to you



SHEFFIELD CONFERENCE

JANUARY 4–6 AT TOTLEY HALL

AIMS AND METHODS OF ARCHITECTURAL EDUCATION

The Sheffield conference of the British Architectural Students' Association concludes the association's analysis of the aims of education. Simultaneously, it marks the beginning of a new programme of work to evolve methods of architectural education to implement these aims. BASA has found dangerous decay both in the policies and the methods of the present-day system of architectural education, and our conferences at Bristol in January 1960, Oxford in September 1960, and at York in September 1961, have attempted to provide a new basis for coherent and constructive educational proposals. These are outlined in a report on the aims of architectural education which may be obtained at the Sheffield conference. The report acknowledges the need for planned re-ordering of the total form of our environment. Part of this need will be fulfilled by the new concept of a building service. We envisage a much closer liaison between designer and constructor in the building process and a fundamental extension of the architect's field of active influence and control. This would include compiling the building-brief and acting as a determining factor at various levels of national planning and at detailed implementation. In addition to these, and as an integral part of the building service, we envisage a co-ordinated programme of research, wide in scope and detailed in depth, with adequate communication channels to ensure "feedback" information to every stage in the building process. BASA recognises that it is essential to promote and maintain an educational policy and method capable of achieving this. The association's conference at Sheffield will formulate a programme of work designed to meet this need.

Totley Hall is a domestic science college, situated in pleasant surroundings about six miles outside Sheffield, and reached by a twenty minute bus journey (No 45) from the bus station opposite Midland Rd Station. It consists of a Jacobean manor house to which is attached a wing of bedrooms and classrooms built in 1950. Bedroom accommodation for conference members will be in the new wing and conference sessions will be held in the common room.

Provisional Programme

Thursday, January 4

2pm. Conference members assemble in Sheffield for conducted tour of the Park Hill development and the market.
5pm. Bus to Totley Hall. Signing-on.
6pm. Dinner.
7.30pm. Introductory talk followed by informal session with films and slides.
10.30pm. Coffee and sandwiches.

Friday, January 5

8.30am. Breakfast.
9.30am. *Paper No 1, The idea of education,* by K. Neuberg, MA, Institute of Education, University College, London.
11am. *Paper No 2, The teaching of environmental physics,* by Professor John Page, BA, Professor of Building Science, University of Sheffield.
1pm. Lunch.
2.30pm. *Paper No 3, The anatomy of judgment,* by Dr Jane Johnson Abercrombie.
4pm. Tea.
4.30pm. *Paper No 4, Machines for teaching.*
6pm. Dinner.
7.30pm. *Discussion groups.*
10.30pm. Coffee and biscuits.

Saturday, January 6

8.30pm. Breakfast.
9.30am. Forum.
11am. Coffee.
11.30am. *Open discussion.*
1pm. Luncheon.
2.30pm. *Final session.*
4pm. Tea.

End of conference

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cut here

Please reserve.....place(s) at the BASA Sheffield conference

I enclose.....booking fee (10s per person) and agree that this will be forfeited in case of cancellation after Wednesday December 27

Name..... School.....

Home address ....

I should/should not like to attend the site visit on Thursday afternoon

PTO

PARK HILL VISIT FOR CONFERENCE DELEGATES

The back-to-back nineteenth century brick slum terrace housing of Sheffield's Duke Street area has been pulled down. In its place a new social idea with an architectural form has been evolved, emerging directly and humbly from the pattern of human relationships that were there before. The significance of the breakthrough in terms of architectural thought is not yet completely appreciated. Its terms of reference in providing the right kind of spaces in which human associations might form, tend to diminish those positive aspects which are only of purely architectural merit. Such is the strength of the idea of valid architecture which emerges so clearly and so instantly that one is unaware of the actual architecture involved. Park Hill is people: the architecture is anonymous (actually, the work of Sheffield's city architect's department—and fully illustrated AJ 23.8.61); supreme when shown in its true place, as here.

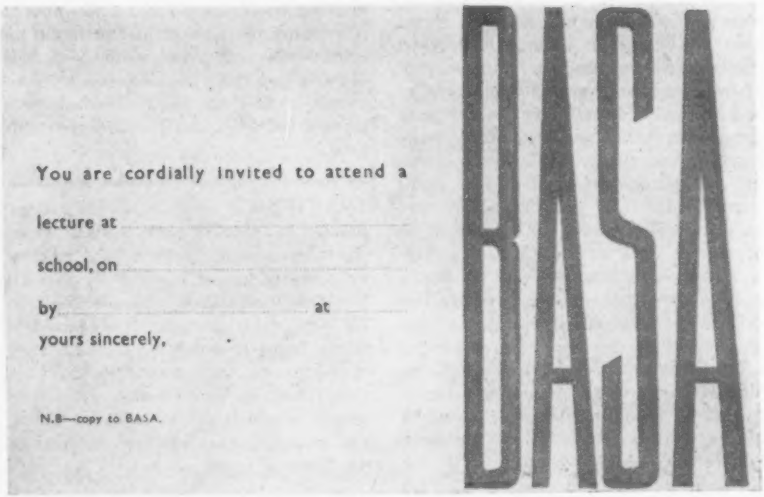
BASA delegates will visit Park Hill on the first day of the conference, Thursday afternoon at 2 pm. An on-site discussion with a social worker has been arranged, and the party will be shown round by a member of the city architect's department. We are pleased to have been able to arrange this visit to Park Hill, as its significance can be judged only by experiencing it. Following this, a visit will be made to Castle Hill market in the city centre.

FILL IN YOUR RESERVATION FORM ON PAGE 1165 AND SEND IT WITH YOUR BOOKING FEE WITHOUT DELAY. REMEMBER CHRISTMAS AND POSTAL DELAYS

Send to the BASA president: Christopher Musson c/o the Building Centre, Store Street, London WC1

REGIONAL COMMITTEES

The first rumblings of regionalisation were heard at the York annual general meeting. Why and what is the problem? There are sixty-four schools of architecture in Britain. We are presented not only with this large number of schools, but the fact that they are at various degrees of recognition and are situated in differing establishments of learning. There are ten types in all. Sixty-four is obviously too many for everyday administratio. . By their nature, some functions will remain in the hands of the central executive while others can be organised regionally, ie lectures, forums, etc. These regions are based on an optimum number of schools and allied societies (AJ 11.10.61) and BASA wishes to create regional executive committees to correlate functions. To assist this, BASA is issuing printed invitation cards to all schools.



The preliminary meetings in London and Wales/West regions, have been successful. The former has met twice, exchanging programmes and creating an executive, the latter has met once, exchanging programmes and arranging a second meeting which a member of the central executive will attend. Meetings are to take place shortly in the South and Yorkshire/Lancashire regions which an executive member will also attend. When these groups are fully established they will elect a representative to the central executive, thus ensuring regional opinions.

The solution of mutual problems becomes easy and the initial vitality stimulated by these meetings is a healthy sign by which architects may at least see the rewards of exchange and co-operation.

BASA SHEFFIELD CONFERENCE

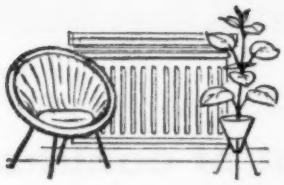
Aims and methods for architectural education

Totley Hall, Sheffield. Thursday, January 4, to Saturday, January 6 1962

BASA subscribing members	£3 5s
Non-subscribing students	£4 5s
BASA associate members	£4 5s
Architects and teachers	£5 5s

All inclusive of 10s booking fee payable at time of reservation

Hot water never runs cold on her!



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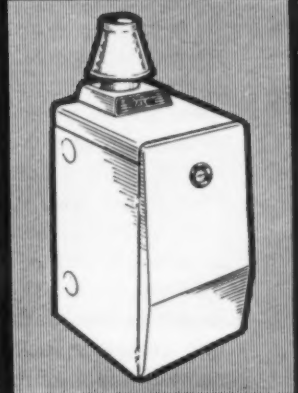

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suitable for up to 220 sq. ft. of radiators and 40 gallons of hot water. Price £95.

MODEL SA35
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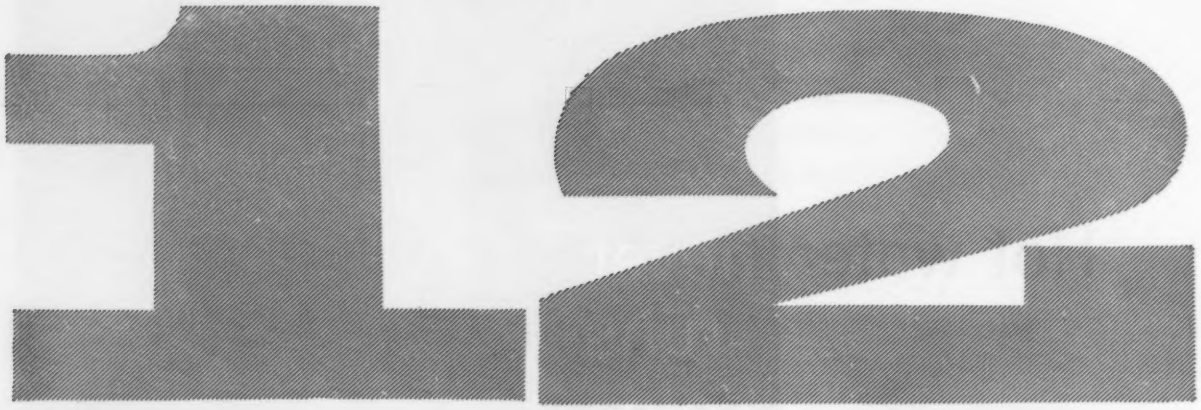
suitable for 50 sq. ft. of radiators and 30 gallons of hot water. Price £65.

THE LOGICAL USE OF COLOUR IN BUILDING



The eye-contrast and the enhancement of contrast

The importance of ensuring the right degree of contrast in the several parts of a decorative scheme cannot be over estimated. That such contrasts should lie between certain limits, and that contrasts can nowadays be partly calculated, is well known.

It is not the purpose of this note to consider contrast in general, but the use of colour to produce an enhancement of colour contrast by placing colours near to each other but not adjacent to each other. In this way certain complementary colours can be used to make certain objects or architectural features more or less prominent. Simply, the basic hues, blue-yellow, red-green, when placed near but not adjacent to each other, enhance or increase the chroma of each colour. If the pair are originally of high chroma, then the enhancement effect can almost reach the pain level. If one is of high luminance and the other low, then the high luminance colour appears lighter and the low luminance colour darker than if they were viewed separately. The effect of this contrast enhancement can be controlled by the degree of separation of the colours and framing one with another different colour. This serves to emphasise the chroma of the colour and to prevent the unpleasant adjacent complementary colour associations. If the frame of a door (already painted a high chroma colour) is painted with a high value colour (say cream and white), the decoration of the door is enhanced.

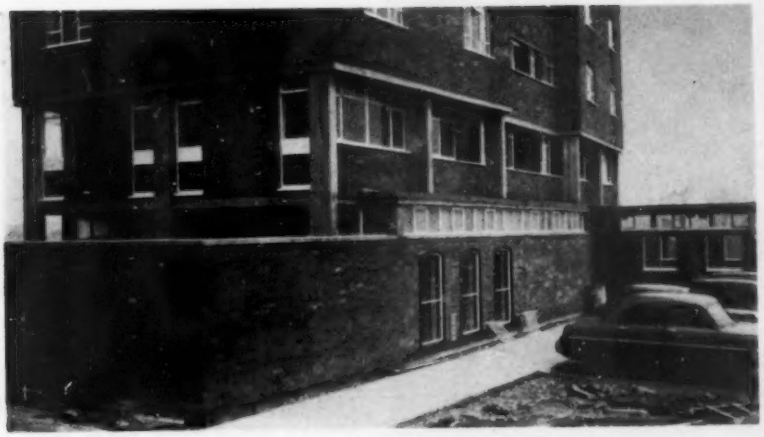
By suitable choice of the position or area of the red-green, blue-yellow parameter colours, the enhancement of colour can be made a decorative feature.

ANTI-UGLY 2

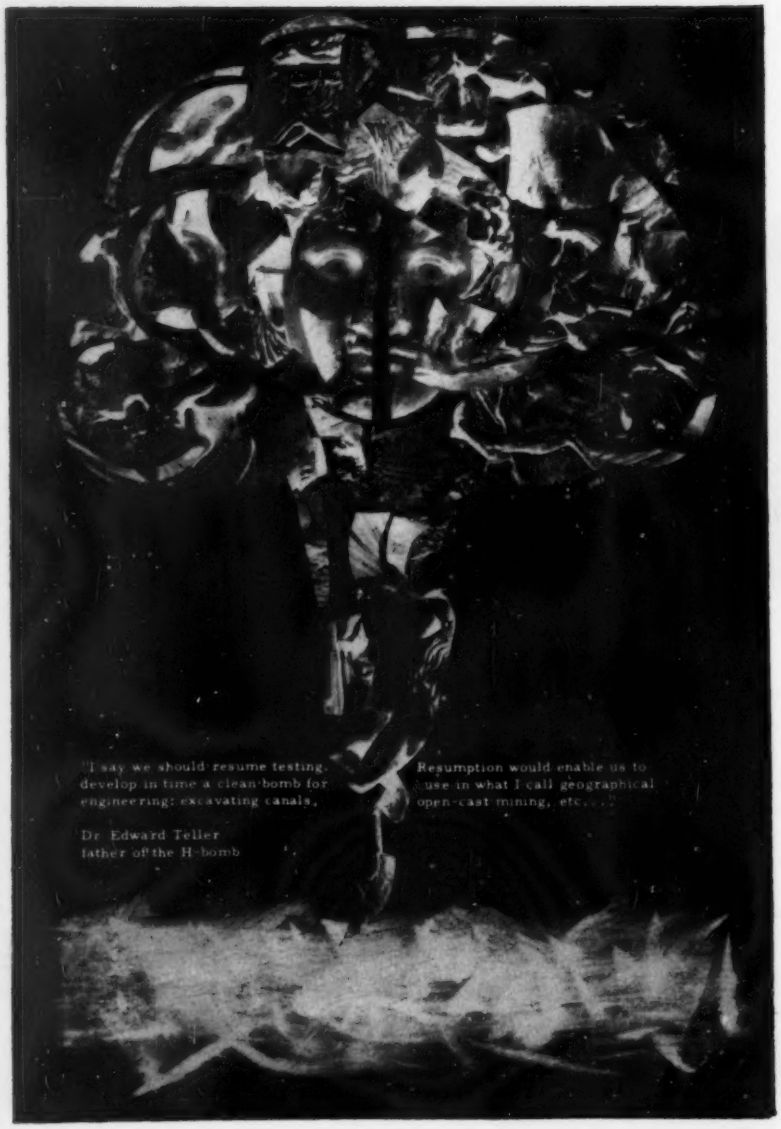
RED BRICK AT LOUGHBOROUGH

Student hostels at the College of Advanced Technology.

What was the architect, Harry S. Fairhurst & Son, trying to achieve—a typical British restraint in its buildings, integration into the landscape, a touch of brutalism here and there, or just homeliness?



Not quite architecture. Or, will every builder keep a bomb in his basement?



That nuclear energy can be a source of immense new power to enable us to undertake great engineering projects to improve the life of mankind, such as conserving water, irrigating deserts, excavating new canals, is obvious. But Dr Edward Teller, "father of the H-bomb," would have us believe that we can't use it for such purposes without further H-bomb tests, to forward the development of a "clean bomb." This is a pretty silly argument when work on the peaceful uses of nuclear energy is going on all the time, in this country as much as anywhere. Or does Dr Teller really visualise busting through the seas and mountains, regardless of the destruction of landscape, plant and animal life for a large radius round such "geographical engineering" activities? If this were so, the pickaxe might be preferable.

Architects:
G. S. Hay, F.R.I.B.A., Chief Architect Manchester, Co-operative Wholesale Society Ltd., in association with Sir John Burnet, Tait and Partners.
Photograph taken on 6 September 1961 reproduced by courtesy of the Contractors, John Laing Construction Ltd.

High honours for Broughton Moor

After being selected for the curtain walling of the tallest building in the Commonwealth (Canadian Imperial Bank of Commerce Building, Montreal) Broughton Moor green slate has been chosen for the tallest building in Britain. We are proud that the Architects elected to use 1,500 lineal feet of Broughton Moor heavy section slate coping for the Co-operative Insurance Society, Ltd., building in Manchester. Because of its beautiful colour, great durability, resistance to moisture and the corrosion of City atmosphere, Broughton Moor slate takes the highest honours everywhere. Technical pamphlets showing typical methods of fixing are available on application:
1. Flooring. 2. Facings. 3. Coping. 4. Cills. 5. Riven Face Slabs.
In three distinct colours: Light Sea Green, Olive Green and Spoutcrag (Silver Green) Barred.

Broughton Moor
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Announcements

A number of fellowships and scholarships are open to application from persons wishing to undertake graduate studies in landscape architecture. These range in value from free tuition, free board and a stipend of $500 per annum, to a minimum of free tuition.
Inquiries should be directed to Ian L. McHarg, chairman, department of landscape architecture, University of Pennsylvania, Philadelphia 4, Pennsylvania, USA. The closing date for completed applications is March 1 1962.

Kenneth Draper, ARIBA, and B. S. Fijalkowski, Ing Arch, ARIBA, have become associates in the firm of Frank Rutter, FRIBA, of 60 Woodbridge Road, Guildford, Surrey (telephone Guildford 60235).

The regional architect's department, Little Bromwich branch office and furniture and equipment section of the Birmingham Regional Hospital Board, have changed their address to Empire House, 159 Great Charles Street, Birmingham 3 (telephone Central 0365).

Nicholas Johnston, ARIBA, DiplArch, has started practice at 33 Holland Villas Road, London w14 (telephone Park 4115 or Welbeck 1118), trade literature welcomed.

Andrews, Kent & Stone, consulting engineers, have opened an office at 125 High Street, Croydon, Surrey, under the control of their associate J. G. Fincham, AMIStructE. Their main office will still be at 60 Wardour Street, London w1.

J. A. Story & Partners, land engineering, hydrographic & mining surveyors, of 8 Laurence Pountney Hill, London EC4, have established a branch office in Dares-Salaam called J. A. Storey & Partners, East Africa. The address is PO Box 2639, Dar-es-Salaam. P. J. Taylor, ARICS, will initially take charge of this office.

Bronek Katz, R. Vaughan & Partners have taken Frank Dolezal, AADip, ARIBA, and Stanislaw Fleszar, DipIng Arch, as associate partners.

The appointment of senior architect (housing) in the city architect's department, Birmingham, has been given to C. Griffiths, Dip Arch (Dist) (Wales), Dip CD (L'pool), ARIBA, AMTPI.

On the retirement of R. A. Lovell, CBE, AMIMechE, chief mechanical engineer to the Ministry of Transport, the post will be filled by H. Perring, BSC.

File this week

The Element File this week, on SfB (21) Walls: **External, non-loadbearing: General,** starts on page 1186, although the Information Library, of which the Element File is a part, begins on the opposite page. Features preclassified for removal and filing in SfB order are:

1 Report of the Ministry of Housing and Local Government committee on **Housing Standards** (pages 1155–1160). This should be filed under SfB (98): UDC 728.1.

2 **Products File** (pages 1170, 1171). A record of new products and services, this is so arranged that it can be cut into A6 sheets. The items are classified separately so that, when the sheet is cut, each product or service can be filed in its place. Alternatively, the sheet can be filed intact under Aa2 in an SfB file.

3 Building Study, 2nd series (pages 1172–1185) **Leicester University chemistry building.** To be filed under SfB (97): UDC 727.3.

The Element File contains:
4 **Element Design Guide** (pages 1186–1204).

5 Working Details (pages 1205–1208) **Walls: External, non-loadbearing: General** Curtain wall: College at Ystrad Mynach; Storey height window panels: Offices in London w1. To be filed under SfB (21): UDC 69.022.326 and 69.022.327 respectively.

6 Information Sheets: Four on **Light cladding** and one on **Heavy cladding panels.**

The Element File also contains a number of advertisements concerned specifically with the file's subject.

Building Exhibition corrections

SfB Bb9
In the preview of the Building Exhibition (AJ 15.11.61) it was stated that Dallow Lambert Limited was providing equipment to extract fumes from stands in the heating section. In fact it showed a wood waste suction plant operating under working conditions and serving sixteen woodworking machinery stands.

SfB (30)
In the report of the Building Exhibition (AJ 29.11.61) it was stated on page 1054 that Alfred G. Roberts Ltd has taken the English agency for Paulssonbolagen AB glass door knobs. In fact, the sole agent for these door knobs in this country is N. F. Ramsay & Co Ltd, Wigmore Place, Cavendish Square, London, w1. Langham 1598.

On the same page it was stated that the Huba-Lux lifting door gear is fitted to the Gerrard-Unitas lifting door. In fact, the Primus gear is fitted to doors of this make.

SfB (35)
On page 1060 it was stated that Luxaflex 23 swg panels (Hunter Douglas Ltd, 33 Sloane Street, London, sw1, Belgravia 6275), are $\frac{3}{16}$in to $\frac{5}{16}$in wide. This should have read $3\frac{5}{16}$in wide. Prices are available on request and the material is now being marketed.

SfB (42)
The Turinese range of tiles by The Malkin Tiles (Burslem) Ltd, Burslem, Stoke-on-Trent, Staffordshire, Stoke-on-Trent 87287, average about £5 a sq yd unfixed—not fixed as stated on page 1061.

SfB (94)
The Ministry of Housing and Local Government stand was designed by P. Isern of the Central Office of Information, and not by the Design Research Unit as stated on page 1072.

SfB Dg
The telephone number of Ceramic Consultants Ltd, 36 Thayer Street, London, w1, is Welbeck 0398 and not as stated on page 1073.

SfB (38)
On page 1061 it was stated that Evered & Co Ltd showed an asbestos cement Slimline gutter. This gutter is, however, made by Turners Asbestos Cement Co Ltd, Trafford Park, Manchester 17, Manchester Trafford Park 2181.

We apologise for any inconvenience caused by these errors.

AJ Products File December 13 1961

SfB (43)Hi3

UDC 69·025·351·1

Hardwood floorings

Junckers beech flooring is supplied in boards 12ft 4in long, $\frac{7}{8}$in thick, and with a face width of 4$\frac{1}{2}$in, each board being planed, tongued and grooved to very accurate limits, and with the face sanded at the factory. Each board consists of a number of strips 2$\frac{1}{2}$in wide by about 24in long, kiln dried and assembled with double dovetail joints into a single board, which thus has the appearance of a 2$\frac{1}{2}$in face when laid on the floor. The floor is quick to lay, since each board has an area of half a square yard, and finishing costs are reduced by the pre-sanded face.

Laminated floorings are also produced, and provide a decorative floor at considerably less cost than traditional parquet. Each board is made with a longitudinal pine base, a transverse pine core and a hardwood face of beech, ash or oak, the three layers being cemented together under pressure with a waterproof glue, the face being sanded like the other boards. This type of flooring is made in both long strip and basket weave patterns and in two thicknesses, $\frac{1}{2}$in for laying over existing floors, and $\frac{7}{8}$in for laying direct on joists or battens which may be spaced up to 24in centres, according to the floor loading. This note replaces the note on this subject published on November 22 when the illustration was printed upside down.

Junckers laminated flooring

Junckers (London) Ltd, 17 Hanover Square, London W1

AJ Products File December 13 1961

SfB (37)

UDC 69·024·92

Roof lighting

A roofing unit which includes a single or double skin Perspex dome-light is now being made by Neolith. For use with flat roof decks it uses this firm's channel reinforced roofing slabs. The lights are fixed to galvanised steel curbs, which are in turn insulated with a 1in thickness of Neolith wood wool and mounted on standard slabs suitable for spans up to a maximum of 10ft. The units are easily fixed in position and most of the usual cutting and trimming is avoided.

Neolith roof light

Neolith Ltd, 157 Elswick Road, Newcastle upon Tyne 4

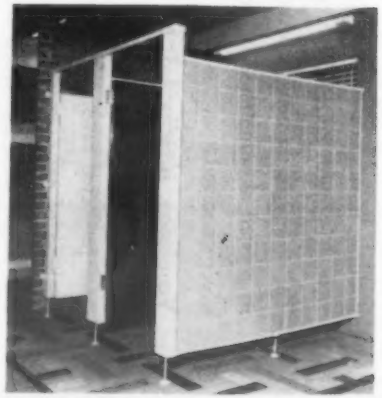
AJ Products File December 13 1961

SfB (22)Sg

UDC 69·022·5

Tiled partitions

Unifab tile partitions are prefabricated units which need no cement filling or any other fixative. They are made on a $\frac{3}{4}$in waterproof base and faced on both sides with $\frac{5}{16}$in by 6in by $\frac{1}{4}$in tiles. The partitions are supplied complete with fittings and are ready for erection, only the painting of the door posts and the grouting of the tiles being necessary. Standard partition size is 5ft 6$\frac{1}{2}$in square, each unit being made in three sections which are fixed together with $\frac{3}{16}$in steel dowels. The partitions are also made in other sizes and in a range of finishes.



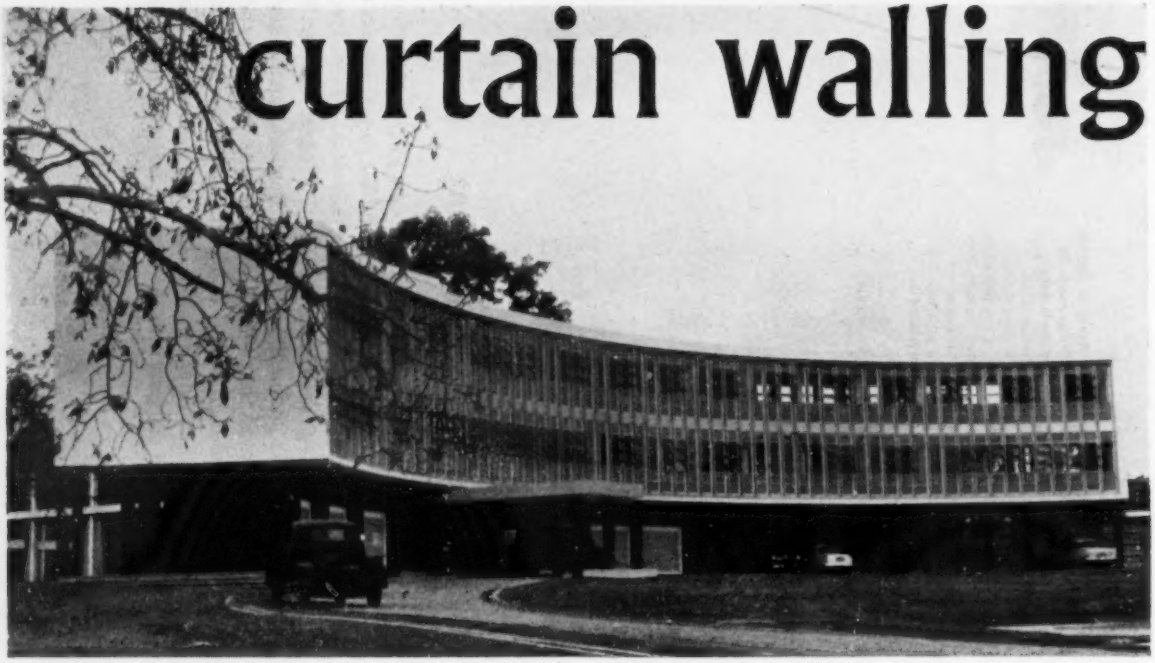
Richards Tiles Unifab glazed ceramic tile partitions

Richards Tiles Ltd, Tunstall, Stoke-on-Trent

Products File by Brian Grant

The Industry has been replaced by Products File. Each item occupies a quarter-page (ie A6 size) and is given an SfB number so that readers may cut the page and file each under its number if they wish. Alternatively, they may tear out the whole page and file all Products File pages together. Products File pages never back on to editorial matter. Readers wanting more information from manufacturers may turn to the back page where they will find Products File items included in the lists of advertisers. The reader, therefore, has merely to tick the manufacturer's name, add his own name and address, detach the page and post it to the Journal, using the reply paid folder.

HOPE'S aluminium curtain walling

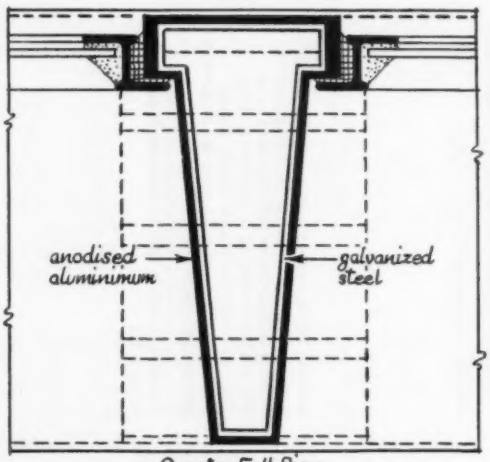


WESTERN REGION AGRICULTURAL RESEARCH STATION, IBADAN, NIGERIA

Architects: Design Group (Nigeria) Ltd.

The 160 ft. curved elevation of this building is covered to a height of 20 ft. 8 in. with HOPE'S Curtain Walling. The complete framework is constructed in pressed aluminium sheet, etched and silver anodized.

Ventilation is provided by two ranges of HOPE'S hot-dip galvanized steel projected casements with maximum opening of 85°. Fixed panes above and below these casements are glazed with blue 'Colourglaze.'



Quarter Full Size

HOPE'S WINDOWS *The Name Guarantees*

HENRY HOPE & SONS LTD
SMETHWICK, BIRMINGHAM
LONDON: 17 BERNERS ST., W.1

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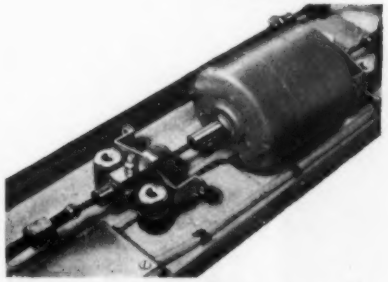
SfB (72)

UDC 645·3

Electric control for curtains

Motor driven opening and closing of curtains is now available in conjunction with Ruffiette curtain track. The motor drives a flexible cable which is carried in a channel forming part of the curtain runner rail and is in turn connected to the end runners of the curtain. The travel of the cable is controlled by limit switches which stop the motor when the curtains are fully opened or closed. The complete mechanism is carried on a headboard which can be mounted under the lintel or form part of the pelmet fixture. Maximum curtain weight which can be operated by one motor is 66lb, and prices vary from £30 to £60 for windows from 5ft to 12ft wide.

Thomas French & Sons Ltd, Chester Road, Manchester 15



Electric drive unit of Thomas French curtain control

SfB Rn6

UDC 691·175

Translucent plastic sheeting

A new range of Filon polyester resin sheet has just been announced. It weighs 6oz a square foot, this figure including 2oz of glass fibre reinforcement. It has the same structural strength as the previous 8oz material, and sells at the same price. It is produced in general purpose and self-extinguishing grades (the latter rated EXT.SAA when tested to BS 476) and in a wide range of profiles to match most profiles of metal or asbestos cement roof sheeting. A range of colours is available, but any colour in any profile can be produced if more than 1,000 linear feet of full width sheet is ordered. Flat sheet is also produced for decorative purposes and for suspended ceiling lights. Catalogue is A4 and SfB.

BIP Reinforced Products Ltd, Streetly Works, Sutton Coldfield, Warwickshire

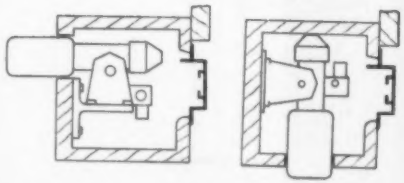
SfB (72)

UDC 69·028·33

Shop blinds

Electromatic Shopblinds has issued a series of data sheets on electrically and mechanically operated shop blinds. Push-button control electric units are produced for all lengths of blind, including a full range of accessories such as photo-electric cells for automatic control and offset shafting units for taking the drive round columns. Mechanically operated blinds are made in lengths up to 40ft for operation either with a removable hooked-end handle or through a system of bevel gears to a conveniently placed winding box.

Electromatic Shopblinds Ltd, 201 Eade Road, London N4



Electromatic drive unit can be fitted to work in many directions

SfB (56)

UDC 697·244

Industrial heaters

The new Valor industrial heater has a heat output of 100,000 Btu an hour and burns paraffin. It is a self-contained free-standing unit which operates automatically and is controlled by thermostat. The fan will circulate 80,000cu ft of air an hour raised to 60 deg F, and no extra work is required beyond a simple flue connection. Maximum fuel consumption is 6pt an hour.

The Valor Co Ltd, Erdington, Birmingham

Valor industrial heater

The most efficient, easiest to handle and least costly insulation...

FIBREGLASS TRADE MARK CROWN

* It has a low K value.

* It stays put, once in place: will not pack down.

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AJ SfB (97)

Building Study, 2nd series UDC 727·3 Universities, colleges

Chemistry Buildings

Air view with the university and Students' Union on the right. The block behind the two chemistry buildings is the physics building by Sir Leslie Martin, now nearing completion

for LEICESTER UNIVERSITY

designed by ARCHITECTS' CO-PARTNERSHIP

quantity surveyors DAVIS, BELFIELD & EVEREST, who prepared the cost analysis

structural engineers OVE ARUP & PARTNERS

Two blocks have been provided, one for teaching and the other primarily for research. They are linked at basement level and fit splendidly into the development plan for the university. The architects have achieved not only an admirable clarity in their planning solution, but also a very high degree of internal flexibility in anticipating future changes of use. That the cost of these buildings is higher than other university research blocks published in this series is entirely due to the scope and complexity of the services required to make such flexibility possible. Much of the success of the interiors results from the care with which benches and other fittings have been specially designed and detailed by the architects

N?

APPRAISAL

The University of Leicester required accommodation for about 360 undergraduates in teaching laboratories; research laboratories and offices for a staff of 70 including readers, lecturers, research fellows and research students; two lecture theatres each seating 80 and two seating 50; administrative offices, storage, workshops, ancillary rooms and a departmental library; plus a boiler house with sufficient capacity to heat other projected buildings on the site.

The accommodation has been arranged in two separate blocks to conform with the development plan for the science precinct designed by Sir Leslie Martin in association with Colin St John Wilson. One block has four storeys and contains teaching laboratories, lecture theatres, offices, bulk storage and boiler house; the other has two storeys containing the research laboratories.

The precinct, now half complete, is sited on ground which rises steeply from University Road and lies to the north-east of the recently completed Students' Union and the main university buildings. Sir Leslie Martin has made skilful use of the levels and has created what will be basically three interlocking and interrelated terraces around which the buildings are grouped. The intermediate terrace serves as the means of access to the majority of the blocks and also as the main concourse from the old university buildings. The development plan was not intended to define precise building sizes but to establish the general layout, scale and heights of buildings.

The teaching block has its long axis at right-angles to the contours while the research block lies parallel to them. They are approximately 20yd apart and are both connected to the intermediate terrace at ground floor level. This terrace between the two buildings forms the approach to the main entrances of both buildings, and serves as a roof to the semi-basement link between them. The lower terrace contains a service road to the basement stores, workshops, etc.

The planning of the teaching block aims, quite rightly, to concentrate the main weight of student circulation on the lower floors and reduce it to a minimum above. The ground floor contains a generous entrance hall, part of which acts as a crush space for three lecture theatres. A 12ft corridor, leading off the entrance hall, gives access on the one side to the professors' and administrative offices and, on the other, to the library and radio chemistry laboratory. Above are two floors of teaching laboratories; at the lower terrace level below, storage space, an additional lecture theatre for 50 and workshops, with cloakrooms and ancillary rooms in the link with the research building. There are two stairways and a goods lift serving all floors.

The large teaching laboratories are planned as openly as possible round three sides of a core containing circulation, fume cupboards, ventilation trunking, store rooms, cloakroom, etc, and are separated from one another by light partitioning and demonstrators' glazed room. A degree of flexibility is thus possible if adjustments are needed to the relative sizes of the laboratories in future. Fixed benches are laid out at 10ft centres. The architects found it necessary to design their own benching because, at the time, no manufactured variety was found adequate for the purpose. Services are housed in a perimeter duct at sill level, and ventilation trunking for the fume cupboards is accommodated in the void above the corridor false ceiling.

A large plant room on the roof of the teaching block accommodates water storage tanks and processing plant, lift motor, inlet air plant and extract ventilation fans; the latter discharging through louvred openings in the walls.

The main entrance to the research building is opposite that of the teaching block. Both floors contain similar laboratories planned around a central core of stores, lavatories, ancillary service rooms and staircases. One of the stairs and a goods lift descend to the semi-basement of the link. The planning module for partitions between laboratories is 10ft, giving a minimum sized laboratory of 150 sq ft.

Provision is made in the floor slabs for vertical ducts at 20ft centres adjacent to corridor walls, so that fume cupboards can be fitted in any room, whatever rearrangement of partitions is made in the future. Each fume cupboard is served by an individual fan mounted on the open roof over a vertical duct, and discharging through the projecting canopy of the plant room roof. The roof has been treated in this manner to separate the discharged air from the air intake louvres on the walls of the plant room penthouse.

Benches in the research block are designed with simple teak tops on welded steel frames with loose under-bench storage units. These movable benches give flexibility of use and can be clamped to service strips round the walls.

The external treatment of the teaching block differs from the research building. This was thought desirable because of the different scale of building; it has been achieved by expressing the in-situ concrete structure as a simple, elegantly proportioned frame resting on the brick walls of the semi-basement. The structural frame is faced externally with matt black mosaic, and infill panels have teak frames with aluminium windows and stove enamelled hardboard behind glass below them.

The research block has an in-situ frame with an internal core of loadbearing bricks. The frame has been faced externally with dark grey precast polished concrete, which also acts as permanent shuttering. The external walls are of stock brick and the windows are in teak. The floors for both buildings are 12in in-situ concrete slabs.

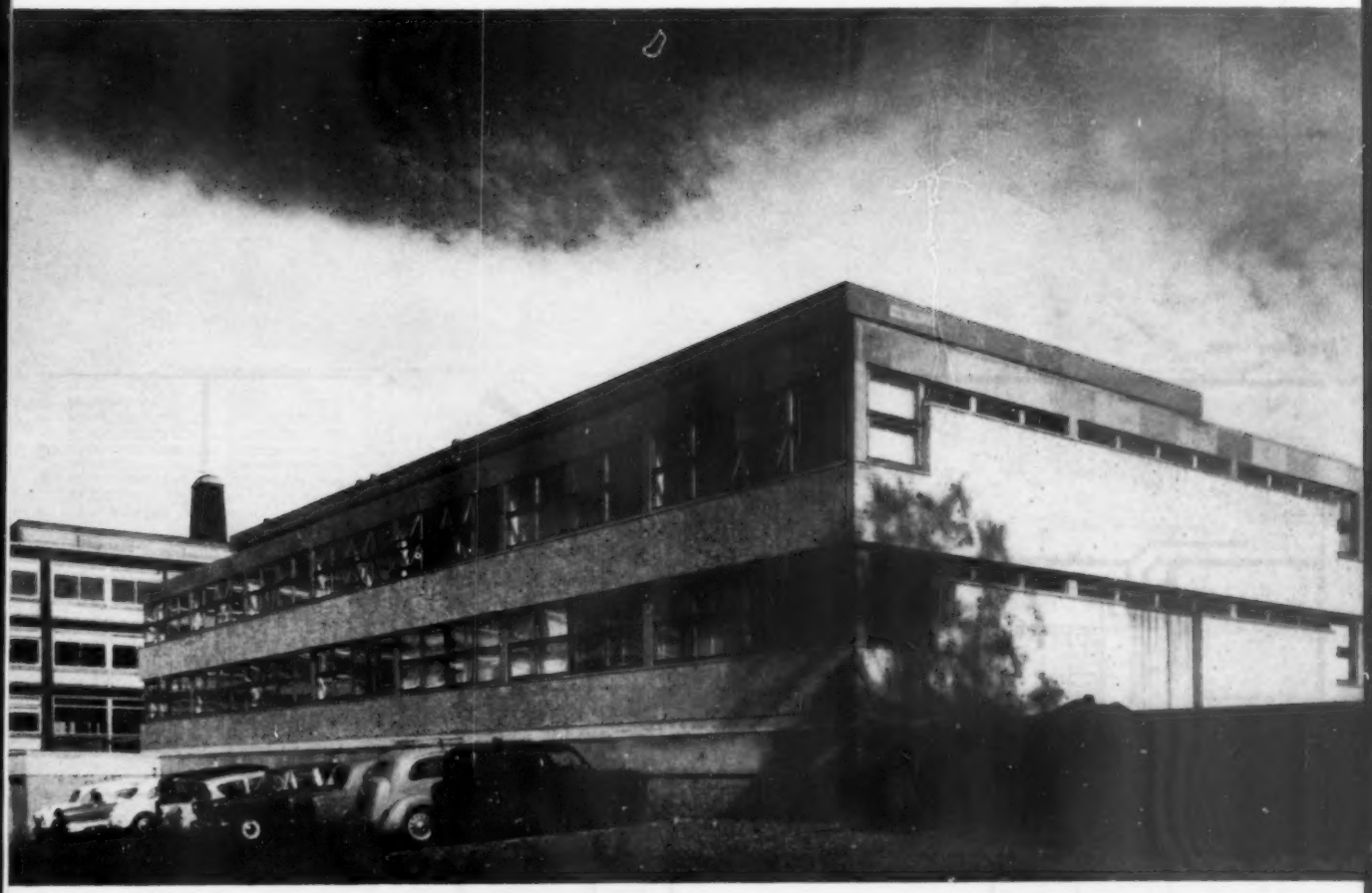
The limited number of external finishes in use for all the new buildings add dignity and unity to the whole precinct, a lesson for other architects working on university development programmes.

Many of the internal finishes used have been chosen for their resistance to damage by chemical action. The laboratories have hardwood block floors, teak bench tops and sills and the radio chemical laboratory has a pvc welded sheet floor, where the chemicals which attack this material are not generally in use. Corridors and entrance hall have studded rubber tiles and although these have the advantage of quietness, they are already developing an unsatisfactory appearance and the uneven surface is awkward for trolleys loaded with glass.

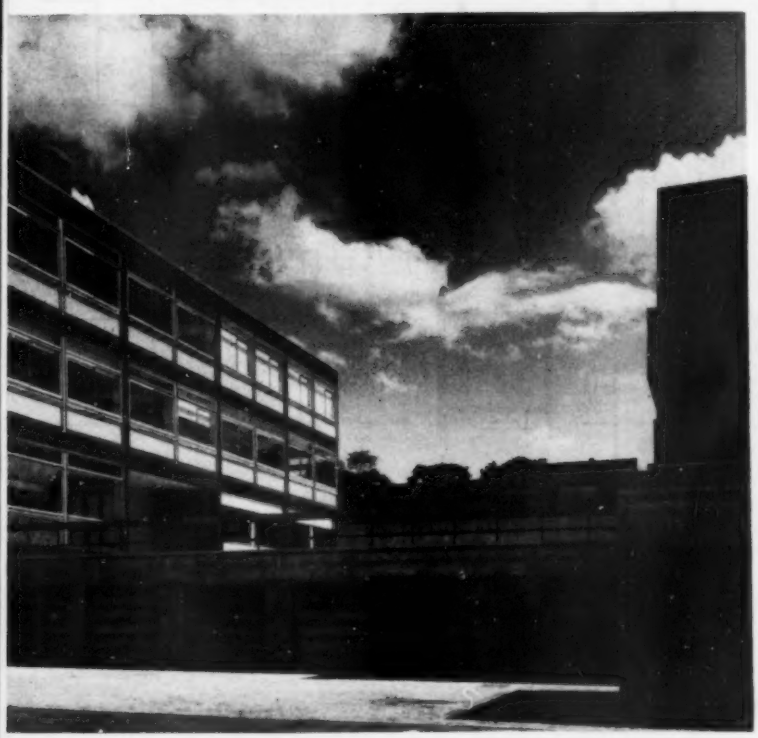
Heating in the teaching block is principally by radiant hot water panels cast in the soffit of the floor slabs, which has made for simpler planning in the arrangement of the services. In the research block, convectors are used immediately below the windows and behind the perimeter services. Tempered inlet air is provided to laboratories and lecture theatres.

The vertical passage of the services is mainly through two ducts immediately next to the stair landings, and two subsidiary ducts, one related to the men's and women's wcs, the other to the lift shaft. These ducts have large access panels on each floor. The services to the laboratory benches include hot water, cold boosted water, de-ionised water, electricity, gas, steam and drainage. The pipes to the perimeter service ducts and the island benching are exposed and suspended from the ceiling in a minimum number of carefully arranged runs. The perimeter duct is designed with access panels, while the pipes in the fixed

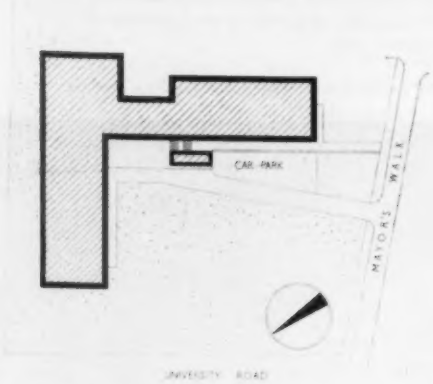
General view of the research block—the projecting canopy of the penthouse with four fume cupboard outlets is just visible



On the left, the teaching block and, on the right, the research block with link between them containing furnace, fire-proof and cold room and other special purpose accommodation. Separate stores for explosive chemicals in the immediate foreground at the lowest level



The research block on the left, and the teaching block beyond



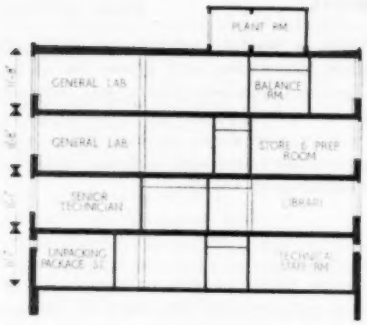
Site plan [Scale: $\frac{1}{16}$" = 1' 0"]

Teaching block

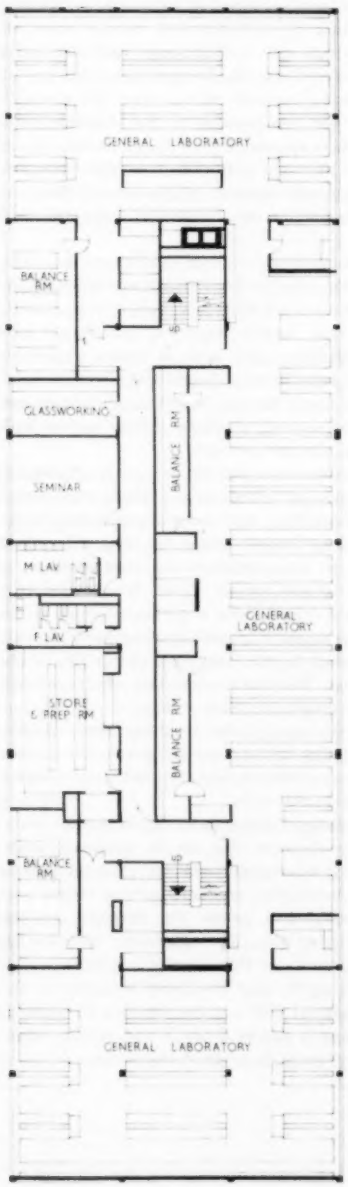
Lower ground floor of teaching block, and connecting basement to research block [Scale: $\frac{1}{16}$" = 1' 0"]

Basement of teaching block

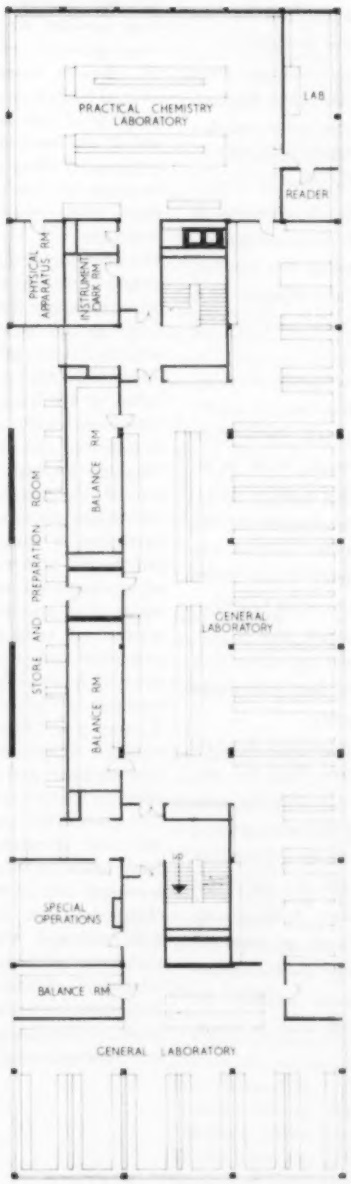
Ground floor, teaching block



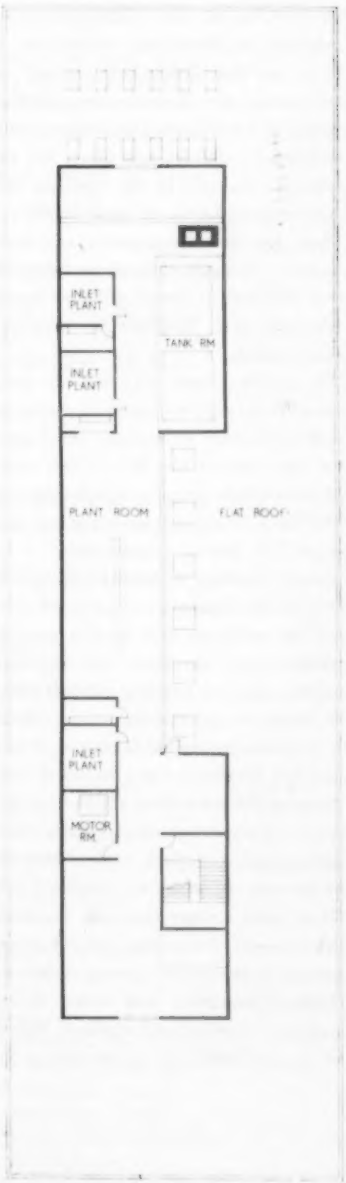
Section through teaching block



First floor, teaching block
[Scale: $\frac{1}{16}$" = 1' 0"]



Second floor, teaching block



Roof plan, teaching block

benching can be reached through the panels at the back of the cupboards. Independent drainage is installed for radio-active water, with equipment for collection, treatment and disposal.

The general level of detailing is good and shows a careful consideration of the many special requirements of the building, but there are one or two exceptions. For instance, the rather crude benching in the entrance hall seems hardly appropriate for such a prominent position. Externally, the teak framed windows in the research block relate well in general proportion to those in Sir Leslie Martin's physics building opposite, but from inside the small research laboratories the very thick centrally placed mullion is visually troublesome. One also wonders if it was really necessary to exclude all daylight from the lecture room in the semi-basement.

The general level of lighting is adequate but in some rooms it appears dull because of large areas of dark colour; this is particularly so in the lecture rooms. The exposed fluorescent tubes in the laboratories are rather uncomfortable to the eyes. Some form of louvre with additional tubes to compensate for the reduction in illumination would have been more satisfactory.

In an age that demands increasing numbers of scientists from universities, the question arises whether or not Sir Leslie Martin's design of the chemistry buildings, or indeed of the whole complex of science buildings, has taken the problem of expansion into sufficient account. In the teaching laboratories there is a well-defined programme of work based on routine experiments in which the use of equipment and materials is reasonably predictable. Although methods used may alter in detail, it is unlikely that the routine nature of these experiments will change. It is relatively easy, therefore, to establish the space and service requirements.

The teaching block may well be adequate for some years to come. It is not yet filled to capacity and, in any case, it might well be possible to organise the time-table to take more than the 360 planned for. But in the case of research, there is no easily definable routine; experiments may develop in many ways. The basis is one of improvisation, resulting in changes to the space and service requirements. A further point is that the research building is already approaching capacity. There could be a limited expansion on the south-west of the existing building, but the structure and finishes used do not make this a particularly easy operation. The alternative would be to build a further separate building with its own services, but this would be expensive and therefore more difficult to justify.

It is obviously desirable that such interiors should be flexible, and the architects have achieved this objective. But the real pressure will come from the increasing future demands for more space. This creates many problems concerning the arrangement and expansion of space, types of structure and finishes, flexibility of services, etc, which the practising architect and the individual client have neither time nor resources to solve. A large-scale development programme of laboratory buildings is required, perhaps sponsored by a group of universities or by the University Grants Committee, and based on collaborative research by architect, scientist and engineer. This is the only way in which a long-term, economic answer can be found.

CLIENT'S REQUIREMENTS

About 360 undergraduates in teaching laboratories of 40, 60 and 100 places; research laboratories and offices for about 70 including readers, lecturers, research fellows and research students; two lecture theatres seating 80 each and two seating 50; administrative offices, storage, workshops, ancillary rooms, and a departmental library; a boiler house with sufficient capacity to heat other projected buildings on the site.

SITE

Previously used for playing fields, an area north-east of the earlier university buildings and separated from them by Mayors Walk with a fairly steep slope down from the south-eastern boundary. Sir Leslie Martin's site layout uses the fall of the ground to create, in principle, two terraces, the upper separated from the lower by a retaining wall about 10ft in height.

PLANNING AIMS

The accommodation has been arranged in two separate blocks. One contains the teaching laboratories and lecture theatres, administration, bulk storage and boiler house, and the other the research rooms. The teaching block is of four storeys, its long axis cutting across the contours of the site; the research block is of two storeys and lies parallel to the contours. One end of the teaching block is moored to the upper terrace which is extended along part of one side of the block so that the main entrance of both teaching and research is approached from it. Below this terrace extension, a semi-basement links the two buildings.

The planning of the teaching block aims to concentrate the main weight of student circulation on the lower floors, and to minimise it on the upper floors. The ground floor is at upper terrace level, and contains entrance hall, lecture theatres, professors' and administrative offices, library, and also a radio chemistry laboratory. Above it are two floors of teaching laboratories and below, at the level of the lower terrace, is a floor of storage and workshops, with cloakrooms and ancillary rooms in the link to research, and access to the service road.

The large teaching laboratories are planned as openly as possible around the northern core of circulation. Fume cupboards, ventilation trunking and ancillary rooms are separated by light partitions or demonstrators' glazed rooms, so that there is a fair degree of flexibility in the relative sizes of laboratories if adjustments are needed in the future. Fixed benches are laid out at 10ft centres, and serviced from a perimeter duct below window sill level. Service pipes from the northern core to this perimeter duct are gathered together at three points and slung exposed below the ceiling. Ventilation trunking etc is accommodated in the void above corridor false ceilings.

A large plant room on the roof of the teaching block accommodates water storage tanks and processing plant, lift motor, inlet air plant and extract ventilating fans, the latter discharging through louvred openings in the walls.

The ground floor of the research block is at upper terrace level, the main entrance being opposite that of the teaching block. Both floors contain similar laboratories and are planned around a central core of stores, lavatories, ancillary service rooms and staircases. One staircase and a goods lift descend to the semi-basement level of the link. The planning module for partitions between laboratories is 10ft, giving a minimum size laboratory of about 150 sq ft, and provision is made in the floor slabs for vertical ducts at 20ft centres adjacent to corridor walls, so that fume cupboards can be fitted in any rooms, whatever rearrangement of partitions is made in the future.

Teaching block

SUMMARY

Ground floor area: 13,762 sq ft.
Total floor area: 67,400 sq ft.
Type of contract: RIBA.
Tender date: January 1958.
Work began: April 1958.
Work finished: November 1960.
Tender price of foundation, superstructure, installation and finishes including drainage beyond collecting manhole: £412,529 0s 0d.
Tender price of external works and ancillary buildings, including drainage beyond collecting manhole: £6,314 0s 0d.
Total: £418,843 0s 0d.

COST ANALYSIS

Based on tender. (AJ revised elemental breakdown in use from November 10, 1960)	*Cost per sq ft* s d
Preliminaries and insurances 5·17 per cent of remainder of contract	6 1¼
Contingencies	2 9
Work below lowest floor finish Reinforced concrete slabs on concrete blinding including asphalt tanking.	4 11¼

STRUCTURAL ELEMENTS

Frame — 4 6
Reinforced concrete columns forming structural bays 20ft 0in. × 20ft 9in. Occasional beams trimming openings and supporting floor slab in 40ft span over lecture rooms. Steel frame to plant room on roof.

Upper floors — 5 8¼
12in flat slab over 20ft 0in. × 20ft 9in bays reinforced in two directions.
Reinforced concrete; 4,823 sq yd, 79s 5d per sq yd.
(This includes floor over boiler house.)

Roof — 4 3½
Reinforced concrete; 1,786 sq yd, 94s 3d per sq yd.
Channel reinforced woodwool roof to plant room; 458 sq yd, 29s 0d per sq yd.
Asphalt on screed to falls on foamed polystyrene insulation slabs; 979 sq yd, 56s. 5d per sq yd.
(Part of concrete roof forms floor to plant room.)

Rooflights — 1¼
Glass domes on metal kerbs and linings with glass laylight at bottom of lining.
18 rooflights; 12 sq yd, 780s 0d per sq yd.

Staircases — 9½

Type	*Width*	*Total rise*
Main	5ft 0in	54ft 0in
Main	5ft 0in	34ft 0in
Secondary	3ft 0in	11ft 0in

Reinforced concrete, terrazzo treads and risers, metal balustrades with west African mahogany handrail.

External walls — s d: 2 5½
5in to 9in reinforced concrete walls: 824 sq yd, 114s 5d per sq yd.
Hollow wall consisting of 4½in brick skin, cavity and 4½in wall in facing bricks at 445s per 1,000; 400 sq yd, 91s 4d per sq yd.
9in brick wall; 288 sq yd, 49s 6d per sq yd.
Western red cedar cladding; 152 sq yd, 129s 9d per sq yd.
4in lightweight concrete block back-up walls behind window units.

Windows — 5 4
Sliding and top-hung aluminium units in teak frames, fixed panel below opening lights in rough cast glass with enamelled hardboard sheet behind; 8,464 sq ft, 27s 5d per sq ft.
Aluminium patent glazing; 366 sq ft, 17s 6d per sq ft.

External doors — 3¼
No of single: 5.
No of double: 9.
Western red cedar door; 16 sq ft, 14s 3d per sq ft.
West African mahogany; 64 sq ft, 13s 9d per sq ft.
Teak; 377 sq ft, 29s 1d per sq ft.

Internal structural walls — 10½
5in reinforced concrete walls; 441 sq yd, 86s 1d per sq yd.

Partitions — 2 10½
4½in brick wall in internal facings, at 400s per 1,000; 465 sq yd, 50s 1d per sq yd.
3in, 4in and 5in lightweight concrete block partitions; 2,800 sq yd, 45s 2d per sq yd.
4½in brick wall in commons; 205 sq yd, 29s 5d per sq yd.

Internal doors — 9½
No of single: 85.
No of double: 22.
Painting quality flush doors; 186 sq ft, 5s 3d per sq ft.
West African mahogany flush; 634 sq ft, 19s 6d per sq ft.
Flush doors; 2,342 sq ft, 16s 10d per sq ft.

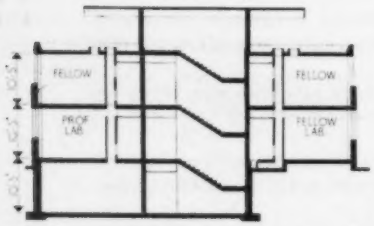
Ironmongery — 6½
Anodised aluminium generally.

Total of structural elements: 28s 6½d

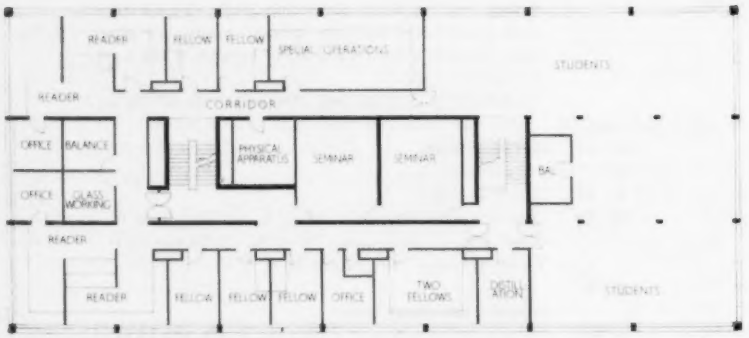
FINISHES AND FITTINGS

Wall finishes — 1 3
⅜in aluminium faced plywood sheeting (wc partitions); 50 sq yd, 201s 9d per sq yd.
Plaster; 6,341 sq yd, 8s 0d per sq yd.
Plaster including bonding coat; 927 sq yd, 9s 0d per sq yd.
⅜in wall tiling; 138 sq yd, 57s 11d per sq yd.

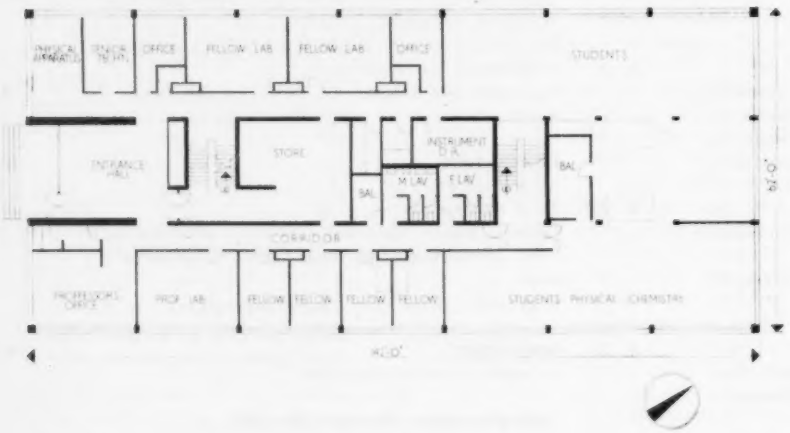
Floor finishes — 5 4½
2in precast concrete flags; 60 sq yd, 14s 6d per sq yd.
Corrosion resistant asphalt; 369 sq yd, 54s 1d per sq yd.
Quarry tile paving; 461 sq yd, 36s 9d per sq yd.
Pvc tile flooring; 3,282 sq yd, 38s 8d per sq yd.
Cork tile paving; 201 sq yd, 41s 10d per sq yd.
Studded rubber flooring; 589 sq yd, 49s 6d per sq yd.
Terrazzo paving; 292 sq yd, 48s 0d per sq yd.
Hardwood block flooring; 388 sq yd, 45s 6d per sq yd.
Hardwood strip flooring; 282 sq yd, 70s 6d per sq yd.



Section through research block



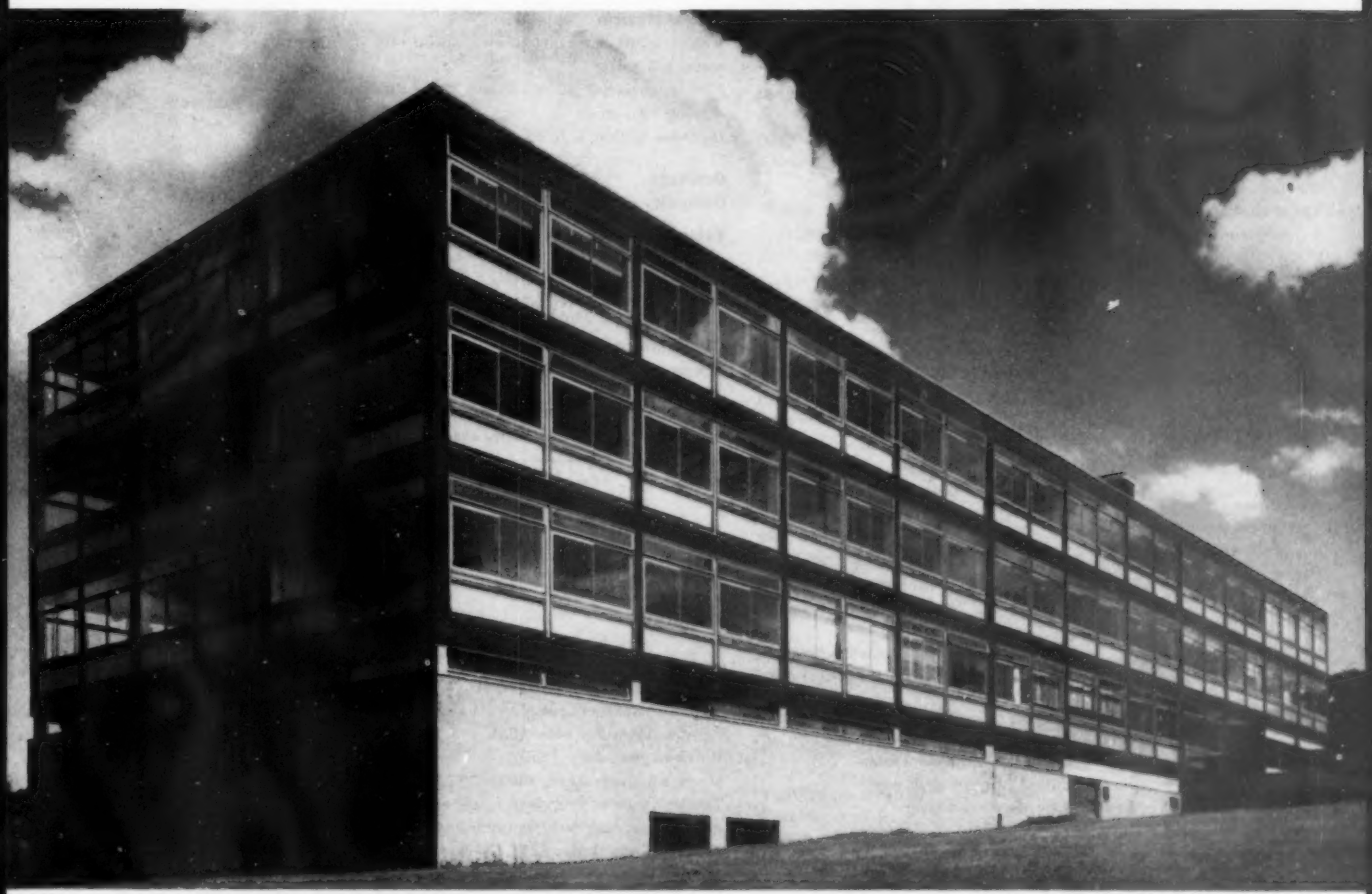
First floor, research block



Ground floor, research block [Scale: $\frac{1}{32}$" = 1' 0"]

Teaching block

Typical laboratory benching. Each bench has a double cupboard unit on each side of the sink. The shelves are lined with white opaque glass. Note the exposed pipes suspended from the ceiling



Ceiling finishes — s 1 d 5½
Suspended asbestos insulation board; 829 sq yd, 66s 7d per sq yd.
Plaster; 3,079 sq yd, 9s 11d per sq yd.

Decorations — 3 4
External mosaic facing; 668 sq yd, 182s 8d per sq yd.
Eggshell finish oil paint on walls and ceilings, gloss oil paint on joinery and fittings and clear finish on hardwood joinery.

Fittings — 14 9½
Laboratory benching; 1,563ft run, 282s 0d per ft run.
Fume cupboard; 300ft run, 370s 0d per ft run.
Shelving and cupboards in stores.
Balance shelving.
Oven shelving.
Lecture room seating.

Total of finishes and fittings: 26s 2¾d

SERVICES

Sanitary fittings — 5

Type	*No of each type*
Sinks	210
We suites	11
Corbelled wcs	9
Showers	3
Bath	1
Drinking fountains	4
Slab urinal	1
Urinals	15
Lavatory basins	29

Waste, soil and overflow pipes — 8 10¾
Soil generally heavyweight cast iron LCC pipes and fittings with some copper branches. Domestic wastes and overflows in copper. Chemical plumbing in acid-resistant plastic. Vertical stacks are in cast iron

Cold water services — 6 8¾
Main direct supply for human consumption, domestic gravity supplies for domestic use and high pressure boosted supply for laboratory service. Generally cast iron and copper.
No of draw-off points: 1,050.
Includes builder's work, 3¾d.

Hot water services — 2 4¾
Calorifiers with primary coils fed from boiler house.
No of draw-off points: 85.
Includes builder's work, 3¾d.

Heating services — 15 8¾
Oil-fired boilers, radiant ceiling panels in entrance hall and two lecture theatres, radiators elsewhere.
Heat load, 2,400,000 Btus per hour.
Includes builder's work, 7¾d.

Ventilation services — 10 10¾
Extract ventilation including extract from fume cupboards. Asbestos cement used for fume extract ducting, otherwise galvanised steel. Warmed and filtered plenum system to lecture rooms and laboratories.
Includes builder's work, 2d.

Gas services — 9¾
Services in black mild steel tube.
No of outlets: 400.
Includes builder's work, 2d.

Electrical services — s 5 d 8
Pvc conduit and trunking.

Clock points	17
Bell points	8
Lighting points	607
13amp power points	791

Total load, 327 kW

Special services — 11¼
1 electric lift, capacity 15cwt, speed 60ft per minute, serving 4 stops.
1 hoist, capacity 15cwt, speed 30 to 40ft per minute, serving two stops.
Includes builder's work, 1¼d.

Drainage — 10¾
Generally cast iron.

Total of services: 53s 4d

External works — 2 4¾
Drains from last collecting manhole.
Site layout.
Roads and paths.
External services.

Total cost per sq ft of floor area:
£40,529 (net cost, excluding external works) / 67,400 sq ft (measured inside external walls) = 121 10¾

Research block

SUMMARY

Ground floor area: 8,467 sq ft.
Total floor area: 19,110 sq ft.
Type of contract: RIBA.
Tender date: January 1958
Work began: July 1959.
Work finished: April 1961
Tender price of foundation, superstructure, installation and finishes including drainage to collecting manhole: £151,197 0s 0d.
Tender price of external works and ancillary buildings including drainage beyond collecting manhole: £5,623 0s 0d.
Total: £156,820 0s 0d.

COST ANALYSIS

Based on tender. (AJ revised elemental breakdown in use from November 10 1960.) — *Cost per sq ft*

Preliminaries and insurances — 8 7½
5·54 per cent of remainder of contract.

Contingencies — 3 6½

Work below lowest floor finish — 5 9½
6in reinforced concrete bed on concrete blinding.
Pad foundations under columns.

STRUCTURAL ELEMENTS

Frame — 3 0½
Reinforced concrete columns and beams, steel framed plant room.

Upper floors — 4 0
9in reinforced concrete; 902 sq yd, 85s 1d per sq yd.

	s	d
Roof	7	0½
9in reinforced concrete covered asphalt on screed; 901 sq yd, 114s 10d per sq yd.		
2in channel reinforced woodwool covered with asphalt on screed; 523 sq yd, 60s 6d per sq yd.		
Staircases	1	9
Two reinforced concrete 4ft 0in wide × 31ft 0in high. Terrazzo covered treads and risers, metal balustrades with west African mahogany handrail.		
External walls	3	6
Hollow wall consisting of 4in lightweight concrete block on ground floor and 7in thick sill-height reinforced concrete beam on first floor, cavity and 43ft wall in facing bricks (bricks 445s per thousand); 600 sq yd, 111s 6d per sq yd.		
Windows	6	5½
Softwood; 3,592 sq ft, 34s 5d per sq ft.		
(Teak was substituted for these but price is not available.)		
External doors		2
No of single: 2.		
No of double: 2.		
Softwood; 39 sq ft, 9s 4d per sq ft.		
Teak; 88 sq ft, 30s 0d per sq ft.		
Internal structural walls	1	0
9in brickwork; 412 sq yd, 45s 8d per sq yd.		
Partitions	2	11½
3in and 4in lightweight concrete blocks; 261 sq yd, 26s 10d per sq yd.		
4½in brick walls; 784 sq yd, 23s 9d per sq yd.		
Internal doors	1	2¾
No of single: 64.		
No of double: 12.		
2-in softwood; 265 sq ft, 14s 8d per sq ft.		
Flush; 1,122 sq ft, 17s 4d per sq ft.		
Ironmongery	1	5½
Anodised aluminium generally.		
68 sets of window opening gear.		
Total of structural elements: 32s 7½d		

FINISHES AND FITTINGS

	s	d
Wall finishes	1	0
Plaster; 2,415 sq yd, 7s 11d per sq ft.		
Floor finishes	4	11½
2in cement and sand paving; 200 sq yd, 17s 0d per sq yd.		
Quarry tile paving; 31 sq yd, 39s 8d per sq yd.		
Pvc tiles; 92 sq yd, 41s 6d per sq yd.		
Studded rubber flooring; 275 sq yd, 53s 8d per sq yd.		
Terrazzo paving; 57 sq yd, 48s 10d per sq yd.		
Wood blocks; 1,251 sq yd, 55s 1d per sq yd.		
Ceiling finishes	2	0½
Suspended asbestos insulation board; 599 sq yd, 46s 7d per sq yd.		
Plaster; 1,160 sq yd, 9s 5d per sq yd.		
Decorations	4	0¾
Eggshell finish on walls and ceilings, gloss on joinery.		
Precast concrete facing units; 1,336 sq ft, 26s 4d per sq ft.		
Fittings	18	1½
Laboratory benching; 709ft run, 282s 0d.		
Total of finishes and fittings: 30s 2½d		

SERVICES

Sanitary fittings 2½

Type	*No of each type*
Sinks	8
Wc suites	5
Slab urinal	1
Lavatory basins	5

Waste, soil and overflow pipes 19 5

Soil generally heavyweight, cast wire LCC pipes and fittings with some copper branches, domestic wastes and overflows in copper. Chemical plumbing in acid resistant plastic. Vertical stacks are in cast iron

Cold water 3 11½

Main direct supply for human consumption, domestic gravity supplies for domestic use and high pressure boosted supplies for laboratory service. Generally cast iron and copper.
No of draw-off points: 55.
Includes builder's work, 9½d.

Hot water 7 0¾

Calorifiers in plant room on roof.
No of draw-off points: 22.
Includes builder's work, 10d.

Heating services 8 2½

Convectors round perimeter of block, radiators in internal rooms
Heat load, 700,000 Btus per hour.
Includes builder's work in connection, 1s 7d.

Ventilation services 21 10

Fans at roof level, one per fume cupboard, with vertical asbestos cement ducting.
Plenum system distributing air from plant room through corridor ceiling; separate extract from internal rooms.
Includes builder's work, 5d.

Gas services 1 4

Mild steel conduit.
No of outlets: 350.
Includes builder's work, 5d.

Electrical services 11 0

Clock points: 5.
Fire alarm points: 5.
Telephones: 20.
Lighting points: 200.
Total electrical load: 182 kW.
Includes builder's work, 2½d.

Special services 2 0¾

1 electric lift, capacity 15 cwt, speed 60ft per minute serving 3 stops.
Includes builder's work, 3½d.

Drainage 2 5½

Generally cast iron.

Total of services: 77s 6d

External works 5 10½

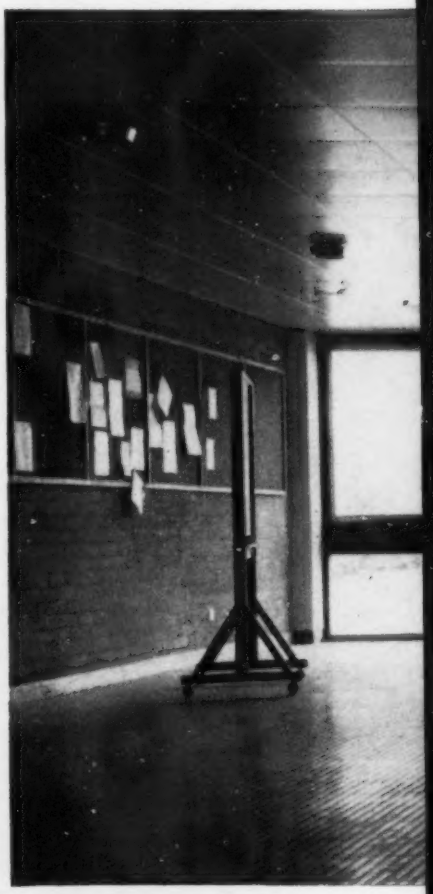
Grassed areas. Paths and retaining wall.

A lecture theatre. Special steps have been taken to achieve a quiet ventilation system and to insulate the floor to avoid penetration of noise from the boiler house below. The seating was designed by Ernest Race

View of teaching laboratory. Doors to shelving on the right slide down to form chalk boards

Detail of lobby leading from lecture theatre to the entrance hall

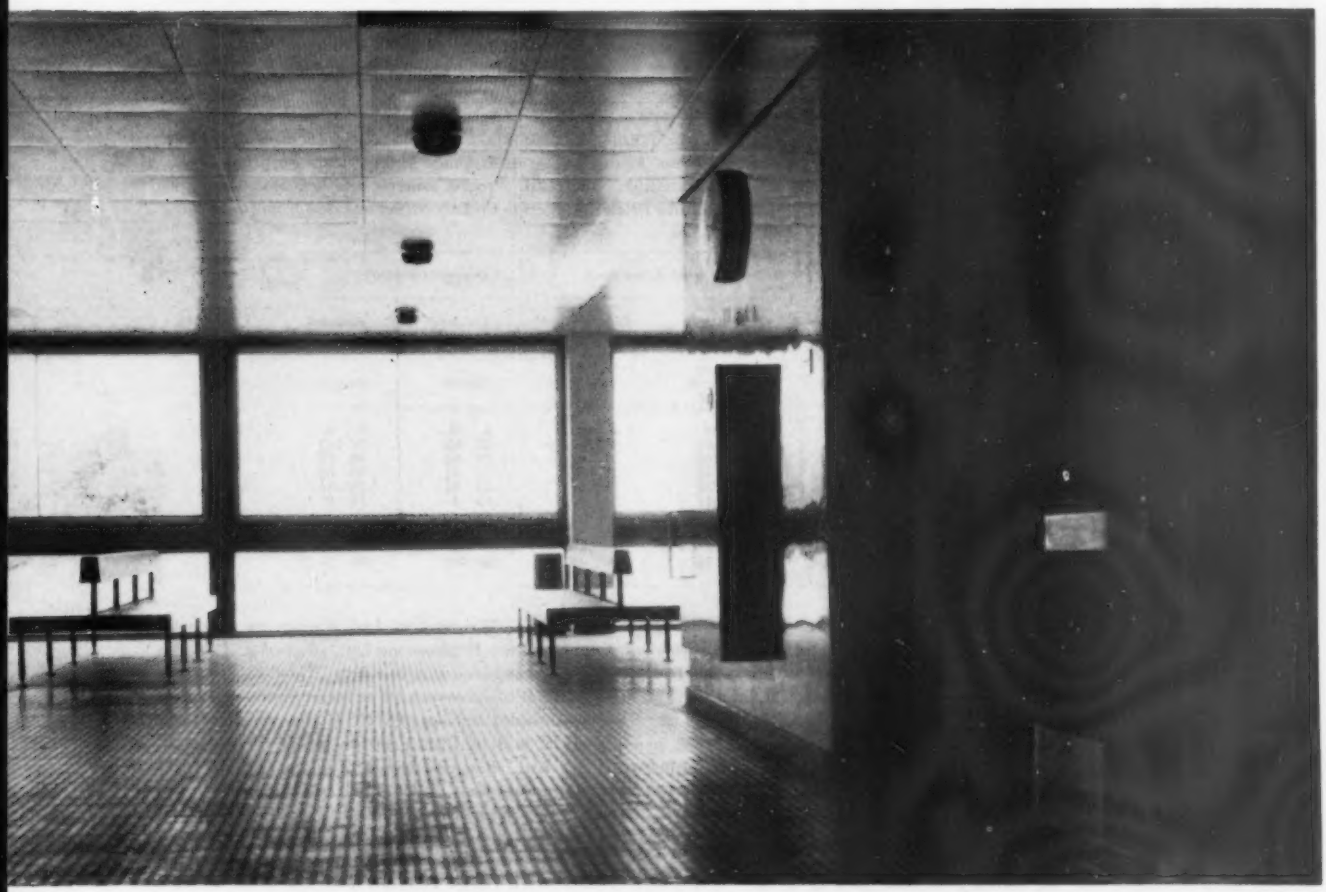
Corridor in research block. The shower heads are a safety precaution installed to wash off dangerous chemicals should they be spilt on anyone

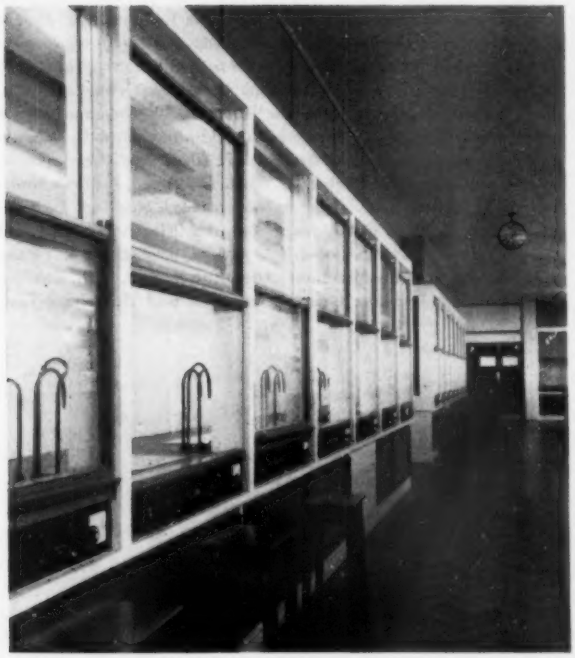


General view of entrance hall in the teaching block

A typical stair detail in the teaching block

Fume cupboards in the teaching block





Total cost per sq ft of floor area: s d

£151,197 (net cost, excluding external works) / 19,110 sq ft (measured inside external walls) = **158 3**

COST COMMENT

In view of the current building programme aimed at a vast expansion of the student population within a limited national budget, there must obviously be some cost limit, even for such a difficult and variable type of accommodation as science laboratories. At first sight, therefore, it may seem that these blocks deserve to be criticised as excessively expensive, since in both cases the cost per sq ft is considerably higher than previous such buildings in the series. But if a comparison for the main groups of elements is made with previous examples, as in the table below, a quite different picture emerges.

Building	*Liverpool*	*Edinburgh Engineering*		*Edinburgh Agricultural*		*Leicester Chemistry*	
	Physics	*Labs etc*	*Lecture rooms*	*Teaching*	*Experimental*	*Teaching*	*Research*
Date published	28.7.60	9.3.61	9.3.61	26.7.61	26.7.61	—	—
Date of tender	June 57	Aug 58	Aug 58	1955/56	1955/56	Jan 58	Jan 58
Element group	s d	s d	s d	s d	s d	s d	s d
Preliminaries, foundations	14 9½	13 1½	12 5½	7 0½	10 10	13 9½	17 11½
Structure	39 0½	35 6	24 1	28 10½	26 10½	28 6½	32 7½
Finishes	13 6½	6 2	10 10½	12 1½	10 0½	11 5½	12 0½
Fittings	13 1	6½	4 10	20 5½	23 6½	14 9½	18 1½
Services	27 2½	26 5½	14 5	29 7½	34 8½	53 4	77 6
Total cost per sq ft net floor area	107 7½	81 9½	66 7½	98 1½	106 0½	121 10½	158 3

This comparison shows that the structure and finishes for each of the Leicester blocks are very much in line with the others, indeed, that they are rather less than those of the physics building at Liverpool. It is only in the case of services that Leicester shows an increase. It should be noted that the demands placed on services will depend very much on the particular subject involved, and the figures confirm that chemistry has raised the elemental costs for drainage and ventilation. The remaining services, in fact, appear to show very careful budgeting, being close to those of a normal building. Nevertheless, it is rather surprising that ventilation and drainage costs should be so high, at a combined cost, for instance, of over £2 a sq ft for the research building. This is quite obviously a matter out of the hands of the architect, since it is a direct result of the client's requirement for a very high degree of flexibility in the placing of sinks and fume cupboards. In view of this high cost, the validity of this requirement is open to question, in comparison with the alternative of carrying out alterations *a priori* as the need arises.

CONTRACTORS

General: Wilson Lovatt & Sons Ltd. *Sub-contractors and suppliers: Heating, ventilation and plumbing:* G. N. Haden & Sons Ltd. *Electrical:* Witcomb & Blackwell Ltd. *Tanking and asphalt roofs:* Flexi-Mastic Roofs & Asphalt Ltd. *Roofing to teaching building plant room:* The Weatherall Roofing Co Ltd. *Wood block and strip floor finish:* Hollis Bros Ltd. *Terrazzo, quarry tile and granolithic:* The Standard Pavements Co Ltd. *Granolithic in Teaching Building, plant room:* W. Herbert & Sons. *Cork tiles, studded rubber tiles, pvc sheet and vinyl tiles:* Haskell Robertson Ltd. *Mosaic facing to teaching building and external facing bricks above damp proof course:* Proctor & Lavender Ltd. *Facing bricks below damp proof course:* Eastwoods Sales Ltd. *Foundation bricks:* Richard Parton (Builders Merchants) Ltd and W. L. Jackson & Co Ltd. *Internal facing bricks:* Stonehenge Bricks Ltd. *Partition blocks:* Thermalite Ytong Ltd. *Precast concrete and terrazzo:* The Croft Granite Brick & Concrete Co Ltd. *Structural steel frame to teaching building plant room:* R. O. Wright & Co Ltd. *Aluminium windows, teaching building:* Quicktho Engineering Ltd. *Rooflights:* T. & W. Ide Ltd. *Window gearing, research building:* Teleflex Products Ltd. *Asbestos insulation board suspended ceilings:* Sundeala Board Co Ltd. *Heated suspended ceilings:* G. N. Haden & Sons Ltd. *Flush doors:* F. Hills & Sons Ltd. *Venetian blinds:* The Crittall Manufacturing Co Ltd. *Blackout blinds:* London Blinds Ltd. *Roller shutters:* Dennison Kett & Co Ltd. *Ironmongery:* A. G. Roberts Ltd and Parker Winder & Achurch Ltd. *Sliding door gear:* E. Hill Aldam. *Rubber mats:* Tyre Products Ltd. *Lifts and hoist:* Evans Lifts Ltd. *Floor duct covers:* The Dover Engineering Co Ltd. *Fire hose reels:* John Taylor Dunford & Co Ltd. *Chalkboards:* Tabula Chalkboards Ltd. *Lecture room seating:* Race Furniture Ltd. *Escape ladder, teaching building:* Loft Ladders Ltd. *Escape ladder, research building:* Minimax Ltd. *Lightning conductors:* W. J. Furse & Co Ltd. *Fume cupboards (both buildings) and fixed laboratory benching, teaching building:* Griffin & George (Laboratory Construction) Ltd. *Movable laboratory benches and storage units, research building:* Sintacel Ltd. *Painting:* G. & C. Whittle Ltd. *Paint:* ICI Ltd. *Plastering, wall tiling and floor screeds, teaching building:* W. Herbert & Sons. *Plastering, research building:* F. C. Meason Ltd. *Floor screeds, research building:* L. Shelbourne. *Fluorescent light fittings:* Simplex Electric Co Ltd and Atlas Lighting Ltd. *Tungsten light fittings:* Troughton & Young (Lighting) Ltd, The Merchant Adventurers Ltd, Ega Electric Ltd, GEC Ltd, Rotaflex Great Britain Ltd and Holophane Ltd.

AJ SfB (21)

Walls: External, non-loadbearing: General

Michael Rostron is one of the AJ*'s two research fellows in charge of production of the Element Files. His previous contributions to the* AJ *include a series of articles on light cladding. He is a member of the* RIBA *technical information committee*

(21) *Walls, external, non-loadbearing: General*

This week's Element File deals with all external walls which accept loads due only to their self-weight and to wind pressure and which do not carry structural loading. The Element Design Guide contains a procedure for the design of sheath (curtain) walls and all types of panel walls and cladding and includes considerations of anchorage devices, jointing and cleaning mechanisms, together with a wide range of references to individual items.

There are, however, very few general works on this element. Denzil Nield's *Walls and wall facings* (London, 1949, Spon) deals with heavy claddings and some light sheeted claddings but was written before the development of the modern sheath wall. BRS Digest Nos 98 and 99 (first series) *Light Cladding* offer a useful but limited account of some problems and materials.

A number of American works give a thorough account of American practice but their usefulness in this country is limited by different economic conditions and the different structure of the industry. The most useful of these publications are listed below:

HUNT, W. D. The contemporary curtain wall. New York, 1958, Dodge Corporation.

PRINCETON UNIVERSITY School of Architecture: Curtain walls of stainless steel. Princeton, New Jersey, 1955, Committee of Stainless Steel Producers, American Iron and Steel Institute

NATIONAL ACADEMY OF SCIENCES, Building Research Institute: Metal curtain walls. Publication 378, Washington, DC, 1955

NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS. Metal curtain wall division. Metal Curtain Wall Manual, USA, 1960

The File also contains a group of information sheets dealing with anchorage devices, sealants, the use of timber in curtain walls, sound insulation and heavy cladding panels.

AJ **SfB (21)**

Element Design Guide **UDC 69.022.326 Walls: External, non-loadbearing: General**

(21) Walls : External, non-loadbearing : General

Bibliographic references (third column) are graded as follows:

* General reference of value to every architect and which he may wish to possess

** Specialised reference normally used by consultant or architects with special knowledge of particular aspects of building

*** Highly specialised references and research papers which would not be of value to the architect unless working with a consultant

Figures in square brackets are SfB references to the publications. References in **bold type** are to AJ Element Files

Data required

1 **Definitions**	CLADDING: a non-loadbearing enclosure LIGHT CLADDING: cladding which requires a secondary means of support	BRITISH STANDARDS INSTITUTION **BS 661:1955 Glossary of acoustical terms [Aa2] **BS 2787:1956 Glossary of terms for concrete and reinforced concrete [Aa2] **BS 874:1956 Definitions of heat insulating terms and methods of determining thermal conductivity [Aa2] **BS 1339:1946 Humidity of the air. Definitions, formulae and constants [Aa9] *BS 952:1953 Glass for glazing: classification and terminology (including thickness and tolerances) [Ro] *BS CP 152:1960 Glazing and fixing of glass for buildings [Ro] **BS 1611:1953 Glossary of colour terms used in science and industry [Aa2] **BS 2015:1953 Glossary of paint terms [Aa2] *BS 2847:1957 Glossary of terms for stone used in building [Aa2] *BS 565:1949 Glossary of terms applicable to timber, plywood and joinery [Aa2]
2 **Assess environment**	EXTREMES OF CLIMATE: peak rainfall: *maximum rate* relative humidity wind conditions: *prevailing:* velocity direction *gusts:* velocity frequency temperature range: *maximum recorded* *minimum recorded* sunshine: *maximum intensity* *duration* SOURCES OF NUISANCE fumes dirt pollution: *nature:* acidic alkalinic neutral *degree* noise: *intensity* *frequency range*	*Obtain data from local meteorological office. Microclimate may be affected by building, vegetation, water and hard surfaces which should be recorded during site survey* *Obtain mean gust velocity over 1 minute or 15 seconds* *Note whether nuisance level is increasing or decreasing* *Obtain data on pollution from local medical officer of health* *In severe conditions initiate noise survey*

duration
location

assess noise vulnerability of nearby buildings

*PARKIN, P. H. and H. R. HUMPHREYS Acoustics, noise and buildings: chap 7 p 168–173, chap 9 p 247–255 and appendix D p 320. London, 1958, Faber and Faber [Ab9]

*BS CP 3: Chapter III (1960) Sound insulation and noise reduction [Ab9]:
section two: Dwellings
three: Educational buildings
four: Hospital buildings
five: Office buildings
six: Industrial buildings
seven: Miscellaneous buildings

3 Function of envelope

CONSIDER:
use of building
environment: *internal, external*
SELECT REQUIREMENTS
barrier to: *fire, dirt, moisture, insects*
filter to: *light, heat, cold, air, sound, smell, people, animals*

4 Statutory requirements

PLANNING

Dimensional: *building and improvement lines, height*
Aesthetic: *form, materials*

SfB (11) Ground: General Element Design Guide para 6

		MINISTRY OF HOUSING AND LOCAL GOVERNMENT Model by-laws—series IV Buildings. 1953 edition, HMSO [Aa6]	LONDON COUNTY COUNCIL London building (constructional) by-laws, 1952 [Aa6]	MINISTRY OF EDUCATION Building Bulletin No 7 Fire and the design of schools. 1961, HMSO [Ab9]	DEPARTMENT OF HEALTH FOR SCOTLAND Model building by-laws: Burghs 1954, reprinted 1957. HMSO [Aa6]	DEPARTMENT OF HEALTH FOR SCOTLAND Model building by-laws: Counties 1954, reprinted 1957. HMSO [Aa6]
FIRE	Specified fire resistance in hours	38, 39 40, 41	9·02 9·09	95, 96 and table IX	29 and table 10	35 and table 10
	Combustibility rating	38, 39, 40, 41	9·02(3) 5·27	89 and table VI	29 and table 10	35 and table 10
	Restriction of area of openings (ie necessity for back-up wall)	47	5·26	table X	30, 31	36, 37
	Minimum distance from boundary	39, 40	5·26	99 to 101 and table X	29 and table 10	35 and table 10
	Fire stops	46	9·02(11)	90 and appendix 1, 5	35	41
	Relaxation of requirements when structural projections occur	47(2)(*b*)	—	—	31	37

THERMAL INSULATION

Model by-law 78 [Aa6]
Model building by-laws (Scotland): Burghs 147, Counties 161 [Aa6]
THERMAL INSULATION (INDUSTRIAL BUILDINGS) ACT 1957 [Aa5] and REGULATIONS 1958, Statutory instruments 1958 No 1220 [Aa6]

NOISE

From internal sources

NOISE ABATEMENT ACT 1960 [Aa5] states: "Best practical means to be used to prevent noise or vibration"

LIGHT AND AIR	Minimum size of glazed areas and opening lights	Model by-laws 73(2) [Aa6] London building (constructional) by-laws 11.03(2)(*b*) [Aa6] Model building by-laws (Scotland): Burghs, part IX; Counties, part XI [Aa6] BURGH POLICE (SCOTLAND) ACT 1892: sections 173, 185 and 251 [Aa6]
MAINTENANCE		LCC by-laws for the Good Rule and Government of the Administrative County of London state that no person may " stand or kneel on the sill of any window for the purpose of cleaning or painting such window or for any purpose whatsoever, such sill being more than six feet in height from the level of the ground immediately below it, without support sufficient to prevent such person from falling "
5 Further constructional requirements		
INSURANCE	Fire Burglary Housebreaking	*In consultation with Fire Offices Committee and client's insurance company*
FIRE BRIGADE	Access Means of escape Nature of contents	*Chief fire officer*
6 Examine supporting structure	FORM DIMENSIONS: planning grids: *structural* *non-structural* heights tolerances deflection MATERIALS LOCATION OF SERVICES	
7 Determine special construction problems	Restricted site: *erection, storage, access* Speed Phasing Capabilities of contractors: *labour, plant*	*Determine in consultation with client and on results of site survey*
8 Assess internal environment	Temperature: *time/temperature curves for summer and winter* *location of heat emitters* *required U value of building enclosure* *required thermal capacity*	**INSTITUTION OF HEATING AND VENTILATING ENGINEERS (IHVE) A guide to current practice: p 37 and 377. London, 1959, The Institution [Ab8] *BS CP 3: Chapter VIII (1949) Heating and thermal insulation: table I (temperatures) [Ab8]
	Maximum relative humidity Pollution from internal processes	
	Ventilation: *method* *degree*	*With heating and ventilating consultant* **SfB (57) Installations, ventilation, air-conditioning: General** *BUILDING RESEARCH STATION Digest 34 (first series) The principles of natural ventilation of buildings [Ab8]
	Natural illumination: *daylight factor* *quality of light*	**SfB (31) Windows: General** *BRS Digest 70 (first series) Some general principles of the lighting of buildings [Ab7] *BRS Digest 80 (first series) The prediction of levels of daylighting in buildings [Ab7]
	Noise: *nature, intensity and duration of internal noise sources* *acceptable internal noise level*	AJ Information Sheet No 1037 Light cladding : sound insulation [**(21)**]
9 Assess design life of envelope	Design life of whole building Future extensions Technical advances Prestige and fashion Expediency	

10 **Degree of maintenance**	Design life of envelope Environment Acceptable expenditure Prestige Availability of labour Accessibility	*British Architects' Conference 1957: Finance, design and durability of buildings: RIBA *Journal*, 1957, 64 (9) (July) p 349-374 (conference papers); (10) (August) p 396-421 (discussion) [Ba7] *BRS Digest 109 (first series) Building economics: p 3 [Ba7]
11 **Allocated cost**	Proportion of cost within total as influenced by: CLIENT REQUIREMENTS: *prestige* *maintenance* *design life* PERFORMANCE FUNCTION APPEARANCE	*STONE, P. A. Cost prediction—a guide to design decisions. AJ, March 2 1961 p 319–324 [Ba7] *BRS Factory Building Study No 12 Economics for factory building. 1961, HMSO [(93)]

Basic design decisions

12 **Determine maximum wind pressure**	Positive Negative	*BS CP 3: Chapter v (1952) Loading clauses 7, 8, 9, 11, tables 3 and 5 and appendix 3 [Ab4]
13 **Desirable thermal properties of envelope**	CONSIDERATIONS: thermal properties of building enclosure construction of roof and floors local climate aspect heating and cooling system and intermittency of use PROPERTIES U value thermal capacity radiation transmission through windows	**SfB (56) Installations, heating: General** **VAN STRAATEN, J. F. Some thermal aspects of curtain wall construction. *South African Architectural Record*, 1961, 46 (3) (March) p 22-34 [(21)] *ROSTRON, R. M. Light cladding 1: Heat transmission. AJ, February 25 1960 p 338–339 [(21)] *HARDY, A. Thermal comfort and building structure. *Arch. Review*, 1961, 129 (769) (March) p 211–213; (760) (April) p 284–285 [Ab9] *HARDY, A. Designing for thermal comfort. AJ, November 20 1958 p 758–761; November 27 1958 p 779–781 [Ab9] *Thermal capacity is related inversely to quantity of solar heat transmitted into the interior and directly to its time delay in reaching the internal surface* *GROUNDWATER, I. S. Solar radiation in air-conditioning: chap VI. London, 1957, Crosby Lockwood [Ab7]
14 **Desirable sound reduction of envelope**	Nature, intensity and duration of internal and external noise sources Acceptable internal or external noise level Masking	*PARKIN and HUMPHREYS chap 8 and chap 10 p 302 [Ab9] *BS CP 3: Chapter III (1960) appendix A cl 15 [Ab9] *ROSTRON Light cladding 5: Sound insulation. AJ, March 31 1960 p 519–520 [(21)] AJ Information Sheet No 1037 **[(21)]**
15 **Determine extent of glazed areas and opening lights**	Statutory requirements Desirable thermal properties of envelope Desirable sound reduction of envelope Natural illumination required Amenity Ventilation	
16 **Disposition of glazed areas and opening lights**	Safety Appearance View, in and out Internal planning: *partitions, furniture, services, entrances*	

	Natural illumination Accessibility for maintenance and repair	
17 **Method of erection**	CONSIDERATIONS: availability of labour and plant speed required capability of contractor access erection from *inside* *outside* cost size and height of building METHOD assembly of large units attached directly to structure assembly of small units attached to a secondary non-structural frame or backing assembly of self-supporting small units	*BRS Digest 129 (first series) Cranes for building [Bb4] *ROSTRON Light cladding 10: Erection. AJ, July 21 1960 p 115–116 [(21)]
18 **Consider technical and visual relationships**	WITH ADJACENT ELEMENTS: walls, floors, columns, roofs FORM OF ENVELOPE: wall planes, setbacks, angles: *internal, external*	
19 **Protection against solar radiation** AMOUNT FLEXIBILITY METHOD OF CONTROL	Consider: radiation intensity: *direct* *diffuse* area of glazing aspect total room heat loss flexibility of heating, ventilating and air-conditioning systems capital cost: maximum load running cost: seasonal cooling load Time when protection is necessary: *path of sun* *occupancy of building* Capital cost Maintenance: *cost* *accessibility* Required illumination level Reduction in area of glass Increased mechanical or natural ventilation Fixed external louvres, fins or projections Adjustable external louvres, blinds or awnings Heat absorbing glass plus natural ventilation or double glazing Adjustable internal blinds plus natural ventilation Reorientation of building	**Princeton Curtain Wall Research Project Study No 6 Thermal behaviour of curtain walls. Princeton, New Jersey, 1957, Princeton University Press [(21)] *This fully examines the problem of solar radiation on non-loadbearing walls and, using the 'sol-air' temperature concept, enables accurate predictions and solutions to be determined; but the study is intended for use in severe conditions and is rather too complicated for the architect in this country* *IHVE Guide, section IX p 380–393 [Ab8] *explains a method of calculating solar radiation falling on vertical walls and suggests a basis for determining the transmission through glass* *Other useful references are:* *GROUNDWATER chap I–VI [Ab7] **NATIONAL ACADEMY OF SCIENCES Windows and glass in the exterior of buildings. Publication 478. Washington DC, 1957 [(31)]
20 **Establish position of envelope**	Between structural elements Enclosing structural elements Behind structural elements	
21 **Assess need for secondary framing**	Type and spacing of structural members Position of envelope relative to structure Size of basic units Wind pressure	
22 **Determine position of framing within wall thickness**	Exposed (eg curtain wall) Concealed	
23 **Establish provisional spacing of secondary framing**	HORIZONTAL AND VERTICAL COMPONENTS: structural dimensions method of erection extent of glazing internal partitions wind pressure required thermal properties appearance planning grid	

24 **Establish principle of rain exclusion and condensation ejection**	Cavities: *drained* *ventilated* *drained and ventilated* Impervious outer skin with vapour barrier	
25 **Determine elemental cost target**	Cost plan Cost analysis: *per unit floor area* *per unit envelope area*	*Determine in consultation with quantity surveyor*
26 **Assess total available annual expenditure on maintenance**	Running cost Amortised capital cost of appliances	
27 **Determine type of cladding**	Architect detailed Proprietary: *standard* *purpose-designed*	
PROPRIETARY CLADDING 28 **Consult specialist subcontractor**	Obtain estimates on basis of sketch design and performance specification: COMPETITIVE PRICE for manufacturer's standard system NEGOTIATED PRICE for special design	
29 **Compare price with elemental cost target**		
30 **Appoint specialist subcontractor**		*The appointment at this stage of the specialist contractor for a proprietary cladding system enables all questions of detailed design to be jointly agreed by architect and subcontractor. When no proprietary cladding system is used, appointment of subcontractor is made at para 113 below*
31 **Execute detail design**	In conjunction with specialist subcontractor	
32 **APPRAISAL**	Examine all data collected and basic design decisions taken and reassess suitability of a non-loadbearing wall as the solution to the problem	

Detail design

SECONDARY FRAMING 33 **Choose material, shape and finish of members**	CONSIDER: position, fire resistance, strength, cost, maintenance, conductivity, thermal and moisture stability, availability, method of attachment, appearance SELECT: mild steel: *galvanised*	*ROSTRON Light cladding 7: Materials and finishes: metals. AJ, May 12 1960 p 224 [(21)]
	painted	*BS CP 231 (1952) Painting [V] *BS 2521–4: 1954 Ready mixed oil-based priming paints [Vv6] *BRS Digest 64 (first series) Painting metals in buildings [V]
	enamelled *bonderised* *lead-covered*	*BS CP 145: 101 (1951) Patent glazing [Ro]
	plastic-covered stainless steel	*SCHOOL OF ARCHITECTURE, PRINCETON UNIVERSITY Curtain walls of stainless steel. Princeton, New Jersey, 1955, Committee of Stainless Steel Producers, American Iron and Steel Institute [(21)] **Princeton Study No 1 Data on stainless steel curtain walls [(21)]

	aluminium: *mill finished* *anodised* *etched* *painted* *lacquered*	*ALUMINIUM DEVELOPMENT ASSOCIATION (ADA) Aluminium and its alloys in building. London, 1953, The association [Dd4] *BS 1470: 1955 Wrought aluminium and aluminium alloys. Sheet and strip [Dd4] *BS 1161: 1951 Aluminium and aluminium alloy sections [Hd4] *BRS Digest 40 (first series) Aluminium and aluminium alloys in building: part II p 1–4 [Dd4] *BS 1615:1958 Anodised aluminium [Du1] *BRS Digest 111 (first series) Corrosion of non-ferrous metals: II [Dd8] *ADA Information Bulletin No 20 Painting practice for aluminium [V]
	bronze	*BRS Digest 110 (first series) Corrosion of non-ferrous metals: I [Dd4]
	concrete	
	timber: *painted* *varnished* *stained*	*TIMBER DEVELOPMENT ASSOCIATION (TDA) The use of timber in curtain walling. RSA 7 reprinted from *Architecture and Building*, May 1957 [(21)] *BS CP 112.100 (1952) Preservative treatments for timber used in buildings [Du3] *BS 913: 1954 Pressure creosoting of timber [Du3] *BS 256:1936 Interior oil varnish [Vv4] *BS 1215: 1945 Oil stains [Vv2] *BS 1282: 1959 Classification of wood preservatives and their methods of application [Du3] *BRS Digest 30 (first series) Painting woodwork [V] *TDA publications: TBL 8 Timber preservation, 1958 [Du3] C/TR/2 Weathering of clear finishes on various timber species, 1957 [Vv4] *OLIVER, A. C. External clear finishes for timber. RIBA *Journal*, 1957, 64 (8) (June) p 329–33 [Vv4]
34 **Assess need for temporary protection**	PAPER PLASTIC: film and tape sprayed cocoon LACQUER	
35 **Consider junctions with other elements**	Partitions Cross walls and columns Edge beams and floor slabs Sills Plinths Fascias	
36 **Assess possibility of " cold bridge " and remedy if necessary**	Change of material Use of split mullions and transoms Avoidance of through metal fixings Provision of insulation between external or internal surfaces and framing members	
PANEL DESIGN 37 **Determine provisional economic thermal properties**	CONSIDERATIONS : required thermal properties of envelope window/wall ratio type of glazing type and material of framing PROPERTIES: U value solar absorption thermal capacity	*ROSTRON Light cladding I p 337–340 [(21)] *HARDY Thermal comfort and building structure [Ab9] *HARDY Designing for thermal comfort [Ab9]

38 **Consider material, surface texture and finish of panel surfaces**	Appearance, cost, availability, durability, strength, weathering qualities, ease of maintenance, size available, thickness, fire resistance, combustibility, resistance to impact, weight, adjacent structure, dimensional stability, availability of replacements, degree of hazard if broken or damaged, ability to accept applied finish if required		
39 **Choose panel material**			
HEAVY	Clay products		*BS CP 121.101 (1951) Brickwork [Fg] *BS CP 122 (1952) Walls and partitions of blocks and slabs [(21)F] *BS 1190: 1951 Hollow clay building blocks [Ff] *BRS Digest 25 (first series) The selection of clay building bricks [Fg2] *BS 187: 1955 Sandlime (calcium silicate) bricks [Ff1] *BRS Digest 6 (first series) The avoidance of cracking in masonry construction or sand-lime bricks [F]
	Natural stone, marble, slate and travertine		AJ Information Sheet No 1035 [**(21)**] *BS CP 121.201 (1951) Masonry walls ashlared with natural stone or with cast stone [Fe] *BS 1232: 1945 Dimensions and workmanship of natural stone for building [Fe] *BRS Digests (first series): 20 The weathering, preservation and maintenance of natural stone masonry (part I) [Fe] 21 The weathering, preservation and maintenance of natural stone masonry (part II) [Fe] *ROSTRON. Heavy cladding panels 1: *Arch. Review*, 1961, 129 (771) (May) p 355 [Uf2]
	Cast stone		AJ Information Sheet No 1041 [**(21)**] *BS CP 121.201 (1951) [Fe] *BS 1217:1945 Cast stone [Df]
	Concrete block		*BS CP 122 (1952) [(21)F] *BS 1180:1944 Concrete bricks and fixing bricks [Ff2] *BS 2028:1953 Precast concrete blocks [Ff]
	Concrete panel: *faced* *unfaced*		*BRS Digest 6 (first series) [F] *WILSON, J. G. Concrete facing slabs. London, 1961, Cement and Concrete Association [Uf2] *ROSTRON Heavy cladding panels 1 [Uf2] *EASTWICK-FIELD, J. and J. STILLMAN Out of the form. *Arch. Review*, 1959, 125 (749) (June) p 387–397 [E]
	Lightweight concrete		*BRS Digests (first series): 29 Aerated concrete (part II) [Df4] 52 Lightweight concrete blocks for housing [Ff4]
	Glass block		*BS CP 122 (1952) [(21)F] *BS 1207: 1953 Hollow glass blocks [Fo]
LIGHT	Mild steel		*ROSTRON Light cladding 7 [(21)] *BS 3083: 1959 Hot dipped galvanised corrugated steel sheets for general purposes [Nd2]
	Stainless steel		PRINCETON UNIVERSITY Curtain walls of stainless steel [(21)] **Princeton Studies: No 1 [(?1)] No 4 A reflective method for testing flatness and thermal buckling of metal panes. 1957 [(21)] *ROSTRON Light cladding 7 p 727 [(21)]

	Aluminium	*ADA Aluminium and its alloys in building [Dd4] *BS CP 143: Part 1: 1958 Aluminium corrugated and troughed sheets (for pitched and vertical cladding) [Md4] *BS 1470: 1955 [Dd4] *BS 2855: 1957 Corrugated aluminium sheets for general purposes [Nd4] *BRS Digests (first series): 110 [Dd4] and 111 [Dd8] 39 Aluminium and aluminium alloys in building: part 1 [Dd4]
	Copper and bronze	*ROSTRON Light cladding 7 p 724 [(21)]
	Glass	*ROSTRON Light cladding 8: Materials and finishes: timber and glass. AJ, May 19 1960 p 764 [(21)] *MARKUS, T. A. The glass curtain wall 2: Heat transmission, AJ, November 21 1957 p 780 [(21)] *BS CP 152:1960 [Ro] *BS 952:1953 [Ro]
	Asbestos composites	*ROSTRON Light cladding 9: Materials and finishes, concluded. AJ, June 23 1960 p 966 [(21)] *BS 690: 1953 Asbestos-cement slates and sheets [Nh1] *BRS Digest 130 (first series) The cracking of asbestos-cement sheets p 3 [Nh1]
	Timber	*ROSTRON Light cladding 8 p 761 [(21)] *BS 1455: 1956 British-made plywood for general purposes [Ri4] TDA publications: *TBL 7 Plywood: revised 1961 [Ri4] *RSA 7 [(21)] AJ Information Sheet No 1040 [**(21)**]
	Plastics	*ROSTRON Light cladding 9 p 967 [(21)]
40 **Protective treatment and/or finish to panel surfaces**	Paint: *brushed* *sprayed* *stoved*	*BS CP 231 (1952) [V] **BS 2521-4: 1954 [Vv6] *BS 2525-32: 1924 Ready mixed oil-based under-coating and finishing paints (exterior quality) [Vv6] *BRS Digests (first series): 17 Colourwashes (including paints) on external walls [Vv6] 30 [V] 38 Painting asbestos cement [V] 50 Emulsion paints [Vv6] 64 [V] *ADA Information Bulletin No 20 [V]
	Metal spray	*BS 2569: Part 1: 1955 Sprayed metal coatings. Protection of iron and steel against atmospheric corrosion [Du1]
	Porcelain enamelling	*ROSTRON Light cladding 7 p 725 [(21)]
	Anodising	**BS 1615: 1958 [Du1]
		*ROSTRON Light cladding 7 p 727 [(21)]
	Stone preservatives	*BRS Digests (first series): 20 [Fe] 21 [Fe] 63 Questions and answers p 2 [Aa2] 90 Colourless waterproofing treatments for damp walls: p 1 [Du6] 128 Stone preservatives: p 1 [Du6]
	Timber: *seals* *varnishes* *oils* *stains* *preservatives*	*OLIVER [Vv4] *BS CP 112.100 (1952) [Du3] **BS 913: 1954 [Du3] **BS 256: 1936 [Vv4] **BS 1215: 1945 [Vv2] **BS 1282: 1959 [Du3] TDA publications: *TBL 8 [Du3] *C/TR/2 [Vv4]

41 **Determine whether back-up wall is necessary**		See para 4 above *Consult local authority and apply for waivers if necessary*
42 **Determine material of back-up wall**	Clay brick or block Concrete brick or block Reinforced concrete	*BS CP 121: 101 (1951) [Fg] *BS CP 122 (1952) [(21)F] *BS 187: 1955 [Fg1] *BS 1180: 1944 [Ff2] *BS 1190: 1951 [Fg] *BS 2028: 1953 [Ff] *BRS Digest 6 (first series) [F] *BRS Digest 25 (first series) [Fg2] AJ Information Sheet No 1035[**(21)**]
43 **Determine panel form**	Integral Built-up without cavity With sealed cavity With ventilated and/or drained cavity	
44 **Position of services relative to panel**	Heat emitters: *recessed into panel or back-up wall, within cavity* Protection of panel from: *conducted heat, radiant heat* Relationship of casings to: *secondary framing, glazing, sill heights* Location of: *pipe runs, controls*	
45 **Examine method of panel attachment**	Self-supporting Attached to main structure Attached to secondary framing or backing	
46 **Calculate initial U value of panel**	Check with economic U value to determine additional insulation required	Refer to para 37 above *BRS The thermal insulation of buildings: G. D. Nash, J. Comrie, H. F. Broughton: part 1 p 13–22. 1955 HMSO [Ab9] *IHVE Guide section 11 [Ab8]
47 **Assess effect of solar absorption on panel**	Aspect Temperature range Radiation intensity Shading Panel colour: *dark* *light* Panel texture: *matt* *reflective* Edge shading stresses	*BRS The thermal insulation of buildings: part 1 p 5 [Ab9] *IHVE Guide section IX p 380–389 [Ab8] ***BALLANTYNE, E. R. Temperature distribution on glass wall cladding exposed to the sun. Australia, Commonwealth Scientific and Industrial Research Organisation, Division of Building Research, Report 06.1–2. Melbourne, 1960, The Organisation [(21)]
48 **Consider thermal capacity of panel and adjust if necessary**	Thermal conductivity Density Specific heat Relative positions of panel components	*To achieve required thermal capacity, locate higher density material within the thickness of the panel relative to the required thermal characteristics*
49 **Achieve required U value**	Rigid thermal insulating sheet materials Low density insulating block wall materials Creation of multi-cavity construction Cavity filling of quilt or granular materials Application of reflective surfaces to faces of cavities	*BRS The thermal insulation of buildings: part 1 [Ab9] *BS 1589: 1950 Thermal insulating materials (plastic composition, flexible and loose fill) [K] *BRS Digest 103 (first series) Plastics for building: p 4 [Dn6]
50 **Interstitial condensation**	If necessary, eliminate risk by use of: *porous outer skin* *ventilated and/or drained cavity* *insulated outer skin* *correctly located vapour barrier*	*ROSTRON Light cladding 3: Condensation. AJ, March 10 1960 p 404–408 [(21)] *BRS Digests (first series): 23 Condensation problems in buildings: p 3 [Ab9] 103 p 4 [Dn6] *BS 1521: 1949 Waterproof building papers [Lj2]

51 **Assess range of thermal movement of panel and framing**	Panel and framing material: coefficients of expansion Surface temperature range Size of panel	*ROSTRON Light cladding 2: Stability. AJ, March 3 1960 p 361–365 [(21)]
52 **Determine clearances and tolerances required**	Thermal and moisture movement Fixing Manufacturer's requirements	AJ Information Sheet No 1040 [**(21)**] *ROSTRON Light cladding 2 [(21)] *ROSTRON Light cladding 10 p 116–118 [(21)]
53 **Assess need for temporary protection**	PAPER PLASTIC: film and tape sprayed cocoon LACQUER	
GLAZED AREAS		For fuller consideration of glazed areas refer to: **SfB (31) Windows: General** **SfB (31) Windows: Sections, metal** **SfB (31) Windows: Sections, wood**
54 **Determine type of glazing**	CONSIDER: required thermal properties required sound insulation quality of light cost necessity for clear vision SELECT: single: *normal* *heat-absorbing* *glare-reducing* *diffusing* *directional* multiple: *metal spacer* *synthetic spacer* } UNIT *glass/glass weld* *pivoted double frames* *removable double frames* *sliding double frames* } BUILT-UP *bead spaced: sealed* *ventilated*	*BS CP 152: 1960 section 5 [Ro] *MAGUIRE, R. Double glazing. *Arch. Review*, 1955, 117 (700) (April) p 280–282 [Ro] AJ Information Sheet No 1037 [**(21)**] *ROSTRON Light cladding 5 p 523–524 [(21)] *ROSTRON Light cladding 8 p 764–765 [(21)]
55 **Type of opening lights**	CONSIDER: principle of natural ventilation local climate obstruction to curtains and blinds obstruction to vision cleaning requirements danger to external traffic SELECT: side-hung top-hung } OPEN OUT OR OPEN IN bottom-hung horizontally pivoted vertically pivoted projected balanced vertically sliding horizontally sliding sliding-folding louvres removable	*Windows in tall blocks: tenants' opinions. AJ, July 10 1958 p 64–70 [(31)]
56 **Frame material and finish**		*The choice of frame material will generally be determined by considerations similar to those which determined the choice of secondary framing. For these considerations, materials and references, see para 33 above*

57 **Determine method of regulating natural light**	SINGLE GLASS: directional, etched, sand-blasted, coated LAMINATED DIFFUSING GLASS: plain, patterned BLINDS: fixed, movable LOUVRES	*VOELCKER, J. Blinds. *Arch. Review*, 1954, 116 (693) (September) p 199–204 [(72)]
58 **Type of glass**	CONSIDER: size of sheet position required thermal qualities required illumination SELECT plate (GG, SG, SQ) float sheet (OQ, SQ, SSQ) transparent, obscured, prismatic coloured, tinted, opal plain, wired: *Georgian* *hexagonal* block "Armourplate", toughened heat-absorbing	*MCGRATH R., FROST, A. C., BECKETT, H. E. Glass in architecture and decoration: appendix p 617–672. London, 1961, Architectural Press [Do] *BS CP 152:1960 [Ro] *BS CP 122 (1952) [(21)F] *BS 952:1953 [Ro] *BS 1207:1953 [Fo] *PILKINGTON BROTHERS LTD leaflets: Glass in building [Ro]: B1(H) Types and characteristics B2(H) The transmission of light B3 Hollow glass blocks B7 Prismatic glass B9 Wired glass B14 Heat absorbing glass B15 "Antisun" B16 Cast glass "Calorex" B17 One way vision glazing *MARKUS, T. A. The glass curtain wall 1. AJ, November 7 1957 p 700–704 [(21)]
59 **Thickness of glass**	Size of pane Size available Exposure Position Sound insulation	*BS CP 152:1960 cl 302 [Ro] or *MCGRATH, FROST and BECKETT p 446–447 and 570–571 [Do] AJ Information Sheet No 1037 [**(21)**]
60 **Decide whether glass is to be fixed from inside or outside**	PUTTY AND SPRIGS BEADS: timber metal: *screwed* *clipped* GROOVES PREFORMED GASKETS	*BS CP 152:1960 cl 402 and 404 [Ro] **BS 544:1934 Linseed oil putty for use in wooden frames [Dt4] For details of sealants and gaskets see paras 81–85 below and AJ Information Sheet No 1038 [**(21)**]
61 **Determine glass manufacturer's recommended edge, front and back clearances**		*BS CP 152:1960 [Ro]
62 **Method of positioning glass in frame**	SETTING BLOCKS: neoprene, hardwood, lead DISTANCE PIECES: hardwood, pvc, polychloroprene, hemp rope	*BS CP 152:1960 cl 401(c) [Ro]
63 **Assess need for weather stripping**	CONSIDER: required thermal insulation required sound insulation type of opening windows standard of internal comfort SELECT: phosphor bronze pvc synthetic rubber	*WHITELEY, P. Draught exclusion and weatherstripping. *Arch. Review*, 1957, 122 (727) (August) p 142–146 [Ab9]
64 **Determine method of operation of opening lights**	Manual Accessory (eg long arm) Remote control: *hand-operated* *mechanically operated*	*MAGUIRE, R. Remote control gear for ventilators. *Arch. Review*, 1956, 120 (747) (October) p 272–274 [(30)] *Specification. London, 1961, Architectural Press [Ba5]
65 **Consider range of furniture required**	Casement turns, cockspurs, espagnolette bolts, sash stops, sash fasteners, rack bolts, pivots, hinges, locks, stays, sash balances, sliding track, curtain track	**SfB (30) Accessories, ironmongery: General**

66	**Avoidance of condensation**	Permanent ventilation Adjustable ventilation	
67	**Disposal of condensed water**	Channels and tubes or holes to outside	
	ANCHORAGE DEVICES		
68	**Review function**	To effect junction between panel or secondary framing and structure To take up dimensional inaccuracies To ensure alignment To allow for movement: *thermal, moisture, structural*	
69	**Review requirements**	Adjustable in all directions Resistant to corrosion: *chemical, bimetallic* Adequate strength to resist dead and live loads Flexible enough to allow for movement Secure Fire-resistant Simple	
70	**Determine type of device relative to components to be fixed**	Slotted angles Straps Hook bolts Oakley clips Cast shoes Dovetailed anchors Nibbed anchors Hooks Cramps Corbels Bearings: *nylon* *polytetrafluorethylene (ptfe)*	**NATIONAL ACADEMY OF SCIENCES Mechanical fasteners for industrial curtain walls. Publication 916. Washington DC, 1961 [(20)] *ROSTRON Light cladding 10 p 118–119 [(21)] *ROSTRON Heavy cladding panels 2. *Arch. Review*, 1961, 129 (772) (June) p 427–432 [Uf2] *BS 1494:1951 Fixing accessories for building purposes [(20)] *BS 2465:1954 Aluminium fixing accessories for building purposes [(20)] AJ Information Sheet No 1039 [**(21)**]
71	**Determine method of adjustment**	Slots, shims, screwed, sliding	
72	**Determine material**	Corrodible metal: *steel* } MUST BE ACCESSIBLE FOR *cast iron* } MAINTENANCE Incorrodible metal: *stainless steel* *bronze* *copper*	*Beware of corrosion from bimetallic contacts* *To ensure that no binding or "stick and slip" movement occurs, use nylon or ptfe washers where necessary*
73	**Consider material to which fixing is to be made**	STRUCTURAL OR SECONDARY: steel, aluminium, concrete, brick, stone, timber, plastic	
74	**Determine method of attachment**	Screws Bolts Rivets Stud welding Plugs Cement-in sockets Lewis or rag bolts Expansion bolts Dovetailed slots Box and channel inserts	*BS 1210:1952 Wood screws [(20)] *BS 916:1953 Black bolts, screws and nuts [(20)] *ROSTRON Light cladding 10 p 120–122 [(21)] *GRANT, B. Mechanical fixings. *Arch. Review*, 1955, 117 (699) (March) p 212–214 [(20)] AJ Information Sheet No 1039 [**(21)**]
	JOINTING		
75	**Review function of joint**	Achievement of visual and practical connection of similar or dissimilar materials Toleration of thermal, moisture and structural movements Correction of dimensional and alignment variations	
76	**Review requirements of joint**	Exclude water, air and dust Preserve insulation of wall Withstand working loads Easy assembly, maintenance and renewal Easy dismantling to allow for repair or replacement of adjacent components	

77 **Estimate maximum amount of movement at joint**	Thermal Moisture Structural	*ROSTRON Light cladding 2: Stability. AJ, March 3 1960 p 361 et seq [(21)] *Princeton Study No 2 Joints in metal curtain walls: p 2–5 [(21)]
78 **Determine size of joint**	Amount of movement Amount of shear and tensile stresses to be imposed on sealant	*The wider the joint the less will be the stress on the sealant*
79 **Joint type**	CONSIDER components to be joined: *shape* *material* SELECT: *butt* *lap* *mated* *accessory*	*ROSTRON Light cladding 6: The joint. AJ, April 28 1960 p 653–654 [(21)] *Princeton Study No 2 p 10–17 [(21)]
80 **Joint seal**	CONSIDER: *amount of movement* SELECT: rigid: *welding, riveting, wedging, bonding, adhesive* non-rigid: *sealants, gaskets, cover tapes, metallic strips*	*ROSTRON Light cladding 6 p 654–655 [(21)] *Princeton Study No 2 p 18–20 [(21)]
81 **Review requirements of sealants and glazing compounds**	Easy to apply at expected erection temperature range Readily assumes shape of joint Adheres strongly in direct tension and shear Readily deformable without slump Non-staining, non-hardening, non-shrinking Resistant to water, wind, heat, light, ozone, ultra-violet radiation, erosion, mechanical attack, abrasion	
82 **Determine sealant material**	Mortar Oil-based mastic: *knife-applied* *gun-applied* Synthetic rubber: *polysulphide (two-part)* *butyl (one-part)*	**NATIONAL ACADEMY OF SCIENCES Adhesives and sealants in building. Publication 577. Washington DC, 1958 [Dt] *ROSTRON Light cladding 6 p 655–659 [(21)] *Princeton Study No 2 p 20–33 [(21)] *PHILLIPS, D. (editor) Sealants and adhesives. Supplement to *Architectural Design*, 1961 June [Dt] **BS 544:1934 [Dt4] *BRS Digests (first series): 82 p 1 Building mastics [Dt4] 105 p 3 Thiokol jointing compounds [Dt] 126 Mortars for jointing [Dq4] AJ Information Sheet No 1038 [**(21)**]
83 **Gasket material**	Neoprene Butyl Pvc Silicone rubber	*ROSTRON Light cladding 6 p 659–660 [(21)] *Princeton Study No 2 p 28–31 [(21)]
84 **Method of pressure application to gasket**	Filler strip Hollow tubular gasket Applied beads or enclosures Projecting legs on frame	
85 **Treatment of gasket at angles**	Radiused corners Site fusion (pvc) Shop welding (neoprene) Preformed angles butt-jointed to sides: *in shop* *on site*	
DRAINAGE 86 **Assess desirability of draining cavities**		Refer to para 24 above
87 **Determine position of flashings**	Flashings to protect inner skin Baffles or upstands to prevent entry of wind-blown rain	*ROSTRON Light cladding 3 p 408 [(21)] *Upstands to be at least 8in high*
88 **Assess amount of run-off from wall**	Permeability of facing Local rainfall Area of wall surface	*BRS Digest 98 (first series) Light cladding—Part 1 p 2 [(21)] (1 *gallon per minute per* 100 *sq ft*)

89 **Determine position for collection of run-off**	Base of wall First floor level Each floor level	*TANNER, G. C. A. The disposal of rainwater. *Arch. Review*, 1961, 129 (768) (February) p 139–142 [(52)]
90 **Method of collection of run-off**	Channel and gullies Gutters and downpipes	
91 **Method of disposal of run-off**	Connection to surface water drainage system Soakaways	
CLEANING AND MAINTENANCE		
92 **Determine scope of cleaning**	Glass Frames Panels Whole wall	*ROSTRON Light cladding 11: Durability and maintenance. AJ, September 22 1960 p 427 et seq [(21)] *Glass:* *BS CP 152:1960 cl 901 (*b*) [Ro] *Stone:* *BRS Digests (first series): 20 p 4–8 [Fe] 21 p 3–5 [Fe] 47 The control of lichens, moulds and similar growths on building materials [Bc] 95 Questions and answers p 2 [Aa2]
93 **Frequency of cleaning**	Use of building Locality Atmospheric pollution Materials and finishes	
94 **Statutory limitations**		See para 4 above
95 **Method of cleaning**	Manual Automatic (eg sparge pipe)	*ROSTRON Light cladding 11 p 431 [(21)]
96 **Means of access**	FROM INSIDE: type and size of opening lights maximum reach FROM OUTSIDE: structural projections ladders platform lorry cradle temporary scaffolding	Windows in tall blocks: tenants' opinions [(31)] *ROSTRON Light cladding 11 p 428–429 [(21)] *WRIGHT, L. The cleaning of large buildings. *Arch. Review*, 1960, 127 (758) (April) p 283–286 [Bc1] *BS 1129:1960 Timber ladders, steps and trestles [Bb9] *BS 1139:1951 Metal scaffolding [Bb4] *BS 2037:1953 Aluminium alloy ladders, steps and trestles for the building and civil engineering industries [Bb9] *BS 2830:1957 Suspended safety chairs [Bb9]
97 **Ladders**	Maximum height Length of ladder Maximum slope	
98 **Provide supports**	Foot of ladder Top of ladder	
99 **Platform lorry**	Provide roadway	
100 **Method of cradle suspension**	Roof runway Permanent projecting supports Temporary projecting supports	*WRIGHT [Bc1]
101 **Provision of cradle**	Permanent Hired	
102 **Method of guiding cradle**	Ropes Permanent vertical track on secondary framing	*ROSTRON Light cladding 11 p 428 [(21)]
103 **Provide accommodation for cradle when not in use**		

GENERAL		
104 **Check heat transfer through envelope**	U value and surface areas of: *panel* *glazing* *secondary framing* Thermal capacity Radiation transmission	*ROSTRON Light cladding 1 p 338–339 [(21)] See para 14 above
105 **Check sound insulation of envelope**		*ROSTRON Light cladding 5 [(21)] *BS CP 3: Chapter III (1960) appendices D and F, figs 4 and 5 [Ab9] *PARKIN and HUMPHREYS p 271–274 [Ab9]
106 **Check construction for corrosion**	Chemical Electrolytic	*ADA Information Bulletin No 21 Aluminium in contact with other materials. 1955 [Da] **ADMIRALTY AND MINISTRY OF SUPPLY *Interservice Metallurgical Research Council*: Corrosion and its prevention at bimetallic contacts. 1958, HMSO, 2nd edition [Da] (Partly reproduced in BS CP 152:1960 appendix A [Ro])
107 **Amend and modify drawings as necessary**		
108 **Perform final cost check**		
109 **Prepare documents for final approvals**	Client Relevant authorities Consultants Specialist suppliers and contractors	

Specification

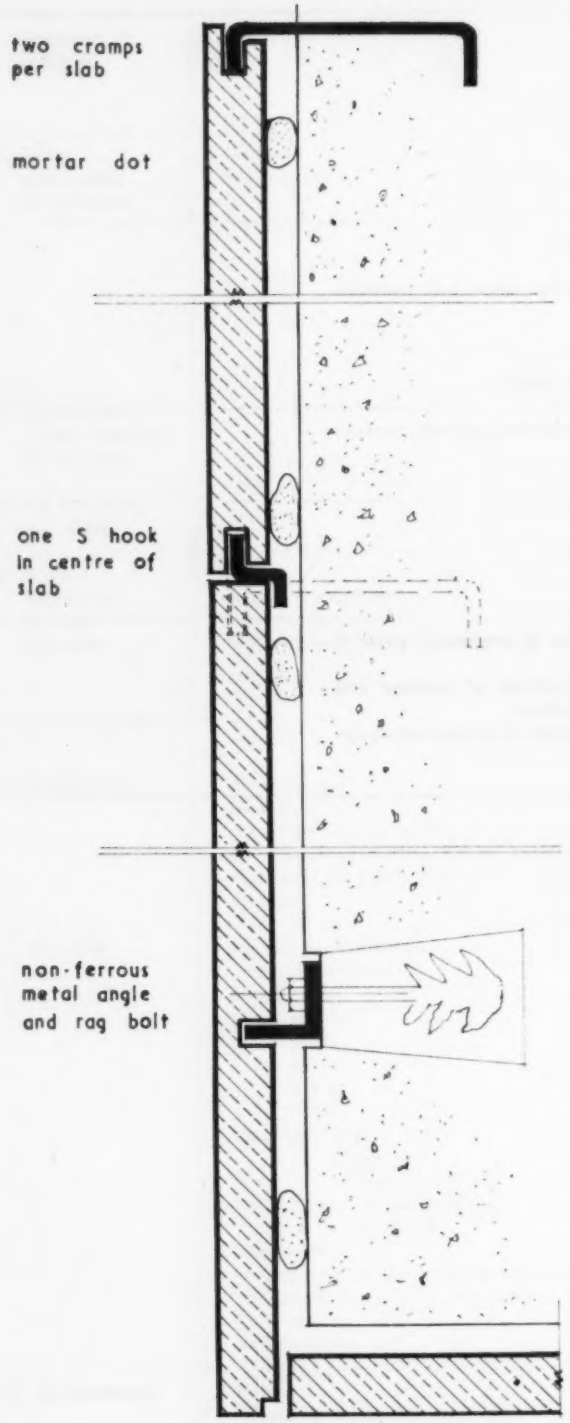
110 **Preliminaries**	Access to site Insurance Attendance on specialists Provision of scaffolding, hoists, cranes Electricity for power tools Phasing	
111 **Materials**	SOURCE: manufacturer merchant TYPE: name number grade density colour finish DELIVERY: time place assistance required PROTECTION: impact damage weather LABELLING DISPOSAL OF CRATES, BOXES, PACKING PROVISION OF SAMPLES AND SAMPLE WALL TESTING GUARANTEES	
112 **Workmanship**	Quality Clearances } *by numerical value* Tolerances } Making good Keeping clean Final cleaning Adjustment of moving parts	*If quality higher than normal is required, specify in detail*

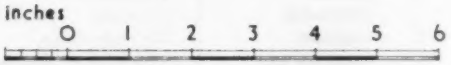
Contract stage

113 **Select and appoint specialist suppliers and subcontractors**	*With authority of client*
114 **Agree with general contractor, specialist suppliers and subcontractors**	Erection procedure Programme Ordering Delivery dates Provision of samples Erection of sample structures Site storage Temporary protection
115 **Supervise erection**	Checking deliveries against samples Setting out Erection of structure to specified linear and plumbing tolerances Routine supervision Cleaning down Removal of temporary protective finishes
116 **Ensure final adjustment of moving parts**	Windows, doors, blinds, louvres, shutters, gantries, runways
117 **Carry out final inspection**	Defects from: *use of unspecified material* *poor workmanship* Damage
118 **Prepare and hand to client service chart**	Names and addresses of suppliers of proprietary parts of walls Recommended frequency and methods of cleaning and painting and replacement of sealants Recommended frequency of overhaul of mechanical equipment

HIGH FELL
green slate cladding

SfB	(21) Ue5
UDC	69·022·326





MATERIAL

HIGH FELL GREEN SLATE

CHARACTERISTICS

Geological . . . Of the ordovician series.
Practical . . . Rot proof, damp proof, shrink proof, non-warping, self-cleansing, unaffected by atmospheric polution.
Colour . . . . . Light grey green and light sea green for cladding generally.
Distinctive barred duo-colour for special positions.

FINISHES

Four finishes are available. Natural riven, frame sawn, sanded and fine rubbed.

SIZES

Practical max. 6'-0" x 3'-0" x 1"
Recommended max. 3'-0" x 2'-0" x 1"
Riven slab max. 2'-3" x 1'-3" x 1"

FIXING

Fixing is not undertaken by the Company. Typical fixings are illustrated. Over openings etc., the weight of the slabs must be taken by strong metal corbels or angles. Mortar must be cleaned off the face of slabs before it dries.

COST

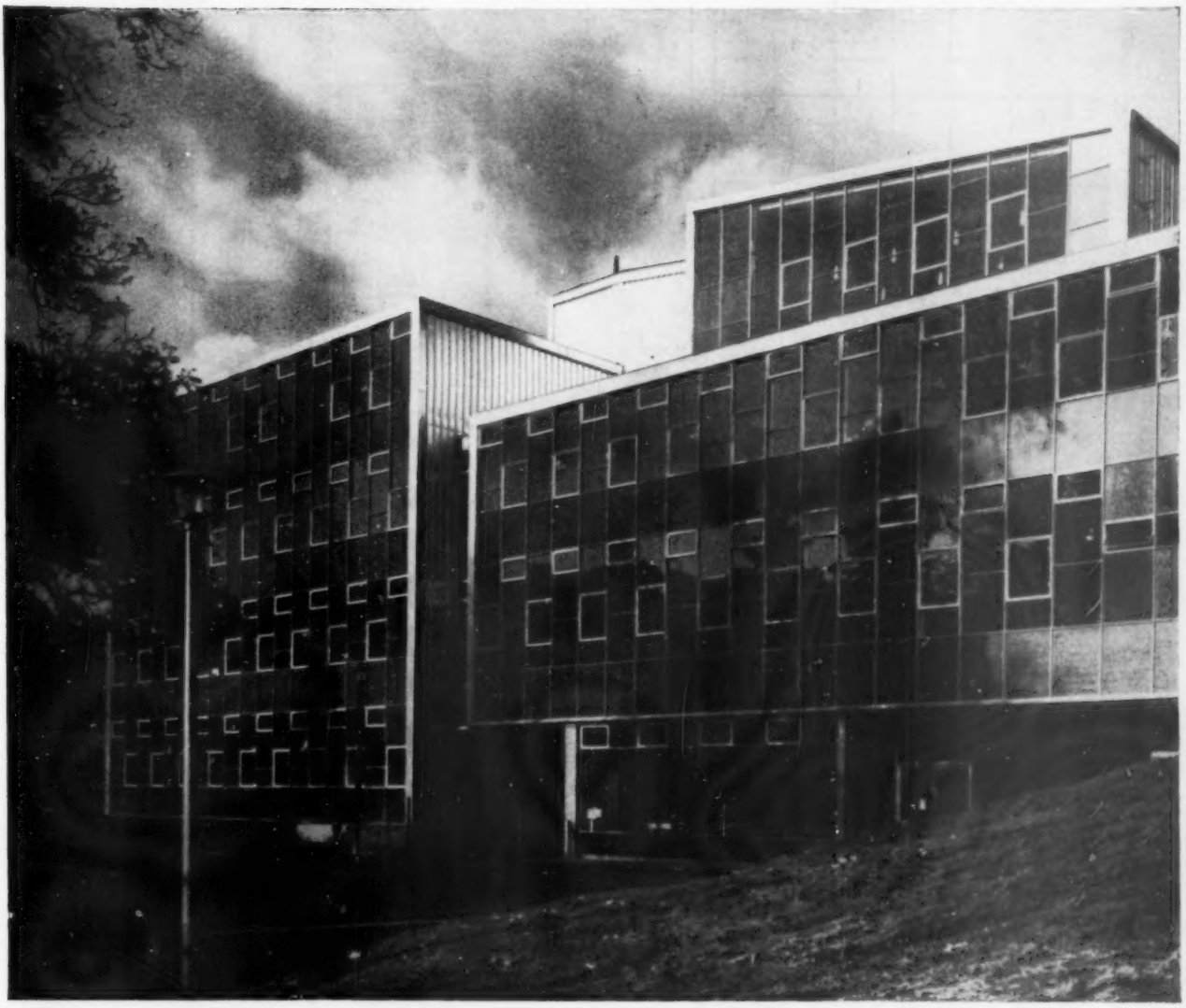
For guidance only and based on medium sized contract.
1" thick frame sawn 18/- per ft sup
1" thick fine rubbed 17/6 - do -
Fixed price quotations on request.

LIMESTONE & GREEN SLATE SLAB CO. (WESTMORLAND) LTD.
Appleby Road, Kendal. Telephone: Kendal 1246.

AJ **SfB (21)**

Working Detail No 9 **UDC 69·022·326**

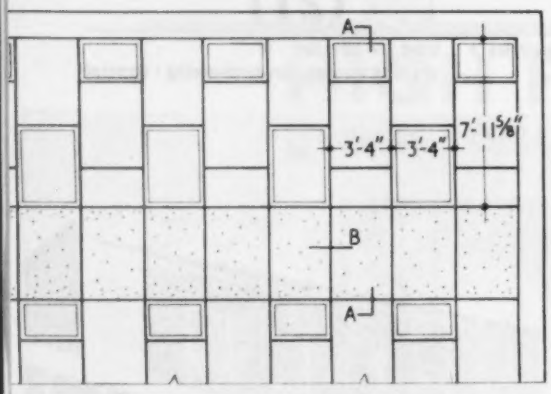
Walls: External, non-loadbearing : General



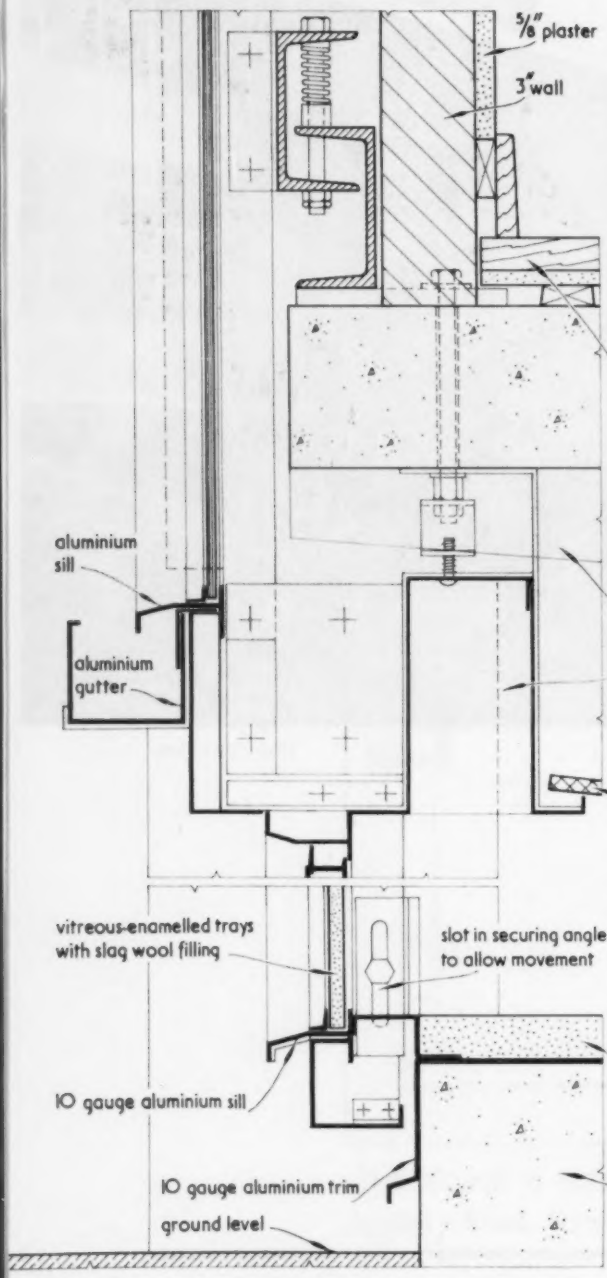
Curtain wall: College at Ystrad Mynach

T. Alwyn Lloyd & Gordon, architects, in association with F. J. Samuely & Partners, structural engineers

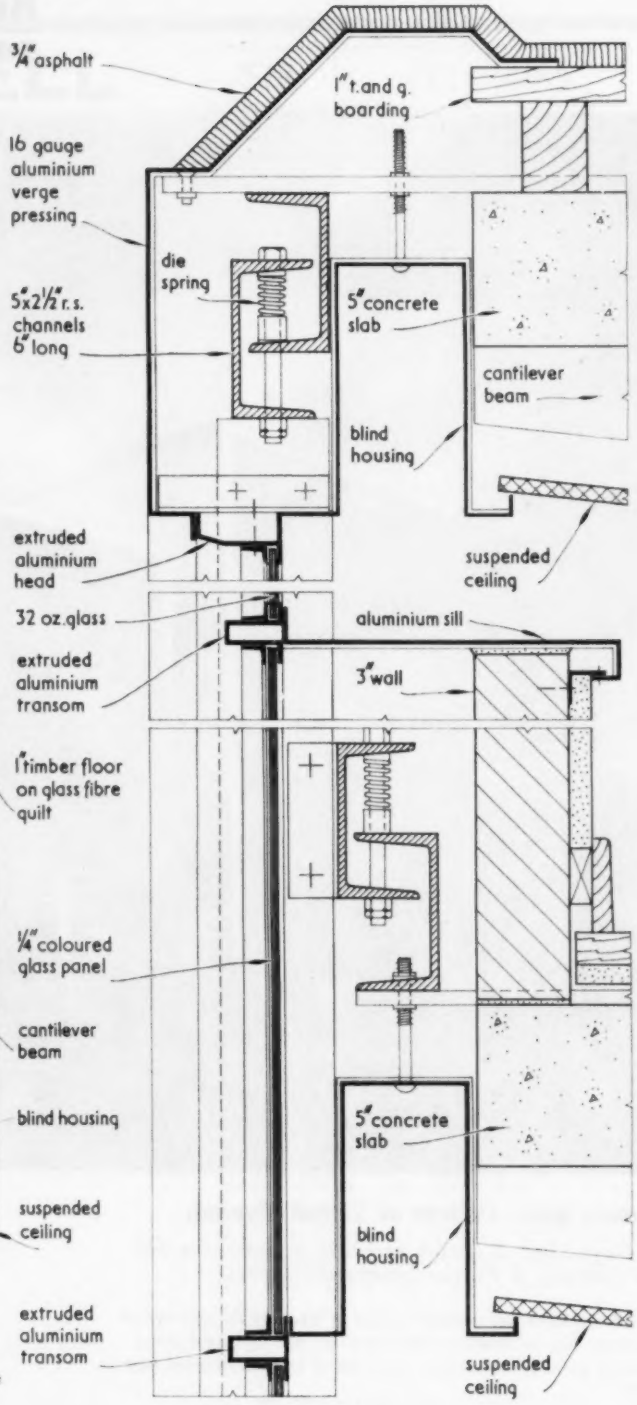
This detail shows an unusual method of allowing for differential movement between structure and cladding. Spring-loaded joints allow for up to ½in movement at the end of long cantilevered floor slabs



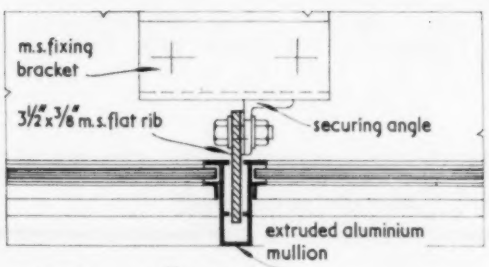
KEY ELEVATION. scale ⅛" 1'-0"



SECTION AT FOOT OF WALL. scale ¼ full size



SECTION A-A. scale ¼ full size



PLAN AT B. scale ¼ full size

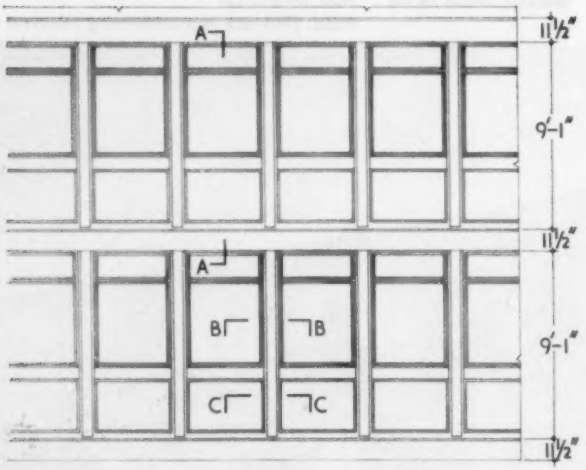
AJ **SfB (21)**

Working Detail No 10 **UDC 69·022 327**
Walls: External, non-loadbearing : General

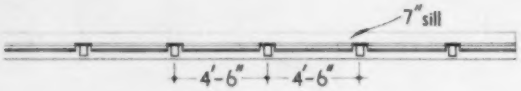
Storey height window panels: Offices in London W1

Riches & Blythin, architects, for the Westminster City Council

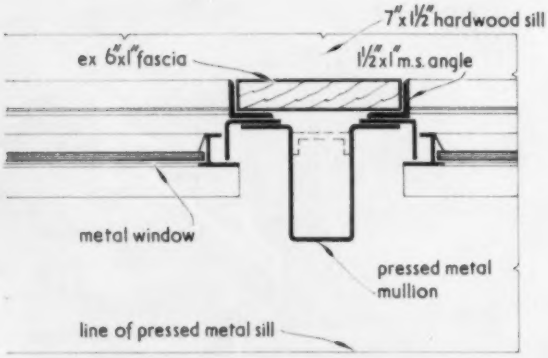
Not a curtain wall, this detail is an example of the external infill wall between floors, using pressed metal mullions at 4ft 6in centres, metal window frames and sashes, and vitreous porcelain steel-faced spandrel panels



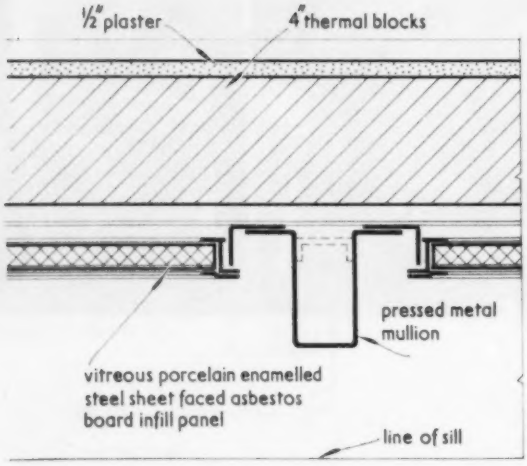
ELEVATION. scale ⅛"=1'-0"



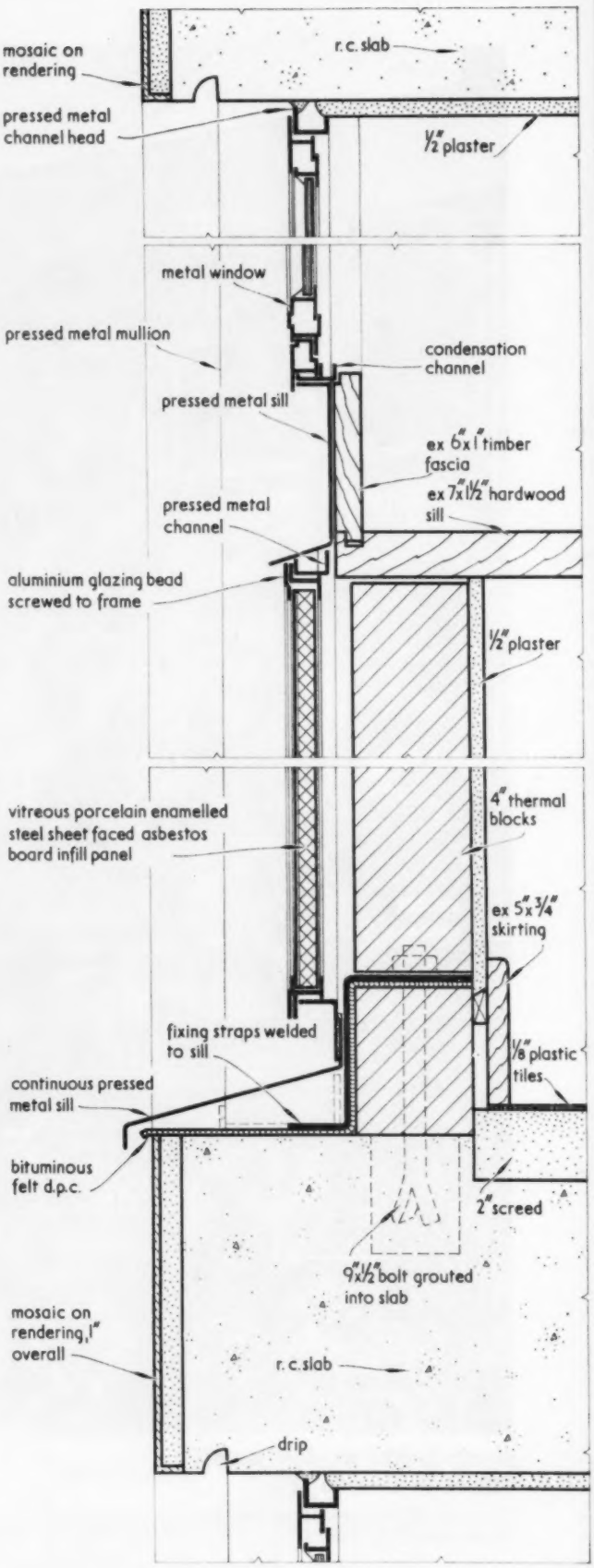
PLAN. scale ⅛"=1'-0"



PLAN AT B-B. scale 3/16 full size



PLAN AT C-C. scale 3/16 full size



SECTION A-A. scale 3/16 full size

SfB (21) Ff4

Space saving insulation with

THERMALITE

Loadbearing insulating building blocks

1 In these single storey homes at Crowthorne in Berkshire, designed and built by Renway Construction Company Limited, 3″ Thermalite Blocks are being used for the loadbearing inner leaf of external cavity walls. They will provide a high degree of *extra* insulation *plus* an overall saving of internal floor space.

Properties of Thermalite.

1. Dry density 50 lb./ft.³
2. Compressive strength to BS:2028 type A.
3. Moisture movement/drying shrinkage to BS:2028 type B.
4. Thermal conductivity (k) 1.4 B.T.U.'s, etc.
5. Nominal face size 18″ x 9″ or 9⅛″, actual sizes 17⅞″ x 8⅝″ or 9⅛″ x 2½″, 3″, 4″, 5″, 6″ and 8½″ (tolerance to BS:2028).
6. Fire resistance 4″ loadbearing plastered hot face—2 hour grade. Fire resistance 4″ non-loadbearing unplastered—4 hour grade.

2 The photograph shows the neat returns to the reveals, typical of Thermalite construction. No special Corners or Closers are necessary; Thermalite Blocks are readily and accurately sawn. The 3″ thickness of the inner leaf can clearly be seen.

3 Thermalite is particularly suited to dry construction. Direct reliable fixing without need for plugs further reduces the cost of this economic construction method. Note, too, that the cable channelling is spiked directly to the Thermalite wall for speed and simplicity.

A LAING COMPANY

For further information and samples apply to:

THERMALITE YTONG LIMITED

Hams Hall, Lea Marston, Sutton Coldfield, Warwickshire. Telephone: Coleshill 2081.

SfB (21) Ri4

FORMICA* for outdoor use!

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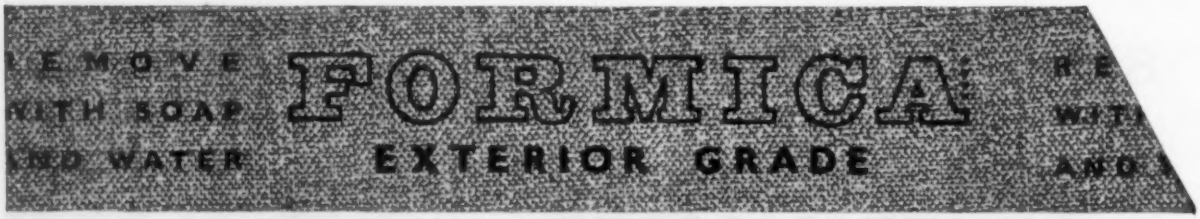

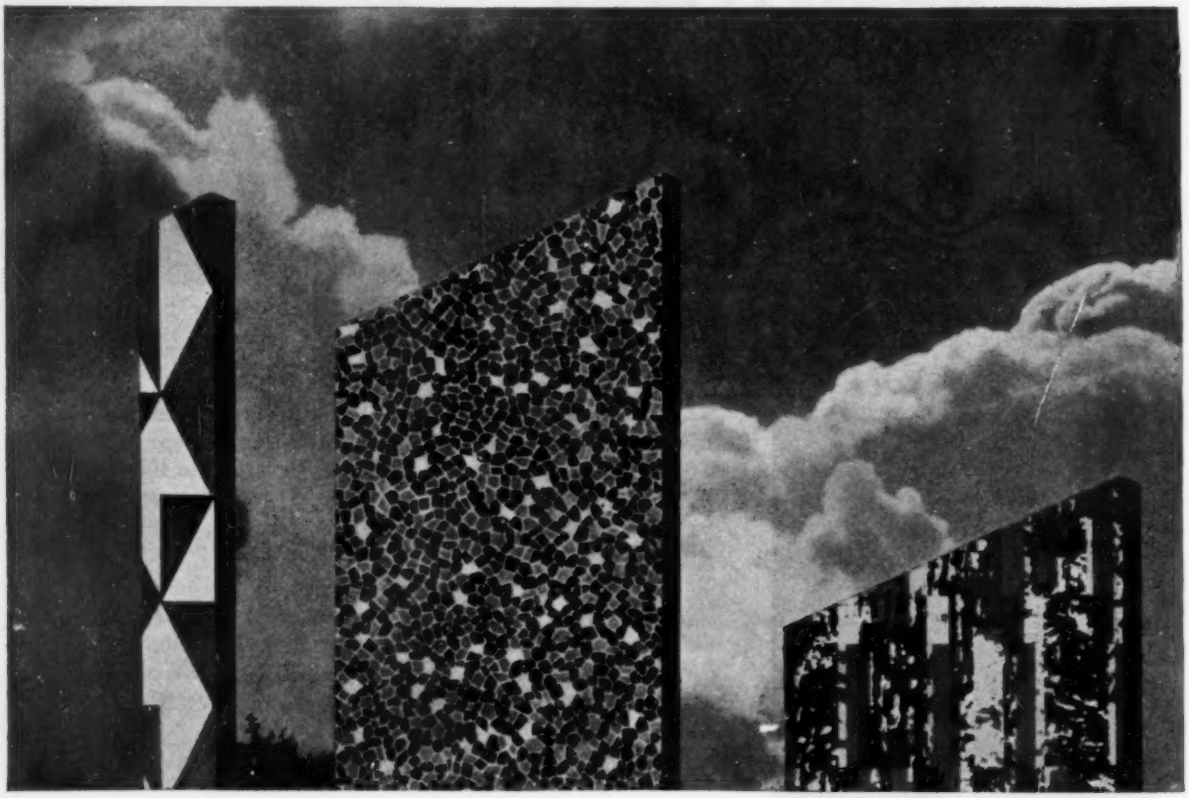

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Barbour Index File Number 193

The Architects' Journal Information Library December 13 1961

AJ SfB (21)

Information Sheet No 1037 UDC 69·022·324: 699·844
Walls: External, non-loadbearing: General

LIGHT CLADDING 1: SOUND INSULATION

2.E4

This Sheet is the first of a series on light cladding for curtain walls and deals with sound insulation.

Calculation of Required Sound Reduction

The simplest method of estimating the required sound reduction of a wall is to subtract the permissible room noise level from the noise level of the source measured at the wall surface, both levels being averages taken over their characteristic frequency range. For example, if noise impinging on a wall has an intensity of 70 dB and it is desired to reduce this to 40 dB, the required insulation value is approximately 70 – 40 = 30 dB. It is necessary to refer to textbooks for the limitations of this statement but it can be taken as accurate for most practical purposes. The following table gives the intensity of some common noises at specified distances from the source.

Noise source	Distance (ft)	Intensity (dB)
Large turbo jet at take-off power	125 (overhead)	130
Large piston-engined airliner at take-off power	125 (overhead)	120
Electric train	20	90
Electric train	100	65/70
Steam train	100	75
Steam train	8000	45
Heavy traffic	25/30	75/85
Average traffic	25/30	55
Light traffic	25/30	50
Quiet street, evening	—	40
Quiet garden	—	30

The permissible levels of noise for various applications are given below in decibels.

Theatres, concert halls	30/35
Hospitals	35/40
Flats, hotels	35/45
Classrooms, lecture rooms	35/40
Conference rooms	40/45
Offices, executive	40/45
Offices, general, banks	45/55
Offices, typing	65/70
Restaurants	50/55

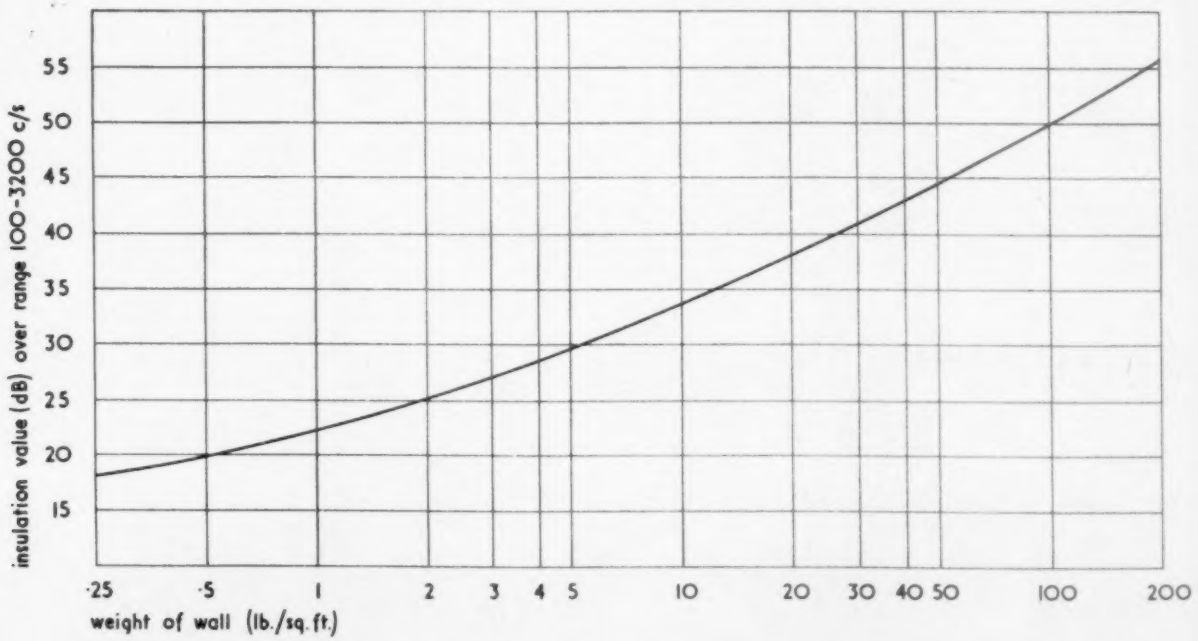
Application of Mass Law

The resistance of a homogeneous wall to sound is determined almost entirely by its weight per unit area (mass law). The graph below shows the relationship between mass and insulation values, the superficial weight being plotted against the sound reduction in decibels.

It may be seen that by doubling the weight per unit area an increase in insulation value of approximately 5 dB is obtained. With composite walls, the sound reduction is affected by the width of any cavities and whether or not the leaves of the wall are discontinuous, the airtightness of the wall and the insulation value of its weakest part.

Openings in Walls

Normally, openings constitute the weakest part of any wall and the following table sets out the insulation values which may be expected from various types of window. It should be noted that these are average



LIGHT CLADDING 1: SOUND INSULATION

values, dependent on workmanship, the degree of air-tightness of opening lights and the efficiency of the seal: a variation of 2 dB in either direction may occur.

The effect of inserting a window into a wall of comparatively high insulation value is shown in the table below, which gives the overall sound reduction of window to wall from 0 to 100 per cent. The table should be read in conjunction with the one which follows it, giving comparative insulation values for some common types of panel and loadbearing walls.

Type of glazing	Insulation of wall (dB)	Reduction of wall and window (dB) for percentage of glazing				
		0	25	50	75	100
Single 26/32 oz with opening lights	30/35	30/35	20/21	18	16	15
	40	40	21	18	16	15
	45	45	21	18	16	15
	50	50	21	18	16	15
Single 26/32 oz with fixed lights	30/35	30/35	27	25	23	22
	40	40	27	25	23	22
	45	45	27	25	23	22
	50	50	28	25	23	22
Double ¼-in plate, with 8-in cavity	30/35	30/35	36	37	38	40
	40	40	40	40	40	40
	45	45	43	42	41	40
	50	50	48	44	42	40

Construction	Weight (lb/sq ft)	Reduction (dB)
16 swg steel sheet ¼-in asbestos cement sheet 1-in chipboard or blockboard	2/5 2/5 2/5	15/20
¼-in plywood or hardboard on both sides of 2½-in timber studs with glass silk in cavity single sandwich panel	5/10 5/10	30/35
panels with cavity between faces 2-in concrete slabs	10/15 25	40
single sandwich panel/cavity/ 3-in clinker concrete back-up wall 4½-in brickwork	25/35 50	45
3-in clinker/3-in cavity/ 3-in clinker 9-in brickwork	40/45 100	50

From these tables, some perhaps surprising facts emerge. Where, for example, 75 per cent of a wall has the large insulation value of 50 dB and the remaining 25 per cent is a closed window, an overall insulation value of only 21 dB may be expected. It is obvious therefore that, as with thermal insulation, it is a waste of time and money to increase the insulation value of the wall itself if the value of the window is low. In both cases the wall and window must be treated as a single composite unit.

property		natural rubber	butyl	polysulphides e.g. Thiokol	Neoprene
resistance to	ozone	fair	excellent	excellent	excellent
	oxidisation	good	excellent	good	excellent
	sunlight aging	poor	very good	very good*	very good
	flame	poor	poor	poor	good
	heat	good	excellent	fair	excellent
	cold	excellent	good	fair	good
	mineral oil	poor	poor	excellent	good
	animal and vegetable oils	poor to good	excellent	excellent	good
	water absorption	very good	very good	fair	good
compression set		good	fair to good	poor	fair to good
adhesion		excellent	good	good to excellent	excellent
resistance to	tearing	good	good	excellent	good
	abrasion	excellent	good	poor	excellent
air permeability		fair	very low	low	low
electrical insulation		good to excellent	excellent	fair to good	fair to good
cost (oil-based mastic = 100)		extremely variable	170	1300	375

*externally

TABLE SHOWING RELATIVE PROPERTIES OF NATURAL AND SYNTHETIC RUBBERS

The Architects' Journal Information Library December 13 1961

AJ SfB (21) Dt4

Information Sheet No 1038 UDC 691.59 Walls: External non-loadbearing: General

LIGHT CLADDING 2: SEALANTS

This Sheet is one of a series on light cladding. The table on the face shows the relative properties of natural and synthetic rubbers used for sealants and gaskets in curtain wall construction etc. The following is a list of the manufacturers of these products.

List of Manufacturers

Oil-based compounds:

Adshead Ratcliffe & Co Ltd, Belper, Derby.

Evomastics Ltd, Common Road, Stafford.

Expandite Ltd, Chase Road, London NW10.

Farmiloe Sealants Ltd, Nine Elms Lane, London SW8.

Sealanco (St Helens) Ltd, St Helens, Lancashire.

Secomastic Ltd, Bracknell, Berkshire.

Tretol Ltd, Tretol House, The Hyde, London NW9.

Butyl compounds and sealing strips:

Adshead Ratcliffe & Co Ltd, Belper, Derby.

BB Chemical Co Ltd, Ulverscroft Road, Leicester.

Evomastics Ltd, Common Road, Stafford.

Expandite Ltd, Chase Road, London NW10.

Farmiloe Sealants Ltd, Nine Elms Lane, London SW8.

Hatcham Rubber Co Ltd, Princes Way, Waddon, Croydon.

Kelseal Ltd, Vogue House, Hanover Square, London W1.

Minnesota Mining & Manufacturing Co Ltd, 3M House, Wigmore Street, London W1.

Storey Witty & Co Ltd, Beverley, Yorkshire.

Polysulphides:

BB Chemical Co Ltd, Ulverscroft Road, Leicester.

British Paints Ltd, Northumberland House, 303 High Holborn, London WC1.

Evomastics Ltd, Common Road, Stafford.

Expandite Ltd, Chase Road, London NW10.

Farmiloe Sealants Ltd, Nine Elms Lane, London SW8.

Kelseal Ltd, Vogue House, Hanover Square, London W1.

Sealanco (St Helens) Ltd, St Helens, Lancashire.

Secomastic Ltd, Bracknell, Berkshire.

Minnesota Mining & Manufacturing Co Ltd, 3M House, Wigmore Street, London W1.

Neoprene gaskets:

Capon Heaton & Co Ltd, Hazelwell Mills, Stirchley, Birmingham 30.

P.B. Cow & Co Ltd, Factory Square, Streatham Common, London SW16.

Dunlop Rubber Co Ltd, Dunlop Research Centre, Kingsbury Road, Erdington, Birmingham.

Empire Rubber Co Ltd, General Stores, Dunstable, Bedfordshire.

Hall & Hall Ltd, Oldfield Works, Hampton, Middlesex.

Hermetic Rubber Co Ltd, Priory Road, Aston, Birmingham 6.

Hertfordshire Rubber Co Ltd, Works Road, Letchworth, Hertfordshire.

Howard Clayton-Wright, Wellesbourne House, Wellesbourne, Warwickshire.

Kautex Ltd, Elstree Way, Elstree, Hertfordshire.

Alfred Roberts & Sons Ltd, Deykin Avenue, Witton, Birmingham 6.

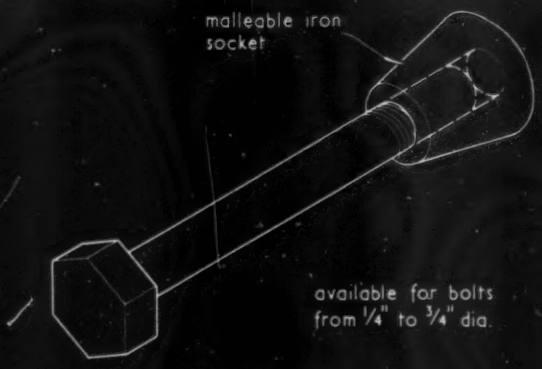
Sherbourne Rubber Co Ltd, 133 Sherbourne Street, Ladywood, Birmingham 16.

Tomo Trading Co Ltd, Packet Boat Dock, Cowley Peachey, nr Uxbridge, Middlesex.

The Architects' Journal Information Library December 13 1961

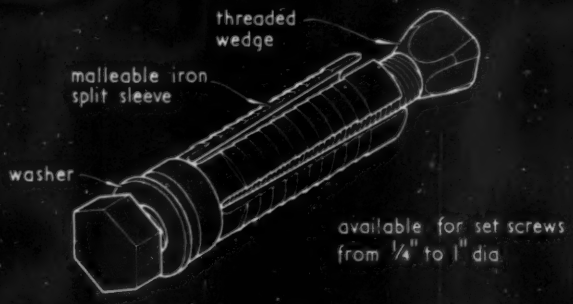
AJ **SfB (20)**

Information Sheet No 1039 **UDC 691-88**
Accessories : Structural Fixings

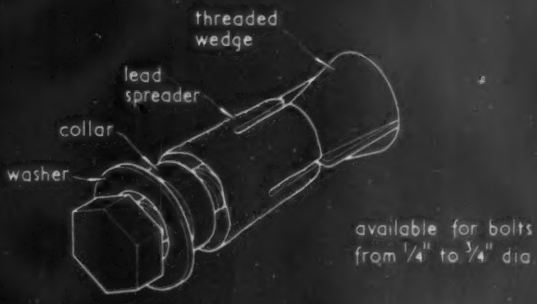


CEMENT-IN SOCKET. (Expandite Ltd.)

LEWIS OR RAG BOLT.

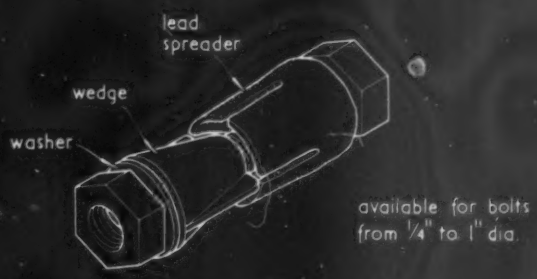


EXPANDA BOLT. (Expandite Ltd.)

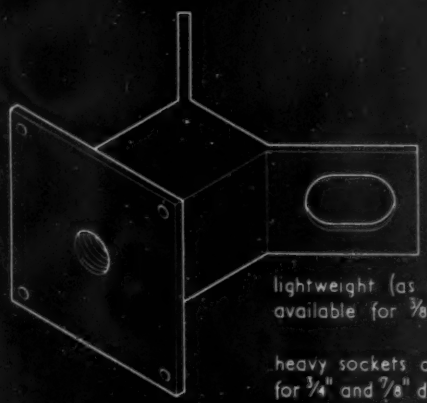


PHILPLUG STUD BOLT. (Expandite Ltd.)

INDENTED BOLT. [Guest Keen and Nettlefold (Midland) Ltd.]



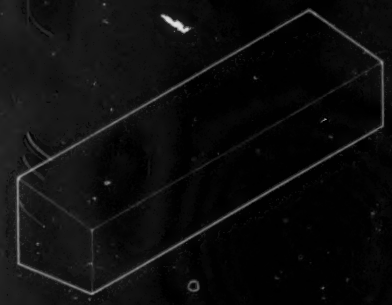
PHILPLUG ANCHOR BOLT. (Expandite Ltd.)



RIGIFIX BOLT HANGER SOCKET. (Huntley and Sparks Ltd.)

note for purposes of comparison all fixings are shown for 1/2" dia. bolt

devices shown on the face of this Sheet do not provide for adjustment and necessitate spot fixing : those on the reverse permit adjustment of the fixing in either a vertical or horizontal direction



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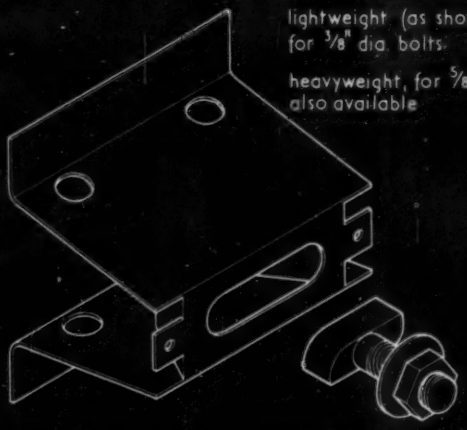
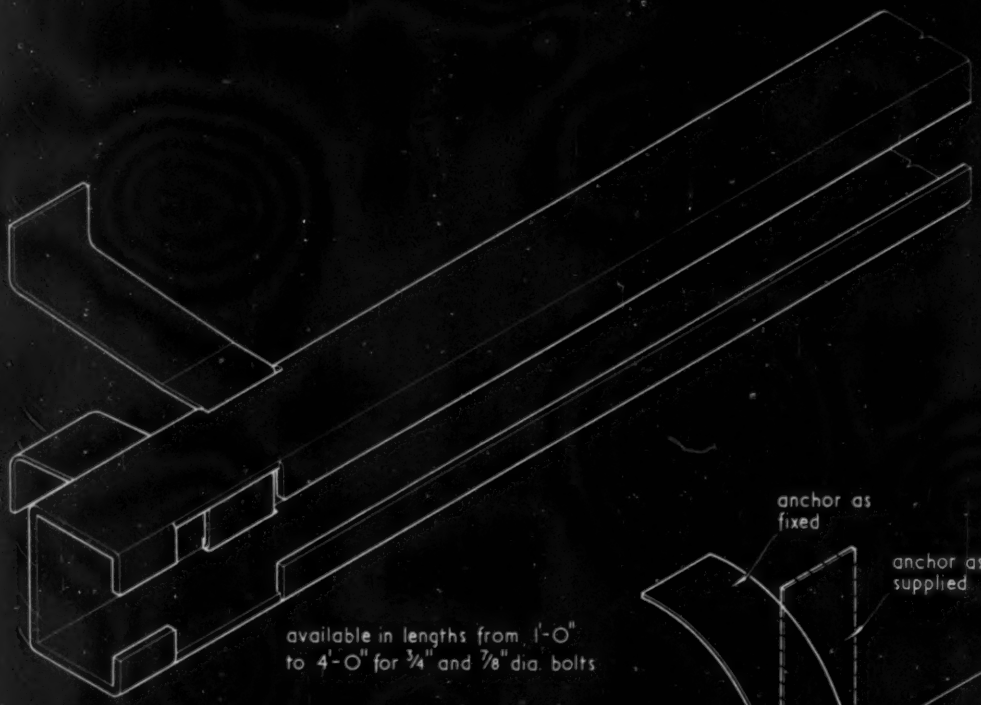
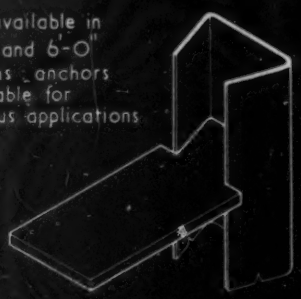


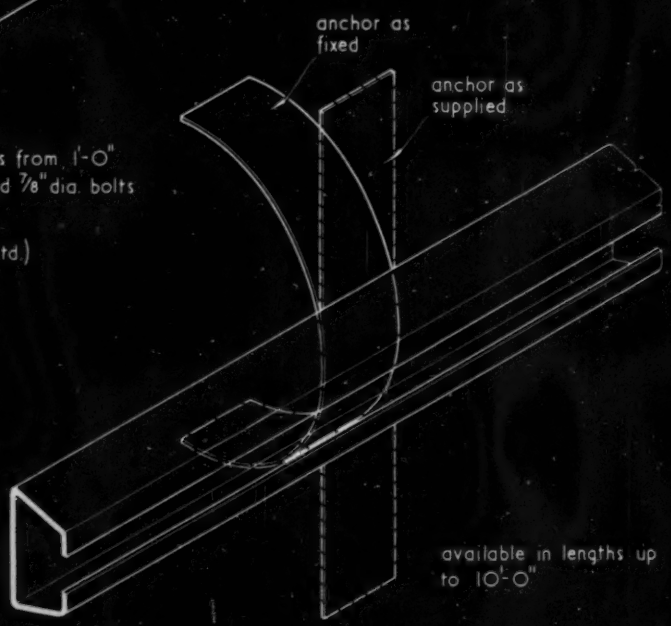
ANKORTITE BOX INSERT (Abbey Building Supplies Co.)



RIGIFIX SLOTTED INSERT (Huntley and Sparks Ltd.)



TYCON DOVETAIL SLOT
(Mclaren Johnston and Co. Ltd.)



ANKORTITE CHANNEL INSERT (Abbey Building Supplies Co.)

LIGHT CLADDING 3 : ATTACHMENT DEVICES

The Architects' Journal Information Library December 13 1961

AJ **SfB (21) Ui**

Information Sheet No. 1040 **UDC 69·022·324 Walls: External non-loadbearing: General**

common name	colour	grain texture	working (machining nailing, gluing)	ease of finishing •	natural durability	stability (moisture movement)	relative availability	cost index
afrormosia	brownish	fine	medium – good	requiring care (iron staining)	durable	small	fairly good	115
afzelia	reddish	coarse	medium	requiring care	durable	small	fairly good – short	160 - 180
agba	yellowish	fine – medium	good	easy – fairly easy (gum)	durable	small	fairly good	110
idigbo	yellowish	medium – coarse	medium – good	fairly easy	durable	small	fairly good	120
iroko	brownish	medium – coarse	medium	fairly easy	durable	small	good	180
jarrah	reddish	coarse	medium – difficult	fairly easy	durable	medium	good	115
karri	reddish	coarse	medium – difficult	requiring care	moderately durable	large	good	115 - 120
keruing, gurjun yang	reddish	coarse	medium	requiring care (exudes resin)	moderately durable	large	very good	100 – 120
African mahogany	reddish	coarse	good	easy	moderately durable	small	good	125 – 165
makore	reddish	fine	difficult	easy	durable	small	short	115
niangon	reddish	medium – coarse	good	requiring care (oily)	moderately durable	medium	short	115 - 120
European oak	yellowish brown	coarse	medium	requiring care (iron staining)	durable	medium	fairly good	180 – 300
opepe	orange brown	medium	medium	fairly easy	durable	small	very good	90 – 110
sapele, utile	reddish	medium	good	easy	moderately durable	medium	good	115 – 125
white seraya	yellowish brown	medium – coarse	good	fairly easy	moderately durable	medium	good	125
teak	brownish	medium	medium	requiring care	durable	small	fairly good	200 – 425

HARDWOODS

Western red cedar	reddish brown	medium	good	easy (iron staining)	durable	small	fairly good	cost of softwood is not critical
Douglas fir	reddish yellow	medium	good	fairly easy	moderately durable	medium	good	
Western hemlock	pale brown	medium	good	fairly easy	non-durable°	medium	good	
European redwood	yellowish red	medium	good	fairly easy	non-durable°	medium	good	
European whitewood	whitish	medium	good	fairly easy	non-durable°	medium	good	
pitch pine	yellowish brown	medium – coarse	medium	requiring care	durable	medium	fairly good – short	

SOFTWOODS

• extent of preparation and care required before applying surface finish (filling grain, sealing gum, etc.)

° requiring protection

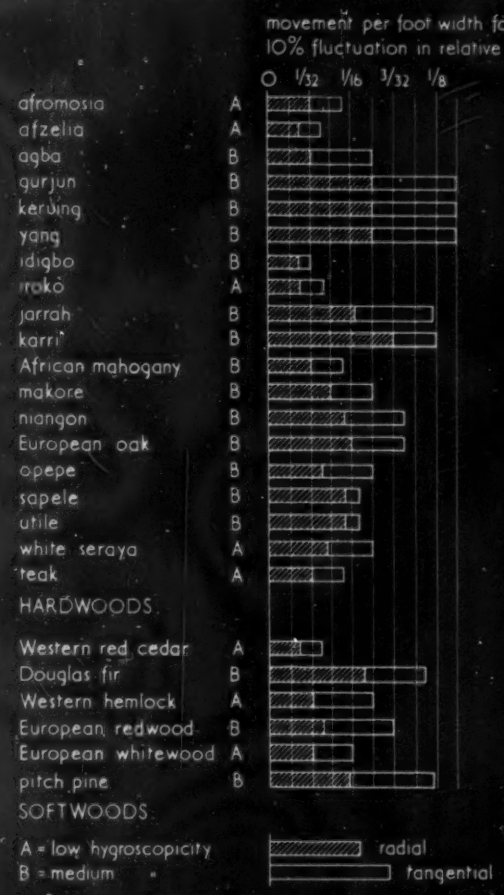
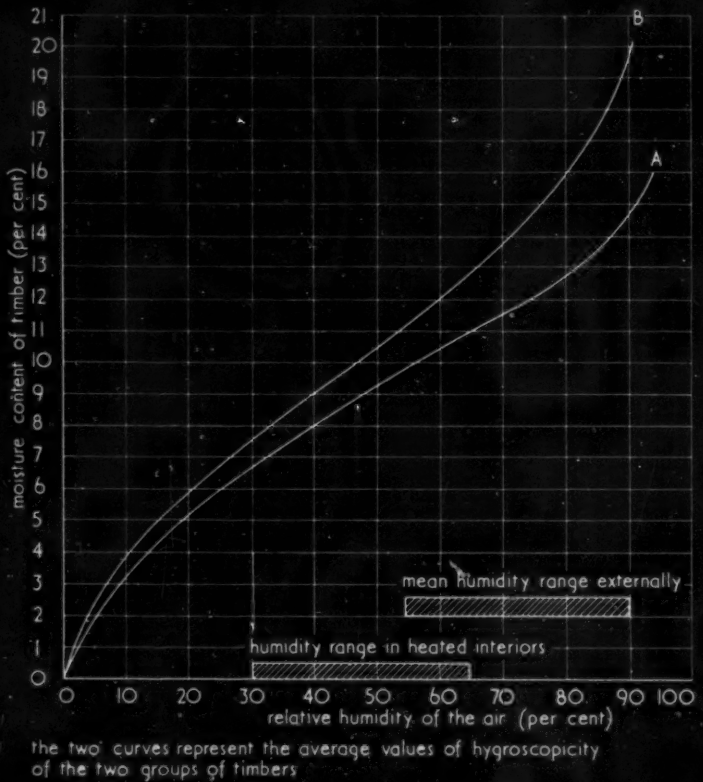


DIAGRAM SHOWING COMPARATIVE MOISTURE MOVEMENT VALUES FOR COMMON TIMBERS



the two curves represent the average values of hygroscopicity of the two groups of timbers

GRAPH SHOWING EQUILIBRIUM MOISTURE CONTENTS FOR DIFFERENT RELATIVE HUMIDITIES

LIGHT CLADDING 4 : TIMBER

This Sheet gives a guide to the selection of timber for cladding. The general properties of a number of common timbers are tabulated on the face. The diagrams above are concerned with moisture movement for the same range of timbers. That on the left shows the amount of movement in inches for a given length of timber, cut radially and tangentially. The graph on the right gives the equilibrium moisture contents for different relative humidities.

Use of Diagram and Graph

On the diagram, the timbers have been divided into two groups, A and B, and a curve representing the average values of hygroscopicity for each group is shown on the graph. By referring to the appropriate curve, the moisture content of the timber can be related directly to the humidity of the air. Given a range of humidity for the air surrounding any piece of timber, the fluctuation in moisture content can be determined from the graph and the amount of movement in inches can be calculated from the diagram.

Example

If a 9in wide flat-sawn (tangential) board at 12 per cent moisture content were to be used in a position where the average humidity of the air is as low as 30 per cent (eg for a radiator casing), its moisture content would drop to $7\frac{1}{2}$ per cent (curve B). The drop in moisture content from 12 per cent to $7\frac{1}{2}$ per cent corresponds to a drop in humidity from 60 per cent to 30 per cent, ie a fluctuation of 30 per cent. Assuming that it is decided to use idigbo for this application it will be seen from the diagram that the movement of flat-sawn idigbo is $\frac{1}{32}$ per foot width for each 10 per cent fluctuation in humidity. The shrinkage of the board will therefore be $\frac{1}{32} \times \frac{30}{10} \times \frac{9}{12} = \frac{9}{128}$ ($\frac{1}{16}$ approx).

The Architects' Journal Information Library December 13 1961

AJ SfB (21) U

Information Sheet No 1041 UDC 69·022·325
Walls: External non-loadbearing: General

HEAVY CLADDING PANELS

14.A1

This Sheet deals with natural stone and precast concrete panels for use as heavy cladding and gives their physical properties and the sizes and finishes in which they are obtainable.

Definition of heavy cladding panels

For the purposes of this Sheet, a panel which is at least 2ft square in area and 1in thick is considered as a heavy cladding panel.

NATURAL STONE

Sizes

Type	Minimum thickness	Maximum area	Longest dimension
Granite	2in	6 sq ft	3ft
Marble	1¼in	16 sq ft	5ft
Limestone	6in	25–30 sq ft	6ft
	4in	12–15 sq ft	6ft
	2in	12 sq ft	6ft
Sandstone	1½in	10 sq ft	5ft
Slate	1in (sawn)	10 sq ft	5ft
	1in (riven)	4 sq ft	3ft
	½in (riven)	1½ sq ft	1ft 6in

Finishes

There are three main types of finish for natural stone as follows.

Natural: This has the natural surface of the rock as cleaved from the quarry. Deeply-modelled natural finishes eg rock-faced granite, require a panel too thick for general use. With the exception of natural-riven slate, stone cleft on its natural bed should be avoided. Most natural finishes impose size restrictions owing to quarrying difficulties.

Machine: These are the most suitable finishes for cladding panels. A very wide range is produced by mechanical planes, saws and polishers. The surface texture may vary from medium rough shot-sawn to smooth polished. The harder granites, slates and marbles will take a high polish but marble soon dulls and is not recommended for exterior work. The cheapest finish is plain sawn, but the saw marks, which are $\frac{1}{32}$ to $\frac{1}{16}$in deep, retain dirt in polluted atmospheres and make the panels hard to clean. The saw marks can be removed by a rubbed finish, which makes the panels a little more expensive but easy to wash clean.

Hand tooled: Hand finishes eg bush hammering, pick pointing, axing, etc, are all expensive and though these finishes have more character than machine ones, they will only occasionally be required.

Cost indices

The following table shows the relative costs of typical stone panels expressed as cost indices. Owing to the wide range of stones in each group actual costs are difficult to determine but the cost index 100 represents very approximately 20s, including delivery, but excluding erection. The cost increases with the hardness of the stone and the type and degree of surface dressing required.

Type	Finish	Thickness	Cost index
Granite	All polished	2in	350
	Eggshell	2in	300
	Fine axed	2in	275
Marble	Cost varies so widely that each case must be considered individually: can be the most expensive stone to use, whereas comparatively cheap marbles are obtainable		
Limestone (Portland)	Frame sawn	6in	125
	Frame sawn	4in	90
Sandstone (Bolton Wood)	Rubbed	2in	65
Slate	Fine rubbed, sanded or frame sawn	1in	85–105
	Natural riven	1in	65–85

Further information

Information on the supply and use of natural stone for heavy cladding can be obtained from British Stone Federation, 70 Victoria Street SW1, who will also supply a list of members' names and addresses.

Table of physical properties

Type	Density (lb/cu ft)	Hardness (abrasive)	Absorption (per cent by weight)	Crushing load (1,000 lb/sq in)	Ultimate shear strength (1,000 lb/sq in)	Ultimate tensile strength (1,000 lb/sq in)	Modulus of rupture (1,000 lb/sq in)	Coefficient of thermal expansion (deg F × 10^{-6})
Granite	163	20	0·1–0·8	10–25	2·3	Up to 1·5	1·2–2·2	4·5–6·0
Marble	170	15	0·09–0·25	10–23	0·7–1·8	Up to 0·7	0·9–2·3	0·8–6·0
Limestone	136	12	2·4–13·0	1–15	0·6–1·2	Up to 0·5	0·25–2·7	1·3–5·0
Sandstone	137	13	2·3–8·5	2·5–13·5	0·9–2·3	Up to 1·0	0·5–2·2	4–9
Slate	175	18	1·0 min	8·3–30·6	—	Up to 12·8	5·0	3·5–5·5

HEAVY CLADDING PANELS

PRECAST CONCRETE PANELS

Types

The basic unit is normally of precast concrete but there is available an extremely wide range of colours, textures, patterns and weathering qualities, varying from mosaic, through various exposed and brushed aggregate finishes, to reconstructed stone and smooth polished surfaces.

Construction

The components are one of the various Portland cements, aggregates and water: rapid-hardening Portland cement is recommended for increased factory production. The choice of aggregate is important: it should be clean, hard, durable, strong and free from organic or chemical matter. It should be well graded by size and as light as possible consistent with the above qualities. Lightweight aggregates have better thermal-insulating qualities than traditional sand and gravel, but can only be used on thicker panels owing to the necessity for providing a less porous outer face.

Panels should be reinforced to prevent their falling apart under impact fracture, rather than to enable them to sustain distributed loads. Mesh or fabric is normally sufficient, except for very large panels, which should have additional rods in the ribs. All reinforcement should be at least ½in from the back of the panel and not less than 1in from the face: galvanising should be hot-dip, carried out after bending.

Sizes

The following minimum thicknesses for panels are based on aggregates passing a ¾in mesh: for larger aggregates thicknesses must be increased.

Plane panels: These should be 2in thick minimum for a slab of 9 sq ft maximum area, the length of which should not exceed 3ft 6in. All panels should have light reinforcement. The area given should only be exceeded in certain circumstances, eg where panels are used as permanent shuttering to rc walls.

Framed panels: These should normally be 2in thick between ribs. Where, however, the aggregate does not exceed ⅜in and reinforcement is confined to the ribs, the thickness can be reduced to 1½in provided also that the ribs in one direction are at not more than 3ft centres; any unribbed portion should be 2in thick, eg a continuation of the panel downwards over the face of an edge beam.

Weight

Panels that are to be manhandled should not exceed 150lb approximately in weight; allowing for edge thickening this would give an area of about 4½ to 5 sq ft for a 2in thick panel. Where mechanical handling is envisaged, the largest possible size should be used, 120 sq ft approx being the economic maximum. In either case, panels should be dished to reduce weight and allow suitable edge thicknesses for jointing. For reconstructed stone, the length and width should be halved.

Colour and texture

Colour: Although pigmented cements are available, they do not weather uniformly when used alone. A combination of naturally-coloured exposed aggregate and pigmented cement produces the best type of finish to weather uniformly without fading. The more exposed the aggregate, the less prominence the cement colour will have, although its tonal effect will never be negligible. Where a colour effect only is desired a smaller aggregate can be used than the minimum of ½in recommended. The following table gives a rough guide to the colours of some of the various aggregates, although they will vary with geological type and quarry.

White	Grey and blue-grey	Pink and red	Green and blue
Spar	Basalt	Correnie granite	Penzance granite
Calcined flint	Whinstone	Red Peterhead granite	Shap blue granite
Silica quartz	De Lank granite	Shap pink granite	Welsh and Westmorland slate
Portland stone	Kemnay granite	Croft granite	Swedish green marble
Sicilian marble	Lower Persley granite	Stoneycombe granite	Connemara green marble
Norwegian quartzite	Rubislaw granite	Radford limestone	Montgomery-shire basalt
Creetown granite	Craigenlow granite	Norwegian marble	Criggon green granite

Texture: Where texture in exposed aggregate is the first consideration, the aggregate should always be larger than ½in. The size chosen, however, will depend on the distance from which the panels will be viewed, and J. Gilchrist Wilson of the Cement and Concrete Association makes the following recommendations:

Size of aggregate (in)	*Distance from eye (ft)*
2–1½	125
1½–1	90
1–¾	75
¾–½	50

These distances are based on single-colour aggregates: the distances will require modification where a mixture of light and dark particles is present, or for special lighting conditions.

The degree of exposure must also be taken into consideration when choosing the size and shape of exposed aggregates, in order to ensure that they remain in place after years of weathering. It is recommended that they be embedded in the matrix to a depth of at least two-thirds of their effective thickness as laid. The mix of the matrix should be not leaner than 3:1 nor richer than 2:1 and should be cast simultaneously with the backing concrete. Where large stones are used the thickness of the backing concrete should be adjusted accordingly.

Other patterns can be formed by moulding or, for small-scale texturing and polishing, by surface treatment of the panel while it is still green. Moulds can be lined with patterned sheets of timber, steel, plastic or rubber or by casting the panel face on to previously arranged aggregate. Reconstructed stone requires special treatment: carefully chosen and graded aggregates must be hand-packed into clean moulds, the mix being very dry.

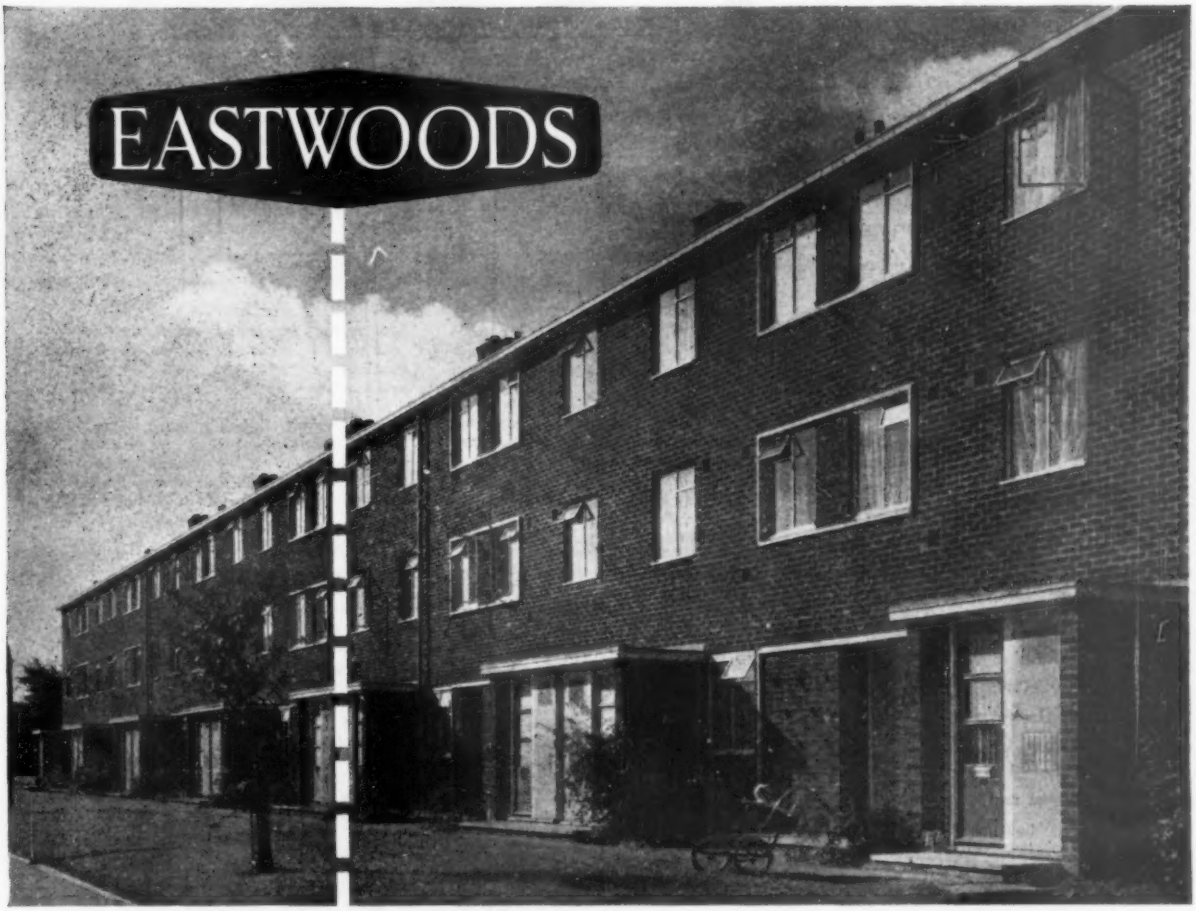
Further information

Information on the supply and use of precast panels for heavy cladding can be obtained from the Cement and Concrete Association Limited, 52 Grosvenor Gardens SW1, who will also supply a list of members' names and addresses.

At their research laboratories at Wexham Springs, the Association have precast panels exposed to weathering in order to discover the effect on appearance of panels with different finishes.

SfB (21) Fg2

facing the future with..



Houses in S. E. London
Contractors: Wates Ltd.
Architect: Mr. K. W. Bland, A.R.I.B.A.

FLETTON FACING BRICKS

build for the future ... confidently with ...

these attractive, yet economic facing bricks made by Eastwoods, who have over 50 years experience in this field of manufacture. Combining economy with durability, their colours and textures make these bricks some of the finest facings yet produced for both suburban and rural housing schemes.

- **GOLDEN RIDGEFACED FLETTONS**
- **BUFF RIDGEFACED FLETTONS**
- **DARK MULTI-COLOURED SANDFACED FLETTONS**
- **BROWN-GREY MULTI-COLOURED SANDFACED FLETTONS**
- **RIDGEFACED MULTI-COLOURED FLETTONS**
- **PLAIN FLETTONS**

Illustrated folder sent on request

EASTWOODS SALES LIMITED

HEAD OFFICE: **158-160 City Road, London, E.C.1.**
Telephone: Clerkenwell 2040 (30 lines)
NORTHERN SALES OFFICE: **39-41 Thorne Road, Doncaster**
Telephone: Doncaster 49256/9
Consult your telephone directory for details of your local depot.

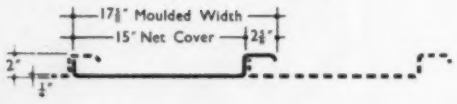
U.A.M. Group Information Service April 1961	UNIVERTICAL SHEETS DATA SHEET	Nh1

THE UNIVERTICAL SHEET for Wall Cladding

DESCRIPTION

Composition of Asbestos Cement material is identical to that employed in the manufacture of sheets under B.S. 690.

The corrugated sheet W/2801/A



DIMENSIONS AND WEIGHTS

Lengths

4' 0" to 6' 0" in 6" increments, plus 4" socket. 8' 0" for use on Gables, without socket.

Size of Sheet	Area in sq. yards	Sheets per ton Approx.
4' 0"	0·650	140
4' 6"	0·731	124
5' 0"	0·813	112
5' 6"	0·894	102
6' 0"	0·975	93
8' 0"	1·300	70

Weight and Area

Weight per sq. yd. as laid including fixing accessories: 30·5lb.

Sq. yds. per ton 91

Covering Capacity

Cover of 6' 0" sheet is 6' 0" × 1' 3"

No.	Covering Width
1	1' 5½"
2	2' 8½"
3	3' 11½"
4	5' 2½"
5	6' 5½"
6	7' 8½"
7	8' 11½"
8	10' 2½"
9	11' 5½"
10	12' 8½"
11	13' 11½"
12	15' 2½"
13	16' 5½"
14	17' 8½"
15	18' 11½"
16	20' 2½"
17	21' 5½"
18	22' 8½"
19	23' 11½"
20	25' 2½"
21	26' 5½"
22	27' 8½"
23	28' 11½"
24	30' 2½"
25	31' 5½"
26	32' 8½"
27	33' 11½"
28	35' 2½"
29	36' 5½"
30	37' 8½"

PROPERTIES OF THE SHEET

Thermal Insulation

U = 1·3

Fire

As material, incombustible; as structural element, no fire resistance. See B.S.476 for test details.

Colour

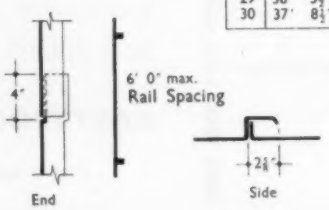
(Surface treatment) Gloss or Matt to range indicated in B.S.2660.

DESIGN AND SPECIFICATION

Vertical Cladding

Centres of Supports: not exceeding 6' 0"

Laps.



DETAILS

Asbestos Cement Accessories Special pieces can be made to order.

The Universal Asbestos Manufacturing Company Limited, Tolpits, Watford, Herts.
Telephone: Watford 34551 Branches: London, Birmingham, Manchester, Bristol, Glasgow.

SfB (21) Ud

ESCOL

porcelain enamel on steel

panels for curtain walling

The rapidly expanding employment of the curtain wall system of building construction has created a demand for infilling panels which provide a very high standard of durability, heat and sound insulation and rugged strength all combined with beauty of texture and colour.

Escol porcelain enamelled steel panels fulfil all these requirements to a degree impossible by other materials.

Stewart & Gray Limited offer a specialised service in the development, manufacture and all technical aspects of porcelain enamelled steel in architecture. Please consider this at your disposal.

Escol panels are lightweight curtain wall infill panels of sandwich construction. Insulating cores may be of resinated paper honeycomb infilled with vermiculite, foamed P.V.C., Insulation Board, Cork or Asbestos Board. Edges of panels are covered with self-adhering P.V.C. Tape to give protection during handling on site and to obviate drying out of the bedding mastic due to absorption by the backing material.

DESIGN AND FABRICATION

Escol panels permit expansion and contraction between the various units of the building structure. Suitable anchorages and attachments are provided where required to facilitate weather-tight assembly. Panels are made to shapes and sizes according to approved drawings with permissible tolerances of $\frac{1}{16}$ in. on all dimensions. Tray type panels are welded at corners with welding metal of the same composition as the steel base. Clips and other attachments may be spot welded. Enamelled steel facings incorporating reeded or embossed designs are also now available.

STEEL BASE

The steel sheet base is of vitreous enamelling quality mild steel in the range of 16 B.G. (0.0625 in.); 18 B.G. (0.0495 in.) or 20 B.G. (0.0392 in.) or according to special requirements.

PORCELAIN ENAMELLING

All metal surfaces are thoroughly cleaned prior to enamelling. The porcelain enamel is fired so as to ensure complete fusion with the metal base. A ground coat is applied to cover completely all areas of each panel, including back and flanges, if any. Backs and other concealed areas of the panels are given adequate protective coating of enamel in addition to ground coat. The colour of the panels conforms to the requirements of the purchaser and where appropriate the enamel finish will meet the tests specified in B.S. 1344 "Methods of Testing Vitreous Enamel Finishes."

FLATNESS OF PANELS

Panels of eight square feet or less are guaranteed flat to a tolerance of $\frac{1}{8}$ in. at the centre. Proportionately greater allowances for panels of greater area.

INSULATION

Where specified by the purchaser, panels are supplied complete with insulating material to provide the requisite heat insulation and fire resistance.

OUTERSKINS

Escol porcelain enamelled steel on both sides, or galvanised steel, aluminium, asbestos board on reverse side.

FINISH

In any colour with a variety of textures such as stipples, full gloss or semi-matt. Porcelain enamelled steel is a well tried and accepted material for the exterior treatment of buildings.

MAINTENANCE

Requires only occasional washing down with mild soap and water.

DURABILITY

The fusing of Escol porcelain enamel to steel at temperatures in the 800°C. range produces a coating highly resistant to damage by thermal shock and physical impact. The inorganic "glass" surface is resistant to corrosive attack by atmospheric gases or acids. The colour will not fade, and is permanent.

COMPLIANCE WITH STANDARD

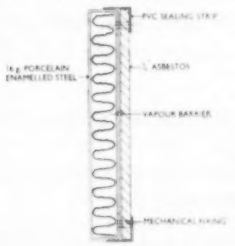
Where so specified in an enquiry or order, the purchaser, before accepting the material, may (*a*) request us to supply a certificate stating that the panels are in accordance with the standard laid down, or (*b*) to make, or have made, tests on specimens selected to ensure compliance with the standard laid down for flatness and porcelain enamelling.

INSPECTION

The purchaser may at all times have access to our works for inspection at any stage of the manufacture and testing of panels being made to his order.

TYPE A

Composite panel consisting of 16 or 18 G Vitreous porcelain enamelled steel sheet bonded to $\frac{1}{8}$" or $\frac{1}{4}$" asbestos board. The asbestos backing may also be covered by an enamelled steel sheet or galvanised sheet.
Weight per sq. ft.—5 lbs.
U value .48.

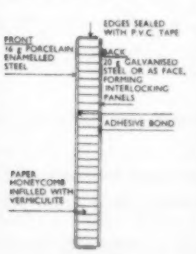


TYPE B

Panel consisting of 16 G porcelain enamelled face, with box flanges all round and welded corners. Panel filled with Rocksil or Fibreglass and backed with $\frac{1}{8}$" Asbestos board. Vapour Barrier is incorporated between insulating core and backing. Total thickness approximately $1\frac{1}{2}$".
Weight per sq. ft.—5 lbs.
U value .2.

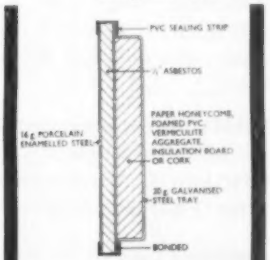
TYPE B2

Similar to the above but with additional skin of asbestos insulation board bonded inside panel with core of $\frac{1}{2}$" Rocksil. Overall thickness $1\frac{3}{8}$". Fire rating is 1 hour; by increasing core to 1" thickness fire rating is 2 hours.



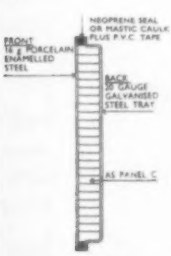
TYPE C

Composite panel consisting of 16G porcelain enamelled steel face with core of either paper honeycomb infilled with vermiculite, foamed P.V.C., vermiculite aggregate, insulation board or cork with 20G galvanised steel backing. Galvanised backing may be replaced by enamelled steel or asbestos board. The panel is bonded under pressure.



TYPE D

Panel comprising 16G flat sheet enamelled steel facing bonded to $\frac{1}{4}$" asbestos board backed with 20G galvanised steel tray containing insulation material similar to that used in Type C. Panel bonded under pressure.
U value according to type of insulation; minimum. 2.



TYPE E

Panel comprising 16G porcelain enamelled steel facing with cores similar to Type C backed with 20G galvanised steel tray with rebated edges. Minimum edge thickness $\frac{1}{4}$".
U value and weight similar to Type C.

STEWART & GRAY LTD., SWAINS ROAD, TOOTING, S.W.17

telephone MITcham 1634 (8 lines)

Members of the Vitreous Enamel Development Council and Porcelain Enamel Inst.

P7392

PILKINGTON BROTHERS LIMITED,
Manufacturers of all types of structural glass.
St. Helens, Lancashire. (Tel: St. Helens 4001)
London Office and Showrooms: Selwyn House,
Cleveland Row, St. James's, S.W.1. (Tel: WHItehall 5672).

SfB (21) Ro4

PILKINGTONS' GLASS CLADDING ADDS THE MAGIC OF COLOUR

"ARMOURCLAD" Plate and Cast Glass—specially designed ceramic enamelled and toughened glass for use in cladding. The colour is fused into the glass during manufacture, and is not affected by weathering.

"Armourclad" Plate is a clear glass processed as above and the colour shows through without diffusion.

"Armourclad" Cast has a patterned surface on one side. It diffuses the colour when viewed from the exterior.

SPECIFICATION

	NOMINAL THICKNESS in.	NORMAL MAX. SIZES in.	APPROX. WEIGHT per. sq. ft.	REMARKS
"ARMOURCLAD" PLATE	¼	82 x 60		Sizes over 25 ft. super will be $\frac{3}{32}$"
		or		
		100 x 36	3½ lb.	
	⅜	164 x 60	5 lb.	
"ARMOURCLAD" CAST	¼	80 x 54		
		or		
		100 x 36	3½ lb.	
	⅜	164 x 60	5 lb.	

COLOURS: Glacier White, Light Stone, Smoke, Cactus, Lime, Daffodil, Turquoise, Cornflower, Cobalt Blue, Grey, Flame, Black. (Other colours are available and specimen shades can be matched, subject to the limits of the manufacturing process and the quantity required.)

"MUROGLASS" Rough Cast Glass which has had colour permanently fused into its smooth side.
SPECIFICATION: Thickness: Nominal ¼" Sizes up to 48" x 100" Weight 3½ lb. per sq. ft.
COLOURS: Glacier White, Daffodil, Turquoise, Cactus, Flame, Spring Green, Lime, Grey, Cobalt Blue, Light Stone.

"VITROLITE" An opaque glass which will not craze, having a fire-finished surface. Colour is inherent in the glass, not a surface glaze.
SPECIFICATION: Thickness ¼" available in a range of stock or cut sizes including a range of ashlar sizes.
COLOURS: Pearl Grey, Blue, Primrose, Ivory, Green, Black, White, Shell Pink.

Other Pilkington Glasses, too, can be successfully used in cladding techniques. Our technical service staff will be glad to discuss your ideas—and problems. Just telephone Selwyn House, St. Helens or any of our provincial depots.

PILKINGTON BROTHERS LIMITED

"ARMOURCLAD" "MUROGLASS" and "VITROLITE" are registered trade marks of Pilkington Brothers Limited. Supplies available through the usual trade channels.

SfB (21) Fe5

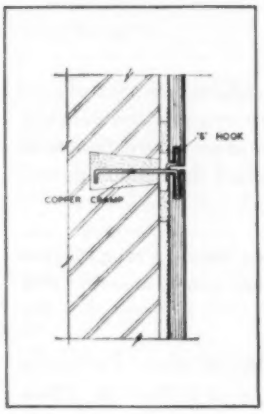
Broughton Moor Green Slate

Broughton Moor Green Slate, quarried in the lake district, is volcanic in origin and therefore practically indestructible. It is relatively unaffected by atmospheric pollution and cannot warp or shrink.

Fixing

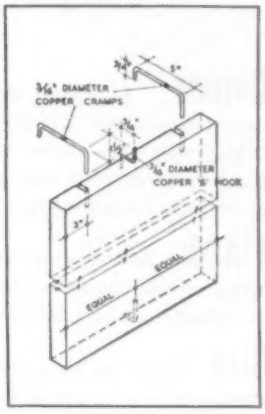
The proper design, manufacture and installation of the fixing for slab fixings is of vital importance and specialist advice should be sought at the earliest stage. The quarry does not undertake this kind of work but will readily arrange a visit of an expert.

All fixings should be of copper, or other non-ferrous metal and usually perform the two distinct functions of supporting the dead weight of the slate and retaining it in the correct position.

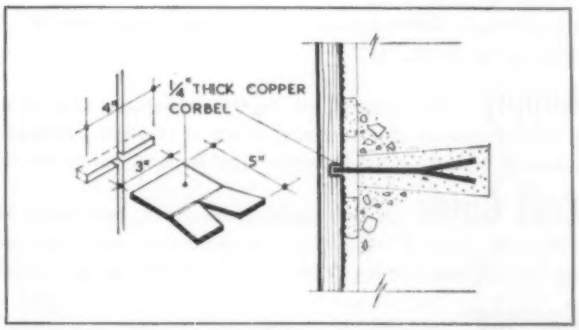


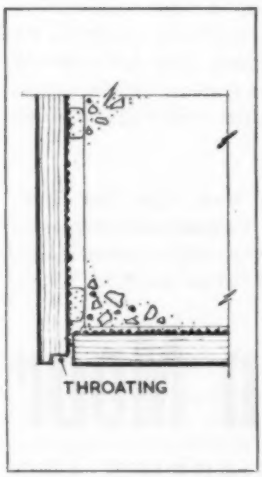
The standard method of fixing is two copper cramps at the top of each slab ($\frac{3}{16}$" or $\frac{1}{4}$" depending on the thickness of material) and a copper 'S' hook at the base. Where there is no slab below, a dowel is fixed into concrete nibs, or a cramp about 6" up on the vertical joints.

It is essential that there be a $\frac{1}{2}$" cavity between the brickwork and the facing slabs where four cement dabs are placed.



Where walling is to be supported or suspended it is necessary to introduce $\frac{1}{4}$" copper corbel plates 5" long by 3" wide. These are fixed at the centre of all vertical joints about 6" from the bottom.



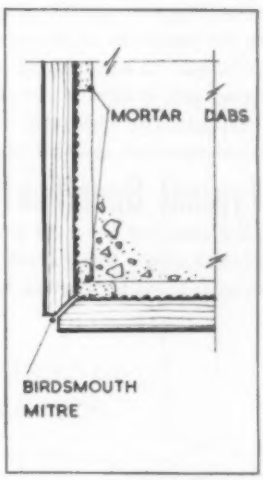


Plain butt joints are usually close jointed with a 'sawn' finish to the edges of the slate which produces an extremely fine joint. (See illustration left). Alternatively they can either be left open or pointed with coloured cement.

Care should be taken to ensure that no cement is left on the face after fixing, but is promptly removed with a strong bristle brush and clean water, as it will be difficult to remove afterwards.

Joints for vertical and horizontal changes of plane are usually one of the two kinds shown.

Where Riven faced finish is being used a change of plane in either direction will produce an exposed edge which will not match the natural texture of the face. In these cases it is best to use a birdsmouth mitre, as illustrated right.



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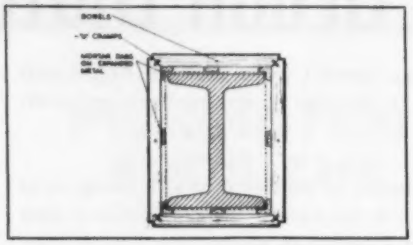
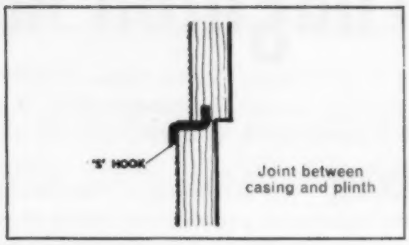




Broughton Moor Green Slate can be used to face columns and stanchions. With steel framing there is the particular advantage that the slate will provide a more than adequate degree of fire protection. The method of fixing these facings is illustrated above.

Colour Broughton Moor slate is available in an infinite range of natural variations of three basic colours. Light Sea Green is the lighter tone obtained from the lower stratas of the workings. Olive Green is the darker shade quarried from the upper levels of the same quarry. Spoutcrag is a pale green slate with beautiful unique natural bar markings, obtained from the re-opened quarry near Langdale Pikes.

Finish All Broughton Moor slate is available in four finishes. Frame Sawn—a rough texture with a vertical emphasis. Natural Riven—the natural split texture. Sanded—a fairly smooth finish. Fine Rubbed—a very smooth eggshell finish.

Size Slabs can be supplied in sizes up to 6′×2′ 6″ in all finishes except Riven. For normal uses slabs should not be larger than 4′ 6″×2′. Average sizes are 3′×2′ or 2′ 6″×1′ 9″. Thicknesses vary from ¾″ to 1½″.
Natural Riven Slabs are not recommended larger than 24″×18″ except in the case of Spoutcrag supplied up to 36″×18″.

Supply The Quarries are highly mechanised and are able to deal expeditiously with large orders. Enquiries can be made direct or through specialist sub-contractors. Delivery is either direct to the site in the Quarries' own transport or to the nearest railway station, carriage paid.

Cost Guide As an approximate guide, Broughton Moor Green Slate facings, delivered within 250 miles of the Quarries in reasonable quantities, will cost approximately from 12/6d. to 20/- per square foot for 1″ thick, and from 17/- to 26/- per square foot for 1½″ thick.

Service All work is carried out to customers' requirements from architects' drawings, schedules and specifications. Special mouldings for irregular shapes can be supplied in addition to the provision of all necessary rebates and grooves, etc. which are normally worked by the Quarries. To assist fixing, a key plan can also be supplied. The Company does not undertake fixing, but is able to recommend expert fixers who will undertake work at competitive prices. They can also invariably arrange the visit of a technical expert to advise where special fixing problems arise, at short notice.

Typical Specification The facing to be of Broughton Moor *Light Sea Green Slate* obtained from the Broughton Moor Green Slate Quarries Ltd., Coniston, Lancashire, of *1″ thick* with a *Riven* finish to face, sawn to sizes as shown on detail drawings, complete with circular holes for cramps, fixings, etc. Note: The items in italics above can be varied.

Broughton Moor

GREEN SLATE QUARRIES LTD

Coniston, The Lake District, Lancs. Tel: Coniston 225/6

U.A.M. Group Information Service November 1961	TILES, SHEETS (OVERLAPPING) ASBESTOS CEMENT	Nh1

CORRUGATED ASBESTOS CEMENT SHEETS

for Roof Covering and Wall Cladding

BRITISH STANDARDS

BS 690 Asbestos Cement Slates and Sheets.
BS 1494 Fixing Accessories for Building Purposes.
BS Code of Practice CP 143.201. (1951).

PROPERTIES

Dimensions and Weights

Profile	Size	Weight* per sq. yd.	Yards per ton	Thermal Insulation U's
Standard 3" Corrugated	4' 0"—10' 0"	27·75 lb.	100	1·3
Standard Six	4' 0"—10' 0"	29·0 lb.	90	1·3
Canada Tile	4' 0"—10' 0"	27·5 lb.	97·6	1·3
Fort Sheets	4' 0"—10' 0"	27·5 lb.	92·3	1·3
Trofsec Sheets	4' 0"—10' 0"	41·0 lb.	63	0·98
Twin Twelve	4' 0"—10' 0"	25·0 lb.	102	1·3

* *As laid for roofing including fixing accessories.*

Thermal Expansion

Roofs 150'-250' one expansion joint, then one for each additional 100'.
See Code of Practice 143.201 paragraph 307.

Fire

As material incombustible: as structural element, no fire resistance.
See B.S. 476 for test details.

Colour

(Surface treatment) Gloss or Matt to range indicated in B.S. 2660.

FIXING

Profile	Roof Pitch*	Centres of Supports: Purlins	Centres of Supports: Rails	End Lap	Side Lap
Standard 3" Corrugated	22½°—25°	3' 0"	5' 0"	6"	1½ corr.
Standard Six	22½°—25°	4' 6"	6' 0"	6"	2½"
Canada Tiles	22½°—25°	4' 6"	6' 0"	6"	1 corr.
Fort Sheets	22½°—25°	5' 6"	6' 6"	6"	3"
Trofsec Sheets	22½°—25°	6' 6"	6' 6"	6"	3"
Twin Twelve	—	—	6' 0"	4"	2½"

* *Normal conditions.*
Shallower pitches consult manufacturer.

DETAILS

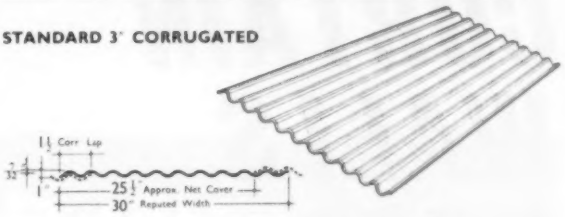
Asbestos Cement Accessories

The full range of standard patterns is shown in the product catalogue. Special pieces can be made to order.

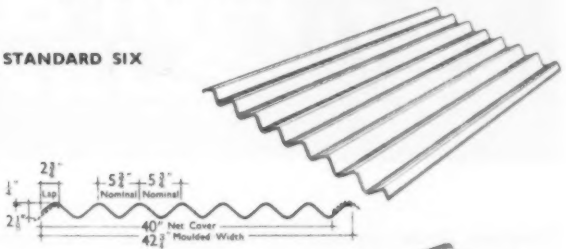
SANDWICH CONSTRUCTIONS

Underlining sheets to effect double skin cladding, with an infill of glass fibre insulant, in accordance with Universal Sandwich constructions are available for all profiles.

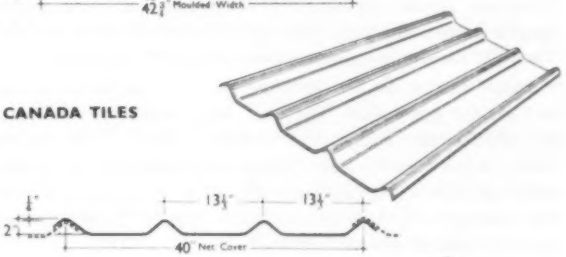
STANDARD 3" CORRUGATED



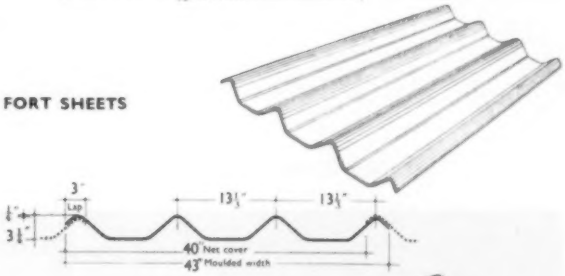
STANDARD SIX



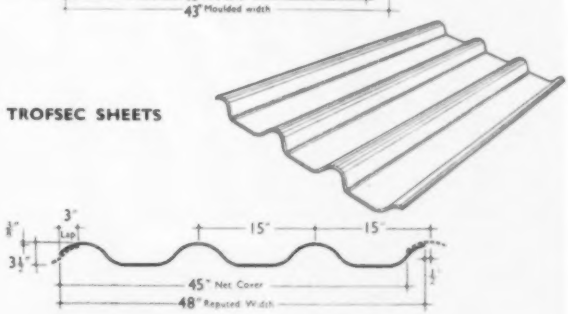
CANADA TILES



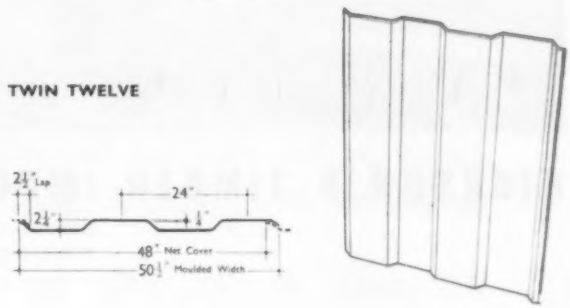
FORT SHEETS



TROFSEC SHEETS



TWIN TWELVE



The Universal Asbestos Manufacturing Company Limited, Tolpits, Watford, Herts.
Telephone : Watford 34551 Branches : London, Birmingham, Manchester, Bristol, Glasgow

SfB (21) Du3

CURTAIN WALLS NEED

'Tanalith' C
PRESERVATIVE

OR

'Pyrolith'
FLAME RETARDANT

'Tanalised' timber, plywood etc :— Curtain walls and cladding require permanent protection from decay and insects. *Specify 'Tanalith' vacuum/pressure impregnation 0·25 lb/cu. ft.*

'Pyrolith' treated timber, plywood etc :— In addition to decay and insect protection, 'Pyrolith' treatment imparts Class 1, BS : 476 resistance to spread of flame. 'Pyrolith' impregnated timber is used as the main structural material in multi-storey buildings and in conjunction with other materials fire endurance ratings of 2 hours are achieved. *Specify 'Pyrolith' vacuum/pressure impregnation 2·5 lb/cu. ft.*

HICKSON'S TIMBER IMPREGNATION CO. (G.B.) LTD.

Castleford, Yorkshire. Castleford 3841
8 Buckingham Palace Gardens, London, S.W.1. SLOane 0636

SfB Uo

PLYGLASS LIMITED

VITROSLAB INFILL PANELS

VITROSLAB is a coloured double glazing unit consisting of two sheets of flat or figured glass sealed at the edges.

APPLICATIONS For infill panels in metal and timber rebated frames with bead fixing and in systems of vertical patent glazing.

COLOURS 38 stove enamelled colours (matt and glossy) are available, the majority being British Standard.

INSULATION 'U' values vary from 0.6 to 0.11.

INCOMBUSTIBILITY This is achieved by the use of compressed asbestos linings.

FIRE RESISTANCE Units with a fire resistance of two hours are available.

THICKNESS Minimum $\frac{3}{8}$" Maximum $3\frac{1}{8}$" } according to type.

EFFECTS By placing layers of glass fibre over the background colour either in continuous veils or as cut shapes, interesting textured effects are produced. Heavily patterned glass may also be used for the external leaf.

PLYGLASS LIMITED
A member of the Gas Purification Group

Information and Price Lists on request
'PLYGLASS' Units carry a 5 year warranty

PLYGLASS LIMITED, VICTORIA HOUSE, SOUTHAMPTON ROW, LONDON W.C.1. Tel. CHAncery 8347

SfB Uo

PLYGLASS LIMITED

DIFFUSING DOUBLE GLAZING UNITS

'PLYGLASS' Diffusing Double Glazing Units contain an interlayer of fine glass fibres which may be either white or coloured.

APPLICATIONS For roof and sidewall glazing to reduce glare and the input of solar heat. To reduce heat losses.

COLOURS White, grey, amber, biscuit, peach, shell pink, sky blue, and alpine green. (Colour availability may vary from time to time.)

INSULATION *Heat gains*—Radiation. For air conditioning purposes, overall solar heat gain through 'PLYGLASS' Diffusing Double Glazing Units should be taken as half the local figure for identical areas of sheet or cast glass.

Conduction and Convection. Transfer of airborne heat is reduced by approximately 40% compared with single glazing. Lower thermal transmission coefficients can be provided by special 'PLYGLASS' laminations.

Heat Losses—'U' values (normal conditions):

Roofs	*Windows*
0.70	0.60

ANTI-SHATTER The glass fibre interlayer can be permanently affixed to the inside leaf making it shatter proof. Alternatively, wired glass may be used.

THICKNESSES Minimum $\frac{5}{16}$"
Maximum $\frac{9}{16}$"

PLYGLASS LIMITED
A member of the Gas Purification Group

Information and Price Lists on request
'PLYGLASS' Units carry a 5 year warranty.

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SfB (21) Hd

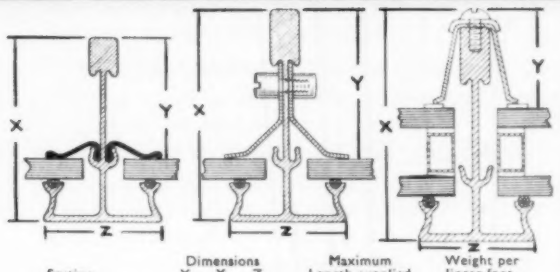
ALUMINIUM & STEEL PATENT GLAZING

LANTERN LIGHTS . SKYLIGHTS . "MONOLIGHT" ROOF LIGHTS, DEADLIGHTS FOR FACTORIES . POWER STATIONS . COMMERCIAL BUILDINGS . SCHOOLS . HOSPITALS Etc.

Heywood – Helliwell

PATENT ROOF & WALL GLAZING

ALUMINIUM ALLOY PATENT GLAZING BARS



Section	Dimensions X	Y	Z	Maximum Length supplied	Weight per linear foot
No. 0	1⅛"	1 1/16"	1½"	6' 0"	.953 lbs.
No. 1	2⅛"	1 7/16"	1½"	8' 0"	1.08 lbs.
No. 2	2⅛"	1 11/16"	1½"	10' 6"	1.18 lbs.
Double Glazing	2⅛"	—	1½"	10' 0"	—

Heywood-Helliwell Features

Extruded aluminium alloy glazing bars. Continuous lead or aluminium glazing wings. Asbestos cord cushions held in grooves. Aluminium glass stop bolted through web of bar.

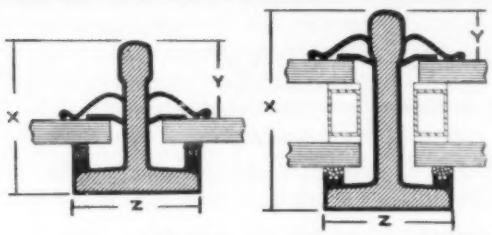
A special extruded aluminium wing, bedding on asbestos cord to outer glass surface is also available.

DOUBLE GLAZING

Extruded aluminium alloy section completely covered above the outer glass line by an aluminium capping. Aluminium alloy separator to give an air space of approx. ⅜" bedded on to efficient sealing strip. Asbestos cord seating for inner layer of glass. Aluminium alloy glass stop. Weight per square foot of glazing 7¼ lbs.

A special extruded aluminium cap bedding on asbestos cord to outer glass surface is also available.

GALVANISED STEEL FULLY LEAD CLOTHED GLAZING BARS



Section	Dimensions X	Y	Z	Maximum Length supplied	Weight per linear foot
No. 0	1¼"	7/16"	1⅛"	5' 6"	3.0 lbs.
No. 1	1⅜"	11/16"	1⅛"	7' 6"	3.5 lbs.
No. 2	2¼"	1 5/16"	1⅛"	10' 6"	4.0 lbs.
Double Glazing	2¼"	—	1⅛"	10' 0"	—

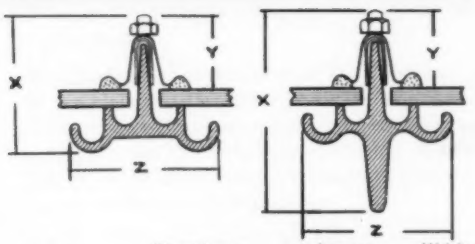
Heywood-Helliwell Features

Continuous lead sheath, hermetically sealed galvanised steel core of robust section. Asbestos cord cushions held in grooves. Copper glass stop set-screwed to bar.

DOUBLE GLAZING

Fully lead clothed galvanised steel core. Double lead wings. Aluminium-alloy separator to give an air space of approx. ⅜", bedded on to efficient sealing strip. Asbestos cord seating for inner layer of glass. Phosphor bronze glass stop. Weight per square foot of glazing 9 lbs.

"PERFECTION" GALVANISED STEEL GLAZING BARS



Section	Dimensions X	Y	Z	span between purlins	Weight per linear foot
ordinary	1⅛"	⅜"	2 7/16"	6' 6"	2.30 lbs.
medium	2⅛"	⅜"	2 7/16"	8' 6"	3.11 lbs.
strong	2⅛"	⅜"	2¼"	11' 0"	3.85 lbs.

Heywood-Helliwell Features

Hot dip galvanised rolled steel bar of special section embodying "drop-dry" condensation channels. The glass is firmly held in place by detachable caps of zinc, aluminium or copper secured to the glazing bar with brass or zinc plated capping bolts and nuts and zinc, aluminium or copper clips spaced at 1' 6" centres. 12-strand asbestos cord under the caps ensures a weather-tight joint. A malleable iron glass stop is locked at the foot of the bar.

"Perfection" glazing bars are very suitable for joggling to hold two or more panes of glass thus giving a continuous area of glazing down the slope of the roof.

BRANCHES: LONDON MANCHESTER GLASGOW BELFAST NEWCASTLE BIRMINGHAM LIVERPOOL LEICESTER NOTTINGHAM DUBLIN

P G C

Contributing quality and service to the architect's skilful handling of daylight throughout the whole field of industrial and commercial building.

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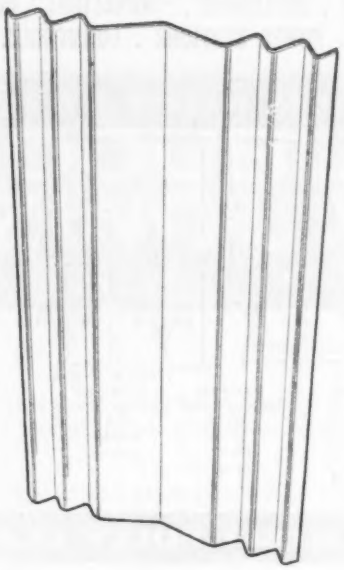
HEYWOOD - HELLIWELL LTD . BAYHALL WORKS . HUDDERSFIELD

SfB (21) Hd

U.A.M. Group Information Service April 1961	CONCAVE PANEL SHEETS DATA SHEET	Nh1

THE CONCAVE PANEL SHEET for Wall Cladding

The corrugated sheet W/4530



DESCRIPTION

Composition of Asbestos Cement material is identical to that employed in the manufacture of sheets under B.S. 690.

DIMENSIONS AND WEIGHTS

Lengths

4' 0" to 10' 0" in 6" increments.

Weight and Area

Weight per square yard as laid including fixing accessories. 29 lb.

Sq. yds. per ton 90

Covering Capacity

Cover of 9' 6" sheet is 9' 2" × 3' 4"

PROPERTIES OF THE SHEET

Thermal Insulation

U = 1·3

Thermal Expansion

150' - 250' one expansion joint, then one for each additional 100'
See Code of Practice, para. 307.

Fire

As material, incombustible: as structural element, no fire resistance.
See B.S.476 for test details.

Colour

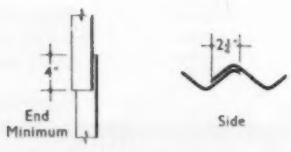
(Surface treatment) Gloss or Matt to range indicated in B.S.2660

DESIGN AND SPECIFICATION

Vertical Cladding

Centres of supports

Laps



DETAILS

Asbestos Cement Accessories Special pieces can be made to order.

The Universal Asbestos Manufacturing Company Limited, Tolpits, Watford, Herts.
Telephone : Watford 34551 Branches : London, Birmingham, Manchester, Bristol, Glasgow

SfB (21) U

WILLIAMS & WILLIAMS

Reliance Works, Chester.
Tel: Chester 24624
Telegrams: Reliance, Chester.

Head Sales Office:
37/39 High Holborn, London, W.C.1
Tel: Holborn 9861

Wallspan Curtain Walling

Wallspan is a complete walling system consisting of hollow extruded aluminium alloy mullions and transoms fixed together by means of spigots to form a grid.

Material and Manufacture. There is a wide range of tubular box-form extrusions of HE-9 alloy, to form mullion, transom, head and sill members.
The range of auxiliary components: fixing lugs, jointing spigots, etc. is standard for all installations.
Sealed expansion joints make full allowance for all possible thermal movement.
Provision is made for collection and disposal of condensation.
All types of infilling panel, glass, metal windows and doors can be accommodated.
All attachments to the building have three-way adjustment.

Fixing Methods and Fixings. The complete Wallspan curtain wall is retained by spigots at the head and sill and by fixing the foot of each mullion member to the appropriate floor slab. For fixing to the floor slab channel, inserts provided by the manufacturers are cast in the floor slab by the main contractors and ½ in. dia. bolts are located therein. A saw tooth extrusion fits on this and is locked to a small extrusion which passes through an accurately machined slot in the mullion.

British Standards. Aluminium alloy in accordance with B.S. 1476: 1955 Wrought aluminium and aluminium alloys.

Loading. Wallspan is designed to accommodate the wind loading laid down in B.S. CP3: Chapter V: 1952. Loading.

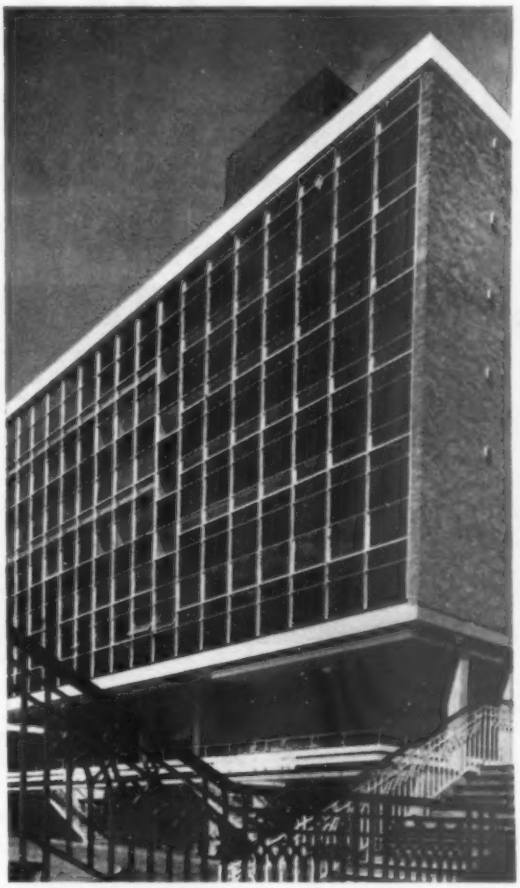
Thermal Movement. To provide for movement due to changes of temperature, the foot of each mullion is fixed rigidly to the floor slab, but the upper end is free to slide on the mullion joint spigot or the head of the fixing spigot.
Lateral expansion is absorbed by the transoms being free to move on their spigots which are fixed rigidly to the sides of the mullions.

Weathering. A 'multiple-barrier' weather proofing is provided by a range of special details including drip bars on the transoms, saw-tooth grooves on the transom spigots, grooves and side wings on the mullion joint spigots, weathering flanges and mastic holding rebates on the main components and the use of special non-setting mastics.

Finish. Wallspan components are available in two finishes: Standard etched finish. Self colour anodized finish.

Availability. Supplied and fixed by Williams and Williams Ltd.

Prices and Delivery. Prices, inclusive of delivery to any site, will be quoted on application to the Sales Division or any of the offices listed on the right or our Head Sales Office.



Williams & Williams Wallspan on the new grandstand at Ascot racecourse. Chief Architect: E. V. Collins, A.R.I.B.A. Contractors: Geo. Wimpey & Co. Ltd.

OFFICES

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WILLIAMS & WILLIAMS *forward looking building products*

BARBOUR INDEX: 245

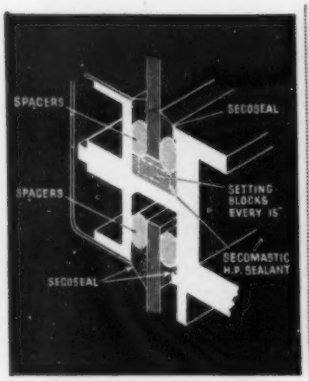
WILLIAMS & WILLIAMS ALSO MAKE STEEL AND ALUMINIUM WINDOWS, PATENT GLAZING, PARTITIONS, CUBICLES

SfB (21) Dt4

SECOMASTIC

REGD.

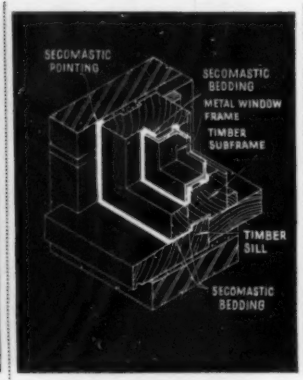
THE FIRST NAME IN SEALANTS FOR THE BUILDING INDUSTRY



SECOSEAL

ELASTOMERIC SEALANT

A polysulphide liquid polymer sealant for high duty applications. Available in patented cartridges with catalyst integrally contained. Elastic, rubber-like consistency, capable of accepting very large movements.



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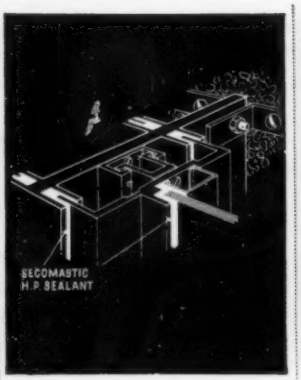
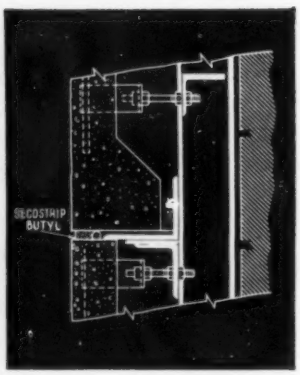
The universal mastic sealant proved throughout the world over nearly two decades for general joint-sealing in building construction. Excellent adhesion to all dry building materials, easy to apply, economic and versatile.



SECOMASTIC H-P

HIGH POLYMER

A synthetic rubber sealant based on plasticised butyl rubber of high molecular weight. Outstanding adhesion and gunnability, combined with great extensibility.



SECOSTRIP BUTYL

BEDDING AND SEALING STRIP

A pre-formed mastic strip based on an improved formulation available in a wide range of extrusions. High degree of adhesion, non-hardening, non-ageing, especially suitable for overlap joints.

***JOINT-SEALING IN CONTEMPORARY BUILDING CONSTRUCTION**

Our latest technical bulletins describe the most modern techniques and sealants available for ensuring that every type of joint is not only sealed in the most effective way possible—but also with the maximum economy.
Write to Architectural Department

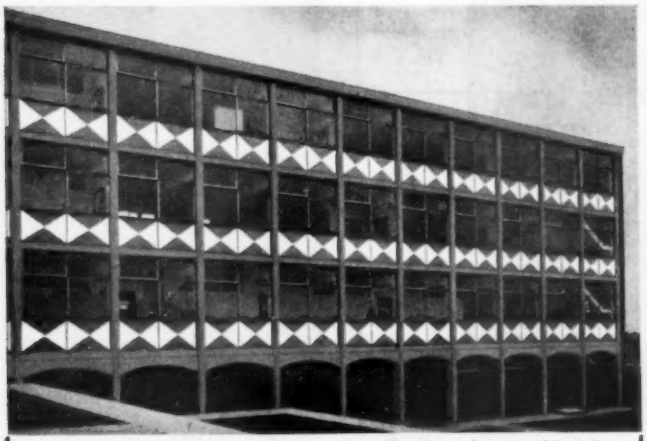
SECOMASTIC LIMITED

BRACKNELL, BERKSHIRE. TELEPHONE: BRACKNELL 910. TELEGRAMS: SECOMASTIC BRACKNELL. TELEX: 25420.

SfB (21) Ud

VITREOUS ENAMELLED PANELS

in steel for use in the building industry



Application of Vitreous Enamelled Panels at Clough Top County Secondary School for Boys with acknowledgments to Bernard Taylor and Associates in collaboration with Leonard C. Howitt, M.Arch., D.A. (Manc), Dip.T.P., D.P.A., F.R.I.B.A., M.T.P.I., City Architect of Manchester.

Advantages of Standard MS Vitreous Enamelled Infill Panels

VITREOUS ENAMEL

This is a vitreous inorganic coating bonded to the metal by fusion at high temperatures. It is the art and science of fusing glass to metal. Vitreous Enamel has a hard impervious surface and must not be associated with stove enamel, painted surfaces or other less durable finishes.

COLOUR & DESIGN

The colour range and design is practically unlimited thus providing the architect with complete "Freedom of Expression". All colours are permanent and will not fade and can be produced in a full gloss, semi-matt or matt finish.

DURABILITY

When steel is covered with Vitreous Enamel, there results a product which is rigid, rust-proof and far more scratch resistant than other materials.

MAINTENANCE

Due to the excellent qualities of Vitreous Enamel, maintenance costs are most economical. This is a "Lifetime Finish" which only requires the occasional cleaning with water in the same way as ordinary window cleaning.

THERMAL INSULATION

Vitreous Enamelled composite panels of 2 inch thickness can give the same thermal insulation as 9 inch brickwork.

WEATHER RESISTANCE

The hard impervious surface of Vitreous Enamel gives the advantage of resisting the severest of weather conditions.

All panels are manufactured to the standard required by the Vitreous Enamel development Council.

Vitreous Enamel and Porcelain Enamel are synonymous.

BARBOUR INDEX FILE No. 345. SfB. 21.U.d2

MATTHEW SWAIN LIMITED

VITREOUS ENAMEL AND ARCHITECTURAL DIVISION

NEWTON HEATH, MANCHESTER 10

Telephone: Collyhurst 2527-8 1961-2

MEMBERS OF THE VITREOUS ENAMEL DEVELOPMENT COUNCIL

TYPE A

Flat Vitreous Enamelled 16 swg steel sheet bonded to ¼" or ⅜" asbestos fibreboard with all edges sealed by P.V.C. tape. A backing of 20 swg galvanised or 16 swg vitreous enamelled steel may also be incorporated in this panel.

'U' value ·48.

Approx. weight per sq. ft. 6 lb.

TYPE B

Tray Type Vitreous Enamelled 16 swg panel with welded corners bonded to asbestos fibreboard and all edges sealed with P.V.C. tape. As in panel 'A' a backing of 20 swg galvanised or 16 swg vitreous enamelled steel may be incorporated in this panel.

'U' value ·48.

Approx. weight per sq. ft. 6½ lb.

TYPE C

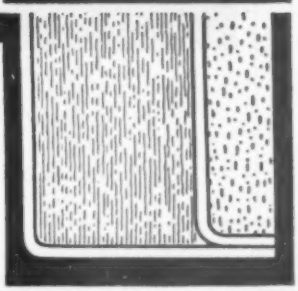
Tray Type Vitreous Enamelled 16 swg panel with welded corners bonded to resinated paper honeycomb, the cells of which may be filled with granular vermiculite. All edges sealed with P.V.C. tape. A backing of 20 swg galvanised or 16 swg vitreous enamelled steel is incorporated in this panel.

A typical panel of 1" thickness has a 'U' value of ·28 and the approx. weight per sq. ft. is 4·1 lb.

TYPE D

Tray Type Vitreous Enamelled 16 swg panel with welded corners bonded to a core of glass fibre and a backing of asbestos fibreboard with a vapour barrier of Aluminium foil. All edges sealed with P.V.C. tape.

A panel thickness of 1½" will give a 'U' value of ·20 and the approx. weight per sq. ft. is 6 lb.



TYPE E

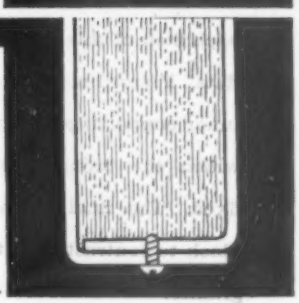
Flat Vitreous Enamelled 16 swg steel bonded to resinated paper honeycomb, the cells of which may be filled with vermiculite with a backing tray of galvanised steel. All edges are caulked with rubber or mastic and sealed with P.V.C. tape.

A total panel thickness of 1" will give a 'U' value of ·28 and the approx. weight per sq. ft. is 4·1 lb.

TYPE F

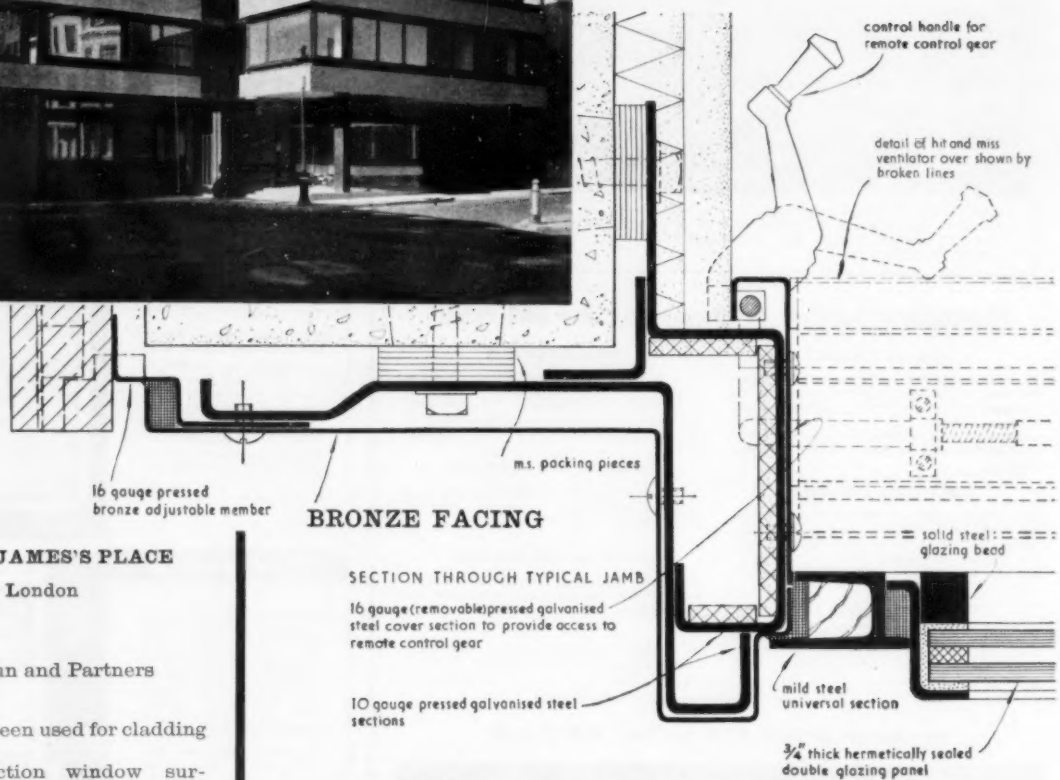
Double Tray Type Vitreous Enamelled 16 swg panel with an infill of glass fibre and mechanically assembled by self-tapping screws.

A panel thickness of 1" will give a 'U' value of ·20 and the approx. weight per sq. ft. is 5½ lb.



SfB (21) Ud
UDC 69.022,1 .4

bronze cladding



Flats at ST. JAMES'S PLACE Westminster London

Architects:
Denys Lasdun and Partners

Bronze has been used for cladding the bold-section window surrounds which extend between each floor of this block of luxury flats. Pressed steel provides the inner supporting assembly on to which the bronze sections are fixed. The final finish is matt black to contrast with the white granite.

The Morris Singer Company have long specialised in the design of Window Wall systems incorporating the use of bronze and stainless steel — two metals not adversely affected by marine or industrial atmospheres. Phone or write for details.

Morris Singer

THE MORRIS SINGER COMPANY LIMITED
Hope House, Gt. Peter Street, Westminster, S.W.1. Telephone: ABBey 4701
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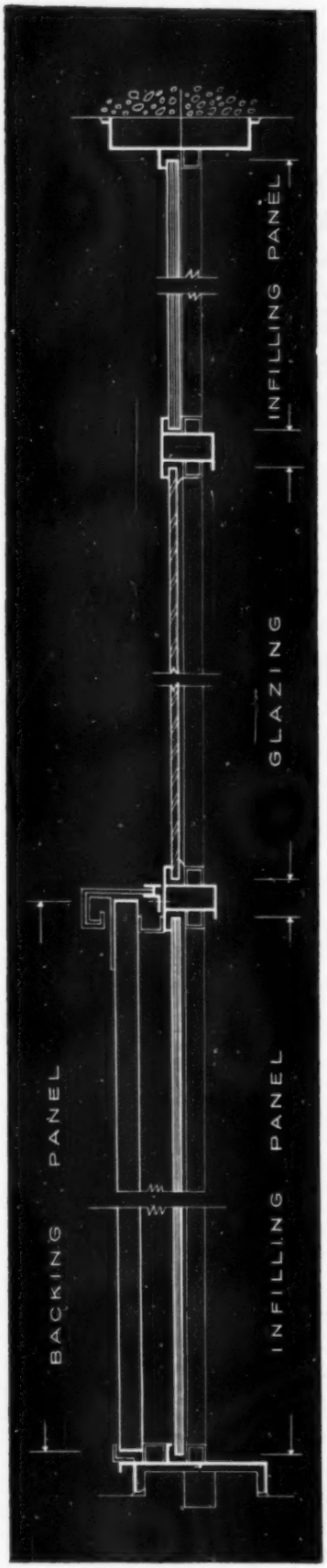


TAC

INFILLING PANELS SUITABLE FOR EXTERNAL FACES OF CURTAIN WALLING

NOTE: The maximum panel sizes indicated are those applicable when the infilling panels are held in position by mastic filled glazing beads as illustrated on the cross-section.

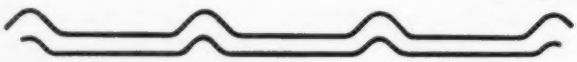
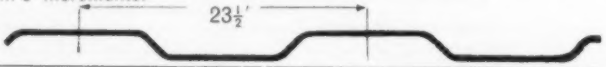
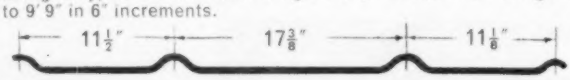
Product title	Symbol Nos.	Thickness	Maximum Sizes	(K) Value	Decoration
"TURNALL" Asbestos Low-Density Rigid Panels (Density: 36 lb. per cu. ft.)	LP. 1	½, ¾, 1, 1¼ and 1⅝	6 ft x 4 ft	0.78 Btu. in/ ft²h. F	Available with: Metal veneers, Decorative sheets of resin bonded glassfibre. Decorative asbestos-cement veneers. Natural Grey 1.12" asbestos-cement veneer suitable for painting. (See Publication B. 109)
		"TURNALL" L.D.R. Panels can also be utilised for backing panels (see cross-section) bonded with a variety of decorative veneers as follows:- Decorative plastic, Wood, Decorative asbestos-cement veneer, Decorative sheets of resin bonded glassfibre, Metal veneers.			
"POILITE" A.C. Flat Sheets Fully Compressed	FSFC 1	¼" ⅜"	4 ft x 3 ft 6 ft x 4 ft	4.50 Btu. in/ ft²h. F "	Available in "TURNALL" "COLOURGLAZE" and "HAMMERGLAZE" Finishes or supplied in Natural Grey for decoration in situ. (See Publication B. 61)
"TURNALL" Granitone Decorated Sheets	DSG 12.21	¼"	4 ft x 3 ft	4.50 Btu. in/ ft²h. F	Available in 10 coloured patterns: D.S.G. 12 Green on white D.S.G. 13 Red on white D.S.G. 14 Black on white D.S.G. 15 Yellow on white D.S.G. 16 Blue on white D.S.G. 17 White on black D.S.G. 18 Green on black D.S.G. 19 Red on black D.S.G. 20 Grey/black mottle D.S.G. 21 Grey/black mottle Light pattern. (See Publication B.1 19)
"POILITE" A.C. Flat Sheets (Textured)	FST 1, 201, 301, 401, 501, 601, 701 & 801	¼" ⅜"	4 ft x 3 ft 6 ft x 4 ft (FST 301 only)	4.50 Btu. in/ ft²h. F "	Available in 8 patterns and can be supplied treated with "TURNALL" "COLOURGLAZE" and "HAMMERGLAZE" Finishes or supplied in Natural Grey for decoration in situ. (See Publication B. 57)

TURNERS ASBESTOS CEMENT CO. LTD.
A member of the **TURNER & NEWALL** *group*
TRAFFORD PARK · MANCHESTER 17 · Tel: TRAfford Park 2181
LONDON Tel: WATerloo 4712 and at Birmingham, Bristol, Cardiff, Glasgow

SfB (21) Uh1

TAC

ASBESTOS-CEMENT CLADDING MATERIALS FOR NON-LOADBEARING EXTERNAL WALLS

Pub. No.	PRODUCT	Maximum purlin spacings ft in	Weight per 100 sq ft as laid in lb	'U' Value
B.90	"EVERITE" Standard Asbestos-Cement Corrugated Sheets. Nominal Width 2′ 6″. Covering Width 2′ 1½″. Lengths 3′ to 10′ in 6″ increments. 	3 0	308½	1·40
B.95	"EVERITE" "BIGSIX" Asbestos-Cement Corrugated Sheets. Nominal Width 3′ 6¾″. Covering Width 3′ 4″. Lengths 4′ to 10′ in 6″ increments. 	4 6	320	1·40
B.95	"EVERITE" "BIGSIX" Asbestos-Cement Corrugated Sheets and "EVERITE" Asbestos-Cement Lining Panels with 1″ glassfibre infill. 	5 6 (Excluding Battens) / 4 6 (Including Battens)	590 / 596	0·25 / 0·19
B.85	"EVERITE" "BIGSIX" Asbestos-Cement Corrugated Sheets (Metal Reinforced). Nominal Width 3′ 6¾″. Cover Width 3′ 4″. Lengths 4′ to 10′ in 6″ increments.	4 6	320	1·40
B.89	"TURNALL" Trafford Tile (Asbestos-Cement). Nominal Width 3′ 8″. Cover Width 3′ 4″. Lengths 4′ to 10′ in 6″ increments. 	4 6	304	1·40
B.89	"TURNALL" Trafford Tile (Asbestos-Cement) and "EVERITE" Asbestos-Cement Lining Panels with 1″ glassfibre infill. 	5 6 (Excluding Battens) / 4 6 (Including Battens)	574 / 580	0·25 / 0·19
B.100	"EVERITE" Asbestos-Cement Panel Sheets (for vertical use). Nominal Width 3′ 6″. Cover With 3′ 4″. Lengths 4′ to 10′ in 6″ increments. 	6 0	295	1·40
B.120	"TURNALL" Asbestos-Cement Cladding Tiles (for vertical use). Nominal Width 4′ 1″. Cover Width 3′ 11″. Standard Lengths 4′ to 12′ in 6″ increments. 	6 0	275	1·40
B.95	"EVERITE" "BIGSIX" Asbestos-Cement Lining Panels (for underlining only). Nominal Width 3′ 5¼″. Cover Width 3′ 4″. Lengths 3′ 9″ to 9′ 9″ in 6″ increments. 	5 6	262	1·40

TURNERS ASBESTOS CEMENT CO. LTD., TRAFFORD PARK, MANCHESTER 17

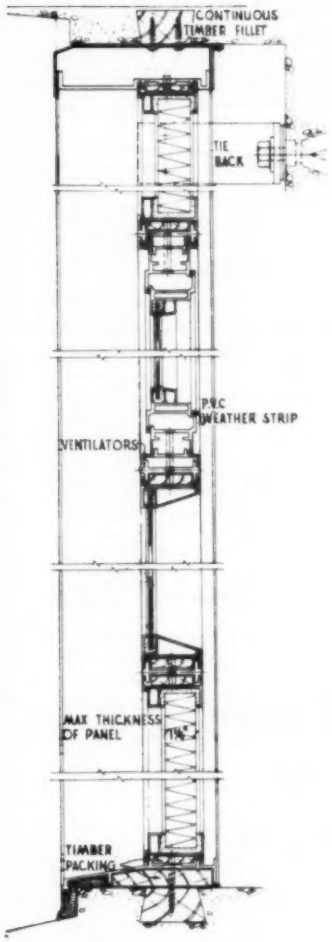
A MEMBER OF THE TURNER & NEWALL GROUP

TRAFFORD PARK MANCHESTER 17 Tel: TRAfford PARK 2181 and at LONDON BIRMINGHAM BRISTOL CARDIFF GLASGOW

ALUMINIUM CURTAIN WALLING

SfB (21) Ud4
UDC 69.022.326:691.771

ALUMINIUM CURTAIN WALLING



Typical vertical section

The Heywood-Helliwell Split-Mullion system of Aluminium Curtain Walling is fabricated and assembled into panels in our factory – panel sizes being determined by the distance between floor levels and the modular widths.

Fully inter-locking assemblies can incorporate various suites of weather-stripped Aluminium "Continental" Windows and fast lights with infil panels as required – the split-mullion members integrating the assemblies during transportation and erection.

The system is tremendously flexible and allows for site inaccuracies and thermal movement as well as simplifying and greatly speeding up erection time.

Two ranges of aluminium mullions are available, the complete sizes of which, when inter-locked are : $1\frac{3}{4}$" x 4" and $1\frac{3}{4}$" x 6". Horizontal thermal movement is allowed for between each panel, the clearance being sealed by a flush-faced expansion member.

Vertical thermal movement is usually allowed for at the top of the building but can be allowed at floor levels by engaging one panel on top of another where the 6" cill member forms the base of the upper panel and the 6" split-mullion member the head of the lower panel.

The Heywood-Helliwell Aluminium "Continental" Windows – Series "A" and Series "B" (Special) which are incorporated in this system of curtain walling have a very high standard of finish and appearance, with ease and efficiency in operation. In accordance with first-class practice, mitred corners are crush welded to give additional strength and neatness of finish.

Constructed of extruded aluminium alloy hollow sections of advanced design for strength and lightness, and matching quality moving parts and fittings, these windows consist of :

"A" Series : Choice of single or double glazing, inward or outward opening, and inside or outside glazing.
Types of windows supplied : Fast lights; side-hung, top or bottom-hung; horizontal or vertical pivot opening through 90°. In larger sizes of the pivoted window an efficient two-point locking device is included.

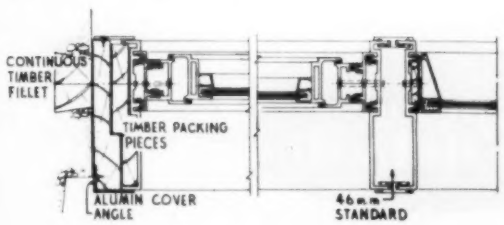
"B" Series (Special) : Horizontal or vertical 180° reversible, prepared for inside glazing. The section accommodates double glazing units as standard and incorporates unique two-stage concealed friction pivots. In fully closed position these windows are secured at each of the four corners thus ensuring continuous bedding on all four sides. Aluminium glazing beads are standard in all windows.

It is recommended that the complete Curtain Wall structure should be anodised finish to Grade "A" (B.S.S.1615/1958) which is our minimum standard. If colour anodising is required, Black or Gold can be recommended. Natural mill finish can be supplied if required.

At all stages of manufacture, greatest care is taken to ensure the finest possible finish.

A wide range of infil panels can be incorporated.

Typical cross section



Heywood – Helliwell

SfB (21) Ud4
UDC 69.022.326:691.771

HEYWOOD-HELLIWELL LIMITED, BAYHALL WORKS, HUDDERSFIELD
Branches at : London, Manchester, Glasgow, Belfast, Newcastle-upon-Tyne, Birmingham, Liverpool, Leicester, Nottingham, Dublin.

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UDC 69.022.326:691.771

Deflection under ten pounds per square foot wind pressure

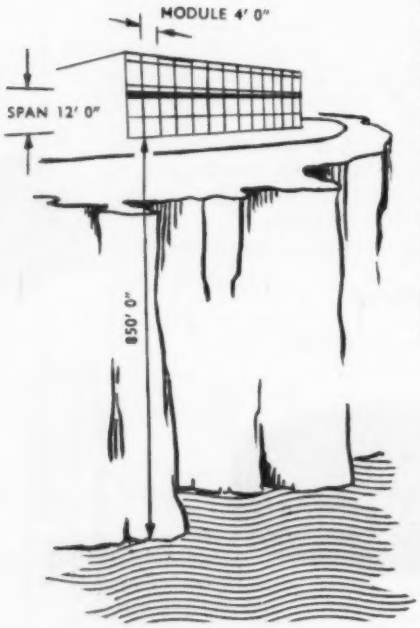
	SPAN L (ft.)	MODULE 3' 4" Deflection in ins.	MODULE 4' 0" Deflection in ins.	MODULE 5' 0" Deflection in ins.	MODULE 6' 0" Deflection in ins.	MODULE 6' 8" Deflection in ins.
6" MULLION	10	.091 L/1320	.109 L/1100	.136 L/881	.163 L/736	.181 L/662
	12	.188 L/766	.226 L/637	.282 L/510	.338 L/426	.376 L/383
	14	.384 L/483	.417 L/402	.521 L/322	.626 L/268	.696 L/241
	16	.595 L/323	.714 L/269	.892 L/215	.071 L/179	1.190 L/161
	18	.951 L/227	1.141 L/189	1 428 L/151	1.712 L/126	1.902 L/113
	20	1.450 L/165	1.742 L/138	2.180 L/110	2.510 L/95	2.910 L/82
4" MULLION	9	.194 L/556	.232 L/466	.290 L/372	.348 L/310	.387 L/279
	10	.295 L/406	.354 L/339	.442 L/271	.531 L/226	.590 L/203
	11	.431 L/306	.517 L/255	.646 L/205	.776 L/170	.863 L/153
	12	.611 L/236	.734 L/196	.918 L/157	1.101 L/131	1.225 L/118
	13	.840 L/185	1.012 L/154	1.265 L/123	1.520 L/102	1.690 L/92

Wind pressure to give deflection of $\frac{\text{span}}{250}$

	SPAN L (ft.)	MODULE 3' 4"	MODULE 4' 0"	MODULE 5' 0"	MODULE 6' 0"	MODULE 6' 8"
6" MULLION	10	53.0	44.2	35.4	29.4	26.5
	12	30.7	25.6	20.5	17.0	15.4
	14	19.4	16.1	12.9	10.7	9.7
	16	13.0	10.8	8.6	7.2	6.5
	18	9.1	7.6	6.1	5.1	4.6
	20	6.6	5.5	4.4	3.7	3.3
4" MULLION	9	22.3	18.6	14.9	12.4	11.2
	10	16.3	13.6	10.9	9.1	8.1
	11	12.3	10.2	8.2	6.8	6.1
	12	9.4	7.9	6.3	5.2	4.7
	13	7.4	6.2	5.0	4.1	3.7

Basic wind pressures (p)

Effective Height of Building (ft.)	WIND PRESSURE (lbs/sq. ft.) Exposure A v - 45 m.p.h	Exposure B v - 54 m.p.h.	Exposure C v - 63 m.p.h.	Exposure D v - 72 m.p.h.
up to 10	4	6	8	10
20	5	7	9	12
30	5	8	11	14
40	6	9	12	16
50	7	10	14	18
60	8	11	15	20
80	9	12	17	22
100	9	13	18	24
120	10	14	19	25
140	11	15	21	27
160	11	16	22	28
180	12	17	23	30
200 or more	12	17	24	31



EXPOSURE "A": Exceptionally small exposure to wind as a result of natural protection to the building. This exposure hazard should be used only rarely.
EXPOSURE "B": This grade should be used generally, except near the sea coast or estuaries or for altitudes over 500 ft. above sea level.
EXPOSURE "C": This grade is applicable to open country generally, for altitudes up to about 800 ft. above sea level, but not near the sea coast or estuaries.
EXPOSURE "D": This degree of exposure covers exposed sites within 5 miles of the coast or estuary, or at an altitude of over 800 ft. above sea level.

EXAMPLE. We are required to curtain wall the building outlined in the sketch, and wish to determine which mullion system to use — the 6" or the 4".
STAGE I: Determine the Exposure grade. In this case it will be Exposure "D".
STAGE II: From the Basic Wind Pressure table we then establish that the curtain walling will have to withstand a wind pressure of 14 lbs. per sq. inch.
STAGE III: From the Deflection of $\frac{\text{span}}{250}$ table we find that a 12 ft. span x 4 ft. module panel will withstand only 7:9 lbs. per sq. inch using the 4" mullion, but would be safe using the 6".

Granite Facings

finishes

A wide range of colour and grain is available. Facings can be supplied full gloss polished, eggshell polished, rubbed or fine axed.

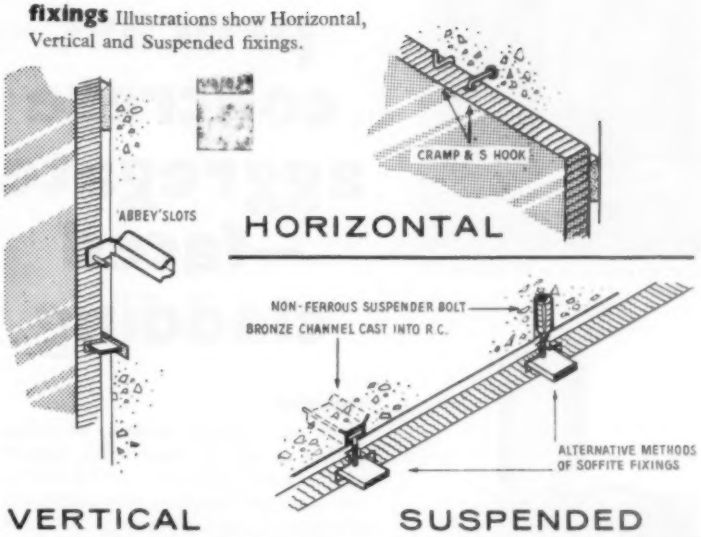
expansion

Thermal expansion coefficient is very near that of reinforced concrete, but long runs should include provision of flexible joints at intervals.

literature

Cladding Fixing Details—
Data Sheets Nos. 11-15
Granite Facing Slabs—
Data Sheet No. 1
Granite Specifications.

fixings Illustrations show Horizontal, Vertical and Suspended fixings.



Mineralite on Asbestolux Infill Panels

The use of *Mineralite* on Asbestolux as infilling panels for curtain walling provides a contrasting texture to glass.

finishes

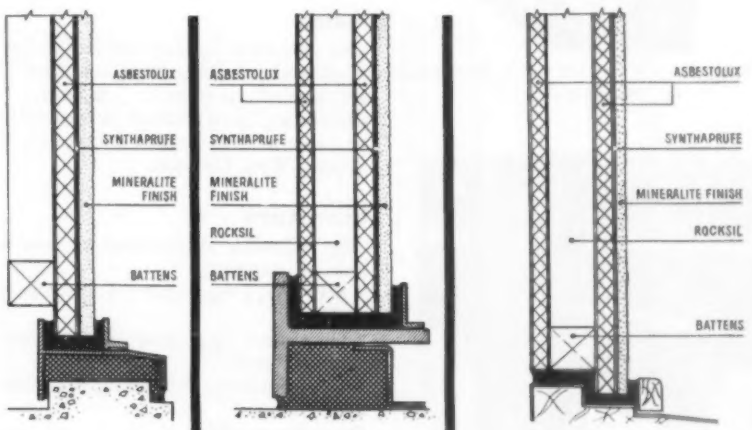
Mineralite has a texture almost indistinguishable from natural tooled stone and is available in a wide range of colours.

fixings

Some typical methods illustrated—further details available.

literature

Mineralite—' Mineralite '. The Unique Surface.
Mineralite on ' Asbestolux '.



Single skin-braced. Used in Metal Frame.

Composite-flush edge. Used in Metal Frame.

Composite-rebated battens Used in Timber Frame.

THE WETTERN GROUP OF COMPANIES

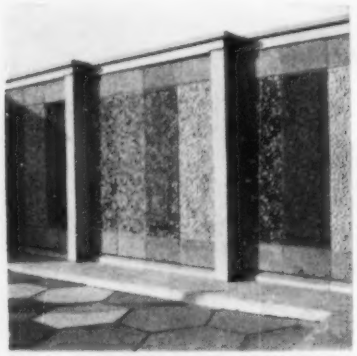
London and the South
Cooper, Wettern & Co. Ltd.,
Suffolk House,
George Street,
Croydon, Surrey.
Telephone: Croydon 3875

Midlands and the North East
Wettern Brothers (Nottingham) Limited,
Trent Bridge Depot,
Nottingham.
Telephone: Nottingham 83331

The North West
Wettern Brothers (Manchester) Limited,
Albany Road Depot,
Manchester 21.
Telephone: Chorlton 2213

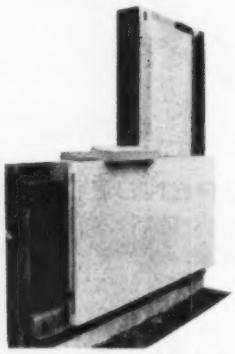
West Midlands
Wettern Brothes (Wolverhampton) Limited,
Linthouse Lane Depot,
Wednesfield, Staffordshire.
Telephone: Wolverhampton 32591

SfB (21) Uf2

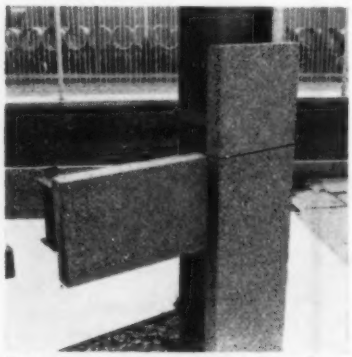


Monart finishes displayed at West Drayton

MONART precast concrete aggregate—faced cladding



Fixing in-situ to concrete wall is described in Data Sheet No. 14



Fixing to steel framed building—Data Sheet No. 15

General view of Mono permanent exhibition

finishes

Over 400 Monart finishes, including patterned and profiled slabs, mosaic slabs and precast mineralite, are currently available for architects' selection. New finishes are periodically available as selected materials are obtained from the United Kingdom and abroad.

fixing

Our technical service can advise on all forms of cladding fixing. Architects are invited to inspect "mock-ups" illustrating fixing methods permanently on show at The Mono Concrete Co.'s Works, West Drayton.

literature

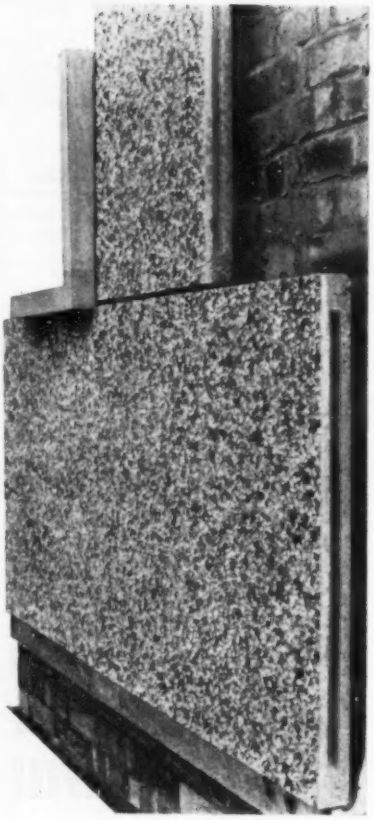
The following publications are available on request:

"MONART Aggregate—Faced Cladding."

"Decorative Aggregate—Faced Concrete Panels."

—a reprint from "Building Materials and Floors."

Data Sheets Nos. 5, 11, 12, 13, 14, 15, 17.



Fixing to brickwork. Photograph shows "mock-up" at West Drayton. Information detailed by Data Sheet No. 12

THE WETTERN GROUP OF COMPANIES

London and the South
Cooper, Wettern & Co. Ltd.
Suffolk House,
George Street,
Croydon, Surrey.
Telephone: Croydon 3875

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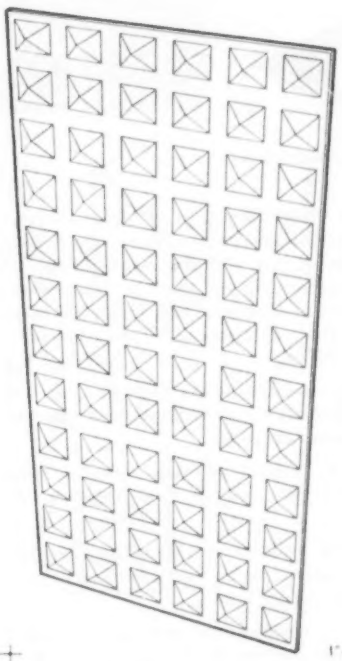
Wettern Brothers (Nottingham) Limited,
Trent Bridge Depot,
Nottingham.
Telephone: Nottingham 83331

The North West
Wettern Brothers (Manchester) Limited,
Albany Road Depot,
Manchester 21
Telephone: Chorlton 2213

West Midlands
Wettern Brothers (Wolverhampton) Limited,
Linthouse Lane Depot, Wednesfield
Staffordshire.
Telephone: Wolverhampton 32591

U.A.M. Group Information Service July 1961	PANEL SHEETS DATA SHEET	Rh1

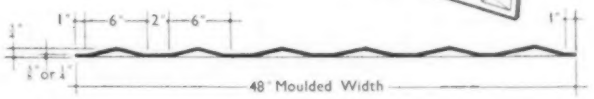
THE MODULAR PYRAMID PANEL SHEET
for Wall Cladding



DESCRIPTION

Composition of Asbestos Cement material is identical to that employed in the manufacture of sheets under B.S. 690.

The Panel Sheet W/5501



DIMENSIONS

Lengths and Widths

8' 0" x 4' 0" made $\frac{3}{8}$" or $\frac{1}{4}$" thick.

Area Covered

32 sq. ft.

No. of Pyramids

72

PROPERTIES OF THE SHEET

Fire

As material, incombustible; as structural element, no fire resistance. See B.S.476 for test details.

Colour

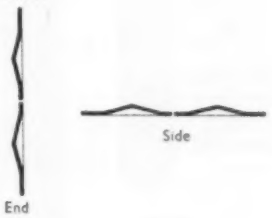
(Surface Treatment) Gloss or Matt to range indicated in B.S.2660.

DESIGN AND SPECIFICATION

Panelling

Centres of Supports: to suit.

Laps: Butt Jointed.



DETAILS

Asbestos Cement Accessories. Dished backing sheets are available. Special pieces can be made to order.

The Universal Asbestos Manufacturing Company Limited, Tolpits, Watford, Herts.
Telephone : Watford 34551 Branches : London, Birmingham, Manchester, Bristol, Glasgow

SfB (21) Ud

THE RUSTLESS IRON CO. LTD.

TRICO WORKS, KEIGHLEY, YORKS. *Telephone:* KEIGHLEY 3737-8-9
Telegrams: RUSTLESS KEIGHLEY

TRICO GLASS-ON-STEEL BUILDING PANELS

"TRICO" BUILDING PANELS consist of 16 or 18 gauge mild steel sheets or trays with welded corners, completely covered with glass enamel which cannot rust. The rear may be fitted with heat or fire resistant material such as Asbestos, Glass Wool, Insulation Board, Polystyrene, or Aluminium Foil. Panels may have a Galvanized Steel backing sheet or a second Vitreous Enamelled face on rear if desired.

ADVANTAGES. Panels cannot crack like plain glass, nor can the steel rust. Washing down is the only maintenance required. Fully fire, scratch and weather resistant.

COLOURS AVAILABLE. Dozens of shades including pastel and other delicate colours to BSS 2660 or Munsell system. All completely fadeless.

TEXTURES AVAILABLE. Glossy semi-matte or satin, and roughcast finishes. Multi-colour, marble, and stencilled designs, or lettering. Chalk board or crackle black.

HEAT INSULATION. Readily obtainable down to O.2 B.Th.U./sq. ft./hr./°F, or below as required.

SIZE. Up to 8′ 0″ long × 4′ 0″ wide, but preferred max. length 6′ 0″.

THICKNESS. From about $\frac{1}{8}$″ upwards to, say, 2″.

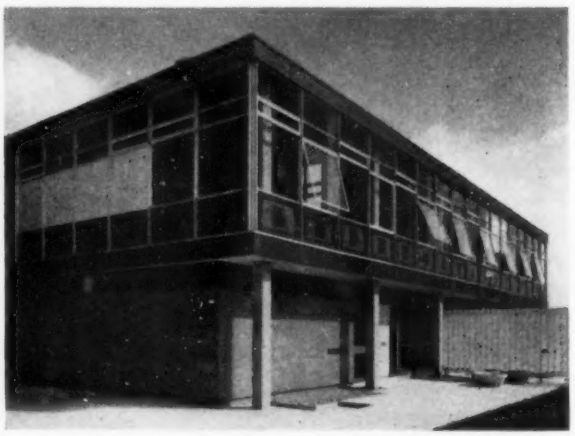
EDGES. Thin edge panels for standard glazing frames are available.

WEIGHT PER UNIT AREA. From 3 lbs. per square foot upwards. Typically 5 to 6 lbs. per square foot.

TYPES OF TRICO PANELS

N.B. We do not make standard size panels and the descriptions below refer to general methods of construction.

Type A Enamelled steel only
Type B Insulated Type
Type C Insulated Type with Vapour Barrier
Type D Resists fire from internal side.
Type E Resists fire from both sides.

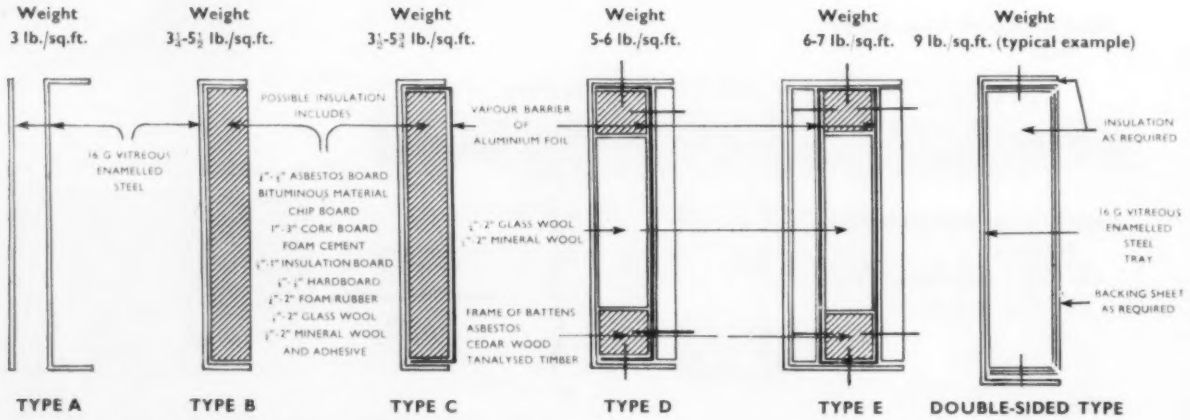


'TRICO' Enamelled Panels used on Depot for H. J. Heinz Co. Ltd., Anlaby, Hull. Architects: Grenfell, Baines & Hargreaves. Preston.

INFORMATION REQUIRED PRIOR TO QUOTING

Includes:

(1) Detailed elevation of each wall with colours and method of attachment specified, from which particulars the number, sizes and thicknesses of panels may be calculated and letters or stencilled designs set out
(2) Insulation value required, i.e. the "U" value, or, alternatively, details of any preferred backing material for insulation or fire resistance.
(3) Details of weatherproof joints between panels.
(4) Details of condensation control, i.e. vapour barrier if any
(5) Desired colour, preferably according to one of the standard systems such as Munsell or B.S.S. 2660.
(6) Fire resistance desired (see B.S.S. 476).



TYPICAL SPECIFICATIONS

TYPE B
$\frac{3}{8}$″ or $\frac{1}{2}$″ Asbestos board (total thickness $\frac{1}{2}$″ or $\frac{5}{8}$″) or $\frac{1}{2}$″ Rocksil or Fibreglass (total thickness $\frac{5}{8}$″) } with $\frac{1}{8}$″ enamelled panel

TYPE D
1″ Rocksil or Fibreglass
$\frac{1}{2}$″ Asbestos board
$\frac{1}{8}$″ Enamelled panel
} Total thickness 1$\frac{5}{8}$″ U=0·18 approx.

TYPE E
1″ Rocksil or Fibreglass
Two $\frac{3}{8}$″ Asbestos board layers
$\frac{1}{8}$″ Enamelled panel
} Total thickness 1$\frac{7}{8}$″ U=0·16 approx.

SfB (21) Dt4

SEALANTS for all forms of curtain wall construction

There are many sealing problems involved in designing an efficient curtain wall.

Salient features to be borne in mind, in addition to weight and appearance, are speed and ease of erection, labour costs, and consideration of long life sealing.

To meet these exacting demands, and those formulated by new techniques and developments, EXPANDITE manufacture, and market throughout the world, a comprehensive range of joint fillers and sealing compounds.

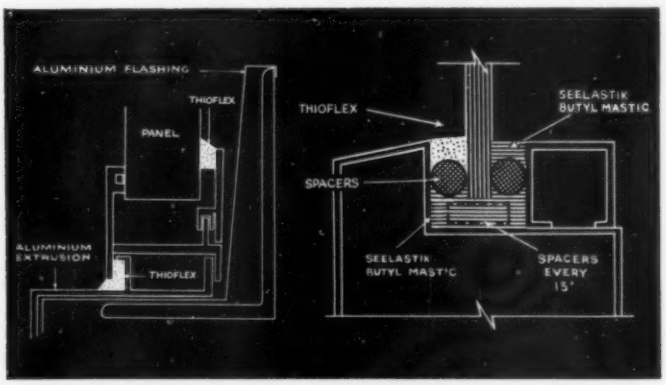
These products which have been designed to withstand vibration, extremes of temperature and the adverse effects of weather and climatic conditions, include:

SEELASTIK is suitable for many sealing and jointing applications in curtain walling. Based on high grade oils and inert fillers, supplied in cartridges for gun application, it has stood the test of time.

SEEL-A-STRIP Butyl mastic preformed strip. This is in strip form and is available in many round or rectangular sections.

THIOFLEX Polysulphide Sealer. Thioflex is a synthetic two-part sealing compound of exceptional qualities, based on "Thiokol" liquid polymer, designed for long life, thus avoiding maintenance of the joint to which it is applied.

SEALANCO BUTYL PUTTY is a high grade non-setting compound for bedding and glazing frames and infill panels.



Further information and data sheets regarding these acknowledged EXPANDITE products, together with additional details of their wide range of bedding and glazing compounds are readily available upon request.

EXPANDITE LIMITED

CHASE ROAD, LONDON, N.W.10.
Tel: ELGar 4321 (10 lines) ELGar 1551 (10 lines) Telex 25420.

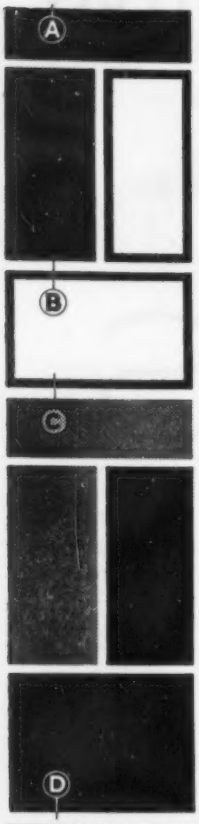
Trafford Park Road, Manchester 17.
Tel: Trafford Park 1285/6.

36 Great North Road, Newcastle-upon-Tyne 2.
Tel: Newcastle 23992.

EXPANDITE (IRELAND) LIMITED, Greenhills Road, Walkinstown, Dublin.
Tel: 501512.

ASSOCIATES AND DISTRIBUTORS THROUGHOUT THE WORLD

SfB (21) U

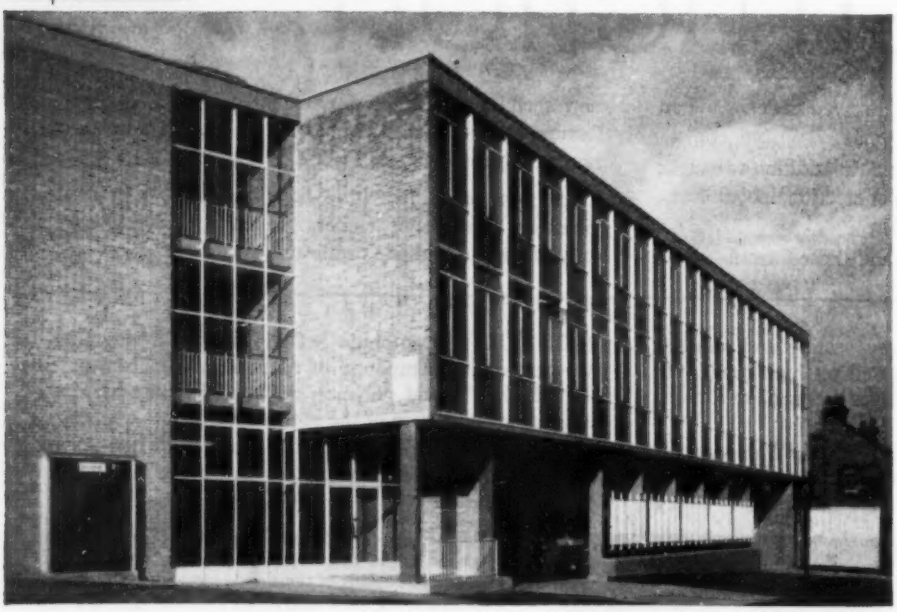


BEACON WALL CLAD

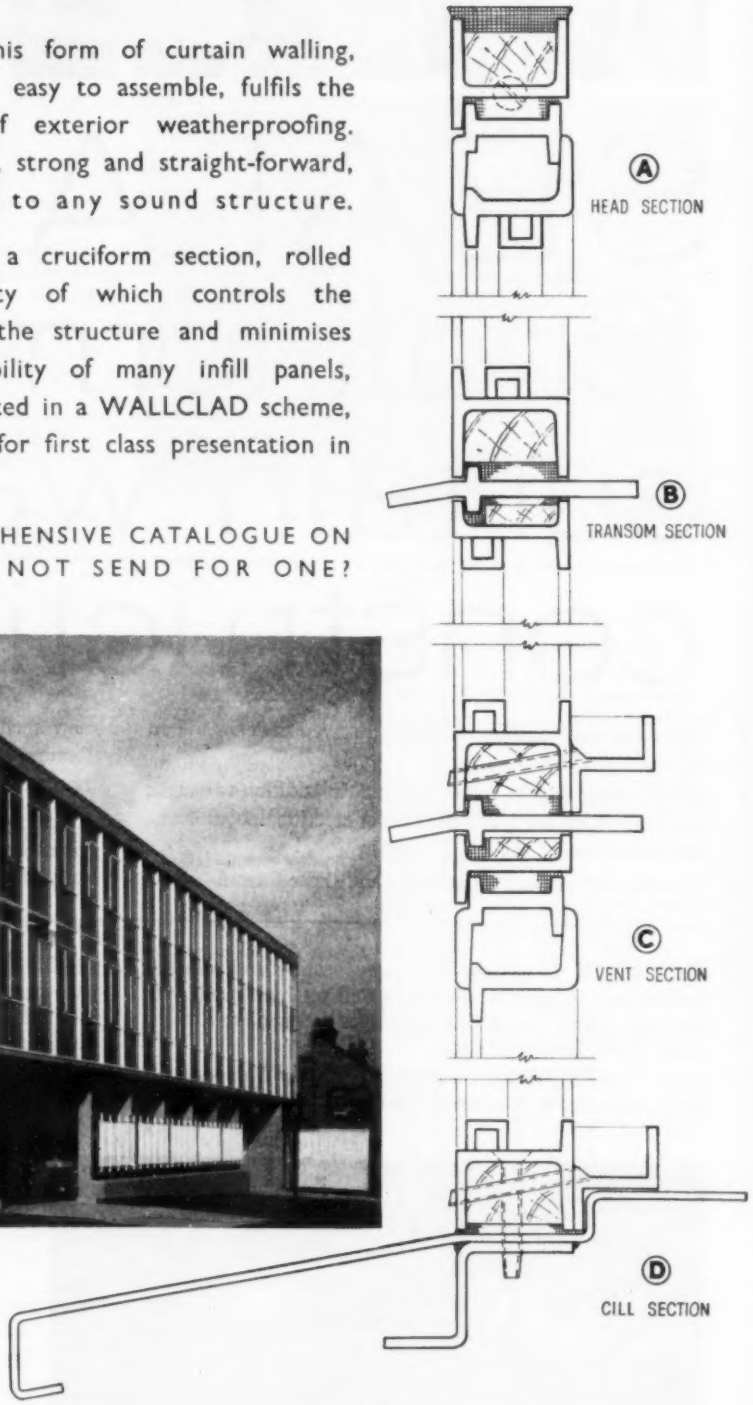
Simple yet versatile, this form of curtain walling, extreme in application, easy to assemble, fulfils the rigorous conditions of exterior weatherproofing. WALLCLAD is flexible, strong and straight-forward, and can be applied to any sound structure.

The main support is a cruciform section, rolled steel bar, the rigidity of which controls the uniform expansion of the structure and minimises distortion. The availability of many infill panels, which can be incorporated in a WALLCLAD scheme, allows extensive scope for first class presentation in building technique.

WE HAVE A COMPREHENSIVE CATALOGUE ON WALLCLAD — WHY NOT SEND FOR ONE?



Wolverhampton Postmen's Office
P.O. and Garage, Horseley Fields, Wolverhampton.
Contractor: A.F.R. Godfrey & Co. Ltd.



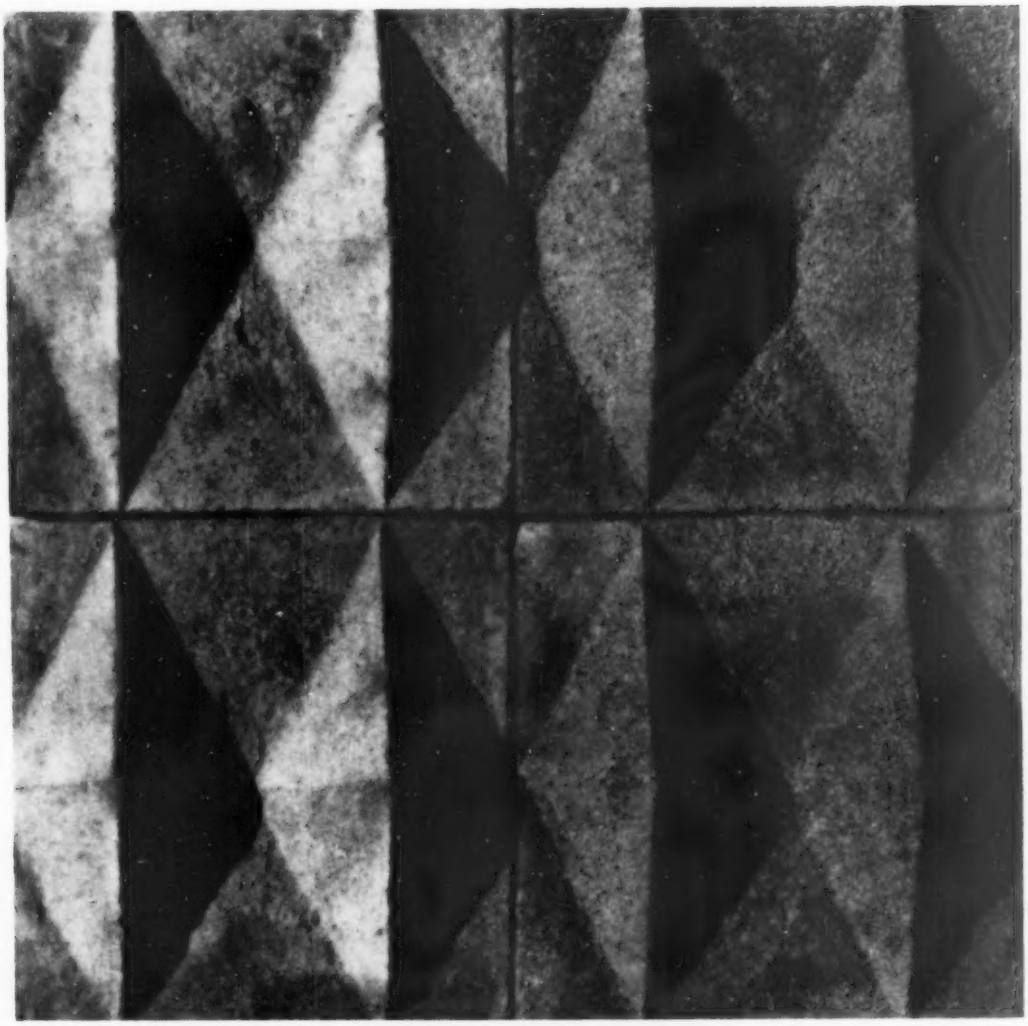
BEACON WALL CLADDING SYSTEM

JOHN THOMPSON BEACON WINDOWS LIMITED, WOLVERHAMPTON

SfB (21) Ug

UDC 69.022.324

WEALDEN CERAMIC CLADDING & INFILL PANELS



Wealden Ceramic Cladding and Infill Panels are made in a variety of types. That illustrated above has basic 8in. units with 2 star projecting diamonds. Panels are 3in. thick up to 12ft. super and 4in. thereafter reinforced where necessary. Panels weigh approximately 25lb. per square foot in 3in. thickness.

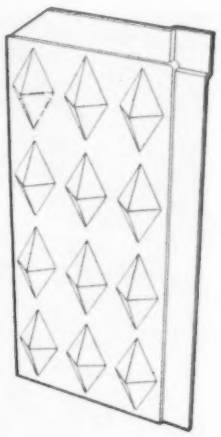
SIZE OF UNITS

Infill Panels: 12 × 12, 16 × 12, 20 × 12, and 24 × 12 in. (nominal).
16 × 16, 20 × 16, 24 × 16 in. (nominal).
16 × 20, 20 × 20, 24 × 20 in. (nominal).

Cladding Panels: Any modular size up to 144 × 120 in.

Rh1	PANEL SHEETS DATA SHEET	U.A.M. Group Information Service July 1961

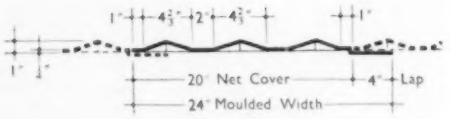
THE DIAMOND PANEL SHEET
for Wall Cladding



DESCRIPTION

Composition of Asbestos Cement material is identical to that employed in the manufacture of sheets under B.S. 690

The Panel Sheet W/4990/A



DIMENSIONS

Lengths and Widths

4' 0" x 1' 8" net cover
Sheets without sockets also available

Area Covered

6·66 sq. ft.

No. of Pyramids

12

PROPERTIES OF THE SHEET

Fire

As material, incombustible: as structural element, no fire resistance.
See B.S. 476 for test details.

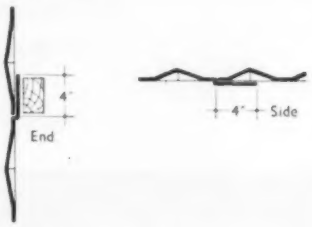
Colour

(Surface Treatment) Gloss or Matt to range indicated in B.S. 2660.

DESIGN AND SPECIFICATION

Panelling

Centres of supports: To suit
Laps:



DETAILS

Asbestos Cement Accessories. Dished backing sheets are available
Special pieces can be made to order.

The Universal Asbestos Manufacturing Company Limited, Tolpits, Watford, Herts.
Telephone : Watford 34551 Branches : London, Birmingham, Manchester, Bristol, Glasgow

SfB (21)
UDC 69.022.1/.4

TRETOL-SERVICISED LTD
expansion jointing systems

KORK-PAK

Pre-Formed Joint Filler

Function

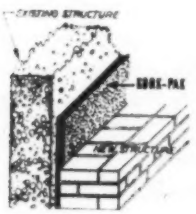
Kork-Pak is intended for use between contact surfaces: concrete to concrete; concrete to brickwork, etc., where a compressible joint filler possessing substantial recovery is required.

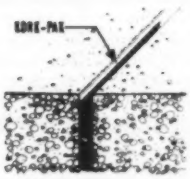
Kork-Pak is a resilient, pre-moulded, non-extruding joint filler.

It is composed of cork and bitumen held in rigid form by outer layers of thick, toughened asphalted paper. It is both waterproof and rot-proof and is ideal for wet forms of construction.

Thicknesses: 1″, ½″, ¼″, ⅛″.

Board sizes: 10′ 0″ × 3′ 0″ or cut to size.





TRETOMASTIC

Sealant

Functions as a multi-purpose, flexible joint seal.

It is a stone-coloured oil-bound mastic used to seal joints round window and door frames as well as gaps in all types of building materials ranging from wood and brick to asbestos sheeting or building boards.

Tretomastic remains permanently plastic and will not seep or stain adjacent surfaces. It is unaffected by climatic conditions; can be painted or distempered and will provide a resilient, water- and airtight seal, capable of accommodating any normal movement, it can be easily and rapidly applied by caulking gun or trowel.

VERTISEAL

Sealing Compound

Function

Vertiseal is designed as a high duty sealant for use in joints where properties are required which are beyond the scope of normal building mastics. Withstands immersion in fresh or salt water. Resists chemical attack.

It is based on polysulphide (Thiokol) synthetic rubber compound.

Vertiseal is widely used for sealing vertical joints in concrete structures, as it sets up into a tough, resilient rubber seal with excellent bonding qualities in spite of prolonged weathering and repeated expansion and contraction movement. Easily applied to the joint by hand or caulking gun.

It will withstand complete immersion in fresh and salt water—attack by most solvents and chemicals—or change in temperature from below −20°F. to 150°F.

It functions ideally for many purposes ranging from curtain walling to all forms of waterproof construction.

Supplied in Stone-Grey to blend with finished concrete, Vertiseal is also available in Black and Brick Red.

Other Tretol-Servicised Sealing Compounds:

Tretojoint	bitumen mastic
Bitujoint	solvent type bitumen putty
Para-Plastic 41	hot poured rubber bitumen sealing compound

RUBBA-PAK

Sponge Rubber Joint Filler

Function

It is designed to function as a low compressive strength joint filler.

Made from high quality cellular sponge rubber, Rubba-Pak is uniform in thickness and density, and has the resilience, compressibility and non-extruding qualities to follow the movement of a joint in both expansion and contraction. Independent cellular construction ensures non-absorption of moisture and protection against frost action. Ideal as backfill to curtain walling sealants and in structures involving 'prestressing' technique.

Neutral Grey in colour, Rubba-Pak blends well with finished concrete and is available in:

Sizes: 10′ 0″ × 2′ 0″ or cut to size.

Thicknesses: ½″, ⅜″, upwards at ⅛″ intervals to 1″ thickness (½″ upwards laminated).

Typical Rubba-Pak Applications

The following applications indicate typical uses for Rubba-Pak Sponge Rubber Joint Filler with Vertiseal Cold Applied Joint Sealing Compound (for details of which see below):

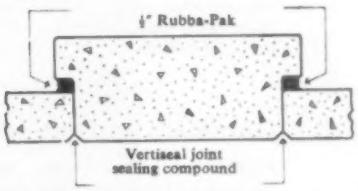


Fig. 1 RUBBA-PAK used on wall sections with column vertical joint.

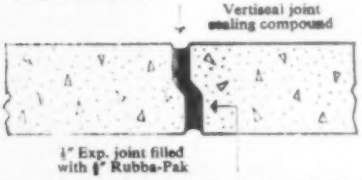


Fig. 2 Filling an offset joint of precast wall panels without column.

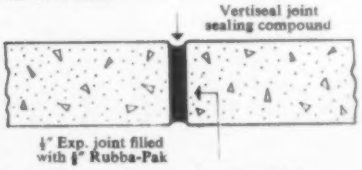


Fig. 3 Filling a butt joint with RUBBA-PAK

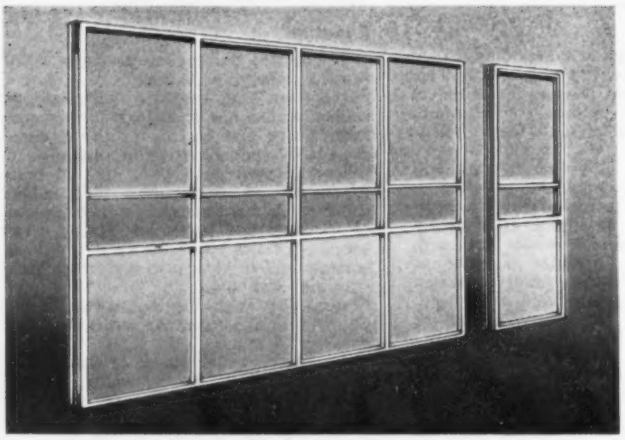
Tretol Servicised Limited
2 Caxton St., Westminster, S.W.1
ABBey 1024
Tretol Ltd.,
Tretol House, The Hyde, N.W.9 COL 7223

SfB (21) Ui

JANES MODOLITE JOINERY

H. C. JANES LTD. Barton · Bedfordshire

Modolite CURTAIN WALLING



DESCRIPTION

General: Unique pre-fabricated system of timber framed curtain walling affording exceptional scope in design. The wide range of frame units and infills available and the dimensional and general versatility of the system will meet most requirements. Also available are Modolite Pivot Windows.

COMPONENTS:

Sub-frame units: are solid-moulded and in which fixed lights, opening windows, doors and a variety of infill panels are fixed according to the requirements of the building. They are not normally wider than 5′ 9″ o.a. nor greater height than 6′ 10¾″ o.a., and with a maximum area of 27 sq. ft. Singly, or in combination, standard sub-frame units will give brick course heights.

Prefabricated Panels:

Sub-frame units are assembled into panels in the factory with coupling heads, cills, jambs, mullions and transomes and transported to the site. These panels may be fixed between cross-walls for one storey height without further support. Maximum area is 144 sq. ft. not exceeding 18′ 0″ high nor 18′ 0″ wide in 1 Panel.

Multi-storey Curtain Walling:

The prefabricated panels are fixed in a self-supporting grid of built-up wood connecting mullions and transomes which are fixed back to the building's structure. In certain circumstances the curtain walling may, however, be designed as load bearing. Internal and external angles may be accommodated.

MATERIALS AND PHYSICAL PROPERTIES

Frame: available in either hard or soft woods or combinations of the two. Standard woods:

Softwoods
1. Joinery Quality Redwood (Russian or Swedish)
2. Douglas Fir (Clear Grade)
3. Western Red Cedar (under-cill cladding only)

Hardwoods
1. Agba (West African)
2. Utile (West African)
3. Afromosia (West African)
4. Teak

Above hardwoods are in price range order; others quoted on request.

Finish: oil, varnish, paint or any proprietary finish to specification.

Infilling Panels, Fittings, etc.: for details of claddings, linings, double glazing proprietary panels, etc., and standard fittings see brochure (refs. below).

Thermal Insulation: 'U' values for typical constructions vary between 0.11 and 0.38 according to the materials used. For full details see brochure.

Fire Resistance: cladding materials of varying fire rating values are available.

Moisture Barriers: bituminised felt or building paper may be fixed behind cladding.

Condensation: aluminium foil (or similar) vapour barrier may be provided. It is an essential specification if the outer cladding is of glass or other impervious material; in such circumstances, outlets, channels from, and ventilation of the cavity are included in the construction.

SITEWORK

Erection by either manufacturer or contractor.

DESIGN

Horizontal or vertical emphasis may be obtained in any or all of three ways: arrangement and choice of proportion of units (in lines or chequerboard layout).
Colour and texture of infill panels.
Relief modelling by projection of mullions.

SPECIFYING AND ORDERING

For model specification and ordering requirements see brochure (refs. below).

PRICE RANGE

Cost per sq. ft. supplied and erected:
Softwood specifications: from 8/6 per sq. ft.
16/– per sq. ft.
Hardwood specifications: from 14/6 per sq. ft.
33/– per sq. ft.

REFERENCES

Modolite Curtain Walling, general brochure.

H. C. JANES LTD. *Barton, Bedfordshire.* · *Tel.: Hexton 364/5.*

SfB (21) Dt4

Curtain Walling and Glazing of London's Tallest Office Building is being—

"KELSEALED"!

ARCHITECTS: RONALD WARD & PARTNERS

specified KELSEAL Joint sealing compounds. THE MORRIS SINGER CO. LTD., are sealing in their Stainless Steel Curtain Wall Units with GLASTICON Butyl Based Putty, Grade 15.007, the Mullions being top pointed with KELSEAL PSR.

They are sealing the ¼" Float Glass and Double Glazed Spandrel panels with a system comprising GLASTICON 480 and 406 Butyl Rubber Based Putty and Gun Mastic. GLASTICORD 400 Butyl Rubber Based Preformed Strip and final top pointing with KELSEAL PSR (Polysulphide Synthetic Rubber). The sealing is being carried out for the MORRIS SINGER CO. LTD., by JAMES CLARK & EATON LTD.

When you are specifying the Sealer for Curtain Walling or Glazing.

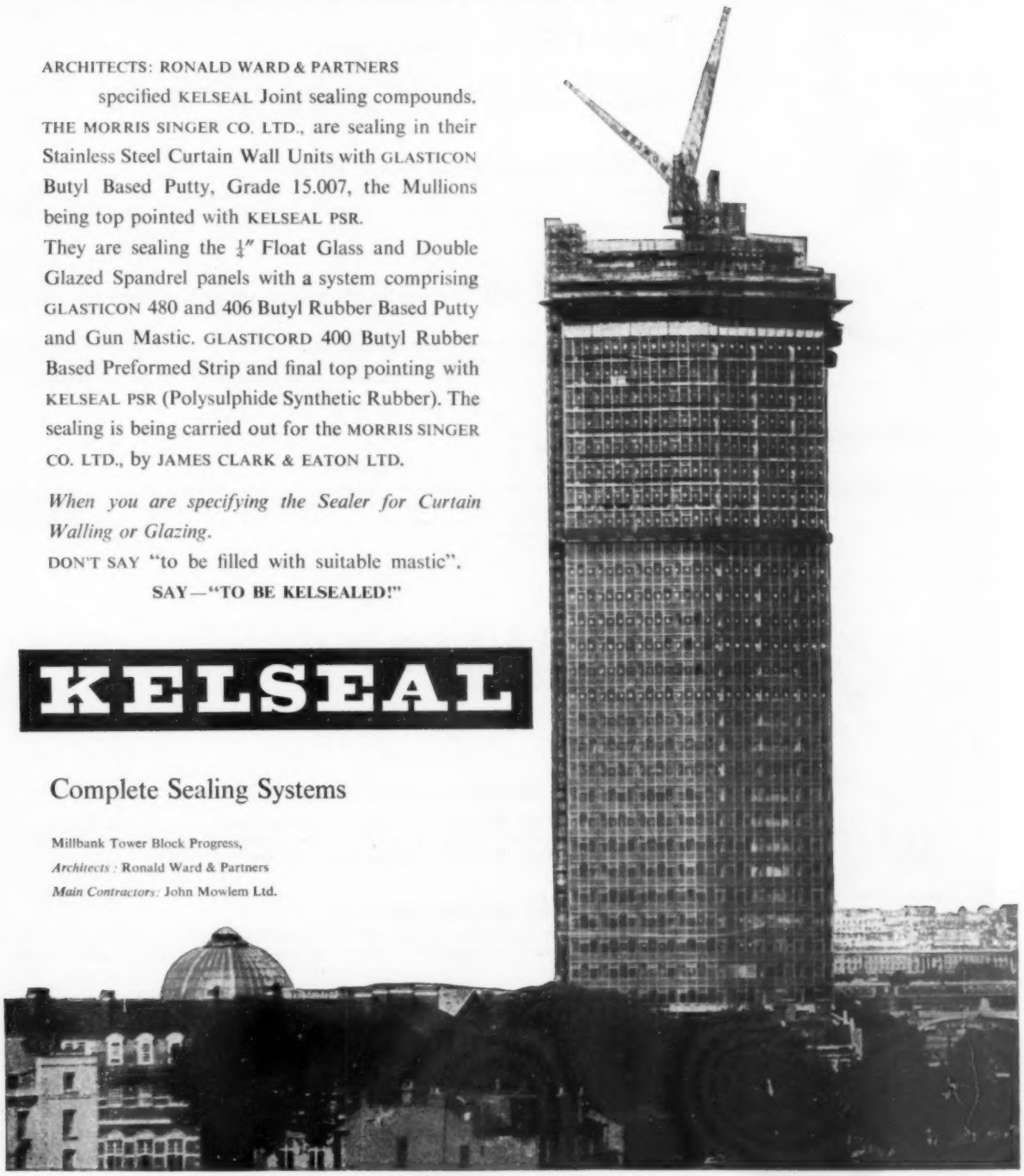
DON'T SAY "to be filled with suitable mastic".

SAY—"TO BE KELSEALED!"

KELSEAL

Complete Sealing Systems

Millbank Tower Block Progress,
Architects: Ronald Ward & Partners
Main Contractors: John Mowlem Ltd.



KELSEAL LTD · VOGUE HOUSE · HANOVER SQUARE · LONDON W.1 · HYDE PARK 1411

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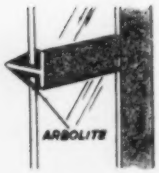
Specify with confidence

MASTICS

BY ADSHEAD RATCLIFFE

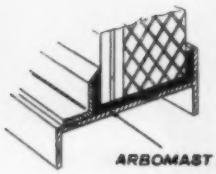


ARBOLITE metal casement putty

The only putty containing 'Arbosyn' which ensures freedom from cracking, freedom from wrinkling, greater durability, better keying properties, good setting properties, easy working consistency, longer keg life.

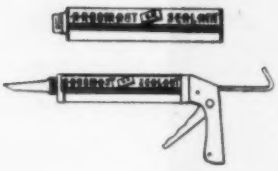
ARBOSEAL preformed mastic strips

The first sealing strip to have a Polythene base, 'Arboseal' is available in flat, round and triangular sections. Easily removed from the reel, it has great powers of recovery under thermal movement and never hardens or dries out.



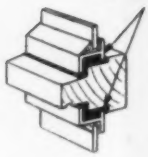
ARBOMAST 500 now with the added advantage of tough, resilient Butyl Rubber

The mastic that masters modern curtain walling work. Developed specifically for fixing double-glazing units, sealing-in panels and glass in conjunction with beading. ARBOMAST 500 adheres positively and permanently. It is self-sealing and withstands the rigours of expansion and contraction.



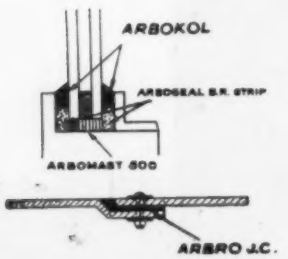
ARBOMAST B. R. (gun grade)

A Butyl Rubber based sealant specially formulated for use with the ARBOMAST applicator gun. A high polymer self-sealing mastic especially recommended for sealing round door and window installations, sealing metal to metal sections in curtain walling and sealing gaps between almost all forms of building materials.



ARBOMAST B. I. bedding mastic

Withstands extremes of temperature without shrinking, running, sagging or staining. The most reliable bedding mastic available to the trade.



ARBOKOL elastomer sealant

A polysulphide rubber sealant of high elasticity, splendid adhesive properties and excellent resistance to weathering. For sealing glass to metal in curtain walling, metal to metal mullions, metal to wood, metal to stone and plastic panels to concrete.

ARBRO J. C. jointing compound

This water-repellent, non-hardening Jointing Compound remains permanently plastic under all conditions. It has been developed to provide a really watertight joint on all asbestos cement rainwater materials.

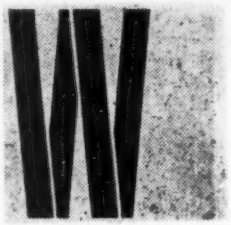
Send for further information of the full range of products to the mastic specialists:

ADSHEAD RATCLIFFE

ADSHEAD RATCLIFFE & CO. LTD.

BELPER · DERBY · Tel: BELPER 2891/2/3

(21)Fe5 Wincilate slate cladding

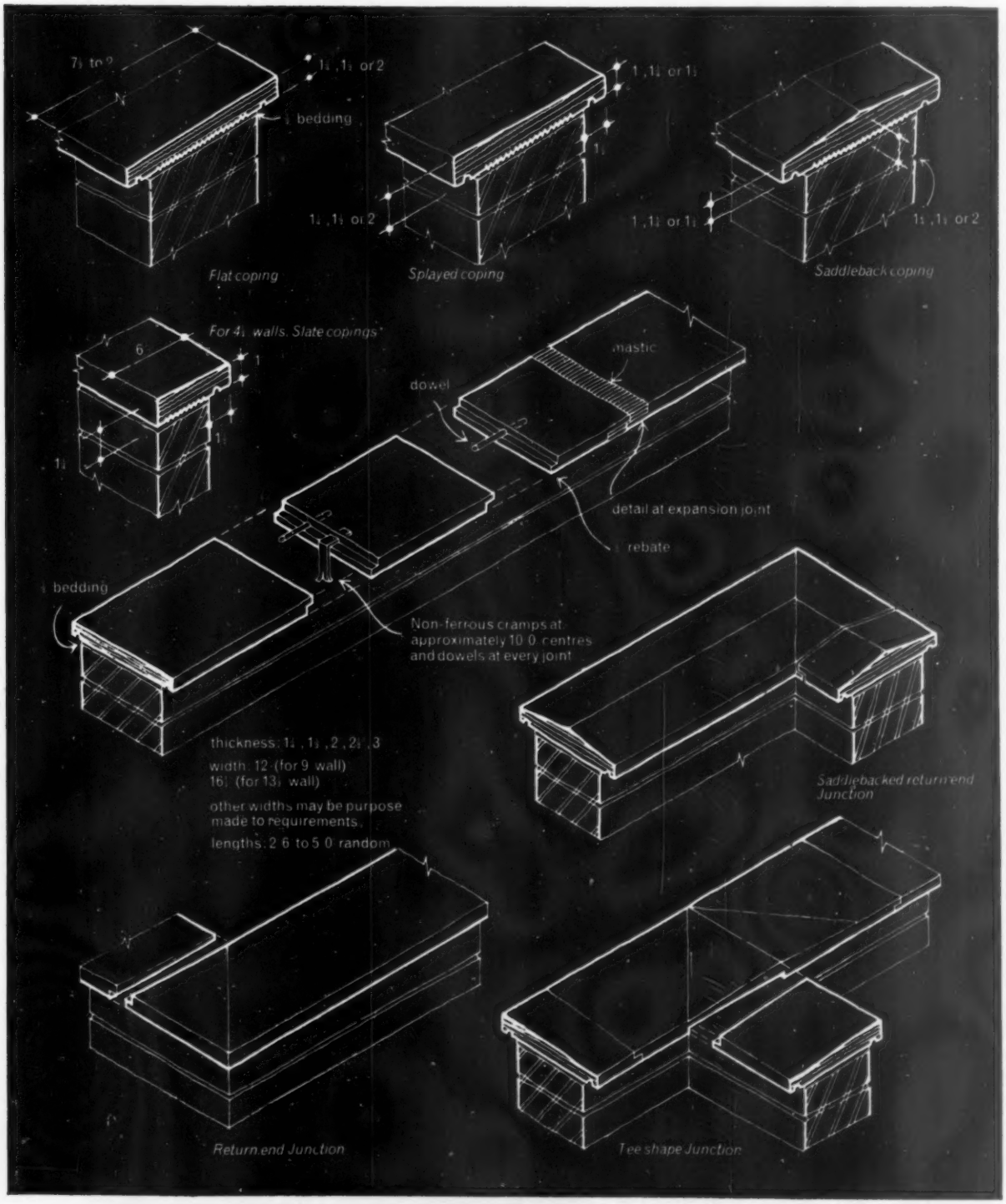


The Bow Slate and
Enamel Company Ltd.
The Town Hall
Bow Road, London E3
Telephone: Advance 2203

Works:
Bow and Battersea
Quarries:
Aberllefeni, North Wales

S f B File Number

(21)Fe5 Wincilate slate cladding



The Architects' Journal Information Library December 13 1961

SfB (21) Fe5

Wincilate slate cladding

Material
Slate is a particularly suitable material for cladding as it can be obtained only 1-in. thick and, under certain circumstances, may be supplied even in ¾ in. It is chemically inert, non-porous and does not warp, shrink or rot.

Description
The cladding is supplied in square or rectangular slabs scored on the back to give a key for fixing and smooth or textured on the face according to requirements; the following three finishes are available:
Fine rubbed or polished: This gives the slate a dark smooth sheen or a matt eggshell finish.
Frame sawn: The surface has a vertically corrugated texture. It appears lighter in colour than the above finish.
Natural riven: This is the surface obtained from the natural cleavage of the slate and is consequently roughest in texture. It can be supplied rebated on two adjacent edges which gives a panelled effect to the slabs (see drawing on face of sheet).

Sizes
For ease of handling and fixing it is recommended that slabs from 2 ft. 0 in. to 3 ft. 0 in. long and 1 ft. 0 in. to 2 ft. 0 in. wide be used. Larger slabs could be supplied against specific orders except in natural riven finishes, which are limited to comparatively small sizes. The standard dimensions suggested are 3 ft. 0 in. by 1 ft. 6 in., 2 ft. 6 in. by 1 ft. 3 in., 2 ft. 0 in. by 1 ft. 0 in., or square slabs of equivalent area. These sizes may be varied within the limits described above in 3 in. units with no cost increase. Intermediate sizes are supplied if required.
The minimum thickness recommended for fine rubbed and frame sawn finishes is normally 1 in., the maximum being 2 in. Where apron cladding between windows or a string course of a similar kind is required, ¾ in. thickness may be used, provided the height does not exceed 1 ft. 9 in. The natural riven finish varies up to $\frac{7}{8}$ in. thickness on its face texture and two thicknesses are recommended: 1 in. average and 1¼ in. average. When natural riven slabs are supplied with a rebate on adjacent edges, the thickness of slate at the rebate will be ¾ in. and 1¼ in. respectively.

Weight
A slab 3 ft. 0 in. by 2 ft. 0 in. by 1 in. thick weighs slightly over ¾ cwt.

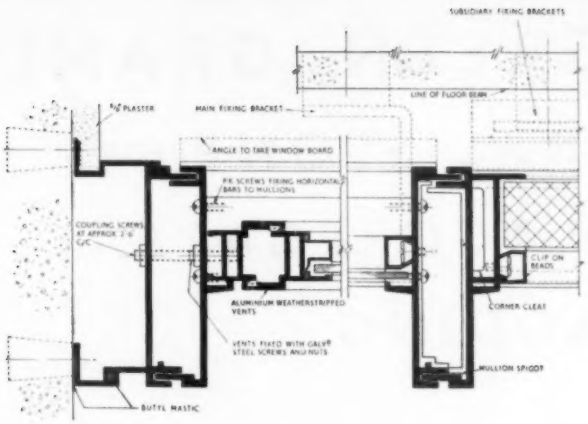
Fixing
Various forms of fixing are illustrated on the face of the sheet and their uses are described in the following notes.

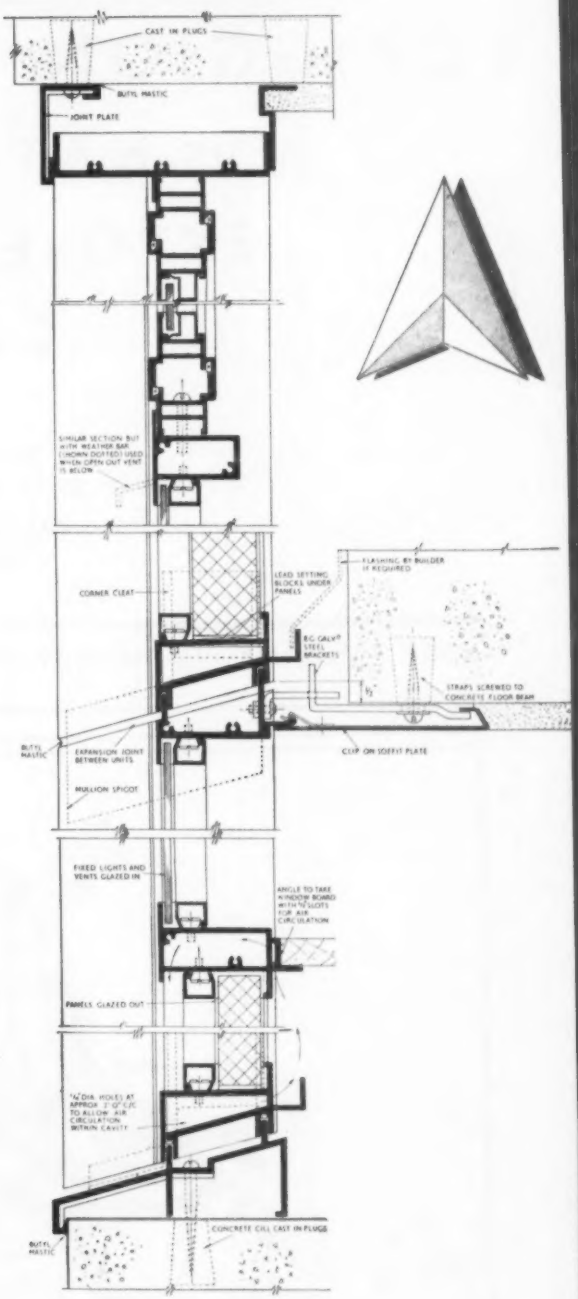
Large wall areas: The following recommendations have been designed to simplify fixing; slate slabs drilled for normal cramp holes and S hooks can be supplied if required. The slate slabs are fixed with $\frac{3}{16}$ in. dia. cramps and inserted into a pre-prepared masonry slot.
Where the lower edge of the facing does not receive direct support from the structure, the lowest course of slabs (and at approximately each 10 ft. 0 in. level) should be supported by a non-ferrous metal angle screwed back to hardwood fillet or asbestos plug pre-prepared by the Contractor and cast in the concrete, either continuous or in lengths of 1 ft. 6 in. at the joints (see detail on the face of the sheet). In addition, the bottom course is tied back to the concrete by means of a $\frac{3}{16}$ in. U-shaped cramp as illustrated.
For fixing to brickwork, fishtailed cramps may be used in place of dovetailed cramps to avoid having to cut the brick; in all other respects the fixing is similar. Slate fixed on the above principle should have a ¾ in. minimum gap for bedding and mortar pads used as shown, one to each corner of a slab and one in the centre.
Where a large building is involved and the corbel cramp is used (shown on face of sheet as alternative to Fig. 1) if, as often happens, variations in the concrete occur, a hole should be left out by the Contractor for copper corbels to be used (see Figs. 5 and 4). These will overcome any variations in alignment and will be used according to conditions on site.
Apron cladding and plinths: For suspended cladding not exceeding 1 ft. 9 in. in depth and also short returns, U-shaped cramps or cramps and S hooks are suggested for use between joints and the course supported with a non-ferrous metal angle (as previously described for bottom course of large wall areas). Slabs should be scored on the back.
Soffits: It is most important that architects ensure that adequate fixings for any soffits are pre-prepared on site. An adjustable cramp for masonry slots may be supplied with the slate, or the soffit may be fixed by screws, the heads of which are covered by a slate button after fixing (see face of sheet).
Weathering: Where there is a set back in the surface to be faced, the slabs should be bedded on the horizontal projection with a slight fall to act as a weathering, the underside of the outer edge being provided with a ½-in. check throating where it is jointed to the vertical slabs below. Bottom edges may be bevelled towards the back of the cladding as an alternative.

CRITTALL

Fenestra Wall Type D Aluminium Curtain Walling

SfB (21)





MATERIAL AND MANUFACTURE. Fenestra Type D Curtain Walling consists of a series of specially designed units having interlocking perimeter members and intermediate transoms positioned to suit elevational requirements.

Infill panels are inserted from the outside and window glazing from the inside.

All normal types of ventilators, including double hung sashes can be inserted in the walling system.

WEIGHT. The curtain walling weighs approximately 4 lb. per sq. ft. but this is dependent on the type of infill, number of ventilators and kind of glass.

TYPES AND SIZES. The mullion shown will cover a maximum span of 10 ft. 6 in. from floor to floor, and a centre-to-centre mullion spacing of 5 feet.

FIXING METHODS AND FIXINGS. The parts are assembled into units complete with ventilators before hoisting and fixing to the structural framework of the building. In some circumstances infill panels can also be inserted prior to erection, in which case the units can be erected from inside the building without the need for scaffolding. Galvanised steel fixing brackets are clamped with bolts to the structural framework and bolted to the mullions. Mullion spigots provide for assembly and expansion.

TBW 163

DETAILS are shown quarter full size.

THERMAL MOVEMENT. Allowance for expansion is provided by the interlocking mullions and transoms on the perimeter of the wall units, so that there is a rigid jointing system employed at all bar junctions.

FINISH. Mill or anodized.

TELEPHONE HOUSE, PORTLAND STREET, MANCHESTER
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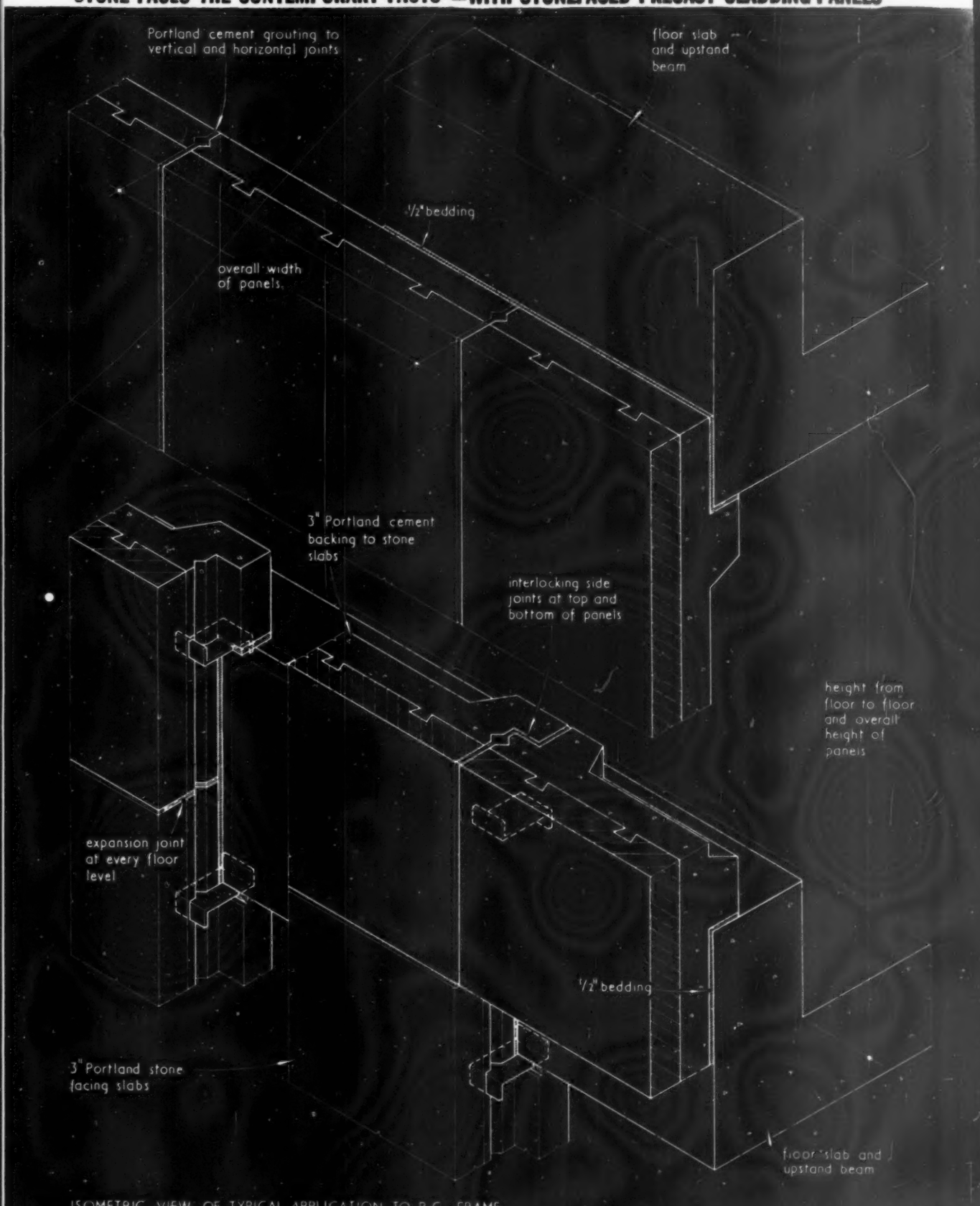


ISOMETRIC VIEW OF TYPICAL APPLICATION TO R.C. FRAME

These drawings were prepared by the Architects Journal from material supplied by The Stone Firms Limited

This technique is one of a number which have been developed to ensure that stone maintains its pre-eminence as a facing material. The Company's Development Drawing Offices are in close touch with the needs of contemporary building. They are staffed by senior technicians who are knowledgeable, forward-looking and articulate.

It is part of the normal service, of which many architects make use, to prepare detail drawings showing specialist fixing details, and these can be made available within a specified time. No charge is made for any part of this service and, of course, it involves no obligation.

Addresses of the Development Drawing Offices of The Stone Firms are: **LONDON**—Vincent House, Vincent Square, S.W.1. Tel: VICtoria 9182
BATH—Abbey Yard, Bath, Somerset. Tel: Bath 3246

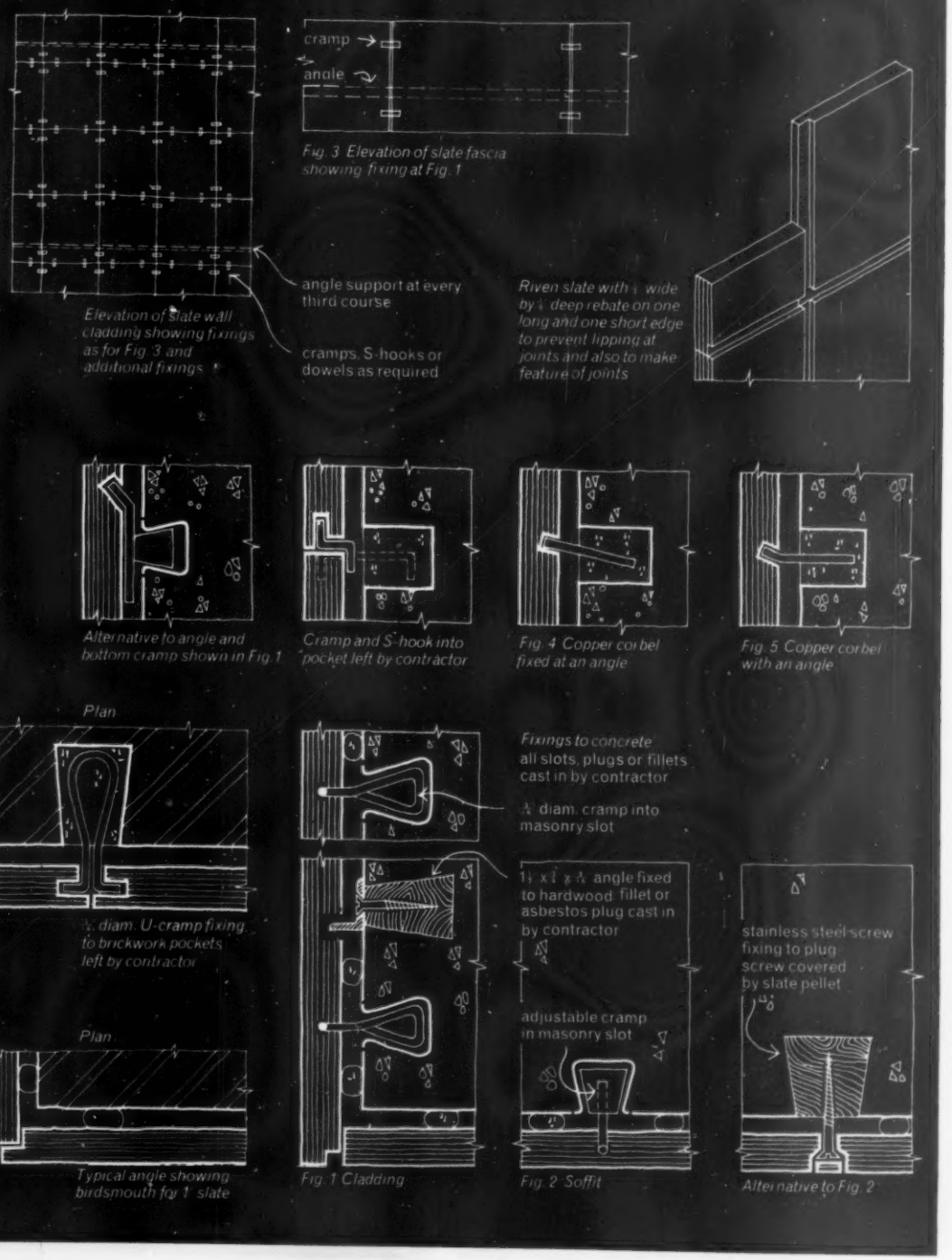
(21) Fe5 Wincilate slate copings

The Bow Slate and Enamel Company Ltd.
The Town Hall
Bow Road, London E3
Telephone: Advance 2203

Works:
Bow and Battersea
Quarries:
Aberllefeni, North Wales

S f B File Number

(21) Fe5 Wincilate slate copings



SfB (21) Fe5

Wincilate slate copings

Material
As slate is chemically inert, non-porous and does not warp, shrink or rot, it is particularly suitable for copings and cappings. The need for damp-proofing is eliminated. Slate copings are effective where a precise skyline to a building is desired.

Description
Three types of slate coping are available: flat, weathered and saddleback. Each type is available in sizes to suit various wall thicknesses and may overhang the brick or concrete or lie flush with the wall face on one or both sides.
Flat coping: This is scored on the underside to provide a key for bedding and normally polished on the face and edges. Copings and cappings which overhang are grooved on the underside for throating.
Weathered coping: As for flat coping, this is scored on the underside, polished on the face and edges and, grooved for throating. In addition it is weathered in one direction for the entire width. The fall is normally ½ in., but this dimension may be varied.
Saddleback coping: As before, this is scored on the underside, polished on the face and edges and grooved for throating. In addition it is weathered in two directions from the centre to the edges. As for weathered copings, the fall is normally ½ in., but this dimension may be varied. For returned ends, the scoring is stopped and both throating and weathering returned. The details on the face of the sheet illustrate the various standard junctions in use. These may be varied to meet special needs. Normally the copings are made in straight lengths but, subject to certain limiting conditions, may be manufactured circular on plan. Joints between lengths of coping should always be specified as rebated to guarantee avoiding water penetration, although butt joints can be made satisfactory with due care in fixing.

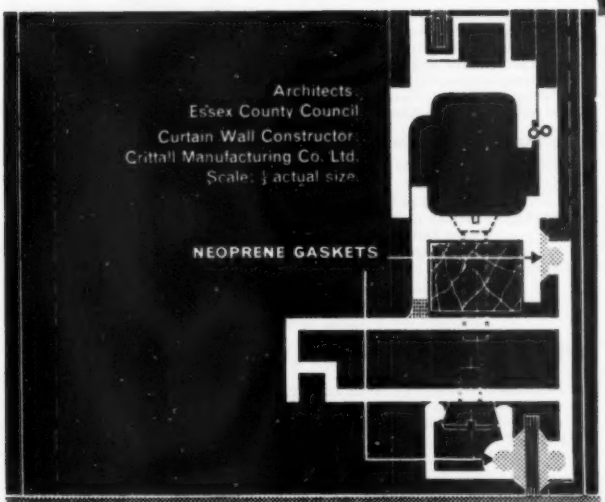
Sizes
As shown on the face of the sheet, copings are supplied in sizes between 2 ft. 6 in. and 5 ft. 0 in. in length and, unless otherwise requested, will be manufactured in random sizes within these dimensions. The only exceptions are the junction pieces which are made of sufficient length to keep the joints between slate pieces away from the junctions: these sizes cannot, in the normal way, be increased.

Fixing
Slate copings should be fixed on ½ in. solid mortar bed (1:3 cement/sand). The joints between slate pieces should be as tight as possible (i.e. ¼ in.) and pointed with a mastic. Pieces should be dowelled together by means of circular dowels at each joint. At approximately every 10 feet a ¾ in. non ferrous hook cramp should be used (see face of sheet) to anchor the coping. The cramps should be 2 in. long minimum to be effective.
The copings may be supplied drilled for cramps and dowels and the latter also supplied if required.
Architects should indicate expansion joints where necessary to allow for any possible building movement. These may be taken up by the use of large rebates on the joints (see face of sheet).

Finish
The slate used for the manufacture of copings and cappings is specially selected for the uniformity of its natural blue-grey colouring. Exposed surfaces are polished smooth.

SfB (21) Dt4

DU-PONT NEOPRENE SETS THE SEAL ON CURTAIN WALLING



Glazing seals made from Du Pont neoprene were chosen for the Braintree College of Further Education (above). Pre-formed seals or gaskets made from Du Pont neoprene enable glass or panels to be fixed into their frames quickly and securely, by unskilled labour, with minimum risk of faulty sealing. Diagram shows method.

Gaskets of Du Pont neoprene offer far greater long-term economy than conventional glazing compounds. They ensure a weatherproof seal that won't crack, dry out, harden, soften, or 'set' and lose sealing pressure. They are highly resistant to sunlight, oxygen, ozone and weathering. With Du Pont neoprene, sealing problems disappear.

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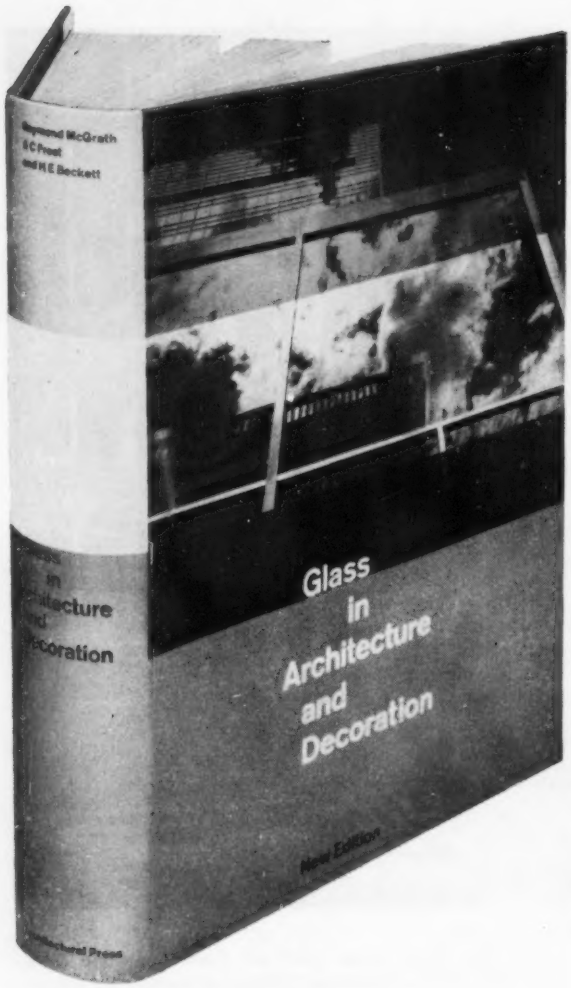

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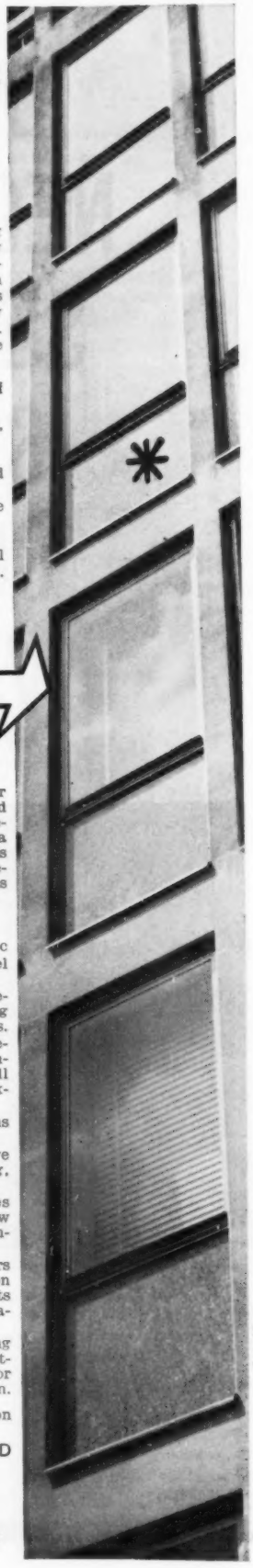

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2

SfB (21)

Asbestolux

Walls, external. Non-load bearing.

Information on non-load bearing external walls is provided by Cape Building Products Limited in their new technical data sheets on Asbestolux, the non-combustible insulation board. The information is divided into two sections.

(21)·4 General

(21)·5 Fire resisting.

The following aspects are covered.

Application

Grades of Material

External Finishes

Common Design Factors

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Water Penetration

Maximum Panel Size

Types of Construction

Infil panels and units fixed into curtain wall structure of concrete, metal or timber.

Asbestolux sheets fixed to a metal or timber frame behind the external sheeting.

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AJ SfB (21)

Walls: External, non-loadbearing: General

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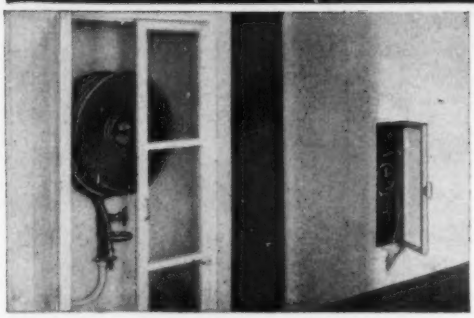

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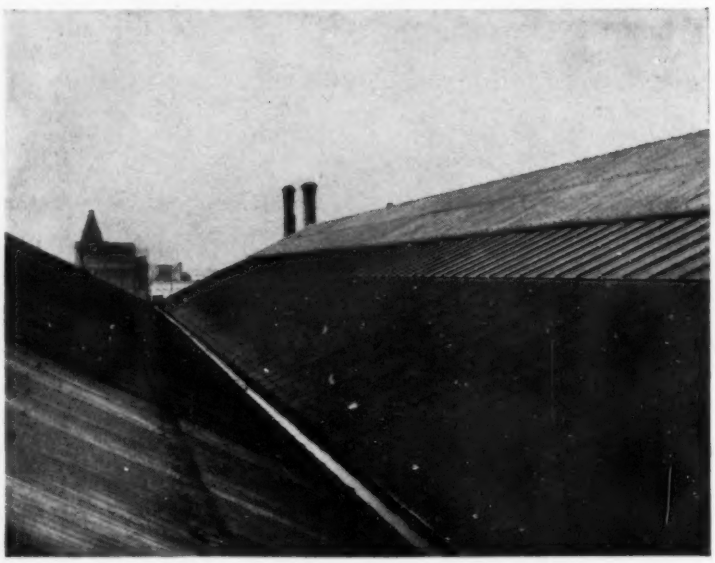

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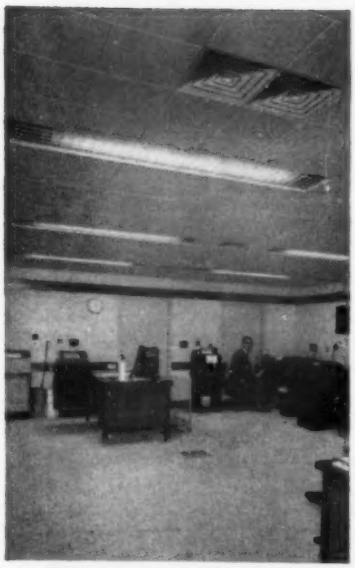

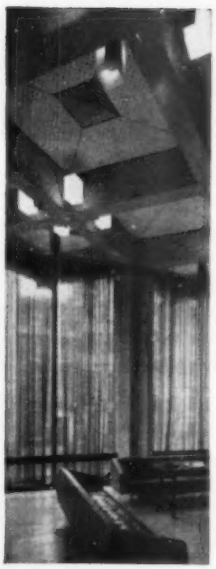

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Acknowledgements:

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Architects:

EERO SAARINEN & ASSOCIATES in association with YORKE, ROSENBERG & MARDALL.

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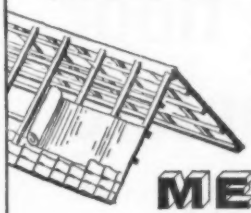

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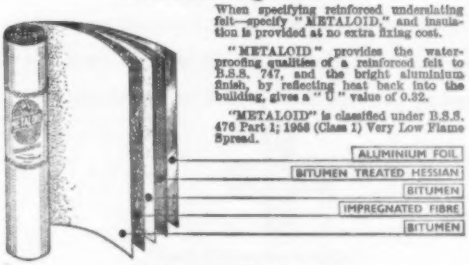

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CLASSIFIED ADVERTISEMENTS

CHRISTMAS PRESS SCHEDULE

Normal printing arrangements have been altered to allow for the Christmas holiday. The latest dates for receiving advertisements for the following issues are:

December 20 issue—Wednesday, December 13.
December 27 issue—Monday, December 18.
January 3 issue—Friday, December 29.

Advertisements should be addressed to the Advt. Manager, "The Architects' Journal," 9-13, Queen Anne's Gate, Westminster, S.W.1.

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 prepayments 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.

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S9917

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1. ARCHITECTURAL ASSISTANTS, Grade A.P.T. II/III, £815—£1,140 p.a.

Applicants for the above must have passed the Intermediate Examination of the R.I.B.A. and for appointment on A.P.T. III, Part I of the Final Examination of the R.I.B.A.

2. QUANTITY SURVEYOR—Trainee or Learner, General Division, £260—£630 p.a.

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I.Q.S.:—Five passes at "O" level including English Language, Mathematics and Geography.

Application forms may be obtained from the County Architect, R. Allport Williams, Esq., M.B.E., B.Arch., F.R.I.B.A., County Hall, Northallerton. Completed forms should be returned to the Clerk of the County Council, County Hall, Northallerton, by the 22nd December, 1961. S1387

COUNTY COUNCIL OF ESSEX
COUNTY PLANNING DEPARTMENT
SENIOR PLANNING OFFICER
A.P.T.D. V (£1,310—£1,480) at Romford

Applications invited for above post in charge of a small section in an Area Office at Romford to deal mainly with redevelopment schemes for central areas, including civic design projects. Candidates should be Corporate Members of the Royal Institution of British Architects and the Town Planning Institute, and have had considerable allied architectural and planning experience in large redevelopment and central area schemes.

Five-day week; medical examination; superannuation. Assistance towards removal expenses will be given in approved cases.

Applications, with the names of three referees, to the County Planning Adviser, Broomfield Place, Broomfield, Chelmsford, Essex, by 15th December, 1961. S1402

WARWICKSHIRE COUNTY COUNCIL
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APPOINTMENT OF
DEPUTY GROUP ARCHITECT
Grade "A"—£1,450—£1,565.

Applications are invited from qualified and experienced architects for the appointment of a Deputy Group Architect. The successful applicant will be required to work in a group mainly employed on Education projects, but will from time to time have the opportunity of research, and preparation of drawings for standard building elements, and work on projects carried out by C.L.A.S.P. The post is one of responsibility requiring a high standard of design ability. Experience in the organisation and day to day running of a group dealing with large projects is essential.

The Council have schemes for the payment of removal expenses. Five-day week worked.

Application forms and full conditions applicable to the appointment can be obtained from Eric Davies, F.R.I.B.A., A.M.T.P.I., County Architect, Shire Hall, Warwick.

L. EDGAR STEPHENS,
Clerk of the Council.

Shire Hall,
Warwick.
December, 1961. S1380

COUNTY OF ARMAGH EDUCATION COMMITTTEE
ARCHITECTURAL STAFF

Applications are invited for the following posts:

(*a*) ONE ASSISTANT ARCHITECT. Salary Scale £936—£1,430.

(*b*) TWO ARCHITECTURAL ASSISTANTS. Salary Scale £645—£915 with possible progression to £1,040.

For post (*a*) applicants must be Associates of the R.I.B.A. or have an equivalent qualification, and for post (*b*) should have previous architectural experience.

Application forms and particulars and conditions of appointment may be obtained from the Director of Education, Education Office, Courthouse, Armagh, with whom completed application forms must be lodged by 5 p.m. on Friday, 22nd December, 1961. 1377

WEST SUFFOLK COUNTY COUNCIL

Applications are invited from suitably qualified persons for the post of SENIOR ASSISTANT ARCHITECT. Salary within Grade "A" (£1,320—£1,565). National Conditions of Service; medical examination; five-day week; schemes for payment of removal expenses and housing separation allowances in operation; travelling allowance at casual user rate.

Application forms from County Architect, 13, Westgate Street, Bury St. Edmunds, to be returned as soon as possible. S1403

THE COUNTY BOROUGH OF NEWPORT

is establishing a separate Town Planning Department and applications are invited for the following appointments:—

(*a*) PRINCIPAL ASSISTANT, A.P.T. V, £1,310 to £1,480. To be in charge of the Section responsible for the review of the Development Plan. Applicants must be Corporate Members of the Town Planning Institute.

(*b*) SENIOR ASSISTANT, A.P.T. IV, £1,140—£1,310. For work in connection with the redevelopment of the Town. Applicants must be Corporate Members of the Town Planning Institute.

(*c*) RESEARCH ASSISTANT, A.P.T. III, £960—£1,140. Applicants should hold a University Degree having qualified in Statistics with either Sociology, Geography or Economics.

(*d*) ASSISTANT, A.P.T. II, £815—£960. To be employed in the Development Control Section.

The new Department will be undertaking a full, varied and interesting programme including redevelopment and a complete review of the Development Plan.

A five-day week is in operation.

Approved furniture removal expenses will be paid.

Applications, in envelopes suitably endorsed and accompanied by two recent testimonials, should be submitted to the undersigned by not later than the 22nd December, 1961.

Borough Planning Officer (Designate),
Civic Centre,
Newport, Mon. S1439

HAMPSHIRE COUNTY COUNCIL
BASINGSTOKE TOWN EXPANSION

CHIEF CLERK, A.P.T. IV (£1,140—£1,310) required for pensionable post in the office of the newly formed technical group who are to draft and carry out a scheme for the expansion of Basingstoke from its present population of 25,000 to 75,000 by 1975. The office will be based on Winchester in the first instance but will eventually move to Basingstoke, probably within a year.

Applications stating age, education, qualifications and experience and the names of two referees should reach the Clerk of the County Council, The Castle, Winchester, by 18th December. S1401

CUMBERLAND COUNTY COUNCIL

There are vacancies on the staff of the County Architect's Department for ASSISTANT ARCHITECTS on A.P.T. Grades III, IV and V. Applicants must be suitably qualified.

Further particulars and forms of application may be obtained from the County Architect, 15, Portland Square, Carlisle.

G. N. C. SWIFT,
Clerk of the County Council.
1476

BASINGSTOKE DEVELOPMENT GROUP
MODELMAKER

This Group has recently been set up to design and implement a project for the expansion of Basingstoke from its present population of 25,000 to 75,000 by 1975. Basingstoke is 47 miles WSW of London, 18 N of Winchester and 35 miles from the New Forest and the coast.

Applications are invited for the post of MODELMAKER to the Group on salary grade A.P.T. II (£815—£960). Candidates must have thorough knowledge and experience of all types of planning and architectural models and be capable of working quickly and accurately in close co-operation with the architect/planners of the Group and other technical officers. The work will include the organisation and preparation of exhibition material.

The successful candidate will be appointed to the staff of the Hampshire County Council and will work under the direction of the Chief Architect/Planner of the Group, Allan G. McCulloch, A.R.I.B.A., A.M.T.P.I.

The post is pensionable. Separation allowance and assistance with removal expenses will be paid in approved cases.

Applications, stating full details of age, education, qualifications and experience, including present grade and salary and accompanied by a copy of one testimonial and the names of two referees, should reach the Clerk of the County Council, The Castle, Winchester, by 22nd December. S1428

BERWICKSHIRE COUNTY COUNCIL
ARCHITECTURAL ASSISTANT

required for County Architect's Department. Salary Scale £1,120 × £40 (4)—£1,280. Placing may be given. Candidates must be registered architects and preferably members of the Royal Institute of British Architects. The post is superannuable. House available. Application, stating age, qualifications and experience and quoting two referees to be lodged with the undersigned not later than 22nd December, 1961.

J. B. SMITH,
County Clerk.

County Buildings,
Duns.
16th November, 1961 S1398

CORPORATION OF LONDON

The City Planning Department requires STAFF to assist on a number of planning projects at present in hand and others in course of preparation. These include the Barbican Commercial Zone where separated walkways are planned for a large area and the Tower of London Precinct. The work is varied and interesting and appeals to qualified Assistants with a fresh but disciplined approach to planning design.

Grade II/III, £990 × 10 increments to £1,310 p.a. (Two posts.)

Please apply in writing to the City Architect, Corporation of London, Guildhall, E.C.2, stating experience, present salary, etc. (no forms are issued). The posts are permanent and superannuated. S1442

METROPOLITAN BOROUGH OF ISLINGTON
BOROUGH ENGINEER AND SURVEYORS DEPARTMENT

Applications are invited from persons not more than 50 years of age for the following appointments:—

ARCHITECTURAL STAFF (Permanent).

(*a*) TWO SENIOR ARCHITECTURAL ASSISTANTS, A.P.T. V (£1,310/£1,480 p.a.).

(*b*) THREE ARCHITECTURAL ASSISTANTS, A.P.T. III (£960/£1,140 p.a.).

ENGINEERING STAFF (Permanent).

(*c*) TWO SURVEYING/TECHNICAL ASSISTANTS, A.P.T. III (£960/£1,140 p.a.).

All plus London weighting.

Applicants for:

(*a*) Should be Associate Members of the R.I.B.A. with wide experience including multi-storey housing.

(*b*) Should have passed the Intermediate Examination of the R.I.B.A. and be suitably experienced.

(*c*) Should have the Intermediate Examination of the Municipal Engineers or Chartered Surveyors or other appropriate qualifications and preference will be given to applicants with a sound knowledge of the Town and Country Planning Acts and London Building Acts.

Application forms, returnable by first post on Tuesday, 19th December, 1961, obtainable from the Borough Engineer and Surveyor, Town Hall, Upper Street, N.1.

H. DIXON CLARK,
Town Clerk.
1481

KENT COUNTY COUNCIL
PLANNING DEPARTMENT
DIVISIONAL PLANNING OFFICER
(ARCHITECTURE)

Applications are invited for a senior post for an Architect-Planner in the Headquarters Design Group. There is wide scope for imaginative design work on urban renewal schemes and in safeguarding the visual character of Kent's towns and villages, in co-operation with other local authorities and private developers. Salary Scale A-B (£1,325—£1,670).

Candidates should be corporate members of the Royal Institute of British Architects and of the Town Planning Institute.

The post is superannuable. Five-day week.

Applications with names of two referees to County Planning Officer, County Hall, Maidstone, by 9th January, 1962. 1479

BOROUGH OF HARROW
ARCHITECTURAL ASSISTANTS—A.P.T. III/IV

Applications are invited for appointments on the Council's Architectural staff which is engaged on a varied programme of municipal building schemes.

ARCHITECTURAL ASSISTANTS, A.P.T. III/IV (£960 to £1,310 p.a., plus London "weighting"). Commencing salaries will be in accordance with qualifications and experience, but applicants who are qualified will be given additional responsibilities and may be placed in A.P.T. IV (£1,140 to £1,310 per annum). The Council may be able to help with housing accommodation in the light of the applicant's circumstances. These posts will shortly be in the Department of the Borough Architect.

A contribution towards removal expenses will be considered.

The appointments are subject to the Local Government Superannuation Acts and to the National Joint Council's Scheme of Conditions of Service.

Forms of application may be obtained from me, and must be returned not later than Friday, 22nd December, 1961.

DAVID PRITCHARD,
Town Clerk.

Harrow Weald Lodge,
Harrow Weald,
Harrow. 1477

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

ARCHITECTS required for interesting programme of alterations, adaptations and extensions to schools, welfare and children's homes, fire brigade stations and other buildings.

Salary up to £1,500. Candidates must be able to carry own jobs from sketch scheme to completion of contract.

Application form and particulars from Hubert Bennett, F.R.I.B.A., Architect to the Council, the County Hall, S.E.1, quoting (EK/A/3334/12). S1478

SURREY COUNTY COUNCIL

Applications invited for the appointment of ASSISTANT ARCHITECT on Grade IV (£1,140—£1,310 p.a. plus £45 p.a. London Allowance). Must be A.R.I.B.A. and have had experience in preparation of drawings and specifications and be capable of assuming responsibility for medium to large scale contracts.

Some housing accommodation available.

Applications, stating age, qualifications, education and experience, present salary and three copy testimonials, preferably one from present employer, to County Architect, County Hall, Kingston, as soon as possible, marked (H) in top left-hand corner. S1480

SOUTH-EASTERN REGIONAL HOSPITAL BOARD
SCOTLAND

Applications are invited for the following superannuated posts in the Regional Architect's Division, Edinburgh.

SENIOR ASSISTANT ARCHITECTS. Salary Scale: £1,300 × £60 (5)—£1,600. To be registered architect.

ASSISTANT ARCHITECTS. Salary Scale: £905 × £35 (1) × £45 (6) × £50 (2)—£1,310. To be registered architect.

ARCHITECTURAL ASSISTANTS. Salary Scale: £625 × £30 (8) × £35 (1)—£900. To be of R.I.B.A. Intermediate standard.

Placing on the Salary Scale will depend upon experience.

Applications, stating age, experience and training, should be sent to the Regional Architect, 18, Rothesay Terrace, Edinburgh, within seven days. 1460

BOROUGH OF RUGBY
ASSISTANT ARCHITECT

Applications are invited for the above appointment in the Borough Engineer & Surveyor's Department which has an interesting and varied programme of work. Salary A.P.T. Grade V (£1,310—£1,480). Housing accommodation will be provided if required and a car allowance on the "essential user" scale will be paid.

Further particulars and form of application may be obtained from the Borough Engineer and Surveyor, Town Hall, Rugby, to whom completed applications must be sent not later than 27th December, 1961.

T. L. DUFFY,
Town Clerk.
1487

LINDSEY COUNTY COUNCIL
PLANNING DEPARTMENT

Applications are invited for the following appointments in the Development Plan and Design Section:—

(*a*) SENIOR ASSISTANT—Architect J.N.C. Grade A (£1,415—£1,565).
(*b*) SENIOR ASSISTANT—A.P.T. V (£1,310—£1,480).
(*c*) ASSISTANT—A.P.T. II (£815—£960).
(*d*) JUNIOR ASSISTANT—Misc. III/A.P.T. I (£555—£815).

Duties of the posts and qualifications expected of applicants are:—

(*a*) To lead and direct staff responsible for architectural control; the preparation of advisory layouts for major town and village extensions; detailed site planning and three dimensional aspects of central area redevelopment schemes. A.R.I.B.A. and preferably A.M.T.P.I.

(*b*) Leader of a team on review of the County Development Plan—mainly Town Map preparation and amendment, and village plans. A.M.T.P.I.

(*c*) Surveys, base maps and statistics required for work under (*b*) above. Intermediate T.P.I.

(*d*) General duties as surveyor and draughtsman. Previous service in planning, architect's or surveyor's office or Geography Degree for A.P.T.I.

Financial assistance available in posts (*c*) and (*d*) towards post entry training by T.P.I. Diploma course at Nottingham. Essential user's car allowance 10 h.p. for appointments (*a*) and (*b*).

Commencing salary within advertised grades in all cases will have regard to qualifications and previous experience.

Council will pay 75% of necessary removal expenses to successful candidates.

Superannuation and national conditions of service as approved by the County Council. Canvassing will disqualify. Relationship to any member or senior officer of the Council to be disclosed in writing.

Applications, with particulars of age, training, qualifications and experience and names of two referees to County Planning Officer, County Offices, Newland, Lincoln, not later than 1st January, 1962. 1469

BOROUGH OF SCUNTHORPE
(Area 7,895 acres — Population 67,257 — Rateable Value £1,562,541)
APPOINTMENT OF CHIEF PLANNING AND BUILDING ASSISTANT
J.N.C. SCALE "A" (£1,310—£1,565 per annum)

Applications are invited for the above appointment in the Borough Engineer and Surveyor's Department, the commencing salary to be fixed within the scale according to qualifications and experience.

The person appointed will be a sectional head responsible to the Borough Engineer and Surveyor for the Planning and Building Surveying work of the Department.

Previous experience gained in a senior post of a local authority planning office is essential; applicants must be A.M.T.P.I., and the possession of an additional architectural and surveying qualification would be an advantage.

Housing accommodation available, if required, and approved removal expenses reimbursed in full. A car allowance and five-day working week apply.

Further information concerning this appointment may be obtained from F. J. Bowyer, A.M.I.C.E., M.I.Mun.E., Borough Engineer and Surveyor, Laneham Street, Scunthorpe, to whom applications stating age, details of present and past appointments, training, qualifications and experience, together with the names of two persons to whom reference may be made, should be sent on or before Wednesday, 3rd January, 1962. S1514

THE UNIVERSITY OF MANCHESTER

Applications are invited for a post of LECTURER IN TOWN AND COUNTRY PLANNING. Applicants must be graduates in Planning or in an allied subject and be corporate members of the Town Planning Institute. Experience in planning aspects of traffic and highway engineering would be an additional recommendation. Salary on a scale £1,050 to £1,850 per annum with membership of the F.S.S.U. and Children's Allowance Scheme; initial salary according to qualifications and practical experience. Applications should be sent not later than January 20th, 1962, to the Registrar, the University, Manchester 13, from whom further particulars and forms of application may be obtained. S1243

BOROUGH OF SCUNTHORPE
(Area 7,895 acres — Population 67,257 — Rateable Value £1,562,541)
APPOINTMENT OF

(*a*) SENIOR ASSISTANT ARCHITECT—Grade A.P.T. IV (£1,140—£1,310 per annum).
(*b*) ASSISTANT QUANTITY SURVEYORS—Grade A.P.T. I (£645—£815 per annum); A.P.T. II (£815—£960 per annum) and A.P.T. III (£960—£1,140 per annum).
(*c*) HEATING AND VENTILATING ENGINEER—A.P.T. III/IV (£960—£1,310 per annum).

Applications are invited for the following appointments in the Borough Engineer and Surveyor's Department:—

(*a*) SENIOR ASSISTANT ARCHITECT—Grade A.P.T. IV (£1,140—£1,310 per annum). Applicants should be qualified Architects preferably with previous experience with Local Government.
(*b*) ASSISTANT QUANTITY SURVEYOR—Grade A.P.T. I (£645—£815 per annum). Some experience required in site measurement, interim valuations, abstracting and billing.
(*c*) ASSISTANT QUANTITY SURVEYOR—Grade A.P.T. II (£815—£960 per annum), for site measurement, interim valuations, abstracting, billing and taking off under supervision.
(*d*) ASSISTANT QUANTITY SURVEYOR—Grade A.P.T. III (£960—£1,140 per annum), for abstracting, billing and taking off for houses and public buildings of all types.
(*e*) HEATING AND VENTILATING ENGINEER—Grade A.P.T. III/IV (£960—£1,310 per annum). Applicants should be A.M.I.H. and V.E., and have experience in the design and supervision of heating installation schemes for public buildings.

For all appointments the commencing salary will be fixed within the Grade according to qualifications and experience.

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

Further information concerning any of the appointments may be obtained from F. J. Bowyer, A.M.I.C.E., M.I.Mun.E., Borough Engineer and Surveyor, Borough Surveyor's Department, Laneham Street, Scunthorpe, to whom applications stating age, details of present and past appointments, training, qualifications and experience, together with the names of two persons to whom reference may be made, should be sent on or before Wednesday, the 3rd January, 1962. 1515

CARSHALTON URBAN DISTRICT COUNCIL
ENGINEER & SURVEYOR'S DEPARTMENT

(*a*) SENIOR ASSISTANT ARCHITECT, A.P.T. Grade IV (£1,165—£1,355). Commencing salary according to qualifications and experience. R.I.B.A. Final Examination and good experience in design and contract supervision of housing and public buildings construction essential. "Casual User" car allowance. Housing accommodation (if necessary).

(*b*) ARCHITECTURAL DRAUGHTSMAN (Gen. Div.—A.P.T. Grade I). Salary within range £335—£670 according to ability and experience; to suitably qualified applicants upper limit £855. Must be neat and accurate draughtsman, preferably with good architectural experience.

Five-day week. Good working conditions. Canteen.

Forms of application, obtainable from me, to be returned by 1st January, 1962.

Canvassing will disqualify.

C. H. DURRANT,
Clerk of the Council.

District Council Offices,
The Grove,
Carshalton, Surrey. 1518

CARMARTHENSHIRE COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Applications are invited for the appointment of an ASSISTANT ARCHITECT, salary within Grade A.P.T. III/IV, £960—£1,310 per annum.

Candidates must be A.R.I.B.A.

Details of qualifications, experience and present salary, with copies of two recent testimonials to County Architect, County Hall, Carmarthen, by Wednesday, 20th December, 1961.

W. S. THOMAS,
Clerk of the County Council.

County Hall,
Carmarthen.
December, 1961. 1464

COUNTY BOROUGH OF GATESHEAD — BOROUGH SURVEYOR'S DEPARTMENT

ARCHITECTS, ENGINEERS, TOWN PLANNERS, QUANTITY SURVEYORS

Applications are invited from Architects, Engineers, Town Planners and Quantity Surveyors for vacancies in the Borough Surveyor's Department to carry out an interesting and varied programme of building and construction works being undertaken by the Council, who are fast becoming recognised for their progressive attitude in municipal development.

The extent of the programme at present being carried out and to be continued will provide a challenge to the experienced professional man and the ideal source for gaining valuable experience for those just commencing their careers in these fields.

The programme of redevelopment now being carried out includes multi-storey flats, traditional housing, schools at all levels (the Council are active members of "CLASP"), central area redevelopment, major and minor highways including fly-over proposals and other usual municipal undertakings.

Salaries will be as follows:—

Grade APT V, i.e., £1,310 to £1,480 per annum
Senior Assistant Architects
Senior Assistant Engineers
Senior Quantity Surveyor.
Grade APT IV to V, i.e., £1,140 to £1,480 per annum
Senior Planning Assistants.
Grade APT IV, i.e., £1,140 to £1,310 per annum
Assistant Architects
Assistant Engineers
Senior Assistant Quantity Surveyor.
Grades APT III to IV, i.e., £960 to £1,310 per annum
Planning Assistants.
Grade APT III, i.e., £960 to £1,140 per annum
Assistant Quantity Surveyor.
Grades APT I to III, i.e., £645 to £1,140 per annum
Junior Architectural Assistants
Junior Engineering Assistants
Junior Quantity Surveyors.

All posts superannuable, subject to medical examination and one month's notice.

Housing accommodation is available at economic rents and part removal expenses will be paid for senior posts.

Applications giving details of present and previous appointments, qualifications and experience together with the names of two referees should be sent to the undersigned within three weeks of publication of this notice.

C. D. JACKSON,
Town Clerk.
Town Hall, GATESHEAD, 8.

BOROUGH OF DARTFORD

Vacancies exist for the following staff for an interesting programme of new works, and applications are invited from suitably qualified persons.

ARCHITECTS

Senior Assistant Architect
Grade APT. IV (£1,140–£1,310, plus £45)

ENGINEERS

Senior Assistant Engineer
Grade APT. IV (£1,140–£1,310, plus £45)

Engineering Assistant
Grade APT. II or III (£815–£1,140 plus £25–£45, according to age and grade)

PLANNERS

Planning Assistant
Grade APT. IV (£1,140–£1,310, plus £45)

Housing Accommodation will be available, if required.

Applications, stating age, qualifications and experience, together with the names of two referees, should be received, by the Borough Engineer and Surveyor, The Bridge House, Dartford, not later than the 22nd December, 1961.

MORRIS MOTORS LTD

THE BRITISH MOTOR CORPORATION

B.M.C. SERVICE LIMITED

Architectural Assistants are required to form the nucleus of an expanding Department responsible for the re-planning of Distributors' and Dealers' premises throughout the world. Most interesting experience will be gained in a new and ever increasing specialist field. Knowledge of Surveying will be an advantage.

Please apply to:

The Personnel and Welfare Manager,
Morris Motors Limited,
Cowley, Oxford

COUNTY BOROUGH OF GREAT YARMOUTH
APPOINTMENT OF BOROUGH ARCHITECT

Applications are invited for this appointment from suitable qualified persons, who must be members of the Royal Institute of British Architects. This post is a newly created one, and the successful candidate will be required to advise the Council on the establishment of the department which will absorb the present architectural staff employed by the Council.

This appointment is subject to the conditions laid down by the Joint Negotiating Committee for Chief Officers of Local Authorities, it is superannuable and subject to a medical examination and to three months' notice on either side.

The salary will be within the scale prescribed commencing at £2,170, and rising by four increments of £75. An essential car user's allowance will be paid in accordance with the Council's scale (Scale B, £180 per annum).

Candidates must state whether or not they are related to any member or senior officer of the Council, and canvassing will disqualify.

Applications in writing, giving age and all relevant details of previous experience, and the names of two referees, must reach the undersigned by the 5th January, 1962, and must be endorsed "Borough Architect."

FARRA CONWAY,
Town Clerk.

Town Hall,
Great Yarmouth.
6th December, 1961. S1523

LONDON COUNTY COUNCIL
PANEL OF PRIVATE ARCHITECTS

Architects in private practice are invited by the London County Council to apply for inclusion in a new Panel from which names will be selected for offers of work of all types except that necessitated by road improvement schemes.

The work concerned will generally be in or near the County of London but may, at a later stage, include domestic and light industrial developments in expanding towns.

Architects whose names are included in the panel for major education schemes established in June, 1960, or in the panel for housing schemes established in February, 1961, will automatically be included in the new panel without further application. All other architects who wish to be included in the new panel should apply on forms which may be obtained from the Clerk of the Council (Ref. CL/G/4), The County Hall, London, S.E.1, to whom completed forms should be returned not later than January 5th. 1504

FOREMEN IN CHARGE OF LAYING-OUT WORKS, to supervise landscape contracts. Experienced in grading, cultivating, draining, turfing and planting. Up to 275s. Forms from Chief Officer, Parks Department, (A.1/J/3291/12) County Hall, S.E.1 (WATerloo 5000 ext. 8076). S1490

COUNTY BOROUGH OF BLACKBURN
ARCHITECTURAL ASSISTANTS

Vacancies exist in the Chief Architect's Section of the Borough Engineer's Department for the following established posts:—

TWO ARCHITECTURAL ASSISTANTS, A.P.T. IV (£1,140—£1,310 p.a.).

ONE ARCHITECTURAL ASSISTANT, A.P.T. III/IV (£960—£1,310 p.a.).

The Department is engaged upon a wide and varied programme embracing the re-development of the Town Centre, New Wholesale and Retail Markets, New Abattoir, New Schools, Housing Schemes embracing multi-storey flats, Health Centres and Clinics, Aged Persons' Hostels, Children's Homes, etc.

Commencing salary according to qualifications and experience. Housing accommodation available if required. Application forms from Borough Engineer, Town Hall, Blackburn, returnable by 29th December, 1961.

FRANK SQUIRES,
Town Clerk.
1465

BOROUGH OF RAWTENSTALL
APPOINTMENT OF ARCHITECTURAL BUILDING SURVEYOR

Applications are invited for the above appointment on the permanent staff of the Borough Surveyor at a salary of £960—£1,140 per annum (A.P.T. Grade III).

Applicants must be good draughtsmen with considerable practical building experience (qualifications not essential). The successful applicant will be required to prepare estimates, reports, specifications and plans, etc., for property alterations and minor building proposals, and must be familiar with office correspondence and routine.

Housing accommodation will be considered if required.

The appointment will be subject to the provisions of the Local Government Superannuation Act, the National Schemes of Conditions of Service, and the termination by one month's notice by either side.

Applications, including names and addresses of two referees, should reach the undersigned not later than Monday, December the 18th, 1961.

Canvassing will disqualify; any relationship to members or senior officers of the Council must be disclosed.

COLIN CAMPBELL,
Town Clerk.

Borough Engineer and Surveyor's Dept.,
Town Hall,
Rawtenstall,
Rossendale.
24th November, 1961. 1459

ARCHITECTS AND MAINTENANCE SURVEYORS. Pensionable posts for men and women at least 25 and under 35 on 1st January of the year in which application is made (extension for regular Forces service, Overseas Civil Service, established civil service and temporary Government service as Architect or Maintenance Surveyor). Candidates must be registered Architects or, alternatively, for Maintenance Surveyor posts, have achieved Corporate Membership of R.I.C.S. (Building Section), or have passed examinations necessary for attaining Corporate Membership. National salary £936—£1,258 according to age, rising to £1,430. Promotion prospects. Write Civil Service Commission, 17, North Audley Street, London, W.1, for application form quoting S/60-61. 1512

EAST RIDING OF YORKSHIRE COUNTY COUNCIL

Applications are invited for the appointment of a CHIEF QUANTITY SURVEYOR on the staff of the County Architect. The salary will be in accordance with Scale "B" (£1,445—£1,670).

Applicants must be members of the Royal Institution of Chartered Surveyors and have had wide experience in the preparation of estimates, bills of quantities, cost analysis, adjustment of final accounts and other work incidental to such an appointment, including the control of staff.

Applications, giving particulars of age, past and present appointments with salaries, details of experience, together with the names of three referees, should be sent to the County Architect, County Hall, Beverley, not later than Friday, 22nd December, 1961.

R. A. WHITLEY,
Clerk of the County Council.
1457

SHOREDITCH BOROUGH COUNCIL

Applications are invited for the following appointments in the Borough Architect's Department:—

1. ARCHITECTS for varied and interesting programme of important Public Buildings:—
   ASSISTANT ARCHITECT, A.P.T. V, £1,355—£1,525 p.a.
   ASSISTANT ARCHITECT, A.P.T. III, £1,005—£1,185 p.a.
   JUNIOR ARCHITECT, A.P.T. I, £670—£840 p.a.
2. SUPT. CLERK OF WORKS to take charge of Capital Housing Programme, A.P.T. III, £1,005—£1,185 p.a.

Applications to Borough Architect, Town Hall, E.C.1. 1458

CHELSEA BOROUGH COUNCIL

ARCHITECTURAL ASSISTANT (A.P.T. II, £815—£960 plus London "weighting") required in Borough Engineer and Surveyor's Department. Applicants must have a sound knowledge of architectural drawing, building construction and the measurement of existing buildings.

Forms of application from Borough Engineer and Surveyor, Town Hall, King's Road, S.W.3, to be returned not later than 5th January, 1962. 1502

BOROUGH OF TWICKENHAM
TECHNICAL STAFF

Applications are invited for the following posts:—

(*a*) SENIOR ASSISTANT ENGINEER—A.P.T. IV (£1,140—£1,310).
(*b*) SENIOR ASSISTANT ARCHITECT—A.P.T. IV (£1,140—£1,310).
(*c*) ASSISTANT ENGINEER—A.P.T. I-III (£645—£1,140).
(*d*) ASSISTANT ARCHITECT—A.P.T. I-III (£645—£1,140).

Applicants for posts (*a*) and (*b*) must have passed the Final Examination of an appropriate body, and these posts have a possibility of proceeding to A.P.T. V in due course.

Applicants for posts (*c*) and (*d*) should state commencing salary required. There is also a possibility of proceeding to Grades IV and V depending upon qualifications and experience.

All plus London weighting; five-day week; J.I.C. Conditions; if married consideration will be given to the provision of housing accommodation; assistance with removal expenses.

Canvassing will disqualify. Applications, giving age, experience, qualifications, etc., and the names of two referees, to the Borough Engineer, Municipal Offices, Twickenham.

W. H. JONES,
Town Clerk.
1492

LANCASHIRE COUNTY COUNCIL
PLANNING DEPARTMENT HEADQUARTERS AT PRESTON

CENTRAL AREA REDEVELOPMENT.—Experienced TECHNICAL OFFICERS with appropriate qualifications capable of original and imaginative work are invited to join a team for Central Area Redevelopment in Lancashire towns.

Vacancies exist on A.P.T. Grade V (£1,310—£1,480) and A.P.T. Grade IV (£1,140—£1,310).

Car allowances are available and disturbance allowances and removal expenses to a maximum of £125 may be granted in approved cases.

Applications, stating grade applied for and giving details of age, experience, qualifications, present appointment and the names and addresses of two referees, should be addressed to the County Planning Officer (Y), East Cliff County Offices, Preston, by the 2nd January, 1962. 1493

CRAWLEY URBAN DISTRICT COUNCIL
(Population of District: approximately 55,000)
SENIOR PLANNING ASSISTANT

Applications are invited for the appointment of a Senior Planning Assistant in the Engineer & Surveyor's Department at a salary within Grade A.P.T. IV (£1,140 to £1,310 per annum) plus temporary local weighting of £45 per annum. In addition an essential user car allowance (not exceeding 10 h.p.) will be paid.

Applicants must have passed the Final Examination of the Town Planning Institute or possess a degree or diploma exempting therefrom.

The Council will assist in the provision of housing accommodation if required. Assistance will be given in appropriate cases towards removal expenses. The Council operate a five-day working week.

The appointment will be subject to the National Scheme of Conditions of Service, the provisions of the Local Government Superannuation Acts, and the passing of a medical examination.

Application forms obtainable from and returnable to the Engineer & Surveyor, Goffs Park House, Horsham Road, Crawley, Sussex, by 27th December, 1961.

Canvassing, directly or indirectly, will disqualify and candidates must disclose, in writing, whether they are related to any member or senior officer of the Council.

R. W. J. TRIDGELL,
Clerk of the Council.
1497

BOROUGH OF DAGENHAM
APPOINTMENT OF ARCHITECTURAL ASSISTANT

Applications are invited for this appointment from persons with architectural experience.

Salary £660 to £855 per annum.

Application form and further particulars obtainable from the Borough Engineer and Surveyor.

Closing date: 23rd December, 1961.

KEITH LAUDER,
Town Clerk.

Civic Centre,
Dagenham. 1494

PUBLIC NOTICE

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

BUILDING (SCOTLAND) ACT, 1959
DRAFT BUILDING STANDARDS (SCOTLAND) REGULATIONS, 1961
NOTICE OF EXTENSION OF PERIOD FOR LODGING OF REPRESENTATIONS

On 25th July, 1961, notice was given that the Secretary of State had published a draft of the above regulations which he proposes to make under section 3 of the above Act prescribing standards in relation to the matters specified in the Fourth Schedule of that Act. It was stated in the notice that any representation as to the draft regulations must be made in writing to the Secretary of State not later than the 1st day of December, 1961.

NOTICE IS HEREBY GIVEN that the period for lodging such representations has now been extended and that any representation as to the draft regulations must be made in writing to the Secretary of State not later than the 16th day of February, 1962. The representation must state the grounds on which it is made and should be addressed to the Secretary, Department of Health for Scotland, St. Andrew's House, Edinburgh, 1.

Copies of the draft regulations may be obtained (price 5s., by post 5s. 7d.) from H.M. Stationery Office, 13a, Castle Street, Edinburgh, 2, or through any bookseller.

The Secretary of State has published also a Memorandum on the draft regulations. Copies of the Memorandum may also be obtained (price 4s. 6d., by post 4s. 11d.) from H.M. Stationery Office, 13a, Castle Street, Edinburgh, 2, or from any bookseller.

A copy of the draft regulations and of the Memorandum have been deposited at each of the following places:

(*a*) St. Andrew's House, Edinburgh, 1.
(*b*) Scottish Office, Dover House, Whitehall, London, S.W.1.
(*c*) The office of the Town Clerk of each city and burgh in Scotland.
(*d*) The office of the County Clerk of each county in Scotland.

These copies are available for inspection by the public, free of charge, during normal office hours.

Dated this 30th day of November, 1961.

H. F. G. KELLY,
Assistant Secretary.

Department of Health for Scotland,
St. Andrew House,
Edinburgh, 1. 1466

Competition

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

THE UNIVERSITY OF LIVERPOOL

OPEN COMPETITION

Architects are invited to submit designs for halls of residence for 1,100 to 1,200 students on the Carnatic site at Mossley Hill, Liverpool. The cost of the works will be approximately £1,500,000.

Assessors:	Sir James Mountford, M.A., D.Litt., D.C.L., LL.D. (Vice-Chancellor).
	Donald Gibson, C.B.E., M.A., D.C.L., F.R.I.B.A., M.T.P.I.
	Professor Myles Wright, M.A., F.R.I.B.A., M.T.P.I.
Premiums:	£5,000; £3,000; £1,000. Further premiums, to a total not exceeding £2,000, may be awarded at the discretion of the Assessors for other designs of merit.
Sending in Day:	4 September, 1962.
Last Day for Questions:	1 January, 1962.

Conditions may be obtained, upon payment of a deposit of £3, from The Registrar, The University of Liverpool, Liverpool, 3. Quoting Reference RVCH/518/AJ. 9647

Architectural Appointments Vacant

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

ASSISTANT ARCHITECT urgently required in busy City Office. High standard of office and residential design essential. Salary £1,750 per annum plus Luncheon Vouchers, Increments and Bonuses. Long-term engagement for right man. Box S1488.

ARTHUR GUINNESS SON & CO. (DUBLIN) LTD. invite applications for appointment as an ASSISTANT ARCHITECT with a commencing salary between £1,000—£1,500 p.a., depending on age and experience.

An important part of the duties will be to advise on the interior planning and décor of public houses.

Applicants should be members of the R.I.B.A. or R.I.A.I. and have had several years' experience after qualifying.

Expenses will be paid if interviewed in Dublin.

Applications stating age, present position and salary, qualifications and experience should be addressed to:—

The Chief Engineer,
St. James's Gate,
Dublin, 8. 1489

SENIOR ASSISTANTS required for work on large hospital programme, excellent opportunities for the right men. Salary £1,000—£1,400. Luncheon vouchers and five-day week. Write giving full particulars: Watkins Gray & Partners, 57, Catherine Place, S.W.1. TC9690

£950-£1,500. ARCHITECTURAL ASSISTANTS with imagination and designing ability required to assist with large and important new developments in the central London Area. Telephone or write: Trehearne & Norman, Preston & Partners, 83, Kingsway, W.C.2. HOLborn 4071. TC9798

ARCHITECTURAL ASSISTANTS of all grades, particularly Intermediate standard, required on varied and interesting projects. High salaries will be paid in accordance with skill or experience of applicant. Lewis Solomon, Kaye & Partners. City 8811. TC5970

£1,000 / £2,000 p.a. will be paid to experienced competent ARCHITECTS by a private practice in the City of London. The work will be primarily on the drawing board on new and interesting projects of magnitude. A high standard of design and detailing ability is required. Please apply in writing to Box TC9360.

INTERMEDIATE TO FINAL ASSISTANTS required immediately. Salary from £1,000 onwards and luncheon vouchers. Theo. H. Birks, 38, Portland Place, London, W.1. LAN 7236. TC8906

£850-£1,600. ARCHITECTURAL ASSISTANTS required. Long term prospects. Non-contributory pension and life assurance schemes. Five-day week. Telephone or write: Ronald Ward & Partners, 29, Chesham Place, Belgrave Square, S.W.1. Belgravia 3361 TC6106

EAST ANGLIA

QUALIFIED AND INTERMEDIATE ASSISTANTS required by Ind Coope (East Anglia) Ltd. Sound training and experience together with an interest in interior design essential. Salary range £890—£1,500. The Company operates a Pension Scheme with substantial widows' benefits in the event of death before or after retirement. Five-day week. Write, giving age, salary (at present, or required) and full details of training and experience to the Architect, Ind Coope (East Anglia) Ltd., The Brewery, Romford. S1528

SENIOR ASSISTANT with five to six years' experience since Final examinations, needed in Kensington Office. Salary in accordance with responsibility undertaken. Varied work. Apply Chapman, Taylor, Partners, WES 6611. 1513

BUSY and progressive private practice has vacancy for ARCHITECTURAL ASSISTANTS, preferably car drivers. Pleasant office and working conditions. Five-day week. Scope for initiative and responsibility on varied and interesting works including Domestic, Commercial, Industrial and Ecclesiastical, over wide area of the country. Commencing salary according to experience and ability up to £1,000 with good opportunity for advancement. Please apply giving fullest details to A. R. Laing, Deacon & Laing, 65 Goldington Road, Bedford. S1524

ARCHITECTURAL ASSISTANT required to carry out design work on large projects. Salary £1,000—£1,200 according to ability. Write giving details of design training and experience to W. H. Rogers, 16 Mark Lane, London, E.C.3. 1510

WEST END FIRM OF ARCHITECTS HAVE VACANCIES FOR STAFF TO WORK ON LARGE PROJECTS. KNOWLEDGE AND EXPERIENCE LESS IMPORTANT THAN ENTHUSIASM AND INTEREST IN ARCHITECTURE. FIVE-DAY WEEK. QUARTERLY BONUS. PENSION SCHEME. BOX S1516.

ARCHITECTURAL ASSISTANT, Intermediate standard, required at once. Flat can be arranged for suitable assistant after probation period. Five-day week 8.30 a.m. to 5 p.m. Luncheon vouchers, no overtime, bonus scheme, non-contributory Nuffield medical scheme. Pleasant surroundings in Wimbledon area. George Watt & Partners, 146 Mostyn Road, S.W.19. Tel.: Liberty 8181. 1495

BRYAN & NORMAN WESTWOOD require SENIOR ASSISTANTS as follows: (1) Architect to work on large War Office project; (2) Architect with interior design and shop fitting experience. Salaries to be agreed. Apply to 21 Suffolk Street, S.W.1. Trafalgar 1106. TC1519

ARCHITECTURAL ASSISTANT required for busy office in Hitchin. Applications in writing stating experience, education, etc., to Norman V. Hyde, B.A.(Arch.), A.R.I.B.A., 100 Hermitage Road, Hitchin, Herts. 1511

BATH—URGENTLY REQUIRED, ASSISTANT of Intermediate or Final standard with at least two years' practical experience for busy office with variety of interesting work. Design ability important and future partnership for right man. Apply in writing, giving age and brief particulars of training and experience and salary required to Paul Kennerell Pope, A.R.W.A., A.R.I.B.A., 18 Brock Street, Bath, or telephone 63065 for interview. S1521

ARCHITECTURAL ASSISTANT

Architectural Assistant required to work in the Architectural Section of a Design Department. The work is mainly concerned with industrial buildings, offices, and general schemes. The work is carried out under the direction of a Chartered Architect.

Applicants should hold at least intermediate R.I.B.A. or equivalent. Industrial experience an advantage.

The company offers excellent employee benefits, including an annual bonus, a voluntary part contributory Life Insurance Plan and a Pension Scheme.

Please apply quoting JAW/15

Men's Personnel Department
KODAK LIMITED (FACTORIES)
Harrow, Middlesex

LEICESTER

CITY PLANNING OFFICER

The City Council seeks an experienced town planner with imaginative and progressive outlook allied to practical ability for this new post to lead a team of planners now given the status of a principal department. The City is on the threshold of large-scale re-development of the central areas and requires a chief officer with ability to direct research and to produce practical schemes reflecting modern concepts of urban planning. The post offers a challenge and an opportunity to influence the commercial and social life of the City.

SALARY

£3,605-£3,980 p.a., plus car allowance.

Applications, giving names of two referees, by 15th January, 1962, to Town Clerk, Town Hall, Leicester, from whom further details may be obtained.

BIRMINGHAM

ARCHITECTURAL ASSISTANTS desirous of working in a modern and progressive office where qualifications are secondary to keenness and ability. Top salaries offered to the right people willing to accept responsibility on interesting and varied projects. Please write to James A. Roberts, A.R.I.B.A., Lichfield House, Smallbrook Ringway, Birmingham 5. S1522

ARCHITECTURAL ASSISTANTS, fully qualified and Intermediate standard, required in London office, King's Cross area for large scale domestic work embracing housing and high flats. Well paid appointment for those who wish to partake in interesting and imaginative schemes. High standard of draughtsmanship necessary. Box 1520.

TWO first class ARCHITECTURAL ASSISTANTS required. Salary range £1,250—£1,750 p.a. depending upon experience. Write with fullest details of experience. Box TC1526.

ERNO GOLDFINGER requires several qualified ASSISTANTS and DRAUGHTSMEN with at least two years' experience to take part in a growing programme of interesting work which includes office buildings, central developments, flats, schools and private houses. Good salaries and scope for men with sound knowledge of construction. Phone HYDe Park 5657. TC1527

NORMAN & DAWBARN, who have moved their London Office to new premises south of the river, require ASSISTANT ARCHITECTS within the salary range £1,200—£1,500 on a variety of projects. Large progressive office offering outstanding opportunities for people of ability, both at home and overseas. Excellent working conditions, hours 9.15 to 5.30, lunch vouchers, three weeks annual leave. Write or phone Norman & Dawbarn, Architects and Consulting Engineers, 234-244, Stockwell Road, London, S.W.9. REDpost 3131. TC1013

OSCAR GARRY & PARTNERS require ASSISTANTS of both Intermediate and Final standard, with at least two years' office experience in this country, to work on interesting projects in early design and contract stages. Five-day week, luncheon vouchers. Salary by arrangement, according to qualifications and experience. Phone WEL 2507 or write 66, Gloucester Place, London, W.1. TC9621

SENIOR and JUNIOR ASSISTANT ARCHITECTS required with progressive outlook for work on a wide range of projects. Starting salaries up to £900 for Intermediate standard and up to £1,250 for Final standard, according to experience. Five-day week. Box TC9219.

ELIE MAYORCAS requires ARCHITECTURAL ASSISTANTS with a minimum of three years' office experience in this country. Write, giving brief particulars of architectural education and experience, to: 13, David Mews, Baker Street, W.1. TC9442

EXPERIENCED ASSISTANT ARCHITECT required in West End office. Varied work, must be a competent designer and administrator. Opportunity for advancement to position of responsibility. Starting salary up to £1,250 according to experience. Luncheon vouchers. Five-day week. Box TC9218.

ARCHITECTURAL ASSISTANT of Finals standard with at least two years' office experience required by busy City office engaged in interesting Industrial and Commercial work. Pleasant working conditions, luncheon vouchers. Salary by arrangement depending on experience. Please apply Eric Firmin & Partners, Thavies Inn House, 5, Holborn Circus, E.C.1. TC1181

GEORGE, TREW & DUNN

WE need help with many projects and invite your application to work with us. Please write, giving the usual details, to 50, Eastbourne Terrace, W.2. TC9884

CROYDON. L. A. Macintosh & Haines require ASSISTANTS, Intermediate to Final standard, £700—£1,200 p.a. Five-day week, varied work and responsibility, contemporary design, good prospects in expanding practice. Telephone CRO 5780. TC9905

ASSISTANT, Intermediate standard, required for Architects' office in Hampstead. B. Newton, A.R.I.B.A., M.R.S.H. Ring SPEedwell 2254. S1388

ASSISTANT ARCHITECT

With design and administrative experience urgently required.
Llewelyn Davies & Weeks,
18 Woburn Square, London, WC1.
MUSeum 7249. 1509

BIRMINGHAM. Leonard J. Multon and Partners require ARCHITECTURAL ASSISTANTS. Applicants with ability and enthusiasm will be offered a generous salary. Five-day week, private pension scheme. Work includes Multi-Storey Flats and Housing, Hospitals, Factories, and Centre City Development. If you require a progressive position please write to 6, Greenfield Crescent, Edgbaston, or telephone Edgbaston 4188. S1340

EXPERIENCED ASSISTANT required for works of restoration/conversion. Philip Jebb, 140, Sloane Street, S.W.1. SLO. 6383. TC1186

SIR BASIL SPENCE requires qualified ASSISTANTS having at least three years' office experience. Five-day week, luncheon vouchers, salary up to £1,500 by arrangement. Write to Sir Basil Spence, R.A., 1, Fitzroy Square, London, W.1. S1223

ARCHITECTURAL ASSISTANTS with some experience are required in Gotch & Partners' London office. Interesting work in hand. Luncheon Vouchers. Salary £1/1,250 per annum. Reply 8, City Road, London, E.C.1. S1279

ASSISTANTS, INTERMEDIATE-FINAL STANDARD, WITH OFFICE EXPERIENCE, REQUIRED FOR VARIED INTERESTING PROJECTS. CONGENIAL OFFICE. SALARY ACCORDING TO ABILITY. NORMAN GREEN, F.R.I.B.A., 12 ADELINE PLACE, BEDFORD SQUARE, W.C.1. S1282

MAIDSTONE.—ASSISTANT required. Interesting and varied work. Advise experience, salary required, when available. Box S1369.

ARCHITECT requires ASSISTANTS of Final and Intermediate standard for expanding practice. Write stating age, experience and salary required. J. D. Coxon, A.R.I.B.A., 14, Grey Street, Newcastle upon Tyne. Telephone 24746. S1309

YOUNG, progressive West End firm require enthusiastic ASSISTANTS to take responsibility for a wide variety of contemporary work in expanding but informal office. Write with brief details to: Diamond, Redfern & Partners, 92 George Street, London, W.1. S1325

TRIPE & WAKEHAM, Chartered Architects, require ASSISTANTS to work in their London office. Telephone WELbeck 7744 or write to 16, Fitzhardinge Street, London, W.1, for an appointment. S1451

ASSISTANT needed by small progressive office for work on wide range of jobs. Offices in pleasant surroundings. 35-hour week ending daily at 4.30. Phone Riley & Glanfield at CHAncery 7328 or write to 6, Raymond Buildings, Gray's Inn, W.C.1. TC1324

PLAYNE & LACEY & PARTNERS require (*a*) an ARCHITECTURAL ASSISTANT of Intermediate standard with two years' practical experience, and (*b*) an ARCHITECTURAL ASSISTANT who has qualified and has since had two years' practical experience. A man of Final standard with appropriate practical experience would be considered. Salary in each case by arrangement. Write 19, Queen Anne's Gate, Westminster, S.W.1, or ring WHI 2552 for interview. TC1366

THE following vacancies occur in Reading and Bristol for:—

(1) SENIOR ASSISTANT ARCHITECTS, £1,200—£1,400. Applicants must be qualified and have had post graduate experience, or have had ten years' experience.

(2) ARCHITECTURAL ASSISTANTS, £750—£1,200. Applicants should have had several years' experience in an Architect's office and be capable of producing working drawings and details with the minimum of supervision.

Salaries progressive on merit; permanent pensionable positions. Applications, stating full details of qualifications, experience, age, etc., should be forwarded to the Senior Architect, Box S1367.

COVELL, MATTHEWS AND PARTNERS require ARCHITECTURAL ASSISTANTS to work on the Manchester Piccadilly Development project. Salary up to £1,450. Telephone REGent 3651. S1371

INTERMEDIATE/FINAL ASSISTANT required immediately. Work includes Schools, Factories, Offices, etc. Good salary paid to keen man willing to take responsibility. Write or telephone: Gerald Shenstone & Partners, 34, Bloomsbury Way, W.C.1. CHAncery 3444. S1418

ROBERT MATTHEW, JOHNSON-MARSHALL & PARTNERS require ASSISTANTS in their EDINBURGH and DUNDEE offices to work on an exceptionally interesting range of HOSPITAL AND MEDICAL RESEARCH projects.

Minimum starting salaries:—

(*a*) Completed full-time technical education £900
(*b*) Elected A.R.I.B.A. £1,100
(*c*) At least two years' experience since election A.R.I.B.A. £1,300

Write to 13, South Charlotte Street, Edinburgh, 2, or telephone CALedonian 3638. S1374

ARCHITECTS in Private Practice in London will pay £1,500 per annum to competent ARCHITECTURAL ASSISTANTS. Varied and interesting work in hand. Write stating age and experience and salary required to Box S1372.

ARCHITECT required with real design skill and some practical experience who is capable of designing and planning projects with minimum supervision. Wide variety of work including hospitals, offices, departmental stores, etc. Salary £1,800 or more for man with real ability. Central London. Apply Box S1411.

ASSISTANT of Intermediate standard required for Mayfair Architects engaged on interesting large scale projects. Write full particulars. TERENCE VERITY ASSOCIATES, 94, Mount Street, Mayfair, W.1, or telephone GROsvenor 8916. S1412

JAMES & BYWATERS

Large Housing Developments,
Office buildings,
Flats,
Showrooms.

London office has vacancy
for experienced
SENIOR ASSISTANT.

MUSeum 9952. S1417

HOSPITAL ARCHITECT

Required for design work on hospitals. Llewelyn Davies & Weeks, 18, Woburn Square, London, W.C.1. MUS. 7249. 1433

EXPERIENCED and capable SENIOR ASSISTANT required in London. Varied and interesting work, pleasant office, five-day week. Annual bonus. Salary £1,500 per annum. Apply giving all particulars. Write Box 4401, c/o Charles Barker & Sons Limited, 20, Cannon Street, London, E.C.4. S1431

£1,200—£1,500. ARCHITECTURAL ASSISTANT required for expanding progressive firm. Varied and interesting work with good opportunities to use talent and initiative. Five-day week. Pleasant working conditions in new building.

Morgan & Branch,
Newspaper House,
8/16, Gt. New Street,
E.C.4. Tel. FLE. 2771. S1432

INTERMEDIATE ASSISTANT required to work in small office, therefore must be capable of working on own initiative, but working with other Assistants on larger projects over £100,000. Projects include office, commercial and industrial work. Write with details to Box S1404, or telephone Mr. Kenzie, CHA. 1371.

FARMER AND DARK

have some vacancies for
QUALIFIED ARCHITECTS, age 25/35,
preferably with office experience
for varied and interesting home
and overseas work. Five-day week.

Apply to Romney House, Tufton Street, S.W.1.
Tel.: ABBey 6311. S1396

ARCHITECTURAL ASSISTANTS, Intermediate or Final standard, also DRAUGHTSMEN, required in London for varied and interesting work. Salary up to £1,300 according to experience and ability. Five-day week, luncheon vouchers. Box S1395.

WANTED: TWO JUNIOR ARCHITECTURAL ASSISTANTS by West End Architects for buildings and interiors. At least Intermediate R.I.B.A. standard or equivalent. Good prospects and satisfactory working conditions. Salary dependent on experience and qualifications. Apply Box S1406.

POULTON & FREEMAN require SENIOR ASSISTANT to work on interesting new projects. Salary £1,200—£1,500. Also INTERMEDIATE ASSISTANT, salary according to experience. Three weeks paid holiday per year. Luncheon vouchers. Telephone AMBassador 2211 or write 7A, Wyndham Place, W.1. S1409

BIRMINGHAM Architects require Intermediate to Final standard ASSISTANTS to work on a wide variety of interesting projects. Scope for initiative and advancement with attractive salaries. Apply in writing to Box S1424.

LANCHESTER & LODGE require keen, young and enthusiastic ASSISTANTS not over 30 years of age. Varied work both large and small offering good all round experience. Please write full particulars including salary required. 10, Woburn Square, London, W.C.1. TC1425

URGENTLY required: Experienced and reliable ASSISTANT capable of preparing specifications and supervising contracts. Small but busy office. Variety of work, chiefly domestic. Full particulars and salary required to A. W. J. Mullins, L.R.I.B.A., 78, Thoro'fare, Woodbridge, Suffolk. S1231

EXPERIENCED ASSISTANT required in small but busy practice situated in market town near Oxford. Work varied and widespread. Salary according to experience. Assistance with housing might be considered. Gerald Banks, 5 London Road, Bicester, Oxfordshire. Tel. No. 308. 1455

CHELTENHAM ARCHITECTS require an experienced ASSISTANT of Intermediate-Final standard. Varied work, congenial conditions, salary by arrangement. Write to Stanley & Hird, 98 Prestbury Road, Cheltenham. 1483

CHAMBERLIN, POWELL & BON require an ASSISTANT in their Research Section. The work involves research in building materials and building methods in connection with a large number of interesting projects. It is desirable that applicants should have some years' experience in a large office. Salary to be in accordance with experience. Applications should be made to the Director, Research Section, 1 Lamont Road Passage, London, S.W.10. 1485

URGENTLY REQUIRED. Intermediate to Final standard ARCHITECTURAL ASSISTANT for varied and busy practice. Pleasant atmosphere made by amiable and considerate fellow workers. Current driving licence an advantage. Write, giving full particulars of experience. Peter B. Davenport, A.R.I.B.A., 34, Market Street, Hyde. 1498

A VACANCY will shortly occur in the office of Northern based staff Architect for an ASSISTANT of Intermediate standard, with sound knowledge of basic structural design. The work is mainly industrial re-instatement and maintenance in traditional materials but substantial in amount. The post would have technical and some administrative responsibility, and is pensionable. Please submit brief details of age, career with dates, and salary expected to: Box 1462.

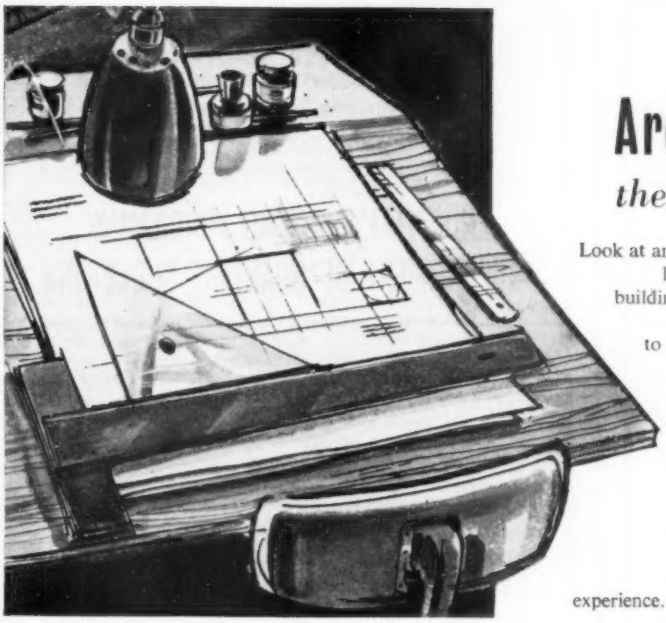
ASSISTANT ARCHITECTS and ARCHITECTS ASSISTANTS required on interesting and varied public buildings. Small office. Generous salary. Apply, The Secretary, McMorran and Whitby, 14 North Audley Street, London, W.1. Telephone MAYfair 6036. 1461

ARCHITECTS required, Glasgow. Five-day week, luncheon vouchers. Start £1,500 per annum. Box S1474.

ARCHITECTURAL ASSISTANTS, Junior, Intermediate and Senior, required by Naylor, Sale & Widdows, Chartered Architects, St. Mary's Gate, Derby. Appreciation of modern design and experience in the organisation and control of contracts are essential for the senior grades. Assistants in housing accommodation will be considered. S1473

SMALL West End Office requires two responsible School-trained ASSISTANTS, preferably with office experience. Salary commensurate with design ability and initiative displayed. Good prospects and pleasant conditions. Booty Edwards & Partners, 24 Portland Place, London, W.1. Tel.: Langham 5270/Museum 1328. 1463

INTERMEDIATE standard ASSISTANTS with high standard of detailing ability required for large office to work on wide range of interesting projects. The post is permanent and the salary commensurate with age, ability and initiative. Annual bonus. Own car an advantage. Write or telephone Sutton, Griffin and Sweetnam, Dip.Arch., F/F.R.I.B.A., 87, Northbrook Street, Newbury, Berkshire. Telephone: Newbury 2812. 1467



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Look at any recently-opened Westminster Bank branch and you will see how far our kind of architecture has travelled from the severe buildings of not so long ago. There's plenty of opportunity with us for adventure in architecture. Plenty of opportunity, too, to advance in your profession. As an Architect's Assistant with Westminster Bank you would work in a well-equipped drawing office where good work never goes unnoticed. There are excellent prospects of subsequent advancement. You would enjoy, *in addition to a realistic salary*, those other advantages which are traditional in the world of banking: security of tenure in your job, an unusually generous and entirely free pension, house mortgages at favourable rates. There is, too, a first-rate Sports Club. So: we offer you the adventure of architecture in the security of banking. Write to us now, stating your age and experience. We will gladly refund your fare when you come for interview.

THE ARCHITECT

Westminster Bank Limited

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EXPERIENCED ARCHITECTURAL ASSISTANTS and DRAUGHTSMEN

Required for heavy programme of building development.

Good working conditions in pleasant surroundings. 5-day week. Progressive salaries commensurate with age and ability. Continuous employment. Pension scheme. Staff canteen.

Interviews to suit applicants.

Write :—

District Architect,
F. W. WOOLWORTH and CO., LIMITED
1264/1266 London Road, Norbury, London, S.W.16

THE RANK ORGANISATION

require in the Works Development Department of Circuits Management Association Limited, additional

ARCHITECTURAL ASSISTANTS

of intermediate and final standards. Experience and knowledge of interior design essential, as this forms a large part of the work. The position is permanent and provides interesting and varied work on Bowling Establishments, Ballrooms, Health Centres, Restaurants, etc. Good opportunity for someone with ability and initiative. Progressive salary. Contributory pension scheme. Free life assurance. Please write giving age, exp. and salary required to The Personnel Officer, The Rank Organisation, 11 Belgrave Road, London, S.W.1.

Architect

required by

PROWTING ESTATES LTD

For new area office in Winchester, Hants. Experience necessary in all classes of housing, flat and shop development. Must be capable of producing completed schemes, from site survey to Planning Approval, including working drawings.

Write to Managing Director,
Prowting Estates Ltd.,
Bury Street, Ruislip, Middlesex

NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD

40 Eastbourne Terrace, London, W.2

W. G. Plant, Dip.Arch.(L'pool), F.R.I.B.A., Regional Architect

HOSPITAL BUILDING PROGRAMME APPOINTMENT OF QUANTITY SURVEYORS

The Board is substantially increasing its staff to deal with rapidly increasing Hospital Building Programmes, and QUANTITY SURVEYORS are invited to apply for the under-mentioned posts which offer interesting opportunities in all aspects of the profession.

Posts are pensionable, with five-day week, and leave 20 days, rising to 23 days.

Car mileage allowance will be payable. Applicants must be Corporate Members of the Royal Institution of Chartered Surveyors.

Senior Assistant Quantity Surveyors

Salary scale commencing at £1,350, rising to £1,650.

Assistant Quantity Surveyors

Salary according to age and experience, within scale £945-£1,360.

Application forms obtainable from Secretary, North East Metropolitan Regional Hospital Board, 40 Eastbourne Terrace, London, W.2, to be returned by 27th December, 1961.

ARCHITECTS

A leading London firm of Architects, whose practice covers University, Hospital and Commercial Buildings, require additional men and women Qualified Architects who have had not less than 2/3 years' experience. The work is varied and interesting, in a congenial professional atmosphere, and staff are able to follow a project through from design to completion. Preferred age 25/35. Initial salary up to £2,000 p.a. according to experience. There are prospects of rapid advancement.

Reference No. 248

Please reply in confidence, quoting reference number, to :

Robert Clive (Consultants) Limited

Appointments Consultants
27, ALBEMARLE STREET, LONDON, W.1

SCOTTISH SPECIAL
HOUSING ASSOCIATION LIMITED

ARCHITECTURAL DIVISION APPOINTMENT of ARCHITECTS

Applications are invited from qualified Architects for the following appointments on the permanent staff :—

Architects Grade II—Salary Scale £1,005–£1,560.

The posts are superannuable under the Local Government Superannuation Acts, and placing will be related to experience.

The Association is a Government sponsored and financed body, providing houses and flats throughout Scotland as directed by the Secretary of State.

The Association has at present a large and interesting programme comprising a number of major housing projects, including central redevelopment in Glasgow and other towns, together with an important programme of work in connection with Glasgow's " Overspill ". Designs for mixed development layouts, including multi-storey blocks of flats up to 26-storeys in height, are being prepared and cost analysis techniques are being used in the preparation of drawings. The posts advertised offer considerable valuable experience and opportunities for persons interested in civic design, landscaping and three dimensional planning of urban developments.

The Headquarters of the Association are in Edinburgh, where housing accommodation may be provided if required.

Application forms with full details of the appointments from Harold E. Buteux, A.R.I.B.A., A.M.T.P.I., A.R.I.A.S., Chief Technical Officer, Scottish Special Housing Association Ltd., 15/21 Palmerston Place, Edinburgh, 12.

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CASSIDY FARRINGTON & DENNYS need urgently ASSISTANTS of Intermediate or Final standard with some office experience willing to accept responsibility. Salary by arrangement. Pleasant small office with varied work. Arrangements made for part-time school training. Telephone LANgham 6290. S1471

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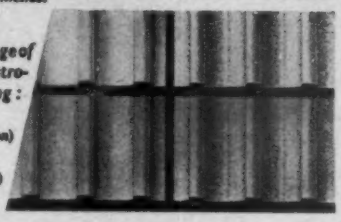

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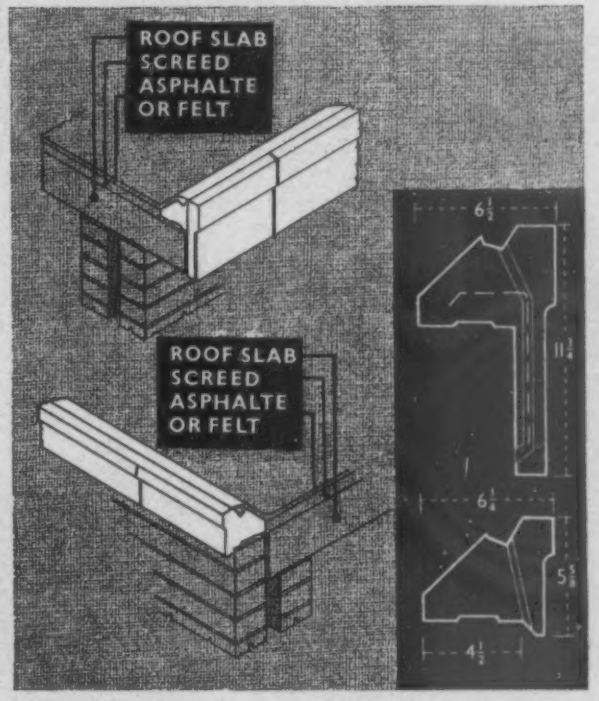

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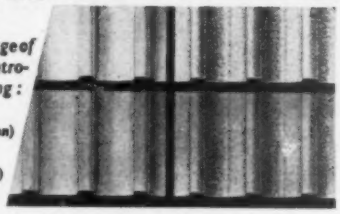

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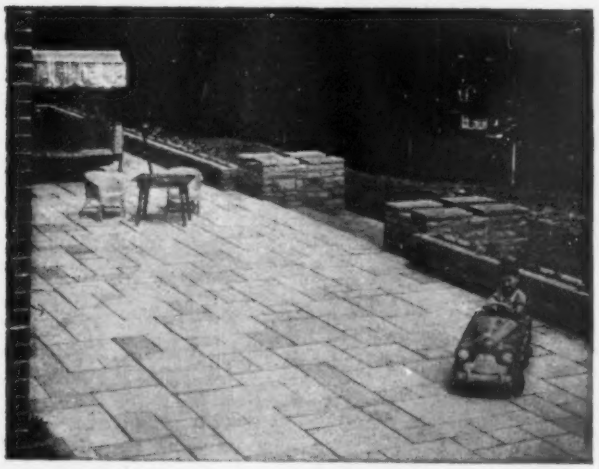

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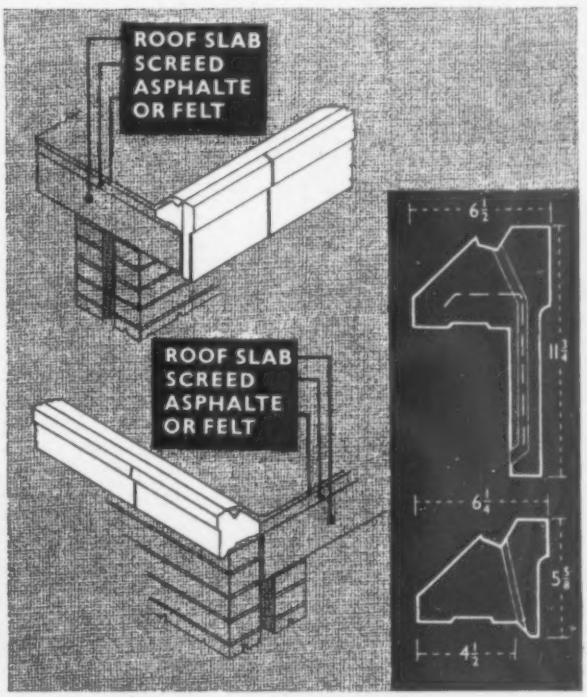

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