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The Architects' JOURNAL for April 24, 1958

THE ARCHITECTS' JOURNAL

No. 3295] [Vol. 127

THE ARCHITECTURAL PRESS

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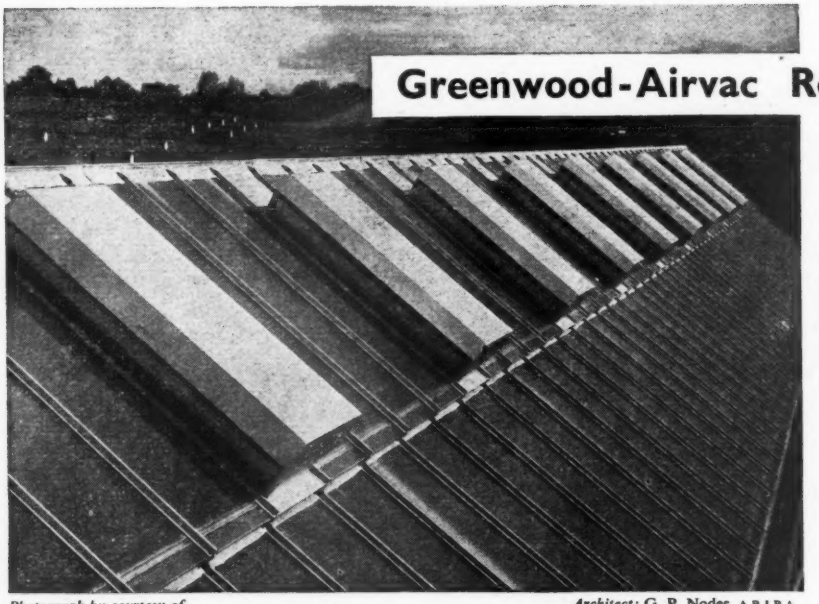
★ A glossary of abbreviations of Government Departments and Societies and Committees of all kinds, together with their full address and telephone numbers. The glossary is published in two parts—A to Ig one week, Ih to Z the next. In all cases where the town is not mentioned the word LONDON is implicit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

AA	Architectural Association, 34/6, Bedford Square, W.C.1.	Museum 0974
AAI	Association of Art Institutions. Secy.: W. L. Stevenson, College of Art, Hope Street, Liverpool 1.	Royal 1826
ABS	Architects' Benevolent Society. 66, Portland Place, W.1.	Langham 5721
ABT	Association of Building Technicians. 1, Ashley Place, S.W.1.	Victoria 0447–8
ACGB	Arts Council of Great Britain. 4, St. James' Square, S.W.1.	Whitehall 9737
ADA	Aluminium Development Association. 33, Grosvenor Street, W.1.	Mayfair 7501/8
ARCUK	Architects' Registration Council. 78, Wimpole Street, W.1.	Welbeck 2915
BAE	Board of Architectural Education. 66, Portland Place, W.1.	Langham 5721
BC	Building Centre. 26, Store Street, Tottenham Court Road, W.C.1.	Museum 5400
BCC	British Colour Council. 13, Portman Square, W.1.	Welbeck 4185
BCCF	British Cast Concrete Federation. 105, Uxbridge Road, Ealing, W.5.	Ealing 9621
BCIRA	British Cast Iron Research Association. Alvechurch, Birmingham.	Redditch 716
BDA	British Door Association. 10, The Boltons, S.W.10.	Fremantle 8494
BEDA	British Electrical Development Association. 2, Savoy Hill, W.C.2.	Temple Bar 9434
BIA	British Ironfounders' Association. 145, Vincent Street, Glasgow, C.2.	Glasgow Central 2891
BID	Building Industries Distributors. 52, High Holborn, W.C.1.	Chancery 7772
BINC	Building Industries National Council. 11, Weymouth Street, W.1.	Langham 2785
BOT	Board of Trade. Whitehall Gardens, Horseguards' Avenue, Whitehall, S.W.1.	Trafalgar 8855
BRS	Building Research Station. Bucknalls Lane, Watford.	Garston 4040
BSA	Building Societies Association. 14, Park Street, W.1.	Mayfair 0515
BSI	British Standards Institution. British Standards House, 2, Park St., W.1.	Mayfair 9000
BTE	Building Trades Exhibition. 32, Millbank, S.W.1.	Tate Gallery 8134
CABAS	City and Borough Architects Society. C/o S. A. G. Cook, A.R.I.B.A., Borough Architect and Director of Housing, Town Hall, High Holborn, W.C.1.	Holborn 3411
CAS	County Architects' Society. C/o S. Vincent Goodman, F.R.I.B.A., Shire Hall, Bedford.	Bedford 67444
CCA	Cement and Concrete Association. 52, Grosvenor Gardens, S.W.1.	Belgravia 6661
CCP	Council for Codes of Practice. Lambeth Bridge House, S.E.1.	Reliance 7611 Ext. 1284
CDA	Copper Development Association. 55, South Audley Street, W.1.	Grosvenor 8811
CIAM	Congrès Internationaux d'Architecture Moderne. Doldertal, 7, Zurich, Switzerland	
COID	Council of Industrial Design. 28, Haymarket, S.W.1.	Trafalgar 8000
CPRE	Council for the Preservation of Rural England. 4, Hobart Place, S.W.1.	Sloane 4280
CUC	Coal Utilization Council. 3, Upper Belgrave Street, S.W.1.	Sloane 9116
CVE	Council for Visual Education. 13, Suffolk Street, Haymarket, S.W.1.	Reading 72255
DGW	Directorate General of Works, Ministry of Works, Lambeth Bridge House, S.E.1.	Reliance 7611
DIA	Design and Industries Association. 13, Suffolk Street, S.W.1.	Whitehall 0540
DOT	Department of Overseas Trade. Horseguards Avenue, Whitehall, S.W.1.	Trafalgar 8855
EJMA	English Joinery Manufacturers' Association (Incorporated). Sackville House, 40, Piccadilly, W.1.	Regent 4448
EPNS	English Place-Name Society. 7, Selwyn Gardens, Cambridge.	
FAS	Faculty of Architects and Surveyors. 68, Gloucester Place, W.1.	Welbeck 9966
FASS	Federation of Associations of Specialists and Sub-Contractors, 14, Bryanston Street, W.1.	Welbeck 1781
FBBDO	Fibre Building Board Development Organization Ltd. (Fidor), 47, Princes Gate, Kensington, S.W.7.	Kensington 4577
FBI	Federation of British Industries. 21, Tothill Street, S.W.1.	Whitehall 6711
FC	Forestry Commission. 25, Savile Row, W.1.	Regent 0221
FCMI	Federation of Coated Macadam Industries. 37, Chester Square, S.W.1.	Sloane 1002
FDMA	The Flush Door Manufacturers Association Ltd., Trowell, Nottingham.	Ilkeston 623
FLD	Friends of the Lake District. Pennington House, nr. Ulverston, Lancs.	Ulverston 201
FMB	Federation of Master Builders. 26, Great Ormond Street, Holborn, W.C.1.	Chancery 7583
FPC	The Federation of Painting Contractors, St. Stephen's House, S.W.1.	Whitehall 3902
FRHB	Federation of Registered House Builders. 82, New Cavendish Street, W.1.	Langham 4341
GPDA	Gypsum Plasterboard Development Association. 11, Ironmonger Lane, E.C.2.	Monarch 8888
GC	Gas Council. 1, Grosvenor Place, S.W.1.	Sloane 4554
GG	Georgian Group. 2, Chester Street, S.W.1.	Belgravia 3081
HC	Housing Centre. 13, Suffolk Street, Pall Mall, S.W.1.	Whitehall 2881
IAAS	Incorporated Association of Architects and Surveyors. 29, Belgrave Square, S.W.1.	Belgravia 3755
ICA	Institute of Contemporary Arts. 17-18, Dover Street, Piccadilly, W.1.	Grosvenor 6186
ICE	Institution of Civil Engineers. 1, Great George Street, S.W.1.	Whitehall 4577
IEE	Institution of Electrical Engineers. Savoy Place, Victoria Embankment, W.C.2.	Temple Bar 7676
IES	Illuminating Engineering Society. 32, Victoria Street, S.W.1.	Abbey 5215
IGE	Institution of Gas Engineers. 17, Grosvenor Crescent, S.W.1.	Sloane 8266



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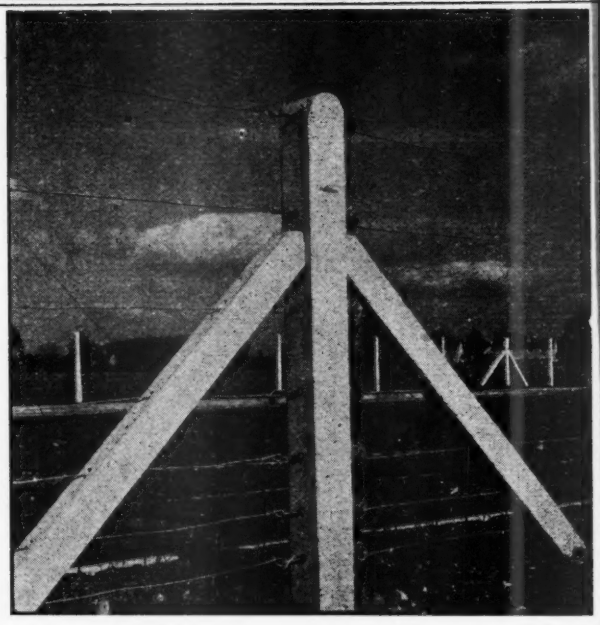

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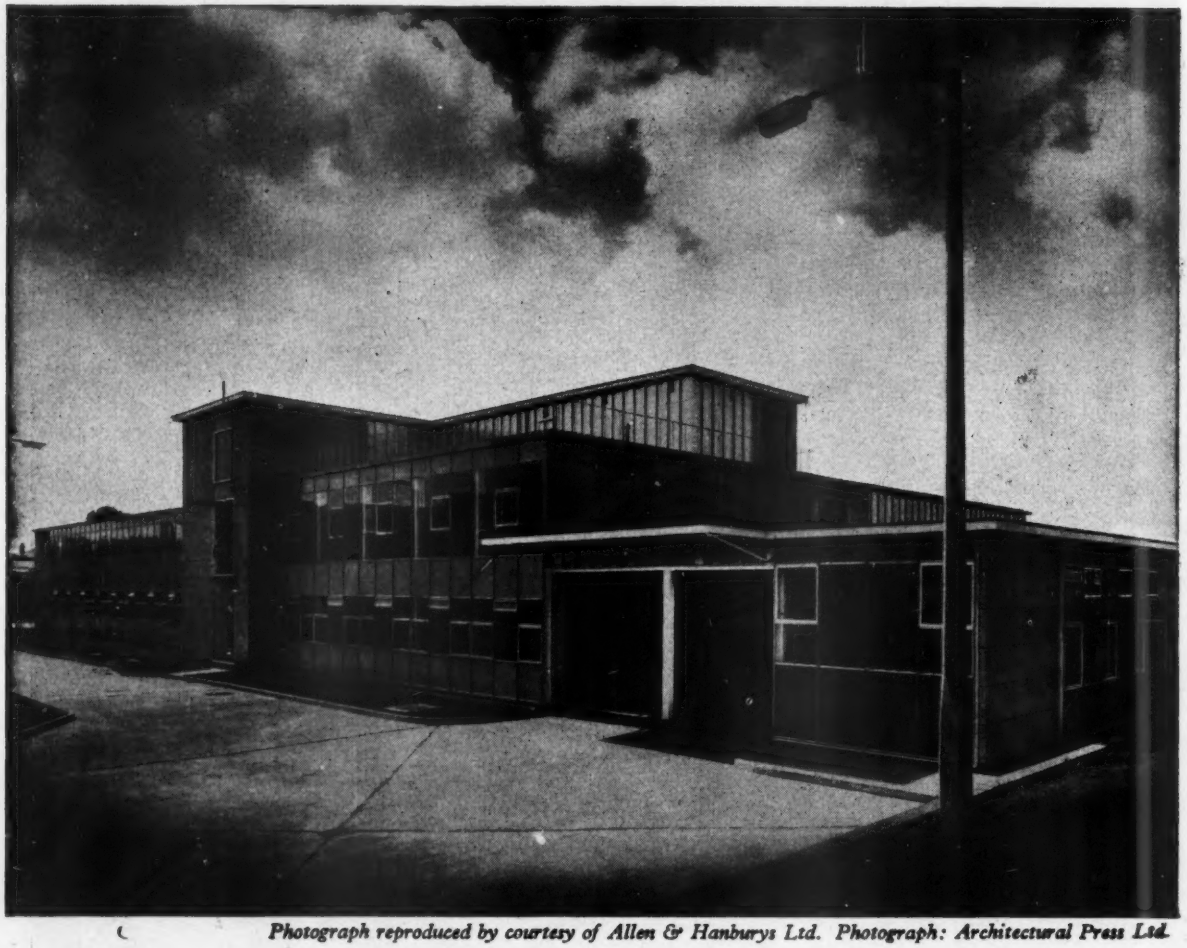

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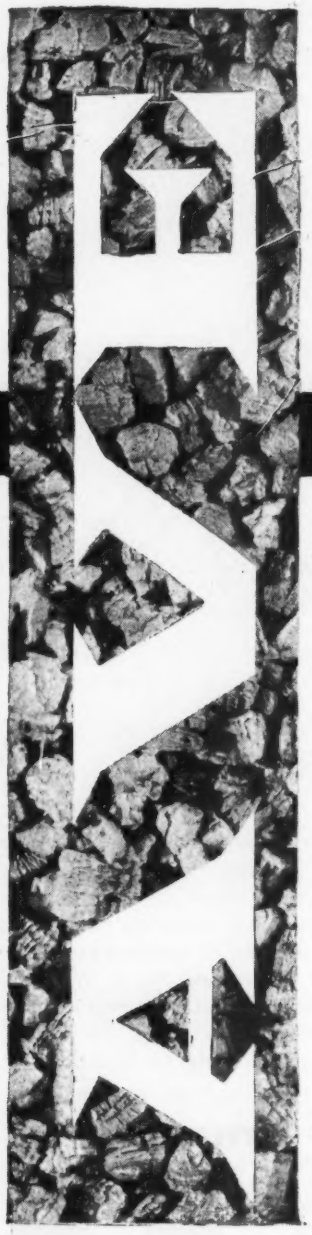

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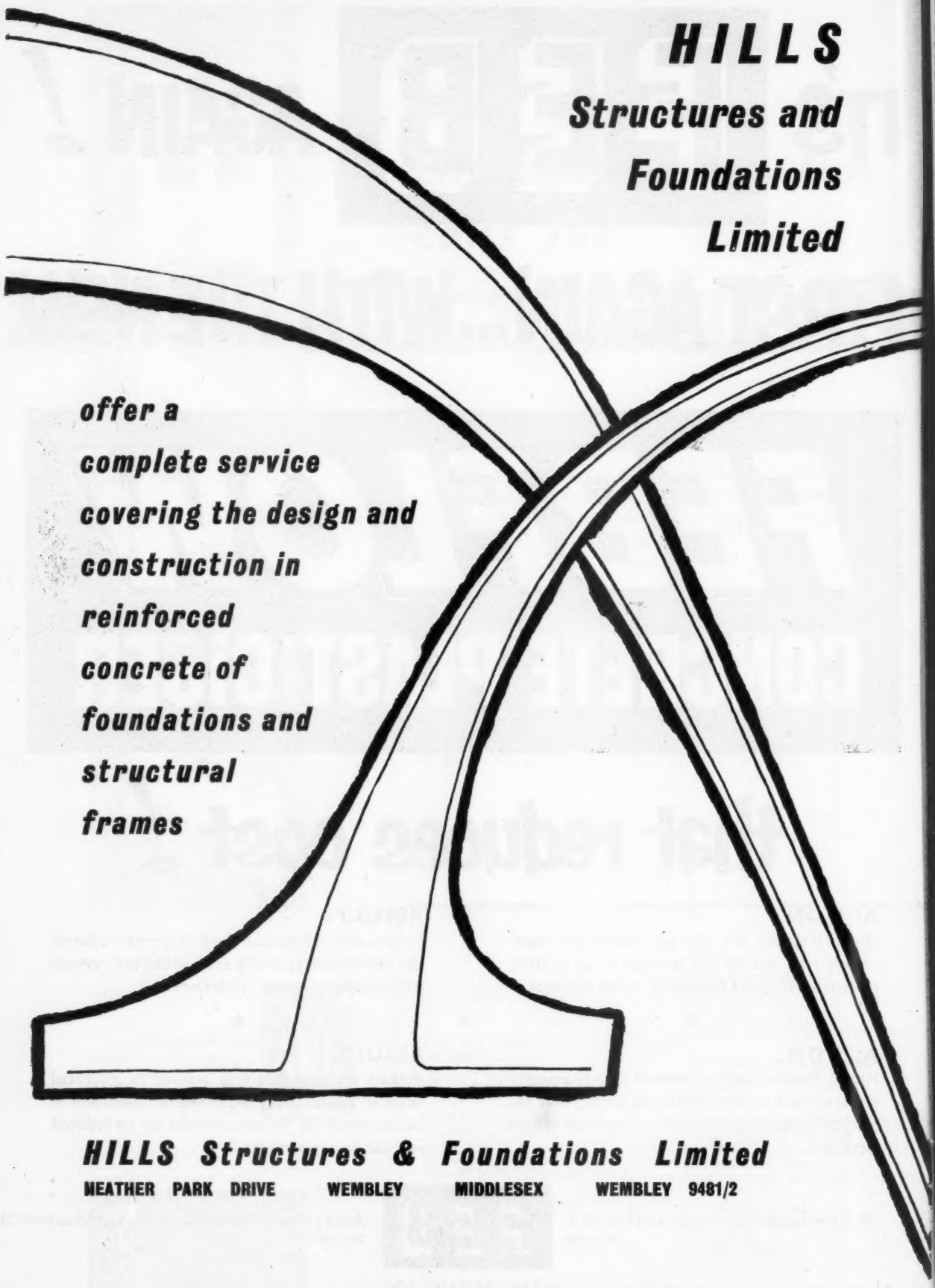

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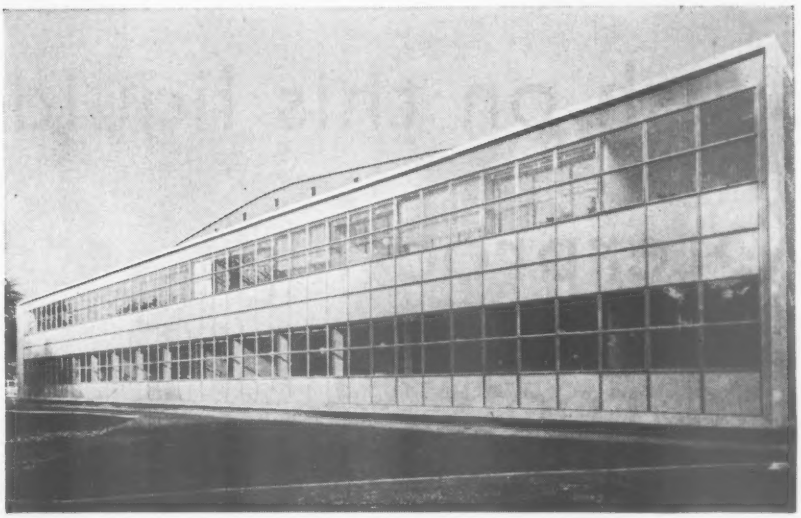

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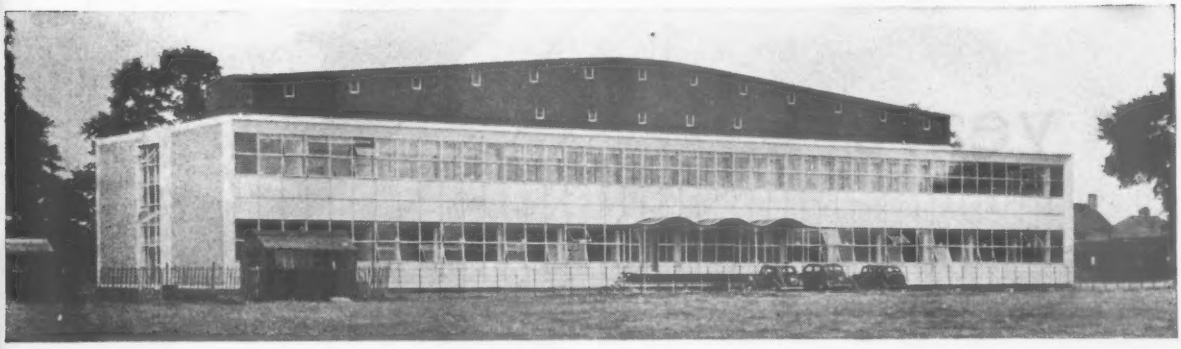

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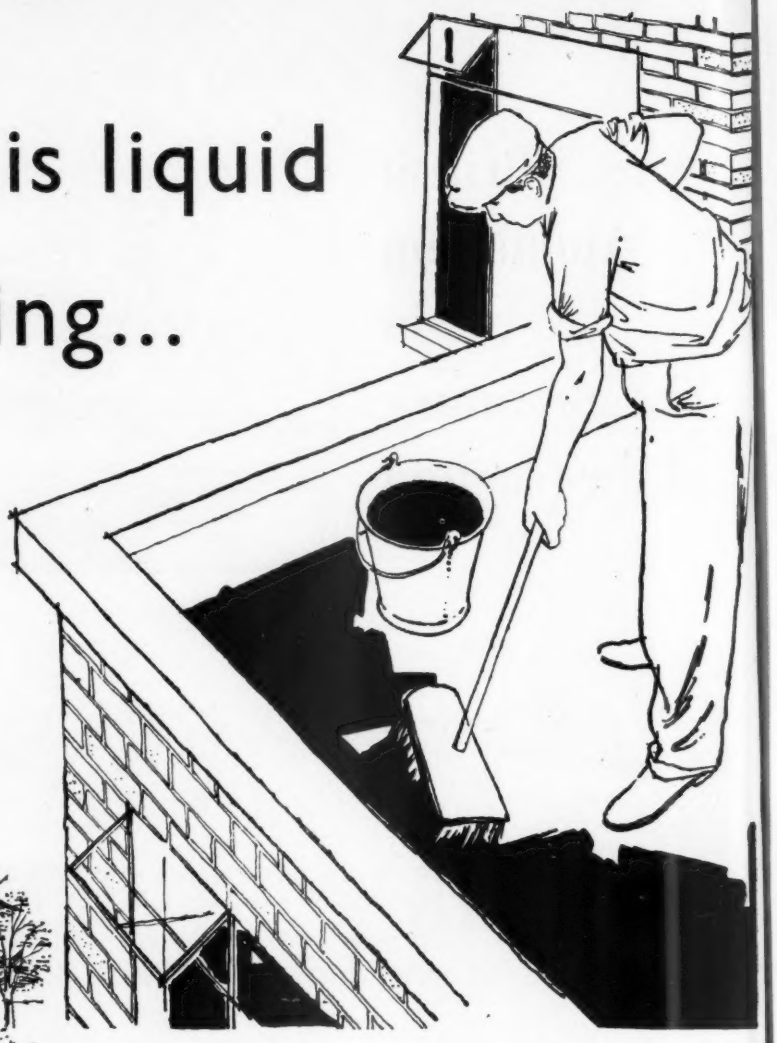

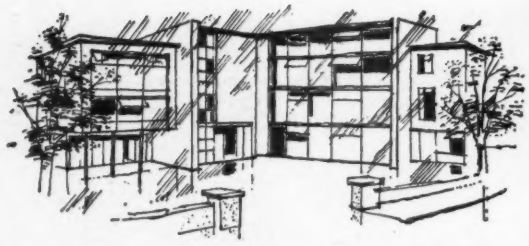

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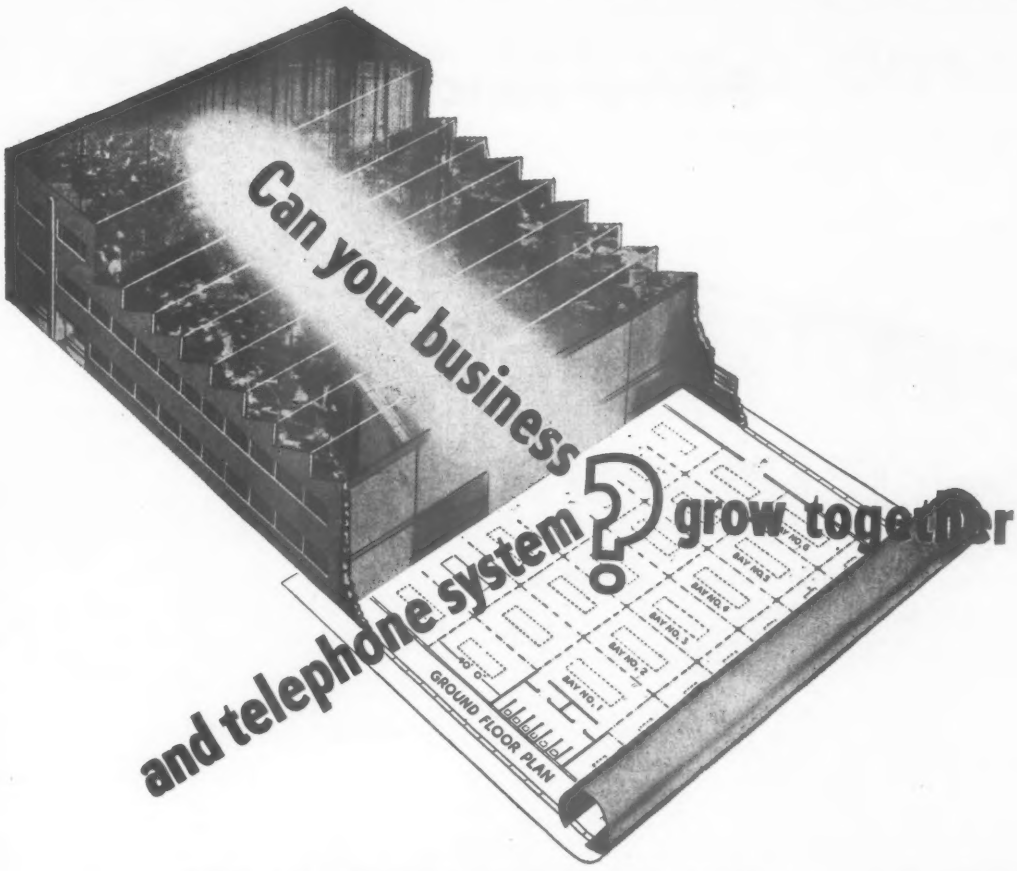

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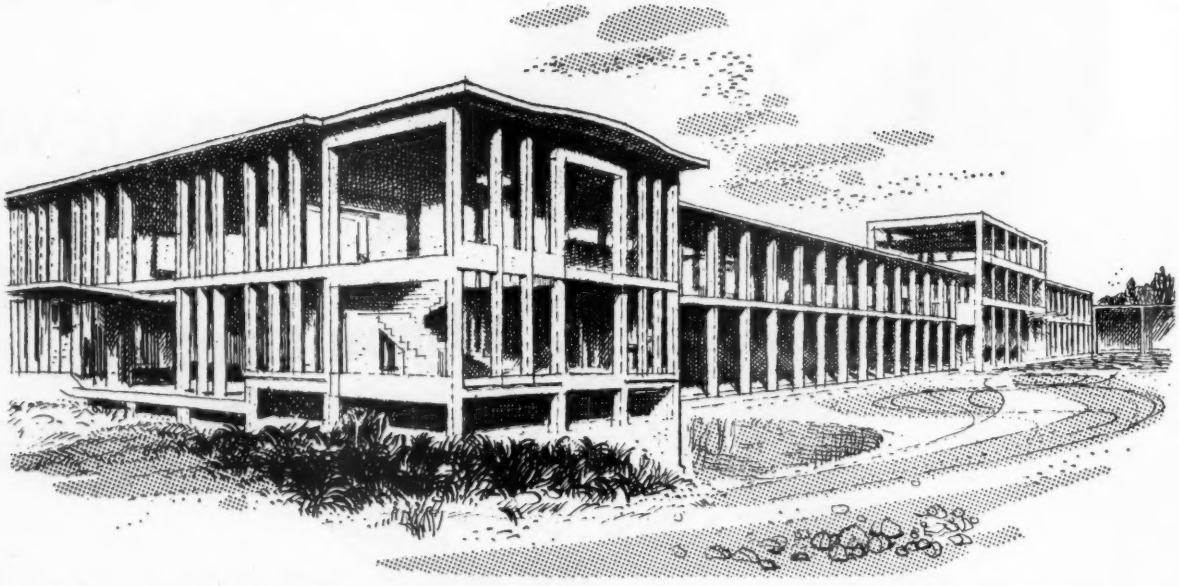

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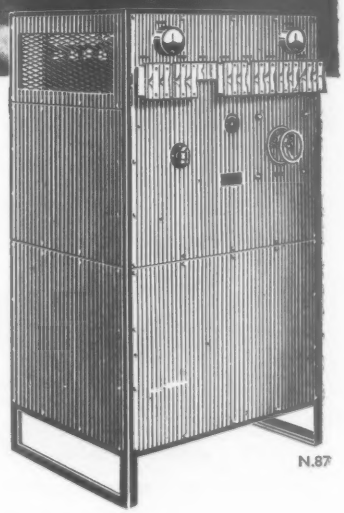

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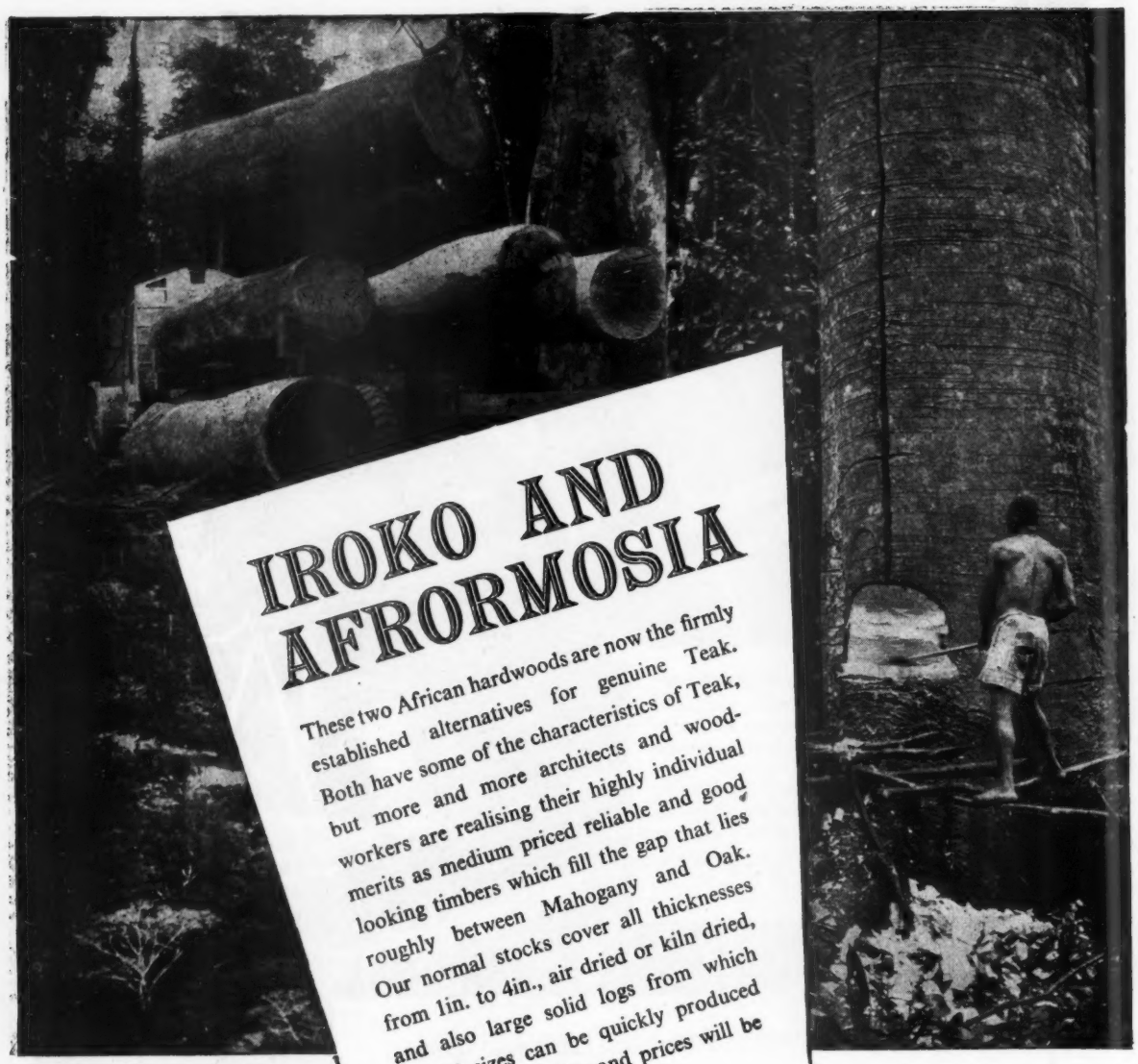

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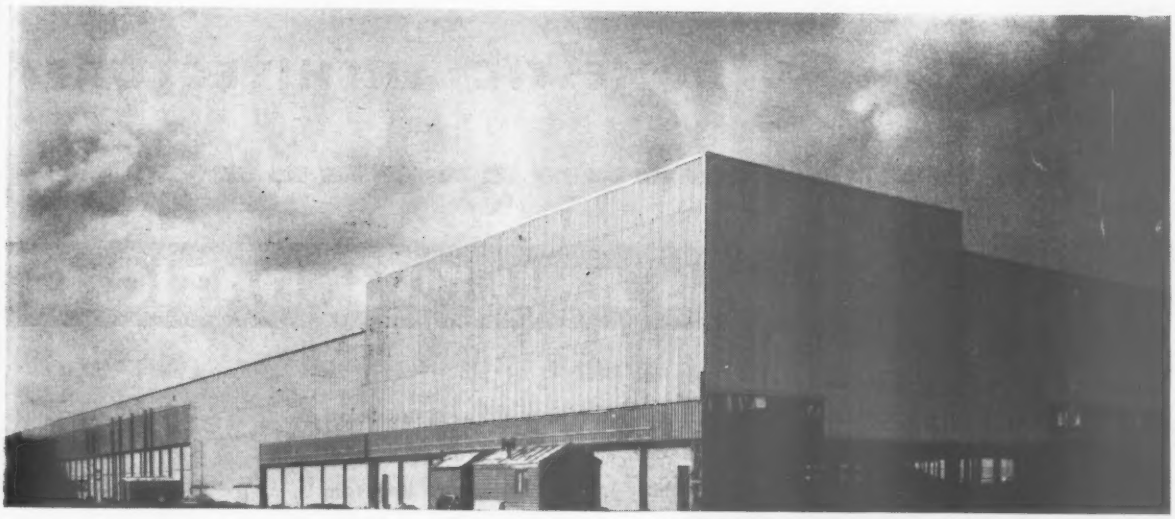

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- ★ LIGHT AND EASY TO HANDLE
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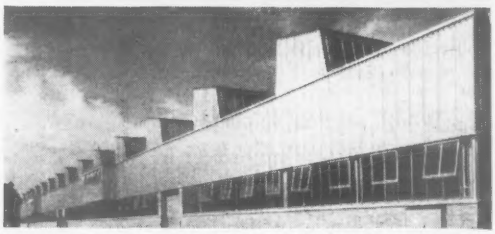

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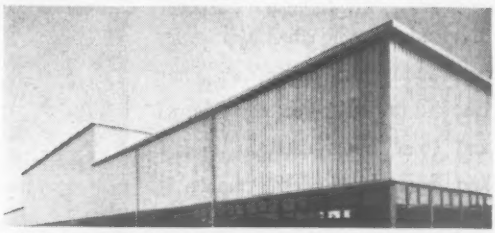

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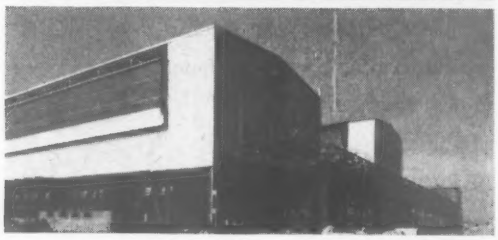

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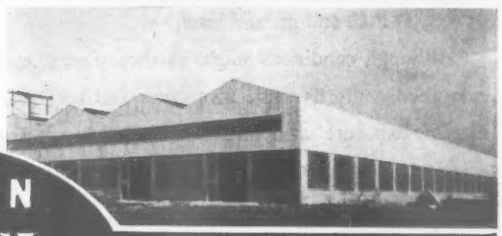

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Illustrations :

Top : Robertson Q-Panel, Type QSG, being erected at the Caterpillar Tractor Company, Tannochside. Architects : Wilson, Hamilton and Wilson, Glasgow.

2 : Robertson Q-Panel, Type QF, at the Rover Company, Solihull. Consulting Engineer : Thomas Bedford, A.M.I.C.E. Architects : Hasker and Hall, London.

3 : Robertson Q-Panel, Type QSA, at the Chance-Pilkington Works. Consultant Architects : Ormrod and Partners, Liverpool. Main Contractors : Holland & Hannen and Cubitts, Ltd.

4 : Robertson Q-Panel, Type QF, at the British Thomson-Houston Works at Larne, Northern Ireland. Contractors : Holland & Hannen and Cubitts, Ltd.

5 : Robertson Q-Panel, Type QF, at Metropolitan-Vickers Electrical Company, Manchester. Design by Metropolitan-Vickers Architects Department.

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QP16

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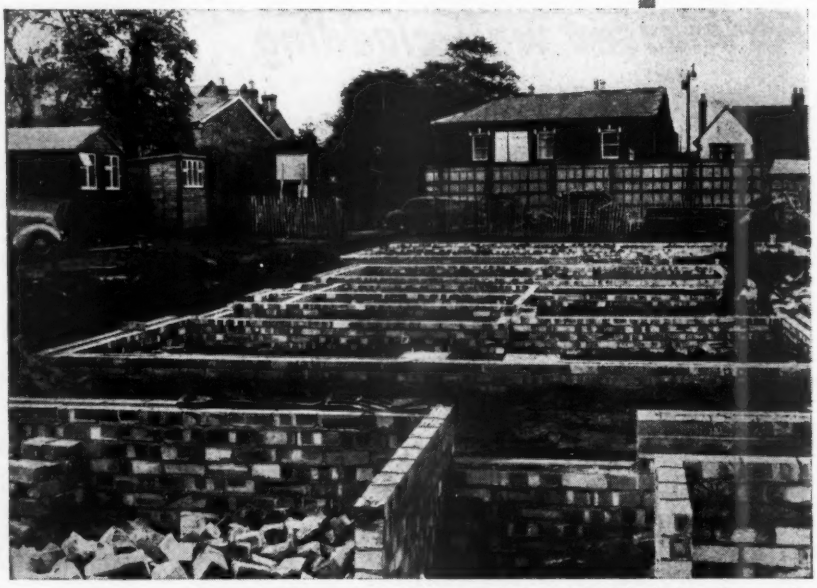
FLETTONS AND FOUNDATIONS

BELOW D.P.C.

In this country where frost rarely penetrates more than a few inches below ground and subsoil moisture conditions remain comparatively uniform the use of 'Phorpres' Flettons for footings is long established practice. Although bricks in footings may be wet they are not subjected to long spells of frost.

Whilst calcium sulphate and magnesium sulphate are present in some soils and other soils are naturally slightly acid, these salts and acids have no effect whatsoever on properly burnt clay bricks. They can and do attack Portland Cement and some limes used in mortar and concrete. For this reason it is good practice in heavily contaminated soils to use sulphate resisting cement to avoid disruption of the mortar.



'Phorpres' Flettons being laid in foundations of the Birmingham Corporation Housing Development at Laurel Road, Handsworth, Birmingham

BETWEEN D.P.C. AND GROUND LEVEL

Practical experience has shown that 'Phorpres' Flettons are entirely suitable for use between D.P.C. and ground level.

Although conditions might in theory seem more severe the building above D.P.C. undoubtedly affords some protection and the conditions obtaining are hardly those of 'extreme exposure' as defined by the Building Research Station.

No case of failure has ever been reported and 'Phorpres' Flettons are specified for foundations by many leading architects and over 400 principal authorities engaged in domestic architecture.

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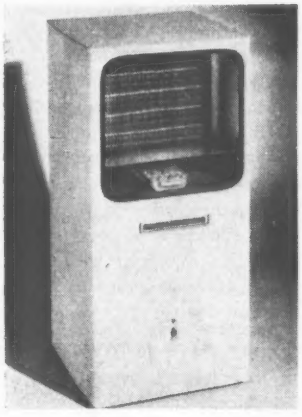
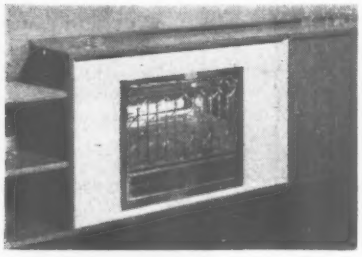
CAN YOU AFFORD NOT TO BUILD THESE HOUSES?

ABOVE: These are some of the all-electric houses on an estate under development at Woking.



LEFT: The Ferranti Fridge-Heater provides constant hot water and a refrigerated larder.

BELOW: Ferranti Panel Fires provide an attractive focal point-of-interest.



They cost less to build less to sell & less to run

These are houses of the future. They will be up-to-date in 1980. Why? Take a look at the roofs—there are no chimneys. These are all-electric houses on an estate which is being developed in Woking. They have a domestic heat pump installed for providing constant hot water and a refrigerated larder. Central heating is provided either by built-in convector heaters or by heating cables buried in solid floors. This latter type of heating gives an evenly spread heat throughout the house and the power may be taken at night when special off-peak rates are available. The absence of chimney breasts and flues means no more draughts and additional space.

The latest types of insulating materials are used in the construction of these houses, for example, lightweight concrete blocks are used for the inner walls and insulation round the edges of the floors prevent loss of heat through the walls. Roof insulation is also provided which cuts down one of the greatest sources of heat loss in any house. And the cost? The capital and running costs are actually less for this type of house than for a conventional one. The all-electric house is here to stay. Look at the tables below: the savings shown are taken from actual figures in the all-electric houses at Woking.

CAPITAL COSTS

All-Electric House

	£	s.	d.
Fridge-heater	159	12	7
Floor warming cable installation	90	0	0
Living room, radiant fire	18	17	8
Bathroom, radiant fire	5	5	0
Bedroom, radiant fires (three)	20	15	3
Extra wiring and labour	15	0	0
	£309	10	6

Conventional House

	£	s.	d.
Refrigerator, 4 cu. ft.	80	0	0
Two chimneys and coal bunker	136	0	0
Flashing, chimney soakers	10	0	0
Tiler and carpenter ...	7	0	0
Ducts in floor ...	1	10	0
Slow burning grate and surround	50	0	0
Five radiators and valves	21	5	0
Towel rail	10	0	0
Boiler and pipes ...	50	0	0
Tubing and plumber's labour	70	0	0
Decorators	3	0	0
	£438	15	0

SAVING BY ELECTRIC METHOD

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The All-Electric House

NEEDS—NO FUEL STORAGE, NO CHIMNEYS, NO FLASHINGS
CUTS BRICKLAYING COSTS, CUTS CARPENTRY COSTS, CUTS TILING COSTS, AND COSTS LESS TO BUILD, LESS TO SELL, LESS TO RUN

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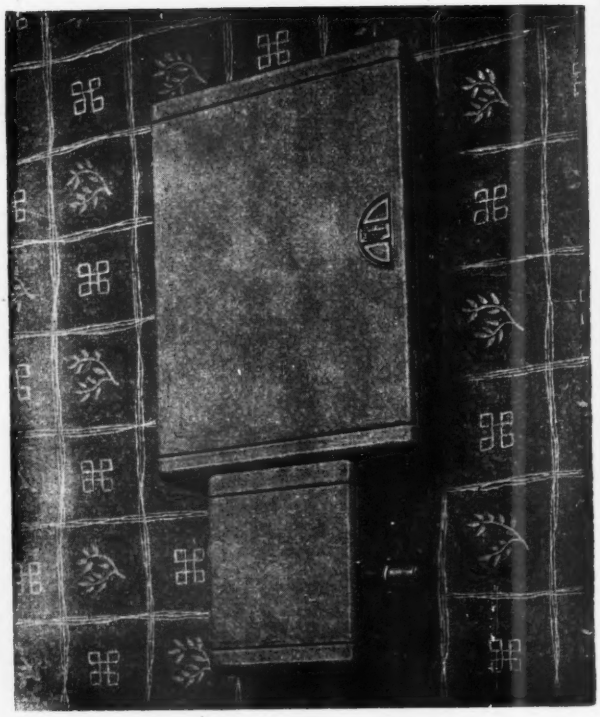

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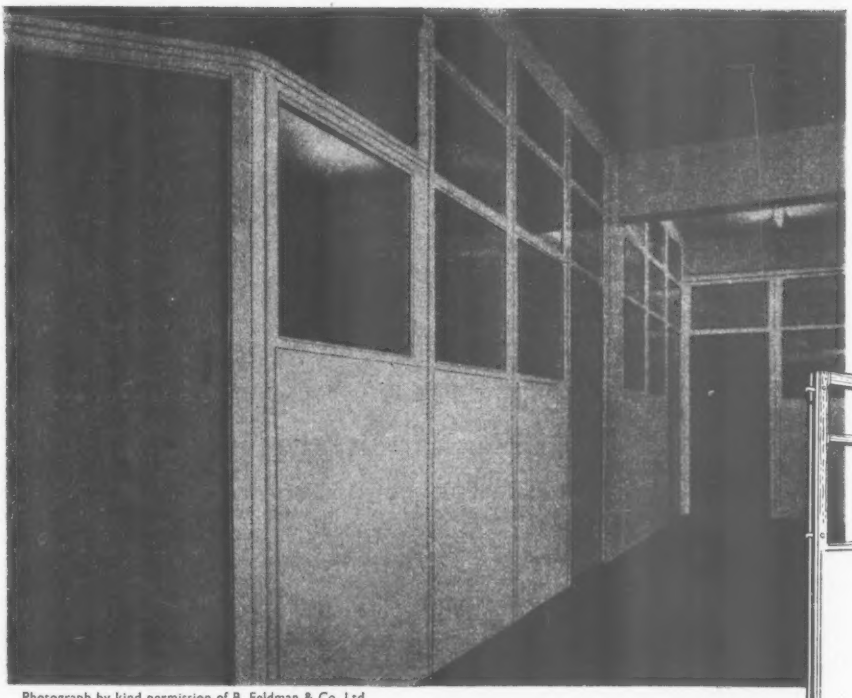

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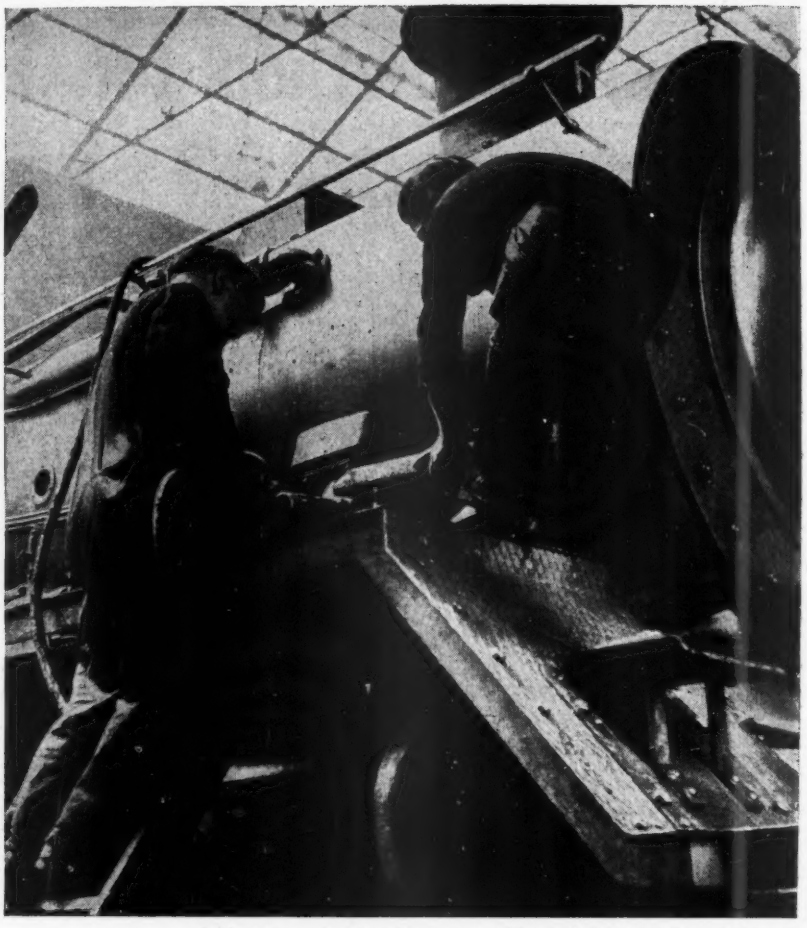

Building a locomotive. Here the operator is drilling platform plates at the smokebox end.

In the locomotive engineering works of the Midlands, in factories all over the country, at home or abroad, wherever you go C.M.A. cables are at work. In the air, underground or underwater, in ships, coalmines and powerhouses, C.M.A. cables are transmitting power, unobtrusively . . . reliably . . . year in year out. For over 100 years members of the Cable Makers Association have been concerned in all major advances in cable making. Together, member firms of C.M.A. spend over one million pounds a year on research and development. At every stage from raw material to finished cable, technical knowledge is pooled and research co-ordinated to avoid wasted effort. This highly-organized co-operative research activity has contributed largely to the world-wide prestige that C.M.A. cables enjoy. It has put Britain at the head of the world's cable exporters. Technical information and advice is freely available from any C.M.A. member.

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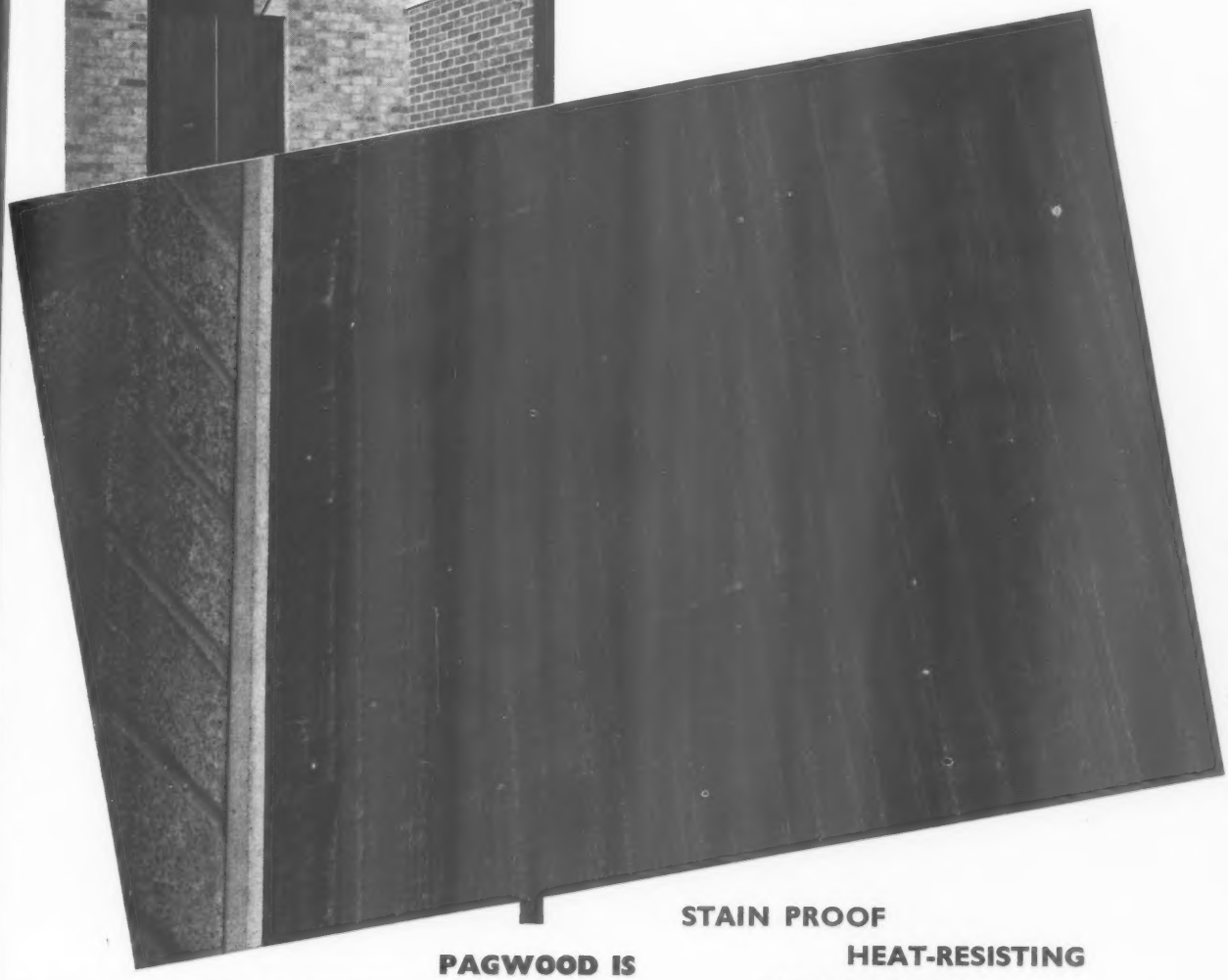

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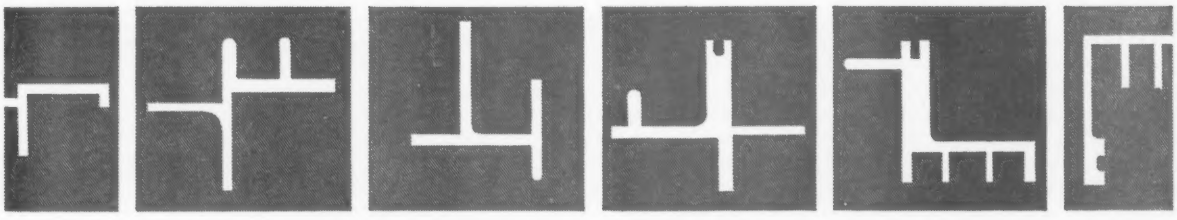

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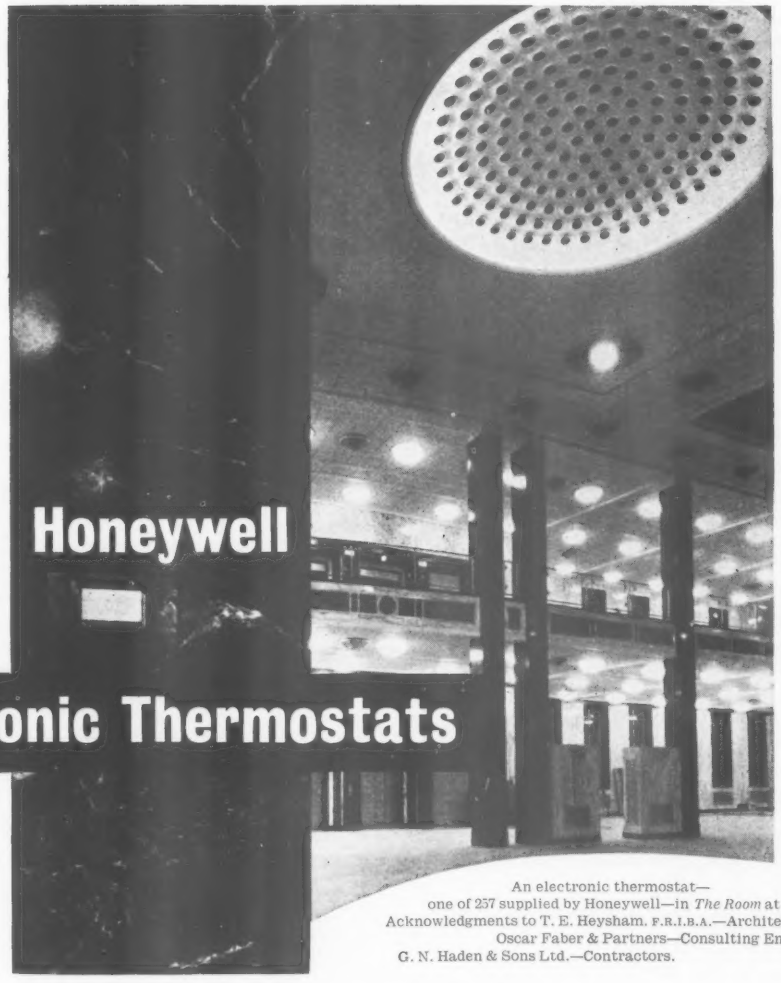

An electronic thermostat—
one of 257 supplied by Honeywell—in *The Room* at Lloyd's new building.
Acknowledgments to T. E. Heysham. F.R.I.B.A.—Architect
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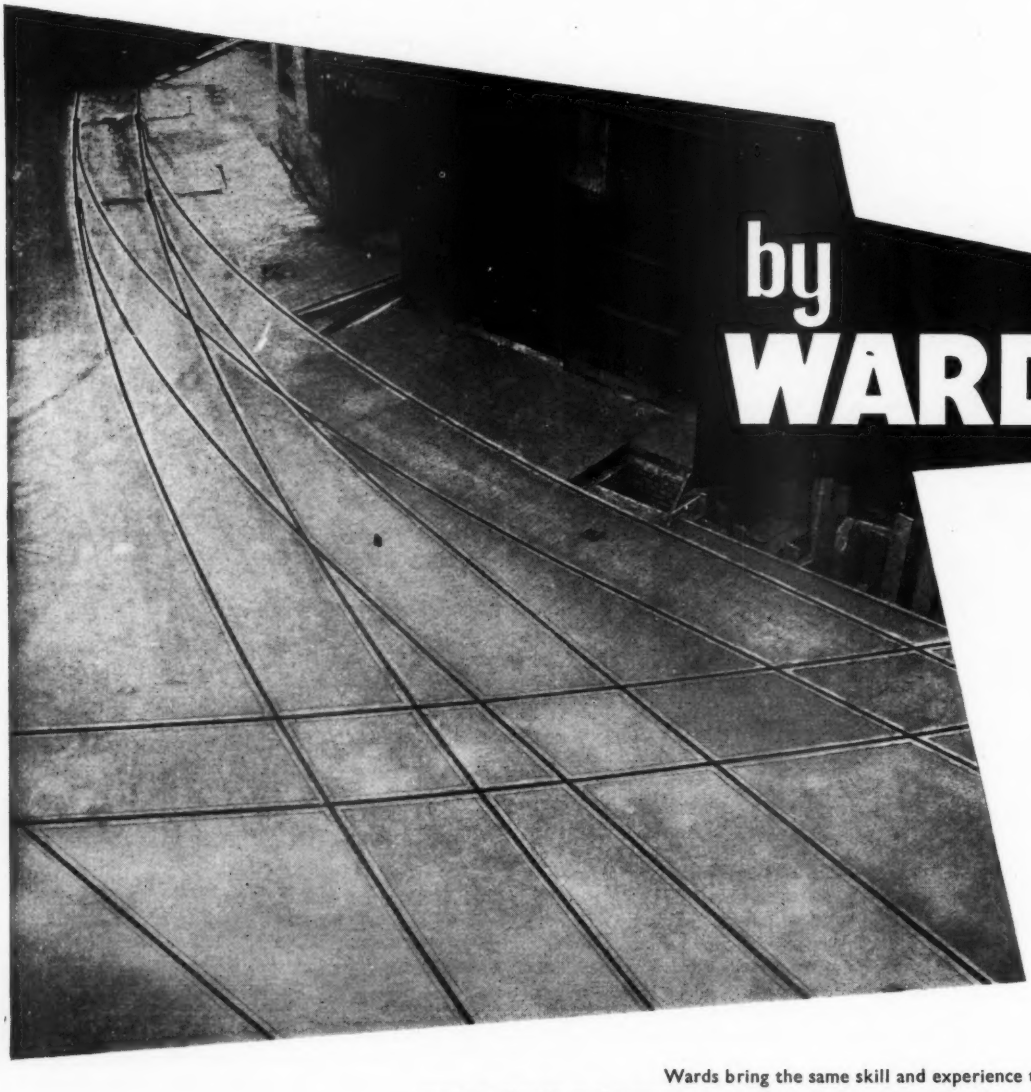

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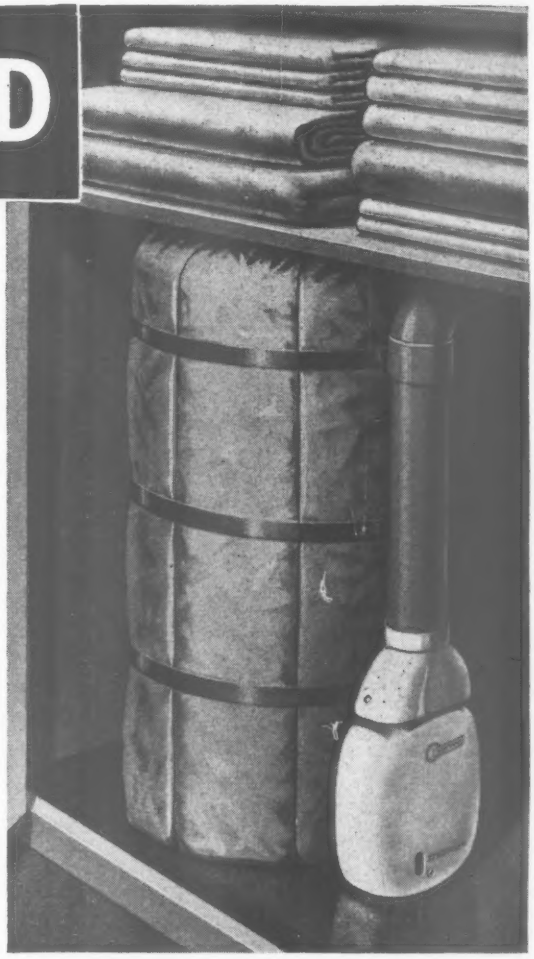

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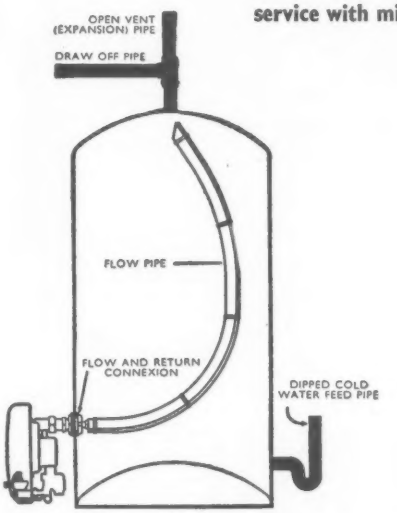

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Output—5½ gallons raised 80°F.
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Available with flue cap or draught diverter. Finished in white vitreous enamel.

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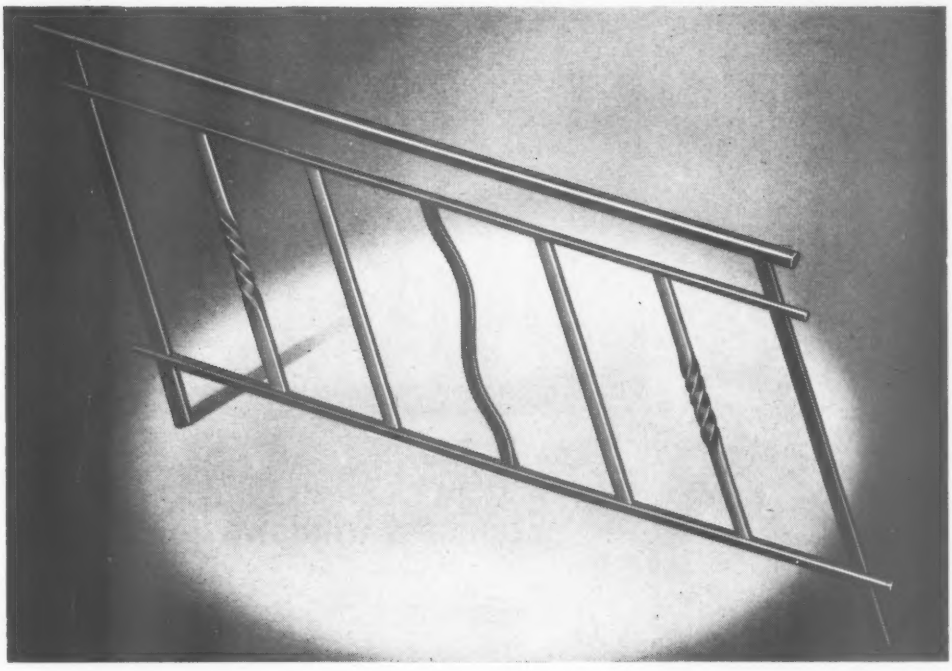

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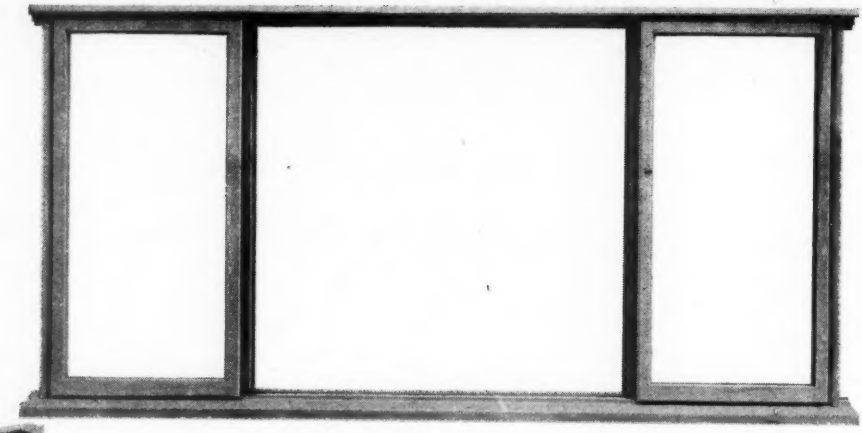

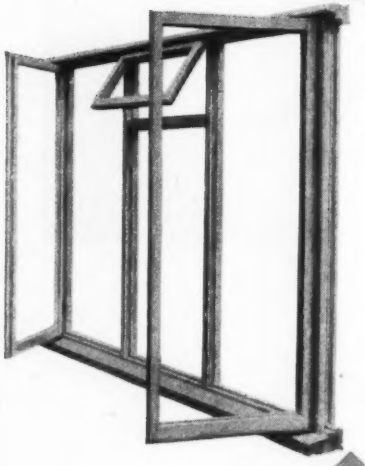

standard windows

with a quality guarantee

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quality standard joinery

Windows
Doors
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etc

agents for NACO SUN SASH ***louvre windows***

BOULTON AND PAUL LIMITED RIVERSIDE WORKS NORWICH

J.26

This advertisement is produced to B.S. 1311, 1956, governing Trade and Technical publications.

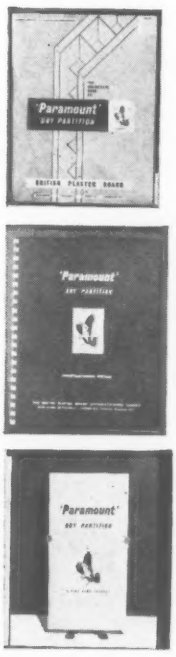
BLUE HAWK PRODUCTS

HOUSES ARE EASILY SOLD

by builders who use

'Paramount' Dry Partition

'Paramount' DRY Partition used as an internal lining in a Modern House.



Learn more about this modern technique by sending for illustrated booklets containing typical applications, technical information, fixing recommendations, constructional details, etc. to

Dry Construction Division
THE
BRITISH PLASTER BOARD
(Manufacturing) LTD

BATH HOUSE, 82 PICCADILLY, LONDON, W.1. TELEPHONE: GROSVENOR 8311.

AP87B

WATERPROOF CEMENT PAINT

Super Snowcem, the outcome of continuous research by the scientists of the Blue Circle Group of Companies, is even better than Snowcem—which gained a world-wide reputation for efficient, low cost decorative treatment.

It offers these advantages:-

- **Brighter colours**
- **Easier and quicker to mix**
- **New attractive colour range**
- **Greater degree of opacity and obliteration**

Write for leaflet and shade card to:-

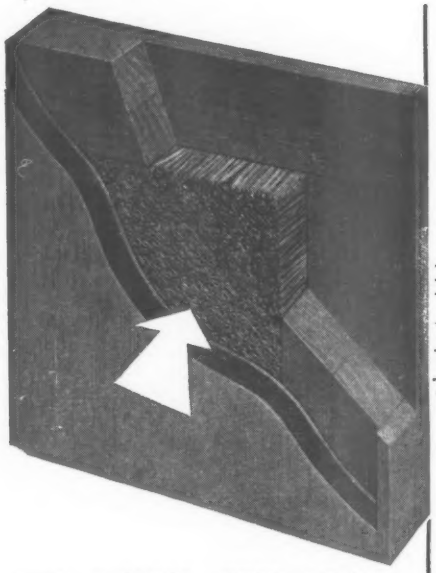
THE CEMENT MARKETING COMPANY LIMITED
PORTLAND HOUSE, TOTHILL STREET, LONDON, S.W.I.
G. & T. EARLE LTD., HULL.
THE SOUTH WALES CEMENT & LIME CO. LTD., PENARTH, GLAM.

T.258

The New Flush Door

THAMESPLY WERNO

STRENGTH IS IN THE CORE



THIS TUBULAR CORE MEANS A BETTER DOOR

Every square foot of the new Thamesply-Werno Flush Door is packed with more than 10,000 equal length tubes of straw. The patent production process ensures uniformity of thickness and density.

POINT FOR POINT, PRICE FOR PRICE, THIS THAMESPLY-WERNO FLUSH DOOR STANDS HEAD AND SHOULDERS ABOVE THE ORDINARY FLUSH DOOR.

The Thamesply-Werno tubular core construction gives these advantages over the average flush door:-

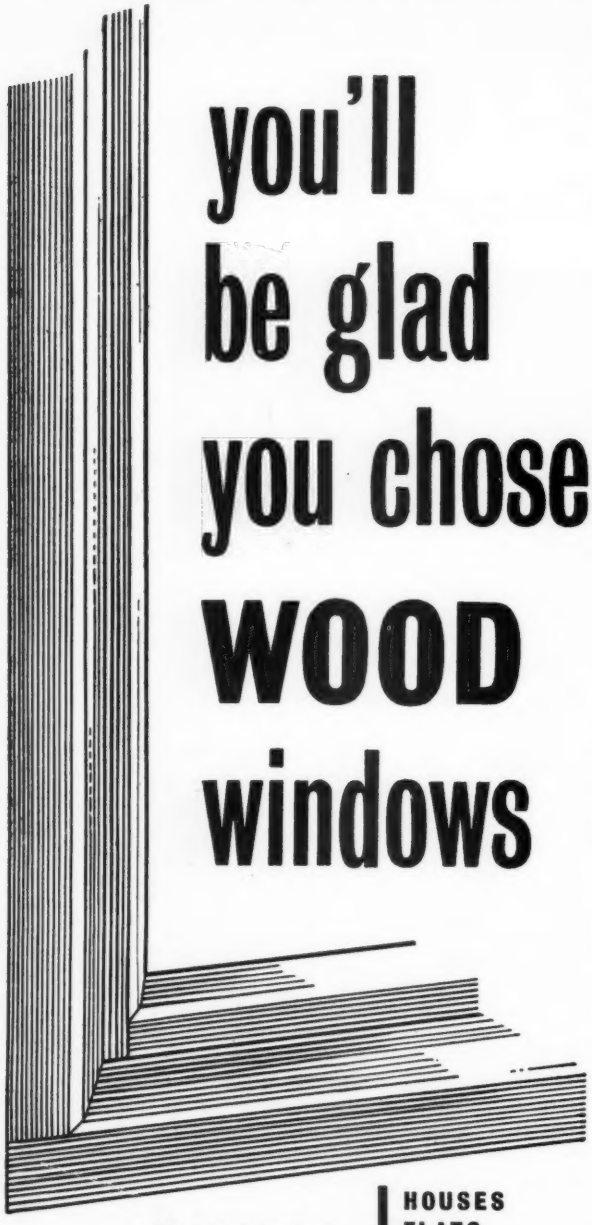
- ★ **Greater strength and resistance to impact**
- ★ **Up to 40% more soundproof**
- ★ **Greater thermal insulation because of the closed cell construction**
- ★ **More fire resistant. Straw closely packed does not burn easily**
- ★ **Sealed against pest infestation.**
- ★ **Doors shot to exact size.**

PLYWOOD-FACED INTERIOR AND EXTERIOR DOORS

THAMESPLY Reg'd Trade Mark

Supplied only through the usual trade channels

THAMES PLYWOOD MANUFACTURERS LTD.
HARTS LANE · BARKING · ESSEX *Telephone : RIPpleway 5511*



you'll be glad you chose WOOD windows

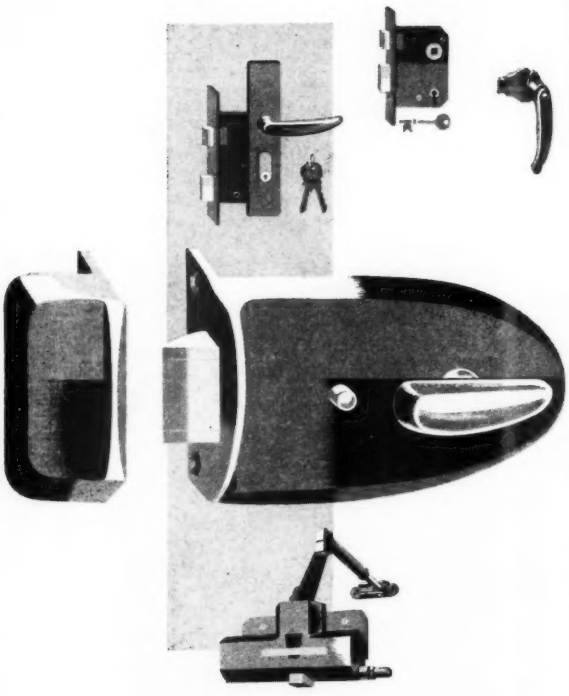
Wood windows are ideal in every way for . . .

HOUSES
FLATS
SCHOOLS
HOSPITALS
OFFICES
FACTORIES

Wood is functional, economical to install and maintain, and provides maximum flexibility in expression. Furthermore, wood windows reduce heat losses, sound transmission and condensation. Remember, too, with wood windows you are ensured a quick delivery.

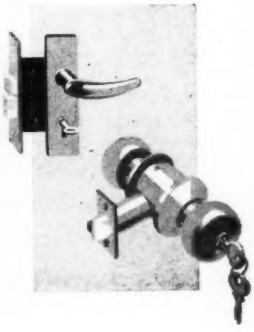
A CASE IN POINT Wood windows have been used in the new Administrative Block at London Airport with a view to combining functional efficiency with the required style of contemporary design. For advice on wood windows suitable for all types of buildings, consult E.J.M.A. Write to the address below.

THE ENGLISH JOINERY MANUFACTURERS' ASSOCIATION (INCORPORATED)
(with which is associated the Scottish Joinery and Door Manufacturers' Association)
SACKVILLE HOUSE · 40 PICCADILLY · LONDON, W.1 · Telephone: REGENT 4448/9



UNION

LOCKS AND BRASSFOUNDRY



The range of **UNION** *Locks and Brassfoundry includes a wide variety of types and grades so that most buildings can be equipped with suitable fittings of our manufacture. There is no higher quality in the trade, and our prices are competitive. We have been in the industry since 1840 and employ upwards of 1,900 people in our factories at Willenhall, Birmingham and Johannesburg. Our trade is conducted solely through builders' hardware merchants but we are always pleased to offer you the benefit of our expert advice.*

JOSIAH PARKES & SONS LTD UNION
UNION WORKS WILLENHALL · STAFFS ENGLAND
BUSH HOUSE, LONDON · JOHANNESBURG, SOUTH AFRICA. EST. 1840
ENGLISH OWNED AND CONTROLLED

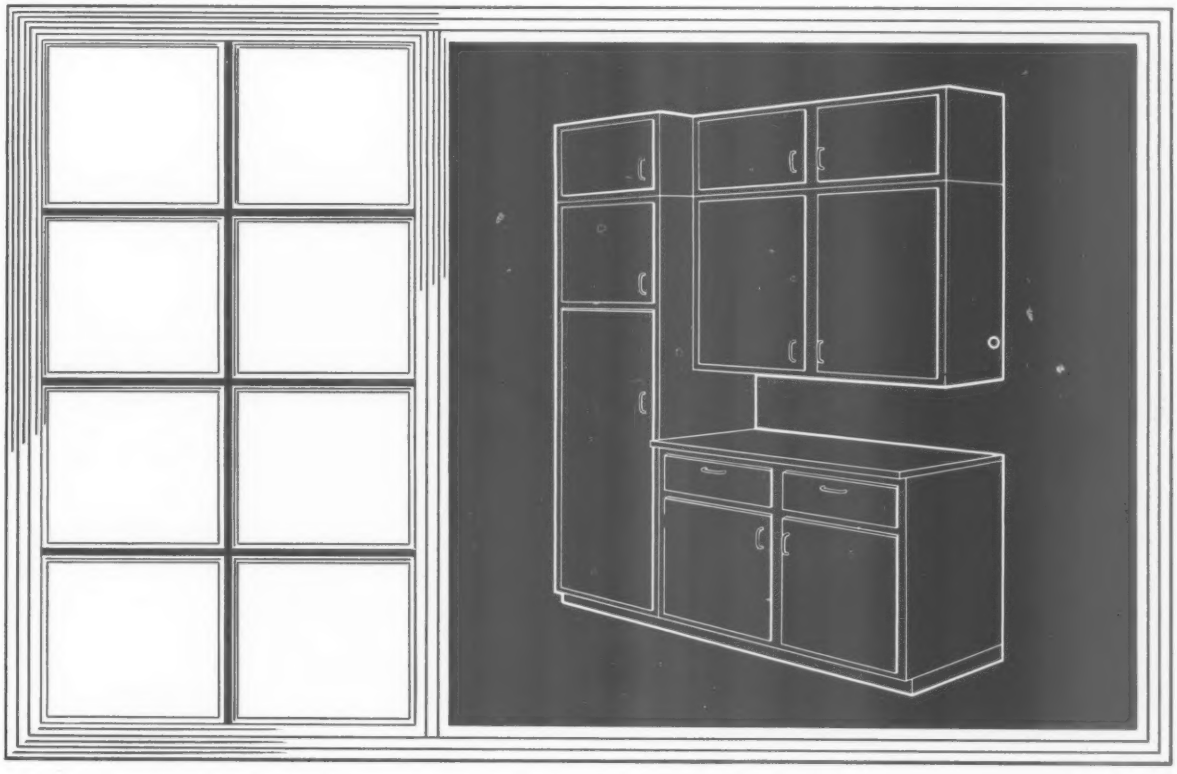
554/1958

When you order windows, external door frames, internal door frames or kitchen units, make sure you buy Rippers—the finest standard joinery obtainable. Over sixty years experience is behind Rippers quality—

RIPPERS STANDARD WINDOWS

'the best in the business'

Write to-day for our free Catalogue : it describes over three hundred designs from which endless window combinations can be arranged, and includes descriptions of all our products. Apply for your free catalogue to Dept. A.J. 24/4.



RIPPER WOODWORK

"you'll be glad you chose WOOD windows"

RIPPERS LIMITED

CASTLE HEDINGHAM, HALSTEAD, ESSEX
TELEPHONE : 191 HEDINGHAM (4 lines). TELEGRAMS : RIPPERS, CASTLE HEDINGHAM
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ROOFING SHEETS *Resist Corrosion*

Wherever there is corrosion in the atmosphere, Corroplast laminated plastic sheets are essential for roofing and side cladding. Corroplast is highly resistant to corrosion and is maintenance free, light and easy to erect. This long lasting roofing material is available in 3 integral colours—Brunswick Green, Natural Brown and Terracotta. For re-roofing and new buildings, specify Corroplast every time; it pays in the long run.

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Write for further details to Dept. **204**

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C6

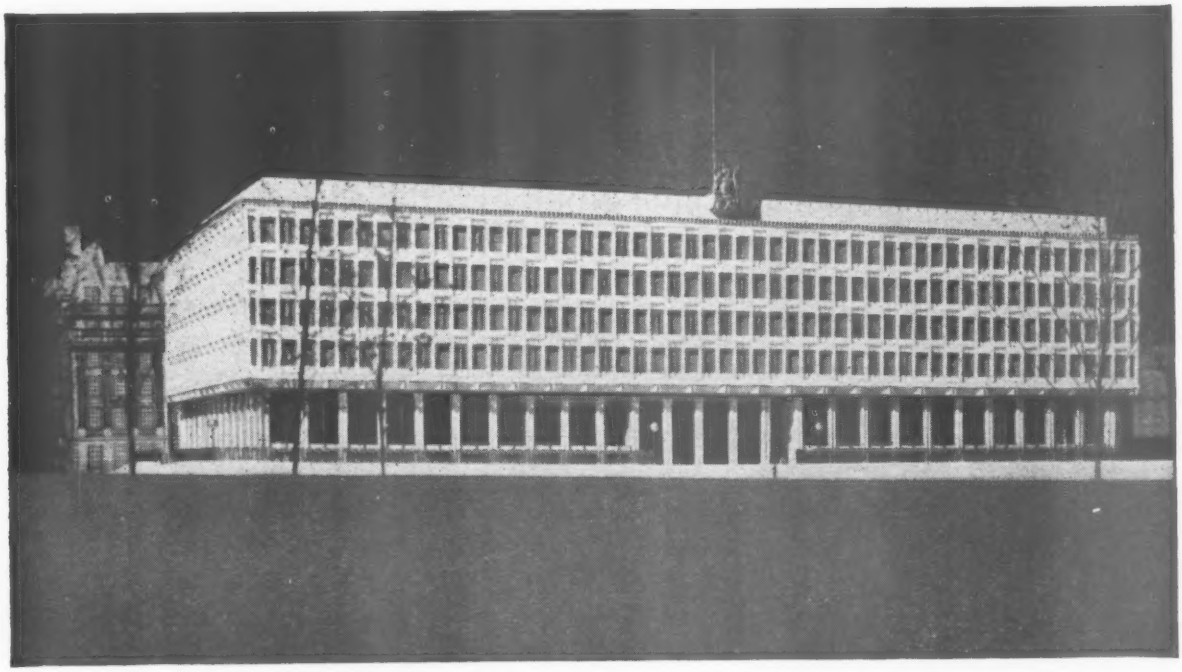
THE MODULAR CONCRETE CO LTD

Pre-cast Concrete Specialists

are pleased to announce
that they have been entrusted
with the supply and manufacture of
the structural pre-cast frame
and flooring units in the new building for

THE UNITED STATES EMBASSY

in Grosvenor Square, London



Architects: Messrs. Eero Saarinen and Associates, Michigan, U.S.A. in association with Messrs. Yorke, Rosenberg and Mardall, 2 Hyde Park Place, W.2.
Consulting Engineers: Messrs. Felix J. Samuely and Partners, 8 Hamilton Place, W.1.

THE MODULAR CONCRETE COMPANY LIMITED

STAINES ROAD · BEDFONT · MIDDLESEX. Telephone: Ashford (Middlesex) 5601-2

DOUGLAS have taken a load off my mind!

TRIAXIAL COMPRESSION TEST

This test accurately measures the shear strength of soils under known stress conditions. On this information can depend the whole foundation design.

Foundation problems that can arise after building has commenced—or even been completed—can only cause worry, trouble and unnecessary expense to the client or contractor. It is, therefore, sound practice and more economical to call in the Douglas Foundation Engineering Department first.

The extensive laboratory and field equipment can be used to help solve any foundation problem, such as assessment of bearing capacity, the stability of slopes and cuttings, the presence of ground water, accelerated consolidation of soft clays, etc.

If *you* have any problems of this nature or need advice on data already to hand—dial for Douglas; they have put many construction plans on to the right footing!

DOUGLAS SOIL MECHANICS & FOUNDATION ENGINEERING DEPARTMENT

ROBERT M. DOUGLAS (CONTRACTORS) LIMITED. GEORGE ROAD, ERDINGTON, BIRMINGHAM, 23.

Telephone: BIRchfields 5261 (15 lines) :: :: :: :: *London . Swansea . Liverpool . Darlington.*

Low Silhouette

ROOF UNITS OF DISTINCTION

by BROOKS

NEW!

Small Extract Units

The 'NELSON'
9 inch—400 c.f.m.

and

The 'TRAFALGAR'
12 inch—750 c.f.m.

All purpose extract units

- ★ Low priced
- ★ Fan-powered
- ★ Moulded glass-fibre construction
- ★ Inbuilt automatic shutters

Write for details

★ Aerofoil fan type "LOW SILHOUETTE" unit shown above is designed for ducted extract systems where resistance conditions call for duties up to 2in. S.W.G.

Exhaust capacity range 500 c.f.m. to 23,000 c.f.m., fans 12in. to 38in. diameter with external lubricators for easy maintenance.

★ Propeller fan type "EXTRA LOW SILHOUETTE" unit with fans 12in. to 36in. diameter designed mainly for free intake conditions. Capacity range 500 c.f.m. to 12,200 c.f.m. Automatic shutters to conserve heat—optional extra.

BROOKS "LOW SILHOUETTE" units combine positive high output ventilation with low power consumption and attractive appearance. Spun weather caps 24in. to 72in. diameter are non-corrosive aluminium. Steelwork all hot-dip galvanized after manufacture.

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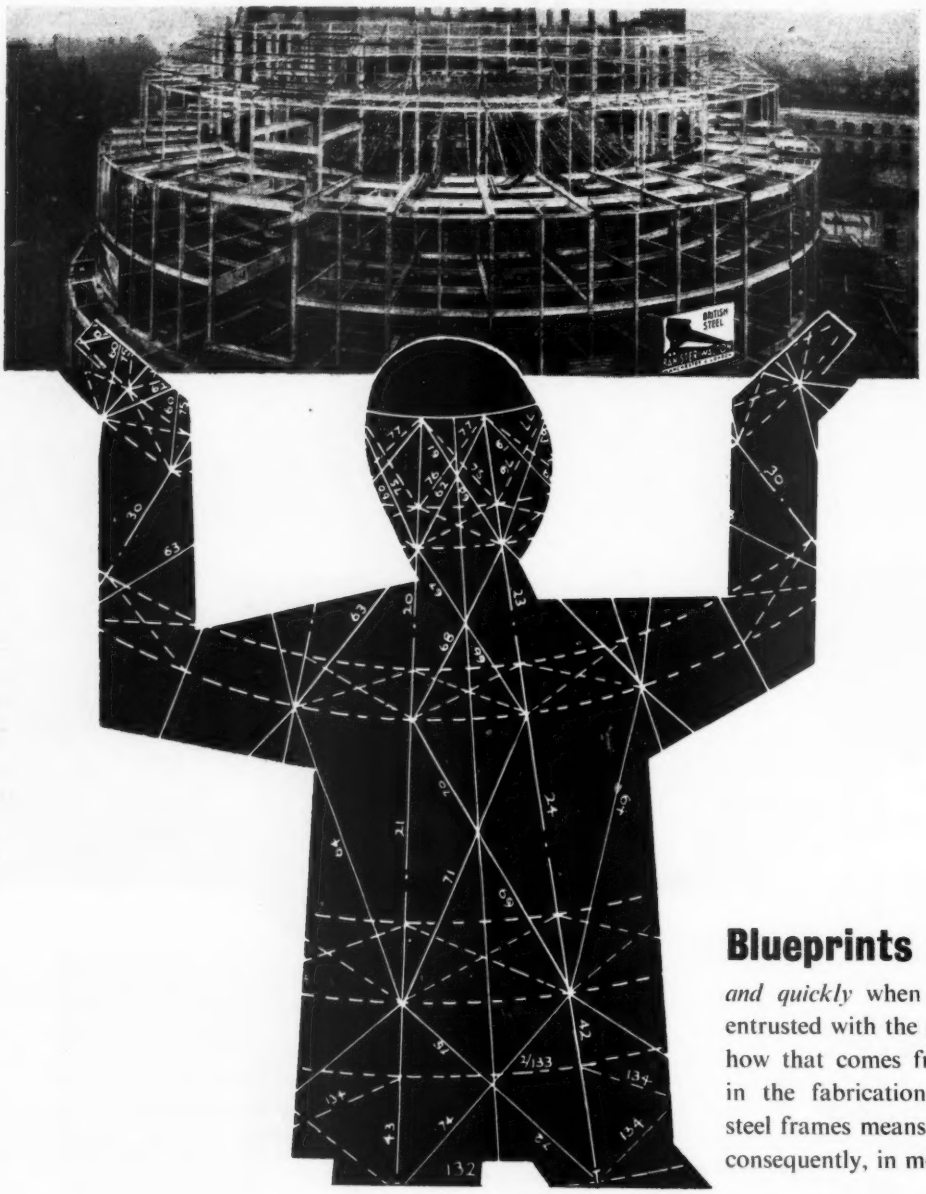
Tel: COVent Garden 1355-1356

SPECIALISTS IN FAN POWERED ROOF EXTRACT AND INPUT UNITS

MCN 3355



Blueprints come to life

and quickly when Banister, Walton are entrusted with the steelwork. The know-how that comes from a long experience in the fabrication and the erection of steel frames means economy in time, and consequently, in money.

☆ *The immediate availability of ample steel stocks ensures speedy erection.*

Banister, Walton

build in steel

BANISTER, WALTON & CO LTD · Structural Steel Engineers & Stockholders · MANCHESTER · LONDON · BIRMINGHAM

City of Birmingham Training College.

Pyrok acoustical and decorative treatment to Assembly Hall and Refectory.

Architect: A. G. Sheppard Fidler, M.C., B.Arch., F.R.I.B.A., A.M.T.P.I., City Architect.

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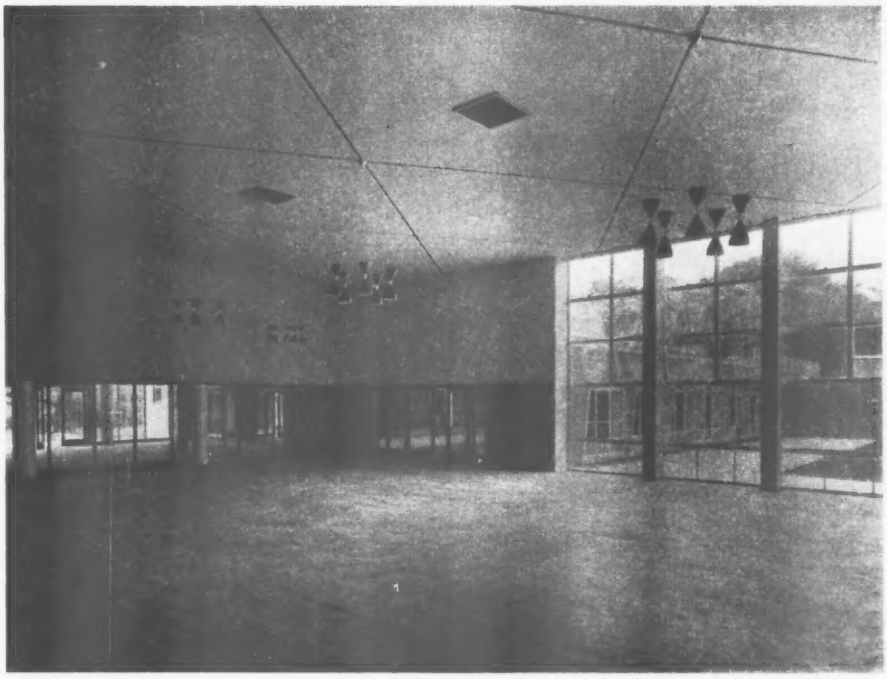
Photo: "The Birmingham Post" Studios.

Pyrok has special properties of fire protection which comply with the high standards required by the Model Bye-Laws.



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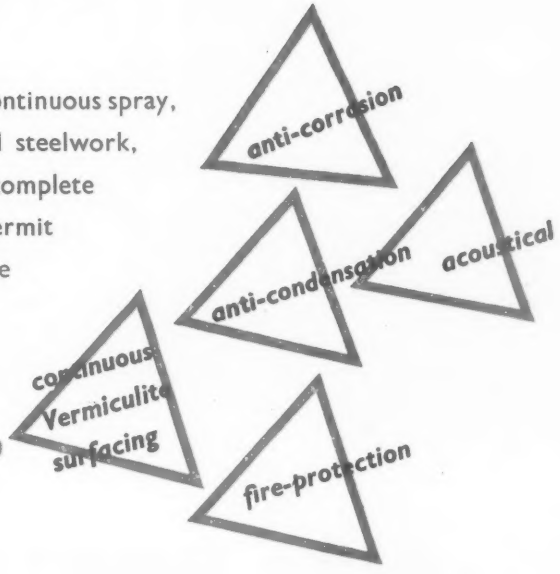
Pyrok is a Vermiculite-cement surfacing applied by continuous spray, setting rapidly and adhering strongly to structural steelwork, concrete, stone, brick and fibre-board. Pyrok gives complete protection to structural steelwork and does not permit oxidization beneath its surface. Particularly effective against sulphurous fumes, Pyrok protects steelwork against fire and has, in addition, remarkable acoustic, insulating and anti-condensation properties.



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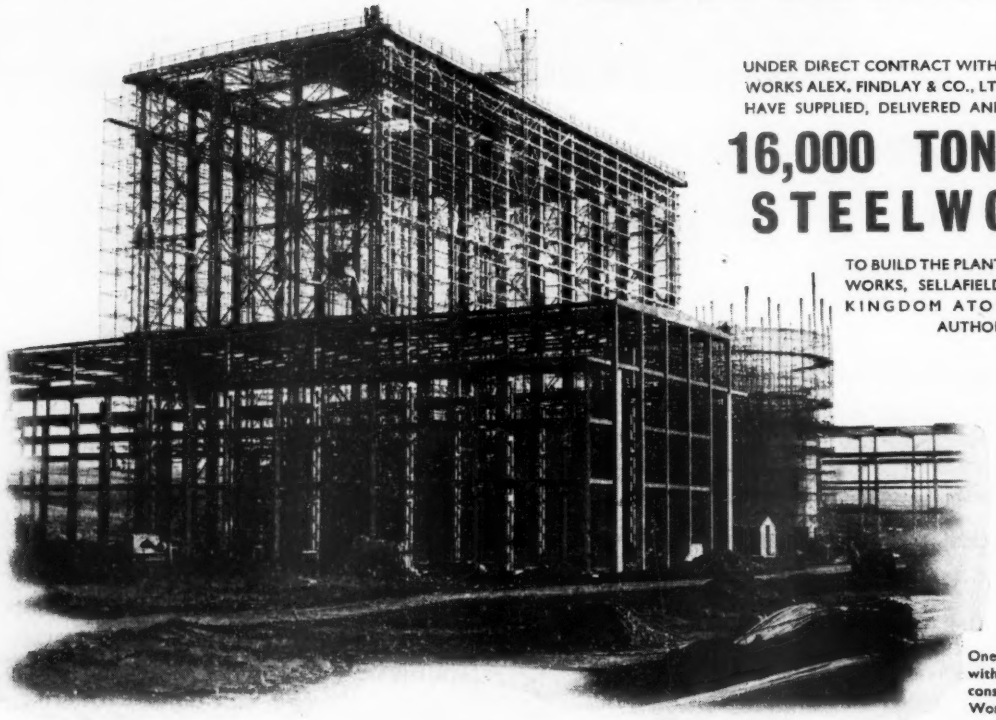
AP 280-57

STRUCTURAL STEELWORK BY FINDLAY

BRITAIN'S ATOMIC FACTORIES

Sellafield



UNDER DIRECT CONTRACT WITH THE MINISTRY OF WORKS ALEX. FINDLAY & CO., LTD., MOTHERWELL, HAVE SUPPLIED, DELIVERED AND ERECTED OVER

16,000 TONS OF STEELWORK

TO BUILD THE PLANT AT WINDSCALE WORKS, SELLAFIELD, FOR UNITED KINGDOM ATOMIC ENERGY AUTHORITY

One of the Pile Buildings with Blower House under construction at Windscale Works, Sellafield.

(By kind permission of United Kingdom Atomic Energy Authority)

ALEX. FINDLAY & CO. LTD.

STRUCTURAL ENGINEERS

MOTHERWELL · SCOTLAND

Phone Motherwell 2301 (6 lines)

★ Member of the Nuclear Power Plant Co. Ltd.

LONDON OFFICE: HIGH HOLBORN HOUSE, 52/54 HIGH HOLBORN W.C.1 TELEPHONE HOLBORN 7330-5083

See the
ALOMEGA WINDOW
at the New
WILLIAMS & WILLIAMS SHOWROOMS
36 High Holborn W.C.1
ADJOINING WILLIAMS HOUSE

SAVES YOU SITE COSTS, TOO

Painting is unnecessary. No glazing—the window is despatched ready glazed.

Building-in consists simply of plugging the masonry reveals and screwing the window in.

NEXT TO NO MAINTENANCE

The only maintenance likely to be needed is glass replacement. And then all that has to be done is unscrew one sash rail, slide out the broken pane and slide in a new one.

The window has been bench-tested to a life of over 200 years' normal use with no appreciable wear. The suspension mechanism is completely enclosed and out of sight.

STANDARD SIZES

Alomega windows are available for inspection at any Williams & Williams Area Office or merchant stockist, and are made in the following standard sizes:

Type 14, 3′ 8¼″ x 1′ 2½″	Type 24, 3′ 8¼″ x 1′ 11½″
Type 34, 3′ 8¼″ x 2′ 8½″	Type 44, 3′ 8¼″ x 3′ 5½″
Type 15, 4′ 8¼″ x 1′ 2½″	Type 25, 4′ 8¼″ x 1′ 11½″
Type 35, 4′ 8¼″ x 2′ 8½″	Type 45, 4′ 8¼″ x 3′ 5½″
Type 16, 5′ 8¼″ x 1′ 2½″	Type 26, 5′ 8¼″ x 1′ 11½″
Type 36, 5′ 8¼″ x 2′ 8½″	Type 46, 5′ 8¼″ x 3′ 5½″

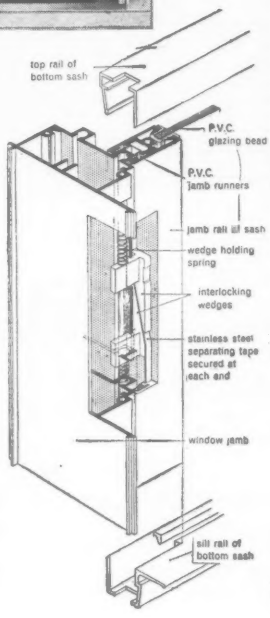
PURPOSE-MADE SIZES

Little more than pro rata prices are charged for purpose-made sizes—the maximum being 19′ perimeter. There will naturally be a certain delay in supply.

NEW DESIGN -NEW LOW COST

Other things being equal (namely £.s.d.) aluminium is probably the first material you would choose for windows. With Williams & Williams Alomega, other things *are* equal. For example, an Alomega window 3′ 8¼″ x 1′ 11½″ costs £6.0.7., in quantities over 48.

This low price is possible mainly because of the new suspension system. There are no weights, cords or pulleys and no bulky jamb sections to accommodate them. A much slimmer sash jamb houses the compact "interlocking wedge" suspension device with a consequent saving in aluminium.



NO SASHCORDS NO WEIGHTS

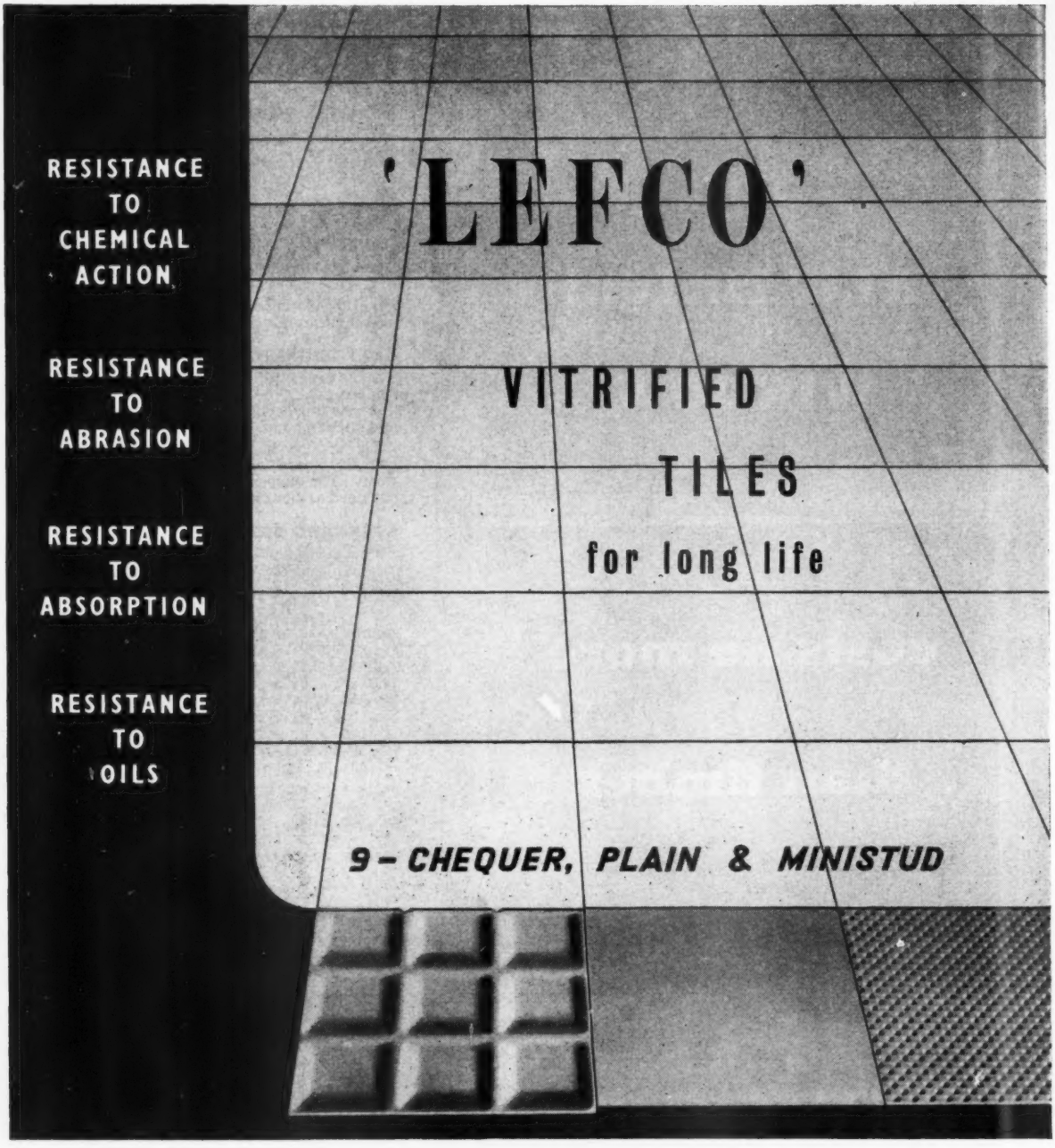
How the Alomega Suspension System works

The two interlocking wedges are contained in a channel extruded in the sash jamb. They are pushed against each other by springs sufficiently tightly to bind them in the channel so that they carry the weight of the sash. When the sash is moved the wedge assembly tends to move with it, but is held back by lugs protruding from the wedges which engage in slots cut in the *fixed* jamb of the window. The lugs are given a small amount of vertical play in the slots, and these are so placed that, whichever way the sash is moved, the hinder wedge (relative to direction of travel) is stopped first. The effect of this is a fractional separation of the wedges permitting free movement of the sash for as long as pressure is applied to it. As soon as the pressure is removed the two retaining springs push the wedges together once again, binding them firmly in the channel and locking the sash in its new position.

WILLIAMS & WILLIAMS
Alomega

WILLIAMS & WILLIAMS LTD.
Williams House,
37/39, High Holborn, London W.C.1

Member of the Metal Window Association.



THE LEEDS FIRECLAY COMPANY LTD.

Here is a tile, the qualities of which, recommend its universal use in industry. In all instances where the acids, alkalis, oils and fats of manufacturing processes come into contact with the floor or where intense abrasion is a problem, "LEFCO" Tiles can be used with confidence. For long life and minimum maintenance use "LEFCO" Vitrified Tiles. Available in plain, nine chequer or ministud surfaces. Write for special literature.

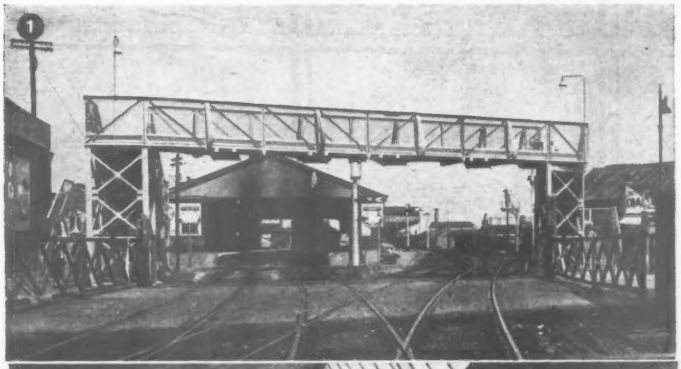
WORTLEY, LEEDS 12 Tel: LEEDS 638021

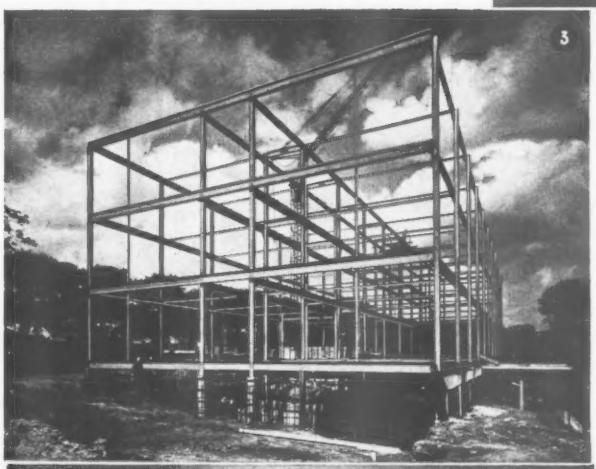
Registered (L F C) Trade Mark

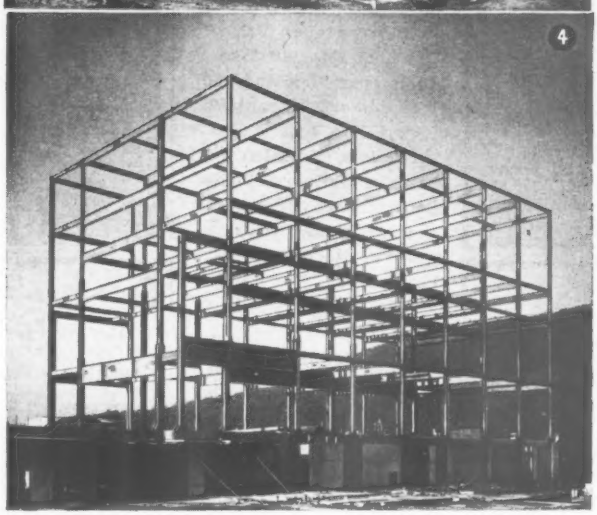
LONDON OFFICE: LEEDS HOUSE, CAVENDISH PLACE, W.1. Tel: LANgham 3511

1. Footbridge for Level Crossing in Grimsby.
2. Interior view of factory for Messrs. Brook Motors Ltd., Barnsley.
3. Sowerby Bridge Secondary School.
4. Control Room, Services and Welfare Block, Elland Power Station.

STRUCTURAL STEELWORK







BY AUSTINS

JAMES AUSTIN AND SONS (DEWSBURY) LIMITED

Thornhill Iron & Steel Works, Dewsbury, Yorkshire
Telephone: Dewsbury 1750 (7 lines)
Telegrams: Austins, Dewsbury, Telex No. 55-129

TRADE MARK VULCAN
ESTABLISHED 1850

LONDON OFFICE: Kirkman House, 54A Tottenham Court Road, London, W.1.
Telephone: Museum 1064

H.P.5917

Maxweld reinforces it

The reinforcement fabric used in the roads at the Marchwood Generating Station (C.E.A. Southern Division) was supplied by Richard Hill. Do you need reinforcements? Then call up the Maxweld man! He can give you all the facts on the type and quantity of fabric you'll need plus a rough idea of the cost. And he's backed by the

Richard Hill Design Service,

who can then draw up more detailed plans and estimates. You can get him at Middlesbrough (2206), London (Mayfair 3538), Birmingham (Midland 5625), Manchester (Central 1652), Leeds (2-7540), Bristol (24977), Glasgow (Central 2179), Nottingham (Bulwell 27-8383), Bournemouth (Westbourne 63491), Cardiff (46552), Belfast (29126).

Maxweld fabric

is manufactured by RICHARD HILL LIMITED (Established 1868)

Newport Wire and Rolling Mills, Middlesbrough, Yorkshire. Tel: Middlesbrough 2206

A MEMBER OF THE FIRTH CLEVELAND GROUP

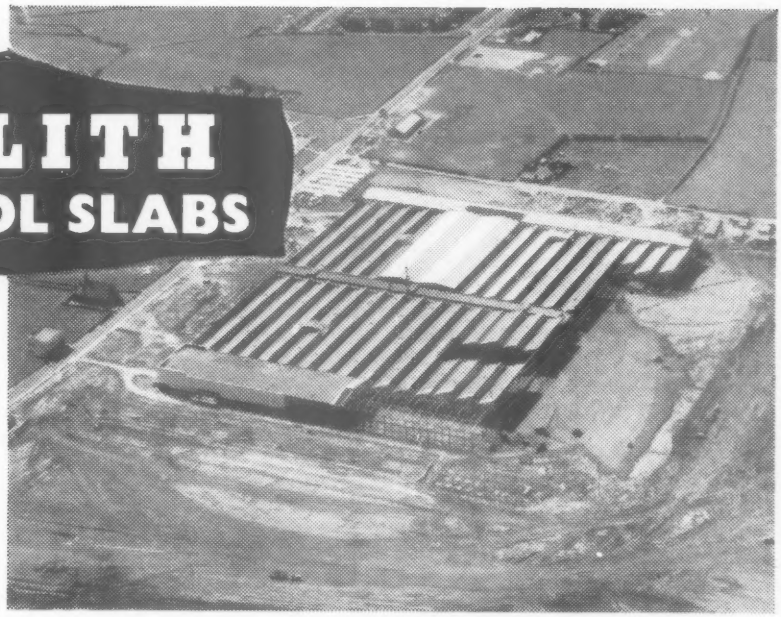
CRC II MX

GYPROC supplied the

fire-resisting, thermal insulating slabs

for this factory roof

GYPKLITH WOOD WOOL SLABS



GYPKLITH wood wool slabs are light in weight and have great structural strength and durability. They have exceptional fire protective properties, being virtually incombustible, with Class I surfaces (B.S. 476). As a thermal insulator GYPKLITH is excellent—a one inch slab of GYPKLITH is equivalent in thermal insulation to twenty-one inches of stone. These are only a few of the features worth studying. Write for leaflet P358 which gives you complete information.

60,000 sq. yards of Gypklith Wood Wool Slabs at the Caterpillar Tractor Co. Ltd. Factory at Tannochside, Lanarkshire.
Architects: Wilson, Hamilton & Wilson, F./A.R.I.B.A.
Roofing Contractors: Wm. Briggs & Sons Ltd.

GYPROC PRODUCTS LIMITED

Head Office: Singlewell Road, Gravesend, Kent. *Gravesend 4251/4.*
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S/GK3

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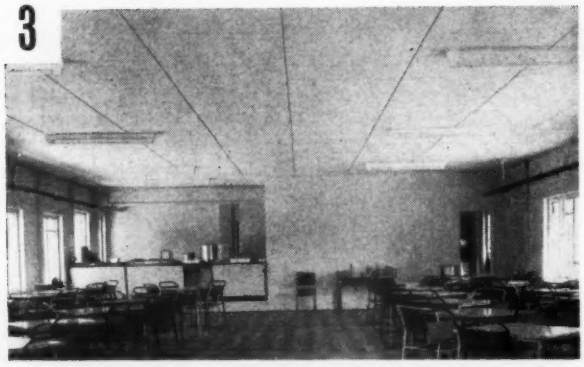
2 *Television Recording Studio—Jablite thermal acoustic tiles in the recording studio of the National Broadcasting Company, a service of Radio Corporation of America.*

3 *Canteen and Kitchen—A coloured false ceiling in the canteen and kitchen at Linfield Nurseries, Thakeham, Sussex.*

4 *Farm—A typical broiler house for a Sussex farm. 12,000 sq. ft. of 9ft. by 3ft. by 1in. Jablite boards, using Jablite cover strips.*

5 *Office—Jablite fins used for light diffusion in the offices of Reyrolle Ltd., Plant and Machinery Works, Hepburn, in County Durham.*



JABLITE THERMAL
and
ACOUSTIC INSULATION
offers you :—

High thermal efficiency resulting in a 50 per cent. saving in fuel costs.

No costly fixing methods—you simply stick it to plain or corrugated surfaces.

An economical price—½in. Jablite, 12s. sq. yd., ¾in. 14s. 6d. sq. yd.

Revolutionary ' U ' factors.

Non-flam, self-extinguishing (Class 1) flame spread.

" K " factor, 0.21 B.T.U.

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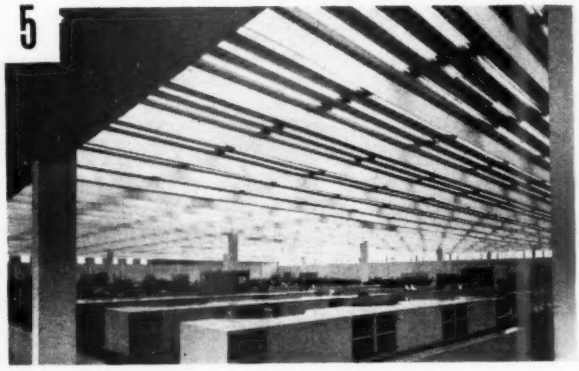

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ARCHITECTS: Thomas Mawson & Son, Lancaster.

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SOME COMPLETED CONTRACTS

Beaconsfield Public Library (right). Woodweld Portal Frames of 30 ft. 6 in. span.

ARCHITECT: Mr. Frederick B. Pooley, F.R.I.B.A., F.R.I.C.S., A.M.T.P.I., Bucks. County Architect, Aylesbury.

Church of the Sacred Heart, Rochdale: Portal Frames with flying Buttresses over a total span of 51 ft. approximately.

ARCHITECTS: Arthur Farebrother & Partners, Manchester.

Miners' Welfare Hall, Upton, Nr. Barnsley: Cranked Woodweld Box Beams resting on brick walls 44 ft. 5 in. apart.

ARCHITECT: The Chief Architect, N.E. Div., N.C.B.

CONSULTANT **for all above Contracts:** Mr. D. W. Cooper, B.Sc., A.M.I.Struct.E., F. Inst./W. Sc.

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Extension of Chemistry Laboratory of King's College, Newcastle.

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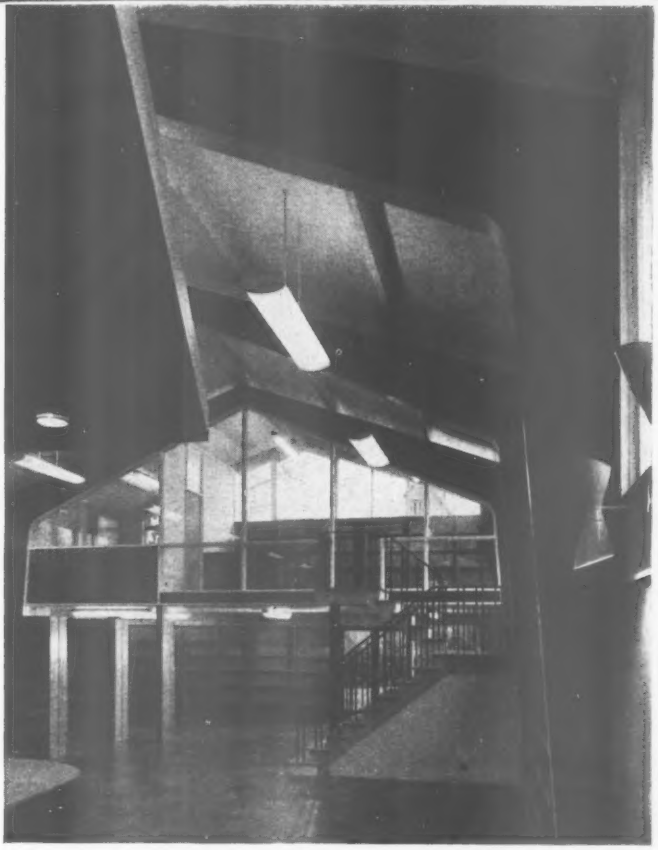

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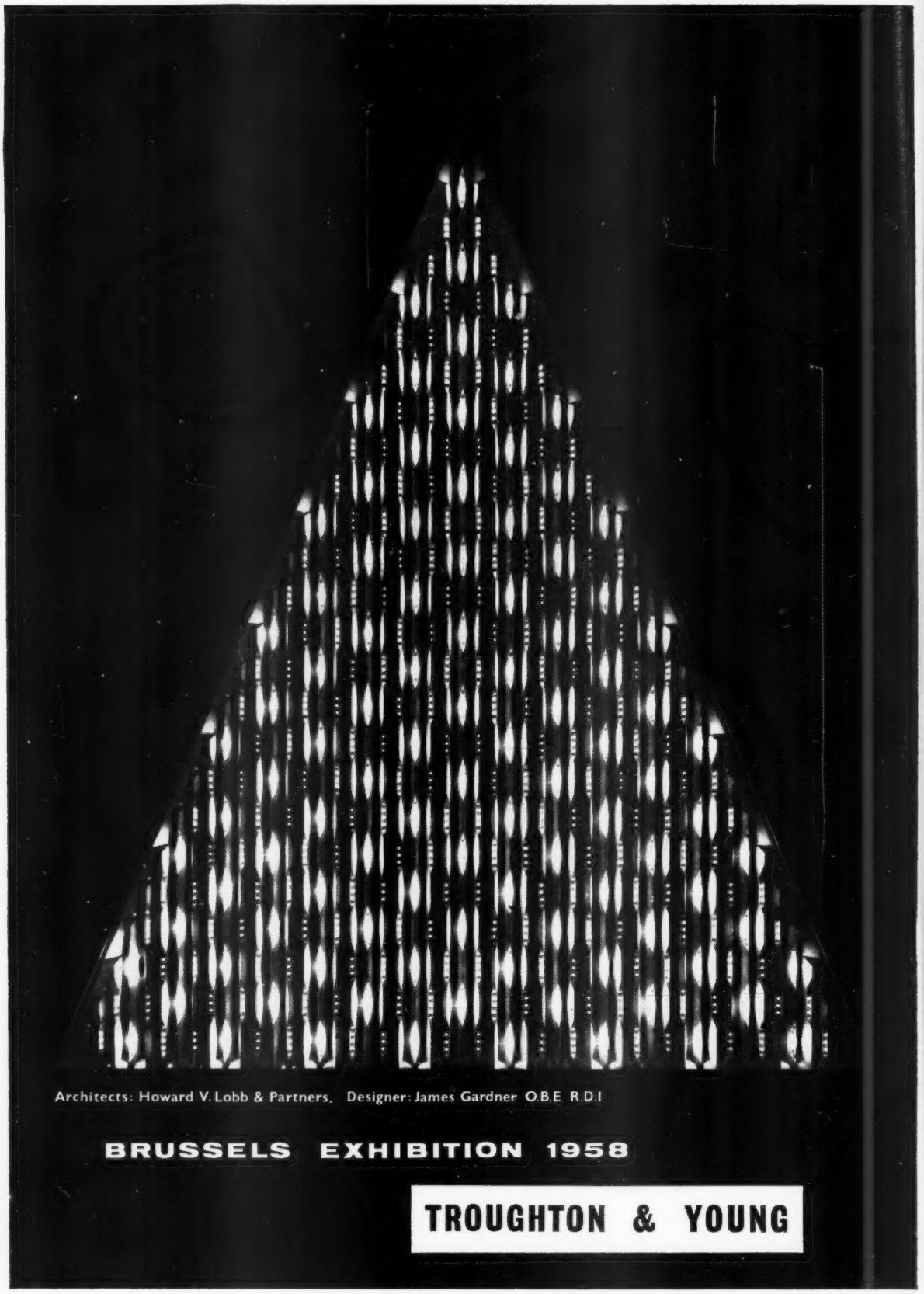
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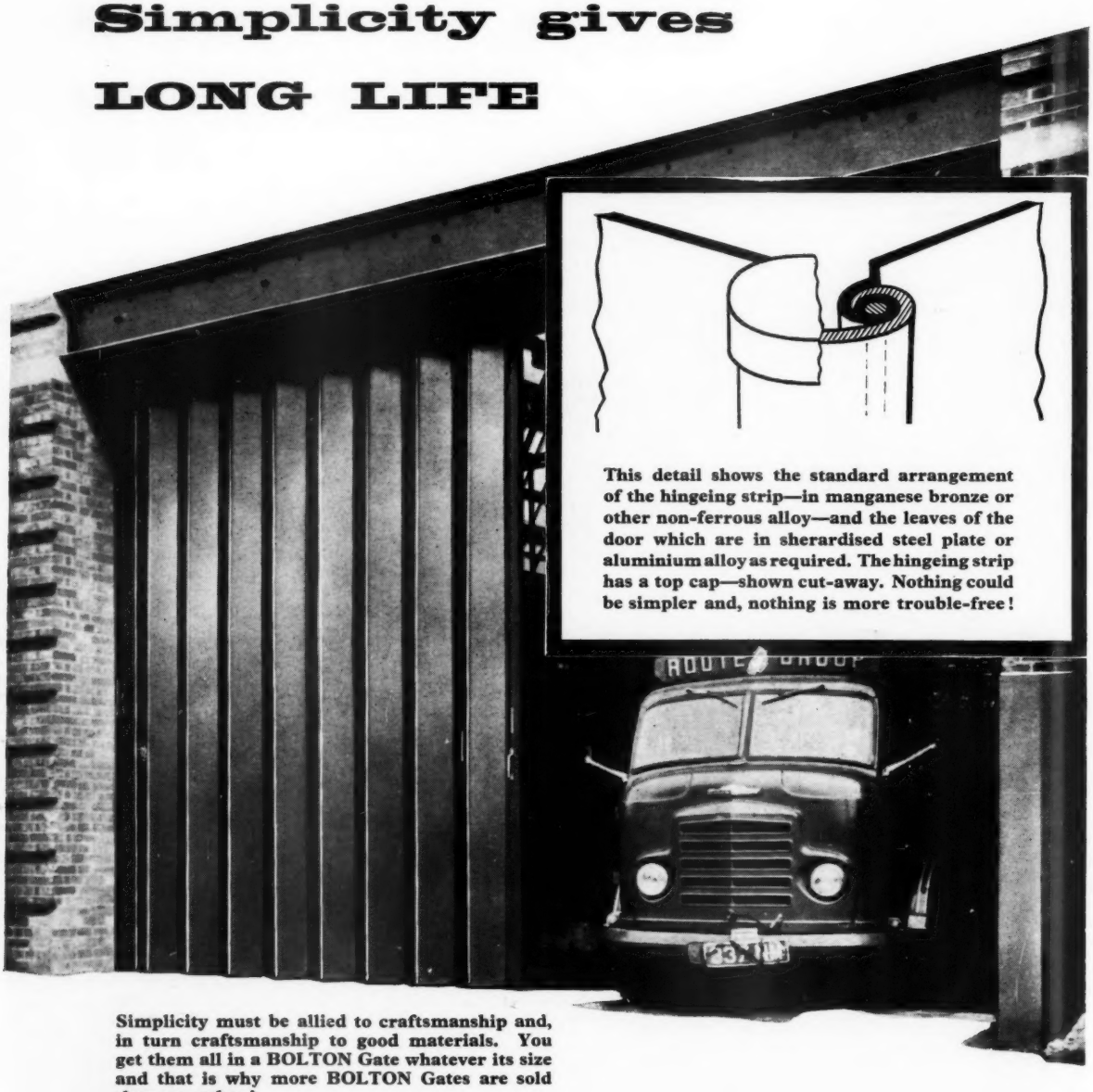

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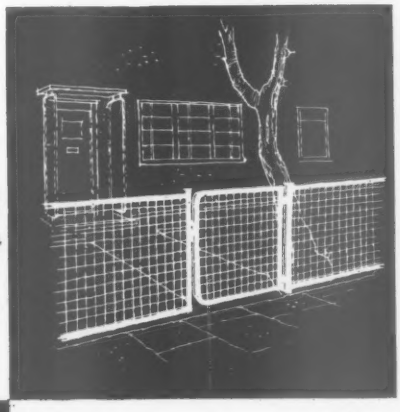
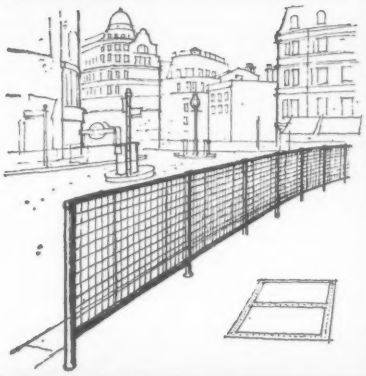
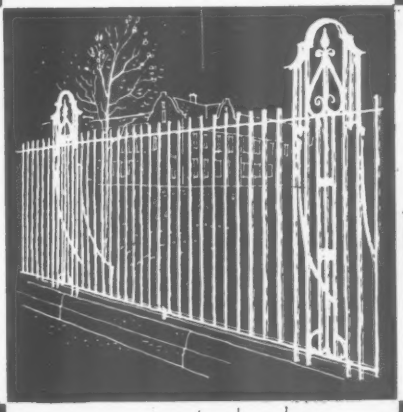

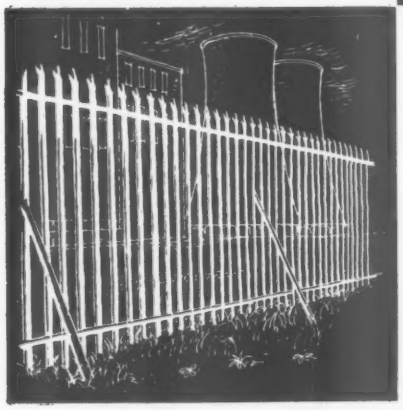
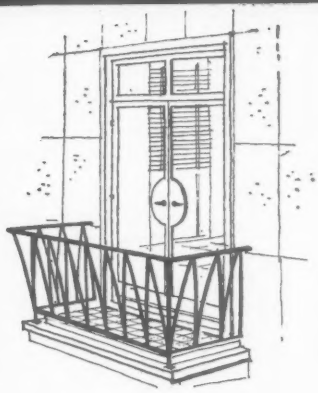
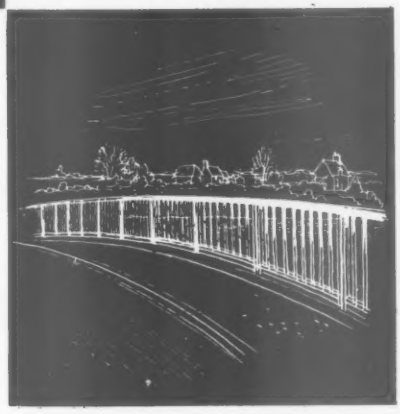

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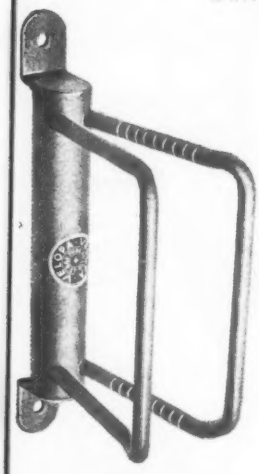

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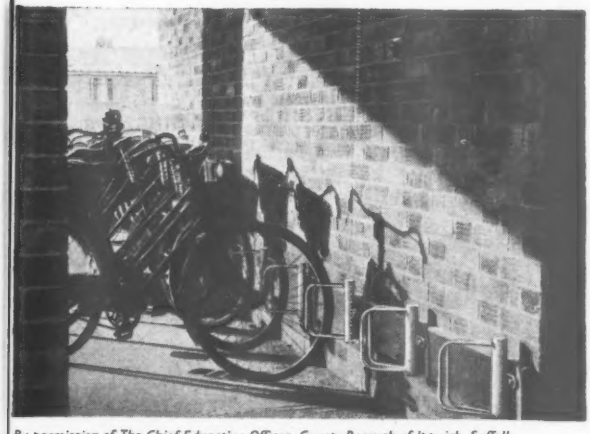

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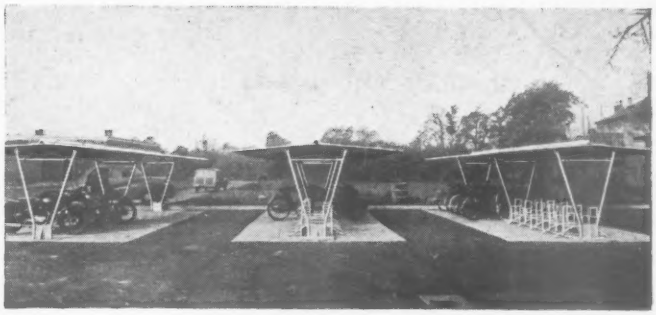

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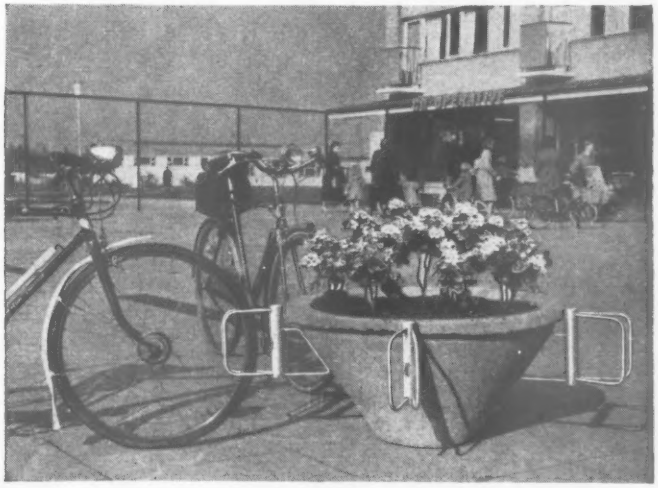

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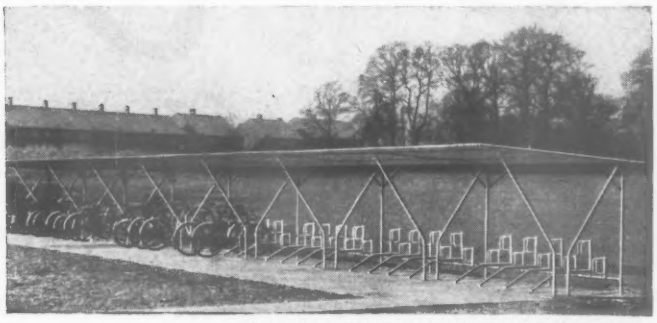

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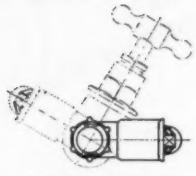

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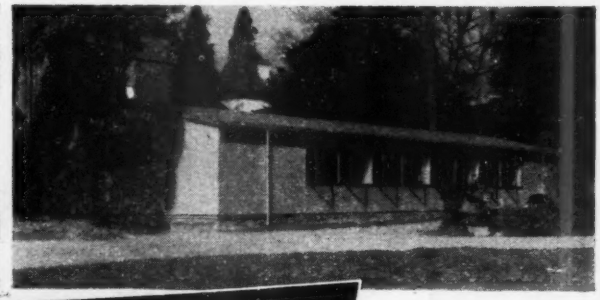

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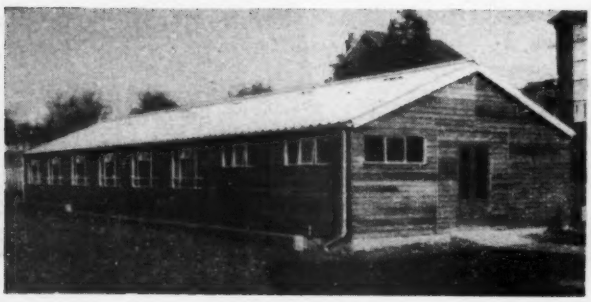

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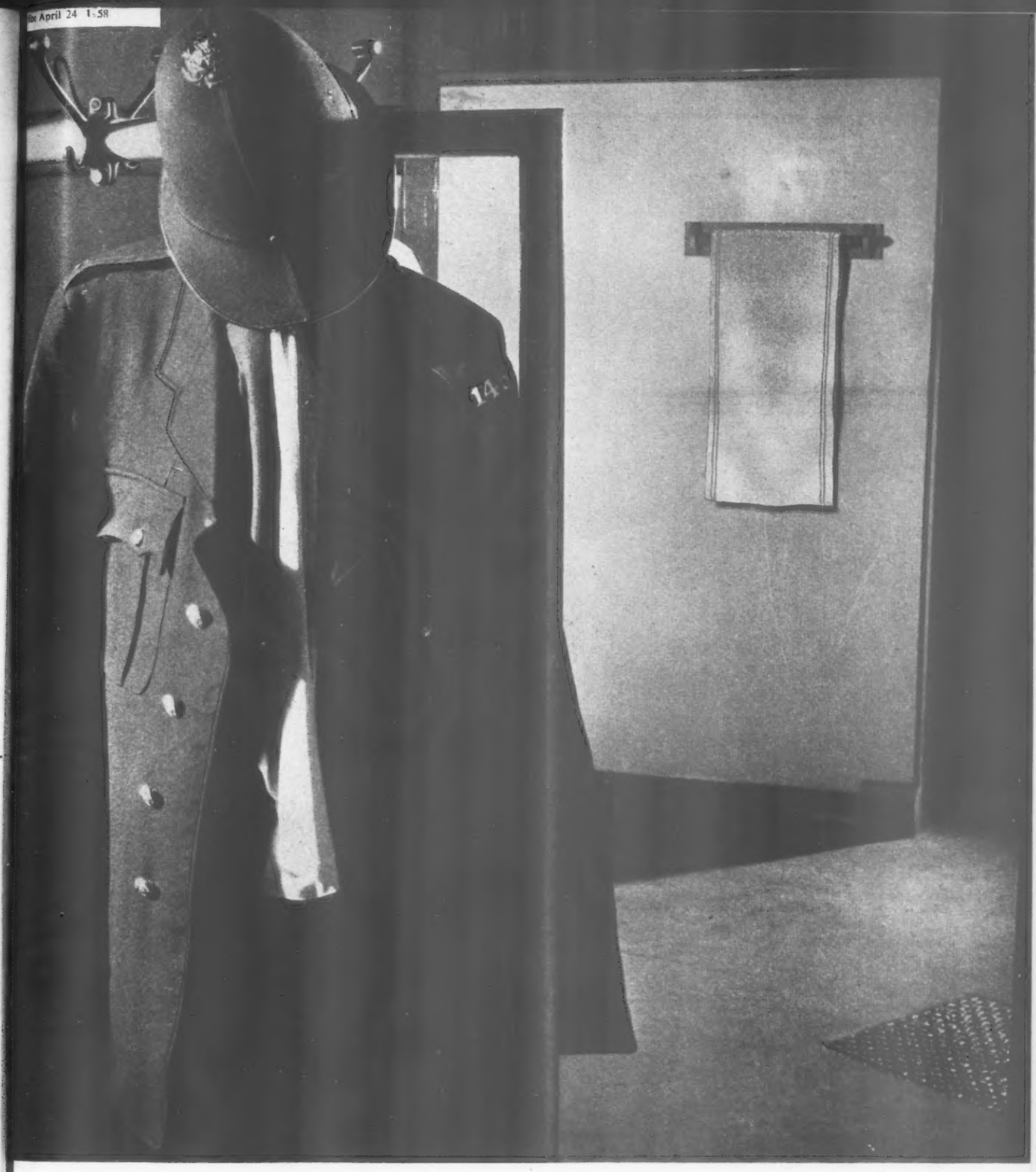

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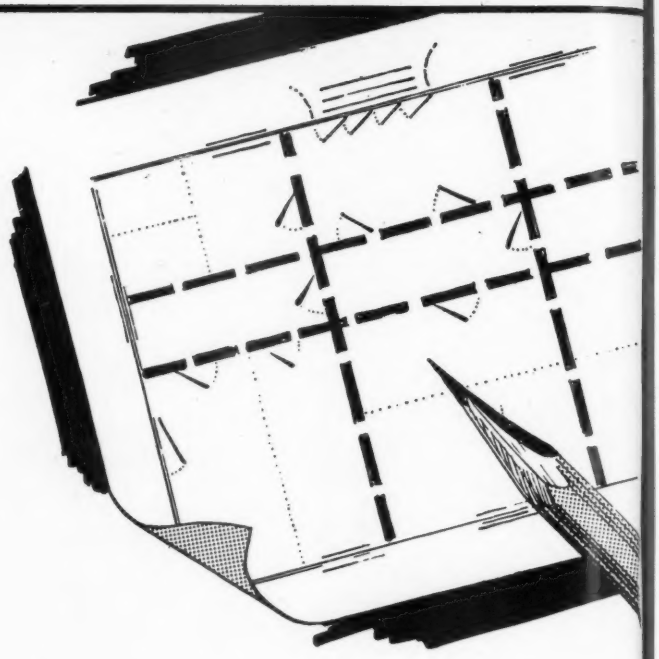

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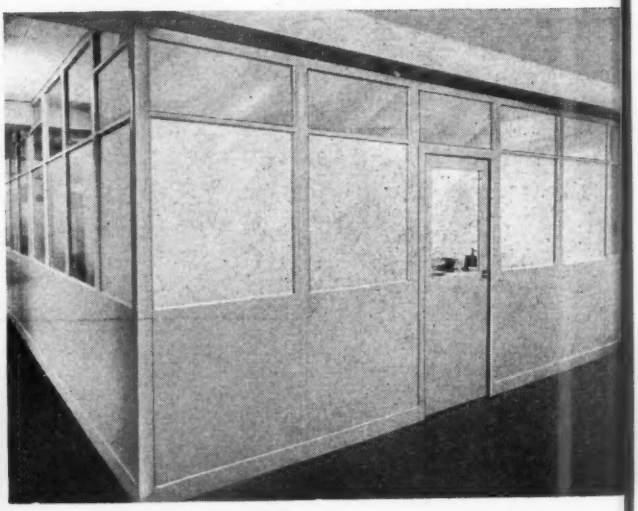

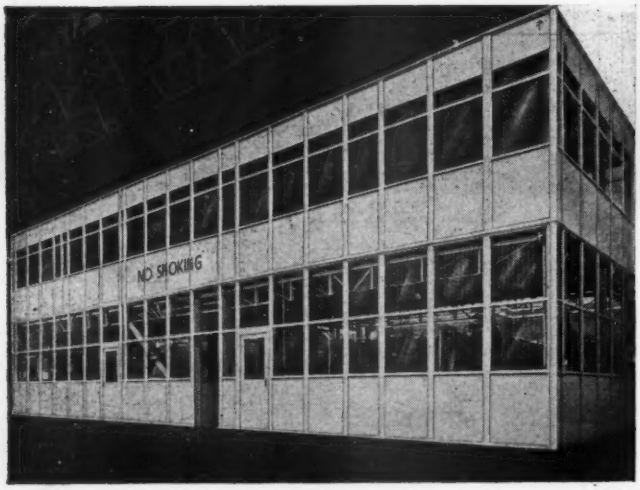

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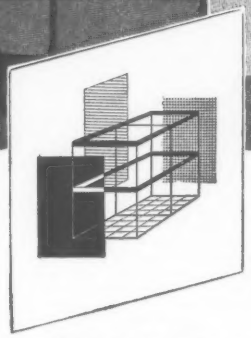

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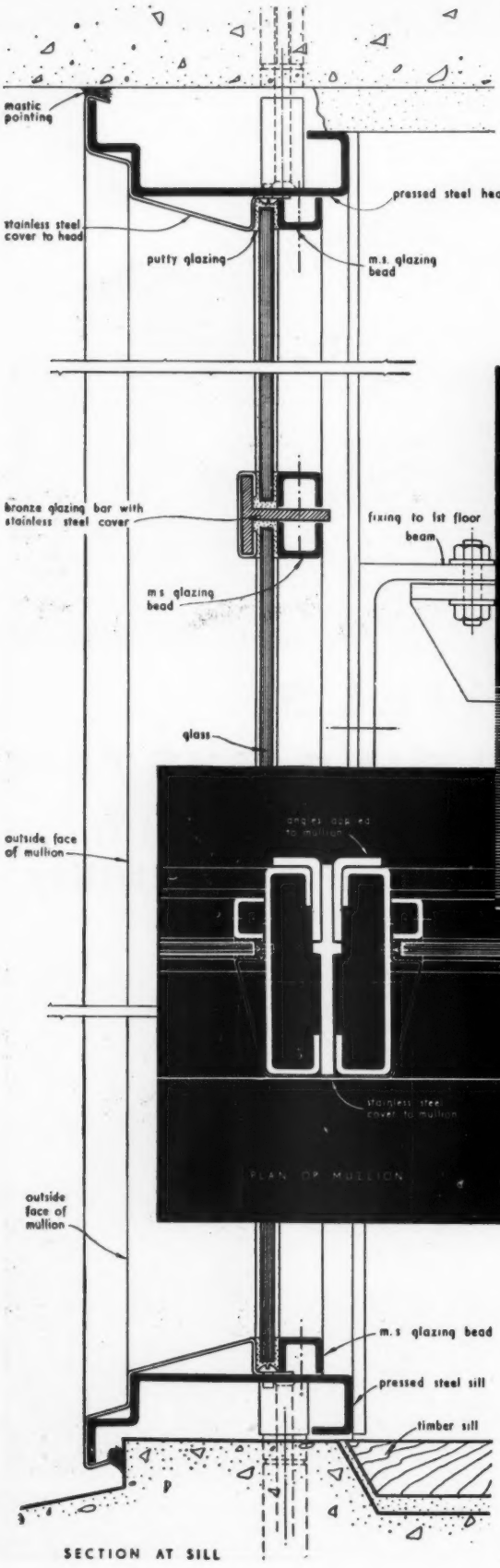

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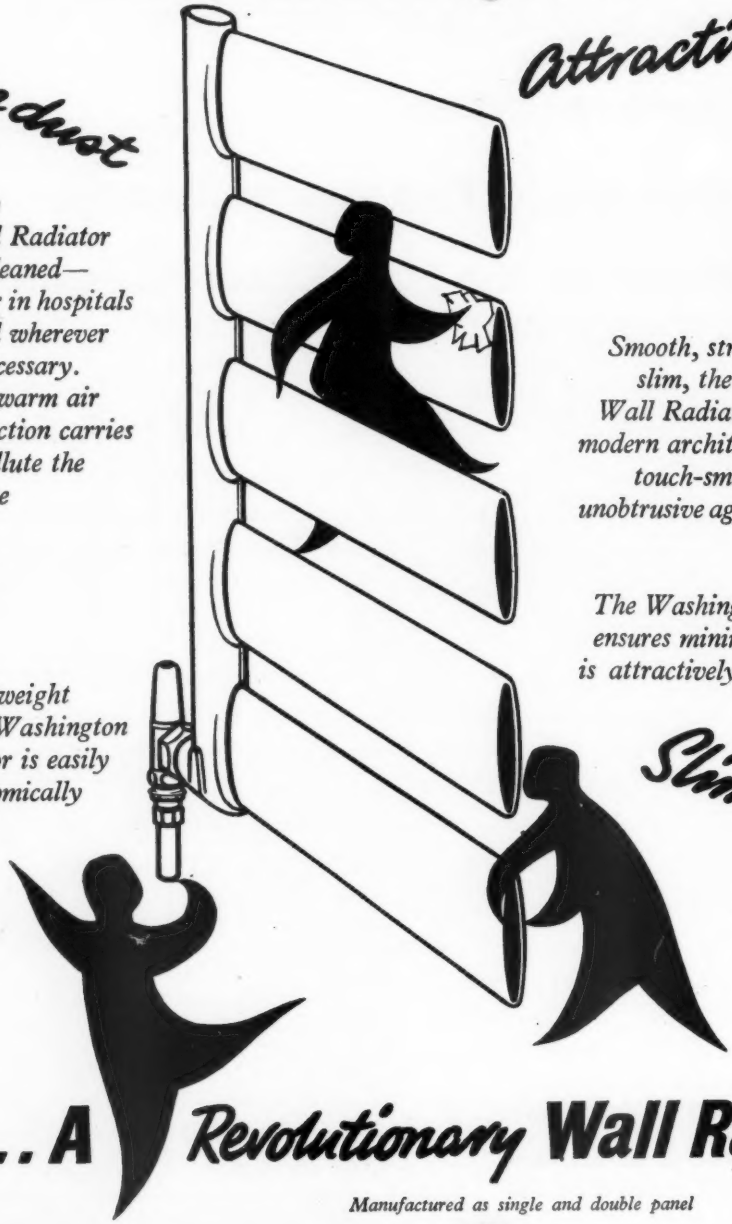

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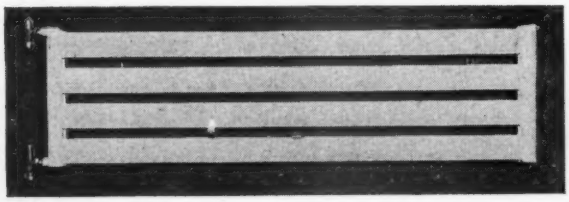

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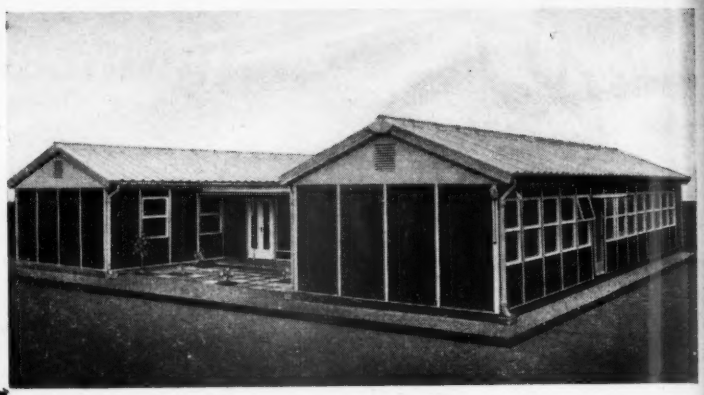

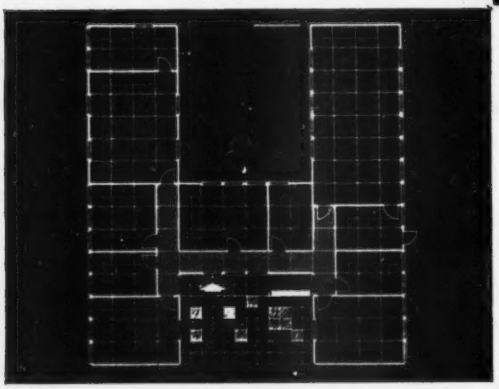

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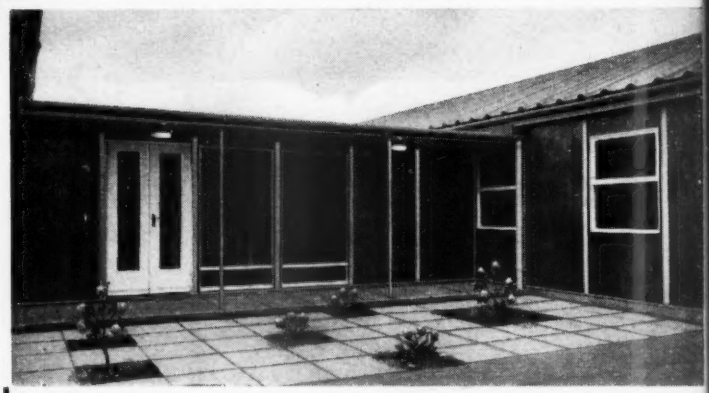

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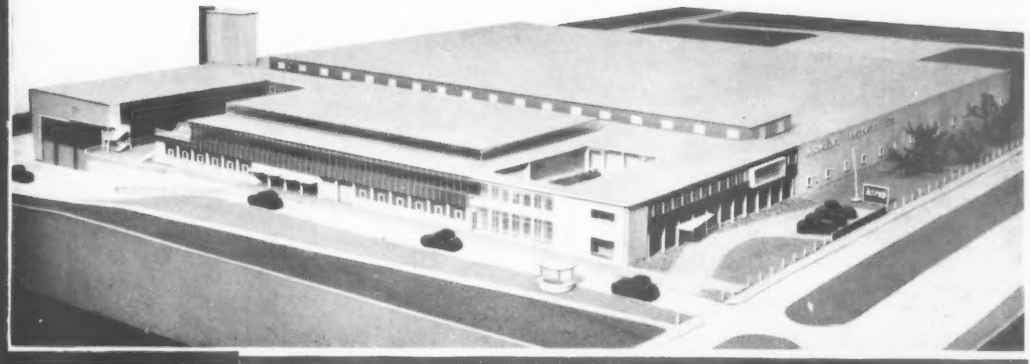

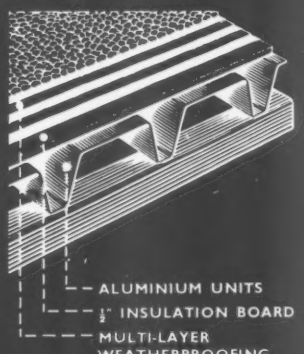

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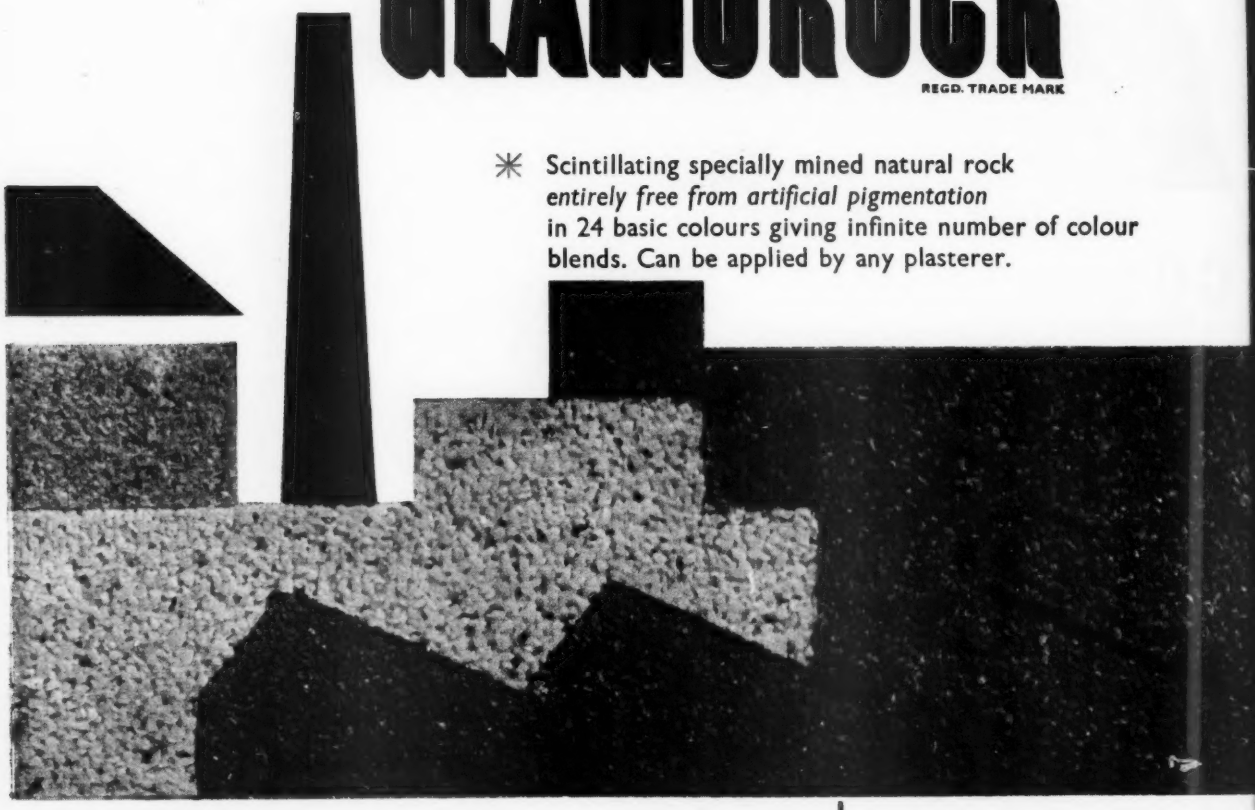

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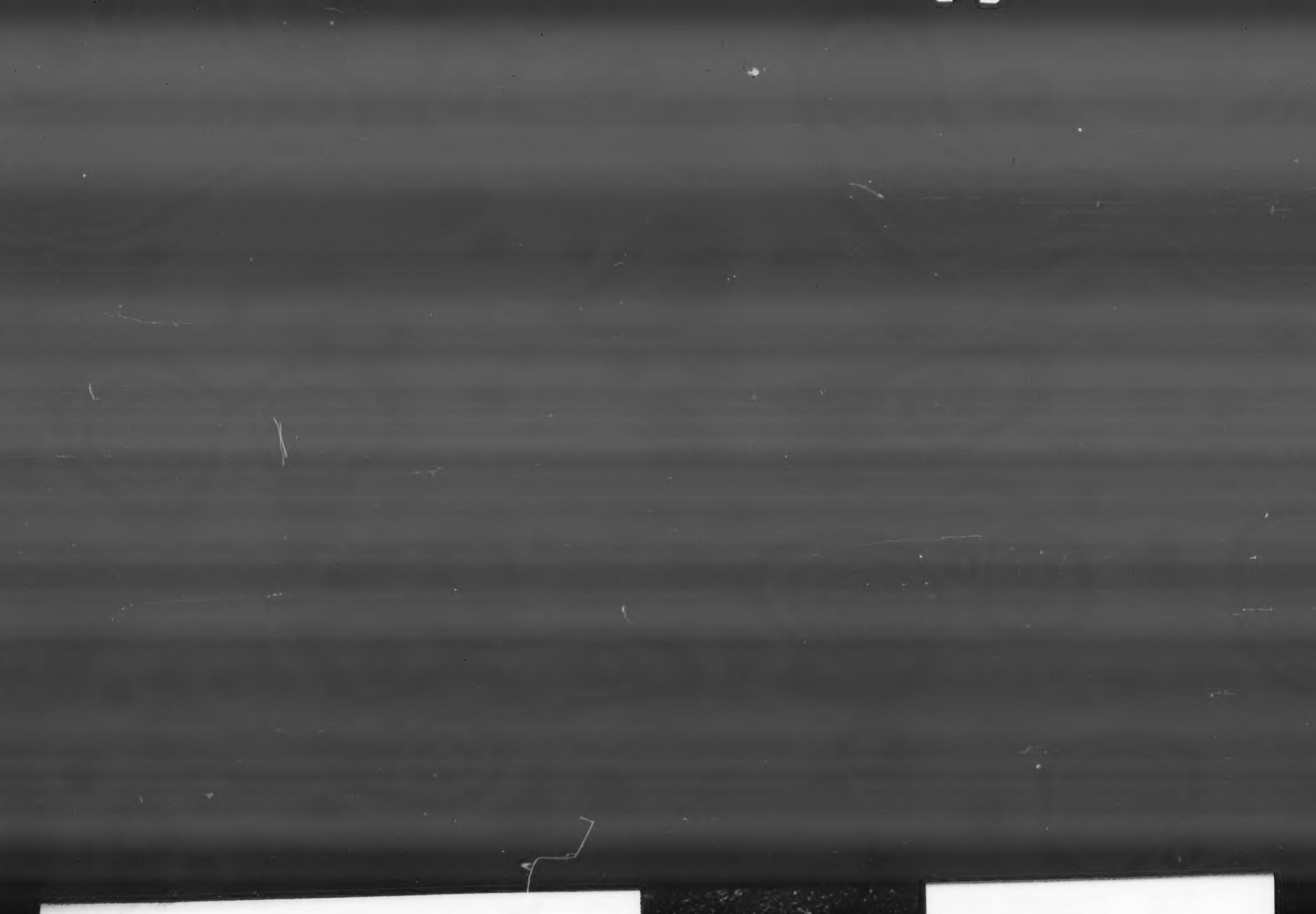

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THE ARCHITECTS' JOURNAL

No. 3295 Vol. 127 April 24, 1958

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NOT QUITE READY:

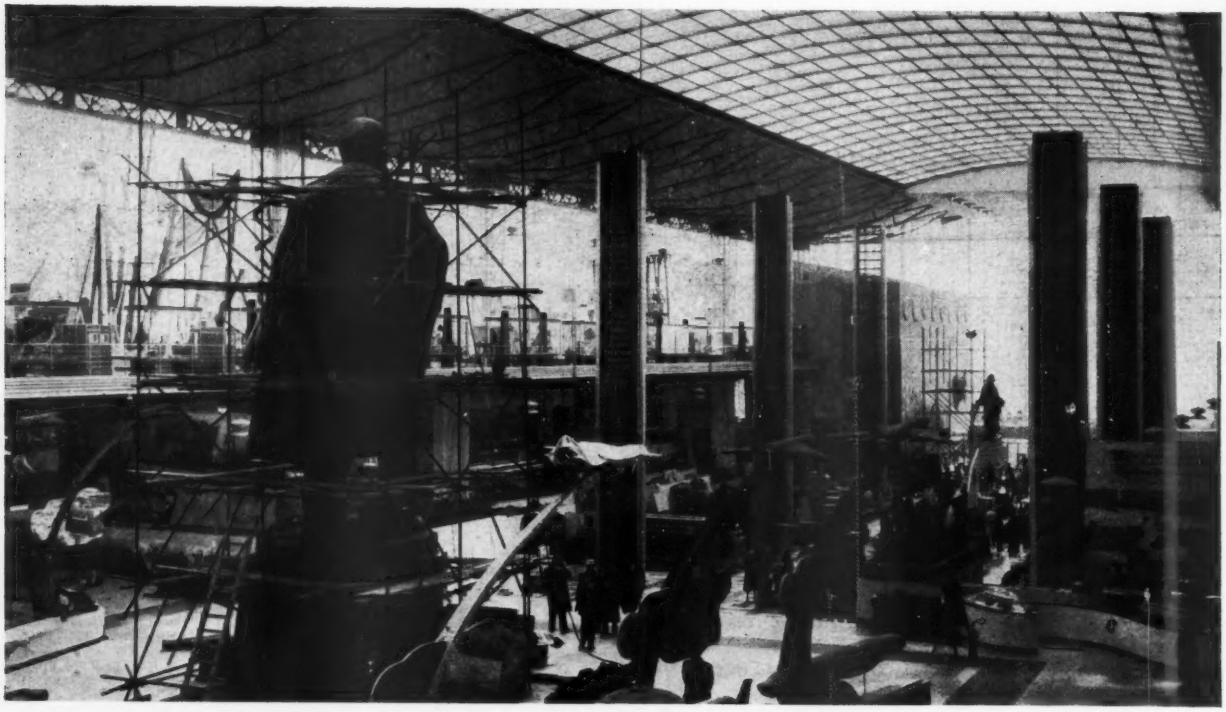
BRUSSELS

The journalist who had to record his impressions of the Brussels World Fair after the frustrating experiences of the so-called Press day, when nothing was ready and everything broke down, would be in difficulty. The *Daily Express*, describing the Fair as a "£360 million architects' frolic" (though it may be doubted if the architects have made quite as much as that), tartly drew attention to its unreadiness and put the profession in the dock again.

*

But the unreadiness was more apparent than real. When the show was thrown open to the public last Thursday, although nearly every pavilion lacked some finishing touches, there had been an almost miraculous transformation, and the only foreign pavilions unable to open were France, Italy, Spain and Brazil. Britain can congratulate itself on the fact that its pavilions (to be criticized by J. M. Richards in the JOURNAL next week) were almost complete on Press day. Unfortunately, le Corbusier's pavilion for Philips was not expected to give its first performance of the "electronic poem" in light and sound until this week. And since, in the words of the programme, "the architectural structure of the pavilion and the spectacle which is to be given in it are one," it is impossible to pass judgment on it without having seen and heard the show. Italy remains a big question mark, for it was quite impossible to tell in its present state whether the distinguished architects who designed it have achieved a disastrous failure or a last-minute success. They have attempted to get away from what they regard as the clichés of contemporary exhibition architecture by designing a small hillside town in traditional whitewashed brick. So it would be wise to postpone one's visit until the end of May, to give the flowers and the trees a chance to bloom and the laggard pavilions a chance to finish—and also to get the AJ special issue, providing a unique architectural guide, which is to appear on May 29.

Above, the interior of the hypaethral main U.S. pavilion (architect, Edward Stone) showing the steel cylinder, which is suspended by cables from the eaves to form the roof. Mannequins parade continuously down the ramp to the platform standing in the central pool of water. Below, the less sophisticated Russian pavilion. More pictures are on page 601.



Is it going to be worth making the trip to Brussels? The answer is an emphatic "Yes"; even if the Fair is not going to prove a landmark in the history of architecture, it has an immense amount to interest the architect, both structurally and æsthetically, particularly in the foreign section. The prize for the best pavilion—if there were one—should go (in my opinion) to the Dutch who were not only the first people to have everything ready, down to the cocks crowing in the farmyard, but have succeeded in providing a convincing architectural frame for such diverse exhibits as a pumping station, a stormy sea

breaking against a dike, farming, engineering and contemporary art.

*

The Belgians have, in quantity, made by far the largest contribution, but its quality is inevitably uneven. The Atomium, which is an effective symbol, is far more successful as a work of engineering than in the handling of its architectural details. The Belgians, as one can see in Brussels, are not yet able to match their mastery of advanced industrial technique with the understanding of modern architecture achieved by the Dutch or the Germans, whose pavilion demonstrates their self-confident reassumption of the Bauhaus tradition of leadership in modern architecture. This pavilion consists of a chain of free-standing glazed blocks, framed in black-and-white painted steel, with white venetian blinds, floored throughout with light-coloured pine, and linked by elevated footpaths and staircases, creating an effect of order, clarity and precision unequalled by any other pavilion. It is unfortunate for the British that the two stand side-by-side.

*

Two smaller pavilions that must be seen are the Swiss and the Yugoslav—the latter much the best of the East Europeans and possibly none the worse for the fact that Yugoslavia could not afford to put very much inside it.

*

It is very different, of course, with the two giants, the Russians and the Americans. The former have a huge rectangular pavilion, an engineering job laid out on classic symmetrical lines, with vast flights of steps leading inwards, statues, murals and columns on either side, and a gigantic statue of Lenin in the centre. It shows no sign of advance in its handling of art, sculpture or architectural detail, but the sweep and comprehensiveness of its industrial exhibits is unrivalled anywhere: the design of their engineering products, incidentally, is much better than that of their Detroit-styled cars or their petty-bourgeois furniture.

*

The American pavilion, a vast circular hall as large as the Colosseum, clad entirely in transparent plastic, encloses living trees and throws its roof open to the sky. It is not only of exceptional interest for its roof and wall construction, but provides a great dramatic experience. Its appeal is altogether more sophisticated than the Russians; America is competing more with fashion shows and pretty hostesses than with heavy engineering, and may score a less palpable hit with the man in the street who is more interested in machinery than in townscape (a feature of the US pavilion); and may find that the naïve Russian paintings in their Victorian gilt frames tells more about Russia than the well-presented display of contemporary American art reveals America. Whether Circarama, the latest cinematic gimmick, will prove to have greater attractions than the Sputnik remains to be seen. But each pavilion in its own way provides a most interesting picture of each country as it sees itself. M. M.

The Editors

ASK NOT FOR WHOM THE BELL TOLLS: ASK WHO'S TOLLING IT

IN two weeks time, on Tuesday, May 6, the annual report of the RIBA will be presented at the AGM. Will this year's AGM consist of the formal business, speedily conducted, of most years, or will there be a repeat of the AGM of three years ago, when a large body of members attended, and a special resolution was put to the meeting by an ordinary member and passed—a procedure apparently almost without precedent?

From the way architects are acting (see page 599) there are signs that, once again the AGM is going to be a well-attended and lively meeting, although one must bear in mind that there is a large gulf between talking and acting. Many people expect the RIBA to look after their interests, but do not themselves bother to offer advice and help. Similarly a large number of architects complain amongst themselves when things go wrong, but are not prepared to ask questions at the AGM either for fear of being labelled trouble-makers by the establishment, or for fear of losing some of the assignments which it is frequently and erroneously supposed that the RIBA can hand out liberally to a chosen few. Or architects do not attend AGM's, either from indifference over their responsibilities in professional matters, or from an inability to travel to London meetings on geographical or financial grounds.

The spark, and it is a fairly hefty one, which is likely to start off an explosion at the AGM is the recent mishandling of the RIBA's finances. The outcome of this financial inexpertise was an increase all round in subscriptions and fees, and this has prompted people to ask: What are we getting for our money from the RIBA? The brutal answer is: you get what you are putting into it.

Granted that the RIBA administration may need modernising; granted that some members of the RIBA Council seem to be out of touch with the membership; granted that the committee system is time-consuming and cumbersome; granted that architectural education needs an overhaul; granted that the position of the architect in the "all-in" service is unsatisfactory and so on. The way to have these things put right lies not in "their" hands, but in yours, the profession at large—and the AGM is your chance to do it.

Of course, at the AGM it is quite possible that one section of the membership will be at loggerheads with another. The RIBA Council, some claim, is handicapped by the reactionaries of the Allied Societies. The RIBA, claim others, is a club for London members. No, say a third group, it is run by principals in private practice trying to feather their nests. On the contrary, argue a fourth, it is dominated by empire-building public architects.

Well, you record your vote (or don't you?) and you make your choice. Any of the above factions may be making

demands and complaints at the AGM, and rocking the professional boat in the process. But what is wanted is active participation in professional affairs by architects throughout the country. It is no longer sufficient merely to have architects with a reputation for doing the " right " kind of buildings on the RIBA Council, who are in turn perfunctorily controlled by a background caucus of architect-knights and the semi-retired. Nor is it enough to have the Allied Societies dominated by principals in private (and, very occasionally, public) offices. Architectural practice must allow *all* members, assistants as well as principals, to participate in the governing of the profession, and when democracy has been achieved it must be made to work.

The recent financial fiasco at the RIBA is a symptom of the profession's deep-rooted malaise. But the profession exists not for one faction or another, or even for itself, but for the furtherance of architecture for all people. Those who speak at this year's AGM, and we hope they are many, must speak not for themselves, but for architecture.

THE BUDGET

The most interesting item in the Budget, at least for salaried architects, is the deduction of professional expenses under Schedule E now being allowed for public as well as private architects. This is the outcome of vigorous pressure applied to the Government by the leading professional societies. In a small way it shows the value of the professions acting together (bear in mind the proposed Local Government Architects' Society which will join with doctors and lawyers, and so on, to form a Professional Panel to work with NALGO). It is also a small feather in the cap of Gordon Ricketts, the RIBA's secretary of Professional Relations, who acted for the RIBA.

*

Otherwise, there doesn't seem to be anything much to be said about Mr. Heathcoat Amory's budget except that the Purchase Tax reductions on gas and electrical equipment were well overdue. So far as I remember, the tax was originally imposed when gas supplies were very limited and electricity was liable to disappear altogether, and from a common-sense point of view it should have been removed as soon as supplies became normal. To halve the tax now is better than nothing, but it is difficult to see why it should stay on at all, for even in the maddest spending spree nobody is likely to buy two fires where one would do.

PRIVATE HOUSE DESIGN

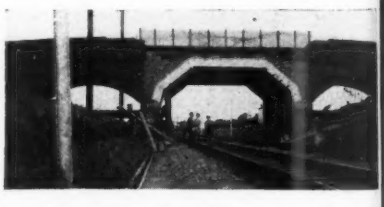
As has been repeatedly referred to in the JOURNAL, the Town and Country Planning and Housing Committee of the RIBA (chairman, Grenfell Baines) has organized a one-day symposium on private house design. The purpose is to achieve higher standards of spec building and thereby improve the appearance of town and countryside—and the obvious way for that to be achieved is by architects convincing builders that they can produce good-looking, easy-selling houses in spick and span settings to rigid cost limits. The builders are obviously intrigued, in that ASTRAGAL learns that their applications to attend now nearly outnumber all the others—planners, architects, building society representatives and so forth, combined. This is admirable, of course, but surely more architects should attend? Here is a clear-cut case where architects must support an enterprising move by their own Institute. If the profession intends to be taken seriously it should find time to participate in this type of venture which could have such far-reaching results to the industry and to the profession's ultimate clients—the general public.

SOUTH AFRICAN EXHIBITION

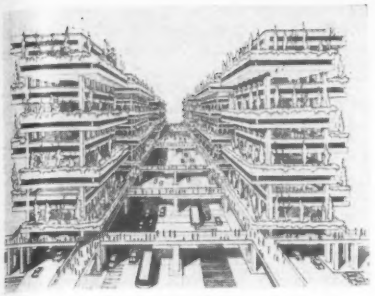
ASTRAGAL has always had a sneaking sympathy with the old Boer principle of moving on when he found he could see his neighbour's chimneys. It's only a pity that he couldn't live up to it more often and thus avoid the congested muddle of most Transvaal towns—or face up to congestion and attempt town planning more viable than the old grid pattern. Certainly town planning is most conspicuously lacking in the exhibition of South African architecture on view at the RIBA until May 1.

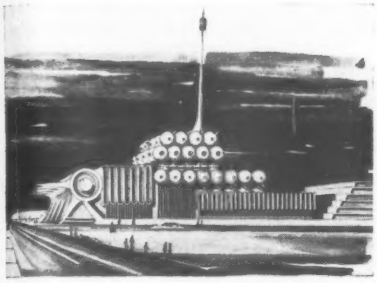
*

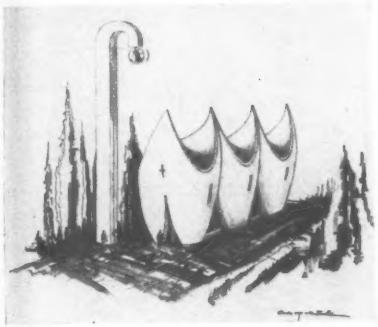
It's an interesting little exhibition, aimed midway between the layman and the architect, but well worth a visit.



The railway line between Crewe and Manchester is being electrified. As a result, in this 31-mile stretch no less than 88 bridges have to be raised in height as the high voltage wires need at least 15 ft. 8 in. clear headroom above rail level. The London Midland Region of British Railways are carrying out this task in the manner shown above. No doubt it is ingenious, but only a modern engineer could make such an ugly mess of the result. No one will claim that the original brick, arched, bridges were anything to marvel at, but they had a simple neatness in the good 19th century engineering tradition—a tradition of which the present generation of engineers seem completely oblivious.







Three designs by the Italian architect Enzo Venturelli now on view in Paris. Top, offices and garden balconies with pedestrians separated from motor traffic. Centre, a suggestion for a radio and television station. Bottom, a church. See ASTRAGAL'S *comment titled "Nuclearchitecture."*

There is the usual historical section which one gets with this type of national exhibition, and about a dozen or so screens showing modern and 'thirties work. Certainly, they've got nothing to be ashamed of. Except for a certain coarseness of style—to English eyes, at any rate (due perhaps to the Dutch influence)—the commercial work and the private houses are quite the equal of ours. There are, however, virtually no schools shown, and very few good public buildings. Bearing in mind British insurance companies' buildings, it was encouraging to see that the S.A.N.L.A.M. Insurance Co., with architects Nel, Vos & Mallis, have put up some very competently designed modern headquarters.

Also shown were examples of early Colonial furniture—upholstered in laced raw-hide, studies of native dress, huts and beadwork, a small section on the current native housing problem—all of which ASTRAGAL would have been delighted to have seen expanded into exhibitions in their own right. Try to visit this exhibition—it may go on tour. Unfortunately you will not then see the display of fantastic Cape flowers from the National Botanic Gardens, Kirstenbosch.

NO CREDIT

A colleague, who is now over in Brussels preparing material for a special issue of the AJ, reports that one of the scandals of the Brussels Exhibition was the failure of the Central Office of Information to give any credit in the publicity material it issued to the Press to the artists who have contributed to the British pavilion. The sole reference to their work in the official hand-out is as follows:

> "Outside the Hall of Technology a number of pleasant courtyards contain demonstrations of British contributions to world literature, the arts and philosophy . . . and several sections devoted to the illustration of the British way of life."

The United States, by contrast, he says, has published an admirable catalogue of its exhibition of American art and pays handsome tribute in its publicity to the artists, sculptors and others whose work is a striking feature of the US pavilion. In the UK pavilion the Brummagem tradition has triumphed and the work of the artists is studiously ignored.

AA RECEPTION

The AA reception last week was fully up to standard—the standard being, of course, that it is the most enjoyable of all architectural functions in London. The combination of odd little exhibitions, cabaret turns, different types of dance music, different types of bar, and different types of architects, from greybeards to the merely unshaven, makes for a variety which never palls.

NUCLEARCHITECTURE

What with the goings on in Brussels and elsewhere, it seems that the gimmick that still can't miss after almost 13 years is to call your product *atomic* or *nuclear*. Sooner or later an architect had to climb on this particular bandwaggon. Enzo Venturelli has done so. A number of drawings by this Italian architect are now on exhibition in Paris under the title of *Architecture du Temps Nucléaire*. What they prove to be, on average, is a mix-up of organic, warped-slab concrete, early Futurist stuff.

*

At its craziest, this turns out churches in the forms of bishop's mitres and over-wrought hi-fi equipment; at its most rational (using the word rather cautiously) it produces multi-level street-scapes heavily influenced by early Corb. Signor Venturelli assures us that the external elements of the new architecture will always follow the internal forms . . . one can only hope, therefore, that what appears to be a cross between a giant Espresso machine and a petrol refinery has been *mis*labelled "Television and Radio Station."

*

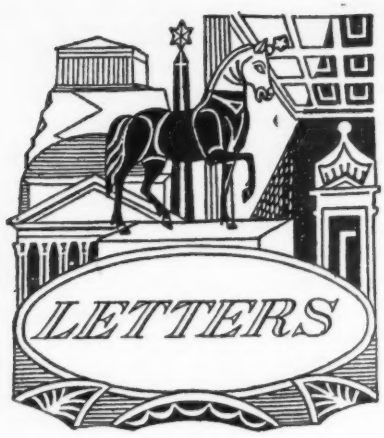
Before a flood of letters start to pour in from enraged students at the AA and the Poly, let me say that I am not one of those who believe that only square architecture is any good. The extremely liberated attitude of many Italian architects to concrete, in particular, seems an entirely good thing to me, but there are limits, as they say—such as shuttering.

MIXED GRILL

Here, to end, is a rather nice letter reproduced from the *Irish Times*. It was sent to ASTRAGAL by Niall Montgomery.

> SIR,—With reference to your report (March 10th) that a new Roman basilica-type church is to be built in Terenure, incorporating many features of early Christian Byzantine and Italian Romanesque architecture, you may be interested to know that I am composing an opera-type verse-play. The libretto combines passages from Homer, Virgil, Chaucer and Shakespeare; the music includes element's from Byrd, Scarlatti, Beethoven and Wagner, and will be played on accordions, harpsichords and drums. The decor is to combine features from Giotto, Botticelli, Rembrandt and Turner. This should be very nice, I think. There is one scene that is really rather striking where the hero drinks sack, mead and malmsey, while the heroine intones the "Clerk's Tale" to the accompaniment of the "Egmont" overture played on the harpsichord. I did think of using "Eine Kleine Nachtmusik" played on the drums, but the hero has to drink a glass of hemlock-type poison near the end, so you need something quieter.
>
> I am often commissioned to do operas and things and make quite a bit out of it, but I would like to hear whether you think this one would be all right for the Theatre Festival.
>
> Yours, etc.
> B. MUSCULUS.
>
> Co. Dublin.

ASTRAGAL



John Basing

C. B. Martindale, F.R.I.B.A.

W. Sinclair Gauldie and
A. F. S. Wright, F/F.R.I.B.A.

W. G. Sprague, A.R.I.B.A.
of E. M. Galloway and Partners

Brian Whateley

Frances Farrer
General Secretary, National Federation of Women's Institutes

Education

SIR,—Somebody once said that a statistician is a man who draws a straight line from an unwarrantable assumption to a foregone conclusion. Recent comments on architectural education by the AJ, the *Ad hoc* committee and Mr. John Smith seem to follow a similar course.

The unwarrantable assumption is that the only thing seriously wrong with the teaching of design in our schools is that it should be based on a better understanding of practical and economic limitations. The foregone conclusion is that the present haphazard system of architectural education is obsolete and must be scrapped.

Now the man who qualifies as an A.R.I.B.A. at 23 or so after five years' full-time training is not an architect, whatever the RIBA and ARCUK are prepared to say for £7 17s. 6d. and £1 10s. a year respectively. Nobody respects his secondhand æsthetic opinions and nobody will trust him alone with practical affairs until he has had years of practical experience. In short, his school-training merely serves as a prelude to a lengthy apprenticeship before he acquires the status of a real architect. What then should be the purpose of architectural education? What can it teach the student better than he can learn for himself in daily practice? Of industrial and scientific techniques, of modular planning and detailing, of job management—nothing. Surely the purpose of architectural education as of all education is to develop receptive, creative, original minds, capable of profiting from unforeseen developments, wise in the interpretation of other people's problems and motives, be they client, specialist or labourer. How badly we have failed can be seen from the blind hostility with which the profession as a whole treats unfamiliar ideas—the New Brutalism, for example, or from how hopeless so many students are at the one abstract logical subject in the syllabus—Theory of Structures. What is the point of cramming more and more detail into undeveloped minds that will have no occasion to use it for 10 years anyway?

So much for the unwarrantable assumption. Let us now examine the foregone conclusion.

Many people are dissatisfied with the present qualifying system. Mr. John Smith thought it was absurd that we should have architects who had received no formal training—I fail to see why. Most people who object to the external examinations do so because they feel that all examinations are by their very nature unfair—again I fail to see why; every job that we do, every drawing that we make is an examination. Nobody seems to think it unfair that these should be taken as a fair test of our abilities. I think that the RIBA examinations are unfair, because one is just as likely to pass on a week's "swotting" as one is to fail on a lifetime of study and experience, but the fault lies with the examiners, who are unable (or unwilling) to form a sound opinion of the candidate's ability, and the remedy is to eliminate the weaknesses and prejudices of individual examiners. I see no reason why some of the profits made out of RIBA examinations should not be devoted to giving every candidate one proper oral examination before a board of examiners rather than a perfunctory interview with each fallible impressionable quasi-specialist.

The remedy for our present mediocrity is not to restrict the intake to those who have taken an approved course but to spread the net as wide as possible and provide an efficient selection board for the final product. I repeat, the only realistic examination is a reformed Special Final; an internal examination which purports to produce 23-year-old qualified achitects who have never left school is ridiculous. Give them a B.Arch. if they must have a label.

JOHN BASING.

Highgate.

SIR,—Most practising architects will welcome your excellent leader in the JOURNAL for March 20, upon the need for a radical change in architectural education.

After 27 years' experience, "man and boy," and having been both an articled pupil and a student of a university school of architecture, it seems to me that to produce the results you ask for it is essential for university training to include at least two years' service in an architect's office (public or private) where the work produced has to stand or fall by its practicability. The present artificial separation of training from experience is unrealistic and not followed by other professions.

C. B. MARTINDALE.

Carlisle.

Controlling The Unqualified

SIR,—In the matter of tightening-up control over the unqualified practitioner, perhaps it is time we stopped trying to insert the thick end of the wedge, and tried the thin one for a change.

Parliament is no more likely to stop "the unqualified person drawing up plans" than to stop Woolworths selling spectacles. A more serious threat is the unqualified person—an estate agent for instance—who not only draws the plans (or gets them drawn) but instructs contractors, supervises the work and settles the accounts.

Whatever else he may call himself, he is "the architect" to everyone on the job, because no other word describes these functions. Could it be that the operative's instinct is sounder than our own, and that the real criterion of an architect is his position as *agent for the client in the carrying-out of building works?*

If so, then his assumption of that position is *per se* "holding himself out to be an architect."

The position that actions matter more than words is already well enough accepted in Law. Joe Smith can call himself "Captain" as much as he likes without worrying the Board of Trade a bit: but he must have their certificate before he can take a ship out.

Parliament probably couldn't care less who "draws the pictures" but it might well be brought to recognize (as in the case of solicitors) that the position of agent between parties in contractual matters of building should be confined by Law to the qualified practitioner subject to a specific professional discipline—in short, the registered architect.

W. SINCLAIR GAULDIE.
A. F. S. WRIGHT.

Dundee.

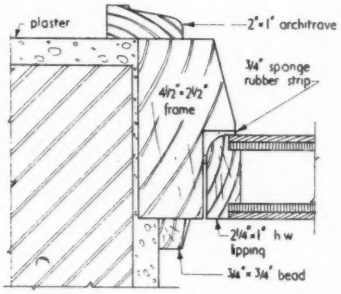
Sound Idea

SIR,—I notice in the feature on the doctors' group surgery (AJ March 20) there is a note to the effect that sound gets into the surgeries through the rebates and under doors.

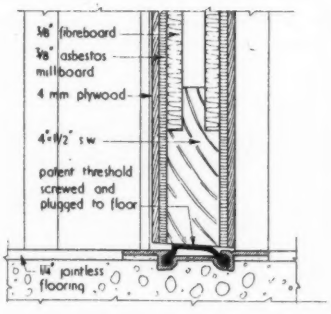
I enclose a detail which we are using on a new X-ray Department at Odstock Hospital, Salisbury, which seems to solve the problem cheaply.

W. G. SPRAGUE.

Southampton.



Above, plan at jamb and below, section of a door at Odstock Hospital. See letter above.



AJ's Inane Journalism

SIR,—This week's sad issue of the JOURNAL (April 10) prompts me to write to you in something like quiet desperation. Over some months, the quality has gone into a steady decline, with each issue taking a pathetic step down the slope. Consider the current issue: 112 pages of advertisements bravely hold up 32 pages of reading matter; of these pages, seven are devoted to editorial, 14 to housing and 11 to new buildings. Surely you cannot contend that this is a worthwhile contribution to the architects' reading?

The whole presentation of the magazine has become flat and lifeless, this being due, in no small way, to the photographs. This week all of them are poor and those on pages 548 and 555 are just pitiful.

I know that your Press can produce journalism of a high standard in the *Review*, and it is surely not impossible to infuse a little of that spirit in to those responsible for the production of the JOURNAL.

If you wish to continue to sell the JOURNAL at all in this part of the world, I implore you to haul out the JOURNAL from the morass of despondency and inane journalism in to which it has slowly but surely sunk. I regret having renewed my subscription and sincerely hope that before the end of the year, some improvement occurs.

Edgbaston. BRIAN WHATELEY.

[We would like to know how many other readers agree with Mr. Whateley's criticisms. —EDS.]

A Tidy Sum

SIR,—In your issue of April 3, under the heading "A Tidy Sum," you say that the Government have made a £15,000 a year grant to the Keep Britain Tidy Group.

I regret to have to tell you, and feel that you may wish to re-title your paragraph upon learning, that the sum we are to receive from the Government is £1,500 a year. This, however, is most welcome and will be spent, not as you might have feared on purchasing sites, but on co-ordinating the widespread work of the Group, which will now have a full-time Secretary.

FRANCES FARRER.

London.

RIBA ELECTIONS

Startling Move

In an effort to secure better representation for the West Country on the RIBA Council the Councils of the allied societies in the West Country have urged their members to concentrate their votes in the forthcoming elections on an agreed candidate, and to restrict the number of votes cast for other candidates. Hugh P. Crallan, hon. secretary of the Wessex Federal Society of Architects, has issued a letter to his members

The Council of the Wessex Federal Society are agreed that it is desirable to increase direct representation from the West Country on the RIBA Council. The Councils of the Wessex Society, the Devon and Cornwall Society, and the Hants and Isle of Wight AA have agreed to give mutual support to a joint nomination, to be made by the Wessex this year, and thereafter by the other Societies in turn. Mr. W. Norman Oliver will therefore be nominated. He is a Past President of the Wilts and Dorset Society of Architects and has a long experience of fighting for the interests of provincial members and West Country architects at the Allied Societies' and other Conferences. I would particularly point out our effort to increase representation can *only* succeed if we disregard all individual preferences and support our Council's action.

It is also vital to remember that the more votes you cast, the smaller the value of each vote. Please therefore exercise all possible restraint, and if you agree with the Council's objective—viz. greater attention in London to provincial interests—*vote for Mr. Oliver.*

MOE

Cheaper School Heating System

Warm air, circulated by electric fans, and heated by oil-fired boilers, has proved 25 per cent. cheaper to run than an oil-fired radiator system. This is the conclusion contained in a special supplement to the Ministry of Education's *Building Bulletin No.* 3 ("Test With Oil-Fired Warm Air System") published to-day (April 17), by HMSO, price 9d. It describes a system of school heating which has proved during a year's trial to be about 25 per cent. cheaper to run than oil-fired radiator systems referred to in the original Bulletin. The test, carried out in a primary school in Hatfield, Herts, employed warm air circulated by electrically driven fans from thermostatically controlled cabinet heaters in each classroom.

The chief reason for the exceptionally economical running of the system was its "high degree of intermittency," says the pamphlet. Though shut off completely during out-of-school hours and at weekends, rooms could be warmed up rapidly before being re-occupied. Time and temperature controls ensured that in exceptionally cold weather the heating was started earlier than usual by an exterior thermostat.

In addition to heating the school, the system provided an adequate hot water service including a supply to each classroom. The system was operated in a normal way; no special precautions were taken to reduce air changes by restricting the opening of doors and windows.

The trial is said to have established the greater economy effected by the alliance of properly controlled oil-firing and warm air heating. But it does not follow, says the pamphlet, that oil should always be used in preference to coal. The relative advantages of these fuels should be carefully weighed in areas where coal is exceptionally cheap.

UNIVERSITY OF LIVERPOOL

The New Department of Building Science described by Professor A. W. Hendry, B.Sc., M.I.Struct.E., the Head of the Department

The title "Building Science" may be considered as a conveniently short label for "Science and Scientifically Based Technology as Applied to Building"; in other words, Building Science may be defined as the application of science and technology to the design, construction and maintenance of buildings. The aim of this Department is thus to study the problems of building by the methods of science and to bring to bear on them any relevant principles or techniques from the whole field of science and technology.

Robert Schofield Morris receiving the Royal Gold Medal from Kenneth Cross, the president of the RIBA, at a presentation ceremony performed at 66, *Portland Place last week. Mr. Morris was escorted to the platform by Gold Medallists Howard Robertson and Percy Thomas. Tributes were paid by Sir Howard Robertson ("a very easy architect to praise, his work speaks for itself"); Basil Spence (in Morris "we have a great friend in Canada"), Sir Hugh Casson and G. A. Jellicoe. Mr. Morris, in his reply, said that the receipt of a Gold Medal made him feel "very young, because I am joining a body of such distinguished people, and very small, because they are architectural giants" . . . "I am here because I am a Canadian—that's the reason . . . The strengthening of the bond of Commonwealth architects is something we feel very strongly about."*

The subject may be, for convenience, divided into the following headings: Building Materials; Physics of Environment; Stability and Safety of Structures; Building Services and Equipment; Building Construction and Operations; Analysis of Function.

Of these headings, the second, third and last call for some comment. Physics of Environment is a subject title which has been adopted by the Department to describe a quantitative study of the outdoor and indoor environment in relation to the attainment of satisfactory conditions of heating, ventilation, insulation, lighting and acoustics. The aim of the subject is, first, the specification of an acceptable environment in a building for a given function in terms of temperature, humidity, air movement, illumination levels, noise, etc., taking into account physiological and subjective requirements and, secondly, the formulation of design principles the observance of which will lead to the achievement of specified conditions in a building. As one of the fundamental purposes of any building is to modify the natural environment in favour of some particular human activity, it will be seen that this subject is of great importance, particularly in relation to the design of buildings.

The Stability and Safety of Structures will be an integrated study of structural stability having regard to the interaction between the structure and its foundation under normal and abnormal conditions. It will include studies of safety factors in relation to such things as probable superimposed loading, the effects of settlement, fire, flooding, deterioration under climatic and biological attack, and so on. That is, the emphasis will be not so much on methods of structural analysis, as in the usual University courses on Structures, but rather on an examination of the principles underlying design codes, of concepts of structural safety and of the behaviour of structures under service conditions. It is evident, however, that these studies will call for the application and indeed the development of the most advanced structural theories.

The Analysis of Function will cover the application of the scientific method to the examination of the use of buildings. Work study and Operational Research methods may be expected to provide information which will form a rational basis for design of a building. Examples of this kind of work are to be found in the Building Research Station study on the design of kitchens and, on a large scale, in the work of the Nuffield Trust on the design of hospitals and of the Ministry of Education on the design of schools.

The other subject headings are largely self-explanatory; in every case the emphasis will be on fundamental principles rather than on details and technique.

The Department is to provide courses in Building Science for architectural students. These courses will have the aim of instilling basic principles without over-burdening the student with detail. There will of course be no attempt to make the architect into two or three kinds of engineer in one, but they will help him to avoid design features which create unnecessary difficulties, for example, in structure or heating. The courses will give him a common language with the specialists enabling him to state his requirements clearly and accurately with the confidence that they can be achieved and further will enable him to assess the merits of the proposals put forward by his consultants. Arrangements are also being made in association with the School of Architecture for post-graduate students in that department to participate in joint research projects and to attend appropriate courses in the Department of Building Science as part of their advanced studies.

Plans are in hand for the establishment of a one year post-graduate course for civil engineers who intend to specialize in building either as structural engineers or as site engineers. This course will be designed to give the student a broad view of the scientific aspects of building. As well as increasing his knowledge of his own field, this will enable him to appreciate the problems of other specialists in the industry and to co-operate with them as effectively as possible. It is intended that a good proportion of the students' time will be devoted to a special study of a fairly comprehensive nature, as for example the structural design of a large building and an analysis of the constructional methods to be used for its erection. In this study it is intended that there should be joint work with advanced architectural students. The bringing together of students of engineering and architecture in this way should be to the advantage of both professions.

Provision is also being made for science graduates who may, for example, wish to enter the cement industry or to specialize in some aspect of Physics of Environment with a view to joining a research organisation in this field. Such students would undertake advanced study or research in appropriate subjects, supplemented by attendance at certain parts of the civil engineer's course, in order to give them a comprehensive view of the problems of building design and construction. A somewhat similar arrangement can be made for graduates in mechanical engineering who intend to specialize in the Science of Heating, Ventilation and Air Conditioning.

Laboratories are being set up in the department for the study of Building Materials and Physics of Environment; for the latter subject there are to be laboratories for Heating and Ventilation and for Day and Artificial Lighting. Facilities for the study of acoustic problems in building exist in a special section of the Department of Physics; close collaboration will be maintained between the department concerned in developing this aspect of Building Science. In 1959, the Department will move into a new building to be shared with the Department of Civil Engineering; this will permit the joint use and development of laboratories for subjects of common interest, particularly Structures and Soil Mechanics.

Research work has already begun in Structures, and it is hoped that within a year or two a balanced programme of research in the various aspects of Building Science will be under way. In addition, it is intended to develop a joint research project on certain problems of the planning of buildings with the School of Architecture.

It is hoped that through the work outlined above, the Department of Building Science will be able to make a useful contribution to the education of professional people associated with the building industry and to building research. The success of these efforts is, however, to a great extent dependent on close collaboration with the industry and on the support of those in responsible positions in the industry and the associated professions. The Department will always endeavour to relate its courses to the needs of the industry and the professions and will hope in return that graduates in engineering, and science will be encouraged to take these courses or to carry out research in the Department.

LAW REPORT

Buying a Practice: Pitfalls for Buyers and Sellers

These notes, by a legal correspondent, on a recent court case involving architects, illustrate some hazards in the buying and selling of a professional practice.

When an architect or other professional man, such as a solicitor or stockbroker, whose practice involves a personal relationship with clients, comes to buy or sell such a practice, the advantage of any connection formed with clients is an important factor in fixing the selling price. This advantage is called goodwill. It may be personal goodwill, which is just the advantage of the recommendation of the owner of the business and of the use of his name. It may be local goodwill, a goodwill which is attached to the premises and depends on their location, appearance, and the length of time they have been established.

The House of Lords, as an appelate tribunal, has criticized as too narrow a definition of goodwill as "nothing more than the probability that the old customers will resort to the old place" and an English judge, many years ago, described goodwill as something easy to describe but difficult to define. "I understand the word to include whatever adds value to a business by reason of situation, name, and reputation, connection, introduction to old customers, and agreed absence from competition, or any of these things," he said. "It is the attractive force which brings in customers. It is the one thing which distinguishes an old established business from a new business at its first start."

Now, a business based on personal professional services will, especially if the premises be held on lease, possess relatively few material assets apart from office equipment. The "practice" or "business" will depend for the greater part of its value on what work in progress is revealed by its books and on evidence of its actual or potential attraction to clients. The presence or absence of the intangible factors which collectively make up "goodwill" may therefore be of considerable importance. This makes the purchaser's assessment of a realistic value the more difficult and imposes a duty on the vendor to be more than usually careful in any representations he may make about the size and character of the practice he is seeking to sell.

These difficulties, latent in the sale of professional practices, were recently illustrated in court for the first time in the case of architects. At Clerkenwell County Court in December last a Mr. Rushton, who carried on his main business in Chelsea and had formerly been a President of the Faculty of Architects and Surveyors and a Member of the Architects' Registration Council, claimed from a Mr. Kenneth Sinclair, an architect and surveyor, £159 as the balance of payment in connection with the sale of a practice at St. Leonards-on-Sea for £300. He had himself bought the practice in 1952 for £400. At that time there was not much doing in the way of work and, as his counsel said, he would be the last to suggest that he had built up a thriving practice.

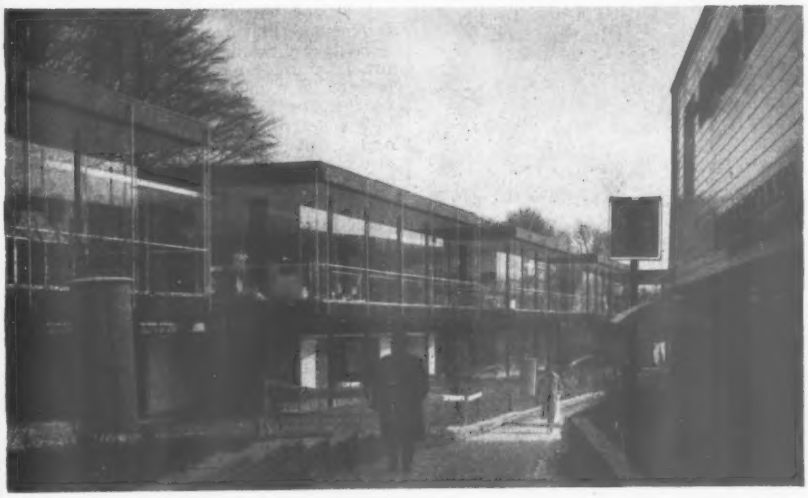
When, added counsel, in September, 1955, a sale was discussed between the parties, Mr. Rushton told Mr. Sinclair that there was no work in progress in the office at that time. Both parties went to St. Leonards and, in court, it was suggested that it must therefore have been obvious to Mr. Sinclair that nothing had been doing in the office for a considerable time.

The parties agreed that Mr. Sinclair should purchase the practice for £300—£150 down and the balance over six months—and he then paid the instalment of £150. He later refused to pay the balance and alleged that "not one penny piece of work had emanated from the practice." He went on to allege that Mr. Rushton had told him that there was an existing practice and that there were a number of useful clients on the books.

Mr. Rushton, in giving evidence, denied

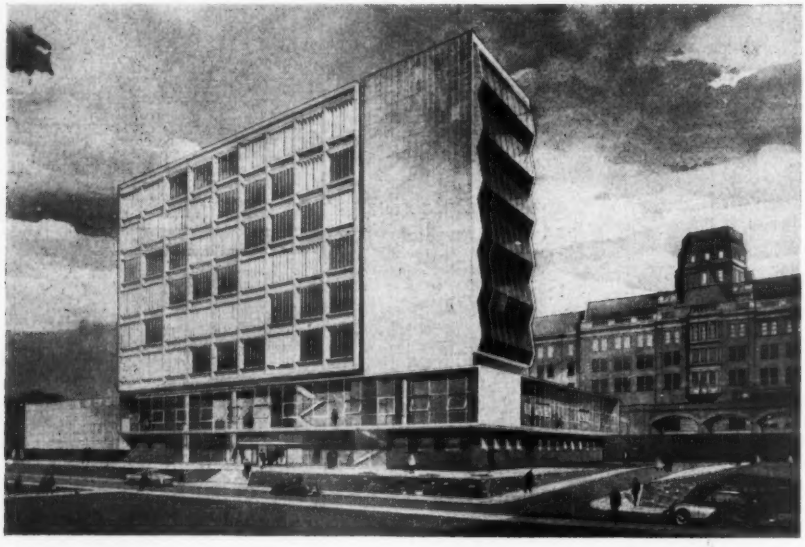
Continued on page 602

BRITISH AND WEST GERMAN PAVILIONS AT BRUSSELS

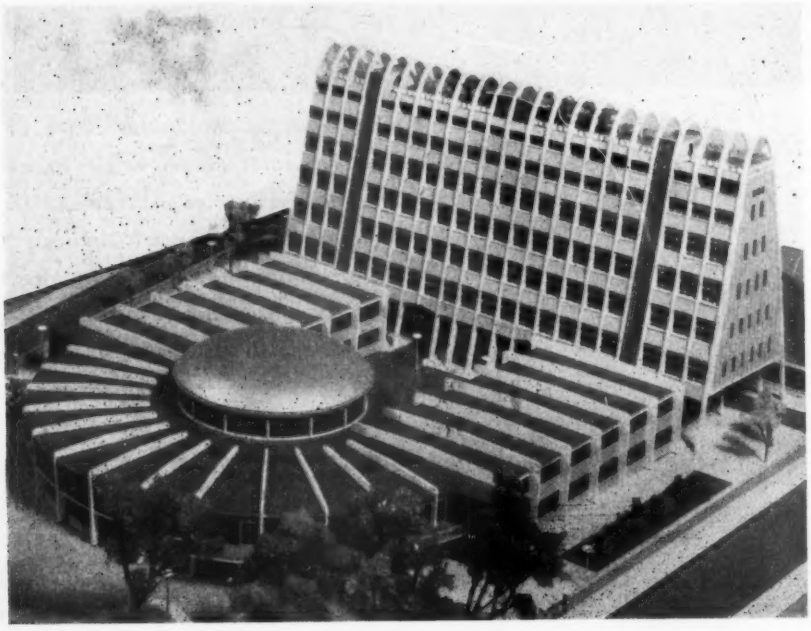


Above, part of the British exhibit at Brussels. On the right is the British Industries Pavilion (architect Edward D. Mills) and on the left is the "Britannia" pub, also designed by Edward D. Mills. In the background is part of the meticulously detailed West German pavilion, of which a closer view is given left, showing its close proximity to the more informal design of the British exhibit. The British pavilions will be fully illustrated and criticized in next week's JOURNAL. *A complete report of the exhibition will appear on May 29. See also page 594.*

PROPOSED EDUCATIONAL BUILDINGS, MANCHESTER



The existing building for the Manchester College of Science and Technology is of an eclectic style (to which the recently completed extension, based on a design of 1927, conforms) which belies the functional nature of the college. It is, therefore, encouraging to see that the college's proposed new lecture block, above, is uncompromisingly modern, and, even more encouraging, the work of a local firm of architects, Cruikshank and Seward. The building consists entirely of lecture rooms and theatres, one seating 500, two seating 300, six seating 150 (the last are lit by the saw-tooth fenestration on the right of the tall block) and a number of smaller lecture rooms. Double walls and glazing deal with noise from the nearby railway and adjustable louvres outside the windows control sunlight. Below, the proposed Domestic and Trades College, Manchester, designed by Leonard C. Howitt, city architect (chief assistant architect, education, R. E. Shapley; group leader, D. B. Hill). The U-shaped block contains staff, common rooms, library, refectory and assembly hall. The teaching rooms are in the six-storey tapering block on the right, a block which misleadingly purports to be of arched construction.



Law report continued from page 600

this. "I never said it was a busy practice," he declared, "and I did my best to give him as faithful a picture of the situation as possible." He had, he said, no recollection of telling the defendant that there were a number of useful clients on the books.

In cross-examination he was asked: "With your experience did it not occur to you that you should take particular care with a young architect who was buying a practice that to all intents and purposes had been dead for over a year?"

"I did not regard him as a young architect," he replied. "I understood he had been in practice for several years. He was quite confident that he would have no difficulty in making the practice go. I would suggest that the sum I asked could, in no circumstances, be expected to be a price for a flourishing business."

The defendant then gave evidence, saying that the plaintiff had informed him that he had not been able to devote much time to the practice, but had kept it going on a reasonable basis. He added that he had no recollection of Mr. Rushton ever saying that there was "nothing but a potential in the practice."

His counsel submitted forcibly on his behalf. "If you have a contract to sell a horse, that contract is not fulfilled by delivering a dead horse. If you have a contract to sell a practice that contract is not fulfilled by selling a non-existant practice."

In giving judgment the learned judge referred to the submission that the plaintiff was not justified in referring to what he had sold as a "practice." "In my view that is not necessarily so. I don't consider that the practice ceased to exist as soon as he ceased to have actual work in hand. I cannot accept that it is established that there was no longer, at the date of the sale, any possibility of old or new clients bringing work to the office." The express term or condition that there was a practice in existence did not depend on there being work in hand—there clearly was not—nor on there being clients on the books—for there were none, and the learned judge held that Mr. Rushton had acted quite properly and never said there were. It was sufficient that there was proved to be a possibility of former clients or new clients bringing work to the office. Judgment was given for the plaintiff with costs.

This decision emphasizes the warning of the old maxim "caveat emptor"; let the buyer beware. Furthermore, the buyer of a practice which may be limited entirely to "goodwill" of a speculative nature should realize that even this nebulous goodwill may become worthless, for, unless he secures a special agreement at the time of purchase, the vendor will generally remain free to recommence practice in the vicinity.

The law is familiar with covenants in restraint of trade and when it is sought to enforce them the question for the court is whether, for that particular trade or business, they appear to be reasonable. Thus, in 1909 a covenant by one partner in an architect's firm that within five years of any dissolution he would not practice as a architect or surveyor within ten miles of Cardiff Town Hall was held to be an undertaking that the courts would enforce by injunction and, in 1911, it was decided that when an infant entered into articles as an apprentice to an architect for four years and covenanted that he would not practice as an architect or surveyor within ten miles of the town where his master resided, this was also an enforceable covenant.

A restrictive covenant in a form approximating to these would seem a prudent precaution to be taken by any professional man who lays out his money for those very intangible assets which may yet properly be advertised as a "practice for sale."

A NEW "OFF-THE-PEG" MULTI-STOREY FLAT SYSTEM

Last week we published illustrations and a cost analysis of flats at Millpool Hill Estate, Birmingham, designed by the Birmingham City Architect, the first flats to make use of the "Plate System" of construction developed by the Trussed Concrete Steel Co. Ltd. It has been found that, using this system of construction—a beamless in-situ *concrete floor slab carried on standard* 10-in. *square columns—the structure costs of multi-storey flats can be brought down to a reasonable level for heights of from* 8 *to* 15 *storeys, the optimum height being about* 11 *storeys. From their experience on the Millpool Hill and other projects, the Company has further discovered that, if the high costs of common elements, such as lift shafts, staircases and access spaces, can be spread over a larger number of flats per floor, the average cost of each flat may be reduced to the region of* £1,800. *With this end in view, the Company has produced standard designs for blocks of flats which it intends to offer to local authorities as a* fait accompli, *with the company acting as structural subcontractor and the designer, John Bickerdike, as consultant architect. The supervision function of the architect would be undertaken normally by the local authority architect. The scheme is therefore another example of the "off-the-peg" architectural service which seems, for better or worse, to be gaining ground in this country. The plan of each block has been organized as two linked towers sharing common vertical circulation. Each tower contains three flats per floor; for this reason the scheme has been called the Double Three Flat System. As the plans on page* 604 *show, the number of each type of flat (bed-sitters,* 1-, 2-, *and* 3-*bedroom) in each block can be varied either by altering plans of different floors within the block, or by adding an extra bay to the block itself. A large measure of flexibility of accommodation is therefore possible. The vertical circulation consists of two lifts and a single staircase; this has been designed in accordance with the amended LCC regulations for means of escape in case of fire. It has one side open to the external air and is approached through two fire-resistant doors forming a smoke lobby. The balconies linking the kitchens of the pairs of* 2- *and* 3-*bedroom flats are also provided as a fire escape from the "cul-de-sac" kitchens. The planning of the latter flats leaves much to be desired; there is a long trek down the corridor and round the dining table in order to reach the kitchen at the far end. In explanation the architect has pointed out that the flats have been*

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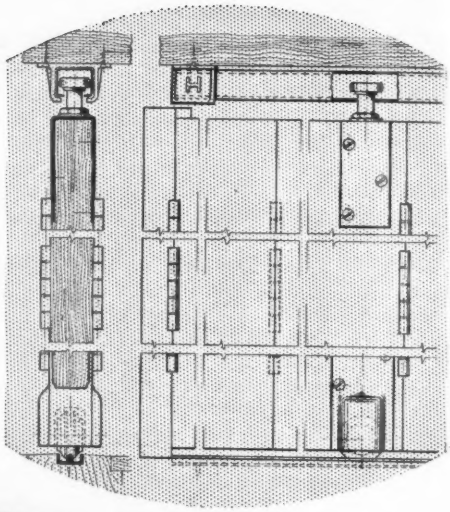

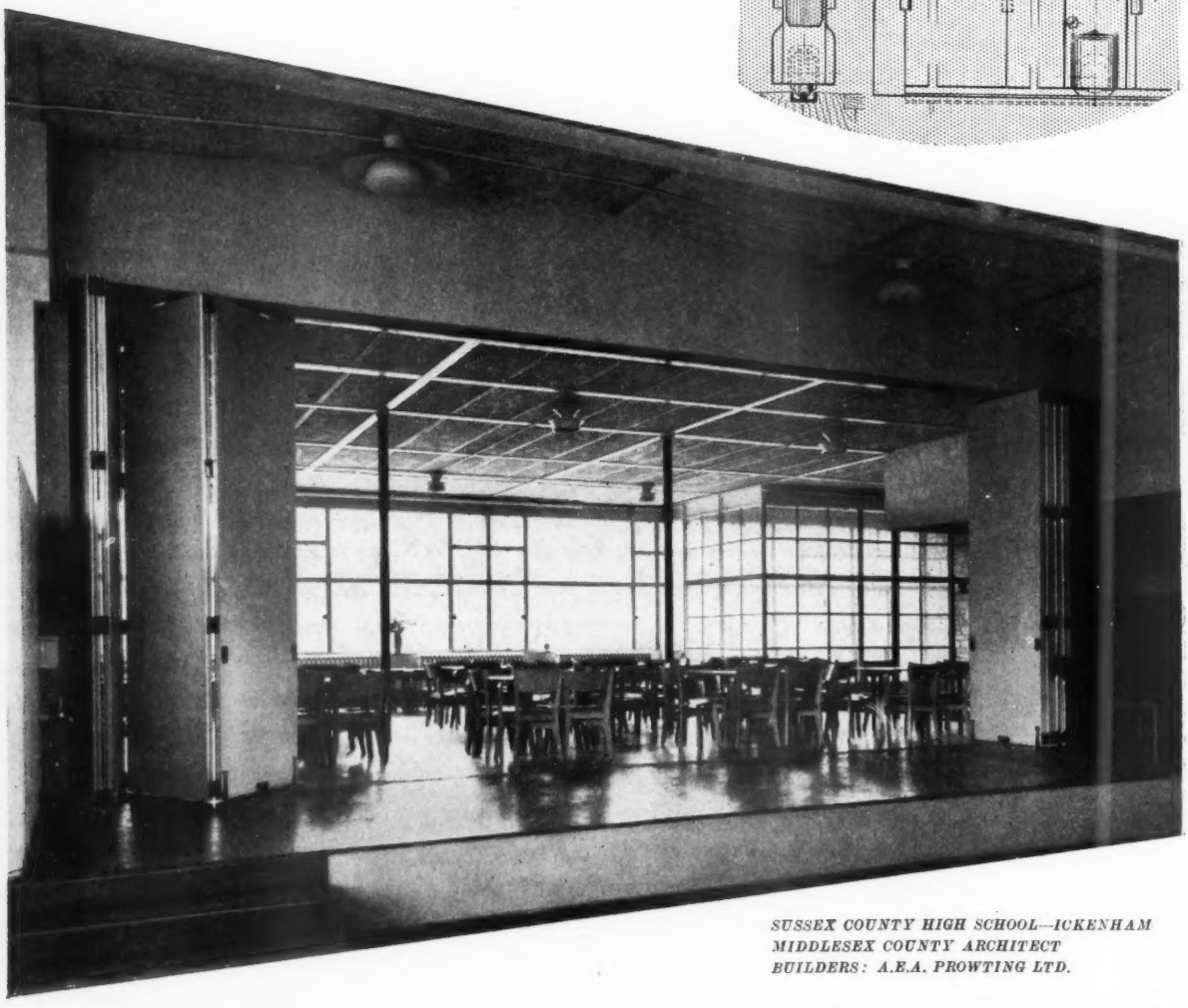

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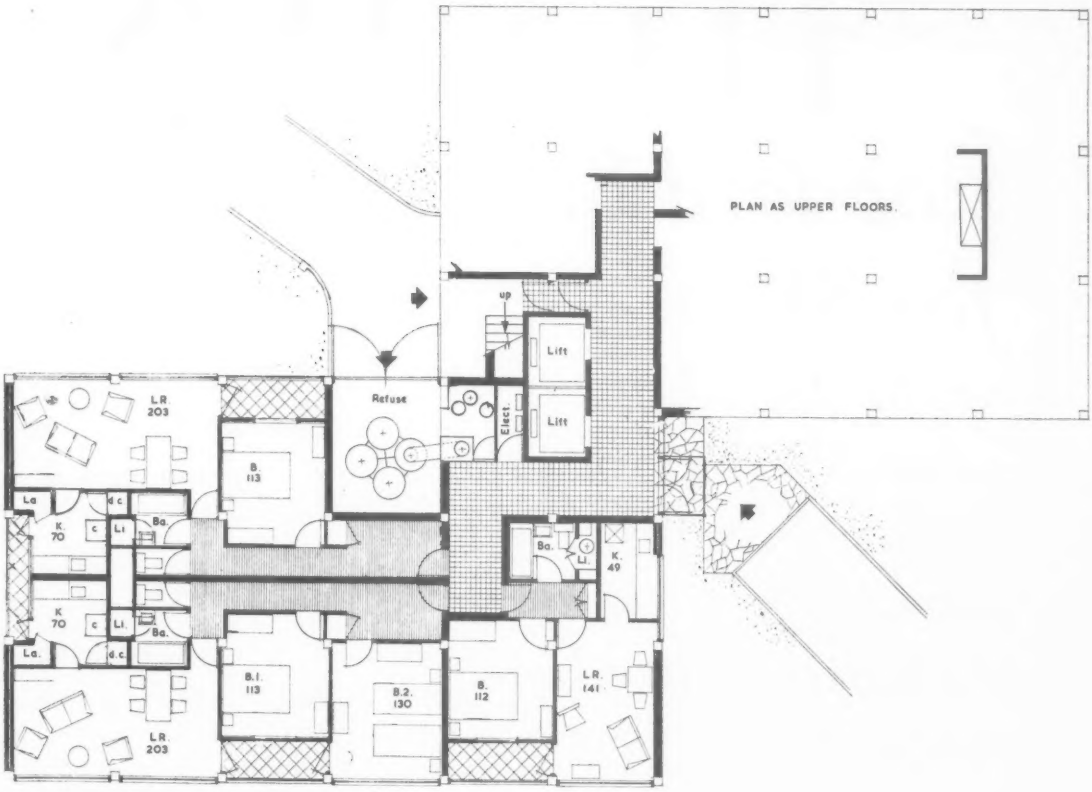
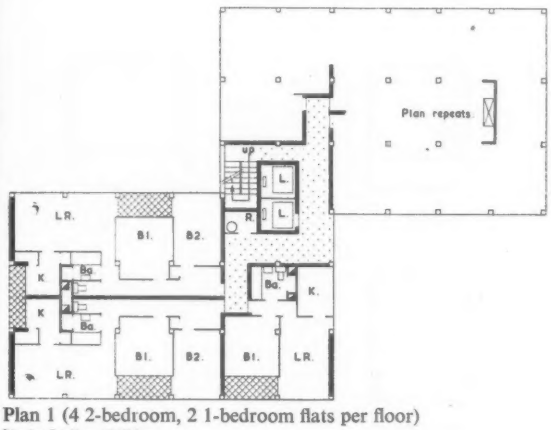
H 111

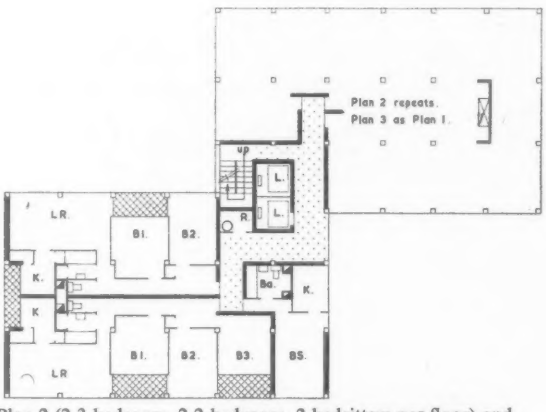
A NEW "OFF-THE-PEG" MULTI-STOREY FLAT SYSTEM: continued



Typical ground floor plan [Scale: $\frac{1}{32}$" = 1' 0"]



Plan 1 (4 2-bedroom, 2 1-bedroom flats per floor) [Scale: $\frac{1}{64}$" = 1' 0"]



Plan 2 (2 3-bedroom, 2 2-bedroom, 2 bedsitters per floor) and plan 3 (1 3-bedroom, 3 2-bedroom, 1 1-bedroom, 1 bedsitter per floor) [Scale: $\frac{1}{64}$" = 1' 0"]

planned within the restrictions imposed by the prejudices of local authorities, the principal one being that the plan organization of a flat must be the same as that of a semi-detached house, i.e., bedrooms, bathroom and living room opening off the space served by the front door, with only the kitchen allowed to open off the living room. A plan in which bedrooms and bathroom open off a separate lobby approached through the living room would not be acceptable. This is an interesting revelation of the "unwritten by-laws" which continue to cramp the style of those who are striving to provide more economical housing. Further economies could have been made had the Swedish system

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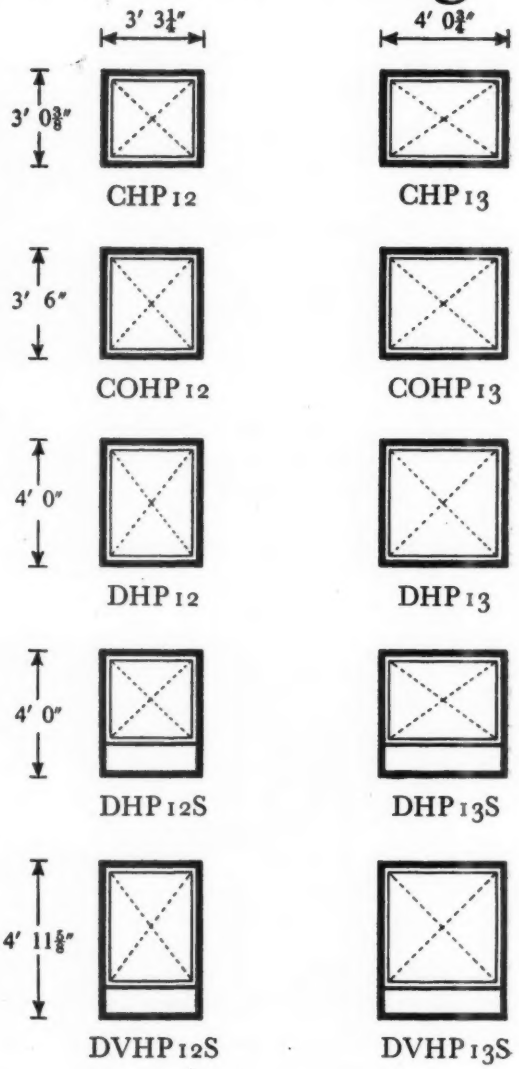

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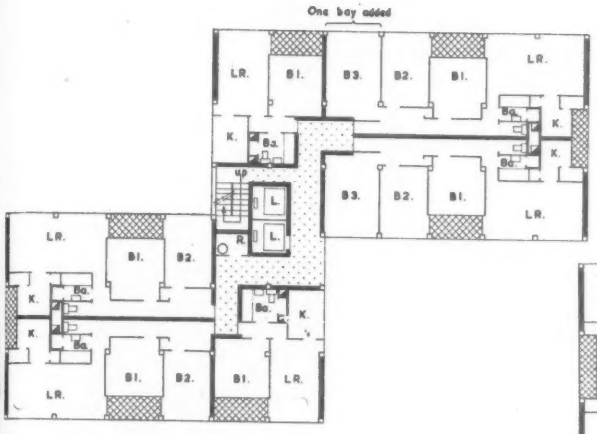
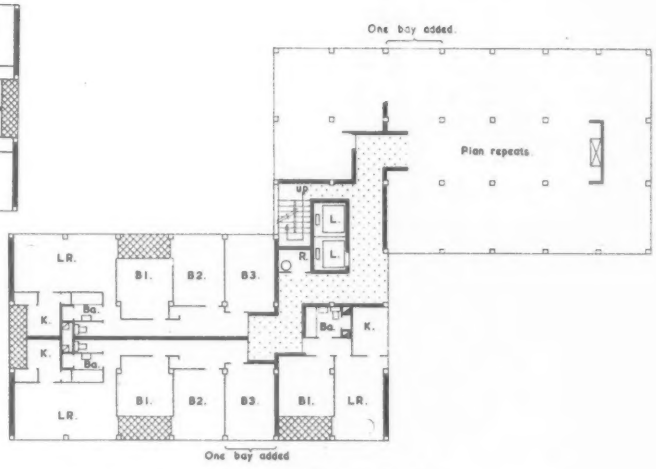
A NEW "OFF-THE-PEG" MULTI-STOREY FLAT SYSTEM: continued



Plan 4 (2 3-bedroom, 2 2-bedroom, 2 1-bedroom flats per floor)
[Scale: $\frac{1}{64}$" = 1' 0"]



Plan 5 (4 3-bedroom, 2 1-bedroom flats per floor)
[Scale: $\frac{1}{64}$" = 1' 0"]

of fire protection been acceptable to authorities in this country. In this system, each flat is constructed as a fire-resistant unit, with an inner and outer front door, and the occupants stay put in case of fire in an adjacent flat. The flat where the fire has started has itself a two-hour fire resistance, limiting the spread from one flat to another. The system has an excellent record in Sweden, where there has not been a fatal accident due to fire in flats for twenty-five years. All the bathrooms and w.c.s are internal, with services and ventilation contained in large ducts which are part of the structure. Each floor is served by the refuse chute, which discharges into rotating bins occupying the area of one bedroom forfeited by a ground floor flat.

BOOK REVIEW

American High Schools

High Schools Today And Tomorrow. Charles W. Bursch and John Lyon Reid. Reinhold. £3 4s. 0d.

Who would have thought that the classical method of education ("chalk and talk" to its present obdurate defenders) was so entrenched in the USA? But this must be our conclusion from reading Dr. Bursch's complaints that the newer educational practices, although widely accepted in principle by administrators, are not being applied in the nation's schools. In presenting his case for the new "growth-development" approach he allows himself some pretty shrewd cuts at the traditional or "school-determined" method. This method he says "warps personalities," "appeals to many military authorities" and upholds a philosophy that in effect says to the student "these are the subject matters you must master and these are the hours you must spend in the mastery."

In claiming that his proposal for individualized work schedules rather than class dominated schedules is "somewhat startling" he does less than justice to many of his colleagues in the field of education who have been quietly operating the Dalton plan in England and the USA both in public and state schools for generations. He should know, too, that the principles he argues are (it is to be hoped) enshrined in our own comprehensive schools.

In essence this plan recognizes that children should be encouraged to develop at their own pace rather than at the administratively convenient but debilitating pace set by orthodox classwork. The implication of this idea on the organization, staffing, educational programme and the "plant" design of the American high school is the theme of this book. The authors give a thorough and sensitive account of this philsophy and they explore in detail the effect its acceptance would have on each teaching space and on the children and staff who use it.

Indeed the exciting and important thing about this book is the evidence of the close and fruitful relationship that has been established between client and architect. Each obviously has a wide understanding and a deep sympathy for the other's aim and both are concerned with total environment. Here is the nub of architecture and the book is a brilliant example of how a brief should be built.

The plans do justice to the text but the sketches (rather odd Corb-like shaky line stuff, these) may prove a little indigestible to a foreign eye. The only reason for not recommending the book to the ordinary reader and specialist alike is the price—a pretty audacious 64s.

DIARY

Brick Sizes, the 4-in. Module and Modular Brickwork. Talk by Bruce Martin, Head of Modular Co-ordination Studies, BSI. At the RSA, John Adam Street, W.C.2. 7.30 p.m.
APRIL 24

Public Planning and Private Enterprise. Talk by J. F. Q. Switzer. TCPA meeting at the Planning Centre, 28, King Street, W.C.2. 6.15 p.m. APRIL 24

Prestressed Concrete. Last of three lectures by G. W. Kirkland. At the RSA, John Adam Street, W.C.2. 6 p.m.
APRIL 28

UNESCO Building, Paris. Talk by Marcel Breuer. At the AA, 34, Bedford Square, W.C.1. 8 p.m. (All seats have been booked for this meeting.) APRIL 30

South African Architecture. Exhibition at the RIBA, 66, Portland Place, W.1. Monday to Friday, 10 a.m.-7 p.m.; Saturday, 10 a.m.-5 p.m. UNTIL MAY 1

Ten Years of Planning: Where Has It Got Us? Talk by L. W. Lane, Senior Planning Officer, LCC. At the RICS, 12, Great George Street, S.W.1. 5.45 p.m.
MAY 5

Design Pays: the Private House and Its Setting. One-day symposium with Sir Hugh Casson in the chair. At the RIBA, 66, Portland Place, W.1. 10 a.m.-5.30 p.m.
MAY 31

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technical section

10 DESIGN: BUILDING TYPES
warehousing, 1

One building type of which the basic design premises have changed almost completely during the last ten years is the warehouse. The cause of this change is the rapid development of mechanical handling. This week we publish the first of a short series of articles by A. B. Waters, an architect who has had special experience in this field, the object of which is to explain the practical effect of the new mechanical handling equipment on warehouse planning. In this first article he describes the different types of equipment now on the market for the storage of goods and for moving them about.

Warehousing of goods is a feature of every type of industrial building. Even in the smallest of production units there is the storage of raw materials, and, after processing, the storage of finished goods.

Distribution of finished goods may be made direct from the factory to the distributor or consumer, but in the case of large undertakings, particularly manufacturers of foodstuffs, some form of combined warehouse and distribution centre is often a necessary link in the chain between manufacturer and consumer. In such cases the normal requirement is that the goods should flow as quickly as possible to ensure that they reach the consumer in a fresh condition. For this to be achieved goods must be handled on the principle first in and first out. This is not always the case, for certain canned goods, fruits and the like, which are processed seasonally, have to be stored for the remainder of the year, and it is sometimes convenient for the distribution depots also to act as warehouses for long term storage.

The Revolution in Materials Handling

Whether storage is long term or short term, or whether it is in the stores section of a factory or in a detached warehouse or distribution depot, it is essential that provision is made for rapid movement of materials and ease of handling.

The 19th century warehouses (of which those around the docks are an excellent example architecturally) followed a simple pattern (fig. 1). To save ground space they were built as multi-storey buildings, with hoists to receive or discharge materials stored on the upper floors. The height of the floors was determined by the height to which a man could lift and place a load. (See section, fig. 2.) This method of storage is costly in building and also in labour, and unless unlimited labour is available, slow in operation, which makes its use quite impossible with present conditions.

It is primarily the need to handle an increasing volume of material with as small a labour force as possible that has led to the introduction of mechanical means of handling merchandize. The introduction of mechanical handling means that buildings must be designed for the economical use of the plant employed.

In contrast to the buildings illustrated in figs. 1 and 2 compare the warehouse recently built for SPD Ltd. at Birmingham shown in fig. 3. The goods are brought in both by road and by rail, and are despatched by road. The building is 134 ft. wide and is covered in one span, and the clear height of 17 ft. 3 in. enables goods to be stacked to a height of 16 ft.

Factors which govern the design of a warehouse

The design of a warehouse should be determined by the type of material which is to be stored, so that the most suitable method of storage and method of handling can be adopted, always providing that the volume of material to be handled will justify special treat-

Fig. 1 Warehouse at Gloucester built about 1870.

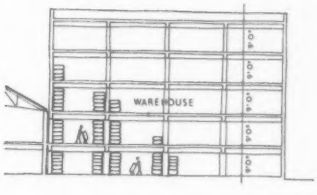


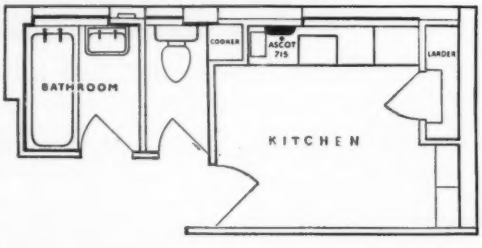
Fig. 2. Section through sack warehouse at the Poplar premises of Messrs. Mazzawattee before alteration. Height under the beams is 7 ft. 6 in. but this was as high as a man could lift a sack.

Tower Court Flats, Clapton Common

ASCOT IN NEW HOUSING (7)

Tower Court Flats, Hackney, is one of a number of schemes designed by different architects around the perimeter of Clapton Common for the Hackney Borough Council. Tower Court consists of 2 blocks of flats: a four-storey block containing 16 two and three-bedroom maisonettes, and a nine-storey block containing 51 flats of bed-sitting room, one-bedroom and two-bedroom design.

To provide an instantaneous hot water service throughout all the flats at Tower Court, Ascot 'balanced flue' multipoints were installed in the kitchens.



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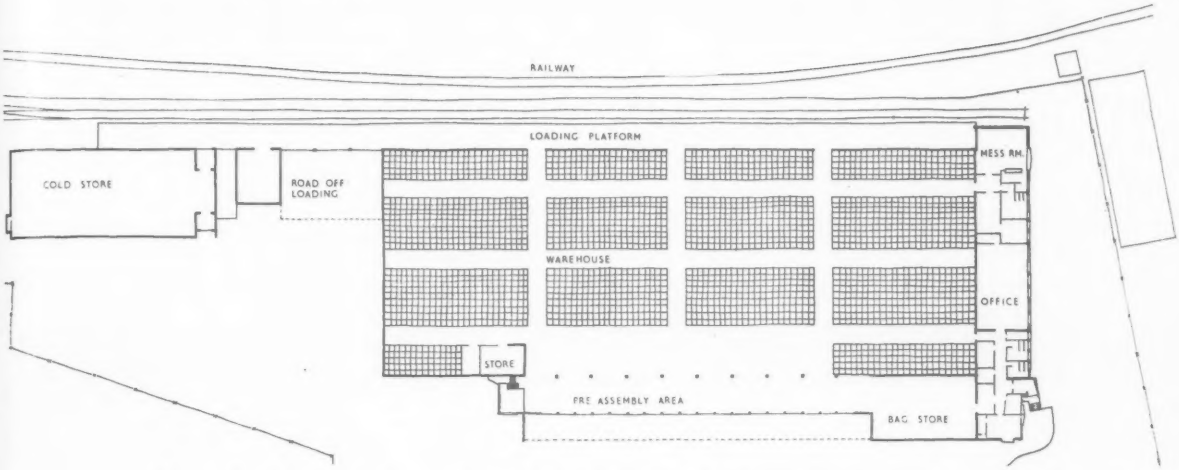
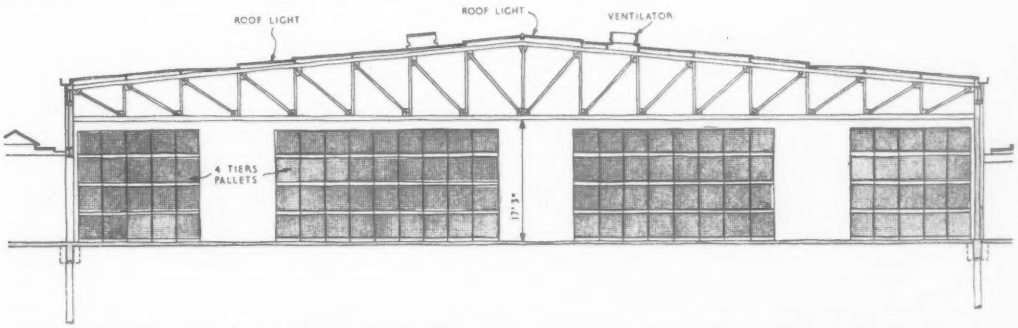


Fig. 3. Perry Barr Warehouse and Distribution Depot of S.P.D. Ltd. Compare with Fig. 2 and note increased height and span necessary for economical use of mechanical equipment.



ment. The three main factors which affect the design of a warehouse are:

1. *Method of storage:*

Methods of storage include:

(*a*) Stacking, in which goods are simply piled one upon the other;

(*b*) Racking, in which the goods are placed upon racks; and

(*c*) Palletization, in which the goods are placed upon pallets, which in the simplest form consist of a flat board.

2. *Method of handling:*

Having determined the method of storage the most suitable means of handling can be considered—by barrow, by conveyor, by crane or by some form of mechanical truck, including the fork lift truck.

3. *Transportation:*

The third factor in the case of a warehouse building is the method by which goods are received and despatched by water, by rail or by road.

Storage by palletization

The storage of goods on pallets (see fig. 4), referred to as palletization, is suitable for warehousing most types of goods, and it is proposed to devote most of this series to this method of storage. It must be stated, however, that while it is worth while to consider every warehouse problem to see if palletization is suitable, experience shows that it is not suitable in every case. In considering a scheme of palletization the following

Fig. 4. Fork truck raising goods stacked on a flat pallet in the Belvedere Distribution store of Messrs. W. and R. Jacob (Liverpool) Ltd.

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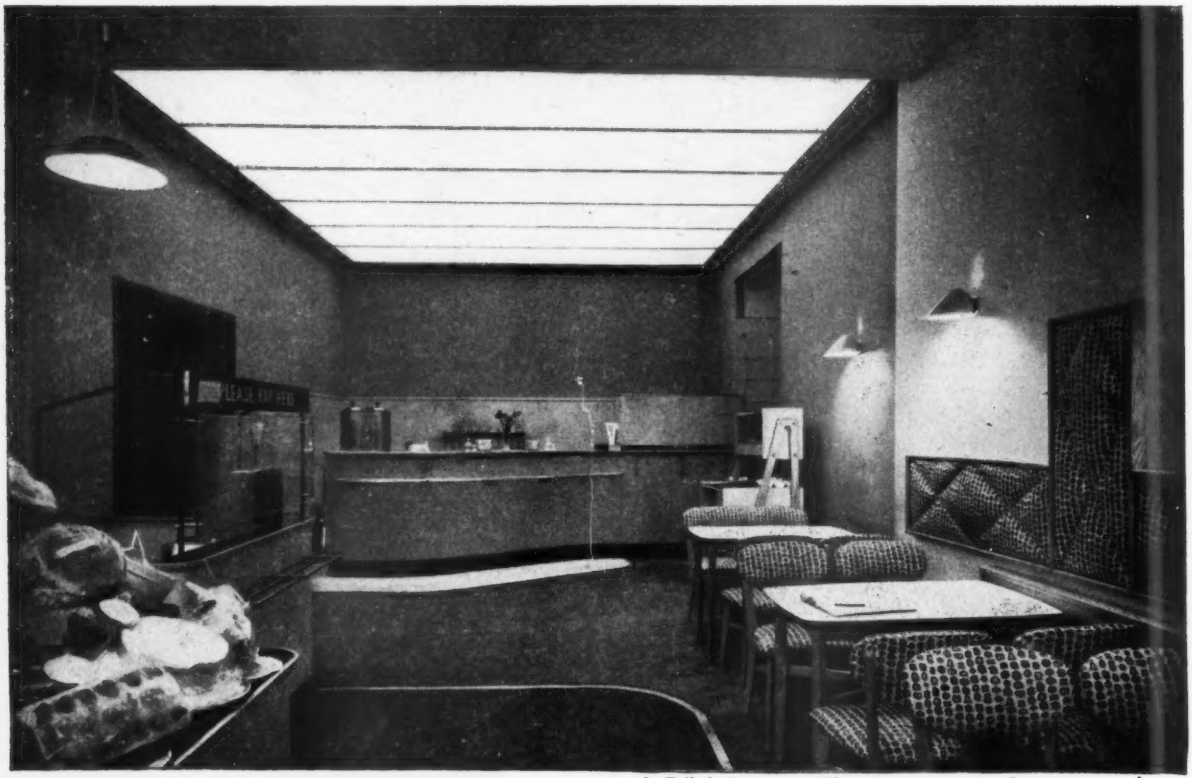

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technical section

procedure must be adopted:
(i) Select a suitable type of pallet—this will depend on the nature of the material to be stored.
(ii) Select suitable handling equipment.
(iii) Based on (i) and (ii) above, the layout of the stacks, the height of the stacks and the width of the gangways can be determined, the two latter being entirely a function of the handling device selected.
(iv) When the height of the stacks is known, the plan area of the warehouse can be determined from the volume of goods to be stored.

Classification of materials for handling and storage

Fisher & Ludlow, in their book *Flowstack Pallets*, divide materials into eight groups:

Group A. Materials not strong enough to withstand crushing—not suitable for unit loads.

Examples: automobile components; made-up textiles; electrical appliances and components; manufacturing chemists' sundries; light engineering products; glassware.

Group B. Materials strong enough to withstand crushing—suitable for unit loads.

Examples: casks and drums, sawn and machined timber; sheet materials.

Group C. Materials strong in themselves of irregular shape, suitably packed into unit loads.

Examples: goods in cases, crates or cartons.

Group D. Bagged materials forming a flat surface under load.

Examples: grain, powder and similar materials.

Group E. Bagged materials which do not form a flat surface under load.

Examples: forgings; moulded or machined parts; nuts and bolts.

Group F. Large irregular loose materials.

Examples: moulded plastics; sheet metal pressings.

Group G: Small irregular loose materials.

Examples: machined and moulded parts; pressings; forgings.

Group H. Materials handled hot from production processes.

Examples: castings and forgings.

Types of pallets

In the British Standards Institution publication *Pallets for Materials Handling, British Standard* 2629:1955 a pallet is defined as "A portable platform, with or without superstructure, for the assembly of a quantity of goods to form a unit load, for handling and stacking by mechanical appliances, particularly pallet trucks and fork trucks."

Any flat board would comply with this description, and there are expendable pallets in use which consist merely of plywood, hardboard or even heavy paper, but in most cases the pallet is regarded as permanent equipment and must therefore be of robust construction of timber or steel.

The simplest form of pallet is the flat pallet (fig. 5). This consists of top and bottom decks separated by side members to allow the entry of a pallet truck or the forks of a fork truck. Flat pallets are of two kinds, the two-way entry pallet which permits fork-entry from two directions and the four-way entry pallet which permits entry from four directions, thus allowing goods to be handled, when in the stack, from the front or the side. When the slats forming the top and bottom decks are suitably arranged the pallet may be reversible, and so for the flat pallet there are four types available, two-way or four-way entry, and reversible or non-reversible.

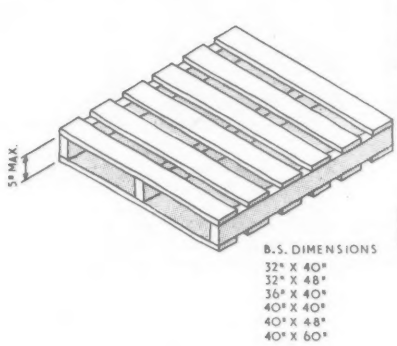
The sizes of flat pallets given in BS 2629:1955 are: 32 in. × 40 in., 32 in. × 48 in., 36 in. × 40 in., 40 in. × 40 in., 40 in. × 48 in. and 40 in. × 60 in. The ratings for the working loads of flat pallets are 1 ton, 1½ tons and 2 tons, and the pallets must be so marked.

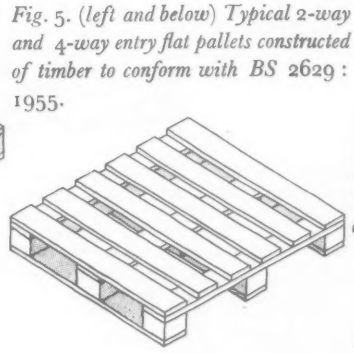
It is outside the scope of these articles to discuss the relative merits of timber and steel for the construction of flat pallets, except to say that timber is cheaper in first cost, and timber pallets are more easily repaired. The standard sizes most suitable for transport in the standard box cars designed by British Railways to receive pallets are 36 in. × 40 in. and 40 in × 40 in. Attempts are also being made to determine an international standard for pallet sizes.

Flat pallets are suitable for goods which are regular in shape and which are strong enough to support the loaded pallets above them.

As indicated in the list of types of materials given above, other types of pallets are necessary for fragile or irregularly shaped goods. The purpose of such pallets is twofold—to provide a method of transmitting the load, through the intermediate pallets, to the floor; and to contain irregularly shaped goods.

The first of these two requirements is answered by





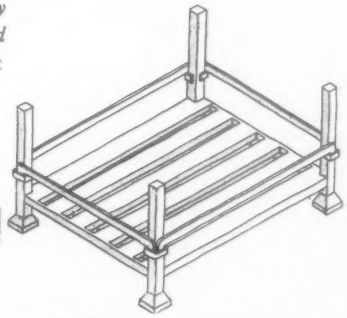


Fig. 5. (left and below) Typical 2-way and 4-way entry flat pallets constructed of timber to conform with BS 2629: 1955.

Fig. 6. Post pallet constructed of steel.

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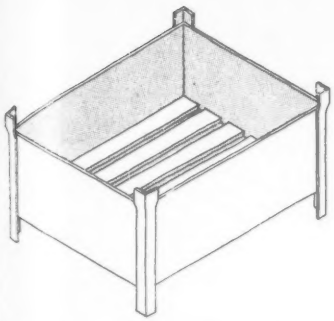


Fig. 7. Box pallet constructed of steel.

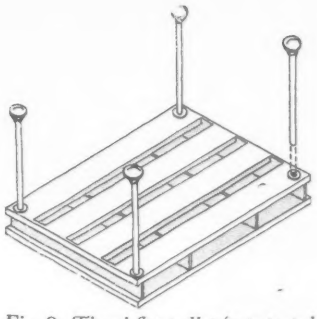


Fig. 8. Tiered flat pallet (a patented design of Fisher and Ludlow).

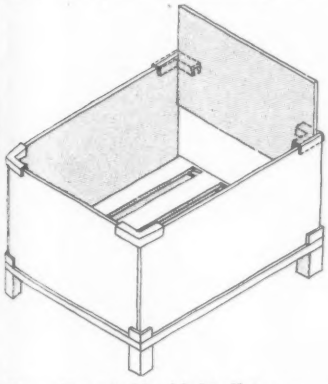


Fig. 9. Detachable sided pallet, can be made in timber or steel.

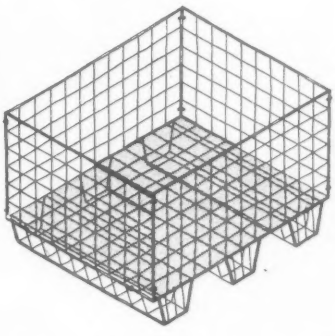


Fig. 10. Collapsible wire mesh box pallet (sometimes called a cage pallet).

providing a post at each corner of the pallet (see fig. 6), the second by enclosing the space between the posts to form sides which will retain the contents (fig. 7).

The British Standard definitions are as follows:

Post pallet: A pallet having a superstructure of posts to take the weight of superimposed pallets. A post pallet may have not more than two fixed, removable or collapsible sides.

Box pallet. A pallet having a superstructure of at least three fixed, removable or collapsible sides.

A variant of the post pallet is the tiered flat pallet, in which the corner supports are screwed into attachments in the pallet itself, instead of being mounted permanently on the corners of the pallet (fig. 8).

Illustrated in figs. 9 and 10 are a detachable sided box pallet and a collapsible wire mesh box pallet, which are adaptations of the box pallet. These have the advantage that the sides can be removed for access to the materials stored in the pallets and also that they can be collapsed for return when empty, thus economizing in space. Such pallets can also be fitted with lids, which can be locked to prevent pilferage.

Only a few of the many types of pallet that are available have been illustrated, but all are based on the types that have been described. Manufacturers of pallets can supply either standard articles, or those which are specially made to suit special conditions.

Two definitions contained in the British Standard have not so far been given. They are:

1. *"Take-it-or-leave-it" pallet.* A pallet so constructed that lifting forks may either: (*a*) Take the pallet and its load complete, or (*b*) take the load and leave the pallet. Such a pallet is suitable for materials such as fibre board which is fairly rigid in itself and can be transported on a fork truck without a pallet.

2. *Expendable pallet.* A pallet which can be considered as non-returnable.

Reference will be made later to special attachments for fork trucks. These include the "squeeze clamp" which enables a number of regular shaped containers (*e.g.*, cartons) to be picked up without a pallet. Alternatively, large cartons may have battens mounted on the base of the carton to permit the entry of forks, enabling the carton to be transported without a pallet.

Industrial trucks

When the size and type of pallet have been determined the dimensions and weight of the unit load are known. A suitable type of truck can then be selected. The range of industrial power trucks is now very extensive, and most of them are outside the scope of this series. Those available are:

Straight load carrier: Used for transferring a load from one location to another. It has no lifting mechanism.

Tractor and trailer combination: A power truck to which a number of two- or four-wheel trailers (without lifting mechanism) may be attached for transporting loads over long horizontal distances.

Low lift platform or pallet truck: A truck which can lift stillages or pallets from ground level, but which is not equipped to stack them on top of each other. The truck is designed for the operator to walk or ride while guiding the truck. (A stillage is a platform or box on bearers of sufficient height to allow the platform of the truck to enter.)

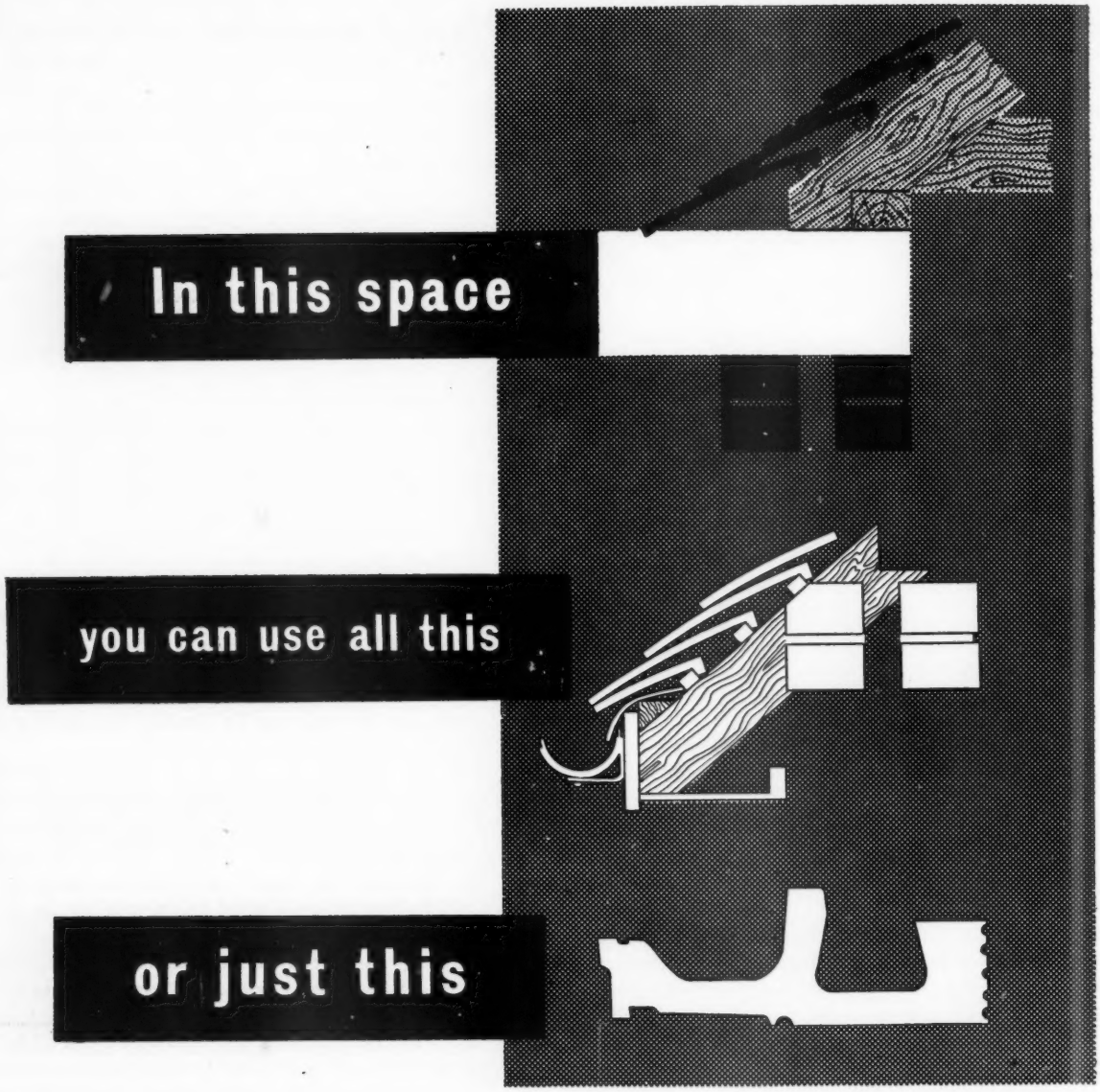
High lift platform truck: A truck which can lift stillages, transport them and stack them on top of each other.

Fork lift truck: A truck equipped with a pair of forks to lift stillages or pallets and transport them to another location, there to stack them on top of each other to the extent required. "Pedestrian" tracks are controlled by the operator, who walks while guiding the truck. "Rider" trucks are of two kinds, and are built for "stand up" and "sit down" positions for the operator. A large variety of attachments are provided for fork trucks for the transportation of specialized loads such as oil drums, rolls of paper, coils of wire, etc., without pallets.

Crane truck: A truck with a crane boom designed to handle bulk materials and products, including railway containers.

Industrial trucks may be powered by electricity, diesel or petrol. For internal use, in warehouses, electricity is the most suitable, but for heavy loads carried out of doors, diesel engines are probably best.

For most applications in warehousing two trucks are required. A pallet truck for horizontal movement from the point of delivery to the stack (and from the stack to the point of despatch) and a fork lift truck for stacking the pallets. Although a fork truck can be used for horizontal movement it is usually more economical



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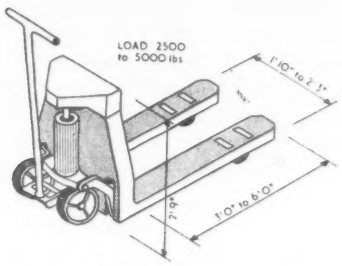


Fig. 11. Typical hand pallet truck.

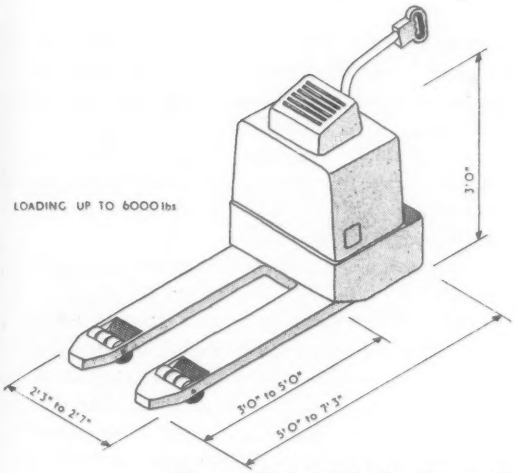


Fig. 12. Typical pedestrian power pallet truck.

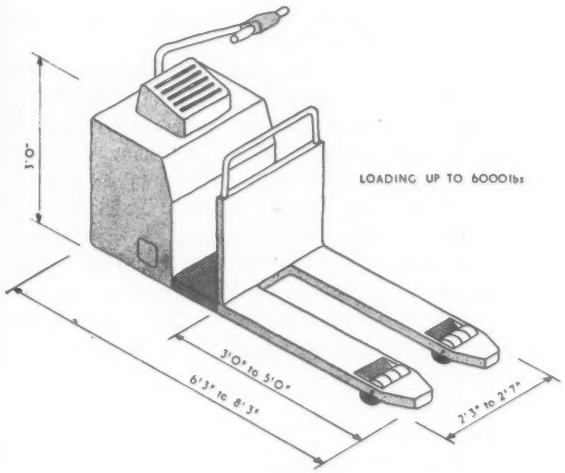


Fig. 13. Typical rider-controlled power pallet truck.

to limit the use of the fork truck to vertical movement and to use a pallet truck for horizontal movement.

Pallet trucks

Pallet trucks are illustrated in figs. 11, 12 and 13. In its simplest form the pallet truck is manually operated, with a lifting device which, after the truck has been placed below the pallet, enables it to be lifted clear of the ground. Where large quantities of goods have to be transported, power operated trucks are necessary, and can be either a pedestrian truck (fig. 12) or a rider truck (fig. 13).

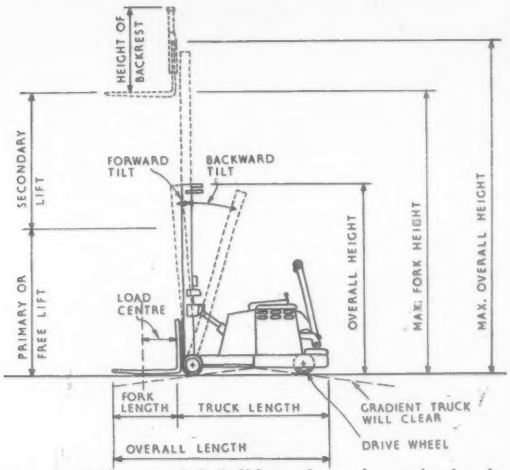


Fig. 14. Diagram of fork lift truck to give main descriptions and dimensions that must be determined when selecting a fork lift truck.

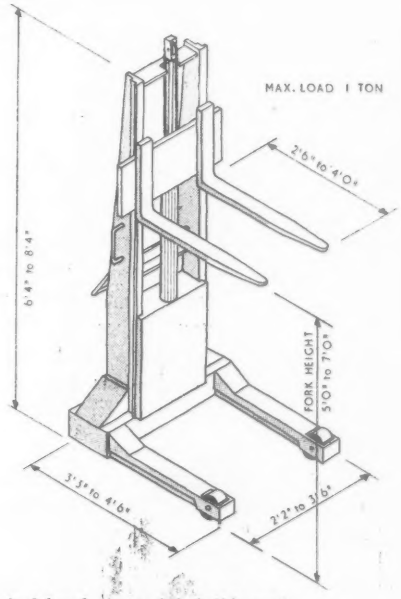


Fig. 15. Typical hand-operated fork lift truck.

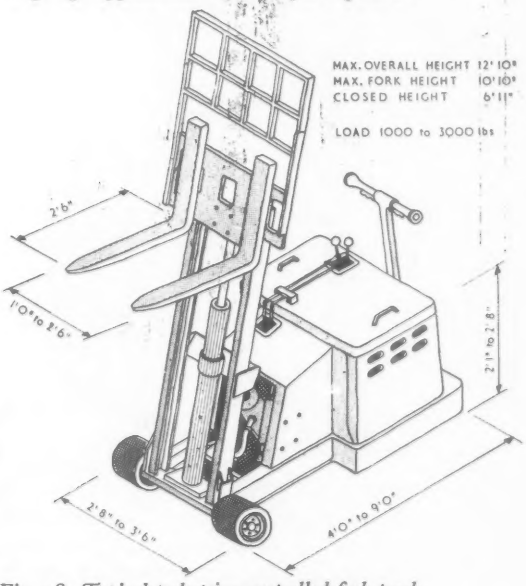


Fig. 16. Typical pedestrian-controlled fork truck.

technical section

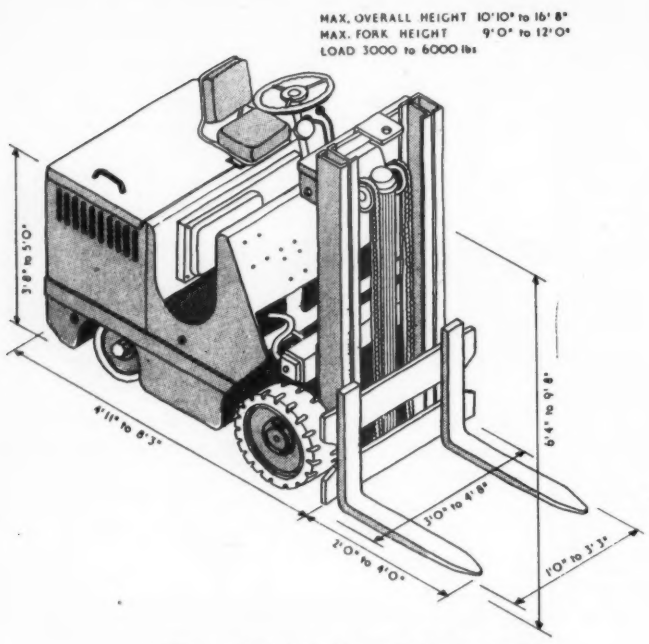


Fig. 17. Typical rider-controlled fork truck.

Pallet trucks are available to carry loads up to 6,000 lb. and are designed to enter the 4-in. space in standard flat pallets before lifting the pallet off the ground. Wheels may be of steel, rubber or fibre, but steel wheels should normally be avoided if excessive wearing of the floor surface is to be avoided.

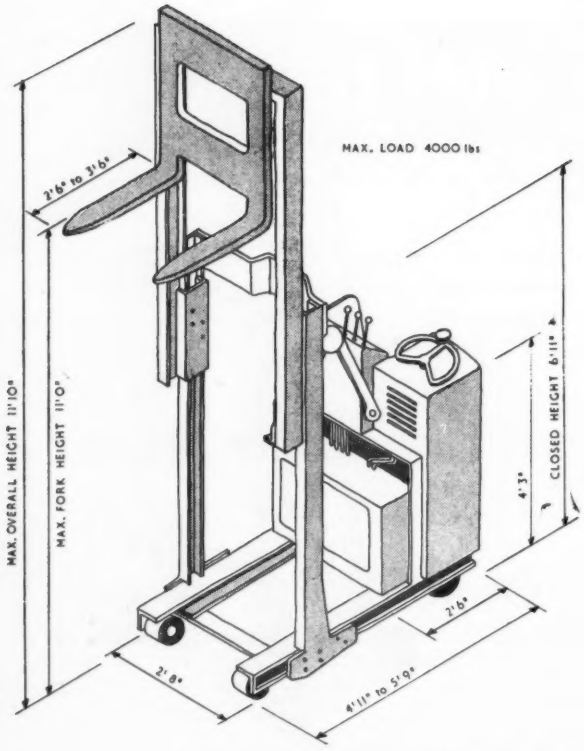


Fig. 18. Typical rider-controlled reach truck.

Fork trucks

The fork lift truck takes its name from the pair of forks used for lifting loads. The forks vary in width and in length to suit the load to be carried, but the depth is constant to permit entry into the pallet. In the diagram (fig. 14) the various parts of the fork truck are defined that affect the selection of a truck for its particular duty. In most fork trucks the mast is extendable, so that the load can be lifted off the floor and transported without increasing the height of the mast. This is important in selecting a truck for use in an existing building if alteration to the heads of openings is to be avoided. The full height of the mast is used in stacking, and the height of a stack can be increased beyond the normal range of the truck if it is capable of lifting two or more pallets at a time. Thus, if a normal pallet load is one ton it is wise to select a truck capable of carrying two tons. In places where there is a limited head room the truck selected should have a "free lift" to enable pallets to be stacked to the full height of the mast.

Typical examples of fork trucks are illustrated in figs. 15, 16, 17 and 18. That in fig. 15 is one of the simpler forms, known as a hand stacker, which is operated manually. It must be pushed into position by means of the loop handles at the side. The bar at the back is a hand brake which locks the machine in position, and the forks can then be lifted, either by electricity or in some models by hand operated gearing. It will be noted that the forks, when lowered, are within the wheel base. This gives stability, although the truck is comparatively light in weight, making it suitable for use on upper floors.

A pedestrian controlled electrically operated truck is illustrated in fig. 16. Such trucks have a range of loading of 1,000 to 3,000 lb., the overall dimensions varying with different loadings and manufacturers.

Rider controlled fork trucks can be obtained in a very wide range, and capable of carrying loads up to 15 tons. For warehousing it is seldom necessary to exceed a maximum load of 6,000 lb., while a truck capable of handling 4,000 lb. is suitable for most purposes. Within this range, 9 ft., 12 ft., and 14 ft. high masts can be fitted, allowing goods to be stacked to a height of 20 ft.

Layout of pallets

The size of the pallets, and therefore the number of them, having been determined, the pallet layout can be set out. Although it is not only the pallet layout which influences the shape of the warehouse, it does determine the actual size, since it is obviously common sense to arrange the warehouse dimensions to suit the pallet dimensions, so that no space is lost. Clearances required between pallets are shown in figs. 21 and 22. These are normally 4 in. between sides of pallets, along the main gangway, 2 in. between back and front of adjacent pallets and 4 in. from the back of the last pallet to the wall. There should be 6 in. between the end pallet and the side wall. These are average dimensions, allowing for slight inaccuracies on the part of the truck operator. Where goods are to be stored

technical section

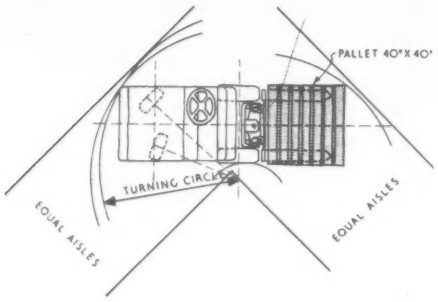


Fig. 19. Turning circle for fork truck. The manner in which the turning circle is determined is indicated in the diagram. The actual dimension depends upon the make of truck and the size of pallet to be carried.

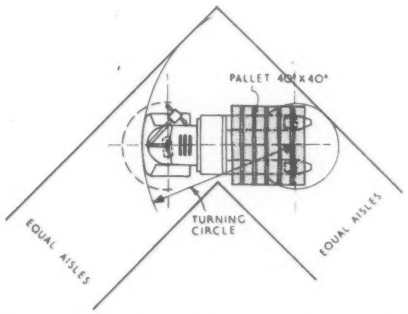


Fig. 20. Turning circle for reach truck. As the forks retract the overall dimension of the truck when travelling is reduced, with consequent reduction in turning circle. Dimensions are again affected by the dimensions of the pallet to be carried.

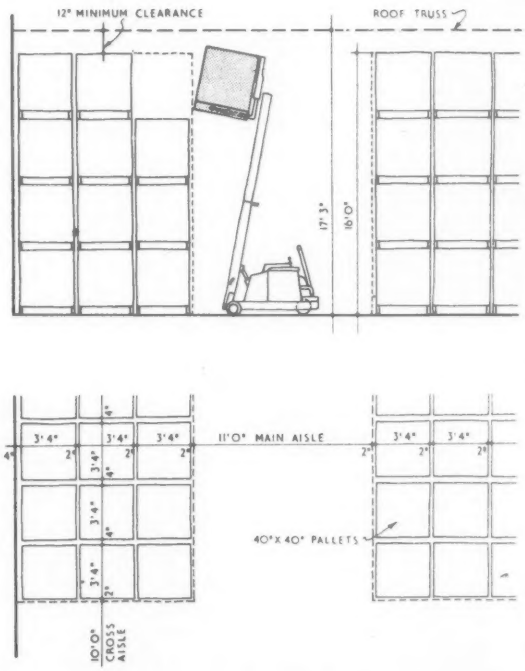


Fig. 21. Typical arrangement of pallets in stacks, showing clearances, and gangway for ordinary fork truck.

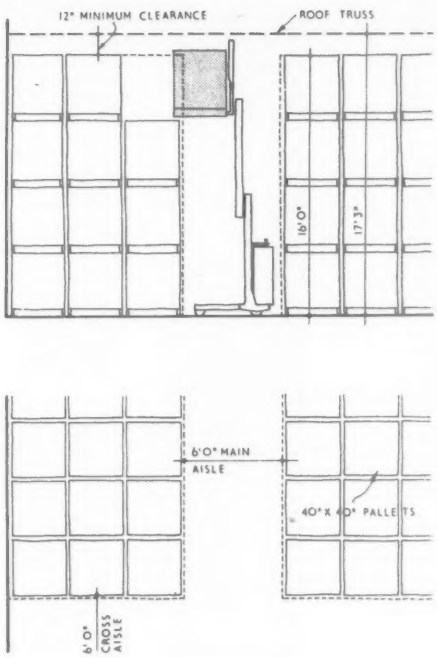


Fig. 22. Typical arrangement of pallets, with reduced gangway for reach truck.

over long periods, and there is danger of movement in the pallet loads, these dimensions should be increased, and where goods are in and out very quickly and the operator is very experienced, these dimensions can be reduced.

The width of the gangways must depend upon the size of the pallet and the turning circle of the truck chosen. Turning circles of typical trucks are given in figs. 19 and 20 and suitable gangways derived from them are shown in figs. 21 and 22.

The number of pallets in the depth of a stack depends on many factors, but it is usually accepted that the maximum depth of a stack against a wall is five pallets and of a free-standing stack, 10 pallets. This is to avoid undue time being lost in cutting into a stack to reach the pallets in the centre, should it be required to get those out quickly.

Pallet racks

As an alternative to using post pallets, heavy or fragile goods, contained in regularly shaped cartons, may be stored on flat pallets on pallet racks. Such a rack is shown at fig. 23. Pallet racks can also be assembled from scaffold tube. These have the advantage that they can be easily dismantled, and if the bottom rails are correctly placed, they can be moved around easily on the fork truck.

Warehouse example

It seems suitable to conclude this article with a description of an actual warehouse (see fig. 3).

This is one of a large number used for the distribution of Unilever products. These include margarine and other fats, soaps and detergents and toilet articles such

technical section

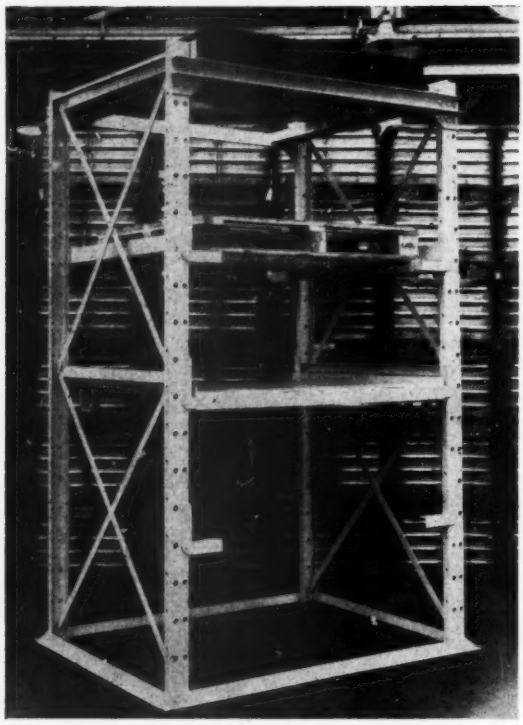


Fig. 23. Rack for pallets.

Fig. 24. Storage of telephone directories awaiting binding to show method of storage with and without pallets.

as perfumes and lipsticks. There is also a cold store for Birdseye Foods.

Goods are delivered to the distribution depot by rail and by road (mainly British Road Services). They are despatched by road. Goods delivered by rail (in palletized rail vans) are off-loaded on to the rail bank by a pallet truck, and are then picked up by a second pallet truck to be taken to the stacking area, after which they are stacked with a fork lift truck.

The rail bank runs the whole length of the warehouse (note on the section that the wall is thickened at the base to provide a flush surface between the projecting piers) and goods can enter the warehouse at three points, reducing the length of travel of the pallet trucks. The road off-loading bay is between the end of the warehouse and the truck charging room (used for battery charging and to house the trucks overnight). Road vehicles are off-loaded by a fork truck and deposited on the rail bank, after which they are handled as before. The fork lift truck has to be brought down to ground level for this operation and the ramp adjacent to the truck charging room is provided for this purpose. A ramp of this kind should be 1 in 12, and not less than 1 in 10 (although some manufacturers claim that their trucks can work on greater inclinations).

The warehouse is comparatively long and narrow on plan to reduce the travel between the receiving side and the despatch side. Stacks of pallets are indicated, which are served by 11-ft. main aisles.

Outgoing goods are assembled in van loads in the pre-assembly area (note that this is lower in height than the rest of the warehouse) and are loaded into covered vans by means of a gravity conveyor. Vans are backed up under a continuous canopy, which gives protection during loading, to openings which are fitted with overhead doors. The pre-assembly area is overlooked by the supervisor's office, which is at a higher level. Access to the warehouse for warehousemen and drivers is by the door adjacent to the supervisor's office, and drivers can take dockets up to the office without going on to the warehouse floor. Adjacent to the assembly area is the bag store, used for the storage of commercial soaps which are sold in sacks, and where the stacking height is less than in the main warehouse.

Adjacent to the supervisor's office are the security room (for the storage of small articles) and the re-coopery room used for the repair of pallets and the re-packing of containers damaged in transit.

The single-storey block at the east end houses the offices (enquiries, general office and manager's office) and welfare and sanitary accommodation for the warehousemen (canteen, locker rooms, w.c.'s, etc.) and the boiler house. The warehouse is unheated and the boiler heats the office block only, as well as providing hot water. Extensive garage accommodation is provided, with a wash down, petrol pumps, oil and air installations. The drivers' sanitary accommodation is placed in the garage block, below the raised transport office.

The tarmac area in front of the warehouse is extensive, but this is necessary if movement of vehicles to the road off-loading bay and from the despatch bay is not to be impeded.

It will be seen from the section that pallets are stacked to a height of 16 ft., and the bottom member of the truss is 17 ft. 3 in. Lighting fittings are kept above this level. The wall surfaces are flush internally and at the base of the wall externally. The height of the raised floor was determined by the level of the rail siding and a loading bank of less height is used on the outgoing side, partly to suit the vehicles, but also to reduce the gradient leading up to the road entrance.

building illustrated

SECONDARY SCHOOL

at BALLS PARK, MANGROVE ROAD, HERTFORD, for the HERTS. C.C.; designed in the HERTS. C.C. architect's department; C. H. ASLIN, county architect; assistant architects JOHN WEATE, KENNETH C. TWIST; assistants A. WATTERS, D. R. FORDEN, V. da MOURA, R. de GROOT, E. TWIST, M. PRINGLE; consultants (structural) HILLS (WEST BROMWICH) LTD.; (heating) WEATHERFOIL HEATING SYSTEMS; (electrical) H.C.C. engineer's department; quantity surveyors GARDINER and THEOBALD

This secondary modern school is planned on a 40-in. module system of construction. The 40-in. module was first used by the Hertfordshire County Council in the Clarendon School at Oxhey, which readers may remember as having columns " off grid " with square mushroom heads to connect them to beams, and with plastic panel walls. The next major step in 40-in. development was at Wokingham by the MQE, where it was taken up to four storeys and solutions worked out for various internal and external angles and junctions; but columns there were " on grid " and a different cladding material was used. Following this there were various 40-in. buildings, such as the Day Nursery at Garston.

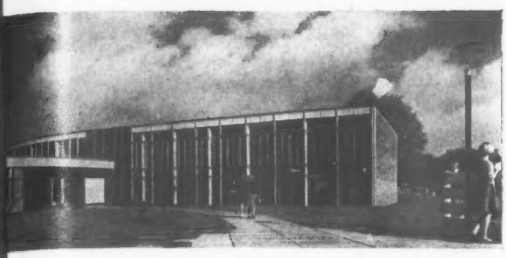
Viewpoint 1: from the south-east. The main teaching block on the right.

building illustrated

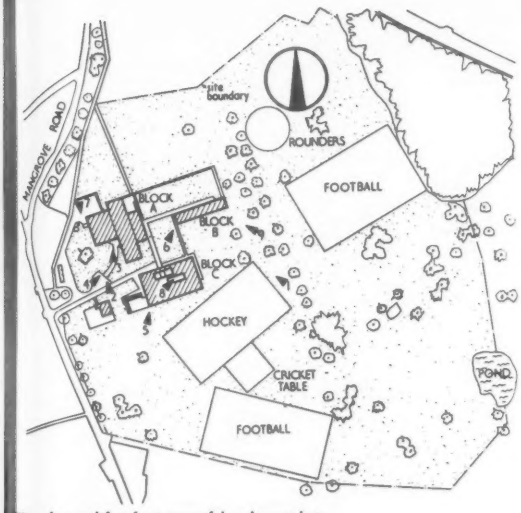
Viewpoint 2: the main entrance. The staff rooms are on the left of the entrance doors. The gymnasium and assembly hall are on the right.

Ground floor plan Block A [Scale: $\frac{1}{32}$" = 1' 0"]

Viewpoint 3: detail of the main entrance. The external cladding: aluminium droppers support asbestos panels (with woodwool core) painted red (Archrome 4) below the window and light grey (9·099) above. On the left, horizontal softwood boarding, painted white. Doors and screen are mahogany. Entrance screen wall of blue brick.



Viewpoint 4: gymnasium and main entrance, from the south-west.



Site plan with photographic viewpoints

Viewpoint 5: detail of south-west external corner of the craft block. The 6-in. × 1¼-in. weathered slate sill is bedded on foundation edge beam with 3: 1 sand cement mortar and supports 4-in. × 1-in. aluminium droppers at 3-ft. 4-in. or 6-ft. 8-in. centres, which are bolted to steel frame at beam level. Windows, spandrel panels and cladding are fixed to droppers by snap-on aluminium beads. Eaves are capped with 5-in. × 2-in. inverted "U" aluminium channel. Sill height is 2-ft. 8-in. (2-ft. and 3-ft. 4-in. are also used), transome is 6 ft. 8 in., room height is 9 ft. Vertical grid is 2 ft. (with 4-in. subdivision). Panels here are asbestos faced, painted light olive (5·060) below windows, dark blue (9·098) above. Softwood boarding painted white.

analysis

CLIENT'S BRIEF

A three-form entry mixed secondary modern school with no particular educational bias. The schedule of accommodation was standard.

SITE

The school is sited on the crest of a hill to the south of Hertford, on land belonging to Balls Park House, which is now a HCC teachers' training college. Access is from Mangrove Road or by a new public footpath up the north west side of the site. The school site is surrounded by parkland and mature forest trees. Shrubs have been planted around the main building and some trees will be added later.

PLAN

The school is divided into three blocks:
1. A single-storey administration block, with assembly hall, gymnasium, kitchen and boiler house.
2. A single-storey craft block, containing science, art, craft (wood, metal, pottery and housecraft) rooms. It was decided to put these in a separate block because of the inevitable noise from some manual work, to simplify delivery of raw materials, because of the need for extra water supplies, and because the classes are only half size.
3. A three-storey teaching block containing classrooms and library (Block B).

The three blocks are arranged round play pitches of netball pitch dimensions. The blocks were originally to have been connected by a covered way following the main path.

MAIN CONSTRUCTION

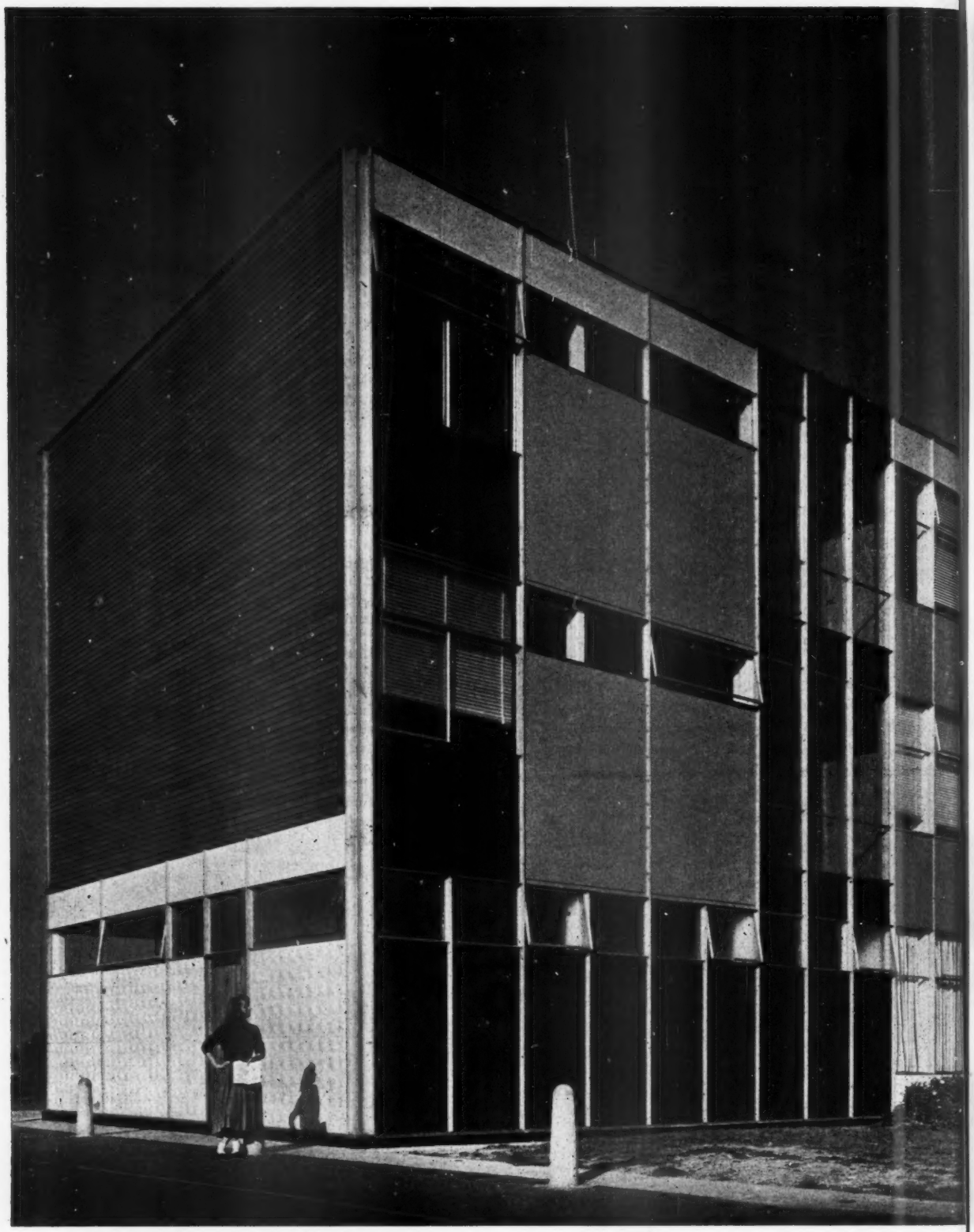
Welded light steel frame developed by HCC with the manufacturers and using a 3-ft. 4-in. planning grid. Pad foundations are connected by an edge beam. Ground floor partitions are of brick, others of asbestos-faced woodwool. Aluminium curtain walling has a variety of infilling. Room heights are all 9 ft. clear, except the hall, which is 21 ft. high and the gymnasium, which is 18 ft. 6 in.

cost per sq. ft.	s	d
preliminaries and insurances	2	0
contingencies	1	2½

STRUCTURAL ELEMENTS

Work below ground floor level	**4 10½**
Stanchions rest on r.c. pads connected by edge beams, in which reinforcement varies with the span. The *in-situ* site slab has no d.p.m. and is unreinforced. Boiler house and chair store are tanked. Sub-soil is good gravel.	
External walls and facings	**13 6**
In order to protect the structural steelwork, a system of curtain walling set outside the main frame is used. This consists of aluminium droppers at 3-ft. 4-in. or 6-ft. 8-in. centres, containing windows and solid panels. Since the wall is outside the grid line, the complications of detailing at external and, more particularly, internal corners and junctions had to be accepted.	

building illustrated

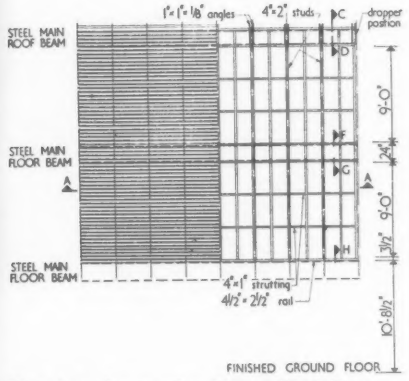


Viewpoint 6: south-west corner of the teaching block. Droppers are at 3-ft. 4-in. and 6-ft. 8-in. centres, a decision resting both on planning convenience and external appearance. The cladding on the gound floor is faced with embossed asbestos sheet painted (three coats of emulsion) dark blue (9·098) and light grey (9·099). On the upper floors: end wall of horizontal Western r cedar boards finished with plastic polish. Main façade: spandrels stair glazing are of smoked glass; panels below windows are asbest faced painted black; below clerestories, plywood painted olive below eaves asbestos faced and painted white and dark blue (9·098

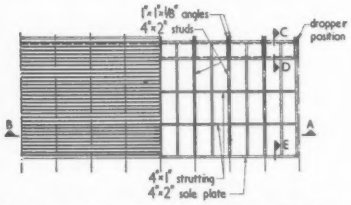
analysis

All types of cladding sit on a slate sill bedded in 3 : 1 sand/cement mix at ground level. It is 6½-in. × 1½-in. weathered and throated with a ⅞-in. × ⅞-in. wrought Burma teak weather h set in mastic.

Ratio: $\frac{\text{solid wall}}{\text{floor area}} = \frac{0{\cdot}795}{1}$



Elevation of external walling to Block B [Scale: ⅛" = 1' 0"]

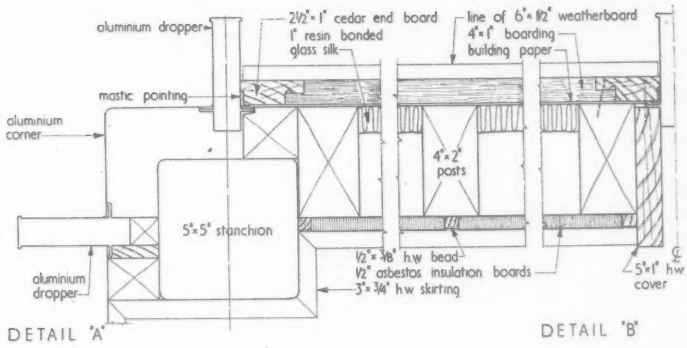


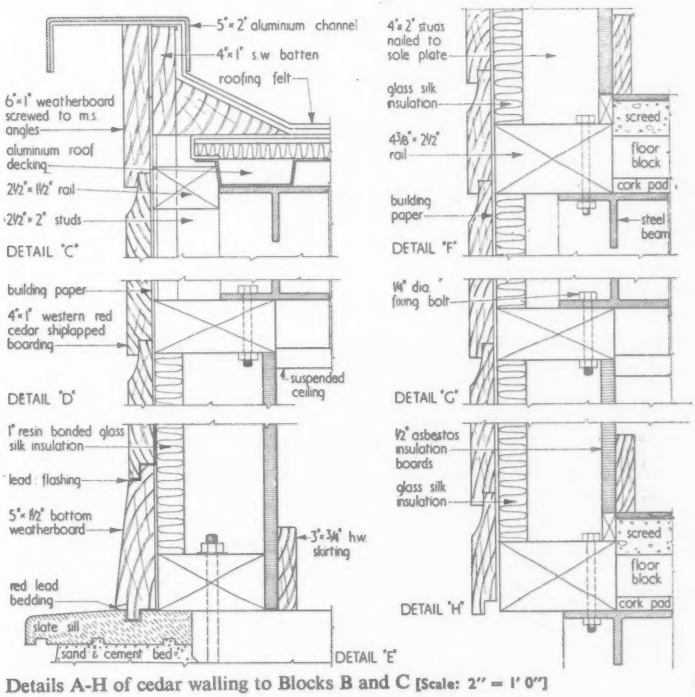
Elevation of external walling to Block C [Scale: ⅛" = 1' 0"]

A variety of external facings and panels is used.
1. Moulded asbestos on softwood frame with asbestos wallboard lining and woodwool core. Total thickness, 1⅛ in. The face is embossed with 5½-in. squares and size varies from 1 ft. 6 in. to 3 ft. 4 in. × 8 ft. 9¾ in.
2. Ship lap western red cedar weatherboards, 4½ in. × 1 in. nailed to studs with 1½-in. copper brads. Backed with building paper, resin bonded glass silk, air space and inner skin of asbestos wallboard.
3. Ply-faced wall panels of ⅜-in. (9-mm.) external quality plywood, glued and brass-screwed to softwood frame. Backed with building paper, 1-in. resin bonded fibre glass and asbestos wood or fibre board.
4. Softwood ⅝-in. boarding on softwood frame backed with polished softwood board, ⅝-in. × 3½-in. face, or 4½-in. flettons.

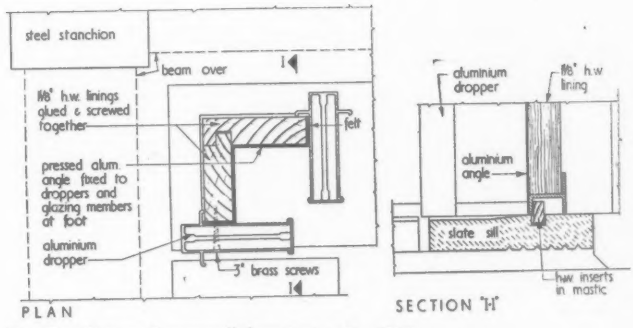
Type of walls and facings	*Area in sq. ft.*	*Cost per sq. ft. of floor area*
Curtain walling and glazing over	12,902	9s. 4d.
Asbestos panels	9,456	1s. 7½d.
Western red cedar panels	4,000	9½d.
Skirtings		1¾d.
Internal skin (finishes and decorations)		1s. 4d.
Brickwork		3½d.

(Cost includes cost of external decorations: emulsion paint on asbestos; oil paint on softwood board and ply; polish on western red cedar.)



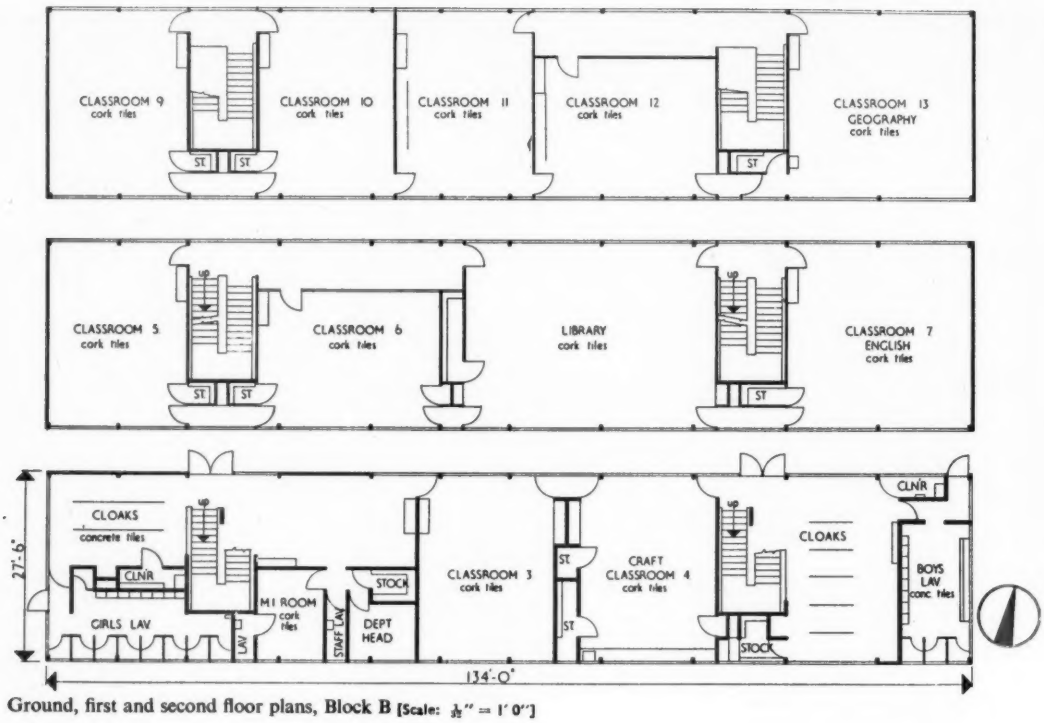


Details A-H of cedar walling to Blocks B and C [Scale: 2" = 1' 0"]

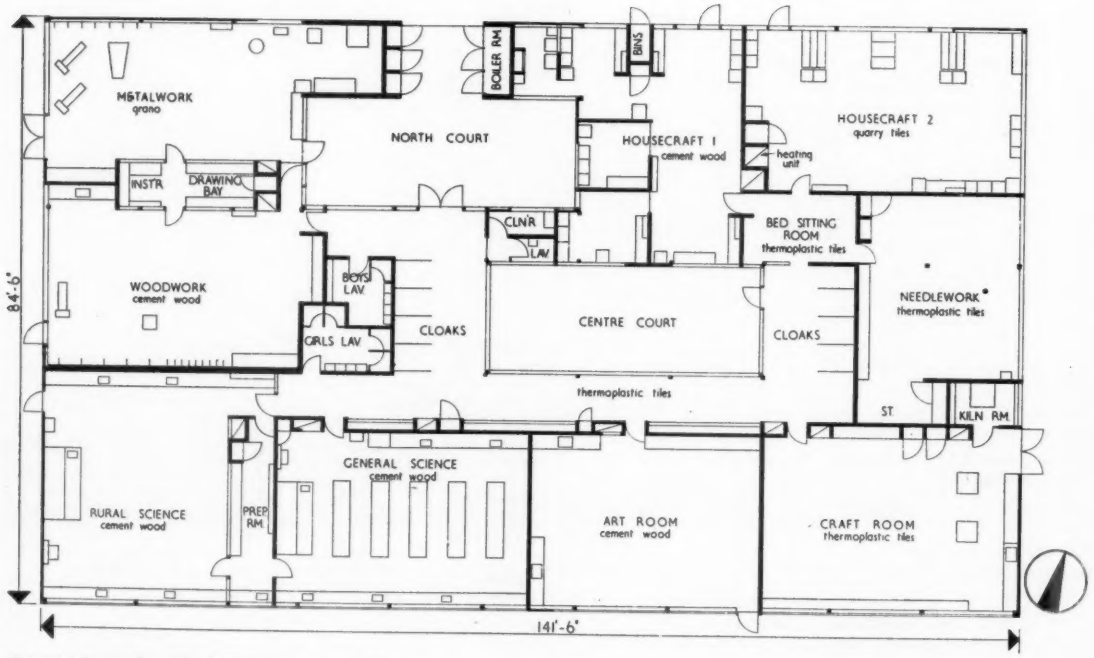


Details of internal corner linings [Scale: 2" = 1' 0"]

building illustrated

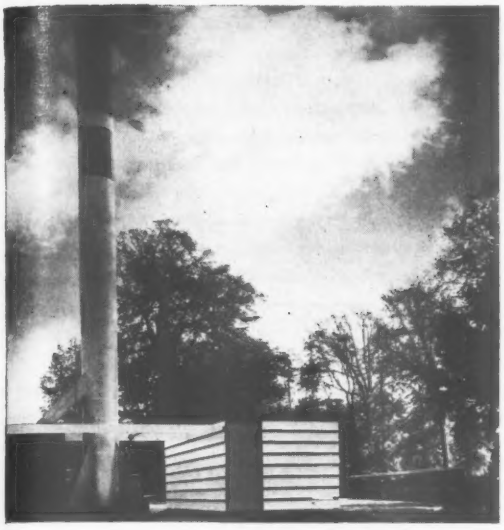


Ground, first and second floor plans, Block B [Scale: $\frac{1}{32}$" = 1' 0"]



Ground floor plan, Block C [Scale: $\frac{1}{32}$" = 1' 0"]

building illustrated



Viewpoint 7 (above left): the steel boiler flue is 30 ft. high with a diameter of 2 ft. 9 in. and is cased in aluminium. On the right, the screen for 16-ft. × 6-ft. × 10-ft. oil storage tank is made up of ex 8-in. × 1-in. softwood boards at 10-in. centres on 4-in. × 2-in. sawn studs at 5-ft. centres. fixed with wrought-iron straps rag bolted to the kerb. The height is 6 ft. 8 in. The door is faced with 12 mm. external quality plywood. Boards white, studs black and door grey. The induced draught fan is housed on the left. Viewpoint 8 (below): the central courtyard of the craft block, surrounded on three sides by circulation. Floor finish: thermoplastic tiles. Ceilings: demountable perforated fibrous plaster panels suspended from structural steelwork. Columns are 5-in. × 5-in. pressed steel. The cladding is mounted 4½ in. outside the external column grid. Colours: floors, dark and light grey; ceiling, columns, walls, white; end wall, dark olive green (5·065). Viewpoint 9 (above right): the teaching block from the south-west. This block contains eight classrooms, English and geography rooms, library, deputy head's room and cloakrooms. This complex of functions has not been "strait-jacketed" into a simple, repetitive pattern, but has been allowed expression externally.

building illustrated

Left: the gymnasium. Beams are 2 ft. 6 in. deep and span 40 ft. Columns are at 13-ft. 4-in. centres, ceiling height 18 ft. 6 in. The floor is hardwood strip. Colours: end wall, warm grey (9.100), structural steel, white; ceiling, blue. Centre left: the housecraft room, an intricately planned area offering children a variety of equipment and considerable scope. In this view the three small kitchens which open off a larger space are seen. All spaces can be supervised from the larger space (a requirement of the client's brief) yet each provides an intimate, domestic environment. Variety of furniture equipment, services and finishes allows comparisons to be made. Colours: facing wall, dark olive green (5.065), flanking wall (with picture), light chocolate (3.044). Below: the woodwork room (for 15 children). The room is divided from the metalwork room by a double-glazed mahogany screen which encloses a drawing office and instructor's room. The floor is of wood composition and the ceiling of perforated (sound absorbent) fibrous plaster

panels. Left: the entrance hall arranged for dining in. On the left is a "dining" classroom normally separated from the entrance by a ply-faced sliding-folding screen. Tables are designed for "family" service in groups of eight. The floor is cork tiled. The roof lights are lined with 6-mm. external quality ply. Colours: classroom wall, medium grey (9.100), wall to right of folded screen, warm, light grey (9.099), ceiling, white. The furniture is beech. Above: the forge in the metalwork room, which has fair-faced fletton brickwork and a granolithic floor. The ceiling is sound absorbent.

analysis

Frame or load-bearing element — s 8 d 7½

Light welded steel frame on a 3-ft. 4-in. planning grid.

Stanchions:

1. for single-storey blocks, 5-in. × 5-in. pressed steel consisting of " U "-shaped 5-in. × 2½-in. channels welded to form a hollow square.
2. for lower floors of multi-storey block, 8-in. × 5-in. consisting of two 2-in. × 4-in. m.s. channels connected with ¼-in. plates on each side, to form a hollow rectangle.
3. for top storey, 5-in. × 5-in., consisting of two 5-in. × 2-in. m.s. channels welded together to form a hollow square.

The face of the stanchion is always 2½ in. in front of the external wall grid line. Beams have lattice steel webs with angle compression members and flat tension members. Maximum spans: roof, 13 ft. 4 in. × 33 ft. 4 in.; floor, 13 ft. 4 in. × 26 ft. 8 in.; intermediate beams at 3-ft. 4-in. centres.
Assembly hall: 13 ft. 4 in. × 40 ft., with timber intermediate beams at 3-ft. 4-in. centres.
Spans are available in 3-ft. 4-in. increments up to the maxima.
All wind bracing is contained within the beam depth.
All beams are 1 ft. 6 in. deep except those of 40-ft. span, which are 2 ft. 6 in. deep. The perimeter beam is 6 in. deep.

Type of frame	*Area in sq. ft.*	*Cost per sq. ft. of floor area*
Single-storey and assembly hall	23,950	7s. 6d.
Three-storey block	10,896	10s. 9d.
	34,846	8s. 6d.

Asbestolux stanchion casings	¼d.
Decorations to exposed metal frame	1¾d.
	8s. 8d.

Upper floor construction — 9¼

Area, 7,569 sq. ft.
Upper floor plates are precast prestressed slabs, 3 ft. 4 in. × 8 in. × 1½ in. thick. These are easily handled and have a low proportion of rejects.
Plugs for fixing floor screeding edge are cast into slabs. Landings of precast slabs, 5 in. thick, spanning 6 ft. 8 in.

Staircases and steps — 1 4¼

Concrete, reinforcement and framework	5d.
Treads and skirtings	3d.
Balustrade and handrails	5¼d.
Cat ladder	¾d.
Sundries and decorations	2¼d.
	1s. 4¼d.

Staircases, in three-storey block, are of *in-situ* r.c. with risers of 5 in. and going of 11 in.
Hardwood treads, 1¼ in. × 11¾ in., are screwed to plugs cast into stringers. Hardwood nosings are 2 in. × 1 in. Handrails of 3½-in. × 2¼-in. hardwood on 1¼-in. × ⅜-in. m.s. flat core, are supported on ⅜-in. m.s. rod balusters. All hardwood is treated with three coats of plastic seal. Steps elsewhere, the same.
Number of staircases, 2.

Roof construction — 3 1¼

Roof and decking: area 26,310 sq. ft., cost per sq. ft. of floor area — 2s. 8d.
Eaves construction: cost per sq. ft. of floor area — 5¼d.
— 3s. 1¼d.

Light aluminium decking with ½-in. insulating board, finished with two layers of felt, finished granite chips.
Eaves upstand, formed by carrying wall panel and aluminium dropper 4 in. above roof level, is capped with 5-in. × 2-in. aluminium channel.

Rooflights — 1 2

Rooflights are built up of self-finished aluminium sections and aprons. ¼-in. g.w.c. glass is bedded in mastic. Kerbs are softwood with ply linings. Both fixed and opening types are used.
Number of rooflights, 105.
Total area, 1,188 sq. ft.

Windows (cost of windows and glazing is included with external walling)

Aluminium framed horizontal sliding windows, top hung hoppers and fixed glass are all fixed direct to aluminium droppers with aluminium glazing clips which snap over pre-fixed spring fixings. All transomes and flashing members are included in the system.

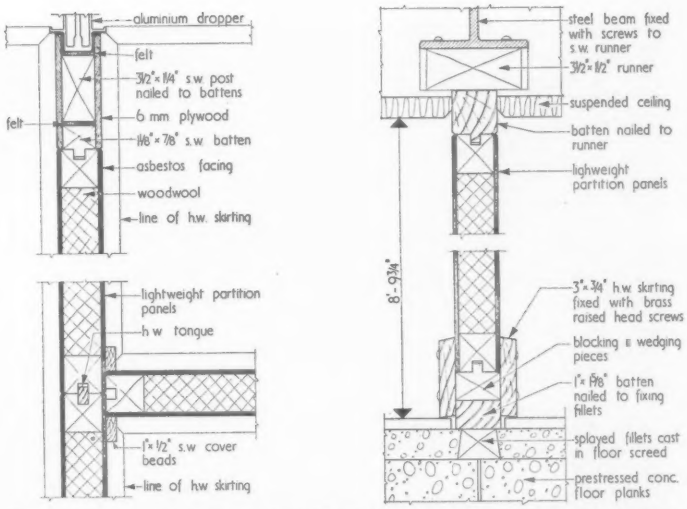
External doors — 11

Area, 856 sq. ft.
Single, or in pairs, fully glazed or solid. All of mahogany with armoured glass. Frames are bolted direct to aluminium droppers.

PARTITIONING

Internal partitions — 4 5¾

To ensure good sound insulation between rooms, all ground floor partitions are of 4½-in. or 9-in. brick, plastered and painted with three coats of oil paint.
On upper floors a proprietary system, with a sound reduction of 31 db. is used, for reduced weight.



Plan and section at internal wall partition junction with external wall on upper floors [Scale: 2" = 1' 0"]

Left: the rural science room. Beyond the glazed mahogany screen is a preparation room leading to general science rooms. The tables are topped with iroko, the floor finished with wood composition. Colours: ceiling, white, wall to left of glazed screen, light olive (5.053). Centre left: the craftroom for pottery and modelling. The door on the left of glazed external doors leads to the kiln room. The back wall is of polished softwood, wall benching has agba frames and iroko tops, cupboards are faced with softwood match boarding. Floor, thermoplastic tiles. Bottom left: the assembly hall from the stage. The wide, low window offers a panoramic view of the site falling steeply away to the north and of the fine trees which surround the site. Finishes: floor of oiled wood block; ceiling, slotted fibrous plaster panels; walls of asbestos board and (above the long window) perforated fibreboard tiles. Colours: tiles, white, asbestos, pale grey green (5.059). The windows are provided

with heavy curtains or blinds. Above: the assembly hall and stage. On the right are the steps to the entrance hall, which is at the same level as the stage. The music room is seen through the window on the left. The suspended sound reflector is faced with ½-in. veneered chipboard (and was illustrated as a Working Detail in the JOURNAL *for April 3). It is in two parts, to allow the stage curtain to be drawn. The hall is 60 ft. × 40 ft., and the stage 40 ft. × 20 ft. deep. Below: a typical classroom in the teaching block. The door on the left opens into the library, the adjacent door to the store, and the one on the extreme right to the staircase. All classrooms have revolving chalk-boards. The recessed light fittings conform to regulations but throw little light on the ceiling. South facing windows have venetian blinds. The window sill is 2 ft. 8 in. high, with protecting bar 3 ft. 4 in. high. Flooring, cork tiles. Colour: teaching wall is warm grey (4.049), fan lights over doors, black, chalkboard, dark green, columns, white.*

analysis

These partitions are timber framed with woodwool core faced with two ⅛-in. asbestos cement sheets. Total thickness, 1⅛ in., height 8 ft. 9¾ in. Panels are jointed with hardwood tongues. At the foot they are nailed to fishtail battens cast into screed and at the head by a tongued batten nailed up to a runner screwed to lower flange of beam. Finished three coats of emulsion paint.

Type of partition	*Area in sq. yds.*	*Cost per sq. ft. of floor area* s d
Brick and plaster	1,691	1s. 8d.
Proprietary partition	309	3½d.
Skirtings		2½d.
Door frames and ironmongery		1s. 4½d.
Wallboards and tiling		2½d.
Decorations		9d.
		4s. 5¾d.

Screens
Area, 645 sq. ft. overall.
Internal glazed screens are used to divide areas which nevertheless form a visual whole.
32-oz. glass, ¼-in. plate, ¼-in. armoured and ¼-in. g.w.p. plate are set in mahogany frames finished with a proprietary polish based on tung oil.

W.c. doors and partitions 2¼
W.c. cubicles are of m.s. faced 9-mm. plywood, used for strength (to carry cisterns) and availability in various sizes. Painted three coats of oil paint.

Internal doors (cost included with internal partitions)
Frames are 1¾ in. × 4 in. with planted stops. All are either flush, fully glazed or have a glazed panel.

Ironmongery to internal doors (cost included with internal partitions)
Generally Swedish with silver bronze finish.

FINISHINGS

Floor finishes 3 8

Type of finish	*Area in sq. yds.*	*Total cost*	*Cost per sq. ft. of floor area* s d
Granolithic	330	£187 2s. 10d.	1¼d.
Concrete floor tiles	458	£643 6s. 0d.	4½d.
Quarry tile	348	£508 10s. 3d.	3½d.
Proprietary tile	87	£200 15s. 8d.	1½d.
Cork tile	1,279	£2,101 5s. 0d.	1s. 2½d.
Thermoplastic	51	£66 12s. 6d.	½d.
Wood composition	477	£603 15s. 0d.	4¼d.
Hardwood strip or battens on quilt	406	£800 2s. 6d.	5½d.
Hardwood block	270	£461 5s. 0d.	3d.
Screeds		£654 4s. 2d.	4½d.
Frames, mats, divisional strips		£205 6s. 6d.	1½d.
			3s. 8¼d.

Wall finishes
Not separated.

Ceiling finishes 3 5½
Asbestos based insulating board.
Suspended fibrous plaster panels finished with distemper.
The material and method combined reasonable cost, fire resistance and sound absorption with ease of fixing and trimming.

Type of ceiling	*Area in sq. yds.*	*Cost per sq. ft. of floor area* s d
Insulation board	700	9½d.
Insulation board with asbestos base	285	3¾d.
Fibrous plaster	2,525	1s. 9d.
Decorations		4½d.
Vertical baffles to ceiling spaces		½d.
Sound reflector to assembly hall stage		2½d.
		3s. 5½d.

Decorations (cost not separated out)
All colours are from the BSS 101 range, except the red, which is archrome No. 4, the architects considering the new range to be deficient in this respect.

FITTINGS

Cloakrooms 2½
8-in. × 2½-in. mahogany boards in 2½-in. m.s. tube. Wood finished with two coats of tung oil seal, metal with 3 coats of oil paint.

Other furniture 4 5¾
Furniture and equipment generally has agba or mahogany frame, iroko tops and Japanese ash veneered plywood panels. Movable furniture is beech.
Kitchen equipment supplied by HCC Purchasing Dept.

Changing room benches 1½
Steel tube and steel mesh with mahogany seats.
Kit lockers supplied by Purchasing Dept.

SERVICES

Rainwater disposal 1½
Rainwater disposal and all plumbing is internal.
Rainwater pipes and sumps of welded aluminium sheet, natural finish.

Plumbing, internal 1 6
Internal waste disposal in copper (by specialist firm) polished and varnished.

Cold water installation
Cost included with plumbing element. Carried out in galvanised m.s. pipe

Sanitary fittings 10½
White glazed fireclay.

Heating 8 3
Re-circulated warm air system from heat exchanges fed by low pressure hot water mains.
No overall " u " value can be given for the curtain walling.

analysis

		s	d
There are three oil-burning boilers, of which two are 1,404,000 B.T.U./hr., and one is 3,780,400 B.T.U./hr. Oil storage capacity for 6,000 gallons of 200 secs. oil.			
The hot water installation is not separated from the heating element.			
Heating installation and flue	7s. 6¼d.		
Builders' work in connection	3½d.		
Tank housing	½d.		
Heater cabinets	4¼d.		
	8s. 3d.		
Drainage		2	5
All stoneware. Foul drainage is taken to main sewer, surface water to pond on south-east corner of site.			
Gas installation			4¼
Normal.			
Electrical installation		3	11
Substation is adjacent to entrance. P.v.c. insulated wire in conduit. Exposed conduit and surface boxes are used where partitions are prefabricated. Majority of ceiling fittings are of recessed type.			
Price per sq. ft. of floor area: £124,321 / 34,970 sq. ft. =		71	1
Paved areas		1	10
Statutory paved area provided is of tarmac on hardcore.			
Site works		8	1
Kept in a separate bill.			

TIME SCHEDULE

Working drawings: January, 1954.
Tender date: March 2, 1955.
Contract signed: April 27, 1955.
Work begun: April 25, 1955.
Work completed: Contract period was 21 months, but final completion was delayed till September, 1957.
This delay was due to the fact that part of the school (the practical block) was finished and occupied ahead of time, in September, 1956, because of the pressure of the number of school children in the area. This slowed up completion of the rest of the building.
Type of contract: RIBA modified for use of local authorities.

COST SUMMARY

Total floor area: 34,970 sq. ft.
Price of work above ground floor level: £115,799
Price of play pitches: £3,186
Price of work below ground floor level: £8,522
Price of external works: £15,508
Gross total price: £143,016

COST COMMENTS

The constructional technique used in this school was a prototype for later projects and a great deal of information had to be made available from it by cost analysis and studies of performance.
Two of the main objectives of the design were:
(*a*) an external walling system fixed at head and sill, and
(*b*) light and dry internal partitions.
It was known before development began that by planning on a 40-in. module using a light steel structural frame, a more economical frame cost could be achieved than by using the 8-ft. 3-in. module steel frame which had been a feature of earlier schools built by the County. This saving on frame costs was used to increase the allocation of money for external walling.
Only a small area of dry partitions was considered for the school, as it would have proved too expensive to use them throughout.
The cost information from the contract was used as a basis for laying down a cost plan for a new technical college with single and four-storey blocks using similar construction. An account of this cost planning was given in an article published in the JOURNAL for May 24, 1956, at the time of the British Architects' Conference at Norwich on Architectural Economics.

CONTRACTORS

Clerk of Works: R. James. *General contractors:* Crook Bro*Sub-contractors: asphalt:* Asphaltic Ltd. *Reinforced concret*T. C. Jones & Co. Ltd. *Bricks:* E. H. Smith Ltd. *Speci**roofings and roofing felt:* Wm. Briggs & Son. *Partitions:* Se*Ltd. *Glass and patent glazing:* Hond & Langer Ltd. *Wood**block flooring:* Hollis Bros. Ltd. *Structural steel:* Hills Lt*Central heating, boilers, and stoves:* Weatherfoil Heating Sy*tems Ltd. *Gas fixtures and fittings:* Eastern Gas Board. *Ven**tilation:* Greenwood Co. Ltd. *Plumbing and sanitary fittings*Stitsons Ltd. *Door furniture:* Nettlefold & Moser Ltd. *Roll**shutters:* Tidmarsh & Sons. *Furniture:* E. C. Hodge. *Su**blinds:* J. Avery & Co. Ltd. *Cloakroom fittings:* A. J. Binn*Ltd. *Paint:* Walpamur Vitretex Ltd.

The Gas Council on Flue

*On the opposite page is a supplement on flues which is sponsored by the Gas Council. This is the fourth of a series of supplement**which have as their object to give a full technical description for architects of the different uses to which gas and coke can b**put. Like Information Sheets, these supplements are a journalistic hybrid: they are "advertisements" in the sense that the spac**they occupy is paid for by the sponsors and that their ultimate object is to foster the greater use of gas: but they are "editorial"**to the extent that the means chosen is to provide as much reliable information as possible and that this information has in fac**been "approved" by the JOURNAL'S specialist editor for heating and ventilation. We hope that readers will extract and kee**these supplements for future reference. For this purpose a special binder can be obtained, free of charge, on application to th**Publicity Manager, Gas Council, 1 Grosvenor Place, S.W.1. Alternatively, readers may apply through the business reply folde**at the back of this issue. The first three supplements "Domestic Space Heating 1. Fires and unit heaters," "Domestic Spac**Heating 2. Central heating by gas and coke" and "Domestic Water Heating. Hot water services by gas," appeared in the**JOURNAL for November 29, 1956, April 25, 1957, and September 26, 1957*

GAS FLUES

This supplement, which is concerned with the construction of flues for gas as distinct from solid fuel appliances, begins by pointing out the value of flues in providing positive ventilation. It then describes where gas flues are necessary, how to size them, where to place the flue terminals, the different types of flue which are available, and the method of construction proper to each. In the course of this description a number of contingent problems are discussed, among them the need for special fire precautions in particular cases, the condensation problem in tall flues, and the special arrangements which have to be made for drying cabinets, incinerators, washhouses and boilerhouses. Lastly, the supplement describes present-day practice in respect of shared flues.

Gas flues and ventilation

Adequate ventilation of living and workrooms is recognized in the Code of Functional Requirements of Buildings as essential for all buildings. Casual ventilation through the structure and *via* cracks in joinery is at best haphazard and while often considerable in older buildings, is less in buildings of current construction and is likely to be inadequate except during periods of high wind. Experimental work carried out by the Building Research Station at Abbots Langley and elsewhere was referred to on p. 627 in Appendix 2, *Domestic Space Heating* 2; *Central Heating by Gas and Coke*. This shows that where doors and windows of a normal, newly constructed building are kept closed, average ventilation rates will fall below the minima laid down in the Egerton report. Conversely, if open, they will normally provide excessive air change in windy weather. Where, however, a flue is provided and there is normal access for air intake into the room, ventilation will be adequate under practically all external atmospheric conditions. The traditional 9 in. × 9 in. brick flue for solid fuel fires will usually provide excess ventilation unless provided with a restriction at the throat level, but the smaller gas appliance flue, with such restriction as there may be due to the appliance or draught diverter, provides adequate and rarely excessive rates of air change. Flues give more positive ventilation than air bricks, particularly when the appliance is alight and are not often blocked up by occupiers.

Flues can be provided both easily and relatively cheaply when the building is first designed and erected. They are with difficulty added later and then only at excessive cost.

Codes of Practice

The Code of Functional Requirements for Buildings covers the need for ventilation (ref. British Standard Code of Practice CP3, Chapter 1(C) (1950)). Structural details are given for Gas Flues in BS Code of Practice CP 331.104:1947 *Flues for Gas Appliances*. Reference should also be made to the Egerton Report.

Building regulations

The provision and construction of flues is generally controlled by local bylaws made under powers granted in the Public Health Act 1936, but in some areas they are covered by local Building Acts. While details may, therefore, vary from place to place, there has been increasing uniformity in recent years and there is now very little departure from the model bylaws last issued by the Ministry of Housing and Local Government in 1952. In London the matter is also controlled by the London Gas Undertakings (Regulations) Act, 1939. The notes on construction in the following pages are in conformity with these regulations with the exception of the shared flues where waivers are necessary.

Recent developments

Since these Codes were prepared, there have been two major developments in flue technique.

1. *Balanced flue appliances*. Gas appliances are now available so designed that the termination of the outlet for the products of combustion may be placed at any point in an external wall adjacent to the appliance.

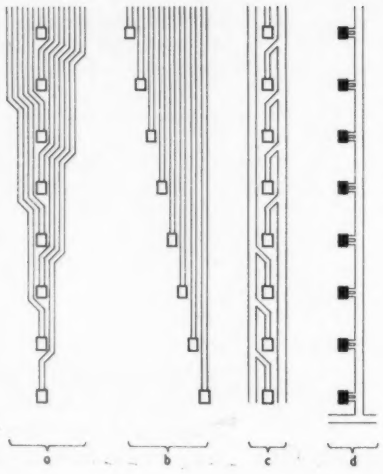


Fig. 1, diagrams comparing the layouts of traditional and shared flue systems. Reading from left to right: **a** *individual flues formed of precast concrete flue blocks.* **b** *individual flues formed of cylindrical flue pipes.* **c** *branched flue system.* **d** *SE duct.*

2. *Shared flues.* It is now possible to design a single duct or "flue" to which a number of gas appliances, incorporating a flame failure device, may be fitted. Somewhat similar arrangements have been used for some time on the Continent, though principally for solid fuel appliances, and are generally referred to there as Shunt flues. A common ventilating duct can also be designed for use with appliances with room sealed combustion chambers. These developments greatly reduce the cost of flues and allow far greater freedom in planning.

The use of two or more appliances in one duct or flue is of recent introduction and is not referred to in current Building Regulations. Any intention to put the system into practice should be discussed with the local Gas Board Engineers and the local Building Authorities at the early planning stage of the work. Both the LCC and, within the limits of their power, the Ministry of Housing and Local Government have permitted a number of installations. It is expected that in view of these precedents further waivers are not likely to be arbitrarily withheld.

To avoid confusion with details of existing practice these two systems are discussed separately on pages 632-634. The implications of this approach to flue design can be inferred from Fig. 1.

Where flues must be provided

1. For all gas-fired space heating appliances having a continuous heat input exceeding 500 B.t.u.s/hr. per 100 cu. ft. of habitable room space.
2. For instantaneous water heaters for bath supplies and for any other appliance fitted in a bathroom for heating bath water having a heat input exceeding 500 B.t.u.s/hr. per 35 cu. ft. of room space.
3. Storage water heaters with a heat input of 15,000 B.t.u.s/hr. or more.
4. Wash boilers and washing machines with a heat input exceeding 20,000 B.t.u.s/hr.
5. All gas-fired central heating appliances.
6. All gas-fired hot water boilers and circulators with a heat input of 15,000 B.t.u.s/hr. or more.

Instantaneous water heaters used occasionally at a sink or basin need not have flues unless they are fitted in an unusually small room or are likely to be in use for abnormally long periods.

Domestic cooking appliances do not need flues but there should be sufficient air change in the kitchen to remove steam and cooking smells.

Combined flues. Outlets from two or more appliances in different rooms may not be combined in a single flue under existing regulations. In view, however, of the success of the systems of shared flues referred to above, applications for waivers for correctly designed schemes can be put forward with confidence.

Principle of flues

The air or gases in a flue tend to rise when they are warmer than the surrounding air at the flue inlet, and this action will continue so long as fresh air can enter the room to replace that which has been evacuated. Generally speaking, the greater the temperature difference between the air in the room and that in the flue, and the greater the height and cross-sectional area of the flue, the more air will be evacuated, although the motive power is very small compared to that of even normal velocity winds. Adequate air inlets and careful flue design and construction are, therefore, essential. The size of the flue must be sufficient to provide the required ventilation as well as to remove the products of combustion of any gas fire or appliance connected to it. Normally the flue provided for a gas fire will automatically provide the necessary ventilation in the room so heated.

Position of flues

There are recognized advantages in placing flue stacks in the centre of the building or at least on inside walls. Such a position usually allows the flue to terminate in a satisfactory place, the flue is not liable to chilling, which may lead to condensation troubles, and the heat lost from the flue will help to warm and dry the building. For short flues a termination on an outside wall will be satisfactory unless it is close to an obstruction which could cause a region of high wind pressure. The newer balanced flue appliances, however, can be placed at any position on an external wall. Details of good and bad positions for flue terminals are given in Fig. 2 on page 630.

Balanced flue appliances

When the provision of a flue is expensive or inconvenient or there is no suitable place for the termination of the flue, the difficulty can be overcome by the use of a balanced flue appliance so designed that the combustion chamber is wholly enclosed and without contact with the air within the room. Fresh air for combustion is drawn into the case from outside the building and the products of combustion are discharged at about the same position; usually intake and discharge are placed concentrically. The result is that the pressure of the external air, no matter how strong the wind may be, is the same on both intake and outlet and the warm products of combustion are discharged without interruption as they would be up a good flue.

gas supplement

The design of the outlet must be carefully calculated and the standard fittings can alone be used. This development means that a balanced flue gas appliance can now be fitted at any point in any external wall whether there is or is not a flue and the use of gas appliances is no longer restricted by any difficulty in providing adequate flues. Such appliances do not, of course, provide any ventilation in the room.

Exceptionally tall flues

Gas flues of traditional masonry types are unsuitable for exceptionally tall buildings, partly because condensation may occur in the upper parts and partly because of the cost and space requirements. For buildings up to 100 ft. in height asbestos cement flue pipes are suitable and can be encased in breeze or similar block structures which serve both to keep the flues warm and to simplify fixing. For long runs—over 60 ft.—the pipes should be internally protected to prevent corrosion due to acid condensates. The upper parts should not be unduly exposed and where there is any doubt they should be insulated to retain heat.

Recent research has made it possible to predict accurately the performance of tall flues and the probability of the occurrence of condensation. Work on the subject is still proceeding and further design data, more particularly in respect of very tall flues, should become available in the next few years. Information will be made available to the regional Gas Boards.

Table of flue sizes

Size of room —c. ft.	*Gas rate of suitable* — *Convector fire*	*Radiant fire*	*Size of square and circular flue*	*Approximate ventilation rate— c. ft./hr.**
Up to 1,000	24	24 to 28	4 in.	2,300
1,000–1,500	28	36	4 in.	2,600
			5 in.	3,100
1,500–2,000	32	48	5 in.	3,400
2,000–3,000	36	48	5 in.	3,400

* Refers to radiant fires only—rather less is provided by convector fires.

Note: 1. The approximate ventilation rates are based on a 30 ft. height but there is not a great variation above heights of 20 ft.

Flues for water heaters

Typical appliance	*Heat input B.Th.U.s/hr.*	*Gas consumption cu. ft. per hr. of 500 C.V. gas*	*Minimum area of flue sq. in.*	*Minimum dia. of standard circ. flue, in.*
Circulator storage heater	Up to 40,000	Up to 80	7	3
Circulator storage heater	40,000–60,000	80–120	10	3½
Bath heater, single point or multi-point	60,000–90,000	120–180	13	4
Bath heater, single point or multi-point	90,000–150,000	180–300	20	5
Large water heater	150,000–250,000	300–500	30	6

Notes: (*a*) It is sometimes desirable to increase these sizes to give greater general ventilation in the room and to minimise the possibility of condensation.

(*b*) As a general rule, no appliance should be connected to any flue having a smaller cross sectional area than that of the outlet of the appliance.

(*c*) Sizes for Shared and Branched Flues are given later.

(*d*) Sizes for Tall Flues should be considered in conjunction with the details of the particular installation.

Flue sizes

Gas fires.—A radiant gas fire of the usual gas rate, when connected to a flue of 5-in. dia., will normally give adequate ventilation to the room in which it is fitted. A flue of larger cross-section will only be necessary in cases where an exceptionally high ventilation rate is required, or to reduce the likelihood of condensation in very tall flues.

Draught diverters

Gas burning appliances normally require a draught diverter in order to ensure uninterrupted operation during periods of down draught and to break the draught or "chimney pull" so that an excessive volume of air is not drawn through the combustion chamber. Most water heaters now incorporate the draught diverter in the appliance, but where this is supplied separately it must be fitted immediately above the appliance and always within the same room. A draught diverter of this type also serves to allow entry of fresh air to the flue to reduce the risk, and the volume, of condensation and to provide room ventilation. The upper part of most gas fires is designed to serve the same purpose as a draught diverter.

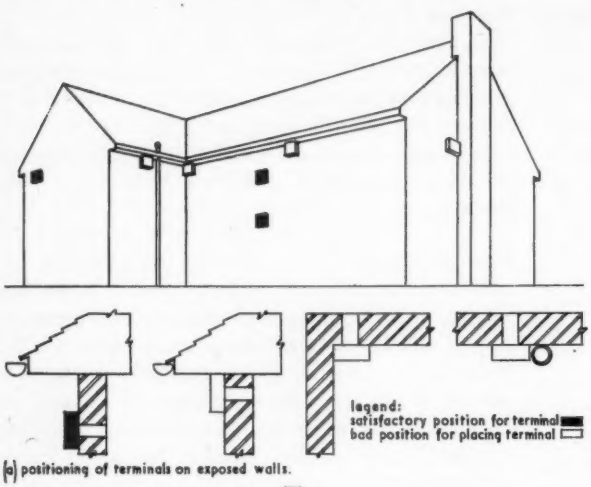
A few of the less common appliances, notably incinerators, are fitted without draught diverters. They may, however, require "spoil draughts" to reduce excessive pull when fitted to very tall flues. It is not possible to give any generalized information on this point. Reference should be made to the makers or to the local Gas Board Engineer.

Terminals

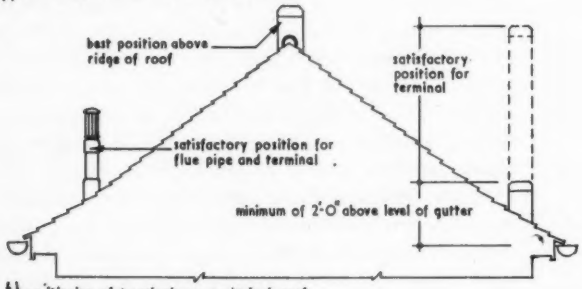
All flues for gas appliances must be provided with a properly designed terminal at the top to prevent access for rain or birds and provide a free discharge to the flue gases. Terminals are available which by their design utilize the forces connected with external air movements to assist the extraction of the flue gases. These terminals are essential whenever a flue must terminate on a wall.

Position of gas flue terminals

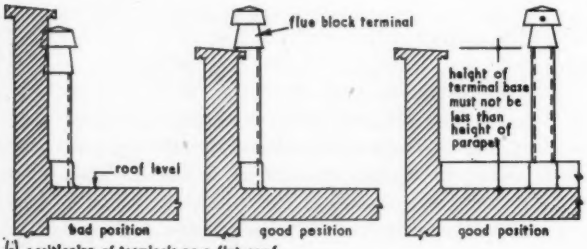
The terminal must be placed in such a position that the wind can blow freely across it at all times. Normally the best position is above the ridge of a pitched roof, or above the level of the parapets surrounding a flat roof and well clear of other and higher parts of the structure, such as tank houses and lift motor enclosures. In the case of monopitch roofs, winds blowing from the highest point can produce turbulence and low pressure areas in the middle of the roof. Blowing from the low side conditions are good and comparable to low pitched roofs. The best position for any terminal is along the highest edge of the roof, but as this is generally unsightly any other position in the roof is acceptable given a height of 2 ft. to 3 ft. above the adjacent roof level. There is no difficulty with flue positions on flat roofs without parapets so long as they are not placed near such obstructions as tank and lift motor rooms. Any wall position is less satisfactory and should be avoided when at all possible.



(a) positioning of terminals on exposed walls.



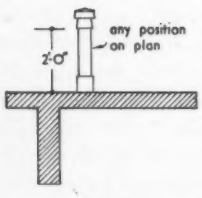
(b) positioning of terminals on a pitched roof.



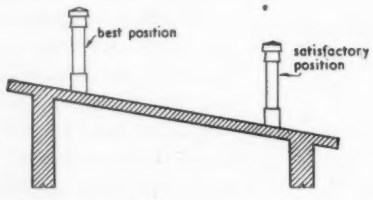
(c) positioning of terminals on a flat roof

POSITIONING OF WALL AND ROOF TERMINALS.

Fig. 2, diagrams showing the correct and incorrect positions of flue terminals.



FLAT ROOF. NO PARAPETS.



MONO PITCH ROOF

The terminal position of any system of joint flues is of great importance and must only be above the ridge or above any parapet to a flat roof. Wall outlets are not suitable.

Unusual flue terminations

Sometimes, especially in existing property, the most convenient termination is in the roof space and this is satisfactory providing the ventilation is good and there is no direct connection with adjoining property. If the roof space is covered with slates, or is close-boarded, the ventilation is likely to be poor. In such cases steps can be taken to increase the ventilation rate, though this will also raise the heat loss from the building through the roof. With thermal insulation laid at ceiling level the degree of roof space ventilation will not materially affect the heat loss through the ceiling. The flue should discharge well away from cold water storage tanks for fear of excessive condensation which may occur when warm flue gases impinge on cold metal. In factories and large volume industrial buildings, flue terminations are often possible just below louvre ventilators at ridge level. Where sheet insulation is fixed at rafter level, ventilation is obviously not possible.

Cavities in ordinary cavity wall construction must never be used to take flue gases.

Use of existing flues

When gas appliances are to be fitted to existing flues, care must be taken to see that the flue is swept to prove that it is free from obstruction. Gas fires can normally be fitted to any 9 in. × 9 in. brick or stone-built flue, which of course may need restriction.

Size of gas fire	*9 in. × 9 in. brick flue (height 30 ft.) Flow rate cu. ft. for different values of restriction area—sq. in.*				
	8	16	24	32	46
24 cu. ft. /hr.	1,800	3,800	5,300	6,800	8,000
32 ,, ,,	2,200	4,000	5,900	7,500	8,700
36 ,, ,,	2,300	4,200	6,100	7,700	9,000
48 ,, ,,	2,500	4,600	6,500	8,500	10,200

The restriction offered by the gas fire itself varies from about 15 sq. in. with modern convector gas fires when correctly installed and sealed to the fireplace opening, to as high as 50-60 sq. in. if the fireplace opening is not filled in correctly and the fire is not fitted flush. The above gives some guidance on the total area of the restriction necessary to give reasonable but not excessive flue flow rates, in general of about 2-2,500 cu. ft./hr.

Water heaters, which are more likely to give rise to condensation, are usually satisfactorily connected to internal flue stacks but may give trouble where the flue is exposed and so is liable to chilling. Gas boilers and large circulators should only be fitted to existing stacks with the advice of the Gas Board's engineers. Special waterproof linings or the insertion of tubular flues within the brickwork may be considered necessary.

Condensation controls choice of material for flue construction

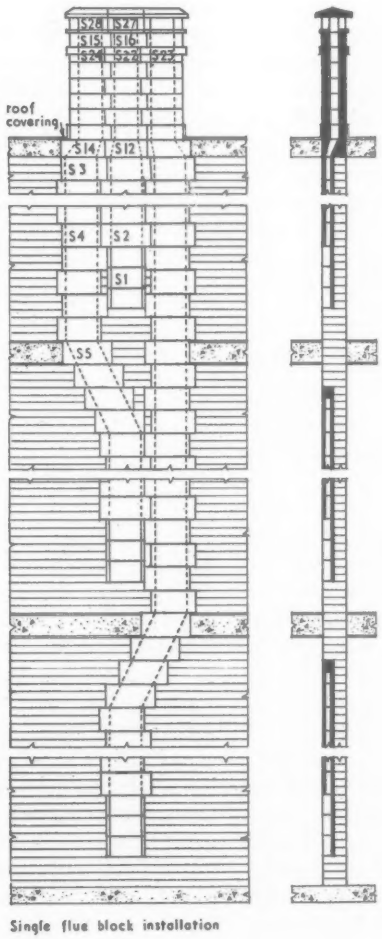
Condensation of greater or less extent will occur in both gas and solid fuel flues if the temperature of the flue gases falls below the dew point before the gases reach the flue terminal. The condensate is usually corrosive and will attack many materials used in flue construction, so that this fact must govern the choice of material for both flue and jointing material.

Normally there is no likelihood of excessive condensation with domestic gas fires, but with high efficiency water heaters the problem is greater. Such flues must be placed in a warm position within the building and

be kept as short as possible, even if this means a wall rather than a roof position for the terminals. Insulation of the flue is often helpful so long as it does not add greatly to the thermal capacity and hence the warming up time of the flue. The provision of a fresh air inlet to the flue at a high level in the room in which the appliance is fitted may help.

Where there is any doubt about the success of any of these measures it may be best to accept the possibility of condensation, construct the flue of waterproof materials such as glazed stoneware, and pipe the condensate from the lowest point to a drain. This pipe must be of lead of not less than 1 in. diameter.

In considering the risk of condensation it is impossible to give any concise rules generally applicable because of the potential number of variables, apart from loss of heat such as will obviously occur with tall flues having low insulation values, trouble can occur in flues of high thermal capacity—such as flues in stonework, where the appliance is used intermittently or is of low gas rate. Large volume flues can cause trouble because, in addition to having large surface areas from which heat will be lost, there may be sluggish movement and so more time for heat transfer and, perhaps, pockets of very slowly moving gases. A well ventilated large flue can, however, be satisfactory since the dilution of the products of combustion can result in a reduction of the dew point and so prevent deposition of moisture.



Single flue block installation

Fig. 3, elevation and section of gas flue stack formed with "Nautilus" blocks.

Construction of flues

Brickwork. Normal 9 in. × 9 in. or 9 in. × 4½ in. flues built in brickwork are satisfactory for gas fires and smaller water heaters, but should preferably be lined with fire-clay liners to provide a reasonably smooth surface and reduce frictional losses. If the flues are parged, aluminous cement mortar is preferable to Portland cement since it will stand up to the acidity of condensation moisture. Where condensation is expected, internally protected asbestos cement flue pipes may be solid bedded in the brickwork and will provide a suitably watertight lining.

Asbestos. Asbestos cement pipes may be used for flues either singly or grouped together and enclosed by suitable non-combustible materials. Asbestos cement is not resistant to attack by the corrosive action of flue gas condensates and should—if condensation is to be expected—be protected internally by a suitable coating and the joints be made with suitably resistant calking materials.

The individual pipes must all be securely and permanently fixed, with the sockets upwards, and each socket must be filled and pointed with cement and sand. Asbestos cement pipes chill very easily and long lengths placed outside a building will almost certainly give condensation trouble and may even fail to function as a flue.

There is considerable saving in the space required for grouped flues of this type compared to traditional brickwork and the casing may be arranged to cover other services, water, heating and gas pipes. They may be used up to a limit of 100 ft., but the weight of the flue pipes must be separately supported at each floor level. Suitable terminal arrangements are required and need careful design. The flow rate of flue gases up the flue varies little between 50 and 100 ft. in height, but is generally more than is required for ventilation, so that the incorporation of a restrictor throat at the fireplace may be desirable. The height above the appliance at which condensation may be expected depends on a number of variables, any very tall flue should, therefore, be discussed with the Gas Board in case it is thought desirable to coat the flue internally or take other precautions.

Grouping of tubular flues in the corner of a room takes less space than the same number on a flat wall and may interfere less with the placing of furniture in the room. In small bedrooms a gas fire placed at high level in a corner position can give good comfort conditions and be more out of the way of bedding and furniture.

Precast concrete blocks

Standard precast concrete flue blocks designed to bond in with brickwork (see Fig. 3) are available with the following cross sectional areas:

12 in. × 2½ in.	30 sq. in.
15 in. × 2½ in	37½ sq. in.
5½ in. × 4 in. (rounded corners)	20 sq. in.

Standard fittings are available for every normal requirement. They should be set in cement mortar and great care must be taken to prevent the mortar squeezing into the flue space and so reducing the net flue area. For this reason the blocks having a modified spigot and socket joint are preferable. Precast concrete blocks having small rectangular flue ways, unless especially lined, are not suitable for water heater flues or for flues exceeding about 50 ft. in height. 9 in. × 9 in. flue blocks or tubular flues should be used for these purposes.

Metallic pipes

Connection between the appliance and a masonry flue, if not made in asbestos cement, may be formed in vitreous enamelled steel or cast iron pipes or in chromium plated copper. Such pipes may also be used for flues, but since corrosion will follow any damage to or imperfection in the protective coating they should only be used in positions where they can be easily seen and replaced if necessary.

Connecting appliances to masonry flues

The connection between the flue outlet on the appliance and the masonry flue is usually made by means of short lengths of metallic or asbestos cement tube. They must be so arranged that the appliance can be removed easily and without damage to decorative finishes or plasterwork, and so that the end of the tube remote from the appliance does not project into, and so block the free passage of, the products of combustion. The connection should always be above the bottom of a masonry flue to allow space for any fallen parging or pointing material. A built-in tubular sleeve of slightly larger internal diameter than the outside diameter of the connecting flue pipe or spigot on the appliance is the only really satisfactory connection. Gas fires can normally be stood in the precast concrete fireplace opening units and do not require tubular flue connections.

Fire precautions

Gas flues normally operate at relatively low temperatures and as there are no deposits of soot or tarry matter, fires due to this cause are impossible and flue fire risks are, therefore, small.

The outer surface of flue pipes does not normally exceed 150 deg. F. excepting only for short lengths of connecting flue pipe between the appliance and the flue and situated in the room in which the appliance is placed. To ensure such a maximum temperature, it is assumed that concrete or burnt clay flues must be not less than one inch thick at any point.

Where a flue pipe passes through or close to combustible material, the pipe must be surrounded by an asbestos cement or metallic sleeve so fixed as to maintain an annular space round the flue pipe of not less than one inch. This space should be ventilated.

If the flue pipe passes through a room or space other than that containing the appliance, and the temperature of the surface of that pipe might exceed 150 deg. F. then it should be protected to prevent contact by persons using or goods stored in that room. This applies particularly to attic and box room spaces where dry combustible materials may often be packed away and cause a build-up of heat.

Special flues

Drying cabinets: The normal small domestic drying cabinet may be connected to any flue suitable for a gas fire. A baffle board within the appliance is necessary if it is fitted to a flue and particularly if fitted to an old flue previously used for solid fuel to prevent soiling the contents if down draught should occur.

Incinerators: The small incinerators used in kitchens and lavatories may be fitted to brick or tubular flues, but special considerations apply with tall flues and a larger diameter flue or spoil-draught may occasionally be needed to reduce excessive flue pull. Provision for access and flue cleaning is always essential. For multi-storey lavatory blocks it is better to provide a common duct with an extract fan.

Any suggested system should be prepared after consultation with the district gas engineer and should be submitted to the local authority for approval before installation.

Wash houses: Where a wash house is provided, flues and ventilating ducts require special consideration owing to the greater risk of condensation. Communal wash houses are dealt with under the Special Uses section. Small domestic utility room flues can usually be arranged in protected asbestos cement tubes. The condense should be arranged to discharge to a drain.

Boiler houses: Where one or more gas-fired boilers are installed in a boiler house, arrangements must be made to provide for adequate fresh air inlets to the boiler house, which should have free unobstructed area of at least twice that of the main flue or flues. Drainage for condensate from the flue should be designed in consultation with the Gas Board's Engineer.

Recently introduced common flue systems

These systems have been developed since the last revision of the building regulations and Model Bylaws. Successful installations are in use in the London area and more are being built there and elsewhere. It is, however, necessary to discuss the matter with the local Building Authority in the early stages of planning to arrange for any necessary waivers and special permissions.

Branched flue systems

The branched flue system consists of a main stack, usually 8 in. square or 8 in. diameter, with individual branch flues from each appliance about 8 ft. in length to provide some individual "flue pull" to each appliance. The branches are generally 8 in. × 6 in. section. Asbestos cement tube can be used but precast blocks are, perhaps, more convenient and could take appliances burning solid smokeless fuel, if required.

Similar systems, generally known from the name of the Belgian company which installed large numbers as "Shunt Flues," have been commonly permitted and used in many European countries and in the United States.

gas supplement

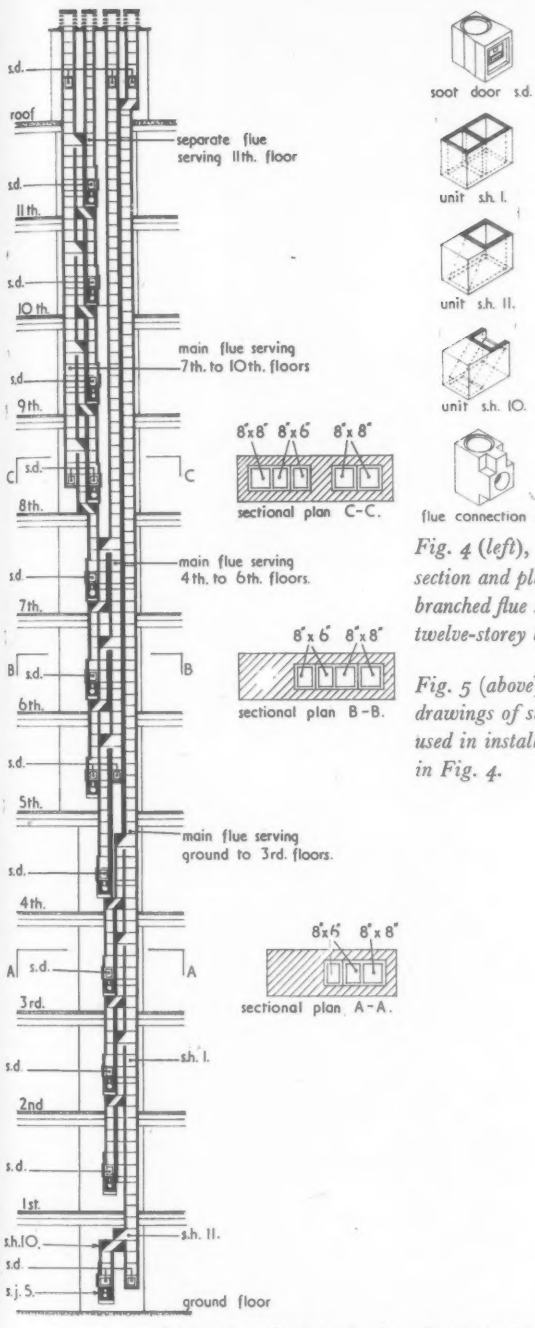


Fig. 4 (left), vertical section and plans of a branched flue system in a twelve-storey block.

Fig. 5 (above), isometric drawings of standard units used in installation shown in Fig. 4.

Advantages include savings in space and above all in costs. Something like £30 per flat or between 2 per cent. and 5 per cent. of the building cost of multi-storey flat blocks can be saved in this way.

In designing a branched flue system, the following requirements should be borne in mind:

(*a*) The appliance in the top flat must generally be vented separately.

(*b*) At present the recommended maximum number of appliances on successive storeys which can be vented into one stack is as follows:

Space heaters	5
Water heaters up to 140 cu. ft./hr.	6
190 cu. ft./hr.	5

A 12-storey block is shown in Fig. 4 having two four-section and one three-section branched flues with one separate flue for the top heater. Fig. 5 shows some of the special flue blocks required.

(*c*) Each branch should rise a minimum of 8 ft. from the top of the appliance.

(*d*) In most cases an 8 in. square or 8 in. diameter flue will be adequate for the main stack, while the subsidiary flue should have an area equivalent to that of a conventional flue attached to the appliance to be connected. 8 in. × 6 in. is a convenient size.

(*e*) The main flue should be as nearly vertical as possible and the minimum number of bends used in the branches.

(*f*) The flue termination must be freely exposed and should be completed by an extractor type terminal rather than a simple cap. The illustration shows the type to be recommended.

(*g*) Gas appliances connected to such a system must be provided with a flame failure device so that there is no possibility of raw gas entering the main flue.

The SE-Duct system

It is possible to fit a number of specially designed appliances to a common duct. This system has now become known as the SE-Duct system and the appliances are becoming known as "Room Sealed Combustion Chamber Appliances." A single vertical duct, freely open to the air at the top and bottom (see layout diagrams, Figs. 6 and 8), is provided and the appliances are connected to this at any point. Air for each appliance is drawn from the duct and the products of combustion return to the same duct.

The size of the duct must be designed to suit the number and types of appliances to be fitted to it to ensure that the air available is always sufficient for complete combustion. The whole system of duct and appliances functions independently of the air in the room.

The termination of the duct at the upper end must be above parapet or ridge levels to avoid external high pressure areas, and the air intake must be so arranged at the bottom of the shaft that it cannot be obstructed. Air inlets should normally be on two faces of the building to reduce the effects of differing wind pressures (see Fig. 8). Wall type terminals are not suitable. Access for dust removal is necessary at the lowest point.

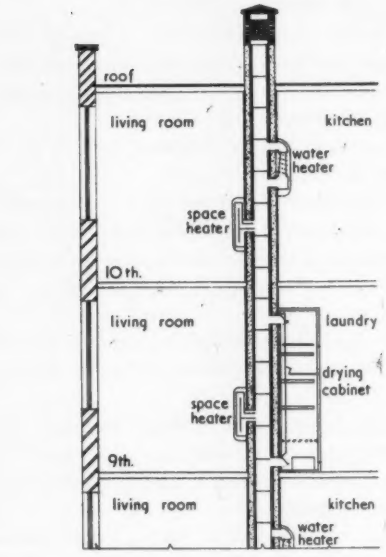
For blocks of flats up to 16 storeys in height it is found that suitable duct sizes fall within three standard units.

Unit mark	*Internal dimensions*	*External dimensions*
SE 1/3	8 in. × 12 in.	10 in. × 14 in.
Se 2/3	9 in. × 15½ in.	11 in. × 17½ in.
SE 3/3	13 in. × 19 in.	15½ in. × 21½ in.

All units are 18 in. high.

All appliances fitted to the duct must be of the "Room Sealed Combustion Chamber" type and be fitted with flame failure cut-off devices.

At present available types include water heaters and circulators, convectors for room heating and fanned



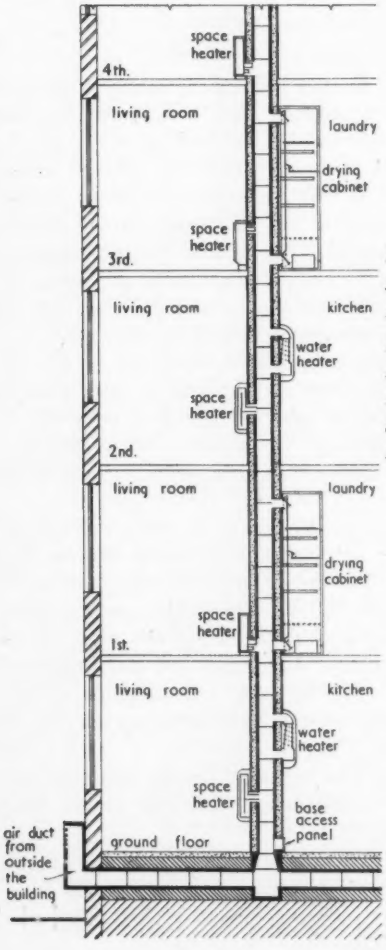
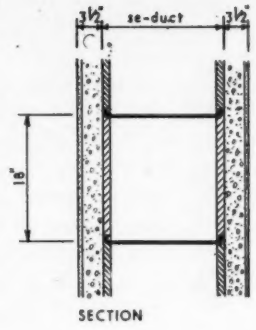
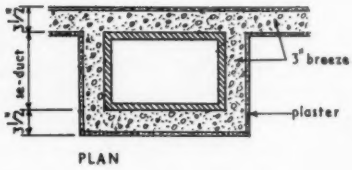
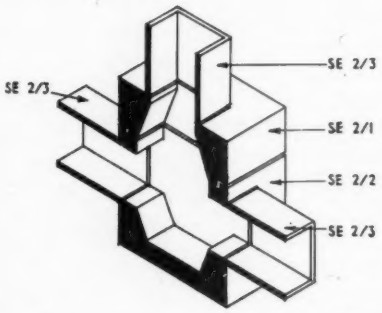
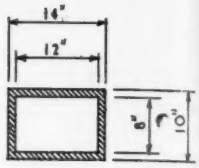


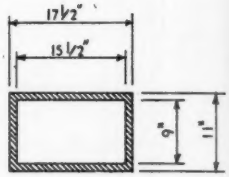
Fig. 8 (right), showing how fresh air is led into an SE. Duct through a horizontal duct at first-floor level.











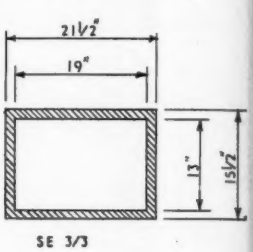
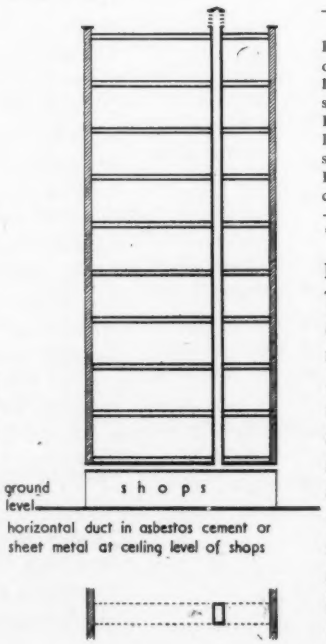


Fig. 6 (left), vertical section through an eleven-storey SE. duct installation.

Fig. 7 (above), drawings showing dimensions of standard units used in SE. duct installation shown in Fig.6.



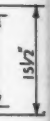
air heaters, all operating at thermal efficiencies of 75 per cent. or better. A special clothes drying cabinet is available which discharges into the duct and is equipped with inlet and outlet apertures which are automatically shut when the cupboard door is opened.

	Number of storeys of flats		
	Up to 7	8–11	12–18
	Flue size	*Flue size*	*Flue size*
Instantaneous water heater only	No. 1	No. 2	No. 3
Instantaneous water heater and space heater of 15,000 B.Th.U.'s/hr.	No. 2	No. 3	No. 3*
Instantaneous water heater, space heater of 15,000 B.Th.U.'s/hr. plus drying cabinet	No. 2	No. 3	No. 3†

* Limited to about 15 storeys. † Limited to about 12 storeys.

Flues for solid fuel boilers

This section deals with gas flues. Where solid fuel appliances are to be installed, reference should be made to C.P. 131.101:1951, "Flues for Solid Fuel Appliances." Branched flue systems are used for solid smokeless fuels on the Continent and two installations are under trial in the Greater London area. Access for sweeping and dust removal is essential. They are not considered suitable for use with bituminous coals or where wood, rubbish and so on are burned in any quantity, as fires of great intensity could occur. Because smokeless fuels are not always easily available in this country there is more objection to this type of flue for solid fuel appliances than for gas appliances.



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working detail

STAIRCASE: SHOP IN STOCKHOLM

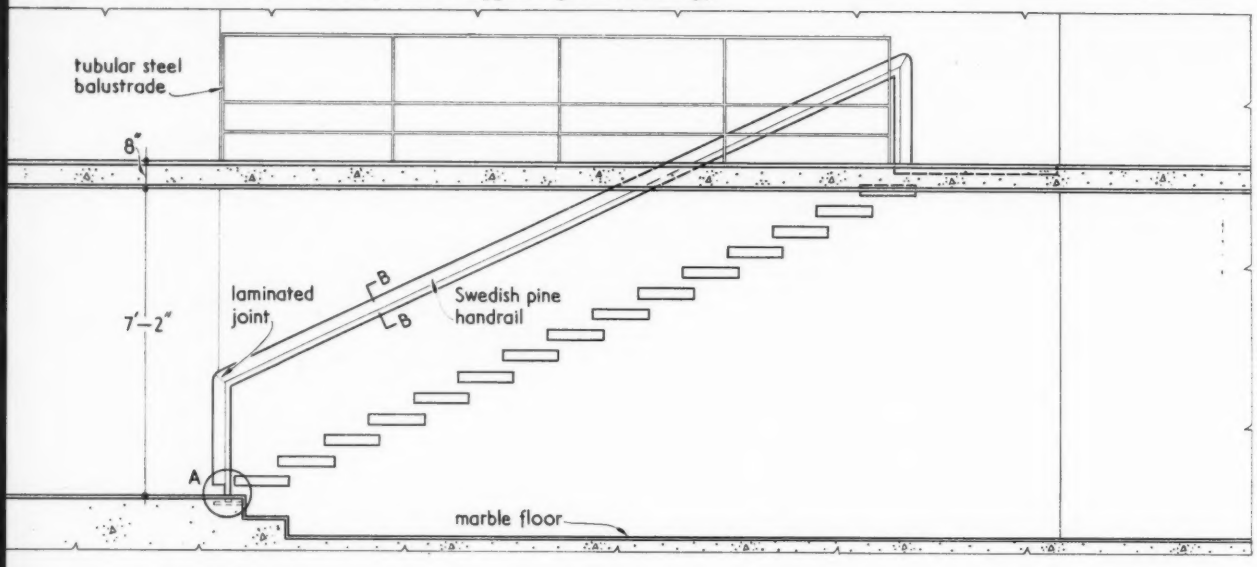
Ahlgren, Olsson and Silow, architects (material supplied by John Whalley)

There is nothing particularly new about the cantilevered stair treads. What is of interest is the thorough manner in which the problem of the offside handrail has been faced: a Swedish pine rail, massively reinforced with steel, runs direct from the lower to the upper structural floor. The treads, on being cast into the wall, are tilted slightly upwards so that they settle to the horizontal.

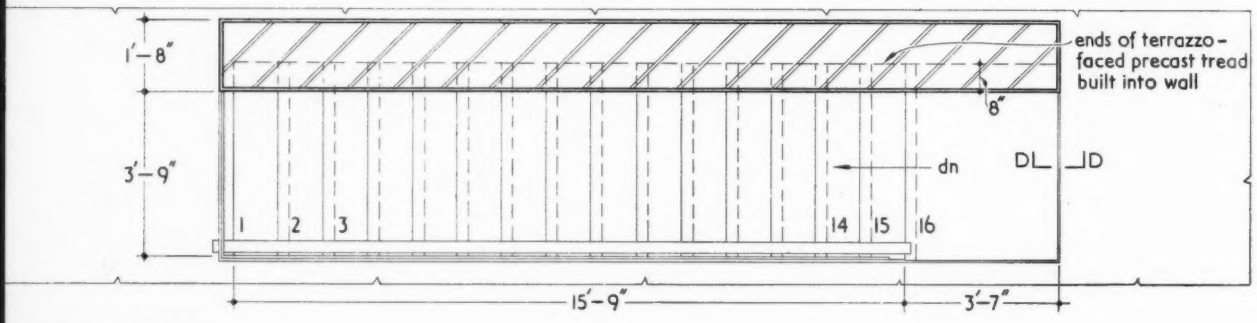
working detail

STAIRCASE: SHOP IN STOCKHOLM

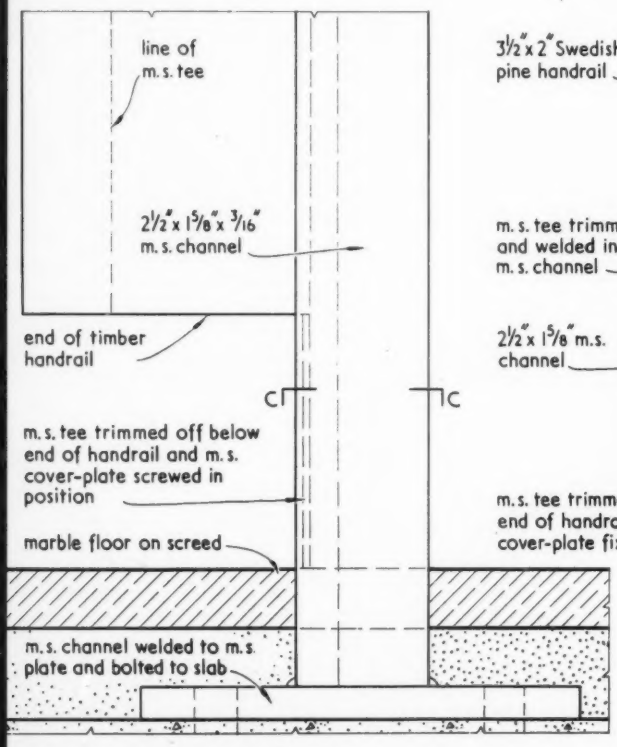
Ahlgren, Olsson and Silow, architects (material supplied by John Whalley)



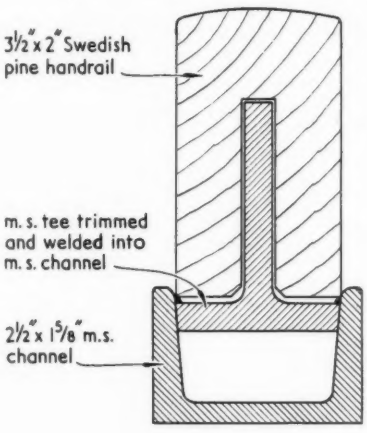
ELEVATION. scale ¼" = 1'–0"



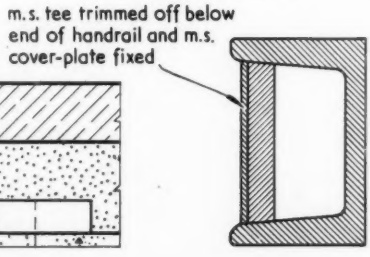
PLAN. scale ¼" = 1'–0"



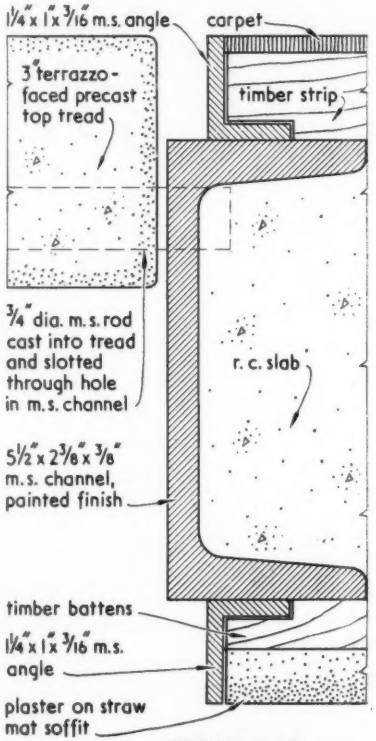
DETAIL AT A. scale ½ full size



SECTION B–B.



SECTION C–C.



SECTION D–D.

note: figured dimensions in feet and inches are approximate

working detail

SUSPENDED CEILING: SHOP IN ROTTERDAM

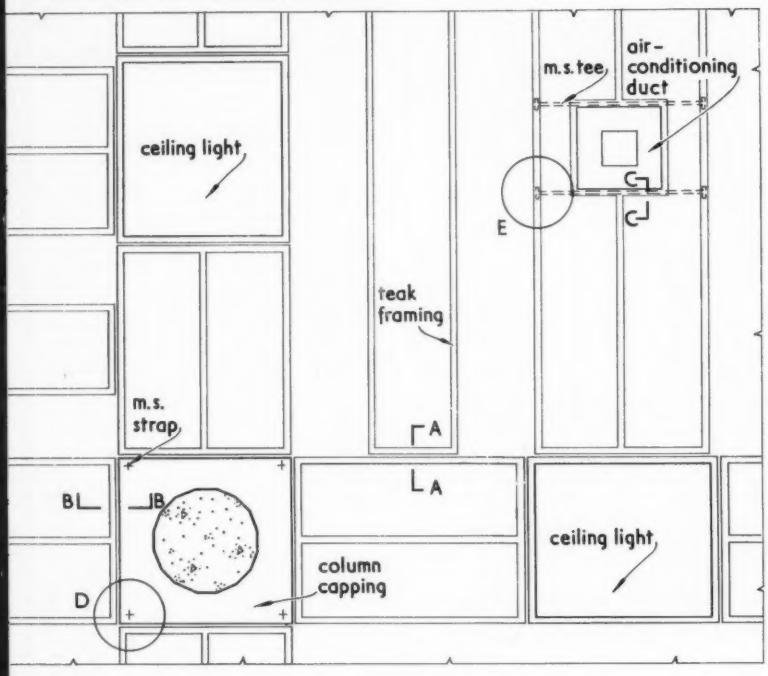
Marcel Breuer and A. Elzas, architects

Ever since the suspended ceiling first became a commonplace, the main effort of designers has been to produce a flat surface similar to the traditional plaster ceiling and to conceal the supporting joists above the ceiling slab. This has the disadvantage that it virtually removes the ceiling from the scope of the designer. It also has the disadvantage (in the case of the demountable ceiling) that the slightest variation between the planes of the separate units reads instantly when seen from below and gives a tawdry effect. This ceiling reverses the usual practice and deliberately shows the built-up teak ceiling joists below the level of the slabs. This gives a design which is positive in its effect and incidentally conceals any slight irregularities which may exist in the joints between slabs and frame.

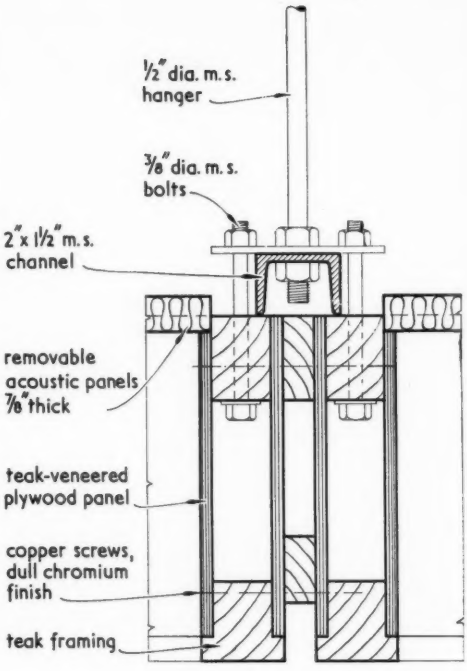
working detail

SUSPENDED CEILING: SHOP IN ROTTERDAM

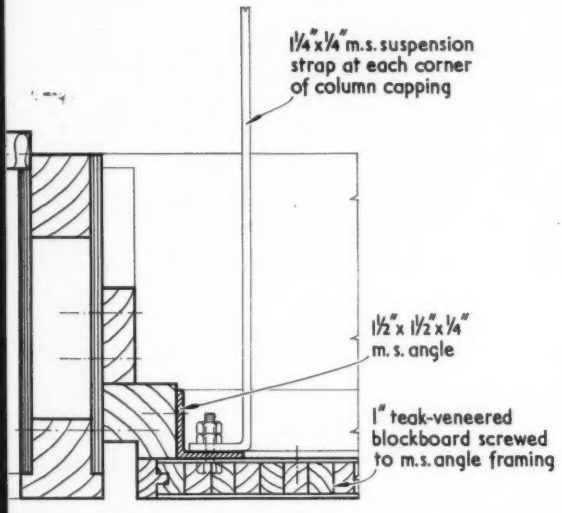
Marcel Breuer and A. Elzas, architects



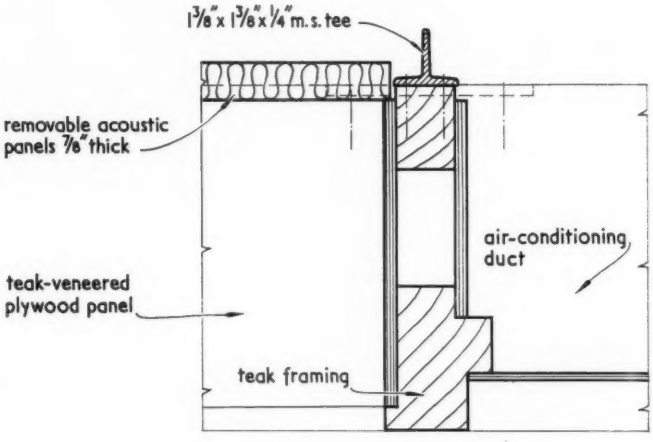
REFLECTED PLAN OF CEILING. scale ¼" = 1'–0"



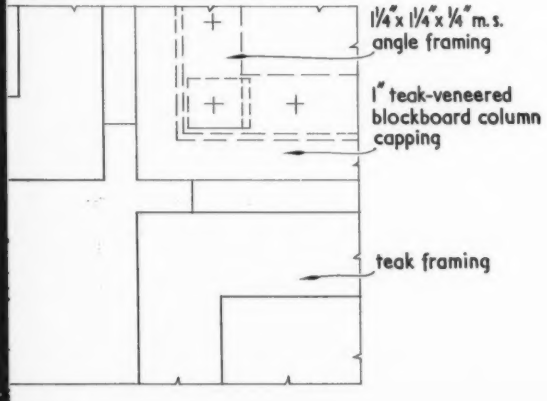
SECTION A–A. scale ¼ full size



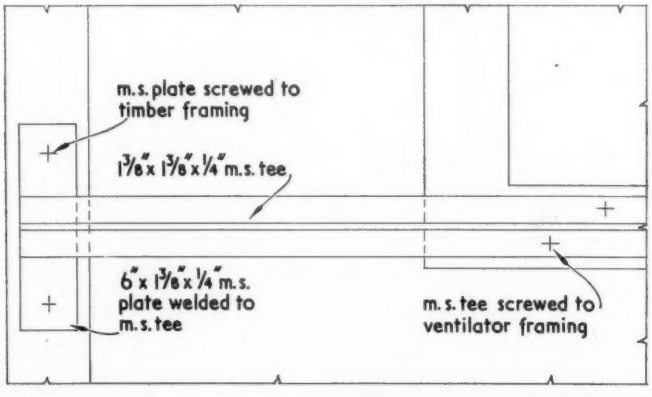
SECTION B–B. scale ¼ full size



SECTION C–C scale ¼" full size

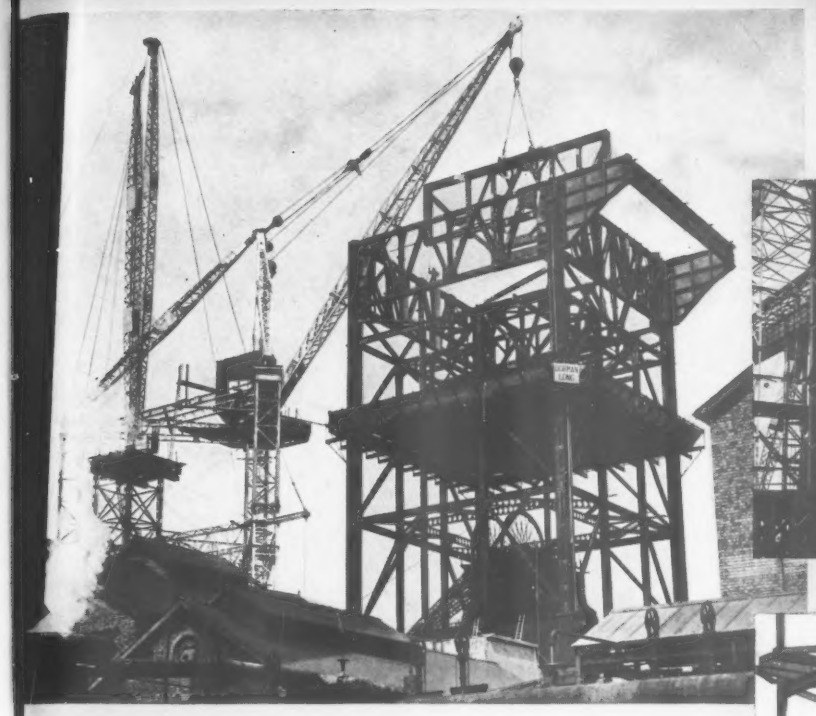


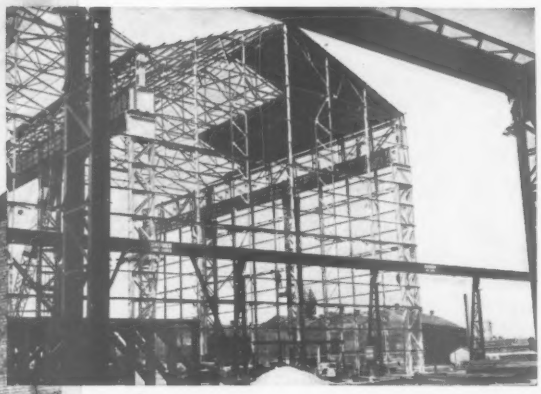
REFLECTED PLAN AT D. scale ¼ full size



PLAN AT E. scale ¼ full size

note: figured dimensions in feet and inches are approximate





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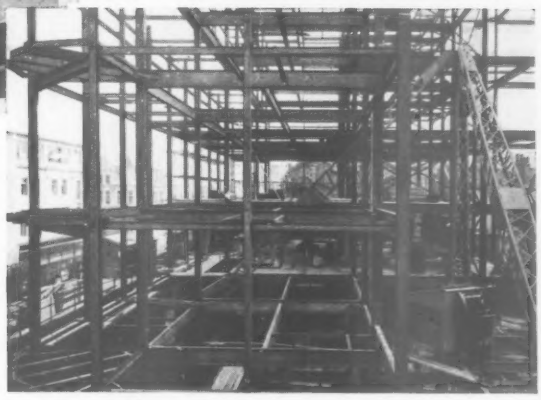


3

4

STRUCTURES FOR COMMERCE AND INDUSTRY

Dorman Long steelwork for multi-storey offices and flats, and for bridges, has often been illustrated. Here are some different examples:—

The top illustration shows Koepe Tower No. 2 at Warsop Colliery

Consulting Engineers: Husband & Co.

No. 2 shows the structure of a building in 'Extension Scheme C' for Smiths Dock Co. Ltd.

Consulting Engineers: T. F. Burns & Partners

No. 3: Steelwork for Binns new store, Middlesbrough.
Architect: Gordon Jeeves Esq., M.C., F.R.I.B.A., M.I.A.
Consulting Engineer: F. R. Bullen Esq., B.Sc., M.I.S.E., M.I.C.E.

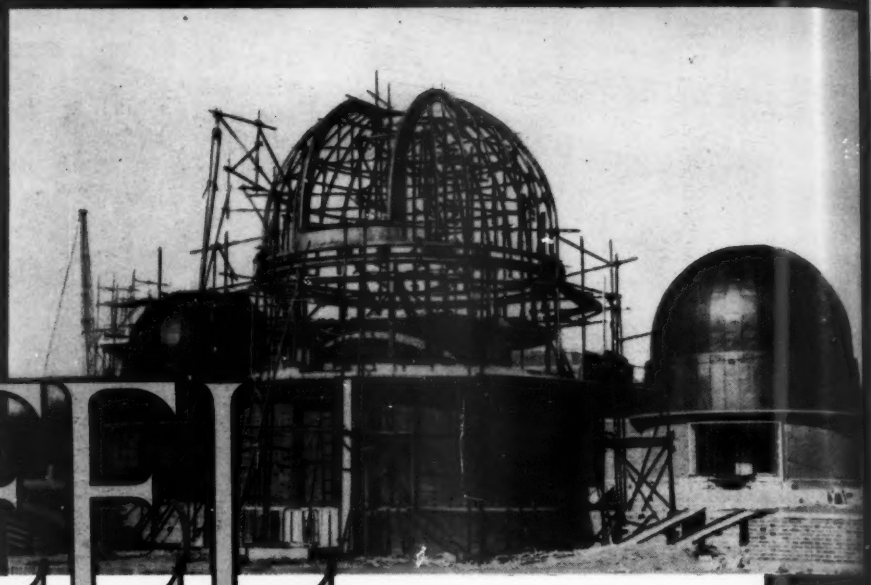
No. 4: Wadsley Bridge extensions at the Baking and Graphitizing shop of British Acheson Electrodes Ltd., Sheffield.

DORMAN LONG

DORMAN LONG (*Bridge & Engineering*) LTD.

DORMAN LONG (*Steel*) LTD.

All steel fabricated by Dorman Long is produced in their own works and, when required, is erected in any part of the world.



STEEL

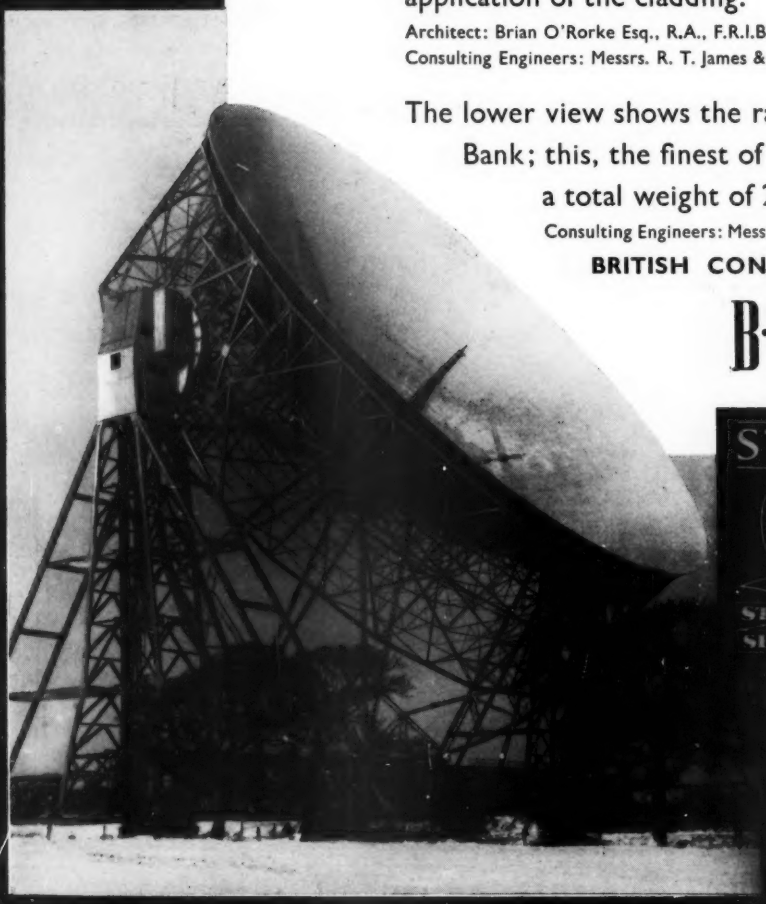
. . . and SCIENCE

The upper illustration shows three of the domes at the new Royal Greenwich Observatory, Herstmonceux, the central dome showing the structure before application of the cladding.

Architect: Brian O'Rorke Esq., R.A., F.R.I.B.A.
Consulting Engineers: Messrs. R. T. James & Partners, London

The lower view shows the radio telescope at Jodrell Bank; this, the finest of its kind in the world, has a total weight of 2000 tons.

Consulting Engineers: Messrs. Husband & Company, Sheffield & London



BRITISH CONSTRUCTIONAL STEELWORK ASSOCIATION

B·C·S·A

Artillery House,
Artillery Row,
Westminster,
London, S.W.1.

STEEL
STRENGTH
SECURITY

HOTEL IN COPENHAGEN DESIGNED BY ARNE JACOBSEN

Scandinavia's biggest hotel, designed by Arne Jacobsen, is beginning to go up in the centre of Copenhagen, where a rapid increase in tourist traffic has made new hotel accommodation urgent. Twenty-two storeys high, and largely glass fronted, the hotel will give visitors an uninterrupted view over Copenhagen and its great harbour. It will have 275 rooms with 475 beds, garage space for 300 cars, and its own bank, post office, travel bureau and shops. The building is expected to cost 30 million kroner.

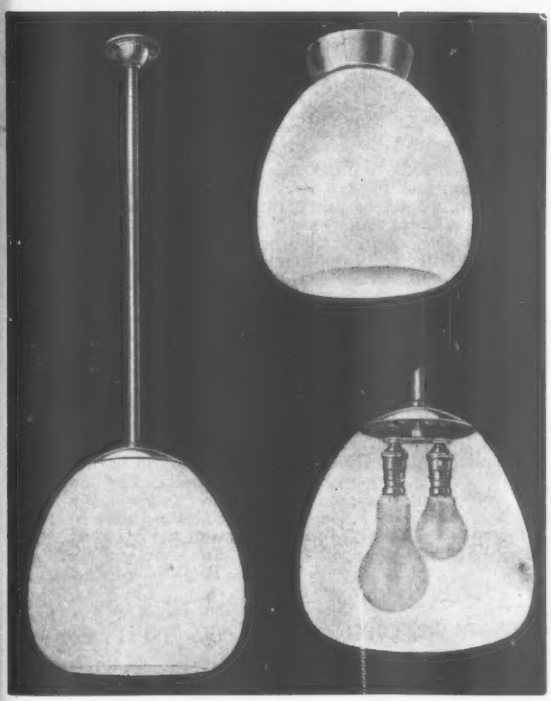
Announcements

PROFESSIONAL

Peter Manning, A.A. DIPL., A.R.I.B.A., would be pleased to receive costs information and technical literature of structures and materials suitable for use in farm buildings, addressed to him at the Department of Agricultural Economics, Nottingham University, School of Agriculture, St. Michael's House, Sutton Bonington, Loughborough.

Alison & Hutchison & Partners, F.R.I.B.A., have now moved to new offices at 4, Rothesay Terrace, Edinburgh 3 (telephone: Caledonian 6537/8/9). The schools section of the firm will also move to the new premises.

FOR TUNGSTEN LIGHTING FITTINGS



These matched fittings for adjacent high and low ceilings are two of many available. Pilot light attachments may be used in any fitting with a minimum 4½inch top opening.

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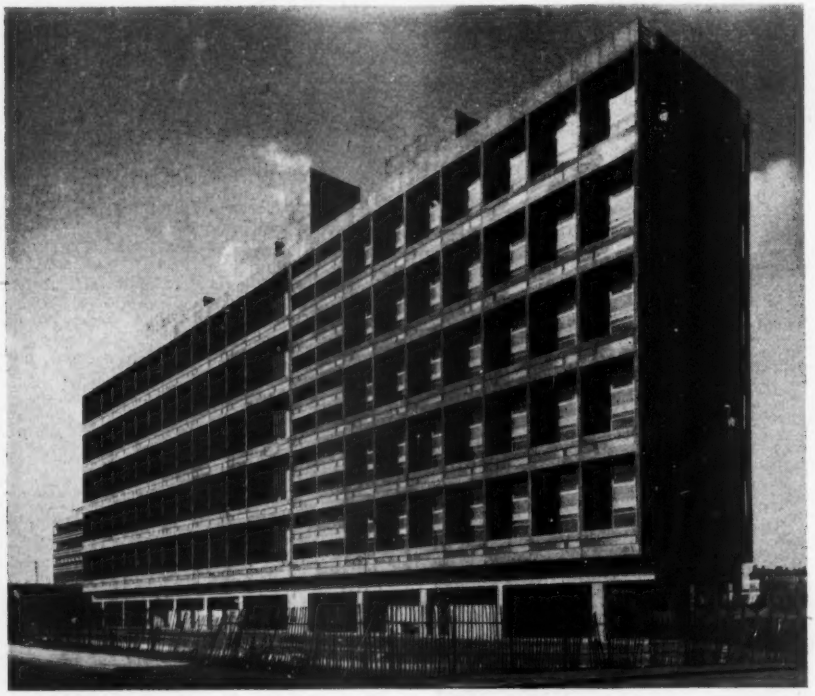
BEACON WORKS, MORLEY, YORKS
Telephone: Morley 571-2

MAISONETTES IN HACKNEY, LONDON, E.9



This block of maisonettes for the LCC (Architect to the Council, Hubert Bennett; Principal Housing Architect, Whitfield Lewis) is nearing completion in Cassland Road, Hackney, London, E.9. A development of this slab block is used in the LCC's Roehampton Estate.

TRADE

Mathew Tait has been appointed Managing Director of Diespeker & Co. Ltd., of Clifton House, N.W.1, the makers of structural floors, terrazzo and mosaic work. Diespeker's were first established in this country in 1881 and Mr. Tait, after some years of service with the Crittall Manufacturing Company, joined the Company's board of directors in 1930.

English Clock Systems and Smiths Industrial Instruments Division (both members of the Smiths Group of Companies) have opened combined showroom and offices in Birmingham. The address of the new premises—184, Corporation Street, Birmingham 4 (telephone: Central 8737).

Carpet Trades Limited have re-opened their London studio. F. C. H. Milward has been appointed London designer for Carpet Trades and his services will be directed to developing the already established contract service. Mr. Milward was formerly head designer with Wilton Royal Carpet Factory Limited.

A. G. Elliott, managing director of FEB (Great Britain) Limited, is now in America where he is studying modern American building methods.

The Commercial Department of the Medical X-Ray Division of Philips Electrical Limited have moved to the following address: Philips Electrical Limited, Medical X-Ray Division, 45, Nightingale Lane, Balham, London, S.W.12.

Correction

In the AJ for April 10, 1958, article on *Social Enquiry on Scottish Housing Estate*, the first line of the second column on page 541 should have read "Beds were contained in recesses along one . . ."

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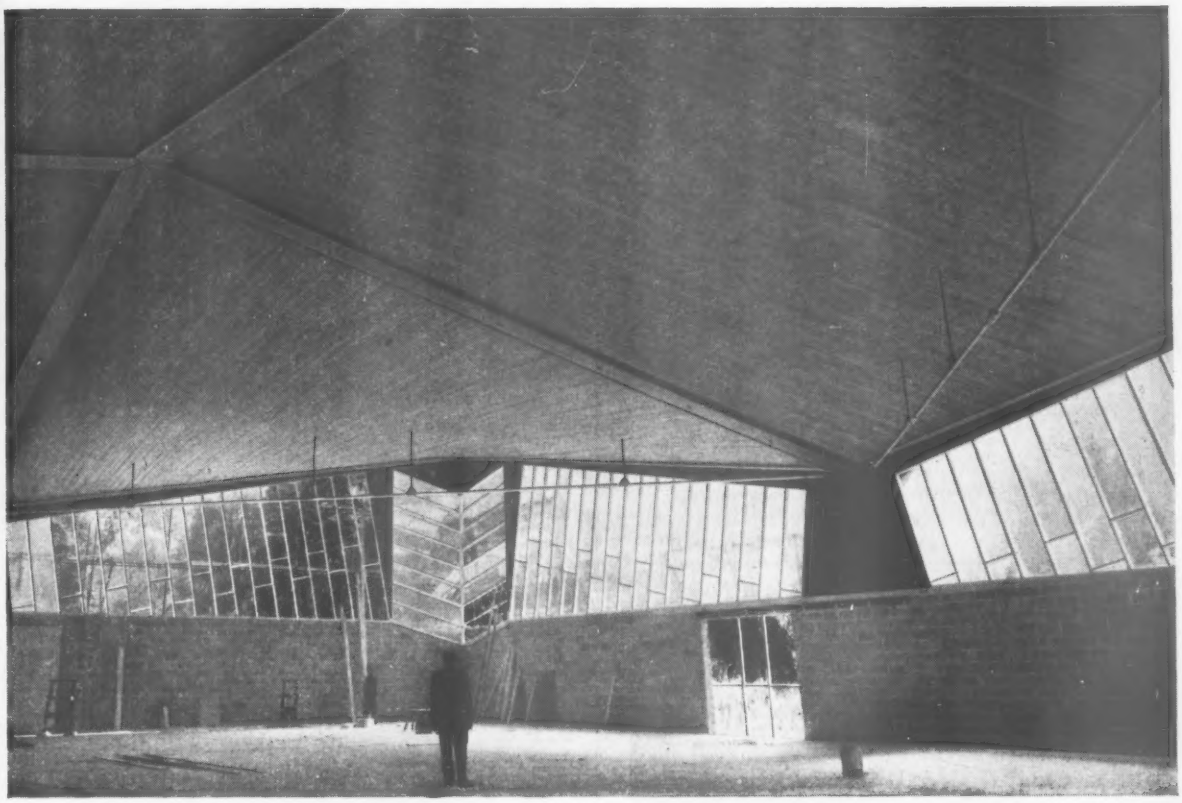

This unique example of timber roofing, has been erected for the Wilton Royal Carpet Factory. The roof consists of four timber shells, each measuring over 57 feet square.

ARCHITECT: Robert Townsend, F.R.I.B.A.
CONSULTING ENGINEERS: Timber Development Association
SIZE: 115′ 10″ square
HEIGHT: 18′ 0″ column head
COVERAGE: 13,420 sq. ft.
CONSTRUCTION: Three layers of boarding nailed together

Before you decide . . .

please do not hesitate to consult the T.D.A. who will gladly supply you with information on the uses of softwoods, hardwoods, plywoods, modern timber design and the names of timber fabricators.

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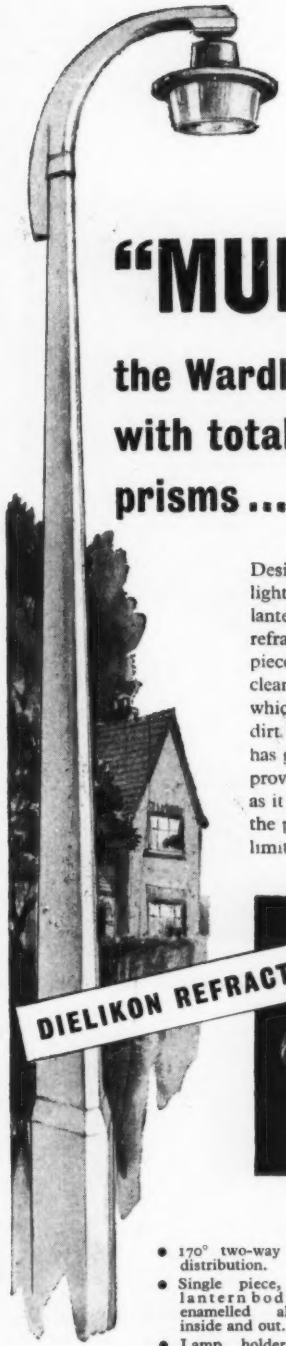

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the Wardle lantern with totally enclosed prisms ...

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for Group "B" lighting

- 170° two-way non-axial distribution.
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- Compact, lightweight, economical, easy to install.
- Lamp rating: 100/150/220w. GLS; 80/125 w. MB/U; 80/125 w. MBF/U.

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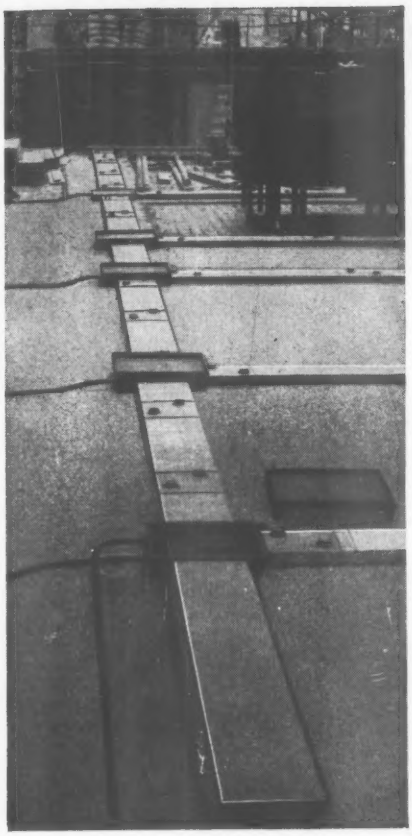

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Greenwood-Airvac underfloor Conduit System

. . . provides for all cables to be accommodated in one duct with adequate screening between telephone and power cables.

Bankers Trust C. (New York) Bucklersbury House, E.C.4. Architect: O. Campbell-Jones, Esq. FRIBA, FRICS, London, E.C.4. Main Contractors: Humphreys Ltd., London, S.W.1. Electrical Contractors: Thorpe & Thorpe Ltd., London, E.C.4.

Latest Developments:
★ Remote adjustable floor frame in brass
★ Waterproof junction box

Greenwood-Airvac

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Patentees, Designers and Manufacturers of Ventilating Equipment and Electrical Conduit Systems

BEACON HOUSE, KINGSWAY, LONDON, W.C.2. CHAncery 8135 (4 lines). 'Airvac' London

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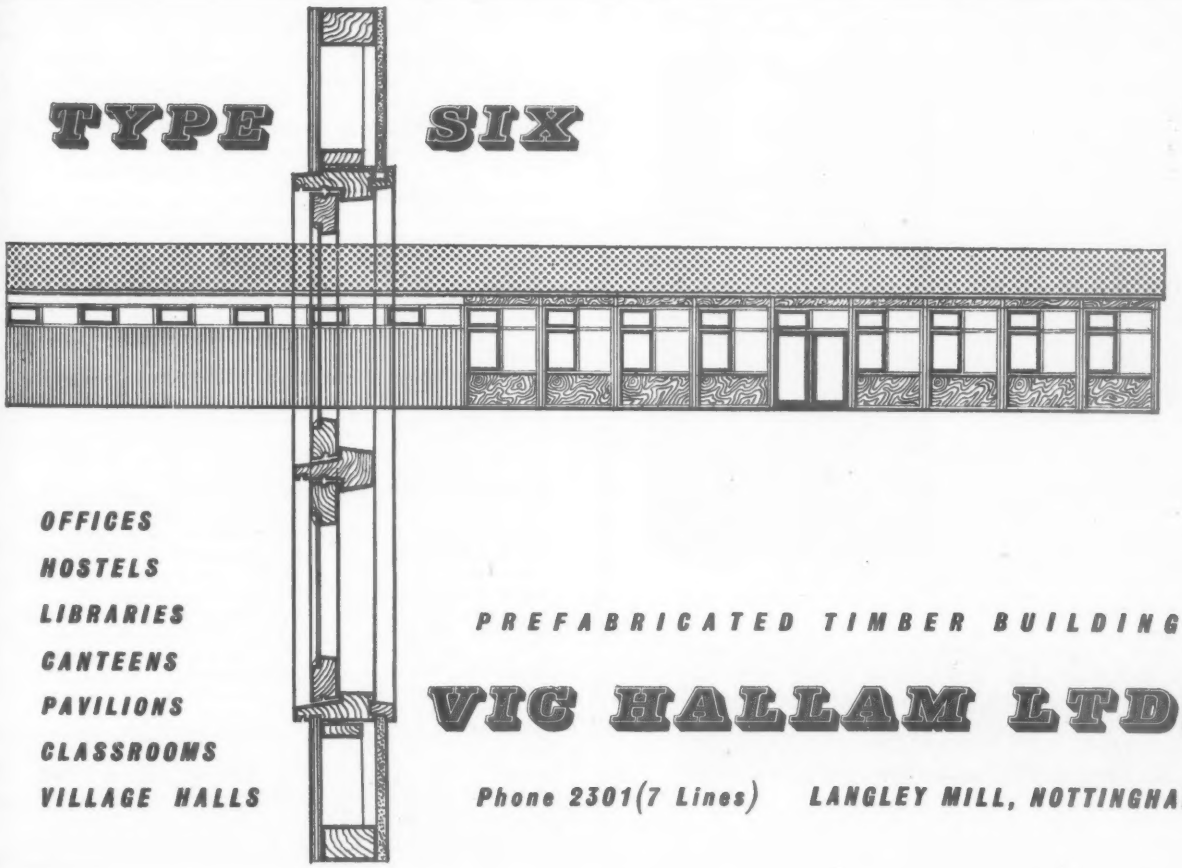
TYPE SIX



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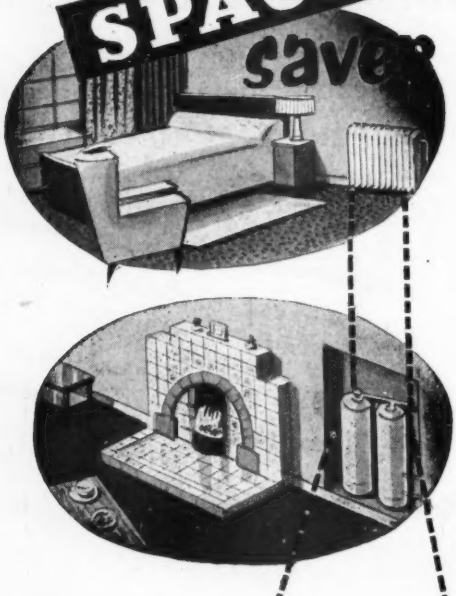

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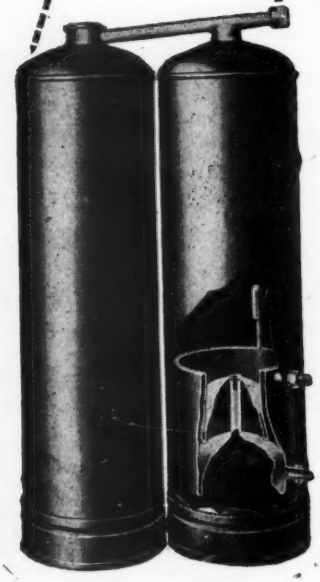

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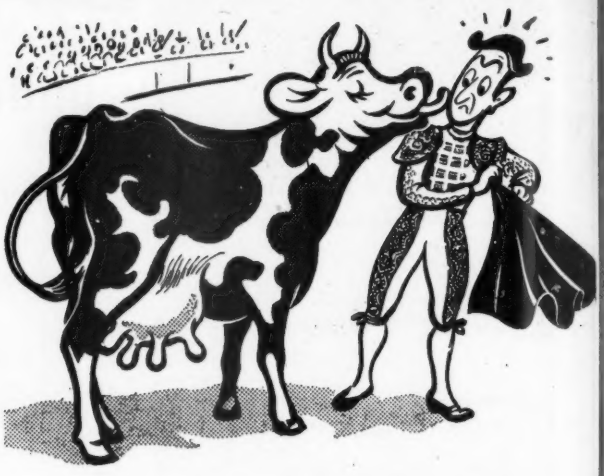

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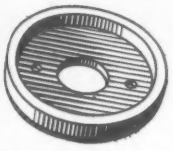

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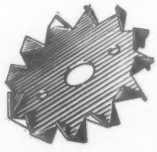

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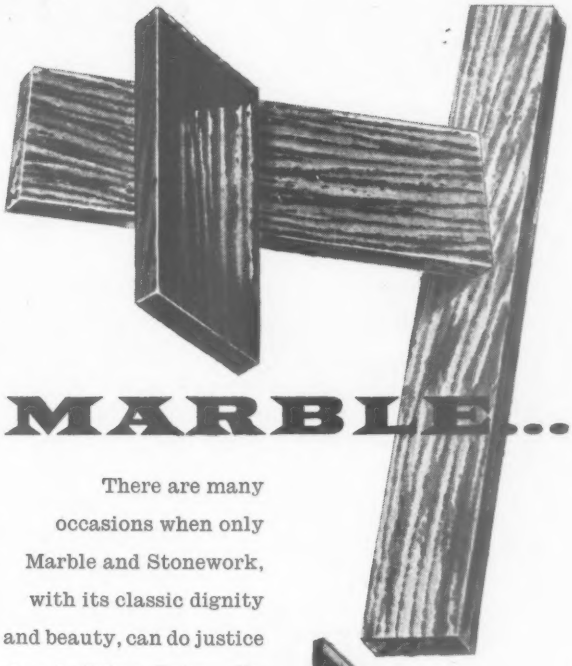

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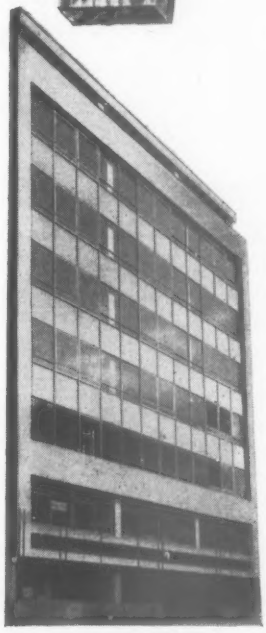

Photograph shows: HENDALE HOUSE, High Holborn. Architects: Alfred George, Derek C. Davies and Frederick Webb. Associated Chartered Architects

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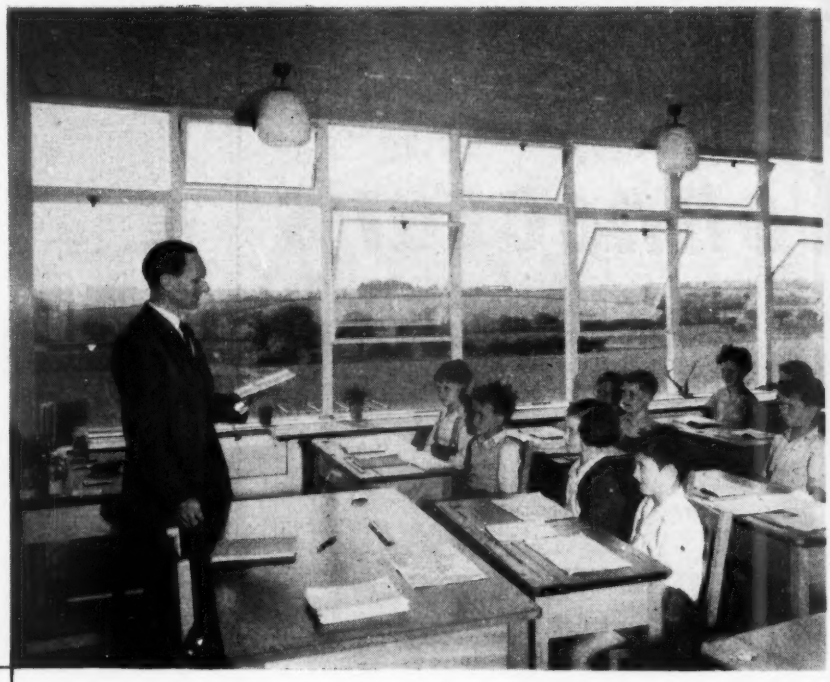

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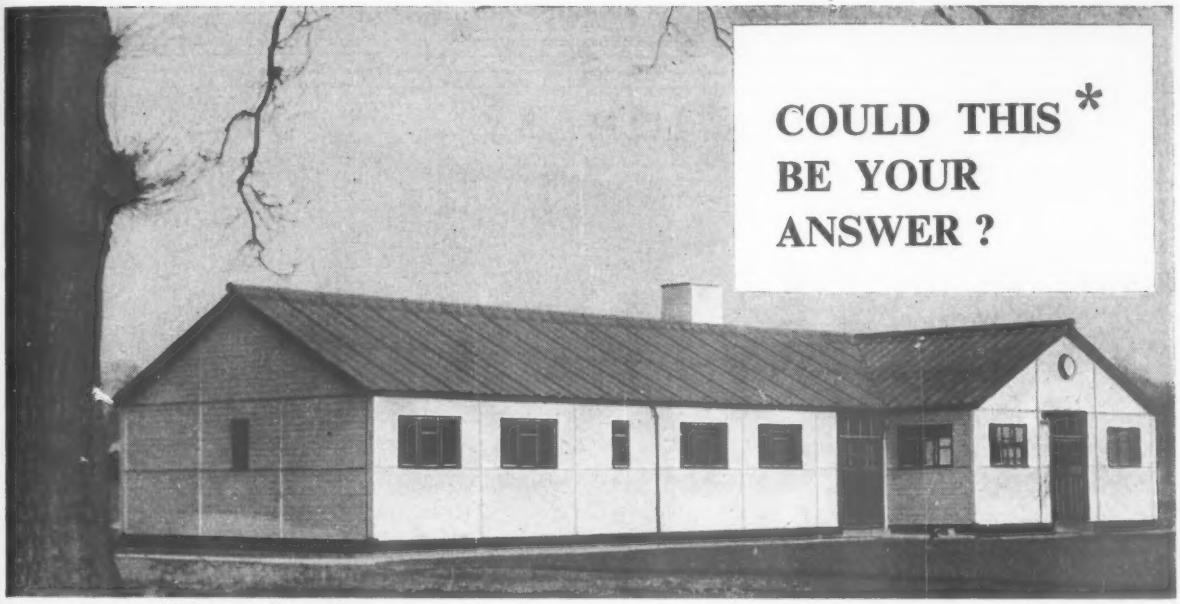

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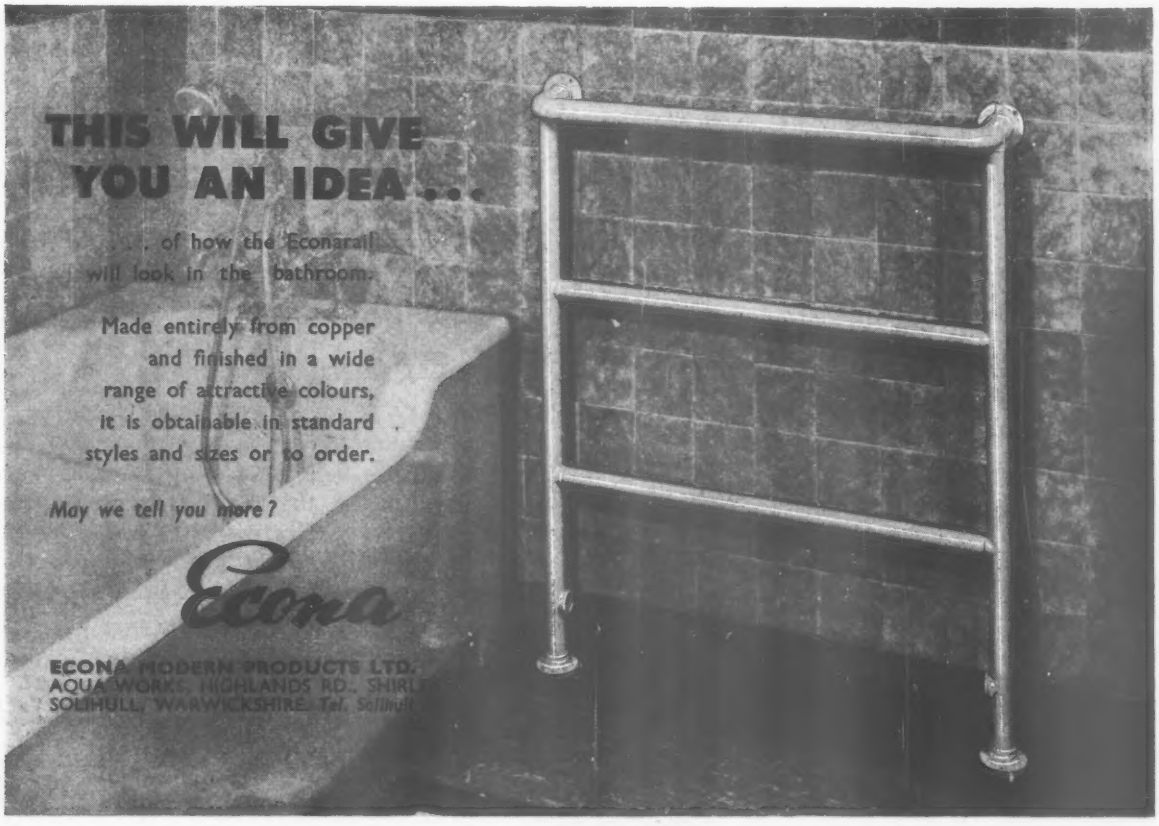

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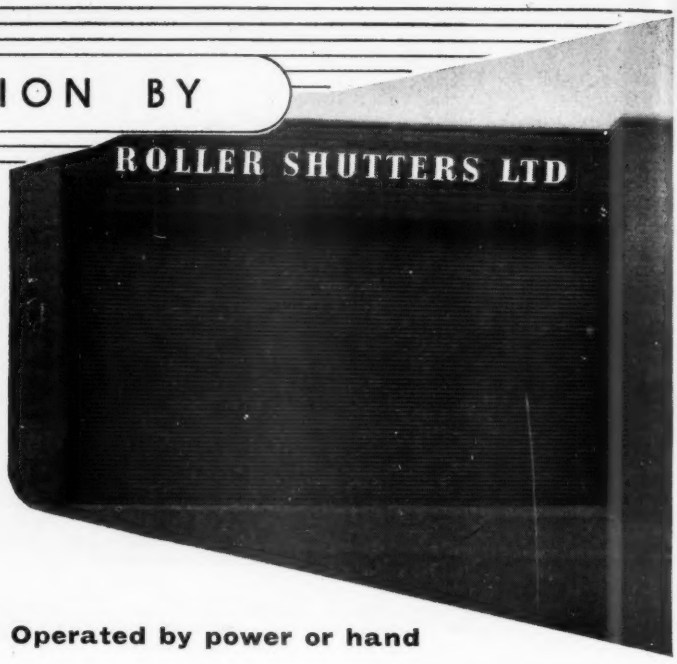

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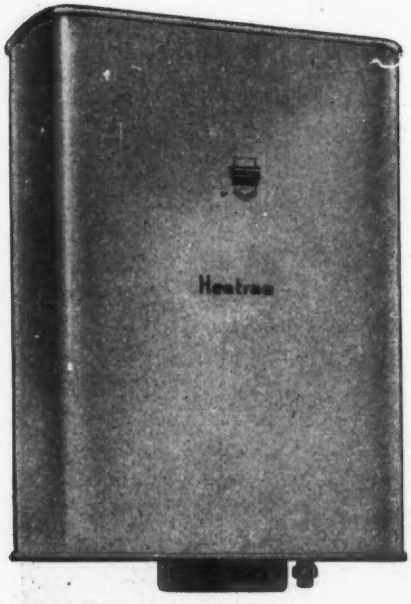

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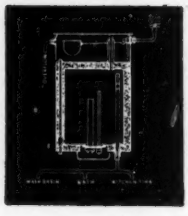

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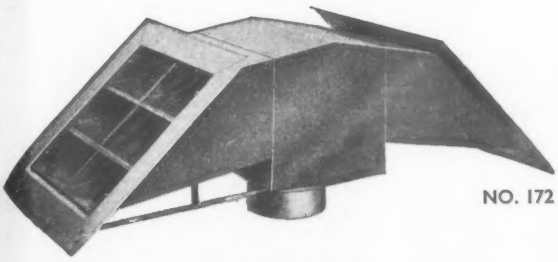

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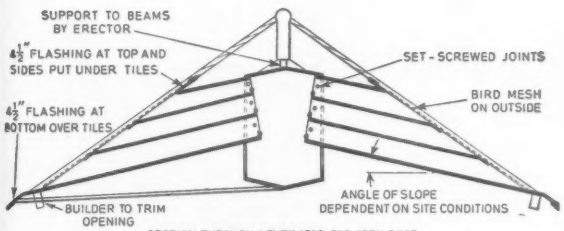

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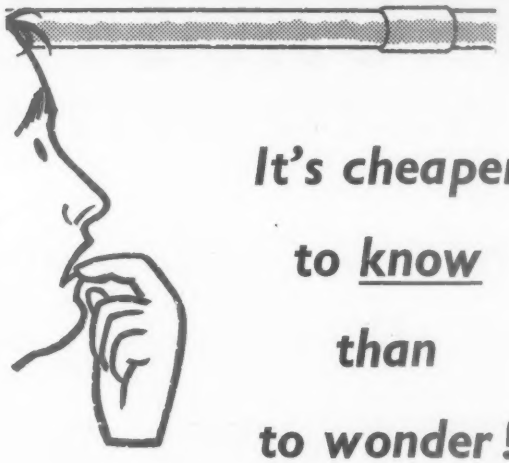

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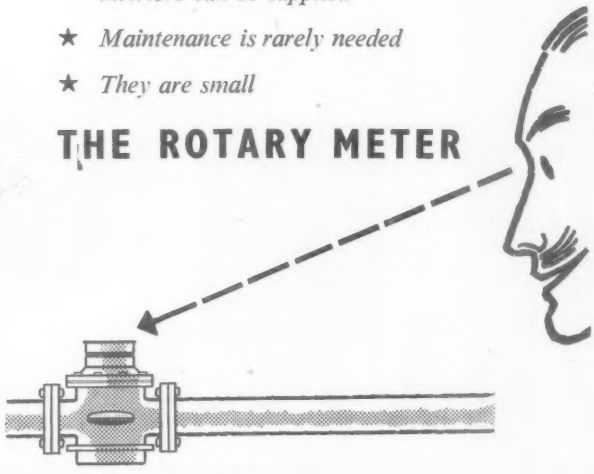

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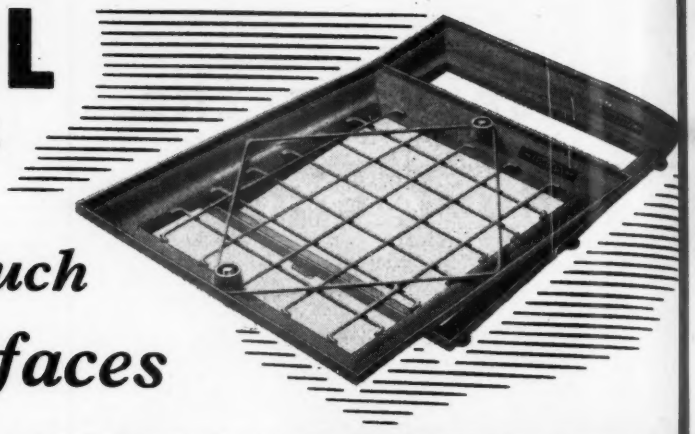

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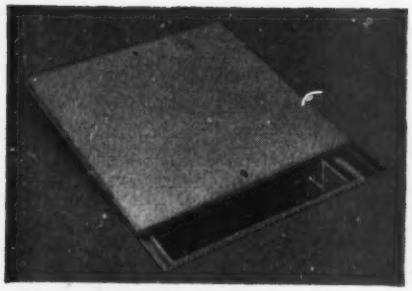

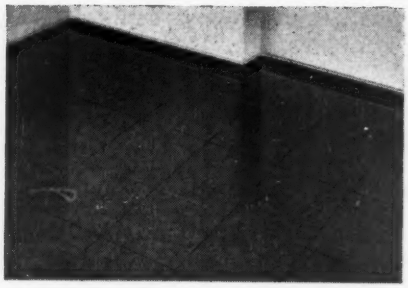

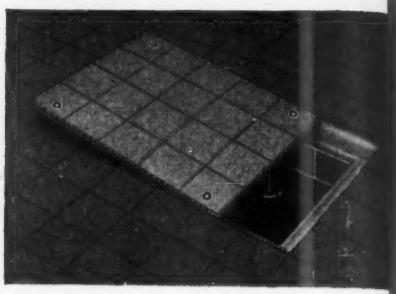

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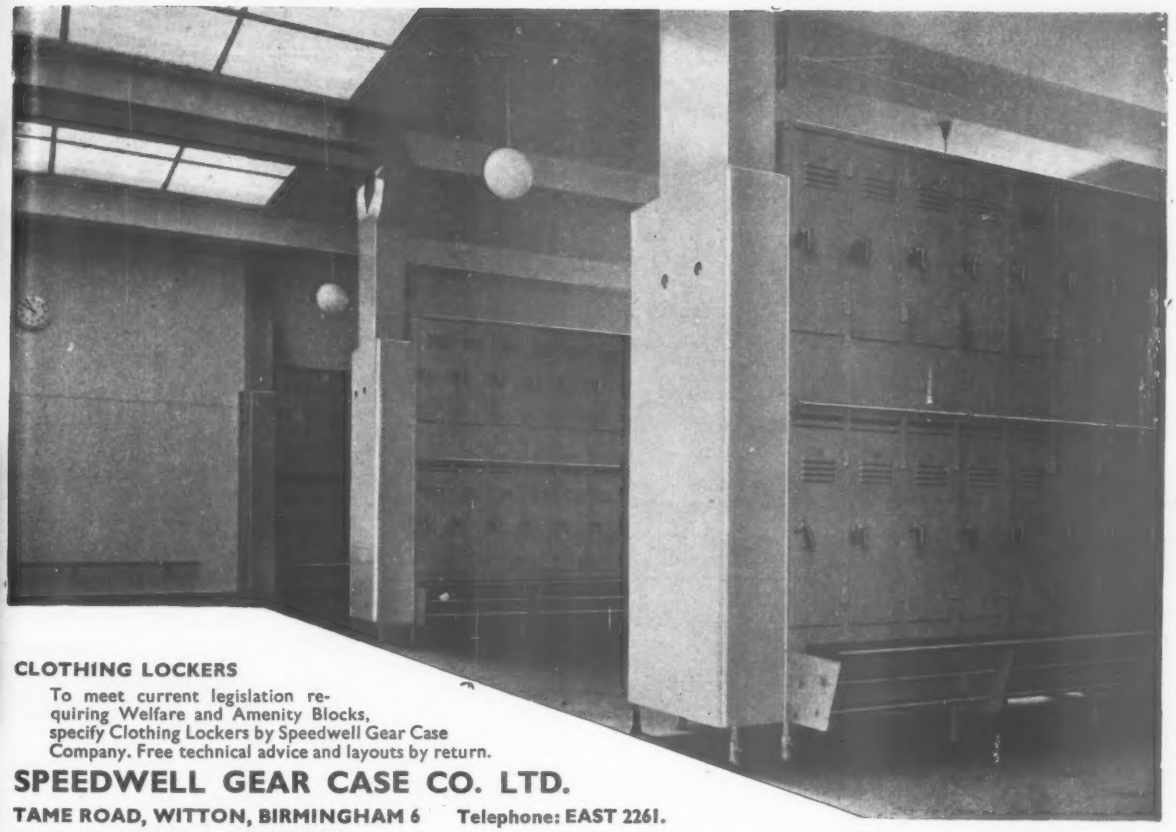

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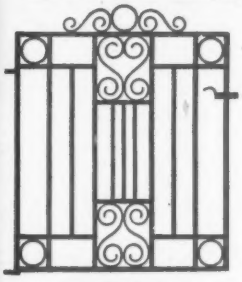

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APRIL

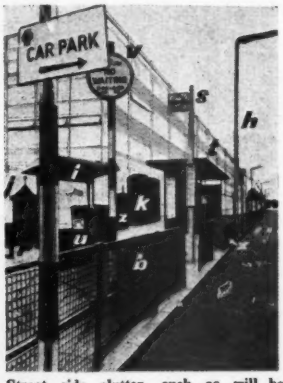
Triangular wooden church at Les Grés, France, by Rome Prize Winner Michel Marot; from Peter Hammond's article *A Liturgical Brief*, calling for a new functional approach to church design.

Another church from *A Liturgical Brief*, Klarenbach Lutheran, Dusseldorf, by Wilhelm Kongeter.

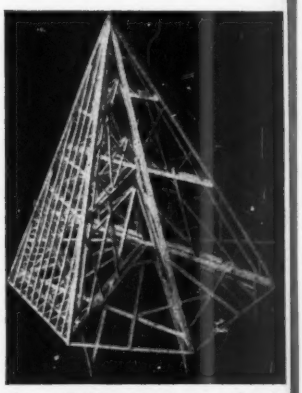
House in the Isle of Wight, by James Stirling and James Gowan.

MAY

Ove Arup's house in Highgate, by the Danish architect Erhard Lorenz.



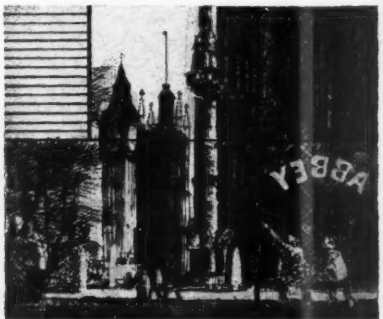
Street side clutter, such as will be imposed on any architect's ideal vision if it is built in a town; from Kenneth Browne's article *Streetscape with Furniture*, the street in this case being replanned Notting Hill Gate.



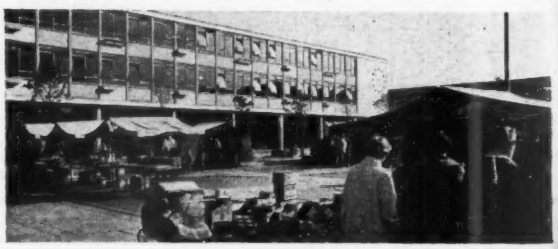
Great Gothic space-frame; Quentin Hughes' magnificent model to illustrate his article on roof of York Chapter House.

JUNE

Town centre of Vallingby, above, and the market place of Harlow New Town, right; contrasts in animation from *Hubs Without Wheels*, a survey of two important new town centres.



Building development in Victoria Street near the Abbey, touch off again the future of Westminster Precinct. This enfilade of the spires of Westminster highlights Gordon Cullen's proposals in *Westminster Revisited*.



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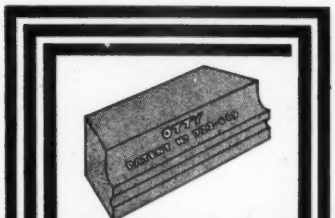

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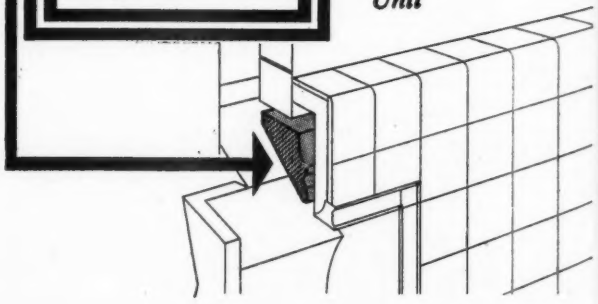

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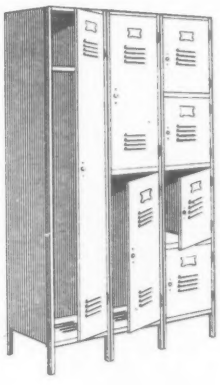

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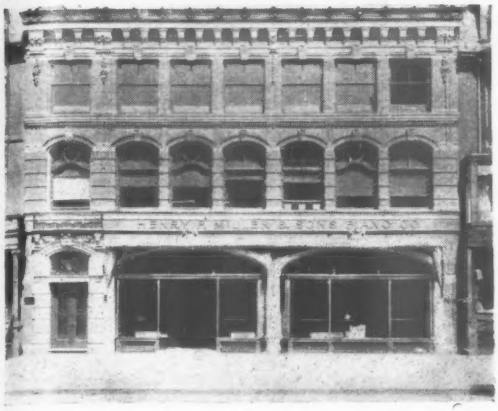

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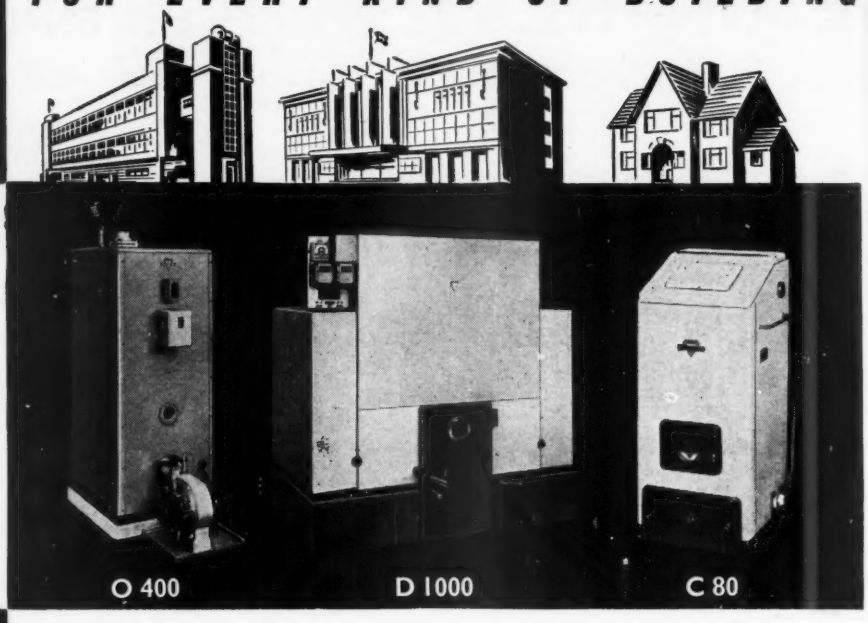

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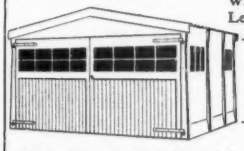

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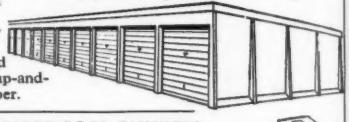

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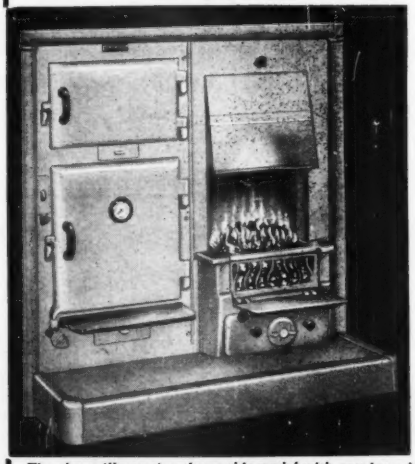

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(*a*) ASSISTANT ARCHITECT, Grade A.P.T. VI (£934—£1,146 p.a.).
(*b*) ASSISTANT ARCHITECT, ASSISTANT ARCHITECT/PLANNER, Grade A.P.T. V (£844—£1,029 p.a.).
(*c*) ARCHITECTURAL ASSISTANT, Grade A.P.T. III (£679—£811 p.a.).

A.R.I.B.A. required in all cases, and T.P.I. Final for the Planner, who will work on the implementation of the Master Plan.

Rented housing available.

Application on the special form (obtainable from the Chief Architect) to the General Manager, Basildon Development Corporation, Gifford House, Basildon, Essex, endorsed with the relevant appointment by Friday, the 16th May, 1958. 9271

WESTERN REGION HOSPITAL BOARD

Applications are invited for the posts of SENIOR ASSISTANT ARCHITECT (one post) and ASSISTANT ARCHITECT (two posts). Candidates must be registered architects, having passed the requisite examinations. Previous hospital experience will be an advantage. Salary scale:—

Senior Assistant Grade: £1,010, rising by 6 annual increments to £1,195.
Assistant Grade: £700, rising by 10 annual increments to £1,015.

In the Assistant Grade starting salary may be above the minimum, having regard to experience.

The appointments are superannuable and will be terminable on two months' notice on either side. Successful candidates may be required to pass a medical examination.

Applications, stating age, qualifications, and full details of previous experience, together with the names of three referees, should be addressed to the Secretary, Western Regional Hospital Board, 64, West Regent Street, Glasgow, C.2, within 14 days of the appearance of this advertisement. 9245

EAST RIDING OF YORKSHIRE COUNTY COUNCIL

Applications are invited for the permanent appointment of a CONTRACT CLERK in the Quantity Surveyor's Section of the County Architect's Department.

The salary will be in accordance with N.J.C. Scales, Clerical Division, Grade I (£565—£640).

Applications, giving particulars of age, qualifications, past and present appointments with salaries, together with the names of three referees, should be sent to the County Architect, County Hall, Beverley, not later than Friday, 9th May, 1958.

THOMAS STEPHENSON,
Clerk of the Council.
9265

CAMBRIDGESHIRE EDUCATION COMMITTEE CAMBRIDGESHIRE TECHNICAL COLLEGE AND SCHOOL OF ART

(*Principal*: D. E. MUMFORD, M.A.)

ASSISTANT LECTURER IN ARCHITECTURE required from 1st September, 1958, to share teaching in part-time courses and new full-time courses. Candidates should have an A.R.I.B.A. qualification and preferably some teaching and office experience.

Salary will be in accordance with the Burnham Scale for Grade "B" Assistants in Establishments of Further Education, *i.e.*, (man), £650× £25—£1,025. There are additional degree and training allowances. Starting point on the scale depends on previous experience. Further particulars and forms of application, which should be returned by Monday, 12th May, may be obtained from the Principal, Cambridgeshire Technical College and School of Art, Collier Road, Cambridge. 9264

CITY OF SHEFFIELD CITY ARCHITECT'S DEPARTMENT APPOINTMENT OF GROUP LEADER ARCHITECT

(Grade A.P.T. V (£1,175—£1,325)

Applications are invited from suitably qualified persons for this permanent appointment on the staff of the City Architect, Mr. J. L. Womersley.

The post is in the Education and General Section, which has an intensive programme of new schools, colleges and public buildings of all kinds. The successful candidate will be required to design and supervise to completion major works of this nature.

Applications, stating age, education and training, qualifications and experience, present and past appointments, together with the names and addresses of two referees, should reach me by Monday, 5th May, 1958.

JOHN HEYS,
Town Clerk.

Town Hall, Sheffield, 1.
25th April, 1958. 9263

CITY AND COUNTY OF NEWCASTLE UPON TYNE CITY ARCHITECT'S DEPARTMENT

Applications are invited for the post of SENIOR STRUCTURAL ENGINEER in the City Architect's Department, in the A.P.T. Division, Grade V, at a salary of £1,175, rising by three annual increments of £50 to a maximum of £1,325 per annum.

Applicants should preferably be Associate Members of the Institution of Structural Engineers or the Institution of Civil Engineers.

The officer appointed will be responsible for the preparation of calculations and detailed structural schemes for steel and reinforced concrete framed buildings, and experience in dealing with problems of special foundations will be an advantage.

The above appointment will be subject to the provisions of the Local Government Superannuation Acts, 1937-53, and to three months' notice on either side. The successful candidate will be required to pass a medical examination.

Further particulars and Forms of Application may be obtained from George Kenyon, A.R.I.B.A., A.M.T.P.I., City Architect, 18, Cloth Market, Newcastle upon Tyne, 1.

Closing date for receipt of completed applications: Wednesday, 14th May, 1958.

JOHN ATKINSON,
Town Clerk.

Town Hall, Newcastle upon Tyne, 1.
16th April, 1958. 9244

BOROUGH OF ERITH

Appointment of:—

(*a*) CHIEF ARCHITECTURAL ASSISTANT.
(*b*) SENIOR ENGINEERING ASSISTANT.
(*c*) ENGINEERING ASSISTANT.

Applications are invited for appointments (*a*) and (*b*) at a salary in accordance with A.P.T. III (£845—£1,025), plus London weighting; and for appointment (*c*) at a salary in accordance with A.P.T. II (£725—£845), plus London weighting.

Applicants should have had a good general Municipal experience.

The appointment will be subject to the scheme of Conditions of Service and the provisions of the Local Government Superannuation Acts.

Applications, stating age, previous appointments, qualifications and experience, together with the names and addresses of two referees, should be sent to the Borough Engineer and Surveyor, Town Hall, Erith, Kent, not later than Monday, 5th May, 1958.

The Council will assist in the provision of housing accommodation if required.

Canvassing will disqualify.

J. A. CROMPTON,
Town Clerk.

Town Hall, Erith, Kent. 9243

HEMEL HEMPSTEAD DEVELOPMENT CORPORATION

Applications are invited for the following appointment in the Planning Section of the Chief Architect's Department.

SENIOR PLANNER. Salary range £934 to £1,146 p.a. Applicants must be Corporate Members of the Town Planning Institute and should have had experience, preferably in the Development Plan Section of a Local Planning Authority, of large scale redevelopment schemes for housing, industry and commercial areas. The appointment is mainly concerned with the preparation of a revised Master Plan for the new town of Hemel Hempstead, and offers exceptional opportunities for experience in town planning of a novel and exciting character.

Local Government Superannuation Scheme and conditions of service similar to those for local authorities. Housing accommodation may be available.

Applications, stating age, qualifications, experience, and names of two referees, and endorsed Vacancy No. 107, to reach the General Manager, Westbrook Hay, Hemel Hempstead, Herts., by 3rd May. 9242

BOROUGH OF HEYWOOD APPOINTMENT OF ARCHITECTURAL ASSISTANT

Applications are invited for the above-mentioned appointment in the department of the Borough Engineer and Surveyor, at a salary in accordance with A.P.T. Grade I (£575—£725) of the Scale of Salaries.

The possession of some part of the R.I.B.A. Intermediate Examination will be an advantage.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, to the National Joint Council's Conditions of Service, and to one month's notice in writing on either side.

The successful applicant will be required to pass a medical examination.

Applications, endorsed "Architectural Assistant," stating age, qualifications and experience, and accompanied by copies of two recent testimonials, should reach the undersigned not later than Friday, 9th May, 1958.

Canvassing in any form will be a disqualification.

W. R. PARKER,
Town Clerk.

Municipal Buildings, Heywood.
11th April, 1958. 9234

QUEENSLAND GOVERNMENT VACANCIES FOR ARCHITECTS, DESIGNING ARCHITECTS AND QUANTITY SURVEYORS

Applications are invited for appointment to the following positions in the Department of Public Works in Queensland. Age limit: 45 years.

DESIGNING ARCHITECTS, Division I (A£1,859 10s. to A£1,994 10s.).
DESIGNING ARCHITECTS, Division II (A£1,719 10s. to A£1,844 10s.).
ARCHITECTS, Division I (A£1,719 10s. to A£1,844 10s.).
ARCHITECTS, Division II (A£1,384 10s. to A£1,509 10s.).
QUANTITY SURVEYORS, Division I (A£1,559 10s. to A£1,734 10s.).

Application Form and further details may be obtained from the Agent-General for Queensland, 409/410, Strand, London, W.C.2. 9233

EASTERN ELECTRICITY BOARD NORTHMET SUB-AREA

GENERAL ASSISTANT ENGINEER (CIVIL ENGINEERING AND 41/58.N BUILDING), Sub-Area Headquarters (Ref. 781).

Candidates should have had a good general and technical education, possess a sound knowledge of practical building and civil engineering construction, and be capable of setting out and supervising site works.

Salary: N.J.B., Class M, Grade 16 (£740—£785), plus London allowance.

The successful candidate will be required to contribute to a superannuation scheme, and may be required to undergo a medical examination.

Apply by letter to S. F. Osborne, M.I.E.E., A.C.I.S., A.M.B.I.M., Manager, Northmet Sub-Area, Eastern Electricity Board, Northmet House, Southgate, London, N.14, by 5th May, 1958. 9268

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Vacancies for (1) ARCHITECTS, Grade III, starting salary up to £1,090 a year. (2) ARCHITECTURAL ASSISTANTS, starting salary up to £860.

Full and interesting programme of houses, flats, schools and general buildings.

Application form and full particulars from the Architect (AR/EK/5/58), The County Hall, S.E.1. (205) 8741

SURREY COUNTY COUNCIL

Applications invited for appointment of ASSISTANT ARCHITECT Special Grade, £750—£1,030 p.a. plus £30 p.a. London Allowance. Must be A.R.I.B.A.

Full details, present salary and 3 copy testimonials to County Architect, County Hall, Kingston, as soon as possible. 9219

COVENTRY

PRINCIPAL PLANNING OFFICER, Grade "D" (£1,405×£55—£1,625). Salary within Grade if appropriate. Responsible under City Architect and Planning Officer for all planning and reconstruction work in City. Should be an enthusiast for creative planning.

Housing accommodation may be available. Loan for removal expenses if required. Application forms, etc., from City Architect and Planning Officer, Bull Yard, Coventry, returnable within 14 days of publication. 9267

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Vacancy for ARCHITECT, GRADE I (£1,245 to £1,482 10s.) to lead group engaged on part of programme which includes homes for the aged; children's homes; students' hostels; industrial buildings and Town Development. Good designer with experience in controlling staff and organising and supervising large scale building contracts.

Particulars and application form, returnable by 9th May, 1958, from Hubert Bennett, F.R.I.B.A., Architect to the Council, The County Hall, S.E.1, quoting ref. AR/EK/17/58. (743) 9274

COUNTY BOROUGH OF ROTHERHAM
ARCHITECTURAL ASSISTANTS

Architectural Assistants are required for established posts in Grade I (£575—£725) and in Special Grade (£750—£1,030), the grade and commencing salary to be according to applicant's qualifications and experience.

Housing accommodation will be available, if necessary, for the higher grade appointments.

Applications stating age, qualifications and experience with the names of two referees to be delivered to the Borough Engineer, Municipal Offices, Rotherham, not later than Friday, 9th May, 1958.

JOHN S. WALL,
Town Clerk.

Municipal Offices,
Rotherham.
17th April, 1958. 9272

HUNTINGDONSHIRE
COUNTY ARCHITECT'S DEPARTMENT
ARCHITECTURAL ASSISTANT, Grade A.P.T. II (£725—£845).

Applications are invited for the above appointment from suitably qualified persons.

Further details and application forms may be obtained from the County Architect, County Buildings, Huntingdon, to whom completed application forms should be returned by Friday, 2nd May, 1958.

A. C. AYLWARD,
Clerk of the County Council.
9235

Tenders Invited

6 lines or under, 15s.; each additional line, 2s. 6d.

CITY OF PLYMOUTH
CIVIC CENTRE

Tenders are invited from Contractors for the construction in reinforced concrete of the Foundation and Substructure of the Council House, the 14-storey Administration Building, and other office buildings in the Civic Centre. The contract will also include drainage. It is anticipated that the value of the contract will be in the order of £150,000.

Applications, accompanied by a deposit of £3 3s., made payable to the Plymouth Corporation, to be made to the Architects (Messrs. G. A. Jellicoe & Partners, 5, Princess Square, Plymouth).

Bills of Quantities and Forms of Tender will be made available on 19th May, 1958, and drawings may be inspected after that date at the office of the Architects or of the Consulting Engineers (Messrs. Ove Arup & Partners, 1, Princess Place, Plymouth).

No tender received after noon on Monday, 16th June, 1958, will be considered. No tender will be received except in a plain sealed envelope addressed to the Town Clerk, Town Clerk's Office, Pounds House, Plymouth, and bearing the words "Tender—Civic Centre Foundation Contract," but no name or mark indicating the sender.

Deposits will be refunded on the receipt of bona fide Tenders not subsequently withdrawn.

14th April, 1958. 9236

Architectural Appointments Vacant

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

RONALD WARD & PARTNERS require ARCHITECTURAL ASSISTANTS with contemporary outlook, and willing to use own initiative. Salary range £600 to £900. Congenial working conditions. 5-day week.—Apply: 29, Chesham Place, Belgrave Square, S.W.1. Telephone Belgravia 3361. 9112

YOUNG qualified ARCHITECT required whose main interest is design, preferably with office experience of practical design work. A high standard of draughtsmanship is essential. Write stating particulars to Box 9155.

TREHEARNE & NORMAN, PRESTON & PARTNERS have vacancies for ASSISTANTS. Salary according to experience and qualifications.—Apply 83, Kingsway, W.C.2 (HOL. 4071). 9196

ARCHITECTS, interested in writing on Architectural, Building and General Technical Subjects, are invited to give details, in confidence, of experience, interests, etc.—Write Box 9185.

OPPORTUNITY for advancement occurs for single young man of Intermediate or better standard as SECOND ASSISTANT in Country Practice. Reply to Box 9207.

YOUNG SINGLE ASSISTANT of about Intermediate Standard required for Housing Act Improvement Grant Schemes in Country Architect's Office. Car Driver. Reply to Box 9208.

ASSISTANT JUNIOR required any age up to and including Intermediate standard for South-West London office. Reply with full particulars and salary required to Box 9210.

SOUTHEND-ON-SEA. — ARCHITECTURAL ASSISTANTS required for work on Churches, Schools, Housing, etc. Final standard and some experience desirable. Salary according to qualifications and experience.—Write with details to Burles & Newton, 36/7, County Chambers, Weston Road, Southend-on-Sea. 9166

GRENFELL BAINES & HARGREAVES, Architects and Planning Consultants, invite applications from enthusiastic chaps to work on big job in their new Derby office. Salary plus share of income after basic expenses have been met, all according to age, experience and ability. Superannuation scheme optional.—Apply, giving full particulars, to Martins Bank Chambers, Market Place, Derby. 9225

A.R.I.B.A. Qualified ASSISTANT ARCHITECT required for the Newcastle office of a Major Oil Company with extensive programme of development. The applicant must have a contemporary outlook, be experienced in all stages of building work, capable of administration and staff supervision and must hold a current driving licence. The position calls for initiative and responsibility and offers excellent working conditions with a five-day week, pension and life assurance schemes and free luncheon vouchers. Write giving details of age and experience to Box 9262, quoting QAN 104.

ASSISTANT ARCHITECT required for Sheffield Office of Major Oil Company. Applicants should be recently qualified and capable of controlling work through all stages of development. Must hold current driving licence. Five-day week, good pension and life insurance schemes, sickness benefit and free luncheon vouchers. Write, giving full details of age, experience and salary required, to Box 9261, quoting AAS 107.

WANTED, qualified or near qualified ASSISTANTS with practical experience for work on Licensed Premises. Apply: The Secretary, Benskin's Watford Brewery Limited, P.O. Box 105, Watford, Herts. 9265

ARCHITECTURAL ASSISTANTS of Intermediate standard required for work on large and small projects at home and abroad. Salary according to qualifications and experience. Apply E. J. D. Mansfield, A.R.I.B.A., Sir William Halcrow & Partners, 47, Park Lane, London, W.1. 9260

ARCHITECTURAL ASSISTANTS, Intermediate standard and with a few years' office experience, required in Barnet, Hertfordshire office by Architects with General Practice. Apply Box 9259.

SENIOR ASSISTANT required for West End Architects' office. Good draughtsmanship and experience of industrial work essential. Salary by arrangement. Phone WHI 0188 or write Box 9258.

EXPERIENCED ARCHITECTURAL ASSISTANT required for University and school building programme. Salary £900 p.a. and bonus. Telephone CHA 3526. 9257

SENIOR ASSISTANT, qualified or near, with good practical experience required by small, busy office. Good style and speedy draughtsmanship; also experience of building and land surveys desirable. Work varied but includes large amount of estate developments. Details of age, experience and salary required please to Field and Shaw, Chartered Architects, 40, Station Road, North Harrow. Tel. Har. 7502. 9256

ARCHITECTURAL ASSISTANT required, with some office and site experience. Intermediate or Final standard. Car driver. Write sending particulars to Brian A. W. Savage, A.R.I.B.A., The Commons, Shaftesbury, Dorset. 9252

THE ROYAL COLLEGE OF SCIENCE AND TECHNOLOGY, GLASGOW
(In affiliation with the University)
DEPARTMENT OF ARCHITECTURE AND BUILDING

APPLICATIONS are invited for LECTURESHIP in Building Construction and Building Science in the Degree and Diploma Courses in Architecture and the Associateship Course in Building.

Salary on scale £900—£1,650 (with placing according to qualifications and experience) and F.S.S.U. and family allowances.

Forms of application and further particulars may be obtained from the Secretary, George Street, Glasgow. 9251

APPLICATIONS are invited for the appointment of ARCHITECTURAL ASSISTANT at a commencing salary of £850 to £950 per annum. Minimum qualifications: Intermediate R.I.B.A. or H.N.C. (Building), plus five years' office training.

Only candidates who are accustomed to the design, planning and preparation of working drawings of industrial buildings and offices, and who are competent to make necessary site surveys, should apply.

The appointment is permanent and pensionable.

Assistance with housing will be given if necessary.

Excellent canteen, sports and welfare facilities.

Please send curriculum vitae to (Mr.) A. C. McCombie, Michelin Tyre Co. Ltd., Stoke-on-Trent. 9250

YOUNG, recently qualified ASSISTANT ARCHITECT required for Birmingham Office. Ability to co-ordinate and administer drawing office and contractural work. Luncheon vouchers, five-day week. Particulars of qualifications and experience to Box 9246, quoting ref. YAB 102.

GOLLINS, MELVIN, WARD & PARTNERS are opening an office on the 19th May in Sheffield, at 281, Glossop Road, and require ARCHITECTURAL ASSISTANTS to work on new buildings for the University and Technical College in that City. Apply in the first place in writing to 15, Manchester Square, London, W.1. 9247

ARCHITECTURAL ASSISTANT (intermediate standard) required. Small office Gray's Inn, London. Write stating experience and salary required. Apply Box 9270.

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JUNIOR ARCHITECTURAL ASSISTANT required in Branch Office, Birmingham, to work on a varied and interesting programme of commercial projects. Applications, giving full particulars, to G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society Ltd., 1, Balloon Street, Manchester. 9269

CHIEF CIVIL ENGINEER
BRITISH RAILWAYS, YORK

VACANCIES exist on the staff of the Chief Civil Engineer, British Railways, York, for JUNIORS interested in pursuing a career in Quantity Surveying. Salary on age scale. Applicants should have passed the General Certificate of Education Examination in at least five subjects, including Mathematics and English. Applications in writing, giving age, qualifications, etc., to Chief Civil Engineer, British Railways, North Eastern Region, York. 9232

ASSISTANT QUANTITY SURVEYORS required for "Taking Off," preparation of Approximate Estimates and assisting in settlement of final accounts under supervision, for Architectural Building Works and Civil Engineering Work. Applicants should be Probationers of R.I.C.S. Salary range £809/877 per annum. Five-day week. Residential travel and other favourable travelling concessions available. Superannuation Scheme. Applications should be addressed to the Chief Civil Engineer (ref. 62), London Midland Region, 5a, Euston Grove, London, N.W.1. 9231

QUALIFIED ASSISTANT ARCHITECTS required to work under minimum supervision. Staff Pension Scheme. Good salaries paid. Apply in writing, giving full particulars, to Chippindale & Edmondson, Chartered Architects, Empire House, Piccadilly, Bradford. 9230

SURREY/HANTS area. Old established practice has vacancies for SENIOR and JUNIOR ASSISTANTS. Bright prospects for experienced practical man. Wide variety of work. Box 9229.

FRY, DREW, DRAKE & LASDUN have vacancies for experienced, qualified ASSISTANTS in their London office. Write to the Secretary, 63, Gloucester Place, W.1, with details of training, qualifications, experience, etc. 9228

ARCHITECTURAL DRAUGHTSMEN are required by a manufacturing Company for general work on factory and office buildings. Candidates must have had some years' practical experience with a firm of Architects or Builders, and should have reached H.N.C. standard. The starting salary will be from £770 to £950, depending upon background, and there are good prospects. Write to Box 9227.

ARCHITECTS require SENIOR ASSISTANT. Reply stating qualifications, experience and salary required to Jackson & Greenen, Hinton Road, Bournemouth. 9241

ARCHITECTURAL ASSISTANT required, Intermediate standard. London Area. Apply Box 9240.

ERIC FIRMIN & PARTNERS require SENIOR and INTERMEDIATE ARCHITECTURAL ASSISTANTS with previous office experience, preferably in industrial work. Please write: Thavies Inn House, Holborn Circus, E.C.1. 9239

Architectural Appointments Wanted

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

ARCHITECTURAL ASSISTANT (34), Inter. R.I.C.S., requires position of responsibility. Varied experience, including stone districts.—Box 9200.

POLISH Final R.I.B.A. standard seeks any position, salary £750 p.a. Box 9266.

ASSISTANT, 27 (Intermediate) R.I.B.A., desires position in Nottingham or Newark area. Box 9254.

A.R.I.B.A., wide experience, car-owner, seeks responsible position. Temporary or part-time work considered. Box 9273.

Other Appointments Vacant

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra

A BUILDING and Development Company have a vacancy for a qualified ARCHITECT. For further particulars apply Box 9216.

WANTED, young man, capable copying garden plans, willing to travel also act as salesman interesting nursery. Sunningdale Nurseries, Windlesham, Surrey. 9253

Other Appointments Wanted

4 lines or under, 9s. 6d.; each additional line, 2s. 6d. Box Number, including forwarding replies, 2s. extra.

CLERK OF WORKS seeks post in Birmingham area, over 20 years' experience as C. of W. on schools, factories, offices, shops, hospitals, flats and houses. Excellent references. Box 9248.

Services Offered

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"DON" ARCHITECTURAL MODEL MAKERS. We offer the highest grade work with speed and reliability.—Please 'Phone Brith 3843 or Hastings 1366. 1673

A.R.I.B.A. seeks part-time work, evenings or week-ends. Prefers complete small jobs. Write Box 9144.

ESTIMATES for Conversions, Industrial Developments, Single Houses; London and West Sussex.—Parsons & Co. (Builders), 18, Maplestead Road, S.W.2. TUL. 3052 for immediate attention. 8918

ARCHITECTURAL. Reinforced Concrete and Steel design and detailing work required. Over 30 Assistants available. MUS. 8753. 5145

SITE Surveys and Surveys of Buildings prepared at short notice anywhere in Britain. MUSeum 8753. 3103

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A.R.I.B.A., wide experience, home and abroad, offers services to the Profession.—Box 9182.

FIBREGLASS/PLASTICS ROOFING, CLADDING, PARTITIONING. Manufacturers producing all standard forms are also able to laminate your own decorative patterns, Sanderson prints, etc., in translucent or opaque materials to Specification.—Structural Plastics, Ltd., Eythorne, Dover, Kent. 8734

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NAMEPLATES, PLAQUES, CRESTS, etc., in bronze, brass, and plastic; quotations and lay-outs submitted.—Abbey Craftsmen, Ltd., Abbey Works, 109A, Old Street, London, E.C.1. CLE. 3845. 4165

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SECONDHAND sectional timber buildings completely reconditioned, delivered free 100 miles. 24 ft. × 12 ft., £102. 30 ft. × 15 ft., £138. 30 ft. × 18 ft., £154. 60 ft. × 20 ft., £302. Floors extra.—Universal Supplies, Crabtree Manorway, Belvedere, Kent. Erith 2948. 9152

RHEOSTATS.—Ward-Leonard. Serial No. 4373441; OHMS 0-125; amps. 10, volts 600 max. Rotary variable type. Brand new. 5s. each. 60 available.—D.S. Discount Sales, Holyhead Road, Chirk, N. Wales. 9179

NEW HALLS-TOLEDO ECCENTRIC VALVE SEAT GRINDER. 230 volt, AC/DC; Model No. EJA 49; Serial No. 1370134. Complete with instructions, wheel trueing stand diamond, spare grinding wheels, pilots, etc. £18 10s.—Griffiths Motor Works, Holyhead Road, Chirk, N. Wales. 9177

WATTS THEODOLITE.—Serial No. 8896; in mahogany case. Complete with attachments. £19 10s.—D.S. Discount Sales, Holyhead Road, Chirk, N. Wales. 9178

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A. J. BINNS, LTD., Specialists in the supply and fixing of all types of Fencing, Gates and Cloakroom Equipment.—Harvest Works, 96/107, St. Paul's Road, N.1. Canonbury 2061.

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ARCHITECTURAL METALWORK of all types supplied and fitted. Gates, doors, balustrades, staircases, steel structures. Design staff available.—Clayton & Bamber, Ltd., Carterfield Road, Waltham Abbey, Essex. 5823

OFFICE accommodation in centre of Croydon suitable for small professional firm consisting of well-lit single room, 15 ft. × 6 ft. on third floor with usual facilities. Apply Box 9249.

ARCHITECT, F.R.I.B.A., with offices in the Baker Street area has 16 ft. by 12 ft. first floor office to let to another architect with share of smaller room and telephone. Lease for two and three quarter years available at £200 per annum inclusive. Write Box 9237.

Educational Announcements

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R.I.B.A. and T.P.I. EXAMS.—Stuart Stanley (Ex. Tutor Sch. of Arch., Lon. Univ.), and G. A. Crockett, M.A./B.A., F./F.R.I.B.A., M./A.M.T.P.I., prepare Students by correspondence, 10, Adelaide Street, Strand, W.C.2. TEM. 1603/4.

R.I.B.A. Inter. and Final EXAMS. TUITION, BY POST.—C. W. BOX, F.R.I.B.A., 115, Gower Street, W.C.1. Tel.: EUS. 3906. 1941

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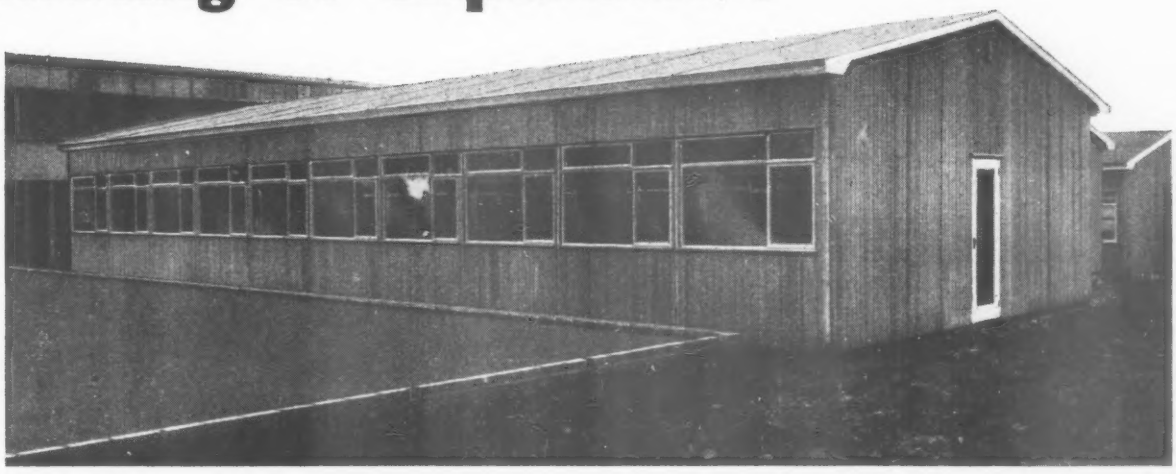

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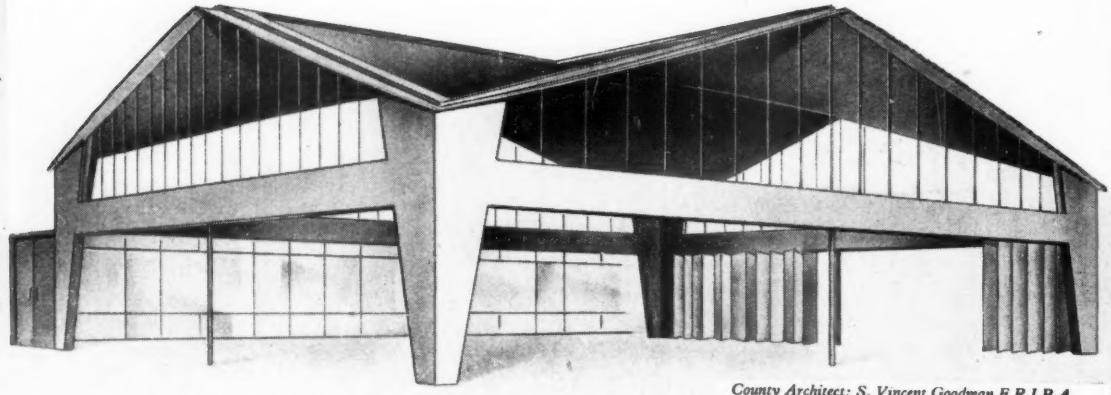

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