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contents

every issue does not necessarily contain all these contents, but they are the regular features which continually recur

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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 Ie one week, Ih to Z the next. In all cases where the town is not mentioned the word LONDON is implicit in the address.

THVE Institution of Heating and Ventilating Engineers. 49, Cadogan Square. Sloane 1601/3158

IIBDID Incorporated Institute of British Decorators and Interior Designers. 100, Park Street, Grosvenor Square, W.1.
Institute of Landscape Architects, 2, Guilford Place, W.C.1.
Institute of Arbitrators. Hastings House, 10, Norfolk Street, Mayfair 7086 Holborn 0281

ILA I of Arb Strand, W.C.2. Temple Bar 4071

Institute of Builders. 48, Bedford Square, W.C.1.
Institute of Quantity Surveyors. 98, Gloucester Place, W.1.
Institute of Refrigeration. Dalmeny House, Monument Street, E.C.3. IOB Museum 7179 IQS Welbeck 1859 IR Avenue 6851 Institute of Registered Architects. 47, Victoria Street, S.W.1.

Institute of Structural Engineers. 11, Upper Belgrave Street, S.W.1.

Lead Development Association. Eagle House, Jermyn Street, S.W.1. IRA Abbey 6172 ISE Sloane 7128 LDA

Whitehall 7264/4175 London Master Builders' Association. 47, Bedford Square, W.C.1. Lead Sheet and Pipe Council. Eagle House, Jermyn Street, S.W.1. LMBA Museum 3891 LSPC

Whitehall 7264/4175 Ministry of Agriculture, Fisheries and Food. Whitehall Place, S.W.1. Trafalgar 7711
Ministry of Education. Curzen Street House, Curzon Street, W.1. Mayfair 9400
Ministry of Health. 23, Savile Row, W.1. Regent 8411 MAFF MOE Mayfair 9400 Regent 8411 MOH Ministry of Housing and Local Government. Whitehall, S.W.1 MOHLG Whitehall 4300 MOLNS MOS

Ministry of Labour and National Service. 8, St. James' Square, S.W.1. Whitehall 6200 Ministry of Supply. Shell Mex House, W.C.2. Gerrard 6933 Ministry of Transport. Berkeley Square House, Berkeley Square, W.1. Mayfair 9494 Ministry of Works. Lambeth Bridge House, S.E.1. Natural Asphalte Mine Owners and Manufacturers Council. MOT MOW NAMMC

NAMMC
Natural Asphalte Mine Owners and Manufacturers Council.

94/98, Petty France, S.W.1. Abbey 1010
NAS
National Association of Shopfitters. 9, Victoria Street, S.W.1. Abbey 4813
NBR
National Buildings Record. 31, Chester Terrace, Regent's Park, N.W.1. Welbeck 0619
NCBMP
National Council of Building Material Producers. 10 Storey's Gate, S.W.1. Abbey5111
NEFMAI
National Employers Federation of the Mastic Asphalt Industry.

21, John Adam Street, Adelphi, W.C.2. Trafalgar 3927
NFBTE
National Federation of Building Trades Employers. 82, New Cavendish Street.

W.1. Langham 4041/4054

NFBTO National Federation of Building Trades Operatives. Federal House, Cedars Road, Clapham, S.W.4. Mac National Federation of Housing Societies. 12, Suffolk St., S.W.1. Whit National House Builders Registration Council. 58, Portland Place, W.1. Macaulay 4451 Whitehall 1693 NFHS

NHBRC Langham 0064/5

National Physical Laboratory. Head Office, Teddington. Moless Natural Rubber Development Board. Market Buildings, Mark Lane, E.C.3. NPL. Molesey 1380 NRDB Mansion House 9383

NSAS National Smoke Abatement Society. Palace Chambers, Bridge Street, S.W.1. Trafalgar 6838 NT

National Trust for Places of Historic Interest or Natural Beauty.

42, Queen Anne's Gate, S.W.1.

Political and Economic Planning.

Reinforced Concrete Association.

44, Queen Anne's Gate, S.W.1.

45, Queen Anne's Gate, S.W.1.

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47, Queen Anne's Gate, S.W.1.

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47, Petty France, S.W.1 PEP RCA RIAS

Fountainbridge 7631 Royal Institute of British Architects. 66, Portland Place, W.1. Langt Royal Institution of Chartered Surveyors. 12, Great George Street, S.W.1. RIBA RICS Langham 5721

Whitehall 5322/9242 Royal Fine Art Commission. 5, Old Palace Yard, S.W.1.
Royal Society. Burlington House Piccadilly, W.1.
Royal Society of Arts. 6, John Adam Street, W.C.2.
Royal Society of Health. 90, Buckingham Palace Road, S.W.1.
Rural Industries Bureau. 35, Camp Road, Wimbledon, S.W.19. RFAC Whitehall 3935 RS Regent 3335 RSA Trafalgar 2366 RSH Sloane 5134 Wimbledon 5101 RIB Society of British Paint Manufacturers. Grosvenor Gardens House,

Grosvenor Gardens, S.W.1. Society of Engineers. 17, Victoria Street, Westminster, S.W.1. Abbey 7244
School Furniture Manufacturers' Association. 30, Cornhill, London, E.C.3. SE SFMA

Mansion House 3921 SIA Society of Industrial Artists. 7. Woburn Square, London, W.C.1.

Langham 1984/5 Structural Insulation Association. 32, Queen Anne Street, W.1. SIA Langham 7616 SNHTPC Scottish National Housing. Town Planning Council.

Scottish National Housing.

10wn Planning Council.

Hon. Sec., Robert Pollock, Town Clerk Rutherglen
Society for the Protection of Ancient Buildings.

55, Great Ormond Street W.C.1.

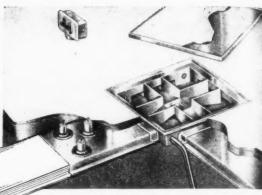
Holborn 2646 SPAB

Town and Country Planning Association. 28. King Street, Covent Garden W.C.2 **TCPA** Temple Bar 5006 TDA

Timber Development Association. 21 College Hill, E.C.4. City 4771 Town Planning Institute. 18, Ashley Place, S.W.1
Timber Trades Federation. 75, Cannon Street, E.C.4
War Damage Commission. 6, Carlton House Terrace, S.W.1.
Zinc Development Association. 34, Berkeley Square, W.1. Victoria 8815 TTF City 5040 Whitehall 4341 WDC ZDA Grosvenor 6636

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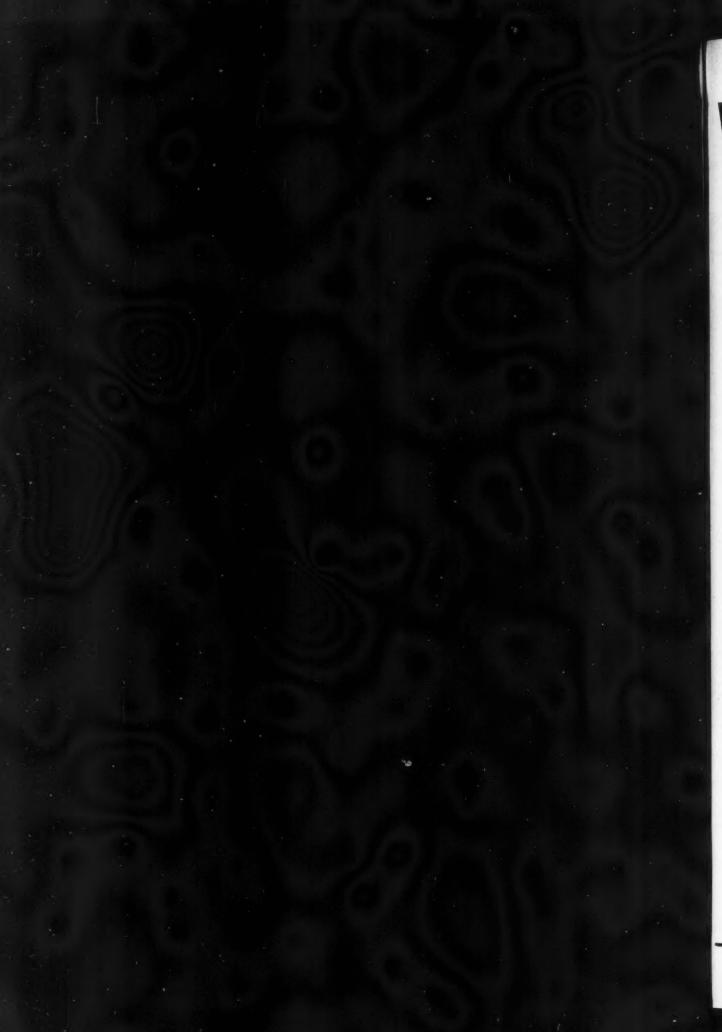
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in the field of HEATING & AIR TREATMENT ENGINEERING

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Boilerhouse dimensions . . .

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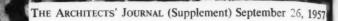
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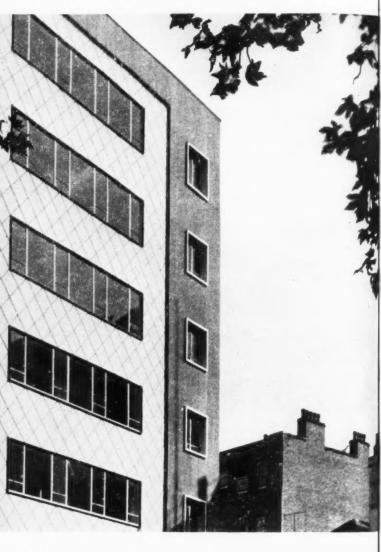
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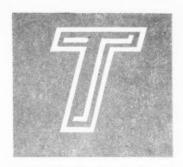
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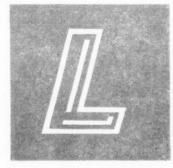
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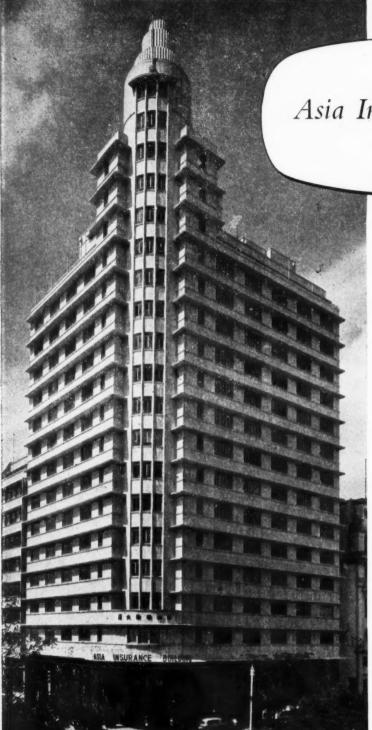
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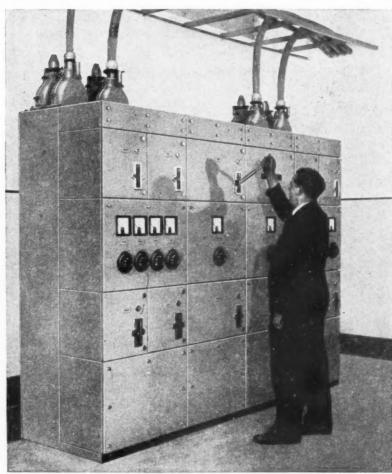
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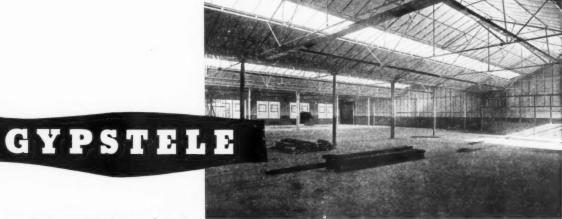
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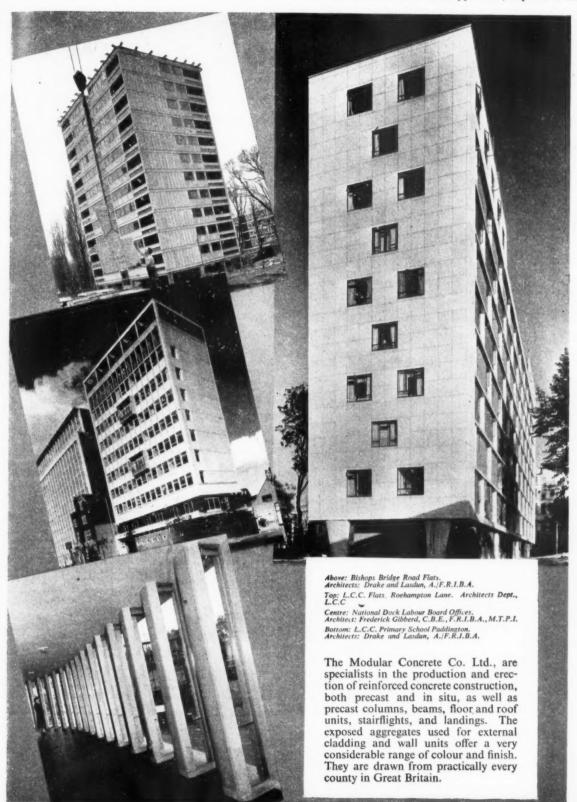


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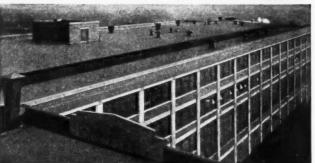
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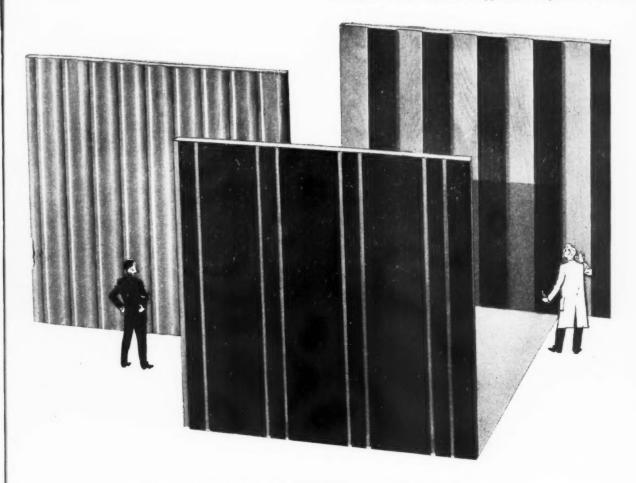
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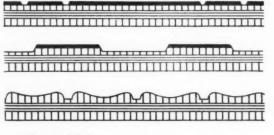
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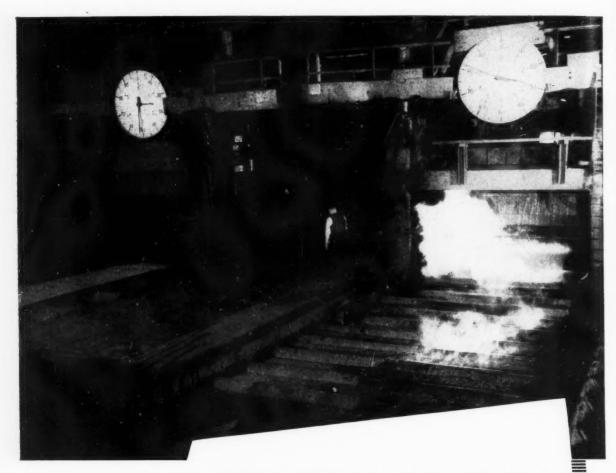
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A typical run of Key pipe on a Wolverhampton housing site. This scheme has been designed and carried through by the Wolverhampton Corporation under the supervision of the Borough Engineer and Surveyor, and Director of Housing, W. Mervyn Law, M.B.E.



Get to know more about



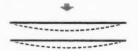
Smooth bore and clean joints

Key Pitch Fibre pipes have precisionmachined taper joints which require no mortar or compounds. Combined with their smooth bore, this means a high flow factor, with no problems of root growth.



No cracking through settlement
The resilience of pitch fibre pipes ensures
that no cracking occurs under normal con-

The restlience of pitch nore pipes ensures that no cracking occurs under normal conditions of earth settlement. This also means that bedding concrete is unnecessary.



Resistant to corrosion

Key pipes are vacuum-impregnated with pitch and are non-porous and resistant to normal effluent corrosives throughout their thickness.

Maximum loan period

The 30-year loan period applies to all Key Drain pipes. Pitch fibre pipes have been used with notable success in the United States for over 50 years.



A piece of heavy timber is placed against the coupling and a length knocked home.



The precision-machined taper joints require no mortar or jointing compounds.



Short lengths of pipe can be cut with a coarse toothed handsaw.



A special hand lathe is used for cutting joints on short lengths.

SPEEDING THE JOB— CUTTING THE COST

500 feet an hour is a modest rate for laying Key pipes. The simple system of jointing also ensures that the pipe can be laid in all weathers. Because there is no cement to dry out, the completed drain can be tested immediately and the trench back-filled without delay. When contracts must be carried out to a tight schedule these advantages are well worth bearing in mind. On a cost plus labour basis, pitch fibre pipes are cheaper per installed foot run than other drainage systems.

THOROUGHLY TESTED AND TESTED APPROVED

British Standard

Key pipes exceed the requirements of BS 2760/56 for Pitch-impregnated Fibre Drain and Sewer Pipes. This standard was approved by the Bituminous Products Industry Standards Committee consisting of representatives of Government departments and professional bodies, including the following:

Royal Institute of British Architects Ministry of Housing & Local Government Ministry of Works Institution of Civil Engineers

Royal Institute of Chartered Surveyors D.S.I.R.— Building Research Station Institution of Public Health Engineers

London County Council

Ministry of Health Model Bye Laws

Pitch fibre pipes are deemed to comply with M.O.H. Bye Law requirements.

Building Research Station Report

Key pipes were tested by this body and given a favourable report.

Other approving bodies Federation Civil Engineering Contractors.

National Federation of Building Trade Employers.

Royal Society for the Promotion of

Many local authorities have installed KEY pipes

Test Results
Key pipes have been subjected to detailed physical tests.

Also specify KEY Underfloor Ducting and cable Conduits



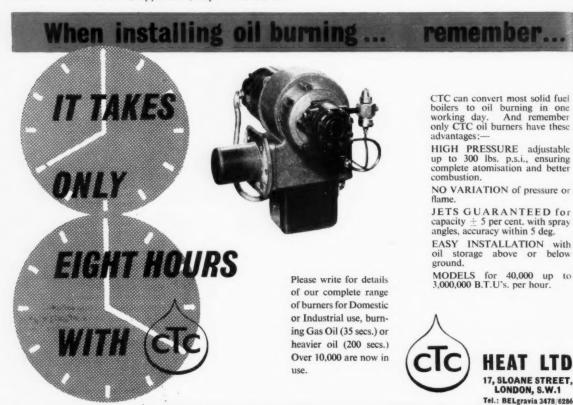
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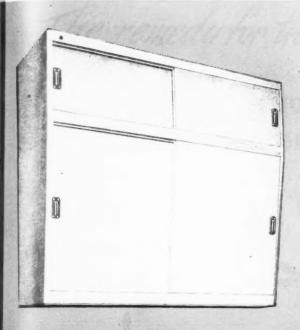


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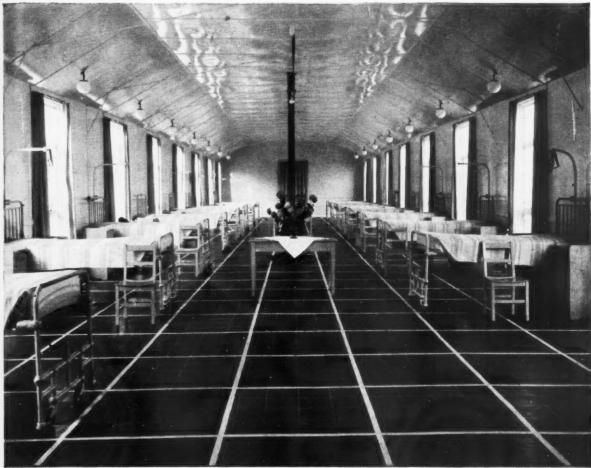
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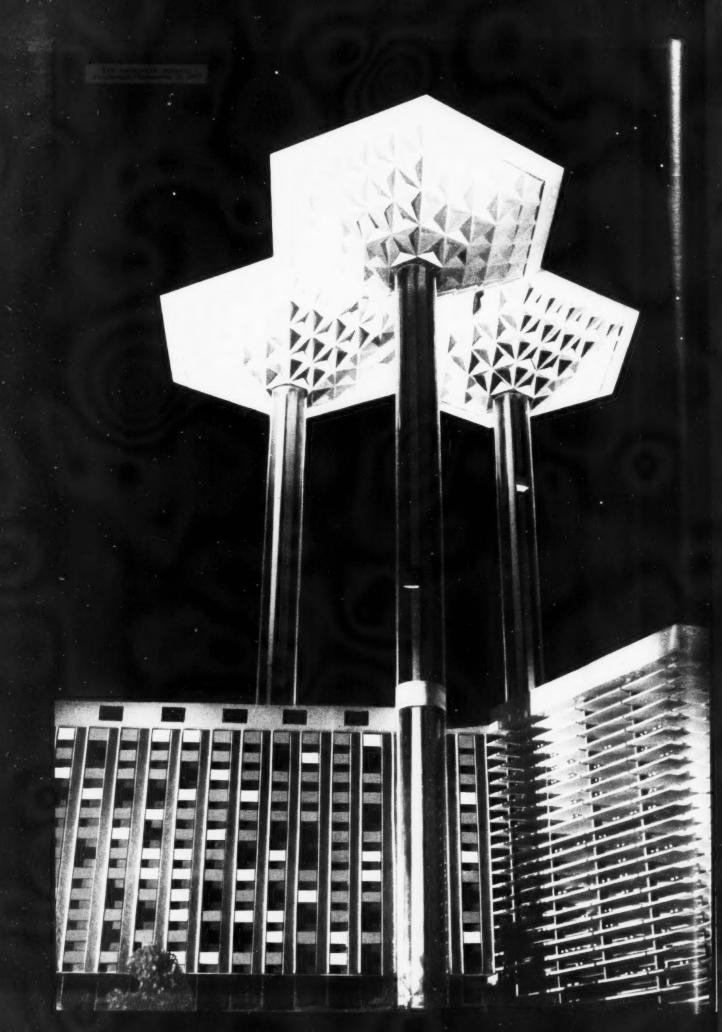
The undoubted advantage of using Accoflex for hospital floors from the points of view of hygiene, easy cleaning and hard wear is equally important. For this new flexible vinyl-asbestos tile gives these benefits and more. It has a lustrous surface that polishes well. It resists grease, most dilute acids, and alkalis. And it offers great scope for design and colour schemes.

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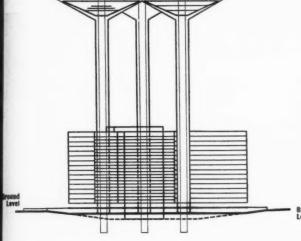




SKYPORT ONE

GROUND LEVEL AND THE BASEMENT

SKYPORT ONE is a *Glass Age Development Committee project. It has been designed by James Dartford, A.R.I.B.A., as an example of the city-centre air station which will be needed in the year 2000. These drawings describe a purely imaginary building which would occupy a site at St. George's Circus, London, but they are also intended as basic plans for a standard type of Skyport, which, with local variations—especially in regard to height—would serve any large centre of population. In essence skyport one consists of a 500 ft. high landing-deck supported by three shafts which in this example straddle a 200 ft. high triple-wing building.



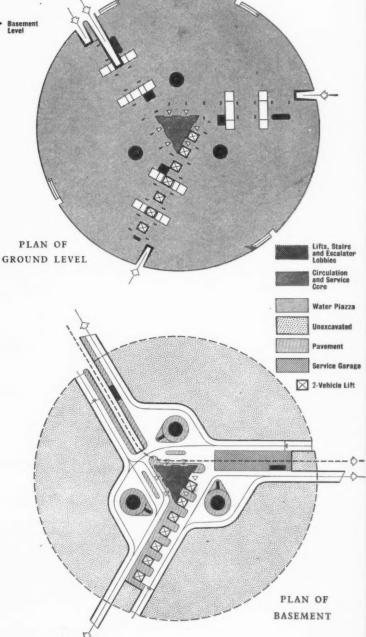
The Triple-wing building is 15 feet above a pedestrian piazza, formed of triangular paving slabs in a free pattern over water. The piazza is 575 feet in diameter; and the pattern of paving terraces, paths, bridges, islands and flower beds is of a free shape and acts as a deliberate foil to the relatively formal lines of the building and the geometric form of the underside of the Skyport superstructure. A triangular entrance lobby, repeated at basement and subbasement levels, is centrally located under the building. Pedestrians wishing to take lifts to the Skyport descend by escalator to the special lobbies in the basement. Ramped roads, leading to the basement and sub-basement, enter at the end of each of the three building wings. These roads are partially day lit by means of large transverse wells set in the piazza. Floodlights are concealed at strategic points on the piazza, and these, with diffused lighting effects under the water, light the Skyport and Triple-wing building from below at night. From above powerful searchlights shine down from the outer inter-sections of the deck.

The basement and sub-basement are for the most part excavated only under the triple-wing building. Ramped entry roads and exit tunnels permit separate circulation for all vehicles using the Skyport or triple-wing building. A small service garage is provided, and also a bus station and concourse (not shown on the plan) in the sub-basement.

*The Glass Age Development Committee is convened by Pilkington Brothers Limited and consists of G. A. Jellicoe, F.R.I.B.A., Edward Mills, F.R.I.B.A., and Ove Arup and Partners.



COMPARATIVE HEIGHTS OF ST. PAUL'S CATHEDRAL AND SKYPORT





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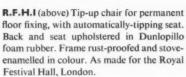


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Technical staff are available to architects for consultation on any problems relating to auditorium seating, canteen furnishing and the like.





M.313 (right)

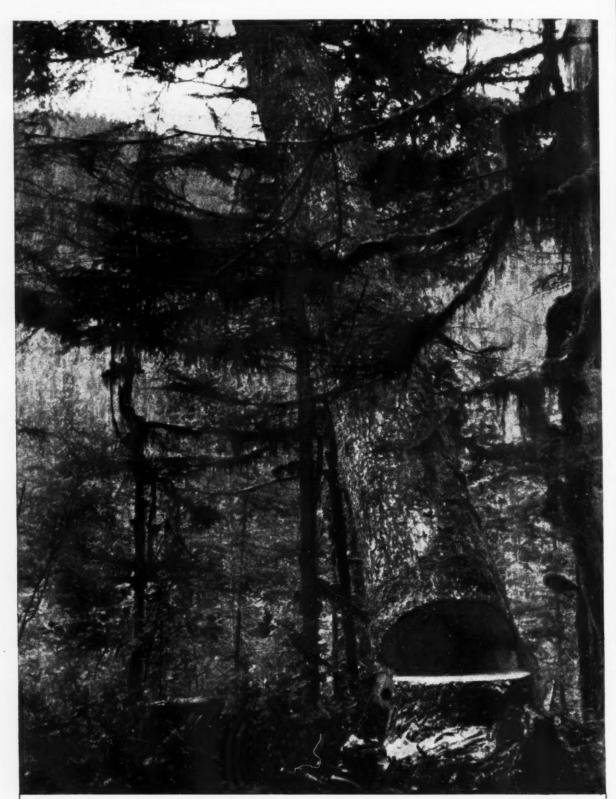
A new style nesting chair designed for maximum comfort, the seat being upholstered in foam rubber and the back in rubberised hair.



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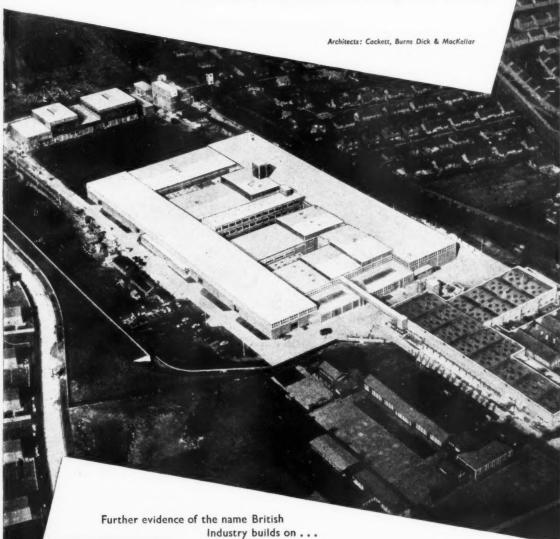


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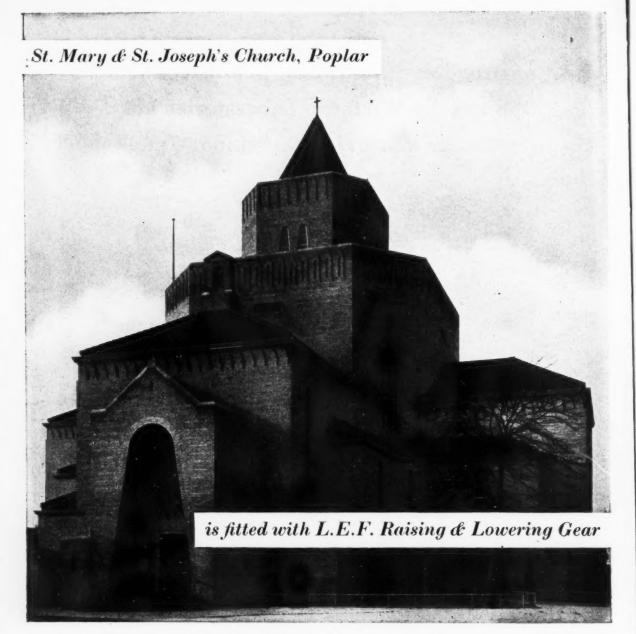
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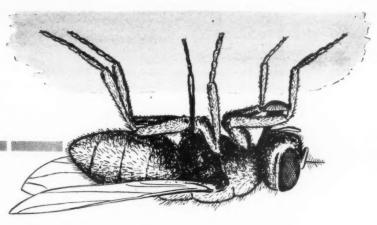
HE position of many of the light fittings in this new church would have presented difficulties when maintenance was necessary had not L.E.F. Raising and Lowering Gear been installed. This gear enables each of the fittings, which weight approximately 2 cwt. and were manufactured by General Electric Co. Ltd., to be quickly lowered to the ground by means of a hand winch and raised again after maintenance. The make and break of electrical contact is automatic. In all, sixteen sets of heavy duty gear have been fitted in this church.

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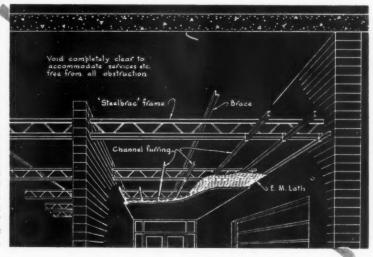
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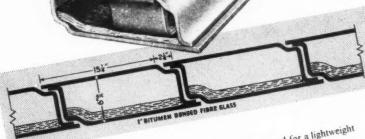
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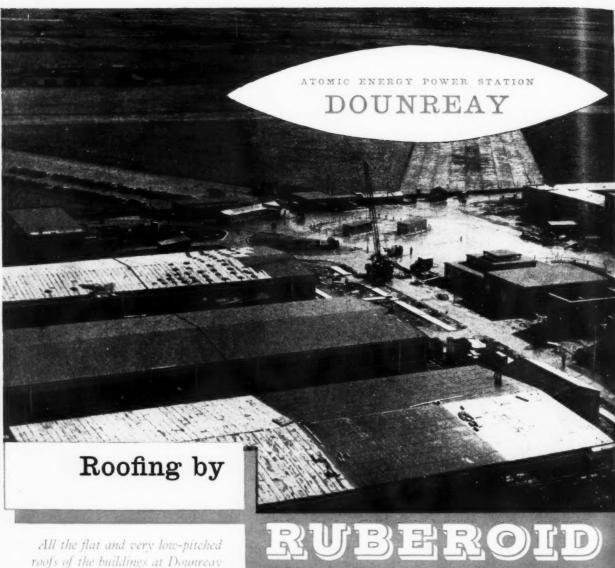
on to the supporting beams.

The units simply butt up to each other and the interlocking side lap provides at one operation a flat upper surface ready to receive the normal felt finish and a flat hygienic ceiling ready for decoration.

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But away went tradition as the great project for the United Kingdom Atomic Energy Authority reached planning stage. For the large roof spans visualised, the amount of support needed for heavy slab tiles would have been formidable in the extreme. The Ruberoid Company Limited was called in.

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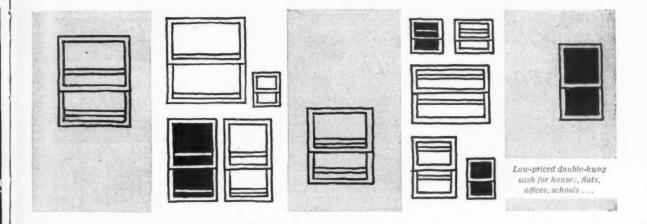
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At one time, aluminium double-hung windows were the kind of thing one omitted from a Specification because they were too expensive. But not nowa-

Aluminium "too expensive"? Not now!

days. The ghost of "prohibitive cost" has been laid. Here, in the ALOMEGA, Williams & Williams have a completely new design of aluminium double-hung window at a price everybody can afford. E.g. £6.0.7d. for window 3' $8\frac{3}{6}$ " x 1' $11\frac{1}{2}$ "

(Quantities over 48) It is primarily the new design that brings about this new low price; because there is no counterbalancing mechanism and, therefore, no need for bulky hollow jambs to house it. Also, there are several new, cost-saving techniques on the assembly line.

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Lower site costs, too. For three reasons: 1. No painting: construction is entirely of aluminium.

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Maintenance costs are almost abolished. The only repair ever likely to be necessary would be the replacement of a broken pane of glass. This is no trouble. One rail of the sash is just unscrewed and a new pane slid into place.

Standard sizes or Purpose-made

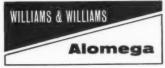
ALOMEGA Windows are available for inspection at any Williams & Williams Area Office or merchant stockist, and are made in the following standard sizes:

Type	14,	3'83"	×	1'21"	Type	24,	3'8;"	×	1'11}"
Туре	34,	3'88"	×	2'81"	Type	44,	3'88"	×	3'51"
Type	15,	4'83"	×	1'21"	Type	25,	4'8%"	X	1'111"
Type	35,	4'83"	×	2'81"	Type	45	4'81"	K	3'51"
Type	16,	5'83"	×	1'24"	Type	26,	5'83"	×	1'1114"
Type	36,	5'88"	×	2'81"	Туре	46,	5'83"	×	3'51"

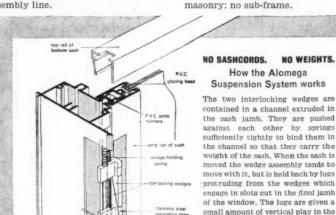
Owing to the method of construction, purpose-made sizes present no difficulty and are available up to a maximum of 19 perimeter, at approximately pro rata prices-although, of course, there will be a certain delay.



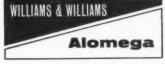
normal use. The whole mechanism is completely



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slots, and these are so placed that,

whichever way the sash is moved, the hinder wedge (relative to direc-

tion 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

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7"	2'0'	35 lbs.	X7	Case 1	20'-10"	197-37	17'-5*	15'-11'	14'-6"	12′-7-	117-31	9'-1"
7"		36 lbs.	do	Case 2	24'-0"	22 -5*	20 -2*	18'-7"	16 -9"	14'-7"	13:-0*	107-5-
7"	2' 6'	40 lbs.	do.	Case 3	26 -0"	24' 2"	21 -9"	20 2-	,181.9	16'-0"	14'-4"	11 -6"
7"	2' 0'	42 lbs.	do	Case 4	27'-6"	25′-0⁻	24'-5"	22 -8"	20′-6″	17'-10'	16'-0"	12'-11"
7"	1000000 7	60 lbs.	do.	Case 5	-	_	-	-	-	24'-1"	22:-10	17′-10′
9"	1' 8" 9. ½	47 lbs.	н9	Case 1	31 -3"	29'-2"	26'-6"	24'-7"	22 -5′	19*-8*	17:-7*	14'-3"
9"		53 lbs.	do.	Case 2	36'-6"	34'-0"	31 -2"	281-101	26'-4"	23′-2-	20′-6°	17′-0*
10"	12" 12" 12"	55 lbs	110	Case 1	38'-8"	36:-3"	33 -4"	31 -1"	28′-3″	24'-9"	22′-4°	17'-11"
10"	10-	64 lbs.	do.	Case 2	44:-1"	41:-2*	38'-04	35'-6"	32:-3"	28 -7'	25'-10'	20:-3*

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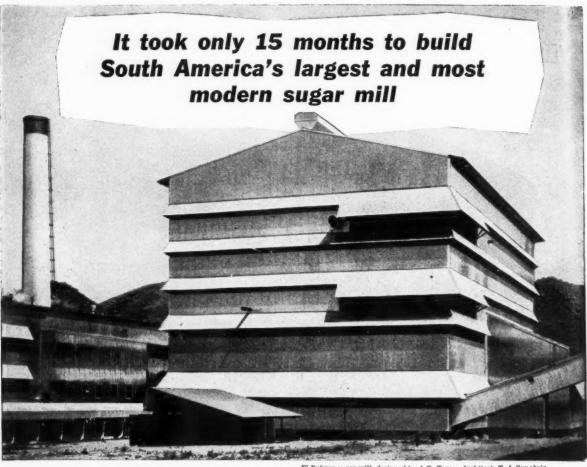
Introduced several months ago, the 'Super-lynx' has been enthusiastically received by architects, builders and plumbers. Not only because it is super-efficient, not only because it is super-smart, but also because it is guaranteed for 5 years. Inside and out the 'Super-lynx' really is an outstanding job-one which you will be pleased to specify for initial installation or for replacement. High and low level models are available in extra high gloss black Duranite and white Keramic ware. The low level model has gold-lustre beading, operating lever and flush pipe. The high level model has a gold-lustre lever mechanism and beading, and chain with coloured acrylic handle. Matching flush pipe for the high level model can be supplied at extra cost. The 'Super-lynx' is fitted with the rustless, unbreakable, silent flush-at-a-touch 'Kingfisher' syphon mechanism. Powerful flush syphon to B.S.S. 1125 and water works specifications. Capacities 2, 21 and 3 gallons.



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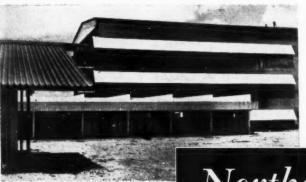
El Palmar sugar mill, designed by A.O. Toro. Architect: T. J. Sanabria.

 The extensive use of Noral alloys enabled builders to erect this enormous sugar refinery near Caracas, Venezuela, in little more than a year from the time they first started to prepare the site. More than 200 tons of 20 SWG Industrial sheet were used

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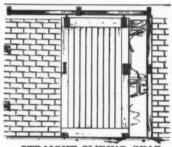
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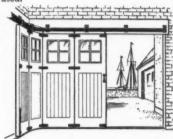
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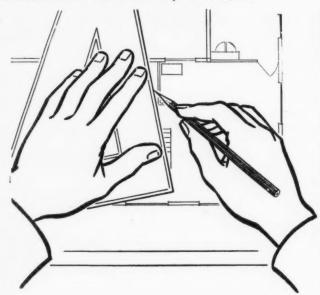
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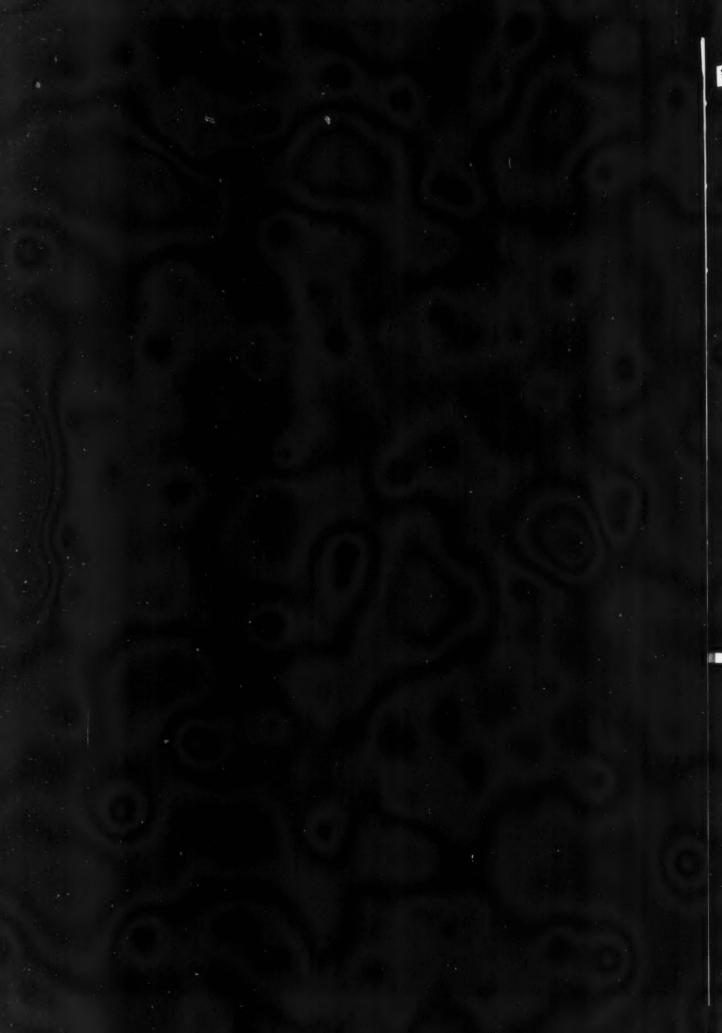
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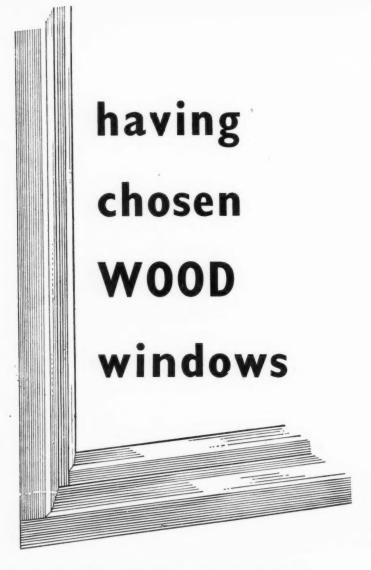
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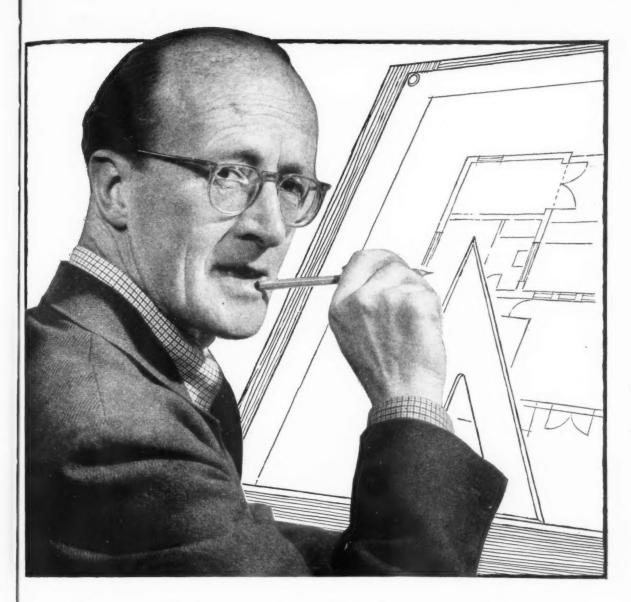
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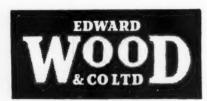
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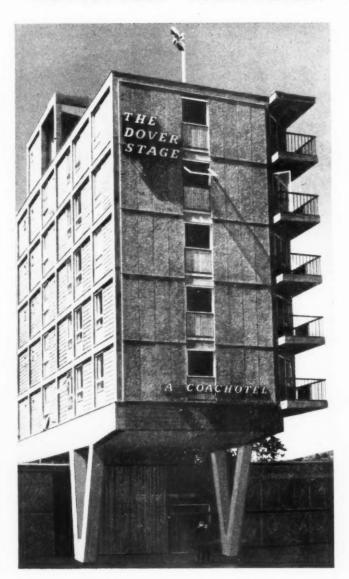
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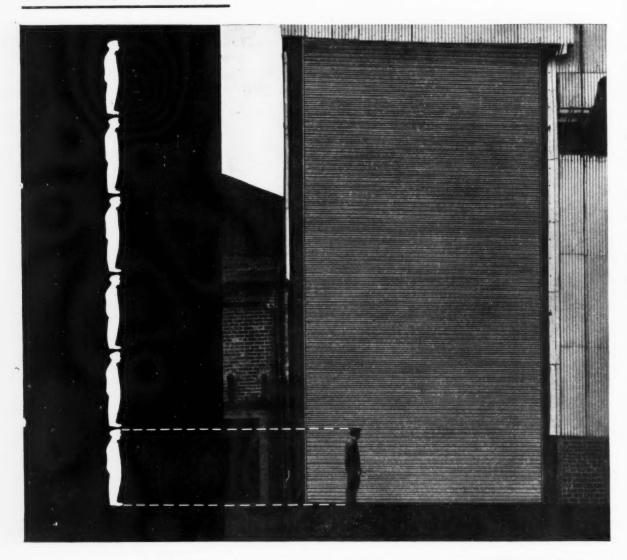
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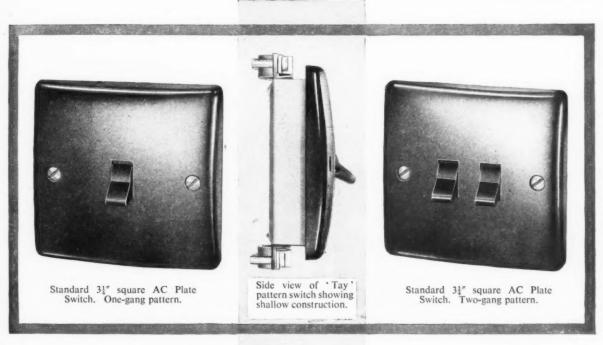
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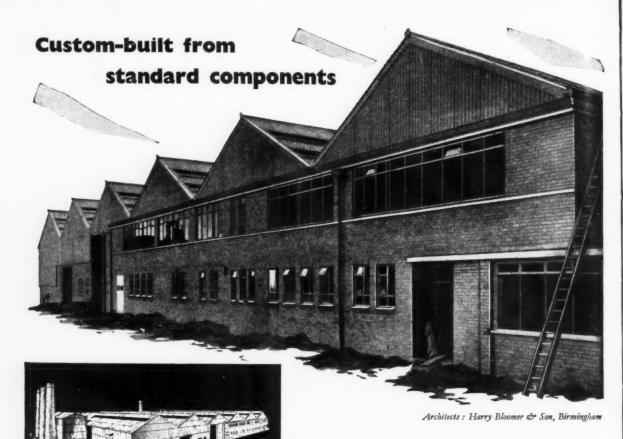
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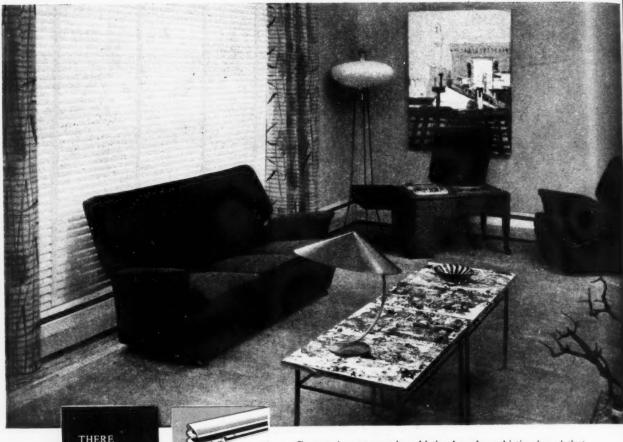
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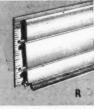
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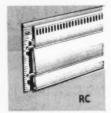
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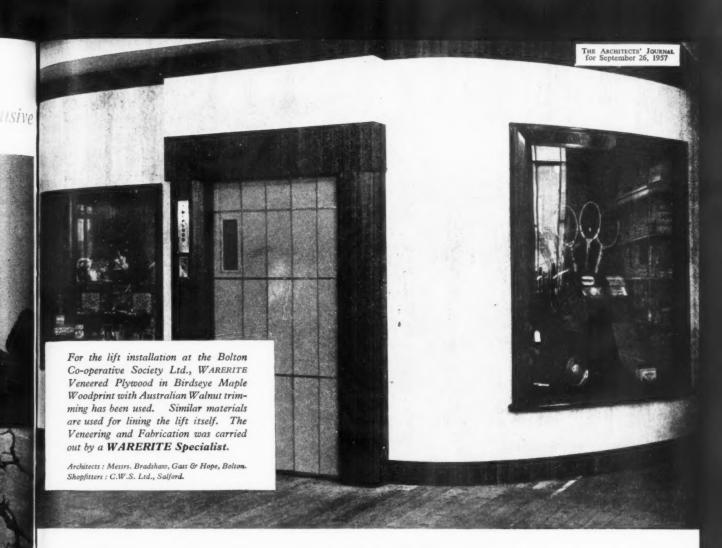
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for good looks and functional efficiency

Here is a scientifically-designed shelf support which has the strength required for industrial applications, yet is attractive enough for use in showrooms, libraries and the home. Spur is scientifically-designed, simple in principle, easy to install and flexible in arrangement. There are only two main components—slotted V-channel uprights, and flanged brackets which key into the slots.



FOR INDUSTRIAL STORES, HOMES, OFFICES, LIBRARIES, SHOPS, LABORATORIES, EXHIBITION STANDS

Shelve those problems of support on



FLEXIBILITY OF ARRANGEMENT

The height of Spur brackets can be altered without the use of tools whenever storage needs change. Alignment is automatic. Both right-angled and slanting brackets are available.

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Uprights are available in lengths up to 94½ in., and brackets are supplied in seven standard sizes up to a maximum of 18½ in. Loadings have been calculated for each size, and the largest will support 1½ cwt.



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The uprights are easily screwed to walls, but where free standing units are required with shelves both sides—in libraries or storerooms for example—double-sided uprights can be used. Special collars are available for fixing uprights to the floor and ceiling.

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A full range of accessories such as shelf straps and book supports give the SPUR system added flexibility.

SPUR

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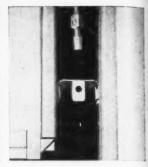
Roften Modular **Partitioning** is as easy as this to put up or rearrange



1 Two steel sole plates for each 2 The 40" wide, modular units are 3 Five link plates, at 15" centres. to the floor with wood screws.



unit of partitioning are screwed bolted to the sole plates. All units dropintoready pressed out pockets are interchangeable.



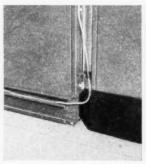
and fix each unit to the next.



4 Link plates are also used for 3-way fixing - but in this case



frame, linked in with the rest of between partitioning units and they are finally bolted in for extra, the system, is firmly anchored at along specially provided channels sections, finishes off the top of the the foot by a cleat.



at the bottom.



5 The 40" wide modular door 6 Electric wiring runs down 7 A head channel, cold rolled like all Roften Modular Partitioning free-standing screening.



8 Pilasters are clipped on to the finish off the joins between units.



9 Skirting is clipped on to the 10 Four rubber-buffered glazing 11 Any type of 32 oz. glass slips notches of the link plates to bottom of each unit. Plinths beads clip in. Special beads are into the opening, followed by the cover the joins in between.



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The partitioning installation is now finished. Although it is easy to rearrange, Roften Modular Partitioning is permanent in appearance, all joins are flush, there are no uncovered bolts or screw heads, 13 standard colours are available, and contactions. trasting schemes can be easily arranged at no extra cost. Roften Modular Partitioning will give your client quiet, warm, well laid out offices—of sumptuous appearance.

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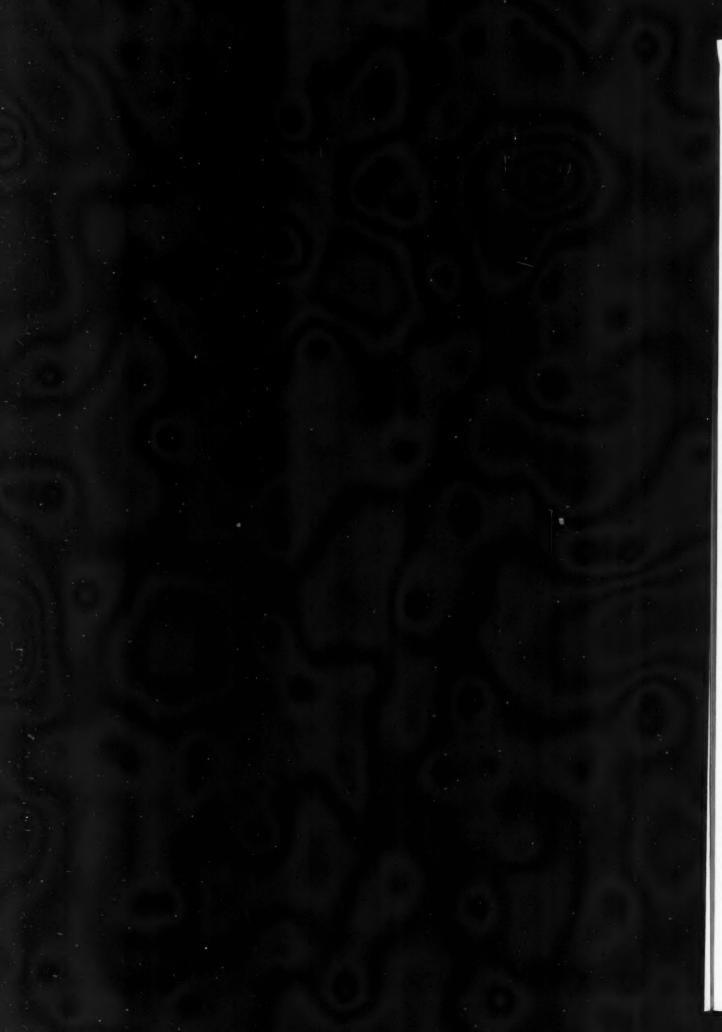
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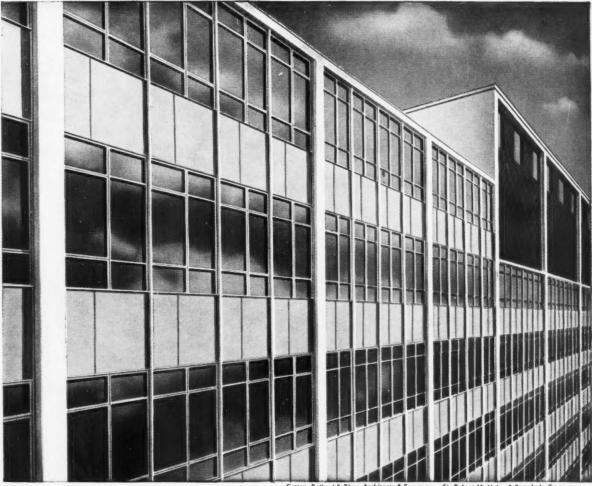
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HOLOPLAST CURTAIN WALLING

The 'Big Top' is a big job-and Holoplast helps to do it!



A view of the 'Big Top' as it will appear when completed showing the extensive use of Holoplast Curtain Walling.

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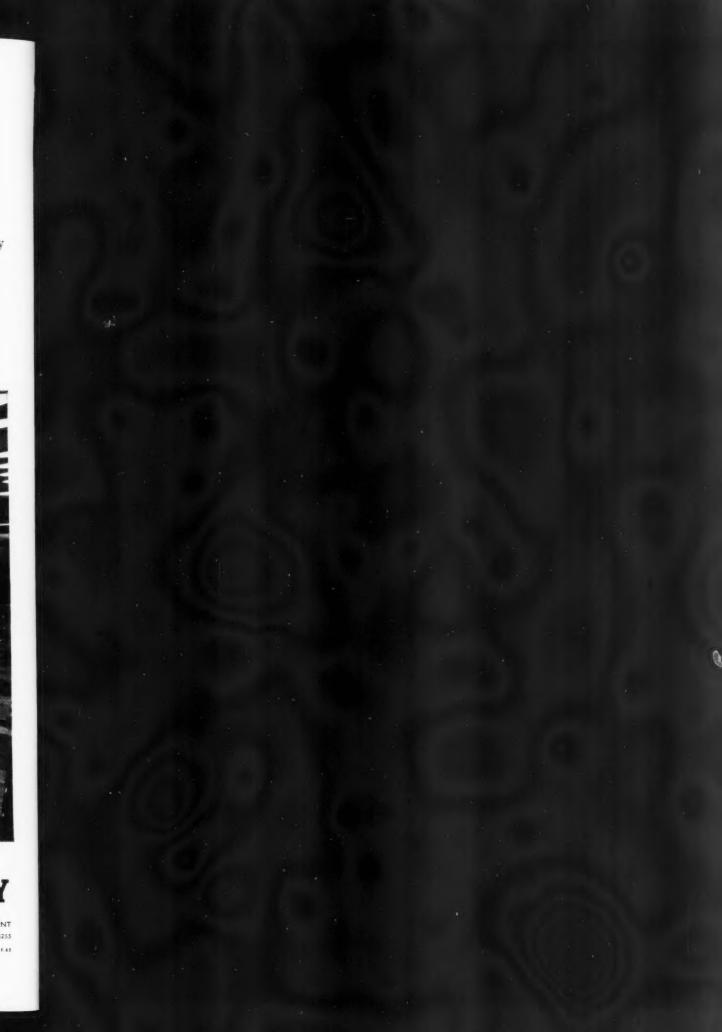
Architects: Howard V. Lobb & Partners

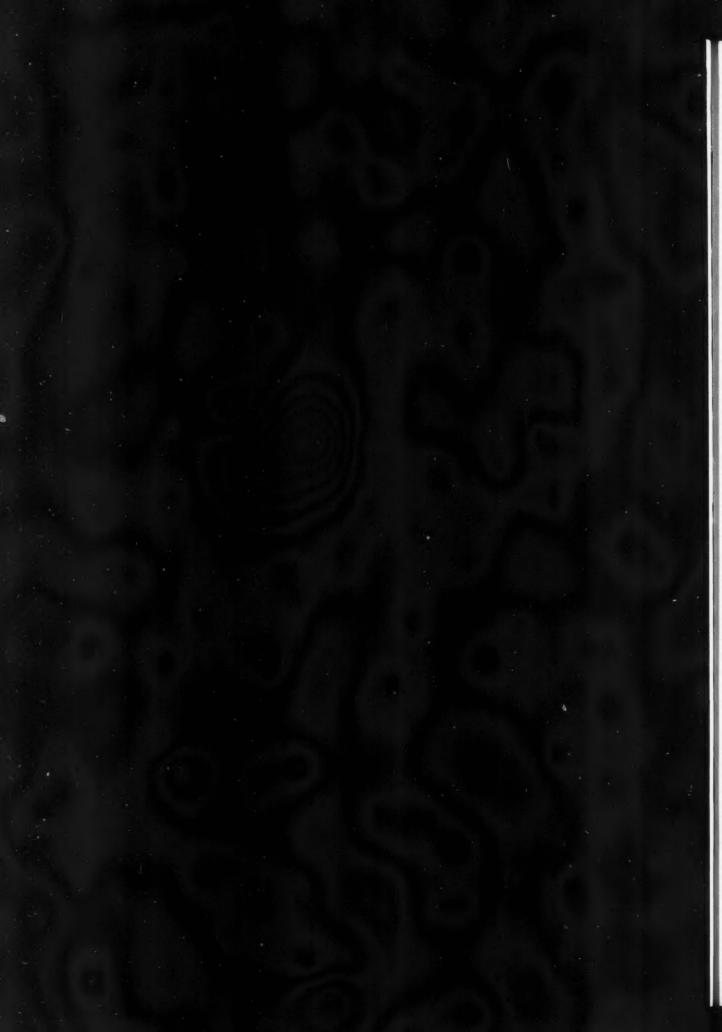


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F.63





NG DOOR



The illustration on left shows yet another example of ELLARD Decrease. Stiding Door Gear in the modern dwelling-house. See how simple it is to convert a spacious room to one of cosy and intimate atmosphere. Elegant appearance, ease of operation and long service are the main selling features of this attractive ELLARD Door Gear. The obvious choice for both council estates and private houses is ELLARD Door Gear.

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The illustration on right shows ELLARD "Radial" shows ELLARD "Radial" Sliding Door fitted to a private garage. Valuable working space is offered at the entrance to the garage. ELLARD Door Gear provides to the garage. ELLARD Door Gear provides easy access to and from the garage by a personal entry door. ELLARD "Radial" Sliding Door Gear is low in price and gives long service without maintenance. This gear is also suitable for the larger openings of commercial and industrial garages.





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NOT QUITE ARCHITECTURE

IDEAL ULSTER The Poor Man's Olympia

Ulster has just had its own Ideal Home Exhibition which-apart from a stand designed by Robert McKinstry and a bungalow by Houston and Beaumont-could be described as the poor man's Olympia. Although Ulster's textile designers are becoming increasingly well known in London, Dublin and elsewhere, no attempt was made here by the textile industry to show its latest work. It is absurd that a better selection of Ulster-made art-designed fabrics for the home can be put in a London store than in Ulster's own exhibi-

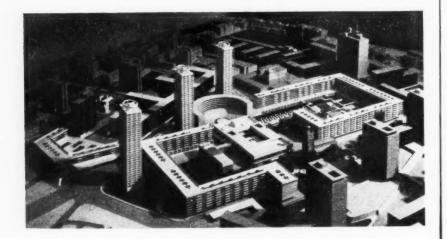
Ulster's basic industry-agriculture-was also largely ignored in favour of the produce of nations on the other side of the world (an accurate mirror of government policy, this)-albeit "in the Common-wealth." The Milk Marketing Board could have used some attractive girls on their hygienic-looking stand, while crops, cereals and by-products were encased in a pantomime structure of unsurpassed vul-The Australian stand quite overshadowed these efforts, not by superiority of design, but by sheer wealth and quality of the produce displayed.

A brief look at the rest of the stands showed that at this sort of exhibition the well-designed display does not necessarily The novelty shopattract the public. plastic urinating babies, rubber snakes and trick objects displayed twelve times to the

CRITICISM: J. M. Richards is on holiday. His series of critical articles on new buildings will be resumed next month.



"Genuine Residential Neighbourhood"



That title sounds like part of an estate agent's blurb. It is, in fact, a description which a special committee of the City Corporation has given to the 25 acres of the Barbican site that it has set aside for housing. The committee's report was approved by the Court of Common Council last week, and as a result of this another ad hoc committee-the Barbican Committee-will be set up. Although this committee will be in no way committed to any previous plan for the area, one of the opposers of the scheme said there was obviously a "strong bias" in favour of the plan put forward by Chamberlin, Powell and Bon. This scheme (bottom picture), which was

illustrated in the JOURNAL on June 7, 1956, is seen also in a modified form at the back of the top picture, which shows a composite model (including the Martin-Mealand proposals) prepared in the City Corporation's offices. The housing proposed by Chamberlin, Powell and Bon was intended for middle and higher income groups, and this fact alone has started wrangling in the City. But whatever type of housing is decided upon, and whatever "income bracket" is chosen for the area, the Barbican Committee must insist on comprehensive development. It would be absurd if this much-discussed part of the City was to suffer from piecemeal development.

square foot-was constantly beseiged; so was a gentleman polishing lino with a beard (damned clever, these Chinese). A disproportionate amount of space was allotted to stands selling "jewllery" (from London and Birmingham); automatic plastic hair curlers in hideous blue, pink and green; egg whisks and-a momentary lifting of the spirits here-"cuties," which turned out to be skirt hangers. At gallery level, C. & A. Modes' mannequins jostled an art exhibition, organized by Patric Stevenson, showing works by contemporary Ulster artists. The fashion showthree times daily-was certainly drawing the crowds, and you might have been forgiven for supposing you were watching Muscovites being confronted with Lancashire girls displaying capitalist-designed garments. You could see the struggle in the Ulster breasts between provincial sales resistance-prompted by fear of the neighbours' ridicule-and woman's natural instinct to beautify herself.

After too much of haute couture, laced with exhortations from the compère to "wear something like this next time you go to the Arts or Group Theatres" (instead of the usual mac, and headscarf), and with phrases like "ruched tippet," "pink tinged mushroom," "Velasquez, Spindle and Sack Lines" ringing in the ears, the art exhibition provided a restful change and a pleasant glimpse of recognizable colours. An excellent innovation this, and apparently quite a successful one: with still a week of exhibition to run, a total of 12 works had been sold out of the 50 or so on display.

What were the parting impressions of this show in King's Hall, that drab, ill-considered giant of a building? If its purpose was to sell goods—any old goods—then it is a roaring success; if its purpose was to raise the design standard of things connected with the home, then it was only partly successful. A lot of the contemporary furniture, for instance, was of poor design and badly displayed and there were signs that the "voluptuously vulgar" school is by no means extinct. Next year, let us have an exhibition architect and many more Ulster goods, designed and displayed by Ulstermen.

LOUIS ADAIR ROCHE

DIARY

Redevelopment of Greenwich and Blackheath. Project by the Diploma students of Town Planning, Regent Street Polytechnic. At the HC, 13 Suffolk Street, S.W.1. 6 p.m.

SEPTEMBER 26

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Landscape in Modern Life. Civic Trust exhibition at the Royal Festival Hall. Monday to Friday 5.30 p.m. to 9.30 p.m. Saturday and Sunday 1.30 p.m. to 9.30 p.m. OCTOBER 2 TO 17

The Career of Landscape Architecture. ILA exhibition at the BC. 26 Store Street, W.C.1. Monday to Saturday 9.30 a.m. to 5 p.m. OCTOBER 3 TO 17 EDITORIAL BOARD: (1) Consulting Editor, F. R. Yerbury, O.B.E., Hon. A.R.I.B.A. (2) House Editor, J. M. Richards, A.R.I.B.A. (3) Executive Editor, D. A. C. A. Boyne. (4) Editor Information Sheets, Cotterell Butler, A.R.I.B.A. (5) Editorial Director, H. de C. Hastings.

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* To preserve freedom of criticism these editors, as leaders in their respective fields, remain anonymous

The Editors

AN INDISCRIMINATE WEAPON

NCE again the building industry is to be used by the Government as an economic regulator. Unfortunately, however, it is not so easy to turn building on or off, as if with a tap. Raising the bank rate with the object of compelling companies and public authorities to contract their building programmes is a crude and wasteful method of regulating capital investment. It hits indiscriminately at necessary and less necessary building projects, it sharply raises the cost of such building as does take place and so increases the ultimate costs of production, and its action only takes full effect after a delay of a year or more, when circumstances may be very different. The immediate effect on the building industry will not be great, as buildings already begun or contracted for will not be affected unless contractors experience difficulty in financing their operations. But the effect in company boardrooms, local authority committee rooms and architects' offices will be felt sooner and far more severely. Should the new conditions last for long, the result could be most damaging both to essential investment in new factories, and to the long-term programme for schools and

One way to minimize the damaging effects of the high rate of interest would be for the Government, through the Public Works Loans Board, to finance an agreed programme of schools and housing at a much lower rate of interest than will be obtainable on the money market. The size of the programme would continue to be controlled by the Government, which has to sanction the loans, but the costs would not soar to prohibitive heights, and tenants would be able to afford the rents. It is inconceivable that such projects as London's new town, or for that matter any large programme of schools or houses, can be financed for long by the ratepayers at $7\frac{1}{2}$ or 8 per cent. There is a real danger that the high rate of interest may force local authorities to reduce their architectural and planning staffs, and to break up their design teams. Since the volume of public investment is already controlled, nothing is gained by making permitted expenditure ruinously expensive.

A REKINDLING OF THE MODERN MOVEMENT

Some people see modern architecture as an emotional substitute for religion. Others see it as a fusion of art, science and public service—and these people will get pleasure and comfort from a series of articles written for the JOURNAL by members of the Nottinghamshire County Education and Architect's Departments. These four articles (the first appears on page 465) demonstrate the value of team-work—or group working, as

the Journal's 1952 Guest Editor team called it.

Group working in this sense does not mean a body of disciples round a father-figure, or sycophants before a tycoon, but a small number of architects, each of whom accepts responsibility, accepts and offers criticism, and accepts group discipline, all as essential aids to the development of good architecture. The story the Nottinghamshire County Architect's Department tells is simple enough. The first step was to get the County Council and the local committees confident in their architects. The architects did this by making a close study of the clients' requirements, by keeping an accurate control over expenditure, and, quite simply, by showing that architects could deliver

The all-important early task of the architect is, of course, the investigation, in collaboration with the client, of what the building is required to do, so as to get maximum value for money spent. The next step is to collaborate with the builder and the manufacturer to find the most truly economical way of building. The third step is to organize a programme to which the architect's office and the builders can adhere, and the fourth step is to ensure a feed-back of information from the users of the buildings, from the builders and the manufacturers, and from the group architects, so that the development work, the creation of yet better buildings, steadily progresses. This is what the Nottingham architects have done. Their articles are most heartening. They tell how several groups of architects are inspired by, and in turn inspire, the educationalists (as next week's article by the Nottinghamshire Director of Education will show). They are not dictated to by specialist engineers, but they take expert advice when necessary and advance evenly across the whole broad front of architecture. During their sensible application of civilized ways of working they have evolved an entirely new method of putting up buildings on ground liable to subsidence.

Subsidence is an acute problem in Nottinghamshire and in many other areas of Great Britain and abroad, so the Nottinghamshire solution may well achieve international fame. If it does so it will be due to the fact that educationalists and architects in a local authority are working in harmony together, and regarding architecture more as a public service than as a form of personal expression or artistic egotism. Those who want to know what modern architecture is all about should make a visit to Nottingham and endeavour to develop the same approach in their own offices.



HASTINGS AND ALL THAT

Last week there was a nigger in the woodpile at White Rock, Hastings. He was, however, an invited nigger. The Association of Municipal Corporations —a body that represents the controllers and condoners of Subtopian growthwisely decided to ask Sir Hugh Casson to address its annual conference. And Sir Hugh took the opportunity of loading his words and slanted (to use current jargon) his remedies with his specialized audience in mind. After giving a résumé of the symptoms of Subtopia-and doing it so well that even blasé ASTRAGAL nearly ran berserk in panic-he suggested that the counterattack should begin inside the town hall itself, which was usually "a place to pay the rates and register some sort of complaint, not the busy and popular centre of city life."

How should such an attack be planned? Sir Hugh reminded the civic servants that "one ill-tempered clerk, one ill-kept corridor can undo years of carefully built-up good relations between the town hall and the citizen." (True enough: have you ever called on the planning office at P1*m**th?) And then he criticized the system by which each local specialist (the engineer, the transport manager, the parks superintendent) was left to apply his own

standards of taste to any design work that fell within his field of activity. There was no need, he added, to have a dictator of taste: all that was required was a very small and competentlyadvised design policy committee, which would vet everything from litter bins to housing layouts. The speaker went on (as they say in local newspapers) to criticize the present local government system, with its delegated powers in district councils and county boroughs. This arrangement, he said, was almost bound to achieve-visually compromises speaking—the offended the fewest people, because the borough or district council was often a small-scale reflection of national politics-not a real reflection of what the man in the street wanted. Briefly, his remedy was to cut away planning from local government, or to reorganize it in one of two ways-either in smaller units that were really representative of the people, or in very large units of sufficient size to be kept reasonably clear of political or prestige battles. Councils should not, he said, be able to get their hands on things which were national or regional concerns—such as land use, green belts, overspill arrangements, decentralization and so on.

This talk, entitled "Town Sense," sounded very good sense to ASTRAGAL, who is delighted that the Subtopian campaign has now reached a stage at which constructive advice is not only being given, but even asked for.

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Who, by the way, will volunteer to deliver a Subtopia lecture to the Skywriters' Association before it is too late? I quote from the Daily Telegraph: "Skywriting. This impressive and novel art will be a delightful surprise for Birthday or Anniversary Greetings written across the sky over your home area. Cost is most reasonable. Please request details from . . .".

SHELL SHILLY-SHALLY

When Sir Hugh Casson was telling local authorities of some of the big business organizations with successful design policies, he mentioned Shell. But Shell has blotted its copybook in a big way with its South Bank block. It is almost eighteen months since the JOURNAL described this building as

the "South Bank's Vertical Failure," and the foundations are now being laid. To hundreds of people this project is a monstrous disappointment. And some of these people have been in a position to say so in important places. why have they kept silent?

The Observer which always has its ear to the ground, architecture-wise, has noticed this ominous silence. In its preview advertisement last week the newspaper described the building as "an architectural disaster," and asked "why is no public fuss being made about it?" Came Sunday and most of the leader page was filled with "The Mystery of Shell," written by Ian McCallum and backed by editorial comment ("London is silently presented with a huge unsatisfactory building "-" mediocre on a scale and in a place where mediocrity is a public calamity ").

The Observer's article is very Mr. McCallum reminds thorough. readers of the early controversy about the block; of the RFAC's hope that "the architectural treatment of the building would be made lighter than in the design submitted," and of the LCC's 1953 development plan for the South Bank. He discusses in some detail the dull, conventional system of construction, and the unsuccessful relationship of height to volume ("neither quite a tower, nor entirely a slab"). In its external expression, he writes, "it contributes nothing to the development of twentieth-century architecture that was not already fully and more convincingly worked out over twenty years ago in America."

Such outspoken comment is very satisfactory. If we must have such a building, let it at least go up to the accompaniment of heavy broadsides from peope who like good architecture and know it when they don't see it.

KEEPING TO THE POINT

ASTRAGAL'S note on the Hinkley Point power station had gone to Press last week when the three contractors concerned held a conference to talk about their plans. After a preliminary skirmish to see who could pay the most compliments to his fellow contractors, they got down to business, and to anyone educated in nuclear physics the whole thing would probably have been extremely interesting.

A few new pieces of design information did emerge among the technicalities. The tiny harbour at Combwich, on the River Parrett, is to be enlarged. so that heavy equipment can be brought by sea and avoid the towns, and there will be a landscape architect for the station. After a discouraging announcement that the layout had been dictated entirely by economics, ASTRAGAL was relieved to hear that Frederick Gibberd is to be responsible for the landscaping as well as for the buildings. We look forward to publishing another drawing showing how the station will look when it has really been fitted into the landscape. A first-class scheme for Hinkley Point could serve as an example for future stations-it seems that most of them are going up in remote places-and would encourage everyone who is anxious to have both atomic power and a country which it is still possible to live in. But ASTRAGAL suggests that the next enlightened body to do this sort of job should have the building and the landscaping designed simultaneously.

TWO-WAY DUTCH OUTING

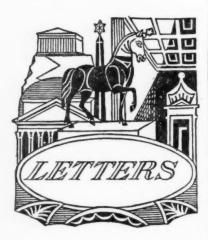
Last week ASTRAGAL heard of an excellent system for the international exchange of planners, which has been devised by the indefatigable Percy Johnson-Marshall—one of the LCC's group planning officers. A party made up of members of the LCC planning staff had just returned from a long week-end in Rotterdam: they had travelled cheaply on a charter flight, and had stayed in the homes of Dutch planners. They are now arranging to entertain a similar party from Rotterdam in their own homes.

At a Press conference held at the AA (which failed to interest the national Press, who probably thought planning went out when the 7 per cent. bank rate came in) the LCC planners were very enthusiastic. They were deeply impressed by the work done in Rotterdam and were convinced that

they had learned more by "mucking with their Dutch colleagues than they would have done in hotels. And naturally enough they were grateful for the organization of a comparatively cheap trip-particularly the juniors and the married men with families.

Mr. Johnson-Marshall, who sold the idea to Rotterdam's planning chief, Van Traa, also persuaded the British Council to contribute to the fares of the Dutch party (the Netherlands government helped the LCC party). And now, with other town visits under discussion, he is hoping to run across some generous-hearted benefactor. So leave the Journal open at this page if you are having one to dinner.

ASTRAGAL



" Just Another ARIBA"

" A Visitor"

Norman G. Marcus

V. A. Wannop

Still Overcrowded?

-It was with interest that I read Peter Scher's article on education (Sept. 12), and I agree with many of the suggestions and changes he suggests.

What amazes me, however, is that architects should be discussing the method of training for the profession when the whole architectural set up is so topsy turvy and out of date. Surely, isn't it about time that architects were a little less concerned with training and concerned with how that training can

be related to what the public want.

To me it is quite useless to think of any form of training before we place education in its proper perspective, and view the whole problem in a logical sequence, as follows. 1. Decide the number of qualified architects

required per year to carry out the work for which an architect is normally trained.

2. Determine the best possible means of training for this work.

3. See that adequate and fair remuneration (related to other professions) is paid.

Ask any ARIBA who has been trained, either at full-time or part-time schools, during the last ten years, what percentage of his training, especially design and professional practice, is being put to one hundred per cent, use, for the community as a whole, and you will be surprised at the answers given. A large number of architects are not being used as professional men, but as glorified draughtsmen. And until some body decides to relate supply to demand, then enthusiastic architects who wish to put into practice the ability for which they have been trained, are going to continue being completely frustrated.

My own view is that the architectural pro-fession is very overcrowded, simply because the inadequate business organization for relating the above three items. Let us soft pedal the training of architects for the next few years, and devote our time to seeing that our present ARIBA's ability and training are put to their correct uses, before trying to think of new ways of training.

"JUST ANOTHER ARIBA."

Creeping Dereliction

SIR,—The photographs in your report (Sept. 5) reveal a great deal of dereliction within the Pembrokeshire National Park and this is not infrequent, but commonplace in certain areas. One is tempted to ask if the powers which created this National Park are blind to the fact that finance is necessary to ensure the removal of all the eyesores, so that this beautiful coastal belt may be a Park in the fullest sense.

Unfortunately the remains of war-time camps go hand in hand with ugly overhead cables, decayed and mined buildings in some of the villages, untidy foreshores and sometimes the careless disposal of rubbish spoils an otherwise beautiful view.

Many of the new buildings in the villages are out of character and ultimately, as new replaces old, the attractive unplanned charm of many communities will have gone for ever.

If the nation is to lose part of its Park to industry then someone should see that what remains is not lost to unimaginative building and creeping dereliction.

"A VISITOR."

How Long Is A Piece Of Plywood?

SIR,-On September 12 you illustrated sliding and folding doors at offices in Bir-mingham. The following statement was made about plywood:

"The horizontal line which occurs about 1 ft. 4 in. above the floor is occasioned by the fact that the plywood on to which the veneer is backed is only obtainable in 8 ft, high pieces. The architects prein 8 ft. high pieces. ferred to express the join with a vee-shaped checking rather than to attempt to conceal it."

We should like to point out that plywood is obtainable in lengths of up to 12 ft. (144 × 48) and blockboard for the doors (1½ in.) is also obtainable in 144 × 48.

In addition, we should like to say that the implied limitation to the length (or width) in which modern plywood can be obtained is incorrect. We, and other members of the British Plywood Manufacturers' Assothe British Plywood Manufacturers' Association, supply boards in lengths of 20 ft., 25 ft., 30 ft., etc., using the scarf joint method. Boards so joined are used for method. Boards so joined are used for pontoons, assault boats, aircraft flooring, and the method is recognized by Services and Government Departments as one which will give substantial strength. would go so far as to say that the method of scarfing and the adhesives that we use here with scarf-jointed boards at the point of scarfing strength may even be increased.

There certainly would have been no difficulty in our supplying through any of our stockists plywood and blockboard, 9 ft. 4 in. in length veneered with sycamore, for the attractive sliding and folding doors for the offices in Birmingham.

Middlesex.

Avoid The "Daily Maul"

NORMAN G. MARCUS.

SIR,—London County Council have published a well-illustrated booklet* which they bravely call "A Plan to Combat Congestion in Central London." As an explanation to businessmen of how and why the size of their new offices is going to be limited by plot-ratio control the booklet does well, to propose it as a plan to fight Con-

gestion is a bit too thick.

By the LCC's calculations there were, in January of 1956, some 600,000 people working in the offices of central London, and enough new offices had then been given planning approval to bring in a further planning app daily 150,000.

Now, the LCC's new plan. This is to contain within the office zones of the Develop-ment Plan the kind of large offices that since the war have marched out of the city across the West End and up to the Royal parks. There is to be no reduction in the amount of office space originally intended for the office zones. Only in the West End where, mixed with shops, the remaining town houses and a few defiant theatres, will new offices be cut down to smaller size. Here between a half and a third of the floor space till now allowed on a plot will be withheld unless it is used for flats or a hotel.

Fair enough, except that in their com-mentary on the new plan the LCC admit that since the war their floor-space standards have been normally exceeded, and that in few instances were offices of a size less than the ostensible standard. In another confession it is said that the newly-revised standards won't be rigidly maintained, but will be relaxed for deserving cases. Not so fair enough. In the end we've got a scheme that scarcely deserves being called "A Plan to Combat Congestion." It can do nothing to clear up the present mess and little to ease the confusion of another 150,000

people in the middle of town. Now, the LCC have thoughts of their own New Town, so why not instead something like a New "City"? Why not found a major centre for offices in outer London, one with an initial prestige and an eventual size so that even the smaller office could move there? A centre not rival but commove there? A centre not rival but complementary to the City, for the kind of office not bound tightly in the intimate business life around the Bank and the Stock Exchange, for just the kind of office that has spread over the West End since the war. A form of Development Corporation must do the job, though much better if businessmen themselves could do it—as in Pennsylvania they saved Pittsburgh from the smog. if the Government won't be the founders, it would take the LCC no more time to raise the money than for their New Town. Surely the taking of 200,000 office workers

out of the daily maul in town would be a better thing for London and the country than a New Town? V. A. WANNOP.

London.

* Reviewed in last week's JOURNAL.

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Sir William Holford is to assess a limited Sir William Holford is to assess a limited international competition for Toronto's city hall and square, in collaboration with Ernesto Rogers, Eero Saarinen, as well as Gordon Stephenson and C. E. Pratt, Canadian architects. The eight competitors who will be invited to take part in the second stage of the competition will each be paid \$7,500. The winner, who will be the architect for the building will receive \$25,000. tect for the building, will receive \$25,000 in advance of fees which are set at 6 per

cent. of the building's cost.

The cost of the building will probably be limited to \$18 m. For a deposit fee of \$5 (or its equivalent) architects can get copies of conditions from Toronto's pro-fessional adviser, Professor Eric Arthur, c/o City Hall, Toronto, Canada.

CIAM has now decided on its future shape. The reorganisation committee and the council and delegates who met at La Savvaz. Switzerland, earlier this month, decided that CIAM, whose former groups decided that CIAM. whose former groups are dissolved, will now be composed solely of "individuals without reference to place or nationality." A co-ordinating committee which has been appointed—with J. Bakema, of Rotterdam, as general secretary—will decide who the new members will be. Their decision will be made partly "on the basis of recommendations from former CIAM groups."

Al! matters of organisation are in the hands of the co-ordinating committee until after a working congress of the participants has met. The committee say that the primary aim of CIAM now is "to establish the interrelation of the social structure and the contemporary means of expression." Its title has become—CIAM: Research Group for Social and Visual Relationships.

£50 is the first prize in a competition for a motif to symbolize the recently-designated Northumberland National Park. There will be a second prize of £10. The conditions can be obtained from J. B. Ross, county planning officer, of County Hall. Newcastle-upon-Tyne. The closing date is November 30, 1957.

Edward Mills has become consultant architect to the new advisory service of the UAM Group of companies. The object of this service is both to give advice to intending users of any of the materials in which the group is interested (asbestos cement, pitch fibre and reinforced plastics) and to assist in the development of products. Desmond Kirkness, the managing director of the group, told a Press conference last week of the backwardness in design of our own asbestos cement industry when compared with those of other countries.

Mr. Mills says that his appointment stemmed from a recommendation by the Industry Liaison Sub-committee of the RIBA's Science Committee. Manufacturers Edward Mills has become consultant archi-

RIBA's Science Committee. Manufacturers

—the sub-committee had said—should
make a fuller use of architect consultants.

An open letter to local authority architects has been written by the RIBA's Ad Hoc Committee of Salaried Architects and Structure of the Profession. We print it here in full.

"Those familiar with the aims of the Ad Hoc Committee will realize that we are constantly debating whether, if a pressure group representative of the entire profession could be formed, it would find itself uniquely well placed to ensure that architects are properly employed and rewarded by the society they serve. None of us on the Committee has ruled such a pressure group out of court, but candidly nothing in our studies so far suggests that it is the

lack of one that is the root cause of the problems we are required to examine. The development of an aggressive British Architectural Association, wielding a big stick in the manner of the Transport and General Workers, is in our view some long way off, and it would be a pity if anyone had illusions about this

sions about this.
"Nevertheless, in the field of negotiating machinery (which it is as well to remember need not be our only weapon) there is everything to be said for improving what already exists. Local government machinery is a case in point. Those directly concerned will know that this negotiating machinery is being overhauled, and now is the time to ensure that, in whatever emerges, the major professions shall be singled out and recognized as a clearly defined class, whose interests shall not this time be submerged by the sheer weight of non-professional numbers. There is every reason to think that our colleagues in the major professions are as determined about this as we are.

"They are, however, better equipped than we are in that, if we can all get our voices directly heard at the negotiating table, they have to hand the necessary societies from whom representatives could be appointed to serve, whereas we have not. Our profession has the County City and Borough Architects' Association, but this is limited to watching the interests of Chief Officers and Deputies and there are good reasons why it cannot be expected to expand its terms of reference to include the remainder. Who then shall speak for those below Deputy level? Many would say the RIBA, but the white the state of the terms the would and his root. familiar ones: (1) The Royal Charter pre-cludes it (as for that matter the Law Society's prevents their 'representing' Solicitors); (2) RIBA membership includes architects in every kind of occupation, whereas any society seeking recognition as a negotiating body would need to be limited

to local government officers.
"Our Committee is thus led to the conclusion that we are likely to want to encourage before long the establishment of a local government architects' society to cover Assistants, but closely associated with the RIBA. Such a society might well find enough good works to do to justify its existence in any case, but appointing representatives to negotiate for Assistants would be among its more important function. be among its more important functions.
"It would, of course, be unrealistic to

look for any radical change in the balance of power among all the associations con-cerned in local government, simply by reason of our getting the professions estabreason of our getting the professions estab-lished on a proper footing. Everyone knows that on the Staff side, NALGO is predomi-nant, and there are many who would not wish it otherwise. At any rate, our society would clearly need to be thought of as supplementary to and not a substitute for the overall machinery, which has after all been laboriously built up through long and sustained effort.

'We shall want to look into all this more "We shall want to look into all this indice closely, for the pattern of negotiating machinery is still in the melting pot and no one yet knows precisely what can be made to emerge; but local government architects are invited to give the matter some thought and to send their observations to the Secretary for Professional Relations, PIRA 66 Portland Place London W1. RIBA, 66, Portland Place, London, W.1, and to indicate whether they would become members of such a society if it were established."

RICHARD H. SHEPPARD

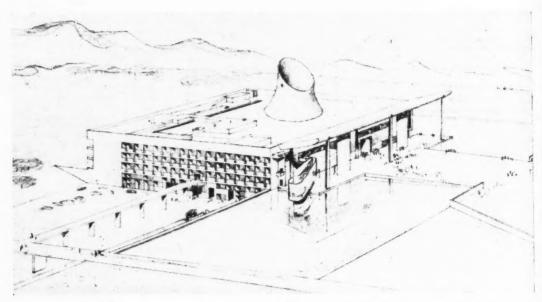




Two views of the general display in the pavilion provided by the Board of Trade, in collaboration with the COID, at the recent Helsinki Fair. The designer was Robin Day. Five furnished rooms (on the left in the bottom picture) were designed by Helen Challen.

LE CORBUSIER, 65 to 70

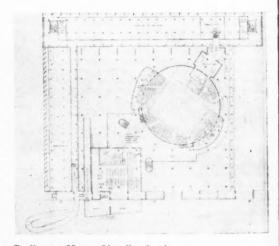
OEUVRE COMPLETE, Vol. 6, 1952-57*, reviewed by Reyner Banham



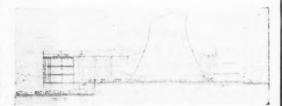
Parliament House, Chandigarh, with upper part of the Assembly Chamber rising above the roof of the main concourse.

Le Corbusier is seventy this year, yet it is only in the last eighteen months that anyone has been able to pin down a quality that genuinely runs through the whole of his work. This was the proposition, brought forward by James Stirling at last year's ICA symposium on Ronchamp, that Corb is an erudite, rather than an inventive architect. This may appear a shocking (or banal) observation, but its implications are particularly worth consideration in the light of the buildings and projects illustrated in Volume VI of the Oeuvre Complète,* which covers the work of the last five years.

What the proposition means in practice is this: faced with a particular problem-how to put a hand-rail on a spiral stair, or a motor-road through a city-Corb can always find in his mental filing system (or his notebooks) a ready-made answer that he remembers having seen somewhere or other. The method is of Beaux-Arts extraction-old Gaudet, who taught Perret and Garnier (and thus taught Corb at second hand) used to refer to this kind of information as "the luggage you need to take with you," but with him it was always drawn from the history of French architecture. Where Corb is originalindeed, where he is Corb-is that his ready-made answers are picked up from all over the place, from Turkey, aeronautics, the peasantry, prehistoric remains, his own followers, ships, bicycle-racing and practically anything else you like to name, and a large part of his genius lies in the craft with which they are transposed out of context and turned to utterly unexpected use-an example to be going on with is the gargoyle at Ronchamp derived from



Parliament House, Chandigarh, plan.



Parliament House, Chandigarh, section.

^{*} Editions Girsberger, Zurich, Price, 48 Fr.



the spill-way of a dam designed in the thirties by a M. Coyne.

However, Vol. VI abounds in examples of this kind of thing, some of them classic cases of his ability to take an idea, turn it inside out and upside down, apply it to some function that's a mile away from the original and still leave it making sense. The best, without a doubt, is the project for the parliament building at Chandigarh. Much of it is old and familiar: the sun-breakers, the gigantic porte-cochère, the column grid that marches rough-shod all over the functional plan, and that highly Corbish device of "the two geometries"-a major curvilinear interruption to an otherwise rectangular plan. In this case the interruption is the Assembly Chamber itself, and its form is obtrusively derivative from something quite different. As the text says in the execrable English that is now practically a house-style with this publisher "here the principle of industrial cooling towers has been applied to the architectural intentions."

One's immediate reaction, caught flat-footed by this masterstroke, is to acclaim it as a brilliant method of clearing away the hot air (no cracks!) from a body of tropical MP's. Two thinks later one has a sudden catastrophic vision that of air rising and cooling, and gallons of exhaled moisture and Sikh perspiration condensing out and showering down on the legislature. No call for alarm, Supermind has the situation in hand and cool air will be pumped in at the top, extracted at the bottom, and the thing has a roof on it anyway. The reasons for the cooling-tower form are nothing to do with airflow but (as in the case with cooling towers too) for the sake of an economical concrete shell to wrap round a tall circular space.

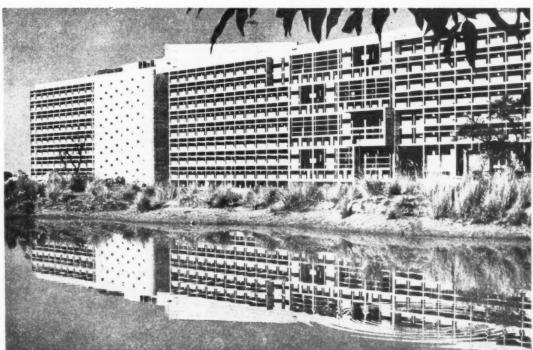
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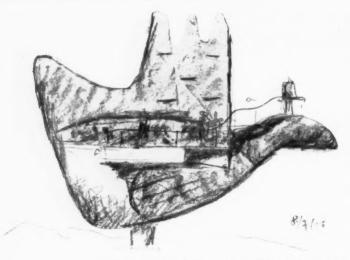
Nine courts of justice under one roof, Chandigarh.

But why a tall circular space anyhow? The answer, one suspects, is what Wally Harrison did to the UN assembly building. If one suspects correctly, then we have a close sight of the true quality of originality in Corb's eclecticism. When the original double-cheese-wedge form was replaced by a sagging catenary roof with a pimple-dome poking out of its low point, everybody groaned—but Corb seems, alone, to have discerned that here, in the wreckage of one of his most masterly functional-formal conceptions, lurked the germ of another one, that could be made equally masterly when the weak form of Harrison's cupola had been replaced by the gay splay of the cooling tower.

Below, two views of the Secretariat, Chandigarh, showing a ramp-tower and the fenestration of the Ministers' rooms.







A recent version of the projected "Open Hand" at Chandigarh, with the thumb used as a viewing platform.

We learn from experience, and it is always better to buy the experience of others than to have to live it oneself. But it is a kind of genius to let other people live it for you while you derive from it knowledge they won't ever miss. It is also a kind of genius to remake your own earlier experience in a form that people can hardly recognize, as Corb so often does.

Thus it is a rule of thumb in Corb-criticism to expect him, in designing a large and complicated structure, to put all the repetitive, standardized accommodation (flats, dormitories, offices) in a large rectangular slab, and all the unique elements (creche, refectory, council chambers) in separate boxes under, alongside, atop the slab. The Pavillon Suisse is the text-book example, but in the recent Unités there are no lateral projections and the stairtowers have been pushed back inside the slab, which is left flush-sided, more or less. But now in the Secretariat building at Chandigarh the main vertical circulation, in the form of ramp-towers, is set outside the long run of the block, and at an angle to it, thus breaking up the flat of the façade about as emphatically as it could. At the same time the main non-standardized accommodation, the ministerial suites, instead of being located, say, on the roof, are made part of the main slab and erupt on its façade as a complete change in the sun-breaker griddoubled scale, set-backs, projections, canopies and whathave-you.

What is more, this area of breakdown in the grid is not contained neatly between one expansion joint and the next, but spills over into adjoining sections of the building, and it is in this, much more than the more obvious novelty of béton brut and gross sculptural plasticity, that one sees the change that has come over Corb in recent years. The mode of designing exemplified by the Pavillon Suisse is an additive one, in which each verbally

Left, Le Corbusier's museum for Ahmedabad, designed in 1952-3; right, Junzo Sakakura's museum at Kamakura, Japan, designed in 1949.

identifiable function is served by a separately conceived "element of composition," to give them the name that Guadet gave them, and much of the zip and clarity of Corb's earlier work came from the way that the separateness of these elements was made so clear that even a little child would notice—the apotheosis of this particular form of aesthetic infantilism being the porter's lodge at the Pavillon Suisse, which is tucked under the edge of the main slab, but isolated from it by a well-advertised sixinch air-space.

The ministerial eruption in Chandigarh Secretariat, cautious as it is, seems to herald the decay of this additive method. The profit that Corb could derive from its complete dissolution would be the ability to design buildings no longer as aggregations of independent elements, one per function, but as unitary envelopes, inside which the functions are fitted. The difference can be phrased in English terms as the contrast between the additive obviousness of early finger-plan Hertfordshire schools and the single rectangular volume of Hunstanton. You would have had a job to find anything as all-of-a-piece as the latter in Corb's earlier work—even the Villa Savoye breaks out in "elements" on the roof—but now in Vol. VI there is one first-rate example of a unitary design.

Not the High Courts building at Chandigarh, whose appearance of unity is a neat trick-you line up justice in a row of nine compartments, clap a roof on top and, hey presto, a railway carriage! Not the High Courts in Chandigarh, but the museum in Ahmedabad, an almost unpierced rectangular of uninformative brick façades, stilted up on dumpy pilotis and closed by a concrete lid. It is conceived as a single built volume in its own right and may well stay that way since rumour has it that the planned subsidiary pavilions may not be built. It is the nearest thing so far to the Boîte à Miracles he proposed at Hoddesdon CIAM congress, a great shoe-box full of space that would be equally useful for uplift, down-beat, mothers' unions, boxing, beetle-drives and any more for the skylark. The interior of the Ahmedabad job isn't as undifferentiated as that, of course, but it's vague enough to give the museum staff a mild crop of duodenal ulcers every time they have to hang an exhibition-though nothing like as bad as that grandiose, hyper-cerebral concept that lies figuratively buried beneath it, the extensible spiral museum.

Ahmedabad, in general, has called forth from Corb work of a more relaxed kind than at Chandigarh. At the latter he clearly feels compelled to give of his best even if it kills him, and the effort involved in outdoing Lutyens' New Delhi on a shoestring is so heroic that its proper monument is the proposed Open Hand sculpture, because it unavoidably calls up the mental image of a gigantic Modulor Man, already buried up to the ultimate wrist in the burning plain, like a latter-day Ozymandias the Great. But at Ahmedabad nobody is pitting his genius against the inscrutable East, and Corb is happy to freewheel and repeat himself (and to repeat the work of his own followers; the museum is an obvious pup off his pupil Sakakura's at Kamakura, Japan).





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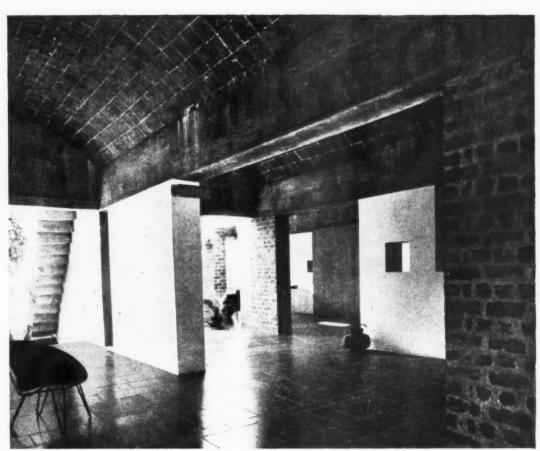
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Diagonal view through the car port and open verandas of the Sarabhai house.

And at least one piece of self-reiteration at Ahmedabad is a real peach; the house for Mrs. Manorama Sarabhai. The idiom is familiar, brick piers and tiled vaults—familiar from the Jaoul Houses and also from the little semi-subterranean Maison de Weekend of two decades ago—but here it is done on the scale of a substantial villa, and

also, the peasant qualities and, notably, the "Catalan" vaults, that look a bit arch in the Paris suburbs, seem perfectly at home here, even without the master's sentimental prose-poems about "materials friendly to man." Spacious without ceasing to be reassuringly domestic in scale, beautifully related to its garden and site, frequently

Although the Sarabhai house has open views running through from garden to garden (right), it was found necessary to instal in some of its inner recesses suspended fans, below, that have excited the wrath of the architect.





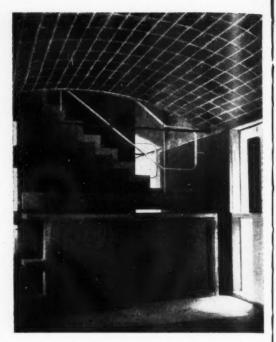
U.S. Embassy project, New Delhi, by Ed. Stone.

dramatic in its interior effects, rich in texture, but not by means of expensive materials, the Sarabhai house could make "manoramic" an alternative term for "fabulous," and certainly puts Corb in the front rank of dream-house builders.

But not in his own eyes. He has some pretty big reservations about this building and claims that it is not the one he designed. What it seems to come to in practice is that he didn't design enough overhead airspace into the rooms for comfortable natural ventilation, and the Sarabhais have made good this deficiency by hanging traditional three-blade punkah fans from the crowns of the vaults. These, he avers, "font hou-hou dans le plafond" but whether this is meant aurally or visually is not clear. What is clear is that to British eyes, perfectly accustomed to such fans in Indian interiors, but not at all accustomed to tiled vaults, the two things go together perfectly naturally in an exotic image of the mysterious-type Orient.

All the same, future art-historians are going to have to pose this question—Has Corb, as the architectural servant of the Progressive *idées-fixes* of the mid-century, done any better by India than Lutyens as the architectural servant of the Imperialist *idées-fixes* of thirty years earlier? Corb, casting out his shoe over the "English, Scottish and Tuscan" architecture of the British Raj is in no doubt,





The Jaoul House, Paris: Sarabhai elements on a cramped suburban scale.

yet in his description of the Sarabhai house he virtually admits that he can't design for hot climates because his imagination is manacled to a set of old-time European atavisms, such as the ineradicable belief that a house should be warmer inside than out. Indeed, what Chandigarh and all his other recent works reveal, is a mind as basically European as a Doric column, steeped in the building traditions of the now small and parochial Mediterranean basin. You have only to imagine the pretty grille-work of the "Taj Maria" (Ed Stone's Embassy building in Delhi) set among the concrete of Chandigarh to see that Corb's passage to India terminated, mentally, somewhere about the arch of Ctesiphon.

Left, Ronchamp as the pilgrim finally finds it; below, exterior in use for a pilgrims' service.



The reverse of this coin is, of course, Ronchamp-a gesture of solidarity made by a European traditionalist to the European tradition. But not to Orangemen, kilted Presbyterians, Bethesdans, Bethelites and the whole horizontal spread of low, broad Anglicans. To them, all pilgrimage churches-Compostella, Vierzehnheiligen, Walsingham-will be equally exotic, if not improper, and one suspects that it is an inability to comprehend the function of the building that has made Ronchamp such hard going for Anglo-Saxons. It is not a good protestant auditory, it is not an arena for Liturgirama, it is not a bawling-box for Sankey-and-Moody tooth-cleaners. It is a landmark for the pilgrim to aim at, it is an exterior acoustic shell from which he can be congratulated in bulk on arriving, and it is a contemplative interior in which he can meditate privately on his intentions and accomplishments in having arrived.

These functions Ronchamp serves, and it is these functions that have blocked its acceptance, just as they blocked the acceptance of Baroque church architecture over here. So much so that some public mouths have announced that Ronchamp is Baroque. How silly can you get? The forms of Ronchamp have traceable ancestries, in technology, in Corb's own paintings and Fernand Leger's, in peasant architecture, in mediaeval fortification . . . which is where we came in, on the theme of his formal and functional erudition.

This is a very rare note on which to leave an undoubted genius who is now seventy. At that sort of age most creative minds have achieved a sort of absolute originality—as in Cezanne's late watercolours, Michelangelo's Roman architecture, Einstein's fast cosmogenies—that is extremely private and draws almost exclusively on internal resources, not on external stimuli. But not Corb; he is still a predatory genius, seizing what he needs from the external world, acquiring it raw and digesting it himself. In other words, his talent still has its own teeth—and of how many other architects of his age could this be said?

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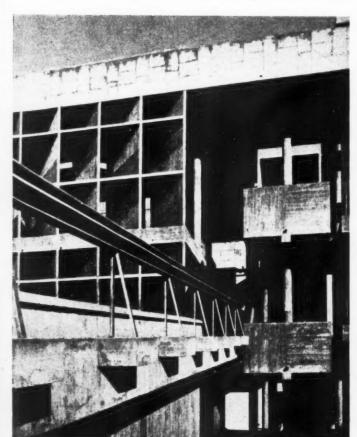
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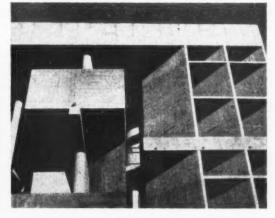
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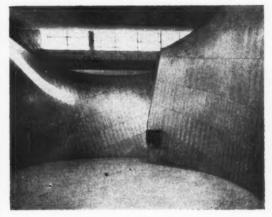
below.



Above, the "contemplative interior" of Ronchamp. The dramatic emphasis on thickness of wall, pierced by diminutive openings like arrow-slits in a castle is in striking contrast to the Millowners' Building at Ahmedabad, below, where concrete is used almost as if it were of sheet material, giving the effect of a student's balsa wood model magnified to the scale of life. Even the curved walls of the Conference Room (below, right) are of brick, in spite of their wooden appearance.







This is the second of two articles. Last courses available to them. This week he week Alan Tate explained the exams which " management level " builder-students have to pass and described the many training in which it might be organized.

concludes by considering the need for joint architect-builder training and discusses ways

TRAINING FOR MANAGEMENT

EDUCATION FOR BUILDERS

by Alan Tate

Joint training

The position has now been reached in the building industry where it is widely agreed that training must be comprehensive. It must, in other words, include adequate theoretical instruction plus appropriate practical experience. Training for management, as distinct from technical training, should encourage a rational approach to such problems as organization, methods and communication.

The type of course that could best provide this comprehensive training is at present being considered by the Management Training Committee of the NFBTE, but it is improbable in so diverse an industry as building that any one method will be so strongly supported by the federation as the "recognized school" system by the RIBA. At this point, we might quote the report of the Joint Committee on Architectural Education (the McMorran Report, 1955).

"Many people concerned with the subject feel that the training of the architect should be linked with training for management in the building industry. Builders have to recognize the situation that managerial posts may properly be filled either by promotion from the crafts by way of general foremanship, or through professional channels such as building surveying or accountancy. This creates difficulties in the organization of training courses and in the establishment of a standard of qualification. Some schools already aim at providing a common training ground for the technical, managerial and professional components of the industry. It has been suggested that this kind of training might well be further developed, and, in so far as it would keep architectural students in closer touch with the practical and economic aspects of design, should be welcomed.

"When the practical experience requirements for Associateship RIBA come into force in 1955 there will be an increased demand for situations on building sites in the capacities of assistant clerks of works, junior surveyors, and the like. It may be difficult for builders to help the architectural profession in this respect, because of the demands of their own trainees, but it seems advisable for the Royal Institute to make some enquiries on the point. Young men training for the building industry would gain much from periods spent in architects' offices and it might therefore be possible to make reciprocal arrangements.

"Closer liaison between builders, surveyors, engineers

and architects on training matters would seem to be most desirable, and the Royal Institute should promote a conference on the subject."

This latter suggestion led to the Conference of January 31, 1956, convened by the Joint Consultative Committee of Architects, Quantity Surveyors and Builders. It was attended by over 100 delegates representing most of the interested bodies. It issued the following resolution:

"That this Conference, being confident that the building industry could improve its standards and raise its productivity by inter-relating the training of its constituent administrative branches, invites the Joint Consultative Committee of Architects, Quantity Survevors and Builders to sponsor a representative National Committee to keep under review the current systems of training, including qualification by examination, to consult with responsible bodies and to assist in promoting mutual developments."

The outcome of this was a Joint Advisory Committee on Training in the Building Industry, consisting of ten members to be nominated by the Joint Consultative Committee, the RIBA, Board of Architectural Education, the Board of Building Education, and the Quantity Surveyors' Committee of the RICS. Its terms of reference are: "to explore current systems of training and to make recommendations for future action, including the setting up of a committee as envisaged in the resolution passed at the Building Training Conferences held in January 31, 1956." In considering the possible methods of implementing the recommendations of the McMorran Committee, and other bodies, for joint architect-builder training, one has obviously to take as a starting point the present building/architectural educational system. This consists very broadly speaking of the RIBA " recognized schools" largely university and/or art school based and, on the other hand, the Technical College building education system closely integrated with the industry and incorporating a growing (but as yet small) number of IOB "recognized" courses. The AA are evidently considering training builders (AJ, July 19, 1956), but there is, so far as I know, no architectural school yet at which architect/builder cooperation can be learned. At some building colleges which include RIBA listed or recognized schools-such as Brixton School of Building-co-operation of a sort can and does exist, however. This includes the con-

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s (AJ, archier coolleges —such a sort e construction, by craft apprentice students, of projects prepared by architects, and regular teaching by the same staff of both student architects and builders. Opportunities for informal social contact also exist. It has already been suggested that a "joint" course might be run at a leading architectural school and this would seem to be a desirable development. In addition, the universities with schools of architecture might initiate degree courses in building which (unlike the one at Manchester) could be linked with architectural courses.

At present, however, it does seem that the best centres for the development of joint training on a considerable scale through existing machinery are the larger technical colleges. These colleges can already fulfil all the requirements of building education including, in the case of sandwich courses (with the co-operation of the industry), appropriate practical experience as part of the course. Most architectural students at the recognized schools enjoy a first class liberal education but lack contact with the building industry until after qualifying. The industry and a large part of the architectural profession seem to agree that this deficiency is serious, but no specific suggestions have yet been made which might lead to a solution*. The McMorran Committee (quoted above) did suggest that student architects should have experience on building sites but this is, in my opinion, impractical at present partly because of the relatively short periods for which architectural students are available and partly because they usually learn, in the early years of school training, very little that is of direct use on the site.

Joint sandwich courses?

There might be a number of ways to overcome this difficulty, but one way—which seems to me at least possible—is to organize a number of four-year architectural sandwich courses alongside selected existing building sandwich courses. The institutions at which such courses might be run would have to be those capable of giving all facilities for architectural and building studies, and should desirably include RIBA and IOB recognized courses. The object of a joint course would be to enable students of building and architecture to work together during their most formative years and to give real opportunities to the student architect to learn by experience something of the industry which he is learning to lead.

So far as the student builder is concerned such a joint course would differ little from his present course. He would take some classes of common interest alongside his architectural colleagues and would probably do some studio work with them. He might also engage in some group projects—especially in later years—with the architect and, by so doing, enlarge his own understanding of the industry as a whole and particularly the rôle of the designer.

For the architectural student the course could be more revolutionary with emphasis in the first year on building construction, building science and surveying and levelling (subjects taken in 1st year sandwich courses) plus, of course, studio projects, history of architecture, and other work in which the building students would not take part. During the time devoted to these architectural studies the building students might pursue accountancy, additional maths, and the subjects at present included in the first year course (see previous article, AJ: September 19, 1956).

With the additional technical knowledge gained in his first year, the architectural student would be as well equipped as the building student to work in a builder's organization, and thus his chances of getting a job in the industry would be greater. He would, of course, have to be available for six months' continuous work, perhaps as an assistant general foreman, helping to co-ordinate sub-contractors, or as a bonus clerk.

During the second and subsequent years at college the divergence between the two groups would probably become more marked. The "builders" would have to do quantities, estimating and builders' accounts, whilst the "architects" took theory of design, more history of architecture, and so on. Nevertheless, there would be common ground for each of the four years, though this might mean adjustment of the existing detailed syllabuses for both groups in structures, heating and ventilating, sanitary engineering and other subjects of mutual interest.

A subject hitherto not considered in either builders' or architects' training is building economics. This—the study of factors affecting economy in design and site operations—might well form an important "shared" subject for builder and architect students. In the second and subsequent six months' industrial practice periods, the architectural group might return to sites for one of these, go to an architectural office for another, travel for a third. Some part of one or more of these periods might be taken up with private study, a project, measured drawings, or other academic work if the periods at college proved insufficient.

Such a course would provide joint training—now widely recognized as desirable—together with practical experience in the industry, essential for both architect and builder. Moreover, experimental courses could be organized in established colleges already operating separate building and architectural courses recognized by the IOB and RIBA respectively.

There are, of course, snags. Only 10 per cent. of the 60,000 building firms responsible for 75 per cent. of building work in this country have more than 20 men, and a small builder could probably not afford to lose a good trainee for four six-month periods. Some sort of group training scheme operated by employers' organizations has been suggested as a possible solution. In addition the length of the course-a total of four years, including "industrial" practice-may be insufficient for architects, and the more academic parts of the present architectural courses may have to be dropped in order to include some building subjects vital to the "building" group, and so on. Despite these and other objections, I believe that joint sandwich courses might offer, as no other type of course can, architect/builder co-operation at student level. This could be done-at least experimentally-in existing institutions.

^{*} This article was written before publication of the Report on the proposed College of Advanced Technology, by the London and Home Counties Regional Advisory Council for Higher Technological Education. (AJ. August 1.)

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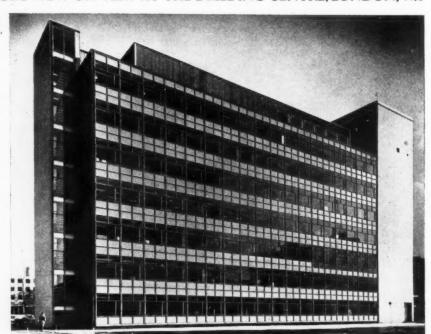
Module: usually 2' 0" Span: up to 10' 0"

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The photograph illustrates one of HOPE'S Window Walls 91'0" high and 162'0" long which was assembled from 126 separate units of specially designed Pressed Steel Sub-frames containing casements and insulated panels. The south elevation is similar in all respects.

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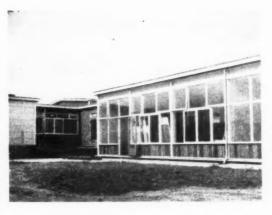
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MEMBER OF THE METAL WINDOW ASSOCIATION







Below is the first of a series of four articles on different aspects of the work of the Notts County Architect's Department (Chief Architect, Donald Gibson). Since the subjects of these articles differ they will receive different classification numbers. It cannot be emphasized too strongly, however, that each has a close bearing on the others in that the achievements outlined in articles 3 and 4 were made possible by the administrative arrangements outlined in articles 1 and 2. The titles of the other articles in the series are: Client/Architect Relations in the Design of Notts Schools; Design for Mining Subsidence; The Development of the Notts System of Construction. Those particularly concerned in the reorganization outlined below were K. Allerton, L. H. Blockley, R. N. D. Iredale, H. T. Swain and E. H. Turner, the Group Leaders; J. Scott, the q. s.; and E. H. Mozley, the administrative officer. The photographs above are a progress shot and a general view of Mansfield Bancroft Lane Infants School, which is the first school to be built by the Department after the reorganization described below. It will be referred to again in the last two articles.

7 PRACTICE

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the reorganization of a county architect's department

The examples of Hertfordshire and of MOE have shown what great things can be done by a sizeable public architect's office if the work is regarded as a special kind of co-operation between client, architect, builder and manufacturer. This co-operation requires a reorganization of manpower within the office. How can this be done by an office which is already grappling with a heavy load of work?" Our authors, W. D. Lacey and H. T. Swain, open the account of the work of the Notts County Architect's department by explaining how reorganization was carried out there.

In 1955 the Architect's Department made a general reappraisal of the County Council's building programmes. The following were the main problems which emerged. Firstly, the rate of school building needed to be increased because throughout the county the need for new school buildings was acute. Secondly, a more effective and cheaper method of preventing

damage by mining subsidence was needed. On schools, up to 10 per cent. of the nett cost was being spent as an extra on special subsidence foundations, and the buildings were still liable to be seriously damaged. In one annual school building programme the cost of the special precautions could amount to £60,000. Thirdly, the planning of new schools required revision in the light of ten years' experience under the 1944 Act, to ensure that the best use was being made of the money available within the Ministry of Education's ceiling costs.

It would obviously take some time to find a satisfactory answer to all these problems. But as an immediate step to improve the rate of school building the County Council decided to build the 1955-56 and 1956-57 school building programmes, consisting of 14 schools, in the "Derwent" system of timber construction. To further increase the speed of erection, one contractor was appointed for the whole programme, and the operation was planned with this firm, so that labour and materials were available as required on the various sites. The contractor was appointed as a result of competitive tendering on the first school.

In order to create time in the office for the research and development work necessary to solve the problems described in the first paragraph, the County Council employed a number of private architects on this two-year programme of jobs, and in fact 12 firms have taken part.

The next problem was to formulate a plan of operation for the research and development work, this plan fell into three main parts: (a) the building up of the office organization, (b) the selection or development of a suitable system of construction, and linked with this an investigation of the ground movements caused by mining subsidence, (c) a survey of educational requirements in relation to primary and secondary schools. Each one of these was clearly a major task. The work which has been done on part (a) will now be described and parts (b) and (c) will be dealt with in subsequent articles.

The change-over in the office

At this time (i.e. October, 1955) the Department was heavily committed with jobs on the board or in course of building. The majority of the groups were engaged on this work. However, target dates often as far ahead as six months were set by which these outstanding jobs could be finished on the drawing board. To begin with, the research and development on structure and planning was undertaken by a small group of three architects. After three months, preliminary investigation on the alternative forms of structure which might be developed had been done, and the planning survey had been started. Also, as a result of a vigorous recruiting drive, a number of new staff had arrived. In January, 1956, Group No. 1 -which was doing the structural development-was therefore gradually increased so that by mid-February it consisted of six architects. It was now given the task of producing a set of detailed standard drawings by June, 1956. By June, 1956, the target dates for the completion of the "backlog" of jobs were being reached and architects from the other groups came on to the job of preparing the standard drawings. In about nine months the pattern of work in the office had therefore been reorganized, the old jobs had been tidied up-although job architects were still spending about two days a week in supervising these jobs-the research work on planning and construction had been done and the majority of the architects in the education programme were now working on the new construction. The next step was to start the sketch plans for the first two schools in the 1957-58 programme. The working drawings for these jobs followed in due course. The groups were then working in the way envisaged when the office reorganization had started. Within each group the work of preparing sketch plans, preparing working drawings and the carrying out of site supervision is now going on all the time. Further, each group makes a contribution to the preparation of new standard drawings. In this way there is no special development group but architects throughout the Department are constantly making a contribution to the development work. The feeling that decisions are made by a special team which in their wisdom impose them on the rest of the office is therefore eliminated and development work is accepted as the normal function of the whole office.

Group working

With an anticipated school building programme of approximately one million pounds per year, and a programme of general projects, it was obvious that considerable delegation of responsibility to group leaders and job architects would be necessary. Whilst these architects would have to operate with a degree of independence it would be necessary for them to work within the general framework of the office policy. Also, with the complex problems of modern. buildings, team work seemed to have much to offer and, as Dr. Gropius has said, "the pooling of diverse talents and interests makes working in a collaborative group a many-sided experience." The method of group working advocated some years ago by the JOURNAL'S Guest Editors was therefore adopted. On the major projects the size of the groups varies from five to eight architects each with a group leader. The Education programme of primary, secondary and further education jobs is handled by three groups and the general projects-Fire, Health, Welfare, etc.-by the two other groups. It was felt that this division of work allowed each group to have a variety of jobs; for example, in the groups working on the education programme the projects vary from primary schools to Further Education schemes. At the same time this division of work provides the specialization necessary for architects to become familiar with the design and administrative requirements of the various Client Departments and Ministries. Altogether, in the five groups, 37 architects are now working on major projects and of these 24 are working on schools. Minor works jobs are dealt with in a separate part of the

Group leaders meetings

At the initial stage in building up the organization of the office a series of fortnightly group leaders meetings was started. These have now developed a regular pattern and are the means by which (a) Administrative information in connection with the running of the Department is distributed. For example, group leaders have recently been made responsible for checking annual leave, this was discussed at one of the meetings and the best method of recording it agreed upon. (b) Administrative procedure on the jobs is discussed—to quote from the minutes of a recent meeting-"The problem of co-ordinating the work being done by various architects who are obtaining quotations for provisional sums to be used on the jobs in the programme, was considered. It was agreed that jointly L.H.B. and H.T.S.* would produce an Information Sheet on this subject, telling job architects exactly what action they have to take when they accept those items on their individual jobs. In the preparation of this the quantity surveyors will be consulted." This Information sheet was reported on at the next meeting. (c) Progress of the work in the office is checked-this consists of a review of the Master Charts—which will be described in a later paragraph. (d) Policy on the detailed standard drawings is controlled-to quote again from the minutes. "K.A.* reported he had discussed the problem of the 'drop out' window with the Fire Officer and instead of a normal window he had produced a design using a louvred ventilator. This is acceptable to the Fire Officer. The meeting decided

^{*} Members of the staff.

Fig. 1. This is the programme working drawings for Clipstone Secondary Modern School. The names at the top are the assistant architects concerned. Opposite each is the total amount of time to be spent on the job. It will be seen that each architect has a form of hatching proper to himself and reference to the main chart shows on which drawings the time of each will be spent. It is the job architect's task to produce this chart in consultation with the other members of the group who will be part of the working drawing team. This form of chart has been found essential if a proper set of working drawings are to be prepared by the time they are required by the quantity sur-

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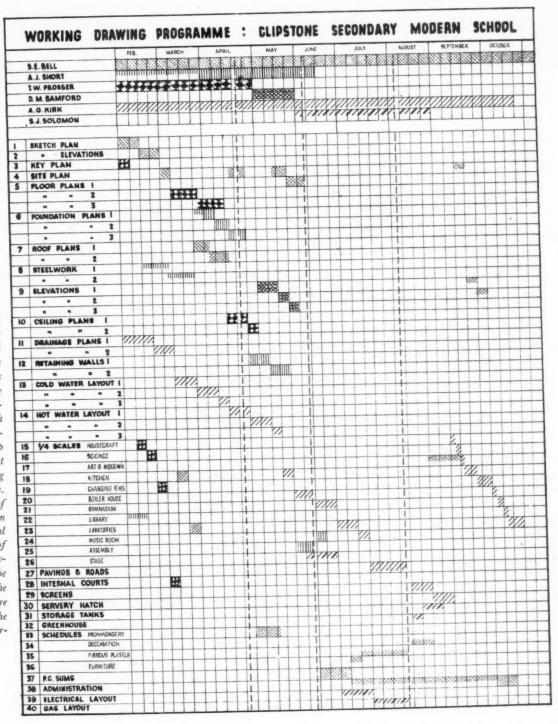
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it was a good proposal and K.A. was instructed to proceed with the details." This was then incorporated in the standard details for use on all schools.

An Administrative Procedure Information Book has been compiled and circulated to each architect in the Department. With the policy of delegating responsibility, and younger architects being responsible for running jobs, it was essential that all architects should have a reference book from which they could see the administrative steps to be taken at each stage in the job. This book has assumed the rôle of a text book on architectural practice and procedure. When it was being compiled the draft was discussed with the Clerk of the County Council, the Director of Education, and the County Director of Planning so that the architects' responsibilities at each stage of the job were clearly understood and agreed. The first section of the book consists of a check list of the administrative steps to be taken at all stages both in the preparation and running of the jobs. These are set out under Stage 1, Sketch plan; Stage 2, Working Drawings; Stage 3, Contract and Tender; Stage 4, Erection; Stage 5, Completion. The other sections consists of explanatory memoranda related to the check list in the first part of the book and are headed (a) Ministry Building Regulations and County Council Standing Orders, (b) Reports to Committee, (c) Fire Regulations, (d) Contract procedure, (e) Office organization. There are 35 copies distributed throughout the Department and it is obviously important that all copies are kept constantly up to date. With this problem in mind the book was produced in a loose leaf form and carefully sectionalized and indexed. Amendment sheets and additions are produced from time to time, for example, a memorandum on a new procedure for "Handing over" completed jobs was inserted the other day. The administrative section of the Department is responsible for seeing that these are all inserted in the books of the individual architects.

The completion of jobs on the dates required by the Client Department is regarded as of the highest importance. The progress of jobs through the office is therefore carefully planned. At the beginning of the Education building programme, for example, a master chart is prepared setting out the starting and completion time for the sketch plan, working drawings, quantities and contract period on each school. Unless events outside the control of the Department make amendments inevitable the dates on this chart are regarded as inviolable. In addition, each group has its own progress chart which is a more detailed breakdown of the Master Chart, and job architects chart the preparation of working drawings (see Fig. 1). It has been found that these visual records make architects more aware of the importance of timing in their work. The charts also form the pattern for the production and delivery charts which have been prepared in conjunction with the manufacturers of the prefabricated components. A further value is that they are a reliable basis on which to advise the Client Department and Committees of anticipated site starting dates, etc.

Sub-contracts and provisional sums

To make possible the development work on structure (to be described in detail in a later article), the County Council amended the Standing Orders dealing with sub-contracts and provisional sums. Previously, it was necessary to obtain competitive tenders for all provisional sums and these had to be submitted to Committee for approval. If the tenders were in excess of the estimated cost in the bill of quantities then it took three months from receipt of tenders for the final approval of Committee to be obtained. This arrangement had two serious limitations, first, it slowed down the placing of orders for sub-contract items and. secondly, the need to obtain competitive tenders precluded the possibility of the architect carrying out development work with one nominated contractor. The County Council agreed that with the new methods of building using factory resources, combined development work between the architect and manufacturer can often produce more economical building than with the old system of competitive tendering. Once the main contract is approved the County Architect now has authority to settle provisional sums by competition or

by nominating a single firm if he considers this desirable without seeking the approval of Committee, Before submission to Committee, the assistance of the Clerk of the County Council, County Treasurer and County Education Officer was obtained in the formulation of these changes in procedure and their help proved to be invaluable.

This greater freedom in running the jobs has necessitated a precise financial control by the County Architect. Because of this, a system of Variation Orders and Running Financial Statements, which together give the position at any stage in the job, has been adopted. The job architect is responsible for seeing that these are kept up to date and for drawing attention to any cases in which the amount spent on the contract is likely to exceed the amount authorized.

Cost control

One of the most important aspects of the service which the Department provides is to ensure that tenders come in at the estimated cost for the job, and that the best distribution of money has been achieved within this figure. In order to try to achieve this a method of cost control similar to that advocated by the Ministry of Education has been adopted for all major projects. A job quantity surveyor is appointed at the same time as the job architect and they co-operate on all matters of cost throughout the job. As soon as the draft of the sketch plan is available, it is discussed with the quantity surveyor, and where necessary modifications to area or perimeter shape are made in the light of the quantity surveyor's advice on cost. At about the time when the sketch plan of the building is determined, the cost plan for the job is prepared. Subsequently, as the drafts of the working drawings become available, the cost targets are checked by the quantity surveyor and, where necessary, the individual targets are altered as a result of this check. Experience on recent jobs shows that the individual targets need to be modified a number of times at this stage, as more detailed information becomes available. This process of cost checks continues up to the completion of the working drawings. Throughout the cost checking process the quantity surveyor is responsible for all the cost advice and only the cost checks prepared by the quantity surveyor are put into the cost plan.

With this method of regular cost checks modifications are made as the scheme is being detailed. Without cost planning, on the other hand, experience suggests there is a greater danger of having to alter drawings at the contract stage—a very much more difficult task—because cuts have had to be made to get within the ceiling cost for the job. It is realized that cost planning will not always prevent tenders exceeding the cost limit, but it is hoped it will reduce the risk.

In this article we have tried to show how, despite the pressure of work, the department has been organized so that development work can be done. We make no apology for having devoted this first article to the problems of organization, because until these are resolved it is impossible to follow up the opportunities for development work in planning and construction, which exist in a local government department.

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The Steel Skeleton-Vol. 2. Baker, Horne and Heyman (Cambridge University Press. 1956. 63s.).

The second volume of J. F. Baker's great work dealing with plastic behaviour and design of mild steel structures.

1 was reviewed in the Journal in 1954 and was a general review of elastic behaviour, the work of the Steel Structures Research Committee, its recommendations and the realization of the futility of pro-

and the realization of the futility of producing a comprehensive design formula in terms of elastic theory.

In Vol. 2, Prof. Baker is joined by his colleagues Horne and Heyman in a rather similar treatment of the plastic theory except that where in Vol. 1 he was one of a team, in Vol. 2 he described work in which he can only be described as a nonneer. Most of the material in the book pioneer. Most of the material in the book has, of course, been used in papers to the various Institutions but it is particularly interesting and enlightening to follow the experimental and analytical work chrono-

experimental and analytical work chronologically in the way it developed. The first six chapters are of a general nature. Chapters I and 2 are an introduction to the work of earlier scientists on beams and portals which were important in that they showed the great reserve of strength after the point at which yield first developed. Chapters 3 to 6 deal with simple plastic theory of bending and describe early work by the author, tests on and application to continuous beams and eventually leading to the full-scale tests on eventually leading to the full-scale tests on ortal frames.

Chapters 7 and 8 give the fundamental theorems of plastic theory and general methods of analysis. Chapter 9 deals with shakedown, that is to say, the consideration of failure from the application of varying loads to a structure setting up a cycle of plastic deformations.

Chapter 10 considers minimum weight design first by deriving general principles which show whether there is any reduc-tion in weight by transferring material from beam to stanchion, and second, by varying the section at different points. Chapters 11 and 12 deal with shear and problems of instability in beams. Chapters

13 to 15 cover the application to stan-chions so far as this has gone, though in the words of the text. "a general method of design for stanchions seems far away Chapter 16 examines load factors and the probability of loadings. Chapter 17 describes some of the work which has been accomplished in practice. There is an extensive bibliography referenced to the appropriate chapters and an index. The two volumes of the Steel Skeleton should be read by every steelwork designer.

8 ESTIMATING

current wage rates, market prices and measured rates

The small advances in materials prices resulting from the wage increase of May 27 last and which we prophesied last quarter have generally been realised. This steady upward rise, though depressing, is of little interest unless it happens to upset the balance between rival materials. Thus the rise in the price of steel by 55s. per ton might well have proved significant had it not been matched by a corresponding rise of 1s. per yard cube in mass concrete. In a period of rising prices it is a relief to notice even small decreases. Among the non-ferrous metals sheet lead has fallen by 8s. per cwt., copper by 45s. per cwt. and zinc by 17s. per cwt.; and among relatively new materials we note that the price of polythene tubing has fallen from between 5s. and 12s. per 100 ft.

Rates of wages rose on May 27, 1957, and are now as follows :

	Craft	tsmen	Labo	urers
London District Within 12 miles radius From 12 to 15 miles radius	s 4 4	d 7½ 7	s 4 4	d 1 0½
Liverpool and District	4	71/2	4	1
Grade classifications A Al	4 4	6 5 <u>1</u>	3	111

Market prices

Prices are given for the major items in each trade, they are intended as average prices and include delivery in the outer London area. They do not include overhead charges and profit.

Measured rates

Measured rates
Prices are for work carried out in the Outer London area and include 10% to cover overhead charges and profit except in the case of work which would be carried out by specialists when 5% has been allowed.

The prices given in italic represent the total value of the materials included in the measured rates, including an allowance for waste and 10% for overhead charges and profit. The cost of labour included in the measured rates (including its proportion of overhead charges and profit) (including its proportion of overhead charges and profit) can be ascertained by subtracting the prices in italics from the prices in heavier type.

Abbreviations

Appreviations
Inches: in. Feet: ft. Yards: Y. Yards cube: YC. Yards super:
YS. Feet cube: FC. Feet super: FS. Ton: T. Feet run: FR.
Thousand: M. Square: Sq. Number: No. Hundredweight:
C. Pound: Ib. Gallon: Gal.

To all estimates based on prices for measured rates add for Preliminaries, water, insurances, etc., depending on the nature of the job, say 10%

Price changes

* Shows changes in market prices and measured rates since the last issue (June 27, 1957).



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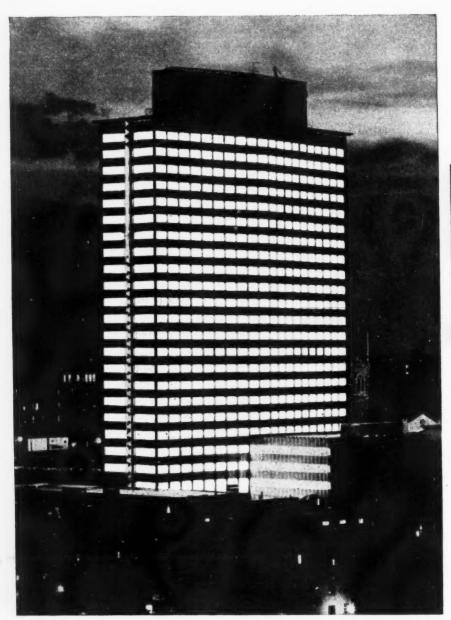
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technical section										
EXCAVATOR		s	d		s	d			s	d
Market prices				spreading and levelling not			Suspended floors and roofs			
Carting away, up to 8 mil				exceeding 200 yds. (using 6 yd. cube scraper)	2	71	4	rc	19	6
Hand los Machine lo		8	0	Removing excavated material and depositing, not exceeding			Suspended floors over 4½-in to 6-in. thick	rc	17	1
Hardcore	YC *			200 yds. (using 3 yd. cube dumper)	2	0	Suspended floors over 6-in. to 12-in. thick	rc	14	7
Ashes	YC *	10	6	Planking and strutting			Beds not over 41-in. thick	YC	9	9
				Planking and strutting to sides of surface or			Beds 41-in. to 6-in. thick	YC	7	4
Measured rates				basement excavation FS			Beds 6-in. to 12-in. thick	YC	2	5
Hand excavation and dispo	osal		1	Depth up to 5 ft. Depth up to 10 ft.		8	Hollow tile floor of clay			
NB: the following are applicable to excavation in heavy soil.				Depth up to 15 ft. Planking and strutting to sides of surface and basement trenches FS		111/2	tiles 4-in, thick at 15-in, centres laid on formwork (measured separately), nibs filled in with concrete (1:2:4) and finishing top			
Excavating over site to remove top soil and vege able matter, 6 in. deep As above, 12 in. deep	YS YS	1 2	2½ 5	Depth up to 5 ft. Depth up to 10 ft. Depth up to 15 ft. Hardcore, etc.		2 3½ 4	tiles with bed of concrete I-in. thick including tamp around reinforcement (measured separately)	ing	*17	
Excavating over site to reduce levels and getting				Hardcore filled-in in layers,	***		Ditto, but tiles 8-in, thick	YS	*26	10
out	YC	9	9	each layer well rammed YC	13	9	Ditto, out this only thick		18	
Excavating for basement and getting out	YC			Bed of ditto, 4-in. thick YS	*3	5	Sundries			
Depth up to Depth between 5 & Depth between 10 &	10 ft.	11 15 20	10	Ash filled-in in layers, each layer well rammed YC	*19	11	Finishing concrete with trowelled face to receive linoleum	YS	1	24
Excavating surface trenc	hes YC			CONCRETOR	17	,	Applying horizontal damp- proof membrane of Synthaprufe in three coats			
Depth up to		13		Market prices			to surface of concrete and blinding with sand to form			
Depth between 5 & Depth between 10 &		18 23		Portland cement, 6 tons and over T*	113	6	key	YS	5	9
Excavating basement trenches and ditto	YC			Rapid hardening, 6 tons and	124		Supplying floor clips (p.c. (each) and fixing	ód. No.	1	14
Commencing 5 ft.		10	,	3-in. down, washed, crushed			Formwork			
existing ground Commencing 10 ft. existing ground	below				18	1	Formwork including strutt	ing		
Commencing 15 ft.	below			11-in. ditto YC			easing and striking:			
Wheeling surplus excava				Sharp sand YC	22	1	Vertical faces of foundation		*18	2
material not exceeding 100 yards and depositing		4	101	\$-in. diam. mild steel rods to BS 785 delivered station T*	836	6			9	
Add to last for:				3-in. ditto T*	929	0	Vertical faces of wall	YS	*18	
Roughly spreading and levelling Spreading, levelling and consolidating to make u		ı	51/2	Measured rates			Soffite of floors not over I high		*18	
fevels Returning, filling-in and	YC	3	2	Portland cement mass concrete in foundations etc.			Sloping soffite of stairs	YS	*22	
well ramming excavated material around foundate	ions			I : 12, 1½-in. " all-in " aggregate	*60	-	Sides of columns	FS	2	
	YC	4	31/2	1:3:6, 1½-in. aggregate	*68	8	Sides and soffites of lintols			10
Loading surplus materia lorries and carting to ti	p,		10	1:2:4, 3-in. aggregate	*76	1	and beams	FS	2	
not exceeding 8 miles Excavating from spoil h	YC	15	10	$I: I\frac{1}{2}: 3, \frac{1}{2}$ -in. aggregate	56 * 77 57	9	Add to the above for wro	t	,	
selected top soil, wheel not exceeding 100 yard: spreading, levelling and consolidating, not exceed	ing s, and			Add for: Working around rod or mesh reinforcement YC		101	formwork including rubbi down concrete Reinforcement		2	5
6 in. to receive turf	YS		2	Walls not over 6-in, thick YC	24		5-in. diameter mild steel			
Mechanical excavation a				Walls 6-in. to 12-in. thick YC Walls over 12-in. thick YC	17		rods, hooked, bent and ti and fixing	ed C	*66	
excavating for shallow sexcavation and loading lorries or dumpers (usi	into			Columns not over 72 sq.	46	4	½-in.	C	*73	
	· '&		-		-10				54	
§ yd. cube excavator)	YC	3	0	Columns 72 to 144 sq. inches YC	36	7				





The B.C. Electric building, newly completed in Vancouver, is 258 feet high and has a total floor area of over 368,000 square feet. Architects: Thompson, Berwick & Pratt, Vancouver. Contractors: John Laing and Son (Canada) Limited. Wallspan curtain walling system by Williams & Williams Ltd.

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technical section							
Concretor continued		s	d	s d		\$	d
in.	C	*93		Lingfields in cement mortar YS	2½-in.		
		60	"	Flettons *32 11	3-in.	*12	
Steel wire mesh fabric weighing 4-32 lb. per yd. super and laying in concr				17 7 Second stocks *52 3 36 10	4-in.	*15 8	7
super and laying in conci	YS	*4	5	Lingfield Grade B * 50 6 32 9 Thermalite-Ytong ditto	YS		,
Ditto weighing 6.57 lb. g	ner			Half brick wall ditto YS	2½-in.	12	
yd. super	YS			Flettons *18 I 8 4	3-in.	14	10
		5	3	Second stocks *27 9	4-in.	18	
Ditto weighing 9.32 lb. p yd. super	YS	*8	6	Lingfield Grade B *27 5 15 10 Hollow clay ditto	YS		4
Precast concrete				I I-in. hollow wall with 2-in. cavity and wall ties YS	2-in.	5	
Precast concrete (1:2:	4)			Flettons *39 4	$2\frac{1}{2}$ -in.		10
finished fair on exposed and hoisting setting and	faces			17 1	3-in.		10
jointing:				Second stocks *58 7 (6 cavity)	4-in.		6
$4\frac{1}{2}$ -in. \times 6-in. lintols rein forced with one $\frac{1}{2}$ -in. roo		2	8	One brick wall built fair and Wood wool slabs ditto	YS		
•		2	21/2	pointed both sides YS Flettons *39 4	2-in.	13	11
$\frac{41}{2}$ -in. \times 9-in. ditto with				Second stocks *58 7	2½-in.	. 16	2
⅓-in. rods	FR	3	31	36 10	3-in.	12	
Piling				Lingfield Grade B *55 10 32 9		13	9
Reinforced pre-cast conc	rete			Sundries			
piles, approximate prices supplying, unloading, pit	for			Extra over common brick-			
and driving 12-in. × 12-in. up to 30 long			0	work for internal fair face and flush pointing YS 4 Salt glazed stoneware p and flush pointing YS 4 Salt glazed stoneware p and flutings, "Best" qu			
14-in. × 14-in. up to 50	ft.			Horizontal damp proof course Ordinary pipes	FR		
Sheet steel piling, ditto	FR	1176		bedding and pointing FS *4 6½	4-in	n. *1	
		1680	to	2 10	9-in.	. *4	
		1000		Horizontal damp proof course Bends	No.		104
BRICKLAYER				of hessian base bitumen FS II 9	6-in.		31
Market prices Soft sand	YC	: 18	0	Facings The above are Standard prices less 2½%.		17	,
				Extra over ordinary brick- Pitch fibre pipe	FR		
Hydrated lime	1	117	6	work with bricks P.C. 118s. per 1,000 for facings as	3-in. 4-in.		103
Plain Flettons	M	1118	0	described	6-in.		
Second hard stocks	M	1*296	9	To solid wall in Flemish Cast iron s. and s. pipe	to YR		
Lingfield Engineering wi	re			bond YS Facings P.C. 250s per M 15 7	4-in.	. *28	
cuts Grade B		1*256	0	9 7 Facings P.C. 350s per M 22 11	6-in. 9-in.	. +77	
Partitions				16 11 Spun iron s, and s, pipe	to		
Clinker concrete, solid	YS			Facings P.C. 450s per M 30 2 BS 1211, Class B	YR 4-in	. +13	3
	2-in 24-in		9	To cavity wall in stretcher	6-in.	. *21	3
	3-in.			bond YS	7-111.	. *35	0
Thermalite-Ytong	YS			7 4			
	2½-in	. 7		Facings P.C. 350s per M 18 5 Trenches and beds			
	3-in 4-in	. 11		Facings P.C. 450s per M 23 11 18 5 Excavate trenches by h heavy soil, including pla and strutting, part retu	anking		
Hollow clay	2-in	. 4		built fair and pointed on wheeling and spreading	1		
	2½-in 3-in		8	one side Facings P.C. 250s per M *29 9 surplus, for pipes 4-in., and 9 in. dia.			
(6 cavity)	4-in	. 6	10	Facings P.C. 350s per M 35 3 Average depth of trenc			5
Normal quality wood we slabs	ool YS			21 6 Facings P.C. 450s per M *40 10		. *21 . *38	
	2-in	. 8	10	27 1	9-ft.	. *70	0
	2½-in 3-in		5	Partitions Excavate trench as last			
Measured rates				Clinker concrete solid by mechanical trencher partition blocks and setting Average depth of trencher	ch 3-ft.		
Reduced brickwork in				in cement lime mortar YS 2-in. *9 0	4-ft. 6-ft.	*17	
cement lime mortar.				4 8		*51	

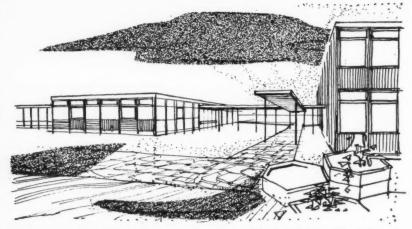
newly B feet rea of Archi-Pratt, Laing IIspan Illams

new ent ects

TRIP, S.

1.

BLIN



Buildings can be made solely from Newsums' products. Wal-pak here supports a Trofdek roof.



Wal-pak is ideally suited for the cladding of multi-story buildings.

THE VERSATILE CURTAIN WALLING

Wal-pak is a unique system of curtain walling. It can be used either as a cladding for a framed building, or to support the weight of the roof, or as a complete building in conjunction with Newsum's roofing products Trofdek and Diaframe.

Wal-pak simplifies site work as assembly follows a step by step plan based on component "Packs" pre-sorted at Newsum's factory.

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Wal-pak timber curtain walling combines the beauty of wood with the strength and endurance of brick.

WAL-PAK



Wal-pak used in cross-wall construction or as a load-bearing wall.



Engineered by NEWSUMS

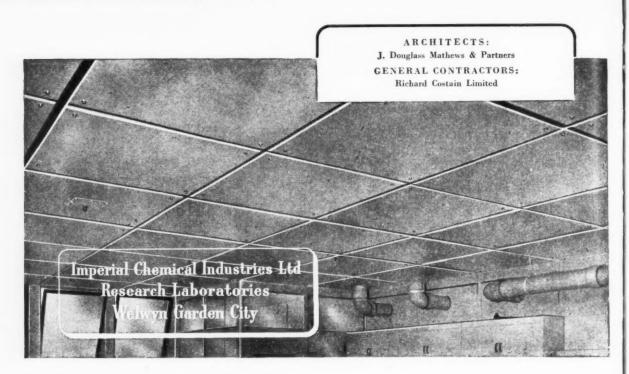
H. Newsum Sons & Co. Ltd., 238 High Street, Lincoln.

Ltd., 238 High Street, Lincoln. Telephone: Lincoln 812

and at: 28 St. George Street, Hanover Square, London W.I. Telephone: Mayfair 3453

453

Drainlayer continued		S	d		S	d		d
6-in. concrete bed and	VD	*9	5	Pitch fibre drains		-	TT:11:2 : 12:	5
benching for 4-in. pipes	YR		10	Pitch fibre drain pipes and			531410 30	
As above, for 6-in. pipes	YR		0	laying and jointing in trench FR		1	Roofing	
6-in. concrete bed and		0	10	3-in.	2	3	1-in. flat laid to falls in two	
surround for 4-in. pipes	YR	*15	4	4-in.	2 1	14	thicknesses on and including	
As above for 6 in piper	YP	*18	5		2	91	felt underlay YS BS988 *13	8
As above, for 6-in, pipes	11	11	5		5 1	8	BS1162 *22 I	
Stoneware drains							6-in, skirting with angle	
" Seconds " quality salt				Extra over pitch fibre pipe for 45° bend No.			fillet at bottom and rounded	
glazed stoneware drain pand laying and jointing in				3-in. I	3 1		edge at top turned into groove FR	
trench	FR			4-in. 2	3	1	BS908* 2	
	4-in.	*2	8		ī	3	BS1162* 2 I	1
	6 in.	*3	5	6-in. 3		3	6-in. fascia with solid water	
		2	6	3	4	3	check roll at top and under-	
	9-in.	*5	8 7	Cast iron drains			cut drip at bottom FR BS988* 4	9
" Best " quality salt glaz	ad			Cast iron spigot and socket			BS1162* 5	6
stoneware drain pipes ar				drain pipes and laying and		1		
laying and jointing in				jointing in trench FR 4-in. *1	3	1		
trench	FR 4-in.	*2	9	1	1	0	PAVIOR	
		2	0	6-in. *!		0	Market prices	
	6-in.		10	9-in. *3	6	4 3	•	
	9-in.				0	7	Granite chippings, 4-in. to dust T *50	2
		5	4	Fuer over seet iron pines for		-	Buff quarry tiles, 6 in. ×	2
Extra over "Seconds"				Extra over cast iron pipes for bend No.			6 in. $\times \frac{7}{8}$ in. YS 21	9
quality pipes for:				4-in. *3		2	2-in. Noelite paving YS 13 I	1
Bend	No.			6-in. *7	3	2	Measured rates	
Della	4-in.			6	4	2	Cement and sand floated	
	4 1-	*5		9-in.*I8	0		screed to receive pavings YS	
	6-in.		11		0 1		4-in. *4	1
	9-in.	*16	0	Spun cast iron spigot and			1-in. *4 I	4
		15	4	socket drain pipes and laying and jointing in trench FR			3	0
Single junction	No.			4-in. *	7	6	1¼-in. *5	7
	4-in.	*6	5	6-in. *1	5	5		0
	6-in.	*9	10		8	11	Cement and sand paving trowelled hard and smooth	
	9-in.	8		9-in. *2		8	YS	
	y-111.	19			-			7
Dauble innerion	NI			Cast iron gullies				5
Double junction	No. 4-in.	+10	9	Cast iron gully trap with high		ĺ	3	0
		8		invert and setting on and			14-in. *6	6
	6-in.	12		surrounding with concrete and jointing to drain No.				
	9-in.	*30	6	4 in. *4		7	Granolithic paving laid on concrete YS	
		27	1	6 in.*11	37	3	I-in. *7	4
r				9	79	2	5 14-in. *9	5
Stoneware gullies				9 in.*24	47 30	3	1½-in. *9	0
Salt glazed trapped gully	,				,,		Lie and assessing a second	
with galvanized grating including setting gully o				ASPHALTER			In. red composition paving laid on prepared screed YS 16	6
and surrounding with co		е		ASTINALIEM				_
and jointing to drain	No.			Measured rates			a-ln. terrazzo paving laid on prepared screed YS 38	4
6 in. × 6 in. grating	outlet	*26	4	Damp proof course and tanking				*
		22	3	Lie manifed dema proof			I-in. rubber flooring and laying in rolls YS *39	5
9 in. × 9 in. grating	g 6 in. outlet	*43	5	1-in. vertical damp proof course in two thicknesses on			13 37	,
			3	brick or concrete YS	-		4-in. rubber flooring and	
Grease and mud gully 9	-in			BS1097* I BS1418* 2			laying in rolls YS *63	0
diameter with 4-in, out				551110 2		•	16-in. cork tile flooring,	
galvanized bucket and g				1-in. horizontal damp proof			12 in. × 12 in. and fixing with mastic and including	
and setting gully on and surrounding with concr				course in one thickness on brick or concrete			polishing YS 45	11
and jointing to drain		+91		BS1097 *I			l in chammanlastic sile	
Road gully with 6-in. ou	ıtlet	81	2	BS1418 *I	1	10	in. thermoplastic tile flooring and laying-on screed	
including setting on and	1			Vertical tanking in three			YS 12	
	ete			thicknesses YS BS1097 *2	26	3	21	
surrounding with concr								
and jointing to drain 15-in. dia. 30-in.	No.			BSI418 *3				
and jointing to drain	No. deep	*108	6				la-in. coloured linoleum and fixing with mastic to cement	



High sound absorption

High resistance to fire (Class 1 fire resisting)

Lightness of weight

Simple concealed fixing



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These ceiling panels have proved themselves in service over the last three years, and a large repeat order has been received for Phase II of the work.

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IELS

ondon

technical section		
Pavior continued s d	s d	Measured rates s d
in. coloured linoleum and fixing with mastic to cement	lining FS 39 11	Softwood and fixing in plates, sleeper joists and lintols FC *15 8
screed or boards YS 20 3 Z-in, buff guarry tiles laid on	SLATER TILER AND ROOFER	In floor and ceiling joists FC *17 11
prepared screed YS 36 6	Market prices	In stud partitions, purlins and struts FC *20 0
7-in. blue black quarry tiles laid on prepared screed YS *34 6	Welsh slates, best quality M 16-in. × 10-in. 1038 6	In hip and valley rafters FC *22 7
2-in. Noelite paving laid on prepared bed, in random sizes	20-in. × 10-in. 1914 3 Best hand made sand faced	Battening and boarding
and mixed colours YS 20 0	plain tiles. $10\frac{1}{2}$ -in. $\times 6\frac{1}{2}$ in. M*315 0	Slate or tile battens $1\frac{1}{2}$ in. \times $\frac{3}{4}$ -in. and nailing to fixing for
12 in. × 12 in. anchor steel plates laid complete YS 54 9	Grey corrugaged asbestos cement sheets YS *7 0	Sq.
places laid complete 10 31 /	Measured rates	16-in. × 10-in. slating to 61-in. gauge *39 0
MASON	16-in. × 10-in. best Welsh slates laid 3-in. lap Sq. 310 0	20-in. × 10-in. slating to 8½-in. gauge 32 0
Market prices	20-in. × 10-in. best Welsh	10½-in. × 6½-in. plain tiling
Stone in blocks in truckloads at stations in the London area:	slates 3-in. lap Sq. 412 0	to 4-in. gauge *56 0
Beer FC *8 9	Westmorland green slates in random sizes laid 3-in. lap Sq. 632 9	14½-in. × 10-in. pantiles to 12-in. gauge *23 0
Portland FC *8 8	Best hand made sand faced plain tiles, $10\frac{1}{2}$ in. \times $6\frac{1}{2}$ in. laid	S.E. boarding in batten widths close jointed and fixing to
Woodkirk Blue building quality FC *17 11	to a 4-in. gauge Sq.*221 0	flat or sloping roofs Sq. 3-in.*119 10
Broughton Moor slate in	Best hand made sand faced plain tiles, $10\frac{1}{2}$ -in. $\times 6\frac{1}{2}$ -in.	87 9 I-in.* 147 8
blocks at stations in the London area FC 65 0	hung vertically to 4½-inch gauge Sq.*237 0	115 6
Marble in blocks at works: Dove FC 70 0	Berkshire hand made sand faced red pantiles, I4½-in.×	T. & G. boarding in batten widths close jointed and fixing to flat or sloping roofs Sq.
Roman stone FC *70 0	10-in. laid 2½-in. head and 1½-in. side lap Sq.*213 0	¹ / ₄ -in. 138 2 98 0
Measured rates	Grey corrugated asbestos	1-in. 169 3
Stone and all labours in pilasters and quoins FC	roofs Sq.*129 3	1-in. wrot and cross tongued
Portland *55 2 Beer *51 5	Grey corrugated asbestos cement sheets fixed vertically	eaves soffit FS 2 3
Jambs FC Portland *55 2	Sq.*139 3	\frac{2}{4}-in. \times 6-in. wrot and grooved eaves fascia p.o. FS 10
Beer *51 5	Cedarwood shingles laid 5-in. gauge Sq.*241 0	6
Lintols FC Portland *56 2	Metal roof decking and fixing with hook bolts, finished	Wall and ceiling boards fixed to softwood YS
Beer *52 6 Arches FC	with 12-in. insulation board and three layers self finish	1-in. fibre board *6 6 4 10
Portland *67 3 Beer *60 5	felt roofing YS 18 gauge for	1/8-in. hardboard *5 9
Ashlar average 7-in. on bed	spans up to 10 ft. 57 6 20 gauge for	4 4
with plain dressed face FS Portland *31 3	spans up to 8 ft. 6 in. 50 0	wallboard 5 8
Beer *29 II Extra for each additional I-in.	Two layer one ply bitumen felt and fixing with bitumen to concrete or boarding YS *9 5	3/16-in, asbestos cement flat sheeting *8 6
thickness FS Portland *3 7	Three layer bitumen felt YS *12 7	4 11 4-in. asbestos cement flat sheeting *10 3
Beer *3 5	Patent ribbed aluminium	2-in. Stramit, showerproof
$4\frac{1}{2}$ in. \times 4 in. sill sunk, weathered, throated and	roofing and fixing to purlins Sq. 287 6	quality fixed to joists with butt joints 15 6
grooved for water bar, set and jointed in cement mortar FR Portland *II 7	CARRENTER	11 5
Beer *10 11 Artificial 4 8	CARPENTER Market prices	JOINER
4 in. × 12 in. coping,	Softwood, carcassing quality	Measured rates Floors and skirtings
weathered and twice throated FR Portland 22	Std.*1910 0	Tongued and grooved soft-
Beer *21 2 Artificial 11 3	Softwood, joinery quality Std. 2140 0	wood flooring and nailing to joists Sq.
Marble and slate	½-in. imported fibre board Sq. *45 0	2-in. 164 0 126 6 1-in. 181 9
3-in. Dove marble lining and	i-in. imported hardboard Sq. 40 0	144 0
fixing on brick backings FS *36 9 2-in. Roman stone lining FS *36 9	a-in. insulating gypsum wallboard YS 3 3	I-in. nominal double grooved t. and g. Swedish softwood



"No jokes about Admirals please...

To a man in my position dignity is essential-dignity with perhaps a dash of colour. Similar considerations apply to the décor of the foyer-especially the floor which is one of the first things patrons notice. And incidentally my advice to architects and people who design floors is-'always insist on rubber flooring.' It's easier for my charladies to clean, keeps its colours longest and stands up to really rough treatment. It's quiet underfoot too and that's very important in a place like this . . . ??

Having decided on Rubber; insist on Runnymede Rubber and ensure superlative quality in every respect. Runnymede offers a wide choice of plain and marbled colours to harmonize with every kind of interior. Available in 9", 12" and 18" squares or 3' wide rolls in maximum lengths of 6' for plain colours and 80' for marbled colours. Standard gauge is 3.75 mm. but all patterns can be supplied in $\frac{3}{16}$ " and $\frac{1}{4}$ " thicknesses for orders of 50 sq. yards or more.

RUNNYMEDE RUBBER FLOORING

Runnymede Rubber Co. Ltd., 6, Old Bailey, London E.C.4. Telephone: CITy 2471

technical section						
Joiner continued	S	d		s	d	s d
block flooring set in mastic and polished YS	29	5	Oak	3	6 7	3-in. steel butts Pr. to softwood 4 4 to hardwood 5 9
European beech YS	33	7			1	
African Muhuhu YS	41	0	Shelving and fittings			Double action floor springs No.
		6	3-in. shelving of 2-in. slats spaced 1-in. apart on bearers			to softwood 21 9 to hardwood 29 0
	3.		(measured separately) FS	2	EI	6-in, barrel bolts
Moulded skirtings, 3-in. to 6-in. sectional area planted on (per inch in sectional			Softwood	ī	51/2	to softwood 2 0 to hardwood 2 8
area) FR			3-in. solid shelving on bearers FS	_		Cupboard locks
Softwood		3½ 2½	Softwood	2	11	to softwood 4 1 to hardwood 5 5
Oak		9° 7½	Oak	4	8	Cylinder night latch
		* 1	2 :	,		to softwood 6 10 to hardwood 9 1
Extra for grounds plugged to brickwork FR			2-in. shelf bearers plugged to wall FR			Mortice latch
Softwood		9	Softwood		7½ 5½	to softwood 5 5
Windows			Oak	1		to hardwood 7 3
2-in. rebated and moulded					2	Mortice lock to softwood 6 10
sashes divided into squares FR			Staircases		1	to hardwood 9 1
Softwood Oak		8	I-in. treads and 3-in. risers tongued together on and		i	Casement fastener
Extra for side hanging Each		9	including framed carriages FS Softwood	4	71	to softwood 1 8 to hardwood 2 2
Softwood Oak				3	61	Casement stays
Doors			Oak	12		to softwood 1 8
2-in. framed, ledged and			13-in. × 11-in. wall string			to hardwood 2 2
braced doors, filled in with I-in. T and G and V jointed			plugged to brickwork FR Softwood	4	5	
boarding and hanging FS Softwood	6			3	5	STEEL & IRONWORKER
Soitwood	5	5	Oak	10		Market prices
Four panelled door square			14-in. × 11-in. outer string			Structural steel joist
both sides and hanging FS Softwood	6	8	FR Softwood	3	41	sections, basis sizes, ex mills T*822 6
Oak	19	6	Oak	2	10	Extras for other than
	18	6	Odk	6		basis sizes vary between 10s. and 70s. per ton
1½-in. Standard flush door, hardboard faced size 2-ft. 6-in.			Ends of treads and risers			Measured rates
imes 6-ft. 6-in. and hanging No.		0	housed to strings No. Softwood	ı	41	
	31	,	Oak	6		Rsj in steel framed structures hoisted and
Linings and frames			2½-in. × 3-in. moulded handrail FR			fixed complete T*1600 0 Riveted compound girders
Window and door linings, 6-in. to 12-in. sectional area			Softwood	3		including plates and rivets T*1880 0
(per inch sectional area) FR			Oak	6		Rs stanchions including caps,
Softwood		4 3	14-in. × 14-in. square	5	7	bases, cleats etc. T*1860 0
Oak		9	balusters FR Softwood		*81	Metal windows including cutting and pinning lugs to
		8			61	brickwork and bedding frames in cement mortar No.
Frames wrot all round and framed (per inch sectional			Oak	1		Domestic type 4 ft. high
area) FR Softwood		31	Framed ends to balusters No. Softwood		61	to BS 990
Oak		8	Oak		9	Type ND2F 3 ft. 3½ in. wide 88 1 72 7
Mullions, transomes and cills						Type HD2F 3 ft. 3¼ in. wide 95 1 79 7
(per inch sectional area) FR Softwood		4				Type ND11F 6 ft. 6½ in. wide 150 1
Oak		9	IRONMONGER			"Z" range, 4 ft. high
Mouldings, architraves, etc. 4-in. to 6-in. sectional area			Market prices			Type ZNDI 2 ft. 03 in. wide 59 1
(per inch sectional area) FR		*4				49 6 Type ZND4F 6 ft. 0 ² / ₄ in. wide 152 5
Softwood		3	As prices for ironmongery vary so greatly depending			125 0
Oak		9	upon the type and quality required no prices are quoted			
6-in. window boards, 1-in.			here			PLASTERER
thick with rounded nosing tongued at back and includ-			Measured rates			Market prices
ing bearers FR		01	The rates which follow are			Plastering sand YC 22 I
Softwood	1	0½ 8	for fixing only and are inclusive of profit			Plaster to BS 1191

HARVEYS OF GUILDFORD

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Gutters and flashings *3 5

Flat roofs

FS

20 SWG super purity

aluminium

FR 3-in. *3 9

4-in.

ASSIST

HEMES

(1:1:6) and finishing with

three coats patent coloured mix preparations applied with hand operated machine

s d		s	d		s d
INTERNAL PLUMBER	Flushing and warning pipes			Class B tubing fixed to	
Market prices	fixed to softwood FR	*3	8	walls FR ½-in.	*2 7
		1	11		10
Lead pipe in quantities of 5 cwt. to I ton C	I-in. 5	*4	7 4	∄-in.	*3 0
BS 602*132 6 BS 1085*139 6	1 1 -in. 6	*5		1-in.	*3 1
	1½-in. 7	*6		I≟-in.	*3 10
Polythene tubing, heavy gauge, in quantities of 500 to	-	3	4	I‡-in.	*5 I
999 ft. per 100 ft. 	Waste pipes and fixing to			*******	2 3
3-in.*152 0	softwood FR	**	10	Every for mellochie iron:	
Î-in.*193 6	14-in. 6	*5	11	Extra for malleable Iron: Bend No.	
Steel tubes to B.S. 1387 class B galvanised FR	1½-in. 7		4	I-in.	*5 1
1-in. *0 9		3	1		3 1
1-in. *1 0½ 1¼-in. *1 5½	Joints to fittings No.			I‡-in.	*7 24 4 6
$1\frac{7}{2}$ -in. *1 $10\frac{7}{4}$	½-in.	6	2	I ½-in.	*9 4
The above are Standard List prices plus 34½%.	3-in.	+7	8		0 /
Galvanised malleable fittings.		2	5	Tee No.	
Bend No.	I-in.	* 7	6 2		
1-in. *2 9½ 1½-in. *4 2½	I ¹ / ₄ -in.	*8	4	₫-in.	*3 1
l½-in. *6 0°	I-j-in.	*9	5 2	₫-in.	*3 5
Tee No. -in. *1 0	-	4	11	I-in.	*4 0
-in. *1 4-1	Extra for:		1		2 2
I-in. *2 0 I ¹ / ₄ -in. *2 9 ¹ / ₂	Bend No.	2	7	I ∦- in.	*5 6
The above are Standard List	l∦∙in. l⅓-in.		8	l½-in.	*6 10
prices less 23½%, less 6½% plus			1		4 5
40%. Copper tubes to B.S.659 FR	Branch joints No.			Copper tube	
4-in. *0 101	l i-	6	9	Copper tube to BS 1386 as	
	⅓-in.	1	8	supply pipe laid in trench	
14-in. *2 2½	₹-in.	9 2		(measured separately) to the following size and gauges FR	
The above are calculated on a basic price of 2s. 0 d. per lb.	I-in.	9	5	1-in. 18	*1 11
plus C.T.A. extras.	1½-in,	3	4	<u>3</u> -in. 17	*2 8
Measured rates		4	_		2 0
Lead pipe to BS 602	I ½-in.	5		1-in. 16	3 0
Main supply and laying in	Between with a F R C 1072			1 1 -in. 16	*4 10
trench (measured separately)	Polythene tubing to B.S. 1972 Heavy gauge as supply pipe			1½-in. 15	*6 1
at the following sizes and weights in lbs.	laid in trench (measured separately) FR				5 4
½-in. 7 *4 2 3 3	1-in.	*1		Copper tube to BS 659 as	
1-in. 11 *6 2	3-in.	*2	31/2	distributing pipe fixed to walls FR	
1-in. 16 *8 9		*2	9	½-in. 19	*2 0
7 5 14-in. 28 *14 10	I-in.	2		3-in. 19	*2 5
12 9				I-in. 18	*3 2
1½-in. 35 *19 0	Heavy gauge as supply or distributing pipe fixed to				2 7
Main supply fixed to walls	walls FR	*2	9	1 1 -in. 18	*4 0
and ceilings FR		1	7	1 1 -in. 18	*4 8
1-in. 7 *4 9 3 4	3-in.	*3	3½ 2		3 /
3-in. 11 *6 10	I-in.	*3	11	Extra for brass compression	
I-in. 16 * 9 6		2	9	fittings joining copper to	
7 5 1½-in, 28 *15 7	Steel tubing to BS 1387			copper No.	
12 10	Class C with screwed red			Coupling 1-in.	5 10
1½-in. 35 *20 4	lead joints as supply pipe				3 3
Distributing pipes fixed to	laid in trench (measured separately) FR			4-in.	6 8
walls and ceilings FR	1-in.	*2		1-in.	9 3
½-in. 4 *3 4 2 0	₫-in.	*3	10	1 <u>1</u> -in.	11 11
3-in. 5 *3 11 2 5	I-in.	*3		1 1 -in.	7 7
I-in. 7 *5 2		1	41	12	11 0
1½-in. 9 *6 2	14-in.		11	Bend 1-in.	7 4
4 6	11 :	*5			4 6 8 7
$1\frac{1}{3}$ -in. 12 *8 0	l ⅓-in.		5	3-in.	5 6

				1110 A	rchitects' Journal for September 26,	1901	7 [
1	technical section	,					
	Internal plumber continued	s d		s d		3	d
	I-in.	12 2 8 3	and glazing with mastic or beads (supplied). In panels		Add for each additional coat		10
	1 <u>1</u> -in.	15 5	15 to 20 ft. super FS	0 (1	December on the section of sections		34
	I ½-in.	10 6 25 0	32 oz. sheet 4-in. polished plate	8 6½ 18 2	Prepare, prime and apply one coat heat-resisting paint on		
	Tee 1-in.	9 6	Patent glazing		heating surfaces of radiators YS		
		6 1	Patent glazing with rolled		Basis price	4	5
	3-in.	7 0	steel lead capped bars for		Add for each additional coat	i	10
		16 2	8-ft. spans and glazing with 4-in. Georgian wired cast FS	*4 9			7
	I 4-in.	22 8 16 5	Aluminium alloy patent		On wood		
	I ½-in.	34 8 26 5	glazing FS	*5 3	Knot, prime, stop and apply one coat oil colour on		
			PAINTER		general surfaces YS Basis price		101
	GLAZIER		Market prices		Add for each additional coat	1	- 4
	Market prices		Washable distemper C.	120 0			10
	Sheet glass cut to size FS 24 oz.	*103	Emulsion paint Gal.	45 0	On work not exceeding 3-in.		
	32 oz.	* 43	Hard gloss paint: Gal.		girth YR Basis price		6
	4-in. Polished plate glass,		Underçoat		Add for each additional coat		2
	glazing quality in plates not exceeding: FS		Finishing	48 0	7100 101 60611 00016101101 0000		Ī'
	2 ft. super 5 ft. super	3 10	Measured rates		For each additional 3-in.		
	45 ft. super	5 7	On walls and ceilings YS		girth YR Basis price		5
		6 0	Twice whiten plastered ceilings	1 41	Add for each additional coat		2
	Rolled plate glass FS	*112	cennigs	3			1
	4-in. Georgian wired	5 6	Two coats distemper on		Stain and varnish		
	Attention is drawn to reduction in certain glass		plastered walls or ceilings	2 21	Prepare, size, stain and twice		
	prices offered by manufac-		Two coats distemper on	•	varnish on general surfaces of woodwork YS	4	3
	turers for acceptance of specified minimum quantities		fair-faced brick or concrete walls	2 8		1	8
	of one size and substance delivered to one address at		Walls	1 3	On work not exceeding 3-in. girth YR		7
	one time		Two coats emulsion paint on		giren		14
	Measured rates		walls or ceilings	2 9½ 1 8	For each additional 3-in.		
	Glazing to wood	1			girth YR		6
	Ordinary quality sheet glass		Prepare, prime and apply one coat oil colour on plastered		Oiling and polishing		
	and glazing with putty in		walls	3 9			
	squares FS 24 oz. O.Q.	*1 5	Add for each additional coat	1 8	Twice oiling general surfaces of hardwood with linseed oil		
	32 oz. O.Q.	*2 0	And for each additional toat	10	YS	1	10
	in. rolled plate glass	*1 61	On metal		On work not exceeding 3-in.		
		*	Prepare, prime and apply one		girth YR		2
	4-in. rough cast glass		coat oil colour on general		For each additional 3-in.		
	Prismatic glass	*2 9	surfaces YS Basis price	3 6	girth YR		14
	4-in. wired glass	*2 21/2	Add for each additional coat	1 71			1
	4-in. Georgian wired plate glass	*7 91		10	Staining and wax polishing general surfaces of hardwood		
	4-in. Polished plate glass	7	On metal casements YS Basis price	5 6	FS	1	01/2
	(glazing quality) in plates 5 to 45 ft. super	*7 101	Add for each additional coat	1 6 2 5	Staining bodying-in and fully		
		102	. inc. in. Justi acceptation code	10	French polishing on general	2	71
	Glazing to metal		On bars, angles etc., not		surfaces of hardwood FS	4	71
	Add to above rates Id. per ft. super		exceeding 6-in, girth YR Basis price	11	Papering		
			Add for each additional coat	3 5	Preparing and sizing walls		
	Sundries		and a second second second	2	and hanging plain lining	10	5
	Hacking out broken sheet glass FS	1 3	On small pipes YR		paper Piece	3	3
			Basis price	3	Hanging wall paper, p.c. 10s.		
	Black ribbon velvet and bedding to edge of glass FR	8	Add for each additional coat	5 2	per piece Piece	12	
	Double glazing		On large pipes YR		Hanging border p.c. Is. per		
4 900	Insulight units of two skins	1	Basis price	1 10	yd. YR	1	9

THE INDUSTRY

Brian Grant reviews a machine for cleaning paintwork and a new domestic boiler.

CLEANING PAINTWORK

It is now possible to clean walls and other paintwork with a small machine which gives accurate control of the amount of water and cleaner used, and thus avoids the usual mess of cloths or paper on the floor. The machine consists of two cylinders, one for detergent and the other for rinsing water, plus a hand pump to provide an air pressure of about 20 lb. The detergent is fed by hose to a cleaning pad, and the amount consumed is controlled by a push button on the pad, the same applying to the rinsing water. Various shapes of pad are produced for flat surfaces and for the awkward recesses of such things as radiators. The machine is mounted on castors, and costs £55. It seems a useful and time-saving device for most types of building. (Revvi Ltd., 70, Blackstone Road. London, N.4.)

NEW SMALL BOILER

The illustration on the right shows the new small No. 2 Rayburn boiler, which has been designed to provide an adequate supply of hot water for the small house, but which is not intended for central heating. Standard finish is white or cream vitreous enamel with



Above, washing a wall down with the Revvi equipment. One of the cylinders contains detergent, the other, rinsing water. Several shapes of pad are available. Right the Rayburn No. 2 boiler.

a black top plate. Thermostatic control is provided and a rotating grate makes ash disposal easy. The manufacturers claim that no clinker can form in the boiler, a point which one would have thought depended more on the fuel used than on boiler design. Having obtained considerable quantities of clinker from all the solid fuels I have used since the war, even in stoves with rotating grates, I view this claim with a certain amount of suspicion, but I sincerely hope that the Rayburn provides the answer. Price is £27. (Allied Ironfounders Ltd., 28, Brook Street, London, W.1.)



The Gas Council on Domestic Water Heating

On the opposite page is a supplement on domestic water heating which is sponsored by the Gas Council. This is the third of a series of supplements which have as their object to give a full technical description for architects of the different uses to which gas and coke can be put. Like Information Sheets, these supplements are a journalistic hybrid: they are "advertisements" in the sense that the space 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 fact been "approved" by the Journal's specialist editor for heating and ventilation. We hope that readers will extract and keep these supplements for future reference. For this purpose a special binder can be obtained, free of charge, on application to the Publicity Manager, Gas Council, I Grosvenor Place, S.W.I. Alternatively, readers may apply through the business reply folder at the back of this issue. The first two supplements "Domestic Space Heating 1. Fires and unit heaters," and "Domestic Space Heating 2. Central heating by gas and coke" appeared in the Journal for November 29, 1956, and April 25, 1957.

DOMESTIC WATER HEATING hot water services by gas

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This supplement begins by discussing how much hot water will be needed per day in different types of building and at what temperatures, and thence passes to a consideration of the relative performance of storage and instantaneous type heaters and of the relationship between capacity, the rate of delivery and the rate of recovery. Next the specific advantages of gas heating are set forth and the comparative economy of gas and other forms of heating and of the different types of gas heating is discussed. The five main groups of gas water heater are then described—the range of ratings in which they are made, their performance and points which have to be watched concerning their installation and fixing. The concluding sections of the supplement deal with matters which concern all types of gas heater: with ventilation, with water supply and with the incorporation of gas equipment in indirect or calorifier systems.

This article covers the provision of hot water only for use in domestic dwellings, shops, offices and industrial premises, with particular reference to the selection and various available types of gas heated appliances suitable for this purpose.

The first survey of domestic hot water supply (National Building Studies Special Report No. 8, 1950) revealed that only 36 per cent. of all separate households have hot water piped to a sink, wash basin or bath; and some 44 per cent. of all households had no hot water

at all other than that supplied by kettles, pans and coppers. This shows something of the immense need for more and better water heating facilities throughout the country and suggests reasons as to why there was no accepted suitable design standards for such installations. A wide variety of unrelated proposals have been suggested by innumerable sources and the selection of design criteria has been largely a matter of personal opinion.

Functional requirements

In 1945 a committee under Sir Alfred Egerton, studying the problems of heating and thermal insulation in dwellings, laid down certain realistic standards (Post-War Building Studies No. 19 Heating & Ventilation of Dwellings), which have been reinforced by subsequent investigations. Particularly valuable work has been done by the Building Research Station in a comprehensive investigation at Abbots Langley, the results of which were summarized by Dr. J. C. Weston in the Journal of the Institute of Heating and Ventilating Engineers, 1950, Vol. 17, No. 175.

It is largely on the data supplied by the Egerton and BRS Reports that the up-to-date design standards rest. These standards are affected by three main factors: 1. TEMPERATURE: It has generally been agreed for years that hot water for domestic and similar uses should be provided at a temperature of 110° F. for bathing and 140° F. for washing-up and home laundry purposes. This will mean that the heater will heat water from the cold main varying from 40°-70° F. depending on time of year, which is usually taken as being an average rise of 80° F. It should be noted that except where boiling water is required, water temperatures should be kept below 160° F. in order to reduce or prevent the scale formation in hard water areas. 2. VOLUME: The Egerton Report recommended for small houses of two adults and two children, that provision should be made for a maximum of 250 gallons per week at 140° F. Where such water is supplied from a central source it was suggested that this figure would be 350 gallons per week when it is remembered that such installations tend to encourage a more lavish use of hot water.

The BRS investigations at Abbots Langley showed that the actual consumptions vary widely between 90 and 350 gallons per week, with a few isolated cases outside these limits. Most of the families in these experiments

used a lot of hot water when it was quickly and easily available but when it was realized that the cost rose *pro rata* with the consumption, in some cases great economies were made.

It is quite clear therefore that the daily consumption does not so much depend on fixed and preconceived requirements of an average family as upon the method and cost of heating, the income group of the family, and the day of the week.

The experience of the Gas and Electricity Authorities now indicates that 150 gallons per week at 140° F. is a realistic average when the flexibility of gas and electrical water heating appliances is possible. Though they agree that 250 gallons per week is more reasonable for the relative inflexibility of solid fuel systems. These gross volumes are of interest in calculating the average running cost of a heating system, but are of little use when sizing equipment. This will depend chiefly on the type of hot water system envisaged, i.e., whether local instantaneous heaters; local storage heaters or a piped central supply.

Central storage requires capacities based usually on the daily usage but with some allowance against savings. The peak demand in practice is never equal to the full daily consumption, but the following table, derived from the British Standard Code of Practice CP342: 1950, is a useful guide:

Building type	water required. Gals. per head/ day	Central buli storage gals head
Factories and offices	3	1
Flats—low rental	15	5
Flats-medium rental	25	7
Flats—high rental	30	7
Hostels	25	7
Hospitals-general	30	6
Hospitals-infections	50	10
Infirmaries	15	5
Hospitals-mental	20	5
Hospitals-maternity	50	7
Nurses homes	30	10
Hotels—1st class	30	10
Hotels-average class	25	8
Houses-medium cost	25	10
Houses-high cost	30	10
Boarding schools	25	5
Day schools and colleges	3	1
Sports pavilion (spray showers)	8	8
Public bath (slipper)	30 per bath per hr.	15 per bath

Low rental—not exceeding 950 sq. ft, in area. Mcdium rental—950 to 1,500 sq. ft, in area. High rental—more than 1,500 sq. ft, in area.

Instantaneous heaters have no volume and it is only necessary therefore to consider their rate of delivery. In the case of local storage types it is necessary to consider the peak demand—even if it does not occur regularly or often—and to judge the maximum recovery period which can be tolerated between one complete use of the stored content and the next. A smaller capacity can be justified when the recovery rate—heat input—is higher.

Clearly there are two factors here: the capacity of the storage and the rate at which the water within can be heated up (i.e. the recovery rate). The advantage of a storage over an instantaneous heater is that (provided the gas has been turned on sufficiently long before) a

hot bath will fill up more quickly, since the flow is limited only by the diameter of the draw-off pipe and tap. With an instantaneous heater the rate of flow is determined by the ability of the heater to heat the water as it passes through and it will take ten minutes or more to get a hot bath from the time that the heater is turned on. A point to be noticed with a storage heater, however, is that when you know that there is more hot water waiting in the storage cylinder you will tend to use it; for this reason people who have storage heaters tend to have deeper baths and spend more money than those who have an instantaneous heater. Another point of difference is that, whereas storage heaters, when heated, give the water at a fixed temperature, instantaneous heaters give only an 80° F. rise and the temperature of the water which comes out varies therefore with that of the cold feed. The first critical factor with a storage heater is therefore (to continue with the example of a bath) whether the storage capacity is great enough to enable two hot baths to be had in quick succession. Since a good bath takes some 15 gallons (of which about 12 will be hot water), a 30-gallon storage heater would provide two hot baths without question. Since gas storage heaters are designed to give good stratification (i.e., the cold water when entering does not dilute the hot which remains), even a 20-gallon storage will go a long way towards providing two baths in succession since, after the first bath has been discharged, the heater has only to heat enough additional hot water to supplement the residue of hot water left from the first bath and to provide enough hot water in the top of the cylinder for the second bath. This, the "recovery rate," is deducible from the heat output.

Finally it should be noted that much higher consumptions than 350 gallons per week are quite common in America and that requirements in this country are steadily increasing year by year, and in some districts are already comparable to American figures. It is therefore recommended that allowance for this expansion or consumption should be made, or at least, carefully considered.

3. RATE OF DELIVERY AND RECOVERY: The ability of an instantaneous appliance to meet a demand is directly determined by its maximum rate of heat-up expressed in B.Th.U.s, and hence its size.

The higher the rating the greater the flow of water at a given temperature. Standards are difficult to define as they are largely dependent upon what can be afforded for installation and running. Supplies to a domestic sink should obviously be unlimited and available at all times. It is only where economy is of the greatest concern that there should be appreciable waiting; but to be realistic, the delivery should never be less than ½ gal. a minute at 140° F. Instantaneous bath heaters should have a flow of not less than ½ gal. per min. at 110° F. (or 0.9 gal. per minute at 140° F.), which will give a good bath in 10-15 minutes. For local storage systems, it can be said that the rate of delivery and recovery should be as high as possible, but naturally the running and installation costs rise in

proportion. A practical balance between these two has therefore to be assessed according to the particular circumstance. A reasonable allowance in domestic buildings would be a flow of 5 gallons per minute with a half-hour recovery period for baths and 1 gallon per minute with a 10-15 minute recovery period for sinks. The recovery period is calculable by estimating first how much hot water will be left in the cylinder after a bath has been drawn off (for this purpose, as we have seen, a bath may be said to contain 12 gallons of ho! water), and to deduce from that how much additional hot water will have to be heated to provide a further 12 gallons for the second bath. If it is agreed that a half-hour recovery period is reasonable, it is then a matter of choosing a storage heater which has an output sufficient to heat up this amount of water in half an hour. It is to be noticed that the output varies for each model and is deducible directly from the rating multiplied by the thermal efficiency, usually of the order of 75 per cent.

Table 1: Standard Instantaneous and Local Storage Heaters and Their Various Uses

Appliance		Service
Instantaneous sink he swivel spout. (Gas onl		 Kitchen sink; one handbasin or two handbasins if side by side; heater must be fitted at sink or basin. One shower cubicle.
Instantaneous sink mu (Gas only)	ltipoint heater	Kitchen sink, one handbasin or two handbasins; heater can be fitted at some distance from the sink or basin.
Instantaneous bath he only)	ater. (Gas	Bath and adjacent handbasin.
Instantaneous multipo heater. (Gas only)	oint water	 Bath, 1-3 handbasins and kitchen sink. 3-6 handbasins. 2 shower cubicles.
Sink storage heater. (delectricity)	Gas or	Kitchen sink or one handbasin or two handbasins if side by side; heater must be fitted at sink or basin.
Storage multipoint	12-15 gal.	1. 3–8 handbasins. 2. 2 shower cubicles.
(Gas or electricity)	15-20 gal.	2. 2 shower cubicles. 1. Bath, handbasin and kitchen sink. 2. 3–10 handbasins. 3. 3–4 shower cubicles.
	20-25 gal.	 Bath, kitchen sink and 1-3 handbasins. 3-10 handbasins. 4 shower cubicles.

Table 2: Equivalent Running Costs of Comparable Gas and Electrical Appliances

		1 Therm is equivalent to	0:
System		For continuous use	For intermittent use ⁴
Gas circulator Electric immersion heater	}	20 units	22 units
Gas storage heater Electric ,, ,,	}	18 units	22 units
Gas instantaneous heater (a) Bath heater and sink heater (b) Multipoint heater Electric immersion heater	}	(a) 30 (b) 24	(a) 30 (b) 24
Gas conversion unit		No elec	tric equivalent
Gas wash boiler Electric wash boiler	}	-	20 units

^{*} Turning off when hot water is not required for long periods.

These figures have been obtained under laboratory conditions; for gas water heaters they are given in more detail in two papers Technical Aspects of the Gas Industry's Contribution to Past War Housing by Andrew, Dunning and Holliday—Institution of Gas Engineers Communication No. 278, and The Cost of a Domestic Hot Water Service by Gas by C. H. Purkis to the London and Southern Junior Gas Association. For electric water heaters, comparative figures are difficult to obtain but those given by Dr. J. C.

Southern Junior Gas Association.

For electric water heaters, comparative figures are difficult to obtain but those given by Dr. J. C. Weston of the Building Research Station to a sessional meeting of the Institute of Heating and Ventilating Engineers on January 11, 1950, agree substantially with those quoted above for Storage Water Heaters, and in the case of the Instantaneous Multipoint Water Heater are very much more favourable to gas.

This balance becomes even more difficult to judge when it is recalled, as was pointed out in the first space heating article of this Supplement, that changing living patterns of the post-war world are tending towards a widely varying intermittent use of heating systems. Many more married women go out to work for part or all their married lives, the occupancy of the home by children varies drastically with their age-even the possession of a television set will have its own effect. Changes in family income either from illness. unemployment, changes in tenancy, or even rises in the cost of fuel or living-all these factors can cause a fluctuation between full and partial use of a hot water system and call for a high degree of flexibility together with an even operating efficiency at all levels of consumption

The advantages of gas for water heating

Comparison between the three possible sources of heat for water heating, gas and electricity on the one hand and solid fuel on the other, is difficult because the latter is more normally used when space and water heating is combined. It can be said, however, that solid fuel although slightly cheaper to run, can never supply the flexibility or the operating efficiency for all levels of consumption that can be achieved with gas and electricity. The storage of fuel, disposal of ashes and the labour of stoking are eliminated as are the uncertainties of supply, and control is much simpler and more easily automatic.

Gas and electric installation in conversion work, a common problem today, is simpler and cheaper than solid fuel; particularly is this true of gas where a supply already exists.

The factors which favour the use of gas as against electricity for water heating can be set down broadly as follows. First, the range of equipment available for gas is better adapted for intermittent use. Thus all electrical water heaters on the market are of the storage type: electricity as a heat source does not lend itself to the instantaneous heating of water. An instantaneous heater will always be more economical for intermittent use than a storage heater, since there are no standby losses. (It will be even more economical in practice, as we have seen, since the storage heater will tempt people to use more hot water than they need: but that is another matter.)

Secondly, should the storage system be considered more suitable, gas water heaters of this type are available with a higher heat input rate than their electrical counterparts; this results in a quicker recovery rate.

The influence of these factors on average running costs can be seen with reference to table 2, where each main class of gas heater is bracketed with the nearest electrical equivalent, and the relative efficiency of each is recorded in terms of the number of units the electric alternative will use in order to give the amount of hot water which the gas alternative will give for one therm. It is not, of course, possible to translate these two units of fuel into money since both vary within wide limits up and down the country.

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Types of gas water-heater available

The various types of gas heaters fall into frve main classes; their uses, together with advantages and disadvantages, are described on the following seven pages

Instantaneous heaters

These heaters will give a continuous flow of hot water tap to which the heater is connected. The temperature maximum temperature available at any time, but it is at any time within a few seconds of turning on any of the water is variable according to the temperature of the cold feed, heaters being designed to give an usually possible to obtain a greater flow at a lower 80° F. temperature rise. The flow is limited at the temperature without any drop in the efficiency of the jet, gas is only used when the water is flowing. For this reason they are the most economical form of heater heater. Apart from the small consumption of the pilot and, in fact, the instantaneous single point type has the lowest running costs of any gas water heater.

the high gas rate may entail larger service pipes and for storage heaters giving the equivalent service, though instantaneous heater depends on a minimum flow of water it is essential that a heater has an adequate head of water. This will vary with each appliance and must be ascertained from the gas board. Where there is any doubt about the continuity of supply, heaters should be fitted with an automatic valve (see water supply, page 489). Since the correct adjustment of instantaneous heaters is more critical than that of meters, Since the satisfactory operation of

Capital and installation costs are generally less than other types, they will need more frequent maintenance.

Sink Sink Sink

TYPES OF INSTANTANEOUS HEATERS

Type	Rating	Output	Flue	Notes
Sink	20,000	21-5 pints/minute (140° F.)	None normally. Some require 3 in. dia.	Interlocking cock types are cheaper than auton Suitable for mains supply. Jigged fittings and p Single or multipoint types are available.
Sink (boiling)	30,000-	14–3 pints/minute (212° F.) 4–5 pints/minute (140° F.)	None normally. Some require 3 in. dia.	Interlocking cock and automatic valve models- or tank supply—manual control of hot-boiling
Bath	-000,009	0·9-1·6 gal./minute (140° F.)	4 in5 in. dia. required	Interlocking cock and automatic valve models. way spouts, fixed spouts and extension spouts.
Multipoint	97,500-	1.5-2.25 gal./minute (140° F.)	5 in6 in. dia. required	Connected to point of discharge by pipes. Som adjustable integral water pressure governor. A

pillar fixing available

matic valve types.

s-suitable for mains

setting.

A balanced flue appliance me models incorporate available. adjustable integral water pressure governo is available for building into outside wall.

s. Swivel spout, two

Sink (boiler)

adjustable integral water pressure governor. A balanced flue appliance is available for building into outside wall. Connected to point of discharge by pipes. Some models incorporate

Sink (boiler)

Instantaneous sink heaters

The reason damage. Multi-point heaters are connected to the fittings Single point heaters must always be fitted within arm's length (i.e. about 24 in.) of the draw-off point. Where this longer than about 24 in. would run the risk of mechanical is not possible the multi-point type must be used even they serve by means of pipes and discharge through taps as for any other piped supply. These pipes are easily for this is that a single point sink heater discharges through a spout which, as the water control is on the supply side, is unsupported throughout its length. Spouts though only one draw-off is being supplied. supported.

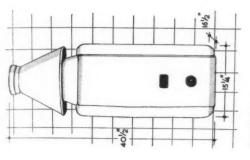
Instantaneous bath heaters

Bath water heaters should be fitted as low as possible to bring the outlet near the bath and to ensure a vertical

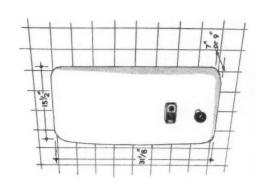
run of flue immediately next the appliance and thence to give a good flue pull. Instantaneous bath heaters can be provided with an extended swivel spout to serve both bath and basin. Where the position of the flue outlet makes it impracticable to use an instantaneous bath heater (i.e. because the spout cannot reach the bath or bath and basin) a multi-point heater can be used, as with this type the relationship between heater and points of supply is not critical.

Instantaneous multi-point heaters

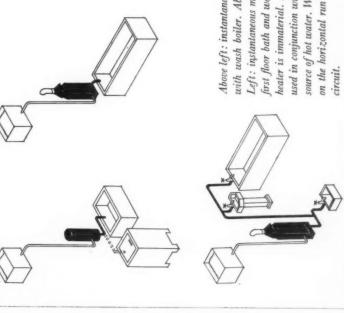
summer use or as an alternative fuel supply. In the latter Instantaneous multi-point heaters can be used on their own or in conjunction with a solid fuel installation for event the heater must be fed from the same feed cistern as the solid fuel system, in order to ensure the same head of water in both (see diagram). The heater should always be connected with the secondary and not the primary circuit.



Multipoint



Balanced Flue Multipoint



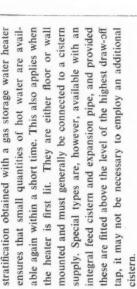
Sink

19.7

Storage heaters

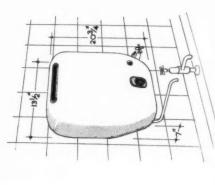
These units comprise a heater combined with an insulated storage vessel that will store water which is the capacity, so that the size of unit has to be of a storage heater, but should it occur then the good heated over a period of time against a future demand. The volume of hot water they can supply is limited by carefully selected to meet any likely peak demands. Properly sized it is exceptional to use the full capacity

able again within a short time. This also applies when mounted and must generally be connected to a cistern stratification obtained with a gas storage water heater ensures that small quantities of hot water are availthe heater is first lit. They are either floor or wall supply. Special types are, however, available with an integral feed cistern and expansion pipe, and provided these are fitted above the level of the highest draw-off tap, it may not be necessary to employ an additional



27"

Sink



Sink (quick recovery)

	Kating	Capacity			
Sink	-000'9	I-5 gal.	5-8 gal./hour (140° F.)	°Z.	Thermostatic control. Main or tank water supply. Swivel spout.
Sink (quick ecovery)	11,000-	1-1½ gal.	10-14 gal./hour	No	Some models available with push button thermostat eliminating maintenance gas rate. Swivel spout. Main or tank water supply.
Multipoint	7,500-	12-100 gal.	9-120 gal./hour (140° F.)	3 in5 in. dia. required	Some with integral ball valve cistern.

Notes

Flue

Output

B.Th.U./hr. Storage

Type

STORAGE HEATERS

12/2"

integral cistern

3 in.-5 in. dia. Some with integral ball valve cistern.

required

Sink (quick recovery)

Notes on installation

Sink storage heaters

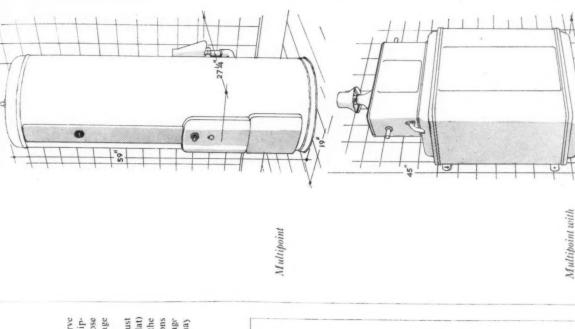
Sink storage heaters are invariably fixed to the wall and discharge over the sink by means of a swivel spout. They must therefore be fixed not less than 24 in. from the drawoff point.

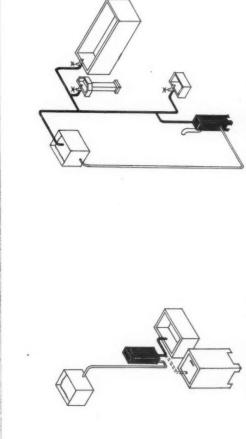
Multi-point storage heaters

There is no distinction in design between multi-point storage heaters which are fixed adjacent to all points to be served (i.e. are "local" storage heaters) and those

which are installed centrally in the dwelling and serve is, however, the gas circulator combined with storage ment which is most commonly used for the latter purpose taps at a considerable distance. The type of gas equipwhich is discussed in a later paragraph.

Storage heaters require an expansion pipe which must discharge over the cold feed cistern. Where (e.g. in a flat) floors above, a secondary cold feed cistern of 25 gallons it is impossible to take an expansion pipe through the capacity may be fixed just above the level of the storage unit. Alternatively a heater with an integral cistern may be used.





Left: storage heater for sink use provided with swivel spout and fixed to enable easy filling of bulk boiler. Storage multi-point heater piped to serve ground floor sink and first floor bath and wash basin.

Gas circulators

A gas circulator is a heater designed for connection to use either as a "booster" to a solid fuel boiler or as an alternative source of heat in summer. It is also possible to obtain gas circulators combined with insulated storage vessels. There is, in fact, no difference in the mode of operation between a gas circulator with storage and a gas storage heater, the difference consists in the fact that with a circulator the heating element a hot water storage vessel in a hot water system for

is attached to the storage vessel and with a storage heater is integral with it. It is to be noticed that circulators of much higher ratings than those given in the table can be obtained for large-scale central hot water supply. It is usual, however, to refer to these as "gas supply or for combined space heating and hot water

It is to be noticed that, though the range of "output" figures has been given, the actual performance must depend on the layout and insulation of the existing hot water system.

boilers."

TYPES OF GAS CIRCULATORS

	and	
Notes	hr. 3 in. dia. when Available with economy valve. One model has concentric flow and required return connections	3 in.—44 in. Can be supplied with integral ball valve feed cistern, factory when required insulation, tappings for solid fuel, economy valve
Flue	3 in. dia. when required	3 in4\frac{1}{2} in. when required
Output	5.5-28 gal./hr. (140° F)	5.5-28 gal./hr. (140° F)
capacity		18-25 gal.
B.Th.U. hr. capacity	90,000	900,00
Type	Separate	Combined with storage

Notes on installation

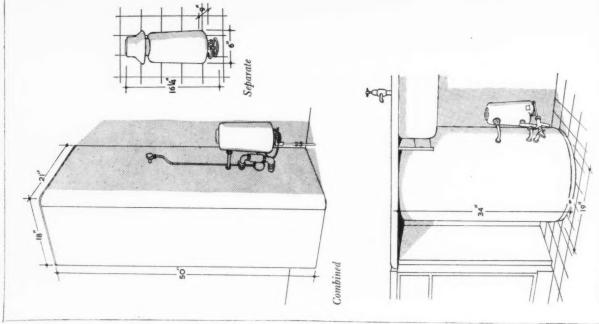
supply of hot water in a combined space heating/hot nected with the normal return pipe at the foot of the cylinder and the connection is governed by the economy Where a gas circulator is being used to give a summer water system, stopcocks must be inserted in the system to these stopcocks is critical and the advice of a gas engineer should be sought. The operation of an economy valve (see notes above) can be appreciated by reference to the righthand diagram on page 490. A third drilling is made in the cylinder a short distance from the entry of the flow pipe valve. When the valve is "on" the normal return is closed and the return is therefore taken through the upper enable the heating circuits to be shut off. The position of and a second return pipe is inserted, and this pipe is con-

pipe.

the water in the cylinder above the entry of the return With a correctly designed cylinder and connections, only will circulate; there will be no intermixing of the water being heated with the cold water in the lower section of the cylinder. Thus some five gallons of constant hot water will be maintained in the tank at less cost than it would take to heat the whole. When more than 5 gallons is wanted the economy valve is turned off and the system operates in the normal way.

The concentric flow and return connections are a device which enable the circulator to be connected to the cylinder through a single tapping. The flow pipe is of smaller diameter to the return and runs inside it with an extension which turns upwards on entering the cylinder and discharges the hot water near the top.

Combined



[487

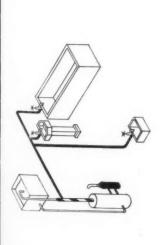
vaive. When the return is therefore taken through the upper pipe.

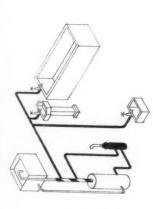
Combined

which turns upwards on entering the cylinder and dis-

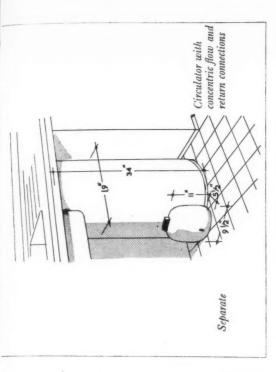
charges the hot water near the top.

erel to the fetuin and funs miside it with an exte





Left: Gas circulator combined with a hot water storage cylinder with the flow discharging directly into the cylinder. Right: Gas circulator used in conjunction with a storage cylinder, the flow pipe from the circulator being connected to the flow pipe from the cylinder.



Conversion units

Whereas a circulator is designed for fitting a storage heater, a "conversion unit" is designed for fitting to a back boiler fire to give hot water when the fire is not in use. A conversion unit will use the same flue and ventilation as the fire and will need no additional pipes and tank. Special types are available (of higher rating

than that specified below) for the permanent conversion of solid fuel boilers. Though conversion units of this type are less efficient than the other forms of gas water heating, they can give an acceptable hot water service when used in association with a sink heater.

TYPES OF CONVERSION UNITS

Rating

			And the second of the first contract of the second of the
rsion	20,000	Dependent on installation	Uses existing flue

Notes

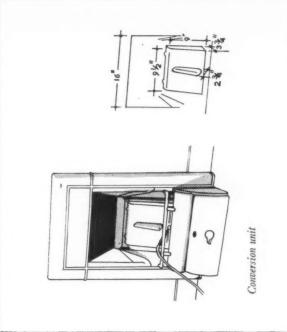
Notes on installation

Not all back boilers are capable of receiving conversion units. In general the following requirements must be satisfied:

(a) The exposed boiler face must be at least 9 in. wide and 5 in., or preferably 7 in., high.

To be used in conjunction with solid fuel fire and back boiler

- (b) The bottom of the boiler must be 1 in. and not more than 3 in. above the grate bars.
- (c) There must be 9 in. of unobstructed height above the grate bars.
- (d) With the unit resting snugly on the grate bars the face of the unit must fit closely to the face of the boiler.



Bulk boilers

"Bulk boiler" is a term used in the gas industry to describe a freestanding gas heated water container. The most frequent use of a bulk boiler is for domestic laundry, when it is commonly described as a "wash boiler"; the water is heated to boiling point, the clothes are put in it, and when the washing is over the

	Notes
	Flue
S OF BULK BOILERS	Rating B.Th.U./hr. Output
TYPES	Type

method of hot water discharge by displacement. A drain tap is fitted to enable the appliance to be used as a wash boiler when required A dual-purpose unit consisting of a wash boiler incorporating a Requires some method of water transference, e.g. syphon pump Not normally required diameter 3 in. 7-8 gallons boiling 7-8 gallons boiling water in one hou water in one hour 20,000 20,000

boiler in conjunction with a bath. The hot water in the wash boiler is trans-

ferred to the bath by displacement (i.e.,

by running more cold

connection to the water mains. When placed in the kitchen

they will not usually need a flue, but when placed

is essential.

bathroom a

in the

Diagram showing the use of a wash

Notes on installation

Bulk boilers are filled by hand (or—as they are movable—by being placed under a tap) and need no permanent

water is emptied through a draincock in the base. There is, however, a variation of bulk boiler which is in effect a gas-fired equivalent of the traditional "copper." This is similar in all points to a wash boiler and can be used as such, but it is also designed to enable the hot water to be transferred to a bath.

Selection of suitable gas appliances

Decisions to use Central Bulk Storage and Bulk Water Heaters of the combination set, conversion unit or wash boiler types usually result from special factors outside the scope of this article. The selection of a suitable appliance would be according to size as dictated by the circumstances of the case. It can be said, however, that wash boilers provide the very minimum of hot water service—fixed quantities for the infrequent or "once a week" demand, and though not particularly efficient, the capital and installation cost is the lowest possible. This service can be greatly improved by the addition of a small sink heater.

The best hot water service for a domestic household which is more or less in continuous occupation will be given by a circulator with a high recovery rate coupled to an insulated storage vessel. For the average family of two adults and two children, 30,000 B.Th.U's per hour with storage of 30 gallons would probably be right. Such an installation would provide unlimited hot baths at half-hourly intervals after an initial heat up period of about an hour.

Where it is probable that a household will be only spasmodically occupied—flats in cities where the occupiers do little cooking and washing or may be away three nights out of seven—instantaneous heaters would be preferable. They also have advantages where there is a shortage of space for storage appliances or where plumbing makes difficulties for other types of systems,

Flues

The requirements relating to flues are dealt with fully in the "Flues" supplement, but it should be noted that flues are normally required for all heaters except the following when installed in adequately ventilated rooms:—

Instantaneous Heaters—less than 40,000 B.Th.U's per hour.

Storage Heaters—less than 15,000 B.Th.U's per hour. Wash Boilers—less than 20,000 B.Th.U's per hour. Circulators—less than 6,000 B.Th.U's per hour. Balanced Flue Heaters—See page 489.

Ventilation requirements

The importance on hygienic grounds of providing permanent ventilation is now authoritatively recognized by the Housing Repairs and Rents Act, 1954, the BS Code of Functional Requirements, and many local byelaws.

This is particularly desirable in a kitchen, for example, where discomfort arising from the effects of cooking and clothes washing can be unpleasant irrespective of the fuel used.

Any gas appliance requires for combustion a volume of air at least 5-6 times as great as the volume of gas burnt, but the contribution to the conditions of discomfort directly arising from the products of com-

bustion is normally and comparatively small. Where several gas appliances are in use in a poorly ventilated room, however, the products of combustion, if permitted to reach too high a level, can impair the combustion of the gas. Adequate ventilation is, therefore, essential to avoid discomfort and ensure safety.

Owing to its relatively high gas rate, a flued instantaneous water heater requires a large volume of air for combustion. Furthermore, under adverse wind conditions, products of combustion may be discharged intermittently from the draught diverter into the room. For this reason it is wise, when installing an instantaneous heater in a bathroom, to restrict the size of the heater, wherever possible, to a gas rate of 0.6 times the volume of the room and to provide a ventilator of at least 12 sq. in. free area. Alternatively, consideration should be given either to placing the heater in some other room or to installing a model of the balanced flue type.

Balanced flue heaters

Water heaters are now available designed on the balanced flue principle which overcomes many of the difficulties of providing ventilation and flues.

The operating principles of the balanced flue depend upon balancing the air intake and flue outlet in a "U" shaped tube sealed from the room, and having an inlet and outlet close together. This is generally achieved by arranging an inlet and outlet concentrically. The burnt gases in the outlet, or flue, are displaced by the heavier cold air in the inlet. This, of course, occurs in the conventional flue, but the proximity of the inlet and flue in the same terminal means that atmospheric conditions affect both equally. Thus the difference in

products outlet for combustion air inlet for combustion head exchanger

Diagram illustrating operation of a balanced flue (which is here associated with a convection heater).

weight of air is constant and operation is assured no matter what the wind pressure may be,

The diagram below shows the typical arrangement.

The advantages of such heaters are:

A heater may be installed on any external wall, even on the lowest floor of a very high block, without need for a lengthy and possibly unsightly flue.

A heater may be installed in any room no matter what the volume or ventilation condition, since no air is drawn from—nor can flue gases be discharged into the room.

Such a heater, having no flue or draught diverter in the room, can be of neater design.

Normally balanced flue heaters are fitted on to external walls (see Flue Section of these Supplements) and require at least 11 in. overall thickness, although a few are now available for fitting into a 9-in. thick wall. They require a recess on the inner face of the wall, usually about 30 in. high by 15 in. wide which, in some instances, may require a lintel. For full instructions as to sizes and fixing, see the manufacturer's instructions for the particular heater.

The principle of the balanced flue has now become well established with water heaters, and it is to be expected that the future holds a rapid extension in the number and variety of this type of appliance, some of which may not have to be recessed into the wall

Water supply

The water supply to instantaneous gas water heaters should be at a continuous uniform pressure and for this reason appliances should be, wherever possible, supplied from a feed cistern provided that there is sufficient head of water. The water head required varies for different heaters and details should be obtained from either the local Gas Board or the manufacturer.

Where the head of water is insufficient, or it is necessary for some other reason to connect direct to the main, the appliance should preferably be fitted with an automatic valve. This type of valve controls the gas supply in the event of an interruption to, or loss of, water pressure, and they should be fitted wherever there is a doubt as to the continuity of supply.

Most sink and instantaneous type heaters are fitted with these valves.

Both automatic valves and interlocking cocks, if correctly designed and used, safeguard the consumer and the appliance against the consequence of incorrect lighting, but interlocking cocks will not control the gas supply in the event of interruption or loss of pressure in the water supply.

Interlocking cocks are cheaper than automatic valves, more robust and do not operate on water pressure; for this reason they can be used with smaller heads of water, but it must be remembered that the head of water should be sufficient to give a minimum flow through the appliance, otherwise overheating may occur.

In cases where the mains supply has to be used and there are wide variations in the pressure, a water

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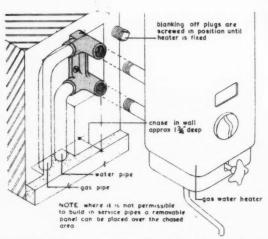
governor should be fitted, or an appliance with an integral water governor should be used.

Notes on installation

As a later supplement is to be devoted to installation little need be said about it here. There are, however, a few matters which particularly concern water heaters, but which have not been mentioned when discussing the separate heater types and which call for comment here.

Water pipes should not, so far as is possible, be run on the inner surface of an external wall where there is the risk of frost damage. Both gas and water pipes should be wrapped in oil paper before embedding in plaster to reduce the corrosion risk, and to allow for expansion with temperature changes. Concealed pipes properly installed and protected can be expected to last possibly longer than pipes in ducts.

To facilitate the subsequent fitting of appliances in buried pipe-work installations, some manufacturers now design sink heaters to be connected directly to a special jigged gas and water fitting which can be fixed to the structure before plastering. These fittings ensure the accurate positioning of pipe connections with those on the appliance. In most cases, no other support is needed for the appliance.



Method of fixing a jigged wall fitting for sink water heater.

Special pillars incorporating gas and water connections are available for fixing sink heaters in positions where support presents problems, *i.e.* in front of windows or on a fixed counter.

Draw-offs

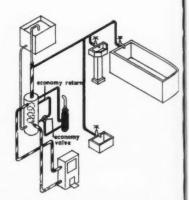
All draw-off pipes should be as short as possible and as small in diameter as will give the required delivery

rates. The most used outlet should be nearest to the appliance. Where long draw-offs are unavoidable, it may be more economical to use two heaters. (Maximum lengths are usually laid down by the Water Supply Authorities.)

Indirect or calorifier systems

There is an increasing number of indirect hot water systems in use in which the water heated in the boiler passes only through a heat exchanger or calorifier in the hot water storage vessel and is not drawn off for use through the taps. Such systems reduce scaling troubles and are essential in hard water areas or with back boilers not fitted with access plates. The gas circulator can be used with such systems and may be fitted to either the calorifier (taking the place of the boiler) or direct to the storage vessel. The latter is preferable since there is quicker heating up, better stratification and hence small amounts of really hot water are almost instantly available, the thermostat on the circulator will respond more quickly to variations in the hot water temperature and the circulating temperature can be lower.

A typical layout of an indirect system is shown below. The economy valve is fitted so that it is possible to heat only a small part of the water in the storage vessel, except when baths are needed. This can greatly reduce heat losses. All pipes shown in heavy line and the hot water storage vessel must be adequately lagged.



Gas circulator used as a booster of as an alternative source of hot water in a solid fuel system employing a calorifier. The primary circuit from the boiler is connected to the calorifier and the flow and return from the circulator to the storage vessel, an economy valve being incorporated in the return.

building illustrated

HOUSE

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in BIRCH LANE, PURLEY, SURREY designed by R. G. R. HAGGARD



From the south.

This house on a secluded site at Purley is the fourth private house to be fully cost analysed in the JOURNAL. The house, which was designed by the client for his own occupation, has an area of 1,482 sq. ft., plus a garage of 255 sq. ft., and was built in six months under a cost plus lump sum contract. The heating system is by copper pipe under-floor coils, served by an oil-fired boiler.

The garden facade. The uindows to bedrooms I and 2 are on the left.



booster of hot water ploying a rcuit from

calorifie the circun economy the return.

building illustrated





Above, an awning can be drawn across the timber framed canopy over the living room windows, in hot weather. Left, the large timber framed windows on the south side of the living room. Below, the storage wall dividing living room and hall.

CL

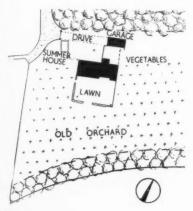
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CLIENT'S REQUIREMENTS

Four bedroom house for family with children. Living room with dining recess, kitchen with breakfast area, study off living room. Floor heating in all rooms. Good view from kitchen along main corridor, to control movement of children. Log burning fireplace to use timber on site. Enclosed service yard.

Shallow drainage controlled position on site.



Site plan

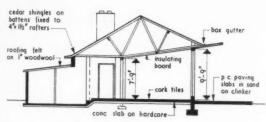
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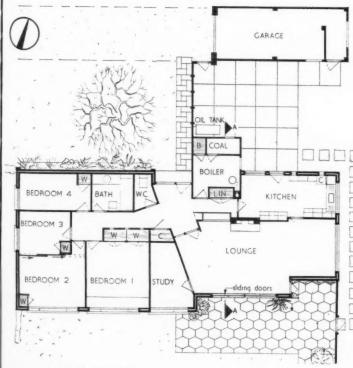
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Section A-A [Scale: 10"]



Floor plan [Scale: 16" = 1'0"]

analysis

PLANNING AIMS

Visual separation of four external areas-closed entry "court," open formal garden on south, general site (rough orchard) and service yard. Bath and w.c. windows removed from entry elevation partly for privacy, partly so that blank wall emphasises closed appearance of entry in contrast with open view to south from hall and living room. Break-up of box form in living area by sloping ceiling, irregular walls and glass wall to south. Separation of living and sleeping areas. Screen wall to suggest enclosure of formal garden. Removable summer sunshade for high living room window.

	cost per sq. ft. s	d
Preliminaries and insurances		41
Tree clearance, fire, third party and	employers	
insurances.		

MAIN CONSTRUCTION

3 5

Frame or load bearing element Load bearing external walls (brick outer leaf, lightweight-concrete block inner leaf). Brick Stack. R.s.j.'s. over sliding doors. Load bearing partitions. solid wall 0.926 ratio

			floor	area	1		
Windows						1	11
Timber and	metal	windows.	sliding	gear for	living		

room window.

External doors 81 Metal "up and over" door for garage. Five flush doors.

0.078 ratio floor area

Roof construction 4 23 Timber framing (common rafters and purlins). Trim to roof light. Trimming to hang living room ceiling under r.s.j.

Sunshade framing. Roof lights 73 One line of five: four in bathroom, one in w.c. Total area, 20 sq. ft.

1 15 Double glazing to 19 large panes. Plate to roof light and entry wing light. Plate between hall and living room. Remainder sheet.

17 31

Total of structural elements PARTITIONING

1 01 Internal partitions Breeze, plastered (745 sq. ft.), sliding timber panel 72 sq. ft., between bedrooms 2 and 3. 7 Internal doors 10 gaboon faced flush doors. One glazed door

between hall and living room. Frames and linings. 8 Door furniture, fuel hopper, general hardware, satin

analysis

FITTINGS 2

6

1 73

Extractor fan, kitchen cupboards, fireplace, built-in wardrobes, cupboards with counter top for bathroom basin. Basic cabinet for building-in of radio and storage unit in living room.

Total of partitions and fittings 4 94

Aluminium faced plasterboard and plastering. Insulating board ceiling in living room (including

metal fixings) and cover strips.

FINISHINGS

Ceiling finishes

Floor finishes	2	111
1-in. cork tiles. 1107. sq. ft. 29s. 6d. per sq. yd.		
Lino tiles. 207. sq. ft. 16s. 6d. per sq. yd.		
Wall finishes	2	0.
Glazed wall tiles, wall plastering, timber mouldin	gs.	







Top, the north and west facade, and the garage, from the entrance drive. Centre, a view down the length of the house from the kitchen to bedroom 3. Bottom, bedroom 1.

	-	-
Roof finishes	3	103
Cedar shingles (2443 sq. ft.). Mineral surface felt on boards (54 sq. ft.).		
Decorations	3	4
All internal and external painting. Polishing of		
internal doors. Wallpaper.		
Total of finishes 13 10		

SERVICES

Hot and cold water installation

External plumbing	1	5
Timber box gutters with asbestos and bitumen lining		
and aluminium capping. Rain water pipes. Flashings.		

H

in

2 31

4 14

1 1

Tanks and calorifier, copper	pipe and fittings,
service connection.	

Heating and ventilation
L.R. 65°. Beds 55°.
'U' of walls 0.15 and 0.21.
'U' of roof o·14.
Oil-fired boiler, oil tank, pump and controls,
copper pipe for floor coils.

Gas installation None.

Electrical	installation		2	1
Light	Triple power	Single power		
25	(13a, 2x 2a)	(13a)		
	9	6		

Total of services	11	0
Drainage		

Soakaways and	connections.	Manholes	and soil
connections.			
Commention to			a familie .

Connection to private sewer at manhole inside plot.

Other elements not shown above 1 11 Builders' general expenses (transport, unloading, clearing up, etc.). Note that paths, terrace paving, entry drive, garden screen walls cost £249 not included in this analysis.

COST SUMMARY

Shillings per sq. ft. of
$$= 52s$$
. 9d. $= \frac{£4580}{1.737}$ ffloor area $= 52s$. 9d. $= \frac{£4580}{1.737}$ sq. ft. $= \frac{£4580}{1.737}$ measured inside external walls)

Cost with external work, £4,829 (cost £4,329 plus agreed £500) including garage and fuel store. Ground floor area: house 1,482 sq. ft. Garage 255 sq. ft.

Total floor area: 1,737 sq. ft. Work began: June, 1955. Work finished: January, 1956.

Note: All prices include a proportion of the builder's lump sum profit.

HOUSE

3 103

3 4

2 31

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4 13

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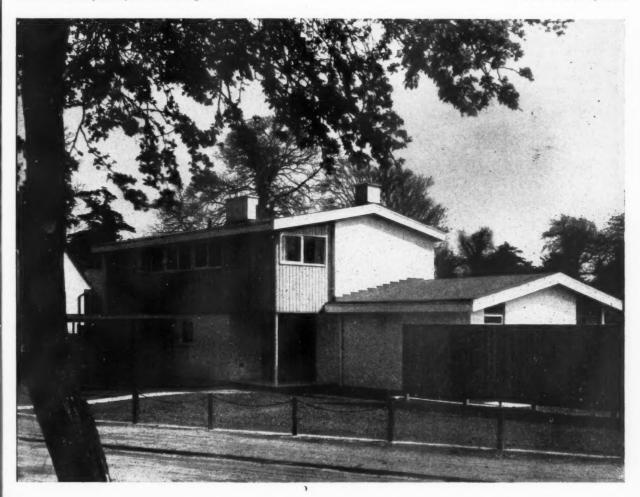
in BOYLE FARM ROAD, THAMES DITTON, SURREY designed by MI HAEL LYELL (WELLS-COATES and MICHAEL LYELL)



The south and east facades from the kitchen garden.

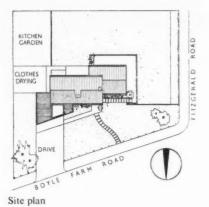
This house at the junction of Boyle Farm Road and Fitzgerald Road, Thames Ditton, was designed for a family with two children, and to provide also additional accommodation for a living-in maid and for guests. The clients required the house to be as labour saving and as easy to run and maintain as possible, and that the adults' and children's living areas should be reasonably separate. The whole of the garden is concealed from the road.

The north and west facades.



sun





First floor plan



Below left, from the south-west, with the living-dining area in the foreground.







Top, the hall, main entrance door and porch looking towards the living room. Above, the staircase, which has treads of polished mahogany.

SITE

Nearly one-third of an acre of flat ground on the Boyle Farm private estate, with a road frontage on two sides. The house was sited due north and south parallel with southern boundary, pedestrian and vehicular entrances being off Boyle Farm Road.

The whole of the garden to the south of the house is enclosed by a brick wall along Fitzgerald Road, and by vertically boarded cedar fences at each end of the house, ensuring complete privacy from both thoroughfares. Further divisions of the site were made with brick walls and paved areas to form kitchen garden, drying yard, terraces, etc.

PLANNING AIMS

The main area of the house is planned in two storeys with a single-storey extension containing the living and dining rooms, divided by a large fireplace in natural brickwork with a terrazzo mantelpiece. The sloping ceiling of these rooms is finished in Columbian pine strip boarding, as is also the floor of the dining room and part of the living room, linking the two together visually.

The south wall is largely glazed with a solid sliding door centrally placed between the two rooms opening on to an extensive terrace. The north wall contains a built-in fitment including bookcases, cupboards and cocktail cabinet. The terrazzo hearth is a continuation of the floor finish in the hall and entrance porch, across which an invisible beam switches on the porch light and rings the door bell when anyone approaches the front door. Light fittings are recessed into the hall ceiling of acoustic tiles, which extend over part of the dining room.

A kitchen and utility playroom are planned as one large space, divided by a breakfast bar. The solid fuel boiler is situated in the utility room, from which there is direct access to the garage and children's terrace. A clear glass panel is incorporated above the hatch fitment (illustrated as a Working Detail in the Journal for June 20, 1957) between kitchen and dining room, which, while keeping the two areas separate, greatly increases the apparent space and size of the rooms. Two-way cupboards are fitted beneath the hatch.

The single garage is planned within the main area of the building and there is also an open car port alongside. An open riser staircase of polished mahogany with painted stringers leads out of the hall to the first floor, which includes four bedrooms and two bathrooms, the master suite at the eastern end of the house containing private dressing room and bathroom, with fitted shower. The sloping roof of the house is expressed in the bedroom ceilings to give added interest and height to the rooms. All except one bedroom have built-in wardrobes and shelves. A concealed lighting trough on the staircase landing provides an illuminated shelf for plants, pottery, esc.

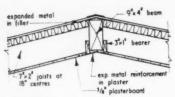
CONSTRUCTION

External walls

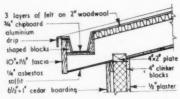
Ground floor: 11-in. cavity construction with 4½-in. Midhurst white facings and 4-in. insulation block plastered. First floor: end walls as above. North and south elevation timber framed with 4-in. insulation block infilling faced externally with western red cedar vertical boarding.

Internal walls

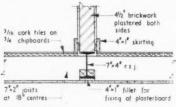
4½-in. × 9-in. brick and breeze partitioning. Fireplace: grey rustic wirecut facings.



Detail C



Detail B



Detail D [Scale: 1" = 1' 0"]

Ceilings and roof

Plasterboard and setting coat, timber joists, woodwool insulation and three layers roofing felt with green mineral finish.

Ground floor: plasterboard and setting coat. 12-in. \times 12-in. acoustic tiles (dining-room and hall); 3-in. \times 1-in. Columbian pine strip (dining and living rooms).

Floors

Ground floor: 4½-in. concrete slab damp-proof membrane, screed covered with p.v.c. floor tiling, terrazzo tiling, Columbian pine strip on battens, and fitted carpet. First floor: timber joists covered with ¾-in. chipboard and fitted carpet.

Hot water and heating

Solid fuel automatic boiler. Immersion heater for summer use.

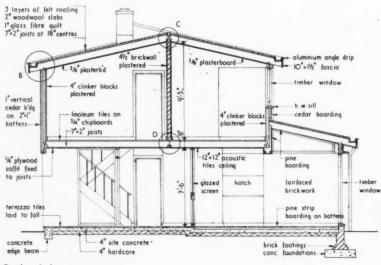
COST

Cost, with external work, £8,843.

Internal floor area (exclusive of car port and recessed porch), 1,810 sq. ft.

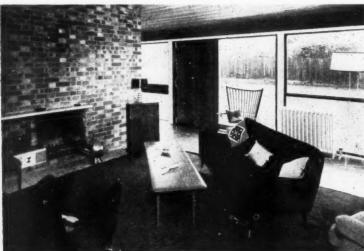
Cost per sq. ft. of floor area = 87s. 6d.

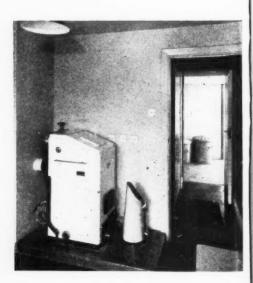
Cost of external works, including car port, driveway, paths, garden walls, cedar fencing, gravel drying yard and children's and main terraces, £925.



Below: left, the living room, looking towards the terrace and garden. Right, the solid fuel automatic boiler which provides central heating and domestic hot water. The passage on the right leads past the coal and coke stores to the dustbins, which are under cover.







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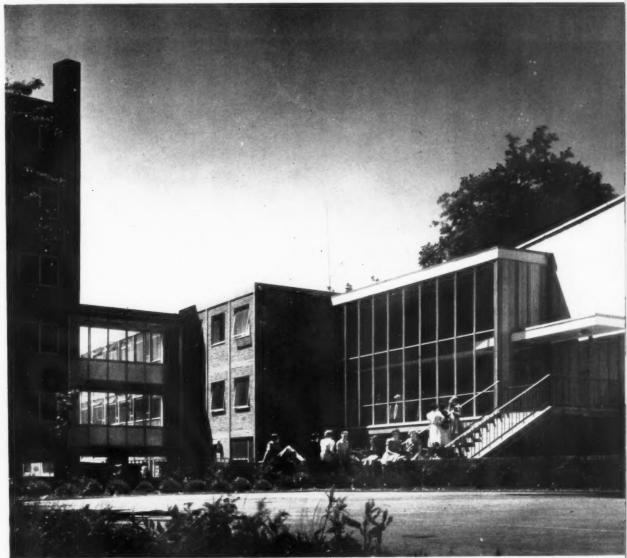
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COVERED WAYS AND CANOPIES: 23

working detail

CONNECTING BRIDGE: SCHOOL AT SYDENHAM

Basil Spence and Partners, architects

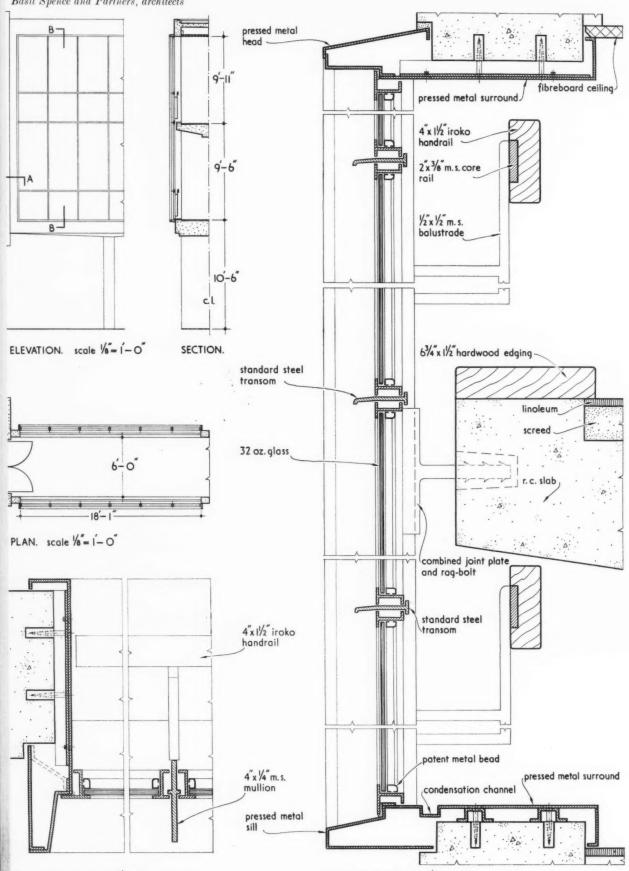


This two-storey bridge connects the administrative block to the main building. The glass below the transoms on each floor is Georgian wired and the mullions are rag-bolted for support to the intermediate floor slab.

working detail

CONNECTING BRIDGE: SCHOOL AT SYDENHAM

Basil Spence and Partners, architects



working detail

ILLUMINATED CEILING: SHOP IN ROME

Giorgio Coletta, architect (material supplied by Pietro di Rienzo)

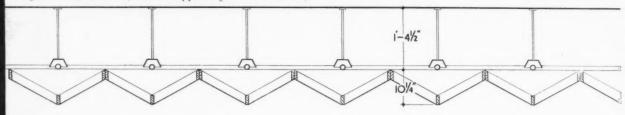


The false ceiling was introduced to lessen the height of the small room and provide an economical diffusion of light. It shows an original use of common materials.

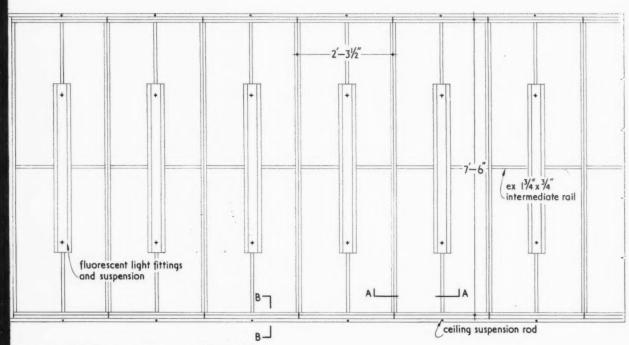
working detail

ILLUMINATED CEILING: SHOP IN ROME

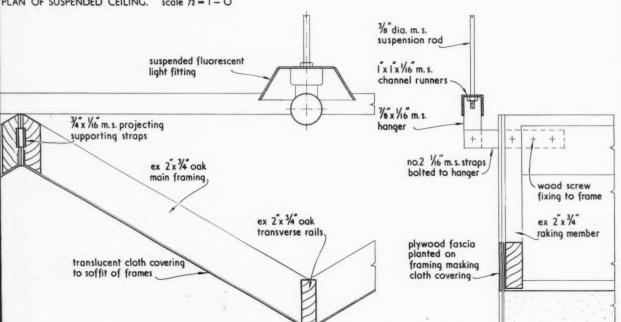
Giorgio Coletta, architect (material supplied by Pietro di Rienzo)



CROSS SECTION. scale 1/2"= 1-0"



PLAN OF SUSPENDED CEILING. scale 1/2 = 1-0



SECTION A-A. scale 4 full size

SECTION B-B. scale 4 full size

note: figured dimensions in feet and inches are approximate





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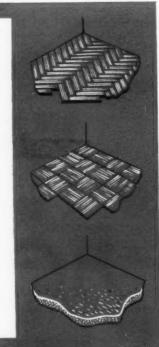
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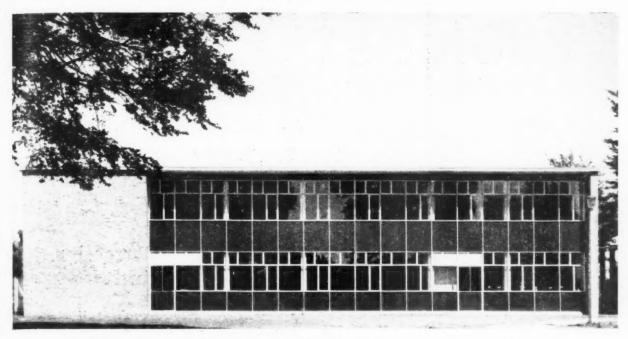
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Buildings Illustrated

House in Birch Lane, Purley, Surrey (pages 491-494). Architect: R. G. R. Haggard, A.M.I.C.E., A.M.T.P.I. General contractor: H. J. Mundy, General Foreman, J. Austin. Sub-contractors.—Floors: Holborn Asphalte Co. Ltd. Joinery: Bignall Joinery Co. and R. Sutton. Boiler: Perkins C.M.E. Ltd. Roofing: Roberts & Burling Ltd. Roof Lights: British Challenge Glazing Ltd. Paving: Noelite Ltd. and Mono Concrete Co. Double Glass: Plyglass Ltd. Sanitary Goods & Hardware: Alfred Goslett Ltd. Bricks: Crowborough Brick Co. Door Gear: Silent Gliding Doors Ltd., and P. C. Henderson Ltd. Electrical Work: H. W. Hart. Electrical Fittings: New-Day Accessories Ltd.

House in Boyle Farm Road, Thames Ditton, Surrey (pages 495-498). Architect: Michael Lyell, A.R.I.B.A., of Wells Coates and Michael Lyell. Assistant architect-incharge: Bryan Thomas, A.R.I.B.A. General contractors: Thorogood & Sons Ltd. Subcontractors and suppliers.—Felt roofing: H. V. Smith & Co. Ltd. Accoflex flooring: Armstrong Cork Co. Ltd. Electrical installation: The South Eastern Electricity Board. Photo electric equipment: Radiovisor Parent Ltd. Sanitary fittings and ironmongery: W. N. Froy & Sons Ltd. Purpose-made metal windows: The Crittall Manufacturing Co. Ltd. Heating and Hot Water installation: G. E. Falkner & Son Ltd. Terrace Paving: Noelite Ltd.

PROFESSIONAL

F. J. Samuely, B.SC., A.M.I.C.E., of 8, Hamilton Place, W.I and 5, Grafton Street, W.I, has taken into partnership F. Newby, W. F. Smith and Miss P. Hutchings. The practice will continue as Felix J. Samuely and Partners.

W. H. Saunders & Son (J. H. Saunders, L.R.I.B.A., and R. W. Leggatt, A.R.I.B.A., A.M.T.P.I.) have moved their London office to 45, Chancery Lane, W.C.2 (telephone: Holborn 1550), where they will be working in association with David A. Wilkie, F.R.I.B.A. J. Scaife, A.R.I.B.A., will continue to be chief assistant to the London office at its new address.

Harlow Development Corporation announce that their address is now:—Liaison Department, 1, Adam House, Stone Cross, The High, Harlow, Essex (telephones Harlow 24170, 24875, 24638).

TRADE

The Lead Development Association announce that the affairs of the Lead Sheet and Pipe Council have been integrated with those of the LDA. The LDA has formed a Lead Sheet and Pipe section, on the Committee of which members nominated by the Lead Sheet and Pipe Manufacturers' Federation will serve.

The Dravo Division of Weatherfoil Heating Systems Ltd. are holding a private Exhibition of their heating equipment at the East Room, McLellan Galleries, Glasgow, from October 1 to 3, 10 a.m. to 6 p.m.

Aga Veneers Ltd. of 1, Kingly Court, Beak Street, W.1 announce that the following firms have been appointed distributors: Allied Manufacturing Co. (London) Ltd., London; C. Brewer & Sons Ltd., Eastbourne; Buxton Dawson Ltd., Derby; William Evans & Co. (Distributors) Ltd., Liverpool and Manchester; W. N. Froy & Sons Ltd., London; Graham & Wylie Ltd., Glasgow; S. Leboff Ltd., London; Alexander Mackenzie & Co. Ltd., Edinburgh; Thomas McClune & Sons (Glass) Ltd., Belfast; William Muir & Co. Ltd., Glasgow; Nottingham Handcraft Co., Nottingham; Rowe Bros. & Co. Ltd., Bristol, Birmingham and Exeter; and F. H. Thompson & Sons Ltd., Newcastle-upon-Tyne.

Ashdowns Ltd., of Eccleston Works, St. Helens, Lancs. announce that their parent company Pilkington Brothers Ltd. have decided to close down their premises from December 31, 1957. They hope, however, to negotiate the sale of the process of "Undulite" and are therefore prepared to continue to accept orders for this.

Correction

In the JOURNAL of September 5, page 367, we illustrated a multiple paraboloid roof on a factory at Wilton, Wiltshire, designed by Robert Townsend. The floor area of the factory was given as 110 sq. ft. This, of course, was incorrect. It is, in fact, 110 ft. sq. and the total area of the roof is 13,225 sq. ft.

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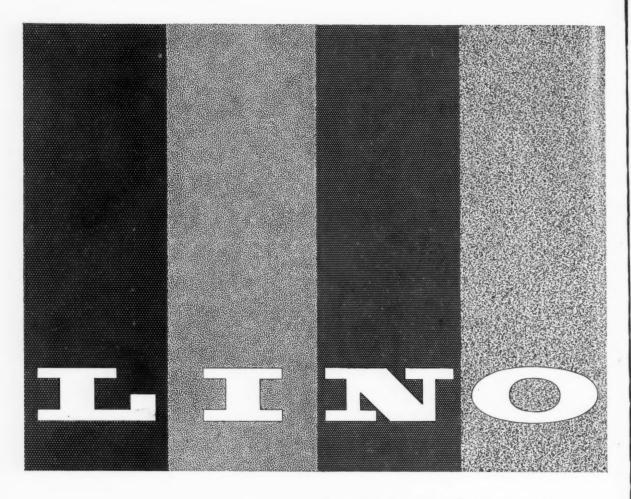




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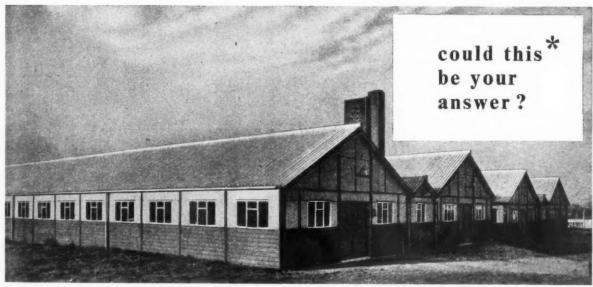
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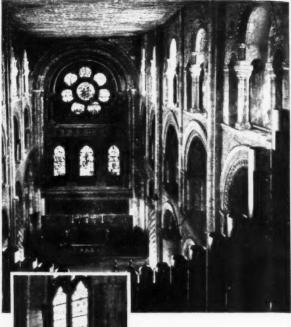
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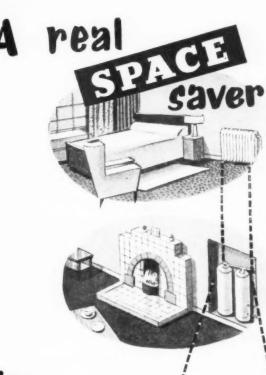
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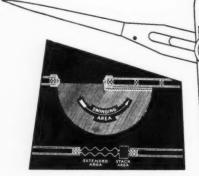
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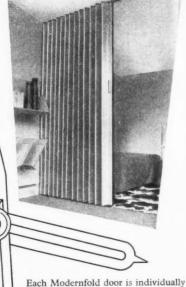
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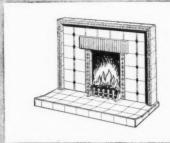


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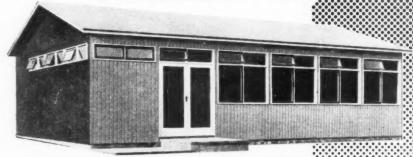
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of building today, Curtain Walling
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number of the Review. Michael



Curtain Walling detail of the new B E A terminal off Cromwell Road, Kensington.

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The annual post free subscription rate payable in advance is \$2.18.0 sterling; in U.S.A. and Canada \$9 9-13 H H Queen M 1 ž Anne's -B ARCHITECTURAL Gate, a H Westminster, H bd C REVIEW H S.W.1. d H HING! -F further Whitehall 06 Ħ



House in the lower town Shepton Mallet

means of clothing buildings, while in Skill there will be a supplement on some of the products and systems that are available on the British Market. Also in Skill will be new Jaeger shop Interiors by Dennis Lennon, as well as Design Review and other regular departments. Aspects of the diversity of English nineteenth-century architecture are covered by Hugh Honour's account of the improbable Roman Church at Everingham, and a narrative of the building activities at Strawberry Hill of Frances Waldegrave, recounted from original sources by Osbert Wyndham Hewett. September Townscape features will deal with Shepton Mallet, whose multilevel town-centre will be discussed by Gordon Cullen.

Universities Staircase Arcadia

October Architectural Review
Vexed by conflicting interests
and lack of comprehension of the
issues at stake, the design of
Universities has become a prob-



3 D shop lettering in Dublin.

lem that excites passion and prejudice, rather than constructive thinking. In the October number of the Review, Professor Pevsner and the Hon. Lionel Brett will attempt to put the problem back on a realistic basis in a special feature covering both the historical growth of universities and their present needs, emphasising

the diversity of concepts, both in organization and architecture that the term embraces. Two articles in the same issue will deal with problems of architectural lettering; Nicolete Gray contributing a study of Lettering in Three Dimensions and Skill, surveying the design of Fascia



Staircase at the MEA store, Stockholm.

Boards. Also in Skill will be an illustrated description of Arne Rudberger's stunning staircase for the MEA department store in Stockholm, and other recent structures to be illustrated will include a small house by Sir Hugh Casson on the South Coast. and another well-designed adjunct to a department store-G. A. Jellicoe's roof garden on top of Harvey's at Guildford. Two historical features will deal with developments in the first quarter of the present century: Ian Nairn's delayed study of Hampstead Garden Suburb is now expanded into a larger study of Arcadia as a place to dwell in, and Reyner Banham will investigate the implications of recent publications on the position of Mondrigan both as a pioneer of modern design, and as a model to be set up for emulation by architects in the future.

Smithsons Building Exhibition ONNO

November Architectural Review

The controversial Smithsons will make their first appearance as contributors to the Review in November, with an illustrated study of the Shape of the Community, in which they set against the exhausted diagrams of CIAM planning their vision of a more humane type of ciry. For nonvisionaries—and for visionaries too-Skill will provide a full coverage of the Building Exhibition from the technical point of view, as well as an Interiors treatment of G. A. Jellicoe's restaurant and shopping floors at Harvey's of Guildford, whose roof-garden was dealt with in the October Review. Visionary qualities, spurred by hard practical necessities, illuminate Kenneth Browne's proposals for applying the ONNO traffic-directing technique to Park Lane and west Mayfair. Also in Miscellany, Ian Nairn will describe a giant waterwheel-a little-known triumph of the Functional Tradition in the Isle of Man, and the study of the functional tradition will be carried further by Brian Spiller's article on Georgian Breweries. Buildings described in this issue will include the new Bowater Factories by Farmer and Dark, whose cladding provides a practical follow-up demonstration of patent-glazing techniques, and Rangoon University and Technical Institute, by Raglan Squire and Partners, extensively illustrated in colour. Professor



Entrance to the Library of the new Rangoon University. Architects, Raglan Squire and Partners.

Pevsner reviews Tschudi Madsen's important book on the Origins of Art Nouveau, whose character is summed up in the title Beautiful and, if need be, useful, and Dr. S. Lang will provide a note on Architectural Visitors to Padua. based upon a register kept by the university there, in which practically every English architect and amateur of note signed his name when passing through. Regular features such as the Counter-Attack bureau will continue, and Kenneth Browne will contribute a frontispiece-drawing-this time a trailer to the coverage of the TUC building which will appear in the December issue.



Water wheel at Laxey, Isle of Man.

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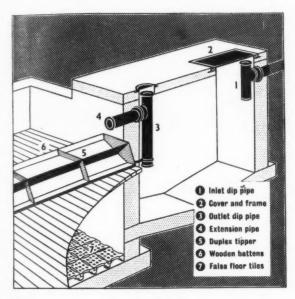
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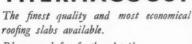
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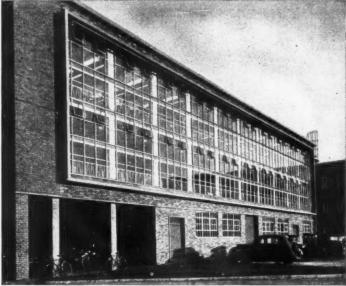
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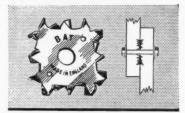
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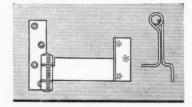
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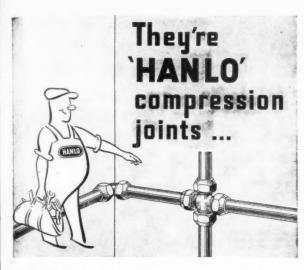
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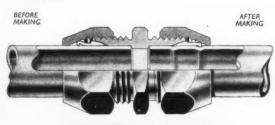


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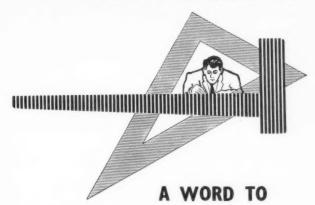
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within this range according to quantifications experience.

Applicants should have had experience in Local Authority work and in the administration of a department. Experience in town planning and re-development of built-up areas will be an advantage.

Applications, stating age, qualifications and experience, together with the names of two referees, should be sent to the Town Clerk endorsed Deputy Borough Architect not later than noon. 5th October 1957.

G. A. BLAKELEY.

Town Wall Walthamstow. E.17.

Town Hall, Walthamstow, E.17. 6th September, 1957.

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G. S. McINTIRE.

G. S. McINTIRE.

Town Hall, Sunderland.

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Preference given to applicants who have have saverence in Building Construction and preparation of specifications and supervision of maintenance work for estate property.

Salary based on scale—maximum, present 2731 per annum
Certain free and reduced rail facilities will be granted.

Apply in writing to:—
District Estate Surveyor,
British Transport Commission,
Western Region, Central Chambers,
1, Penarth Road, Cardiff.

104

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ARCHITECTS IN THE PUBLIC WORKS DEPARTMENT: GOVERNMENT OF SINGAPORE
TO design and supervise the construction of
Government buildings.
Contract appointment in the salary range
glool-41,988 a year, plus Expatriation Allowance and substantial cost-of-living allowance. In
ance and substantial cost-of-living allowance. In
the property of the service, including approved leave.
Free passages for officer, wife, and up to
children under 10 years. Free medical attention, generous leave, and quarters at low rental,
if available.
Candidates, under 40, must be A.R.I.B.A. and
have at least five years' experience since qualification. Gross emoluments on appointment for
andidates with five years' post qualificationsingle man £1,785 a year; married man £1,965
a year; married man with children £2,009 a year.
Write Director of Recruitment, Colonial Office,
London, S.W.I, giving briefly age, qualifications
and experience, quoting BCD 112/25/03. 756
CUMBERNAULD DEVELOPMENT CORPORATION require a SENIOR ASSISTANT PLANNING OFFICER in the Department of the Chief
Architect and Planning Officer. Salary scale,
El,100 to £1,320. A.R.I.B.A., A.M.T.P.I., required.
The new town, situated on a hilly site between
Glasgow and String; is to provide accommodation for 50,000 people at densities considerably
higher than those of other existing new towns:
applicants must be interested in compact urban
development.
The salary scale is Whitley Council for New
Towns Staff Scale APT VIII and appointments
may be made above the minimum of the scale.
The Corporation are aware of the difficulties
of the housing situation and will endeavour to
provide assistance in an appropriate case.
Write to L. Hugh Wilson, O.B.E., A.R.I.B.A.,
Dist.T.P., A.M.T.P.I., Chief Architect and Planning Officer, Cumbernauld Development Corporation, Cumbernauld House, Cumbernauld, for application form, to be returned not later than
2th October, 1937.
BOROUGH OF HESTON AND ISLEWORTH
Applications are invited for the permanent
appointment of a SENIOR ARCHITECTURAL

Hall. S.E.I. (1609). ABUNEAUGOSI, THE COURTY TOTAL AMENDED ADVERTISEMENT BOROUGH OF CHELMSFORD ASSISTANT ENGINEER, Special Grade (£750—£1,030 per annum).

ASSISTANT ARCHITECT, Special Grade (£756—£1,030 per annum).

ASPLICATION OF ARCHITECT, Special Grade (£756—£1,030 per annum).

APPLICATION OF ARCHITECT, Special Grade (£756—£1,030 per annum).

APPLICATION OF ARCHITECT, Special Grade (£756—£1,030 per annum, housing accommodation is available. Further particulars may be obtained from the Borough Engineer and Surveyor, Municipal Offices, Chelmsford. Closing date: 11th October, 1957.

B. A. FRANCIS.

B. A. FRANCIS. Town Clerk

Town Clerk.
7571

MANCHESTER REGIONAL HOSPITAL
BOARD invite applications for two new posts of
MAINTENANCE CLERKS OF WORKS, one
covering North Lancashire/Westmorland and the
other covering South Lancashire/Cheshire. Duties
will principally be to prepare and keep up to
date records of structural defects of all the
board's properties. Knowledge of costing is
desirable. Salary £635×220 (2)×225 (3)—£755.
National Health Service conditions and superannuation. Application forms obtainable from
the Secretary of the Board, Cheetwood Road,
Manchester, 8.
7572

HARLOW DEVELOPMENT CORPORATION
ASSISTANT ARCHITECT required on the temporary staff, Grade A.P.T. VI. Salary £902×241—
2.1.107 per annum.
Candidates should be A.R.I.B.A, or equivalent,
and have experience in the design and supervision of buildings. Housing provided in suitable
cases.
Applications within seven days to General

Applications within seven days to General Manager, "Terlings," Harlow, Essex. 7580

NORTHAMPTON RURAL DISTRICT COUNCIL

ARCHITECTURAL ASSISTANT

Applications are invited for the above appointment on the revised Grade A.P.T. III. (2725×230 to £845 per annum), according to qualifications and experience.

Applicants should have passed the R.I.B.A. Intermediate Examination, or its equivalent, at one of the recognised schools of architecture, and have had a sound general experience.

The principal work will be preparation of improvement schemes for Council Houses, although from time to time new works will be involved.

The appointment is subject to the Local Government Superannuation Acts, the National Conditions of Service, a satisfactory medical examination, and termination by one month's notice on either side.

Applications, endorsed "Architectural Assistant, with personal details and details of experience and qualifications, together with names of two referees, to be sent to the undersigned by first post on Saturday, 5th October, 1957.

CLIFFORD E. JONES.

CLIFFORD E. JONES.

Council Offices, 1, Cheyne Walk, Northampton.

13th September, 1957.

BRACKNELL DEVELOPMENT CORPORATION, Applications are invited for the following posts in the Chief Architect's Department:—

(a) ARCHITECT, Grade A.P.T. VI. Salary \$6565-£784.

Superannuation scheme, medical examination. Housing available in due course.—Apply by 9th October, 1957, stating which post is applied for, and giving age, education and qualifications, experience and appointments held (with dates and salaries), with names of two referees, to General Manager (A.VI) or (A.A.III), Bracknell Bevelopment Corporation, Farley Hall, Bracknell, Berks.

VERBAN DISTRICT COUNCIL OF

Manager (A.VI) or (A.A.III), Bracknell Development Corporation, Farley Hall, Bracknell, Berks, 7621

URBAN DISTRICT COUNCIL OF

TETTENHALL

Applications are invited for the appointment of an ARCHITECTURAL ASSISTANT on the staff of the Engineer and Surveyor at a salary of \$228 \times 250 to 2845.

Applications should be suitably qualified, with experience in connection with the design of houses and estate development, and should be competent to prepare plans and specifications in connection with same.

The Council will give consideration to the provision of suitable housing accommodation to the successful applicant, if required. Applications, setting out details of qualifications and experience, together with names of two persons to whom reference can be made, should be sent to J. W. Mason, M.I.Mun.E., M.T.P.I., Engineer and Surveyor, not later than Thursday, 10th October, 1957.

R. WAKEFIELD RUSSELL.

Clerk of the Council.

Council Offices, Upper Green.

Tettenhall, Staffs.

19th September, 1957.

ASSISTANT TOWN PLANNING OFFICERS.
PLANNING AND HOUSING DEPARTMENT TO assist in the prevaration of town planning schemes and liaise with, and give advice to local authorities on planning and building bye-law matters.

Permanent and pensionable appointments. Inclusive salary range £1.242 to £1.656 p.a. Free passages for officers and families up to five persons in all. Quarters, if available, at low rent. 34 days leave for each month of resident service. Allowances for children educated outside Cydyns.

Candidates must be A.M.T.P.I., or hold a recognised university degree in town planning.

rent. 3½ days' leave for each month of resident service. Allowances for children educated outside Cyprus.
Candidates must be A.M.T.P.I. or hold a recognised university degree in town planning.
Write Director of Recruitment. Colonial Office. London. S.W.1. giving briefly age. qualifications and experience, quoting BCD.62/17/03.
7575
CITY ARCHITECT'S OFFICE MANCHESTER Applications are invited for the appointment of a TEMPORARY CLERK OF WORKS to supervise the erection of new buildings and alterations to existing buildings at the District Police Training Centre. Bruche. near Warrington.
Salary: A.P.T. III (£945—€1,025 per appnum). Recent experience as Clerk of Works on important large-scale building works essential. The successful candidate will be responsible to the Home Office Architect's Department.
Particulars and form from City Architect. P.O. Box 488, Town Hall, returnable by 12th October.
7518

CITY OF NOTTINGHAM
ESTATES DEPARTMENT
Ambigations are invited for the appointment of
ASSISTANT ARCHITECT in the Chief Architect's Section at a commencing salary within
Grade A.P.T. V (£814 178, 6d.—£994 5s.). (New
salary scales not yet confirmed.) Applicants
should be Registered Architects.
The appointment will be subject to the National
Joint Council's Scheme of Conditions of Service.
Applications, stating age, qualifications, experience, present appointment and salary, and naming
two referees, should be sent to the Estates
Surveyor and Valuer, Guildhall, Nottingham, by
Tuesday, 8th October, 1957.

T. J. OWEN.

T. J. OWEN. Town Clerk.

The Guildhall, Nottingham.

BOROUGH OF BEXLEY
FIRST ASSISTANT ARCHITECT
Applications are invited for this appointment, at a salary within the Special Scale (£750—£1,050 per annum), plus London weighting.
Candidates should have experience in Schools and Housing projects, and must have passed the Final R.I.B.A.
Forms of application and conditions of appointment are obtainable from the Borough Engineer, West Lodge, Broadway, Bexleyheath, Kent. to whom completed applications must be returned by 21st October, 1957. The Council may be prepared to assist in the provision of housing accommodation. Canvassing will disqualify.

ARTHUR GOLDFINCH.

Town Clerk.
7619

ARTINATION ARTINATION ARTINATION APPLICATION APPLICATI

UNIVERSITY OF NOTTINGHAM
BUILDING DEPARTMENT
ARCHITECTURAL ASSISTANT required.
Candidates must have reached Intermediate
R.I.B.A, standard. Contributory pension scheme,
Salary £550-£700, according to age and experience. Forms of application and Conditions of
Appointment from the Registrar, University Park,
Nottingham.

Tenders for Contracts

Tenders for Contracts

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

NOBLE'S (ISLE OF MAN) HOSPITAL
DOUGLAS, ISLE OF MAN
PROPOSED MULTI-PURPOSE WARD BLOCK
AND TWIN OPERATING THEATRE UNIT
TO REGISTERED BUILDING CONTRACTORS
Registered Building Contractors are invited to
submit their names for consideration in connection with the proposed erection of a MULTIPURPOSE WARD BLOCK AND TWIN
OPERATING THEATRE UNIT on the Hospital
site in Westmoreland Road, Douglas, Isle of
Man, in accordance with Plans and Specifications
prepared by the Hospital's Architect, Mr. W. T.,
Quayle, F.R.I.C.S., F.I.A.A., of 29, Athol Street,
Douglas. Tenders will be based on Bills of
Quantities.
As the building and work connected therewith
is complex and of considerable size, only Contractors who have sufficient labour and resources
to undertake such work should submit their
names. The names of Architects to whom reference can be made in respect of works carried out
by Contractors, must be submitted with the
application. The names of Contractors will be
given full consideration, and a selected list will
then be asked to submit firm tenders.
Applications to be submitted to the undersigned on or before noon on Monday, 30t September, 1957.

E. C. KNEALE.

Secretary.

E. C. KNEALE. Secretary. Hospital Management Committee, Noble's Isle of Man Hospital, Douglas Isle of Man. 17th September, 1957.

Architectural Appointments Vacant 4 lines er under, 9s. 6d.; each additional line, 2× 6d. Box Number, including forwarding replies, 2s. extra.

ONDON office with widely varied practice urgently requires all grades of ASSIS-TANTS, preferably with London experience. Five-day week. Lewis Solomon, Son & Joseph, 21, Bloomsbury Way, London, W.C.1. Holbors 5108.

21. Bloomsbury Way, London, W.C.1. Holbors 1608.

CO-OPERATIVE WHOLESALE SOCIETY, LTD. ARCHITECT'S DEPARTMENT, RIMINGHAM

APPLICATIONS are invited for the following appointments in the above Branch Office undertaking interesting and varied commercial and industrial projects:—

(a) ASSISTANT QUANTITY SURVEYOR, with good experience in the preparation of Bilts of Quantities, measuring and adjusting variations and estimating under supervision (salary range £550 to £820 per annum).

(b) ASSISTANT ARCHITECT, capable of preparing working drawings from preliminary details (salary range £550 to £820 per annum). There is a 5-day week in operation, and the appointments offer prospects of upgrading. Applications, stating age, experience, qualifications and salary required, to G. S. Hay, A.B.I.B.A.. Chief Architect, Co-operative Wholesale Society, Ltd., Balloon Street, Manchester, 2073.

JUNIOR ARCHITECTURAL ASSISTANT required, with previous office experience.

Must be a quick and accurate draughtsman and have a sound knowledge of building construction. 5-day week.—Hugh Macintosh & Partners.

33. High Street, Croydon.

PRIVATE Architects Office, Charing Cross, requires senior and intermediate ASSIST-ANTS. Varied type of work. Good salaries commensurate with experience. Five day week. Write Box 7491. Telephone WHItehall 7926.

SSISTANT ARCHITECT. Co-operative Wholesale Society, Ltd., invite applications for the position of Assistant Architect. Must be capable of preparing working drawings from preliminary details. The post is superannuable, subject to medical examination. 5-day week in operation. Applications, giving details of age, experience and salary required, to—W. J. Reed, F.B.I.I.A. Chief Architect, C.W.S. Ltd., 99, Leman Street, London, E.I.

SENIOR and JUNIOR ASSISTANTS required for busy office in the North-East. Ability and a sense of responsibility are the essential qualities. Good starting salaries are offered, and progress will depend on performance. Pension scheme and bonus scheme are both operated.—Box 7412.

Operated.—Box 7412.

ENIOR ASSISTANT required in busy West
End office. Interesting commercial work,
and must be prepared to take responsibility.—
Please Write, giving details of experience, etc.,
Elow 7462. Please w Box 7462.

A RCHITECTURAL ASSISTANTS for University and Hospital work. Good salary, dependent on experience. Non-contributory Pension Scheme in being after probationary period. Three weeks' holiday a year, and five-day week.—Reply, stating age, experience, etc., to Thomas Worthington & Sons, 178, Oxford Road, Manchester, 13.

Thomas Worthington & Sons, 178, Oxford Road, Manchester, 13.

7476
RESEARCH FELLOWSHIP TENABLE AT THE BUILDING RESEARCH STATION.

APPLICATIONS are invited from Architects for a SENIOR RESEARCH FELLOW to work as a member of a team studying the design and construction of factory buildings. The Fellowship will be for a period of two years.

Candidates should be Associates of the R.I.B.A. or have equivalent status, and have additional experience preferably in a field related to the investigation. Total emoluments up to £1,000 per annum depending on qualifications.

Applications, which should give the names of three referees, should be addressed to Building Research Station, Garston, Watford, Herts., marked "For the aftention of the Secretary, Factory Building Research Committee" to be received not later than 11th October, 1957. 7606

YIEW to Partnership East Anglian private practice. SENIOR QUALIFIED ASSISTANT required. Apply in writing stating age, experience and salary to Box 7594.

LEADING ARCHITECTURAL ASSISTANT required by the ATOMIC ENERGY RESEARCH ESTABLISHMENT, HARWELL, to take carrier of a drawing office group preparing sketch plans and working drawings for a variety of buildings. Applicants should be up to Final R.I.B.A. standard and have suitable experience. Salary: 4835-45,100.

Housing, superannuation and excellent conditions. EADING

ditions.

Send Post Card for application form and details
to Recruitment (925Y/119), A.E.R.E., Harwell.
Didcot, Berks. 7585

Didcot, Berks.

7585

ASSISTANT ARCHITECTS required in private private private practice in Yorkshire in salary ranges £600-£800, and £1,000-£1,200. Applicants should be qualified and those for senior posts should have had considerable office experience fully competent to see contracts through from start to finish. In this grade we are looking for men who will eventually deal with schemes of major importance. Work is interesting and varied including schools, offices, industry, housing, etc., of good contemporary design. Pension scheme in operation. App., y stating age, experience, to J. G. L. Poulson, L./F.R.I.B.A., Chartered Architects, Surveyors, 29, Ropergate, Pontefract, Yorkshire.

A SISTANT ARCHITECT required for design division of South London Contractors. Equivalent to Intermediate R.I.B.A., standard, experience of commercial and office design, and ability to work with minimum supervision is desired. The job offers a commencing salary of 4750 to 850 (with excellent prospects for talented person), is permanent and pensionable, and assistance can be given with accommodation if required. Please apply, giving age, experience and qualifications to Box 7600.

ANDREW BUCHAN'S BREWERIES, LTD., requires an ARCHITECTURAL ASSISTANT in their Estate Department. The appointment offers wide scope in licensed property work. Commencing salary 2750. Contributory pension scheme in operation. House provided rent free. Car allowance. Applications giving age, details of previous experience and qualifications if any, should be sent to Alwyn Morgan, A.R.I.B.A., Company Architect, Breweries Offices, Rhymney, Mon. Box 7508. A SSISTANT ARCHITECT required for design division of South London Contractors.

Box 7604.

HOX 7604.

ONDON Office requires ASSISTANTS of Intermediate standard. Wide variety of interesting work. Five-day week. Study concessions for evening students according to circumstances. Good salaries. Box 7587.

WELL-KNOWN London Architects require ASSISTANTS between Intermediate and Final standard. Interesting projects. Fiveday week.—Write, Box 861, c/o 7, Coptic Street, W.C.

A RCHITECTURAL ASSISTANT required urgently for interesting work in connection with large store development programme. Excellent prospects with progressive Company in Welwyn Garden City. London applicants quality for housing priority. 4750 to £850 according to experience. Box 7590.

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A RCHITECTURAL ASSISTANT required for housing to studied to final standard, with office experience for small busy practice. L.V. No saturdays. Shaw & Lloyd, F.R.I.B.A. 74, 6t. Russell Street, W.C.I. Museum 9693. 754. A SSISTANT between Intermediate and Final Architect's West End office. Interesting varied programme of work. Five-day week, loach vouchers. Phone TEM 3785 for interview. 752. A RCHITECTURAL ASSISTANT required in busy London Office with varied practice. Good salary and prospects for suitable applicant. Five-day week. Write, giving particulars of age, qualifications, experience, etc., to Box 862, c/o 7, Coptic Street, W.C.I. ASSISTANT

qualifications, experience, etc., to Box 862, c/o 7, Coptic Street, W.C.1.

UNIOR ARCHITECTURAL ASSISTANT, preferably taking the R.I.B.A. examinations, required in small busy office. Opportunities of experience in interesting and varied work. F. Potter, F. R.I.B.A., 3, Vicarage Road, Edg. States of the control of the co

industrial projects including Atomic Power Stations.

Applications, stating experience, qualifications and salary required to Personnel Manager, 18, Victoria Street, London, S.W.I.

ARCHITECTURAL ASSISTANTS. The London of Co-operative Society, Ltd., invite applications for positions as Architectural Assistants at their Works Department, Whitta Road, Manor Park, London, E.12. Pension scheme. Applicants should have reached Intermediate R.I.B.A. standard. Write Staff Office, L.C.S. Ltd., 9, Maryland Street, Stratford, London, E.15. Endorse application "Architectural Assistant." 7665

SENIOR ASSISTANT to work in Victoria office on contemporary, industrial and commercial projects. Administrative experience desirable. Tel. SLO 0639 for appointment or write Box 7597.



Batley multiple garages can be erected in any number in one block at a fraction of the cost of brick structures. In a variety of designs, i.e. roof sloping front to back, back to front, garages back to back and stepped.

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THE ARCHITECTURAL PRESS, 9-13 QUEEN ANNE'S GATE, S.W.

ARCHITECTURAL ASSISTANTS (Internethate standard) required for effice at
Northoit Airport. Salary £400—£600. For appointment telephone w Axlow 4311. Ext. 614. 7625

A SSISTANT of Interdicite-Final standard
required for detailing and site supervision
of interesting work in London and Home Counties. write stating age and salary required to
Westmore & Partners, 121, Cheapside, London,
2598

require ate and Five-day t, W.C.1. 7589

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ARCHITECTURAL ASSISTANT, Final experience and initiative, required to take responsible position in Lake District practice. Full particulars and referees to Hargreaves & Mawson, 25, Finkle Street, Kendal, Westmorland.

A RCHITECTURAL ASSISTANT (Junior) with approximately four years' Drawing Office experience required for Contractors' Office. Some experience of Site Surveys, Lay-Outs and Levelling might be an advantage. Replies to: Josepa webb & Co. Ltd. 1, Ivy House Lane, Coseley, Nr. Bilston, Staffs.

Nr. Biston, Stats. 1, Ivy House Lane, Coseley, Nr. Biston, Stats. 7624

A RCHITECTURAL ASSISTANT required, varied experience for newly qualified person. Reply giving full details to T. I. Frith, A.R.I.B.A., Newcastle Chambers, 45, Carlton Road, Worksop.

QUALIFIED CHIEF ASSISTANT required for Country practice. Good prospects. Reply with full details including salary required to Box 7627.

RCHITECT in Midlands requires experienced SENIOR with initiative, Salary by arrange-nt, but not less than £1,000 per annum. Box

A SENIOR with initiative, Salary by arrangement, but not less than £1,000 per annum. Box 7628.

Intermediate to Final standard Assistanting salary £750 approximately. Box 7629.

Assistant required in Birmingham Office, Starting salary £750 approximately. Box 7629.

Assistant required for London Architects' interested in good design and detailing and willing to take responsibility. Please write giving details of experience. Box 7630.

DUCKINGHAMSHIRE firm of Architects within thirty miles of London with a varied practice, require two Architectural Assistants and experience. Please write giving full particulars to Box 7631.

JÜNIOR ARCHITECTURAL ASSISTANTS required. 5-day week. Factory and office buildings. Minimum 3 years' experience.—Write full particulars, R. H. Gallannaugh, LR.I.B.A. 54, Queen Anne Street, London, W. 7491.

T. W. WOOLWORTH & CO., LTD., Architect's Department, Kensington District office, Applications are invited for the following appointment:—

Architectural Assistant of Intermediate R.I.B.A. standard, capable of carrying out surveys, preparing sketch schemes, working transportant and details.

The appointment is permanent and pensionable, Tiveday week. Dining room facilities. Application, stating age, experience, qualification and salary, to District Architect, F. W. Woolworth & Co., Ltd., 26/40, Kensington High Street, London, W.8.

Architectural Assistant required, assistant regular capable of carrying out surveys, preparing sketch schemes, working the appointment is permanent and pensionable. The appointment is permanent and pensionable five-day week. Dining room facilities. Application, stating age, experience, qualification and salary, to District Architect, F. W. Woolworth & Co., Ltd., 26/40, Kensington High Street, London, W.8.

Architectural Assistant required, assista

A RCHITECTURAL ASSISTANT required, salary range £550 to £650. Varied work, five-day week. Write stating age, training, experience, present salary. All interview expenses paid.—G. de C. Fraser, Son & Gearey, Chartered Architects, 27, Dale Street, Liverpool, 2.

SENIOR ARCHITECTURAL ASSISTANT required in Architect's Department of London Brewery Company. Must be good draughtsman.—Write, stating age, qualifications, experience, salary required, Box 7502.

ARCHITECTURAL ASSISTANT required, private, office, Bl miles London. Good prospects.—Full details to Box 7554.

A SSISTANT ARCHITECT, qualified and able to take senior position with responsibility. Pension scheme. Salary according to experience.—Heilberg & Harris, 13, Queen Victoria Road, Coventry. 7504

Heilberg & Harris, 13, Queen Victoria Road, Coventry.

H. WATKINS, GRAY & PARTNERS require ASSISTANTS for interesting hospital work. Pension scheme in operation.—Write or 'phone, 57, Catherine Place, S.W.L. ViCtoria Tol. 7555

NORTH Lancashire Architect requires ASSISTANT, Splendid opportunity with prospects for keen, capable young man, of Final, or near Final, standard. Varied and interesting types of work in pleasant office; every encouragement given to man of initiative and integrity. Salary in £755 bracket, according to experience.—Full particulars to Box 7520.

SENIOR and JUNIOR STAFF required for varied contemporary practice.—Apply in writing, stating salary and experience, to H. A. Halpern, A.R.I.B.A., 193, Nelson Road, Gillingham, Kent.

ARCHITECTURAL ASSISTANT required for

ham, Kent.

7513

A RCHITECTURAL ASSISTANT required for interesting work of an industrial and commercial nature. Inter. standard. Salary in accordance with experience and qualifications.—Apply Box 7547.

Agricultural accordance with experience and qualincations.

Apply Box 754.

A RCHITECTS' ASSISTANTS required.

A R.I.A.S. Pension Scheme in operation.—

Applications, stating age, particulars of experience and salary required, to Wylie, Shanks & Underwood, Chartered Architects, 12. Clairmont Gardens, Glasgow, C.3.

A RCHITECTURAL ASSISTANTS, Intermediate and Final standard, required for Coventry and London offices. Excellent opportunities in varied practice covering wide area. Good salaries, closely related to capabilities and reviewed annually. Pension Scheme available. Five-day week. Travelling expenses to applicants selected for interview.—W. S. Hattrell & Partners, 1. Queens Road, Coventry—60668, and 14. Hanover Square, London, W.1, Mayfair 4992.

A RCHITECTURAL ASSISTANT required in pany in East Midlands area. Work comprises general maintenance, alterations and extensions of industrial buildings. State age, experience and qualifications. Apply Box 7568.

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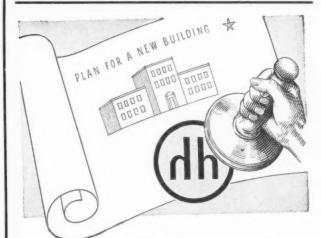


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