

ARTS DEPARTMENT

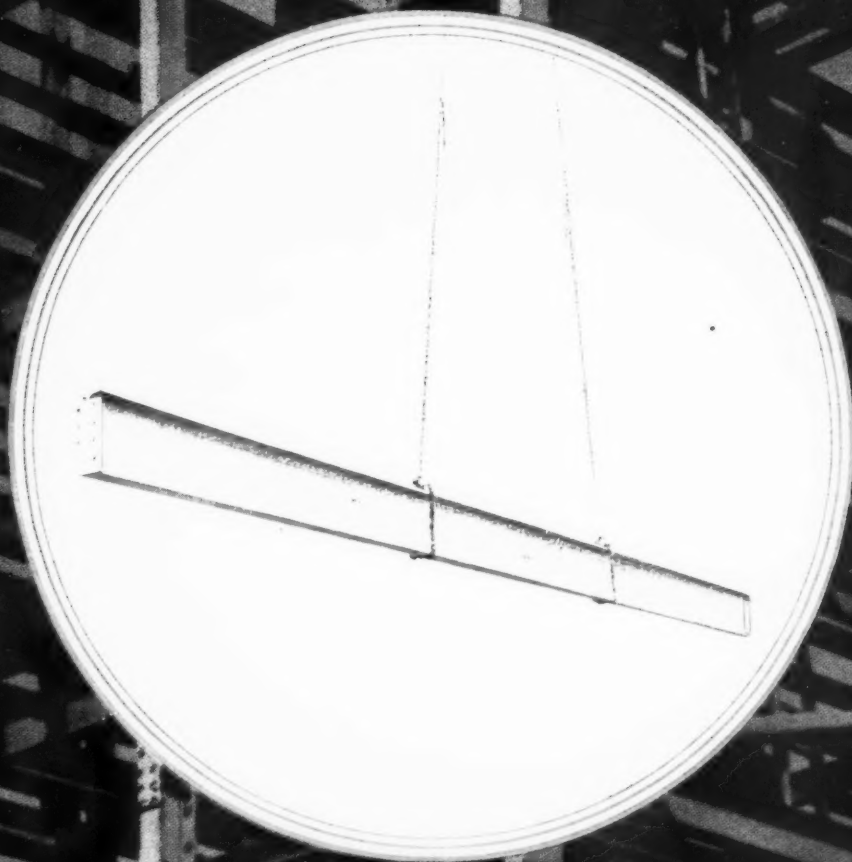
Steel

Registered as a Newspaper. THE ARCHITECTS' JOURNAL for December 15, 1955. No. 3172. Vol. 12.

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THE ARCHITECTS' JOURNAL



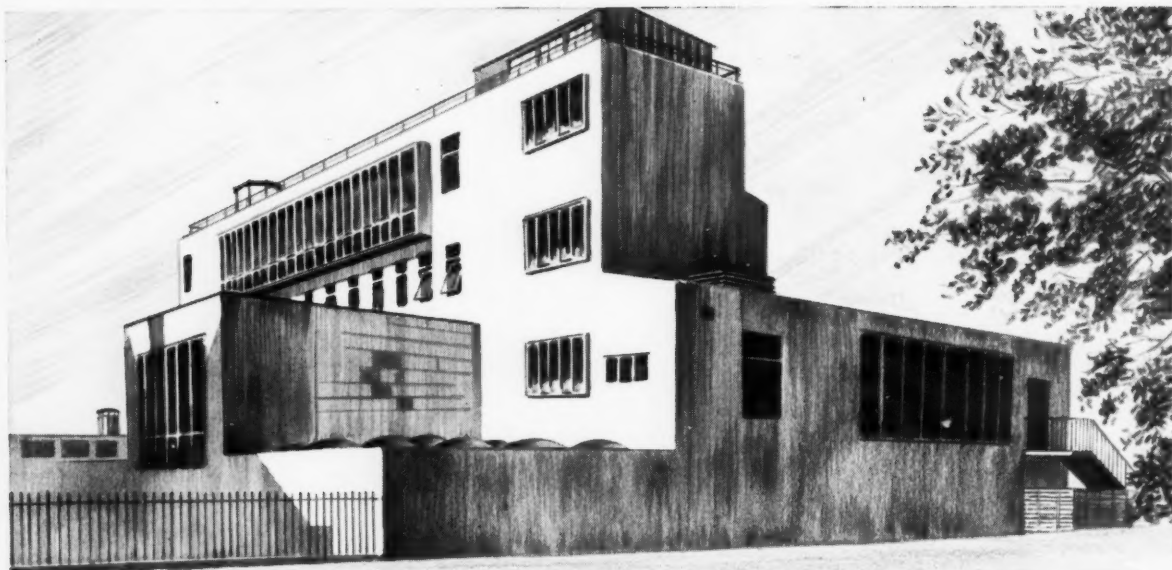
SIMPLE AND STRAIGHTFORWARD
structural steelwork

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REVOLVING DOORS BY

WILLIAM NEWMAN & SONS LTD.

BIRMINGHAM, 19.



The revolving doors in the entrance hall of the new Research Building at Glasgow University were manufactured by William Newman & Sons Ltd. makers of window opening gear, fire station door gear, and the famous 'Briton' door closer.

View of main
entrance Hall



Architects:—Basil Spence & Partners, Edinburgh.
Contractors:—John Cochrane & Co. Ltd., Glasgow.

COLT Ventilation right from the start at . . .

A. E. C. SPARES BUILDING, Southall, Middlesex

ARCHITECT: HARRY W. WEEDON, F.R.I.B.A. & PARTNERS

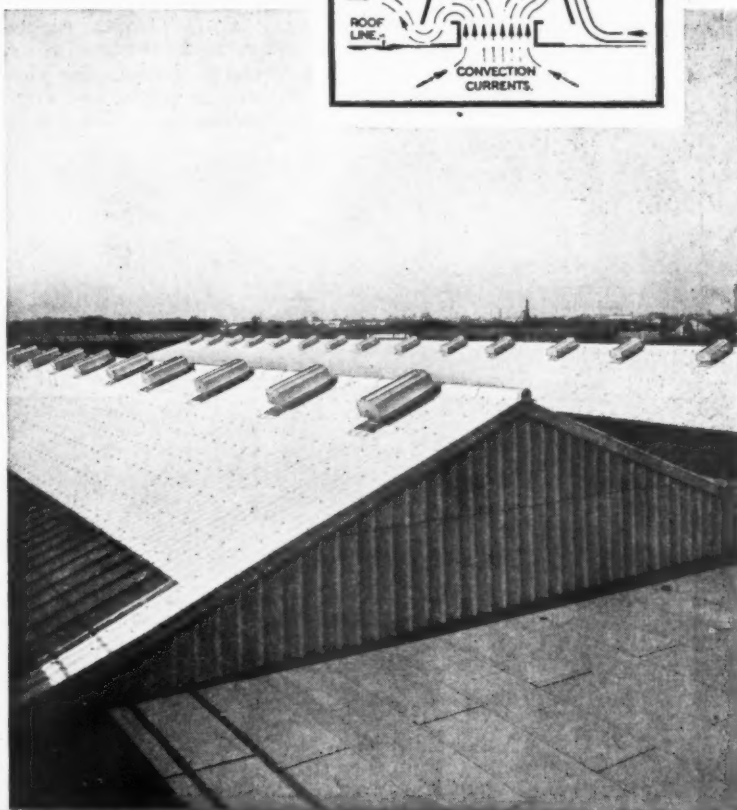
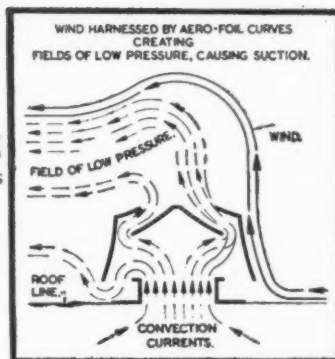
For the New Spares Stores for A.E.C. Ltd., the Architect required a natural system of ventilation to extract 3,000,000 cubic feet of air per hour from the building when desired. Control to facilitate the reduction of this rate of ventilation was also essential.

Colt were consulted and a scheme involving the installation of 32 SRC/2046 Gear Controlled Ventilators was formulated and subsequently incorporated in the design of the building.

Of robust construction, and yet remarkably light, this High Duty Natural Roof Extractor incorporates aerofoil curves which harness the wind and roof eddies to combine with the power of convection within the building. It is maintenance free, and simple to install. One very notable feature is its appearance! When fixed in the roof it is quite unobtrusive.

Colt's wide experience in ventilating all types of buildings throughout industry is at your disposal. Whether the ventilation problem is large or small—in an existing building or for one still 'on the drawing board'—consult them first.

WRITE FOR FREE MANUAL with full specifications of Colt Ventilators to Dept G.54/161



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THE **PLIMBERITE** **REBOND**

PARTITIONING SYSTEM

The photograph (below, left) shews PLIMBERITE Rebond Partitioning in the British Van Heusen Company's new factory at Bishops Lydeard, Taunton.

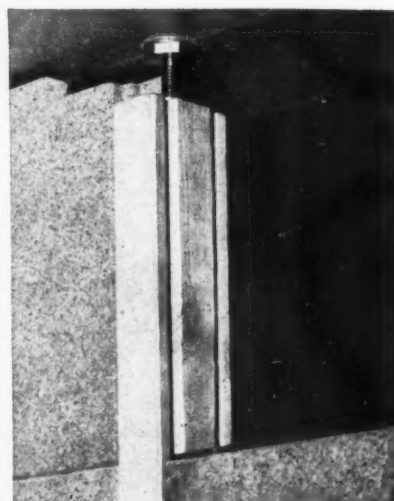
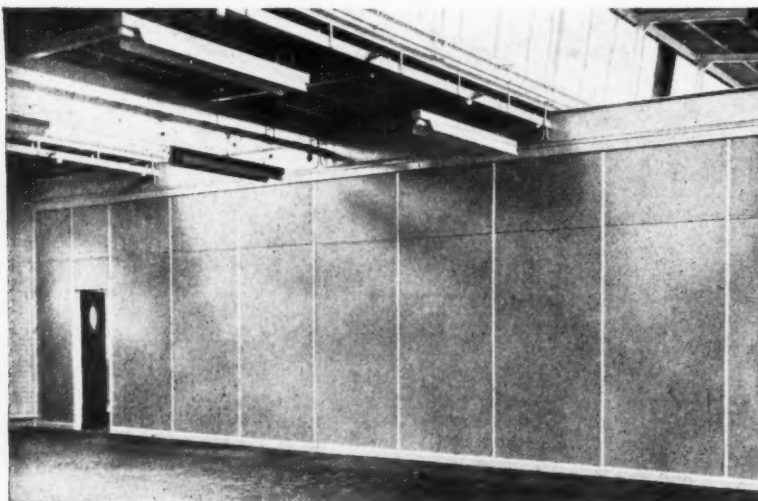
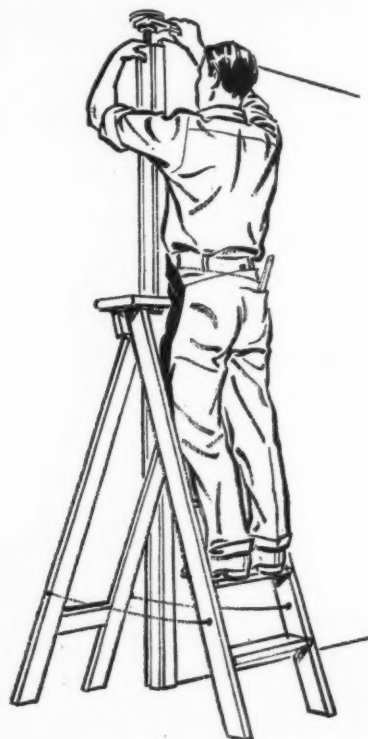
Architect: Steer & Shirley-Smith, A./A.R.I.B.A.

Contractor: Stansell & Sons (Taunton), Limited.

The System consists of timber posts at 4 ft. 1 in. centres, grooved to receive $\frac{3}{4}$ " PLIMBERITE boards whose vertical edges are rebated to form tongues which slot into the grooves in the posts. The posts are held in position on the floor by a pin, and at the top by the PLIMBERITE REBOND screw jack, as shewn in the photograph (bottom, right).

- Construction is "dry".
- No disturbance to existing floors and ceilings.
- Doors and glazing can be incorporated as required.
- Dismantling and re-erection elsewhere can be done with negligible damage or loss of material.

Full working details with constructional drawings are contained in the PLIMBERITE REBOND Booklet, which may be had on request.



BRITISH PLIMBER LIMITED

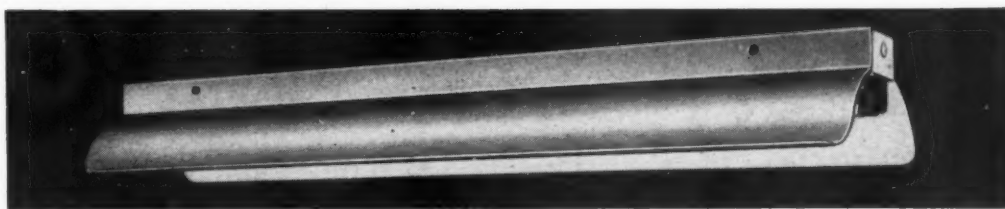
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BUILDING BOARD

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FLUORESCENT LIGHTING FITTINGS

TROUGH REFLECTORS					LENGTH	FIXING CENTRES	WEIGHT	
F.T.F. 4231	E Single	4' 40 watt	(Closed top)	-	-	4' 0½"	36"	17½ lb.
F.T.F. 4231	EO	(Open top)	-	-	-	-	-	-
F.T.F. 4242	E Twin	4' 40 watt	(Closed top)	-	-	4' 2"	36"	24 lb.
F.T.F. 4242	EO	(Open top)	-	-	-	-	-	-
F.T.F. 4231	P Single	4' 40 watt	-	-	-	4' 0½"	36"	17 lb.
F.T.F. 4242	P Twin	4' 40 watt	-	-	-	4' 2"	36"	23 lb.
F.T.F. 2201	E Single	2' 20 watt	(Closed top)	-	-	2' 0½"	10½"	7 lb.
F.T.F. 2202	E Twin	2' 20 watt	(Closed top)	-	-	2' 0½"	10"	12 lb.
F.T.F. 2202	E Twin	2' 40 watt	(Closed top)	-	-	2' 0½"	10"	15 lb.

Manufactured from Best Quality silver sheet steel and finished inside and out with Siemens "Haligloss" super-hard white stove enamel. The fittings may be arranged in continuous line or as individual units. Reflector or opal "Perspex" are supplied with models F.T.F. 4231P. and F.T.F. 4242P.



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a
light
idea



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effective answer to hundreds of building problems. It's tremendously strong, durable and shatterproof. Use it for roofing, skylights, wall lights, panels and partitions.

Use it to let the daylight into farm buildings, factories, shops and office buildings.

light, strong and easy to handle —

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made by **Ashdowns**

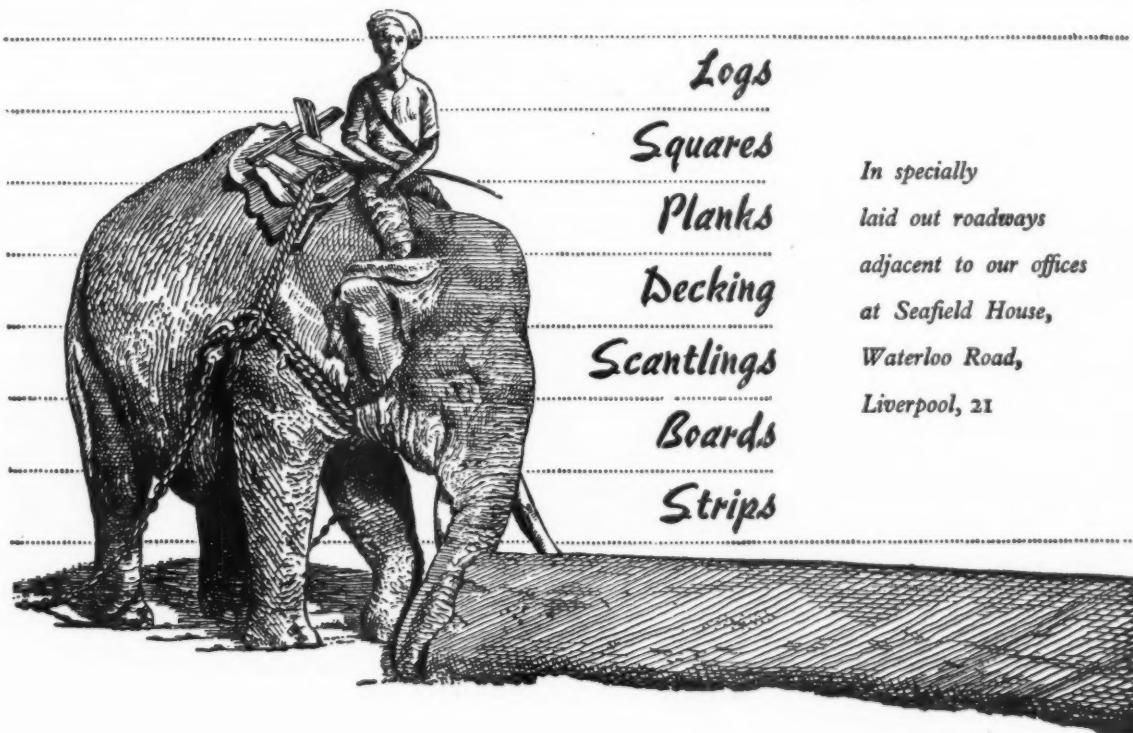
"UNDULITE" is made in standard sized sheets to nest with standard pitches of other materials, and it can be cut, sawn, drilled, clipped or even nailed with ordinary tools to suit your particular requirements. For further details, please write for a copy of our illustrated folder. *Delivery of standard profiles ex. stock.*

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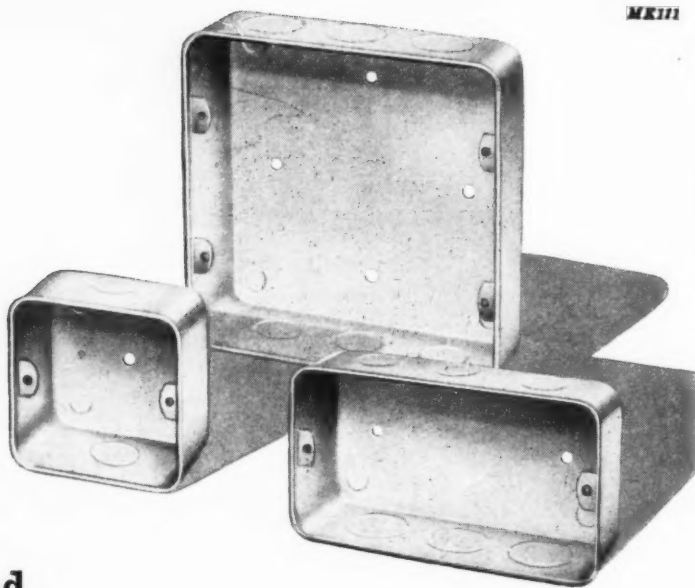
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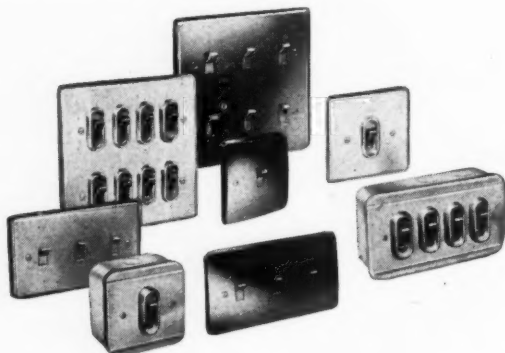
of switches for flush and


surface work from one to eight gangs



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Only three boxes to take on the site! This is the first important reason for choosing the new MK Gridswitch. Simplicity and standardization reduce stocks and cut installation delays. The three boxes illustrated are all that is needed to build up a complete range of flush and surface switches up to eight gangs in a variety of styles. Write for leaflets 231 and 232 which feature the new MK Gridswitch in detail.



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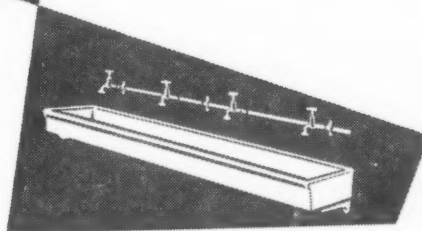
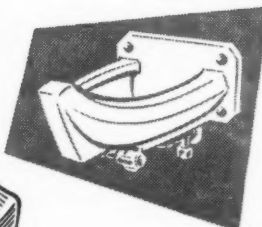
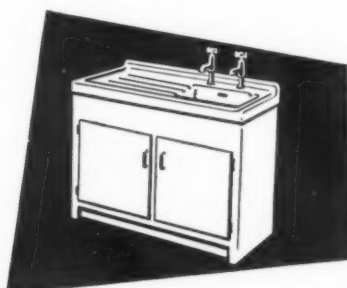
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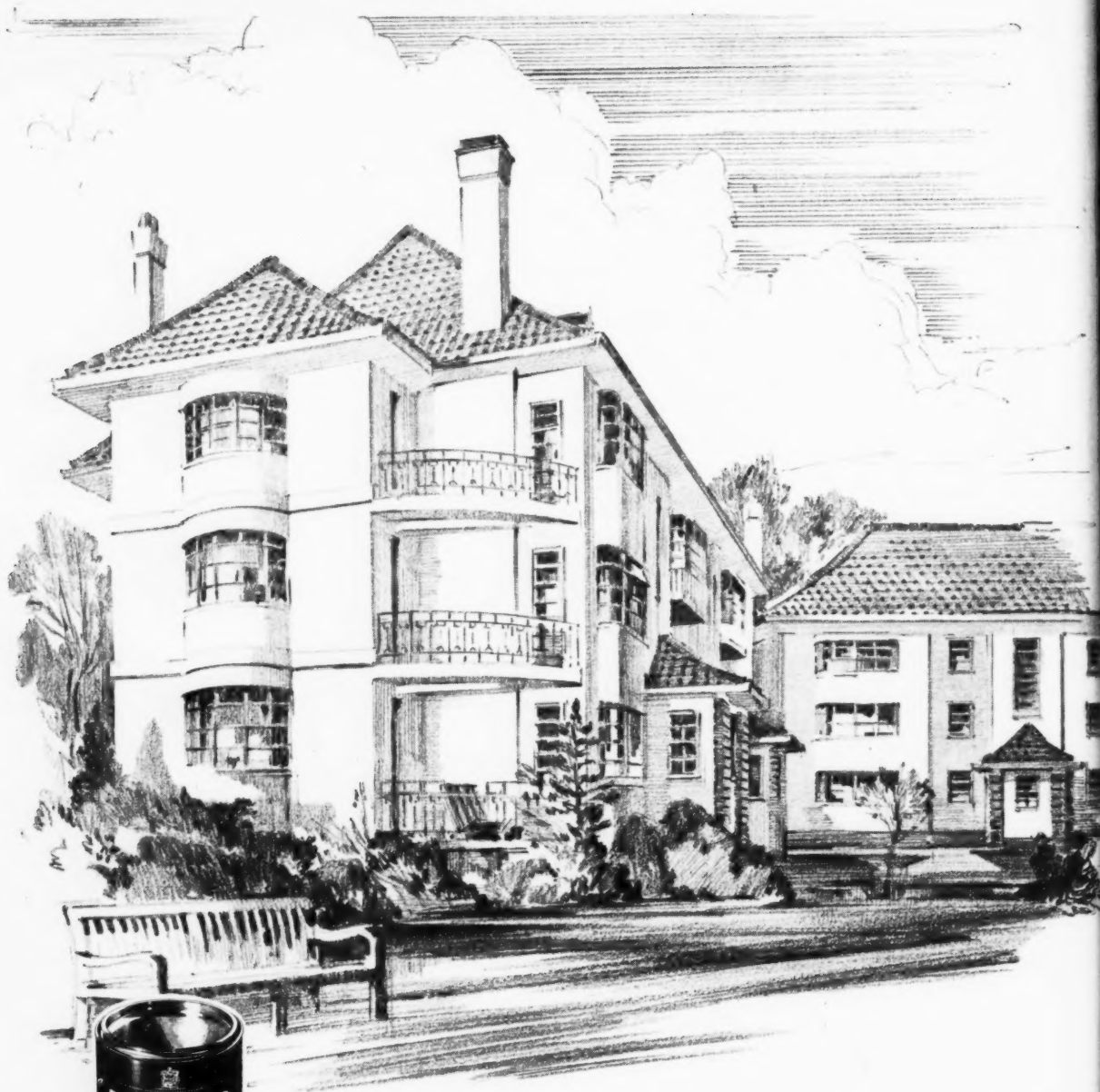
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The Time and Life Building in New Bond Street is the main European Headquarters of Time-Life International. It was designed by Michael Rosenauer, F.R.I.B.A.; and Sir Hugh Casson, R.D.I., M.A., F.R.I.B.A., F.S.I.A., was the co-ordinating designer for the interior. The building has an oil-fired heating system consisting of three boilers, two for central heating, one for domestic hot water, with a combined capacity of four million Btu/hr.

THE LATEST IN DESIGN—AND COMFORT

London's Time & Life Building has Oil-fired heating

A NEWLY-ESTABLISHED landmark in London is the Time and Life Building on the corner of New Bond Street and Bruton Street. This seven-storey building is the main European Headquarters of Time-Life International. The architecture, the interior decorations and the furnishings are all of the most modern design, and the building is one of the most comfortable to work in—because it has an oil-fired heating system. This quickly warms up the whole building

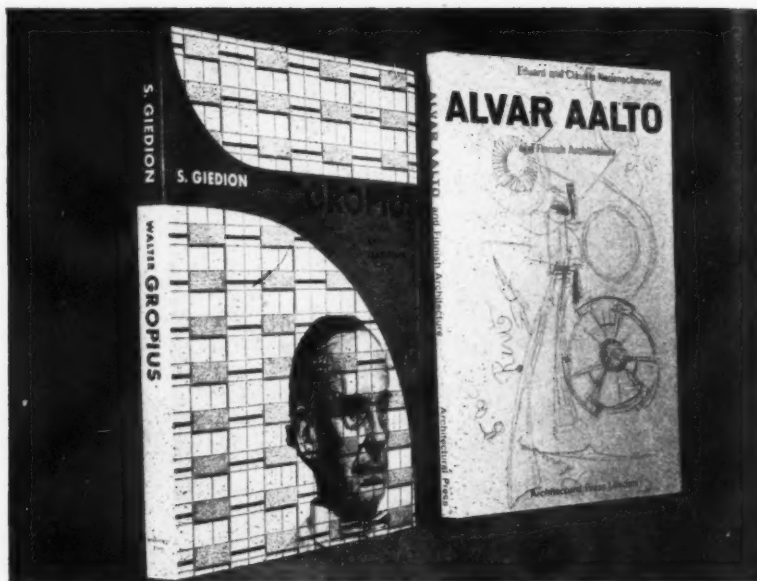
and keeps it at any desired temperature for as long as is required.

This kind of heating system is simplicity itself to operate. There is no stoking to be done. No ash to clear out. And maintenance takes little more than a few minutes every few weeks. Also oil is a clean-burning fuel and does not contribute to London's smog.

Flexibility, ease of operation, saving of labour—these are all outstanding features of this most efficient form of space and water heating.

Nor is it extravagant. When you are going to install or modify a heating system in any public building, office block or factory, school or hospital—or, even, in any largish private house—you may find it well worth your while to make provision for oil-firing. If you would like any detailed information of a technical nature, please write to Shell-Mex and B.P. Ltd., Fuel Oil Dept. 25F, Shell-Mex House, Strand, London, W.C.2. This will, of course, place you under no obligation.

BOOKS ABOUT TWO GREAT ARCHITECTS



THE MOST IMPORTANT BOOK yet written about one of the greatest living architects, by one of the most widely-read writers on architects and architecture. The author of *Space, Time and Architecture* pays tribute to the creative genius of a world-renowned pioneer of the modern movement, his friend Walter Gropius—who, in January, 1954, was awarded the first São Paulo Prize for Architecture in recognition of his work as an innovator and educator during the past half-century. Dr. S. Giedion, at the instigation of the Matarazzo Foundation of São Paulo (donor of the prize) writes a detailed, authoritative study of Gropius' development as designer, teacher and leader and illustrates his account with over 300 photographs and plans of buildings and projects for which Gropius has been responsible, either alone or—practising one of the principles he has so vigorously preached for many years—as a leading member of a creative team of designers.

Chapters on Gropius' background, heritage and personality are followed by appreciations from two of his greatest contemporaries, Mies van der Rohe and Le Corbusier. The 11 chapters on his life and work include Gropius and the Bauhaus, Buildings for Education, Buildings for Industry, the Modern Theatre, Prefabricated Houses, Development of the Slab Apartment Block, the Changing Structure of the City. Then follow over 140 pages of illustrations of Gropius' work, by far the most comprehensive collection ever published. The book ends with a complete list of Gropius' works, bibliographies of all his books and other writings, and of books and critical articles about him and his work: and an index. Size 10½ ins. by 7½ ins. 248 pages with over 300 line and halftone illustrations, and a full list of Gropius' works and projects, bibliographies of works by and about Gropius. Price 42s. net, postage 1s. 3d.

THIS WORK by Eduard and Claudia Neuenschwander gives an insight into a frontier of Western civilization where some of the most interesting works of the modern movement have been created, and where today an entirely new architectural generation, inspired by Alvar Aalto, receives professional training and stimulation probably unequalled elsewhere. First place in Finnish society belongs not to the manager or the politician but to the intellectual and the creative genius. And the architect shaping the environment and many of the accessories of modern living is held in particularly high esteem. Without many words, through careful choice of photographs, sketches and detailed plans, the authors clearly show how Aalto's creative power impresses itself on the landscape and way of life of Finland, and how this creative power organically evolves from the country's peculiar regional characteristics.

Eduard Neuenschwander worked in Alvar Aalto's office for three decisive years, decisive because during these years Aalto became absorbed with the design of large-scale projects. Aalto had, of course, worked on large-scale projects before: but now realization immediately followed the drafting stage. Aalto almost deliberately destroyed his sketches and plans. Even photographs of his major works are extremely rare. This book—possible only because Neuenschwander, in daily working contact with Aalto, succeeded in collecting and preserving original material—shows the great works and projects completed from 1950 to 1952 as well as numerous earlier buildings, and is thus a unique document and a standard work for every architect. Text and captions are printed in English, French and German simultaneously. Size 10½ ins. by 7½ ins., 192 pages with approximately 300 photographs, plans and detailed layouts. Price 50s. net, postage 1s. 3d.

WALTER GROPIUS: WORK AND TEAM- WORK

by Dr. S. Giedion

ALVAR AALTO AND FINNISH ARCHITECTURE

by E. and C. Neuenschwander

THE ARCHITECTURAL PRESS, 9-13, QUEEN ANNE'S GATE, LONDON, SW1



ARCHITECT: ARTHUR S. ASH, F.R.I.B.A.

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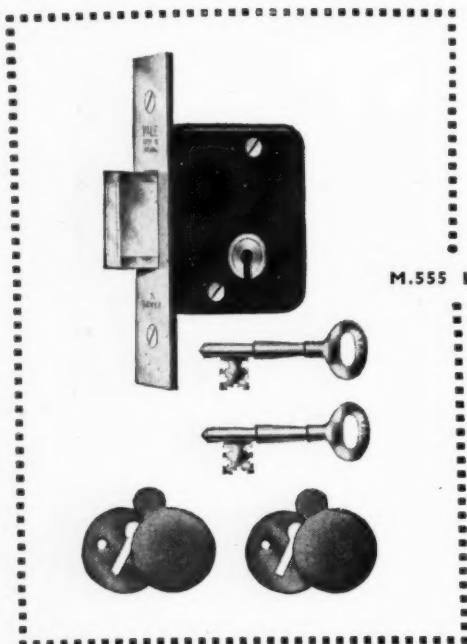
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Free House!



It wasn't supposed to be an invitation. The trouble is so many old locks do no more than just keep the door closed (and sometimes not even that) whilst real security measures are non-existent. The safest course if you value your property is to re-equip all important doors inside and out with the world's most reliable locks — YALE. There are YALE locks and padlocks to meet every security risk. Here is an example:



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The latest lock for keeping out the uninvited 'guest' from lock-up premises. Designed to meet insurance requirements, it is a 5-lever deadlock operable by key from both sides. Differs are obtainable on levers only and not by use of wards, making it extremely difficult to pick. Its steel reinforced deadbolt and 10" steel striking plate make it almost impossible to force. Available ex stock; literature on request.

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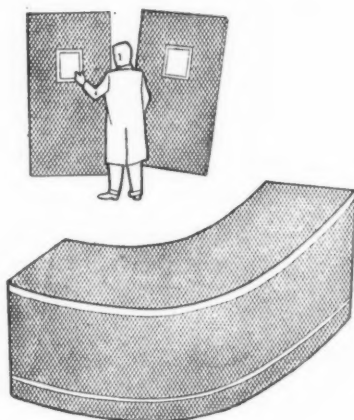


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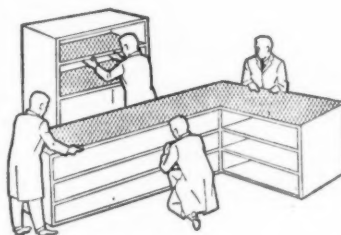
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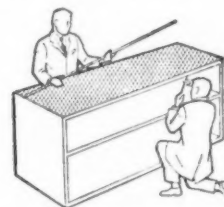


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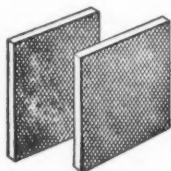
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Tel: Sloane 0898

187-9 Broad Street, Birmingham, 15.
Tel: Midland 5911

Royal Exchange, Manchester, 2.
Tel: Blackfriars 5174/7

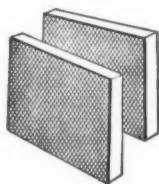
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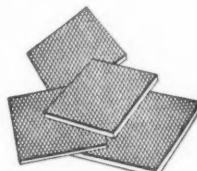
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WARERITE Veneered Boards

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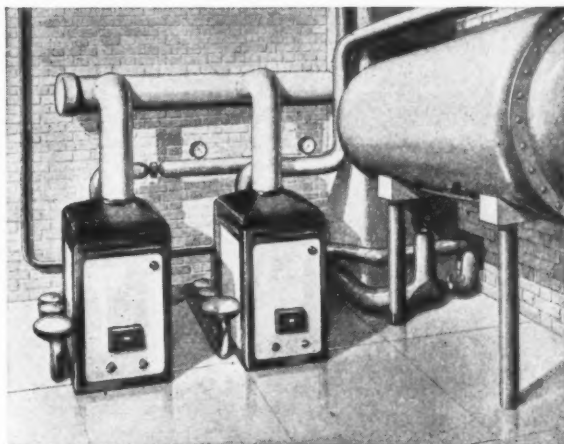


There's always another use for gas

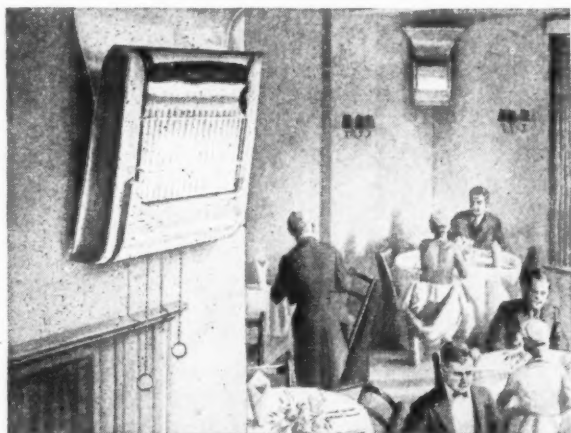
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From swimming bath water to salt bath solutions, gas heating has no rival. Gas goes to work rapidly and is simple to operate. Whatever the quantity, whatever the liquid, it burns clean and constant to give you the precise heat you require.



Gas-fired boilers



Room heating

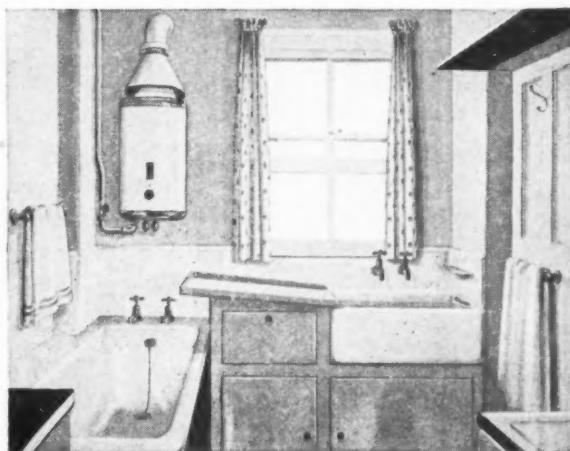
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Practically any problem requiring heated air can be solved by gas whether it is for space heating, drying or for industrial processing.

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Gas can play an important part in improving housing conditions. Costs are kept low by use of existing gas supplies and absence of elaborate structural work. Gas adaptability is particularly suitable to the conditions found in 'Operation Rescue' properties, and, of course, the popularity of gas for water heating and cooking is unquestioned.

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'Operation Rescue'

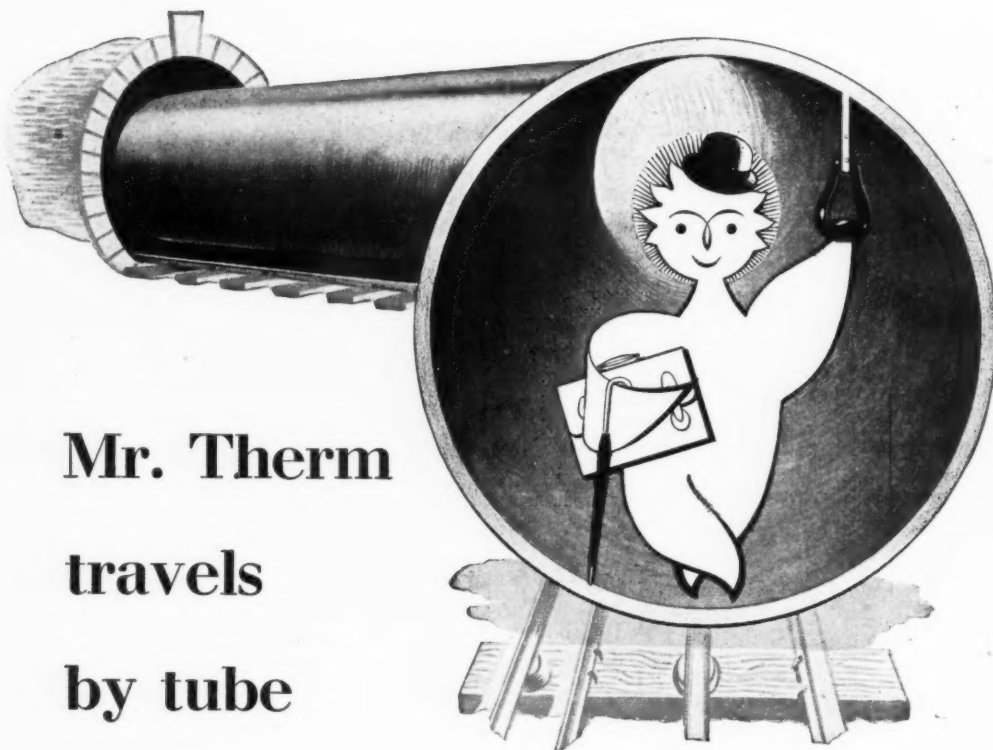


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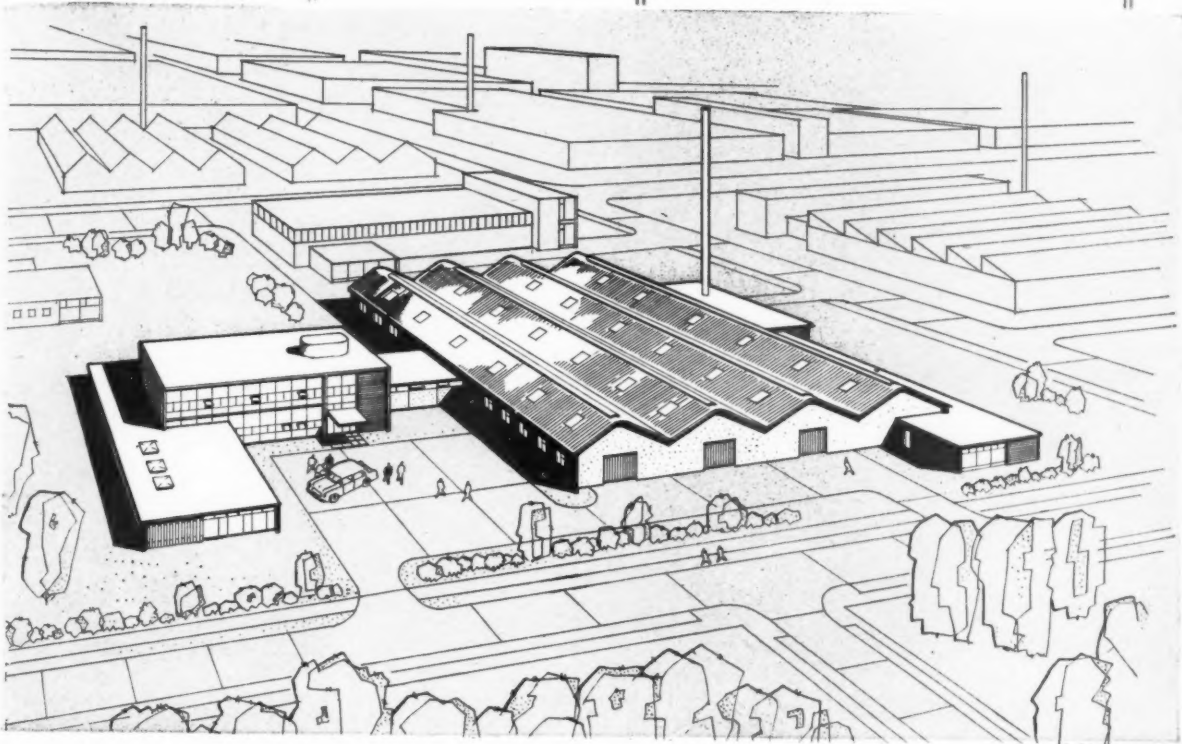
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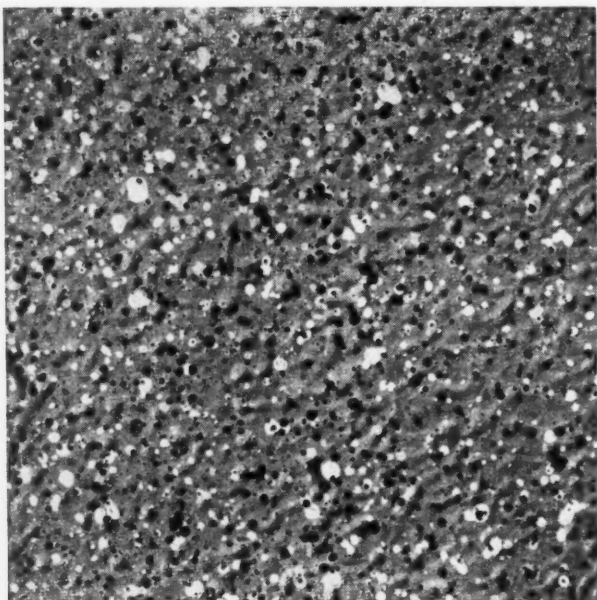
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ELECTRIC INSTALLATIONS

THE 13TH EDITION OF THE I.E.E. REGULATIONS

The new edition of the Regulations for the Electrical Equipment of Buildings by the Institution of Electrical Engineers which has just been published, is in fact, an important new work. The regulations previously issued, together with their recent revisions and supplements, have been completely overhauled and rearranged in a most direct and rational manner: they have also been directly related to the statutory provisions of the Electric Supply Regulations 1937, and to the relevant Electrical Codes of Practice and British Standards, so that the present volume can be regarded as an epitome of electrical usage in and related to buildings and their equipment. The really important factors involved in providing a supply of electricity where required may be appreciated without difficulty by architects, who, it is hoped, will now become more aware of what is going on in this field.

Essential Prerequisites for Supply

Perhaps the most interesting feature of this new edition is the bringing together of a small group of basic requirements to make up a code of essential directions for the safe use of electricity in and around buildings. This constitutes Part I of the Regulations: failure to comply with these requirements in a consumer's installation in Great Britain would release the Supply Authority from the obligation to provide, or in some cases to continue to provide, a supply of electricity to that consumer.

Part I opens with the famous old Regulation 1 set in large type — "Good workmanship is essential for compliance with these Regulations": then follow eleven requirements, the first five of which are so fundamental that they should be universally known and recognised.

First, all conductors and apparatus shall be sufficient in size and power for the purposes for which the electricity is to be used... and constructed, installed and protected so as to prevent danger... Second,... all single pole switches shall be inserted in line conductors only. A mistake in this matter, i.e., a switch in the neutral or return conductor, can have most serious results, as it would leave the appliance live, whether switched on or off. Third, all conductors... shall be so insulated or protected as to prevent danger... Fourth, every circuit shall be protected against excess current... so as to prevent danger — this is the function of the fuse and its modern counterpart, the circuit-breaker — and fifth, any metal work... associated with current-carrying conductors... shall, where necessary to prevent danger, be connected with earth.

Part II consists of the means of securing compliance with the eleven requirements of Part I, that is to say it sets out in detail how the Institution of Electrical Engineers consider they may be met.

The Regulations in General

The regulations state the main requirements and precautions for ensuring satisfactory results, including freedom from fire and shock. They relate principally to installation, inspection, testing and maintenance, and are arranged in 8 sections followed by a series of Appendices of which (B) lists the British Standards and (C) the Electrical Codes of Practice referred to in the Regulations. Notes inserted in the text immediately after the clauses to which they refer elucidate doubtful points and contain much practical information.

Notable innovations are: the rationalisation of circuit arrangements in respect to socket outlets in particular (see Tables 2 & 3), and of the capacities of conduit; two-pin socket outlets and plugs are no longer recognised; and the requirement of satisfactory earthing of exposed metalwork

TABLE 1 VOLTAGES

EXTRA-LOW	Normally not exceeding 36 volts A.C. or 50 volts D.C.
LOW	Normally exceeding extra-low voltage but not exceeding 250 volts
MEDIUM	Normally exceeding 250 volts but not exceeding 650 volts
HIGH	Normally exceeding 650 volts

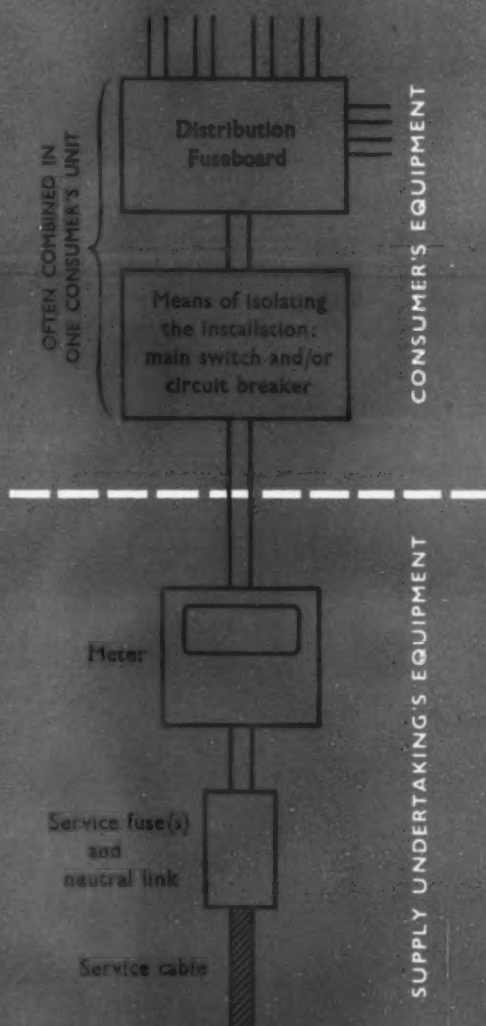


Fig. 1 Sequence of supply controls

Taken from Regulation 102
See also DI.2 fig. 3a

DI.3

TABLE 2 ASSUMED CURRENT DEMANDS OF POINTS

Regulation 119: The number of points which may be supplied by a final sub-circuit of rating not exceeding 15 amperes is limited by their aggregate demand as determined from this table: there must be no allowance for diversity in the final sub-circuit and the current rating of the cable must not be exceeded.

Point or Appliance	Current demand to be assumed
15 ampere socket outlet	15 amperes
13 ampere socket outlet	See Table 3 below
5 ampere socket outlet	5 amperes
*2 ampere socket outlet	$\frac{1}{2}$ ampere minimum
Lamp holder	Current equivalent to the connected load with minimum of 100 watts
Electric clock	May be neglected
Fixed or Free standing appliances	British Standard rated current or normal current

**2 ampere socket outlets are usually supplied from lighting sub-circuits (see DI.2, Figs. 1 and 2). In determining the number of these socket outlets permissible on any lighting sub-circuit, the load on each must be taken as not less than $\frac{1}{2}$ ampere.*

TABLE 3 USE OF FUSED PLUGS AND SOCKET OUTLETS

with provision for locally fused fixed appliances.

Controlling requirements, if any.	Min. number and diam. (ins.) of wires forming conductors	Max. permissible socket outlets and fixed appliances*	Max. rating of fuse(s) protecting final sub-circuit (amperes)
—	7/025	2	20
All socket outlets in one room (of house or flat) of less than 200 sq. ft. floor area, not being a kitchen	7/025	3	20
—	7/036	5	30
Ring circuit and spurs (if any) in industrial and other premises	7/025	10	30
Ring circuit and spurs (if any) in house or flat	7/025	On a ring circuit serving not more than 1,000 sq. ft. of floor area or part thereof, any number of socket outlets may be installed	30

**Other than electric clocks fed through fused clock connectors.*

anywhere, which means that the old conception of "earth-free situations" (in which it was assumed that there was no likelihood of an electric shock to earth from any live metal) is no longer recognised.

Socket Outlets and Ring Circuits

In domestic installations, the use of the universal 13 ampere socket outlets served by ring circuits is clarified and amended; the old regulation referred to in DI.2, that no more than ten socket outlets per ring circuit may be installed in houses or flats over 1,000 square feet in area, has been withdrawn. One ring circuit is now permitted for every 1,000 square feet of floor area, or part thereof, and each ring circuit may serve as many socket outlets as required, provided they are reasonably distributed between the circuits. This removes an obvious anomaly and will no doubt lead to the standardisation of this system. The regulations concerning spurs and the connection of fixed appliances to ring circuits remain as described in DI.2, figure 3a of which also shows switch and control gear complying with the requirements of this section.

It is confirmed that the use of switches controlling socket outlets on A.C. supply is a matter of convenience so long as the plug is readily withdrawable; they are however obligatory where D.C. is concerned.

Conduit and Duct Systems

Several requirements in the installation of conduit systems are probably unfamiliar to many architects, but they require to be widely known. Regulations 218 and 219 make it quite clear that conduit with plain slip or pin-grip sockets does not comply, and that elbows or tees other than those of the inspection type must not be used except at the ends of conduits immediately behind accessories or lighting fittings. The conduits for each circuit must be erected complete before any cable is drawn in, and it is considered desirable that inspection boxes, draw-boxes, etc., should remain accessible throughout the life of the installation.

The radius of conduit bends must fulfil the requirements for the bending of the cables which they enclose and in addition the inner radius of the bend shall be not less than $2\frac{1}{2}$ times the outer diameter of the conduit. Conduit systems not intended to be gas-tight must be self-ventilating and provided with drainage outlets at any point in the installation where condensed moisture might otherwise collect.

Duct and trunking systems are subject to similar requirements with regard to completion before installation of cable, protection against water, and diameter of bends. When the latter are formed in a circular concrete duct or pipe, they shall be of an inner radius of not less than four times the diameter of the completed duct. The radial thickness of concrete or screed surrounding the cross section of a complete concrete duct cast in-situ must not be less than half an inch at any point.

Cables for power and lighting operating at a voltage exceeding extra-low voltage (see Table 1) must not be drawn into the same duct or conduit as the cables of extra-low voltage systems, or radio, telephone, bell and call or sound distribution systems unless the latter are insulated for the highest voltage present in the power and lighting cables. On the other hand, cables with insulation appropriate to their particular use, may be installed in the same duct or trunking provided that they are effectively segregated throughout its entire length.

For further details apply to

DI.3 British Electrical Development Association

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∴ Since $a+b+c+d$ = the cost of Heating Service it may be seen that the Potterton Oil-Fired Boiler is the most economical means of supplying hot water for central heating and domestic purposes if oil is the fuel to be used.

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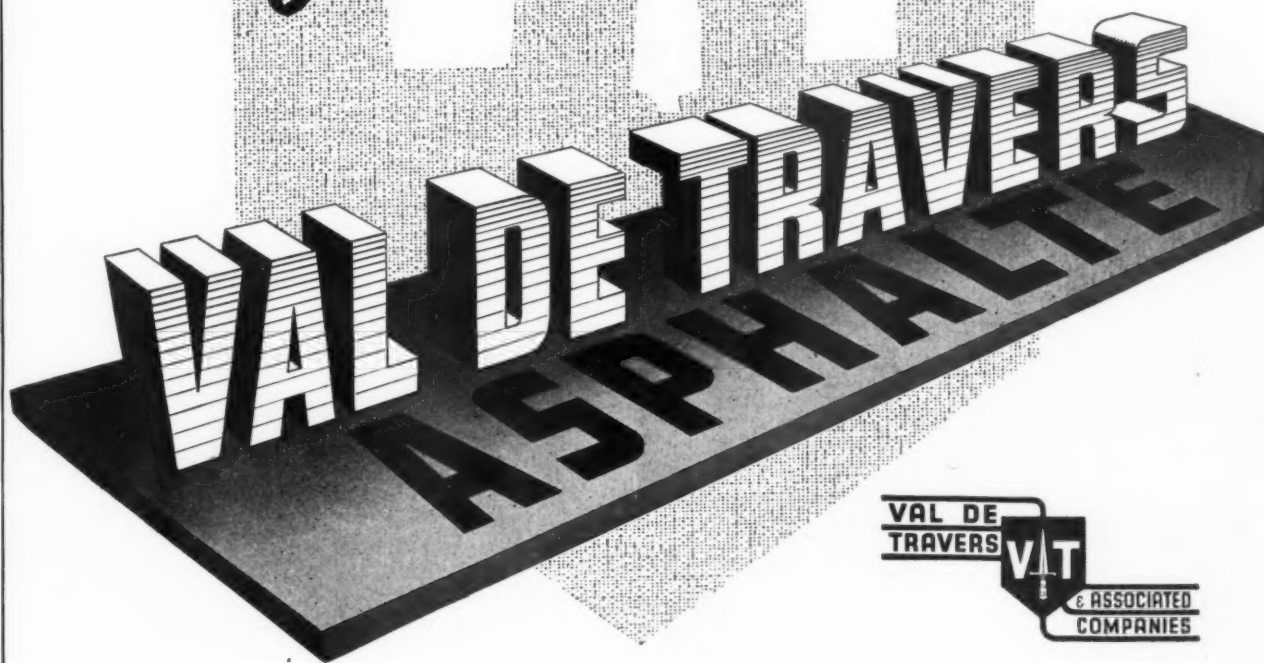


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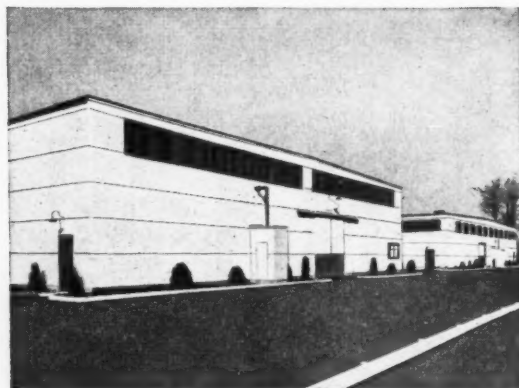
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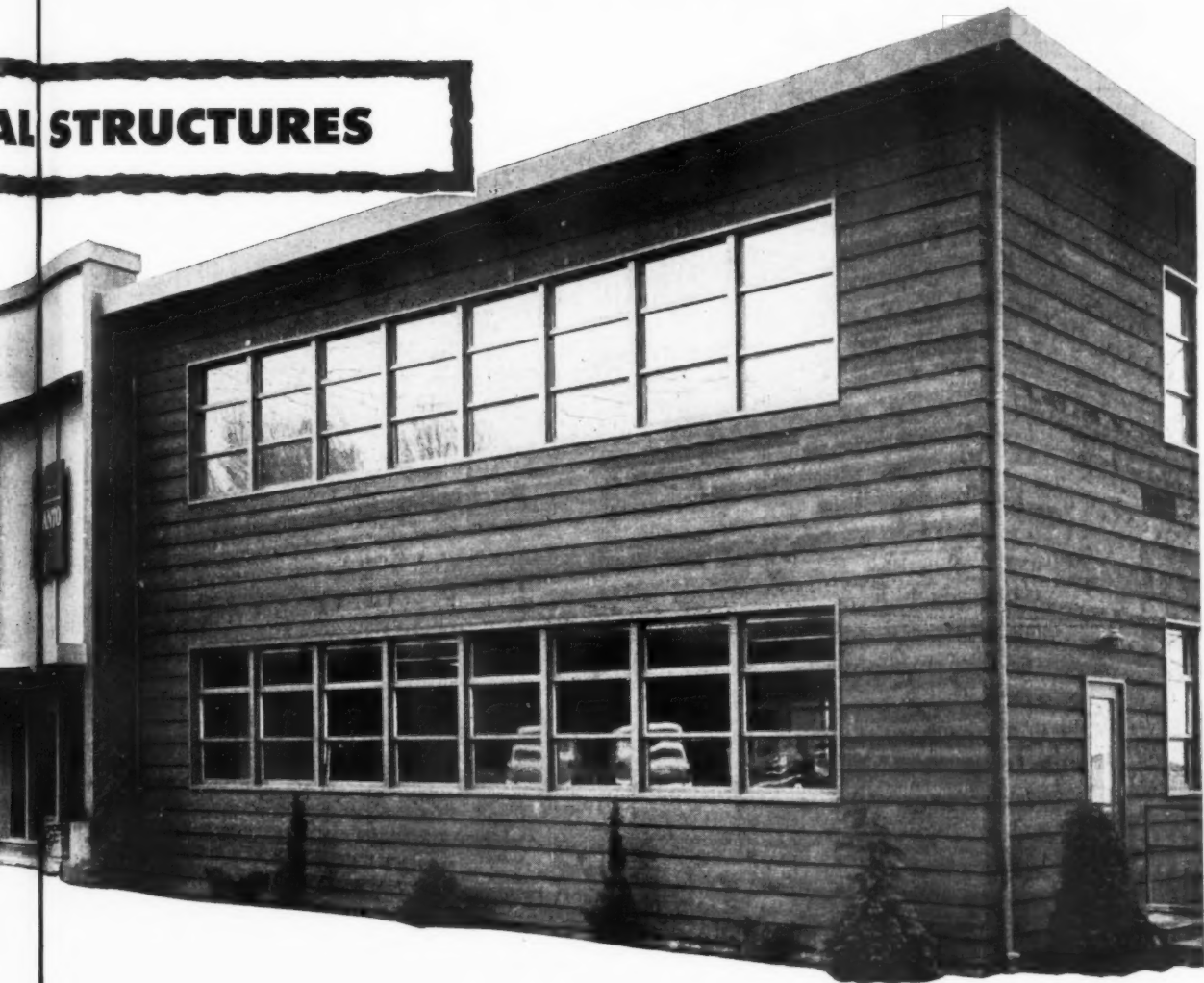


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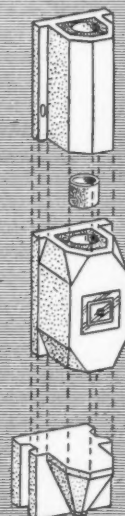


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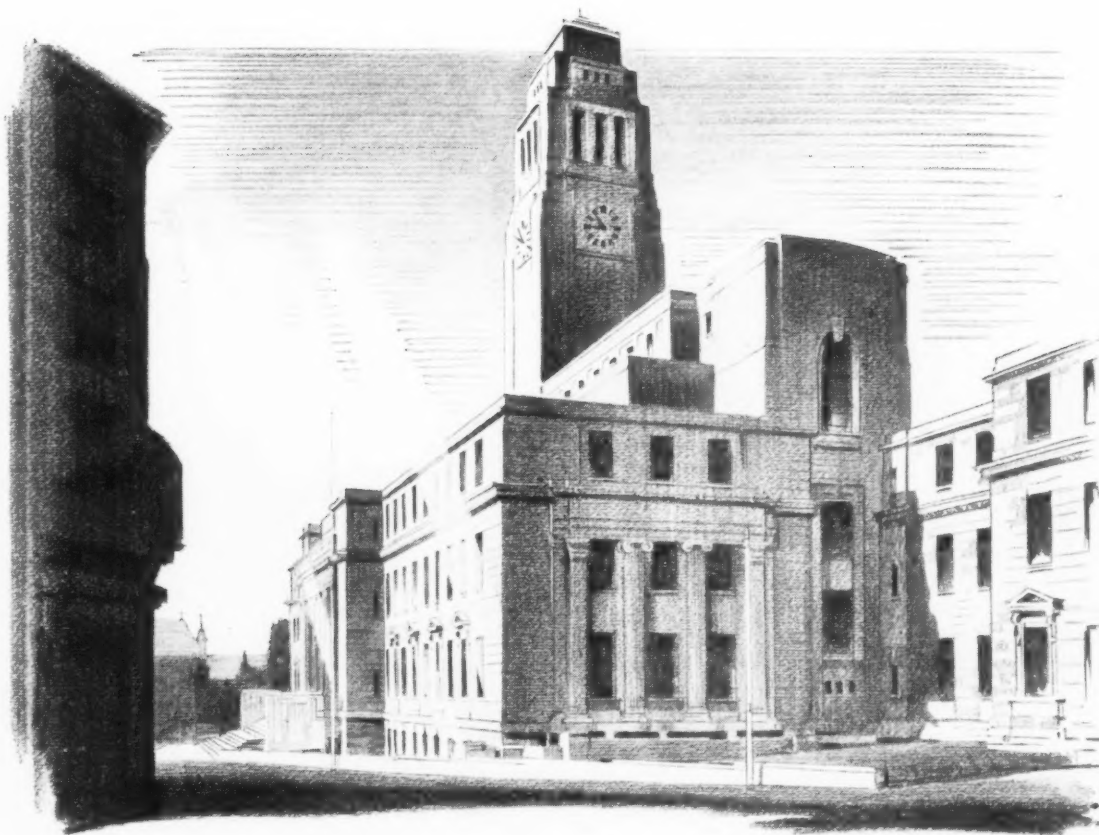
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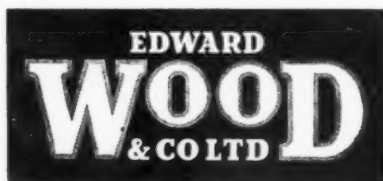
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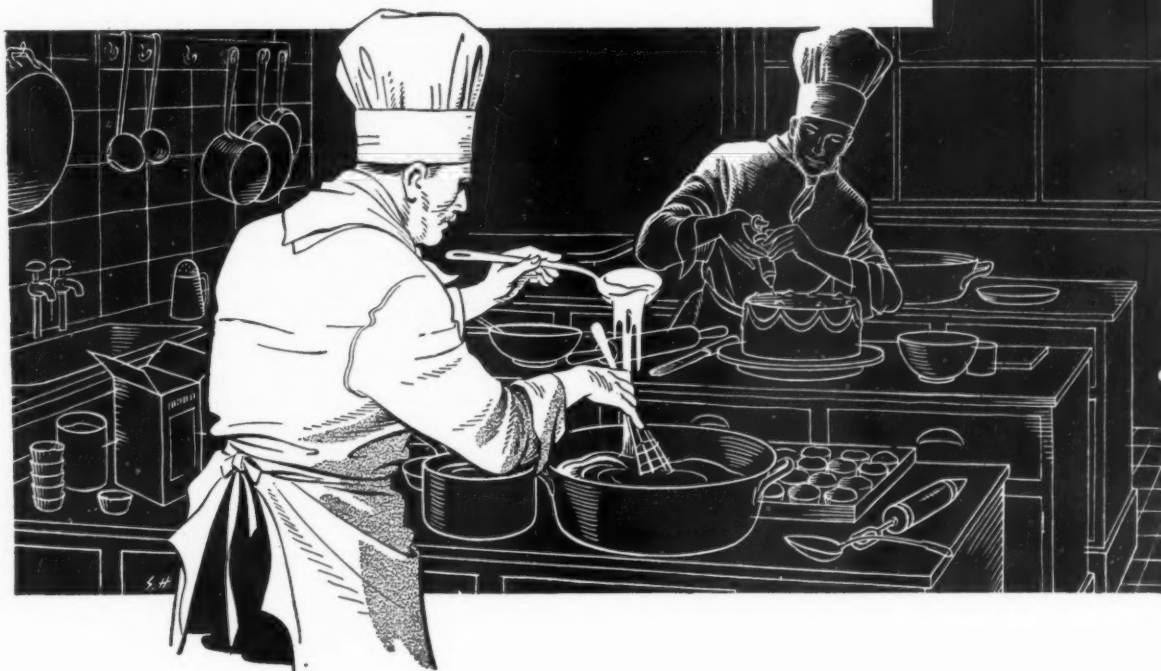
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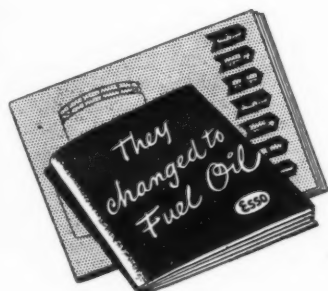
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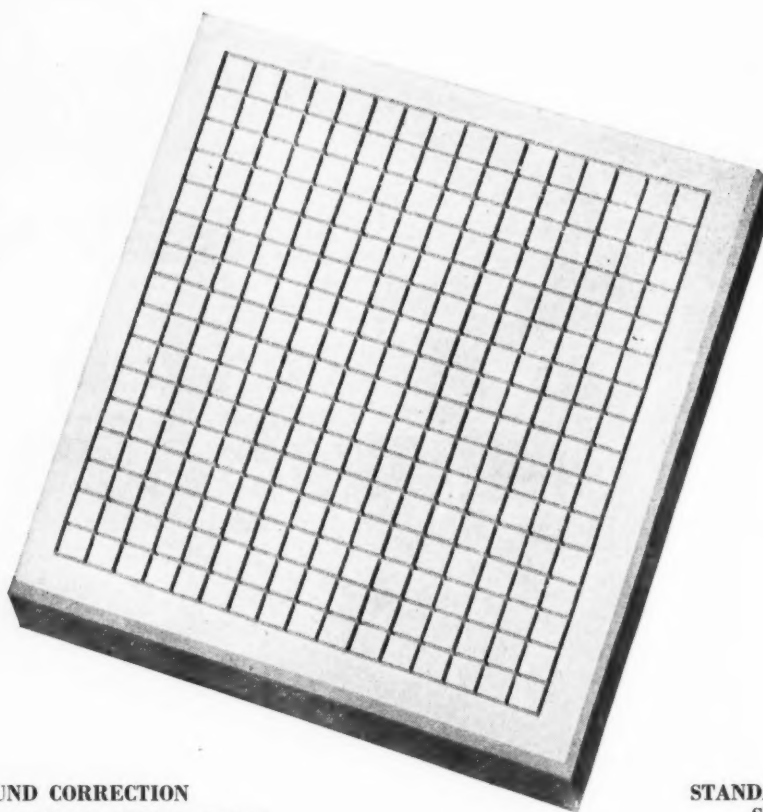


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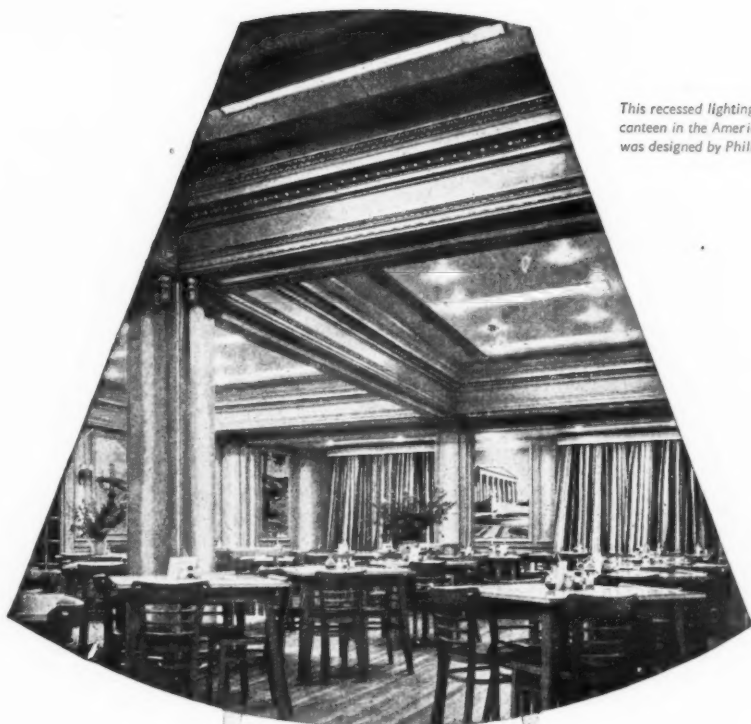
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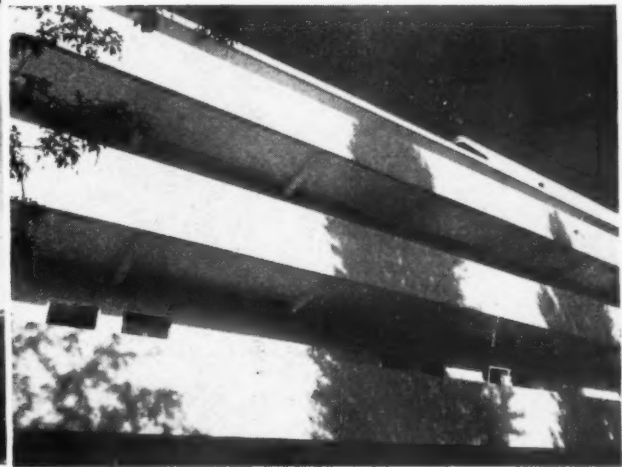
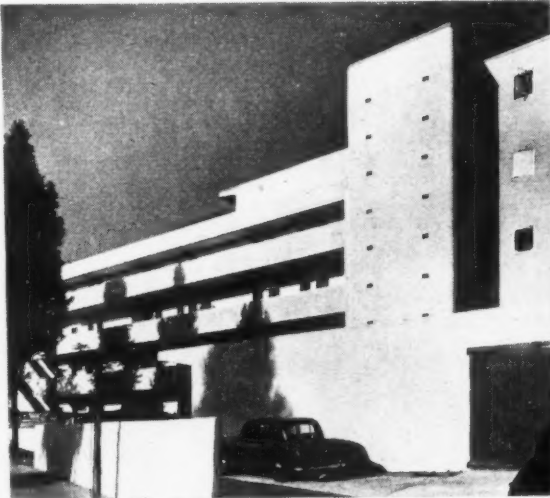
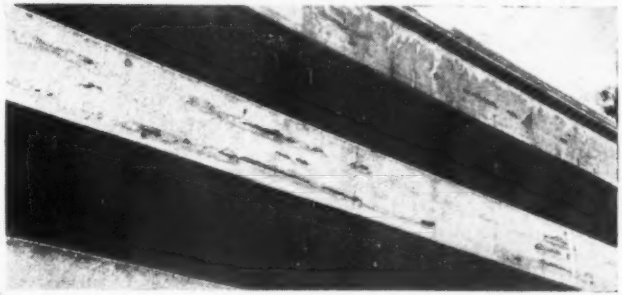
PIERHEAD LIMITED

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TEL: FELTHAM 3031

Span and
Loading
table
for
Floors
and Roofs
on request.

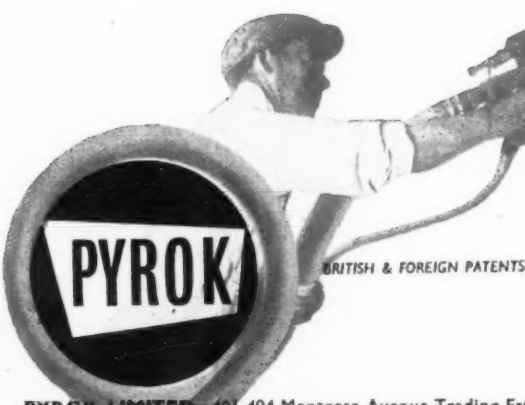
A Pyrok weatherproof rendering has been applied to the damaged surface of a block of flats in Lawn Road, Hampstead. Differential thermal movements had resulted in entry of moisture, corrosion of the steel reinforcement and subsequent spalling of the surface concrete, as may be seen above on the right. With the Pyrok decorative surface, illustrated below and on the left, complete protection from these conditions is obtained. W. W. Wells Coates, O.B.E., F.R.I.B.A., was the architect responsible for the design and building of these flats, completed in 1934. The architects, under whose direction the Pyrok treatment was carried out, were: Colin Jones, A.R.I.B.A., A.A.dipl. and Jennifer Dennis, A.R.I.B.A., A.A.dipl., Chartered Architects. Contract was executed by C. & T. (Pyrok Contracts) Ltd., London.



PYROK versus corrosion

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

Vermiculite surfacing
the modern way



Contracts are undertaken by Licensees in all parts of the U.K. and in countries abroad. We shall be glad to supply further information on request.

PYROK LIMITED 401-404 Montrose Avenue Trading Estate Slough Bucks

tel.: Slough 24061-5 'grams: Pyrokad Slough

LICENSEES U.K. C & T (Pyrok Contracts) Ltd., London NW2 also, Bristol 4 and Newcastle-on-Tyne 1
Decorators (Liverpool) Ltd., Liverpool 3 Orthostyle Ltd., Scunthorpe, Lincs Pyrok Contracts (Midlands) Ltd., Birmingham

AP280/33

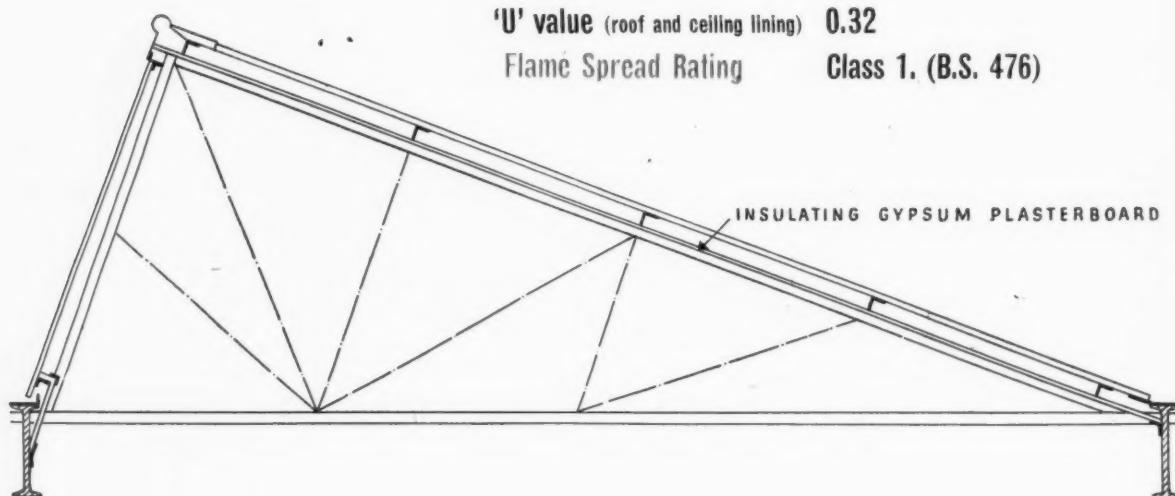
Thermal Insulation of FACTORIES . . .

Example: Job No. D.5679

Construction: North light steel truss corrugated asbestos sheeting with suspended Insulated Gypsum Plasterboard lining below purlins.

SUSPENDED CEILING

Area	1,973 sq. yds.
Contract Cost (erected)	14/8d. per sq. yd.
'U' value (roof only)	1.4
'U' value (roof and ceiling lining)	0.32
Flame Spread Rating	Class 1. (B.S. 476)



Whatever the building, fire hazard must be minimised. Gypsum Plasterboard is fire resisting to a higher degree than any other board of comparable cost.

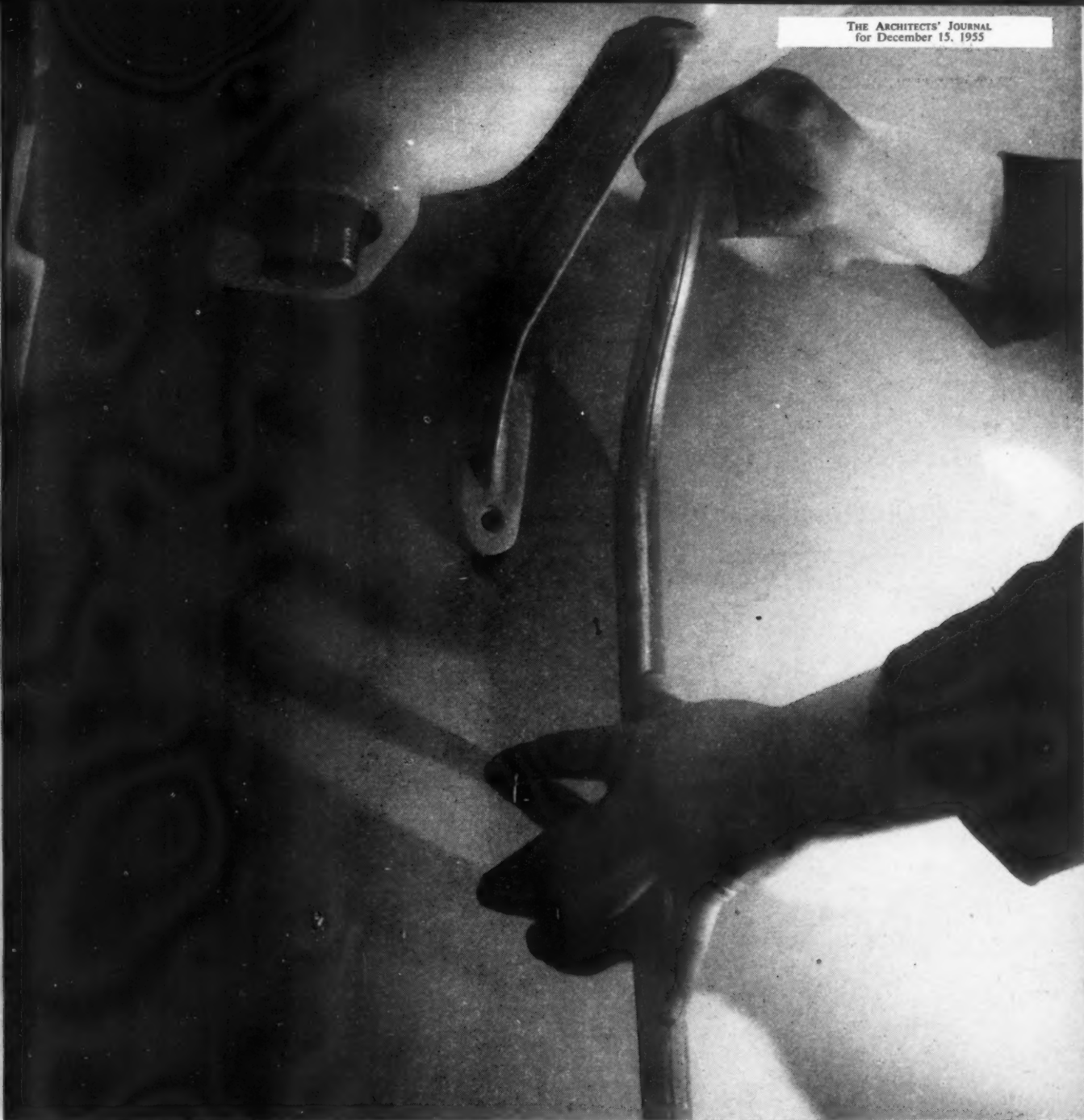
INSULATING GYPSUM PLASTERBOARD

gives the essential degree of thermal insulation
with fire protection at lowest cost.

For information and literature please write to one of these addresses:

GYPROC PRODUCTS LIMITED, SINGLEWELL ROAD, GRAVESEND, KENT Gravesend 4251
IMPERIAL CHEMICAL INDUSTRIES LIMITED, MILLBANK, LONDON, S.W.1. Victoria 4444
THE BRITISH PLASTER BOARD (MANUFACTURING) LIMITED, BATH HOUSE, 82 PICCADILLY, W.1. Grosvenor 7050
PLASTER PRODUCTS (GREENHITHE) LIMITED, GREENHITHE, KENT Greenhithe 2251/5
Published by The Gypsum Building Products Association





h

LEAD LASTS

The Council's Technical Information Bureau will gladly help with problems on the use of Lead Sheet and Pipe in building work. Details of the main uses are given in a series of Information Sheets and Bulletins which can be obtained by applying to the Council.

When the plumbing is in lead the work is well done

Lead Pipe—readily shaped and bent when fabricating or fixing and highly resistant to corrosion—is the best pipe material for plumbing work.

LEAD—for lowest cost per annum

Lead Sheet and Pipe Council *in association with* **LEAD DEVELOPMENT ASSOCIATION**
Eagle House, Jermyn Street, London SW1 · Telegrams: Ukleadman, Piccy, London · Telephone: Whitehall 4175

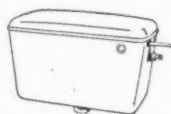
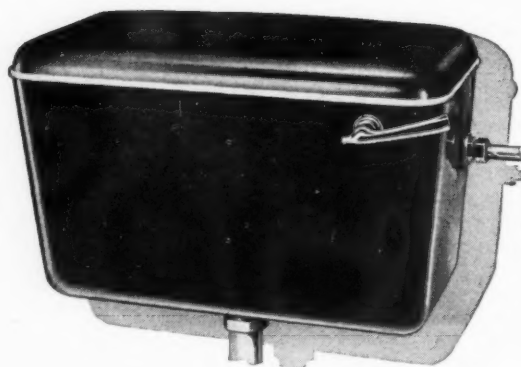
Old name-new styling

PLASTIC CISTERNS BACKED BY 74 YEARS' EXPERIENCE

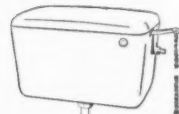
Modern styling, old-time quality — the 'contemporary' look of the Lawley plastic cisterns is backed by seventy-four years' specialised experience in cistern manufacture. Smoothly hygienic, rust and corrosion-proof, these newest members of the Lawley range are perfectly suited to today's building requirements. Prices, too, are planned to meet the need for economy when large-scale building projects — estates, office blocks and workshops, etc. — are on the agenda.



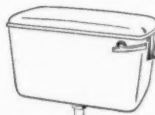
Our illustrated folder gives details of four Lawley models in plastic, to suit all water regulations. We shall be pleased to forward copies on request.



Model LL/SP



Model HL/P



Model LL/FP



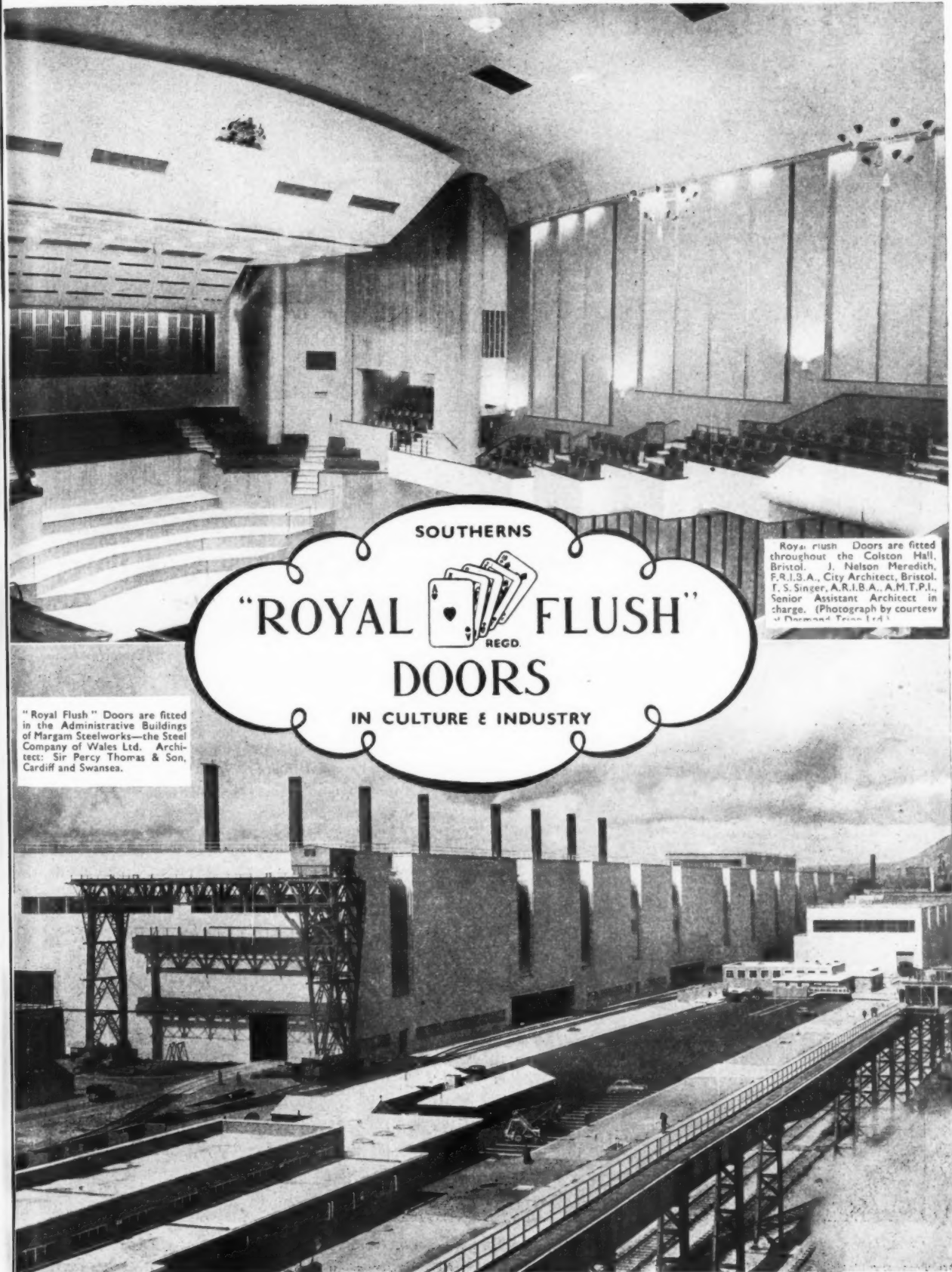
Model WB/P

Lawley

BRITANNIA

pioneers in cistern manufacture since 1881

W. & J. LAWLEY LTD., BRITANNIA WORKS, SAMS LANE, WEST BROMWICH



SOUTHERNS

"ROYAL FLUSH"
DOORS

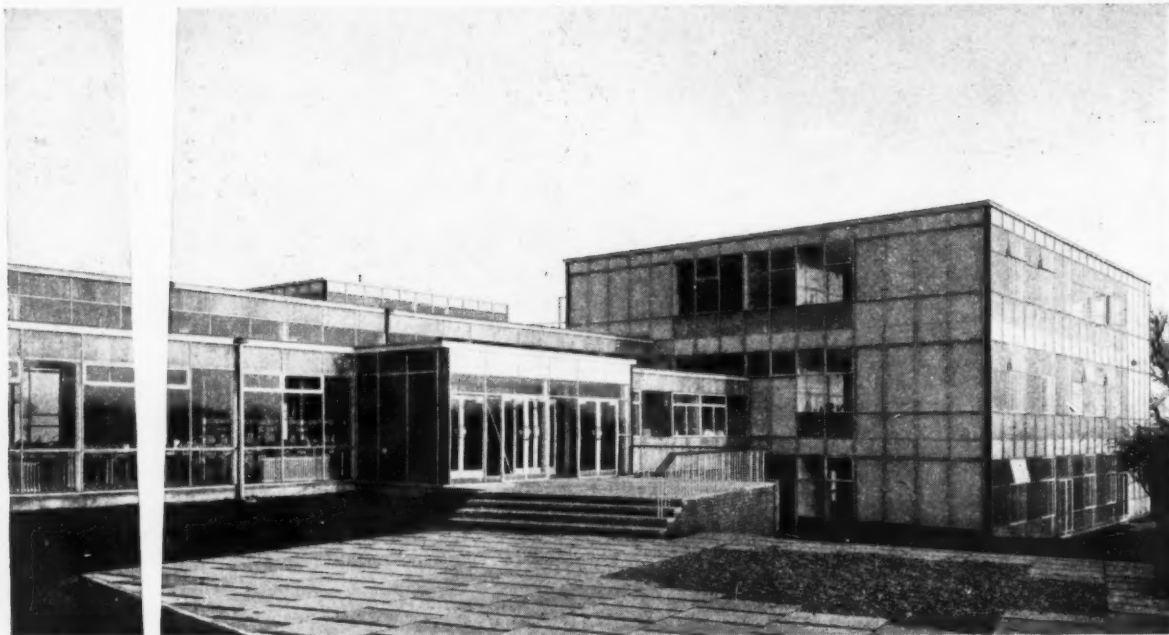


IN CULTURE & INDUSTRY

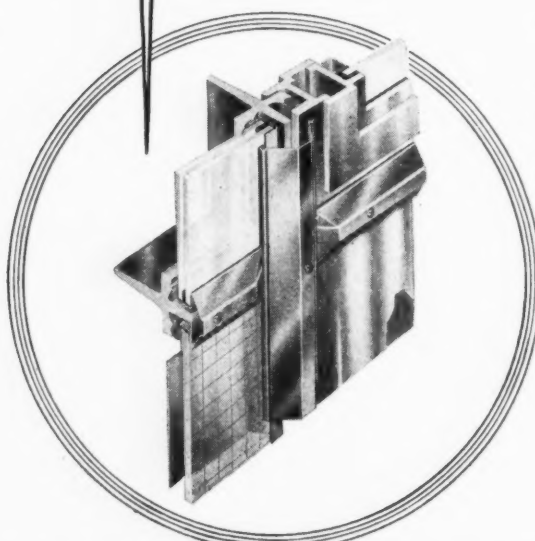
"Royal Flush" Doors are fitted in the Administrative Buildings of Margam Steelworks—the Steel Company of Wales Ltd. Architect: Sir Percy Thomas & Son, Cardiff and Swansea.

Royal Flush Doors are fitted throughout the Colston Hall, Bristol. J. Nelson Meredith, F.R.I.B.A., City Architect, Bristol. F. S. Singer, A.R.I.B.A., A.M.T.P.I., Senior Assistant Architect in charge. (Photograph by courtesy of Desmond Trice Ltd.)

'HILSULATE' PANELS



for HILLS GLASS CURTAIN WALLING



THE result of many years' practical experience, Hills system of Glass Curtain Walling is being extensively adopted in this country and in Canada. An attractive permanent cladding, most economical and speedily erected, it is particularly suitable for multi-storey constructions with large mass areas. Various types of infill panels are available, all offering high thermal resistance. These comprise 'Hilsulate' Double Glazed Panels (having the thermal value of $4\frac{1}{2}$ in. brickwork), 'Hilsulate' Coloured Panels for solid wall areas, Aluminium faced Ply Coloured Panels for opaque areas and Single Glass Panels for lighting areas. Illustrated literature on 'Hilsulate' Panels is available to Architects on request.

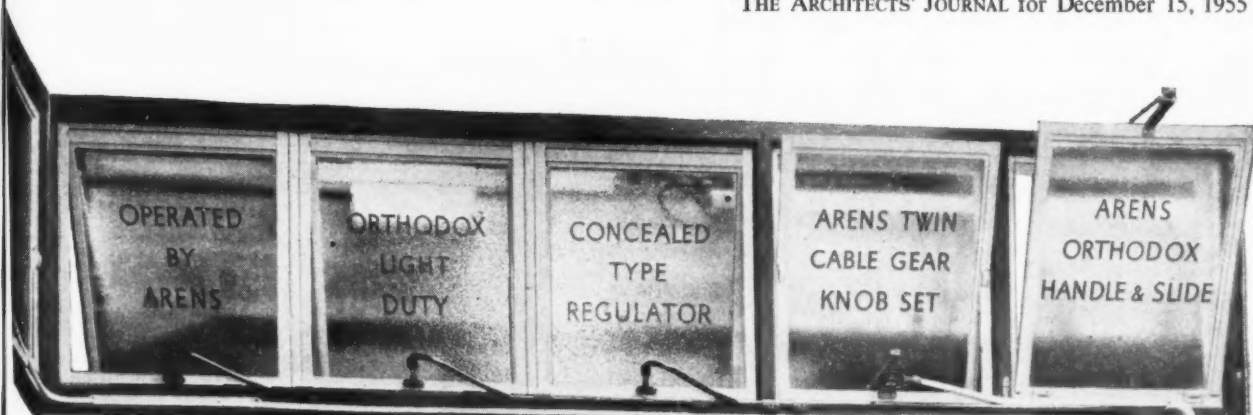
(Illustrated at top). Hurlfield Secondary Modern School for Girls, Sheffield. Architects Co-Partnership in collaboration with J. L. Womersley, A.R.I.B.A., A.M.T.P.I., City Architect.

(Right). The Wingham District High School, Toronto. Architects: Messrs. Kyles & Kyles.

HILLS (WEST BROMWICH) LIMITED



ALBION RD., WEST BROMWICH. Tel.: West Bromwich 1811 (15 lines). LONDON: CHAPONE PLACE, DEAN ST., W.1. Tel.: GERard 0526/9
Branches at Birmingham (Midland 5175), Manchester Blackfriars 3382, Bristol 24765, Leeds (25868), Newcastle-on-Tyne (59081), Glasgow (City 5564) and Belfast (26112)



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ON EXHIBITION

AT THE BUILDING CENTRE

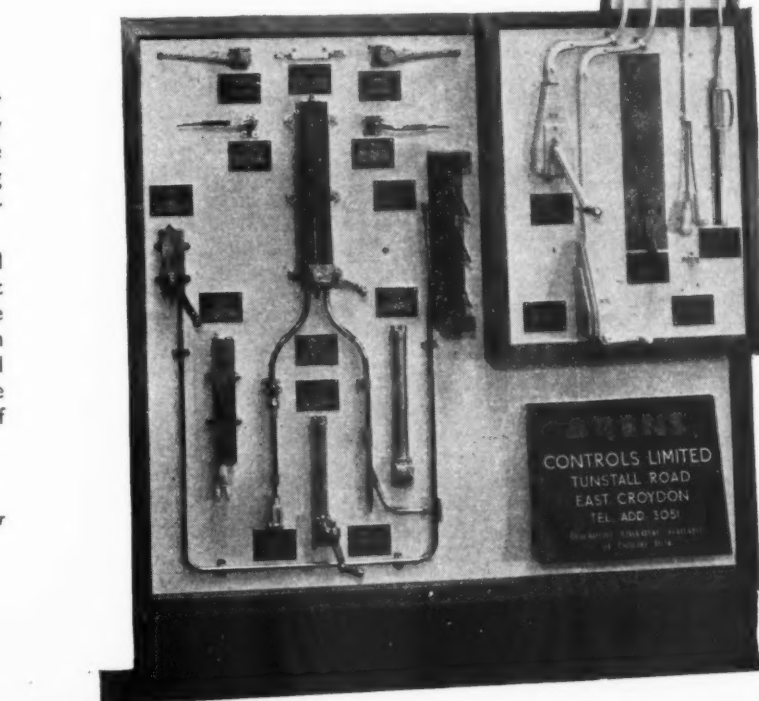
STORE STREET, TOTTENHAM COURT ROAD, W.C.1 MUSEum 5400

Next time you're in London come and see for yourself how much better ARENS Window Controls can do the job. Neat and unobtrusive in appearance, they succeed in combining mechanical perfection with the highest standards of finish and design.

ARENS controls are simplicity itself to install and maintain. Totally enclosed, precision-built mechanisms ensure trouble-free service, and the conduit used can be painted to harmonize with the surrounding colour scheme, or concealed beneath the wall surface as desired. There are ARENS controls available for every type of hinged window.

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Australia: S. K. SHEPHERD, G.P.O. BOX 1.000-H, MELBOURNE. New Zealand: L. J. FISHER & CO. LTD., 30 ANZAC AVENUE, AUCKLAND. Rhodesia: CRITTALL-HOPE (RHODESIA) LTD., P.O. BOX 2301, WORKINGTON, SALISBURY. Western Canada: WILLIAMS & WILLIAMS (WESTERN) LTD., VANCOUVER & WINNIPEG. South Africa: WIRE INDUSTRIES STEEL PRODUCTS & ENGINEERING CO. LTD., OPHIRTON, JOHANNESBURG.



FLOORING AT BELPER

SECONDARY MODERN SCHOOL

Architect : F. Hamer Crossley Dipl. Arch. (L'pool) F.R.I.B.A.
County Architect, Derbyshire

in collaboration with

S. A. W. Johnson-Marshall C.B.E., B. Arch. (L'pool) A.R.I.B.A.
Chief Architect, Ministry of Education

Architect in Charge : Miss B. N. Price, B.A., A.R.I.B.A.

The studded rubber floor
tiles illustrated are one
of the finishes supplied
and laid at this school by

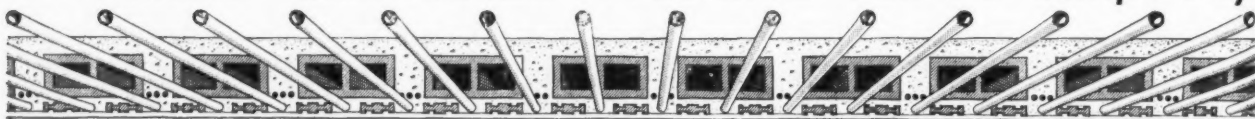
HASKEL ROBERTSON LIMITED

Westland House, Curzon Street, London, W.1.

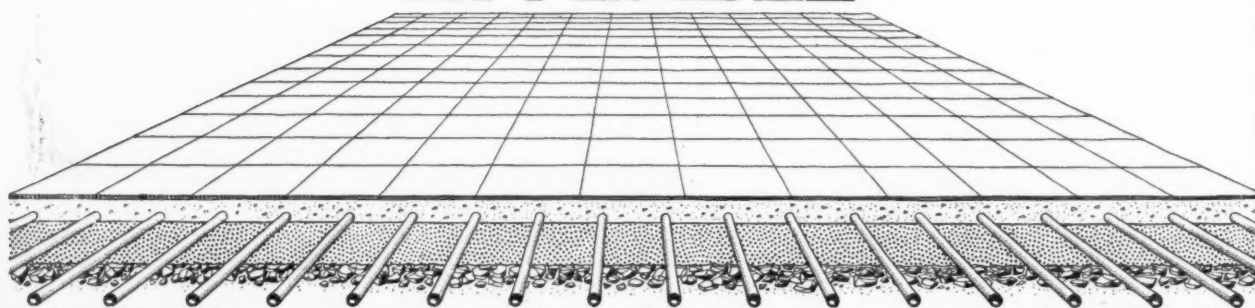
GROsvenor 8764-5

One of the General Asphalte Group of Companies

A reminder that PANEL WARMING can be completely

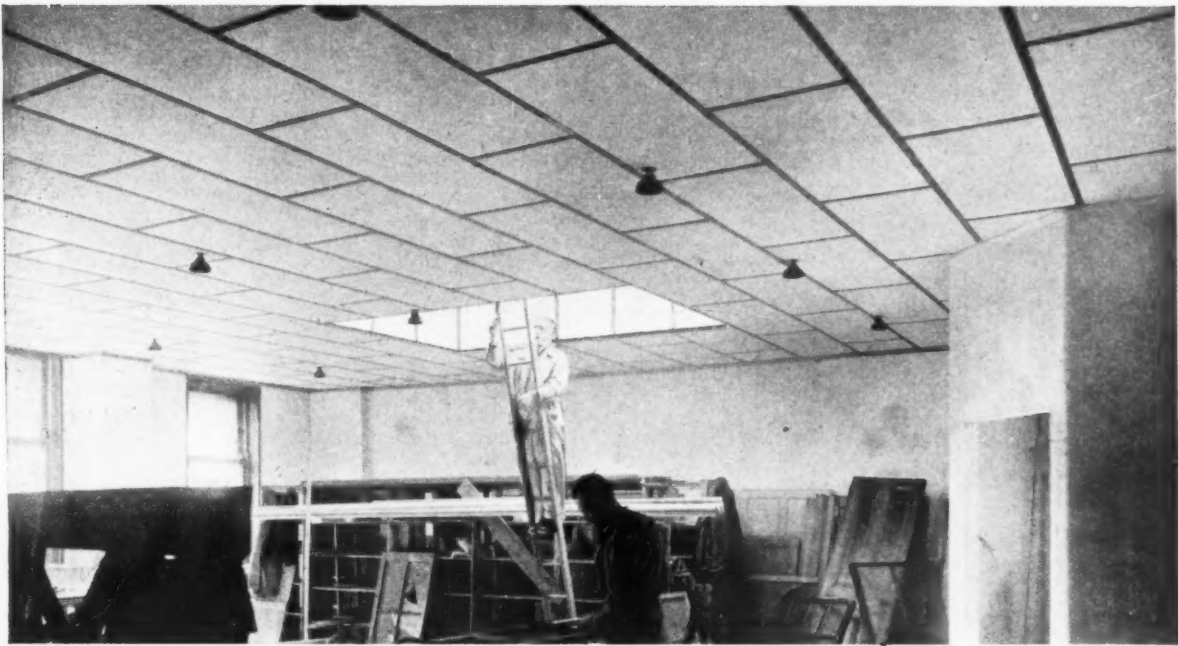


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INVISIBLE PANEL WARMING ASSOCIATION
GRAND BUILDINGS, TRAFALGAR SQUARE, LONDON, W.C.2

Write for information on floor and ceiling heating



GYPROC Plasterboard* is easily and cheaply

installed in all types
of building giving:

Reduced Fire Hazard

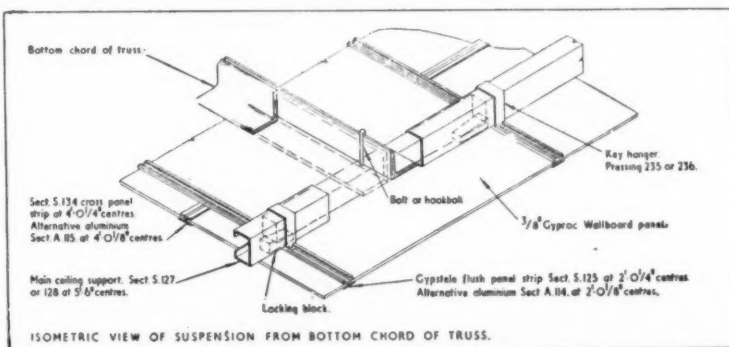
with IMPROVED

Thermal Insulation

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Construction	U. Value	*Fuel used to make good heat loss through 1,000 sq. ft. of structure (Tons p.a.)	Fuel Saving due to Insulation	
			Tons p.a./1,000 sq. ft.	%
Flat Concrete Roof (4" thick) Uninsulated	0.68	3.8	—	—
(a) Suspended Ceiling, plain GYPROC Wallboard (GYPSTELE System)	0.36	2.0	1.8	47
(b) Suspended Ceiling, GYPROC Insulating Wallboard (GYPSTELE System)	0.26	1.4	2.4	63

* These figures are calculated by the method described in the Ministry of Fuel and Power Efficiency Bulletin No. 12 "Thermal Insulation of Buildings"



* For information about any of the following GYPROC Plasterboard products write for leaflets:—

- 22E1 | GYPSTELE Suspended Ceiling
- 22E2 |
- P359 GYPROC Wallboard (tapered and square edged)
- P317 GYPROC Lath
- P326 GYPROC Insulating Wallboard and Lath
- P348 GYPUNIT Panels

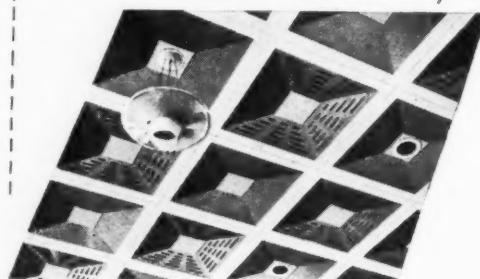
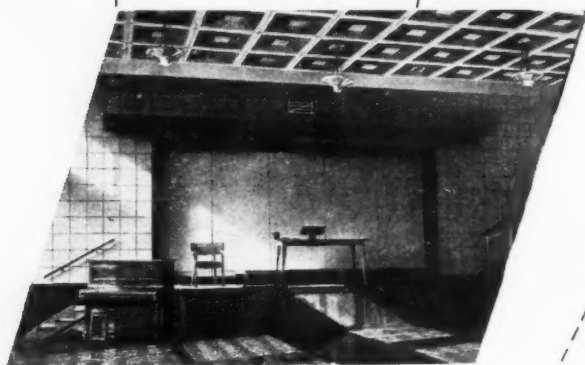
Makers of acoustic and thermal insulation products including GYPROC Insulating Plasterboard, Acoustic GYPROC, GYPROC Slotted Acoustic Tiles, GYPKLITH Wood Wool Slabs, GYPKLITH Fluted Panels, Insulux and ZONALEX Loose Fill Insulation, GYPLITE Vermiculite Insulating Plaster, DEKOOSTO Acoustic Plaster.

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Glasgow Office: Gyproc Wharf, Shieldhall, Glasgow, S.W.1. Telephone: Govan 2141-3. Telegrams: Gyproc, Glasgow.
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London Office: Bath House, 82 Piccadilly, London, W.1. Telephone: Grosvenor 4617-9.

W2

Service to an Authority



Interior features of the New School at Belper, reviewed in this issue.

JOSEPH MASON & CO. LTD. INTER MEMO	
FROM: Technical Service Dept. Ref: PG/7B	TO: Managing Director 18th November, 1955.
CONTRACT TESTS SPECIFICATION VISITS PAINTS SUPPLIED	INTERIOR OF NEW M. OF E. EXPERIMENTAL SCHOOL, AT BARGATE, BELPER, DERBYSHIRE. Carried out tests on special surfaces, i.e. Derbyshire Spar, Copper Pipes, Mahogany, Aluminium, Gypsum Plaster, Special Insulated Ceilings and Asbestos. Application time occupied by tests: approximately 30 HOURS. Specification prepared for treatment of all above surfaces. 21 VISITS involving time spent actually on site: approximately 65 HOURS. MASOPAR Alkyd Enamels MASOTEX Emulsion Paints <i>F. Gerrard.</i>
ARCHITECTS PAINTING CONTRACTORS	F. Hamer-Crossley Esq., Derbyshire County Architect, in collaboration with the Development Group of the Architects and Building Branch, Ministry of Education, Antony Pott Esq., and Miss Barbara M. Price, (architect in charge) D.G. Barron Esq., and Miss Patricia R. Tindale (Ministry of Education). F. Troy & Co. Ltd., Building Contractors, 131, Great Suffolk Street, London, S.E.1.

MASOPAR
Alkyd
Enamels

MASOTEX
Emulsion
Paints

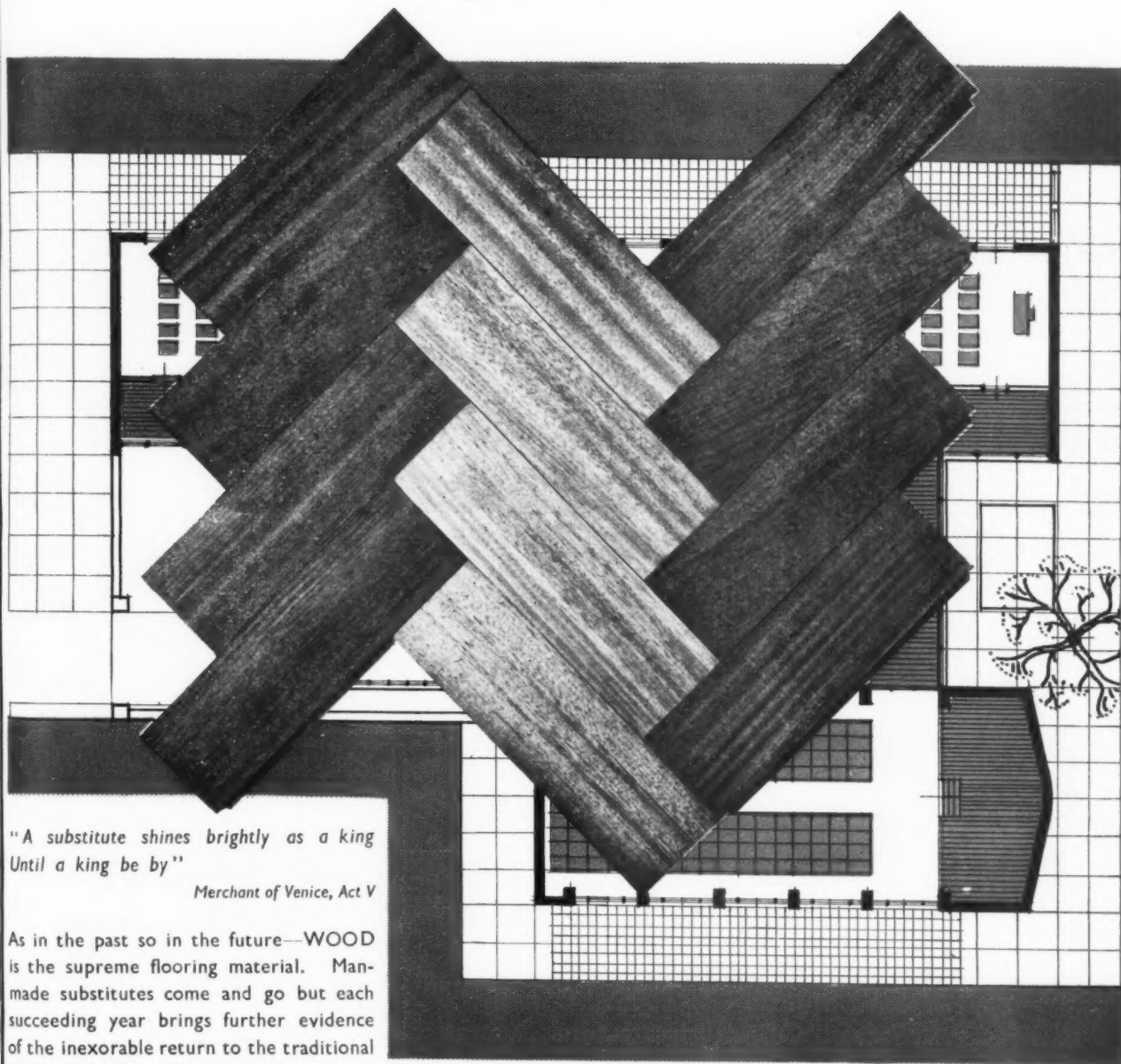
joseph mason paints

JOSEPH MASON & COMPANY LIMITED · DERBY

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Photographs by kind permission of F.W.L. Heathcote, Esq., Development Engineer, Messrs. J. Brockhouse & Co. Ltd.

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"A substitute shines brightly as a king
Until a king be by"

Merchant of Venice, Act V

As in the past so in the future—WOOD is the supreme flooring material. Man-made substitutes come and go but each succeeding year brings further evidence of the inexorable return to the traditional HARDWOOD for floors. Many excellent hardwoods are now available at moderate cost which combine BEAUTY, DURABILITY and COMFORT with ECONOMY.

SPECIFY—MADE IN ENGLAND

to ensure precision in manufacture, controlled moisture content and stability of the floor.

ANOTHER RECENT CONTRACT:— SECONDARY MODERN SCHOOL,

The Parks, South Belper, Derbyshire.

FLOORS SUPPLIED: Seraya Strip, Hardwood Block,
"Semastic" Decorative Tiles.

HOLLIS BROS. LTD.

LEICESTER • HULL • LONDON • BIRMINGHAM

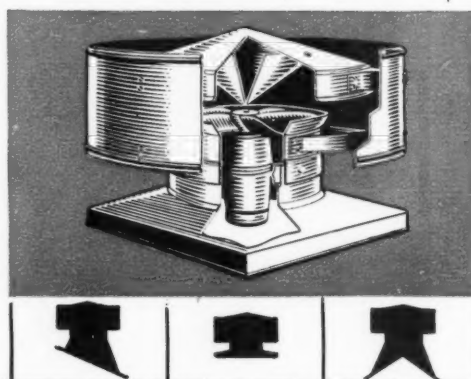
Breathing Space...

IN INDUSTRY

GREENWOOD-AIRVAC 'Lowline'

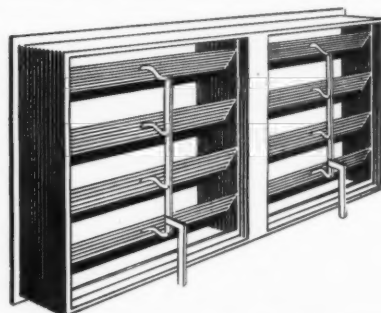
This is a roof ventilator of proved performance. Extraction can be natural, or mechanical with built-in fan available in a wide variety of standard ratings.

A full range of mountings is available for flat, ridge or sloping roofs. Special sizes can be made to order.



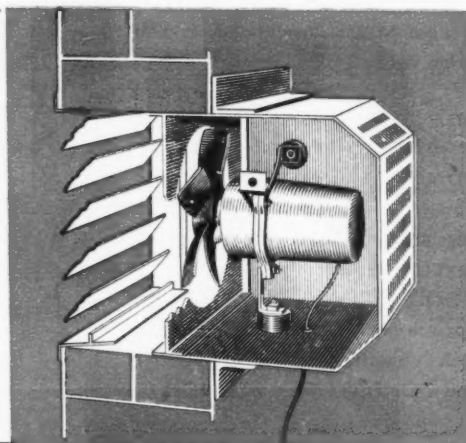
Heavy Duty MOVABLE LOUVRE Ventilators

Balanced ventilation can be assured when these heavy duty movable louvre ventilators are specified with 'Mechavent' roof extractors. As single or multibank panels the units are available in sizes ranging from 3 to 24 louvres, which are hollow-sectioned and streamlined to ensure the minimum resistance to air flow. The well-designed operating gear works in solid brass bearings and locks the louvres in any desired position.



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Designed to extract fumes, steam and smoky atmosphere, etc., in Schools, Hospitals, Factories and Offices, these highly efficient extractors are economical and quiet in use. Several sizes are available for various wall thicknesses to operate on single or three phase supply up to 440 volts. Special features include anti-backdraught louvres, full flow grille and totally enclosed motor. Fixing is a simple matter and the units are completely rust and corrosion proof. Available from 9" fan diameter upwards.



Greenwood-Airvac ventilation

GREENWOOD'S AND AIRVAC VENTILATING COMPANY LTD

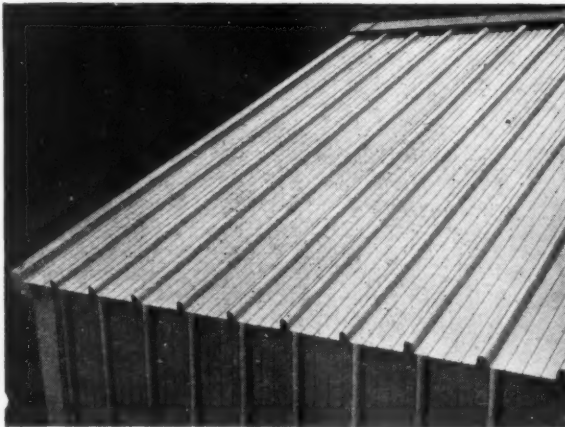
Designers and Manufacturers of Ventilating Equipment for Buildings, Vehicles and Ships

BEACON HOUSE, KINGSWAY, LONDON, W.C.2. CHANCERY 8135/6/7. "Airvac", London

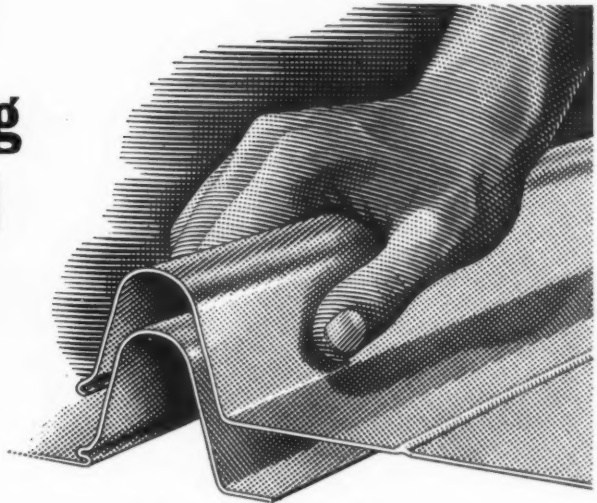
New complete system for roofing and siding—Noral 'SNAPRIB' Sheet

Noral 'Snaprib' sheet is the latest development in aluminium roofing and siding, a complete system that is simple, economical and neat.

Simple—because the basis of 'Snaprib' is the simple but very strong snap-joint by which the sheets are joined together, the roofing or siding being secured by special clips. Economical—because the speed of assembly cuts labour costs. Neat—because all joints and fastenings are concealed, and a complete range of specially-designed accessories is available.



Roof and walls are good-looking and weatherproof.



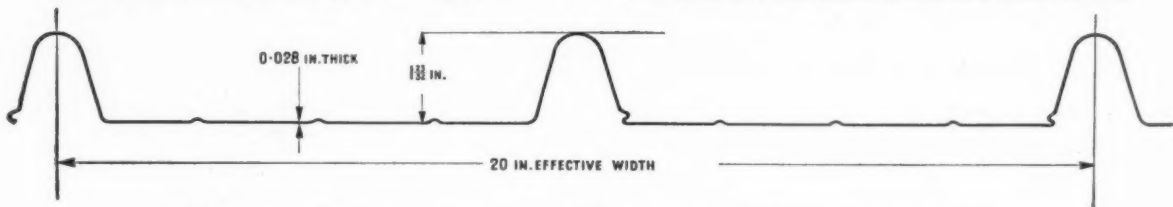
Easily snapped together, the joints 'lock' powerfully against suction loading.

'Snaprib' can be used for roofing houses—traditional or prefabricated—or for siding and roofing industrial buildings. It can be fixed on metal or timber purlins, and insulation boards can be incorporated. It comes in lengths up to 20 ft., so that end-laps can often be avoided altogether. Where necessary, it can readily be dismantled without damage and used again on another installation.

Like other forms of Noral building sheet, 'Snaprib' combines strength with lightness, and needs no painting or other costly maintenance.

The 'Snaprib' system is fully covered by patents held by Cookson Sheet Metal Developments Ltd.

For our descriptive brochure 'Noral Snaprib Sheet', or for specific information, please write to the nearest of the undermentioned Sales Offices.



Northern Aluminium

C O M P A N Y L I M I T E D

Sales Offices

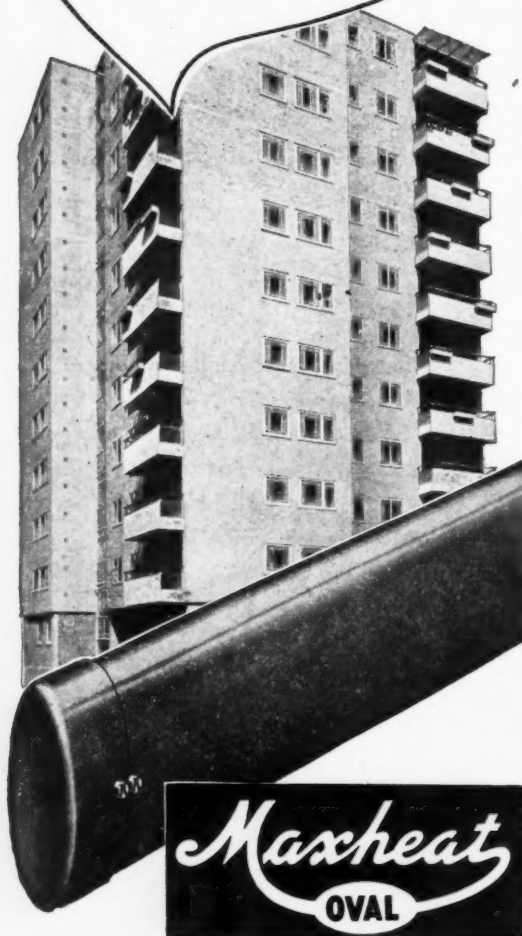
LONDON: Bush House, Aldwych, W.C.2. Telephone: Temple Bar 8430 BIRMINGHAM: 14 Bennetts Hill, 2. Telephone: Midland 5236
MANCHESTER: 75 Piccadilly, 1. Telephone: Central 5479 BRISTOL: Pelouin Chambers, 18 St. Augustine's Parade, 1. Telephone: Bristol 20351
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An ALUMINIUM LIMITED Company

Maxheat
OVAL

**Tubular Electric Heaters
of course!**



Photograph by courtesy of the L.C.C.

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MAXHEAT — FOR BETTER SPACE HEATING

THE **Wardle** ENGINEERING CO. LTD.
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★ **Thermacoust**

WOOD WOOL SLABS

**were designed
and developed
essentially for ROOFS**

★ **THEY ARE THE BEST**

roofing units available today for the modern conception of the BEST type of ROOF . . . low heat losses, exceptional structural strength, easily handled, easily worked units, erected at low labour cost. THERMACOUST Roofing Slabs are being used by leading Architects for public and private building throughout the country.

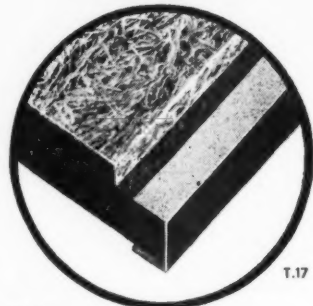


**CHANNEL
REINFORCED**

No other insulating roofing material has greater structural strength. Supplied in large, lightweight, easily handled units: fire-resistant, sound-absorbing and requiring no ceiling-finish.

**REBATED
CHANNEL REINFORCED**

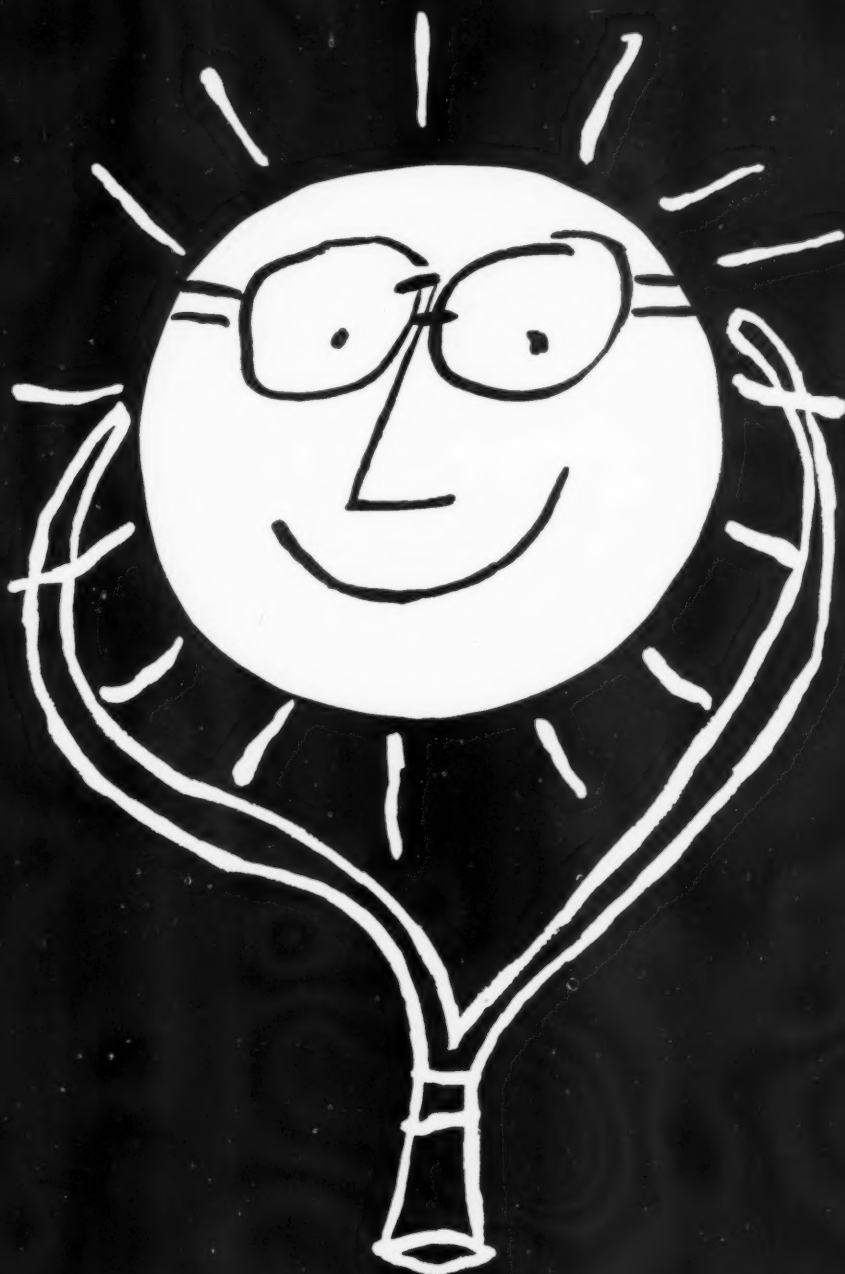
THERMACOUST 3" Rebated Slabs provide higher overall insulation. They are specially designed for buildings where the atmosphere is exceptionally warm or humid. They are rebated to take 1" cork strips to prevent condensation on the steel channels.



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... say health

... say light

... say **Rustproofed Metal Windows**

ISSUED BY THE METAL WINDOW ASSOCIATION, BURWOOD HOUSE, CAXTON STREET, LONDON, S.W.1



in the **Royal Exchange**

This photograph, which was taken in the Royal Exchange, London, where a comprehensive A.F.A. system has been recently fitted, gives further evidence that A.F.A. blends into any decorative scheme. It is equally applicable to existing buildings as above or to the hundreds of new offices, factories and shops going up all over Britain.

The flush-fitting detectors are quite unobtrusive—yet if fire breaks out they call the Brigade at once to the exact location. May we send full particulars?



*Photograph by kind permission of
Royal Exchange Assurance and The
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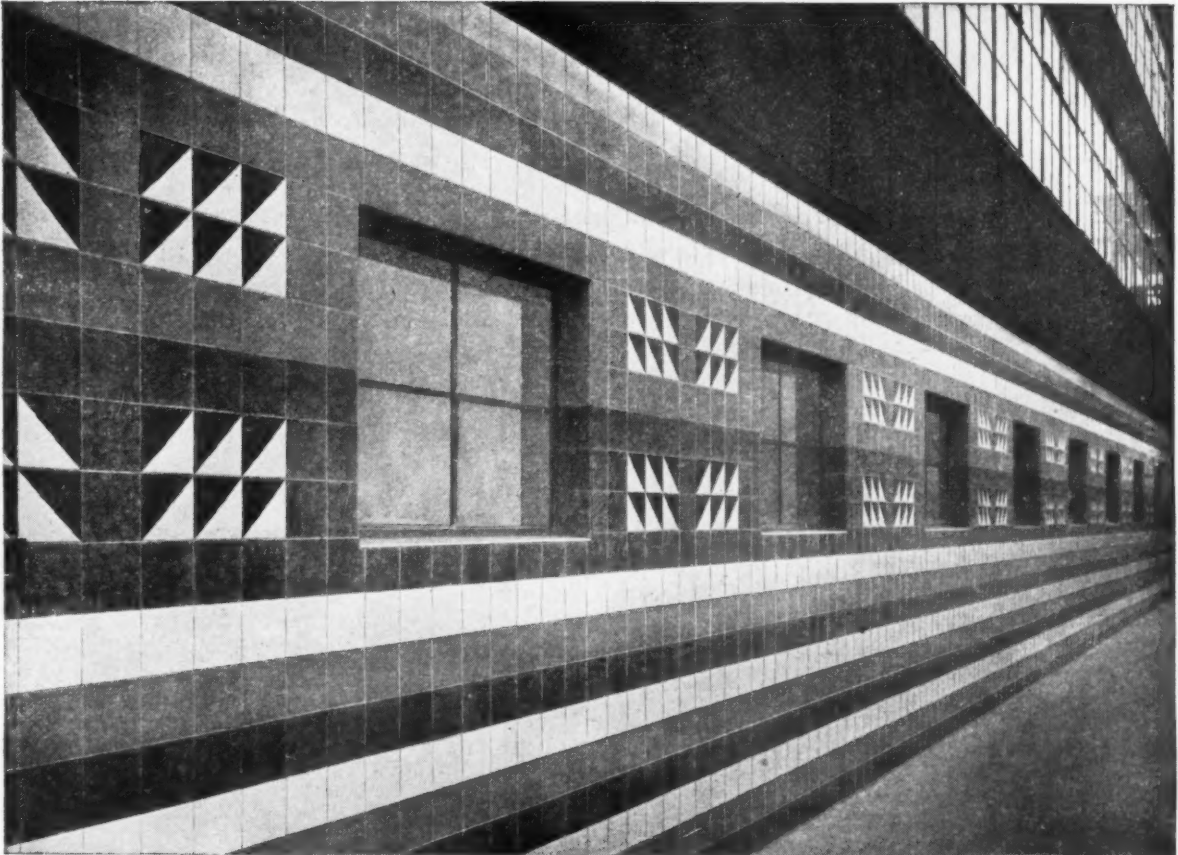
ASSOCIATED FIRE ALARMS LIMITED
CLAREMONT ROAD, WALTHAMSTOW, LONDON, E.17
SERVICE IN ALL MAIN CITIES

TAS/AF.62



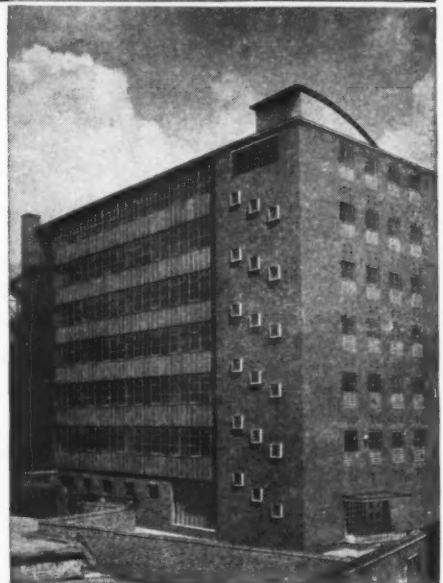
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18/20 Crucifix Lane, S.E.1. Architect: Edward H. Eames, A.R.I.B.A.

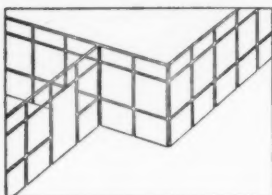
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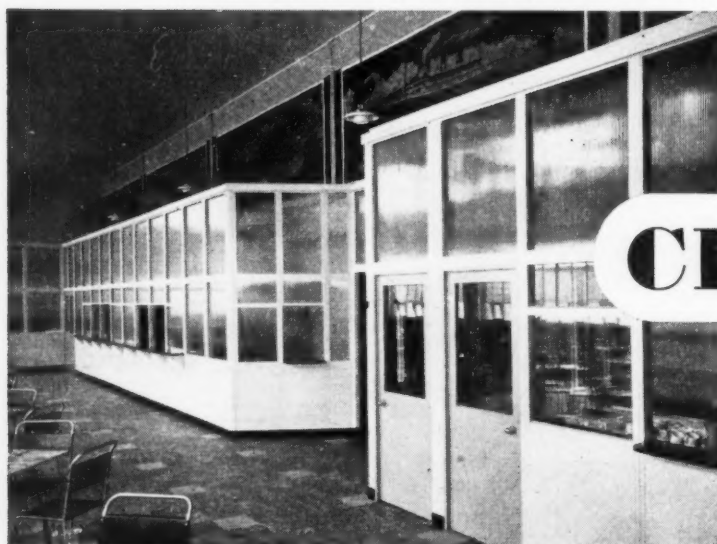
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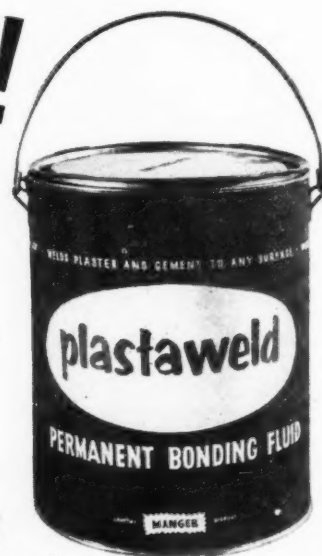
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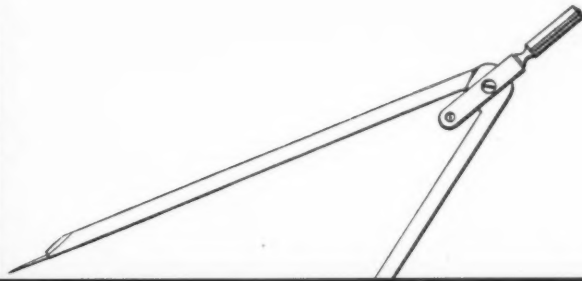
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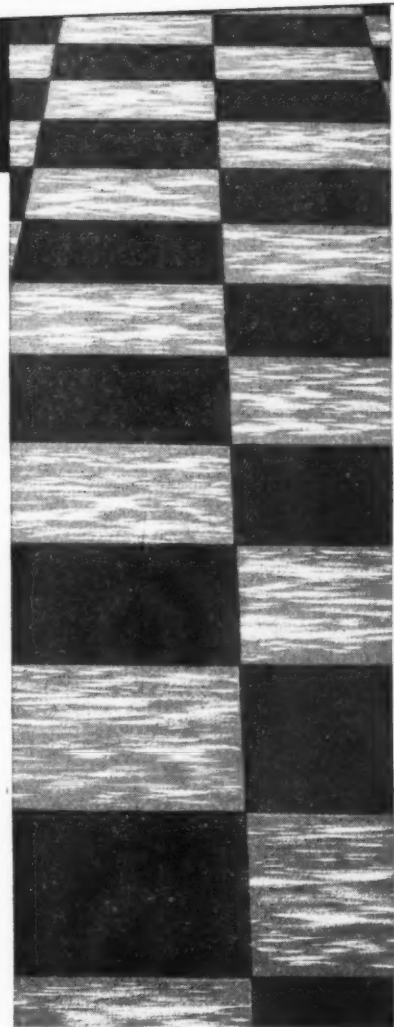
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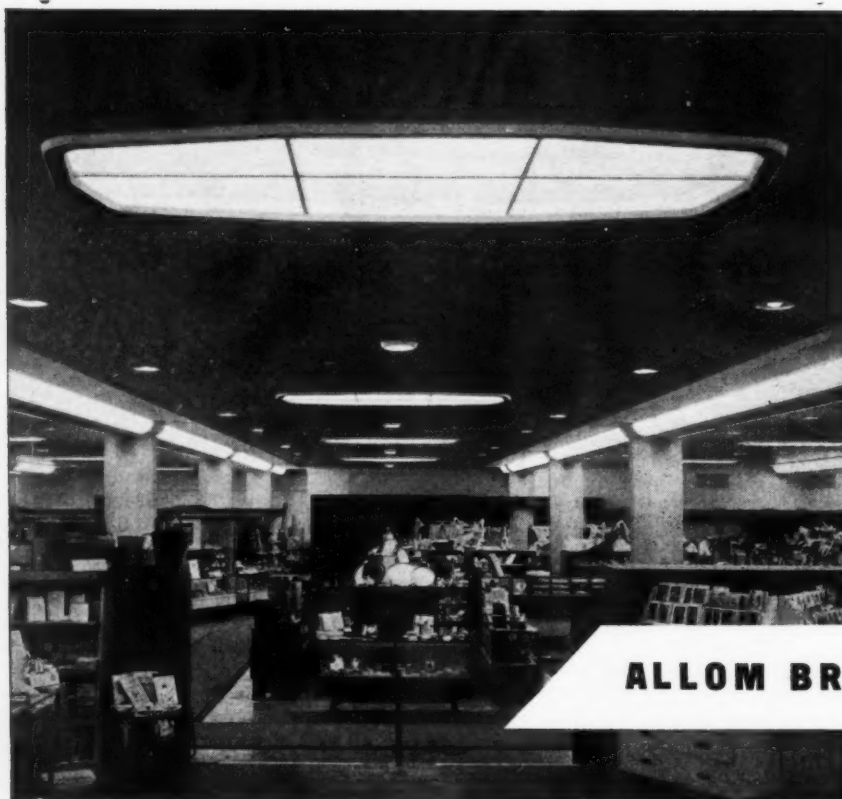
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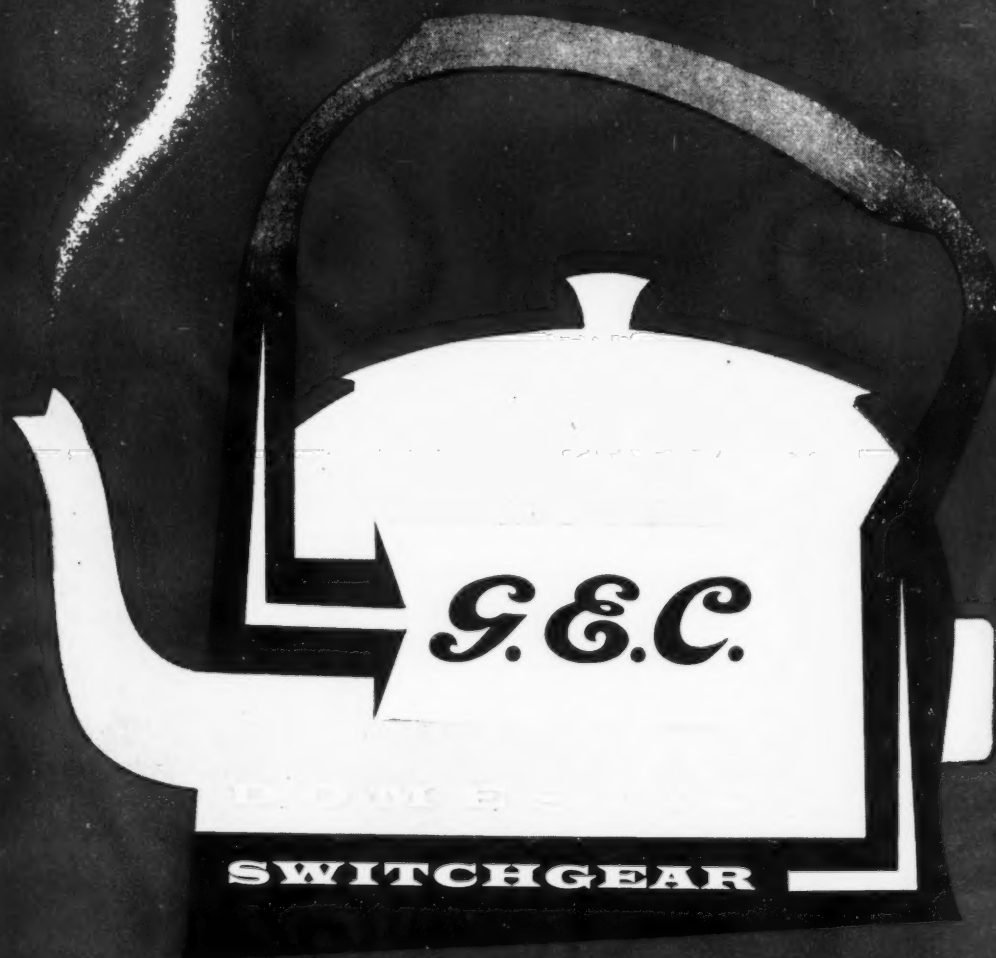
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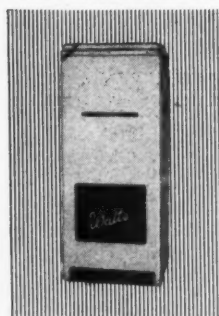
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	2,000 MW	10-15,000 MW
20,000 MW	33-38,000 MW	45-50,000 MW

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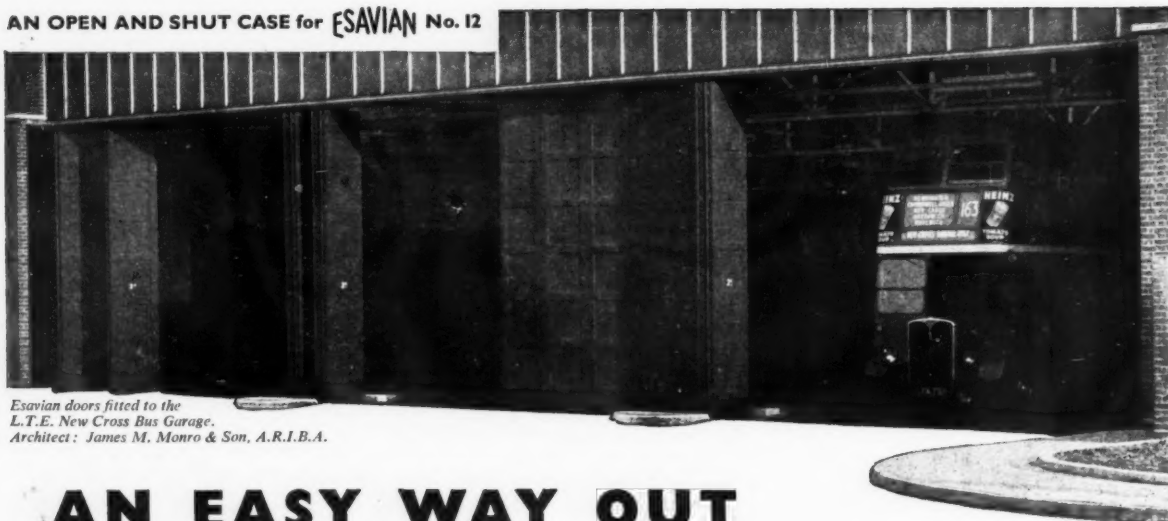
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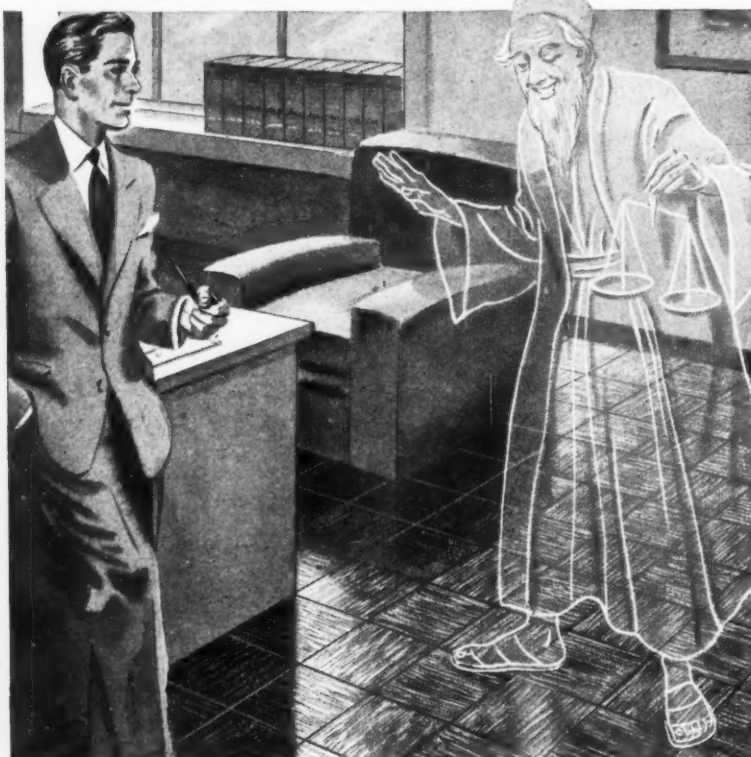
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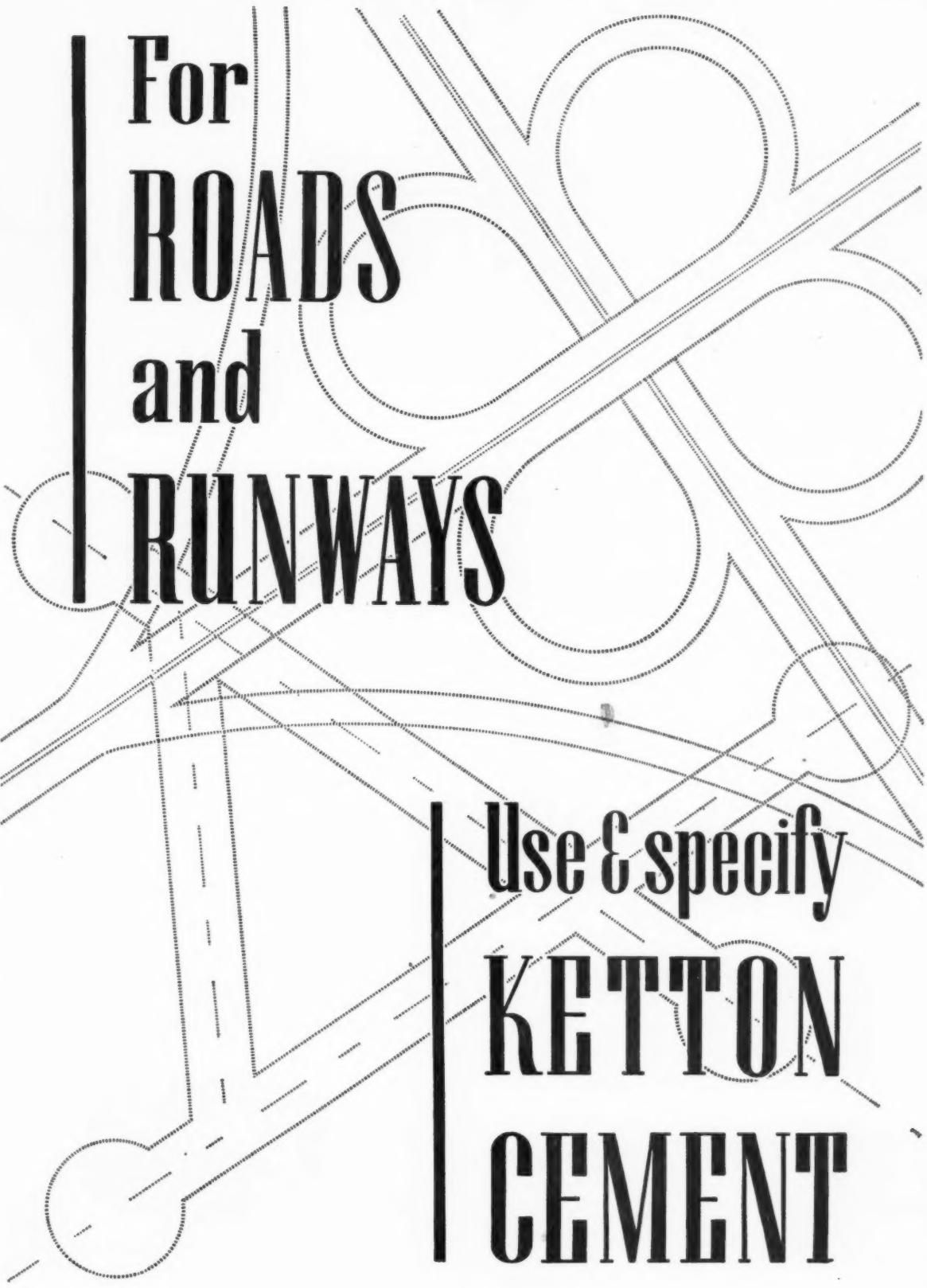
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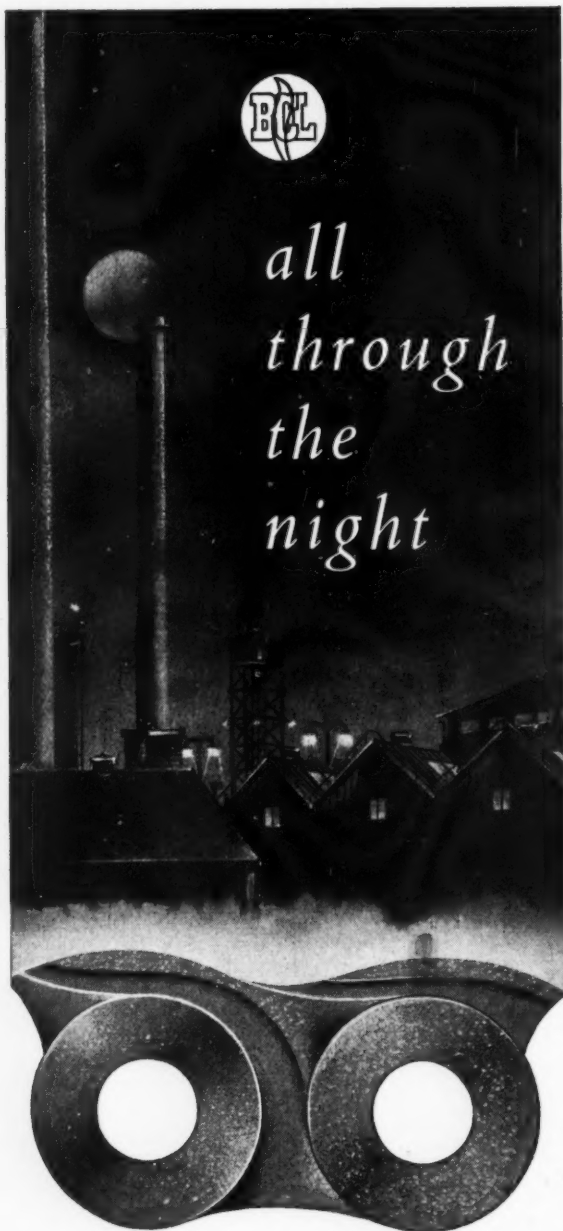
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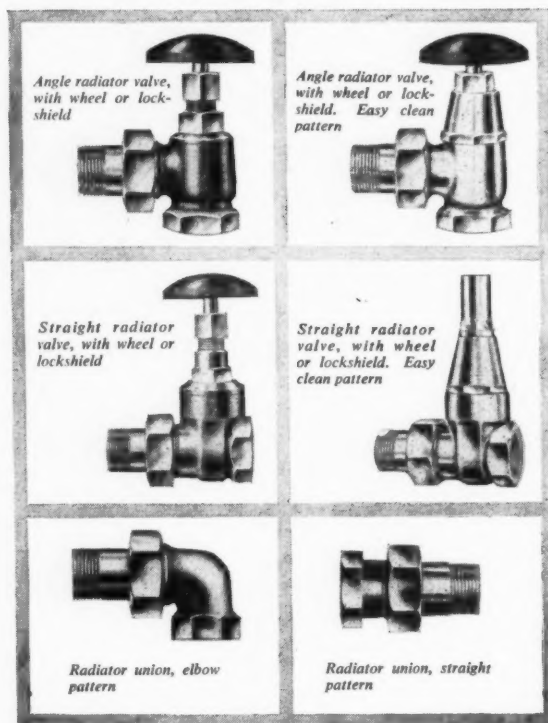
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D Ball valve to BSS.1212: interchangeable seatings.

E Overflow union: provision for interchange with D.

F Cold water feed to heating chamber.

G Vent or expansion pipe.

H Hot water delivery pipe.

I Immersion heater: removable heating core.

K Removable bottom plate.

L Union connection for hot water supply piping.

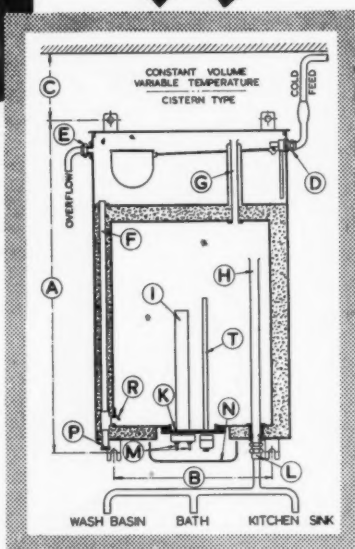
M Main terminals for supply cable.

N Removable cover: access to all electrical connections.

P Drain fitting.

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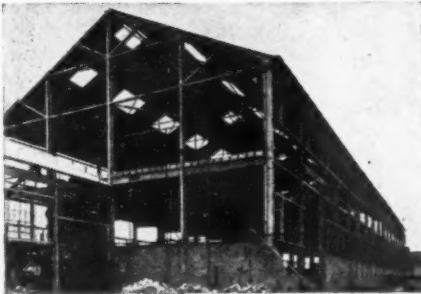
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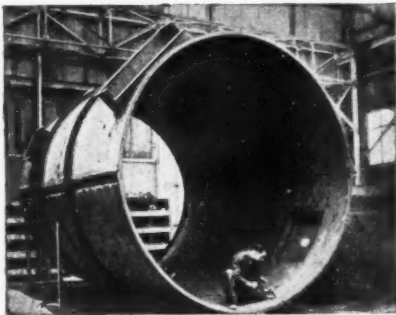
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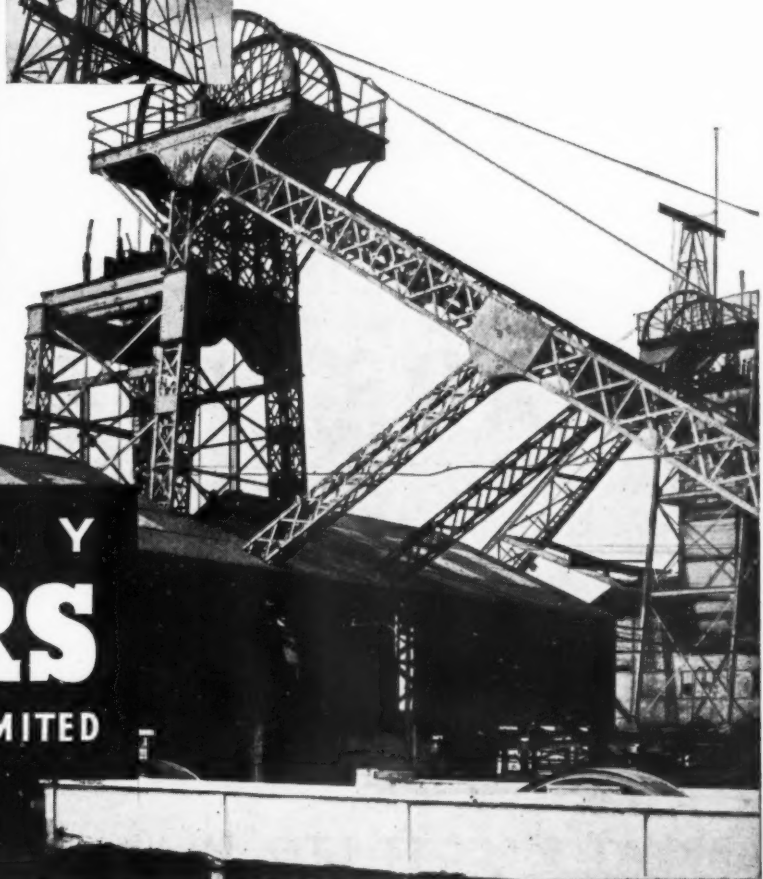
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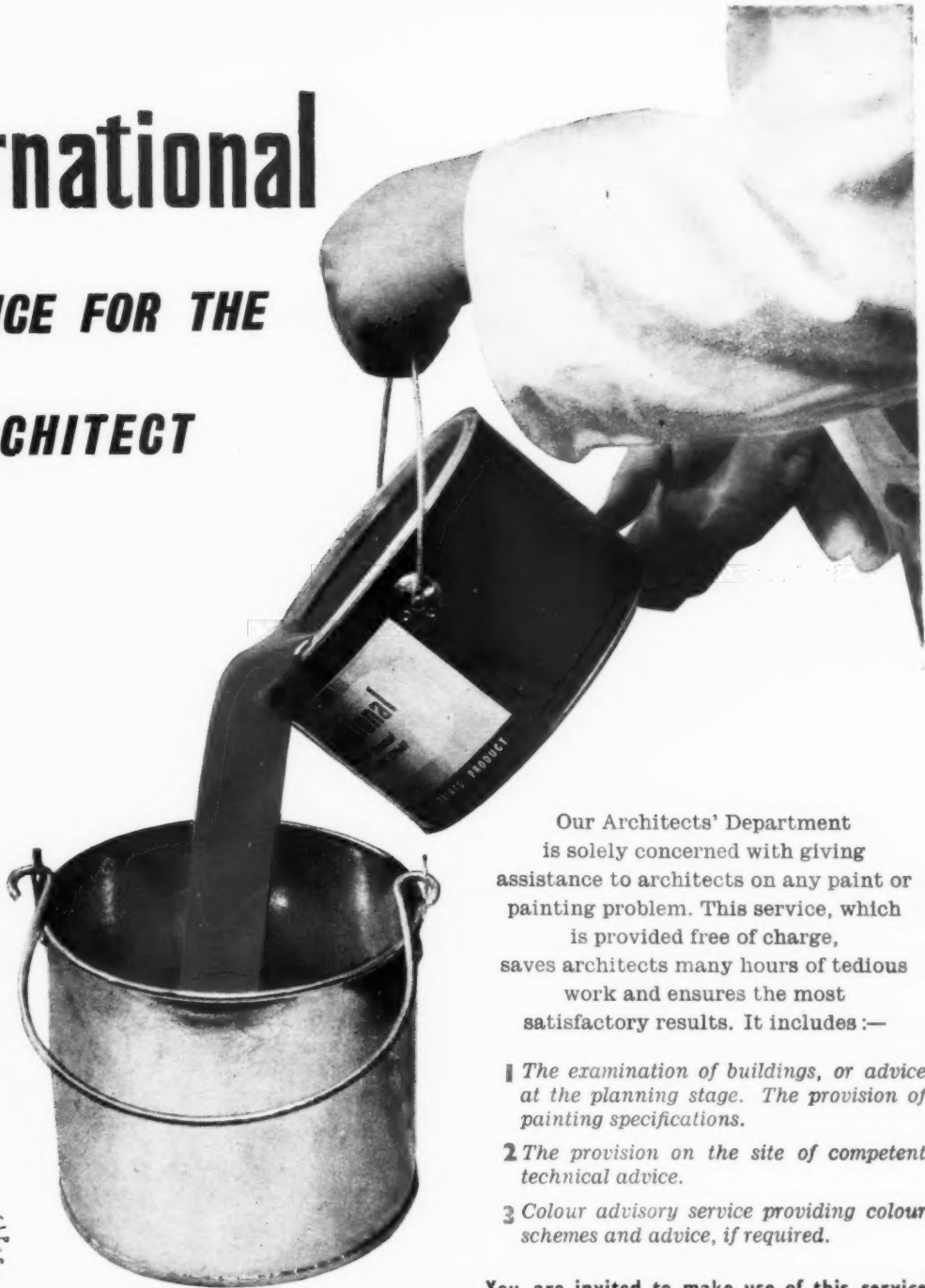


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AMERICANS IN BRITAIN

There has been a lot of coming and going by eminent American architects in London recently. The reason for these brief, if unseasonable, visits has been wrapped in a quite ridiculous cloak of secrecy, made even sillier by the fact that so many people know what it is all about anyhow—though the American State Department have so far withheld any official announcement. The Americans intend to rebuild the west side of Grosvenor Square as a new chancellery. For this job eight well-known modern American architects have been selected: J. L. Sert, Hugh Stubbins, Edward Stone, William Wurster, Ernest Kump, Eero Saarinen and Minora Yamasaki. And each has been

asked to visit the site and to submit designs by the end of January.

As readers of the JOURNAL are well aware, the US State Department has a most enlightened building policy and is one of the leading patrons of that type of architecture which has so long weathered the successive labels of "Bolshevistic, Capitalist, Unamerican, Bourgeois, international, etc.," to become a recognized style of this mid-century. Much of the credit for this enlightenment must go to Pietro Belluschi, Dean of the School of Architecture, MIT, and now retired from one of the most successful practices on the west coast. It is he, who, with others, advises the State Department on the appointment of architects. But someone even higher must surely be given the credit for appointing Belluschi and backing his choice. Up to date a number of top-rate buildings have been built all over the world, from Copenhagen to Hong Kong and Tokyo. The money used for these buildings consists of former US loans granted to various countries. Any political and Press campaigns against extravagance are thus discreetly avoided. One dare hardly contemplate what the Foreign Office would have to face in a similar situation (if it ever got round to commissioning a modern embassy) from the Beaverbrook Press.

The interesting thing about the Grosvenor Square chancellery is that this is the first time a competition has been held for such a building. All those invited to compete have previously done buildings for the State Department. The brief given them, ASTRAGAL is told, is precise and thorough. Rumour has it

that the reason for secrecy is merely to avoid publicity which might embarrass the Ambassador with enquiries about something which is not yet under his control. Whether or not that is so, ASTRAGAL feels it is important to say something about it, if only to encourage the competitors and assessors not to be too polite. There is always a fear that Americans in London will lean over backwards—witness the Time-Life building—to avoid offending, and will thus fall flat on their backs in the primrose path of utter mediocrity—a path so well trodden in present-day London.

The west side is distinctly separate from the rest of Grosvenor Square: it would be the better for being quite different. And an expensive, well-built modern building would give more lift to architecture in England than anything since Nash's Carlton House Terrace.

POLAR BARR

ASTRAGAL is glad to see that the country is exporting architectural brains, as well as importing them. The British Columbia Lumber Manufacturers' Association have invited the LCC to look at Canadian methods of building timber framed houses, and the LCC have responded by sending AJ Guest Editor, A. W. Cleeve Barr, their senior architect in research and development. He flew over last Friday, and will visit Ottawa and Vancouver (where most of the lumber comes from) to talk to builders, architects and timber—sorry *lumber*—manufacturers. He will return, on Christmas eve, via the North Pole.

The kind of houses he will look at, to see if the LCC can make use of the

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method, are built of timber studding with an external brick cladding, giving an exceptionally low "U" value. The work of Cleeve Barr and his research team is beginning to be well known. They are responsible for the LCC Picton Street housing scheme in Camberwell (see AJ for November 10) in which architects, engineers (Ove Arup and Partners) and builders (John Laing and Son) co-operated from the start. They are also responsible for many detailed developments such as shunt flues, locks, door and window furniture, fire places and stoves, all aimed to give speedier erection and more efficient building.

MINERVA FOR MILNER

There is no accounting for the SIA. They decide to institute a medal—and there is a real need for some kind of free-standing honour in the world of design, something not in the gift of either Government or Industry—and they decide, with considerable justification, to award it to Milner Gray, whose wide-ranging activities in many fields of design make him an excellent choice for such an award.

*

But need they have over-cooked the citation to the extent of claiming that he pioneered "standards of design that are only accepted in Great Britain today because of his example." This seems an excellent way to lose friends and offend all the other pioneers of good design in England. And the medal itself is, to ASTRAGAL's eye, a disappointment both as design and as symbol. Visually, with the small Minerva-head floating in a sea of bronze loosely bordered with floral tributes, the medal seems open to all the objections which were thrown at the current low-denomination stamps when they first appeared. However, the design is the work of Professor Goodden, so it is probably only ASTRAGAL's blindness.

*

But why Minerva only? I know she is the symbol of the SIA, but why have they always opted for wisdom and the fine arts only, and never extended a welcoming hand to Vulcan (heavy industry) or Mercury (communications) who are surely just as apt to the SIA's activities.

LIBERATING DESIGNERS

Enough of carping. One cannot but praise the SIA in having Professor

Bronowski deliver its first Design Oration, thus enabling him to expand and continue the line of thought he opened up at the RIBA a few months back. Once again the theme was liberty—or rather, liberation through the use and possession of better equipment. Inevitably, therefore, he had some rough things to say about routine-functionalists, and any suggestion that material, technique and usage fixed the design of objects. He seemed a little optimistic, however, when he supposed that this "important but negative" idea had died out in the hearts and minds of his audience, but was far less certain that the idea of science as hostile to art had died away, and he twitted SIA for burning a scientist in effigy on Guy Fawkes night, which may seem like biting the hand that feeds, on Bronowski's part, but they surely had it coming to them.

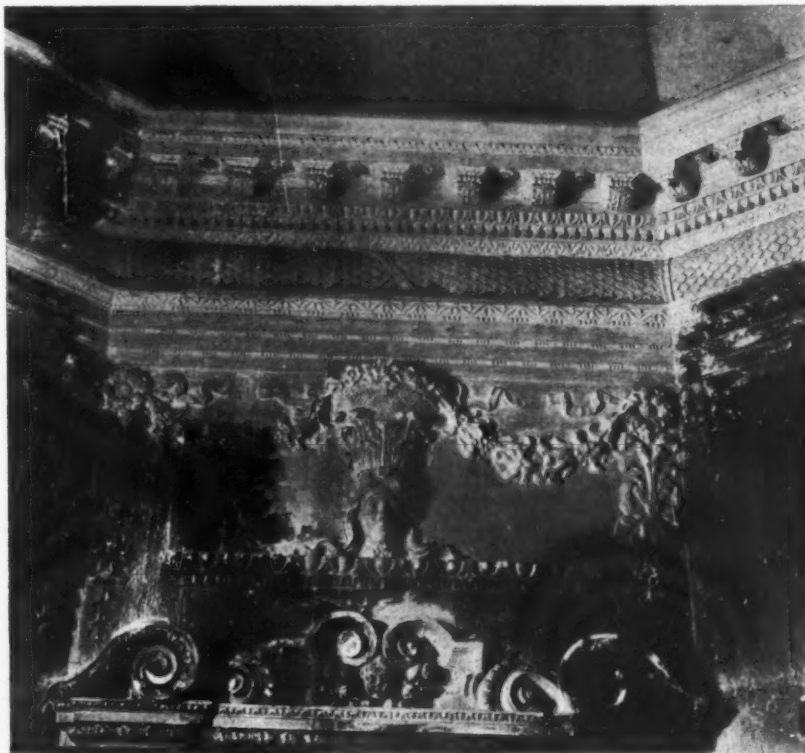
DULL BUT USEFUL

At the RIBA the Ministry of Works are giving, in an exhibition, an account of its stewardship of our heritage of decaying buildings. ASTRAGAL, who found the exhibition as an exhibition rather dull, was impressed by the information given, and, of course, by the work done. The subtitling of the

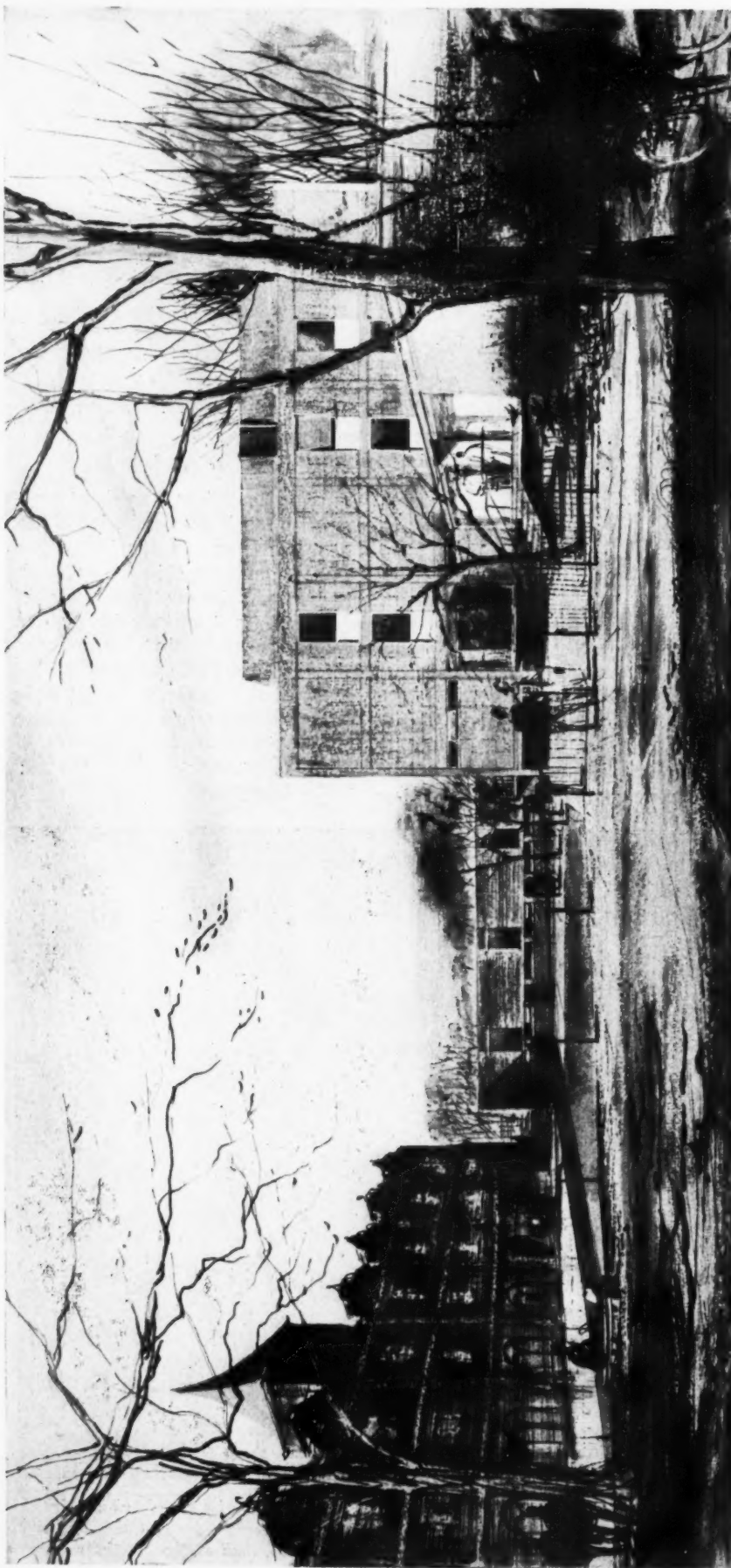


The SIA medal, designed by Professor R. Y. Goodden, which has been awarded to Milner Gray.

exhibition mentions "specialist techniques" and it was comforting to find that MOW are not shy of using a gravity-grouting machine on the rubble walls of Kenilworth Castle or steel corseting (as temporary shores—not embellishment) on the Cow Tower at Norwich; and that they have not felt it unethical to pull the leaning walls of Furness Abbey together. They have still, however, to face the issue of whether they can conscientiously protect masonry with silicones.



This photograph, from the MOW's exhibition on the preservation of old buildings, at the RIBA, shows the repaired plaster work in the small octagon room at Chiswick House. Before the restoration there was nothing but a bare brick wall on this side of the room.



The Holland House Scheme Answers Its Critics

Here, at last, is the scheme for a Holland House youth hostel, by Sir Hugh Casson and Neville Conder, which has caused so much controversy among people and organizations who knew nothing of its details. As can be seen, the architects have designed the extension in such a way as to silence critics who felt that any new building would be a visual affront to the old, and the even more noisy critics who were anxious that trees should be spared. They have related the existing east wing and a loosely-linked group of buildings (a 2-storey dormitory block, a 1-storey dining and kitchen block and a "34"-storey dormitory and entrance block) to a formally-defined courtyard in a way that keeps the old building inviolate and provides a graceful transition from old to new. The bricks used in the new structures will closely match those of the exist-

ing wing. The low-level brick architecture, in the words of the architects, continues the basic architectural character of the site on the west side of Holland House—an architecture of orangeries, high brick walls and terraced levels with retaining walls. The tall block, which will form a contrast to the east wing, will be faced in artificial stone, fairly rough in texture, with rubbed joints. The frame will be faced with a smooth rubbed finish of a slightly lighter tone of the same material. Joints between panel and frame will be more clearly defined than those between individual stones. This scheme, which has now been approved by the LCC, though Kensington Council are still objecting to it, will be built by the Youth Hostels Association. It will be more fully illustrated in a later issue.

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THE REAL EIGHTEENTH CENTURY

As far as its historical exhibitions are concerned, it seems that the RA can do no wrong this season, for it has followed, and partnered, the magnificent Portuguese show with an exhibition epitomizing "English Taste in the Eighteenth Century" in a manner which seems genuinely original, perceptive, scholarly and—one looks for the exact word—degustatory. ASTRAGAL has a strong suspicion that the team which selected, collected and displayed this exhibition must really have smacked their lips over some of the exhibits.

However, you don't have to be a trained connoisseur to get the flavour—or rather, the flavours—of this exhibition, for it emphasizes the diversity of eighteenth century taste in furnishing and art, by isolating such tendencies as Gothick and Chinoiserie, giving them rooms to themselves and treating them, not as wicked deviations from classical norms, but as constituent aspects of the period, and giving them emphasis equal to that on Baroque, Rococo and Neo-Classical. The last-named will probably appeal most to architects. Housed in the Lecture Room, the exhibition offers superb Adam and Adamitic furniture, wall-panels by Athenian Stuart, one of those grand carpets from Syon House and so forth. But don't get stuck in there; you'll find some real eye-openers in the other rooms, particularly the Gothick.

There is an ironical footnote to all this in that the whole thing was presumably laid on as a benefit for the PRA, either for his retirement or, as it turns out, his re-election. However, those, like ASTRAGAL, who have become weary of his Churchill-and-soda rhetoric about the Age of Taste, will not fail to notice that this exhibition, which is the work of deep-searching and far-faring men, quietly makes a mockery of his idealized picture of an age of secure and universal good taste, and presents us instead with a view of an age when fashions changed at the drop of an aristocratic hint, or the discovery of a new ruin; when to be "old hat" was just as much of a social disaster as it is in Coffee-bar circles today. This seems to be a much more credible picture of the eighteenth century than the view through port-wine coloured glasses normally offered from the RA.

ASTRAGAL

The Editors

CLEAN QUIET AIR

IN the last hundred years this country has endeavoured to provide a main water supply to every house. It would seem, to most of us, the minimum requirement of civilized living. Even so, about one million houses are without a piped supply. Today, the nation is beginning to campaign for two further essential conditions for reasonable living: clean air and quiet.

Sir Hugh Beaver, speaking to students of Estate Management at London University on December 1, outlined arguments for preventing atmospheric pollution which are now slowly becoming familiar. In the spheres connected with architectural practice—at least in part—(painting and decorating, the cleaning and depreciation of building other than housing, and the corrosion of metals) air pollution is costing the country £75m. a year. This is a considerable proportion of the total conservative estimate of £250m. a year as the direct and indirect (but excluding health) costs to the nation of air pollution. As regards health, the death rate from bronchitis, for instance, which is but one of the respiratory diseases affected by air pollution, is eight times as high under Britain's best conditions as under Scandinavia's worst (taking 1952 figures). For the architect, and the planner, the lesson to be drawn is to ensure maximum efficiency in all fuel-burning equipment and to press for polluting industries to be removed to the lee of residential areas. The architectural use of colour, for example, is only justifiable when atmospheric pollution does not render maintenance costs exorbitant.

Emphasis to the nation's second essential—quiet—was given by Hope Bagenal, in the Alfred Bosson lecture titled "Planning Against Noise" which he delivered to the RSA last week. It is hoped to publish extracts from this paper shortly, but, amongst Mr. Bagenal's many points two were particularly pertinent to the architect. In industrial layouts for noisy factories, or for aerodromes, buildings should be disposed so as to act as sound barriers between the noise source and neighbouring offices or houses. Architects who are familiar with the reversal of the old social tradition of office planning in central areas which results in corridors, cloakrooms and kitchens being placed on the street front, and therefore facing traffic noise, and boardrooms and committee rooms the back, may not be so familiar with this further requirement which, in addition to circulation and composition, should affect the layout of their buildings.

Mr. Bagenal's second point was that "air-to-ground" noise was more dangerous and direct in its assault than "ground-to-ground" noise. It comes down on to roofs, into courts, and enfilades streets. Therefore, in the future the roof light will no longer protect law courts and council chambers from major noise. He suggests that roofs will have "to take on the mass equivalent of walls."

At a time when construction is tending to lighten, to ensure

economy of erection time and materials, one wonders which will prove more expensive to the nation: to build and plan extravagantly to avoid trouble from noise, or to tackle more effectively the causes of noise nuisance at source. In any event, the source of noise, from the internal combustion engine, from three-shift factory working, and so on, is going to get very much greater, and national health and efficiency will suffer as much from too much noise as from polluted air.

LETTERS

Laurence J. Holloway,

President, L.M.B.A.

R. Towning Hill, A.R.I.B.A.

Michael Hitchings and

Frederick Mark

Building Education: A Reply from the LMBA President

SIR,—I was gratified to see the leading article in your JOURNAL of November 24, dealing with the establishment of a Board of Administration by the LMBA to administer their scheme for articulated pupils and indentured students. I am sure my fellow-builders appreciate the interest you have taken in this matter.

There are five comments I would like to make:—

1. Associateship of the Institute of Builders by examination is recognized by the Ministry of Education as of graduate status, so this is not merely a matter of assertion by my Association.

2. It is well known that a number of employers already pay the costs of training for their pupils and students but at the moment the Board has not sufficient information to know how general is this practice. There is no doubt that as the scheme develops, the Board will in due time be in a position to make firm recommendations both on this point and on the question of remuneration during the training period.

3. The setting up of the scheme and the registration of employers, pupils and students has been done on the principle that the young men should be industry-based, thus ensuring their employment and progressive training under "sandwich" courses and during vacations.

4. With the help of our friends in the technical colleges and schools the opportunities offered under this scheme to public and grammar school boys are very considerable and will increase with time.

5. Promotion to supervisory and managerial grades will still be possible and most desirable from the craft level, although clearly that route may be a long and difficult one.

LAURENCE J. HOLLOWAY.

London.

[We are glad to publish the above letter from the President of the LMBA. Our point was that the LMBA's scheme seemed hardly bold enough to deal with the really immense need for the higher calibre supervisor. The need is for the level of grammar school boy who is capable of taking a civil or mechanical engineering degree. We do not dispute that the AIOB is equivalent to such a degree, but it cannot offer the same distinction or recognized position in society,

which, rightly or wrongly, the sons and parents look for. Thus, we felt that opportunities offered by the builders should have some compensating feature—for example, free or assisted school training. We are glad to note from Mr. Holloway's letter that a number of employers do offer this, doubtless because they realize the value of the investment, and perhaps because they would not otherwise get suitable boys.—THE EDITORS.]

The Winners' Point of View

SIR,—Whilst for obvious reasons we do not wish to frame an elaborate case for the defence, we feel that we should state certain facts which may give some lead on points of general, as opposed to particular, interest which have been raised in your columns (December 1 and 8). The design in question has, in fact, been produced in collaboration with a particular client (a Professional Man) and has received planning and bye-law approval. Many of the criticisms made against the lighting and terracing would have been answered had the report been available for all to read in the technical press.

It is also perhaps worth mentioning that during the course of the last few years we have built a number of houses employing a similar technique and mode of expression. In each case it has been shown that many who originally could not understand and were certainly not enthusiastic about the schemes (these people included the planning authorities and the contractors who eventually built them), have in the end become interested and expressed their excitement, even to the point of suggesting that more houses of a similar nature should be built!

R. TOWNING HILL, MICHAEL HITCHINGS
AND FREDERICK MARK.

Bristol.

NEWS

MODULAR

Meeting at RSA

At their annual general meeting on December 5, the Technical Committee of the Modular Society held an open discussion on four problems—Thicknesses, Jointing, Tolerances and Costs. These had been the care respectively of A. M. Gear, A. L. Osborne, R. Sefton Jenkins and S. F. Mill—members of the technical committee under the chairmanship of W. A. Balmain.

The main burden of the discussion turned upon the tolerance problem, but first there was an exchange on general points. Mr. Balmain expressed his pleasure at the cordiality and closeness of relations between the Society, BRS and BSI, but explained his personal view that the aspect upon which BRS/BSI were concentrating so far left untouched many of the problems that had to

be solved if modular co-ordination were to become a reality.

This was contested from the floor by R. T. Walters who said that William Allen and Bruce Martin are working towards a broader basis. He asked whether the Society's 4 in. module, which presumably allowed a large number of component sizes, was compatible with the BRS/BSI Fibonacci-based number pattern, which limits component sizes progressively as the sizes get larger. Mr. Balmain, in reply, gave his opinion that however theoretically sound the number pattern might prove to be, it was too complex, and a simple system would win the day with manufacturers. Mark Hartland Thomas said that components published in the Modular catalogue did not show an undue number of 4 in. multiples and that the influence of BRS/BSI work and natural selection of economics will keep the number of sizes down. He suggested that the thickness and jointing problem will demand for its solution a number of sizes below the 4 in. to give the "small change" necessary for the "shillings" of component sizes and the "pounds" of the planning grid. The manufacturer will thus need to produce two or three sizes above and below his "standard" dimension. W. A. Balmain (who is a director of Seco Ltd.) disagreed, suggesting that such a multiplication of size would prejudice manufacturing economies.

Then followed the discussion on jointing and tolerances. A. L. Osborne spoke of the cutting and drilling inaccuracies, thermal movement and the wearing of jigs which involve variation in the finished sizes of components. He urged the need for a statistical analysis of actual sizes to show where the burden of tolerance lies, whether on the plus or the minus side. R. Sefton Jenkins supported this, referred to the "frightening amount" that tolerances can accumulate over an assembly of components (which drew murmurs of assent from manufacturer members) and affirmed the possibility of working to 1/64th in. in steelwork. (This drew a protest from a speaker who had found rolled sections to vary as much as 1/4 in.) He emphasized the difference between plus and minus tolerances, and the importance of specifying minus tolerances only—"we make sure our components are too short."

The need for statistical analyses of tolerances was mentioned by other speakers. After more discussion W. A. Balmain again criticized the BRS/BSI concentration on the Fibonacci number pattern. He said that although it might be of great theoretical interest "it is not of the slightest practical use because it is never going to be used."

NFBTE

Presidential Nominations

Nigel Hannen, a director of Holland and Hannen and Cubitts, Ltd., has been nominated by the Council of the NFBTE to be the Federation's president for 1956.

Other presidential nominations by the Council are:—senior vice-president, L. A. Walden; junior vice-presidents, C. P. Howells and T. V. Prosser.

N. PEVSNER

Lectures in Turkey and Greece

Professor Nikolaus Pevsner, Head of the Department of the History of Art, Birkbeck College, London University, is now lecturing on architectural subjects for the British Council in Greece, after a week of lecturing in Turkey.

His subjects are "Elizabethan Architecture," "Sir Christopher Wren" and "Recent trends in English Architecture."

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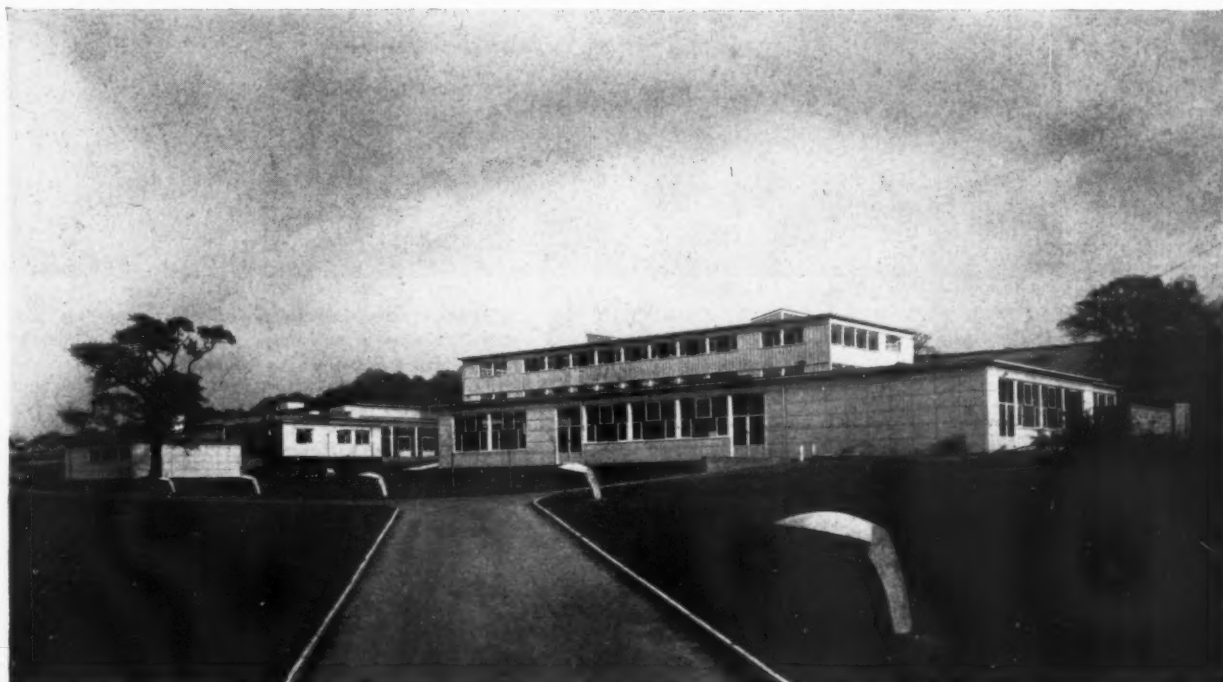
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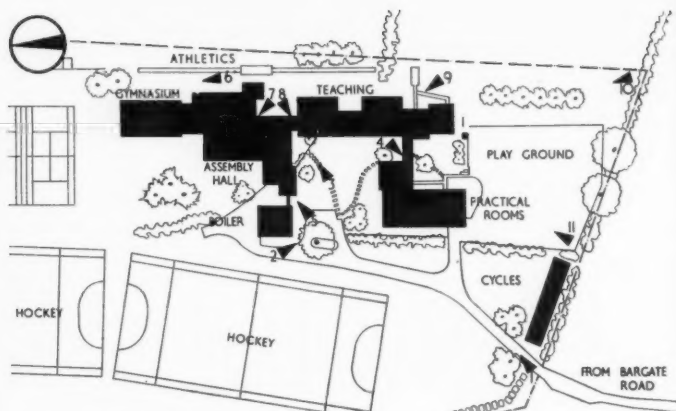
quantity surveyors, J. NESBIT and R. KING (MOE)

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The Belper Secondary Modern School for 450 boys and girls is another research project completed by the MOE Architects' and Building Branch. The project attempts to evaluate the potentialities of a new structural frame system, manufactured from cold-rolled sections of light gauge steel. The architects' problem was intensified by two educationalist research requirements, (a) a target of 70 sq. ft. per place with teaching areas well above the minimum and (b) a plan to be adaptable for the school to be run on a house or form basis. Assessment of any MOE school, as with any research project, is academic unless considered within the strict terms of reference which necessitated its building. Visual delight and exciting spatial qualities are the synthesis of plan form and structure, if the former are lacking, the value of the latter as complex units alone must not be disregarded. The general contractors were F. Troy & Co. Ltd.; for sub-contractors see page 824.

Viewpoint 1: the school from the south west.

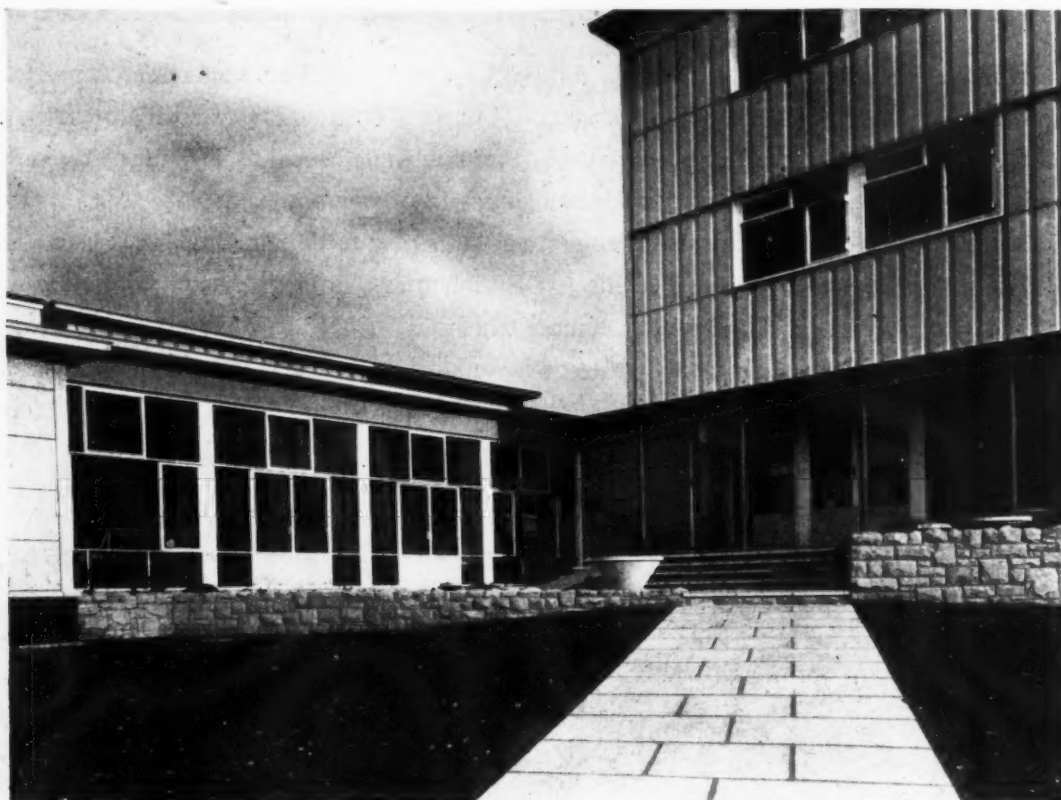




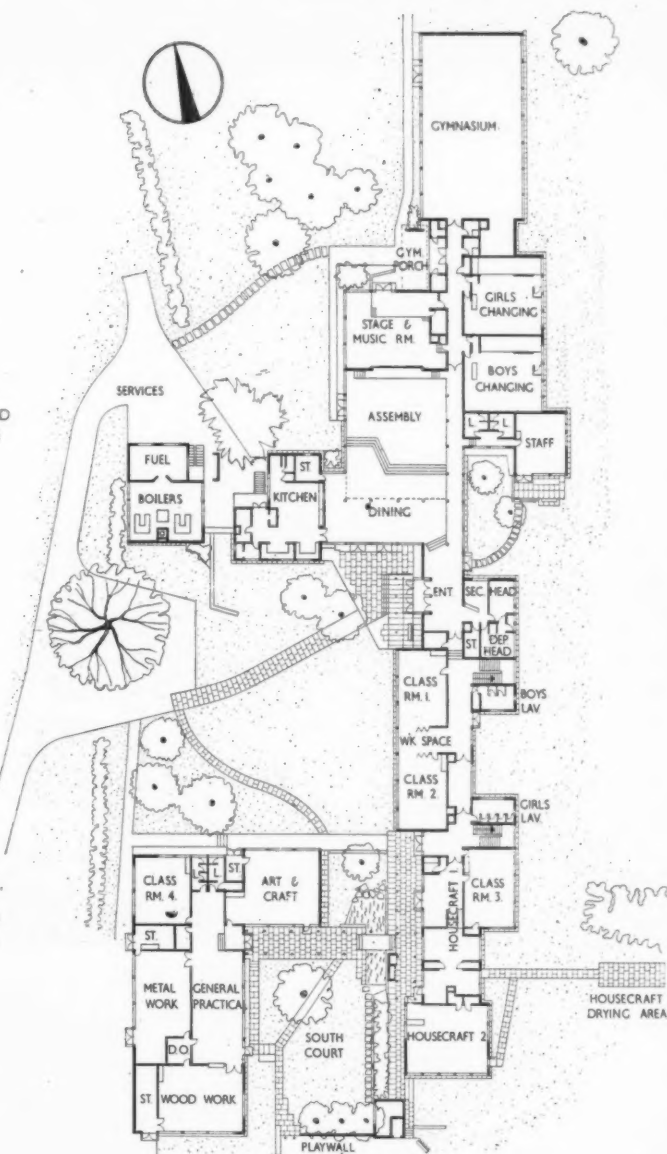
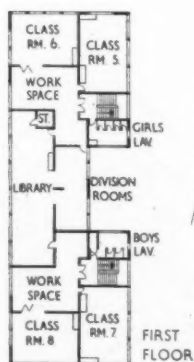
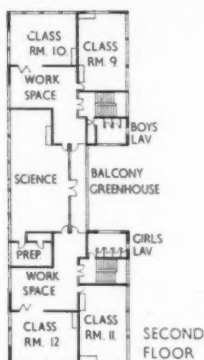
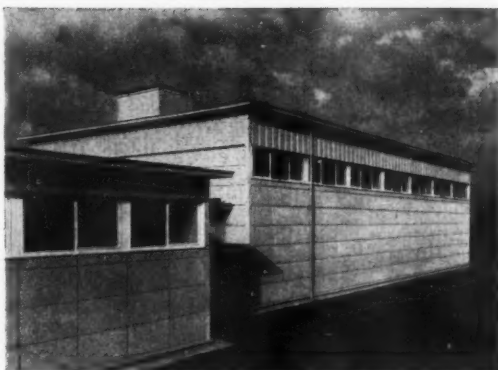
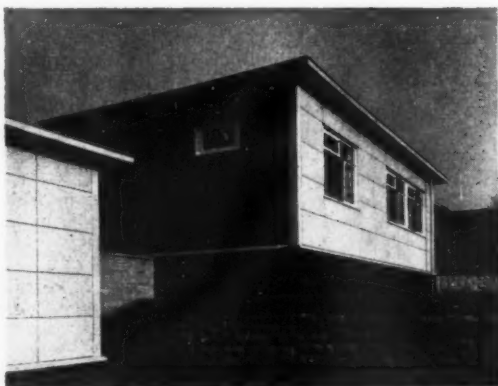
Key plan showing photographic viewpoints

Top: viewpoint 2. The main entrance courtyard is contained by the three-storey teaching block to the east, the practical rooms to the south and the assembly hall, kitchen and boiler

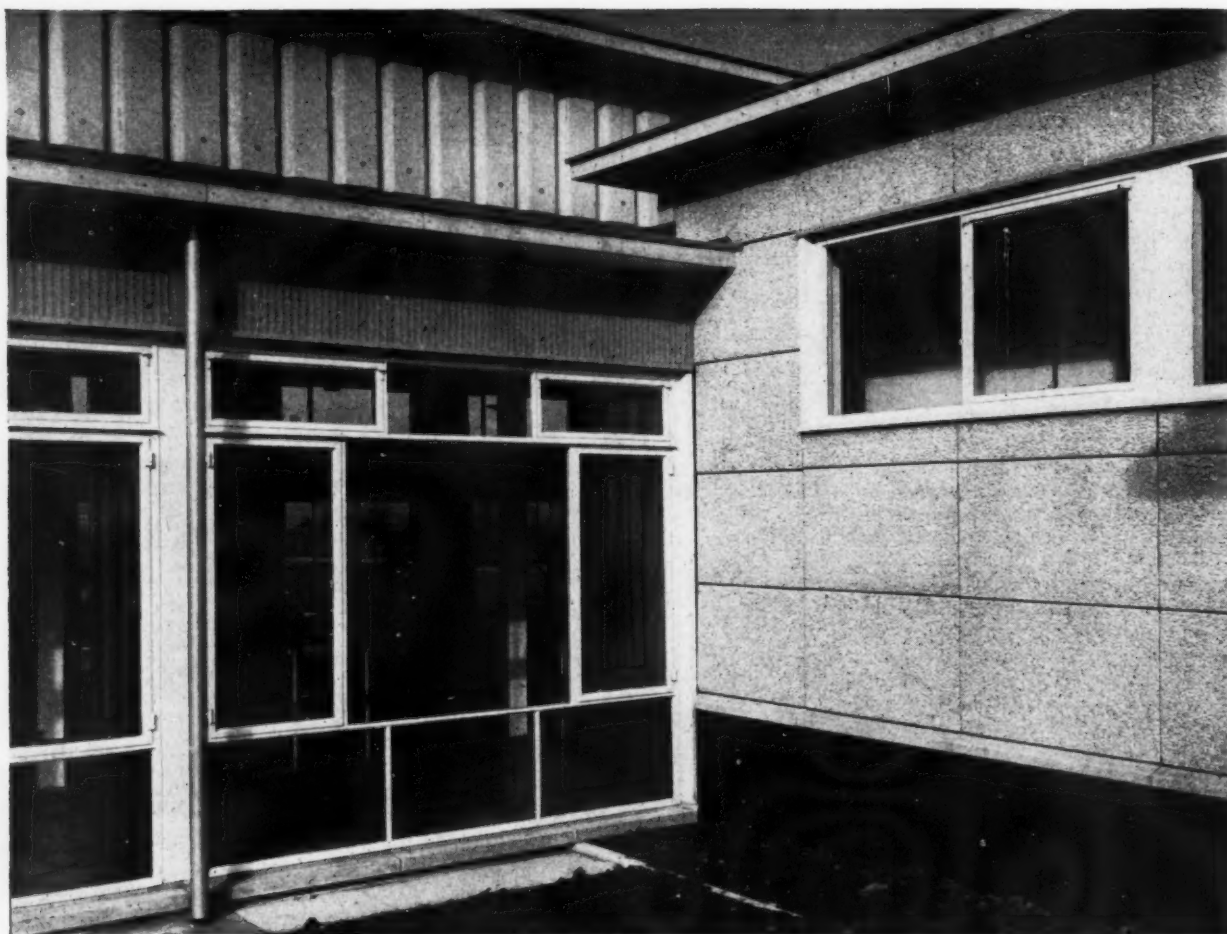
house to the north. Through the open side of this courtyard there are distant views to the west. The upper two storeys of the teaching block are clad with asbestos-cement sheeting.



This was cheaper than the ground-floor concrete-slab cladding. It was just as efficient as a weatherproofer and required fewer fixing rails. Whilst the school demonstrates the possibility of the use of asbestos-cement sheet cladding for buildings other than factories, the choice of this particular type, with its scale and strength of vertical joints, appears somewhat out of scale for a building of this size. Above: viewpoint 3. The main entrance to the school. The windows in the single-storey block are to the dining part of the assembly hall area. The square-snecked, rubble, retaining walls in the foreground are of local stone. Left: viewpoint 4. The practical block on the right is linked to the main school by a covered way. The far end of this area is closed by the brick play-wall to the south playground and in the court produced by this enclosure, where ground textures will be of great importance, a small biology pool will define the northern boundary.

Ground and upper floor plans [Scale: $\frac{1}{4}'' = 1' 0''$]

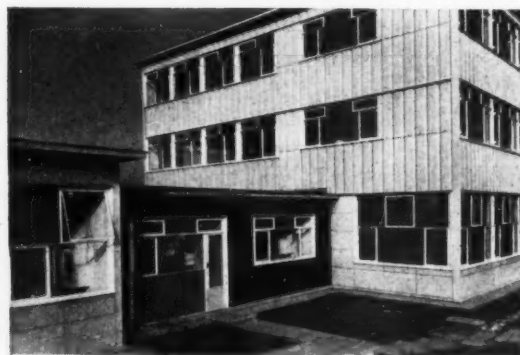
Viewpoint 5, above left: the kitchen and boiler house step down the contours on heavy, black podia. Pre-cast concrete cladding includes the wall slabs, corner pieces and plinth blocks. The straight run slabs are 2 ft. by 3 ft. 4 in. by 2 $\frac{1}{2}$ in. with an internal dished area 1 $\frac{1}{2}$ in. thick. Horizontal joints are weatherproofed with a $\frac{1}{4}$ in. wide strip of talc finished asbestos based felt and the vertical joints with a recessed, gun applied asbestos and bitumen based mastic. On some walls the concrete cladding has been painted dark green; this application follows no particular logic of either direction or plane. Viewpoint 6, left: the east wall of the gymnasium shows the high quality and consistency of the pre-cast cladding slabs. Weakness at the change of direction of a wall surface where the structure is completely enclosed is a re-occurrence of a familiar cladding problem. Awareness of this problem has resulted in a change of texture on the quoins pieces. Corners are, however, still a little indecisive, because the definition between the two textures is too slight. A more complete change of tonal value might have overcome this difficulty.



Viewpoint 7, above; windows to the high-level, open-sided corridor running through the assembly hall. The eaves are constructed in 2-in. woodwool slabs, supported on the flanges of sprocket pieces. The fascia is of $\frac{1}{4}$ -in. asbestos-cement sheet screwed to wood fixing blocks at 10 in. c/c. The soffit is of $\frac{1}{4}$ -in. asbestos-cement sheet. There is an extruded-

aluminium capping piece, over which the roofing-felt is dressed. Viewpoint 8, below left: junction of the single-storey assembly hall complex to the three-storey teaching block. Ceiling heights are maintained internally which necessitates the roof structure of the single-storey block standing above the ground/first floor string course, which is itself at ground floor ceiling level and which is necessary for weatherproofing and to delineate the cladding types. The classical logic of the heavily rusticated base is confused by the juxtaposition of cladding types in this visually unresolved junction. Viewpoint 9, below: from the south side, the junction of the

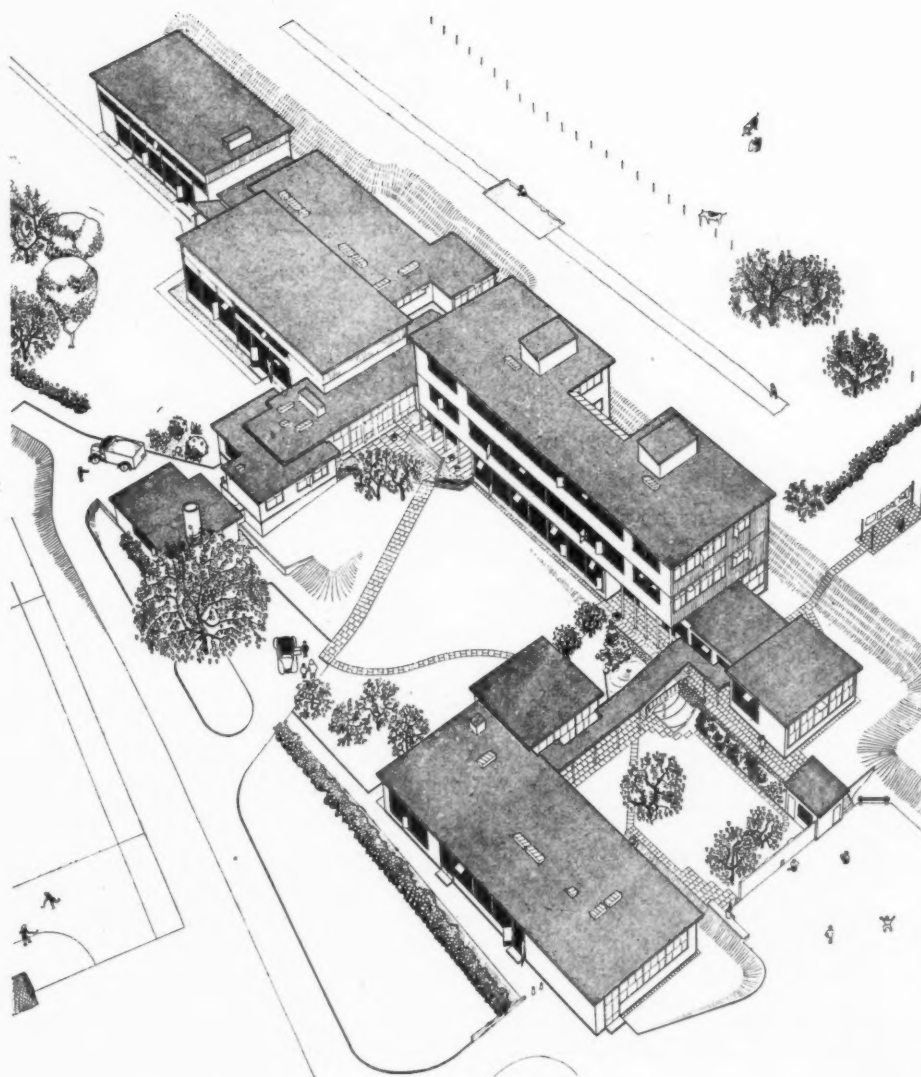
SECONDARY SCHOOL AT BELPER



housecraft rooms to the three-storey teaching block. Apart from the difficulty of the indeterminate eaves treatment this junction, when compared with that shown in viewpoint 7, is far happier. The pre-cast concrete plinth blocks rest directly upon the r.c. ground beams. Against these is a drip plinth of paving slabs, which is always used to separate the building from the ground.



Viewpoint 10, above: from the south-east corner of the site. All openings in the cladding are contained within pressed-metal sub-frames to maintain efficient weatherproofing to the stanchion, or to cover the profile of the concrete-cladding slab. Medium universal sections, hot-dip galvanized after manufacture, are used throughout, with side-opening casements. Viewpoint 11, left: the school from the south-west.



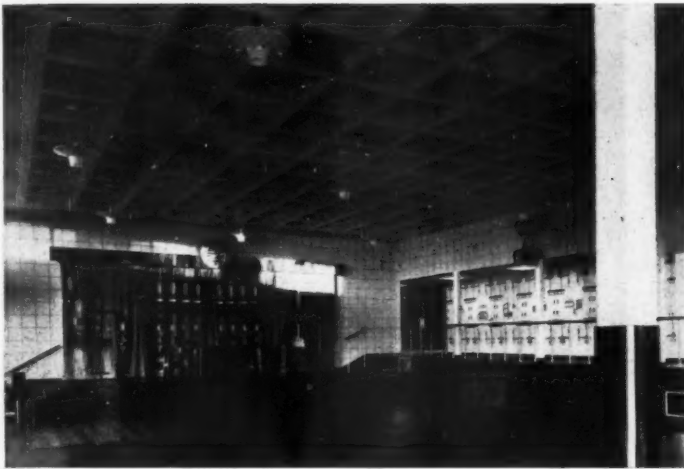
Axonometric aerial view [Scale: $\frac{1}{4}$ " = 1' 0"]



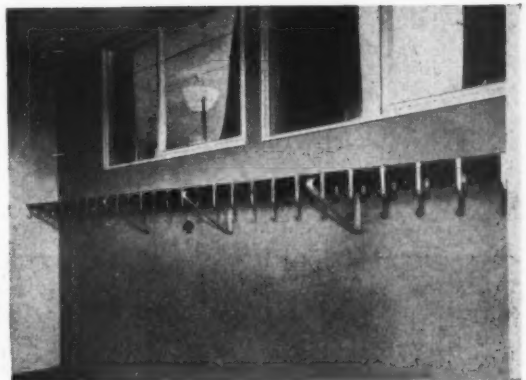
SECONDARY SCHOOL AT BELPER

Above: the staircases are an extremely neat follow-on to the general structure. String beams are cold-rolled steel box sections, factory welded, arriving on site with the ballusters already attached. String beams span from landing to landing and carry pre-cast vibrated concrete tread and riser units which are excellently finished. Risers are painted and treads are finished with Sheet p.v.c. and an aluminium nosing. Soffit of the concrete units is painted with white emulsion paint. Below: division rooms and library on the first floor are separated by curtains and the planning of the area as a free and open space is proving a great success. Because the architects considered that a high level of uniform artificial illumination was necessary in the library a great number of large fittings had to be used which, with an 8-ft. ceiling height, are distracting and fussy. Possibly a less uniform approach, with low intensity background lighting and bright local points, is more desirable in such informal areas. Right: the division rooms off the library.





Above: the assembly hall complex is used as a central social focus serving a variety of purposes including morning assembly, dining and simultaneous teaching in the music room and assembly hall. Curtains, partitions, changes in level and material are used to reduce the scale of the area to the perception of a child as well as their purely physical function of defining space. The area is visually open from the main entrance, it is constantly in use and there is access through it to the gymnasium and changing rooms. Formality has been consciously avoided. The ceiling to the assembly hall is of pre-cast fibrous plaster panels, 3 ft. 4 in. square, plain and perforated, suspended by softwood bearers wadded to the beams. Proscenium walls are acoustic tile and on the corridor wall there is a photo-mural. Stage curtains were specially designed and made by Gerald Holtom using an applique technique and depicting locally invented cotton spinning machinery. Top right: the area of the assembly hall used for dining is raised from the pit of the auditorium by steps, the pit therefore becoming an arena for communal activities which can be observed from three sides without imposing the usual auditorium-stage axis upon the audience. For a formal stage production this raised area becomes an extension of the auditorium. Behind the partly-drawn curtain is the servery hatch and on the extreme left is the main entrance and the school notice board. Centre picture above right: the



curtain in the hall can be drawn to give a more intimate atmosphere to the auditorium, when not used for dining, for the informal teaching for which it is normally used. Above: cloak spaces form part of each house unit of two classrooms, a work space and book lockers. The pegs, of bent aluminium alloy strap, are double banked and supported by hardwood slats carried on bent m.s. brackets plugged to the wall.



Above: formal teaching space on the first floor. Storage space is provided in cupboards and drawers below wall benching. There are six different types of units which were delivered to the site in required lengths and fixed direct to wall battens. Above right: the administrative core of the school is situated near the main entrance, and comprises head's room, assistant head's and medical room and the secretary who works behind the open enquiry desk seen in this photograph.





Above left: the art room is situated in the single-storey craft block, with access to the general practical room and also direct access to the intimate south courtyard so that work may be done out of doors in good weather. The ceiling height is 10 ft. The rear wall has a pin-up area and movable shelves up to 6 ft. 6 in. The floor finish is thermoplastic tile. Above right: to keep within the target figure of 70 sq. ft. per place,



circulation space is cut to a minimum, related rooms being grouped around entrances. In the light craft block access to all rooms is off a general practical room which can be seen through the glass screen wall of the woodwork room. Roof lights are of standard modular width and length and the concrete upstand is lined internally with fibrous plaster. Floor finish is thermoplastic tile.



It was requested that the end wall of the gymnasium should be brickwork to provide a large smooth wall surface for the practising of ball games. The ceiling to all single-storey buildings except the assembly hall is of 3 ft. 4 in. square perforated and plain plasterboard panels supported on aluminium tees clipped to beams. Wallbars against the window wall are hinged and only used when swung out at right angles to the glass.



Girls' changing room and kit store. Note the free communal type of storage instead of the more usual individual padlocked type of pigeon-hole locker. The hangers also give clothes a chance to air and dry, and require far less space than lockers.

CLIENT'S BRIEF: his stated requirements

A three-form entry Secondary Modern school without any particular educational bias, for 450 boys and girls from the two small industrial towns of Belper and Ripley and the surrounding country districts. The project was to be used to examine three educational ideas. The school was to be planned so that it could be run either on a

house basis, 5 houses of 90 pupils each, or on a form basis, 15 forms of 30 pupils each. The stage area was to be designed so that it could be used mainly as a music room. Some classrooms were to be closely associated with the practical rooms to give the opportunity of easily changing from one type of teaching to another. In 1952, when

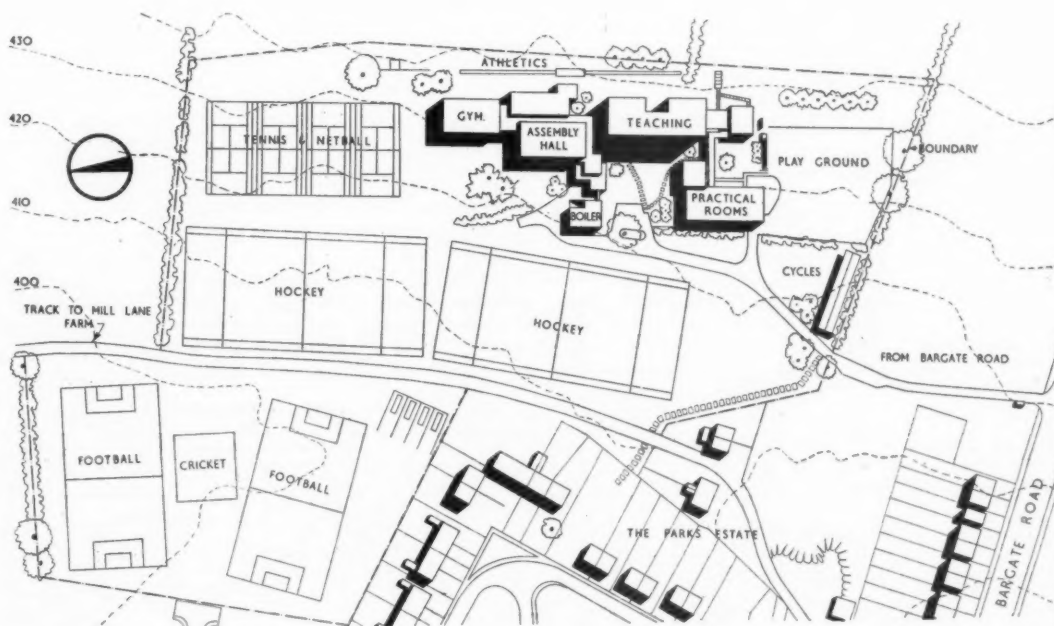
this school was planned, the average area for a three form school was 75 sq. ft. per place and of this circulation had been accounting for as much as 20 per cent. in some cases. The MOE team was given a target of 70 sq. ft. per place within which to provide an area of teaching space considerably above the permissible minimum.

SITE: topography, surroundings, access, planting

The site lies on the eastern slopes of the Derwent valley, above the small industrial town of Belper. It covers 13½ acres on the upper side of a new housing estate and from it there are extensive views to the west and north of the southern hills of the Peak district. It is 500 ft. above sea level and in an exposed position. The site has a slope of about 1 in 10 on the upper and steeper part,

where the school is built, and gradually flattens out towards the west. A farm road and public footpath runs across the lower part dividing the playing fields. Main access is from the Bargate Road which connects Belper to the nearby Derbyshire coalfields. There is pedestrian access from the nearby housing estate and from Belper, by farm path, to the north. Two of the four exist-

ing hedgerow oak trees on the site are now isolated and one has been used as a central focus to the entrance court. Existing hedgerows are retained as boundaries on the north and south sides, but fencing was needed on the east and west. Existing farm ditches have been cleaned and deepened and a considerable amount of new drairage was necessary.



Site plan

PLAN: general appreciation

To avoid expensive changes in floor levels due to the sloping site, it was decided that the main blocks should run parallel to the contours. This has influenced the final form of the school. On the northern side of the three-storey block, which contains the five "house units" is the assembly-hall/dining-room complex and the gymnasium with changing rooms, all single-

storey, with the kitchen and boiler house stepping down the slope to the west. On the south side of the main block is the group of housecraft rooms linked by a covered way to a separate single-storey block containing the practical rooms.

To maintain the target of 70 sq. ft. per place, circulation space has been cut to a minimum by

the grouping of associated rooms around entrances and staircases. On the upper floors the house units, two classrooms and cloak-, locker- and work-space, open directly off the staircases. Access to the housecraft rooms is through the teaching flat. Metalwork, woodwork and art rooms are grouped around a general practical room and access to them is through this room.

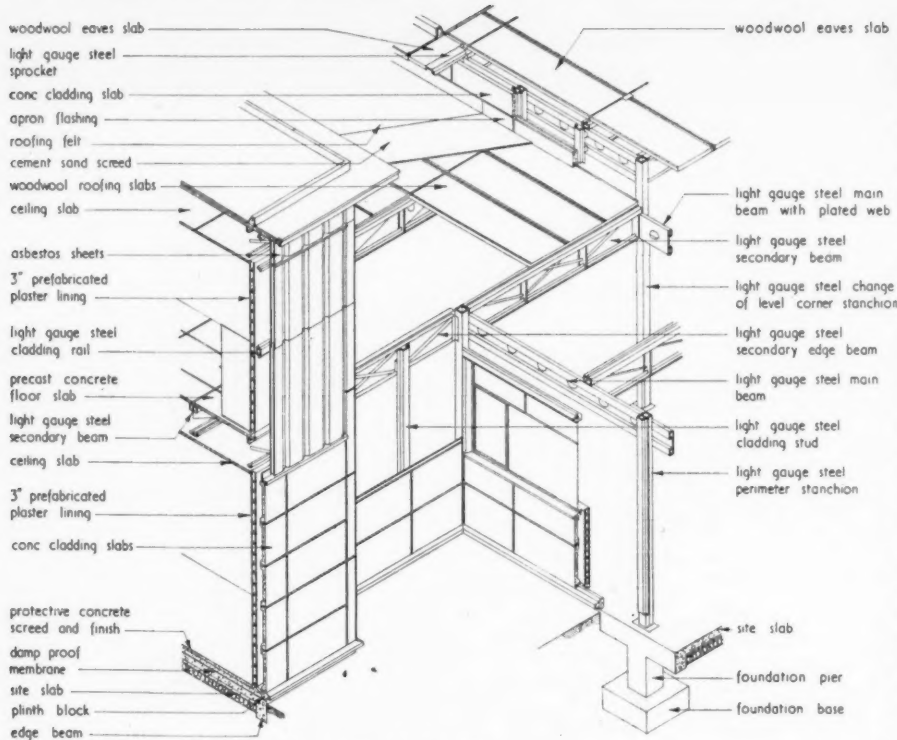
MAIN CONSTRUCTION: general appreciation

The standardised system of structure used for the first time at Belper school was developed by a small team of architects and an engineer who had specialised in the design of structures made of cold-rolled, light-gauge steel. The system was required to provide sets of standard components

which could be used to build schools, planned on a 3-ft. 4-in. module, up to three storeys in height and all within the permitted cost per place.

Before development commenced the following requirements were agreed upon: (a) Two

types of frame: 1, to span up to nine modules (30 ft.) with 8 ft. to 12 ft. high rooms; 2, to span between 12 and 15 modules (40 ft. to 50 ft.) and up to 18 ft. high rooms. (b) A vertical grid of 8 in. and a preferred dimension of 2 ft. for wall slabs

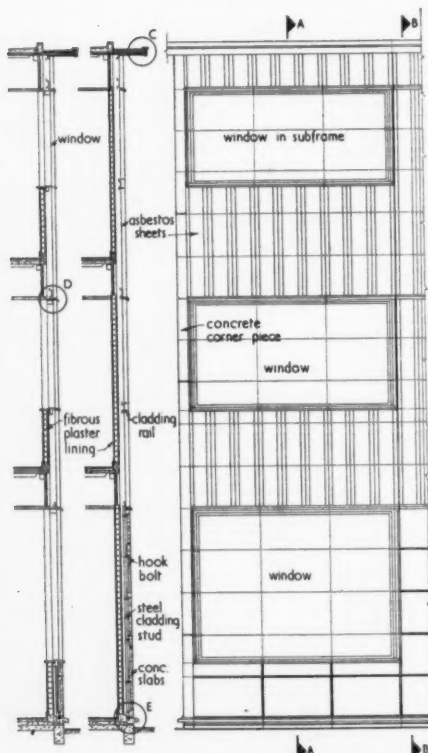
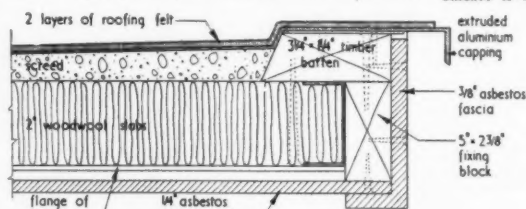
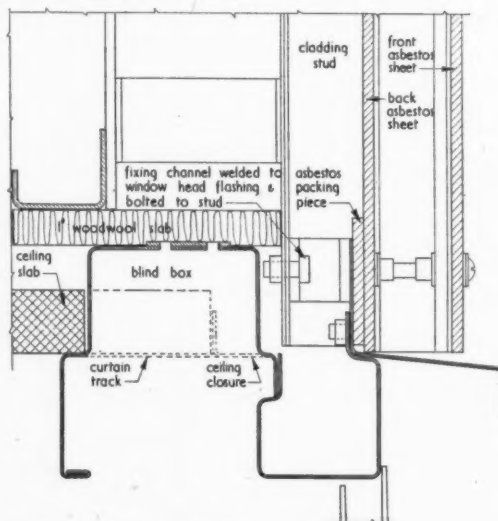
Isometric view of structural system [Scale: $\frac{1}{4}" = 1' 0"$]

room heights and changes of level. (c) A full range of wall components for external and internal corners and all types of changes of level. (d) Two types of interchangeable wall cladding components, to provide a more versatile standard system and to reduce cost of walling. (e) All components to be capable of easy handling without mechanical aid. (f) The structure to

allow all services to pass horizontally through roof and floor spaces and to pass vertically at changes of level.

It is vitally important with light-gauge, cold-rolled steel that components be adequately protected from corrosion. Fire regulations for a three-storey building demand internal cover to give $\frac{1}{2}$ hour protection. Therefore the smallest

possible stanchion was required, so that it might be contained within the two wall skins. It was found that a 4 $\frac{1}{2}$ -in. by 4 $\frac{1}{2}$ -in. stanchion size would meet all requirements, provided that vertical bracing could be used where required. The structure as envisaged was applied to various school plans which were thought to impose extreme structural conditions and the designers were satisfied that the vertical bracing requirements would not seriously restrict planning. A single stanchion size throughout led to a greater standardization of component parts. Further consideration of these conditions led to the idea of the frame as a series of independent "table tops" supported by "legs" at selected points. Main beams carry loads from one direction only and are fixed to the sides of the stanchion, both on the perimeter and internally. This reduces the number of types of main beams required and also allows free vertical passage for services from partitions into floors and roof space and at changes of level. Stanchions do not have to line up across the buildings, they can "slide" in the slot between main beams in either direction on the 40-in. module. Spacings can therefore be accommodated to suit window and door openings. Main stanchions of two-load capacities were designed, the single section carrying up to 8 tons, the same section with additional reinforcement inside carrying up to 16 tons. The beam system was designed to provide the maximum planning flexibility of 40-in. units. A set of floor beams was designed to take floor loads; these are used on the roof at double spacing. So reducing the number of beams. This type of frame may produce in multi-storey buildings a comparatively large number of stanchions, but these are contained within the partitions. The inner lining of the outer wall is designed as half a partition and thus a flush surface is maintained throughout.

Part elevation and sections A-A and B-B through 3-storey block [Scale: $\frac{1}{4}" = 1' 0"$]Detail at C [Scale: $\frac{3}{8}" = 1' 0"$]Detail at D [Scale: $\frac{3}{8}" = 1' 0"$]



[Scale : 3" = 1' 0"]



costs per sq. ft. in this column are based on tender figures

preliminaries and insurance

contingencies

s	d
1	7.7
1	5.3

STRUCTURAL ELEMENTS

Work below ground floor level

Foundation type	Location	Materials	Depth
Stanchion foundations. 12-in. by 12-in. piers to mass concrete bases. Reinforced site slab on reinforced ground beams. 12-in. wide r.c. retaining wall supporting stanchions and walls where f.f.l. is 6 in. above ground level	All buildings except boiler house. Sub-soil: sandy clay, changing to soft moist clay over shale; strata of the middle grit group of Millstone grit	Mass concrete base, 1 : 2½ : 5. 12 in. by 12 in. piers 1 : 2½ : 5. 4-in. thick slab, retaining wall, ground beams 1 : 2 : 4 Bearing capacity: clay 1½ T.s.f.; shale 3 T.s.f.	Foundations to 3-storey block taken to shale. Depth varies 5 ft. to 8 ft.
10½-in. thick retaining walls supporting a tanked 6-in. r.c. slab	Boiler house	Both 1 : 2 : 4	Approx. 4 ft.

To prevent the setting up of any stresses in the framework, due to the possible movement of the permeable clay over the less permeable shale, the site slab is reinforced and tied to the stanchion & pier reinforcement so that the foundation "raft" will move as a rigid block

The type of framework designed requires a comparatively large number of stanchions for the area covered. The necessity for large bases is therefore avoided and the possibility of using auger short-bored pile foundations was investigated. A saving of four weeks in time would have resulted but none in cost and since there were difficulties associated with a high water table and of working an auger machine on a sloping site it was decided to continue with the base and pier foundations.

Sulphates were found in the ground and ground water and sulphate resisting Portland cement was used for all foundations other than the site slab and retaining walls to the boiler house, where tanking protects the concrete.

Work below ground floor level includes £6400 or 3s 6·3d per sq. ft. for complexity of foundations due to slope of site, nature of subsoil, ground water conditions and the presence of sulphates in the soil

work below ground floor level

6 6

External walls and facings	Location	Materials	Finish	Reasons
Pre-cast slabs, including wall slabs, corner pieces and plinth blocks. There are 16 standard slabs fitting into the horizontal and vertical modules. The standard straight run slab is 2 ft. high by 3 ft. 4 in. wide and weighs approx. 140 lb., 2½ in. thick with a central dished area 1½ in. thick. Slabs rest on the site slab and are fixed back at the top only by galvanized m.s. ½-in. d. by 4-in. hook bolts, through holes in flanges of studs and around galv. steel 0-2-in. d. rods cast in recesses in slabs. The horizontal and vertical profiles of the slabs accommodate appropriate types of materials for weatherproofing	Walls of all one storey blocks Ground floor only to three-storey block	Pre-cast concrete slabs vibrated in moulds. Aggregate exposed by fine mist water spray to ¼-in. depth Corner blocks and plinths non-vibrated. Aggregate exposed by coating mould with a retarder and wire brushing after first hardening. Horizontal jointing, ½-in. wide strip, talc finished asbestos-based felt. Vertical jointing ½ in. wide by ½ in. deep recessed, gunfilled, asbestos and bitumen-based mastic	Derbyshire spar and white cement 1 : 3 Spar and white cement 1 : 3 Stonecourt black and white (flint) river gravel and Portland cement 1 : 3	To increase the versatility of the system and to reduce the cost of walls and frame it was decided to use two main types of cladding. It was logical that the heavy cladding material should be on the more vulnerable ground floor walls, with the light, easily-attachable sheeting above. Light gauge steel is particularly prone to corrosion and therefore the weatherproofing of the joints was of great importance. To avoid any vertical movement of the slabs it was necessary to find a non-creeping yet soft material to weatherproof the horizontal joints. Stanchions and studs are further protected by an extruded strip of rubber and bitumen-based mastic 4½ in. wide, which is stuck on with a special primer. Stringent BRS specified water tests were carried out on a sample wall and there was no penetration

<i>External walls and facings</i> <i>continued</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>
Double cladding asbestos cement trafford tile sheets. Sheets are carborundum cut vertically and horizontally. Horizontal overlaps line with window heads or sills to give a range of standard lengths	Upper floors of 3-storey block Between window heads and eaves on long span blocks	Inner sheet $\frac{1}{2}$ in. thick standard trafford tile with end corrugation cut to give nominal width of 3 ft. 4 in. Outer sheet reverse moulded, crown of the wide troughs forms the outer face of the wall	Self-finished material	A light-weight, self-finished, cheap material was required which would give foolproof weatherproofing for steel protection. The asbestos cement double cladding fits the 40 in. planning grid, has a neat appearance and required fewer fixing rails in comparison with the studs for the concrete slabs
3-in. thick pre-cast panel lining on nailable foam slag base blocks. Where stanchions occur panels are grooved and $\frac{1}{2}$ -in. external face only passes in front to cover the stanchion. Fibrous plaster sections are used to cover stanchions at window jambs and mullions	Inner skin of external walls to all buildings	Gypsum plaster with reinforced honeycomb core		A panel similar to the internal partitions, but half their thickness, was required to maintain the internal flush appearance and to give the necessary half hour fire protection to the perimeter stanchions
Two skins ribbed asbestos cement sheet	On single-storey blocks above full height windows and doors		2 coats emulsion paint where desired	To give variety of texture and to explore the possibilities of various cladding types with this structure

external walls and facings

s d
5 3.6

<i>Frame</i>	<i>Location</i>	<i>Materials</i>	<i>Col. grid</i>	<i>Reasons</i>
Stanchions 4 $\frac{1}{2}$ in. by 4 $\frac{1}{2}$ in. Internal plain and reinforced external and re-entrant corners, with welded foldings for fixing cladding	All buildings	Seven new rolls were produced to manufacture the framework from cold rolled light gauge steel. Fabrication of components is by welding; continuous automatic arc-welding for box stanchions, heavy duty spot welding for flanged members composed of top hat sections. General assembly is by manual arc-welding. A number of standard channel and angle sections are also used and some foldings and pressings for small components where total lengths are small	All cols. are located on the intersections of the 3 ft. 4 in. planning grid	Steelwork for schools manufactured from light gauge cold rolled sections has only been used in this country since the war and complete frameworks are a still more recent development. The British Code of Practice is still in the process of development and at present structures are designed in accordance with the American specification (1946) for the Design of L.G. steel Structural Members and the Standard COP (113) 1948 for hot rolled work. The cost of this steelwork is competitive with light hot rolled steel frames; to a large extent the saving in material is offset by the cost of fabrication and protective treatment. The main capital cost is the production of rolls for forming the sections. Consequently the major aim of the designers was to keep the number of new sections to a minimum and where possible use existing sections. Seven new sections were designed and components are made up of these combined in various ways together with a few existing standard channels and angles. Components were designed for quick and accurate erection. All major components are fabricated with standard fixing holes and sleeves. Beams are manufactured to very fine tolerances and the framework can be erected to tolerances of $\frac{1}{16}$ in. in 10 ft. On site the cumulative error, a shrinkage, was found to be within $\frac{1}{2}$ in. in 10 ft. and this may be reduced by packing when stanchions are plumbed
4 $\frac{1}{2}$ in. by 5 $\frac{1}{2}$ in. composite stanchion, half box stanchion and half flanged stud, slotted for fixing slabs and windows	Perimeter			

<i>Frame</i>	<i>Location</i>	<i>Materials</i>	<i>Beam spans</i>	<i>Reasons</i>
14-in. deep main beams, bolted to the face of stanchions. Upper and lower chords 4 in. by 2 in. lipped channel, 10 gauge	All buildings except gymnasium and assembly hall	Plated webs	Short span construction up to three storeys, 3 ft. 4 in. to 13 ft. 4 in., never more than 10 ft. on perimeter for economy	The majority of the beams have plated webs and careful designing of the plates was required to ensure through runs for pipes in the floor and roof space. There are a number of standard web plates, some for main and some for secondary beams, with holes in standard positions. The service engineers acquainted themselves with the position of the holes before designing their pipe and cable runs. The lower chords of both main and secondary beams are constructed of lipped sections which retain adjustable clips for ceiling slabs as well as giving additional stiffening to the beam
17-in. deep secondary beams 3 in. by 2 $\frac{1}{2}$ in. upper chord, lower chord 2 $\frac{1}{2}$ in. by 2 in. lipped angle. 12 gauge and 8 gauge		Plated webs. Open lattice webs. Where used on roof a projecting flange is secured on the upper flange to position roof slabs	10 ft. to 30 ft. 3 ft. 4 in. to 10 ft.	Anti-corrosive treatment, factory applied, follows the recommendations for the protection of mild steel components not exceeding 10 gauge given in the BS publication P.D. 420/1953 for Grade 5 conditions
3 ft. 7 in. deep truss. Both chords 4 in. by 2 in. lipped channel. 10 gauge	Gymnasium and assembly hall	Lattice struts. Fabricated in three sections. Centre portion both chords parallel for 13 ft. 4 in. or 23 ft. 4 in. End 13 ft. 4 in. of each truss top boom sloping	40 ft. or 50 ft. at 10 ft. centres	

<i>Frame continued</i>	<i>Location</i>	<i>Materials</i>	<i>Beam spans</i>	<i>Reasons</i>		
Purlins	Gymnasium and assembly hall	Made of two welded back to back 7-in. by 2-in. lipped channels in 14 gauge steel	10 ft. at 6 ft. 8 in. centres			
Vertical bracing	General	7½-in. by 1½-in. top hat section, as used for studs and rails				
Roof bracing	General	Two 4½-in. by 2½-in. lipped channels				
Bridging beams	General	Made of welded back to back 7-in. by 2-in. lipped channels	Nominal span between floor and roof secondary beams 6 ft. 8 in. or 3 ft. 4 in., but bridging beams are continuous right through building	Bridging beams provide lateral bracing and spreading of concentrated loads in long floor beams. In the roof they form part of the bracing and support the ceiling hanger ² and the roof lights	s	d
					frame	8 9.2

<i>Upper floor construction</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Suspended floors, pre-cast slabs on ½-in. insulation board strips, spanning 3 ft. 4 in. between floor beams	Upper floors of three-storey block	Vibrated reinforced concrete slabs, standard size 3 ft. 4 in. by 1 ft. 8 in. by 1½ in.; mix 1 : 1½ : 3	Screed or bedding to give a constant dimension of 3½ in. from top of beams to F.F.L.	Slabs are laid on the insulation board strips to deny the passage of structure-borne sound Thickness of screed was determined by the minimum thickness possible to lay below the chosen floor finishes		
					upper floor construction	1 0.4

<i>Staircases</i>	<i>Location</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Cold rolled steel welded box section stringers including balusters and core rail welded at factory, supporting pre-cast tread and riser units in vibrated concrete Height: g.f. to f. floor 12 ft. Other floors 10 ft.	Three-storey block	Risers painted. P.V.C. finish on treads with aluminium nosings	It was decided that the staircase should reflect the type of structure used generally		
				staircases	0 6.3

<i>Roof construction</i>	<i>Location</i>	<i>Material</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Channel reinforced wood-wool slabs spanning 6 ft. 8 in. between beams; cement screed laid to falls; 2 layers bituminous felt roofing	All buildings	2-in. thick heavy duty woodwool slabs, 2 ft. by 6 ft. 8 in. reinforced with 2 in. by 1 in. by 16 gauge m.s. channels sherardised after cutting	2 layer roofing, the first laid loose except at roof edges, the second bonded to the first with hot bitumen	Lightweight woodwool slabs gave the required thermal insulation of 0.2. Economy in steel was one of the aims when development work started, and roof beams at 6 ft. 8 in. centres with channel reinforced slabs clearly showed a saving It was hoped to also show a saving in cost but there appears to be very little difference between the system used and using unreinforced slabs with roof beams at 3 ft. 4 in. centres		
Projecting eaves, nominally 1 ft. 8 in., formed also of woodwool slabs cantilevered when at right angles to the roof beams, or supported by sprockets fixed to the top of stanchions when parallel. On the three-storey block concrete upstands are set at 1 ft. 8 in. from the edge of the roof and rainwater is taken to sumps in the roof centre. In the single-storey buildings sumps are placed in the eaves		Portland cement screed 1 : 5. Laid to falls of 1 in 80 minimum		A weak cement screed was used to minimise the movement in the screed and overlaying felt		
At the junction of buildings of different heights, where there is a window or asbestos sheet on the higher building, the eaves on the lower is cut back flush with the wall for a length of 3 ft. 4 in.						
Fascia to the eaves is an asbestos cement angle fixed to timber blocks and the soffit asbestos cement sheets screwed to the woodwool. The fascia is protected by an aluminium alloy drip		Special ½ in. by 4 in. by 1½ in. a/c angle, and ½ in. thick a/c board	Soffit painted two coats emulsion paint	The timber fixing blocks for the eaves were made up on the ground in lengths of 12 ft. and when fixed considerably helped the aligning of the fascia		
					roof construction	3 11.5

<i>Roof lights</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
All rooflights are of a standard module width, to fit between all types of beams and are 3 ft. 4 in. to 13 ft. 4 in. in length. Frames are fixed to 8-in. high pre-cast conc. upstand blocks	All buildings	Medium universal rolled steel sections, hot dip galvanised	Concrete upstands lined internally with fibrous plaster	Smooth surface of fibrous plaster gives good light reflection		
					roof lights	0 5.3

<i>Windows, external doors, glazing</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Pressed metal sub-frames for all wall openings, windows and doors. Two types, (a) for the concrete slabs with straight vertical edge for the gunned joint, (b) for the corner blocks and asbestos sheets with a weatherproofing projection on the side to insert between the slabs or sheets. There is a separate window head flashing piece	All buildings	Pressed m.s. sheets, jambs and heads 14 gauge, non-structural sills, rust proofed after manufacture by hot dip galvanising 16 gauge. Sill rail 10 gauge	Painted with (a) one coat mordant solution. (b) one coat anti-rust primer. (c) two coats gloss oil	A frame is necessary to maintain efficient weatherproofing to the stanchions, to mask the vertical profile of the slabs, to provide an easy fixing for the windows and to give a neat appearance		
Three sets of standard types of metal windows and doors, 3 ft. 4 in., 6 ft. 8 in. or 10 ft. long and to suit the preferred sill heights. Two casements and one ventilator for the 10 ft. window and one of each for the 6 ft. 8 in.		Medium universal m.s. sections, hot dip galvanised	Ditto	To obtain an economic type of window it was decided to use medium universal sections throughout with side hung casements. This restricted the width allowed for opening casements to 2 ft. 2 in. To reduce costs heavy drawn sheet glass nominal 1/4 in. thick was used instead of 1/2 in. plate		
					metal windows } external doors }	s d 5 1.5
					glazing	0 7.8

PARTITIONING

<i>Internal partitions</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
6 in. thick pre-cast panels, 2 ft. wide and 8 ft. or 10 ft. high. Panels set on available foam slag concrete bases, set on structural floor	Majority of internal walls	Gypsum plaster with two external skins and reinforced honey-comb core. External skin thickness of 3/8 in. gives 27 decibel reduction. Where greater insulation is required, external skins are increased to 1 in. giving a reduction of 35 decibels	Joints are poured with gypsum plaster and steel trowelled. Surface of panels made smooth and straight and two coats brushed emulsion applied	Pre-cast panel required for dry erection by semi-skilled labour. Thickness of 6 in. required to cover stanchions. The top of the foam slag concrete base block is 2 in. above f.f.l. so that standard height slabs project 2 in. above ceiling level to improve sound insulation between adjoining rooms		
As above but 3 in. pre-cast panels	Occasionally between stores, heater and calorifier cabinets			Where appearance and soundproofing are unimportant thinner panels have been used to increase the available space		
Sliding and folding timber partitions	Between classroom and workspace	Standard flush door s. & f. gear	2 coats tung oil based wood seal	To enable the three spaces (2 classrooms, 1 workspace) to be used as one for house purposes		
Soundproof movable partition	Closes proscenium opening between stage and music room					
					wall finishes	0 3.5
					internal partitions and screens	2 11.0

<i>W.C. doors and partitions</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Flush doors and partitions	27 cubicles	Softwood skeleton framed flush doors and blockboard partitions	2 coats gloss oil	To accommodate both w.c. cubicles and handbasins in the 10 ft. width of lavatories, cubicles are 3 ft. 4 in. by 4 ft. 6 in. with the w.c. on the diagonal		
					w.c. doors and partitions	0 2.7

<i>Internal doors</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Flush, and glazed to teaching	General	Frames, including fanlights, pressed steel. 1 1/2 in. and 1 3/4 in. hardwood skeleton framed flush doors. Hardwood glazed doors. Anodised aluminium ironmongery to internal doors	Flush doors painted to coats gloss oil			
					internal doors	0 6.0
					ironmongery	0 2.8

FINISHINGS

<i>Floor finish</i>	<i>Location</i>	<i>Finish</i>	<i>Reasons and comments</i>		
2-mm. p.v.c. sheets, hessian backed	Classrooms, corridors and science laboratory	Self-finished mottled colours. Two coats plastic wax polish applied at 3-4 monthly periods	Quiet, hard wearing and resistant to grease acids and alkalis. Mopping and occasional washing only required		

<i>Floor finish continued</i>	<i>Location</i>	<i>Finish</i>	<i>Reasons and comments</i>
12-in. square studded rubber tiles	Entrance hall and corridors	Self-finish, mottled colours. Two coats plastic wax polish at 3-4 monthly periods	Quiet, hard wearing, easy to clean. Pleasant texture
12-in. and 9-in. by ½-in. cork tiles	Library and administrative rooms	Two coats phenolic plastic polish rubbed down to semi-matt with wire wool, renewed periodically	Quiet, pleasant appearance. Mopping only required
9-in. square thermoplastic tiles	Light craft rooms	Self-finish, mottled colours	Hard wearing and cheaper than p.v.c. sheet
½-in. heather-brown quarry tiles on sand/cement screed	Lavatories, changing rooms and kitchen	Cost of plastic wax polish applied at 3-4 monthly periods	Inexpensive and long wearing tile
½-in. diagonally grooved red quarry tiles	Shower and drying area		Non-slip
1-in. hardwood block. Opepe and African mahogany	Assembly hall, music room, housecraft flat	Two coats of tung oil based wood seal applied periodically	Richness of appearance. Mopping only required with use of seal
1-in. hardwood strip. Borneo white seraya	Gymnasium	Two coats of floor seal applied periodically	Hard wearing, non-splintering

floor finishes

s d
3 10·8

<i>Ceilings</i>	<i>Location</i>	<i>Materials</i>	<i>Finishes</i>	<i>Reasons and comments</i>
3-ft. 4-in. by 1-ft. 8-in. pre-cast panels, suspended by adjustable metal "Z" clips	Ground and first floors of 3-storey block. Where required or below main pipe runs in single-storey block	1½-in. thick wire mesh reinforced vermiculite concrete panels, with two 6-in. wide strips of ½-in. asbestos fibre-board cast-in for slip fixing	One sprayed coat of oil-bound distemper	The suspended ceilings have to perform four functions: good appearance, sound absorption, demountability for access to services, half-hour fire protection where required. All this must be within the cost requirements for this element and the panels must also conform to the 3-ft. 4-in. planning grid
3-ft. 4-in. square plain and perforated plasterboard panels, supported on aluminium clipped to beams	Top floor of three-storey block and all other areas in single-storey building except assembly hall	Plain plasterboard ½ in. thick reinforced with one ½ in. by 1½ in. aluminium tee. Perforated plasterboard ½ in. thick, ½ in. dia. holes at ½-in. c/c, backed with ½-in. bitumen-bonded glass wool quilt. Reinforced with three 1½-in. by 1½-in. aluminium tees	Visible aluminium tees rubbed with fine wire wool, painted one coat zinc chromate primer and one under-coat flat oil the whole ceiling then sprayed one coat oil-bound distemper	Expensive perforated plasterboard panels were reduced to a minimum giving the requisite sufficient sound absorption
3-ft. 4-in. square plain and perforated panels, specially designed	Assembly hall	Plain fibrous plaster panels with two 2-in. by 1-in. softwood bearers wadded Slotted panels as above but with ½-in. bitumen-bonded glass fibre backing	Two brushed coats of emulsion paint	High quality appearance and to provide sufficient and correctly disposed sound absorption and reflection on the hall ceiling

ceiling finishes

3 0·2

<i>Decorations</i>	<i>Location</i>	<i>Paint types</i>	<i>Colour preference</i>	<i>Reasons and comments</i>
Applied paint finish	All-steel door and window frames free-standing columns. Softwood doors and frames. Some plaster walls (lavatories and cleaners, etc.) exposed steel and cast-iron pipes. All softwood	Two coats full gloss oil on primer	Archrome range: 17 colours, 4 neutral, white, black Non-Archrome, 4 colours	The colour scheme, with minor exceptions, is based on the Archrome range and the treatment generally follows the recommendations of the MOE Bulletin No. 7 The colour scheme for the classrooms is based on chalkboards of value 4 and the chalkboard walls of value 6 or 7 to avoid too much contrast. Pin-up surfaces are of value 5. In classrooms with a northerly aspect warm colours are used, cooler colours for southerly aspects
	External concrete slabs (one coat only). Plaster walls in rooms with condensation. Aluminium tees to plasterboard ceiling Ceilings generally	Two coats semi-gloss oil on primer Oil-bound distemper		Each "house" has its own colour, and these are painted on the book locker doors. Areas of heavy circulation are painted in a light neutral colour (i.e., Archrome 17), with focal points emphasized in stronger colour
	External a/c sheets. Majority of internal plaster walls	Two coats plastic emulsion paint		In the assembly hall the slight coffering of the ceiling panels has been emphasised by a four colour treatment
	External c/r retaining walls	Two coats bitumastic paint		Externally, small areas of colour are used as a contrast to the concrete slabs and a/c sheets

decoration

1 4·4

FITTINGS

<i>Cloak fittings</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Hat and coat racks fixed to walls, two rows of pegs deep giving 10 pegs for every 40 in.	Combined with workspaces in house units	Hardwood slats supported on bent m.s. strap brackets. Pegs of bent aluminium-alloy strap		Cloaks and locker spaces are planned in five units and form part of the house unit Pegs are provided at close spacing for coats, and shoes are kept in nearby lockers. Dispersed cloakrooms attached to the house were chosen as the most pleasant and economical use of the available space	s	d
					cloak fittings	0 1.6
<i>Other fittings</i>	<i>Location</i>	<i>Materials</i>	<i>Finish</i>	<i>Reasons and comments</i>		
<i>Book lockers</i>						
Batteries of 9 per 40-in. length. Fixed or free-standing, 1 ft. by 1 ft. 4 in. by 9 in. each locker will take shoes, books, pencils, etc.	Combined with workspaces in house units	Hardwood with pull-out flap lid	Lids finished in gloss oil paint in house colours	Subsequent to the tender an order was placed for the supply of book lockers amounting to £1,386. This increases the Other Fittings component and also total cost by 9.2d. per sq. ft. floor area		
<i>Light wall benching</i>						
Six standard and two special types of storage units in 20 in. widths, including drawers, cupboards, open shelving, etc. Specials contain a large or double sink and a hidden recess for sewing machines	All classrooms, housecraft rooms, science room, art room, needlework room	Softwood frames and drawers, hardwood used where visible	Bench tops and fronts two coats of tung oil based wood seal, both coats rubbed down with wire wool	Cupboards below wall benches in the teaching rooms provide storage in an accessible and efficient form, save floor space of an additional store and give working tops and display surfaces where most required		
<i>Heavy wall Benching</i>						
Strong type wall benching for the heavy and dirty operations of practical rooms. Mostly open benching with limited provision for drawers	All practical rooms	Softwood frames, beech tops	Top, two coats linseed oil or finished with sheet metal or zinc		other fittings	2 5.8
<i>Gym kit hangers and benches</i>	<i>Location</i>	<i>Material</i>	<i>Finish</i>	<i>Reasons and comments</i>		
Individual hanger and basket to take clothes, shoes and towel, hung on in two tiers on rails	Changing rooms	Galvanised steel hanger and basket. Painted m.s. tubular rails fixed to floor and walls		Hangers give clothes and towel a chance to dry and air. Layout of rails fixed to walls gives access for each class to hangers and economises in space for storage		
Benches back to back, providing peg and shoe hole	Ditto	Galvanised m.s. frame, hardwood seats and aluminium alloy pegs			changing room fittings	0 11.5

SERVICES

<i>Rainwater disposal</i>	<i>Location</i>	<i>Material</i>	<i>Reasons and comments</i>		
Standard size galvanised m.s. sheet sumps and downpipes	Downpipes external in single storey work. Carried in internal ducts in three storey block	External, 3-in. internal diameter aluminium pipes. In ducts 4-in. c.i. pipes	Aluminium pipes are available in long lengths, and give a good appearance without joints		
				plumbing, external	0 1.5
<i>Plumbing: Internal</i>	<i>Location</i>	<i>Material</i>	<i>Reasons and comments</i>		
Two-pipe system	Sinks and basins all floors W.c. fittings on upper floors	Prefabricated copper wastes, m.s. stacks and c.i. stacks	Prefabricated components were chosen whenever possible to reduce site labour		
	Sinks in science room	Ebonite standing wastes and P.V.C. pipe connections to stacks		plumbing, internal	2 2.1
<i>Hot water storage</i>	<i>Location</i>	<i>Material</i>	<i>Capacity</i>	<i>Reasons and comments</i>	
Three lagged indirect cylinders, heated by primary hot-water mains	Kitchen changing rooms and housecraft	Copper	One 250 gall. Two 200 gall.	Copper tanks were necessary because of the corrosive nature of the water. Heating by primary hot water mains is the most satisfactory method and is used wherever possible	

<i>Hot water storage continued</i>	<i>Location</i>	<i>Capacity</i>	<i>Reasons and comments</i>
Two lagged indirect cylinders, heated by primary hot water mains but with handset mixing valves	Lavatory basins	Two 60 gall.	There are electric water heaters in housecraft and practical rooms. Mixed water provided for lavatory basins saves initial cost of taps and pipes
One lagged indirect cylinder heated by heating mains or by 4-kW immersion heater	Practical block	60 gall.	

price included under boiler type and capacity

<i>Cold water storage</i>	<i>Location</i>	<i>Material</i>	<i>Capacity</i>	<i>Reasons and comments</i>
3 tanks each 8 ft. by 5 ft. by 4 ft.	Above stairwells on roof of three storey block	Galvanised iron	1,000 gall. each	The local authority required a water storage of 3,000 gallons exclusive of storage for all cylinders
2 tanks each 6 ft. by 3 ft. 7 in. by 3 ft.	On roof of gym. and on roof of kitchen	Galvanised iron	400 gall. each	
1 tank, 2 ft. 6 in. by 1 ft. 11 in. by 2 ft.	On roof of practical block	Galvanised iron	60 gall.	

price included under plumbing, internal

<i>Plumbing: sanitary fittings</i>	<i>Location</i>	<i>Material</i>	<i>Finish</i>	<i>Reasons and comments</i>
127 fittings	Lavatories, kitchen, practical rooms, etc.	White fireclay	Glazed	

s d
0 7-5

sanitary fittings

HEATING AND HOT WATER INSTALLATION

<i>Heat exchanger types</i>	<i>Location</i>	<i>Criteria temperature</i>	<i>Reasons</i>
Horizontal heater cabinets at low level, consisting of heater battery and fan cabinets, giving mechanically-circulated warmed air, constructed in hardwood, and insulated with insulating board, and designed to align with standard wall benches, based on minimum internal dimensions of 5 ft. 10 in. by 1 ft. 6 in. by 2 ft. 6 in.	One cabinet in the majority of spaces (class-rooms and workspaces, etc.) and two in the hall	In accordance with MOE building regulations, 32° F. outside temp 62° with 2 air changes per hour	Heating by means of circulated warm air gives good comfort conditions and its introduction at low level reduces the variation in temperature between floor and ceiling particularly in rooms with low ceilings (i.e. up to about 10 ft.) with corresponding improvements in comfort conditions and reduction of fuel consumption
Vertical heater cabinets constructed of the standard 6-in. thick pre-cast plaster partition slabs, one 3 ft. 4 in. grid square in plan	Occasionally on ground floor in large spaces		Used in high areas such as the gymnasium and at the foot of stairs where the height of outlet from the cabinet makes no significant difference to the temperature gradient
Radiators—"neo-classic" floor mounting pattern	Pupil's lavatories and small administrative rooms		
Exposed pipes	Small lavatories		

price included under boiler type and capacity

<i>Boiler type and capacity</i>	<i>Heat load</i>	<i>Fuel</i>	<i>Stoking method</i>	<i>Reasons</i>
Two cast-iron sectional boilers, normally used for heating	1,358,000 B.T.U.s	Kirkby dry clean singles. 170 tons per annum	Automatic worm-fed from hoppers	Interconnecting pipe systems cheaper than installation of a spare boiler
One normally used for the supply of hot water. Supplies are interconnected and any two can serve in the event of the third being out of action				Local Authority provides sufficient labour to move fuel from nearby store to hoppers, therefore completely automatic feeders unnecessary

boiler type and capacity, including hot water storage and heat exchanger type

5 11-9

<i>Drainage system</i>	<i>Location</i>	<i>Materials</i>	<i>Reasons and comments</i>
Separate soil and storm water	General	Standard glazed stoneware pipes, pre-cast concrete manholes, with purpose-designed base to receive drains	
	Science room drains	Special chemically-resistant stone-ware pipes to BSS 1143/1943	Wastes from science laboratories in secondary modern schools are not expected to be very corrosive

drainage

1 0-8

<i>Kitchen ventilation</i>	<i>Location</i>	<i>Airchange rate</i>	<i>Reasons and comments</i>
One roof extract fan (no hood)	Centrally over boiling pans		
One wall extract fan	Above wash-up sinks		

kitchen ventilation

0-7

Gas installation	Location	Materials	Reasons and comments
No. 42 points	Science, art and craft, house-craft and kitchen	Galvanised mild steel piping	

gas installation

s d
0 2.9

ELECTRIC INSTALLATION

Source and fitting type	Location	Illumination level	Comments
Plastic fittings specially designed for rooms with low ceilings,	Classrooms and practical rooms of 8 ft. and 10 ft. heights and administration rooms, of 8 ft. height	Number and disposition of lights calculated for 14-16 lumens/ft. ² average to give 10 lumens/ft. ² minimum	A large number of low intensity light fittings are used to give evenly distributed good illumination. To reduce costs and time spent in installation p.v.c. insulated cable was used
Spun aluminium white enamelled recessed ceiling reflector with protective louvres, tungsten 200 W.	Gymnasium and stage/music room		The cost of the installation was also reduced by the selection of a tariff which permitted the use of single metering and wiring system for the single phase types of consumption
Plastic fittings, suspended 2 ft. 6 in. below ceiling, tungsten 200 W and recessed "dispersive" reflector with louvres giving downward illumination only, tungsten 150 W	Assembly hall		

Wiring and switching types	Location	How distributed
P.v.c. insulated and sheathed multi-core cable with earth continuity cable incorporated under the sheath	General	Supported on lower flange of beams in roof and floor spaces Cables on face of stanchions covered with aluminium sheath
Micro-gap type, single and multi-gang switches		
Pyrotenax cable—heat resistant	Boiler house only	

Power supply type	How distributed
A.c. type single phase (240 volts) generally with three phase (415 volts) to workshops	Single main cable intake from sub-station and then to local distribution boards
Maximum connected load—135 k.V.A.	

lighting, wire, power

3 8.2

total net cost per sq. ft. of floor area

67 8.6

TIME SCHEDULE

Drawings (system and plan)	Tender date	Site work commenced	Site completed
May 1951—July 1952	March 1953	May 1953	September 1955

SITE AND PLAN ANALYSIS

Site accommodation	Area in acres	Per cent. of total	Plan accommodation	Area in sq. ft.	Per cent. of total	Area per place
Building	0.84	6.2	Hall	1,990	17.35	12.18
Playing fields	8.53	63.2	Stage	1,006		
Hard playing areas	0.65	4.8	Gymnasium (and store)	3,216		
Planting near building	2.65	19.6	Library	941	2.75	1.93
Roads	0.17	1.3	Store	44		
Paths and paving	0.66	4.9	Gen. and prac. classrooms, stores	15,629	43.65	30.65
Total	13.5	100.0	Dining	893	2.49	1.75
			Pupils store	1,537	11.18	7.85
			Sanitary accommodation	2,467		
			Staff rooms			

Ratios

Area of solid walls = 0.58
Total floor area

Area of window (inc. ext. doors) = 0.30
Total floor area

Note: Areas in plan accommodation are measured from the school as built. Those given in the cost analysis are based on the tender figures, the plan being slightly reduced in area before building commenced.

COST ANALYSIS

Note: gross cost = net cost plus external works

External works include:
Drainage works beyond manholes adjacent to buildings
Road, paths and fencing
Site layout and planting
Planting fields

No. of form entries	3
No. of places (cost)	510
Floor area (sq. ft.)	36,154
No. of sq. ft. per place	70.9
Net cost	£122,411 8s. 7d.
Net cost per place	£239.9*
External works per sq. ft.	11s. 1.8d.
Gross cost	£142,567 5s. od.
Gross cost per place	£279.5
* Includes a sum for special foundation work amounting to 3s. 6.5d. per sq. ft.	

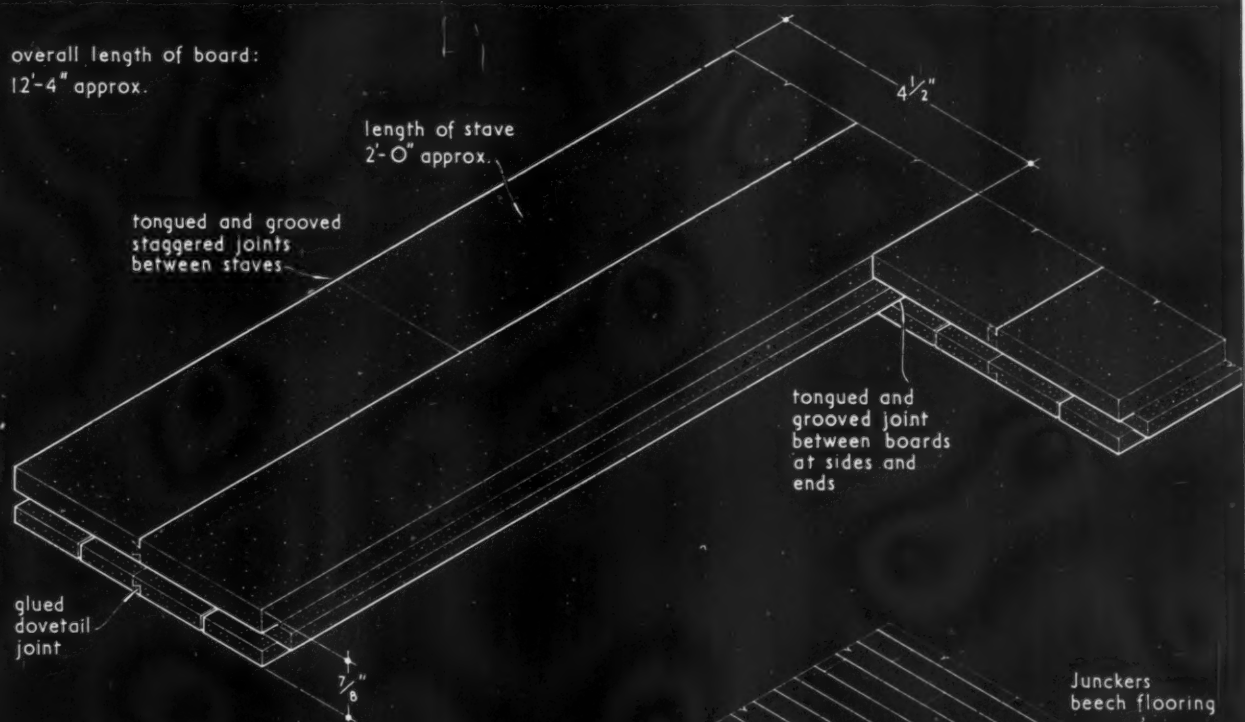
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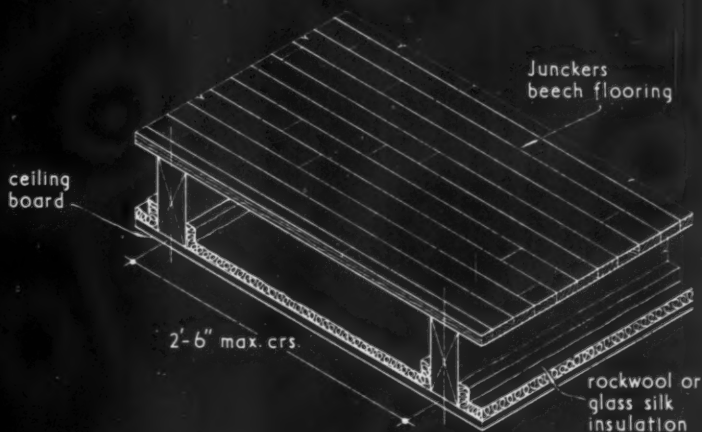
FLOORS TIMBER

20.EI

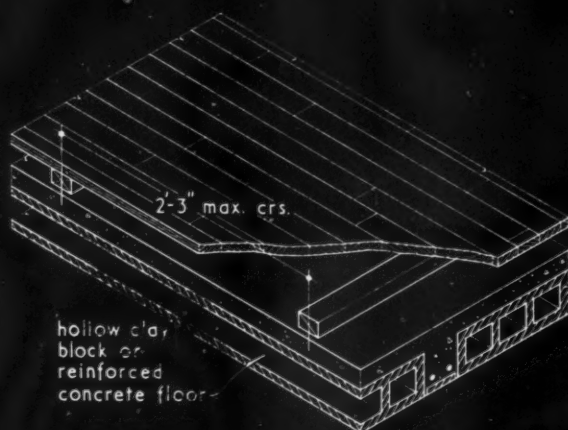
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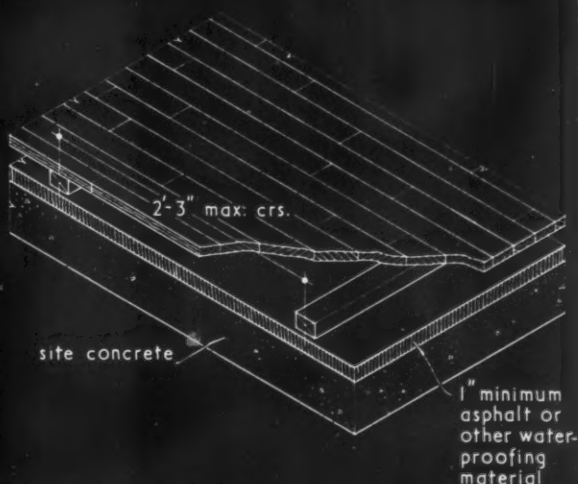
DETAIL OF BOARD.



FIXING TO TIMBER JOISTS.



FIXING TO HOLLOW CLAY BLOCK OR
REINFORCED CONCRETE FLOOR.



FIXING TO SITE CONCRETE.

JUNKERS' SOLID BEECH FLOORING.

Compiled from information supplied by James Webster and Bro. Ltd. for Junkers Savværk

20.E1 JUNKERS BEECH FLOORING

This Sheet describes Junckers solid beech flooring, which is designed to reduce to a minimum the natural movement in timber, and demonstrates its application to various types of sub-floor.

Construction

The flooring is manufactured, as illustrated on the face of the Sheet, from two rows of solid beech staves jointed longitudinally by glued dovetail joints (Linderman process) and at the ends by tongued and grooved heading joints. The complete board is tongued and grooved and end-matched.

Grade

The grade available is prime (clear face) which is free from knots and heartwood.

Size

The finished size of each board is $\frac{7}{8}$ in. thick by $4\frac{1}{2}$ in. wide, the appearance when laid being that of a $2\frac{1}{4}$ -in. strip floor. The lengths are preponderantly 12 ft. 4 in.

Weight

One square yard weighs approximately 28 lb., i.e., about 80 square yards of the flooring weighs one ton.

Moisture Content

The boards are kiln-seasoned and reconditioned to a moisture content of approximately 8 per cent.

Strength and Hardness

The mechanical properties of beech (*fagus sylvatica*) as determined from tests made at the Forest Products Research Laboratory, Princes Risborough, and elsewhere, have been published in various official publications issued by the Department of Scientific and Industrial Research. As a result of these tests, beech is classified as suitable for heavy traffic, having a very high resistance to wear. In the hardness test for example, resistance to indentation on the side grain (1,440 lb.) is greater than either gurjun, oak or teak.

Laying

Bearing in mind that this flooring is dried to a moisture content of approximately 8 per cent., it should be considered of primary importance that before the flooring is laid the building should be in a dry condition with all plastering, glazing, etc., completed.

Being end-matched, the boards can be laid continuously end-to-end, irrespective of joist or batten spacings. Therefore, the flooring should be laid "irregular," i.e., the heading joints of two boards should never fall opposite each other or opposite the joints of staves.

As with other hardwood floors, Junckers flooring is intended to be laid under permanently dry conditions. Where these conditions do not obtain, allowances must be made when laying for possible expansion and, later under drier conditions, for corresponding contraction. Minute tolerances are allowed for in the manufacture of Junckers flooring which are invisible when the floor is laid, but to allow for possible expansion a space of $\frac{3}{4}$ in. should be left at all margins.

Nailing: It is recommended that the spacing of joists should be not more than 2 ft. 6 in. centre to centre. The manufacturers recommend nailing through the face, with one nail to each joist or batten. Nails should be carefully driven and countersunk, the holes being subsequently filled with putty or wood filler. Alternatively, the flooring may be successfully laid by secret nailing, the nail being driven at an angle above the tongue into the joist and countersunk: this is the more popular method in the United Kingdom.

Finish

As Junckers flooring is pre-sanded at the factory, it is not usually necessary either to scrape or sand the floor after laying. The manufacturer recommends that the floor should be buffed with steel shavings, followed by the application of a penetrating sealer before being buffed once more with steel shavings and waxed.

Compiled from information supplied by:

James Webster and Bro. Ltd.

Head Office: Webster House, Derby Road, Bootle, Liverpool, 20.

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The Architects' Journal Library of Information Sheets 550. Editor: Cotterell Butler, A.R.I.B.A.

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Acoustele, see Gyproc Products, Ltd.
Acousti-Celotex, see Cullum, Horace W., & Co., Ltd.
- Acoustics**, acoustic panels .. 27.B9 29.H1
 acoustic plaster .. 29.H2
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TECHNICAL SECTION



In articles which appeared on July 21, August 25 and September 1, 1955 John Eastwick-Field and John Stillman discussed the design and machining of timber joints. This week they continue their series of joinery articles with a discussion of transparent finishes. This subject has been singled out for separate treatment because the authors feel that if information about the behaviour of the various kinds of clear wood finish were more precise and more accessible, architects might specify them more often as an alternative to paint—as is done in Denmark, Sweden, Switzerland and other countries—because their proper use sets timber off to the best advantage. They have tried to give this information, drawing on their own experience in practice and on the results of some special investigations. Even so, they have found clear indications of the relative merits and durability of the different polishes hard to come by, and they would welcome the opinions of architects and others who have had practical experience of comparing them. For purposes of classification the series is numbered 13, Materials: Timber.*

*Previous articles in this series appeared September 30, 1954, November 25, 1954, January 13, 1955, March 24, 1955

THE DESIGN AND PRACTICE OF JOINERY

By John Eastwick-Field and John Stillman

7. TRANSPARENT FINISHES

"Timber does not deteriorate or 'lose its nature' through age alone."* There are in fact many examples of wooden objects several thousand years old which, for one reason or another, have been protected and in which the timber is still in a sound condition. It is common knowledge, however, that most timbers when left out of doors do in time become "rotten." This is not brought about by natural ageing but by fungal decay or insect attack: if exposed to extremes of temperature and constant wetting and drying most timbers will also suffer from warping and splitting and will deteriorate on this account too.

The fungal decay to which they are liable need not be due to Dry Rot (*Merulius Lacrymans*) or Cellar Rot (*Coniophora Cerebella*), which are well known to those

acquainted with building, but to any of a great variety of other fungi which, under certain conditions, attack timber: the results of their attack are often referred to as "Wet Rot" since the fungi usually flourish when the timber is damp.

The most important reason for applying a finish to timber is therefore to prevent decay from fungi and insects: other reasons are (a) to prevent its absorbing moisture, which causes distortion; (b) to protect the timber against special forms of damage such as are occasioned by acids and alcohols, etc.; and (c) to improve the appearance and to enable it to be kept clean.

Fungi and insect attack

It is true that the heartwood of a few timbers (it does not apply to the sapwood) may be used both externally and internally without any protection even against fungi or insects, since these timbers happen to

contain substances which resist decay. Of the commonly used joinery timbers there are in this category*—besides teak whose durability is well known: Afrormosia, Afzelia, Iroko, Makore, Opepe, Western Red Cedar.

All but the last of these timbers is a "hardwood" and Western Red Cedar is, in fact, the only common softwood having these special qualities. Although it is literally a "soft" wood and is not therefore suitable for some joinery it is often used untreated for roof shingles, exposed siding, and embedded plugs and other positions where advantage can be taken of its resistant qualities.

It will be noticed that oak does not appear in this list although most people will have seen untreated oak cills. Long years of

* Decay of Timber and its Prevention. K. St.G. Cartwright, M.A. (Oxon.), and W. P. K. Findlay, D.Sc. (Lond.), HMSO, 1946.

* BRS Digest 59, Oct., 1953. *The Use of Hardwoods in Building.*



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b



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experience have shown that oak is, in fact, reasonably resistant to fungal decay, and by tradition it is often used without protection.

Other woods used outside need protection and the best way to give this protection is to use one of the recognized chemical preservatives, as well as applying a water-proof finish such as paint. The function of the preservative is to reduce the risk of fungal and insect decay and of the paint to protect the timber against moisture movement, warping and splitting. In practice a chemical preservative is seldom specified and reliance is placed on the paint or other finish, yet where the danger from decay is greatest, such as at the back of door frames, a totally inadequate protection is given by only one coat of priming.

In theory it seems that the only satisfactory solution would be to apply to concealed faces a preservative followed by at least two coats of paint. In the opinion of the authors, the single coat of primer usually given, even if applied over a preservative, would do very little to prevent the absorption of moisture which can distort the timber and raise the paint film on the face.

Inside a building there should be no danger from fungal attack on wood, even if used (as it often is) with no preservative or other protection on the parts which are out of sight. Unfortunately there is a real danger, which is more often than not ignored, of destruction at some time or other by wood-boring beetles.

For this reason the authors' opinion is that it is advisable to treat all timbers internally, as well as externally, with a chemical preservative. This is, in fact, quite practicable since pressure-impregnated timber can readily be obtained throughout the country, but architects should make sure that the treatment will not affect whatever finish is applied. Anybody who has had experience of renovations or conversions where all the timber including joinery work has been destroyed by furniture beetle, will appreciate that the initial capital cost is saved in

the long run. Many hardwoods as well as softwoods can be pressure-treated. Treated timber should be used for joinery fittings such as cupboards as well as for structural work. The practical implications of this will be discussed in a further article on "timber specification."

It is true that, provided the beetle is not already in the wood, paints and polishes act as a deterrent to their entry by sealing the surfaces. They are, however, very rarely applied on all faces, and most people will have seen how the attack on, for instance, a polished chair is concentrated on the underside where there is no polish.

Absorption of moisture

The question of the absorption of moisture was mentioned in our second article in this series (AJ: November 25, 1954) from which we reprint the following table (taken from BRS digest *Questions and Answers* 4th Series, No. 13, 1939) which gives the percentage efficiency of various finishes in preventing moisture absorption.

	Percentage efficiency in preventing moisture absorption	
	At 7 days	At 28 days
Bituminous paint, 2 coats	90	69
First quality oil paint, 3 coats (red and white lead primer, undercoat, and finishing coat)	83	56
Lead paint, 3 coats (red and white lead primer, undercoat, and finishing coat)	76	45
Aluminium paint, 2 coats (aluminium paste in bronzing liquid)	70	35
Shellac, 2 coats	68	31
Copal varnish, 2 coats	58	20
Aluminium paint, 2 coats (paste in boiled oil)	47	12
Red and white lead primer, 1 thin coat	38	14
Beeswax and turpentine, 2 coats over cellulose sealer	10	3
Boiled oil and turpentine, 2 coats brushed	2	0
Raw linseed oil, 1 coat rubbed	0	0

We shall return to the practical problem of how to prevent timber from absorbing too much moisture when we discuss specification.

Special forms of damage

The resistance to damage and the hardness of the surface are important considerations, for in situations where alcohols or chemicals may be spilt on to a polished surface, some polishes would be entirely unsuitable. On the other hand it is curious that French polish and wax, which are very susceptible to damage by heat and water, are used for table tops where there is obviously a risk of them being subjected to both. Ring marks from wet cups or glasses are in fact often to be seen disfiguring French polished and waxed tables, but it so happens that a professional polisher can fairly easily remove them and match the surface or patch-polish

Four hardwood panels, newly

cold water



hot cup



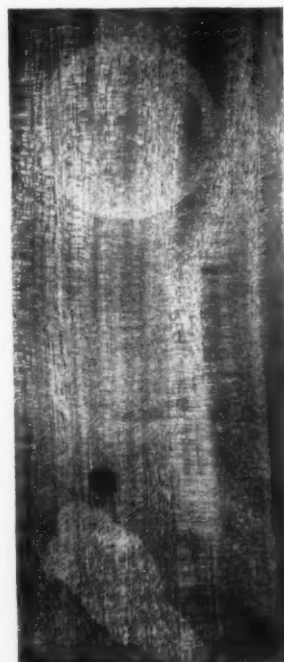
ink



gin



cigarette burn



Wax polish.



d



e

a. staining

Inlaid brass mahogany table being stained to match a sample. The stain is a water stain.

b. filling

A plaster base paste filler being rubbed into previously-stained mahogany. The filler is coloured to match the stained wood.

c. bodying in

Applying early coats of clear French polish on to natural pine.

d. dulling down

Rubbing a French polished surface with pumice powder to produce a semi-matt finish. The powder is applied with a specially made soft brush.

e. cellulose spraying

Part of a spray booth and some of the equipment which is required for this process.

it, whereas he would be unable to do so so easily with oil seals, varnishes, celluloses or plastic polishes, all of which are more resistant to this form of damage, as indeed to most other forms.

The authors carried out some simple tests which confirmed the opinions which were generally voiced about the behaviour of a number of polishes when subjected to some of the likely forms of damage. Each of six sample panels were tested and photographs of some of them are shown below to illustrate what happened. Besides the other tests each sample was scratched, but there was hardly sufficient difference in the degree of marking to make any fair comparison.

The results of the other tests, which we recognize as being unscientific but nevertheless giving a general indication, are shown in the table on page 818.

Finishes for improving the appearance

A decorative finish is usually required to enhance the wood and enable it to be kept clean.

The most common finish applied to all sorts of joinery is paint, but besides this there is a second group of finishes, all of which are more or less transparent: they are most often applied to hardwoods and the group includes varnishes, polishes and lacquers, and synthetic finishes.

Much has been written about paints, and knowledge of their characteristics and the means of applying them is readily available. This is not so true of the transparent finishes, which we shall speak of broadly as "polishes," and it is therefore about these that we propose to write. The painting of joinery is done—with the exception of priming—outside joinery works by an entirely separate trade. Although polishers are also a separate trade they have by tradition been much more closely allied to joiners, and one usually finds a polishing shop forming part of the works.

It so happens that refinements in the techniques of polishing, and particularly French

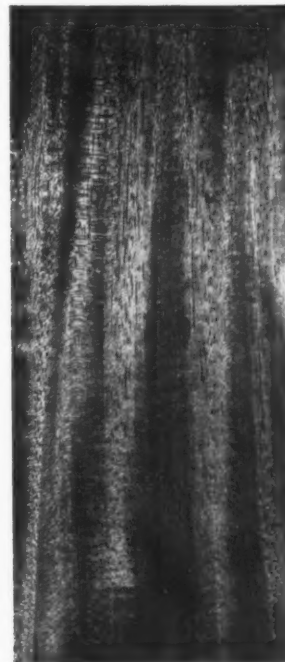
polished, which were tested to illustrate the degree of resistance to damage (see table on page 818)



French polish.



Synthetic varnish.



Synthetic resin finish.

	Cold water under cup left overnight	Ink spot	Hot cup	Cigarette burn	Gin
Oil seal	Nil	Nil	Nil	Through polish	Nil
Wax polish	Whitened	Stained	Dark ring	Through polish dark stain	White stain
French polish	Nil	Nil	White stain: polish melted	Through polish	White stain
Synthetic varnish	Slight mark	Nil	Very slight mark	Through polish	Nil
Cellulose lacquer	Nil	Nil	Slight destruction of film	Through polish	Nil
Synthetic resin finish	Nil	Nil	Nil	Nil	Nil

Above: results of tests carried out on mahogany samples (see illustrations pages 816, 817).

polishing, have been jealously guarded, and for this reason too there is less common knowledge about polishes than about paints. At the present time the kinds of transparent finish which are in use are:

1. Oils
2. Oil seals
3. Wax polishes
4. Liquid wax (stains)
5. French polishes
6. Varnishes
7. Varnish stains
8. Cellulose lacquers
9. Synthetic resin finishes (known loosely as plastic polishes).

We discuss these various finishes in some detail below, but architects will be more interested in their appearance, and in the particular qualities which have an influence in choosing from among them, than in details of their composition and the methods of applying them.

For those who are not familiar with the various kinds of polish it is perhaps worth remarking that however different they may be in composition or properties, there are a number of basic operations which are usually undertaken with them all, especially if the wood is to be fully polished.

These operations are sanding and scraping, stopping, filling, staining and colour matching, polishing and finishing.

When all these operations are undertaken with either French polish, varnish, cellulose or plastic polishes the difference between the various finishes is less easily discernible than is usually supposed. Indeed we doubt whether most people could for instance distinguish by a superficial inspection between a good cellulose lacquer and a French polish of comparable gloss. Oil polishes and waxes, and to some extent varnishes, are perhaps more easily distinguishable from the others and it must also be admitted that there is a subtle difference between oils, waxes and French polish which are rubbed in and varnishes, celluloses and other finishes which are applied on the surface. The quality of the final appearance of any polish is, however, always governed more by the degree of skill and care with which it is put on than by its intrinsic qualities. All the polishes can either be rubbed down or obtained in special form to produce matt and semi-matt as well as in gloss finishes.

Cost

In making a choice, the factors to be considered, apart from appearance, are cost, durability and resistance to damage, and the ease with which the polish can be renovated: it is easy, for instance, for a polisher to strip a French polish as is sometimes required in order to alter the colour of the wood. A comparison of the durability of various kinds of polish must take into account first whether the polish is to be used inside or outside. Broadly speaking varnishes are the most durable outside, and French polish is claimed as the most durable inside—that is there is less tendency for varnishes to flake craze or lose their gloss.

The cost of polishing varies considerably, and any one polish loosely specified could cost as much or as little as any other depending on the amount of preparation and care in finishing expended on it. It is impossible to give any accurate comparative or absolute figures, but since it is always useful to have some idea of the range of cost and to have in one's mind an approximate comparison we include the table below.

Preparation of the surface

Before any of these finishes are applied the wood has to be prepared: the object is to obtain a clean dry surface as smooth as possible, eliminating any roughness of the grain, scratches and tool marks, including those which are not easily recognized in the white but which would show up after polishing; and, possibly, either to alter the colour of the wood, or to make it uniform in colour.

Scraping, sanding and filling

The surface has to be made even smoother than it is when left from the plane, and in good workmanship the timber would first be scraped along the grain with a small piece of sheet steel having one edge sharpened, and then rubbed with glass paper. Even then there will remain, with some timbers, an unevenness between the summer and winter growth rings, and a coarseness of the grain which will prevent

Below: notes and costs of varying methods of polishing.

1. The price of any type of finish depends more on the quality of workmanship entailed than on cost of materials.	
2. The cost of labour is usually several times that of material. It may well be, for instance, 5:1.	
3. The prices given below should be taken as being for good quality work on plain surfaces, including filling, staining and rubbing down, etc.	
4. Floor finishes which may superficially appear to be similar in specification are not of the same quality and are much cheaper. e.g. "Body-in and twice wax" (for floors) "Prepare and apply two coats oil seal." Both about 3s. per yd. super.	The term "body-in" is here used loosely and refers to the customary application of a coat of shellac without a great deal of rubbing.
5. (a) Proprietary preservative (two coats), 2s. per yard Linseed oil (boiled) (two coats), 1s. 6d. per yard	
(b) Wax (bodying in and two coats) Oil seal (two coats) Varnish (four coats)	From 7s. to 10s. per yard
(c) French polish (full specification) Cellulose lacquers (full specification) Synthetic finishes (full specification)	From 20s. to 30s. per yard
N.B.—Rates for hand polishing should be measured per foot super but have been adjusted to read per yard super in this table for purposes of comparison.	
1. The cheapest possible finish is one coat of wax.	
2. For comparison knot prime, stop and paint 3 coats finishing glass = about 7s. per yard.	
3. 2 coats of varnish might cost about 4s.	
1. These prices relate to comparable finishes.	
2. The higher price is largely applicable to the synthetic resin finishes.	
3. All these can be applied to produce less highly finished surfaces and may then cost not more than half the figures quoted.	

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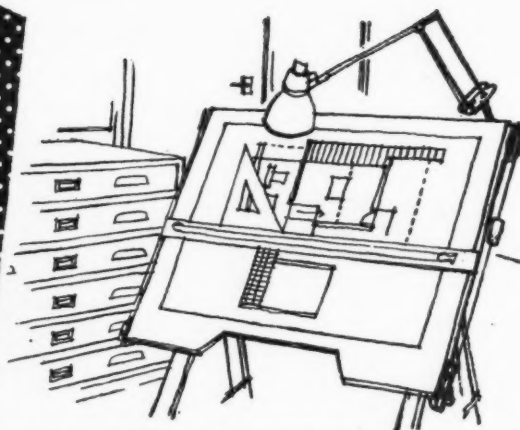
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the glass-like surface which is aimed at from being produced. To overcome this, and incidentally to provide even suction, a filler is used. If, however, a glass-like surface is not required, a surface dressing of gold size and turps or oil varnish can be used to equalize the suction.

Specifications should be very clear as to whether the filling process is required. It is not to be confused with "stopping"—the filling of holes—which one could expect to be done automatically by any reasonable firm: it is, on the contrary, a process which could add considerably to the cost, and a point should be made of ascertaining whether or not it is included in prices received for work.

Fillers

It is beyond the scope of this article to describe all the various kinds of filler, many of which are patent. It is possible, however, to make a broad classification which may be helpful, and in the first place a distinction can be made between fillers used in paintwork and those used before polishing.

Reliable fillers used in paintwork are of two kinds: *lead paste* fillers for external work, and *leadless paste* fillers for internal work where the rubbing down of materials containing lead is prohibited under the Factory Act. They are applied fairly thickly with a broad knife and rubbed down across the grain. They should always be applied over a primer.

Fillers for transparent finishes are of three main kinds:

1. Direct filling, a combination of French polish and pumice powder. The polish is applied with a muslin bag containing pumice powder which gradually fills up the pores. This kind of filling is used only in preparation for "French polishing." It is laborious, but is said to give the best results.
2. Paste fillers consisting of whitening or china clay in a medium such as methylated spirits or turpentine. These are applied with a rag and wiped off across the grain. Different woods require fillers of different tints and the polisher may either add his own stain to the filler or obtain a tinted filler ready made.
3. Special fillers for plastic polishes and celluloses whose solvents would remove the medium of an ordinary filler.

Staining and matching

The staining of wood is also a preparatory process which may be required for one of three reasons: either to conceal any uneven natural colouring, or to darken the wood or to make a cheap wood look like an expensive one. Fortunately more regard is now had for the natural characteristic appearance of many varieties of wood, and there is less desire to produce imitations.

We have already said that colour can be incorporated in paste fillers, but it is also possible to apply the stain separately.

There are a number of colouring materials which are useful in staining woods, and

partly because they are not all soluble in any one medium several kinds of stain are marketed. These are water, spirit, oil, varnish, wax, and chemical stains for liming oak. Each of these has its own characteristics which determine the choice: broadly speaking, spirit (and especially naphtha) stains are preferable to water stains which tend to raise the grain, although there are craftsmen who prefer to use the latter. Oil stains are said to be the most lasting and can be used in conjunction with any kind of finish.

Varnish stains are strictly a "finish" in themselves and are discussed later in this article.

Whilst dealing with the preparation of wood before finishing, mention should be made of the possibility of *bleaching*. This is done with proprietary preparations applied with a brush: many of them have a basis of oxalic acid. *Fuming* is another preparatory process in which the timber is subjected to ammonia fumes. It darkens the timber and is by custom more often applied to oak than to other timbers: fuming is usually followed by a wax polish.

Yet another treatment for oak is *liming*: this consists of leaving slaked lime in contact with the timber until it has become a light grey and then brushing it off and wax polishing.

Oils

The use of linseed oil on hardwoods exposed to the weather is well known. It is usually put on in two coats, and either raw or boiled linseed oils are used. The boiled oil is the thicker of the two and dries more quickly. The oil improves the appearance of the timber but contrary to popular belief does very little to protect it against the effects of the weather. It collects the dirt and the dust and needs to be cleaned off and re-oiled at intervals as short as three to six months.

Another less well known use for linseed oil is as a polish. By a continuous series of applications and rubbing it is possible to obtain a fine lustrous finish which has the great merit of withstanding heat and water. The process is now rarely used commercially because it is laborious and thus an expensive one. It is said that continuous rubbing of linseed oil will produce instantaneous combustion—so would-be polishers should beware!

Oil seals

Various oils by themselves or in combination are used for the treatment of floors to produce hard, smooth, non-slip surfaces: there is much confusion in the names they are given by the trade, for some of the oils designed primarily as a basis for wax polishing are known as "seals," whilst others with the same name are intended to be in themselves a "finish" to the floor. Most of these oils when used as "primers" for waxing have a basis of "tung" oil, though linseed and other drying oils are sometimes used alone.

When designed to produce a "finish" tung oil is used and is submitted to a heat process which alters its characteristics, especially in

so far as it dries harder and is therefore longer lasting in use. A finish of this kind generally needs renewing every one to three years depending upon the amount of wear to which it is subjected. It renders the floor proof against dirt, grease, ink, water, and can be cleaned by damp mopping: on the other hand it does not produce a slippery finish and is often used in gymnasia. It can also be used as a polish to ordinary joinery components, and especially when rubbed down to produce a semi-matt finish, is very satisfactory.

Wax polishes

The simplest finish, with or without the preliminary treatment just described, which is practical and effective and reasonably cheap, is a wax polish. This kind of polish fills the grain adequately unless it is very open, and it is therefore not usually necessary to apply a separate filler: on the other hand the process of obtaining a high polish with wax may be speeded up by applying first a coat of one of the varieties of French polish discussed below, and this is termed "bodying in."

Wax polish itself consists of beeswax and turpentine and is applied as a paste merely by rubbing with a soft cloth. Proprietary wax cleaning polishes which are obtainable in paste or liquid form are similar but have a spirit base: they can be used for treating raw wood but the paste type having more body is preferable to the liquid. In both these forms they are used for maintaining all the other polishes.

Properties of wax polish

Wax polish slightly darkens the wood whilst bringing out its natural colour, and the surface it imparts has a sheen but not a glass-like finish. The extent of the gloss depends upon the amount the wax is rubbed. Much of it is absorbed into the wood, and what remains on the surface stays relatively soft. For this reason it is more inclined to collect dust than other harder finishes.

It does not withstand the weather, heat, water or other liquids. For this reason it cannot be used successfully out of doors nor is it really satisfactory for table tops or other positions where it may be subject to heat or to water. It is nevertheless a most useful polish for doors, fittings, panelling and also for floors. It is easily applied on site. Scratches do not show on it to the same extent as on finishes with a high gloss, and it does not suffer from defects such as blooming, crazing, orange peeling, etc., to which other finishes are sometimes liable. A hint worth knowing is that the very obvious white marks which are formed by water can usually be removed by rubbing gently with a mixture of linseed oil and methylated spirits.

There are on the market liquid wax polishes which are applied by a brush instead of by rubbing in. After drying, most of them have to be burnished to produce a sheen: amongst them there are special water-wax emulsions which don't need burnishing afterwards.

Recently, silicones have been incorporated in the manufacture of both liquid and paste wax polishes to ease the spreading of "hard" waxes, which are said to give the best

* "Stopping" may be either "hard"—a conglomerate of beeswax resin and orange lac which has to be used hot—or "soft"—a putty made of Plaster of Paris, whitening and oil. Both kinds of stopping can be coloured to match the wood.



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polishes but which would otherwise be difficult to apply.

Liquid wax stains

There is a well-known proprietary combined liquid-wax finish* obtainable in clear form or in combination with stains. It is claimed that it enables a stained and wax finish to be obtained in one coat. Also, it builds up a sufficient body in this one coat to provide a sheen after burnishing. It is claimed that in its clear form it darkens the timber less than other wax polishes. It is widely used both in the furniture and building industries since it produces an acceptable finish at an economical price.

French polishes

Until the introduction of cellulose and other synthetic polishes, French polishing was recognised as the most important of the internal finishes, demanding considerable skill in its production. It is by no means superseded by other forms of polish, and despite its limitations many people consider that it gives a more beautiful finish than any other. Each craftsman built up his personal techniques and was reluctant to disclose the means which he learned from experiment and experience for obtaining particular results.

French polishing is not merely the application of a single polishing medium but a system permitting many variations by the choice of the basic polish and the incorporation of stains. In fact one of the main attributes of French polishing is the ease with which particular shades of colours can be introduced, and variations in colour in the natural wood eliminated, if required, to provide a uniform colour to match a sample. The "colour" refers to shades of yellow and brown and grey, and it is not suggested that the wood can be stained bright blue!

Types of polish

The polish itself consists of a "lac," which is a resinous encrustation from an insect found on trees growing in South Eastern Asia, and afterwards dissolved in methylated spirits. The raw lac from the tree is processed by being melted and either flowed on to pieces of wood where it sets in thin layers and is then known as "shell-lac" (shellac) or dropped into water when it forms button-like discs and is then known as "button" lac. Button lac is a little lighter in colour than shellac.

These particular lacs, when mixed with methylated spirit, produce brown polishes which have a darkening effect in use. There is one other well-known variety—in all there are about 28—known as "garnet" polish which is darker but has less body and is therefore more transparent than most of the others.

"White polish" and "transparent polish" are made from bleached lac and do not have a darkening effect though they are considered to be less durable.

Application

"Bodying-in" is the first part of the process of French polishing after filling and

staining—though the latter may be incorporated in the polish—and consists of a series of preliminary and liberal applications of polish. As already mentioned, wax polishing may also be preceded by "bodying in" in exactly the same way with a lac. For economy—both in wax and French polishing—a polish known as "brush" polish can be used. It has more body and consists of a lac to which gums have been added.

The next part of the process is known as "bodying up" and consists in further thin applications of polish applied with a rubber (a pad of cotton wool wrapped in linen) with linseed oil as a lubricant. The number of applications and the amount of papering and of drying between them are matters of judgment and depend on the kind of wood and the finish required.

Finally the last coat of polish is softened by rubbing with another pad dipped in methylated spirits, the effect of which is to eliminate all rubbing marks and to produce a highly glazed surface. This is known as "spiriting out." French polished surfaces may be maintained by wax polishing.

Properties of french polish

French polishes are not ordinarily proof against heat or water or spirits: they are used outside on shop-fronts but need frequent renewal, even if special grades of polish are used. French polishes are associated by tradition with all kinds of furniture, doors, handrails, and high-class joinery, but much of the work which formerly would have been French polished is now cellulosed, especially such things as tables, radio cabinets, and factory made components which can be accommodated in the spray booths used in the process of cellulosing.

Varnishes

A broad distinction can be made between the polishes which we have already discussed, and varnishes, celluloses and plastic finishes. The polishes are rubbed in and the others brushed or sprayed on and when well applied produce a more brilliant surface than rubbed finishes. Varnishes have a characteristic appearance and can usually be detected by the dust particles which almost invariably collect on the surface; in fact one of the difficulties in using varnish is to ensure that it is applied under suitable conditions: dust and draughts have to be avoided, and the air should remain at a constant temperature whilst the varnish dries.

There are two types of varnish, oil and spirit. The names derive from the media in which the resinous substances, which are their main constituent, are dissolved. Oil varnishes are the main type—and the notes that follow are concerned with them—spirit varnishes being used only for special purposes.

Oil varnishes

These are prepared from hard natural or synthetic resins, together with one or more oils. They dry and harden by a relatively slow process of oxidation, the time taken

to oxidise depending on the nature of the ingredients and, of course, the conditions under which the process takes place.

There are many kinds of varnish and very often the individual varnishes retain the descriptive names of the uses for which they were originally compounded: for instance, church oak, crystal paper, elastic copal carriage, engine copal, pale copal yacht, front door, etc. They all fall within four main groups known in the trade as white, pale, medium and dark.

It will be noticed from this list that varnishes are made for both outside and inside use. In general, those for external use contain a larger proportion of oil (in relation to the amount of resin) to increase their flexibility and durability, and these are known as "long oil varnishes." Those with less oil are correspondingly known as "short oil" varnishes and thus dry harder, without tackiness and with a more brilliant finish. Their use should be confined to interior work.

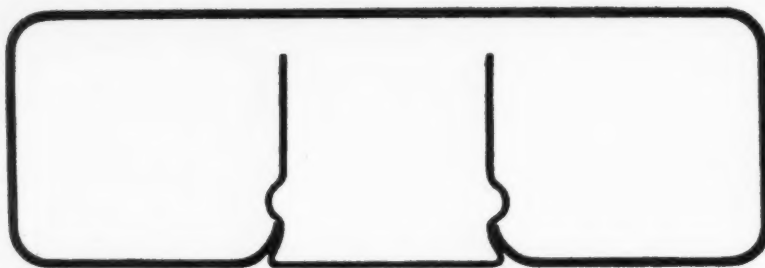
The nature of the oil, as well as its quantity and treatment, affects the performance of the varnish; those containing a proportion of "tung" oil are more durable than those with only linseed oil and withstand extremes of exposure better. The use of synthetic resins instead of natural resins also makes the varnish more durable, and incidentally rather paler.

There are special varnishes which can be used inside only which are formulated to produce semi-gloss or matt finishes. These contain wax or other substances to dull the finish (those containing no wax have the advantage that, if necessary, they can be painted or varnished over without first removing the varnish). Sometimes it may be thought particularly desirable to retain the natural colour of the wood and for this yet another kind of waxless flat varnish can be obtained which is almost invisible when applied. It can be used as a finish or as a base for a gloss varnish, the point of the latter being that the resultant finish will not be as dark as it would otherwise have been.

Preparation for varnishing

The preparation of the wood for varnishing is not as elaborate as it is for other kinds of finish. It may, however, be necessary to stain the wood and in new work to equalise the suction over the surface to be treated: for this some craftsmen advocate sizing and others a coat of french polish. Alternatively the unequal suction can be overcome by applying extra coats of varnish, although this is likely to be more expensive. Unlike the polishes described previously, varnishes can be rubbed down with water as a lubricant using a special abrasive paper known as "wet and dry." This should be done between each coat. Occasionally a pale varnish is used to add permanence to French polished work when it has to be exposed to the weather. There was a time, less than 50 years ago, when varnish was universally used over flat paints to give them life and gloss: ready-mixed gloss paints and enamels were not then known.

* Stainax



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or other equipment. A 4-way 2-pole connector block (patent applied for) specially designed for use in trunking can be supplied if required. A unique feature of Ediswan trunking is the space available for handling wiring after the original installation has been completed because the interior walls which create the three separate ducts are part of the cover strip. They are therefore withdrawn when the cover strip is removed and there is ample space for manipulation.

Suspension, Surface Mounting, Recessing. Ediswan shallow trunking is suitable for all normal methods of suspension; for new buildings it may be incorporated in concrete to form a flush surface, or recessed in plaster or acoustic tile ceilings. Because of its smooth, unobtrusive appearance it is particularly suitable for use in Departmental Stores or Offices.

Cut Costs Trunking systems of any type normally show substantial savings due to lower labour costs, fewer suspension points, and the elimination of multiple conduit runs. Ediswan shallow trunking gives additional valuable savings because it is designed for use with standard conduit accessories and suits standard lighting fittings—and the cost of the trunking itself (in steel) is only 3/1d. per foot approx. (in 0.1" extruded aluminium approx. 5/5d. per foot) plus accessories.

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L.E. 203 A

Properties of varnishes

It will be seen from what has been said about varnishes that whilst they do not produce so mellow a finish as French polish they can last much longer out of doors and they are none of them so liable to marking from water, spirits or moderate heat as French polish. The materials for varnish are expensive but the labour in producing a finish is less than that needed for French polishing: the whole process is cheaper, and is comparable to the cost of painting. The life of varnish is also much the same as that of paint when used outside—on the other hand, varnish finishes deteriorate by cracking, whereas paint often deteriorates by "chalking." The former entails complete removal before retreatment but the latter forms an excellent base for further coats of paint.

Varnish stains

Combined stains and spirit varnishes are sold under proprietary brands for floor margins and other amateur work where their cheapness and quick drying are welcome.

Cellulose lacquers

Whilst French polishes are applied by rubbing, and varnishes by brushing, celluloses are almost invariably sprayed on. The result of spraying is to produce a surface film in much the same way as the brushing on of a varnish, but in other respects cellulosing is more nearly akin to French polishing. It is in fact used as a substitute for it, and was developed in order that the characteristic appearance of French polish could be produced with less labour and skill and at less cost.

It is true that cheap cellulosing may consist of nothing more than the application of very few coats of cellulose on an unprepared ground: this would not constitute a satisfactory finish, and would admittedly bear no relation to French polish. On the other hand it is possible with cellulose to carry out many processes similar to those associated with French polish, and to produce more quickly, and at less cost, a finish which, in appearance, is hardly distinguishable from it. It would be natural to expect that the two kinds of finish would have different properties, and in fact cellulose is known not only to have a shorter life than French polish, but also to be harder and more brittle—but as a consequence to deteriorate eventually by cracking, which involves removal of the whole film if it is to be put right. Neither of the finishes is ordinarily suitable for exterior use. Experience has proved, however, that French polish, when used inside, has great durability although it is more susceptible than cellulose to damage by heat and water and spirits. These deficiencies in French polishing are irritating, especially to the owner of the polished object, but to the polisher they are less worrying since it is always possible to put right a small area and to match it with the remainder.

One must also take into account that sprayed cellulosing (brush-applied celluloses can be discounted for all large-scale work) requires

mechanical equipment and special conditions for application. In general this means that the work must be done in a spray booth, and site work has to be restricted to a minimum. Portable spraying plant is available, but it is not of course convenient to use in, for instance, an occupied house.

The formulation of cellulose lacquers

At this stage the reader may be concerned to know exactly what cellulose is. Used with reference to polishes, the word is a loose term for cellulose nitrate. This is made from cotton dissolved in solvents such as acetone or butyl acetate. To these are added various gums and resins to increase gloss, and plasticizers such as butyl phthalate to lessen normal brittleness of the cellulose and give more flexibility. Pure cellulose when dry is almost "flat," and it is consequently not difficult to produce semi-gloss and eggshell finishes without having to rub the work down.

Preparation for cellulosing

In order to obtain a good finish the preparation of the wood surface should be similar to that for French polishing. The wood must be "dry" to avoid peeling of the cellulose coats, and all surface marks and scratches must be eliminated by papering. The grain should be filled and, if required, the wood stained and sealed. The filling is done with either oil-thinned fillers (with a basis of barium sulphate, whitening, etc.) or waterfillers (with casein or gelatine) which are water soluble as a basis.

Stains and sealers are specially formulated for use with cellulose but serve the same purpose as in French polishing.

Finishing and burnishing

In cheap work glossy celluloses can be left without further treatment, but if the full process of polishing can be afforded, the cellulose can be bodied up and finished off in a variety of ways including hand rubbing. One of the finishing processes is known as a "pull-over." It is similar to the process of "spiriting out" and is done by hand, using a solution of solvents and diluents of just sufficient strength to dissolve the surface of the lacquer. Other methods of finishing are by cutting down with pumice powder and water and finishing off with wax or burnishing with a special cream.

It will be realised that it is important when specifying cellulosing to make clear what quality of polish is required and, as is advisable with all finishes, to work to a sample.

Synthetic resin finishes

Cellulose polishing was developed in an attempt to overcome the deficiencies of French polish, and the introduction of synthetic resins have given rise to the development of so-called "plastic" polishes which in turn are in some ways superior to both French polish and cellulose. Amongst other things, it is claimed that they are

at least as durable as French polish and it is known that they withstand heat, water, grease, acids and alkalis and if specially formulated they can be used for outside work. The polishes are relatively new and there is not much experience of their use outside. They can be brushed or sprayed on. It is claimed that the surface which is extremely hard, does not crack or flake and that it does not chip easily. Nevertheless, the one great disadvantage is that if they are accidentally scratched or damaged they are difficult to patch, and whilst it is possible to maintain them normally by sanding and applying additional coats, it is extremely difficult to get them off altogether should this be required. Some of them also have a marked darkening effect.

In general the material itself is expensive and since the preparation of the surfaces to receive the polish is much the same as that for French polishing and cellulosing but with stainers, fillers, and burnishing creams designed for use with the plastic polish, the whole process is relatively costly.

The polishes are made from synthetic resins such as phenolics, ureas and epoks with thinners, and catalysts or hardeners.

There can be little doubt that for such positions as bar tops, fume cupboards, laboratory benches, shop counters, and all joinery which comes into contact with substances which are likely to destroy either French polish or cellulose, plastic polishes ought to be most useful and a valuable addition to the range of available finishes. They can be applied by brush or spray, but owing to their quick rate of drying it is preferable that they should be sprayed: for this reason it is obviously more convenient to apply them in a workshop than on site, although the latter is not impossible. With cold-setting resins some hours have to be left between coats, and it is important that on completion the surface be kept within a particular range of temperatures for several days, depending on the particular grade of polish.

There is, however, a technique used mainly in polishing furniture, in which the polish is "stoved" in humidity-controlled ovens. The process takes in all about one hour. If this technique were extended we might perhaps look forward to a time when joinery components such as windows and doors leave the factory with a stoved waterproof finish.

It should be mentioned that the manufacturers of plastic polishes produce many grades each designed for a particular use and their advice as to selection and application should be sought, especially since most craftsmen are unfamiliar with the material and it is essential that instructions be closely followed.

Acknowledgements

The authors wish [to] acknowledge the most valuable help given by Messrs. Hadfields (Merton), whose Mr. J. A. Evans discussed the subject matter with the authors and prepared the samples: also the help given by Messrs. Hamptons in permitting photographs to be taken in their polishing shop.

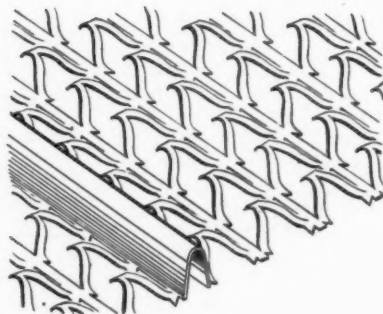
Much information was also obtained from the excellent publication "Wood Finishing," by H. T. Davey (Sir Isaac Pitman & Sons Ltd. London, 1940.)



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* Supplied by gypsum plaster manufacturers under the trade description Special Haired Plaster.



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THE INDUSTRY

From the Industry this week Brian Grant reports on a new range of lighting fittings, a water heating conversion unit, two new types of dampcourses, a booklet on interlocking tiles, a vitreous china wash basin and a cistern float.

LIGHTING FITTINGS

A new range of lighting fittings has been designed for Hume Atkins & Co. Ltd. by Misha Black of Design Research Unit. They have been designed chiefly for use in schools, shops and canteens and consist of globes of white translucent glass to which metal caps have been added to concentrate the light downwards, while allowing a certain amount of side-throw to illuminate the ceiling. The fittings will accommodate lamps from 100 to 200 watts, but some of the shapes are also made in smaller sizes for 40- and 60-watt lamps, which can be used as single pendant fittings. The fittings are produced in a number of standard colours and the caps are available in alternative piercings. (Hume, Atkins & Co. Ltd., New Icknield Way, Letchworth, Herts.)

WATER HEATING BY PARAFFIN

The Valor Company, who for many years have produced paraffin heaters and cookers, have now produced a conversion unit for providing hot water from the ordinary domestic boiler. The installation consists of a burner, a metering valve and a three-gallon paraffin container. The burner is fitted inside the boiler after all fire bars and any firebrick linings have been removed. The paraffin tank must be mounted at about the same level as the burner, but otherwise it can be placed wherever is most convenient, or alternatively, the burner can be connected to a large size outside bulk storage tank. The unit is produced in two sizes, having outputs of 25,000 and 50,000 BTU's per hour, with a paraffin consumption of 1½ or 2½ pints of paraffin per hour for the two models. Prices are £11 15s. and £13 5s.

In small boilers having no waterway in the top plate, one would not expect the efficiency of heat transfer to be very high. In country districts, however, where there is no gas or electricity supply, these units may be well worth while to any householder who has a real detestation for emptying ashes and breaking up clinker. The fuel consumptions quoted above are maxima and can be reduced to as little as half a pint per hour if only small quantities of water are required. (The Valor Co. Ltd., Bromford, Erdington, Birmingham, 24.)

DAMPCOURSES

Asbex and Permalume are two new types of damp course, the former being composed of asbestos and bitumen and being both flexible and resistant to vibration. This type is also produced with a lead core. Permalume is hessian based and has an aluminium core protected on both sides with bitumen. It has been specially produced to meet the demand for a metal-based damp course which will be sufficiently flexible to resist both vibration and settlements. Both damp courses are described in leaflets which also contain detail drawings to show how the materials should be used in foundations and parapet walls. (Permanite Ltd., 455 Old Ford Rd., London, E.3.)

INTERLOCKING TILES

The Redland Tile booklet has been revised and now provides a great deal of technical information. The tiles dealt with are of two types, the 49, a standard interlocking tile 15 in. by 9 in., and the 50, a Roman pattern interlocking tile 16½ in. by 13 in., both these tiles and their associated valley troughs are guaranteed against decay or lamination for 50 years. The booklet contains a number of drawings which show typical fixing details at eaves ridges, abutments and verges, and there are also fixing notes and tables of rafter lengths and the number of courses required to maintain a 3 in. lap, so that the total number of tiles for the roof can be easily determined. (Redland Tiles Ltd., Moorhouse, Nr. Westerham, Kent.)

NEW WASHBASIN

A new Armitage ware washbasin known as the Debdale has just been announced by Edward Johns & Co. It is produced in standard sizes of 25 in. by 18 in. and 22 in. by 16 in. and in six colours or in white, and is made only in vitreous china. Two models are produced, for pedestal or bracket mounting; both models are generally fitted with pillar taps at the side of the basin and a chain waste, but they may, as an alternative, be punched to take a mixer fitting and a pop-up waste. In general the design is smooth and easy to clean, and has the formal blessing of the COID. (Edward Johns & Co. Ltd., Armitage, near Rugeley, Staffs.)

PLASTIC CISTERN FLOATS

A seamless cistern float made of polythene has just been introduced by Associated Builders Merchants. It is made in one size only and has the same performance as a standard 4½ in. diameter copper float to BS. 24 56. The polythene float is the same length as the copper type, but its diameter is smaller and there is not, as a rule, any need to use a bent ball-valve arm. A production technique very much like glass blowing is used: a piece of warmed polythene tube, closed at one end, is placed in a split metal mould. Hot air under pressure is then applied and this completes the softening process and expands the polythene to the shape of the mould. (Associated Builders Merchants, Peters Hill, Upper Thames Street, E.C.4.)



Above, part of the new range of light fittings designed by Misha Black for Hume, Atkins & Co., Ltd. Below, one of the new Armitage ware washbasins, by Edward Johns & Co., Ltd.



Buildings Illustrated

Secondary Modern School, The Parks, Bar-gate Road, South Belper, Derbyshire. (Pages 797-814.) For the Derbyshire County Council. *Architects:* F. Hamer Crossley, DIPL. ARCH. (L'POOL), F.R.I.B.A., County Architect, in collaboration with the Development Group of the Architects' and Building Branch, MOE, Anthony Pott, A.R.I.B.A., Barbara M. Price, B.A. (CANTAB.), A.R.I.B.A. (architect in charge), D. G. Barron, A.R.I.B.A., A.M.T.P.I. (MOE), G. J. Foxley, DIPL. ARCH. (POLY.), A.R.I.B.A., and J. T. Taylor, DIPL. ARCH. (B'HAM) (Derbyshire County Council). *Quantity Surveyors:* J. Nisbet and R. King (MOE). *Structural engineers and sponsors of the system:* J. Brockhouse & Co. Ltd. *General contractors:* F. Troy & Co. Ltd. *Sub-contractors:* pre-cast plaster partitions, fibrous plaster ceilings: John Kent (London) Ltd. *Metal windows, external and internal doors, metal subframes, metal patent glazing for greenhouse, metal rooflights, blinds and curtain boxes:* Henry Hope & Sons Ltd. *Asbestos-cement sheeting, fascia and flashing pieces:* Turner Asbestos Co. Ltd. *Structural steelwork:* Brockhouse Steel Structures

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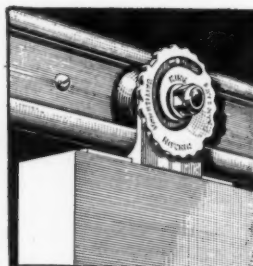
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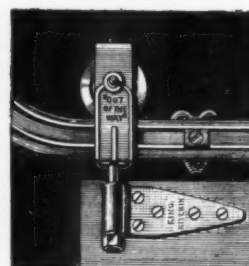
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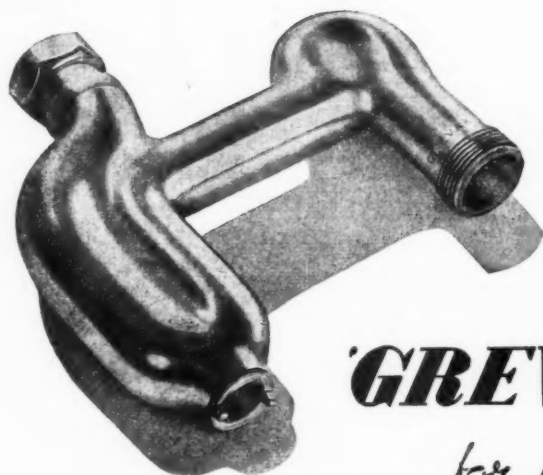


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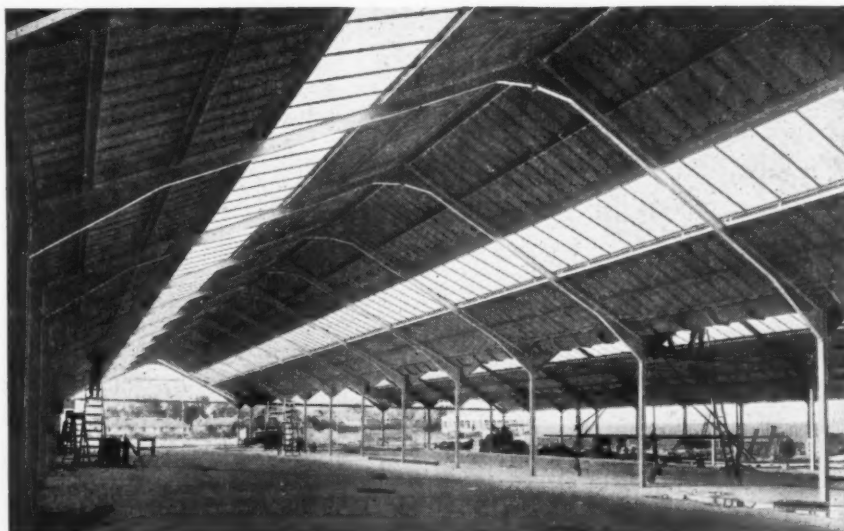
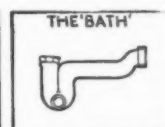
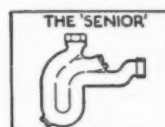
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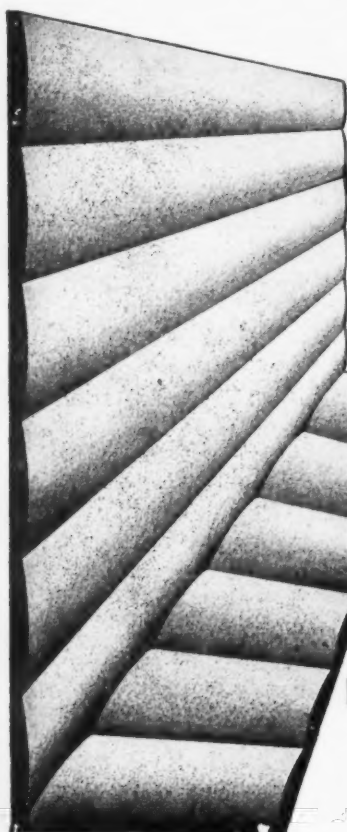


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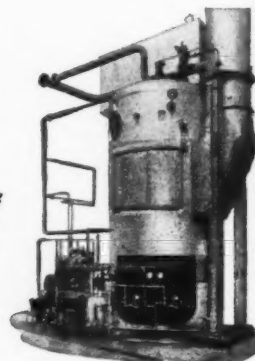
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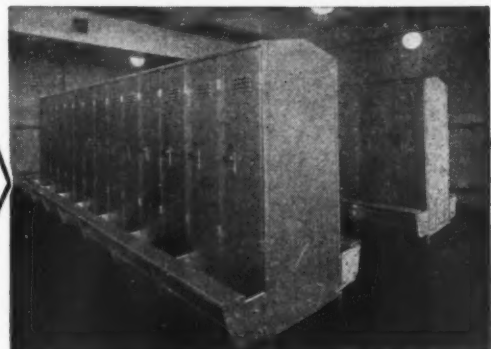
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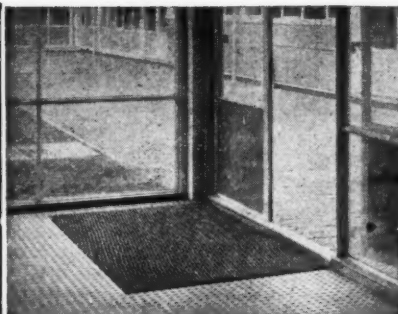
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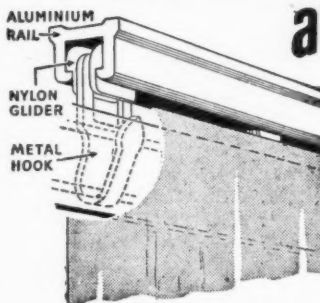
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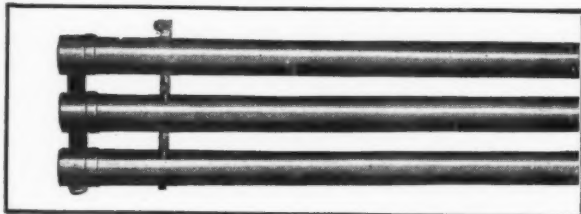
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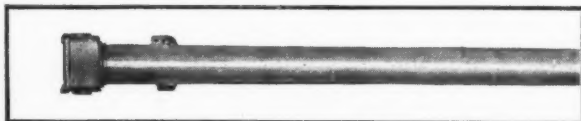
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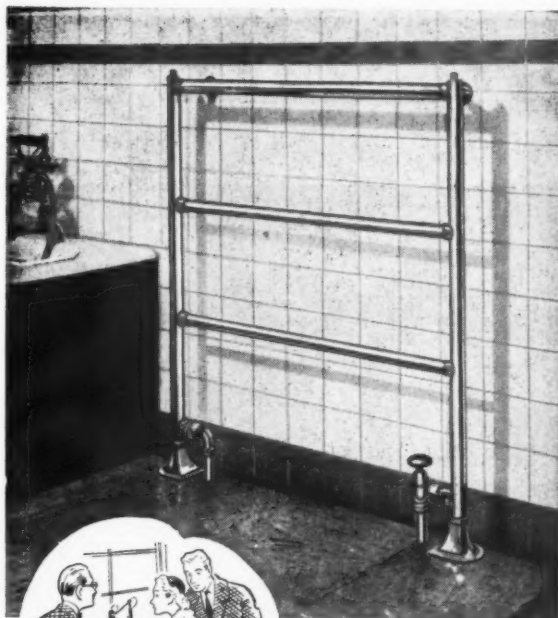
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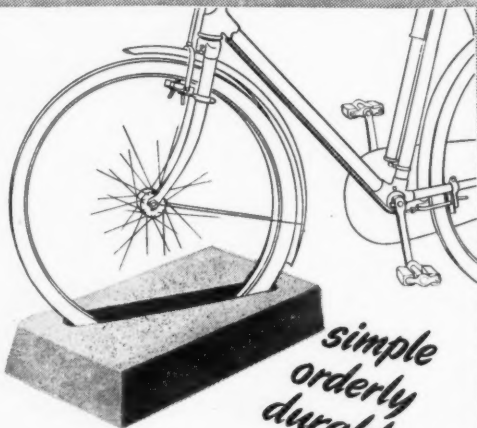
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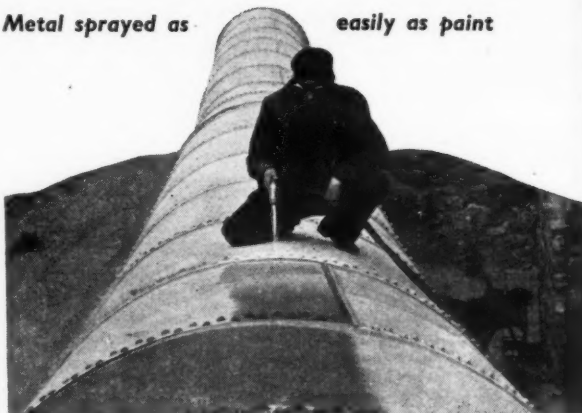
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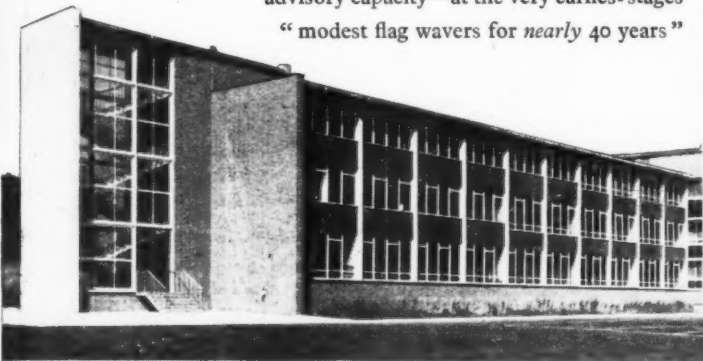
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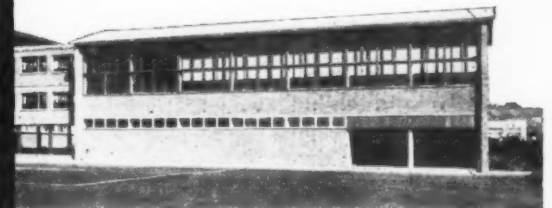
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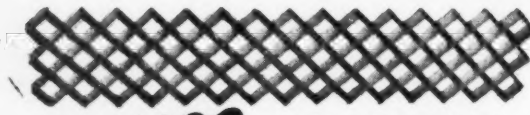
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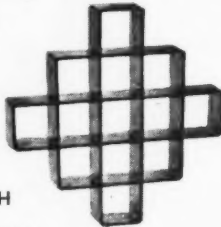
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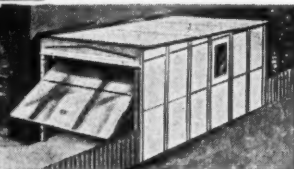
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Replies to Box Numbers should be addressed care of "The Architects' Journal," at the address given above.

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The appointment will be within Grade A.P.T. VII (£900-£1,100 per annum) at a commencing salary according to experience.

Applicants must be Associate Members of the R.I.B.A., or hold an equivalent qualification, and should have an extensive knowledge and experience of design, administration, and organisation of housing schemes.

The post is permanent, superannuable, subject to a medical examination, and to one month's notice on either side.

Applications, endorsed with the heading of the post, stating age, present position and salary, qualifications and experience, together with the names of two persons to whom reference can be made, should reach the undersigned not later than 17th December, 1955.

Canvassing disqualifies.

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Applications are invited for:—

(a) ARCHITECTURAL ASSISTANT (PERMANENT), Grade A.P.T. II, i.e., £560-£640 p.a.;

(b) SENIOR ARCHITECTURAL ASSISTANT (TEMPORARY), Grade A.P.T. IV, i.e., £675-£825 p.a., plus London weighting in both cases, 21-25 years £20 p.a., 26 years and over £30 p.a. Candidates for (a) must have passed the R.I.B.A. Inter. Exam., good experience of housing work with a local authority; (b) must be a Registered Architect, have good general experience in design and construction in relation to municipal housing and other works, and capable of supervising large building contracts. The Council is unable to provide housing accommodation for either of these appointments. Further particulars and form of application available from the undersigned, which when completed must be returned as soon as possible.

GEORGE HOOPER,
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Town Hall, Hayes, Middx. 3712

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(c) BUILDING SURVEYOR, A.P.T. III (£630-£755 inclusive). Qualification required: A.R.I.C.S. (Building). No housing provided. Application form from Town Clerk, Town Hall, S.E.5. Closing date Wednesday, 21st December, 1955. 4915

CARSHALTON URBAN DISTRICT COUNCIL.
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The Council will assist the successful applicant in the provision of housing.

Applications on forms obtainable from the undersigned must be returned with names of three referees not later than the 5th January, 1956. Canvassing will disqualify.

C. H. DURRANT,
Clerk of the Council.

District Council Offices,
The Grove,
Carshalton, Surrey. 5049

LINDSEY (LINCOLNSHIRE) COUNTY COUNCIL.

ARCHITECT'S DEPARTMENT.

Vacancy on the permanent staff for:—

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N.J.C. Conditions of Service. Canvassing will disqualify. Candidates must disclose in writing whether to their knowledge they are related to any Member or Senior Officer of the Council.

Applications giving age, qualifications, experience and names of two persons to whom reference can be made, to be sent to the undersigned not later than Friday, 16th December, 1955.

A. RONALD CLARK, A.R.I.B.A., A.M.T.P.I.,
County Architect.
County Offices,
Lincoln. 4905

EAST ANGLIAN REGIONAL HOSPITAL BOARD.

Department of the Regional Architect (Guy Aldis, A.R.I.B.A., A.A.D.I.M.) for planning of a scheme for the major development of a General Hospital which the Board is about to undertake.

(1) ASSISTANT ARCHITECTS.—Candidates must be qualified and registered architects and possess good general experience in design, construction and specification writing. Knowledge of hospital work desirable. Salary £640-£930 per annum.

(2) ASSISTANT ENGINEER (Mechanical).—Candidates to be experienced in design and installation of heating, ventilating, steam boiler plant and services, etc., and should be A.M.I.H.V.E. or Graduate Members of I.H.V.E., or equivalent. Salary £640-£930 per annum.

(3) ASSISTANT ENGINEER (Electrical).—Candidates to be experienced in design and installation of electrical engineering services and should be A.M.I.E.E., or Graduate Members of I.E.E., or equivalent. Salary £640-£930 per annum.

(4) ENGINEERING ASSISTANTS.—Candidates to be experienced in work described above and possess Ordinary National Certificate (Mechanical or Electrical). Salary £480 (at age 21 or over)—£670 per annum.

(5) DRAUGHTSMEN (Engineering).—Candidates to have had suitable training and experience. Salary £390 (at age 21 or over)—£580 per annum. Additional increments within the scale based on experience and age may be granted in respect of posts (1), (2) and (3). Commencing salary for post (4) may be fixed at point above minimum but will not exceed £560 per annum.

Applications indicating appropriate post and stating age, qualifications, experience and details of present position with names of three referees, to Secretary of Board, 117, Chesterton Road, Cambridge, by 23rd December, 1955. 4932

CARLTON URBAN DISTRICT COUNCIL.

APPOINTMENT OF ARCHITECTURAL ASSISTANT.

Applications are invited for the above appointment at a salary in accordance with A.P.T. Grade IV, viz.: £675 x £30-£825, the point of entry to be determined having regard to the applicants' experience.

Qualifications: Final R.I.B.A. or Registered Architect.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, National Scheme of Conditions of Service and to satisfactory passing of a medical examination.

Applications stating age, qualifications and details of experience, together with names of three referees to be forwarded to the Engineer and Surveyor by 10 a.m. on Monday, 19th December, 1955.

Housing accommodation will be made available and removal expenses will be paid by the Council.

A. E. F. WALKER,
Clerk of the Council.

Council House,
Burton Road, Carlton,
Nr. Nottingham.
25th November, 1955. 4934

BOROUGH OF SOLIHULL.

ASSISTANT ARCHITECT: A.P.T. Grade IV (£675-£825).

Applications are invited for the above mentioned post in the Borough Engineer and Surveyor's Department.

Solihull has a population of 75,000 which is to increase to over 100,000 during the next few years, and the appointment is primarily in connection with the large programme of schools and capital work schemes, including libraries, crematorium, corporation depot, etc., which are in hand as a result of the rapid expansion of the Borough.

No application forms are being issued, but the Borough Engineer will be pleased to answer specific questions regarding the position.

Applications, giving the names of two referees must be sent to Mr. C. R. Hutchinson, B.Sc., A.M.I.C.E., Borough Engineer and Surveyor, 90, Station Road, Solihull, not later than 21st December, 1955.

The appointment is subject to the Local Government Superannuation Acts, the National Scheme of Conditions of Service and one month's notice.

In appropriate cases housing accommodation will be made available as soon as possible.

W. MAURICE MEYLL,
Town Clerk.

28th November, 1955. 4947

BOROUGH OF LEYTON.

(Non-County Borough in County of Essex.
Population 103,200. R.V. £784,110.)

Applications are invited for the following permanent appointments at salaries in accordance with the National Scales indicated:—

(a) TWO ASSISTANT ARCHITECTS, A.P.T. Grade V (£780-£930 per annum).

(b) GENERAL ARCHITECTURAL ASSISTANT, A.P.T. Grade III-IV (£630-£866 per annum).

The above salaries are inclusive of London Weighting (£30) which is reduced according to scale where the age of the successful applicant is less than 25 years. The commencing salaries will be fixed at a point in the scale according to the qualifications and experience of the successful candidate.

Candidates for appointments (a) must be Associates of the Royal Institute of British Architects and must have considerable experience in contemporary design and the construction and supervision of multi-storey flats. Candidates appointed will be employed in connection with the Corporation's extensive programme for Redevelopment Areas.

Candidates for appointment (b) must be Registered Architects and should have good experience in the design, construction and erection of public buildings. The successful candidate will be primarily engaged on the completion of a project for a Central Library.

Housing accommodation may be made available if required.

Alternate Saturday mornings are free of duty and canteen facilities are available in the Town Hall.

Details of the above appointments and forms of application may be obtained from Mr. H. D. Peake, M.Sc.(Eng.), Borough Engineer and Surveyor, Town Hall, Leyton, E.10, to whom they should be returned not later than Wednesday, 28th December, 1955.

D. J. OSBORNE,
Town Clerk.

Town Hall,
Leyton, E.10. 4954

COUNTY OF ESSEX.

ILFORD COMMITTEE FOR EDUCATION.

Applications are invited for the following appointments in the Education Architect's Section of the Borough Engineer's office:—

(a) TWO ASSISTANT ARCHITECTS, Grade A.P.T. IV/VI (£675-£1,000 per annum, plus London weighting).

(b) ONE ARCHITECTURAL ASSISTANT, Grade A.P.T. II/III (£560-£725 per annum, plus the appropriate London weighting).

(c) ONE ARCHITECTURAL ASSISTANT, Grade A.P.T. II (£560-£640 per annum, plus the appropriate London weighting).

(d) TWO ARCHITECTURAL ASSISTANTS, Grade A.P.T. I (£500-£580 per annum, plus the appropriate London weighting).

(e) ONE TECHNICAL ASSISTANT, Grade A.P.T. I (£500-£580 per annum, plus the appropriate London weighting).

(f) ONE DRAUGHTSMAN, Higher General Division.

Applicants for posts (a) must be Associates of the R.I.B.A., and have considerable experience in the planning, designing and supervision of school buildings and have had administrative experience.

Applicants for post (b) should have passed the R.I.B.A. Intermediate Examination, and have had not less than one year's experience in an architectural office.

Applicants for post (c) should have passed the R.I.B.A. Intermediate Examination.

Applicants for posts (d) must have had at least two years' drawing office experience in connection with school buildings.

Applicants for post (e) should have good knowledge of building construction and experience in dealing with minor alterations and general maintenance of school buildings.

Applicants for post (f) should be neat and accurate draughtsmen and have a knowledge of building construction.

The salary will be in accordance with the appropriate grades of the National Joint Council scale, plus the London Area allowance.

There will also be paid such travelling and subsistence allowances as may be determined from time to time by the Essex County Council.

Posts are superannuable and subject to medical examination.

Applications should be made on a form to be obtained from and returned to the Borough Engineer and Surveyor, Town Hall, Ilford, together with copies of not more than three recent testimonials, within 14 days of the appearance of this advertisement. 5039

LONDON COUNTY COUNCIL.

ARCHITECT'S DEPARTMENT.

BUILDING SURVEYORS required (salary up to £783, according to experience) for the following:—

1. BUILDING REGULATION DIVISION;
2. DISTRICT SURVEYOR'S SERVICE;
3. MAINTENANCE DIVISION. To deal with inspections and surveys of all types of council buildings for maintenance repairs and minor alterations.
4. VOLUNTARY SCHOOLS SECTION.—For preparation of specifications and estimates for minor improvements, repairs and painting to voluntary schools.

Application forms from Architect (AR/EK/BS/2), County Hall, S.E.1 (1970). 4936

AIR MINISTRY Works Designs Branch requires in London and Provinces (with liability for overseas service) **ARCHITECTURAL ASSISTANTS** experienced in planning/preparation of working drawings and details for permanent and semi-permanent buildings. Salaries up to £850 (men) and £736 p.a. (women). Starting pay dependent on age, quals, and experience. Paid overtime. Long term possibilities with promotion and pensionable prospects, 4 weeks' leave a year. Natural born British subjects. Write stating age, quals, employment details incl. type of work done to any Employment Exchange quoting Order No. Borough 2535. 3788

LONDON COUNTY COUNCIL.
ARCHITECTS' DEPARTMENT.
Vacancy for **ARCHITECT, Grade I** (£1,134 to £1,296), to lead group engaged on part of programme which include fire stations, homes for the aged, welfare clinics, children's homes, a power station and other industrial buildings. Qualifications: A.R.I.B.A. or R.I.B.A. Final exam. Good designer, with experience in controlling staff and organising and supervising large scale building contracts. Details and application forms returnable by 2nd January, 1956 (AR/EK/GI/1), County Hall, S.E.1. (2034) 4977

CITY OF LANCASTER.
ASSISTANT QUANTITY SURVEYOR required. Varied and interesting programme of work (flats, shops, crematorium, new cattle mart, market hall redevelopment, etc.). **HOUSING ACCOMMODATION** if required. Corporate Member of R.I.C.S. preferred (Q.S. section). Permanent pensionable post. Salary: Grade IV (£675 × £30—£825 p.a.). Applications to reach City Engineer, Town Hall, by Friday, 30th December, 1955, stating age, qualifications, experience, and names of two or three referees. J. D. WADDELL, Town Clerk. 4971

Town Hall, Lancaster.
30th November, 1955. 4971

NORTH-WEST METROPOLITAN REGIONAL HOSPITAL BOARD.

The Board are engaged on an expanding programme of major hospital projects within the Counties of Middlesex, Hertford, Bedford, Buckinghamshire and Berkshire. The following staff, who must possess appropriate general experience in contemporary architectural design and construction, are required to fill a number of newly created posts on the establishment of the Regional Architect:—

(a) **ASSISTANT ARCHITECTS.** Salary scale: £640 × £25 (4) × £30 (4) × £35 (2)—£930, plus £20—£40 London weighting.

(b) **ARCHITECTURAL ASSISTANTS.** Salary scale: £480 (age 21 and over) × £20 (7) × £25 (2)—£670, plus £20—£30 London weighting.

Candidates for posts (a) above should hold full professional qualifications; those for posts (b) should have reached intermediate professional qualifications. Starting salaries may be above minimum, having regard to the extent of experience since qualifying or reaching intermediate standard respectively. Posts are subject to Whitley Council conditions and are superannuable.

Apply, stating which post, and giving age, qualifications (with dates), and experience, to Secretary, North-West Metropolitan Regional Hospital Board, 11, Portland Place, London, W.1, by 31st December, 1955. 4970

BOROUGH OF SOUTHGATE. **ARCHITECTURAL STAFF.**

Applications are invited for the following permanent superannuated posts:—

(i) **FIRST ARCHITECTURAL ASSISTANT** (A.P.T., Grade V, £750—£900 per annum, excluding London weighting). Qualifications: A.R.I.B.A.

(ii) **ARCHITECTURAL ASSISTANTS** (A.P.T., Grade III, £500—£725 per annum, excluding London weighting).

Applications are to be made on a form to be obtained from the Borough Engineer and Surveyor, and must be returned to the undersigned not later than Monday, 2nd January, 1956.

GORDON H. TAYLOR, Town Clerk. 5007
Southgate Town Hall, N.13.

BOROUGH OF OLDBURY. **BOROUGH SURVEYOR'S DEPARTMENT—** **ARCHITECTURAL SECTION.**

Applications are invited for the appointment of **ONE ASSISTANT ARCHITECT, Grade A.P.T. V** (£750—£900), in the Architectural Section of the Borough Surveyor's Department.

Applicants for the appointment should preferably be Associate Members of the R.I.B.A.

The Architect appointed will be required to work primarily on the design and construction of Municipal houses, maisonettes, and multi-storey flats, and previous experience of this type of work is desirable.

The appointment will be superannuable, subject to the National Conditions of Service and to the selected candidate passing a medical examination. Applications, giving particulars of age, qualifications and experience, and the names of two referees, should be delivered to the undersigned not later than Monday, 2nd January, 1956.

Housing accommodation will be made available to married applicants if required.

KENNETH PEARCE, Town Clerk. 5005
Municipal Buildings, Oldbury, Birmingham.
6th December, 1955.

CITY OF SHEFFIELD. **CITY ENGINEER AND SURVEYOR'S** **DEPARTMENT.** **SENIOR PLANNING ASSISTANT, GRADE A.P.T. V.**

Applications are invited for the position of Senior Planning Assistant, Grade A.P.T. V (£750—£900), on the staff of the City Engineer and Surveyor and Town Planning Officer (H. Foster, M.I.C.E., M.I.Mun.E.).

Qualifications: A.M.T.P.I. or A.M.I.C.E., or A.R.I.B.A., or A.R.I.C.S., or Engineering Degree, or A.M.I.Mun.E. Preference would be given to candidates with Planning and Architectural experience.

Superannuable post, N.J.C. Conditions of Service, medical examination.

Applications, stating age, education and training, qualifications, experience, present and past appointments (with dates and salaries), and quoting the names of two referees, should be submitted to the undersigned by the 7th January, 1956.

JOHN HEYS, Town Clerk. 5001
Town Hall, Sheffield, 1.

METROPOLITAN BOROUGH OF WANDSWORTH. **ARCHITECTURAL ASSISTANTS.**

Applications invited for two established appointments of **ARCHITECTURAL ASSISTANTS.** Salaries: Grade III(A), £580, rising to £805 per annum.

Applicants must have passed Parts I and II of the R.I.B.A. Final or Special Final Examination or their equivalent at one of the recognised schools of architecture, and had at least 5 years' experience, including training.

Application forms obtainable from the Borough Engineer, Surveyor and Architect, must reach me by 28th December, 1955.

R. H. JERMAN, Town Clerk. 5000
Municipal Buildings, Wandsworth, S.W.13.

CITY OF PETERBOROUGH. **CITY ENGINEER'S DEPARTMENT.** **APPOINTMENT OF ASSISTANT QUANTITY SURVEYOR, A.P. & T. GRADE II.**

Applicants should be students of the Royal Institute of Chartered Surveyors, and should be capable of abstracting, billing, site measurement, taking off quantities for small work, and settlement of final accounts.

Applications, stating age, experience, details of qualifications, together with copies of three recent testimonials, should be sent in envelopes addressed to the City Engineer and Surveyor (Mr. L. H. Robjohn, M.B.E., A.M.I.C.E.), Town Hall, Peterborough, suitably endorsed, to reach him not later than 30th December, 1955.

Housing will be provided, if necessary. Canvassing, directly or indirectly, will disqualify. Candidates must disclose whether or not they are related to any member or senior officer of the Council.

C. PETER CLARKE, Town Clerk. 4996
Town Hall, Peterborough.
30th November, 1955.

SOMERSET COUNTY COUNCIL. **COUNTY ARCHITECT'S DEPARTMENT.**

Applications are invited for the following appointments:—

(a) **ASSISTANT ARCHITECT, A.P.T., Grade VI** (£825—£1,000).

(b) **ASSISTANT ARCHITECT, A.P.T., Grade I** (£500—£580).

(c) **ASSISTANT QUANTITY SURVEYOR, A.P.T., Grade VI** (£825—£1,000).

Applicants for post (a) must be Associate Members of the Royal Institute of British Architects, and have considerable designing ability.

Applicants for post (b) should be of Intermediate R.I.B.A. standard. Preference will be given to applicants with experience in the work of a local authority.

Applicants for post (c) must be professionally qualified, preferably Associate Members of the R.I.C.S., with considerable experience and ability, and competent to undertake work on all types of Local Authority projects, and more particularly educational establishments.

Applications, giving full details of age, education, professional training and experience, must be submitted, together with one recent testimonial and the names and addresses of two technical referees, so as to reach the undersigned not later than Monday, 2nd January, 1956.

Canvassing directly or indirectly will be a disqualification.

R. O. HARRIS, F.R.I.B.A., County Architect. 4995
Park Street, Taunton.

COUNTY BOROUGH OF BOURNEMOUTH. **BOROUGH ARCHITECT'S DEPARTMENT.**

Applications are invited for the appointment of **ASSISTANT ARCHITECT, Salary Grade: A.P.T. III, £600—£725 p.a.** or Special Grade, £650—£775 p.a., according to experience and qualifications.

Successful candidate will be appointed at present salary if within incremental scale. Application forms and further particulars from Borough Architect, Town Hall, Bournemouth. Completed applications, with copies of three recent testimonials, must reach the undersigned by 10 a.m., 31st December, 1955.

A. LINDSAY CLEGG, Town Clerk. 5045
Park Street, Taunton.

WEST SUSSEX COUNTY COUNCIL. **COUNTY ARCHITECT'S DEPARTMENT.**

Applications are invited for the following appointments:—

(1) **SENIOR ASSISTANT HEATING-ENGINEER-DESIGNER-DRAUGHTSMAN**, at a salary in accordance with Grade V, A.P.T. Division (£750 to £900 per annum).

(2) **SENIOR ASSISTANT HEATING-ENGINEER-DESIGNER-DRAUGHTSMAN**, at a salary in accordance with Grade IV, A.P.T. Division (£675 to £825 per annum).

(3) **ASSISTANT ELECTRICAL-ENGINEER-DESIGNER-DRAUGHTSMAN**, at a salary in accordance with Grade III (Special), A.P.T. Division (£650 to £775).

(4) **SENIOR ASSISTANT ARCHITECT**, at a salary in accordance with Grade V, A.P.T. Division (£750 to £900).

(5) **ASSISTANT ARCHITECT**, at a salary in accordance with Grade IV, A.P.T. Division (£675 to £825).

(6) **ASSISTANT ARCHITECT**, at a salary in accordance with Grade III (Special), A.P.T. Division (£650 to £775).

Further particulars should be obtained from the County Architect, County Hall, Chichester, to whom all detailed applications must be submitted not later than 6th January, 1956.

T. C. HAYWARD, Clerk of the County Council. 4994
County Hall, Chichester.
2nd December, 1955.

CITY OF GLOUCESTER. **CITY ENGINEER AND SURVEYOR'S** **DEPARTMENT.**

The Corporation invite applications for the appointment of **CHIEF ASSISTANT PLANNING OFFICER, Grade A.P.T. IV/V** (£675—£900).

The appointment is subject to the Local Government Superannuation Acts, and the successful candidate will be required to pass a medical examination.

If required, the Council may be able to assist with housing accommodation.

Applicants should be Corporate Members of the Town Planning Institution, preferably with recognized qualifications in Municipal or Civil Engineering, Architecture, or Surveying, have had considerable experience in Planning procedure, and be competent to take charge of the Planning side of a City Engineer and Surveyor's Office.

Applications, stating age, qualifications and experience, accompanied by three recent testimonials or the names of three referees, and endorsed "Chief Assistant Planning Officer," must be delivered to the undersigned not later than 10 a.m. on the 23rd December, 1955.

A. G. W. BOGGON, Town Clerk. 5043
Guildhall, Gloucester.

COUNTY BOROUGH OF CROYDON. **SCHOOL ARCHITECT'S SECTION.**

Applications are invited for established appointments in the School Architect's Section (School Architect, C. T. Ayerst, A.R.I.B.A.) as a **QUANTITY SURVEYING ASSISTANT** (experience in site measurement and final accounts desirable), and an **ARCHITECTURAL ASSISTANT**. Salary in both cases commencing according to experience and qualifications, progressing by annual increments of up to £50 to a maximum of £805 per annum.

Application forms, with terms and conditions, obtainable from the Chief Education Officer, 19, Katharine Street, Croydon.
Closing date 31st December, 1955. 5040

PADDINGTON BOROUGH COUNCIL. **require BUILDING SURVEYING ASSISTANT**

(A.P.T. II, £590 to £670 per annum). Candidates should have practical knowledge of building construction, experience in surveying and levelling, the repair, adaptation and conversion of civil and residential properties, and be capable of preparing plans, specifications and estimates of costs in respect of those works and their supervision. Candidates preferred at advanced stage of preparation for R.I.C.S. Intermediate or equivalent examination. Written applications, stating age, qualifications, experience, and names and addresses of three referees, should reach the undersigned (quoting A.263) by 30th December, 1955.

W. H. BENTLEY, Town Clerk. 5054
Town Hall, Paddington Green, W.2.

PADDINGTON BOROUGH COUNCIL. **require ASSISTANT ARCHITECT (A.P.T. V,**

£780 to £930 per annum). A.R.I.B.A. candidates preferred, with some experience in design and supervision of building works of some magnitude, and a knowledge of local authority requirements. Applications, stating age, qualifications, experience, and names and addresses of three referees, should reach the undersigned (quoting A.261), by 28th December, 1955.

W. H. BENTLEY, Town Clerk. 5055
Town Hall, Paddington Green, W.2.

BERKSHIRE COUNTY COUNCIL, PLANNING **DEPARTMENT.**

PLANNING ASSISTANT required for general planning duties. Must be a competent draughtsman. Salary: A.P.T. I (£500 × £20—£580 p.a.). Form of application from County Planning Officer, 7, Abbot's Walk, Reading, to be returned by 31st December, 1955.

E. R. DAVIES, Clerk of the Council. 4979

BATH CITY COUNCIL. CITY PLANNING AND ARCHITECTURAL DEPARTMENT.

Applications are invited for:—

(a) **GENERAL ARCHITECTURAL ASSISTANT.** £650, rising to £775 per annum. Applicants should have passed Parts I and II of the R.I.B.A. Final or Special Final Examination or their equivalent at one of the recognised Schools of Architecture, and have had at least 5 years' experience (including the period spent on theoretical training).

(b) **ESTIMATOR AND GENERAL TECHNICAL ASSISTANT.** Salary in accordance with revised scale, A.P.T. Grade II (£560-£640). The appointment is permanent and pensionable. Applicants should state their experience in estimating, measurement of works in progress, dilapidation schedules, and improvement grants; a knowledge of the preparation of Bills of Materials will be an advantage.

These appointments are subject to the Scheme of Conditions of Service for the National Joint Council for Local Authorities' Administrative, Technical and Clerical Services, and the Local Government Superannuation Acts 1937-1953. The successful candidates will be required to pass a medical examination.

The Council is prepared to provide housing accommodation, if required, to the successful applicants.

Applications, giving details of age, experience and qualifications, together with the names and addresses of three referees, should be addressed to the City Planning Officer and Architect, 7, North Parade Buildings, Bath. The last day for the receipt of applications is Friday, 7th January, 1956.

JARED E. DIXON.

Guildhall, Bath. 5051

COUNTY OF CORNWALL.

APPOINTMENT OF PLANNING STAFF.

Applications are invited for the appointment of an ASSISTANT AREA PLANNING OFFICER, Western Area, Penzance. The salary will be within Grade A.P.T. IV (£675-£825), according to qualifications and experience. Candidates must be Associate Members of the Town Planning Institute, and preference will be given to applicants with other technical qualifications.

The successful candidates will be engaged on work mainly concerned with development control. The customary service conditions of the Local Government Service will apply.

Applications, together with the names and addresses of three referees, should be addressed to the County Planning Officer, County Hall, Truro, not later than 31st December, 1955.

E. T. VERGER.

Clerk of the County Council. 5053

PADDINGTON BOROUGH COUNCIL require ARCHITECTURAL ASSISTANT (A.P.T. III, £630 to £755 per week). Candidates should be Inter. R.I.B.A. and be capable of preparing working and detail drawings and sketch drawings of smaller schemes, and be quick and competent draughtsmen, with an adequate knowledge of building bye-laws, housing manual standards, and modern construction techniques. Applications, stating age, qualifications, experience, and names and addresses of three referees, should reach the undersigned (quoting A.262) by 28th December, 1955.

W. H. BENTLEY.

Town Hall, Paddington Green, W.2. 5056

DUNDEE COLLEGE OF ART. SCHOOL OF ARCHITECTURE.

The Governors of the Dundee Institute of Art and Technology invite applications for the position of ASSISTANT Grade I.

Applicants should be Members of the R.I.B.A. and should preferably be holders of a degree or diploma of a recognised School of Architecture.

Salary scales: Men, £690 by £30 to £990; women, £582 by £25 to £832, with placing according to qualifications and experience. These scales are at present under revision. Applications should be lodged as soon as possible and should be on the prescribed form, copies of which, with full particulars, may be obtained from the undersigned.

F. RAYMOND WILKINSON.

Clerk and Treasurer.

Bell Street, Dundee. 5th December, 1955. 5010

ISLE OF ELY CITY COUNCIL. COUNTY ARCHITECT'S DEPARTMENT.

Applications are invited for the under-mentioned appointments on the staff of the County Architect:—

(a) **THIRD ASSISTANT ARCHITECT** (Special Grade), £650-£775 p.a.
(b) **JUNIOR ENGINEERING ASSISTANT** (Electrical and Heating), A.P.T. I, £500-£620 to £580 p.a.

(c) **JUNIOR ARCHITECTURAL ASSISTANTS** (FOUR), Misc., I/III, £345-£485 p.a.
All posts are permanent, subject to the National Scheme of Conditions of Service, the Local Government Superannuation Act, and to a medical examination.

Intending applicants are to apply for form, stating for which post they wish to apply, to the County Architect, County Hall, March, to whom they must be returned not later than Saturday, 31st December, 1955.

R. F. G. THURLOW.

Clerk of the County Council. 5008

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE.

COUNTY PLANNING DEPARTMENT. APPOINTMENT OF SENIOR PLANNING ASSISTANT, BARNSELY.

Applications are invited for the appointment of a Senior Planning Assistant to the staff of the Area Planning Office, Barnsley, within the salary grade £675-£825.

Applicants should be Corporate Members of the Town Planning Institute or hold an equivalent qualification, and should have had considerable experience in a Planning Office.

Applications, stating age, qualifications and experience, together with the names of two referees, should reach the undersigned not later than the 31st December, 1955.

ARTHUR BATES.

County Planning Officer.

71, Northgate, Wakefield. 5012

COUNTY BOROUGH OF MERTHYR TYDFIL. BOROUGH ENGINEER, SURVEYOR AND TOWN PLANNING OFFICER'S DEPARTMENT.

(a) Two permanent SENIOR ENGINEERING ASSISTANTS (Public Works Section) on maximum of A.P.T., Grade IV (£825 p.a.).

(b) One permanent SENIOR ENGINEERING ASSISTANT (Planning Department) on maximum of A.P.T., Grade IV (£825 p.a.).

(c) One permanent SENIOR ARCHITECTURAL ASSISTANT on maximum of A.P.T., Grade IV (£825 p.a.).

Applications are invited for the above appointments.

HOUSES WILL BE PROVIDED IF REQUIRED AND REASONABLE REMOVAL EXPENSES WILL BE PAID.

Applicants for appointments (a) and (b) must be Corporate Members of a chartered institution, and should have had good all-round municipal engineering experience. Applicants for appointment (b) should have had experience in a Planning Office.

Applicants for appointment (c) must be Associate Members of the Royal Institute of British Architects, and must have had good all-round experience in the architectural work usually undertaken by a local authority. Planning experience would be an advantage.

The appointments are subject to the provisions of the Local Government Superannuation Acts and to the passing of a medical examination. They are terminable by one month's notice on either side.

The applications, stating age, past and present appointments, qualifications and experience, together with copies of three recent testimonials, should be delivered to the undersigned not later than Saturday, 14th January, 1956.

Canvassing in any form will disqualify.

T. S. EVANS.

Town Clerk. 5013

Town Hall, Merthyr Tydfil.

BOROUGH OF BEDFORD.

Appointment of:—

(a) ASSISTANT ARCHITECT, Grade III/ Special Grade (£600 to £775).

(b) ASSISTANT ENGINEER OR SURVEYOR, Grade A.P.T. I-II (£500 to £640).

Applications are invited for the above appointments.

Applicants for (a) should have passed the Intermediate Examination for the A.R.I.B.A., or will be considered for the Special Grade if qualified.

The Council have in hand a considerable programme of works, including two-storey housing, multi-storey flats, the design of a New Municipal Office block, and extension to the Museum. There is also in progress work in the planning of redevelopment areas, together with many services and other developments, consequent upon the growth of the Borough.

THE COUNCIL ARE PREPARED TO ASSIST REGARDING THE PROVISION OF HOUSING AND ARE PREPARED TO PAY REMOVAL EXPENSES.

Forms of application and particulars of the appointments may be obtained from the undersigned, by whom applications should be received not later than Tuesday, 20th December, 1955.

F. W. DAWKES.

Borough Engineer and Surveyor.

Borough Engineer and Surveyor's Office, Newnham House, Horne Lane, Bedford. 5026

BOROUGH OF BARKING. DEPARTMENT OF THE BOROUGH ARCHITECT.

Applications are invited for the appointment of an ARCHITECTURAL ASSISTANT on the established staff on Grade A.P.T. III-IV (£600 to £825 per annum), plus London weighting £20-£30, according to age.

Applications on forms to be obtained from the Borough Architect, Town Hall, Barking, should reach the undersigned not later than 9 a.m. Friday, 30th December, 1955.

E. R. FARR.

Town Clerk. 5057

Town Hall, Barking.

COUNTY BOROUGH OF STOCKPORT.

SENIOR ASSISTANT ARCHITECT required. Salary £750-£900 per annum. Should be member of R.I.B.A. Applications, giving names of two referees, to Borough Architect, Town Hall, Stockport, by 24th December, 1955. Post pensionable, subject to medical examination. Canvassing disqualifies. Applicants must disclose if related to any member or senior officer of Council. 4930

BOROUGH OF BRENTFORD AND CHISWICK. APPOINTMENT OF JUNIOR ARCHITECTURAL ASSISTANT.

Applications are invited for the above appointment in the Borough Engineer & Surveyor's Department at a salary according to A.P.T. I (£500-£580 p.a.) plus London weighting allowance.

Applicants should be competent draughtsmen. The appointment offers excellent opportunities for gaining architectural training and experience.

A modern flat can be rented by the successful applicant.

Applications, stating age, qualifications and experience, together with the names of two persons to whom reference can be made, should be forwarded to the Borough Engineer & Surveyor, Town Hall, Chiswick, W.4, not later than Monday, the 21st December, 1955.

W. F. J. CHURCH.

Town Clerk.

Town Hall, Chiswick, W.4. 1.12.55. 5050

COUNTY BOROUGH OF HALIFAX. BOROUGH ENGINEER'S DEPARTMENT.

Applications are invited for the appointment of ASSISTANT ARCHITECT (General) (salary £650-£775).

Applications, stating age, education and training, qualifications, present and past appointments (with dates and salaries) and experience, accompanied by copies of two recent testimonials, should reach me by 31st December, 1955.

RICHARD de Z. HALL.

Town Clerk. 5009

Town Hall, Halifax.

BOROUGH OF EDMONTON. BOROUGH ARCHITECT'S DEPARTMENT.

Technical staff required on the under-mentioned grades. Work includes interesting redevelopment schemes, involving multi-storey flats and an industrial estate. Mainly direct labour. Financial assistance for studies and examinations. Alternate Saturdays free.

Applications must be made on forms obtainable from the Town Clerk, Town Hall, Edmonton, and must be delivered by 22nd December.

Salaries subject to the addition of £10-£30 London weighting.

(1) **ARCHITECTURAL ASSISTANTS:**

A.P.T. VI (£825-£935-£1,000).

A.P.T. V (£750-£830-£900).

A.P.T. IV (£675-£730-£825).

A.P.T. III (£600-£625-£725).

A.P.T. II (£560-£620-£640).

(2) **QUANTITY SURVEYING ASSISTANTS:**

A.P.T. V (£750-£830-£900).

A.P.T. IV (£675-£730-£825).

5021

NATIONAL COAL BOARD-EAST MIDLANDS DIVISION.

ARCHITECTS' DEPARTMENT, NOTTINGHAM.

Applications are invited for the following appointments:—

S.V. 478-ARCHITECTS, Grade II.

Salary £700-£830-£1,000.

Candidates should be Corporate Members of the R.I.B.A.

S.V. 479-ARCHITECTURAL ASSISTANTS,

Grade I.

Salary £625-£725-£750 (exceptionally to £900).

Candidates should be of R.I.B.A. Intermediate standard and have had not less than 3 years' subsequent practical experience.

S.V. 480-ARCHITECTURAL ASSISTANTS,

Grade II.

Salary £520-£620-£615.

Candidates should have passed or be studying for the Intermediate Examination of the R.I.B.A. Facilities are granted in certain circumstances to Associates for part-time study at the Nottingham School of Architecture.

The point of entry into the salary scales of the respective grades will depend on the qualifications and experience of the applicant. Superannuation rights under Local Authority and certain other schemes are transferable.

The architectural work of the Department covers the design of Colliery Surface Buildings of all types required in the Division, including Workshops, Stores, Power Plants, Offices, Pithead Baths, Canteens, Medical Centres, Institutes and Recreation Buildings.

Applications, stating age, education, qualifications, present appointment and salary, should be submitted within 14 days of publication to:—

THE STAFF DIRECTOR,

National Coal Board,

East Midlands Division,

Sherwood Lodge,

Arnold, Notts.

Envelopes and applications should be marked with the appropriate "S.V." reference number. Original testimonials should not be sent. 4984

COUNTY BOROUGH OF EAST HAM. THREE ARCHITECTURAL ASSISTANTS

(A.P.T. V).

Applications are invited for the above appointments in the Housing Department, at salaries in accordance with Grade A.P.T. V (£750-£830-£900), plus London weighting.

The Department has an extensive and interesting programme of mixed development of houses, flats and shops, and the re-development of slums, including multi-storey flats.

Further details and forms of application (returnable by 6th January, 1956), from the Town Clerk, Town Hall, East Ham, E.6. 5059

COUNTY BOROUGH OF DONCASTER.
BOROUGH ARCHITECT'S DEPARTMENT.
Applications are invited for the post of ARCHITECTURAL ASSISTANT in the Borough Architect's Department, at a salary in accordance with Grade I (£500-£580) of the A.P.T. Division of the National Scale of Salaries.

Applicants must have passed the Intermediate Examination of the R.I.B.A. or its equivalent at a recognised School of Architecture.

The appointment is subject to one month's notice on either side, the provisions of the Local Government Superannuation Acts 1937/53, and to the N.J.C.'s Scheme of Conditions of Service. The successful applicant will be required to pass a medical examination.

Applications, together with copies of two recent testimonials, should be received by the Borough Architect, 15, South Parade, Doncaster, not later than Wednesday, the 28th December, 1955. Applicants must state whether, to the best of their knowledge, they are related to any member or senior official of the Council.

H. R. WORMALD, Town Clerk.

1, Priory Place, Doncaster. 4981
2nd December, 1955.

COUNTY BOROUGH OF DONCASTER.
BOROUGH ARCHITECT'S DEPARTMENT.
Applications are invited for the post of ASSISTANT ARCHITECT at a salary in accordance with the National Scale of Salaries, £560-£775 per annum.

Applicants must be Associates of the R.I.B.A. and have had at least 5 years' experience (including period of training).

The appointment is subject to one month's notice on either side, to the N.J.C.'s Scheme of Conditions of Service, and to the provisions of the Local Government Superannuation Acts 1937/1953. The successful applicant will be required to pass a medical examination.

Application forms may be obtained from L. J. Tucker, Esq., A.R.I.B.A., F.I.H.S., Borough Architect, 15, South Parade, Doncaster, to whom they should be returned by Wednesday, the 28th December, 1955.

H. R. WORMALD, Town Clerk.

1, Priory Place, Doncaster. 4982
2nd December, 1955.

LONDON ELECTRICITY BOARD.
STRUCTURAL ASSISTANTS AND
STRUCTURAL DRAUGHTSMEN.

Applications are invited for the above positions in the Construction Branch of the Chief Engineer's Department in Central London.

Applicants for the positions of Structural Assistants in the Civil Engineer's Section should be experienced in the design and detailing of reinforced concrete and/or steel-framed superstructures and foundations.

Applicants for the positions of Structural Draughtsmen should have a knowledge of building construction requirements and/or some experience in detailing reinforced concrete or steel structures.

The posts are graded under Schedule "D," National Joint Board agreement, as Grade V-£672 to £777, and Grade VI-£535 10s. to £661 10s. per annum respectively, inclusive of London allowance. Commencing salaries will be dependent on qualifications and experience.

Application forms, obtainable from Personnel Officer, 46/7, New Broad Street, London, E.C.2, to be returned completed by 27th December, 1955. Please enclose addressed envelope and quote ref. V/2003/A. 4983

THE COUNTY COUNCIL OF CLACKMANNAN.
ARCHITECTURAL ASSISTANT wanted for County Architect's Department. Salary scale: £595 by £15 to £630 per annum. Superannuated post. Medical examination.

Applications, stating age, qualifications and experience, with copies of three recent testimonials, to the County Clerk, County Buildings, Alloa, within ten days of publication of this advertisement.

2nd December, 1955. 4973

CITY OF BIRMINGHAM.
CITY ARCHITECT'S DEPARTMENT.

Applications are invited for the following appointments:-

QUANTITY SURVEYORS, Grade A.P.T. IV (£675-£825 per annum).

QUANTITY SURVEYOR, Grade A.P.T. III (£600-£725 per annum).

QUANTITY SURVEYOR, Grade A.P.T. I (£500-£580 per annum).

Applicants for Grade A.P.T. IV must have passed the Final Examination, and for Grades A.P.T. I and A.P.T. III the Intermediate Examination of the R.I.C.S. (Quantity Section), or hold equivalent qualifications. The commencing salaries in the grades will be according to capabilities and experience.

The posts are permanent, superannuable, subject to a medical examination, and to one month's notice on either side.

Applications, endorsed with the heading of the post, setting out present position and salary, qualifications and experience, together with the names of two persons to whom reference can be made, should reach the undersigned not later than 28th December, 1955.

Canvassing disqualifies.
A. G. SHEPPARD FIDLER, City Architect.
Civic Centre, Birmingham, 1. 4988

BOROUGH OF TOTTENHAM.
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT.

ARCHITECTURAL ASSISTANTS, A.P.T., Grades II or I (£560 to £640 p.a. or £500 to £580 p.a.). Commencing salary will be fixed according to experience of successful applicants, who must have passed Intermediate R.I.B.A. or equivalent. London weighting allowance of £20 p.a. at age 21-25 years and £30 p.a. at age 26 years and over, payable in addition.

Application form and conditions of appointment from Borough Engineer, Town Hall, N.15, to whom applications must be delivered not later than 28th December, 1955. 5037

CITY OF ROCHESTER.
ARCHITECTURAL STAFF.

Applications are invited for the following appointments in the City Surveyor's Department:-

(a) **CHIEF ARCHITECTURAL ASSISTANT**, A.P.T. IV-V (£675-£900).

(b) **ARCHITECTURAL ASSISTANT**, A.P.T. III (£600-£725).

Position (a) is the Senior in the Architectural Section. Candidates should be Associates of the Royal Institute of British Architects, and administrative ability is essential in addition to a good general experience, particularly in the preparation of drawings and specifications for municipal housing, including shops and flats. Commencing salary will be according to qualifications and experience.

Candidates for position (b) should have general experience, including the preparation of drawings and specifications for Municipal Housing Schemes. Preference will be given to candidates who are Registered Architects.

In appropriate cases the City Council will provide the successful candidates with suitable housing accommodation.

The appointments will be subject to the National Scheme of Conditions of Service, the provisions of the Local Government Superannuation Acts, and a satisfactory medical examination; one month's notice on either side.

Applications, stating age, qualifications and experience, together with the names and addresses of three persons to whom reference may be made, should be delivered to the City Surveyor, 66, Maidstone Road, Rochester, not later than Wednesday, 4th January, 1956.

PHILIP H. BARTLETT, Town Clerk.

Guildhall, Rochester. 5036
7th December, 1955.

BOROUGH OF MALDEN AND COOMBE.
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT.

APPOINTMENT OF ARCHITECTURAL ASSISTANT.

Applications are invited for the above appointment in accordance with Grades A.P.T. II/III of the National Scale of Salaries, i.e., £550, rising, subject to satisfactory service, to £725, plus London "weighting," commencing point according to experience and qualifications. Application on forms to be obtained from John Apse, A.M.I.C.E., Borough Engineer and Surveyor, Municipal Offices, New Malden, Surrey, should be returned not later than 31st December, 1955.

HAROLD E. BARRETT, Town Clerk.

Municipal Offices, New Malden, Surrey. 5029

COUNTY BOROUGH OF SMETHWICK.
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT.

Applications from candidates, appropriately qualified, are invited for the following appointment—**SENIOR ASSISTANT ARCHITECT**. Salary £750-£1,000 (A.P.T. V/VI) per annum.

The commencing salary in the above appointment will be fixed according to the qualifications and experience of the successful applicant.

The post is subject to the provisions of the National Scheme of Conditions of Service; the Local Government Superannuation Acts 1937-53; to the passing of a medical examination, and to termination by one month's notice on either side.

Forms of application can be obtained from the Borough Engineer and Surveyor, Council House, Smethwick, and should be returned, suitably endorsed, not later than 2nd January, 1956.

E. L. TWY-CROSS, Town Clerk.

5030

KENT COUNTY COUNCIL require a **PRINCIPAL LANDS SURVEYOR**, having a R.I.C.S. or equivalent qualification to take charge of the Survey Section under the County Architect. The volume of work being considerable, the post requires a man of initiative and drive. Duties include all land surveying, levelling, reporting on sites and properties, attendance at public inquiries, and obtaining Town Planning and similar approvals. Salary within scale £1,150-£52 10s.—£1,412 10s. Application forms and further details obtainable from the County Architect, Springfield, Maidstone. Closing date: 5th January, 1956. 4990

SURREY COUNTY COUNCIL.

Applications invited for appointment of **ASSISTANT ARCHITECT**, Grade III, £600-£725 p.a., plus London allowance. Preference given applicants who have passed Inter. R.I.B.A.

Full details and present salary with three copy testimonials to County Architect, County Hall, Kingston, as soon as possible 3889

BUILDING SURVEYORS (up to £783) required by London County Council for the following—
(1) Modernisation of existing blocks of flats.
(2) Minor improvement works to other buildings.
Application forms, returnable by 29th December, from Architect (AR/EK/B/4), County Hall, S.E.1. (2031) 5047

SURREY COUNTY COUNCIL.

Applications invited for appointment of **ASSISTANT QUANTITY SURVEYOR**, GRADE IV, £675 x £30-£825 p.a., plus London allowance. Should be Associate Member R.I.C.S.

Full details and present salary, with three copy testimonials to County Architect, County Hall, Kingston, as soon as possible. 4907

Architectural Appointments Vacant

4 lines or under, 7s. 6d.; each additional line, 2s.

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she or the employment is excepted from the provisions of the Notification of Vacancies Order, 1952.

ARCHITECTS' CO-PARTNERSHIP require unmarried, qualified, experienced **ASSISTANT** in their Lagos office. Maximum tour 14 months. Flat provided. Write 44, Charlotte Street, London, W.1, or telephone Langham 5791. 3274

ARCHITECTS' CO-PARTNERSHIP require a qualified **ASSISTANT** with experience. Write 44, Charlotte Street, London, W.1, or Telephone Langham 5791. 3275

SENIOR SHOPFITTING DRAUGHTSMAN required by leading London Shopfitters. Salary £800 to £1,000, plus bonus and pension scheme. Box 3018.

WANTED urgently: Capable **DRAUGHTSMEN** for preparing working drawings of industrial buildings from sketch designs. Salary according to experience. Write or telephone to Percy Bilton Ltd., 113, Park Street, W.1. Telephone number MAYfair 8240. 3437

BUSY London Office requires two **ARCHITECTURAL ASSISTANTS**, approximately Intermediate standard or upwards. Also requires one **ASSISTANT** with considerable perspective experience, particularly able to do quick interior colour sketches. Five-day week, good salaries. Lewis Solomon, Son & Joseph, 21, Bloomsbury Way, W.C.1. HOL 5108 or 7082. 3483

ARCHITECTURAL ASSISTANTS, Senior and Junior required, preferably with London practice experience, office and factory buildings. Write, giving particulars of experience, etc., to Messrs. Bates & Sinning, 89, Chancery Lane, W.C.2. 2508

ROBERT SHARP & SON, A./L.R.I.B.A., require a **SENIOR ARCHITECTURAL ASSISTANT**, A.R.I.B.A., with office experience, and a **JUNIOR ASSISTANT** of at least Intermediate standard. Apply in writing, stating qualifications and experience, to 13, Lower Belgrave Street, S.W.1. 3821

EDINBURGH—Senior and Intermediate **ASSISTANTS** required. Write, giving particulars of experience and salary required, to Messrs. David Carr & Stuart Matthew, 14, Lynedoch Place, Edinburgh, 3. 3123

JUNIOR ASSISTANT, competent to make measured surveys and prepare working drawings, required by Wallis & Smith, Chartered Architects, Basingstoke. Apply by letter, stating salary required. 2533

ARCHITECTURAL ASSISTANTS, one Intermediate and one junior standard, required for office in St. Albans, Hertfordshire. Write giving brief details to Box 3965.

LOUIS DE SOISSONS, PEACOCK, HODGES and **ROBERTSON** have vacancies in their London and Welwyn Garden City offices for **SENIOR** and **JUNIOR ARCHITECTURAL STAFF**. The work is varied and covers Ecclesiastical, Schools, Offices and Housing (Cottages and Flats). Write stating age, salary and experience to Louis de Soissons, Peacock, Hodges and Robertson, 3, Park Square Mews, Upper Harley Street, London, N.W.1. 3936

ARCHITECTURAL ASSISTANTS (2) required in City Office with a wide and comprehensive range of commissions. Salary range £611-£767. Seely & Paget, CENTRAL 0321. 3939

ARCHITECTURAL ASSISTANTS, approaching Intermediate stage, required. Up to £500 p.a. **SENIOR ASSISTANTS** also required. D. Plaskett Marshall, F.R.I.B.A., 59, Gordon Square, W.C.1. MUJ 7176/7. 3978

LANCHESTER & LODGE urgently require male **ARCHITECTURAL ASSISTANTS** of all grades up to £700. Five-day week and lunch vouchers. Write full particulars, 10, Woburn Square, London, W.C.1. 3961

ARCHITECTURAL ASSISTANTS, with approx. 5 years' office experience, required for West End Architect's office engaged on large office building and cinema contracts. Commencing salary £625. Phone Whitehall 1624 for appointment. 3561

ARCHITECTURAL ASSISTANTS wanted, private practice S.W.1 district. Junior Assistants, £450 (inter. standard, some experience); Assistants, £600 (Final standard); Senior Assistants, £150 (Final with good experience). Box 3930.

CHARTERED Architects with large and varied practice (not houses) in Home Counties require **PERSONAL ASSISTANT to Partner**. General ability and initiative essential. Salary £600/£750. Box 3919.

ARCHITECTURAL ASSISTANT, of Intermediate or Final standard, required. Work consists mainly of hospital, industrial and departmental store buildings. Good prospects and salary for suitable applicant. Apply, with full particulars, to Swanwell & Templeman, 6, Raymond Buildings, Gray's Inn, W.C.1. 4956

JAMES & BYWATERS urgently require **ASSISTANT** of Intermediate standard or higher, for detailing various types of buildings. Salary according to experience and qualifications. Apply in writing to 5, Bloomsbury Street, W.C.1. 4963

ARCHITECTURAL ASSISTANTS required immediately. Pre-Intermediate to Final stage. Interesting work. Alternate Saturdays. Bonus scheme. Salary according to ability. Expenses paid for interview. Write full details with age. J. Roland Sidwell, A.R.I.B.A., 27, Union Street, Coventry. 4959

THE London Hospital, Whitechapel, E.1, requires **JUNIOR ARCHITECTURAL ASSISTANT**. Salary £440 to £650 p.a. according to experience, plus London weighting. Post superannuable. Applicants stating age, present salary and brief particulars of experience to be sent to the House Governor. Accommodation is available in Kensington if successful candidate is a woman. 2677

ARCHITECTURAL ASSISTANTS urgently required for detailed planning work. Intermediate and Junior. Salary according to experience. Please apply to L. O. L. Hansen & John H. Markham, 7 Victoria Street, Westminster, S.W.1. Tel. Abbey 6861. 3115

RONALD WARD & PARTNERS require several capable **ARCHITECTURAL ASSISTANTS**, with contemporary outlook and willing to use own initiative. Salary range £400 to £800. Interesting and varied work, home and abroad. Congenial working conditions. Apply 29, Chesham Place, Belgrave Square, S.W.1. Telephone Belgrave 3361. 3855

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

APPLICATIONS are invited for the following appointments:—

(a) **SENIOR ASSISTANT ARCHITECTS**, with experience of work on commercial and industrial projects.

(Salary range £920 to £975 per annum.)

(b) **ASSISTANT ARCHITECTS**, capable of preparing working drawings from preliminary details.

(Salary range £550 to £820 per annum.)

There is a five-day week in operation, and both appointments offer prospects of upgrading.

Applications, stating age, experience, qualifications and salary required, to G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester, 4. 3872

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

ASSISTANT ARCHITECTS, WORKER-UP, AND SHOP FITTING DRAUGHTSMAN.

Applications are invited from suitably qualified persons. Salary on a scale £485-£945 inclusive of L.W., with placing according to age, qualifications and experience. The posts are superannuable, subject to medical examination. Five-day week in operation. Applications, stating age, experience, qualifications and salary required, to—W. J. Reed, F.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 99, Leman Street, London, E.1. 2824

EXPERIENCED SENIOR AND JUNIOR ASSISTANTS required. Innate design sense essential with Office experience and capable draughtsmanship. Varied work. Responsibility and salary according to ability. Write: David Stern, 24, Gloucester Place, London, W.1, or Box 4998.

ARCHITECTURAL ASSISTANT required in West End Office; able to take charge of medium-sized jobs, including Churches, Hostels, Factories, etc. Telephone for an appointment, WELbeck 8863, or write Box 4995.

W. S. HATTRELL & PARTNERS have vacancies in their Coventry and London offices for **ARCHITECTURAL ASSISTANTS** of Intermediate to Final Standard. Excellent opportunities in varied practice covering a very wide area, and including Hotels, Theatres, Public Houses, Schools, Hospitals, also Industrial and Ecclesiastical. Good salaries offered, closely related to capabilities, and reviewed annually. Pension scheme available. Travelling expenses paid to applicants selected for interview. W. S. Hatfield & Partners, 1, Queens Road, Coventry, and 14, Hanover Square, London, W.1. 5002

INTERMEDIATE STANDARD ASSISTANT required immediately in General Practice. Office experience and ability to drive car essential. Salary by arrangement. Apply in writing, stating experience, salary required, F. C. Levitt, L.R.I.B.A., Commerce House, Biggleswade, Beds. 5003

ARCHITECTURAL ASSISTANT up to Inter. standard required by Plymouth Architects. The position offers valuable experience for working on large and small projects. Details of experience, salary required, etc., to Box 5004.

ASSISTANT ARCHITECT required for the London head office of a major oil company. Applicants must be A.R.I.B.A., capable of supervising staff and controlling work through all stages of development. Must hold a current driving licence. Five-day week, good pension and life assurance scheme, sickness benefits and free luncheon vouchers. Social club. Write, giving full details, stating age, experience and salary required, to Box 5065, quoting Ref. AS 931.

JUNIOR ASSISTANT required by London Architects. Good draughtsmanship essential. Salary £10 p.w. Box 5064.

ASSISTANT ARCHITECT with experience required for Manchester office. R.I.B.A. qualification desirable. Interesting post with wide range of work for man of initiative and capacity.

Please give details of education, experience and salary required, to Harry S. Fairhurst & Son, Chancery Chambers, 55 Brown Street, Manchester, 2. 5062

A SENIOR ARCHITECTURAL DRAUGHTSMAN of good standing required for varied practice in town office. R.I.B.A. qualification preferred. Interesting post for right man.

Please give details of education, experience and salary required, to Harry S. Fairhurst & Son, Chancery Chambers, 55 Brown Street, Manchester, 2. 5063

ARCHITECTURAL ASSISTANTS required immediately. Birmingham practice. A.R.I.B.A. and Intermediate qualifications. Write, giving full particulars, salary required and when available. Box 5061.

GOODHART-RENDEL, BROADBENT AND CURTIS require two **ARCHITECTURAL ASSISTANTS** of Intermediate standard; chiefly for school work. Good knowledge construction, working drawings details. Salary according to experience and ability. 22, Whitehall, S.W.1. Whitehall 8226. 5060

STURDY STUDENT required over Christmas holidays mainly for external duties, surveying and supervision, inexperience no bar as long as moderately intelligent. Advantage if close to Metropolitan line. Phone: HARrow 9433. 5058

ARCHITECTURAL ASSISTANTS, Intermediate Standard, required for work on development and construction of factory extensions, also on proposed large, new factories in North-East London area. Positions offered are permanent with good opportunities and are pensionable. Modern welfare amenities. Apply Personnel Superintendent, The Edison Swan Electric Co. Ltd., Cosmos Works, Brimsdown, Enfield, Middlesex. 5052

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

APPLICATIONS are invited for the following appointments in a newly formed Branch Office, interesting and varied commercial and industrial projects.

(a) **SENIOR ASSISTANT ARCHITECT**, with experience in Store and Shop Design.

(Salary range £820 to £975 per annum.)

(b) **ASSISTANT ARCHITECTS**, capable of preparing working drawings and details from preliminary sketches.

(Salary range £550 to £820 per annum.)

Both appointments offer prospects of upgrading. Applications, stating age, experience, qualifications, and salary required, to G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester, 4. 3872

ARCHITECTURAL ASSISTANTS of all grades urgently required. Five-day week. Lunch vouchers. Apply to Allan Johnson, F.R.I.B.A., Lancaster & Lodge, 10, Woburn Square, London, W.C.1. 4943

APPLICATIONS are invited for the following appointments:—

Young qualified **ARCHITECT**, able to take charge of large contemporary building schemes throughout the country. Excellent opportunity for capable designer.

ARCHITECTURAL ASSISTANT, of Intermediate standard, capable of preparing working drawings and details for contemporary shops.

Good salaries. Applications, stating age, qualifications and experience, to C. H. Barnett, M.A., Architect, Prices, Tailors, Ltd., Cardigan Crescent, Leeds, 4. 4938

ASSISTANTS of Intermediate standard required by West of England firm. Applications, with details of experience and salary required, to Eric & Partners, 12, Bah Road, Swindon, Wilts. 4950

LONDON Architects, doing interesting work in England, Africa, and Middle East, require **ASSISTANTS** of varying experience at salaries ranging from £400 to £800. Bonuses will be paid for really satisfactory work. Five-day week. Luncheon vouchers. Reply Box 4949.

SENIOR AND INTERMEDIATE ASSISTANTS required for West End Architect's office engaged upon various projects, including housing, offices, factories, etc. Apply in writing, stating age, qualifications, experience, and salary required, to Box 4902.

ARCHITECT'S ASSISTANT required. Varied and interesting practice. City centre, Birmingham. Box 5025.

ARCHITECTURAL ASSISTANT required by firm in Home Counties. General practice. Apply, stating experience and salary, to Manning & Steel, F.R.I.B.A., 3, George Street West, Luton, Beds. 4923

ARCHITECTURAL ASSISTANTS, up to Final standard, required for Design Work on Home and Tropical Buildings. Salary according to experience. Apply E. J. D. Mansfield, A.R.I.B.A., Sir William Halcrow & Partners, Stanhope House, 47, Park Lane, London, W.1. 3999

ARCHITECTURAL ASSISTANTS required, all grades, for contemporary office. Salary according to experience. C. H. Elsom, F.R.I.B.A., 44, Catherine Place, S.W.1. Victoria 4304. 3994

ARCHITECTURAL ASSISTANT, Intermediate standard, required for General Practice. Capable of taking charge of small jobs. Good conditions and salary to suitable applicant. Apply Cessford Hall, 205, Lavender Hill, S.W.11. 3993

ARCHITECTURAL ASSISTANT, of Intermediate standard with general all-round ability required. Write Eldred J. Stevens, A.R.I.B.A., 8, Dome Buildings, The Quadrant, Richmond, Surrey. 4922

BASIL WARD requires an **ARCHITECTURAL ASSISTANT**, between Intermediate and Final standard, preferably with not less than one year's office experience. Salary to be agreed. Apply 32, Wigmore Street, London, W.1, or telephone WELbeck 1409. 4912

OLIVER LAW & PARTNERS (Chartered Architects), 35, Ebury Street, Westminster, require two or three additional **ARCHITECTURAL ASSISTANTS (DRAUGHTSMEN)**. Architectural School or office experience essential. Salaries £600 to £800 per annum, according to experience. 3992

ARCHITECT'S Department in City requires **ASSISTANTS** 20-30 years of age. Interesting good class work. Salary according to age and experience. Apply giving full particulars and salary required. Box 4908.

SCHERRER & HICKS require a number of **ARCHITECTURAL ASSISTANTS** immediately. Salary £400-£750 p.a. according to experience. Five-day week with luncheon vouchers. Write 19, Cavendish Square, W.1, or telephone Museum 1105. 3998

ARCHITECTURAL ASSISTANTS required for office in Hertfordshire. Intermediate to Final standard for work on School, Commercial and Industrial projects. Write, giving brief details of experience and salary required, to Box 5015.

ARCHITECTURAL ASSISTANTS required for good general contemporary work in busy office in the Watford area. Excellent salary for suitable applicants. Write, giving brief details of experience, etc., to Box 5014.

ARCHITECTURAL ASSISTANTS, Junior and Senior, required early in the New Year in Welwyn Garden City office. Varied work of contemporary character, comprising industrial, commercial and housing projects. Please reply, giving details of age, experience and qualifications, to Chas. W. Fox, 22, Parkway, Welwyn Garden City, Herts. 5017

JUNIOR ARCHITECTURAL ASSISTANT, South-Eastern Gas Board, Architect and Surveyor's Department, Katharine Street, Croydon. Candidates must have a sound knowledge of architectural drawing, building construction and specifications. Salary within the range £490-£585 p.a. Applications in writing, quoting reference V16/515 and giving full details, to the Personnel Manager at Katharine Street, within seven days. 5018

BBC requires Architectural Assistants in London for work on design of studio, transmitter and office premises. Candidates should be up to Intermediate or Final R.I.B.A. standard with preferably few years' office experience. Salary in scale £620-£830 or £725-£960 according to qualifications and experience. Requests for application forms to Engineering Establishment Officer, Broadcasting House, London, W.1, within 7 days, quoting Ref. EX.74. A.J. 5023

WANTED. Experienced Architectural Assistant about final stage or above, interested in School and Church work. Ring V10 4853. 5019

ARCHITECTURAL ASSISTANTS required, of Final and Intermediate standard. Opportunity to work on large-scale projects of contemporary design. Salary commensurate with experience. Five-day week. Ring LIBerty 1189 for appointment. Box 5020.

BEARD, BENNETT & WILKINS invite applications for positions as Senior Architectural Assistants. Applicants must have good ability in contemporary design and must be able to organise contracts through all stages. An excellent opportunity is offered to suitable men to develop their own ideas of design and detailing. Considerable variety of work already in progress in many parts of the country. Apply stating age, qualifications, experience and salary required, to Mr. Wilkins, 101/3, Baker Street, London, W.1. 5022

ARCHITECTURAL DRAUGHTSMAN, Intermediate standard, with previous office experience. Apply Cable & Pite, F.R.I.B.A., South Park, Sevenoaks, Kent, stating age, training and salary required. 4997

MANCHESTER REGIONAL HOSPITAL BOARD invite applications for the posts of (a) **ARCHITECTURAL ASSISTANT** and (b) **QUANTITY SURVEYING ASSISTANT** in the Architectural Department of the Board's Headquarters in Cheetwood Road, Manchester, 8, at a salary, according to qualifications and experience, of either (i) £480 rising to £670 a year with provision for a commencing salary not exceeding £560, or (ii) £640 rising to £930 a year, commencing at the minimum of the grade. National Health Service conditions and superannuation. Applications, stating age, qualifications and experience, and names and addresses of not more than three referees, to be sent to the Secretary of the Board by December 22nd, 1955. 4974

W. H. WATKINS, GRAY, F.R.I.B.A. & PARTNERS require Architectural Assistants of Intermediate or near-final standard for Bristol Office. Applicants should preferably have passed R.I.B.A. Intermediate and be studying for Final. Good salary and conditions; contributory pension scheme in operation. Full details of age, experience, salary required and date available, to 1, Clare Street, Bristol, 1. 4976

ARCHITECTURAL ASSISTANTS about Intermediate standard required in Guildford and London Offices. Varied work on contemporary designs. Time for study. Apply: Brownrigg & Turner, 163, High Street, Guildford. Phone: 4975

SENIOR ASSISTANT required by leading office in NAIROBI. Salary from £1,200-£1,440 p.a. with free passage, bonus and leave schemes, etc. Further details, quoting OSS 17/10, from OVERSEAS TECHNICAL SERVICE, 5, Welldon Crescent, Harrow, Middlesex. 4985

ORMAN & PARTNERS require experienced Architectural Assistants for their Cyprus Office. Minimum standard Intermediate R.I.B.A. Passage paid and salary by arrangement. Apply, stating age and experience, to 23, High Street, Guildford, Surrey. Telephone 67688-9. 4980

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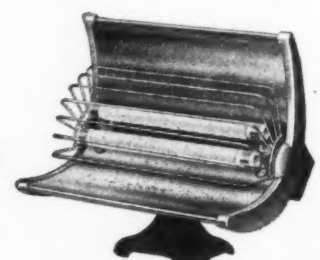
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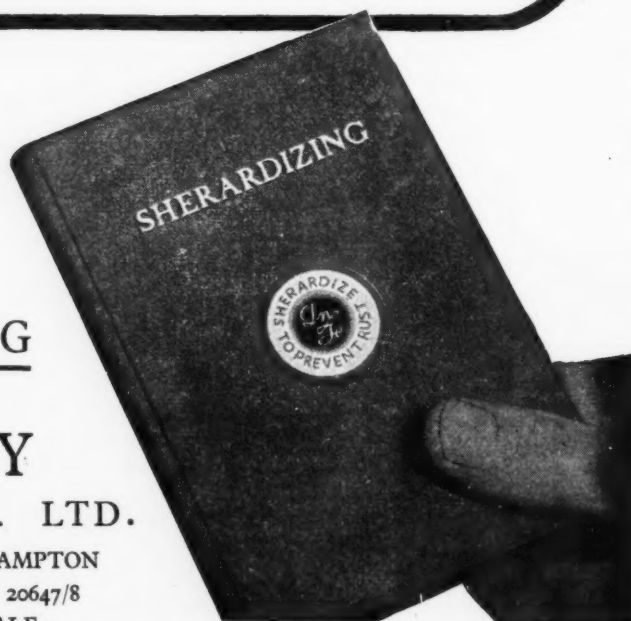
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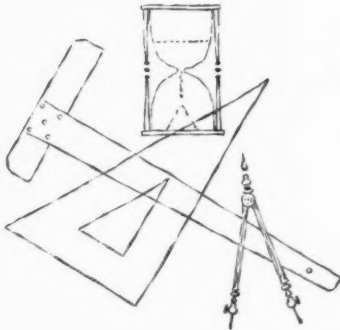
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