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

IHVE	Institution of Heating and Ventilating Engineers. 49, Cadogan Square.	Sloane 1601/3158
"BDID	Incorporated Institute of British Decorators and Interior Designers. 100, Park Street, Grosvenor Square, W.1.	Mayfair 7086
ILA	Institute of Landscape Architects, 2, Guilford Place, W.C.1.	Holborn 0281
I of Arb	Institute of Arbitrators. Hastings House, 10, Norfolk Street, Strand, W.C.2.	Temple Bar 4071
IOB	Institute of Builders. 48, Bedford Square, W C.1.	Museum 7179
IQS	Institute of Quantity Surveyors. 98, Gloucester Place, W.1.	Welbeck 1859
IR	Institute of Refrigeration. Dalmeny House, Monument Street, E.C.3.	Avenue 6851
IRA	Institute of Registered Architects. 47, Victoria Street, S.W.1.	Abbey 6172
ISE	Institute of Structural Engineers. 11, Upper Belgrave Street, S.W.1.	Sloane 7128
LDA	Lead Development Association. Eagle House, Jermyn Street, S.W.1.	Whitehall 7264/4175
LMBA	London Master Builders' Association. 47, Bedford Square, W.C.1.	Museum 3891
LSPC	Lead Sheet and Pipe Council. Eagle House, Jermyn Street, S.W.1.	Whitehall 7264/4175
MAFF	Ministry of Agriculture, Fisheries and Food. Whitehall Place, S.W.1.	Trafalgar 7711
MOE	Ministry of Education. Curzon Street House, Curzon Street, W.1.	Mayfair 9400
MOH	Ministry of Health. 23, Savile Row, W.1.	Regent 8411
MOHLG	Ministry of Housing and Local Government. Whitehall, S.W.1.	Whitehall 4300
MOLNS	Ministry of Labour and National Service. 8, St. James' Square, S.W.1.	Whitehall 6200
MOS	Ministry of Supply. Shell Mex House, W.C.2.	Gerrard 6933
MOT	Ministry of Transport. Berkeley Square House, Berkeley Square, W.1.	Mayfair 9494
MOW	Ministry of Works. Lambeth Bridge House, S.E.1.	Reliance 7611
NAMMC	Natural Asphalte Mine Owners and Manufacturers Council. 94/98, Petty France, S.W.1.	Abbey 1010
NAS	National Association of Shopfitters. 9, Victoria Street, S.W.1.	Abbey 4813
NBR	National Buildings Record. 31, Chester Terrace, Regent's Park, N.W.1.	Welbeck 0619
NCBMP	National Council of Building Material Producers. 10 Storey's Gate, S.W.1.	Abbey5111
NEFMAI	National Employers Federation of the Mastic Asphalt Industry. 21, John Adam Street, Adelphi, W.C.2.	Trafalgar 3927
NFBTE	National Federation of Building Trades Employers. 82, New Cavendish Street. W.1.	Langham 4041/4054
NFBTO	National Federation of Building Trades Operatives. Federal House, Cedars Road, Clapham, S.W.4.	Macaulay 4451
NFHS	National Federation of Housing Societies. 12, Suffolk St., S.W.1.	Whitehall 1693
NHBRC	National House Builders Registration Council. 58, Portland Place, W.1.	Langham 0064/5
NPL	National Physical Laboratory. Head Office, Teddington.	Molesey 1380
NRDB	Natural Rubber Development Board. Market Buildings, Mark Lane, E.C.3.	Mansion House 9383
NSAS	National Smoke Abatement Society. Palace Chambers, Bridge Street, S.W.1.	Trafalgar 6838
NT	National Trust for Places of Historic Interest or Natural Beauty. 42, Queen Anne's Gate, S.W.1.	Whitehall 0211
PEP	Political and Economic Planning. 16, Queen Anne's Gate, S.W.1.	Whitehall 7245
RCA	Reinforced Concrete Association. 94, Petty France, S.W.1.	Abbey 4504
RIAS	Royal Incorporation of Architects in Scotland. 15, Rutland Square, Edinburgh.	Fountainbridge 7631
RIBA	Royal Institute of British Architects. 66, Portland Place, W.1.	Langham 5721
RICS	Royal Institution of Chartered Surveyors. 12, Great George Street, S.W.1.	Whitehall 5322/9242
RFAC	Royal Fine Art Commission. 5, Old Palace Yard, S.W.1.	Whitehall 3935
RS	Royal Society. Burlington House, Piccadilly, W.1.	Regent 3335
RSA	Royal Society of Arts. 6, John Adam Street, W.C.2.	Trafalgar 2366
RSH	Royal Society of Health. 90, Buckingham Palace Road, S.W.1.	Sloane 5134
RIB	Rural Industries Bureau. 35, Camp Road, Wimbledon, S.W.19.	Wimbledon 5101
SBPM	Society of British Paint Manufacturers. Grosvenor Gardens House, Grosvenor Gardens, S.W.1.	Victoria 2186
SE	Society of Engineers. 17, Victoria Street, Westminster, S.W.1.	Abbey 7244
SFMA	School Furniture Manufacturers' Association. 30, Cornhill, London, E.C.3.	Mansion House 3921
SIA	Society of Industrial Artists. 7, Woburn Square, London, W.C.1.	Langham 1984/5
SIA	Structural Insulation Association. 32, Queen Anne Street, W.1.	Langham 7616
SNHTPC	Scottish National Housing. Town Planning Council. Hon. Sec., Robert Pollock, Town Clerk, Rutherglen	
SPAB	Society for the Protection of Ancient Buildings. 55, Great Ormond Street, W.C.1.	Holborn 2646
TCPA	Town and Country Planning Association. 28, King Street, Covent Garden, W.C.2.	Temple Bar 5006
TDA	Timber Development Association. 21, College Hill, E.C.4.	City 4771
TPI	Town Planning Institute. 18, Ashley Place, S.W.1.	Victoria 8815
TTF	Timber Trades Federation. 75, Cannon Street, E.C.4.	City 5040
WDC	War Damage Commission. 6, Carlton House Terrace, S.W.1.	Whitehall 4341
ZDA	Zinc Development Association. 34, Berkeley Square, W.1.	Grosvenor 6636

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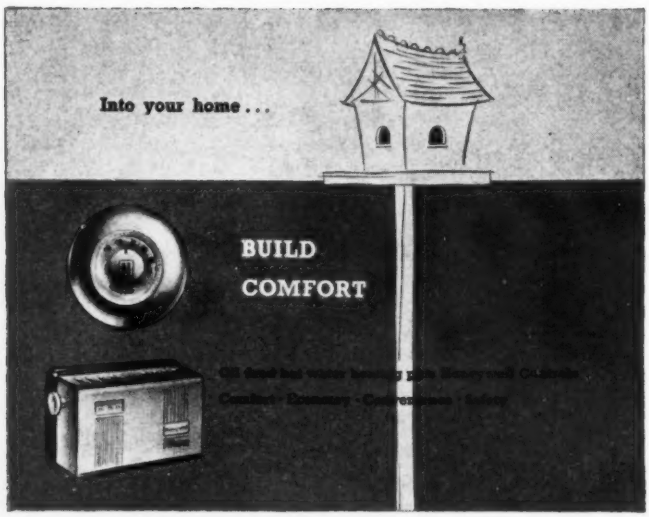

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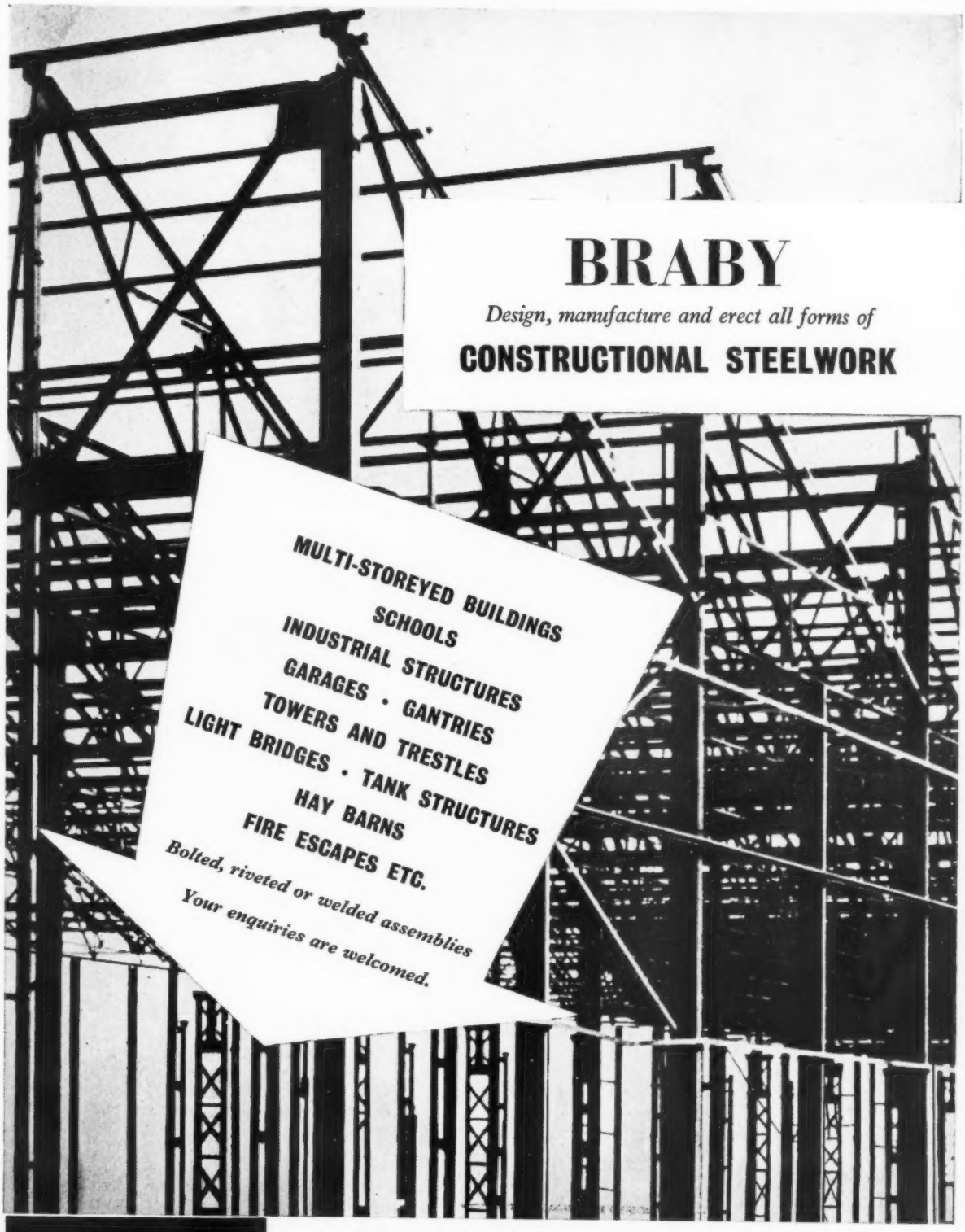

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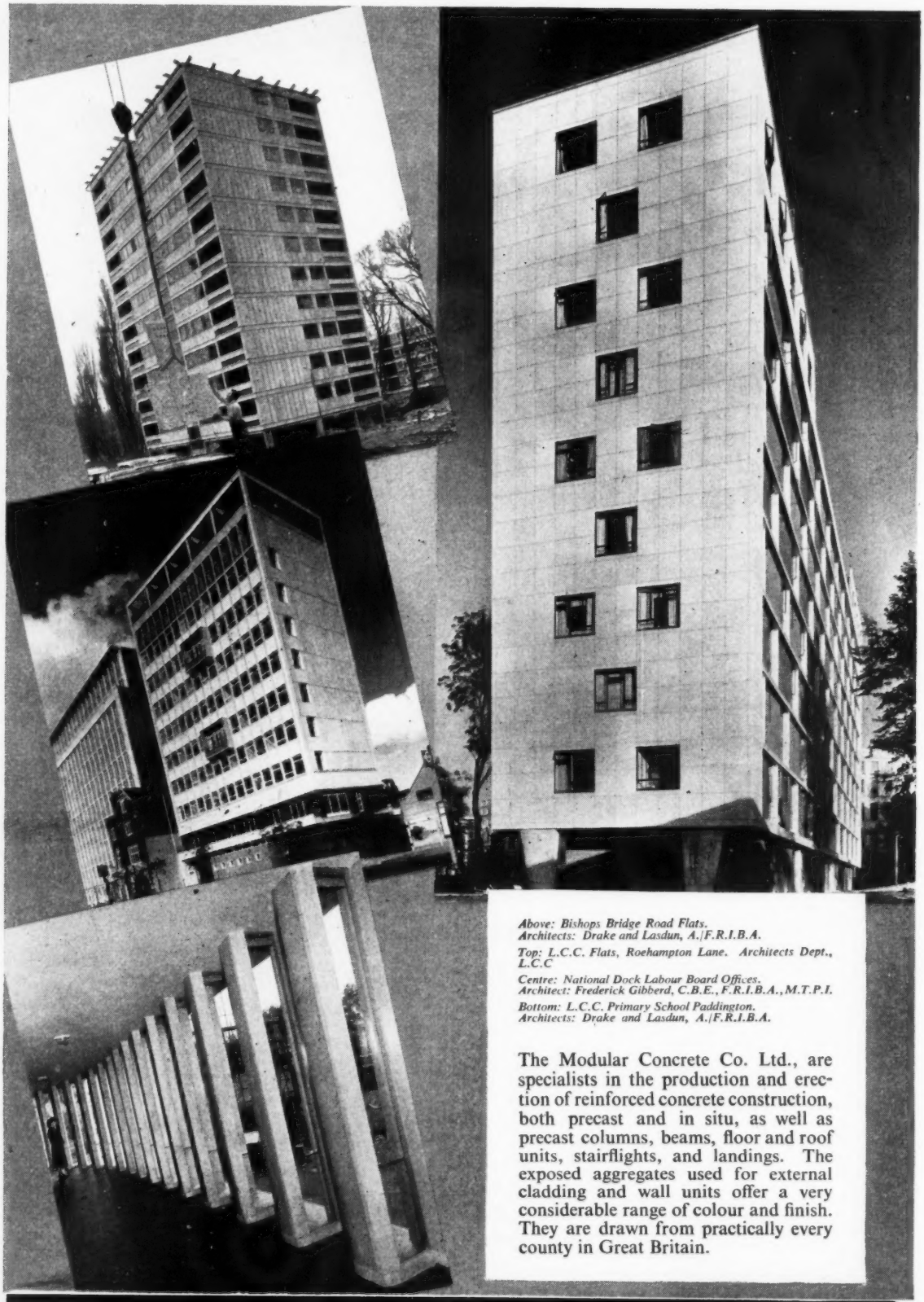

Above: Bishops Bridge Road Flats.
Architects: Drake and Lasdun, A.|F.R.I.B.A.

Top: L.C.C. Flats, Roehampton Lane. Architects Dept., L.C.C

Centre: National Dock Labour Board Offices.
Architect: Frederick Gibberd, C.B.E., F.R.I.B.A., M.T.P.I.

Bottom: L.C.C. Primary School Paddington.
Architects: Drake and Lasdun, A.|F.R.I.B.A.

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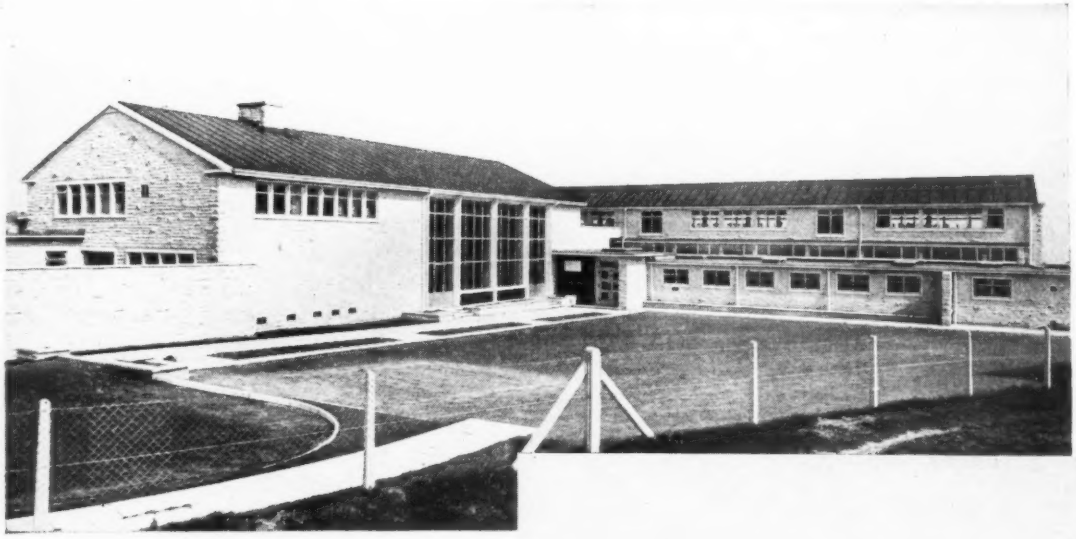

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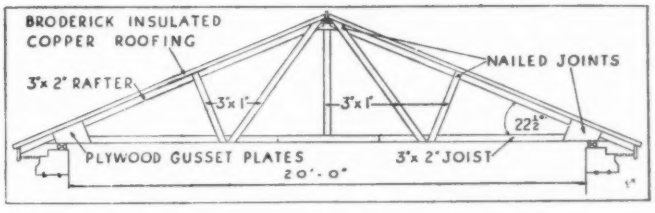

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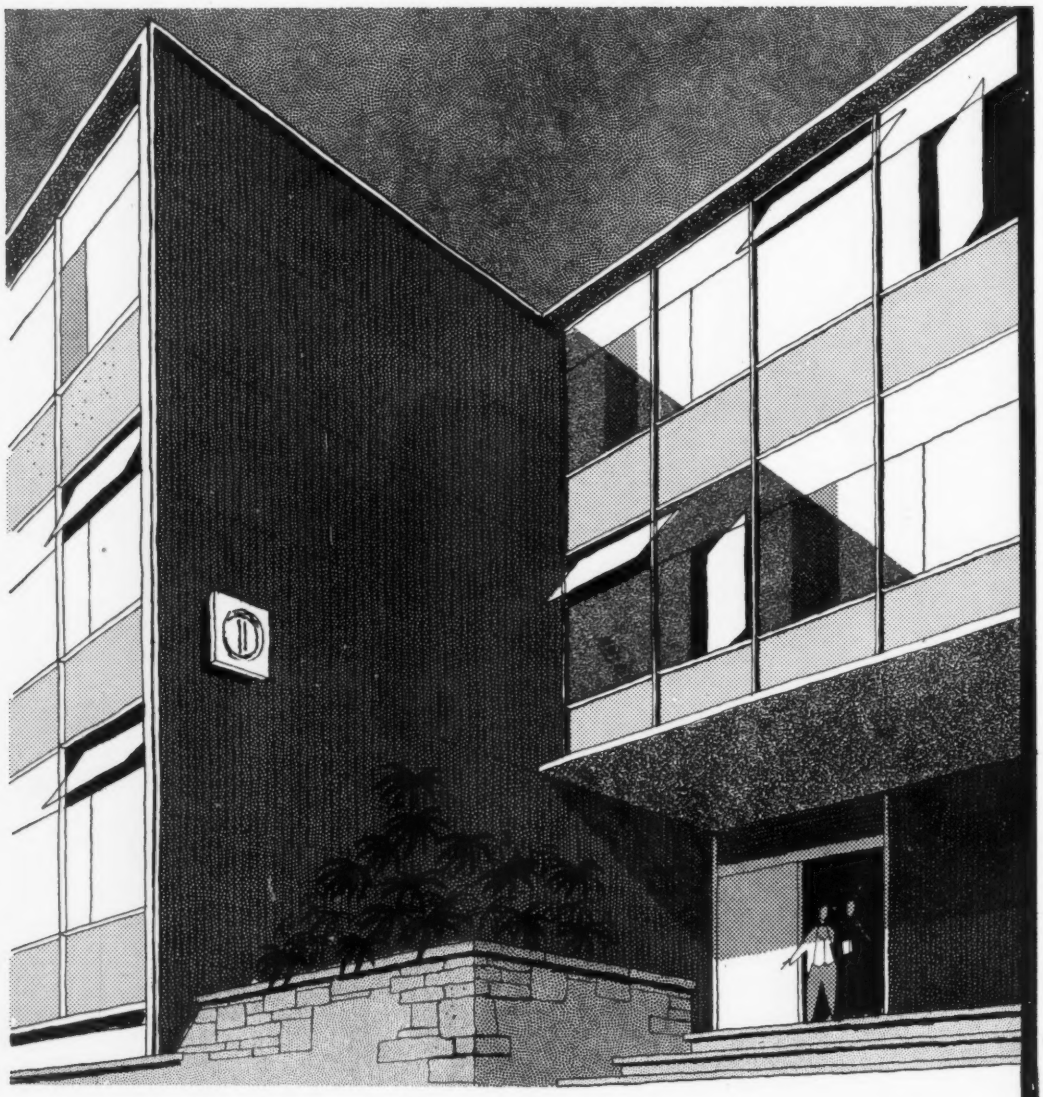

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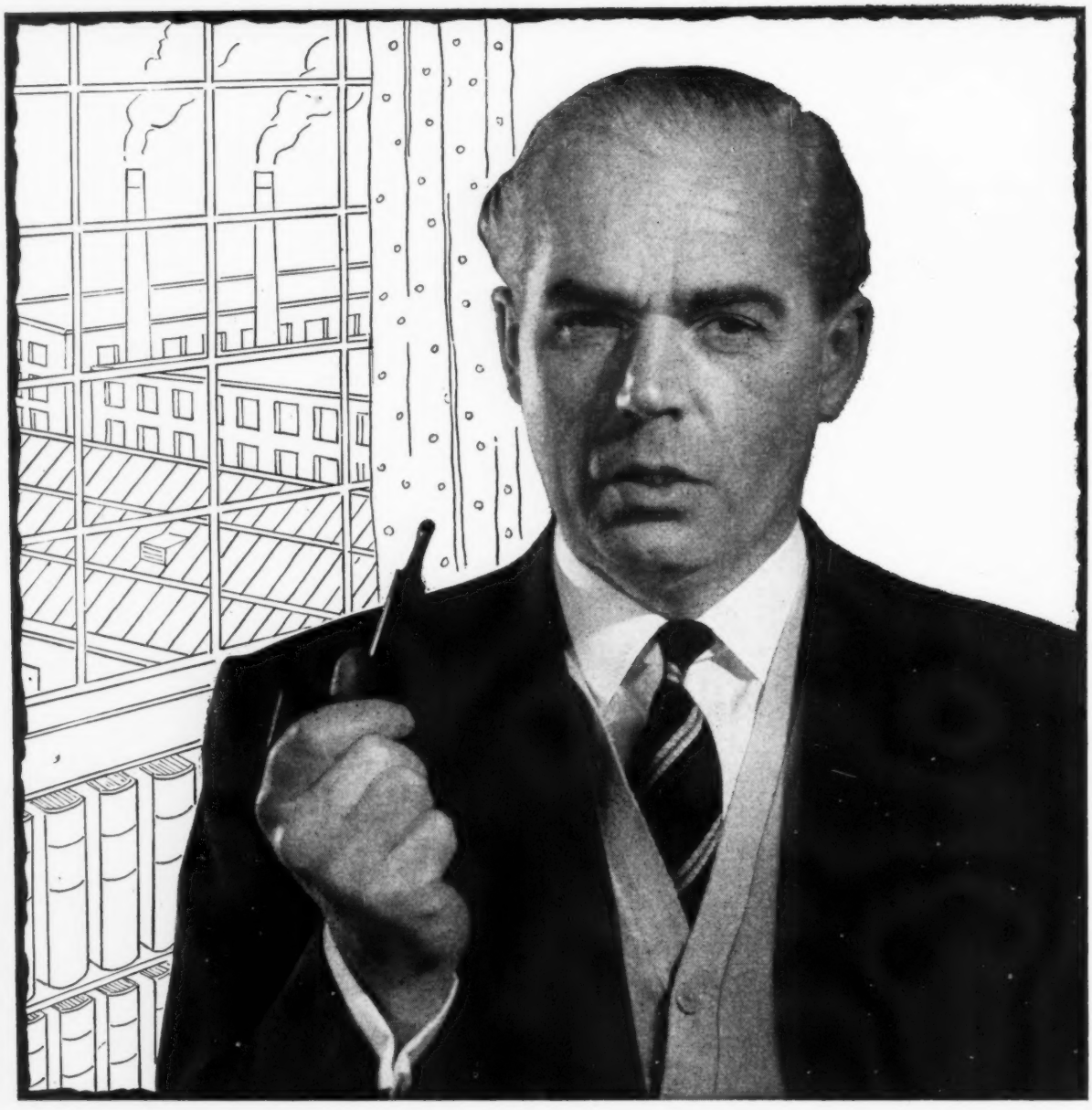

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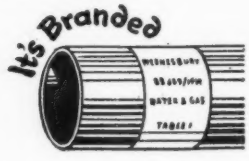

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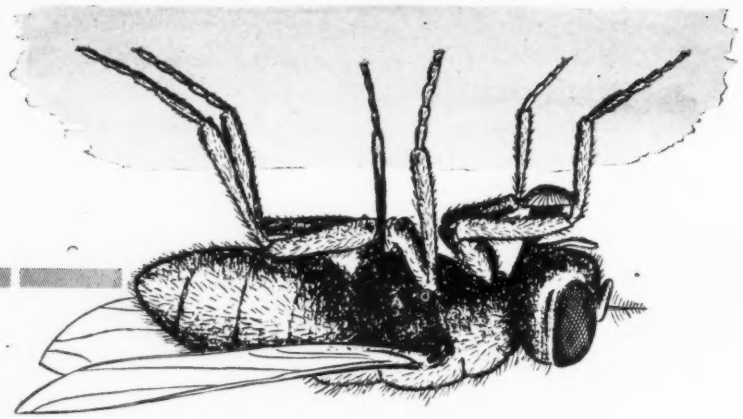

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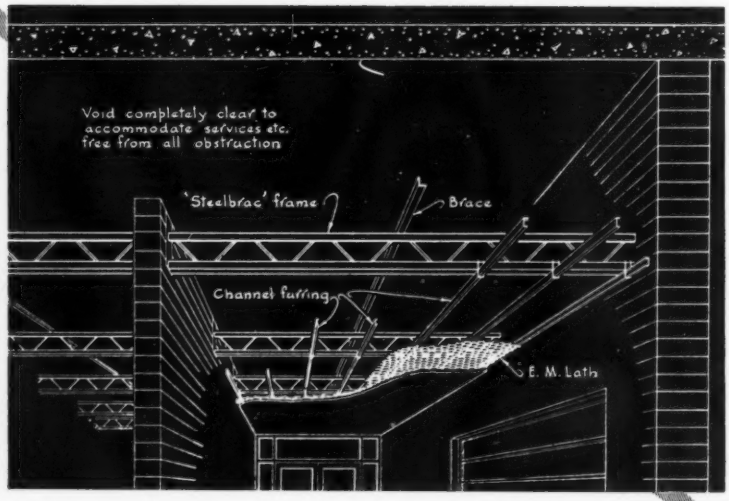

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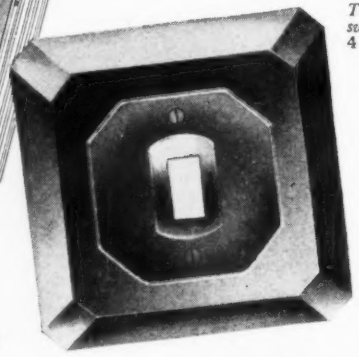

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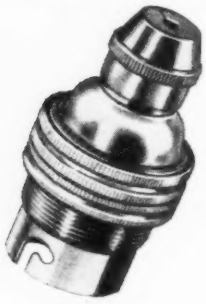

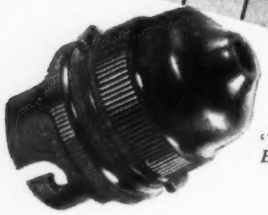

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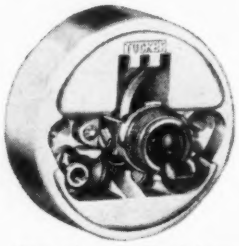

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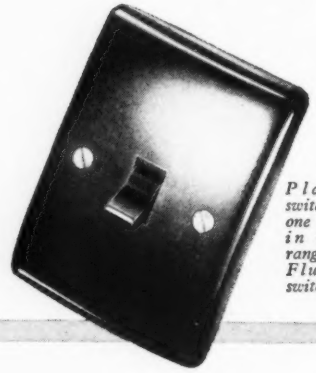

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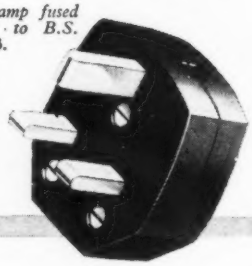

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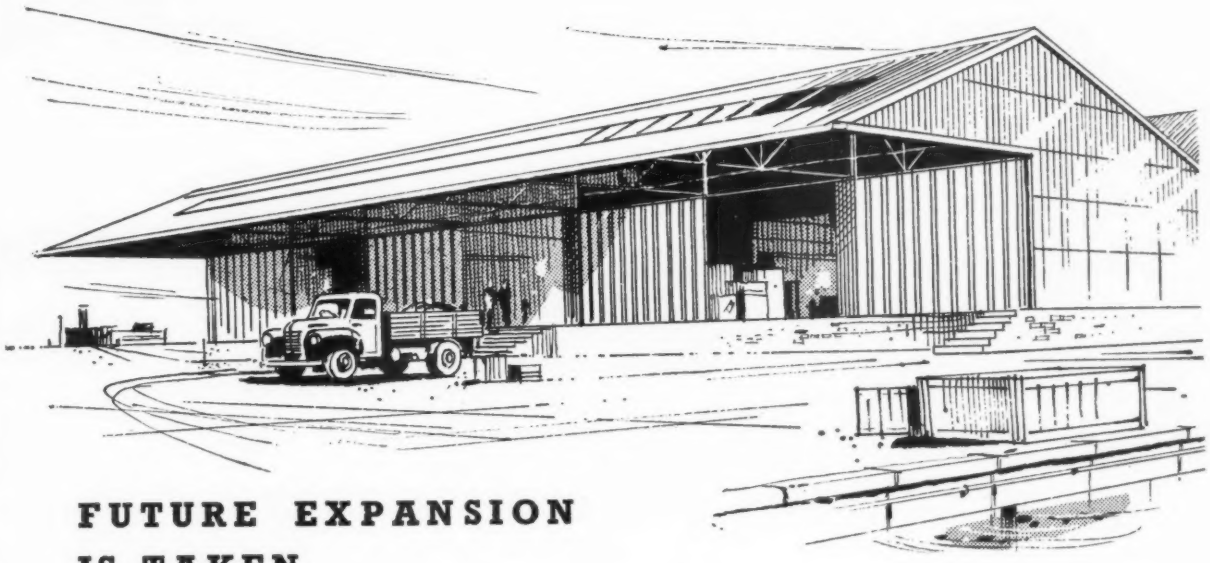

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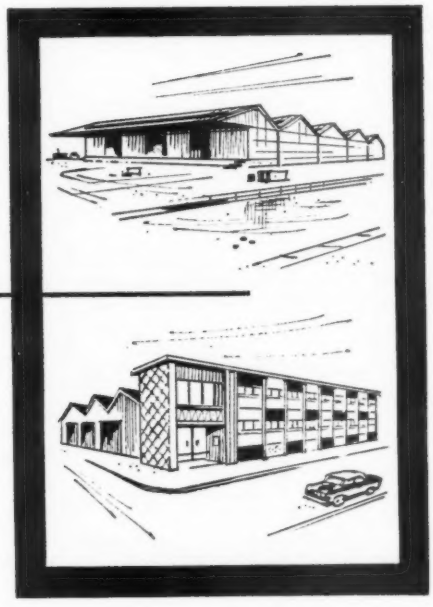

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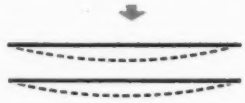

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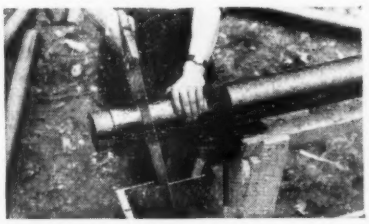
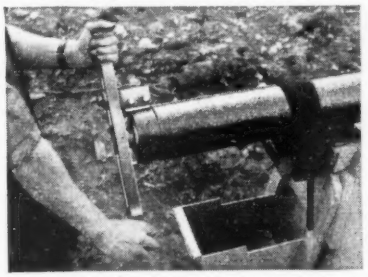
A piece of heavy timber is placed against the coupling and a length knocked home.

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



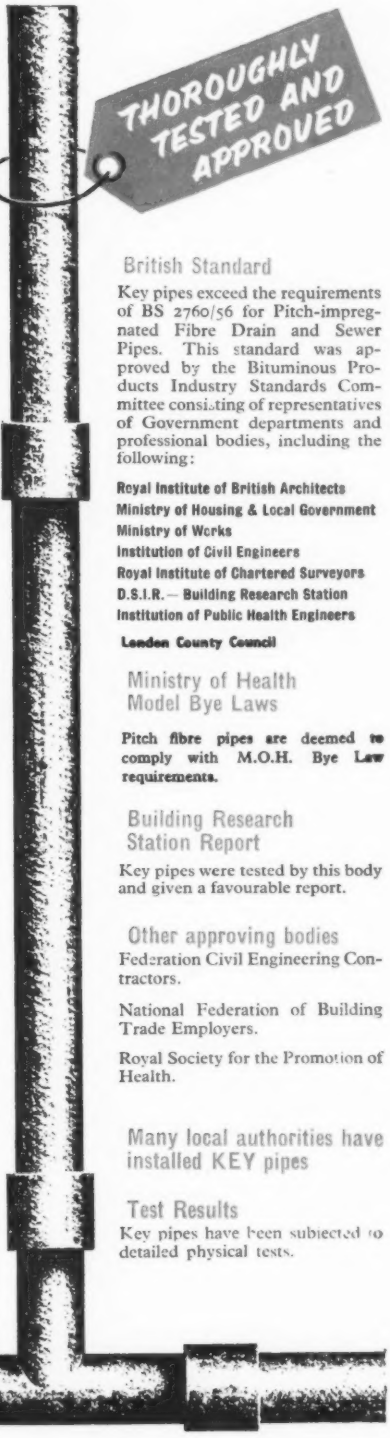
Short lengths of pipe can be cut with a coarse toothed handsaw.



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

SPEEDING THE JOB— CUTTING THE COST

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



British Standard

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

Royal Institute of British Architects
Ministry of Housing & Local Government
Ministry of Works
Institution of Civil Engineers
Royal Institute of Chartered Surveyors
D.S.I.R.— Building Research Station
Institution of Public Health Engineers
London County Council

Ministry of Health Model Bye Laws

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

Building Research Station Report

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

Other approving bodies

Federation Civil Engineering Contractors.

National Federation of Building Trade Employers.

Royal Society for the Promotion of Health.

Many local authorities have installed KEY pipes

Test Results

Key pipes have been subjected to detailed physical tests.

Also specify **KEY** Underfloor Ducting and cable Conduits

KEY PITCH FIBRE PIPES

The world's finest and most modern drainage system

A PRODUCT OF **KEY ENGINEERING COMPANY LIMITED**
4, Newgate Street, London, E.C.1. Telephone: CITY 1185, 6 and 7.

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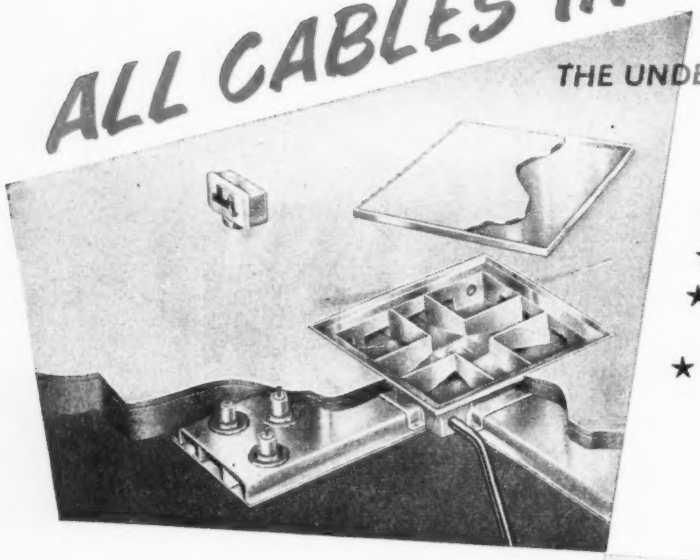
THE UNDER FLOOR SYSTEM FOR 1½" SCREEDS



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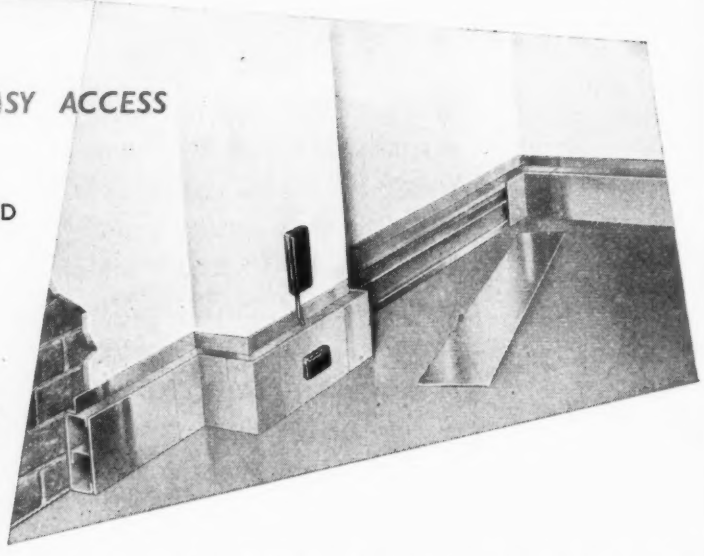

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The publication 'Greenwood-Airvac Conduit Systems' tell you more about these patented cable ducts. Please write for a copy

Greenwood-Airvac *conduit systems*

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PATENT NO. 727280

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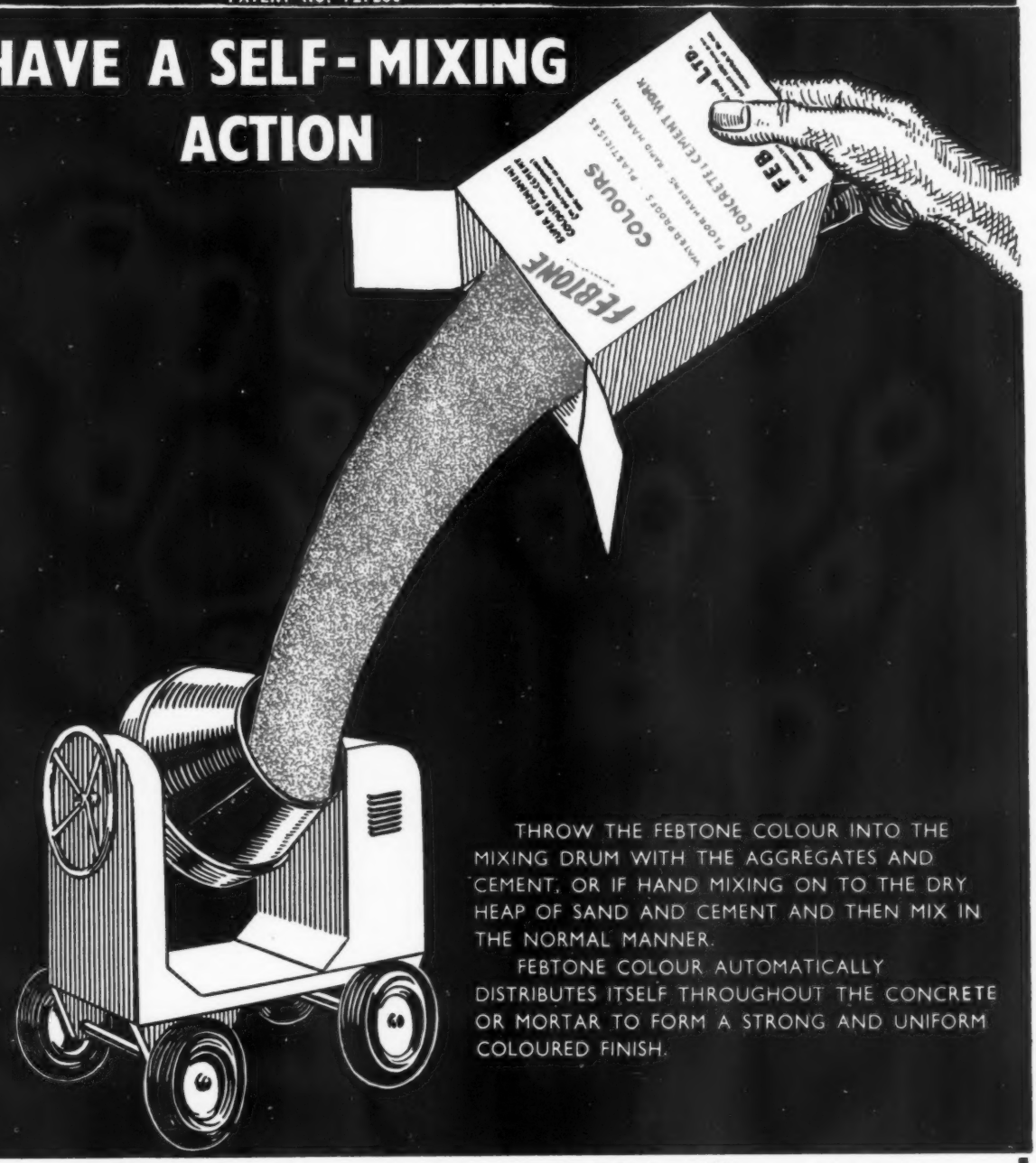

THROW THE FEBTONE COLOUR INTO THE MIXING DRUM WITH THE AGGREGATES AND CEMENT, OR IF HAND MIXING ON TO THE DRY HEAP OF SAND AND CEMENT AND THEN MIX IN THE NORMAL MANNER.

FEBTONE COLOUR AUTOMATICALLY DISTRIBUTES ITSELF THROUGHOUT THE CONCRETE OR MORTAR TO FORM A STRONG AND UNIFORM COLOURED FINISH.

FEBTONE Colours are so compounded that the colour value is developed 100 per cent. when used in concrete and cement work, resulting in the production of the richest colours available with only 3 lbs. to 6 lbs. of FEBTONE incorporated with each 1 cwt. of cement.

Resistant to lime alkalis, acid, heat, light and frost, and permanent and strong in colour, FEBTONE represents the most advanced form of colouring for cement work yet produced.

Consistent in colour and intermixable, FEBTONE not only colours but also improves concrete, granolithic pavings and cement floor and wall renderings.

Can we send you the Febtone Shade Card

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FEB (GREAT BRITAIN) LTD.

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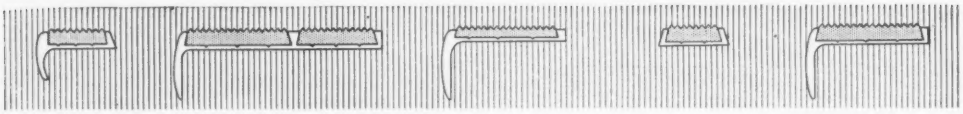
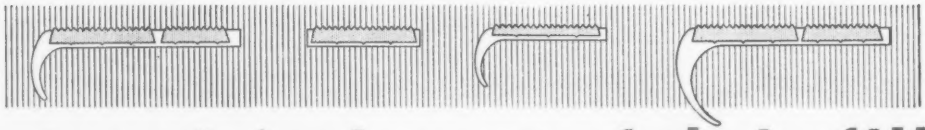
For every type of stair

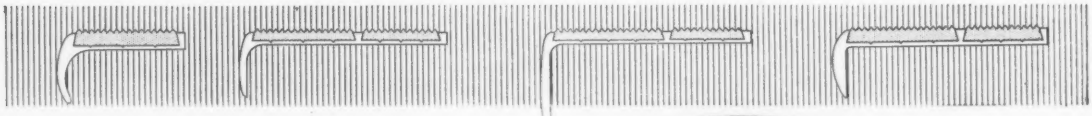


(wood metal or stone)

there's a DON non-slip



tread (colour or fabric-filled)



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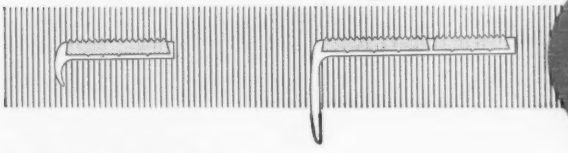

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19 different nosings: extruded from pure aluminium:
plastic-filled in 9 colours (brown, green,
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also available fabric-filled:
suitable for all types of stairway:
can be supplied to fit almost any curve or bend.

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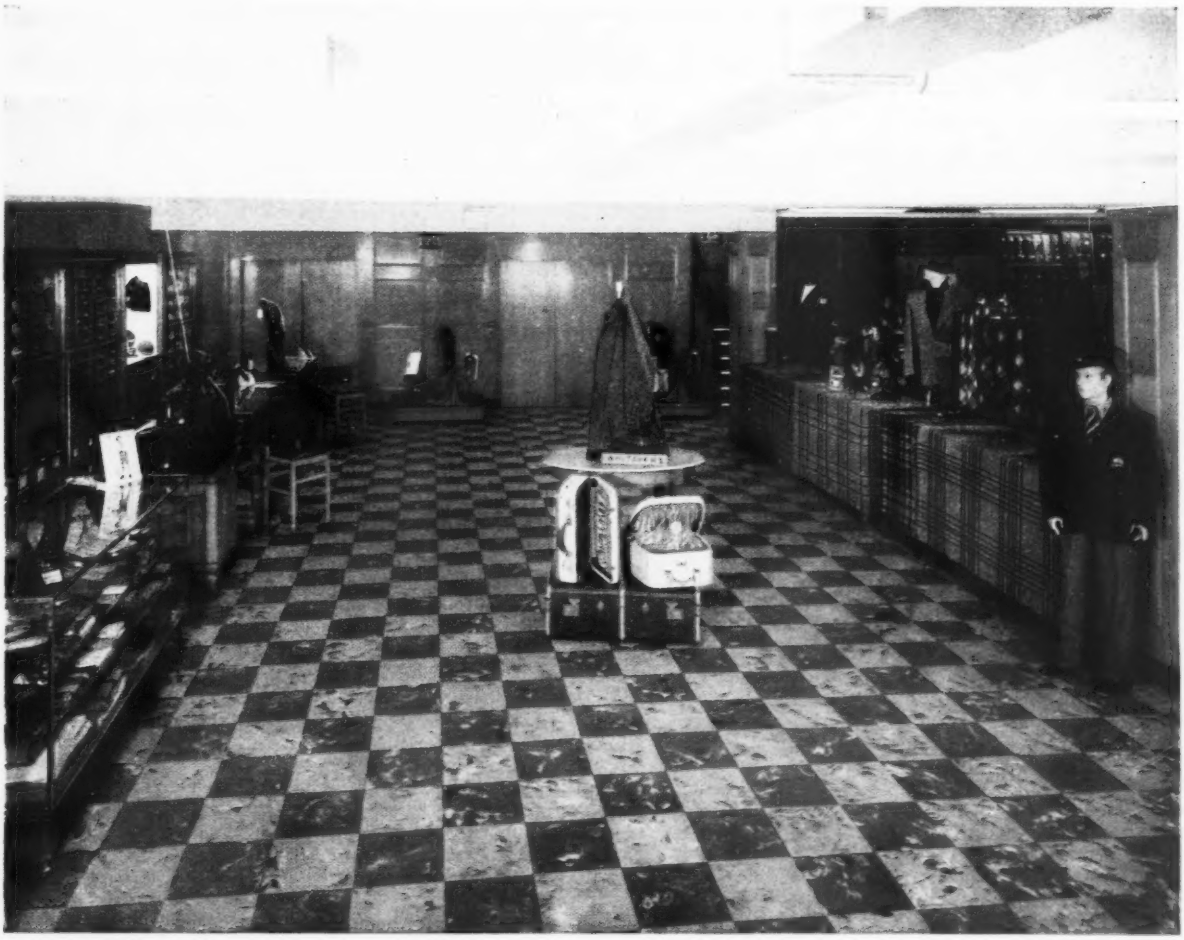
Floors for Stores...



Men's and Boy's Shop, Whitakers of Bolton.

Accotile Specialist Contractors: Rowan and Boden Ltd., MANCHESTER

... need the 'walk-in' beauty of ACCOTILE

A colourful floor that invites one to walk upon it means customers in the shop. For eye-appeal is the first essential in sales aids, as any publicity expert will affirm.

Whitakers of Bolton chose Accotile for their new floor — to give it the bright clean-looking atmosphere that pleases the customer and helps the salesman. But, of course, Accotile brought them more than just colourful design. For this modern thermoplastic tile is tough and hard-wearing over years of service. It is easy to maintain. It is proof against draught, rot and vermin. An Accotile floor is, in fact, an investment in any building.

The range of Accotile colours has now been increased to 26 — send for samples and full details to :—

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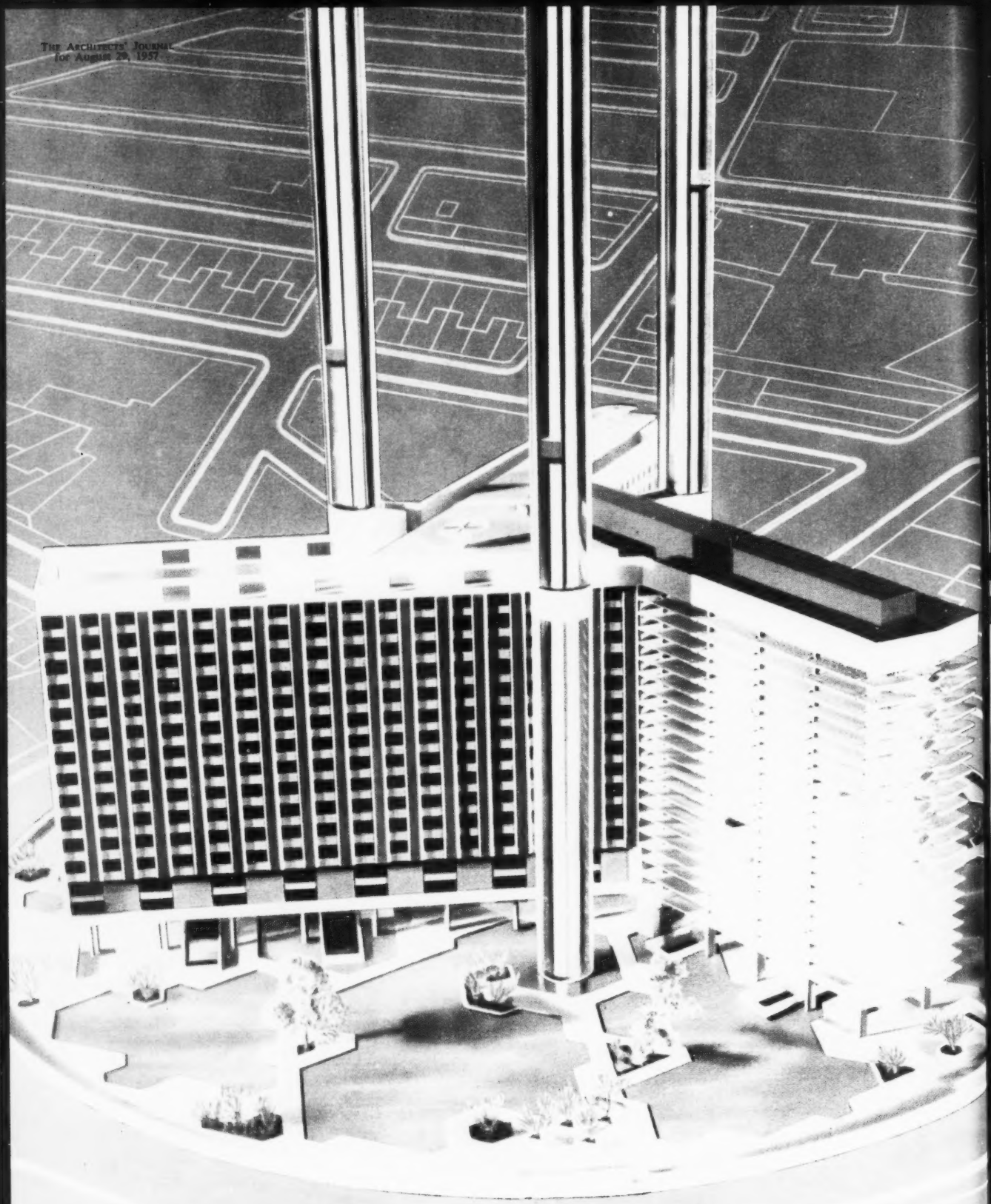
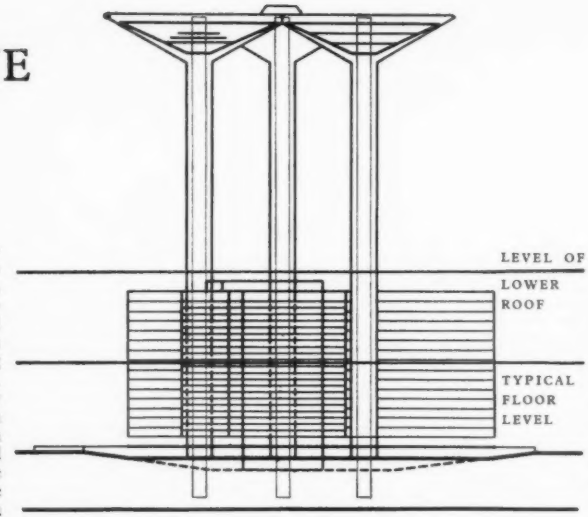


SKYPORT ONE

THE LOWER BUILDING

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



The main rôle of the 200 ft. high roof of the triple-wing building is to provide a landing stage and take-off pad for private rotorcraft and air taxis. These facilities are provided over the central circulation core of the building and the office wing. Bridge connections to the main lift shafts enable interchange and private air passengers to reach this level direct from the Skyport or from the ground. Aircraft will land and take off at a relatively shallow angle until clear of Skyport structure above. These two-to-six seater aircraft, no larger than the present-day car, will have folding rotors for easy parking. Over the Multi-park area are up and down ramps leading to a battery of vertical lift cages which transport aircraft to their parking places.

Over the Transit Hotel is a roof garden.

The Multi-park is an example of the 'Autosilo' type of parking accommodation which might be widely adopted, either in association with such projects as the SKYPORT ONE or as self-contained units. This particular proposal provides 924 parking spaces spread over 21 floors. Cars heading for the Multi-park receive a ticket for the appropriate parking bay, and are directed to one of seven lifts, each capable of carrying two cars. After being left there the vehicles are entirely push-button controlled, being automatically parked by sliding dollies attached to the lift cages. There are similar arrangements for parking aircraft landing on the lower roof. The average time taken to retrieve a car from the park is about two minutes. The parking bays are double-cantilevered open-mesh steel slabs spanning between structural fin walls of concrete.

The Multi-park is open to the air for reasons of ventilation, maintenance and economy.

The accommodation in the Transit Hotel and Office Block is on 14 floors and would conform to the particular client requirements. The façades of these two wings are for the most part clad in glass curtain walling of various colours.

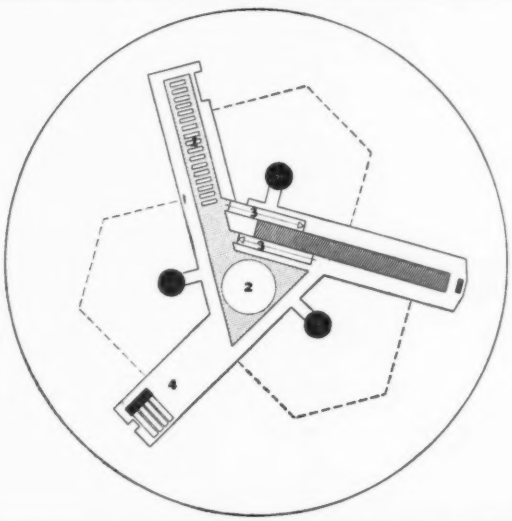
**The Glass Age Development Committee is convened by Pilkington Brothers Limited and consists of G. A. Jellicoe, F.R.I.B.A., Edward Mills, F.R.I.B.A., and Ove Arup & Partners.*

LIFTS AND STAIRS

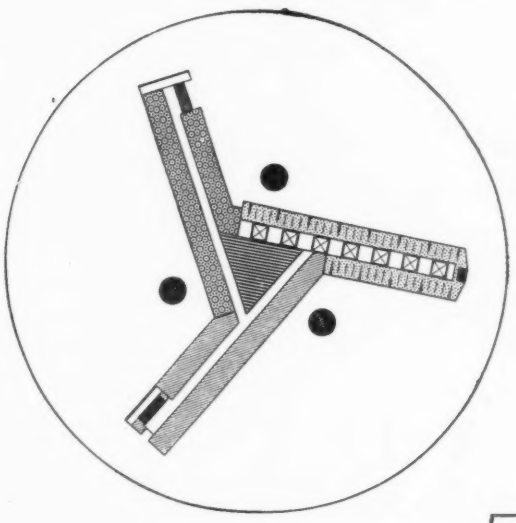
PARKING LIFTS HOUSING

1 Landing Strip
2 Take-off Pad
3 Aircraft Ramps
4 Hotel Roof Garden

THE LOWER ROOF



A TYPICAL FLOOR



LIFTS AND STAIRS

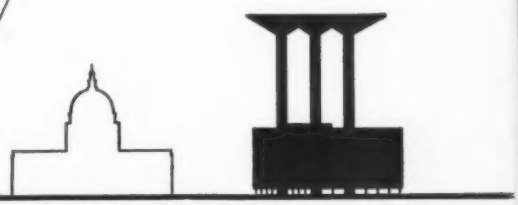
CIRCULATION AND SERVICE CORE

OFFICES

PARKING BAYS

HOTEL

2-Vehicle Lift



COMPARATIVE HEIGHTS OF ST. PAUL'S CATHEDRAL AND SKYPORT

ISSUED BY PILKINGTON BROTHERS LIMITED

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beauty strength and balance...

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A core of Weyroc Man-Made Timber for solid constructional strength: a surface of colourful, durable, melamine plastic. That's WEYDEC, the board that makes plastic surfaced constructional work as straight-forward as carpentry. No adhesives. No presses. No veneers. Just cut the size you need from a WEYDEC board. One job only and your table-top, shelf, partition or what-have-you is there, surfaced *and* decorated.

WEYDEC costs less than conventional plastic veneers, adhesives and base material together. With WEYDEC the job's practically done before you start.

WEYDEC is made in 8 ft. x 4 ft. boards, ¼" and ¾" thick.
Retail prices: ¼" 5/2 a sq. ft., ¾" 5/11 a sq. ft. *Usual Trade Discounts.*

weydec regd. **the plastic surfaced constructional board**

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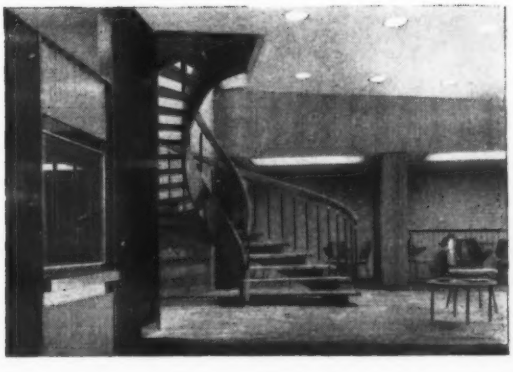

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Each year millions more cubic feet continue to be used of this permanent, fireproof, lightweight insulation aggregate.

By constant research into the development of Vermiculite and its application to modern building methods, the A.V.E. is making an important contribution to the advancement of general building design and construction.

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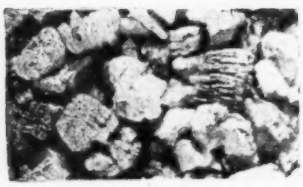

Issued in the interest of better insulation by the Association of Vermiculite Exfoliators
51-55 Strand London WC2

'U' values have news value...

votes to 34 at the ... Liberal Federation conference which ended at Southend yesterday.

Miss Eva M. Haynes, who moved the resolution, said that she had been fighting a personal war "ever since this business of distributing coupons began." She urged housewives to tear the coupons up and to refrain from buying any of the products which "purported to give anything away."

"Surely no one to-day believes that these firms are philanthropists," she said, "and that they are giving something away? The cost of all these schemes is borne by the consumer and is included in the price of the article before the selling price is fixed. It is your money that manufacturers are wasting on this profligate fashion."

The conference was thrown open to anybody who wished to "let off steam" about a pet grievance. The first delegate to reach the microphone objected to "opalescent, incandescent, sight-destroying, inartistic, crude-coloured socks" worn by young people to-day, and the string of complaints which followed ranged from the "infiltration" of American programmes on Independent Television to the bus conductors who "ring a bus away before you have

widespread

INSULATION IN FACTORIES

GOVERNMENT TAKE OVER BILL

FROM OUR POLITICAL CORRESPONDENT

The Thermal Insulation (Industrial Buildings) Bill, a private member's measure introduced by a Conservative M.P., Mr. Gerald Nabarro, is now to be sponsored by the Government and is likely to become law this session. The Bill will provide that all new industrial buildings equipped for space heating must be insulated against loss of heat if they are erected after 1958.

The Bill was introduced under the 10-minute rule in the House of Commons and was given an unopposed second reading on March 13. It has been awaiting its return for consideration in standing committee.

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The Times, May 24th, 1957

With the increasing importance of factory insulation are you aware of the advantage of Thermalite-Ytong Building Blocks?

Having exceptional thermal resistance Thermalite-Ytong blocks, when used in the construction of industrial buildings—or for that matter any building project—have many other properties to recommend them.

They provide an exceptional degree of thermal insulation, they are lightweight yet fully loadbearing, they are incombustible and provide exceptional fire resistance, are easily handled and quickly erected.

Competitive in cost to brick and concrete construction, use of Thermalite-Ytong results in lower site labour costs and provides a rapid and entirely efficient method of integral insulation with which no other construction method can compare.

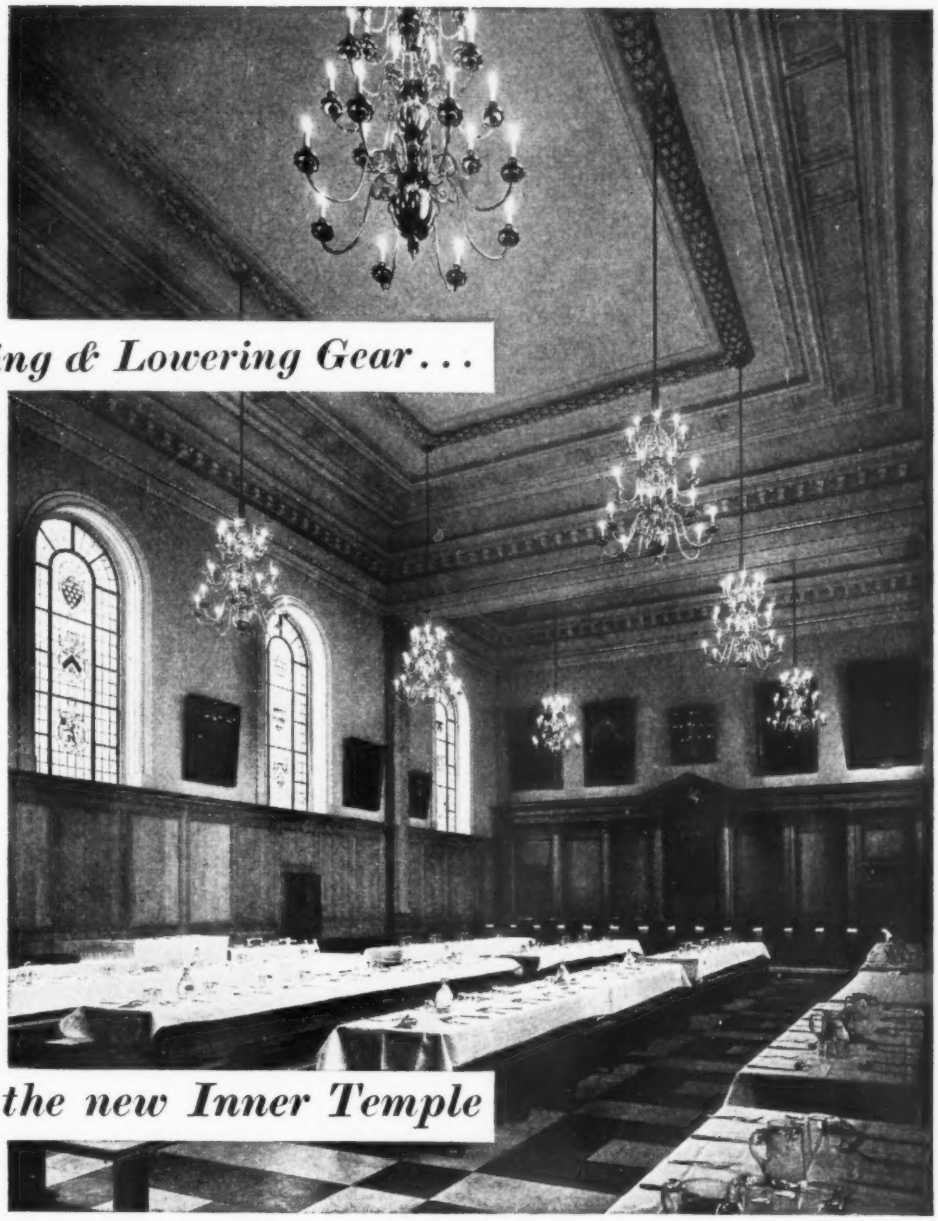
All the facts and figures are to be found in an illustrated brochure which we shall be pleased to send on request.

THERMALITE-YTONG

Load bearing insulating building blocks

- Thermal insulation
- Load bearing
- High speed of laying
- Light weight
- Workability
- Direct fixing
- Fire resistance
- Reduces the risk of condensation

THERMALITE LIMITED
Shepherds House Lane, Earley, Reading, Berkshire
Telephone: Reading 62694



L.E.F. Raising & Lowering Gear . . .

is fitted in the new Inner Temple

The beautiful Hall of the new Inner Temple is lighted by ten heavy chandeliers weighing about 2 cwt. each. They are brought down to floor level for convenient maintenance by means of L.E.F. Raising and Lowering Gear.

L.E.F. were consulted at an early stage during building operations by the Architects (Sir Hubert Worthington, R.A., and T. W. Sutcliffe, Esq., A.R.I.B.A.) and the contractors (Bower Engineering Works Ltd.) with the result that we were able to supply equipment that was " built in " to the ceiling. All working parts are completely concealed.

When you have a problem involving inaccessible lighting fittings, we shall be glad to advise you without obligation. It is often vital to discuss your needs with us at the earliest planning stage, both from the technical point of view and also to ensure that we are able to satisfy your delivery requirements.

LONDON ELECTRIC FIRM LTD. Brighton Road, South Croydon, Surrey *Telephone: Uplands 4781*

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PIERHEAD

PRESTRESSED CONCRETE

Pierhead Floor and Roof construction was used in this eleven storey block of Maisonettes erected in nineteen days by William Thornton & Sons Ltd. for the Birkenhead Borough Architect. Special prestressed beams, precast stairs, landings and balconies were also manufactured and supplied to this contract by Pierhead, Ltd.

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F.R.I.B.A.,
Dip. Arch.

Consulting Architect:
Donald Bradshaw,
F.R.I.B.A.

Consulting Engineer:
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Contractors:
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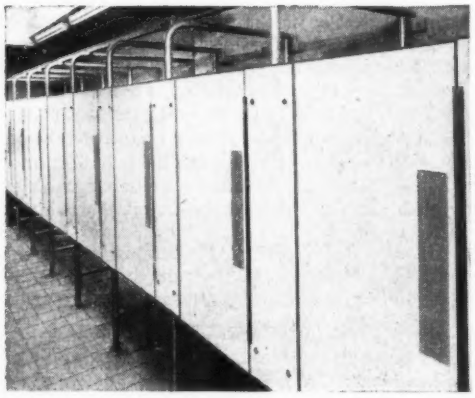
Public Baths in Metropolitan Borough of Hammersmith make extensive use of **Duramel**



Rows of Dressing cubicles adjoin each of the two full-size swimming baths. They afford real privacy in essentially communal surroundings. Both partitions and doors are faced with Duramel.

The Hammersmith Public Baths serve a densely-populated London Borough. With two large swimming baths as well as hot bath and shower facilities for both sexes, they meet a heavy public need all the year round.

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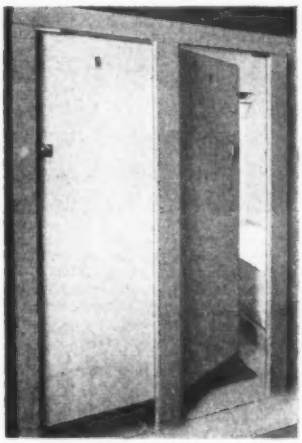

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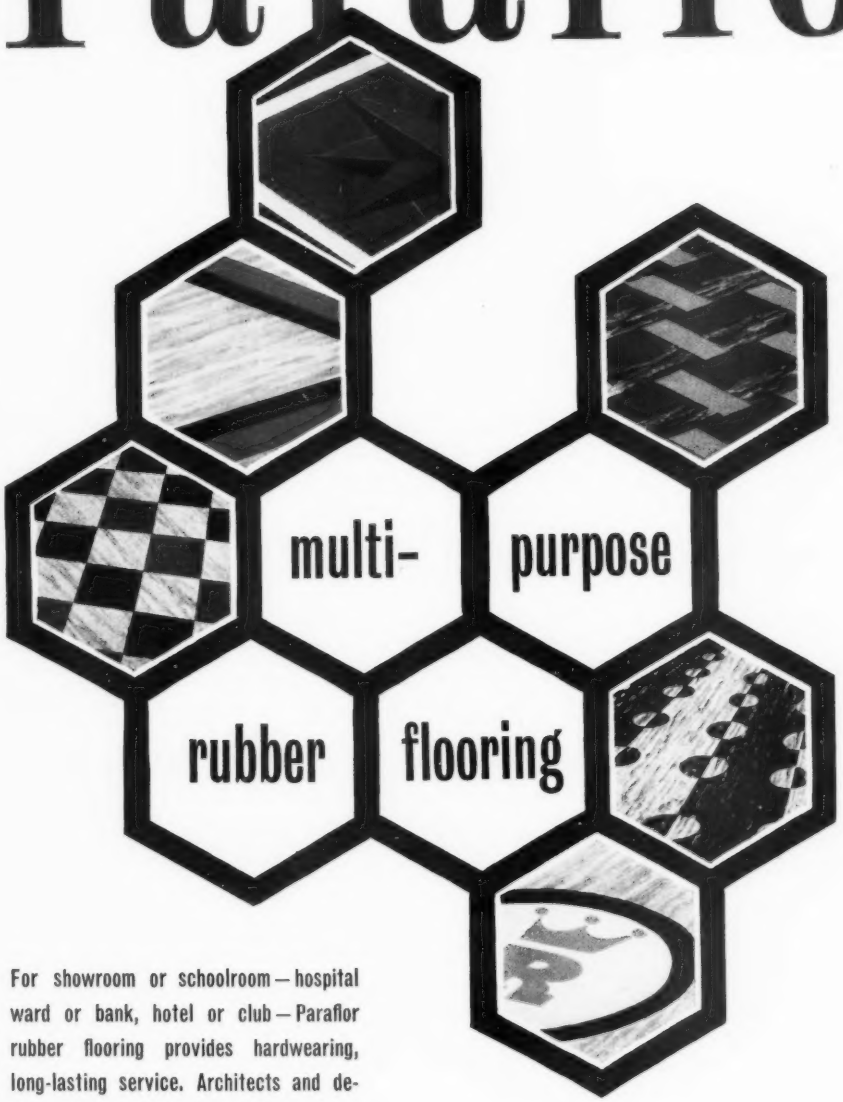

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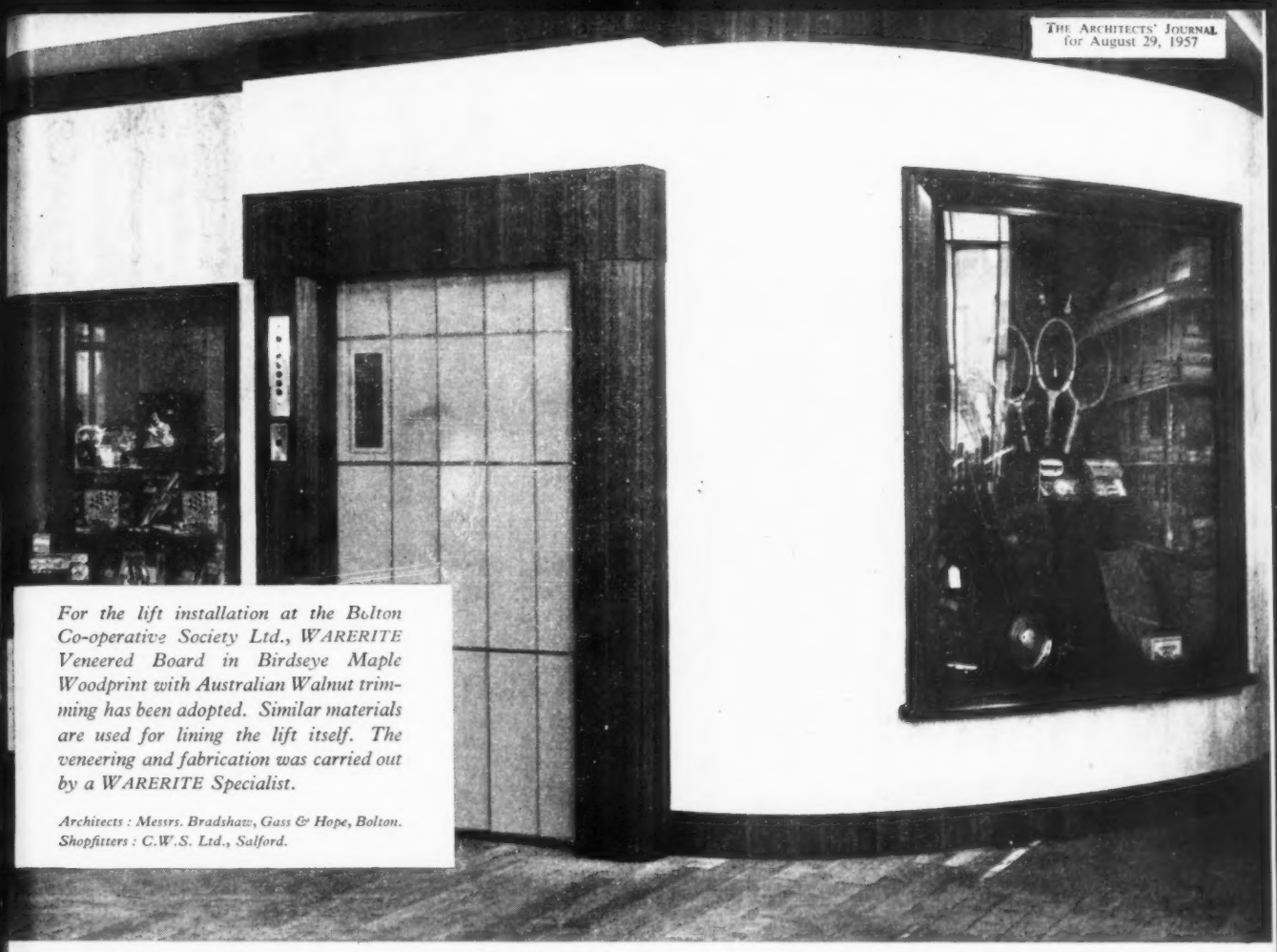

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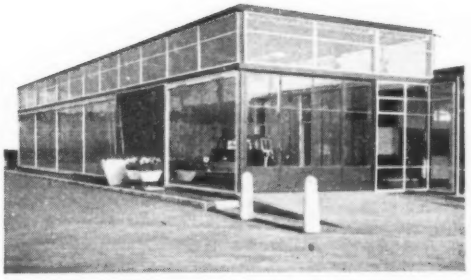

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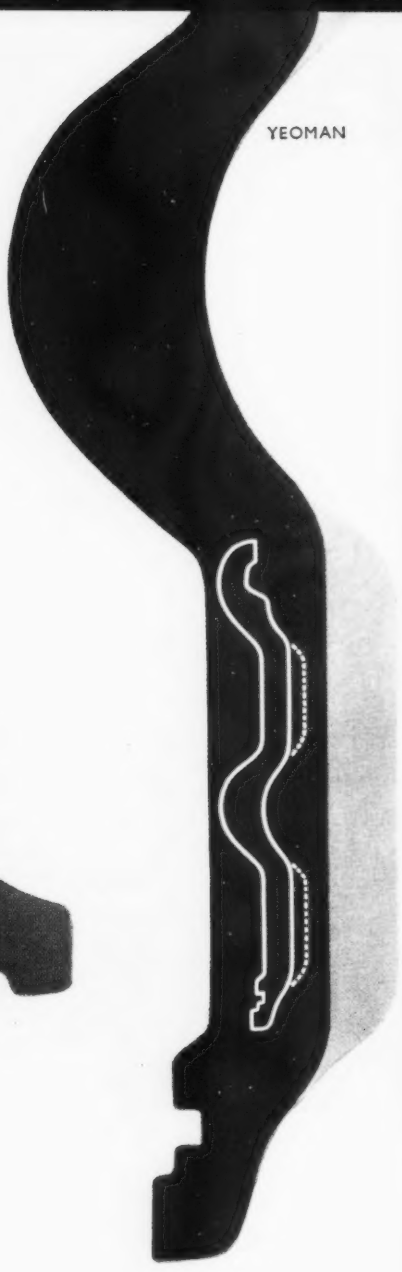

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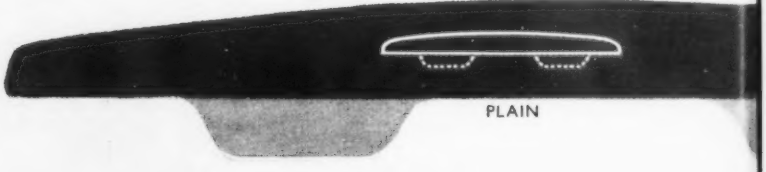

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THE ARCHITECTS' JOURNAL

No. 3261 Vol. 126 August 29, 1957

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NOT QUITE ARCHITECTURE

PYKE'S PAST

Magnus Pyke, nutrition expert, is also one of our leading science-goons, and his Third Programme deflations of scientific pretension have gone so near the bone that the only two nutritionists to whom I have ever dared mention his name, described him as (*a*) "a complete charlatan" and (*b*) as "that —."

*

His new book, entitled *Nothing Like Science** and therefore peculiarly suitable for review in this column, is somewhat based on his broadcasts, and proves to be a garrulous, quotable, quoteful, zig-zag excursion through the undergrowth of theory and research. By pulling aside the bushes from time to time, Pyke is able to let in the light of scientific philosophy and the fresh air of common sense, on a wide variety of subjects, including automation, humbug, dalmatians, sleep, sewage, Charles II, orange squash, fighting fish, the twenty-eight hour day and a man called Albert von Szent-György.

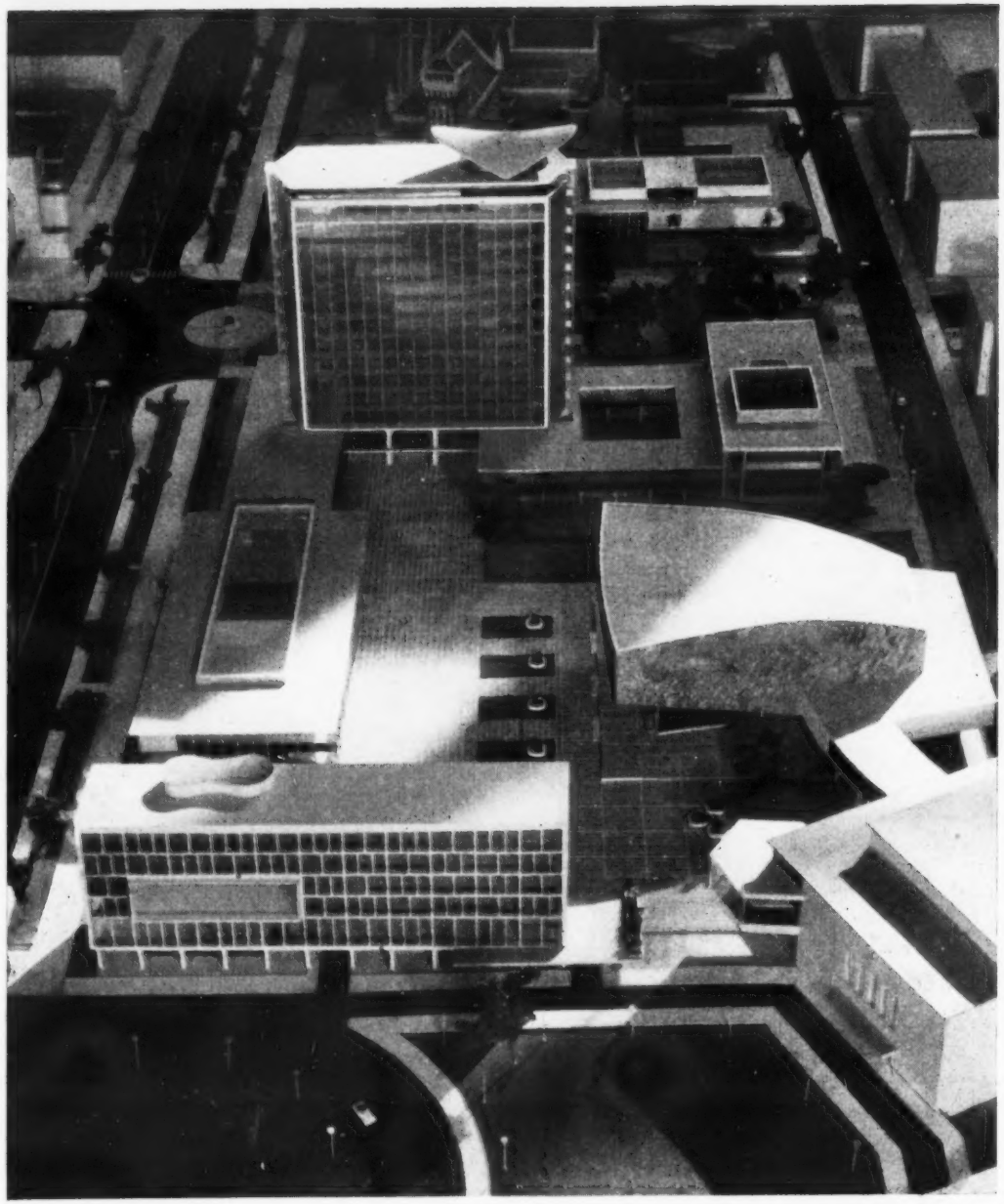
*

Inevitably, as a result of all this bashing about in the boskage, the air is soon filled with red-herrings and startled hares. One which is well worth pursuing here and now is Pyke's attitude to the past, because the past concerns architects too. The great grey architectural square-heads of the Twenties and Thirties made "science" an excuse for looking down on the past, and for them the middle-ages lasted until Einstein's Special Theory of Relativity—which, as Pyke gleefully points out, "was mercifully incomprehensible to most scientists as well."

*

Those days and that particular bigotry are passing slowly, but we still tend to be highly selective in our attitude to the past, and to justify our selectivity by morality rather than reason—in spite of the inroads of scientific art-history on standards of taste, few of us would be prepared to admit that

*. John Murray, 16s.



A Focal Point for Plymouth

Plymouth's proposed civic centre, which has been designed by the city architect's department under H. J. W. Stirling, goes a considerable way towards compensating for the defects inherent in the original Plymouth plan by providing a lively focal point in the centre of the town. In the foreground of the photograph, above, is the restored Guildhall, and the proposed law courts: county court, magistrates' court, probation offices and a divisional police station. This is the first building to be built, and work will commence on it next spring. At the foot of the administration tower, and to the right of it in the photograph, left, is the council chamber block. Both these buildings are being designed in detail, but within the general framework shown on the model, by G. A. Jellicoe and Partners. Fronting on to Royal Parade, the street on the left in the photograph, left, is the proposed city treasury building, below it is an hotel, on the right is an existing cinema, which has been "refaced," on the side elevation, with an office block (see above). Projecting into the centre of the square is a concert hall. Parking space for over 1,400 cars will be provided: a most necessary factor for the smooth operating of the most imaginative town centre yet produced by one of the blitzed towns.

the Mausoleum at Frognal was as necessary a step in the development of architecture as that at Halicarnassus.

•

But reading Pyke one has an extraordinary sense that for him history is not an awful warning or a stern mistress, but simply a place inhabited by other clever lads like himself, each of whom, in his own way, contributed as much to the progress of the science-lark as Enrico Fermi or Alexander Fleming. This becomes explicit in the last chapter where he quotes Tyndall, the nineteenth-century physicist, on the debt we owe to "that foreworld in which man by skill, valour and well-directed strength, first replenished and subdued the earth. Our prehistoric fathers may have been savages, but they were clever and observant ones."

•

The practical equivalence of past and present comes out nicely too in his discussion on how to get more food from plants. On the basis of efficiency, the Brussels Sprout, for instance, is an absolute shocker, and we raise it in order to eat about five-per-cent. of it, if that. Efficiency can be improved in two ways: one is by growing wasteless plants, like the Chlorella micro-organism, of which every part can be eaten by those who can stand the taste, but needs apparatus about the size and complexity of a small atomic pile in order to produce even modest amounts. That is what is commonly thought of as the scientific method, but Pirie of Rothamsted (another top science-goon) proposes to take the maligned sprout in hand, and belt out of every part of it every movable protein molecule, and the proposed apparatus for this is, if you please, the presumably-prehistoric woad-presser.

•

Go easy on your prehistoric fathers then; try thinking of Palladio as an observant and clever savage; and before you pester BRS with some high level enquiry about post-tensioned extruded epoxy-resin modular geodesic four-way-connecting-option trusses, reflect on Pirie's woad-presser, and see if a piece of wood couldn't serve as well. Your enquiry will, almost certainly, be holding up critical research on mud-huts.

REYNER BANHAM

DIARY

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The Editors

PLANNING FOR CHEAP FOOD

ARE people paying more for their food than they need? The question is raised by Dr. Ibrahim Elsammak in the current number of *Planning Outlook*, the journal of the University of Durham School of Planning. He is interested in the problem not as regards food production, but solely with regard to the distribution and marketing of food. It is in this aspect of the problem of reducing the cost of food that the architect and the planner can have an important part to play. In order to realize how necessary it is to plan for the feeding of large cities and conurbations, it must be appreciated that food is the most expensive single item in every family's budget. Dr. Elsammak's information is largely based on American surveys, but the figures would no doubt be similar in this country. The amount spent on food, expressed as a percentage of total expenditure, varies from 42 per cent. for the lowest income group to 32 .2 per cent. for the highest group. The figures for the second highest item of family expenditure—housing and home maintenance—are 35.8 per cent. for the lowest income group and 24.6 per cent. for the highest. As standards of living decrease, the percentage of the family income spent on food rises. In Egypt, for instance, food takes about 62 per cent. of the average family budget.

In recent years architects and planners have been making great efforts to cheapen housing. But, as the figures above indicate, the cost of keeping a roof over one's head is not nearly so expensive as keeping one's stomach filled. But can the cost of food be lessened? Dr. Elsammak makes quite a convincing case that, quite apart from the cost of food production by the farmer, food could be cheapened by having more efficient marketing and distribution. In America, over the past forty years, the farmers' cut from the retail price of fruit and vegetables has been, on average, between thirty and forty per cent. The cost of transport and marketing uses up the other sixty to seventy per cent.

It has long been argued that there are too many middlemen taking their cut from the price of food between the consumer and the farmer, but Dr. Elsammak is not concerned with this aspect of the problem. Using the Boston urban area as an example (a population of three million within a twenty-five mile radius of the city), he sets out to show that the high costs are due to : wastage (lack of refrigeration and proper packag-

ing); misuse of land (due to lack of planning control); the lack of properly sited wholesale markets (with road and rail connection); the lack of parking space at markets; and the lack of standardized systems of mechanical handling of produce. And, of course, he blames the out-of-date, badly-planned and inadequately-sized markets and warehouses themselves.

All these criticisms would seem largely to apply to this country. It is probably impossible to calculate by how much the cost of the fresh food of a Londoner is increased by the evident overcrowding, squalor, mismanagement, and inefficient handling methods of Covent Garden, but it is bound to be appreciable. It may soon occur to the Government that if architects and planners were asked to plan and systematize London's markets an appreciable saving might be made in the cost of food. Such a saving could be used to benefit the farmer, but the real benefit would be that the Londoner could more readily afford better accommodation. The same argument would apply to other large conurbations.

MOW CONTEMPORARY, PLEASE

Frederick Gutheim, who contributes the Washington notes for *Progressive Architecture*, has wondered why no one has attempted to compare the new extensions to the British Embassy there with Saarinen's design for over here. Frankly, one would have thought that the two were incomparable at any level you might like to name. At the level of diplomacy the US flattered us by having six of their best design teams compete for the honour of doing the job, and we gave them the back of the hand in return, by having ours done inside the office at MoW as if it were extensions to an obscure labour exchange or something like that. At the level of urbanistic good manners, too, ours is impolitely exploding the scale of a residential district, whereas Saarinen is carefully preserving the polite fiction that north-west Mayfair is an area of Georgian housing. And so on.

*

The more one thinks about it, in fact, the more one feels that MoW have given up pseudo-period architecture only to take up pseudo-contemporary instead; the dust jacket has changed, but it's the same old story inside. If you are going to make rude density-gestures in a residential district, then you might as well be honest about it and put up an office block that *is* an office block, in an idiom that Americans understand and believe to be appropriate to such buildings. The other solution might have been to take an intelligent leaf out of Lutyens's book and build a deeply indented finger-plan building, with its tall masses well back from the road, and only low, one- or two-storey, wings coming anywhere near the site boundaries. This might well have *looked* residential, though, whatever you did, the clutter of parked cars and other services would have given the game away.

WORLD TOURISTS

Among recent birds of passage to alight on ASTRAGAL'S perch, few have been more welcome than Gyorgy Kepes and the William Wursters. Kepes, who stands in the direct apostolic descent from Moholy-Nagy and is the author of *The Language of Vision*, has been doing Europe with his English wife and his family. He talked enthusiastically about the architectural sculpture that Nivola and Bertoia are doing in the US, and wondered why we have nothing like it over here. Attempts to explain died in embarrassment almost before they were uttered, and when *An Exhibit* (see this column in issue for June 20) was brought forward as the sort of experimental work that might lead to better things, Kepes gently but firmly dismissed it with Mid-European courtesy as "The rearguard of the avant-garde."

*

Wurster, and his wife, housing-expert Catherine Bauer, have been doing a world-tour sabbatical and were full of eye-popping stories about Parsee weddings in India, where the guests sat down in parties of 1,700 at a time and the conversation was drowned by the rattle of diamonds and emeralds. But they were also firmly convinced that the village architecture of southern India is something that ought to be better known, and that too many people, particularly Indian architects, are ignorant about it.

*

Both Kepes and Wurster were agreed that seeing the world with children gave one a new perspective on things—the Kepes family visit to Pompeii apparently finished up as a lizard hunt, and the Wurster daughter, while agreeing that the Changing of the Guard was a nice ceremony, felt that while she was in England she ought to take the opportunity of seeing some Bentleys.

KITE FLYING

Smooth as the smoothest, and always firstest with the newest, the shiny New York magazine *Industrial Design* recently carried a feature on a student design subject that is definitely different, and lends itself to genuinely objective evaluation. Students at Illinois University who are taking industrial design are required to design and build kites—and fly them. No matter how good it

looks, no matter how prettily built, if it doesn't fly, you may not get a pass mark.

*

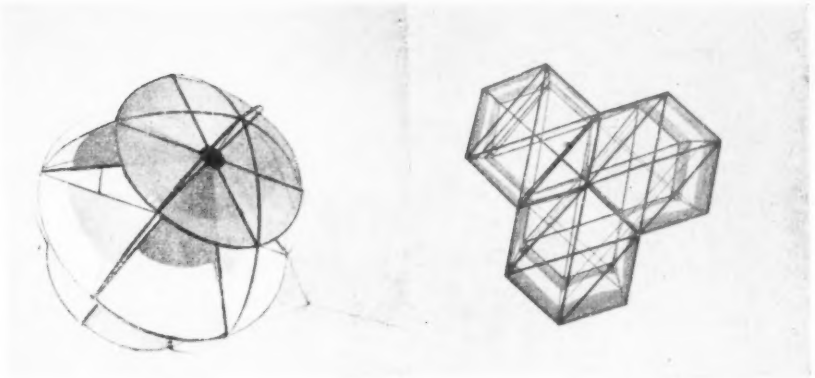
Apparently about 90 per cent. do fly, which must be a great relief to both students and staff, because some of the products look so improbable, aerodynamically speaking, that serious doubts might well be entertained. All the same, it would be interesting to know what put the idea into Prof. Zagorski's head—a desire to get the students out in the open for a day, or a determination to get the inevitable dust-collecting space-frames that students insist on building out of the studio and securely lost up trees and across the state border—or just for the fun of flying kites. Some of the results are illustrated on this page, and should prove, once and for all, that the allegedly inexorable laws of aerodynamics put no visible restraint whatsoever on the imagination of a really determined designer.

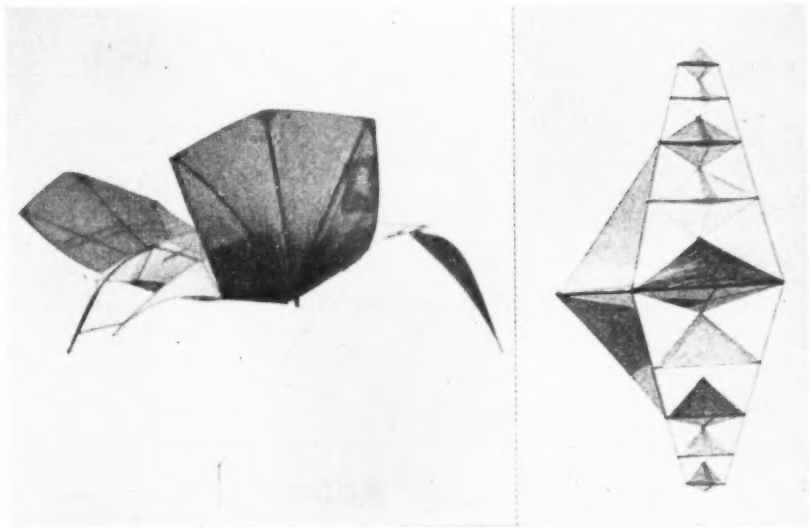
RESTRICTIVE PRACTICES

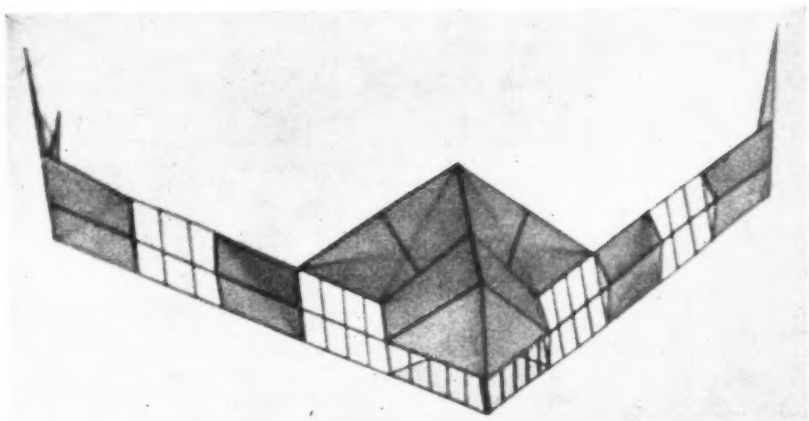
The AJ has already mentioned the fact that you can go to Chancery Lane and on payment of 1s. spend the day seeing exactly who is up to what as regards restrictive agreements, and when I heard that there was a complete list of them in the *Board of Trade Journal* I thought it ought to make interesting reading. But, I fear, no, for although there are no less than 70 entries under "Building Materials," apart from 15 on "Gravel" and 22 on "Sand," the headings say no more than that. No, there's still nothing for it but to go and look for myself. If you're in Scotland, incidentally, you can see the same files at Wemyss Place, Edinburgh.

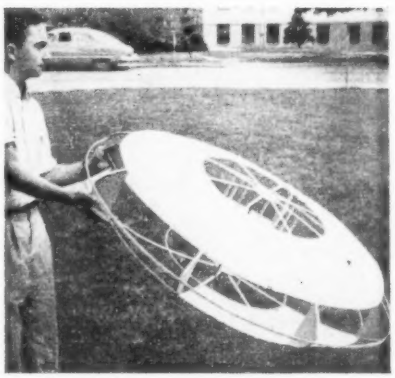
GUIDED-MISSILE GOTHIC

The United States Congress has recently been asked to approve the design, illustrated on this page, for a US Air Force Academy chapel at Colorado Springs. *Time* describes the design as "an ingenious example of contemporary Air Force Gothic," a term intended to convey the highest praise. Congressmen were evidently undecided, for they turned down the design by 102 votes to 53, and next day reversed the decision by 147 votes to 83. The main argument in favour of the design appears to have been its "appropriateness." As one Congressman said, airmen "fight and die in

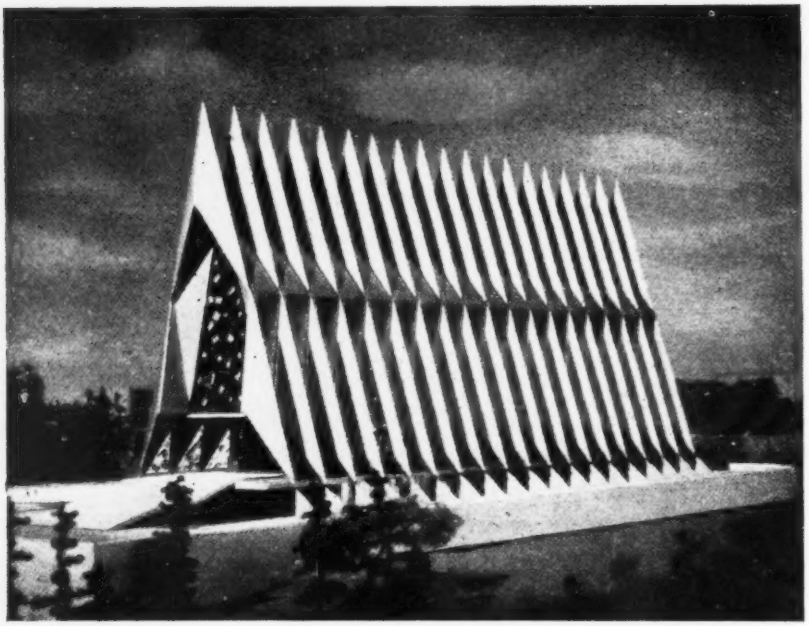








Five illustrations from the July number of the American Journal Industrial Design, *showing the unusual and complicated kite forms evolved by industrial design students at Illinois University. The tetrahedral kite, centre right, above, is shown on its side. The remainder are in more or less normal flying positions, save for the circular box kite, shown left, being prepared for the take-off. See* ASTRAGAL'S *comment.*



An aluminium church at Colorado Springs, reproduced from Time *magazine.*

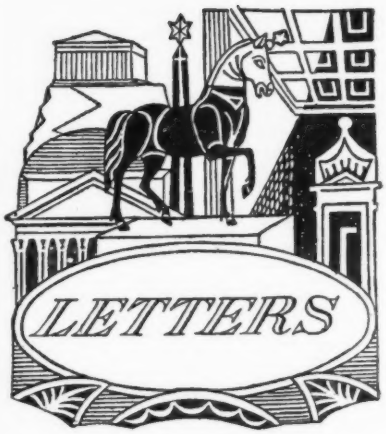
aluminium planes. They can worship in aluminium if they can die in it, can they not? "

*

It seems to ASTRAGAL that an association of ideas linking jet fighters and cathedrals is a poor sort of functional principle on which to design a church. If the emotional impact of a Gothic cathedral is of the same type as that of a well-designed aircraft, this is sufficient proof that it has nothing to do with religious feeling, but merely with structural expression. In that case the true functional principle for churches must lie in another direction, and if this was considered in the design of the chapel it is a pity that it was not brought to the notice of Congress. ASTRAGAL, however, suspects that it was not considered at all.

ASTRAGAL

One of the intriguing features about the new 6d. air letter form stamp released last week by the General Post Office is that the design has presumably been approved by the Postmaster General's Advisory Panel. The distinguished members of this panel are: The Lady Semphill, A.R.C.A.; Sir Francis Meynell, R.D.I.; Sir Leigh Ashton (all nominated by the COID); with Sir Gordon Russell, R.D.I., director of the COID; Sir Kenneth Clark, chairman of the Arts Council, and Sir John Wilson, Keeper of the Royal Philatelic Collection. The stamp was designed by Lynton Lamb. Reynolds Stone assisted with the lettering. The stamp will be issued to coincide with the 46th conference of the Inter-Parliamentary Union, which is being held in London from September 12 to 19—hence the legend overprinted in the top left corner of the stamp and the squeezed lettering which has been inserted on the existing 4d. stamp (designed by M. C. Farran-Bell) around the feebly-handled oval frame to the Queen's portrait (below left). The number "46th" has been apparently inserted at random below the Queen's chin. The sixpenny stamp has the usual duality, only barely resolved by the heavy base line, which is surmounted by a circle apparently held in place by a plinth—the most puerile, mock-constructional device imaginable—and introducing a symmetry out of key with the rest of the design. These stamps will inevitably show the world the poverty of British design—at least in official fields.



Anderson Stewart, A.R.I.B.A.

C. G. Tomley

M. J. Reaney
Director and General Manager of Colt Ventilation Ltd.

Guy H. Nicholls, L.R.I.B.A.

Criticism of Winning Competition Designs Wanted

SIR,—It was gratifying to read ASTRAGAL'S observations on the Carlisle Competition in the JOURNAL of August 15. Comment of this nature on competition results is long over-due. No matter how good or how bad they may be, winning designs are published without comment by the architectural press, a few words from the assessor's report, perhaps, and the sour-grape letter from an outraged and unsuccessful competitor, with the result that the "outrage" assessor and the RIBA feel little or no embarrassment. Might I suggest that there is need of a "criticism" of competition winning designs and that the author, impartial and analytical in the manner of J. M. Richards, inspects the site and carefully reads through the original programme (something many competitors and assessors have neglected to do, or so it would appear) before making his report.

ANDERSON STEWART.

Belfast.

Westminster Blues

SIR,—Your correspondent G. Stoddard queries (AJ, August 15) the appropriateness of colouring blue the Westminster street lighting columns.

At the time of the 1951 Festival Sir Hugh Casson's team (as I always understood) coloured these a very carefully chosen soft pale blue, which had the effect of melting into the blue haze which so often blurs the middle distance in riverside London. Naturally soot and grime soon made repainting necessary and I for one was appalled to see that these standards were being repainted a coarse, commonplace mid-blue, devoid of subtlety and without æsthetic purpose.

Let us, if we are going to colour columns, or any other part of the street scene, in an unusual way, at least have a clear purpose for doing so.

C. G. TOMLEY.

Berks.

Fire Exhaust

SIR,—With reference to the article published on page 111 in the Technical Section of the JOURNAL for July 18 which described the fire test at Uxbridge carried out by Cape Building Products in co-operation with this Company, we must ask you to correct two errors in the article which, whilst appearing to be relatively unimportant, could in fact seriously mislead.

The first is the reference to your statement that:

" . . . . though the temperature on the 'hot' side rose rapidly to 2,450° F. at ten minutes after ignition, the operation of the fans was sufficient to keep the air clear of smoke and to lower the temperature by approximately 200° F. every five minutes."

The second is the reference to "*forced draught* ventilation" in the diagram shown at the foot of the article.

The error in both cases is, of course, that there can be no question of "forced draught" or "fans" to remove heat and smoke in the event of fire, for the very first thing to go when a fire breaks out is the electrical wiring—thus stopping any fans and making them useless. In fact, at the Uxbridge test, the ventilators used were Colt Dual Purpose Clear Opening *natural* Ventilators and the main feature of the demonstration was that these are natural and automatic and not dependent upon any outside power which can go wrong.

The following essential features must be fulfilled by a unit designed for heat and smoke exhaust:

1. Must open automatically in event of fire.
2. Must be self-contained and open independently of electricity or any services which could fail due to distortion or collapse of other parts of the building.
3. Fusible link must give direct release to opening parts, through no intermediate levers, cables or pulleys.
4. Must also be capable of manual release from within the building if occupied, in early stages of fire.
5. Each unit must have individual fusible links, whether connected to group control system or not.
6. Must also allow access for hose, and vision for firemen working on roof.
7. Must be placed in highest part of roof.
8. Must have large free area and minimum resistance to flow when open, and must be fully weatherproof when closed.
9. Must open a suitable percentage of the total roof area—scale varies according to hazard.
10. Must provide reasonable obstruction to flying brands.

As you will appreciate, electrical apparatus could be expected to fail at quite an early stage, either owing to the circuit being damaged by fire or, alternatively, by distortion or collapse of another part of the building.

M. J. REANEY

Surbiton.

Potable Effluent

SIR,—I notice ASTRAGAL suggests that "most effluents properly treated have value as fertilizers and so forth."

I can recall that when I was CRE Gloucestershire during the war, the Thames Conservancy Board insisted, even in those days, that the effluent should be fit to drink. The fertilizers came from another "Department" of the WD Sewage Disposal Plants.

GUY H. NICHOLLS.

Northampton.

AJ COSTS GROUP

First Meeting

On Monday, August 19, the first meeting was held of the study group invited by the AJ to review the form and definitions of our published cost analyses. Readers will remember that the idea of forming this group arose at the course of lecture discussions on Cost Control in Building, which we organized with the Regent Street Polytechnic School of Architecture. Members of the group are: J. M. Austin-Smith (chairman); Michael Smith and John Wilkinson, *architects;* J. K. Carless, H. G. Edwards, C. M. Nott, James Nisbet, E. R. Parrinder, A. E. Towler, R. O. Whittington, and E. H. Wilson (honorary secretary), *quantity surveyors.*

The AJ has asked this independent study group to consider and report on the following terms of reference:

1. To review the present list of element headings and the type of information normally published under these headings and to put forward any changes which could improve the value of published analyses to architects, quantity surveyors and builders.
2. To provide rules or notes for the guidance of those who prepare analyses as to which items in a bill of quantities should be included in each element—the aim being to ensure uniformity of published data.
3. To keep in touch with other bodies interested in cost analyses (such as BRS, the cost research committee to the RIBA, the cost research panel of the RICS and the costs committee of the Architectural Association) so that the AJ analyses may be co-ordinated with cost information published elsewhere.

EDINBURGH

100 Years of American Architecture

The American Institute of Architects and the Edinburgh Architectural Association are both celebrating their centenaries. The AIA centennial exhibition has been sent to Edinburgh in time for the Edinburgh Festival and was opened on August 16. A correspondent writes:

In Edinburgh, where there is no resident, exhibition-going circle, exhibitions, if they are to be seen at all, must be given on a public thoroughfare. Working from this principle, the Student Architects' Group in co-operation with British Railways, last year organized a presentation of the MARS Group exhibition entitled "Turn Again" on the only half-suitable site in the city: within Princes Street Station. Even this had the very limited success photographic exhibitions must have in competition with such violent stimuli as neon or film. "100 years of architecture in America" now on view at the Edinburgh College of Art could not be more discreetly hidden, and even if it were of itself the best of exhibitions (it is in fact a mean selection of diminutive prints from the exhibition reviewed by Robin Boyd in the JOURNAL of June 13 and 27) only a very few conscientious seekers would ever know it.

If, as one presumes, the exhibition had the intention of lifting the contemporary scene into the glorious light of the past by collecting the Caribe Hilton and the Shuckle Canning Corporation into the same room as the Larkin Building and the Owatona Bank, then it fails as miserably as if we put one of our yellow waistcoated churches to compare with the cathedral at Lincoln. The buildings illustrated demonstrate (but they would demonstrate better if Professor Bronowski's paper "Architecture as a science and architecture as an art"—read at the RIBA in March of 1955—were put in place of the catalogue) that in the battle "Sullivan against the rest," the rest now have the field without challenge. In America, architecture is decoration, "rational" in the east and "organic" in the west.

JAGUAR FIRE

DSIR Report

No fire has exerted so much influence on our ideas of the fire precautions to be taken in factories than the Jaguar Car Factory fire of February this year. We print below (by permission of the Director of Fire Research) a report by two officers of the Fire Research Station, L. A. Ashton and G. Langdon Thomas, of a visit they made to the scene of the fire two days after the event.

A visit was made on February 14, 1957, to the scene of the fire that had occurred at the Jaguar Car Factory on February 12. The object of the visit was to study the influence of the fire on the building and its contents and therefore the work of the Fire Service is not considered in detail.

The factory and its contents

The building consisted of a large single-storey steel-framed structure which provided the production area of the Jaguar factory (Fig. 1). The saw-tooth (north light) roof trusses of 30 ft. span were supported on steel stanchions. None of the internal steelwork was protected against fire. The roof covering was of corrugated steel sheeting protected against corrosion by a factory-applied bitumen and asbestos coating on both sides. Below this roof covering was a lining of fibre insulating board supported in metal tees, which in some bays were fixed below the purlins and in the remainder above the purlins. In

portions of the roof there was thus an unstopped air gap between the roof covering and the lining. The north lights in the bays were wired glass in patent glazing. Roof ventilators had been installed about 70 ft. apart along the ridge of each bay. External walls were of 9-in. brickwork. At the mid-point of the length of the building was the main entrance, termed the "link-road," which was bonded by block walls built up to the underside of the roof lining, but these walls were not continuous across the building and therefore did not form a complete separation between the assembly lines and the machine shop, etc.

The north end of the building, which contained stores on two levels for finished components and tyres, was separated from the assembly area by wire mesh and sheet steel partitions. Adjoining the tyre stores was a saw mill similarly screened and along the same external wall near the centre of the building was the paint spraying shop which was separated from the rest of the production area by partitioning of hardboard with glazing of plain glass.

Description of the fire

The following description of the course of the fire is based on information supplied by the Fire Services.

The fire started at the north end of the building either in the tyre stores or saw mill at about 5.45 p.m. shortly after work had finished for the day. It was observed in its early stages but, gaining a hold in the tyre store, it grew with such rapidity that the Works Fire Brigade was unable to control it. Flames soon reached the combustible roof lining and within a few minutes had spread along the whole length of the bay involved.

Dense smoke and hot gases from the burning contents mushroomed out from bay to bay and were augmented by the products of combustion from the roof covering and lining. The absence of any vents in the roof specifically designed to vent the fire confined the smoke and hot gases almost entirely within the building. Fire spread to the contents of the building from the roof, assisted by burning material falling on to combustible material, such as fabrics, tyres and flammable liquids, in the assembly lines. It was stated that the fire in the roof was always some distance in advance of the fire on the floor.

The Coventry Fire Brigade arrived about five minutes after receiving the call and was able to enter the building by the link road In conjunction with the Works Fire Brigade, it could still do little to halt the spread of the fire because of darkness and heavy smoke, until the explosion of an oxygen cylinder shattered a considerable area of roof glazing in the ninth and tenth bays, thus venting the fire. The relief to the firemen was immediate, and from striving merely to check the advance of the fire, they could proceed to extinguish it. Water supplies were ample and the fire was under control in a little over three hours from the time the Brigade arrived. The fire was checked in its progress at the thirteenth bay from the north end of the building and twelve bays suffered damage in varying degrees.

Effect of the fire on the building

Apart from the place where the explosion occurred, collapse of the roof was confined to the area where high concentrations of combustible materials were present. Stanchions in this area, which had combustible material stacked close to them, had suffered severe distortion. The bitumen coating of the roof sheeting had completely burnt away in most of these bays, but in places the mineral fibre base of the coating was still adhering to the underside of the sheets. Near the limits of the fire spread, where the lining had not completely disintegrated, the bitumen coating above the lining appeared to be still adhering to the metal. Where the fire was most intense, some fusing of the glass had occurred. Elsewhere sheets of glass had dropped owing to failure of the patent glazing, probably by melting of the lead casings of the bars, but large areas of glazing were still intact.

Factors encouraging the fire

As usual with large fires, the rapid and extensive spread of this fire is not attributable to one cause alone. There were several factors, none of which might have been decisive by itself, but which, in conjunction with other favourable circumstances, proved capable of producing a major fire. Given a source of ignition at the right time, a complete burn-out of the building was possible.

Precautions that should be taken to prevent a small fire becoming a large one are well known. It will be seen from the following list that the factory was deficient in many features regarded as important for fire protection, but reasonable fire safety could be attained without taking all the precautions described.

1. There was no sprinkler system.
2. There were excessively large undivided areas and in particular no structural separation of the high hazard compartments from the remainder. Freedom from division walls subdividing the main factory was considered a production requirement of the factory, but this need not preclude the complete enclosure of the areas of high fire hazard by fire-resisting partitions. The chance of a major fire starting in the production area was probably small.
3. The structural steelwork was unprotected. Extensive collapse of the roof of a large single-storey building, by hampering fire-fighting operations, may lead to the building becoming a total loss. Protection of internal steelwork against fire is not a bye-law requirement for single-storey buildings but may sometimes be worth-while where the concentration of combustible material is heavy. In most factories of this type the design renders complete protection difficult and costly.
4. The roof lining was combustible and had surfaces of rapid flame spread. It could also produce large quantities of smoke.
5. The roof covering had a combustible coating which could become molten when heated and fall as flaming drops, besides adding to the volume of smoke.
6. There was an unstopped cavity between the lining and the roof covering in the bays first involved.

It has not been established that the spread of fire in the cavity was the primary cause of the rapid development of the fire. It is possible that the initial spread was on the under surface of the fibre insulating board which burnt and broke up, the burning fragments falling on to flammable materials below. The bitumen coating of the roof covering would then be affected and would drop, adding fuel to the fire on the floor.

7. There was no provision in the roof for venting the products of a fire. The normal roof ventilators were inadequate to deal with the large volume of smoke and hot gases generated in the fire and so to prevent their spreading out under the roof. If it is essential to have large areas of unrestricted floor space in a building, the basic principle of compartmenting by fire walls can be replaced to some extent by making provision for the escape of products of combustion and by restricting their lateral spread by means of fire curtains in the roof space. Vents of suitable size properly spaced should be designed to open by means of fusible links. When combined with fire curtains in the form of screens of non-combustible sheeting, the vents provide a flue system to assist in clearing the products of combustion from a fire starting in any part of a building.

Conclusions

The fire at the Jaguar Car Factory illustrates the need for a wider appreciation and application of the basic principles of fire protection. There was no separation of the areas of high fire hazard (stores and saw mill) from the main production areas or assembly lines. The roof sheeting was coated with combustible material, the internal lining was fibre insulating board having surfaces of rapid flame spread and the entire building was without any fire-resisting sub-divisions. Such a lay-out allowed the fire to spread rapidly along the combustible roof lining leaving large parts of the structure to a great extent undamaged but destroying valuable products on the floor below. The combustible coating on the roof sheeting also contributed to the fire, but it is not possible to distinguish between the parts played by the two materials. There have been serious fires in buildings with a roof of protected metal sheeting and no internal lining, as well as in buildings with a non-combustible roof covering and a fibre insulating board lining. Where both covering and lining are combustible, the fire can be expected to be more severe.

Acknowledgment

The paper is published by permission of the Directors of Building Research and Fire Research.

The authors wish to express their thanks for the assistance during the visit given by Mr. Boissonade, Chief Fire Officer, and Mr. Brown, Deputy Chief Fire Officer, Coventry, Mr. Muslin, Safety Officer, Jaguar Cars Ltd., and Mr. Entwistle, Factory Inspector, Coventry.

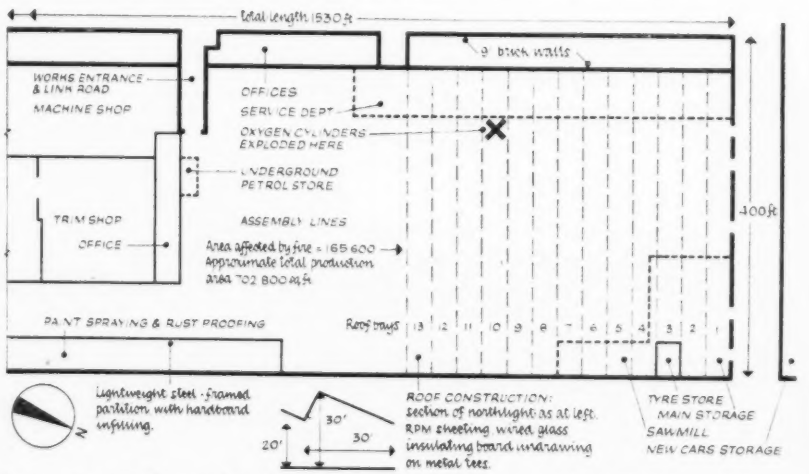
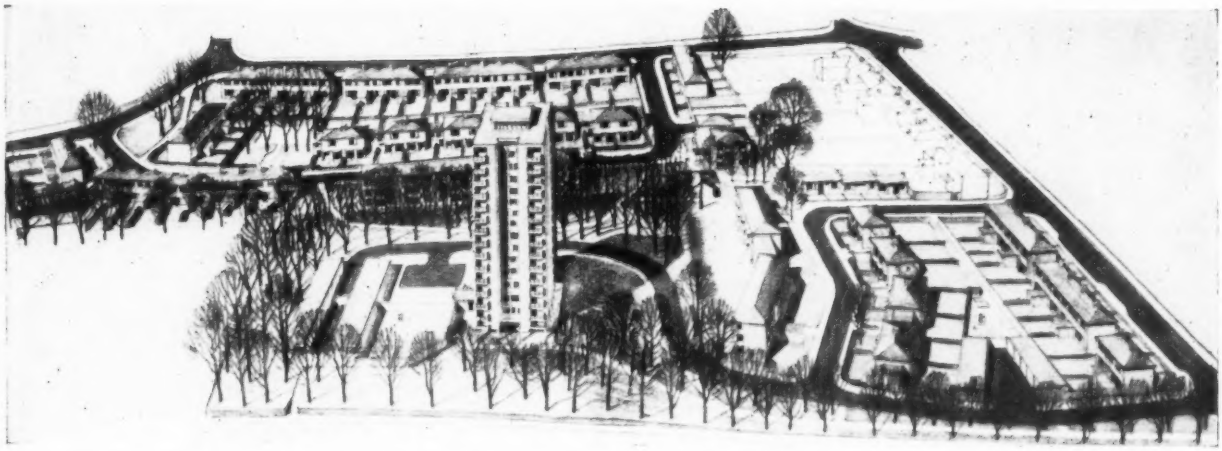
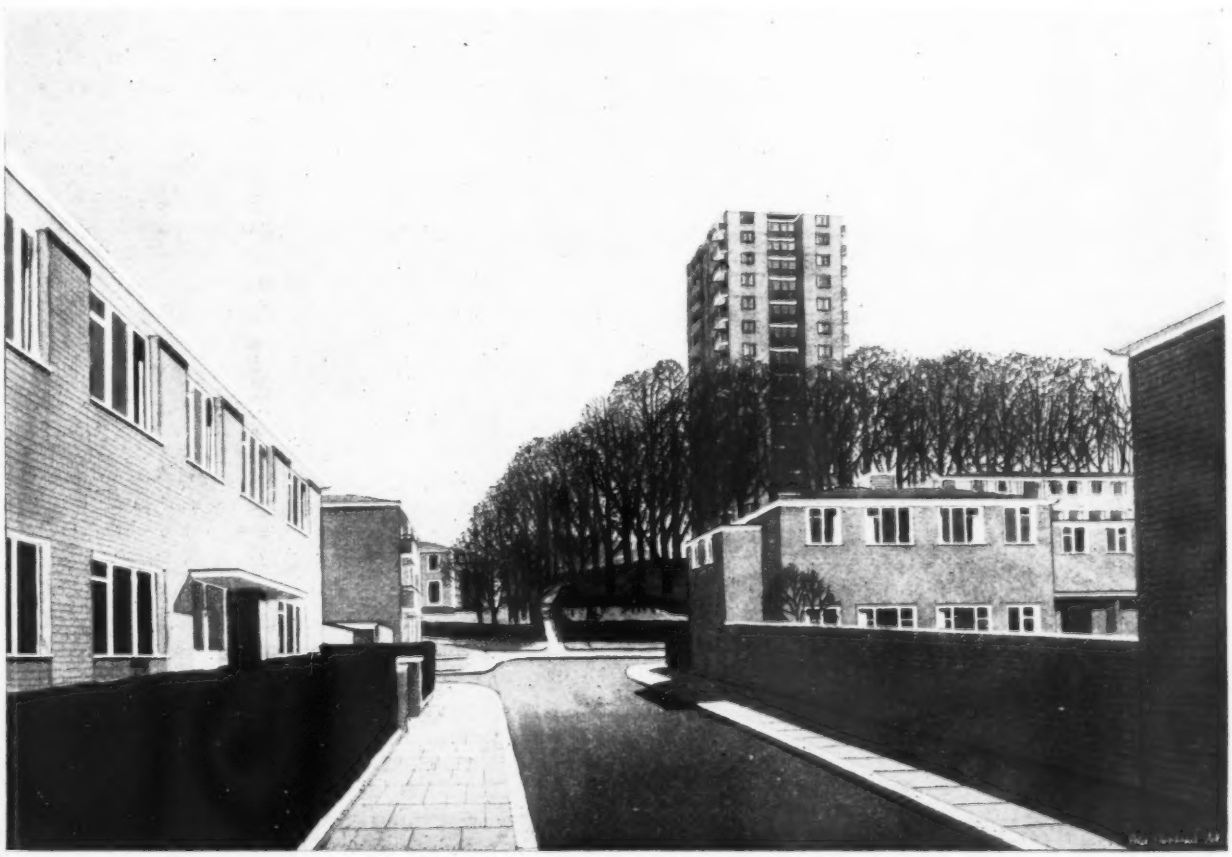


Fig. 1. Layout of part of the factory area of the Jaguar car works at Coventry.

POINT BLOCK PROPOSED FOR CENTRE OF REDHILL



Bridgwater and Shepheard have submitted the housing scheme shown in the bird's eye perspective, above, and in the general view, below, to Reigate Borough Council as a proposal for the development of a site near the centre of Redhill at a net density of 74 persons per acre. 598 habitable rooms are provided in 178 dwellings. 306 rooms are in 2-storey houses and 292 rooms in 3-storey flats and the 16-storey point block. The point block has four flats per floor, with internal bathrooms and W.Cs. Four sites for children's playgrounds have been provided, and the architects recommend that an existing house (centre, background, below) be converted into a nursery school or crêche. The 16-ft. roads (with parking lay-byes) have been arranged so as not to provide short cuts for traffic through the site. Garages have been grouped in yards, of about a dozen, with a larger group serving, and to the west of, the point block (see above). Regarding the point block, the architects state in their report to the Council " we realise that the placing of so high a block will cause it to be seen for many miles in all directions. On the other hand, we are convinced that one tall block rising high above the trees would be an interesting and beautiful landmark in itself, and greatly preferable to a cluster of lower blocks which, while covering up more ground, would present a more massive appearance." The Council have not yet considered the scheme.



CRITICISM

by J. M. Richards

GARAGE and SERVICE STATION
in HARLOW NEW TOWN
designed by MAXWELL GREGORY
consulting architect D. A. BIRCHETT
associate architects RAMSEY, MURRAY, WHITE and WARD

The roadside service-station (with or without the two other types of building that are often attached to it: a repair-garage and a car-sales depot) is one of the best examples of a building that serves an identical function wherever it is placed, and therefore lends itself to the use of standard structural components and modular planning. If our highways were equipped with service buildings of this kind, as intelligently thought out as, say, the Hertfordshire schools, how much we should avoid in the way of visual squalor and gain in the way of efficiency.

This is just the moment to get a reform of this kind under way. New cross-country motor-highways are being planned, alongside which service-stations will, one hopes, be about the only buildings allowed; a large number of the service stations along existing roads are due to be rebuilt (approximately 15,000 of the present total of 35,000 filling-stations in Britain are said to be obsolescent) and the oil companies are taking a growing interest in the design of filling and service stations; they are in an ideal position both to undertake the necessary research and to use standard components on a wide enough scale.

Only two important steps that I know of have been taken in this direction: the architectural competition for the design of modern service stations held by Shell-Mex and B.P. in 1952, which had three sections, first a country service station, second a suburban or neighbourhood service station and last a main motorway service station, and the production in 1955, also by Shell-Mex and B.P., of a standard filling-station on a modular basis with a steel-frame and curtain-walling, designed by D. A. Birchett, the company's architect. But although the winning designs in the 1952 competition were clearly on the right lines, no real use appears to have been made of them; and although the president of the RIBA opened the first of Birchett's Shell-Mex and B.P. filling stations (on the Oxford Road, near Reading) with a speech of congratulation to the company on earning the "gratitude of all concerned for their foresight in approaching the problem in this manner," the prototype was not followed up by production on the scale that might have been expected. It would be interesting to know why these promising openings led to so little.

Whatever the explanation it is a somewhat frustrating history. But the opportunity is still with us, and it is encouraging to see this garage and filling station at Harlow using the Shell-Mex and B.P. experiments as a starting-point and tackling some of the problems that will have to be solved if the principle of using standard components is to work out satisfactorily in practice. The architect of the Harlow building initially was Maxwell Gregory, who had won two sections of the competition including that of a neighbourhood service station, of which Harlow is an example. He had been recommended to the clients, Kennings Ltd., by Shell-Mex and B.P. Ltd., working on the advice of the assessors of the competition, of whom one was Frederick Gibberd, architect-planner of the new town. Maxwell Gregory called in D. A. Birchett, the Company architect to Shell-Mex and B.P., to help him and when he later returned to Australia the job was left in the hands of Ramsey, Murray, White and Ward with whom Maxwell Gregory was in association, with D. A. Birchett retained as consultant. I don't think it is unfair to any of the others involved to say that the most interesting features of the job—especially those relating to the use of standard curtain-wall components—derive from Birchett's ideas and experience. He is no longer, incidentally, on the staff of Shell-Mex and B.P. having recently commenced in private practice; the present architects' section of Shell-Mex and B.P. is now working within the engineering department.

The Harlow garage (fully illustrated on pages 331-338 of this issue) has an ideal situation for its purpose: a corner site, where one of the main ways into the new town from the Cambridge road joins the road leading into the Stow, a neighbourhood shopping centre. It includes all three of the types of building I mentioned earlier as being closely associated: filling and service station; repair-garage; and car-sales depot

The showroom, washing bay and workshop.

with showroom. All three have been made subject to, and to a great extent unified by, the discipline of a modular plan. The grid is the familiar one of 40 in., and the constructional system is similar to that used in the Hertfordshire schools, being designed, as was the Hertfordshire system, to be flexible enough to be adaptable to varying sites. A foolproof flexibility is particularly important in a system designed for use all over the country, because its adaptation to the special requirements of site and programme would probably, in the case of filling stations, be in the hands of a regional architect—not, as in the case of the Hertfordshire schools, of the architect who had conceived the system or someone responsible to him.

If the question is now asked: how well does the system seem to adapt itself to this particular site at Harlow? my own answer is: very well on the whole, subject to one or two reservations, which are largely due to matters outside the architects' control. For example, a building that depends for its æsthetic character on precisely designed and well-related standard components, requires similar qualities in its foreground furnishings, which cannot be "lost" against this rectilinear background as they sometimes can be against the background of a more picturesquely conceived building. Foreground objects are in fact thrown into prominent relief, and the objects that provide the foreground to a garage are of special importance, being part of its functional equipment. The space in which they are set is as much part of the building's plan as the space enclosed by the various structures.

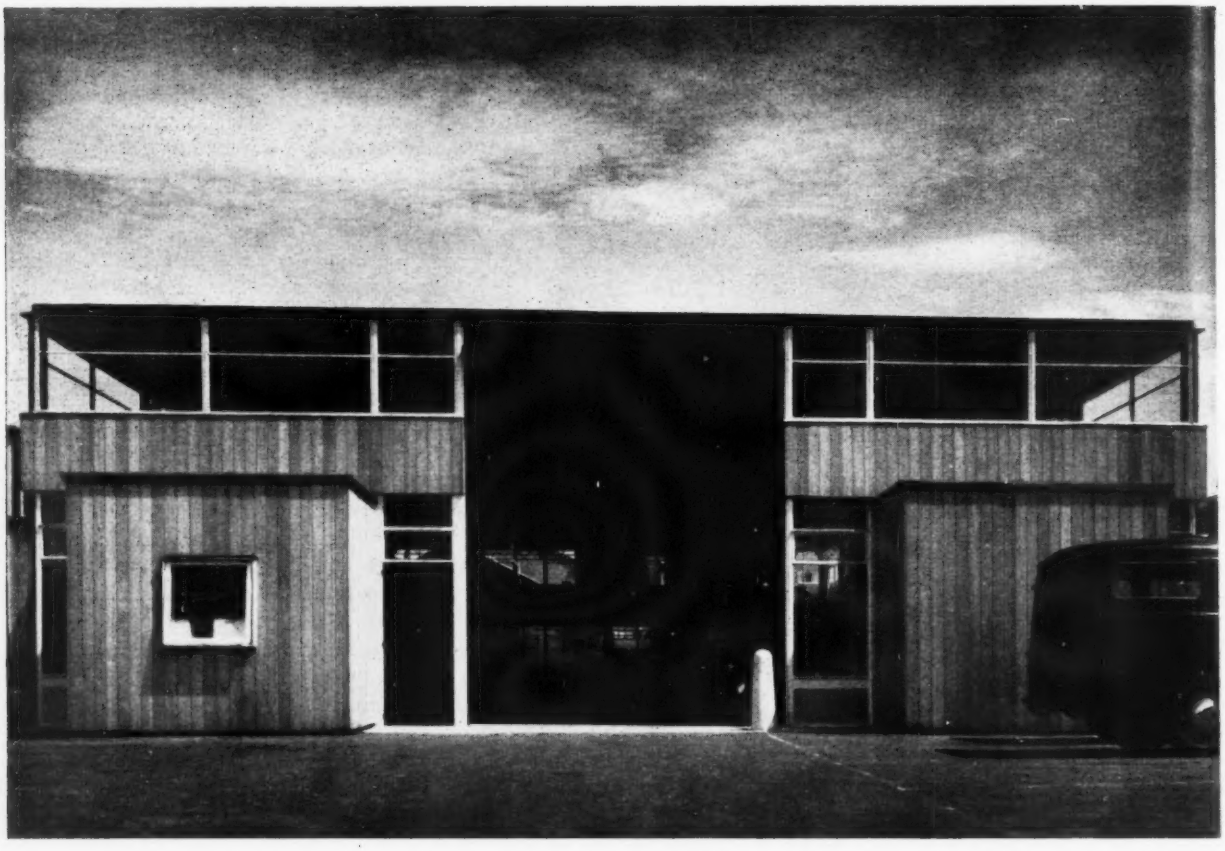
All that this amounts to is that the kiosks, signs, petrol-pumps and other servicing equipment are architectural elements quite as much as the roof-beams and screen walls, and that a garage, regarded as an architectural whole, suffers sadly from the fact that these standardized objects are generally of very poor design. If the oil companies are trying to establish good design standards applicable to all sites under their control, one of the first things they should do is to set a good industrial designer to work on the petrol-pump. Shell-Mex and B.P. have recently taken a step in this direction with their new sign (a plastic shell suspended in a square frame on top of a pole) which is a great improvement on the old one, but they still use colour unimaginatively. The Harlow buildings have had a red and yellow striped base added to them to conform with standard international practice of the Shell Petroleum Co. Ltd. which was obviously not part of the architect's design.

The forecourt of a garage and filling station presents a difficult problem even without the poorly designed objects it has to be furnished with, a problem, moreover, over which the architect has relatively little control. It is in effect a tea-tray on which a number of given objects (painted in given colours—in this case red and yellow) have to be disposed in groups whose positions are largely dictated by factors such as traffic-flow, the length of the pipe-line of a petrol-pump, sight-lines for supervision and so on. There are only two comments I feel it is relevant to make about the way this has been done at Harlow. The first is that the one piece of furniture designed by the architect, the glass-walled kiosk (of which there are two models, rectangular and octagonal, both shown in the picture on page 314) is excellent. It conforms to the style and dimensional module of the main buildings and has a neatly designed tubular corner member serving as a down-pipe for rain-water from the roof.

My second comment is that the architect has surely increased the difficulty of dealing with this assortment of furniture by adding his lamp-posts to it. It was bad enough to have seven vertical objects, of five different shapes, standing in a row on each island (see viewpoint 3 on page 332), but at least only the kiosk rose to any height. A tall lamp-post at either end of the row, making nine objects in all, is too much. The lamp-posts themselves are of a pleasant enough pattern, but would it not have been better to have lit the whole forecourt from above, perhaps by floodlights mounted along the roof of the buildings, leaving the device on top of the petrol-pumps to provide local lighting on the island? Is there any technical objection to this? I would like to know what.

As to the planning of the buildings that overlook the forecourt, this is fully analysed elsewhere in this issue and I will only add that the various operations seem well related to each other (stores centrally placed, accessible to repair, servicing and sales department and so on), that the staff wash-room and off-duty room in a gallery at the inner end of the main repair garage (bottom picture, page 336) achieves an economical use of space and that I note how cunningly the lavatories (a service the motorist nowadays expects a filling station to provide) are placed so that the motorist seeking them must pass the sales counter displaying gadgets and spares.

On paper, the layout of forecourt and buildings seem curiously unrelated, leaving a triangle of ground between the island on which the petrol pumps stand and the re-entrant angle formed by the servicing and stores departments. But on the site one is not conscious of this, and the ground is usefully employed for short-term parking; moreover, the layout of the buildings as a series of blocks at right-angles to one another represents a more satisfactory use of this corner site, from the town-planning point of view and



Close-up of the workshop, with the two "pavilions" on either side of the entrance, criticized below.

that of the perspective views obtained along the approach road, than the obvious alternative—a layout with its central unit placed parallel with the petrol-pumps. A diagonal layout would have been difficult in any case, since one of the limitations of this system of designing with standard components is that any departure from the right-angle (likewise any use of cantilevers) involves special components and thus destroys the logic and economy of the system.

The grouping of the buildings is satisfactory if you accept the fact that the presence of so much glass in structures of this type brings many new factors into the composition in the shape of the reflected images of neighbouring buildings whose exact effect no architect can foresee, and that their transparency is such that adjoining buildings make their presence strongly felt (there are some gabled buildings immediately to the east that somewhat spoil the view from the forecourt, but I believe these are temporary). The only criticism I have to make of the general composition of the buildings from this direction is that the end of the repair garage (seen above) is made too emphatically symmetrical by the two little boarded pavilions, stopping the rhythm where it should flow round the corner. This garage incidentally, if we are pursuing the comparison with the Hertfordshire schools, may be regarded, both in scale and structure, as being to the other buildings what the assembly hall block is to the classroom wings.

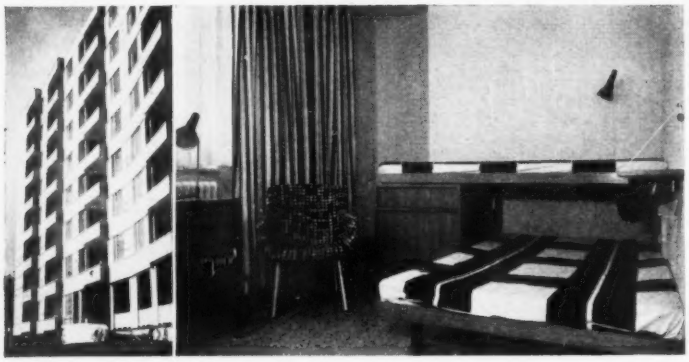
This comparison brings me back to the main interest of the Harlow garage: its use of a structural framework based on a plan-module, like that pioneered by the Hertfordshire schools. What is experimental about it is the way the 40 in. module is multiplied or subdivided according to need, even though this means interrupting the basic rhythm, leaving it understood, as it were, but unmarked. The vertical boarding represents a unit of 4 in. and the large windows of the car showrooms a unit as large as 13 ft. 4 in. (160 in.), which is the distance between main structural members. Though fuller study of the æsthetic and practical problems arising when modular design is used so flexibly is clearly needed, this experiment is a move in the right direction—away from the rigidity imposed by the various curtain-wall systems, where a sequence of fixed units is simply cut up into convenient lengths. Among the important problems are those of detailing, which at Harlow have been well studied—notice the angles, where the detailing brings out the essential character of the structure (close-up picture on page 335).

Whether the system used justifies itself economically I must leave readers to judge from the cost-analysis on page 338, and I will end with just one technical query. There must be great heat losses through the plate-glass walls of the repair-garage. What sort of conditions does this provide for the men working inside in the winter?

INTERIOR DECORATION AT THE BERLIN EXHIBITION

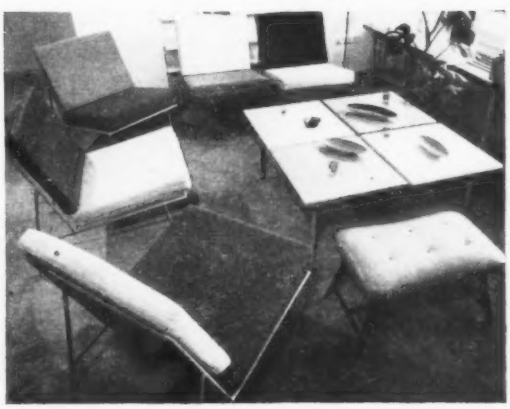
Architects and interior decorators have furnished 56 flats in the completed buildings at the Berlin Exhibition. On this page are three schemes in the flats (right) by Pierre Vago. Below left: an extendible table of interlocking black and white strips of wood, designed by Professor Herta-Maria Witzemann, of Stuttgart. The same designer was responsible for the room below right. Hans Gugelot, lecturer at the school for design at Ulm, designed the furniture shown bottom. He has evolved a prefabricated system, illustrated by the cupboard with access from both sides, for the building up of wardrobes, cupboards or chests. "Bridge" units can be built over doorways or the ends of beds.

INTERIOR DECORATION AT THE BERLIN EXHIBITION:

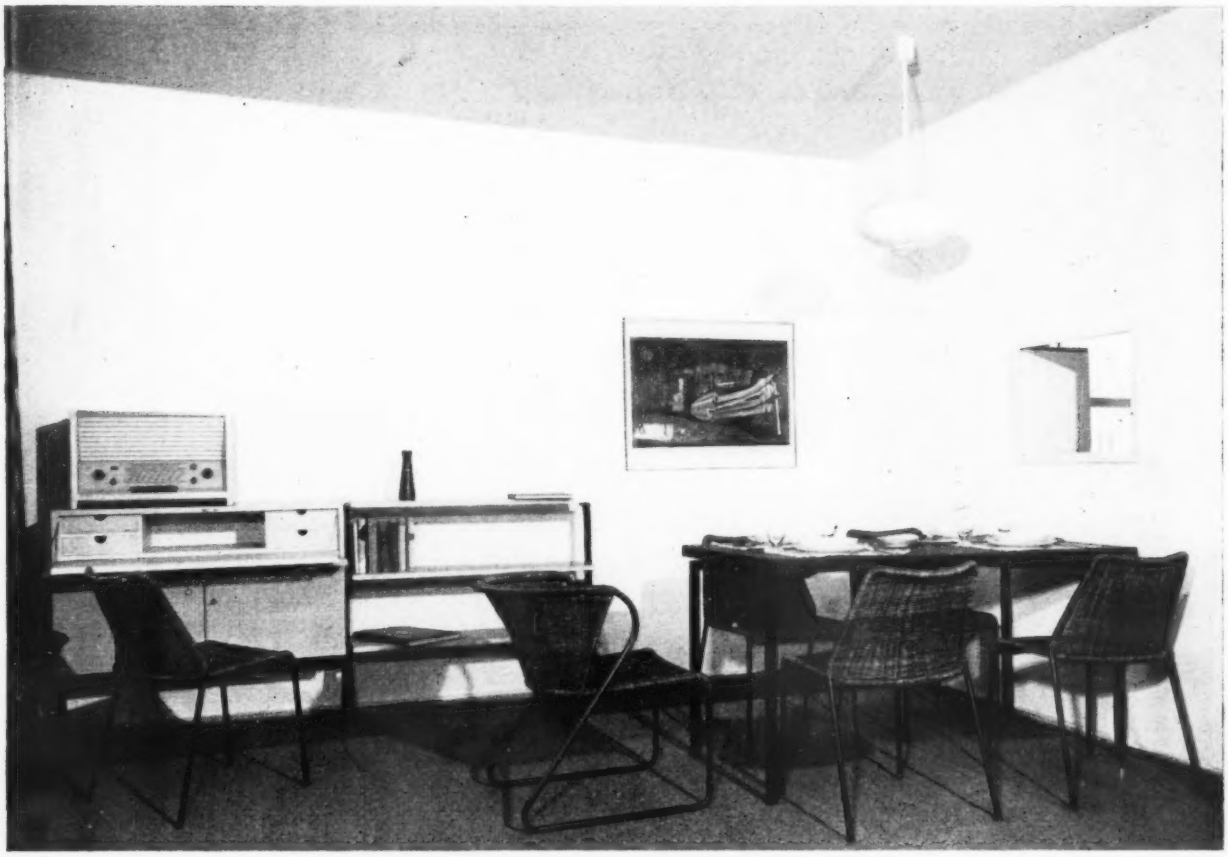


The photographs on this page show rooms decorated by Frau Britte d'Ortschy, of Munich. The couch in the right-hand picture has a back—as the Berlin hand-out says innocently—" which can be moved according to desire." Aalto himself was responsible for the furnishing of the room, top, opposite page. The chair and table legs are of bent birch. The bottom left-hand picture opposite is of a living room furnished by Knoll International. Professor Leusen, of Kiel, designed the furniture in the centre picture, opposite. And far right is a room equipped by Professor Herta-Maria Witzemann.

ROOMS IN ALVAR AALTO'S FLATS



INTERIOR DECORATION AT THE BERLIN EXHIBITION: continued



Professor Herbert Mirche designed the furnishing of the room above, which is in Gropius's block of flats. The architect for the single-storey house (below), Professor Eduard Ludwig, of Berlin, also designed the furniture in it.

technical section

THE INDUSTRY

From the industry this week Brian Grant reviews a new draught-stopper, prefabricated roofing, a mixing valve, fire-proof paint and time control units for thermal storage heating.

Stopping draughts

A new device for stopping draughts, known as the Unda-door, is now being produced by Sealdraught Ltd. It consists of a section of plastic covered foam clamped to a metal carrier which is screwed to the floor beneath the door. Where there is a considerable gap between the door and the floor an additional pad of foamed plastic is used as packing, the height of the excluder being adjusted by screwing it down to the required height and compressing the packing. The price of the excluder is 12s. 6d. and it is sold in lengths of 2 ft. 6 in., 2 ft. 9 in., and 3 ft. (*Sealdraughts Ltd., Chandos House, Buckingham Gate, London, S.W.*1.)

Prefabricated roofing

Some years ago the old established joinery firm of Newsum started the production of a prefabricated house, and followed this up not so very long ago with a system of timber-framed curtain walling. Their latest development is Diaframe roofing panels in widths of 4 ft. and in lengths up to 18 ft., and made from $\frac{5}{16}$-in. plywood diaphragms on a timber frame. The panels are designed to support a load of 23 lb. sq. ft. and are intended for use where access to the roof is needed only for repairs, but higher loads can, of couse, be carried by reducing the spans. The panels provide in effect a fully boarded roof which can be finished in felt or metal, and site work is considerably expedited, as the purlins form part of the panel. (*H. Newsum, Sons & Co. Ltd., Lincoln.*)

Small thermostat valve

Reference was made in these notes some time ago to a spray tap made by Walker Crossweller and intended mainly to save water in public washrooms. The same firm has now produced a small thermostatic mixing valve known as the Leonard Minor which is for use with shower heads or spray taps where a water supply of only about one gallon a minute is needed. The outlet temperature is adjustable and the valve will work with unequal or varying hot and cold water pressure, although it is not suitable for use with supplies at a head of less than 10 ft.

In operation, the hot and cold supplies enter a mixing tube through circular ports, the opening of which is controlled by a rotating sleeve. The sleeve is controlled by a bi-metal thermostat strip, which is at the outlet of the mixing pipe, so that its reaction to changes in water temperature is almost instantaneous, and in normal conditions the outlet temperature is maintained within plus or minus 3 degrees. Thermostat and sleeve form a single unit which can be easily replaced by hand or removed for cleaning in hard water districts.

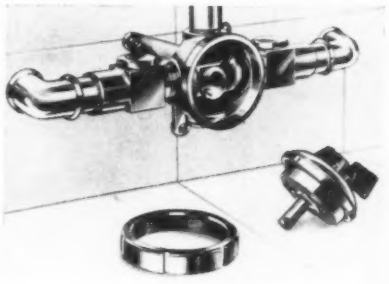
This valve is not intended to replace the other models in the Leonard range. (*Walker, Crossweller & Co., Ltd., Whaddon Works, Cheltenham, Glos.*)

Fireproofing paint

A German produced fireproofing material known as Exolit is now being sold in this country. Tested by the Elstree station the material, with coatings varying from $\frac{3}{4}$ to $1\frac{1}{4}$ oz. per sq. ft., puts insulation board, timber and plywood or acoustic board into class I surfaces of very low flame spread. Under the application of heat, Exolit develops a protective foam barrier layer under which timber remains almost unmarked, even after 30 minutes' application of a blow lamp. It is supplied in powder form, and after mixing with water it can be brushed, sprayed, or applied with a roller, and can be overpainted to provide a decorative finish. There is no need, fortunately, to discuss here whether the Jaguar fire spread *via* the insulating board or the roofing material, but it is worth mentioning that Jaguars have chosen Exolit for use where their roofs are lined with insulating board. (*South American Minerals and Products Co., Ltd.*, 26 *Cowcross Street, London, E.C.*1.)

Controls for thermal storage heating

In order to be economic electric thermal storage systems need some sort of time control so that advantage can be taken of the cheaper off peak rates for current. British Klockner are now making distribution control units incorporating the necessary time controls, which are obtainable with various selective devices so that heating may be omitted on specific days, and the on and off times can also be adjustable. Various sizes of board are produced for jobs from the size of a factory to a small house, and the photograph shows a comparatively small unit for loads up to 12 kW. Price, with four-way fuse unit and Venner switch is £21 2s. 6d. Miniature circuit breakers can be fitted instead of fuses. (*British Klockner Switchgear Ltd., Chertsey, Surrey.*)



Above, Leonard Minor thermostatic mixing valve. Below, the British Klockner control unit for thermal storage heating.

technical section

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INFORMATION CENTRE

23.227 heating and ventilation
FLOOR HEATING

Some Design Considerations of Floor Heating. E. Danter. (IHVE Journal. June, 1957. pp. 53-70).

The paper reports the results of a BRS study of certain design aspects of floor heating. The upward emission of heat from the floor is discussed; heat is partly transferred by convection to the air just above the floor and partly by radiation to furnishings, walls or, of course, occupants. The transfer by radiation may amount to 50 or 60 per cent. of the total emission and consequently warmth may be obtained with a rather lower air temperature than is required with purely convective systems. It is often claimed that this lower air temperature implies a reduced heat loss from the building—the so-called "radiant advantage" of floor heating—but as the author points out, the higher radiation to the occupant is accompanied by a higher radiation to the external walls, which will increase the conduction loss. The author considers radiant and convective systems in detail, and suggests that the radiant nature of floor heating is unlikely to reduce the heat loss for a given equivalent (warmth) temperature by more than 5 per cent.

The paper gives methods for calculation of heat losses through heated ground floors, with and without under-floor insulation. As an example, the losses are worked out for a room 20 ft. × 20 ft., with two external walls assumed to be 1 ft. thick. For the uninsulated floor the downward loss is given in a typical case as 20 per cent. of the above-floor loss; the effect of complete under-floor insulation with an additional thermal resistance of 3° F. hr. sq. ft./B.t.u. would be to reduce the downward loss by about one quarter; and it appears from the data given that most of this reduction could be achieved by a 3 foot margin of horizontal insulation. The author suggests that vertical insulation slabs, which anyhow are much more difficult in practice, would be less effective.

10 DESIGN: BUILDING TYPES
user requirements for laboratories 3
laboratory benches and fume cupboards

In his first two articles* our author W. H. Pritchard discussed how the architect should assess the site services for a laboratory and described the different specialised services which might be wanted and why. This week he turns to the question of laboratory benches and fume cupboards, and since, as the Chairman of BSI's Technical Committee on Laboratory Furniture and Fittings, he has a special competence in this subject, he has gone somewhat ahead of his general brief and has described not only what users will need but also some of the materials and design arrangements which can supply this need.

The laboratory is a workshop equipped for specialized work, most of which will be carried out at some form of bench and, as is the case in the production workshop or factory, the bench may assume many different forms. It is no more possible to design a bench suited to every type of laboratory than it is to design a table suitable for every domestic requirement; axiomatic as this may seem it has not deterred efforts to achieve the impossible. Efforts to produce the ideal universal laboratory bench have made significant contributions to a fuller appreciation of primary requirements and have assisted in the evolution of ranges of basic units capable of assembly into benches of many forms that will fulfil the requirements of a wide range of laboratories. That is a significant advance and, if properly exploited, it will save the preparation of numbers of detailed drawings of laboratory furniture.

Types of laboratory benches

The cardinal rule governing choice of design of bench for any laboratory is that it must be of the simplest nature compatible with the work to be done on it. The plain, sturdy bench will often reveal a better appreciation of laboratory design than one employing new features and materials simply for the sake of novelty.

For assessment of design the laboratory bench may be considered as composed of three parts:

(*a*) The bench top.
(*b*) The support for the bench top.
(*c*) The under bench component which may be cupboards and/or drawers.

* AJ May 30 and June 6, 1957.

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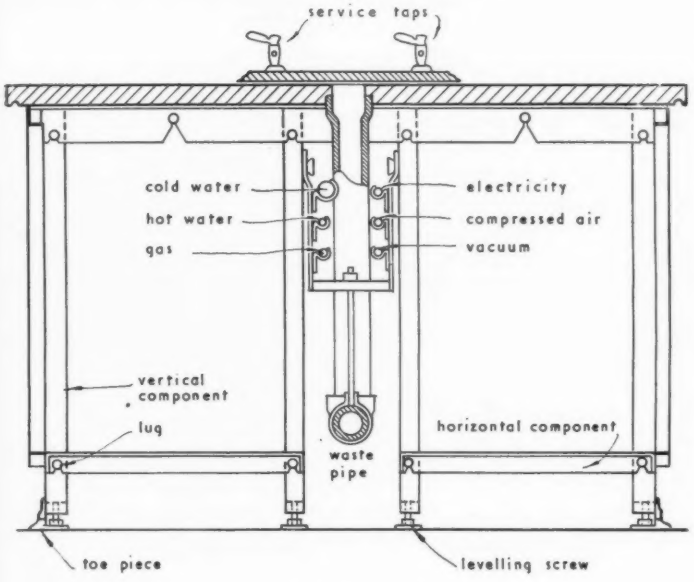
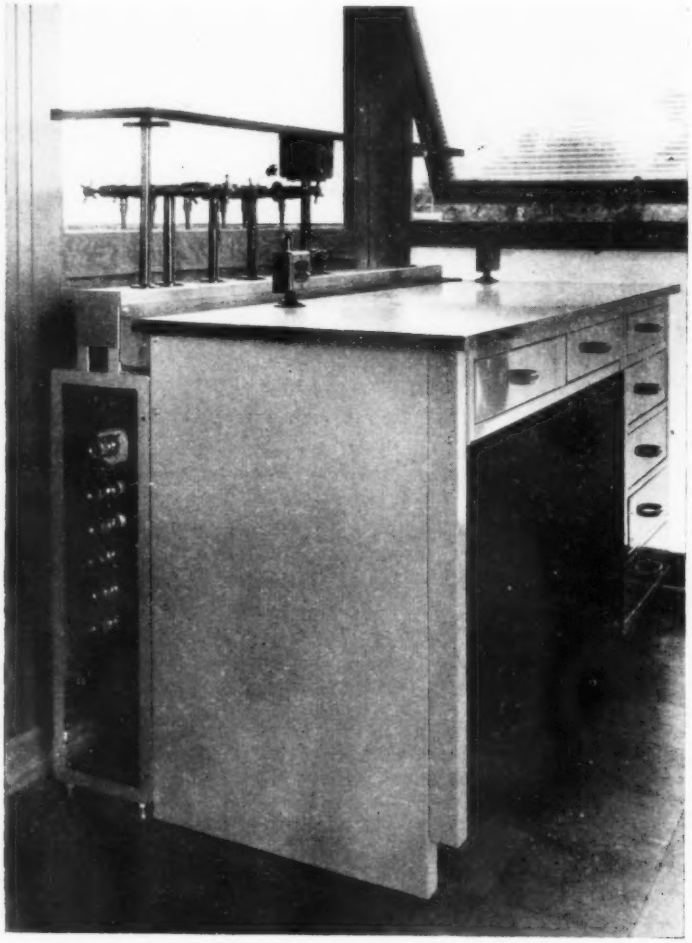


Fig. 1 (above). Section through convertible laboratory bench using minimum of basic components. Fig. 2 (below). A typical laboratory bench unit backing onto a prefabricated service rack (Griffen and George Ltd.)



In any bench (*a*) is the one indispensable item; the function of (*b*) may be carried out by (*c*) or alternatively the latter may be unnecessary. There is a tendency to assume that underbench cupboard and/or drawer units are essential to any laboratory bench. They are not. No laboratory task is dependent upon underbench storage, although in many instances the underbench volume may be conveniently utilized for this purpose. Cupboard and/or drawer units are expensive and if provided in circumstances where they are not strictly essential merely become depositories for odds and ends of junk.

The first approach therefore is to the support of the bench top. Methods normally used are:

1. Direct support on underbench units.
2. Open leg supporting frame with or without mobile underbench units.
3. Support spine embodying arrangements for carrying service pipes permitting use of underbench components as required.
4. Enclosed supporting frame with integral cupboards and/or drawers.

Benches constructed by the first three methods can employ the well designed underbench units marketed by laboratory suppliers. The last method is the most traditional, inflexible, and expensive. The unit construction of benches has therefore much to commend it both in facility of design and versatility in reassembly. Especially is this the case where increased laboratory accommodation follows factory expansion and where for the time being existing or temporary buildings may have to be used. The unit furniture then affords opportunity for reassembly in new layouts when the permanent laboratories become available.

Attempts have been made, with varying degrees of success, to design small basic ranges of components that are capable of being assembled into laboratory benches that combine a high degree of flexibility with moderate cost. Fig. 1 sketches an extensively used system in which the basic components have been restricted to the minimum. The bench top is supported on a metal frame fabricated from steel angle sections with an acid resistant finish. The horizontal and vertical members of the frame are distinct components. Stainless steel lugs are riveted to the sides of the latter and engage corresponding slots in the horizontal members to form a rigid rectangular frame that holds together without the use of nuts and bolts. Levelling screws are fitted to the bottoms of vertical members to take up floor irregularities. The components can be arranged to form single or double sided benches as required and in the latter application service piping is carried on hangers engaging lugs on the back edge of the vertical members. Spacing of frame members under the bench top is arranged to permit under bench units being accommodated as required. Thin steel panels are used to enclose the free ends of benches. The space between the bottom spacer frame and the floor is closed by a steel sheet and a finishing aluminium "toe-piece" casting. Bench tops can be of any length but multiples of under bench units afford the maximum convenience.

technical section

A proprietary version of a different type is shown in Fig. 2.

A convertible bench system that is now produced in this country was described in British Provisional Patent No. 27721/54.

However it is supported, the height of the bench working surface is important. Many different views on ideal bench height have been advanced, but often they are based on purely personal prejudice or environmental habits. Ergonometric studies have confirmed that for work normally carried out while standing 3 ft. is suited to the average adult and 2 ft. 9 in. for science pupils at usual ages up to Ordinary Level standard of the General Certificate of Education. For some types of work, *e.g.* dissection and microscopy, where long periods of sitting are normal, a height of 2 ft. 6 in. is preferable. Low bench height is also essential where tall equipment, such as Bone & Wheeler or Haldane gas analysis apparatus, is in constant use.

A clear bench width of 2 ft. to 2 ft. 3 in. is adequate for most purposes. The very wide bench will normally defeat its own purpose by becoming cluttered up at the back with rarely used bottles and pieces of apparatus that should be tidily stowed away in a cupboard.

The length of bench space per individual will vary with the type of laboratory. In those used for teaching elementary science subjects, 2 ft. 6 in. per pupil will usually suffice, but research usually entails a minimum allowance of 10 ft. of bench length for each person.

Apart from the general bench others may be needed for more specialized equipment or work. The balance bench is an example. Good analytical balances are sensitive instruments and their supporting benches merit careful selection of position and design. They should be positioned away from windows and the effects of strong sunlight and/or draughts. Proximity to ovens, furnaces, radiators or any other form of heat, and fume cupboards, should be avoided. Vibration will shorten the life of the sensitive balance and impair its efficiency. Vibration is best overcome by eliminating it at the point of origin, but where the source is external to the laboratory, elimination of vibration can only be done at the balance bench. In a ground floor laboratory that is subject to vibration the bench for sensitive balances should be mounted on a block of concrete entirely isolated from the building foundations. The block should be of appreciable mass and enter the ground for a distance of 3 to 4 feet. The top of the block should be level with the final floor screed and its sides must have a clearance of at least 4 inches from any part of the building. If the clearance space is filled to preserve apparent continuity of floor the filler must be a vibration damping material such as foam rubber. The balance bench is formed by building up on the block brick piers to support a slab of slate or similar heavy material forming the bench top. A layer of felt half an inch thick should be interposed between the under side of the slate slab and the brick piers, or alternatively, a cork and lead sandwich used. It must be remembered that the slab top should be at least two inches away from the wall, service pipes, or conduits, and if it is allowed to touch any of them all the careful foundation work will be wasted.

The manufacture of laboratory furniture is a specialized job and cabinet making skill is only a part of it. A wide knowledge of materials in their relation to laboratory applications is essential, coupled with sound engineering ability and acquaintance with laboratory layouts and techniques. Unless the architect or his client has available all the requisite knowledge, skill, and design facilities to produce detailed drawings and specifications it is very doubtful if satisfactory results can be obtained by attempting to break the bench down to component parts and ordering them from non-specialist joinery manufacturers. At first sight there may be an apparent saving in initial cost, but this can be offset by subsequent difficulties in service plumbing brought about by design oversights or the failure of material used that may be quite adequate for office or domestic furniture but is readily attacked by reagents. There is no point in attempting *ab initio* the design of components that are marketed as quantity production items by specialized firms.

Materials for bench tops

Many different materials have been used for bench tops, and war exigencies intensified investigation of products that had not hitherto been used in normal laboratory construction. In this country timber is still the most widely used material for laboratory benches. Teak has retained its pre-eminence among timbers used for bench tops. There is only one true teak, Tectona grandis, and the use of such terms as African or Nigerian "teak" to cover Iroko or other timbers is to be deplored. In some circumstances other timbers can be accepted as substitutes for teak, principally on account of lower cost, but they are substitutes and that must be fully appreciated. Iroko (Chlorophara excelsa) is probably the most widely used substitute timber. It is an African tropical hardwood comparable in density and general physical properties to teak. When freshly cut the colour of the wood is a distinct yellow, but on exposure to light is quickly becomes a golden brown. The timber works with moderate ease and its dulling effect on the cutting edges of tools is about 15 per cent. of that of medium quality teak, but occasionally hard stone-like deposits are encountered in the heart wood, causing damage to cutting tools. It is possible to obtain Iroko in boards up to widths of about 4 feet and length of 14 feet, and a complete bench top can be formed without joints. Experience gained in the widespread use of this timber for bench tops suggests that the quality is more variable than is the case with teak. Afrormosia or Kokrodua (Afrormosia elata) is a dimensionally stable wood slightly denser than teak, but of the same general colour and appearance. It is fairly easy to work but stains readily with iron salts. Opepe (Sarocephalus diderrichii) is denser than teak but the structure is fairly open due to large pores. The wood has poor bending properties and tends to split if nailed.

technical section

Purpleheart is sometimes mentioned as a possible timber on account of its high resistant properties. Although plentiful in the country of origin (British Guiana) little has been imported into the UK in recent years.

African mahogany has been used for bench tops, but blows from sharp edges of retort stands, etc., readily cause indentation of this fairly soft timber.

While other timbers may be considered as substitutes for teak, totally different materials may be classified as rivals. Descriptions of American laboratories frequently make reference to Alberene stone bench tops. This material is virtually unknown and unobtainable in this country, but on account of the widespread and increasing popularity in America some appreciation of its qualities is desirable.

Alberene is a natural stone obtained from quarries in Albermarle, Virginia. Two varieties of the stone are marketed, Regular and Grade 25; both are silicates with similar chemical compositions. Regular stone has a high content of the relatively soft mineral magnesium silicate. Average chemical composition is:

Silicon,	estimated	as	the	oxide	..	37·20	per	cent.
Magnesium,	„	„	„	„	..	26·95	„	„
Aluminium,	„	„	„	„	..	8·4	„	„
Iron,	„	„	„	„	..	11·15	„	„
Calcium,	„	„	„	„	..	4·60	„	„
Titanium and miscellaneous					..	0·50	„	„
High temperature loss					..	11·20	„	„

The fusion point of the material is between 2,200 and 2,300° F. Average weight of the stone is 185 lb. per cubic foot. Absorption of moisture, expressed as percentage increase in weight, after 48 hours' immersion, is: Regular Grade 0·12 per cent., Grade 25 0·072 per cent. The Regular variety with a bluish-grey honed finish is normally used for bench tops, but Grade 25 with a blue-black honed finish is recommended for use where extremely severe conditions are encountered. The stone complies with the stringent Federal Works Agency Specification for chemical resistance tests. In America the stone is almost as widely used as a bench top material as teak is in this country.

At present in Europe the rivalry with timber as a bench top material is shared between a number of substances. The use of plastic materials, either by themselves or as protective veneers to less expensive timbers, presents a wide choice of physical and chemical properties. Generally they are especially suitable for food, biological, pathological, and similar laboratories where a high standard of surface cleanliness is essential but the work of the laboratory does not entail a high degree of mechanical wear of the surface or its attack by a wide range of concentrated reagents. The reinforced plastics are more commonly used either as sheets, veneers or tiles. Reinforcement may be in the form of a " filler " such as wood flour or asbestos fibre or in sheet or fibre form suitable for lamination, e.g., paper, fabric, or glass. The bonding resin may be phenol-formaldehyde, urea-formaldehyde, analine-formaldehyde, or melamine-formaldehyde. With such a wide choice of both fillers and resins the suitability of any one commercial product for a particular laboratory can only be properly assessed in specific terms. In general all the resins mentioned show good resistance to most organic solvents and common mineral acids, fairly poor resistance to prolonged contact with strong alkali solutions, and moderate resistance to mechanical abrasion. Other plastic materials that are usually used as thin sheets or films to cover wood or metal bench tops are polythene, polyvinylchloride, and polytetrafluoroethylene. The general properties of the first two materials have been briefly outlined in relation to their employment in tubing form for service distribution pipelines. Polytetrafluoroethylene is a white, hard, tough resin with outstanding resistance to all forms of chemical attack up to temperatures of about 300° C. It is an expensive material but a thin covering of part of a bench top may be justified where resistance to attack by any substance except fluorine and molten alkali metal is essential.

Processed timber in densified, laminated, vacuum impregnated form is especially suitable where high electrical resistance of the bench top is essential.

Stainless steel has been used in applications where it is essential that there is no absorption by the bench top of any substance that may be spilt upon it. It is essential that the appropriate grade of stainless steel is used. Stainless steels may be broadly divided, by their crystal structure, into two main classes, martensitic and austenitic. The latter alloys are the true " stainless " steels and are highly resistant to corrosion and chemical attack mainly by reason of their high nickel and chromium content and the fact that they are homogeneous solid solutions in the soft state. Performance varies with composition of the alloy but, for example, a steel containing 0·1 per cent. carbon, 17-20 per cent. chromium, 8-12 per cent. nickel, and 2·5-3·5 per cent. molybdenum will resist attack by concentrated acetic acid at high temperature and will withstand sulphuric acid at room temperature. The martensitic steels will resist 10 per cent. concentrations of a number of acids, e.g., carbolic acid, pyrogallic acid, tannic acid, and fatty acids but should not be regarded as true acid resisting materials.

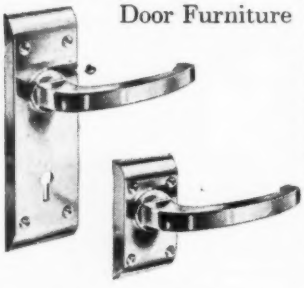
Glass, asbestos-cement sheet, ceramic tiles, and a variety of other materials are usually employed for bench tops where there is emphasis on a particular property, e.g., resistance to heat, as opposed to work demanding a general versatility of chemical and physical properties. The predominant characteristics of such materials are well known and will govern selection for specific uses.

The absorption of water by timber

When novel materials are offered for bench tops or covering, modern technical sales literature often gives data on physical and chemical properties. Assessment of the new materials as compared with those accepted by reason of long established practice is frequently difficult due to scarcity of readily accessible data giving comparable figures for natural products. Especially is this the case with regard to probable rate

DOVER DESIGN

Door Furniture



A design to enhance the contemporary interior. The Dover range includes mortice locksets and latchsets and mortice furniture with lever handles or knobs. Standard finishes — chromium-plated, Im. B.M.A. or Florentine Bronze, special finishes available on request.

"It come orf in me 'and, mum..."

Our sympathy's entirely with you, Mrs. B. There are some people who cheerfully spend a small fortune on redecorating, yet positively seem to enjoy living with antiquated locks and door furniture, cracked and stained finger plates, rusty postal knockers, and so on. But the more enlightened 'furnish' their doors as well — refitting with elegant and enduring Yale door furniture chosen from an impressive range of designs and finishes. The Dover design is an example.

Where there's a door there's a need for YALE

REGISTERED TRADE MARK

DOOR FURNITURE
MASTER KEYED SUITES
DOOR CLOSERS
LOCKS

The Yale & Towne Manufacturing Company · British Lock & Hardware Division · Willenhall · Staffs · England

technical section

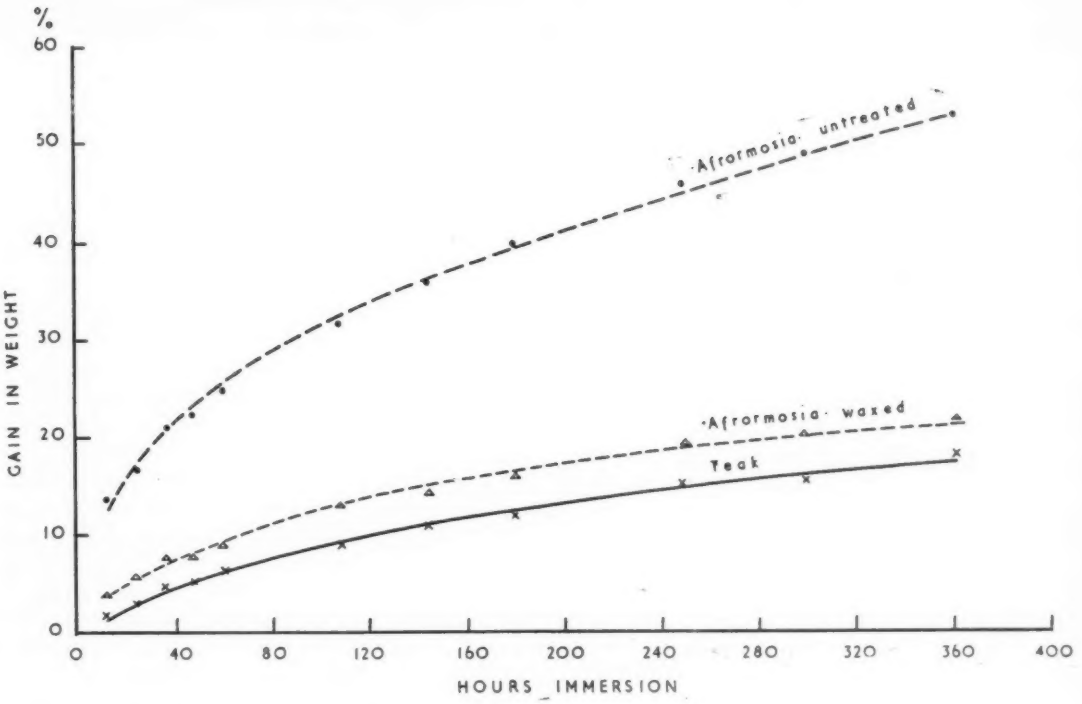


Fig. 3. *Relative water imbibition of timber samples.*

of moisture absorption. Admittedly the factors influencing the moisture absorption of wood are complex and variable but appreciation of probable order of magnitude is essential in attempting comparison with other materials and in deciding whether treatment of the surface of the wood by wax polish, etc., is demonstrably worth the effort.

Some empirical results obtained by the writer are given in the curves in Fig. 3. They are extracted from observations made on a wide variety of timbers immersed in water for periods exceeding 2,000 hours. The curves plot water absorption, expressed as percentage increase in weight, of three specimens over a period of 360 hours. The ageing treatment of the three samples before tests was identical. All were well seasoned samples and were kept by the writer in dry equilibrium conditions for a year after receipt. The two specimens of Afrormosia were cut from the same plank a year before the tests were started. Immediately prior to test moisture content of samples was between 10 and 12 per cent. The specimen of Afrormosia that gave results shown in the top curve and the sample of teak (bottom curve) had no other pretreatment before immersion. The middle curve gives results obtained after three generous applications of good quality wax polish that were well rubbed into the wood, all excess wax being removed by a soft cloth, before immersion. All specimens were weighted to give total immersion, at a depth of six inches, in a glass tank of tap water maintained at 60° F. The curves cannot be taken as absolute values but they indicate (*a*) wide difference of water imbibition of two timbers of comparable cellular structure, i.e., teak and Afrormosia, (*b*) marked differences obtained by simple waxing of an identical sample.

There can be little doubt that the thorough oiling or waxing of timber bench tops both immediately after fabrication and at intervals when in service will materially assist in avoiding both warping due to atmospheric humidity and penetration of basically aqueous solutions.

Fume cupboard design

The increasing employment of chemical reactions involving use of toxic materials entails more efficient fume cupboards than was the case a decade or so ago. One example may be cited. Anhydrous hydrogen fluoride was for many years known only as an extremely pungent, corrosive, toxic compound. It was used only in the laboratory in platinum vessels for work of academic interest. The properties of the compound naturally remain unchanged but anhydrous hydrogen fluoride is now used industrially in large quantities for the production of organic fluorine compounds and as a catalyst in the production of high octane fuels by alkylation. The transition work of harnessing extremely dangerous compounds to employment in useful industrial processes often depends upon adequate fume disposal arrangements in the exploratory stages. In this country fume cupboard framing is usually of timber but there is one overriding exception that entirely precludes wood or similar materials. Perchloric acid, $HClO_4$, sometimes occurs either as a starting material or during a stage of synthesis. It is

technical section

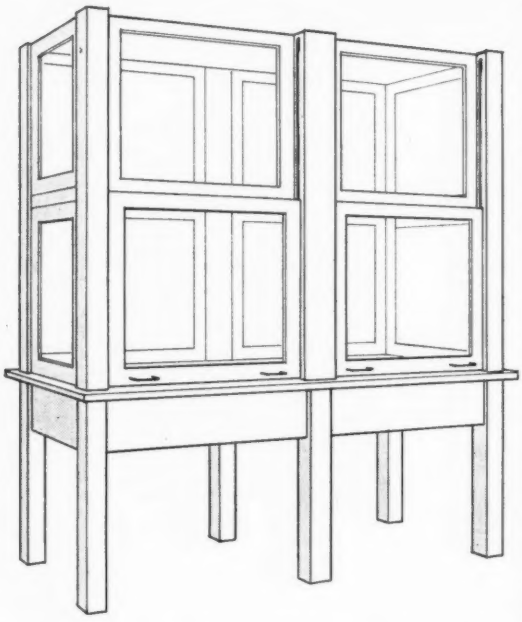
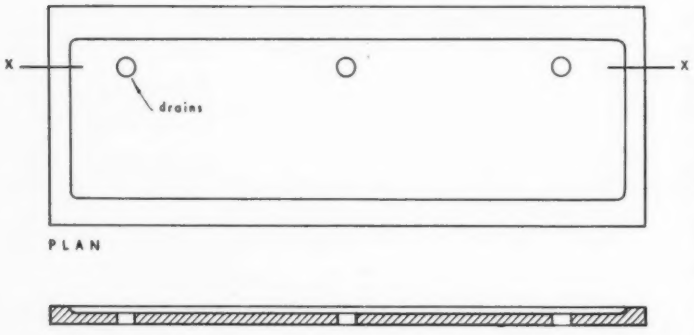


Fig. 4. (*above*). *Simple research fume cupboard. Fig. 5.* (*below*). *Fume cupboard working surface.*



obtained when potassium permanganate is distilled with sulphuric acid under reduced pressure and is also formed when certain chlorates are treated with sulphuric acid. Perchloric acid explodes when brought into contact with wood, paper, and similar materials. The design of fume cupboards in which it is intended to carry out work with perchloric acid differs radically from that acceptable for most other work and general design features should not be adapted to it without specialist advice.

With that outstanding exception fume cupboards may be broadly divided into three classes:

1. Fume cupboards for teaching up to University entrance levels.
2. Fume cupboards suitable for most academic and general industrial work.
3. Fume cupboards for highly toxic or radio-active work.

The height of the fume cupboard working surface or base is important and it should correspond with the level of bench tops in the particular laboratory, in general 2 ft. 9 in. for school laboratories and 3 ft. for others. The more or less traditional design of fume cupboard with a sloping upper front portion is acceptable for school laboratories but this style inhibits usefulness of fume cupboards in research laboratories as tall apparatus, such as fractionating columns, can then only be used at the back of the chamber. A clear rectangular working space is preferable. It is desirable that the fume cupboard should be a complete entity and its back or sides should not be part of the building structure. Using the wall of the laboratory as the back of the fume cupboard is a false economy that often results in escape of fumes, attack of structural materials, and loss of laboratory flexibility. As is the case with the laboratory bench the fume cupboard should be of the simplest design compatible with fulfilling known requirements. For research purposes the fume cupboard should have a clear internal working height of about 6 ft. A simple basic design is sketched in Fig. 4. The lower front sashes can be raised to give a clear opening of about 3 ft. and there is adequate internal headroom for erection of tall apparatus.

Work done in a fume cupboard is frequently messy and it is advantageous if the working surface can be swilled down without swamping the floor of the laboratory. The miniature sink fitted in one corner of a level working surface is quite useless for this purpose and the top should either slope slightly to an open channel at the back or preferably have the dished formation shown in Fig. 5. There should be a clear, unobstructed working depth of at least 2 ft. from the front edge of the fume cupboard. Water baths and similar apparatus can impose relatively high surface loadings and the mechanical properties of the working surface are as important as powers of resistance to chemical attack.

Controls for all services should be placed outside the fume chamber both to avoid corrosion and facilitate rapid handling in emergencies.

A poorly lighted fume cupboard is a nuisance and a potential source of danger. Lighting fittings inside the fume chamber rapidly acquire layers of dirt and are attacked by corrosive vapours. Fittings should be external and arranged to project light downwards into the fume cupboard without causing glare to the standing operator. Constant sitting at the fume cupboard is not good laboratory practice and the design should not encourage it. The reason for using the fume cupboard is that the reaction is dangerous and/or smelly and the minimum time should be spent in the potential danger area that is consistent with adequate supervision of the experiment.

Fume extract systems

Four main methods of extraction from fume cupboards are employed, natural hot air draught, propeller fans, ejector systems, centrifugal fans.

The first is the oldest method but is still widely used in school laboratories; it is accomplished by a gas flame in the outlet flue of the fume cupboard, causing natural rise of air. Good design is extremely difficult

technical section

and it is almost impossible to predict whether it will work or not as draught is dependent upon many external factors including weather. Furthermore there is risk of explosion if inflammable gas, such as hydrogen, is used in the fume cupboard. Even minimum rates of air flow are difficult to achieve with natural draught and the system has little to commend it.

Simple propeller fans provide the cheapest method of mechanical draught induction. They are usually only suited to conditions where the side or back of the fume cupboard is against an external wall and the fan is working against free air conditions on both sides. Simple propeller fans are normally driven by a motor on the central spindle and it is thus in the fume path and liable to corrosive attack.

Ejector systems force air or steam through a nozzle to produce a suction effect comparable with that obtained by an ordinary water filter pump. The principal application is in highly corrosive systems such as fume cupboards designed for use with perchloric acid.

Centrifugal fans are suited to the widest range of applications. The motor is not in the fume path and considerations of corrosive attack need only be confined to the fan materials. Fans of this type are available with metal blades and housing coated with resistant films or alternatively fabricated entirely from plastic materials. Standard fans made by leading manufacturers are, in practice, surprisingly corrosion resistant, and it is doubtful if the additional expense of all plastic fans is justified for any but the most onerous conditions. The fan should be mounted as close as possible to the outlet or free air end of the extract trunking and should be readily accessible for routine maintenance. Where the building has a flat roof the fan should be mounted on it in a simple protective housing. Fan speed is important and should be within the range 900-1,400 r.p.m. Variable speed fans have been fitted in a number of laboratories, but experience has shown that little use is normally made of this facility; the extra expense entailed in fitting speed regulators is only justified in exceptional circumstances.

Many attempts have been made in installing one or more central fans to serve a number of fume cupboards. In general these systems sooner or later prove unsatisfactory and there is abundant evidence that individual fume cupboard fans not only permit better aerodynamic design of individual installations, but also provide fewer maintenance problems and greatly enhance the flexibility of the laboratory.

Estimation of appropriate fan capacity should be based on the uniform linear velocity of air swept through the fume cupboard when the sash is open. Desirable air velocities will vary with the nature of the work, but for the three categories mentioned the following velocity ranges represent realistic standards for adequate fume cupboard performances.

1. School fume cupboards.	20-30 Lineal feet per minute.
2. General purpose fume cupboards.	35-60 Lineal feet per minute.
3. Fume cupboards for hazardous work.	80-100 Lineal feet per minute.

Materials for fume cupboards and extract systems

The exhaust trunking or flue should be considered as part of the fume cupboard, vapours will condense in it and may combine with atmospheric water or gases used in subsequent experiments to form highly corrosive substances. Internal attack of this nature will proceed unseen until such time as the duct material is eroded away. A minimum cross-sectional area of 24 square inches is essential for the ducting to the simplest fume cupboard, and about 75 square inches is required for research fume cupboards. Therefore, whether the trunking assumes rectangular or circular form, a substantial quantity of material will be employed per foot run and this will preclude the use of heavy and/or expensive materials. Thus ¼-in. thick cast iron piping giving the minimum cross-sectional area would weigh about 15 lb. per foot. Corrosion resistant properties, cost and weight, restrict choice of materials that are normally practical. Within recent years a number of plastic extract systems have been marketed, but although they appear promising there are as yet insufficient data to provide conclusive evidence. Asbestos cement pipes and fittings afford practical solutions in the majority of cases. Pipes and fittings should at least comply with British Standard 567 or 835 as relevant. Resistance to attack of the asbestos cement flue will be enhanced by an internal coating of acid resisting or epoxy resin paint.

Formerly fume cupboards were exhausted only from the top, heavy gases then tended to sink and seep over the front edge of the chamber into the laboratory. This unpleasant effect is eliminated if the fume cupboard is exhausted from both top and bottom and a convenient method is the fitting of a false back with slots at the top and about 6 in. from the bottom. The space between true and false backs then becomes part of the extract trunking and must be considered as such. Asbestos cement sheet sprayed with epoxy resin paint has been found very suitable for this purpose and the necessary slots can be cut without inducing strain.

The fume cupboard base or working surface presents all the problems of the laboratory bench, but normally with additional emphasis on chemical and heat resistant properties. Stone comparable with Alberene appears ideal but in this country alternatives have to be sought. Ceramic tiles laid on a cement slab provide a durable surface if care is exercised in selection of jointing cement. A high quality concrete slab coated with a resistant film provides an inexpensive base suited for a wide variety of work. Where numbers offset the initial expense of moulds, fired glazed earthenware bases offer the advantages of dished formation without joints and a surface that is readily cleaned. The use of linoleum or other combustible covering materials for the fume cupboard working surface is inadvisable. Stainless steel and plastic materials present advantages for specific applications, but the limitations already discussed with regard to their use as bench top

technical section

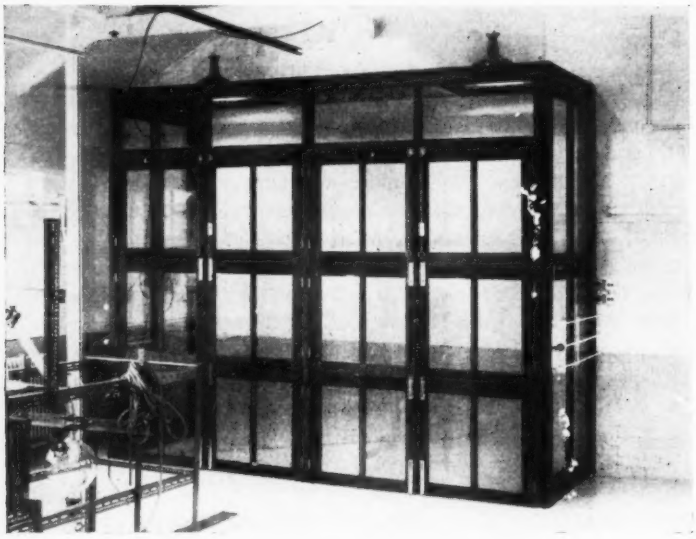


Fig. 6. "Walk in" fume cupboard.

materials apply with additional emphasis.

Explosion risks must be considered in relation to flying glass fragments when the fume cupboard glazing is selected. Where there is no likelihood of explosion, as in straightforward inorganic analytical work, 24 oz. sheet glass is adequate, but where experiments involving low flash point solvents or gas reactions are likely to be carried out some form of glazing that will not give rise to flying glass splinters is essential. The simplest and cheapest method is ordinary Georgian wired glass; its outstanding drawback is normally that of inability to withstand heating without cracking. Toughened glass has much greater resistance to thermal shock up to temperatures of 300° C., but is an appreciably more expensive material. Glass has good resistance to most forms of chemical attack, the outstanding exception being hydrofluoric acid, and if this is likely to be used to any great extent in the fume cupboard glazing with a transparent vinyl polymer material is recommended.

Framing of the fume cupboard is usually timber and it is important that a hard, naturally resistant wood is used. The quantity of timber is so small that there is no point in attempting to save a few shillings on the job by using woods other than teak or oak. Both timbers have good resistant properties but, where conditions are very severe, these will be enhanced by treatment with chlorinated rubber paint.

Sash cords or chains rot or corrode and a safety stop should be fitted to prevent the sash falling violently when the cord or chain breaks. Polyester fibre or nylon cords are more durable than natural fibre ropes or metal chains. Sashes should run easily and be capable of being raised or lowered with one hand.

The "open rig" and the "walk in" fume cupboard

Most laboratory work is carried out at the table type bench and the associated fume cupboard is therefore basically an enclosed bench top. When the quantities of liquid to be handled exceed a few litres, as in pre-pilot plant stages of development, it is convenient to form a three-dimensional "bench" from light steel scaffolding or angle. The fume cupboard must then permit the erection of such an "open rig" within it and, instead of an enclosed bench top, becomes a cubicle extending from the floor to a height of 10 feet or more.

The fume cupboard must, however, still meet all the conditions previously postulated.

A corner of an open assembly together with a simple "walk in" fume cupboard is shown in Fig. 6. The floor area of the fume chamber is 12 ft. × 5 ft. and there is a clear internal height of 10 ft. 6 in. A floor channel drain covered with checker-plate runs across the entire front of the base of the fume cupboard; it is obscured in the photograph by the lower edge of the doors. The false back of the fume cupboard is asbestos cement sheet coated with chlorinated rubber paint. Each of the four front doors comprises three separate panels and all can be opened individually. Release arrangements are also fitted on the interior of the fume chamber. Good lighting is provided through the glazed top panels of the chamber.

Fume cupboards of this type greatly facilitate work that has passed the stage of fundamental investigation but has not yet reached that where laboratory techniques have been developed into industrial processes.

Metal laboratory furniture

The use of metal for laboratory furniture is, in this country, normally confined to bench framing, simple fume hoods, storage units and shelving. All-metal benches are not standard production articles and the bench tops used with metal furniture are normally selected from materials already discussed in relation to timber furniture. The most practical metal for the construction of laboratory furniture is cold reduced, general purpose quality, mild steel sheet. Aluminium or stainless steel are theoretical alternatives but are normally precluded by cost.

Metal furniture can only be considered an economic proposition where there is strict adherence to the makers' established dimensions of units. Unless the quantities are large it is not practical to envisage employment of metal furniture "tailor made" for an individual job. Obviously the units cannot be cut or scribed to fit irregular surfaces.

Metal furniture has advantages in tropical climates or where there is risk of attack by termites or rodents.

Components should be of rigid welded construction and the following should be regarded as minimum acceptable thicknesses of metal for the parts described.

Carcases	18 B.G.
Doors, drawer bodies and fronts ..	20 B.G.
Drawer suspension channels ..	16 B.G.

The finish of metal furniture is important: it should be degreased, treated with a primary rust preventing process, and finally finished with at least two coats of enamel that will resist both chipping and attack by normal laboratory reagents.

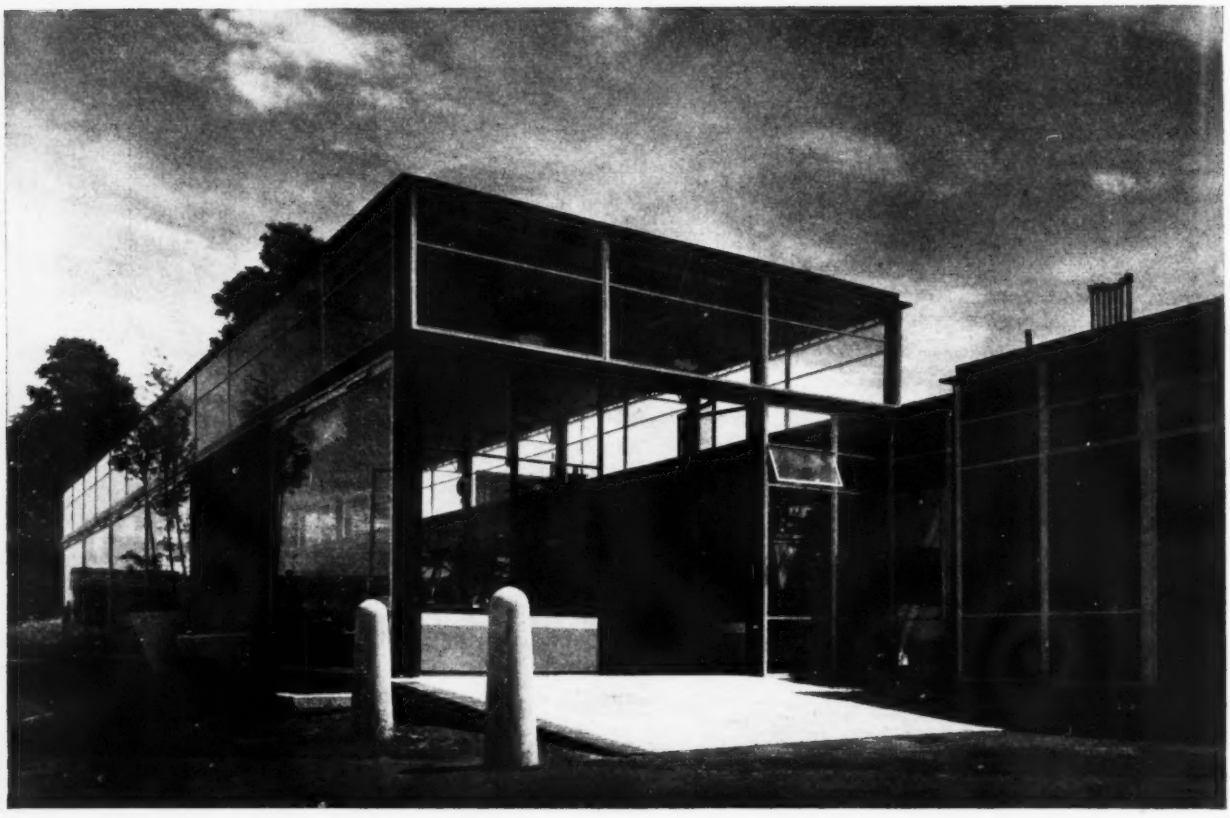
GARAGE AND SERVICE STATION

in FIRST AVENUE, THE STOW, HARLOW, ESSEX; designed by MAXWELL GREGORY; in association with RAMSEY, MURRAY, WHITE and WARD; consultant architect DENIS A. BIRCHETT; assistant G. D. THOMAS quantity surveyors CAMERON and MIDDLETON (building contract), CYRIL SWEETT and PARTNERS (forecourt contract)

The unit system of construction used for this garage, which is the first to be fully analysed in the JOURNAL, has been designed and applied by Shell-Mex and B.P. Ltd. The prototype building is at Reading (AJ, June 16, 1955), and the system was applied at Aylesbury (AJ, April 11, 1957).

Viewpoint 1 *(above) : general view from First Avenue. Viewpoint* 2 *(below) : close-up of the pump islands.*

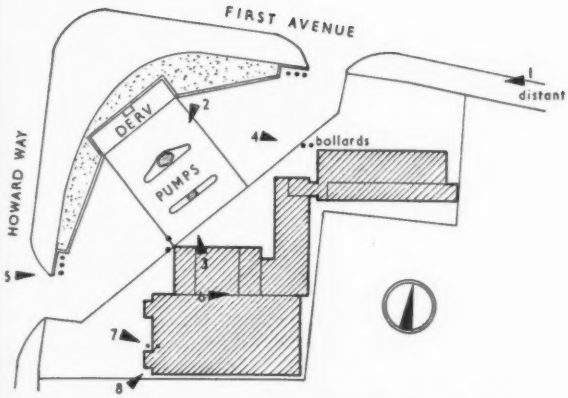
building illustrated



Viewpoint 3 (right): the filling station seen from the roof of the lubrication bay, showing pump islands with space between for three cars abreast to allow maximum use of pumps. There is a separate " Derv " pump in the bay at the back (hidden by lorry). The " Derv " pump is separated because of the smell and to keep heavy traffic clear of the main pump island. The kiosks are of standard construction. Viewpoint 4 (above): the folding sliding doors at each end of the showroom are for car access. All windows are on a standard module, using standard sizes—except show windows, which are 4 × 3ft. 4in.—13 sq. ft. Note the kerb and raised paving which protect showroom windows from parked cars.

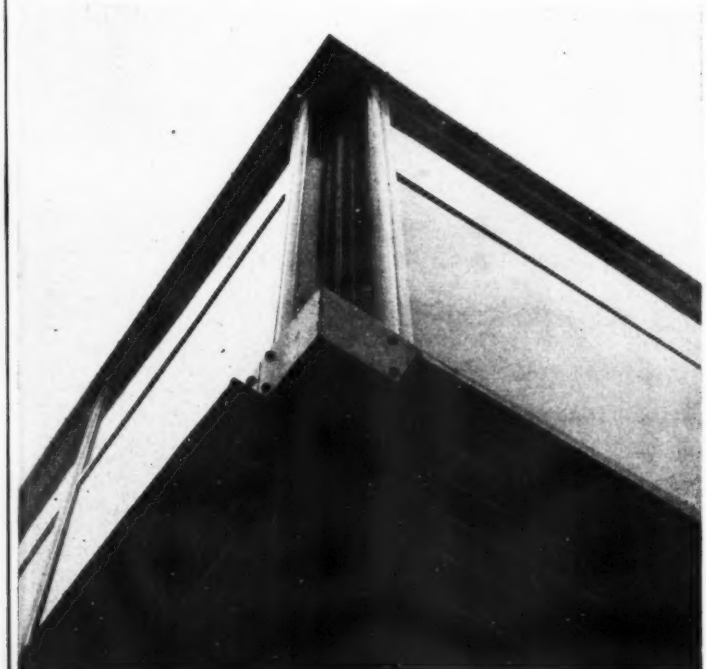
Ground floor plan [Scale: $\frac{1}{32}$" = 1' 0"]

First floor plan



Site plan showing photographic viewpoints. The concrete apron around the pumps is to withstand petrol and oil droppings (seen in viewpoint 3). There are tarmac areas elsewhere for parking and access to showrooms, workshops and stores.

A detail of the angle of clerestory windows with brick panels below, showing the sheet metal cover to a standard column used at window and brickwork junctions.



analysis

CLIENT'S BRIEF : his stated requirements

A filling station, car showrooms, workshops, lubricating and washing bays, stores, administration offices, reception and retail showrooms. The filling station to be constructed first and to function as a complete business while the main buildings were in course of construction under a second contract.

SITE : Area of site, surroundings and access planting

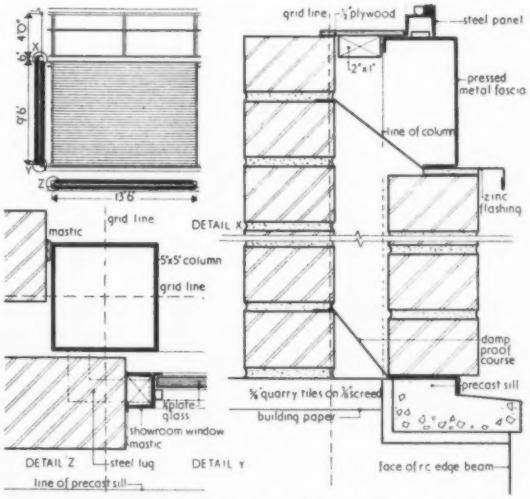
Area of site, ¾ acres (approximately) placed on side of hill falling from S.E. to N.W. Clay sub-soil. At road junction between Howard Way and First Avenue, serving residential area, and Edinburgh Way, serving industrial estate.
Access, from Howard Way and First Avenue.
Planting, grass lawn from forecourt boundary walling to edge of pavement. Trees, flowers and shrubs in concrete pots.

PLAN : general appreciation

Filling station well to front of site in middle of forecourt with vehicular access from main forecourt circulation, providing entry to workshop, car showrooms, salesroom, repair workshop and washing and lubricating bays.
Relation of units: Entrance to store at approximate centre of site, within view from pump islands. Washing and lubrication bays set to be readily seen from pump islands. Sales room gives access to reception area and car showrooms and administrative offices on the east flank of site. On west flank of site access to workshop is planned, clear of main forecourt circulation.

MAIN CONSTRUCTION

Messrs. Hills' steel frame and casement walling system based on 3-ft. 4-in. module.

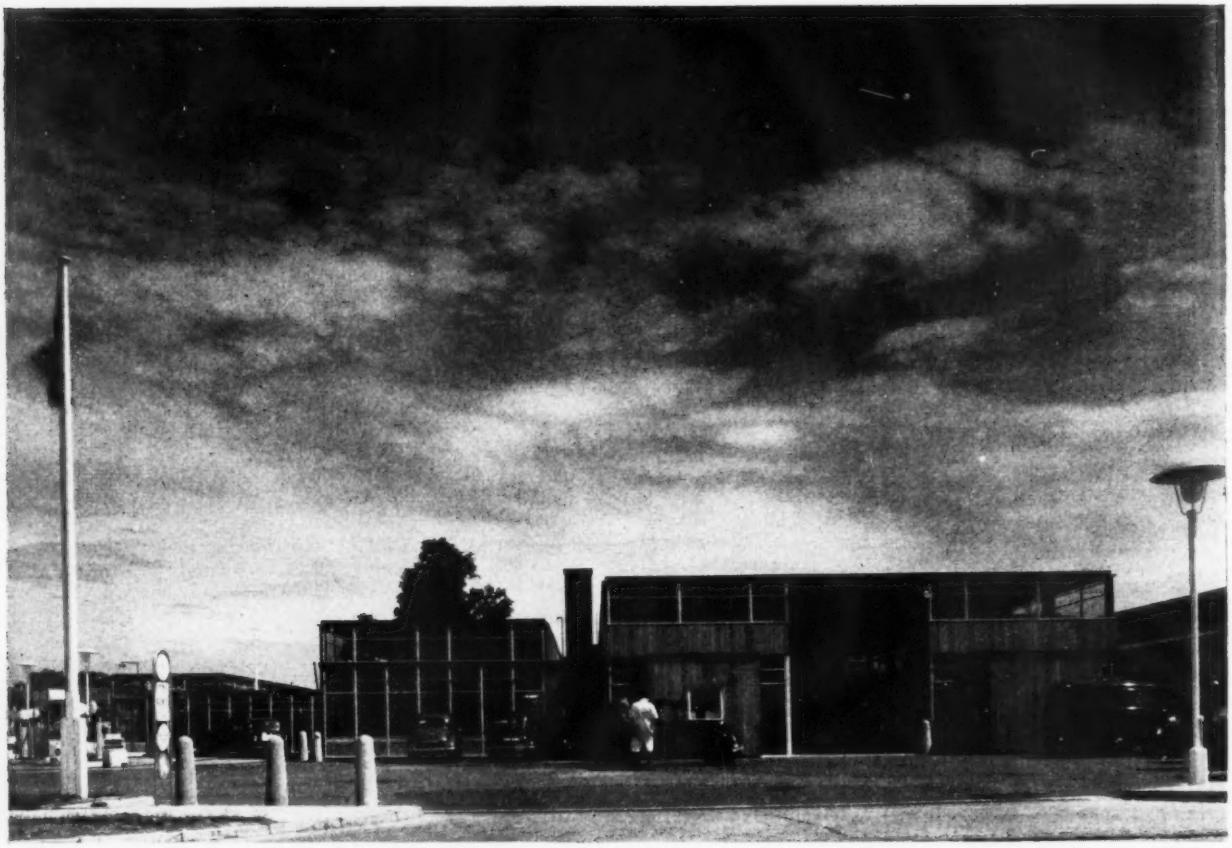


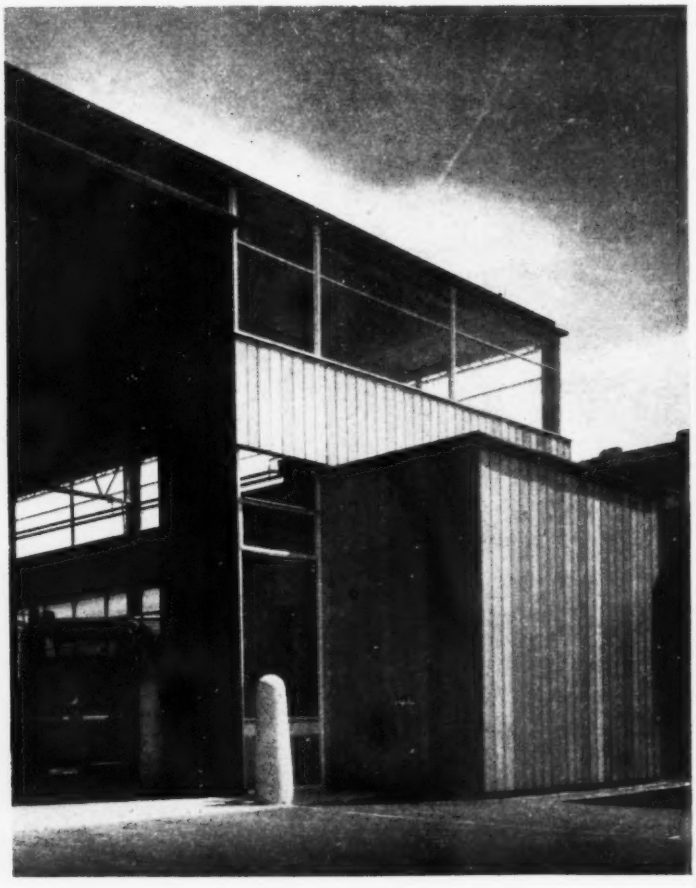
Key plan, elevation, sections and details of brick panel infil to showroom [Scale: ½" and 1½" = 1' 0"]

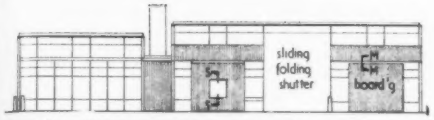
STRUCTURAL ELEMENTS

Work below ground floor level
Concrete footings under columns and 6-in. r.c. slab and 6-in. hardcore. Overall plan in reinforced concrete, painted conc. from ground up to sill level.

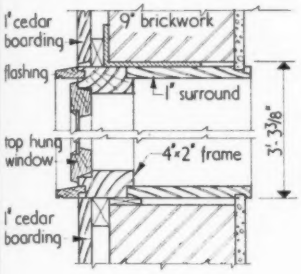
building illustrated



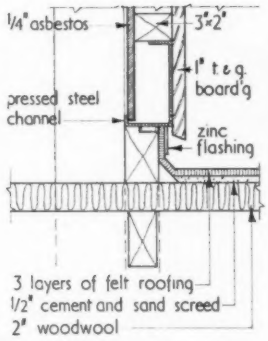




West elevation to workshop [Scale: $\frac{1}{32}$" = 1' 0"]

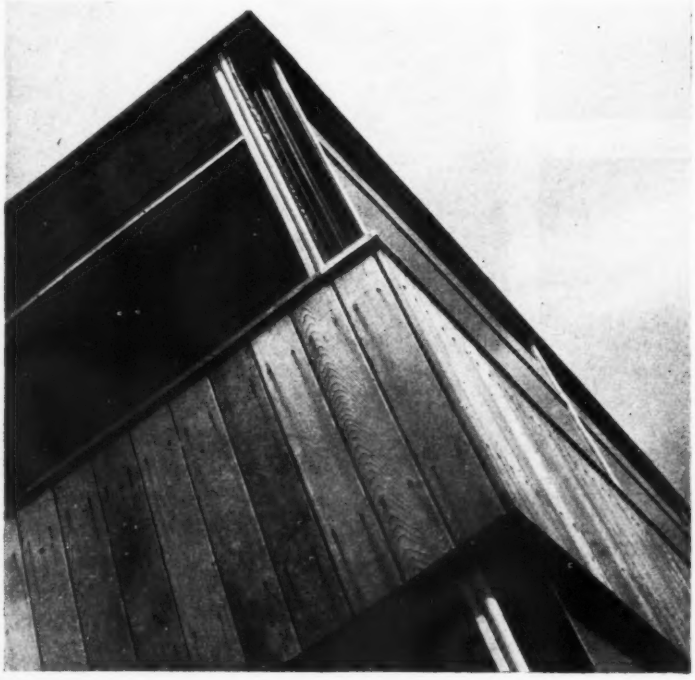


Detail section at S [Scale: 1" = 1' 0"



Detail section at M [Scale: 1" = 1' 0"]

Viewpoint 5 (opposite page, top): workshop (right) washing bay (centre) and stores and showroom (left). The parking space is for cars awaiting servicing. Viewpoint 6 (opposite, bottom left): the boiler chimney, seen from the roof of the lubrication block, showing workshop clerestory and wood cladding. Note that the roof is laid without fall, using internal downpipes. Viewpoint 7 (opposite, bottom right): This picture shows the concertina doors to the workshop, and the protecting bollards. Note the projecting wood-clad wall to the scrap metal store. Viewpoint 8 (below): a detail of the junction of timber cladding between the main and the clerestory windows of workshop.



analysis

External walls and facings
Casement walling around building generally. Glazed galvanized steel casement panels, painted. Complete structural and casement walling system combined with traditional materials.
Surround of boiler house, Dorking blue-black facings.
Office lavatories, stores, workshop (clerestory level strip), timber cladding of natural Western red cedar.

$$\text{Ratio: } \frac{\text{solid wall;}}{\text{floor area}} = \text{garage: } \frac{0{\cdot}199;}{1} \quad \text{the rest: } \frac{0{\cdot}1925}{1}$$

Frame or load bearing element
5-in. × 5-in. stanchions generally of galvanized steel, except for stanchions in workshop, which are 8-in. × 5-in. steel lattice beams: 6 ft. 8 in., 20 ft., 23 ft. 4 in., 46 ft. 8 in. Column grid, 13 ft. 4 in. generally.

Upper floor construction
Suspended r.c. floors on load-bearing brickwork for office lavatories and workshop lavatories. Reinforced concrete, finished black tiles in office toilets, granolithic in workshop lavatories.

Staircases
Two flights in office and workshop in reinforced concrete, finished black tiles for office, granolithic in workshop toilets. 2 ft. f. to f. for office. 8 ft. 6 in. f. to f. for workshop.
Number of staircases, 3. Width, 3 ft. Total rise, 2 ft. and 8 ft. 6 in.

Roof construction
3-in. wood-wool slabs between pressed metal purlins throughout building. Three layers of bituminous felt: top layer mineralized on ½-in. screed. Roof is flat, area, 220 sq. ft. No roof lights.

Windows
Steel, 3-ft. 4-in. casement panels and purpose-made showroom windows. Galvanized and painted.

$$\text{Ratio: } \frac{\text{window area}}{\text{floor area}} = \frac{0{\cdot}00463}{1} \text{ for garage: } \frac{0{\cdot}2336}{1} \text{ for rest}$$

External doors
Part of prefabricated system except for doors to stores and workshop. Stores are timber framed and faced with natural Western Red cedar. Workshop, pressed metal shutter door, painted.

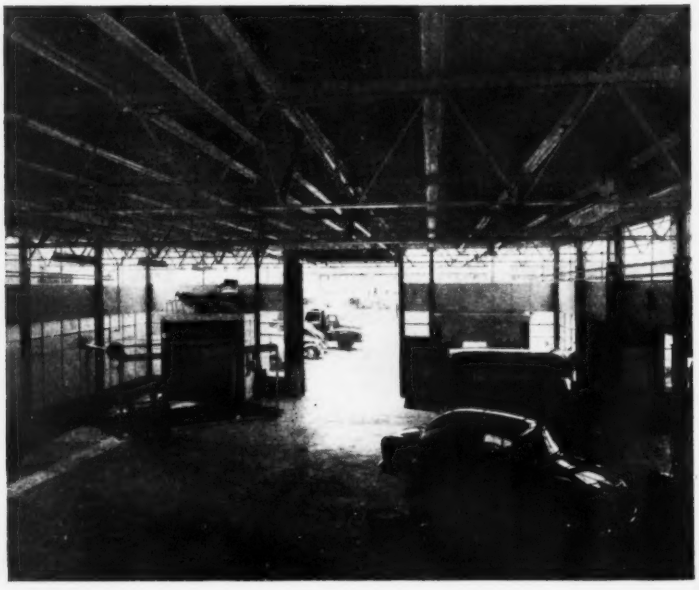
$$\text{Ratio: } \frac{\text{external door area}}{\text{floor area}} = \frac{0{\cdot}0352}{1}$$

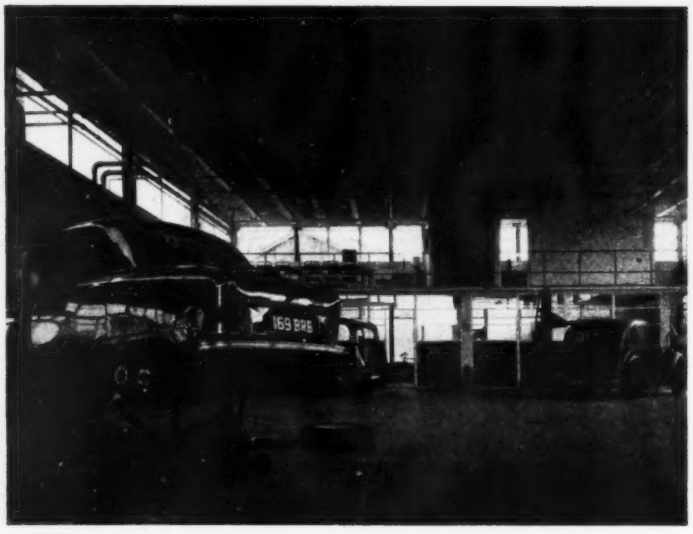
Glazing
Casement walling throughout building, 32 oz. integral with casement walling system; pressed metal windows for showroom in ¼-in. polished plate.

PARTITIONING

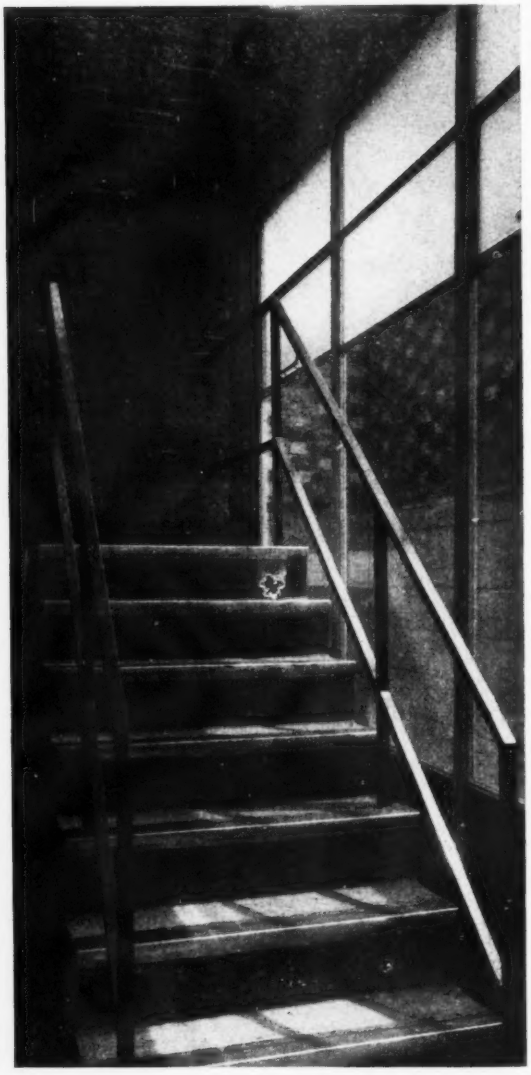
Internal partitions
Brickwork throughout building.
4½-in. brickwork finished plaster in offices. One brick, 621 sq. ft.
3-in. brickwork finished tiles in lavatories. Half brick, 1,683 sq. ft. in garage; 1,170 sq. ft. for rest.
9-in. brickwork fairfaced or painted elsewhere. 3-in. 81 sq. ft. in garage; 72 sq. ft. for rest.

building illustrated





Top left: the showroom's width is only 20 ft., but this permits cars to be pushed into any position without others being removed from the showrooms. T & G boarding fixed to 4½-in. panel walls conceals the structural frame and extends to the exterior. The acoustic tile ceiling is in pastel colour, the black quarry tiles are treated with synthetic resin. Natural wood and fairface brick provide a quiet background to the bright colours of the cars. Centre left: interior of the workshop, looking towards the entrance. Note the roof construction and the exposed woodwool decking for sound absorption and the continuous clerestory windows for even, general day lighting. A movable hoist is used to maintain flexibility of the floor throughout. Bottom left: interior of workshop, looking towards gallery, showing workers' canteen and lavatories. The small workshops are below.



A detail of the staircase. In situ concrete with non-slip nosings and square sections M.S. handrail all welded giving extremely strong and rigid balustrade. Note the simple detailing at the junction of the fairface brick, the steel column and the curtain walling. The retaining wall to the adjoining property can be seen in the rear.

analysis

Screens
Transparent screen placed between washing and greasing bays to prevent water splashing into adjoining greasing bay. Aluminium and georgian wired plate glass.

W.c. doors and partitions
Flush doors to office toilets, painted hardboard.
Tiled partitions in 4½- and 3-in. brickwork for workshop toilets.

Internal doors
Flush doors throughout building, faced plywood and painted.
No. of single doors: 19
No. of double doors: 1

Ironmongery to internal doors
Aluminium with satin chrome finish, lever handles, bolts, fixed handles and push plates, on all internal doors.

FINISHINGS

Floor finishes
In showroom, office toilets and sales area, black quarry type tiles oiled and polished.
Workshop area and stores, cement finished granolithic.
Offices, polished linoleum tiles.
Cost per sq. yd. of each type

s.	d.		Area
12	2½	granolithic	915 sq. yds.
8	6	oil-proof cement	18 sq. yds.
41	0	lino tiles	61 sq. yds.
47	5	quarry tiles	227 sq. yds.

Wall finishes
Showroom boarded in Western Red cedar, painted clear plastic.
Toilets and greasing bays finished ceramic tiles, eggshell.
Stores and workshop, flettons, painted fairfaced.
Offices, painted plaster.

Ceiling finishes
Showroom, office and sales floor, false ceiling, painted.
Workshop and stores, wood wool, spray painted.

Decorations
Showroom, natural timber, clear plastic.
Structure throughout, end walls, fairfaced and plastered.
Painted surfaces, gloss on structural elements and doors, emulsion elsewhere.

Fittings
Aluminium pegs and towel rails in office and workshop lavatories, with satin chrome finish.

SERVICES

Plumbing
Short length of exposed LCC type drain on east retaining wall. Cast iron not treated. L.A. requirements.

Rain water disposal
Internally through 5-in. × 5-in. stanchions to back inlet gullies, located in occasional perimeter columns. Of mild steel, galvanized.

Plumbing, internal
Waste disposal to L.A. main drain.
Copper where exposed, lead elsewhere.

Cold water installation
Rising main to storage tanks on roof over workshop lavatories.
Galvanized m.s. copper where exposed, lead elsewhere.
Tank capacity, 200 gals.

Sanitary fittings
W.c.'s and basins in glazed fireclay
4 w.c.'s, 6 basins, 2 sinks.

Heating installation
Low-pressure h.w. to radiators and convectors.
Convector cabinets in showroom, sheet metal; radiators elsewhere, painted cast iron. " U " valves.
Cost includes hot water installation.

Boiler type and capacity
839,000 b.t.u.s' in boiler room. Standard temperatures between 120°-180°. 2 air changes.

Ventilation system
Natural cross ventilation: Heat load and fuel type, 200 secs. fuel oil, 700,000 b.t.u.'s. Stoking method, automatic oil firing.

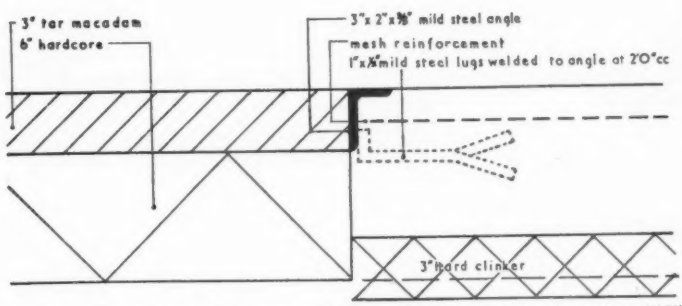
Hot water installation
Indirect through calorifier located in office lavatories.

Drainage: type of system
One pipe system conforming to L.A. requirements. Main drainage runs via forecourt area and boundary retaining walls.
LCC cast iron. Petrol interceptor between garage drainage system and main drains.

Drain types
LCC type with petrol interceptor and silt gulleys.

Electrical installation
Source and fitting type, fluorescent troughs throughout building. Installation and fittings by clients' electrical engineers. 3-phase power supply type. Switchgear compartment adjoining boiler house.

Paved areas
1. Between boundary retaining wall at rear of buildings, behind offices and stores, precast concrete slabs.
2. Forecourt and parking spaces, 3-in. tarmacadam.



Detail section, junction of concrete and tarmacadam in forecourt [Scale: 1½" = 1" 0"

FIRE PRECAUTIONS

Structural: asbestos wallboards to solid panels in workshop at clerestory level. Hand extinguishers at points approved by Fire Authority.
Planning: normal single storey building's requirements. Glazed casement walls and numerous large door openings provide access for fire fighting and means of escape.

analysis

REFUSE DISPOSAL

L. A. services deal with light engineering workshop waste. There is a special collection service for waste oil.

TIME SCHEDULE

Drawings: 16 weeks. Work completed: 23.2.57.
Forecourt contract: The petrol pump islands and forecourt were designed and built as a separate contract ahead of building the rest of the garage block. Commenced, 21.1.55.
Garage buildings: The main building contract was divided in two:
1. Floor slab and structure commencing 7.11.55.
2. Finishings and decorations, commencing 23.7.56.

COST ANALYSIS

Element	*Garage*	*Show-room and offices*	*Garage show-room and offices*	*Main specialist sub-contractor*
Areas on which costs per sq. ft. are based	8,235	2,675	10,910	10,910
	s. d.	s. d.	s. d.	s. d.
Preliminaries and insurances			4 0	
Contingencies			2 6¾	
Work below ground floor level			5 2½	
External walls	1 10½	1 6¾		7 3¼
Frame				10 7
Upper floor	9¾	5		
Staircase	2¼	2		
Roof	3¼			3 9½
Windows	1½	2 8		
External doors	8¼			
Glazing	1	3 2¼		1 7½
Internal partitions	1 1	1 3¾		
Screens	2½			
Internal doors	3	1 2½		
Ironmongery	1	3		
Floor finishes	1 4½	4 11½		
Wall finishes	1 0¼	3 5		
Ceiling finishes	¼	2 1½		
Decorations	3 2½	3 7¾		
Fittings	1¼	2		
External plumbing	1½			
Rain water disposal	2			
Internal plumbing			4¾	
Cold water installation			5½	
Sanitary fittings			3½	
Heating and ventilation			7 0	
Drains			2 4½	
Electrical installation			3 5¼	
Boundary walls			1 7¼	
Outside paving			3 10	
	11 8¼	25 1	31 2	23 3¼

$$\frac{\text{11s. } 8\tfrac{1}{4}\text{d.} \times 8{,}235 + \text{25s. 1d.} \times 2{,}675}{10{,}910 \text{ sq. ft.}} = \begin{matrix} \text{14s. } 11\tfrac{3}{4}\text{d.} \\ \text{31s. 2d.} \\ \text{23s. } 3\tfrac{1}{4}\text{d.} \end{matrix}$$

$$\text{Total cost per sq. ft. floor area (excl. forecourt contract)} = \frac{£37.866\ 5\text{s. 11d.}}{10{,}910} = 69\text{s. 5d.}$$

Forecourt contract	£	s	d
1. General oversite excavation	766	6	3
2. Excavation for petrol tanks and concrete tank pit	1,464	19	10
3. Excavation for petrol interceptor	228	11	8
4. Hardcore and tarmacadam	1,056	16	2
5. Concrete apron	625	12	7
6. Pump islands	332	0	5
7. Fixing of kiosks	59	2	0
8. Pipe lines and vents	47	12	0
9. Drainage	993	14	5
10. Sundries, including trial holes, bollards, kerbs, water connection, and supply, signposts	231	19	1
Travelling time and expenses	100	0	0
Insurance	308	2	8
Preliminaries	395	0	0
Increases	50	13	2
TOTAL	6,660	10	3
Agreed reduction of £56 10s 1d	56	10	1
	£6,604	0	2

COST SUMMARY

TOTAL GROUND FLOOR AREA: 10,095 sq. ft.
Total floor area (excluding basement) 10,910 sq. ft.
Price of work above q.f. level £26,420.
Price of foundations and basement £7,453
Price of external works, £2,083.
Gross total price, £35,956.
Price per sq. ft. of floor area (inc. basement), £3 5s. 11d.
Prices based on tender.
Tender date, Sept. 1955 and April 1956.

SITE ORGANIZATION

Site labour and equipment: the job was supervised by the general foreman with assistance of sub-trades foremen and visiting plumbers and decorators' foremen, all under head office control.
A power shovel was used for skimming the site and loading surplus on to lorries. Paint sprays were used for decorating.
Sub-letting: excavation, owing to mechanical equipment being near the site. Glazing and wall tiling.
Job management: a programme and progress chart were agreed with the architects at the commencement and renewed during progress.
Weekly visits to the job by the supervising surveyor and periodic visits by Directors.

CONTRACTORS

General contractors: Hall, Beddall & Co. Ltd. *Sub-contractors—Steelwork:* Hills (West Bromwich) Ltd. *Forecourt and roofing:* Val de Travers Asphalte Paving Co. Ltd. *Tiles:* Cope & Co. Ltd. *Site excavation and concreting:* John Clarke. *Entrance gates:* Bolton Gate Co. Ltd. *Petrol pumps and lifts:* Avery-Hardoll Ltd. *Boiler and central heating:* Heating and General Engineering Co. *Neon lights:* E. K. Cole & Co. Ltd. *Greasing and washing equipment:* Tecalemit Ltd. *Casements:* Haywards Ltd. *Granolithic flooring:* Malcolm Macleod & Co. Ltd. *Paint:* International Paints Ltd. *Furniture:* Hille of London Ltd. *Electric wiring:* Kennings Estates Ltd.

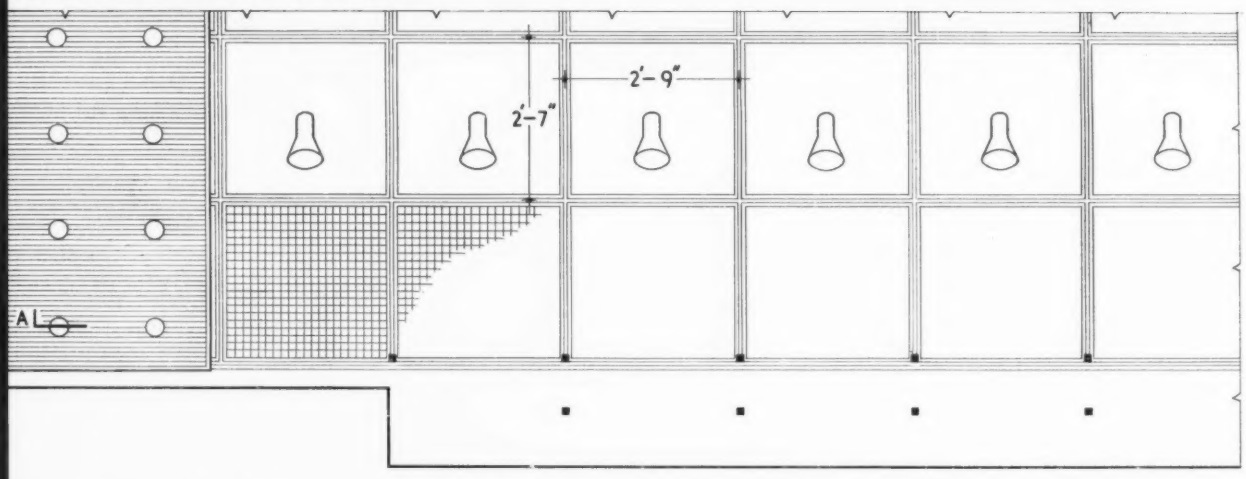
SUSPENDED CEILING: SHOWROOMS IN LONDON, W.1

Howard V. Lobb and Partners, architects

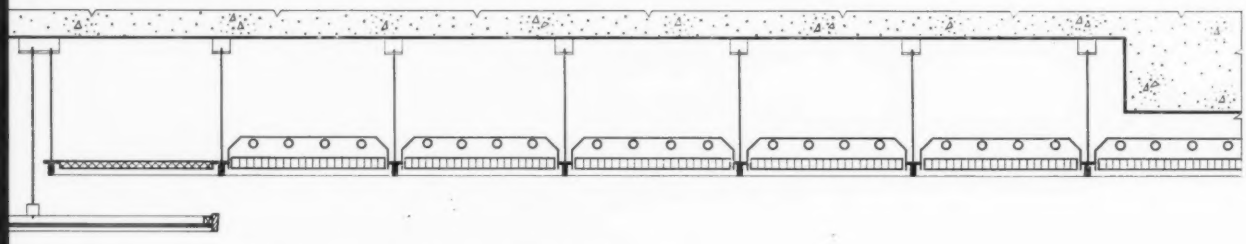
The use of a relatively substantial grid of upright T section enables the ceiling to serve as a support for temporary display panels. The uprights for these panels which are of 1 in. sq. steel tubing are notched at the head to fit over the leg of the T section and can be tightened against this section by means of adjustable feet. The leg of the aluminium T section in the ceiling has a satin brass finish and the underside of the flange is painted black.

SUSPENDED CEILING: SHOWROOMS IN LONDON, W.1

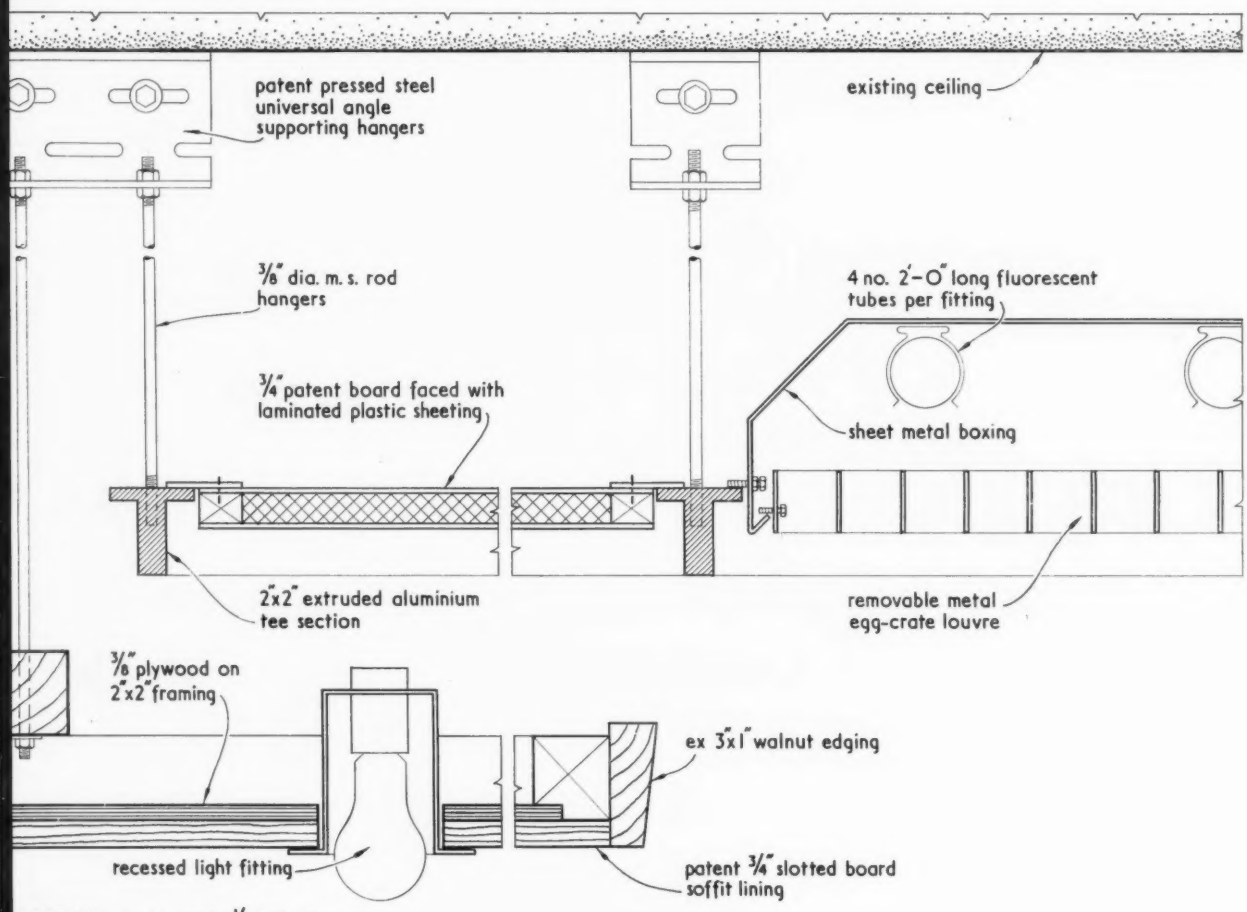
Howard V. Lobb and Partners, architects



PLAN OF CEILING FROM BELOW. scale 3/8" = 1'-0"



CROSS SECTION OF SUSPENDED CEILING. scale 3/8" = 1'-0"



SECTION A-A. scale 1/4 full size

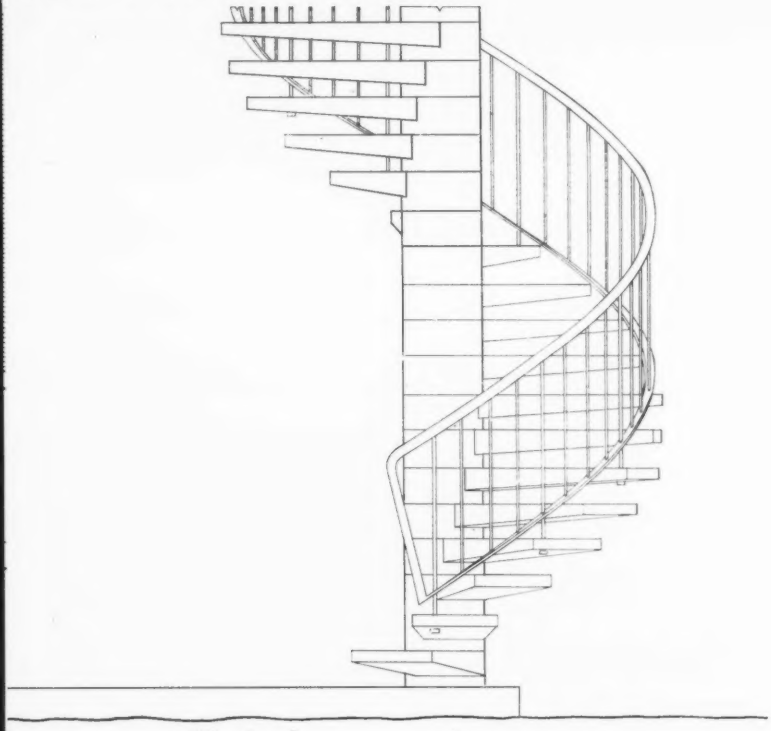
SPIRAL STAIRCASE: OFFICES IN SUNDERLAND

S. W. Milburn and Partners, architects

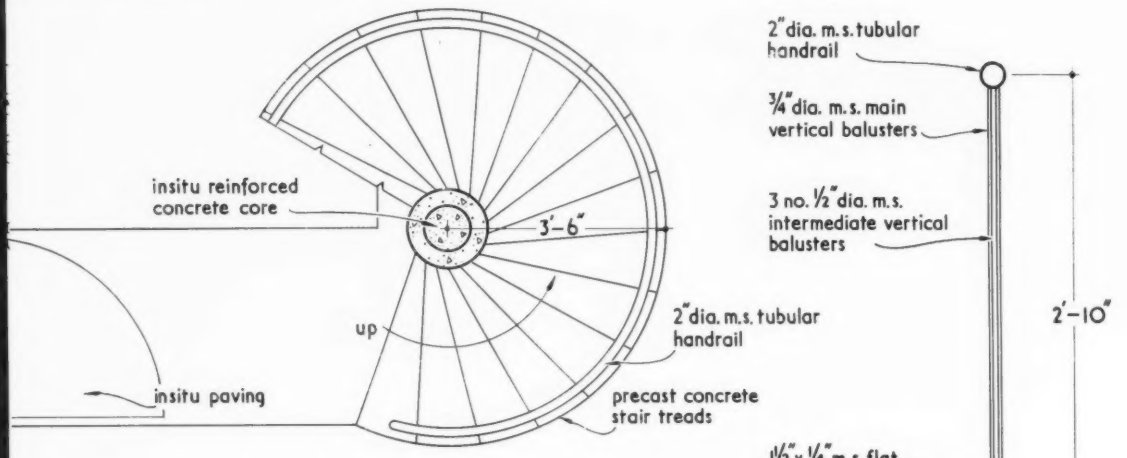
This special stair with precast concrete treads is similar in principle to the Danish example illustrated on April 11, 1957. *Being multi-storied, however, and having no risers to give additional stiffness, it requires a more substantial newel. It is to be noticed that the steps themselves are not radial but are "dancing," to give a greater width at the newel side and that the newel is cast into the* in-situ *landing at each floor level.*

SPIRAL STAIRCASE: OFFICES IN SUNDERLAND

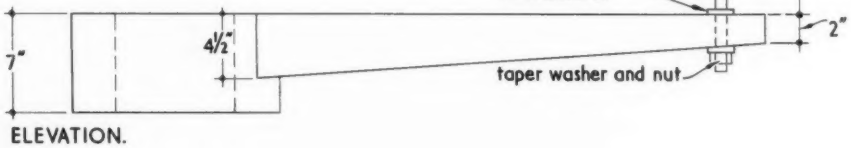
S. W. Milburn and Partners, architects



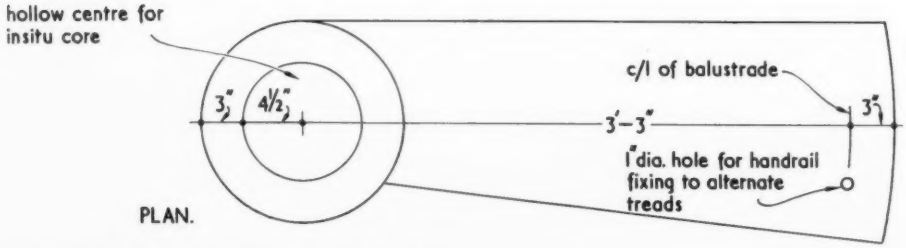
ELEVATION. scale 3/8" = 1'-0"



PLAN OF STAIRCASE. scale 3/8" = 1'-0"

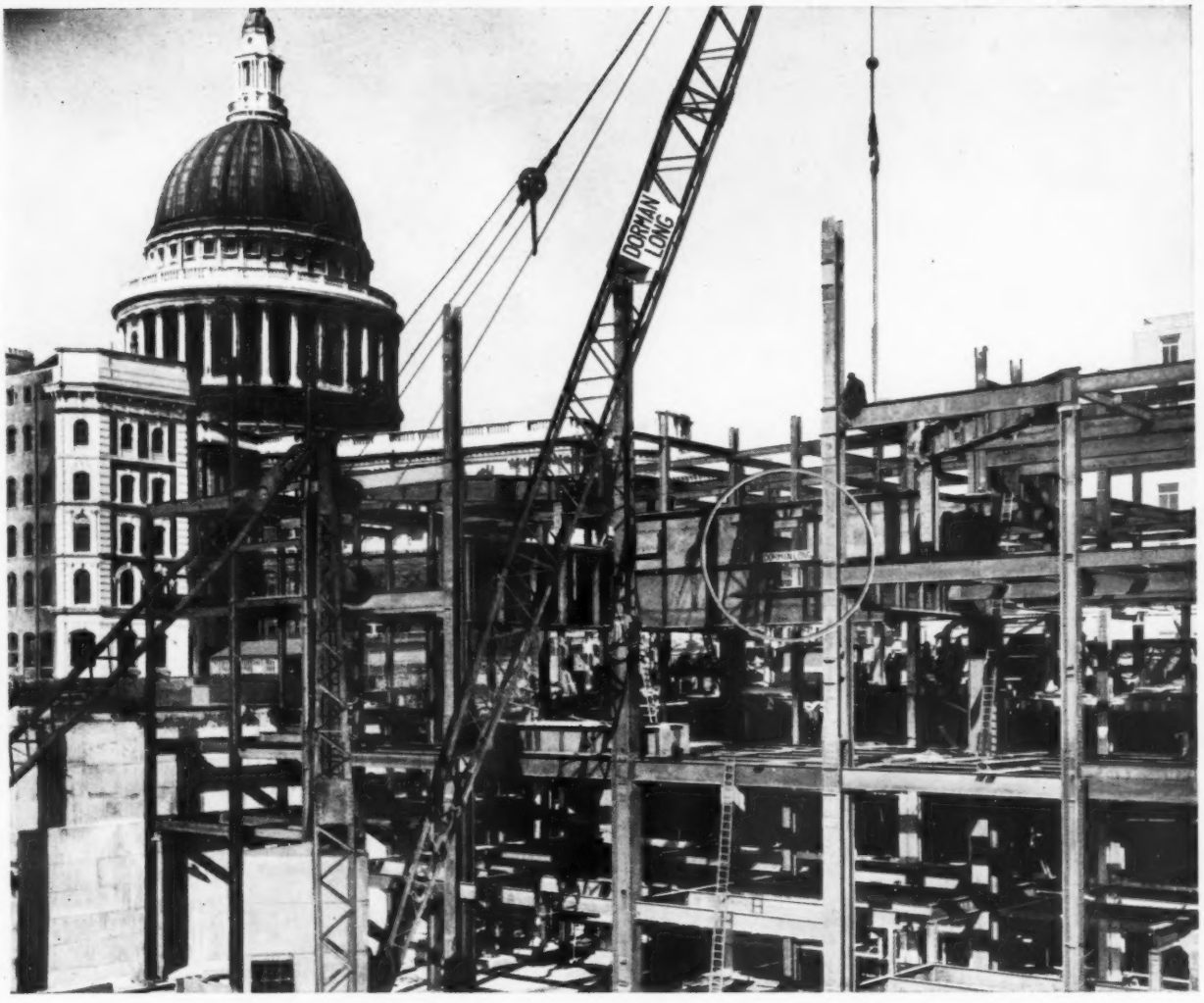


ELEVATION.



PLAN.

DETAIL OF PRECAST CONCRETE TREAD. scale 1" = 1'-0"



NEW BUILDING FOR THE 'FINANCIAL TIMES'

This important new building in the City of London is being built upon a steel frame fabricated and erected by Dorman Long.

An interesting feature of the steelwork is the use of wide-span girders carrying heavy loads.

One of these girders is 45-ft. span and 12-ft. 6-ins. deep, carrying a load of 1000 tons. This girder weighs 23 tons and has a passage-way through it (visible within the circle).

Another girder, 47-ft. span and 8-ft. 6-ins. deep, carries 1180 tons and weighs 29 tons. The total weight of steelwork is 3100 tons.

Architects: Messrs. Richardson and Houfe, P.P.R.A., F F.R.I.B.A.
Consulting Engineer: W. A. Mitchell Esq., M.I.S.E., M.I.W.
General Contractors: F. G. Minter Ltd.

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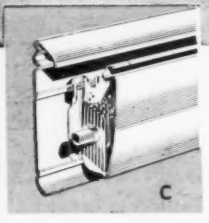
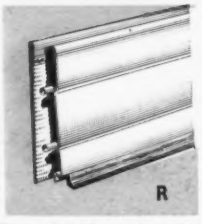
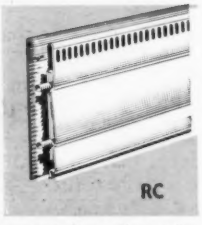
New! *the heating system you've always wanted* —low—unobtrusive

THERE ARE THREE TYPES OF WALLSTRIP







Type C—Recommended for most domestic applications, providing mainly convected heat.

Type R—Institutional model of heavy construction, but shallower from wall to front than Type C, providing mainly radiant heat. Smooth surfaces, free of dust-traps, especially suitable for hospitals and other places where hygiene and cleanliness are vital.

Type RC—Again, an institutional model of heavy construction, similar to Type R but providing a combination of radiant and convected heat.

Copperad WALLSTRIP is a skirting-board: a skirting-board that heats. Which means that it places the heat where it is most needed—all along the outside walls at the normal source of loss.

It also means that windows can reach to within 12" of the floorline.

WALLSTRIP allows you the maximum freedom in aesthetic design. No ungainly, heavy equipment is involved. There is nothing to detract from its flowing lines.

For a new building—home, office, school, hall, hospital or institution—WALLSTRIP costs no more than conventional central heating. The cost of skirting-board is, of course, eliminated. Moreover, no special equipment is required; it can be installed with the ordinary tools of a heating engineer.

If you require further information about WALLSTRIP, we shall be happy to advise you.

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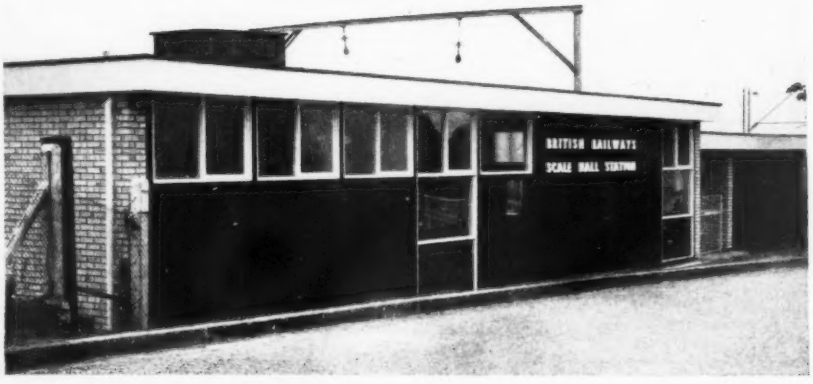
TWO NEW STATIONS FOR BRITISH RAILWAYS



Two new stations designed by the department of the Chief Civil Engineer (J. Taylor Thompson), British Railways, London Midland Region, have recently been opened. The Mumps Station at Oldham (left), comprises new entrance buildings, which accommodate an enquiry office, booking hall, parcels and clerks' offices and messing facilities. The building has a reinforced-concrete frame with brick infilling and a canopy across its entire width. There are circular glass dome roof lights and the ticket offices are fitted with patent double-glazed louvred windows, which prevent the passage of air-borne germs without interfering with sound waves. The station at Scale Hall (left), which is the first entirely new station to be built in this region since the war, is situated on the Lancaster-Morecambe-Heysham electric line. A total of 46,282 passengers used the station during the first 7½ weeks following its opening.

FURNITURE SHOWROOM IN BIRMINGHAM

Hille Ltd. have opened a showroom at 24 Albert Street, Birmingham. The interior decor was by Robin Day.

Announcements

TRADE

The Universal Asbestos Manufacturing Co. Ltd. of Watford announce that they have increased the prices of their asbestos cement products by a general average of 7½ per cent. The change has no bearing on export prices.

Thermocoust Ltd. announce that in response to inquiries from contractors tendering for fixed price contracts they have decided to adopt the following policy. Where they have the architects' assurance that the main contract is to be on a fixed price basis they are prepared to hold their prices firm for a period of nine months providing they receive (*a*) the official order from the contractors within three months, and (*b*) they are permitted to complete delivery within nine months, from the date of their quotation.

Holloway Brothers (London) Ltd., building and civil engineering contractors, announce that P. W. E. Holloway has been appointed managing director.

Conex-Terna Ltd. are holding a series of demonstrations in the southern counties throughout September and the beginning of October. The demonstrations will take place in the following towns: Guildford, Reading, Brighton, Worthing, and Southsea, and will consist of a demonstration of the Conex-Terna pump and a lecture by one of their technicians. Further information may be obtained from: Edward Hilton Advertising Ltd., of Pershore Buildings, 63, Pershore Street, Birmingham, 5.

Draught-Stoppers
Hotels
Advertising

August Architectural Review

The year-round English draught makes *Weather-stripping* a subject of perennial interest and in the August issue of the Review, Peter Whiteley will make a study of the products available for remedial work on both doors and windows, as well as the kind of preventive design that is better than even the best of cures. Two hotels of outstanding interest will be described and illustrated; the *Malmen*, by Wallander and Varhelyi in Stockholm, and Louis Erdi's *Coachotel*. A creative and broadminded approach to a vexed question, outdoor publicity, will be outlined in the new proposals for *Advertising in Stevenage*, and the social and architectural problems of building new *Urban Nuclei* in rural areas will be considered in an article by Hilda Selem on recent re-settlements in Italy, and a study of Richard Llewelyn Davies' and John Weeks' rebuilding programme for *Rushbrooke*

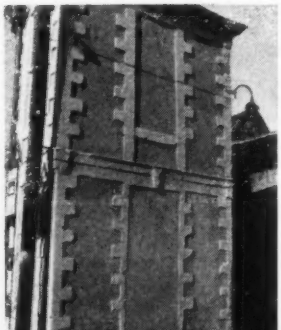
Model of a village at Rushbrooke, Suffolk, by R. Llewelyn Davies and John Weeks, to be illustrated with pilot houses.

in Suffolk. Historical features in this issue will cover the early romantic days at the Weimar *Bauhaus*, whose expressionist and religious fervours are recalled by Helmut von Erffa; a sheaf of notes on out-of-the-way aspects of Italian architecture, and a study of Bernardo Bellotto's four magnificent views of the mysterious *Wilanow Palace* outside Warsaw, now on view at the Whitechapel Gallery. In *Skill*, the *Interior* of the Month will be the new offices for the Orient Line, and in *Design Review*, John Blake will survey recent developments in wallpapers and furnishing fabrics.

Curtain Walls
Roman and Gothic
Shepton Mallet

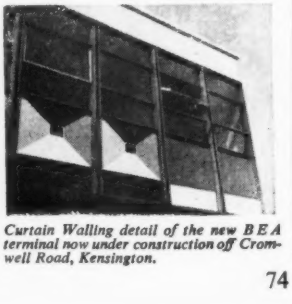
September Architectural Review

A major feature of the Review's *Machine Made America* issue, and rapidly becoming a dominant topic in discussions of the economics, technics and aesthetics of building today, *Curtain Walling* will bulk large in the September number of the Review. Michael Brawne will contribute a full scale study of the potentialities and perils, scope, materials and methods of this fully industrialised means of clothing buildings, while in *Skill* there will be a supplement on some of the products and systems that are available on the British Market. Also in *Skill* will be new Jaeger shop *Interiors* by Dennis Lennon, as well as *Design Review* and other regular departments. Aspects of the diversity of English nineteenth-century architecture are covered by Hugh Honour's account of the improbable *Roman Church at Everingham*, in Yorkshire, whose decorators were a suitably incongruous combination of Yorkshire and Rome, and a narrative of the building activities at *Strawberry Hill* of Frances Waldegrave, recounted from original sources by Osbert Wyndham Hewett, author of a recent full-dress biography of Lady Waldegrave. September *Townscape* features will deal with *Shepton Mallet*, whose multi-



House in the lower town Shepton Mallet

level town-centre will be discussed by Gordon Cullen, and *Hampstead Garden Suburb*, source of so much good and so much evil in English planning, whose status after a half-century of existence will be evaluated by Ian Nairn. And, as usual, the *Counter-Attack Bureau* will give the latest battle-bulletins on the continuing fight against Subtopian blight.



Curtain Walling detail of the new BEA terminal now under construction off Cromwell Road, Kensington.

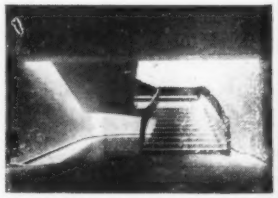
Universities
Staircase
Arcadia

October Architectural Review

Vexed by conflicting interests and lack of comprehension of the issues at stake, the design of *Universities* has become a problem that excites passion and prejudice, rather than constructive thinking. In the October number of the Review, Professor Pevsner and the Hon. Lionel Brett will attempt to put the problem back on a realistic basis in a special feature covering both the historical growth of *universities* and their present needs, emphasising the diversity of concepts, both in organization and architecture that the term embraces. Two articles in the same issue will deal with problems of architectural lettering; Nicolete Gray

3—D. shop lettering in Dublin.

contributing a study of *Lettering in Three Dimensions* and *Skill*, surveying the design of *Fascia Boards*. Also in *Skill* will be an illustrated description of Arne Rudberger's stunning staircase for the MEA department store in Stockholm, and other recent structures to be illustrated will include a small house by Sir Hugh Casson on the South Coast, and another well-designed adjunct to a department store—G. A. Jellicoe's roof garden on top of Harvey's at Guildford. Two historical features will deal with developments in the first quarter of the present century: Ian Nairn's delayed study of Hampstead Garden Suburb is now expanded into a larger study of



Staircase at the MEA store, Stockholm.

Arcadia as a place to dwell in, and Reyner Banham will investigate the implications of recent publications on the position of *Mondriaan* both as a pioneer of modern design, and as a model to be set up for emulation by architects in the future. Robert Melville's survey of art exhibitions will continue, and *Marginalia* will maintain its running commentary on world architecture.

Timber Connectors

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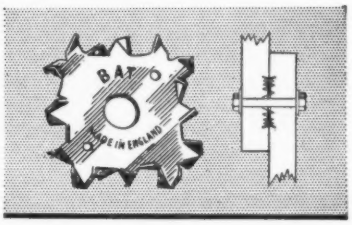

'Easyclean' Hinges

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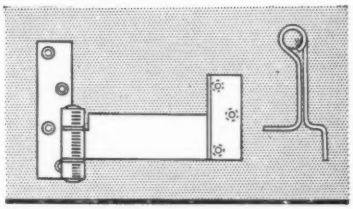

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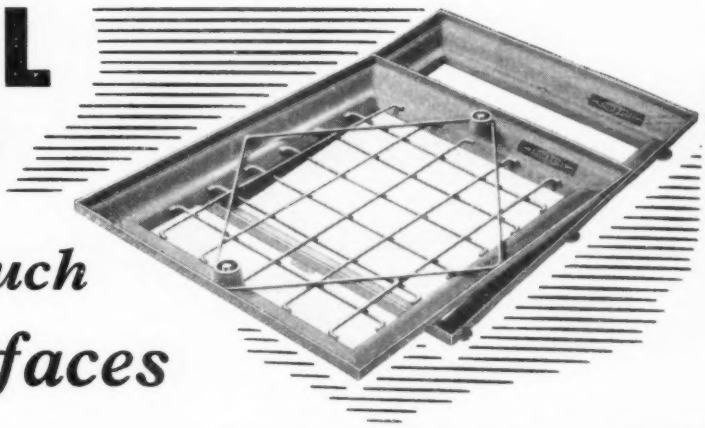

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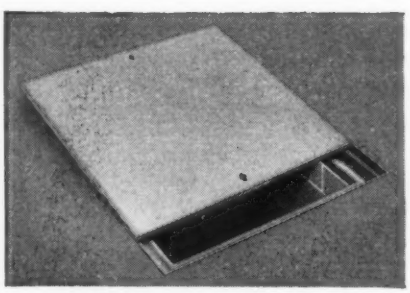
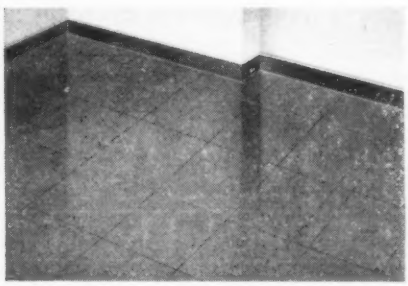
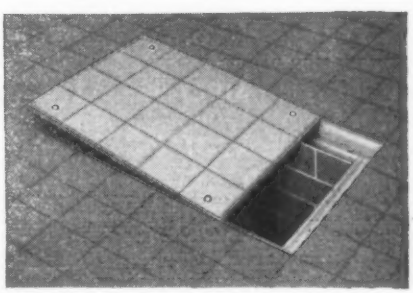




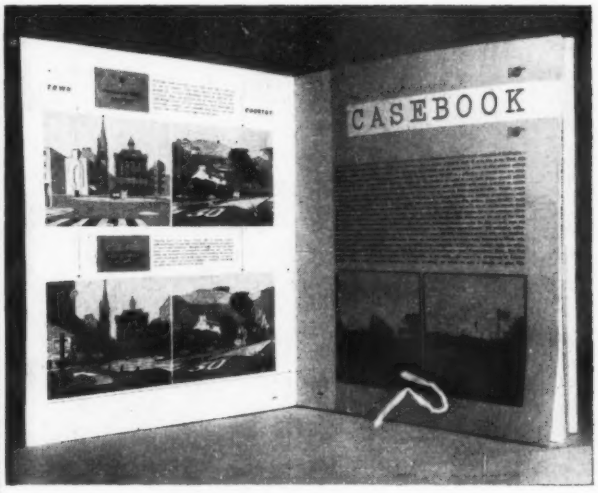


BROADS MANUFACTURING CO. LTD. 4, SOUTH WHARF, PADDINGTON, W.2. Tel: PADdington 7061 (20 lines)

COUNTER-ATTACK
against subtopia

BY IAN NAIRN

THIS BOOK, a reprint of the December 1956 Special Number of the *Architectural Review*, is the sequel to *Outrage*, the book which showed what we are doing to the face of Britain in the name of 'progress', 'amenity' and the 'national interest.' Its revelation of decaying towns, pockmarked countryside and anonymous suburbs shook the press to the extent of 1,100 column inches of special feature and review space, shattered the complacency of many, opened the eyes of many more; the word then coined to describe this squalid mess—subtopia—has become part of everyday speech.



The response to *Outrage* proved that there were plenty of people who recognised the mess and who were prepared to do something about it. What they lacked was ammunition: examples of the right way to do things; arguments to refute theories tossed about by the apostles of inertia to save themselves from the necessity of thinking; a common-sense vocabulary for things which are either dismissed as intangible or served up in woolly abstractions. This book provides all these; it is not a set of pious resolutions but a true counter-attack. If your worry is tree lopping, look at page 381; if badly designed lamp-posts, turn to the designs on page 393; if your housing estate looks like a desert, the reasons are given on page 409; if you want to know why planning doesn't stop subtopia, and how it could be reformed, see page 431. There are forty pages of photographs showing well-designed and well sited examples of every kind of object; at the beginning there is a simple four-point common-sense sequence for sane design which can be applied straight away to see what is wrong with any street—the one outside your window, for instance, or the one which contains your office or your pub. This sequence isn't high-flown or obscure; it can be understood in half an hour, and it is described on pages 355-360.

Here is the ammunition: will you finish the job?

Size 12¾ *in. by* 10 *in.* 84 *pages with over* 350 *illustrations in line and halftone.* 12*s.* 6*d. net, postage* 1*s.* 3*d.*

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CLASSIFIED ADVERTISEMENTS

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

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

Public and Official Announcements

30s. per inch; each additional line, 2s. 6d.

NEW ZEALAND MINISTRY OF WORKS
PROFESSIONAL AND TECHNICAL STAFF

The Ministry of Works, New Zealand, invites applications for the following vacancies on the Permanent Staff. Positions, qualifications desired and commencing salaries are as follows:

ARCHITECTURAL DIVISION

9. ARCHITECTS Corporate Membership of the Royal Institute of British Architects.
Commencing salaries from £895 to £1,465 per annum in accordance with experience.

10. ARCHITECTURAL DRAUGHTSMEN General Certificate of Education or Ordinary or Higher National Certificate (Building) plus five years' draughting experience.
Commencing salaries up to £1,225 per annum in accordance with qualifications and experience.

Enquiries mentioning this paper and quoting reference No. 3/74/133, also stating the type and number of position sought, should be addressed to the High Commissioner for New Zealand, 415 Strand, London, W.C.2. Full details of duties, experience desired, and general information on the conditions of employment in the New Zealand Public Service, together with application forms will then be furnished. 7110

BRACKNELL DEVELOPMENT CORPORATION. Applications are invited for the post of ARCHITECTURAL ASSISTANT, Grade A.P.T. III, salary £656—£784.

Superannuation schemes, Medical examination, housing available in due course. Apply by 11th September, 1957, giving age, education and qualifications, experience and appointments held (with dates and salaries), and names of two referees to General Manager (A.A.), Bracknell Development Corporation, Farley Hall, Bracknell, Berks. 7307

ANGLESEY COUNTY COUNCIL
NEW FIRE HEADQUARTERS, CLINIC AND AMBULANCE STATION, LLANGEFNI

Contractors wishing to submit a tender based on Bills of Quantities for the erection of the above building should forward their names with a deposit of £2 2s. to the County Architect, Shire Hall, Llangefni, Anglesey, on or before 2nd September, 1957.

Cheques are to be made payable to the Anglesey County Council and crossed "Midland Bank Limited."

Tenders must be forwarded in the endorsed envelope provided to reach the undersigned by 9 a.m. on Wednesday, 25th September, 1957.

The Council does not bind itself to accept the lowest or any tender nor will allowance be made for any tenders.

WILLIAM JONES,
Clerk of the County Council.

Shire Hall,
Llangefni,
Anglesey. 7272

COUNTY BOROUGH OF SOUTH SHIELDS

Applications are invited for the following appointments in the Borough Engineer's Department

THREE SENIOR ARCHITECTURAL ASSISTANTS on Grade IV to V (£727 15s.—£994 5s.). The persons appointed will be placed in these Grades according to qualifications and experience.

Vacancies also exist on the Special Grade (£707 5s.—£861) for Qualified Architectural Assistants who desire to obtain practical experience in the profession.

The Council would be prepared to assist with housing accommodation, if required.

Application Forms obtainable from the Borough Engineer, Town Hall, South Shields, should be returned to him not later than Monday, 9th September, 1957.

R. S. YOUNG,
Town Clerk.

Town Hall,
South Shields.
6th August, 1957. 7250

WOKING URBAN DISTRICT COUNCIL
JUNIOR ARCHITECTURAL ASSISTANT
A.P.T. Grade I

Applications are invited for this appointment in the architectural section of the Engineer & Surveyor's Department at a salary in accordance with A.P.T. Grade I (£545 × £20—£625). Applicants should be approaching the Intermediate Examination Standard of the R.I.B.A.

The appointment is subject to the National Scheme of Conditions of Service and the provisions of the Local Government Superannuation Acts and the passing of a medical examination.

Forms of application to be obtained from and returned to Mr. H. P. Tame, A.M.I.C.E., M.T.P.I., Registered Architect, Engineer & Surveyor, Council Offices, Woking, not later than Monday, 2nd September, 1957.

M. SHAWCROSS,
Clerk of the Council.

Council Offices,
Woking.
13th August, 1957. 7271

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

Vacancies exist for a number of Assistants as above, minimum qualification Intermediate examination of the appropriate professional body. Salary scale £595—£1,180 with placing according to age, experience and qualifications.

Form of application may be obtained from the Principal Administrative Officer, 20 Trongate, Glasgow, C.1

A. G. JURY,
City Architect and Planning Officer.
7141

COUNTY BOROUGH OF DERBY
BOROUGH ARCHITECT'S DEPARTMENT

(1) ARCHITECTURAL STAFF
(*a*) A.P.T. Grade III, £656—£784 per annum.
(*b*) A.P.T. Grade II, £609—£691 per annum.
(*c*) A.P.T. Grade I, £543—£625 per annum.
(*d*) Higher General Division, £184—£512 per annum.

(2) QUANTITY SURVEYING STAFF
(*e*) A.P.T. Grade IV/V, £727—£994 per annum.
(*f*) A.P.T. Grade III, £656—£784 per annum.
(*g*) A.P.T. Grade II, £609—£691 per annum.
(*h*) A.P.T. Grade I, £543—£625 per annum.
(*i*) Higher General Division, £184—£512 per annum.

Commencing salary according to qualifications and experience. Permanent superannuable appointments, subject to one month's notice and to medical examination.

National Conditions of Service.

Applicants must state for which post they are applying.

Application forms obtainable from and to be returned to the Borough Architect, The Council House, Corporation Street, Derby, not later than Monday, 16th September, 1957.

G. H. EMLYN JONES,
Town Clerk.
20th August, 1957. 7347

CORBY DEVELOPMENT CORPORATION
APPOINTMENT OF CHIEF ARCHITECT
Salary range £1,800—£2,300

Applications are invited for the above appointment with the Corporation. The construction work is at a most interesting stage of development and many projects remain to be designed. The establishment of the Chief Architect's department is approximately 40, including outside staff, and the work should continue strongly for the next three to five years.

Applicants should be well qualified and experienced in housing and commercial work. A town planning qualification would be an advantage.

The post is superannuable and housing is available. The work of the Corporation is organised under the general direction of the General Manager to whom applications should be addressed, giving particulars of qualifications, present and past appointments, and experience, salaries, and the names of two referees, on or before the 16th September.

R. F. BROOKS GRUNDY,
General Manager.

Spencer House,
Corporation Street,
Corby, Northants. 7277

COUNTY BOROUGH OF GLOUCESTER
CITY ARCHITECT'S DEPARTMENT

Applications are invited from persons having suitable qualifications and experience for the appointment of ASSISTANT ARCHITECT. Special Grade—£707 5s. to £861 per annum.

Superannuable post. Medical examination. Municipal experience not essential.

Applications, stating age, married or single, training, qualifications, previous and present appointments, with copies of testimonials, or names of referees, to the City Architect, Suffolk House, Gloucester, not later than September 14, 1957. 7362

INSTALLATION OF OIL-FIRED BOILERS AT THE MUNICIPAL BATHS, EAST STREET, EPSOM

The Corporation invite tenders for the installation of three Potterton oil-fired boilers of 875,000 B.T.U's per hour capacity, and all necessary ancillary equipment to replace three solid fuel boilers at the above.

The Conditions of Contract and the drawings can be inspected at, and copies of the specification and form of tender obtained from the office of Mr. Colin Cobbett, A.M.I.C.E., M.I.Mun.E., Borough Engineer and Surveyor, Town Hall, Epsom, during working hours, upon payment of a deposit of £2 2s. 0d. Deposits will be returned to Contractors submitting bona fide tenders not subsequently withdrawn.

Tenders must be delivered to me at the address mentioned below not later than 12 noon on Monday, 9th September, and no tender will be received and considered unless it is enclosed in a plain sealed envelope endorsed "Tender for Oil-fired boilers at the Public Baths." This envelope must not bear any mark or name indicating the sender.

The Corporation do not bind themselves to accept the lowest or any tender.

EDWARD MOORE,
Town Clerk.

Town Hall,
The Parade,
Epsom.
August, 1957. 7328

AIR MINISTRY Works Designs Branch require in London and Provinces ARCHITECTURAL ASSISTANTS experienced in planning/preparation of working drawings and details for permanent and semi-permanent buildings. Salaries in London up to £1,015 per annum for men and £932 for women. Somewhat lower in Provinces. Starting pay dependent on age, qualifications and experience. Long term possibilities with promotion and pensionable prospects. 5-day week, 3 weeks 3 days leave a year. Liability for overseas service. Normally natural born British subjects. Write stating age, qualifications, employment details including type of work done, to any Employment Exchange quoting Order No. Borough 600. 7187

CITY OF LEEDS
CITY ARCHITECT'S DEPARTMENT

Applications are invited for the following appointments:—

1. Assistant Architects, APT. V, £814 17s. 6d. to £994 5s.
2. Assistant Architects, APT. IV, £727 15s. to £907 2s. 6d.
3. Architectural Assistants, APT. III, £656 to £784 2s. 6d.
4. Architectural Assistants, APT. II, £609 17s. 6d. to £691 17s. 6d.
5. Architectural Assistants, APT. I. £543 5s. to £625 5s.
6. Draughtsmen, APT. II, £609 17s. 6d. to £691 17s. 6d.

Candidates for posts Nos. 3, 4, 5, 6 should be capable draughtsmen with experience in one of the following:— Structural design, heating schemes or general architectural work.

7. Senior Assistant Heating Engineer, APT. V, £814 17s. 6d. to £994 5s.
8. Assistant Surveyor (Land), APT. IV, £727 15s. to £907 2s. 6d.

Candidates for post No. 8 should have planning experience, preferably of central area redevelopment for housing purposes.

9. Assistant Surveyor (Land), APT. III, £656 to £784 2s. 6d.
10. Assistant Quantity Surveyor, APT. V, £814 17s. 6d. to £994 5s.
11. Assistant Quantity Surveyor, APT. IV, £727 15s. to £907 2s. 6d.
12. Assistant Quantity Surveyor, APT. II, £609 17s. 6d. to £691 17s. 6d.
13. Senior Clerk (Quantity Surveyor's), CII/III, £594 10s. to £722 12s. 6d.

The duties of post No. 13 will be of a clerical nature, but experience in the handling of building contract documents and a knowledge of contract law will be an advantage.

The payment of salary increments will be subject to satisfactory service and will be granted normally with effect from April 1 following the completion of six months' service.

The appointments are subject to the Local Government Superannuation Acts 1937—1953 and the successful applicants will be required to pass a medical examination.

Application forms may be obtained from the City Architect, Priestley House, Quarry Hill, Leeds, 9, to whom they should be returned together with copies of three recent testimonials by 12 noon on Saturday, September 14, 1957. Applicants should clearly indicate for which post they wish to be considered.

Canvassing in any form, either directly or indirectly will be a disqualification.

R. A. H. LIVETT, O.B.E., A.R.I.B.A.,
City Architect.

Priestley House,
Quarry Hill, Leeds, 9.
August 21, 1957. 7360

ARCHITECTURAL POSTS
WEST MIDLANDS DIVISIONAL COAL BOARD have posts open in the Architects' Branch at their headquarters near Dudley as follows:—

ARCHITECTS (Grade 2—Salary £700—£1,000). Requirements: Associate Membership of the Royal Institute of British Architects; experience in design, preparation of sketch plans, working drawings and supervision of work in progress.

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QUANTITY SURVEYING ASSISTANT (Grade 2—Salary £520—£615). Preferably Intermediate R.I.C.S. or studying for such examination.

Superannuation rights under local authority and certain other schemes are transferable.

Office is engaged on a large programme of varied and interesting work of industrial and welfare nature and offers scope for applicants with a progressive outlook.

Applications, on forms obtainable from Divisional Chief Staff Officer, West Midlands Divisional Coal Board, Himley Hall, Dudley, Worcs. (quoting AJ) by 5th September, 1957. 7332

COUNTY BOROUGH OF STOCKPORT

ASSISTANT ARCHITECT—Special Grade £707 5s. 0d.—£861 or A.P.T. I/II £543 5s. 0d.—£691 17s. 6d., depending on qualifications. Commencing salary according to age and experience. Full particulars (age, qualifications, experience, two referees) to Borough Architect, Town Hall, Stockport, by 7th September, 1957, stating if related to any member or senior officer of Council. Post pensionable, subject to medical examination. Canvassing disqualifies. 7333

GLAMORGAN COUNTY COUNCIL require PLANNING ASSISTANTS, to assist in the preparation of Town Maps for the County Development Plan, together with some interesting comprehensive development area schemes. This work presents an opportunity for newly qualified Planners to gain valuable experience in a highly industrialized County.

Salary scale Grade Special/A.P.T. IV (£707 5s. to £907 2s. 6d. per annum).

Candidates must have appropriate professional qualifications. Starting point according to qualifications and experience. Applications immediately, stating age, training, qualifications, experience, present salary, and names of two referees, to the County Planning Officer, County Hall, Cardiff.

RICHARD JOHN,
Clerk of the County Council.
7346

CITY OF BIRMINGHAM
CITY ARCHITECT'S DEPARTMENT

Applications are invited for the appointment as TECHNICAL ASSISTANT (HOUSING)—Grade A.P.T. IV (£727 15s. 0d./£907 2s. 6d. per annum)—at a commencing salary according to experience.

The successful candidate will be responsible for the investigation, layout and design of dwellings for numerous small sites in the City, and applicants should possess an appropriate professional qualification.

The post is superannuable and subject to a medical examination. Five day week.

Applications, stating age, present position and salary, qualifications and experience, and two referees, should reach the undersigned not later than 6th September, 1957.

Canvassing disqualifies.

A. G. SHEPPARD FIDLER,
City Architect.

Civic Centre,
Birmingham, 1. 7331

COUNTY BOROUGH OF WOLVERHAMPTON
APPOINTMENT OF ARCHITECTURAL ASSISTANTS

Applications are invited for the following appointments in the Architectural Section of the Borough Engineer and Surveyor's Department.

(*a*) ASSISTANT ARCHITECT (A.P.T. Special Grade, £707 5s. 0d.—£861). Candidates should have passed the Final Examination of the R.I.B.A.

(*b*) ARCHITECTURAL ASSISTANTS—
Grade I —£543 5s. 0d.—£625 5s. 0d.
Grade II —£609 17s. 6d.—£691 17s. 6d.
Grade III—£656 0s. 0d.—£784 2s. 6d.

Candidates for appointments on Grade II and III should have passed the Intermediate Examination of the R.I.B.A.

N.J.C. conditions, superannuable post, medical examination.

Housing accommodation may be made available to one of the above appointments.

Applications stating for which post, education, qualifications, experience, past and present appointments, naming two referees to Borough Engineer, Town Hall, Wolverhampton, in envelope suitably endorsed, by Monday, 16th September, 1957. 7330

STAFFORDSHIRE COUNTY COUNCIL
COUNTY ARCHITECT'S DEPARTMENT

Applications are invited for ARCHITECTURAL STAFF on the following Salary Grades:—
APT. III £656 0s. 0d.—£784 3s. 0d.
APT. IV £727 15s. 0d.—£907 3s. 0d.

Applicants for Grade IV should be Associates of the R.I.B.A.

Applications, together with copies of three recent testimonials, should be forwarded to P. Woodcock, F.R.I.B.A., Deputy County Architect, Martin Street, Stafford, not later than Monday, September 9, 1957, giving full details of experience and qualifications and stating age, present salary and grade applied for.

T. H. EVANS,
Clerk of the County Council.

August 20, 1957.
County Buildings, Stafford. 7361

MIDLANDS ELECTRICITY BOARD

ARCHITECTURAL DRAUGHTSMEN required on the Chief Engineer's Staff at Board Headquarters, Mucklow Hill, Halesowen, to assist in the preparation of outline and detail drawings for Offices, Stores, Substation and Service Centre buildings. Intermediate R.I.B.A. an advantage.

Salary £595/£715 per annum (N.J.B. Schedule 'D,' Grade 6). Superannuable.

Apply, by letter, within fourteen days, stating age, experience, present salary and position to the Secretary (Ref. FWC), Midlands Electricity Board, Mucklow Hill, Halesowen.

A. STEPHENS,
Secretary.
7373

BOROUGH OF NEWCASTLE-UNDER-LYME
REQUIRED:

ARCHITECTURAL ASSISTANT, APT. IV, £727 15s. to ££907 2s. 6d. p.a., commencing salary in accordance with experience and qualifications.

Applicants must be fully qualified, and favourable consideration to the provision of housing accommodation will be given in suitable cases.

Application forms and conditions of appointment may be obtained from the Borough Surveyor, Lancaster Building, High Street, Newcastle, Staffs, and must be returned to him not later than Monday, September 9, 1957.

C. J. MORTON,
Town Clerk.
7325

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Vacancies for ARCHITECTS and SURVEYING ASSISTANTS in the Building Regulations Division as follows:—

(*a*) For surveys of existing premises and consideration of proposals for alterations and new construction in the Theatres Section, and;

(*b*) for building control work in connection with applications under the London Building Acts and bye-laws as regards compliance with the Council's construction and means of escape standards.

Salaries up to £817 (under review) with starting rates according to qualifications and experience.

Application form and particulars from the Architect (Ref. AR/EK/47/57), The County Hall, S.E.1. (1610). 7377

SOUTHERN RHODESIA GOVERNMENT
Vacancies: PLANNING OFFICERS

1. ASSISTANT REGIONAL PLANNING OFFICERS, Salary Scale £1,700 × 50—£1,850 p.a.

Applicants must have at least five years' practical experience in planning after obtaining the Town Planning qualification and will be appointed to the minimum of the scale.

2. PLANNING OFFICERS, Salary Scale £900 × 100—£1,000 × 50—£1,650 p.a.

Applicants must have passed the Final examination of the Town Planning Institute (or an examination recognized for exemption therefrom). Preference will be given to those applicants holding a qualification in Civil or Municipal Engineering or Architecture. The maximum commencing salary for suitably experienced candidates may be £1,250 p.a. plus an additional increment of £50 for persons holding an additional approved professional qualification in Engineering or Architecture.

Application forms and further details from Secretary (R), Rhodesia House, 429, Strand, London, W.C.2.

Closing date September 14. 7358

LONDON ELECTRICITY BOARD
ENGINEERING DRAUGHTSMAN

Applications are invited for the above position in the Board's Northern District at Hackney, E.5.

Applicants should have had experience in mains recording with a public utility authority, preferably with an Electricity Board, and be able to obtain particulars on site and compile accurate permanent records. Some knowledge of electrical plant layout, building construction and simple reinforced concrete structures would be an additional advantage.

The post is graded under Schedule "D" of the National Joint Board Agreement as Grade 6—£635 to £755 per annum inclusive of London Allowance.

Application forms obtainable from Personnel Officer, 46, New Broad Street, London, E.C.2, to be returned completed by 14th September, 1957. Please quote ref. PER/2368/A. 7369

COVENTRY CORPORATION require TRAINEE PLANNER (Central Area Reconstruction), Higher General Division, £230—£512 (male) or £210—£460 (female) according age, etc. Additional £26 in approved circumstances. Application forms, etc., from City Architect and Planning Officer, Bull Yard, Coventry, returnable within 10 days publication. 7368

COUNTY BOROUGH OF SOUTHPORT

Applications are invited for the appointment of an ASSISTANT QUANTITY SURVEYOR in the Borough Architect and Town Planning Officer's Department at a salary in accordance with A.P.T. V of the National Scales.

Candidates must have passed the Final Examination of the R.I.C.S. (Quantities Division).

Consideration will be given to the provision of housing accommodation if required.

Application forms obtainable from the Borough Architect and Town Planning Officer, 99/105, Lord Street, to be returned by 14th September, 1957.

R. EDGAR PERRINS,
Town Clerk.

Town Hall,
Southport. 7324

WORCESTERSHIRE COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Applications are invited for:—
(1) ASSISTANT ARCHITECT, Grade A.P.T. IV (£727 15s. 0d.—£907 2s. 6d.).
(2) ASSISTANT ARCHITECT, Special Grade (£707 5s 0d.—£861).
(3) ARCHITECTURAL ASSISTANT, A.P.T. III (£656—£784 2s. 6d.).

Forms of application and further particulars may be obtained from L. C. Lomas, F.R.I.B.A., 14, Castle Street, Worcester, not later than 10th September, 1957. (W250.) 7357

BOROUGH OF BARKING
DEPUTY BOROUGH ARCHITECT

Applications are invited from Associates of the Royal Institute of British Architects for the above appointment at a salary on scale B of the recommendations of the Joint Negotiating Committee for Chief Officers of Local Authorities (maximum £1,405 per annum).

Further particulars of the appointment and form of application may be obtained from the Borough Architect, Town Hall, Barking, and completed applications are to be returned to the undersigned not later than Monday, the 16th September, 1957.

E. R. FARR,
Town Clerk.

Town Hall,
Barking, Essex. 7323

HEMEL HEMPSTEAD DEVELOPMENT CORPORATION

ASSISTANT ARCHITECT (Vacancy No. 72). Salary scale £656—£784 p.a. Applicants should have passed Intermediate R.I.B.A. examination.

Starting salary according to qualifications and experience.

Conditions of service similar to those in Local Government.

Housing accommodation available.

Applications, endorsed "Vacancy No. 72," giving age, education, qualifications and experience and names of two referees, should reach General Manager, Westbrook Hay, Hemel Hempstead, by 6th September. 7329

BIRMINGHAM REGIONAL HOSPITAL BOARD

(*a*) ASSISTANT QUANTITY SURVEYORS (Two): £700—£1,015. Final R.I.C.S. or recognised qualifications of I.Q.S. or I.A.A.S. and experience in taking off and preparing bills of quantities and settling final accounts essential.

(*b*) QUANTITY SURVEYING ASSISTANT (One); £525—£730. Intermediate R.I.C.S. or equivalent essential.

All appointments superannuable. Apply naming two referees to Secretary, 10, Augustus Road, Birmingham 15, immediately. 7190

QUANTITY SURVEYING ASSISTANTS required by Air Ministry Works Directorate in London and Provinces. Grade and commencing salary based on not less than 3 or 5 years' previous experience under Quantity Surveyor or Building Contractor. Approved full time study will count towards 5 years period. Normally technical qualifications in Builders' quantities or building, *e.g.* C. & G. Final or O.N.C. or proof to equivalent standard. Duties include abstracting and billing, site measurement and preparation of estimates. Salary range £520 at age 25 to £830 London rate starting pay dependent on age, qualifications and experience. Salaries somewhat lower in Provinces. Pensionable and promotion prospects. Five-day week, 3 weeks leave a year. Appointments carry liability for service anywhere U.K. or overseas. Applicants normally should be natural born British subjects. Write stating age, qualifications and previous appointments including type of work done, to Manager, Professional and Executive Register, M.L.N.S., 1-6, Tavistock Square, London, W.C.1, quoting reference PE.105/745. No original testimonials should be sent. Only applicants selected for interview will be advised. 7188

SHIPLEY URBAN DISTRICT COUNCIL

Applications are invited for the appointment of ARCHITECTURAL ASSISTANT within A.P.T. Special Grade (£750 to £1,030). Commencing salary according to experience and qualifications. Applicants must hold a recognised professional qualification. The position is superannuable and subject to the provisions of the National Scheme of Conditions of Service.

Housing accommodation will be provided if required.

Applications giving age, details of training, qualifications and experience together with names and addresses of two referees to the Engineer and Surveyor, Town Hall, Shipley, Yorkshire, by 10 a.m., Monday, 16th September, 1957.

ERNEST PEARS,
Clerk and Solicitor.
7359

Architectural Appointments Vacant

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

NORTH AND PARTNERS, Chartered Architects, with large and varied practice, require a capable experienced ASSISTANT for drawing office, salary by arrangement. Reply: 40, Broadway, Maidenhead, Berks. 6573

SMALL progressive West End Office requires an ARCHITECTURAL ASSISTANT of Intermediate standard with initiative and drive. Holidays will be respected, if possible. Particulars of experience and salary required to Box 7287.

ARCHITECTURAL ASSISTANT required, of Intermediate standard, preferably with a flair for presentation drawings. West End office, five-day week, luncheon vouchers. Salary in the region of £600 p.a. Box 7284.

LONDON office with widely varied practice urgently requires all grades of ASSISTANTS, preferably with London experience. Five-day week. Lewis Solomon, Son & Joseph, 21, Bloomsbury Way, London, W.C.1. Holborn 6108. 6531

GEORGE WIMPEY & CO., LIMITED

THE Architect's Department seek SENIOR and INTERMEDIATE ASSISTANTS, with ability to apply their knowledge to new construction techniques covering Multi-Storey Flats, Houses, Offices and Industrial Buildings for contracts throughout the U.K.

Appointments are at Head Office, Hammersmith, on a permanent basis, with a 5-day week.

For applicants interested in work in the Midlands, our Regional Office at Birmingham has similar appointments open for Architectural Staff (excepting 5-day week).

Salaries according to qualifications and experience, and, subject to satisfactory service, there is a Pension Scheme available.

Applicants should write, giving particulars, to: E. V. Collins, A.R.I.B.A., Chief Architect, 27, Hammersmith Grove, London, W.6. 7220

ASSISTANT required in West End Office for Working Drawings, details and specifications. Practical experience more important than qualifications. Five-day week. Box 7259.

TRING, HERTFORDSHIRE. SENIOR ASSISTANT ARCHITECTS required for work on Contemporary Schools, Churches and design of prefabricated forms of construction at home and overseas.
Write to Woodroffe, Buchanan & Coulter, 41, High Street, Tring, or phone Tring 2083 for an appointment. 7268

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

APPLICATIONS are invited for the following appointments in the above Branch Office undertaking interesting and varied commercial and industrial projects:—
(*a*) ASSISTANT QUANTITY SURVEYOR, with good experience in the preparation of Bills of Quantities, measuring and adjusting variations and estimating under supervision (salary range £550 to £820 per annum).
(*b*) ASSISTANT ARCHITECT, capable of preparing working drawings from preliminary details (salary range £550 to £820 per annum).
There is a 5-day week in operation, and the appointments offer prospects of upgrading.
Applications, stating age, experience, qualifications and salary required, to G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester. 7073

LEADING Firm of Building Surveyors (City of London) require JUNIOR ARCHITECTURAL DRAUGHTSMAN, age 22/27. Must be well educated and keen to progress in profession. Salary from £350 according to experience. Box 7263.

SENIOR ARCHITECTURAL ASSISTANT required in small E. Anglian practice. Qualifications not necessary, applicant must be interested in producing sound working drawings efficiently and quickly, must be conscientious, good specification writer, reliable and loyal. Able to carry small contracts through to completion including final accounts. Good salary to right person. Five-day week. No age limit. Box 7260.

SIR ALFRED McALPINE & SON, LTD., require an ARCHITECTURAL ASSISTANT in their Design Department. Applicants should be of Intermediate R.I.B.A. standard and capable of producing working drawings and details from sketch schemes.—Apply to Head Office, Hooton, Wirral, Cheshire. 7158

ARCHITECTS.—SENIOR ARCHITECTURAL ASSISTANTS required immediately for a wide variety of work. Salary range £800—£1,000 per annum (according to experience and qualifications). Superannuation Scheme.—Application should be made in writing to Kenneth F. Masson, A.R.I.B.A., Chief Architect, S.C.W.S., Ltd., 76, Morrison Street, Glasgow, C.5. 7179

ROBERT MATTHEW & JOHNSON-MARSHALL require ARCHITECTURAL STAFF in their Edinburgh office for work on redevelopment schemes, large hospital projects, and a wide variety of University, Power Station, School and Office buildings. Salaries from £600 (recently-qualified assistants) to £1,000, with placing according to ability and experience. Applications should be marked "Confidential" and addressed to 31, Regent Terrace, Edinburgh, 7. 7296

ASSISTANTS required in Architects' offices in London and Manchester. Must have an appreciation of contemporary design, have had practical experience and be prepared to take responsibility in the preparation of working drawings for large contracts. Salary £750—£850.—Scherrer & Hicks, FF.R.I.B.A., 19, Cavendish Square, London, W.1. 7317

JUNIOR ARCHITECTURAL ASSISTANTS required. Salary £400 to £550 according to age and experience.—S. Dodson & Son, L./A.R.I.B.A., Museum Buildings, Priestgate, Peterborough. 7316

EXPERIENCED ARCHITECTURAL ASSISTANTS required for contemporary office, salary according to experience. C. H. Elsom, 10, Lower Grosvenor Place, S.W.1. Telephone: VIC 4304. 7299

ASSISTANTS required in medium sized busy office. General practice, including Housing Schemes, Office Blocks, Factories, etc.—Apply in writing only, stating age, qualifications, if any, experience, and salary required, to Thomas Sibthorp, F.R.I.B.A., A.R.I.C.S., A.M.T.P.I., 10, Manchester Square, W.1. 7230

WILLIAM RYDER requires two or three ASSISTANTS in the salary range £600 to £900 per annum. Experience on State aided housing schemes and multi-storey flats would be an advantage. Applications should be made in writing with full details of experience and salary required to 68, Jermyn Street, St. James's, S.W.1. 7334

ARCHITECTURAL ASSISTANT. Final R.I.B.A. standard, age 24-30, with practical experience and initiative, required to take responsible position in Lake District practice. Full particulars and referees to Hargreaves & Mawson, 25, Finkle Street, Kendal, Westmorland. 7366

LAKE DISTRICT ARCHITECT requires personal ASSISTANT for small modern office. Congenial working conditions. Assistance could be given with housing accommodation. Write giving details of age and experience. Salary by arrangement. Gordon Stables, A.R.I.B.A., Chartered Architect, Windermere. 7356

ARCHITECT required by Land and Estate Developers. Experience in Estate Layouts, Planning and Byelaw Applications and low cost housing designs essential. Member of Town Planning Institute an advantage. Qualifications, experience, age and salary required to Box 7335.

ARCHITECTURAL ASSISTANTS up to Intermediate Standard required in busy office having varied and interesting work in progress. Must be able to prepare detail drawings under supervision. Apply stating age, experience and salary required to F. Potter, F.R.I.B.A., 3, Vicarage Road, Edgbaston, Birmingham, 15. 7336

ARCHITECTURAL ASSISTANTS, up to Final and Intermediate 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 and Partners, Stanhope House, 47, Park Lane, London, W.1. 7337

ARCHITECT'S ASSISTANT required, with good general experience, for West London Office. Hammond Harvey. RIV 8848. 7338

ASSISTANT ARCHITECT. Co-operative Wholesale Society, Ltd., invite applications for the position of Assistant Architect. Must be capable of preparing working drawings from preliminary details. The post is superannuable, subject to medical examination. 5-day week in operation. Applications, giving details of age, experience and salary required, to—W. J. Reed, F.R.I.B.A., Chief Architect, C.W.S. Ltd., 99, Leman Street, London, E.1. 6350

ASSISTANT required in small West End office. Intermediate to Final standard. Five-day week, varied work. Salary according to experience. Russell Scott, 6, Brick Street, W.1. GRO 1321. 7340

STAFF ARCHITECT required for North Eastern Brewery Group. Duties to include the co-ordination and control of group expenditure on some 600 licensed properties. Previous Brewery experience an advantage. Apply in writing giving full details of age, experience and salary required to J. W. Cameron & Co., Ltd., P.O. Box No. 21, Greenbank Offices, Lion Brewery, West Hartlepool Co. Durham, marking the envelope "Staff Architect." 7341

ASSISTANT ARCHITECT with practical experience required for small busy practice, mainly flats and houses. Capable draughtsman and detailer essential, and to deal with jobs to finish. Apply in writing, stating salary and experience to R. Jelinek-Karl, F.R.I.B.A., 22, Chancery Lane, London, W.C.2. 7342

NORMAN JONES, SONS & RIGBY require an ARCHITECTURAL ASSISTANT of Intermediate standard, good draughtsman, sound knowledge building construction, able to produce working drawings, surveys. Salary range £550—£650. Please write stating experience to 271, Lord Street, Southport, Lancashire. 7318

CLIVE PASCALL & PETER WATSON require ARCHITECTURAL ASSISTANTS at least Intermediate standard. £600—£650. Five-day week. Luncheon Vouchers. Contemporary outlook on Commercial, Industrial and Airport work. Write particulars and experience to 24, Half Moon Street, W.1. 7321

ARCHITECTURAL ASSISTANT required in small, long established West End office. At least Intermediate R.I.B.A. standard. Experience essential and able to take some responsibility. Five-day week. Write stating qualifications, experience and salary required to Box 7370.

ARCHITECTURAL ASSISTANTS, Junior and Intermediate R.I.B.A. standard, required in West London Architect's Office. Five-day week. Lunch Vouchers and good prospects for Assistants prepared to work. Write stating age, qualifications and experience to Box 7354.

EDINBURGH. ASSISTANT, Intermediate standard or qualified, wanted for recently established practice. Please write, giving full details and salary required to Law and Dunbar-Nasmith, 54, Frederick Street, Edinburgh, 2. 7320

ASSISTANT ARCHITECTS with one to three years' office experience required. Apply with full particulars, stating salary required to Farmer and Dark, Romney House, Tufton Street, Westminster, S.W.1. 7319

SURVEYOR required for Architect's office. Experience in preparing Dilapidation Schedules, Specifications, Measured Bills essential. Salary based on experience. Five-day week. London work. Luncheon vouchers. Write Box 7367.

ARCHITECT required for Nigeria, with prospective Associate Partner status, to manage important projects at Ibadan in New Year, following initial period in London office. High local salary. Quarters, car, etc., provided. Tropical experience desirable. J. E. K. Harrison, Potter, Hare & Macfarlane, F.R.I.B.A., A.M.T.P.I., 19, Broadstone Place, Baker Street, W.1. 7363

TWO ASSISTANTS required in City Architect's Department. Salary range £600—£800 with good prospects of advancement and secure future for suitable applicants. Write giving particulars of experience, age and salary required. Box 7210.

YOUNG ARCHITECTURAL ASSISTANT (male) required in West End office. Write stating age, experience and salary required. Box 6683.

J. M. AUSTIN-SMITH & PARTNERS require an ASSISTANT, qualified or unqualified, for interesting and varied work, with opportunities for taking responsibility and supervising work in progress. Salary will be according to age, and length and type of experience. Apply by telephone, Regent 6133, or to 29, Sackville Street, London, W.1. 7352

ARCHITECTURAL ASSISTANT required immediately for London Brewery. Must be good Draughtsman with sound knowledge of construction. Superannuation scheme. Please reply giving details of experience and training with salary required to Box 7351.

A GOOD opportunity for a keen ASSISTANT, Final standard, in small London progressive Architect's City Office to work on large contemporary projects. Applicants should give full particulars of experience and appointments held in chronological order and present salary. L. Robinson, L.R.I.B.A., 120, Moorgate, E.C.2. 7353

IS anyone interested in the study and preparation of standard working details for a period? Please write to Morrison and Partners, 103, Belper Road, Derby, or 30B, Wimpole Street, London. 7322

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 £820 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. 6023

SIR ALFRED McALPINE & SON, LTD., require a JUNIOR ARCHITECTURAL DRAUGHTSMAN in their Design Department.—Please apply to Head Office, Hooton, Wirral, Cheshire. 7157

POWELL AND MOYA require JUNIOR ARCHITECTURAL ASSISTANT about Intermediate standard, with office experience, to start immediately. Reply by letter to Powell & Moya, 36, Great Smith Street, London, S.W.1. 7339

NORTH & PARTNERS, Chartered Architects with extensive practice, seek partner's personal ASSISTANT. Position will afford excellent opportunity for capable assistant. Reply: 40, Broadway, Maidenhead. 6502

RAMSEY, MURRAY, WHITE & WARD require recently qualified ASSISTANTS, with two to five years' practical experience, to work on interesting industrial and office buildings. Salary by arrangement.—Apply 32, Wigmore Street, W.1. 5929

SENIOR ARCHITECTURAL ASSISTANTS required in busy Bradford Office with varied practice. Good prospects for suitable applicants with salary up to £900 per annum. Participation in Staff Pension Scheme. Pleasant Offices and congenial working conditions. The positions are particularly suitable for men with a keen interest in their work and capable of carrying out a job from start to finish with a minimum of supervision.
Apply with full particulars to: Messrs. Chippindale & Edmondson, Chartered Architects, Empire House, Piccadilly, Bradford, 1. 7269

ARCHITECTURAL ASSISTANT required for the Newcastle branch of a major oil company. Should be of Intermediate standard. Candidates should have experience in contemporary design and be capable of working independently. Good salary. Pension and life insurance scheme, generous sickness benefits, free luncheon vouchers, Social Club. Write, giving full details of experience, age and salary required to Box 7374, quoting ref. 171.

NEW ZEALAND Architectural Practice mainly engaged commercial, bank, and industrial work, requires either ASSISTANT ARCHITECT, with A.R.I.B.A., salary range £825 to £900; or ARCHITECTURAL ASSISTANT, with at least 7 years' sound office experience, salary range £700 to £800. Prefer single man, but could consider married. Salary rate applicable influenced by ability and qualifications, being commencing salary, subject good increases according progress. Splendid opportunity, minimum 2 years' assured engagement, applicants' passage provided, subject some minor conditions. —Apply airmail, with snapshot, and personal and experience details, plus small recent working drawing, to Mitchell & Mitchell and Partners, P.O. Box 187, Wellington, N.Z. 7069

Architectural Appointments Wanted

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

GIRL, 18 years, wants to enter Architect's London office as Junior Draughtsman. No office experience but one year at Technical College. Keen, neat and careful. Barton, 268, Rectory Lane, Loughton, Essex. 7350

ISRAELI GIRL, English speaking, 2½ years' architectural experience, seeks UNPAID post with London architect. Write airmail: D. Sulman, Herut 9, Ramat Gan, Israel. 7233

EXPERIENCED young A.R.I.B.A. with tropical experience, housing, hospitals, seeks suitable position. Please contact: V. P. Barve, A.R.I.B.A., 14, Strathray Gardens, N.W.3. 7349

ARCHITECTURAL ASSISTANT, age 27, of Intermediate standard, desires progressive position in London with firm of private architects. Box 7327.

A.R.I.B.A., A.M.T.P.I., with wide London experience and car-owner seeks post in London. Box 7364.

Other Appointments Vacant

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

H. C. JANES LTD. have vacancies for DRAUGHTSMEN on the staff of their Planning Department.
Applicants should have experience in the design and constructional detailing of houses, shops, flats, factories, etc.
Staff pension scheme in operation and housing accommodation can be provided.
Apply to Head Office at 183, High Town Road, Luton, giving particulars of previous experience and stating salary required. 7265

EDITORIAL ASSISTANT to take charge of production wanted for monthly architectural magazine. Must be tidy, methodical, fond of detail and have a good memory. Write stating age, qualifications, salary. Box 918.

LETTERING ARTIST, DRAUGHTSMAN, required for Design and Production in connection wth Sign Manufacturing. Progressive post with excellent prospects. Ward & Company, 128, Cheltenham Road, Bristol, 6. 7344

SECRETARY, with previous experience, required end of August by Architects, West End office. Salary by arrangement. Five-day week. Telephone HUNter 0361. 7343

QUALIFIED ENGINEER or ENGINEERING DESIGNER/DRAUGHTSMAN required to be trained as Assistant Chief Draughtsman in a Neon Sign and Light Engineering Factory. When replying please give details of qualifications, experience, age and salary required to Claude-General Neon Lights Ltd., Wembley Hill Estate, Wembley. 7356

Services Offered

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

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

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

GOOD LETTERING is essential for Commemorative Wall Tablets, Foundation Stones, etc. Designs prepared and estimates given for the finished work in any suitable material. Renowned as a Centre for Lettering since 1934. Sculptured Memorials, 67, Ebury Street, S.W.1. 9170

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

THE SITE SURVEY COMPANY, Blackheath, S.E.3. Tel.: LEE Green 7444-5. Fully equipped to undertake urgent Engineering and Architectural surveys in any part of the country and abroad. Specialists in ¼ in. scale detailed surveys for extensive city development areas. 1890

MEASURED Surveys of Land and Buildings by qualified and experienced staff. LIV. 1839. 7063

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

NAMEPLATES AND SIGNS, Bronze, Brass and Plastics. Church Metalwork. Quick delivery.—Austin, Luce & Company, 19, College Road, Harrow, Middlesex. Tel.: Harrow 3839. 1174

A BUILDING CONSULTING GROUP has been recently formed to assist the various professions in the Industry. A complete, speedy and accurate service given where continuity is most essential. Operating from London, Halifax, Margate and Dublin.—Further details are available through Box 7202.

ARCHITECTS, experienced in Pre-cast Concrete Structures of all types, offer services and advice to the Profession for General and Detailed Design.—Box 7162.

BILLS OF QUANTITIES typed by ex-Secretary to Quantity Surveyor. First class and accurate work. 4/- per sheet including five carbon copies less quantity pro rata. 'Phone FREmantle 1537. 7375

QUALIFIED assistance offered to Building professions by free lance. Most aspects. Distance not objected to. Box 7371.

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MARBLE PORCH, ex Mansion. Includes four Monolithic columns in Cippolino Marble and paving. In excellent condition. Dismantled. Box 7365.

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