for October 1, 1959
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MOTROPOLIS

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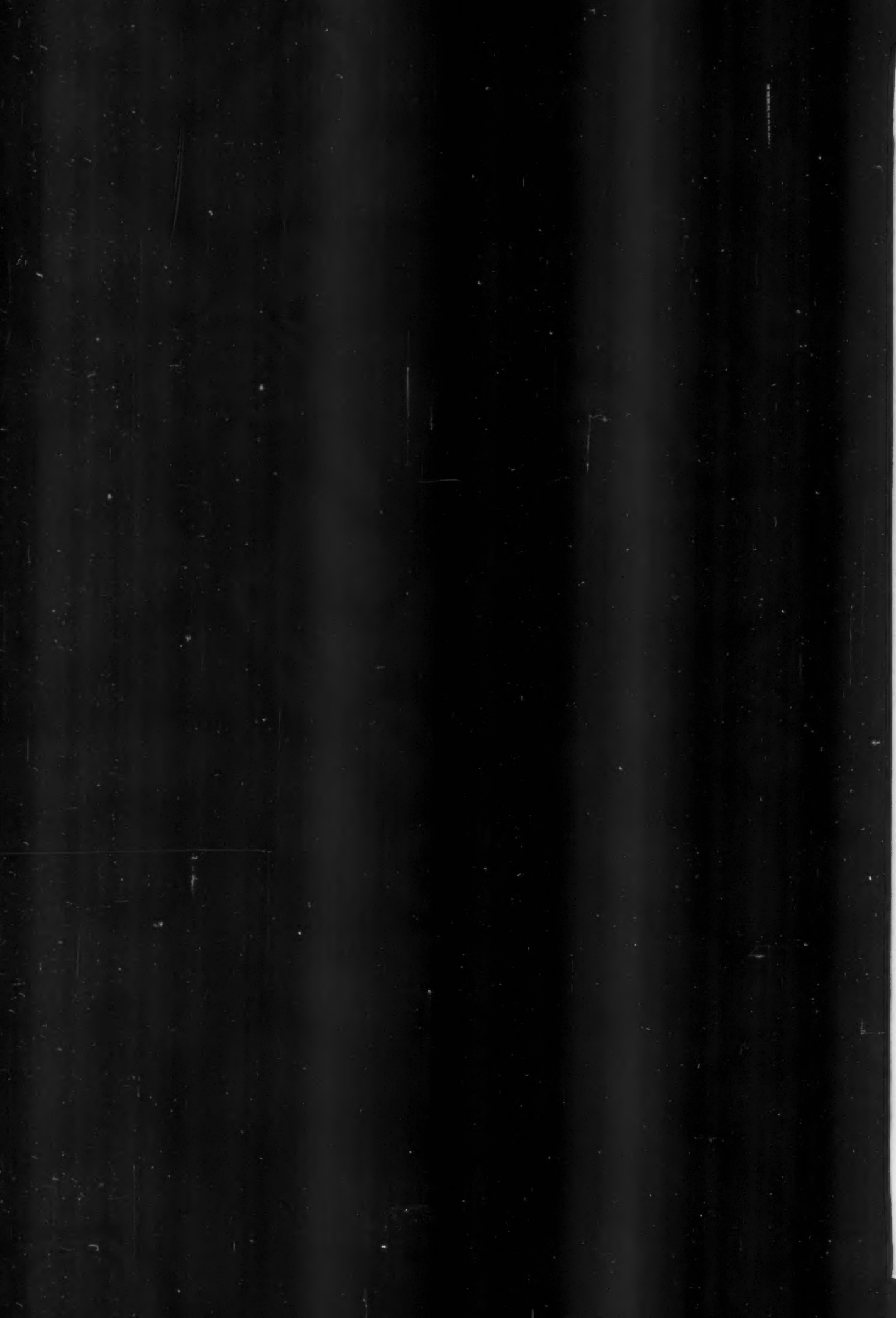

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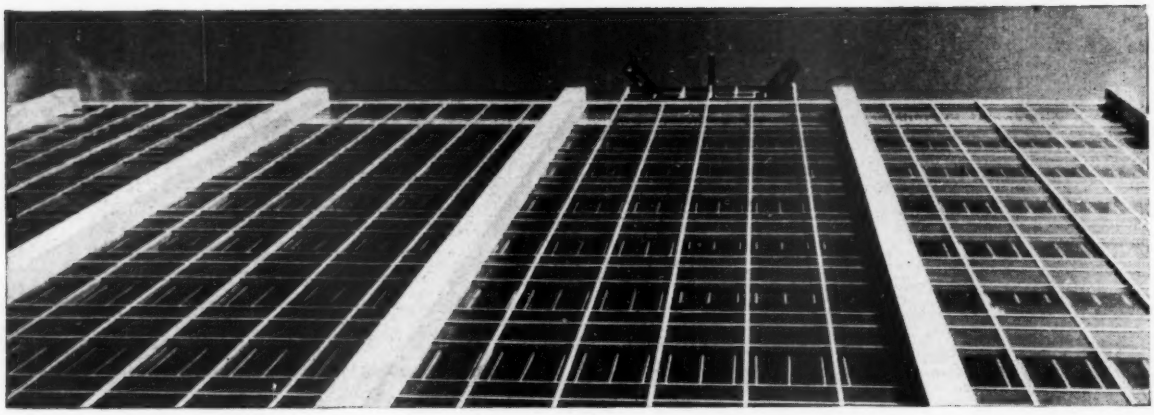

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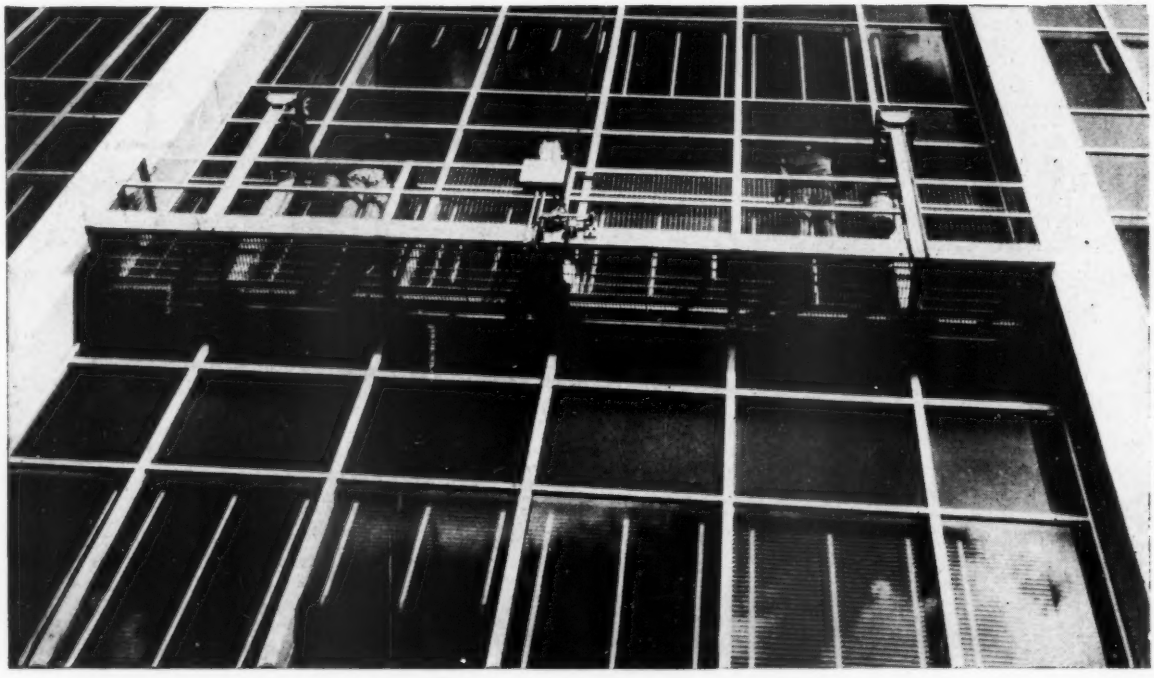

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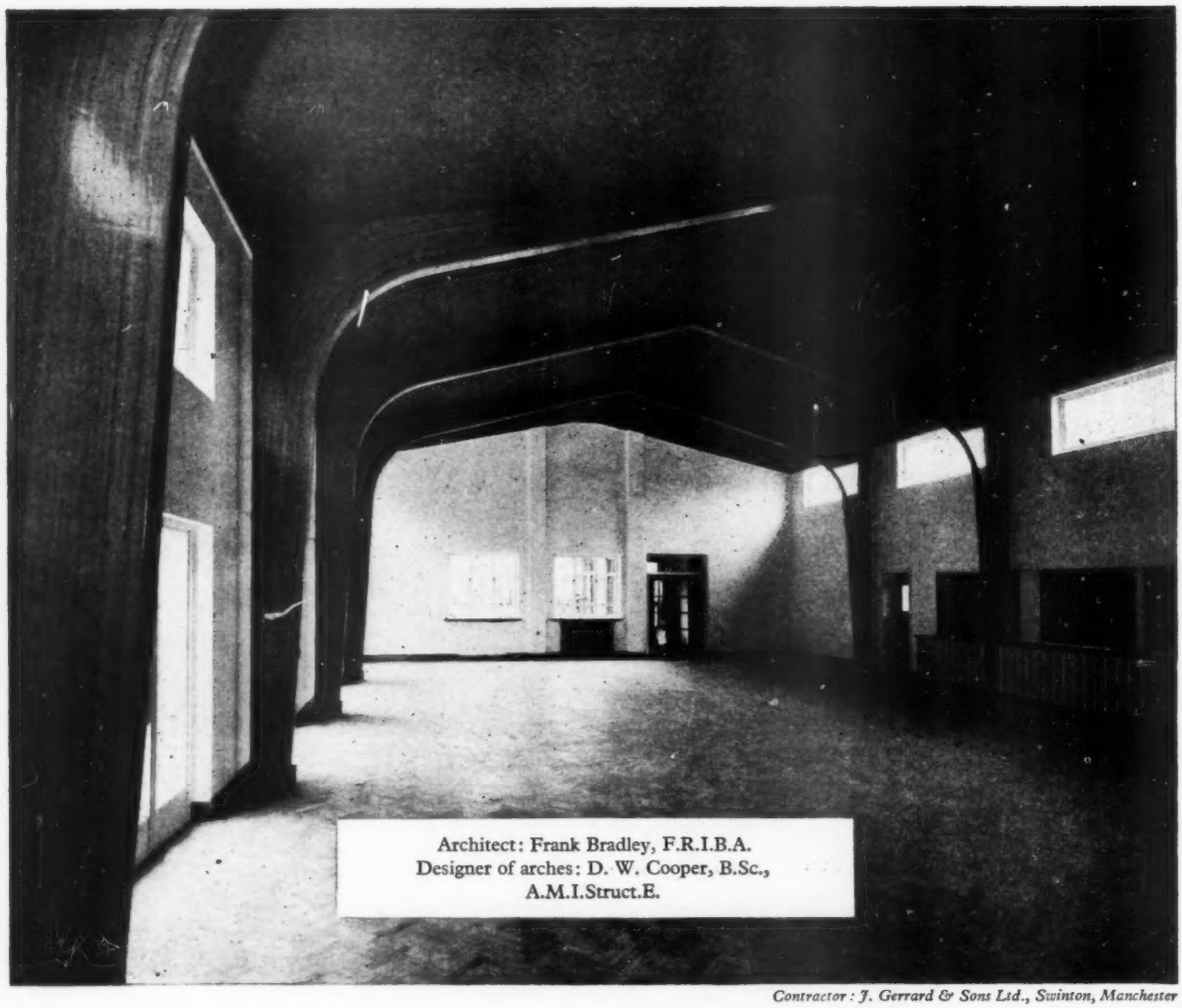

Architect: Frank Bradley, F.R.I.B.A.
Designer of arches: D. W. Cooper, B.Sc., A.M.I.Struct.E.

Contractor: J. Gerrard & Sons Ltd., Swinton, Manchester

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These four arches of 35 ft span each weigh only 16 cwt, and carry the entire roof of the new canteen of Walpamur Ltd. at Darwen. They are constructed of laminated timber measuring 6″ x ½″ in section, a form of structure which is both versatile and economical. The laminations are bonded with Aerolite 311, a new form of the well-known Aerolite glue, and one which is specially suitable for making large laminated structures. Used with a suitable hardener, Aerolite 311 gives ample time for assembly and making up the structure before finally clamping the laminations for setting. When hard, it has all the characteristics of the Aerolite range—remarkable gap filling properties, high strength, long life, and freedom from deterioration. Our brochure "Synthetic resins for the building industry", giving further information, will be sent gladly on request.

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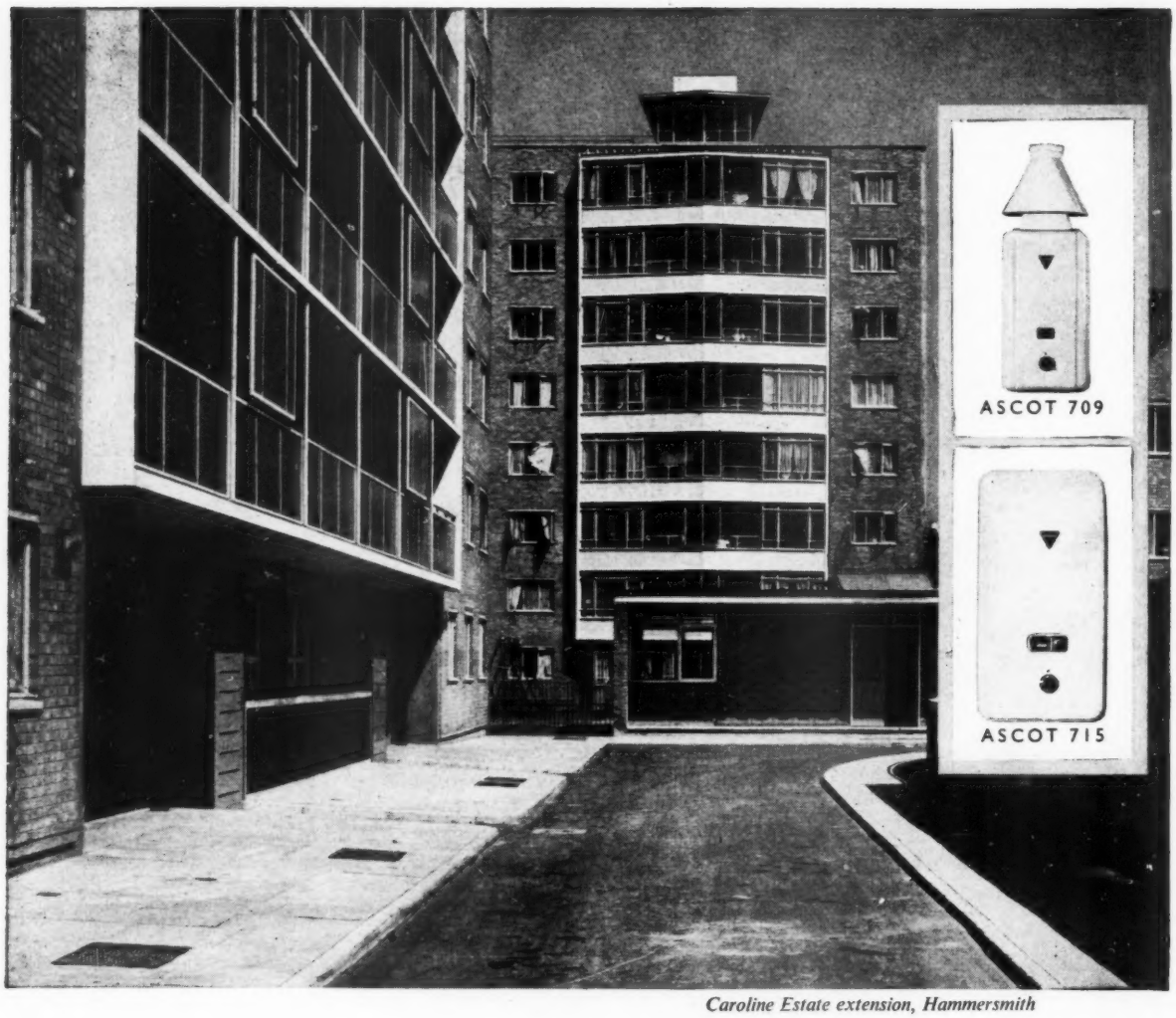
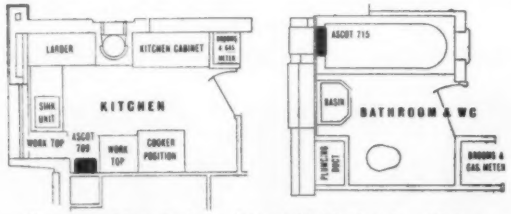


Caroline Estate extension, Hammersmith

ASCOT IN NEW HOUSING (9)

Ascot instantaneous Gas Water heaters have been extensively used for providing hot water in dwellings comprising the London County Council's new Caroline Estate extension at Hammersmith, photographed above. In the eight-storey block, Joanna House, Ascot multipoints have been installed in the 30 three-room and two two-room flats. In the ten-storey block, Henrietta House, Ascot 715 'balanced flue' multipoints are provided in 20 three-room and 18 two-room flats. For technical reasons, an alternative water heating system was necessary in two two-room flats on the ground floor of this block.

In all other maisonettes and flats on the Estate, back boilers have been provided for hot water, except in six maisonettes. Here, Ascot 715 multipoints are installed to obviate difficulties which would have otherwise resulted from having flues for solid fuel fires situated near the ten-storey block.



Two typical installations of Ascot Multipoints in a kitchen and a bathroom in flats on the Estate.

RESPONSIBLE AUTHORITY

London County Council
Architects: Edward Armstrong & Frederick MacManus, F.R.I.B.A., Chartered Architects,
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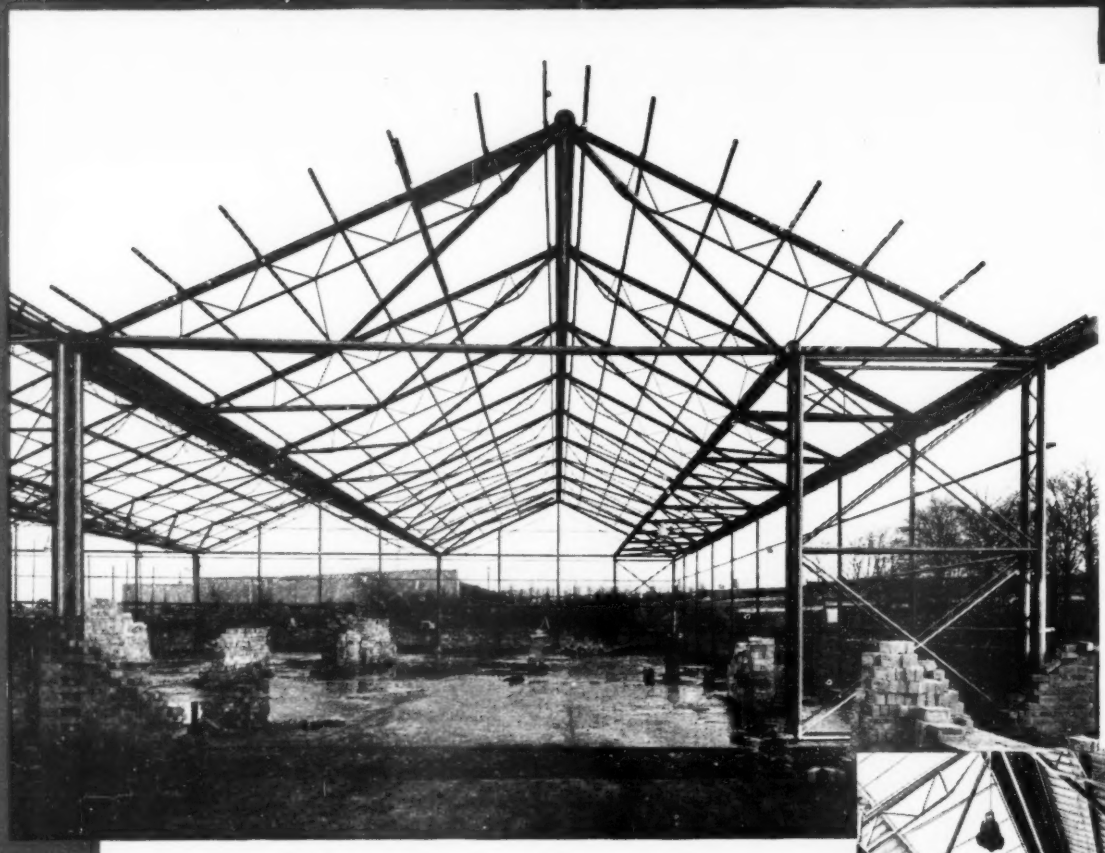
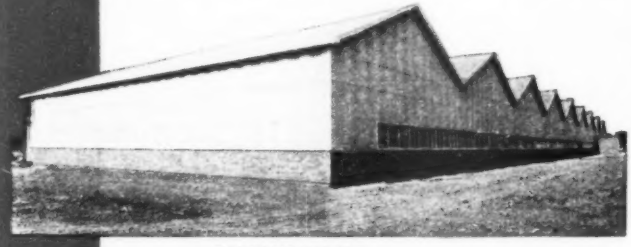


THREE DAYS to erect Tubular Steel Framework for nine 90ft.x40ft. bays

A feature of this speedy erection was the welding-up of each complete roof bay on site and lifting on to its columns by mobile cranes. This building, for the Compositions Division of the Dunlop Rubber Company Ltd., at Fort Dunlop, has a tubular steel framework designed and fabricated by Tubewrights Ltd. The Architect was Mr. Stuart Bentley. This method of construction lends itself to large and small industrial buildings, and Tubewrights' engineers are ready at all times to give prospective users the benefit of their wide experience.



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Top: Longitudinal view of one of the bays showing space frame construction and end thrust girder.

Left: An external view of the completed building which covers an area of over 32,000 sq. ft.

Above: A view showing that the space frame method of construction gives completely unobstructed floor space.

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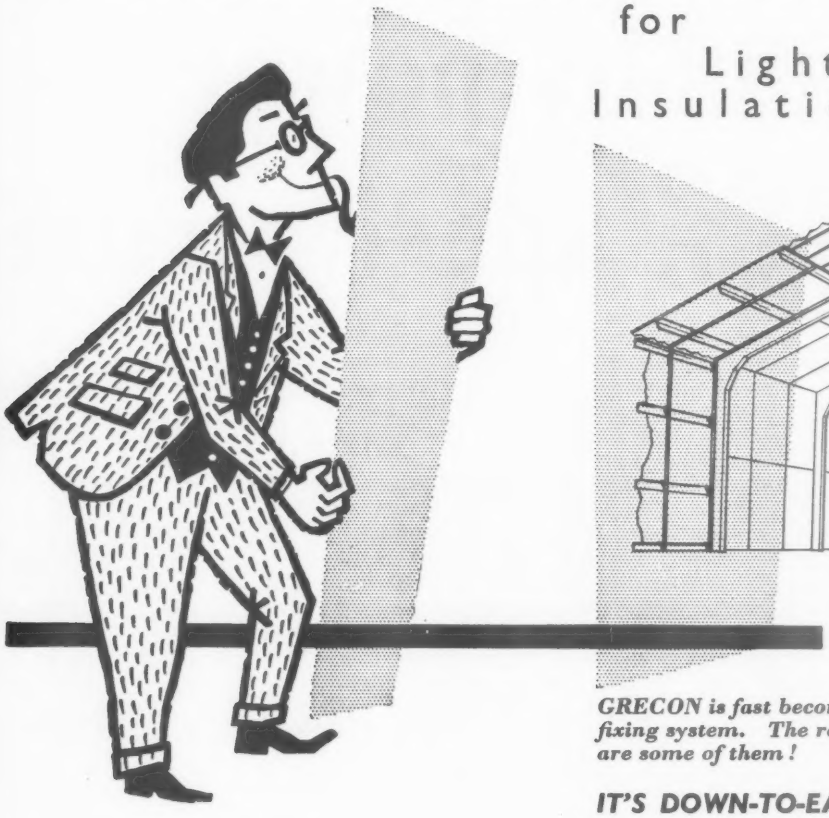

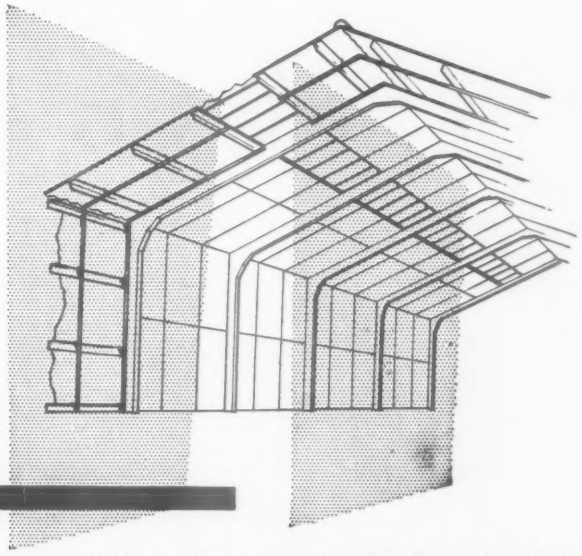

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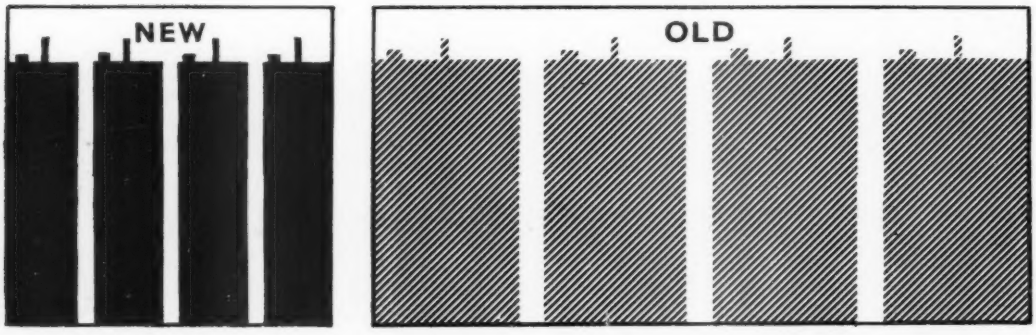

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the new CHLORIDE stationary cell

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* *the new cell will from now onwards be fitted in all Keepalite units—the Chloride Company's automatic emergency lighting system.*

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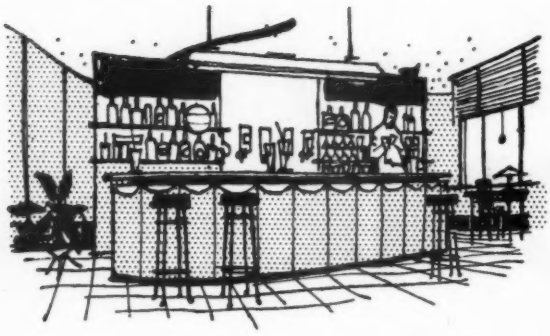

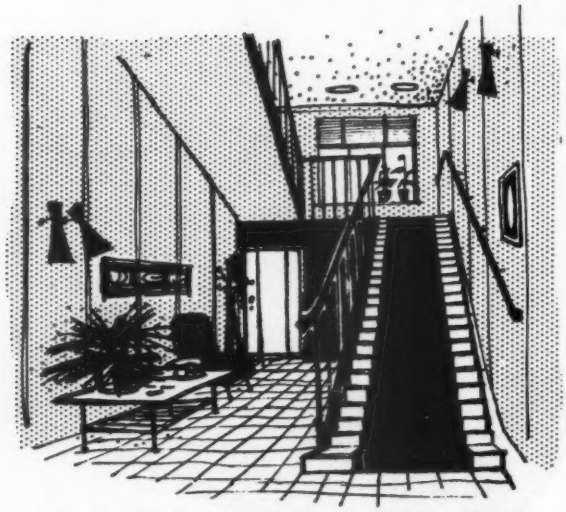

'Vynalast' is ideal for panelling bars, offices, staircases, and is also ideal for surfacing kitchen cabinets and tables.

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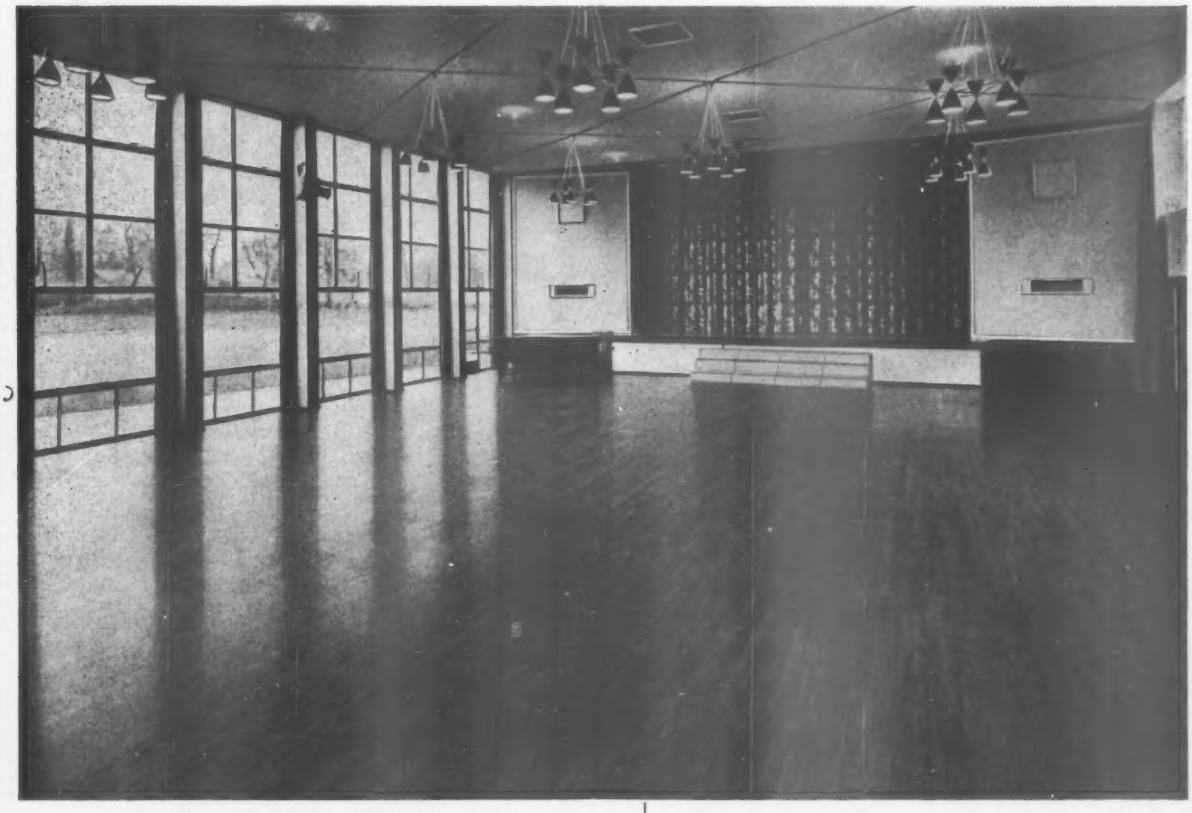

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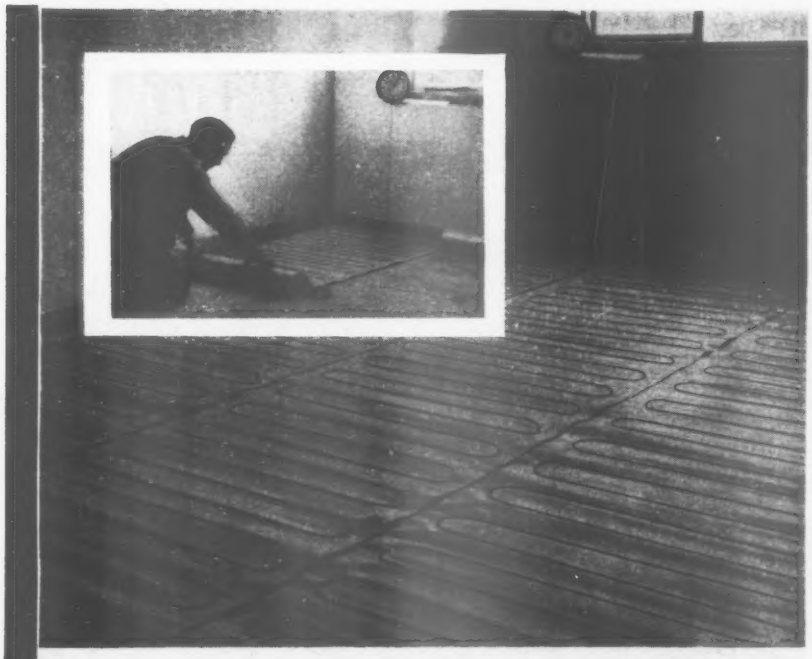

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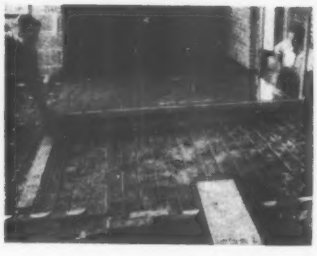

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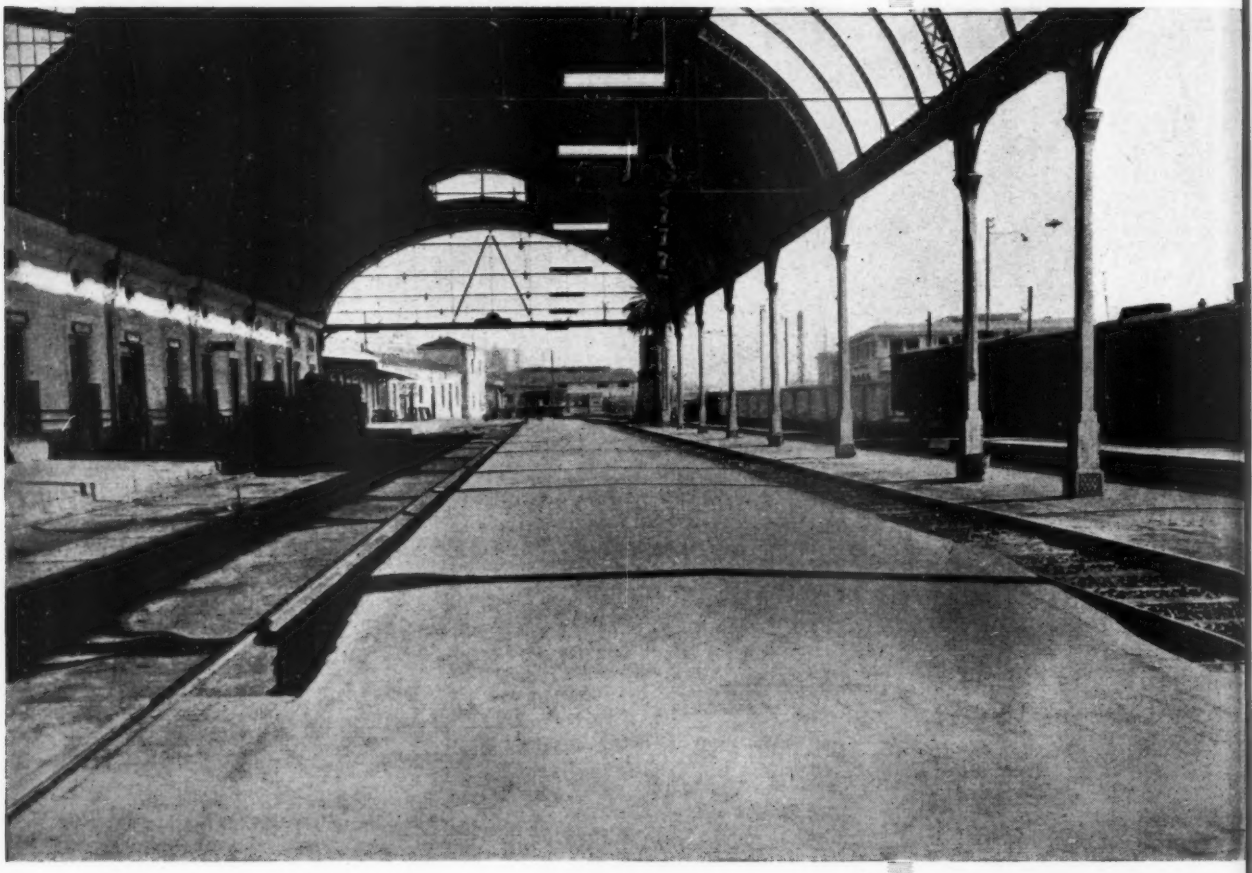

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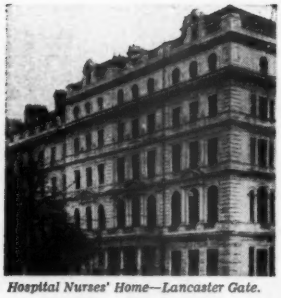

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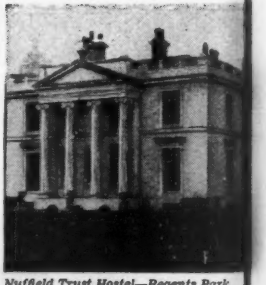
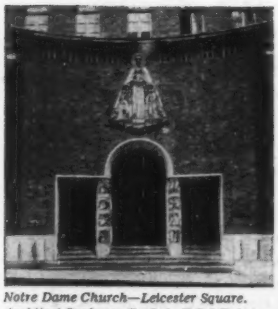


Nuffield Trust Hostel—Regents Park.
Architect Eric S. Brown B.Sc., F.R.I.C.



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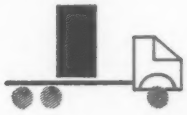

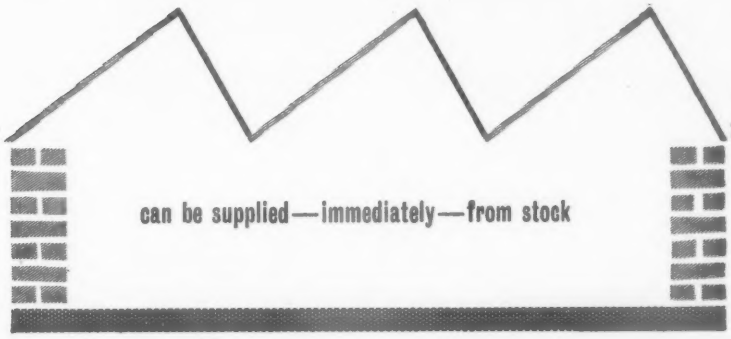

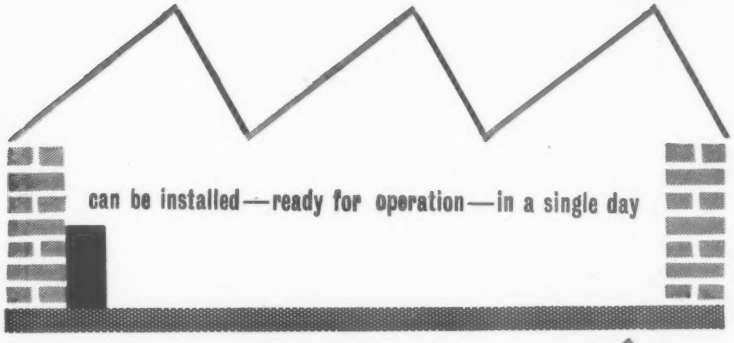

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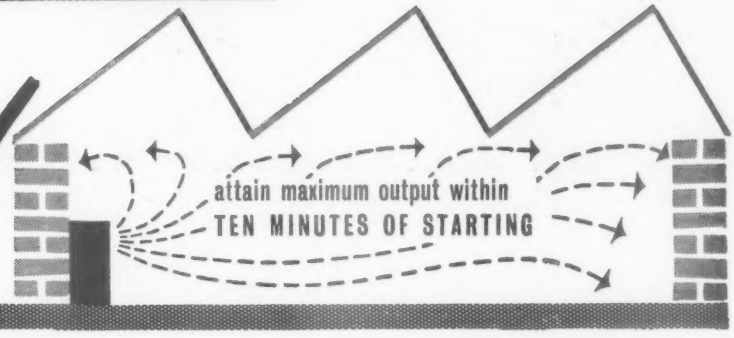
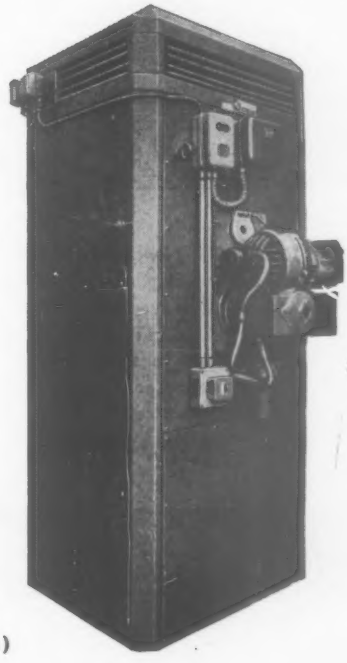
hurry!



But that's not all. Efficiency and economy are of prime importance too and Colt heaters score heavily here. The units are specially designed to ensure absolutely uniform heating throughout the building and the final cost for every 100,000 B.T.U. dissipated into the heated zone is reduced to as little as 11.95d. And every Colt heating installation is as scientifically planned as a Colt Ventilation Scheme. Colt heating engineers are always available for free consultation.

Write for further details to Dept L151/10



COLT Oil Fired Air Heaters

COLT VENTILATION LTD · SURBITON · SURREY · Tel. ELMbridge 0181 (10 lines)

How long will it last ?

We are asked this important question daily. And our short answer is...an ASBESTOLUX lining specification will outlast the life of the building in which it is installed!

THERMAL INSULATION AND FIRE PROTECTION

The new Thermal Insulation (Industrial Buildings) Act, 1957, specifies the kinds of materials which, if used to a substantial extent to achieve the standard of insulation, must either conform to a prescribed standard of resistance to the spread of flame or be used in such a way that they do not add to the risk of fire.

An Asbestolux lining specification *will provide a superior standard* of insulation and fire protection to the minimum standard as laid down in the new Act, and at the same time ensure EXTREME DURABILITY.

Technical data sheets on constructional details, planned fire protection and specification recommendations, finishes, etc. are available.
You are recommended to write for details or for consultant advice NOW!

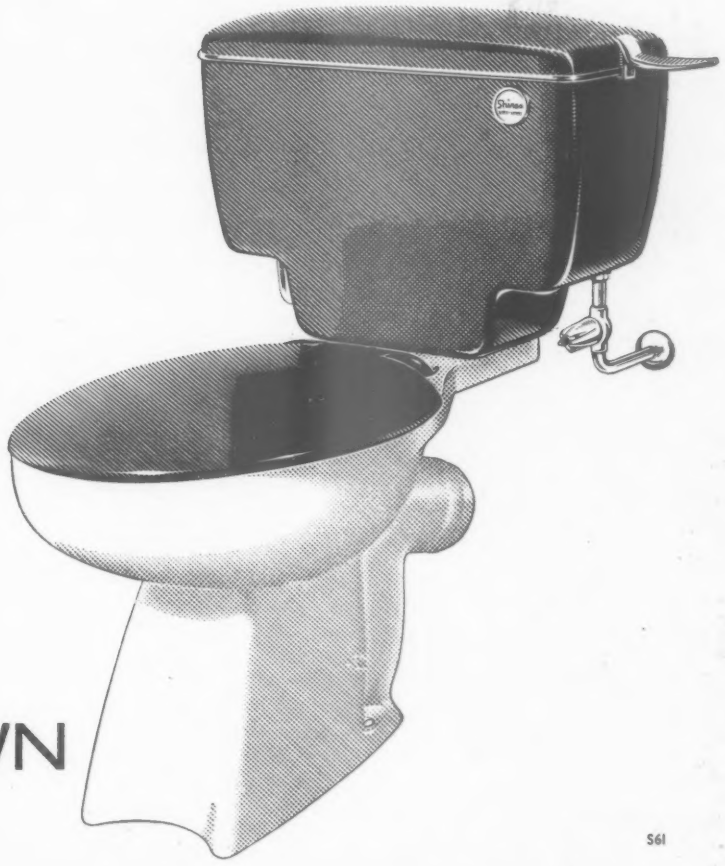
ASBESTOLUX

The non-combustible asbestos insulation board

Manufactured by:
CAPE BUILDING PRODUCTS LIMITED, COWLEY BRIDGE WORKS, UXBRIDGE, MIDDX
TELEPHONE: UXBRIDGE 4313
Also at: MANCHESTER . BIRMINGHAM · GLASGOW · NEWCASTLE
A subsidiary of The Cape Asbestos Company Ltd.
AX9

REVOLUTIONARY!

FIRST CLOSE-COUPLED SUITE WITH PLASTIC CISTERN AND POTTERY WASH-DOWN PAN



561

Shires UNI-LYNX

The Shires UNI-LYNX is the first close-coupled suite to combine plastic cistern and pottery wash-down pan. It's years ahead in design—scientifically *and* aesthetically. That's why it was chosen by the Council of Industrial Design for inclusion in a display of sanitary and plumbing equipment that was awarded a Gold Medal at the 1958 Brussels International Exhibition.

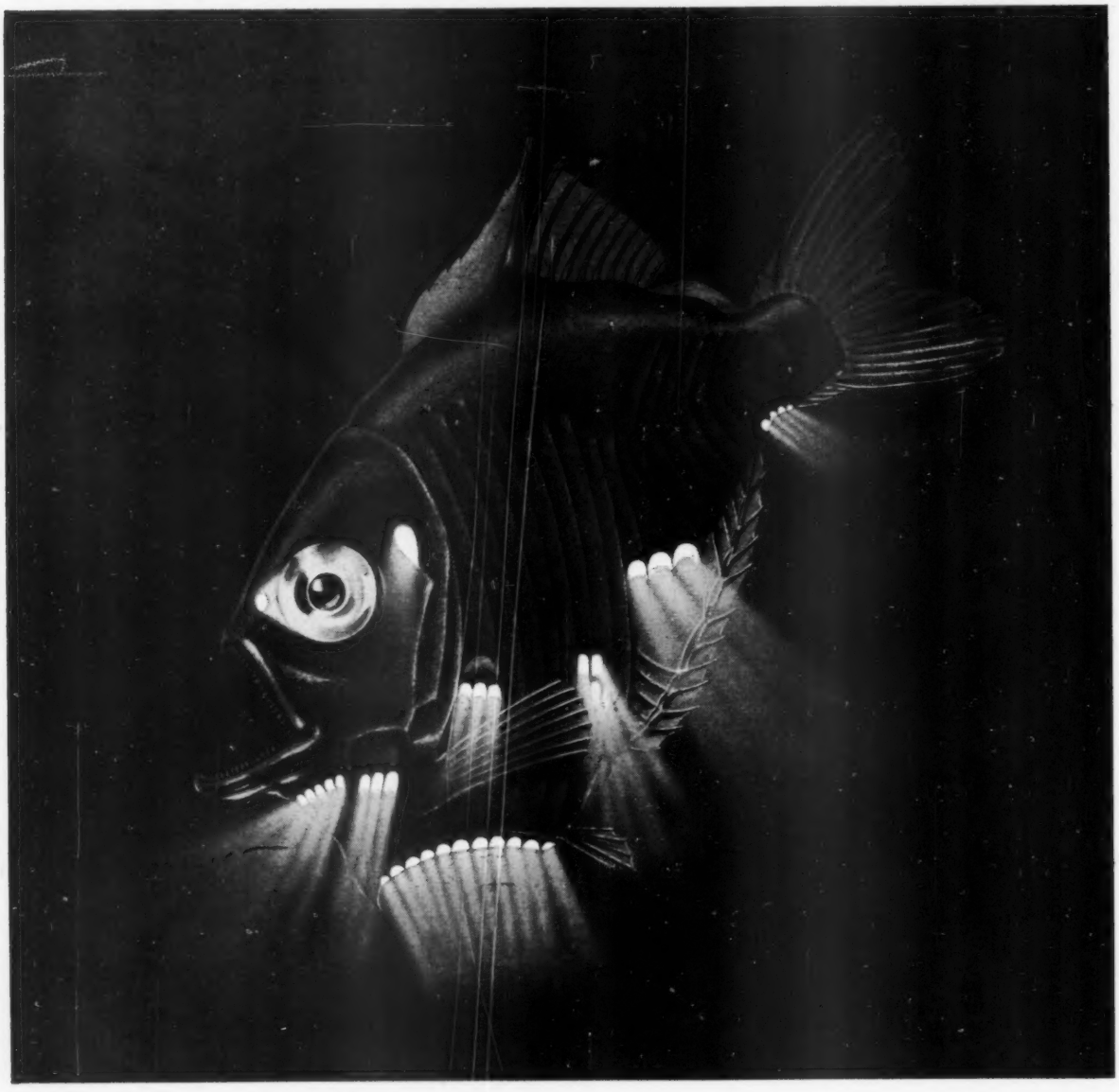
- Unfailingly efficient! The UNI-LYNX has Shires silent-flush 'Hydromatic Action'—a design of ducts and channels directing water in correct volume to the right places to effect controlled maximum efficiency.
- Neat, compact—low height—short projection.
- Wash-down pan with trap to BSS 1213 dimension to eliminate risk of blockage.
- Chromium-plated, all-brass supply fittings—incorporating Shires registered design volume control valve.
- So easy to install! No flush pipes or brackets required. Replaces high level suites at minimum cost.
- Fitted with Shires 'Continental' seat—beautifully designed, flexible, immensely strong—and no buffers!
- Virtually unbreakable Duranite cistern and seat in black. Seat cover in choice of ten colours. Also available with Keramic cistern and matching pan in choice of seven colours.

SHIRES ARE THE LARGEST MANUFACTURERS OF FLUSHING CISTERNS IN THE WORLD

Full details and trade terms from
DIVISION A4, SHIRES & CO. (LONDON) LTD, GREENBOTTOM WORKS, GUISELEY, YORKS
and at LONDON, BIRMINGHAM & GLASGOW
Also supplied by W. & J. LAWLEY LTD, WEST BROMWICH

made by Shires
for your convenience

After "Aspects of Deep Sea Biology" N. B. Marshall (Hutchinson 1954)



The lady with the lamp The Hatchet Fish, *Sternoptyx diaphana,* can see where she is going even in the eternal blackness that prevails a mile down in the ocean. Nature has equipped her with an imposing lighting system of over sixty lamps which she can switch on and off as the need arises.

Millions of years of development may have gone into the perfection of the massed searchlights of the Hatchet Fish; in a much shorter time Siemens Ediswan lamps and fluorescent tubes have achieved the same high standard of reliability, the same fitness for the job they have to do, whether in your home, office or factory.

Join the Brighter Light Brigade

Ask for the following lighting catalogues:
Commercial, Industrial, General Service Lamps, Floodlighting.

SIEMENS EDISWAN Lamps and Lighting

SIEMENS EDISON SWAN LIMITED *An A.E.I. Company*
Lamps and Lighting Division, 38 & 39 Upper Thames Street, London E.C.4 Tel : CENtral 2332
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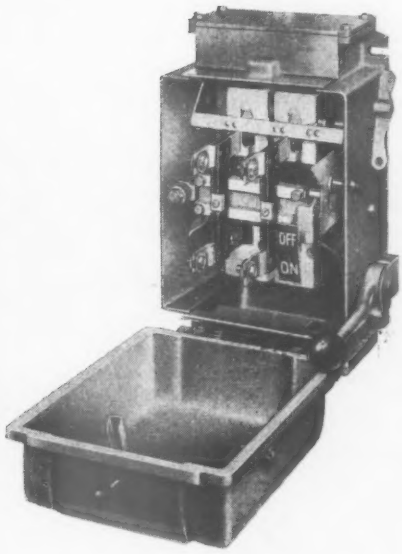


The **"Sandaclad"**

ISOEARTH

for SAFETY

The ISOEARTH is the well-proved "Sandaclad" Fuse Switch incorporating a simple device enabling the main control switch to be locked in the 'off' position, and at the same time earthing the outgoing conductors, thus implementing the recommendation of H.M. Electrical Inspector for safety when working on or near to trolley wires, exposed conductors, etc.

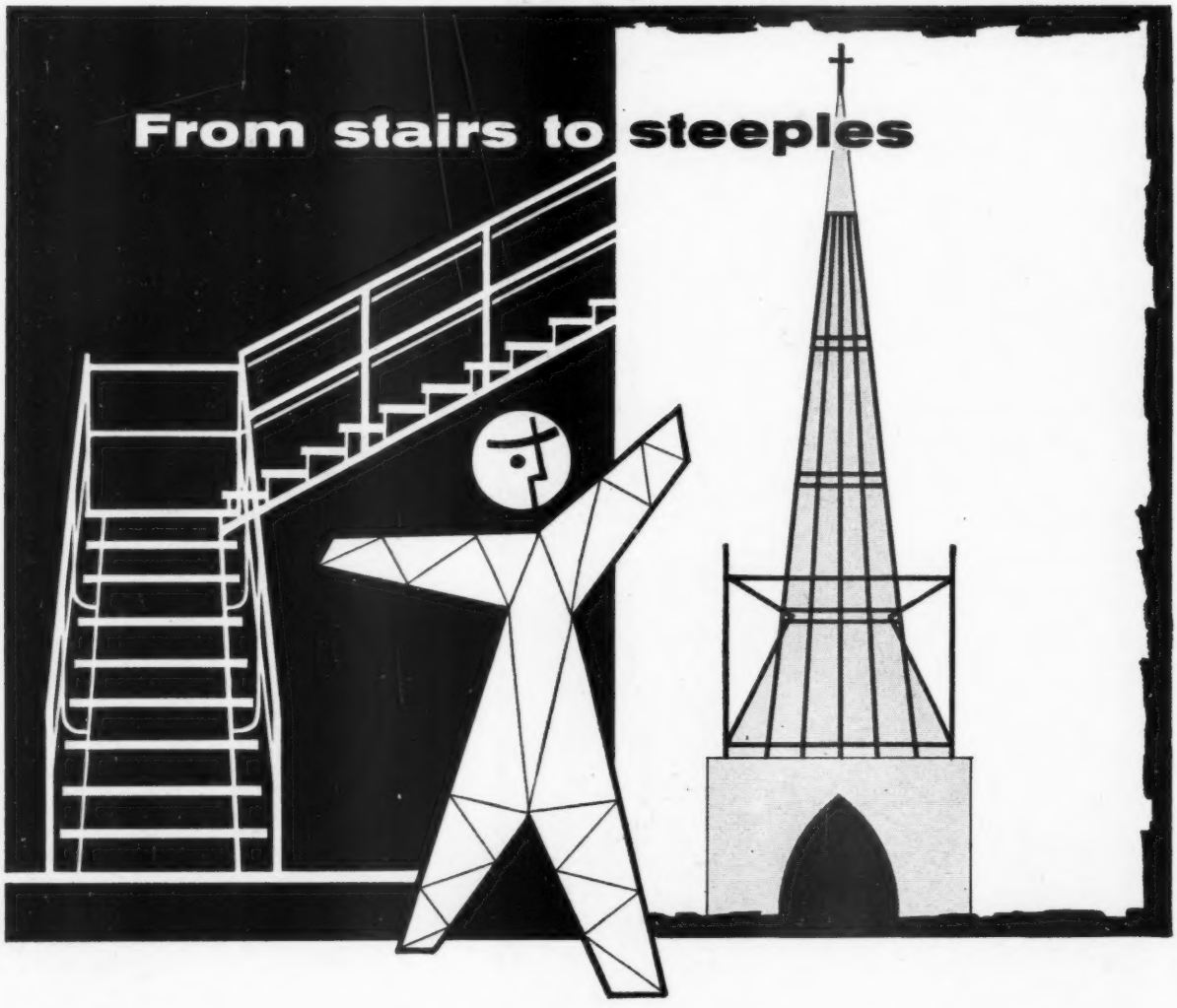
Details of this Switch and full range of other competitively priced products in new Catalogue 158/59.

Make sure you have a copy!

SANDERS
WEDNESBURY

The mark of superiority in Switch and Fusegear

WM. SANDERS & CO. (WEDNESBURY) LTD.
FALCON ELECTRICAL WORKS,
WEDNESBURY, STAFFS.



we make welded structures
in tubular or
sectional steel

for example

ROOF TRUSSES
LIGHT SHELL ROOF FRAMEWORK
STAIRCASES · SHOW STANDS
STORAGE RACKS · TOWERS · BRIDGES

Can we make anything for *you*—from component parts to complete structures? Distance no obstacle. Design service if required.

...BACKED BY EXPERIENCE

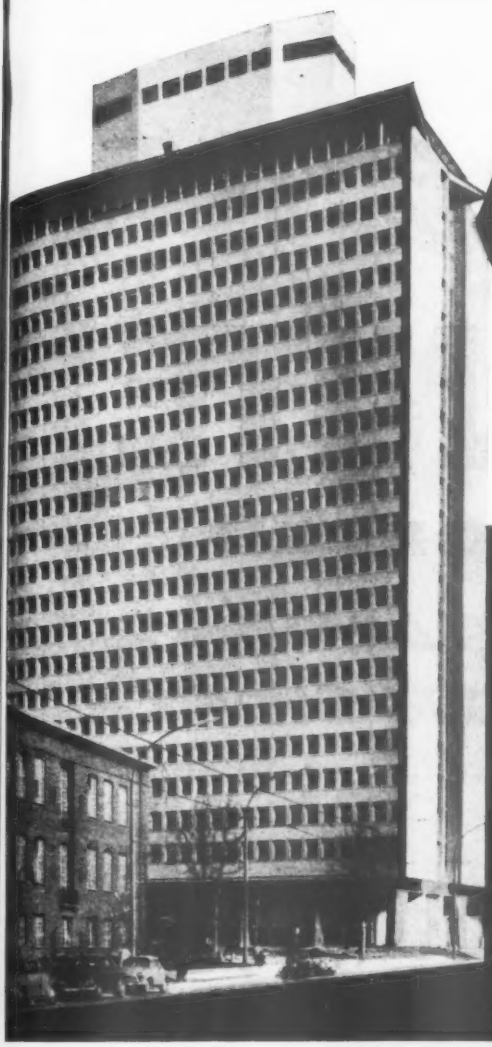
We fabricate welded structures not only at our London works but also at the Warrington Tube Company Ltd. in Lancashire, where we have specialized in tubular work for over 50 years. Another Company in our group, the Bar Construction Company Ltd., specializes in the design and erection of light shell roofing.

BIG BEN **WELDED STEEL CONSTRUCTIONS**

STEEL SCAFFOLDING CO. LTD

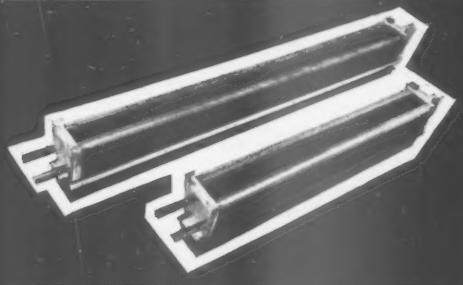
HEAD OFFICE & WORKS: UNION ROAD, LONDON S.W.4. TELEPHONE: MACAULAY 6660

TA968

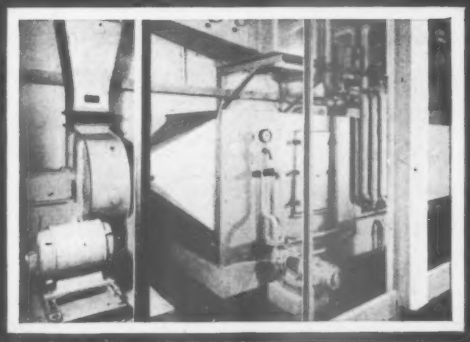


AIR CONDITIONING
with
SULZER
INDUCTION TYPE
AIR CONDITIONING CONVECTORS

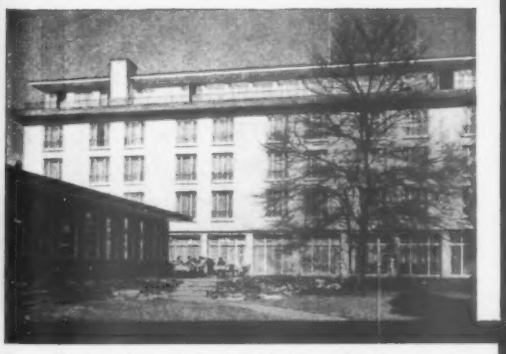
Reduces diameters of air ducts by 70%



Low level convectors require minimum space



Requires air treatment plant half the size of conventional plant



Illustrated above is a multi-story office block and a hotel equipped with Sulzer air conditioning convectors

Further advantages:-

Convectors work as normal radiators in off periods.
Sulzer convector system is practically noiseless in operation.
Ideal for individual regulation of sections or single rooms.

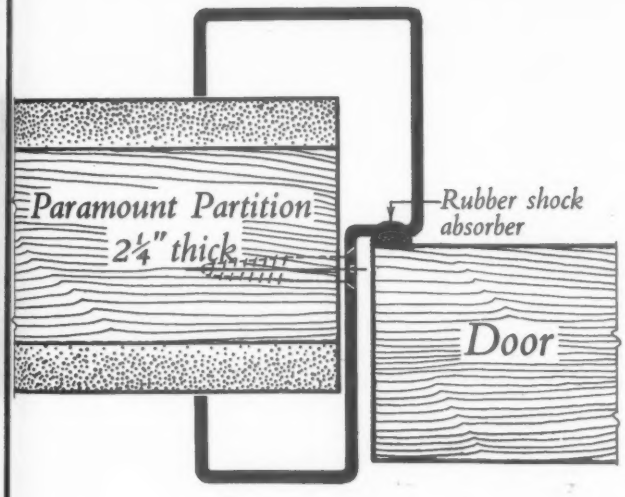
Write for information to:-

SULZER BROS. (LONDON) LTD.
12 Dyott Street, London, W.C.1.

Telephone: MUSeum 7890

BEACON STEEL DOOR FRAMES

NEW STANDARD PROFILE P FOR 2¼" PARAMOUNT PARTITION



Profile P is an addition to our standard range already made in profile A, B and C listed in our Door Frame Catalogue

Beacon Steel Door Frames are manufactured from zinc—coated mild steel sheet of 18 BG and painted one coat of grey calcium plumbate rust-inhibiting primer before despatch. Each door frame is provided with the following:

6 *csk. wood screws.*

2 *zinc-plated 5-knuckle steel hinges, one leaf welded into the frame and the other assembled with loose sherardized pin.*

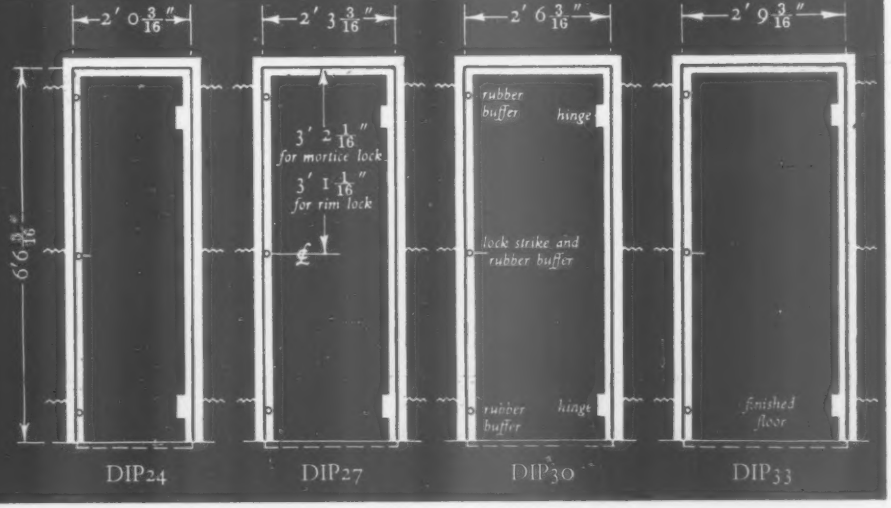
1 *hot-dip galvanized adjustable lock-strike plate with mortar guard.*

3 *rubber buffers (shock absorber s inserted in rebate of the lock jamb.*

Base-ties are of heavy corrugated steel and are adjusted before despatch to set frame to level of finished floor. Floor mixing plates are provided at bottom of each jamb)

Write for details

STANDARD TYPES AND SIZES NOW BEING MADE IN THE NEW PROFILE P



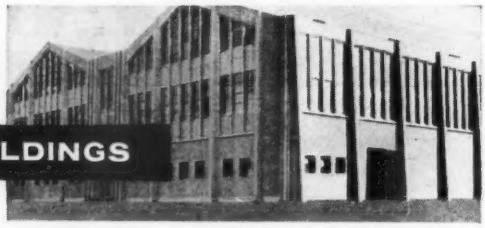
JOHN THOMPSON BEACON WINDOWS LTD · WOLVERHAMPTON

MS

DRI-SIL

silicone masonry treatments protect...

...NEW BUILDINGS



Central Engineering Works for Bryant & May Ltd by Beecham Buildings Ltd, Shipston-on-Stour, Warwickshire. Architects: Hastie, Winch & Kelly.
All prefabricated concrete components used in the construction of this building are treated with a water-repellent solution based on DRI-SIL 29.

...OLD BUILDINGS

All Saints Church, Hastings, mainly 14th century but contains older walling, part prehistoric. With passage of time the penetration of water through the walls has become more prevalent, resulting in the usual decay and fungus. Water penetration has been stopped with DRI-SIL silicone solution. (By courtesy of the Rector and Consultant Architect).

DRI-SIL silicone masonry treatments

- ★ Protect buildings from the damaging effects of weathering.
- ★ Keep buildings cleaner because water-borne dirt is less liable to penetrate into the surface pores.
- ★ Prevent staining and streaking.
- ★ Do not block the pores of building materials, thus do not inhibit "breathing".
- ★ Improve the thermal insulation of buildings by preventing the absorption of moisture by the walls.

...BRIDGES & ROADS

Highway overpass after a rain storm. The treated part of the concrete fascia (right) has not absorbed the water and is much more visible than the untreated section on the left. Silicone treatments also prevent spalling or scaling due to frost action on concrete road surfaces.

THESE FIRMS SUPPLY WATER-REPELLENT MASONRY TREATMENTS BASED ON DRI-SIL. IT IS IMPORTANT TO NOTE THAT TREATMENTS SHOULD CONTAIN 3 TO 5% ACTIVE SILICONE BY WEIGHT FOR SATISFACTORY PERFORMANCE ON MOST SUBSTRATES.

Allweather Paints Ltd, London WC2
Atlas Preservative Co Ltd, Erith, Kent
Bartoline (Hull) Ltd, Hull, Yorks
Lewis Berger (Gt. Britain) Ltd, Chadwell Heath, Essex
Bitulac Ltd, Newcastle-upon-Tyne 1
S. Bowley & Son Ltd, London SW11
British Bitumen Emulsions Ltd, Slough
British Paints Ltd, Newcastle-upon-Tyne 2
Cambridge Timberproofing Laboratories Ltd, Trumpington
Chemical Building Products Ltd, (Dept. DS3), Hemel Hempstead
John S. Craig & Co Ltd, Glasgow
Stuart E. Dickens Ltd, Borehamwood, Herts
Duresco Products Ltd, London SE7
Evode Ltd, Stafford
T. & W. Farmiloe Ltd, London SW1
Farrow & Ball Ltd, Verwood, Dorset
Alexander Fergusson & Co Ltd, Glasgow
Floorlife & Chemicals Ltd, London EC3 and Manchester 17
Joseph Freeman & Sons & Co Ltd, London SW18
Grangersol Ltd, Watford
John Hall & Sons (Bristol & London) Ltd, Bristol
Hydrol Ltd, London W3
Indestructible Paint Co Ltd, London W1
Irish Cold Bitumen Ltd, Belfast
Leyland Paint & Varnish Co Ltd, London W1 and Leyland
George Lillington & Co Ltd, Mitcham
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Architects and contractors are invited to write for full information and details of extensive tests on DRI-SIL masonry treatments carried out in this country and in the U.S.A. DRI-SIL is a registered trade mark of Midland Silicones Limited.

MIDLAND SILICONES LTD
(Associated with Albright & Wilson Ltd. and Dow Corning Corporation)
first *in British Silicones*
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SIGHTHILL HEALTH CENTRE — *designed by the Department of Health for Scotland.*

Electric floor warming at the Sighthill Health Centre

Sighthill was designed as an Experimental Centre under the National Health Service Act. The building forms a hollow square round a central courtyard. The north wing holds administrative departments on the ground floor and dental theatres on the first floor. The south wing houses the joint services departments. The east wing comprises child welfare services and the west wing is divided into six medical suites.

Fully controlled warmth

The building is heated by electric low temperature underfloor radiant heating. This is thermostatically controlled and designed to maintain against an outside temperature of 25°F. the following inside temperatures: surgeries, recovery and X-ray rooms 70°F.; passages and lavatories 60°F.; kitchen 52°F.; other rooms 65°F. Electrical intake is "off peak" and available between 7 p.m. and 7 a.m., and 11 a.m. and 3 p.m.

Loadings

Total loading amounts to 262 kW and is designed for off-peak operation. This load comprises 232 kW embedded in the concrete floors and 30 kW in concealed wall panels. The total floor area of the building is 35,000 sq. ft.

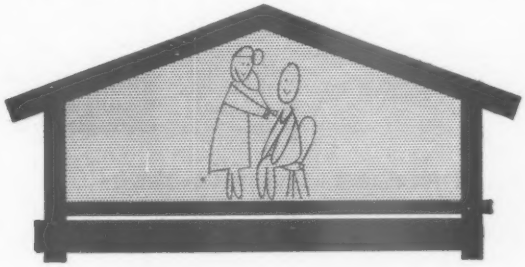
A variety of floor finishes tested

Floor finishes laid were: wood block, cork tile, thermoplastic, mastic asphalt, Caithness stone slabs and terrazzo. All these have given very satisfactory service under heated floor conditions.

Results

The installation has been running for over five years and the average annual consumption for floor warming purposes is 418,960 units costing £1,400.

Thermograph records were taken during the winter 1955/56. These show that when, in February 1956, the mean daily outside temperature was 22.6°F., the maximum drop in inside temperature during the cut-off period was only 2.6°F. Even under these extreme conditions the internal air temperature did not fall below 60°F.



Issued by the
Electrical Development Association, 2 Savoy Hill,
London, W.C.2. Telephone: TEMple Bar 9434.

WHERE SIMPLE OR COMPLICATED SCHEMES OF VENTILATION ARE INSTALLED, AND THE OPERATION IS REQUIRED BY REMOTE CONTROL OR OTHERWISE, AND THE WINDOWS HAVE ANY OF THE FOLLOWING CHARACTERISTICS :—

- OPENING OUTWARDS
- OPENING INWARDS
- TOP HUNG
- HORIZONTAL CENTRE HUNG
- BOTTOM HUNG
- VERTICAL PIVOT HUNG
- SIDE HUNG
- HORIZONTAL SLIDING
- VERTICAL SLIDING

The illustration shows One set of Electrically operated Twin Tension Rod Gear with Counter-Balance Unit operating one continuous opening light, 74' 0" long × 5' 0" deep. Note the Spiral Balance Wheel fitted at the end sprocket.

DOUBLE SECURITY

for glass panelled doors

YALE NO. ONE Double Cylinder automatic deadlatch

1 Lever handle can be locked against turning by key from the inside – and the door slammed shut. Latch can, of course, be opened by key from the outside.
The latch bolt can be locked in "withdrawn" position by depressing hold-back plunger.

2 The latch bolt has a normal $\frac{9}{16}$" throw. When the door is closed it is thrown forward automatically another $\frac{3}{16}$" and is *deadlocked* against end pressure, and for further security the lock is fitted with Yale's special anti-pick mushroom drivers.
This ingenious and practical cylinder rim deadlatch is one of the huge range made by Yale. A range which includes cylinder and lever, rim and mortice locks of all kinds . . . for all types of security risks. Please order through your usual Merchant or Ironmonger.
Literature: explanatory leaflets and detailed specifications will gladly be sent on request.

SPECIFICATION

Case & Staple Zinc Alloy Pressure Cast. Concealed fixing. Standard Enamelled Nickel Bronze finish. $3\frac{1}{16}$ x $2\frac{9}{16}$ x $1\frac{1}{4}$ in.
Alternative finishes :— Chromium-plated all over. Cream, B.M.A. Finish all over.

Striking Plate With reverse bevel bolt for doors opening outwards.

Springbolt Brass, polished. Reversible.

Auxiliary Bolt Brass, polished.

Lever Handle Zinc Alloy Pressure Cast. Regularly supplied. Brass plated. Independently spring loaded. Three pin tumblers.

Hold Back Plunger Brass, polished. Press-button action.

Cylinder Brass, polished (List No. 1109). Five pin tumblers.

Keys Two, List No. 8. Nickel Silver. Changes practically unlimited.

Backset $2\frac{3}{8}$ in.

For Doors From 1 in. to $2\frac{1}{2}$ in.

Packed One in a box. Complete with screws.

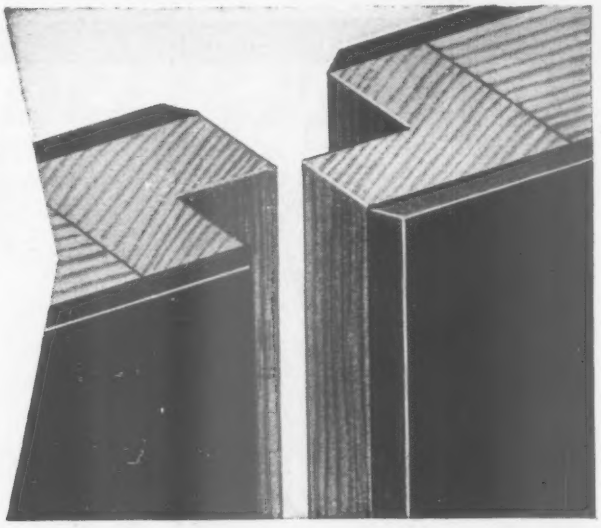
Master Keyed If desired.

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

YALE
REGISTERED TRADE MARK

The YALE & TOWNE Manufacturing Company
British Lock & Hardware Division · Willenhall · Staffs

Here's something NEW in partitions



★ RAPID DRY-CONSTRUCTION

★ FLEXIBLE LAYOUT

★ DE-MOUNTABLE

★ LOW COST

★ HARD SURFACE

★ SOUND REDUCING

★ DURABLE

Thanks to their ingenious design, STRAMIT 'MOVAFLUSH' PARTITIONS can be erected really quickly. Whilst top and bottom edges of each hardboard-faced Stramit panel are finished with square timber, the long edges have an L-shaped member. This means that successive panels can be rapidly, easily fitted together to give a flush finish. These new, dry-construction partitions are simply placed on a sole-plate and secured, being fixed to one another with screws which are neatly seated in brass cups.

STRAMIT 'MOVAFLUSH' PARTITIONS comprise essentially the familiar and well-tried Stramit building slabs and so have all the advantages of Stramit. They are strong, rigid, fire-resistant and have remarkable sound-deadening properties. As STRAMIT 'MOVAFLUSH' PARTITIONS are faced with hardboard, they offer an exceptionally good surface for decoration.

For all their outstanding advantages, STRAMIT 'MOVAFLUSH' PARTITIONS are surprisingly low in price. They are supplied complete with all timber-sections, doors, screws and cups for vertical joints (glass and door furniture are not included) and delivered to site. Owing to careful prefabrication, the costs of erection and decoration are kept to a minimum.

STRAMIT 'MOVAFLUSH'

-THE EASY-TO-ERECT PARTITION

POST NOW FOR DETAILS

Please send me, without obligation, full details of Stramit 'Movaflush' partitions

NAME .....

ADDRESS .....

.....

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For the attention of .....

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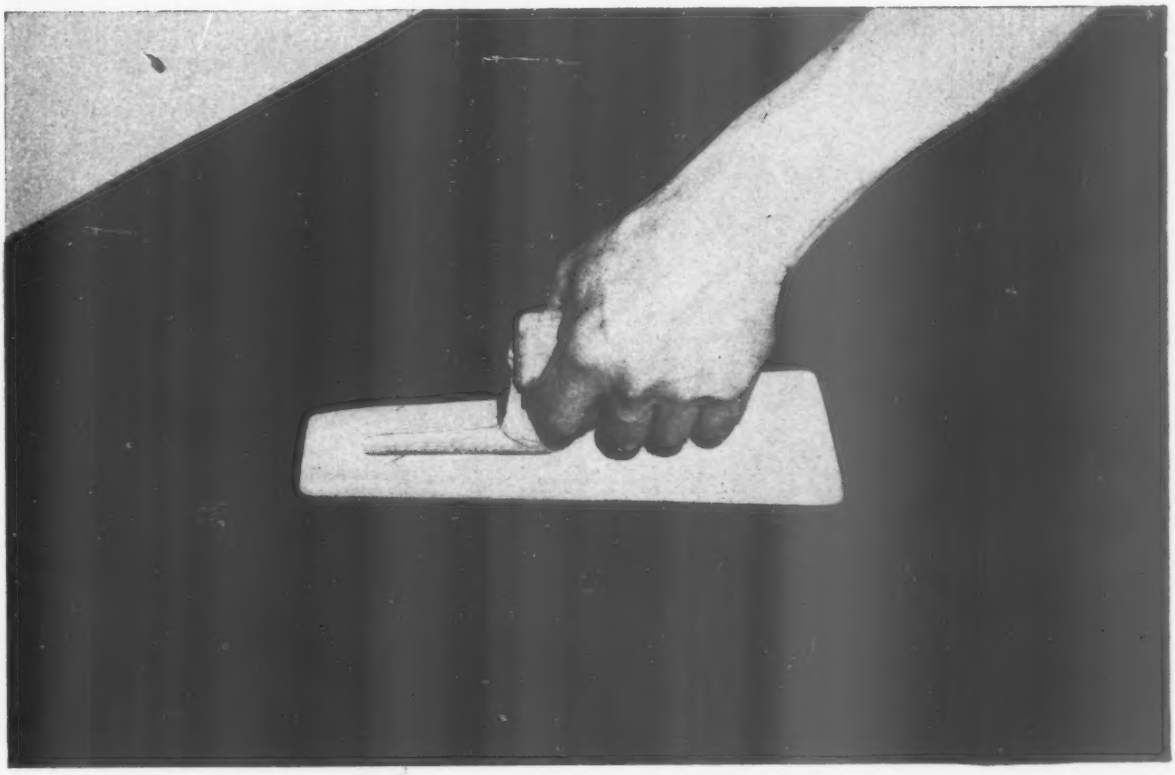
WOULD YOU BELIEVE IT?



When specifying a coloured cement floor, a coloured wall rendering or joints in brickwork, ensure that the colouring compound to be used conforms with British Standard. In doing so, you may avoid specifying a product that contains adulterants and cheap earth colours.

A material cheaper than the pure pigment is added, but the adulterant plays no part in producing colour, and high proportions of this type of colouring compound must be used to stain the concrete to which it is added. Consumer cost is thus increased and strength of the concrete or mortar is reduced.

For example, to stain concrete to a brick red shade, only 3 lbs. of Febtone are required per cwt. of cement. In contrast, if an adulterated colour is used, the proportion of colour may have to be increased up to 10 lbs. per cwt. of cement to form the same shade.

The reason for this is easy to see—because the colouring matter of Febtone consists of pure pigment, free from adulterants, it conforms with British Standard 1014—1942, Type A, and in consequence maximum staining power is obtained with a relatively small amount of colour.

Write now for the Febtone Shade Card

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FEB (GREAT BRITAIN) **LTD.**

ALBANY ROAD, CHORLTON-CUM-HARDY, MANCHESTER, 21 CHO 1063

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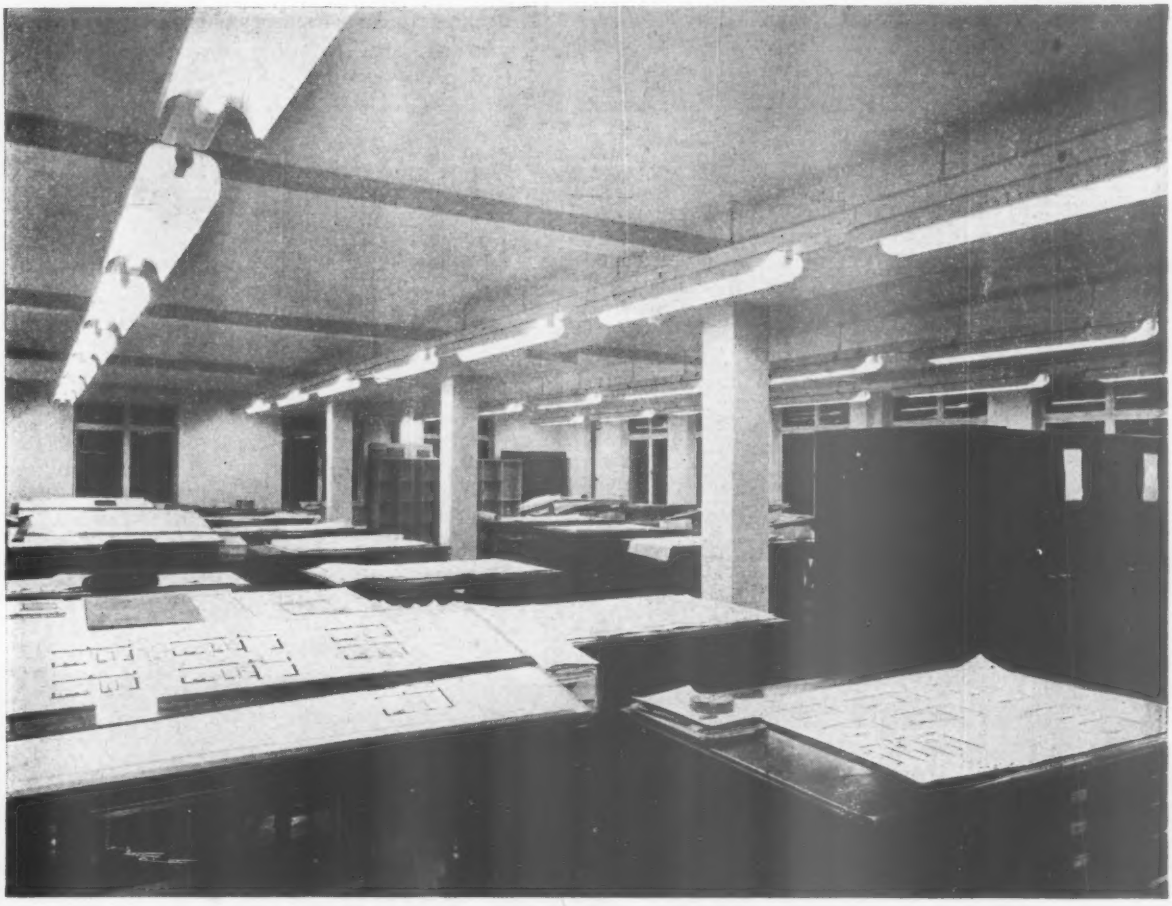
Free Lighting Design Service...



George Wimpey & Co. Ltd., Birmingham.

helps to build for the future

The Philips Lighting Design Service offers comprehensive expert advice from a team of experienced lighting engineers and a qualified architect who has made a special study of light in relation to colour — all this, *without charge or obligation.* The service has, since its inception, been responsible for many of the most imaginative lighting schemes devised in recent years. You can avail yourself of it simply by asking your electrical contractor or getting in touch with Philips direct.

PHILIPS ELECTRICAL LTD *LIGHTING DIVISION*

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Alaflor aluminium flooring and treads are specified when SAFETY AND ECONOMY form the main considerations.
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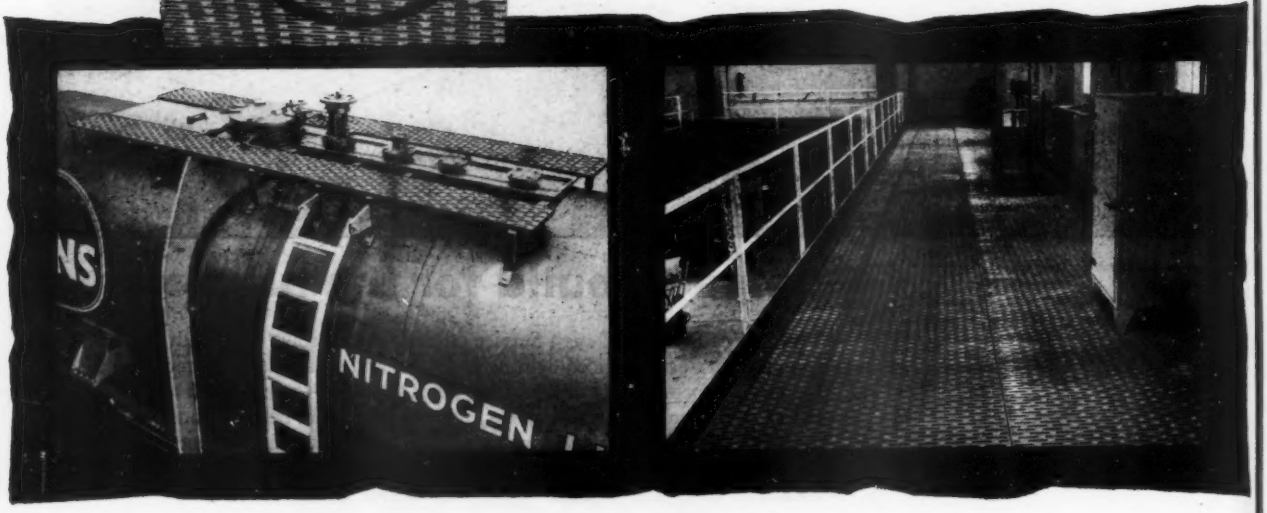

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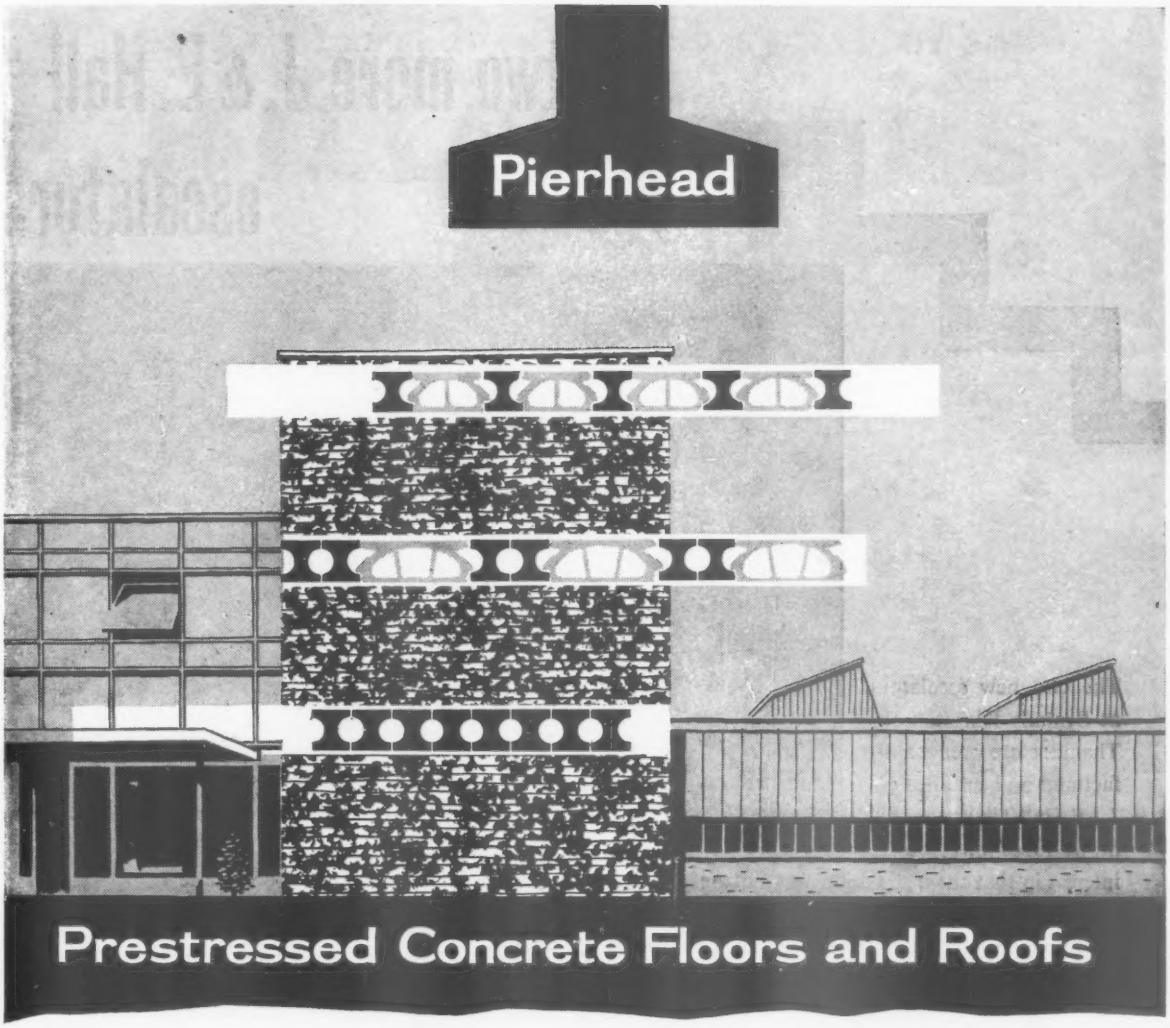

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ARCHITECTS: J. Douglass Mathews & Partners, in association with Skidmore, Owings & Merrill, New York, U.S.A.

MAIN CONTRACTORS: Messrs. A. Monk & Co., Ltd., Padgate, Warrington.

Leonard Fairclough office block.

ARCHITECTS: Hermon Crook & Williams, A.R.I.B.A. Chartered Architects, Surveyors and Valuers, Incorporated Arbitrators.

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two more J. & E. Hall escalators

Architects: T.P. Bennett & Son.

The two new escalators at Bentalls Kingston-on-Thames store were manufactured and installed by J. & E. Hall. The announcement is of particular interest in that the installation was not only completed in record time but actually took place during normal shopping hours without in any way interrupting the service to the public, in fact the latter showed keen interest in the work.

Technical Details

Type	*32 'U'*
Capacity (persons per hour)	*5,000*
Service	*Ground to first floor*
Displacement	*15 ft.*
Operating speed	*90 f.p.m.*

Casings

Mouldings and Deckings	*Aluminium Alloy, gold anodised.*
Panels	*Faced with "Warerite" stardust buff.*

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AP 117

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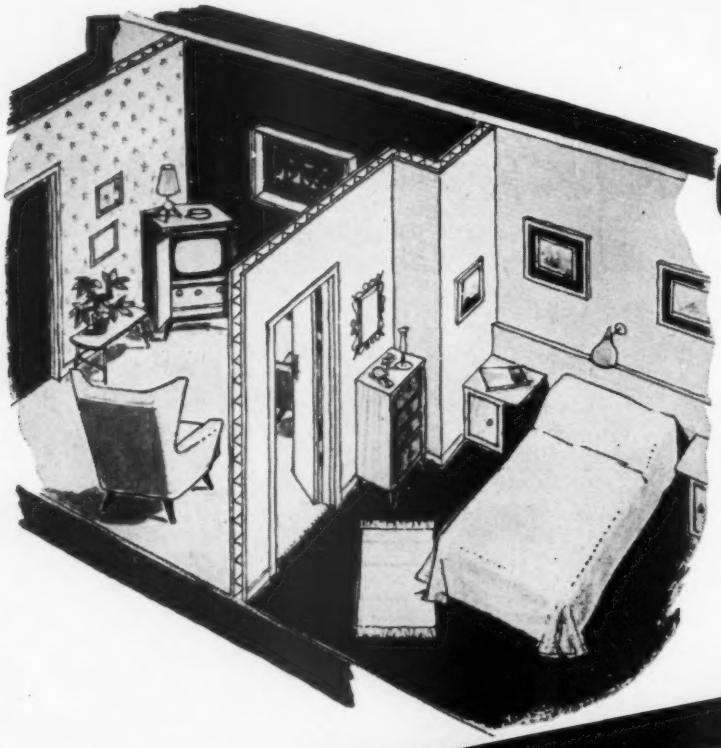

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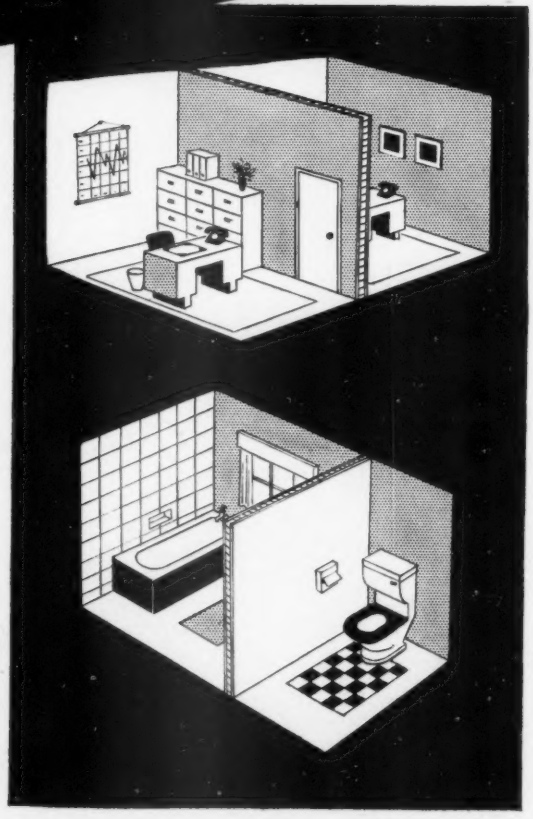

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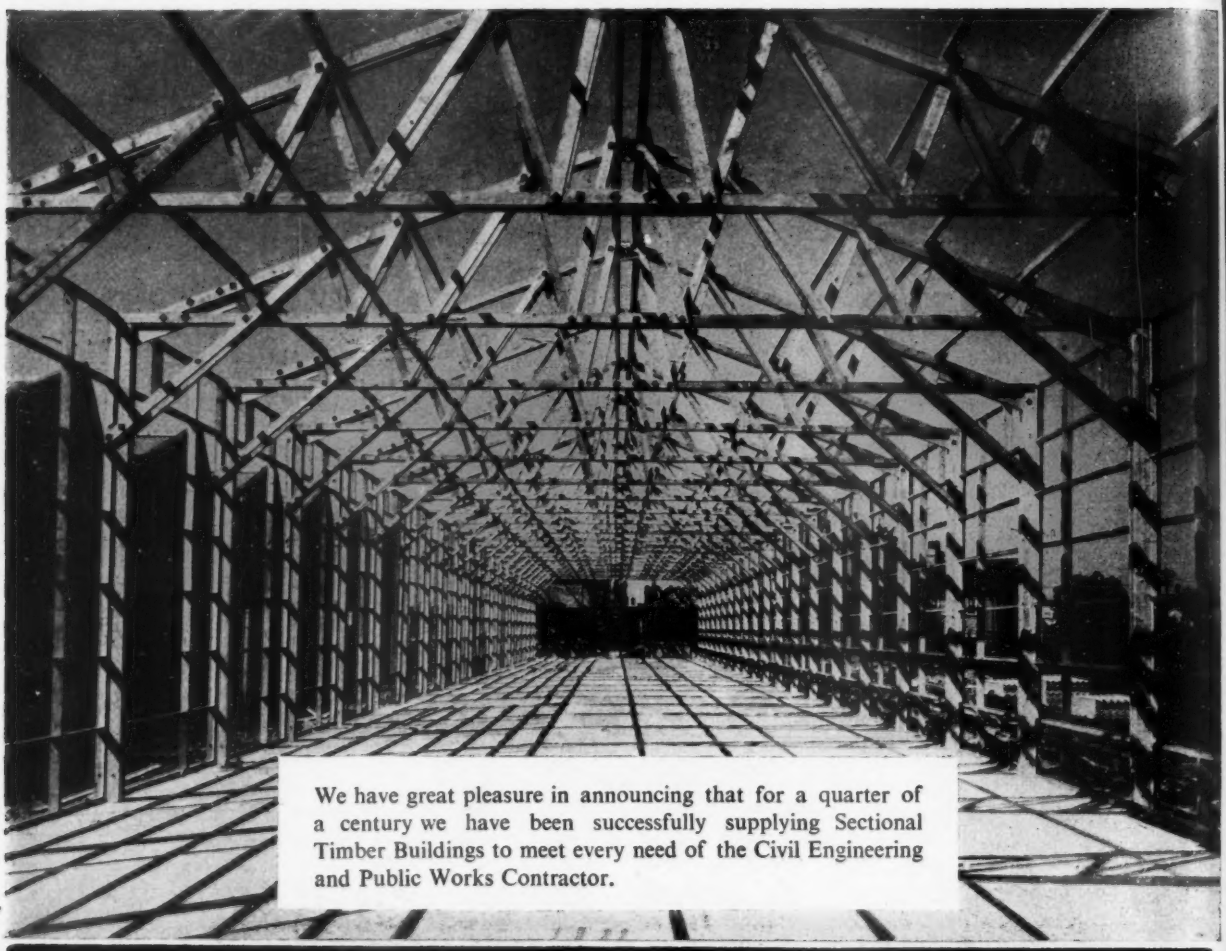

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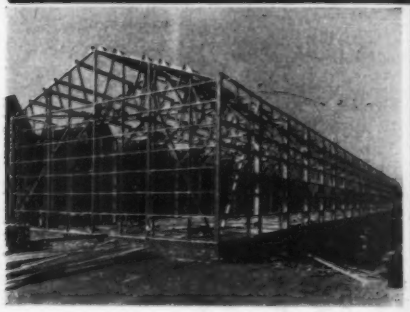

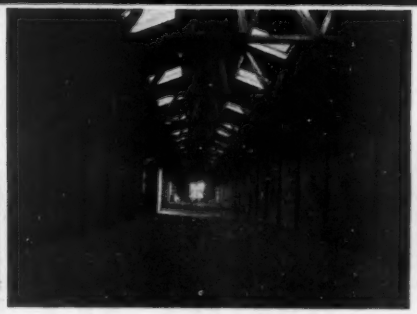

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CASE RECORDS FROM THORNS' FILES - 2

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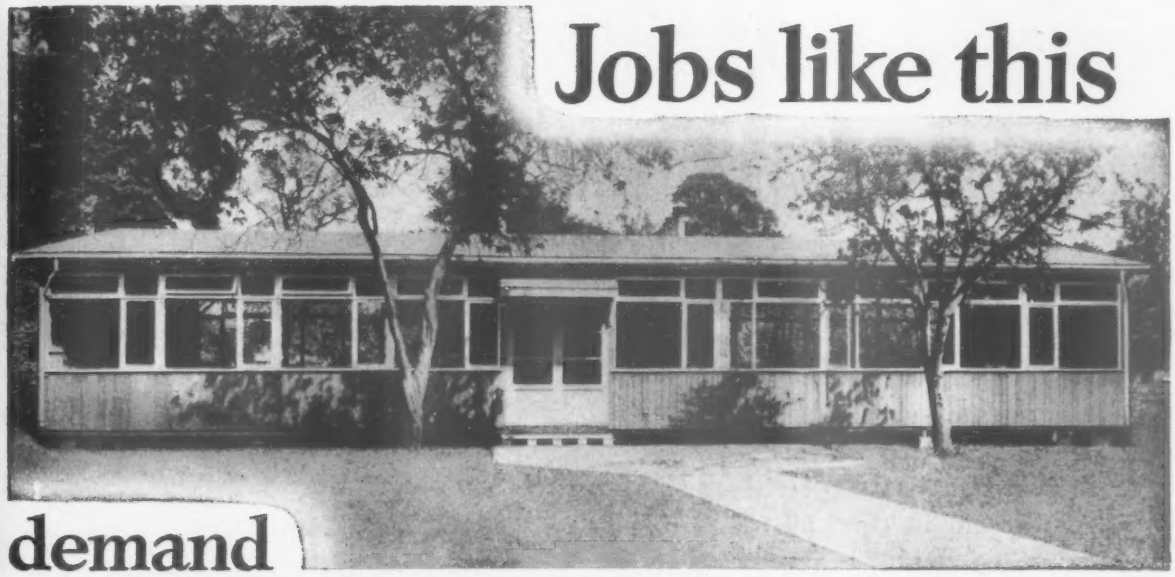

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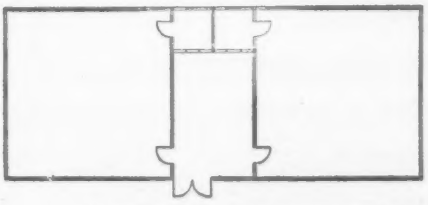

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Photographs by courtesy of the County Architect, Gloucestershire County Council.

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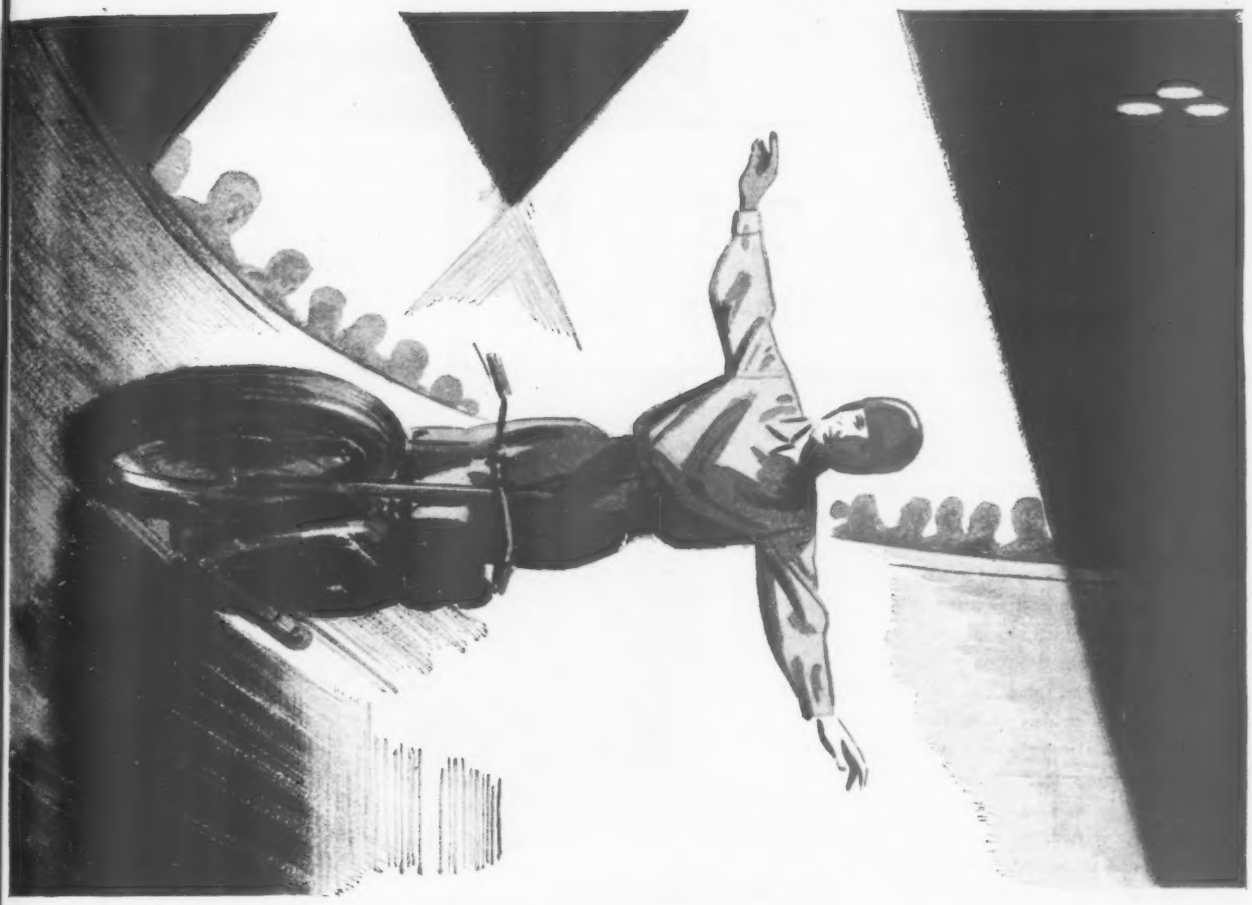

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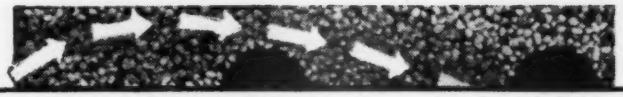
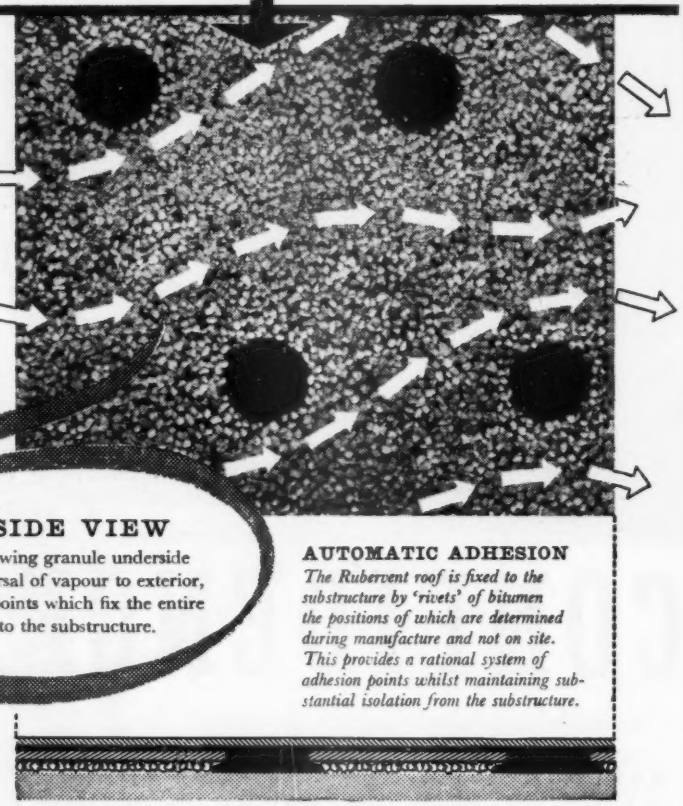


ISOLATION
ventilates built-up roofs

An entirely new technique by RUBEROID

Two innovations make Ruberoid Rubervent a built-up roof that is revolutionary in both design and effect: it *isolates* the weather-proofing from substructure surface hair cracks and *ventilates* the substructure so that vapour pressures may disperse through fully communicating spaces. Rubervent, using glass fibre based bitumen materials, is inorganic and inert. The first layer is coated on the underside with coarse mineral granules. These granules support it uniformly and isolate it from the substructure, thus allowing water vapour and gases to disperse over the entire roof area and ultimately to the exterior atmosphere. Any blistering which might otherwise result from this cause is prevented. All layers are bonded together and to the substructure simultaneously thus avoiding the risk of damp and dirt between the layers. Rubervent is based on the practical experience of associated Ruberoid companies in Europe.



UNDERSIDE VIEW
of Rubervent showing granule underside which allows dispersal of vapour to exterior, and the adhesion points which fix the entire specification to the substructure.

AUTOMATIC ADHESION
The Rubervent roof is fixed to the substructure by 'rivets' of bitumen the positions of which are determined during manufacture and not on site. This provides a rational system of adhesion points whilst maintaining substantial isolation from the substructure.

USES For all substructures to which bitumen will bond, i.e. non-nailable materials — particularly insulating concretes.
SPECIFICATIONS 2 or 3-layer for pitched, flat or curved roofs.
FINISHES Mineral Surfaced Glass Fibre Based Ruberoid Roofing, Rubervent Mineral Topping or Ruberdal Tiles.
FIXING Rubervent roofs are supplied and fixed only by the Contract Division of The Ruberoid Company.
COST A firm estimate for the supply and fixing of Rubervent will be promptly supplied on receipt of plans or quantities for a specific project.

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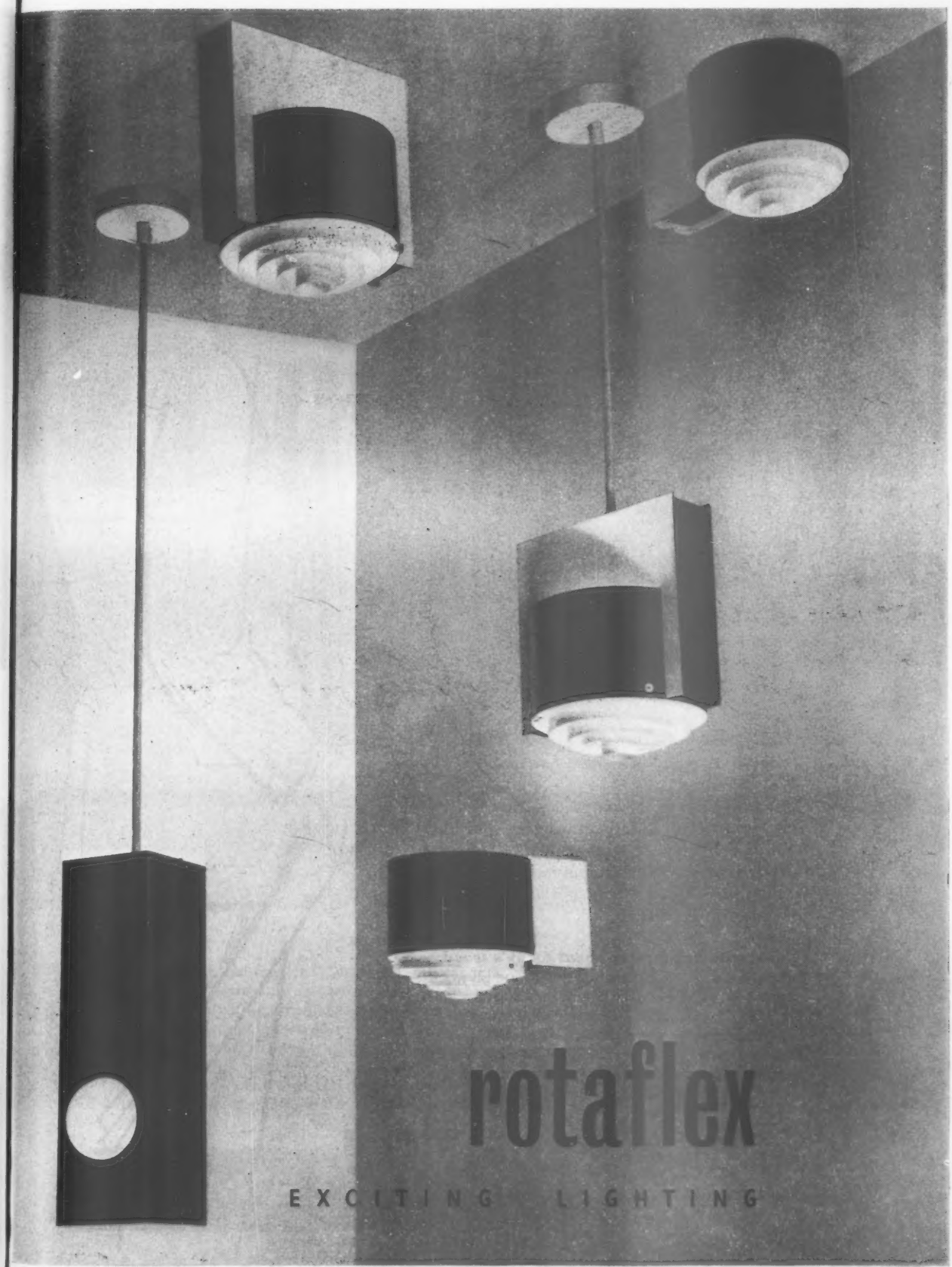

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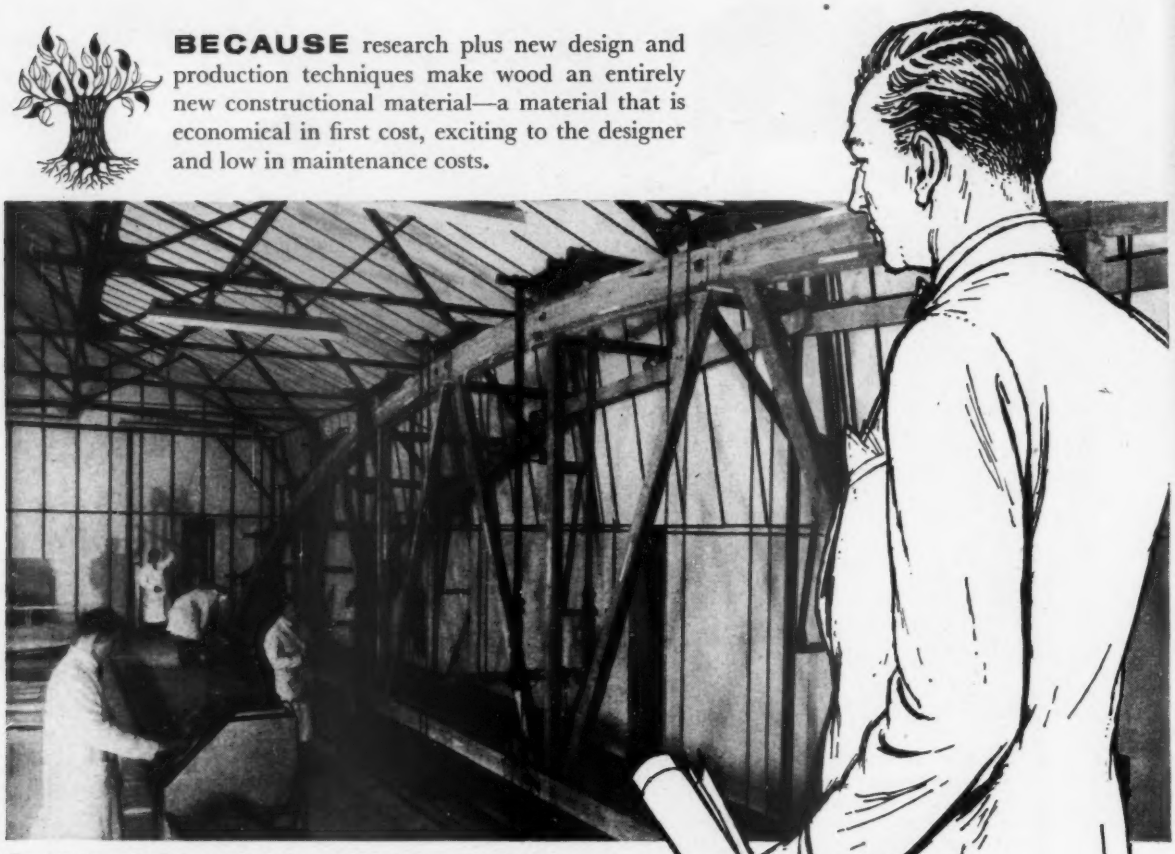

Bowstring truss, 80 ft span, under load test at T.D.A. Research Laboratories.

This truss is a typical example of advanced design and construction in 'new era' wood. The 'tied arch' provides wide spans and is a low-cost, maintenance-free roof structure. It has good fire endurance. Spans of up to 180 ft have been designed by T.D.A.

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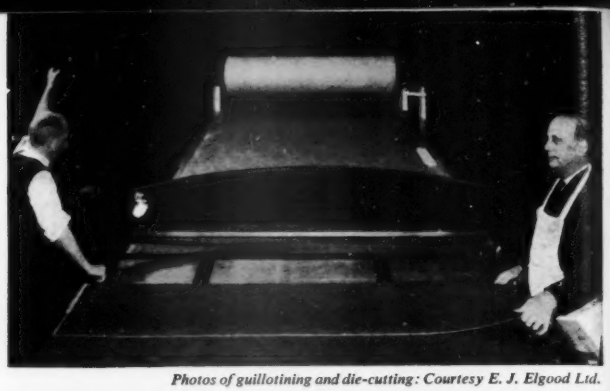
TGA/TD/157

This is the second in a series of articles designed to interest and inform architects on the techniques and scope of linoleum opportunities open to them with modern linoleum floorcoverings.

linoleum contractors' techniques

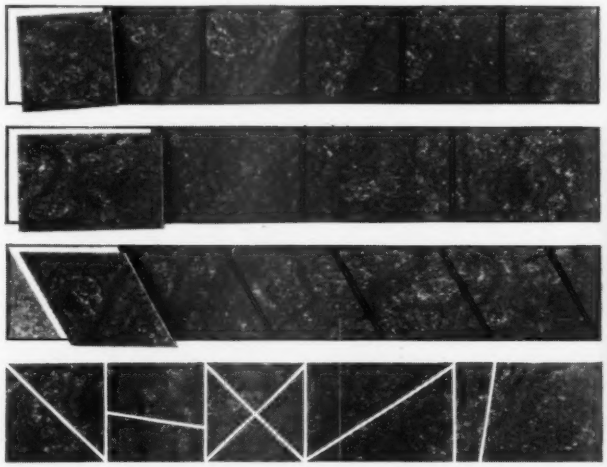
To an increasing extent in the last few years, flooring contractors have cut linoleum into tiles instead of laying it in the form of sheet; some of them say that they use tiles for 90% of their work. This article explains some of the reasons for the change and suggests ways in which the architect can turn this new flexibility to advantage.

Linoleum in sheet form is still cheaper to lay when large unobstructed areas are to be covered; but when faced with complex outlines and central pillars, especially in cramped areas, flooring contractors have found that they can install tiles with very little waste of material, and at costs that are competitive with sheet linoleum. It is here that some knowledge of the contractors' techniques and working methods can help the architect to design interesting floors and still keep down costs.

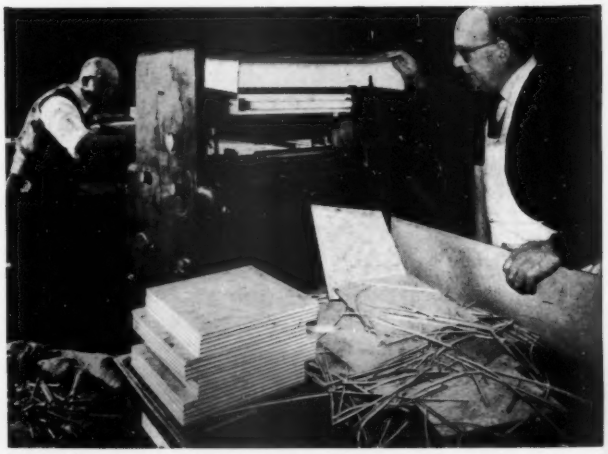


Photos of guillotining and die-cutting: Courtesy E. J. Elgood Ltd.

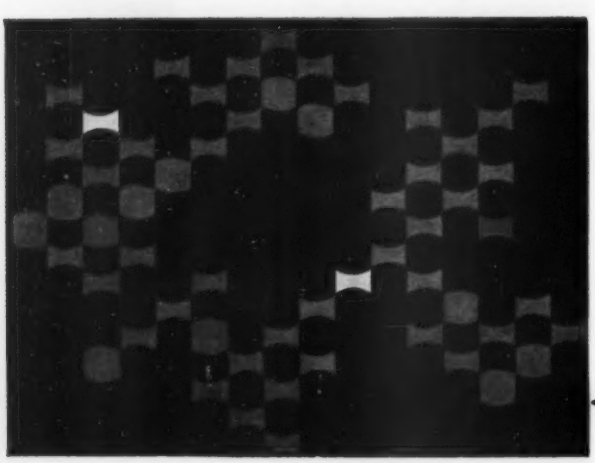
Cutting tiles The contractor uses a guillotine to cut 'slabs' of linoleum across the roll, wide enough to allow a small margin for trimming the tile later. The tiles themselves can be hand-cut by knife—a slow and expensive process—guillotined, or die-cut.

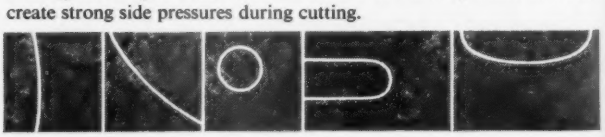


Guillotining Hand-operated or power-driven guillotines can cut squares, oblongs and triangles almost equally economically.



Die-cutting Some contractors have semi-automatic machines that cut tiles up to 18″ square in one movement. These machines also accept special dies to cut other shapes—such as those below—simultaneously with the rectangular tile. (Both parts of the tile should be used in the design to minimise waste.) The design of such shapes should avoid running the shaped cutter into the corner of the tile, where it would create strong side pressures during cutting.





Strip cutting Lacing strips and border strips, in widths ranging from ¼-inch to 18 inches, are used to form decorative effects or borders. (For use as borders, they are cut slightly wide to allow for fitting to irregularities of the wall line.) The cutting machine slices almost through the thickness of the linoleum to make the strips, which are then finally separated as required by the layer on site.

Economical tile sizes Since linoleum is delivered in rolls 72 inches wide, contractors find the following sizes the most economical to cut:

NOMINAL: * 9 inches, 12 inches, 18 inches, 24 inches, 36 inches.

* *Actual sizes are approximately ¼-inch less than the nominal sizes of all purpose-cut tiles.*

THE USES OF SHEET LINOLEUM

This article does not, of course, set out to show that tiles have entirely replaced the traditional way of laying linoleum in sheet form—even where the architect wants to introduce designs in his floor. Below are three ways of using sheet linoleum in individual situations:—

Hand-cut designs Linoleum is easier than most floor coverings to cut into individual designs, and cutting by hand offers the designer the greatest possible freedom of treatment in producing a spectacular floor like the one shown below. At such a focal point—it was, in fact, John Piper's 'Baroque Room' in *The Observer's* Film Festival—the extra cost would be amply justified.

Courtesy Design magazine

IH SYMBOL DESIGNED BY RAYMOND LOEWY
Courtesy International Harvester Company of Great Britain Limited

Hand-cut motifs Most contractors employ craftsmen who will enjoy reproducing in linoleum a motif like this one, being laid in the entrance hall of International Harvester's offices in City Road, London.

Repeated motifs hand-cut by template For special purposes, the contractor can make a hardboard or metal template to cut out several motifs—and the corresponding spaces for them in the background colour.

NAIRN DESIGN BOOK

A full-colour book illustrating new directions in floor design will soon be available to all interested architects. If you would like to receive a free copy immediately upon publication, please write to: Michael Nairn & Company Limited, P.O. Box 1, Kirkcaldy, Scotland.

NAIRN MELOTONE LINOLEUM

The new range of colours of Nairn Melotone Linoleum, consisting of 8 muted shades with softly blended marking, is illustrated on the right-hand edge of this page, together with a selection of colours from the plain and marble ranges in 4.50 mm gauge. A large selection is also available in 6.70 mm gauge. Please write for information to one of the addresses below or consult your technical representative.

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Technical representatives, based at our offices in different parts of the country, are at your service to give advice or information on all matters concerning floorcovering materials. If you wish to consult one of these representatives, please write or telephone to any of the following offices:

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BIRMINGHAM 2: 65 Temple Row
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BRISTOL 4: 349 Bath Road
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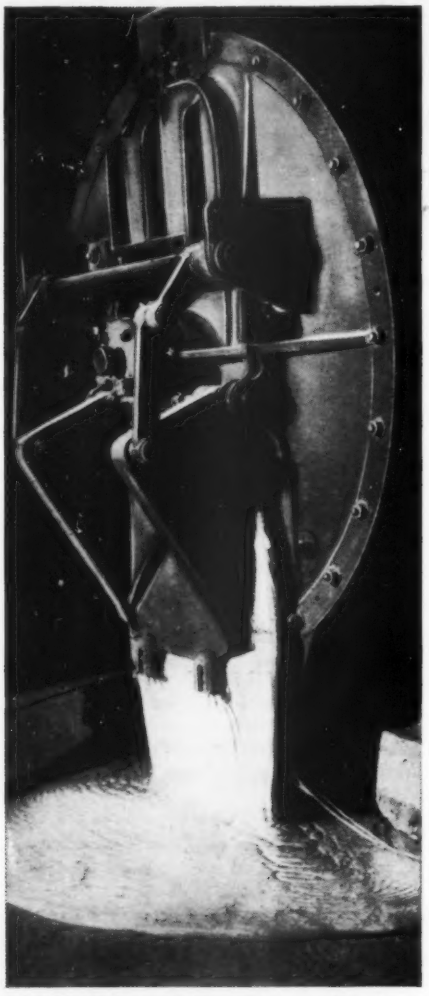

Oxidised linseed oil entering cooling bay.

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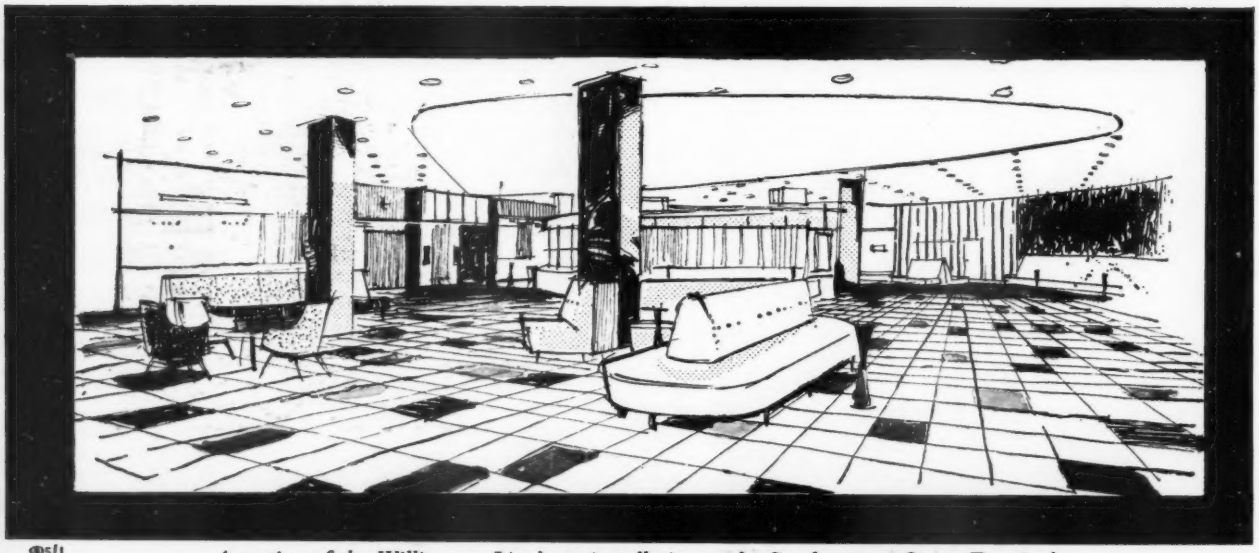

Φs/1

A section of the Williamson Linoleum installation at the Southampton Ocean Terminal. Contractors : Messrs. Heals (Contracts) Limited. Messrs. Semtex Limited.

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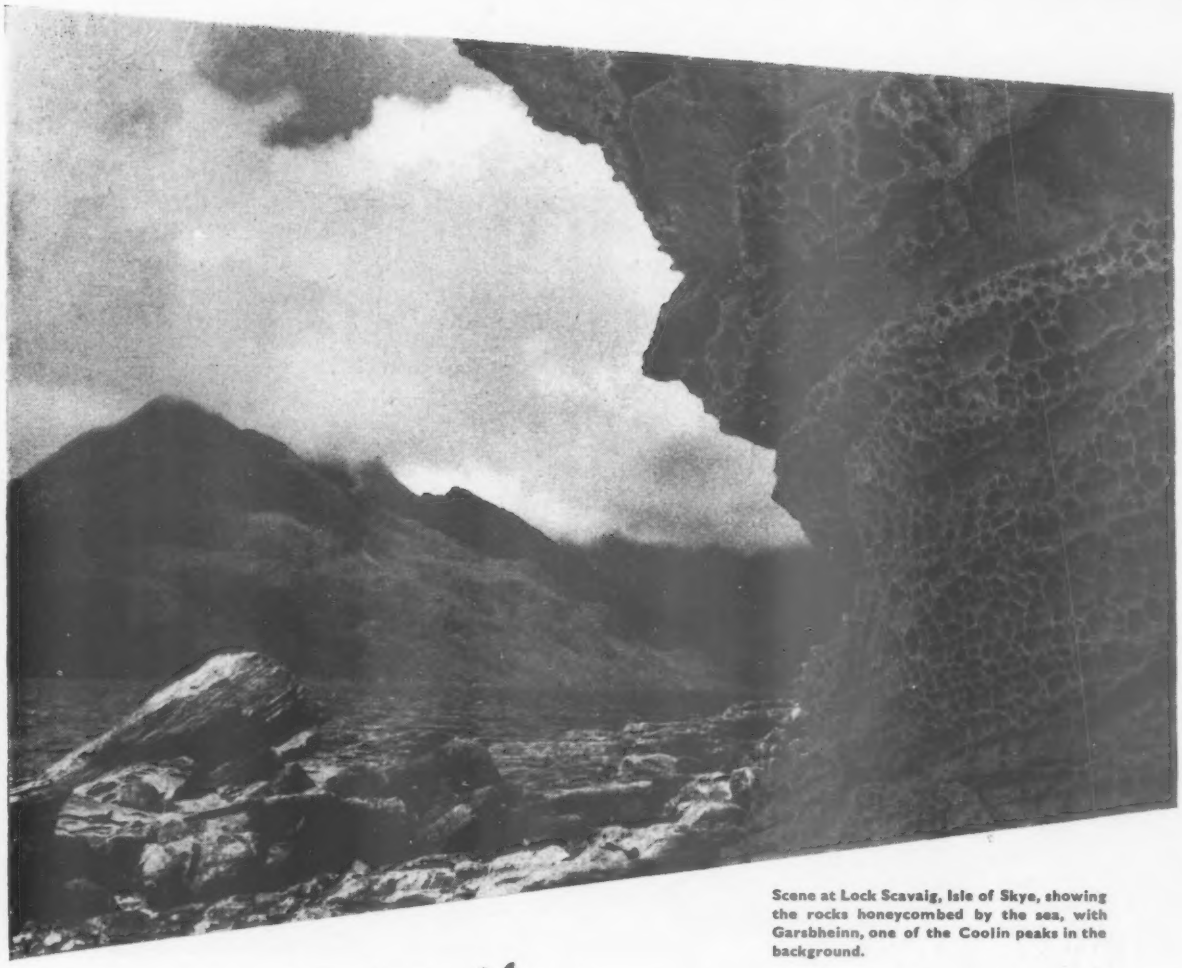

Scene at Lock Scavaig, Isle of Skye, showing the rocks honeycombed by the sea, with Garsbheinn, one of the Coolin peaks in the background.

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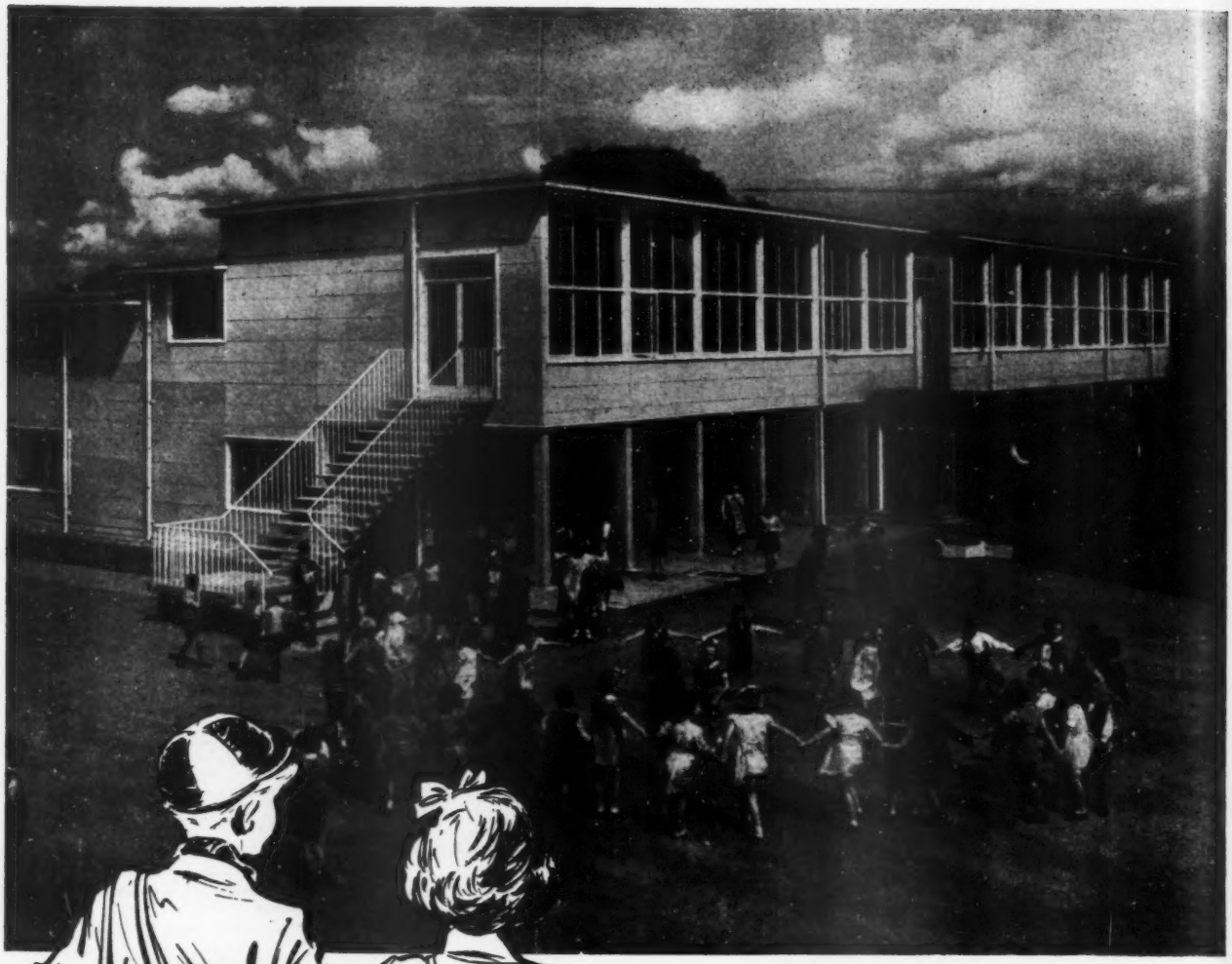

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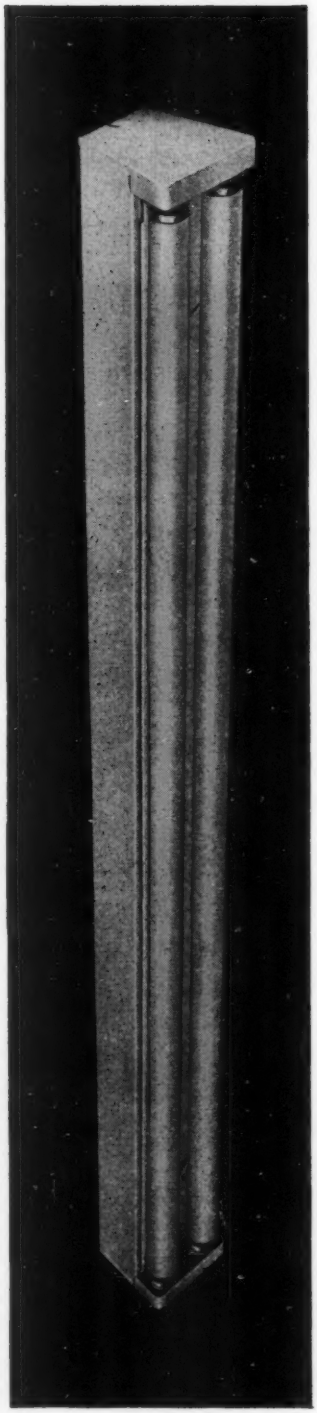

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GENERAL FEATURES

Lamping Generally, all models are available for 5 ft., 4 ft. and 2 ft. lamp lengths in single, twin and triple lamp arrangements.

Control Gear Starter or quickstart.

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Suspension— Variable centres, for ½", ⅜" or ¾" diam. conduit. Keyhole slots are provided for direct ceiling fixing.

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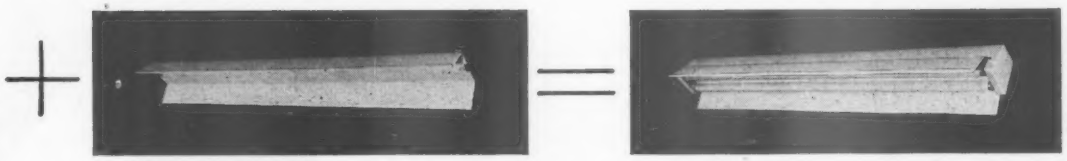

Metal Reflector, open ended

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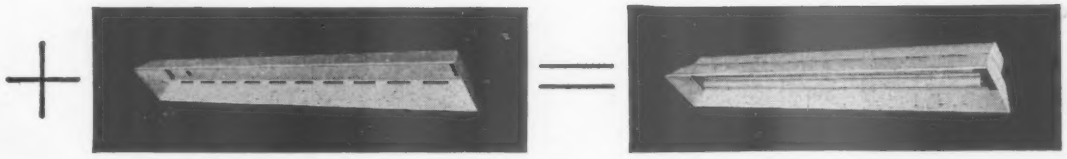

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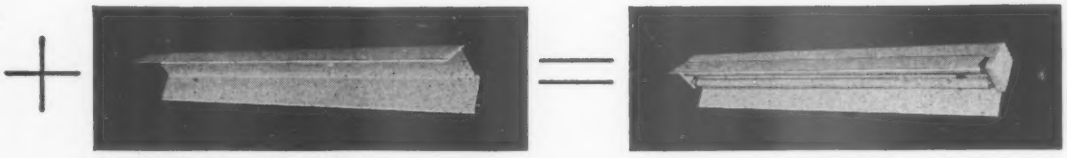

Perspex Reflector, open ended

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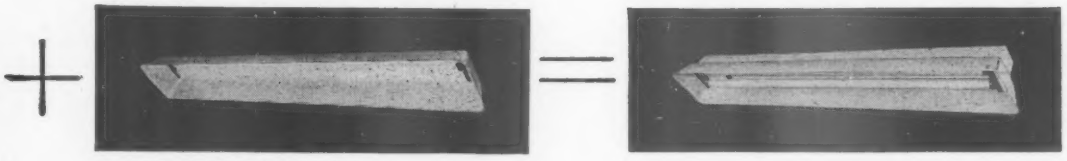
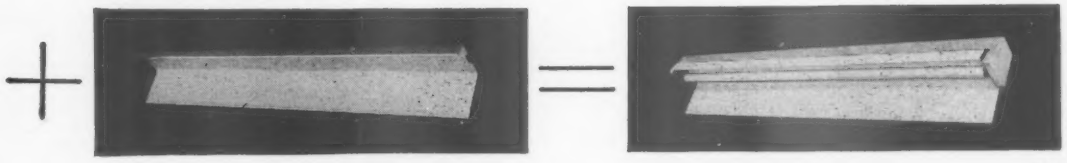


Perspex Reflector, closed ended

MENDIP



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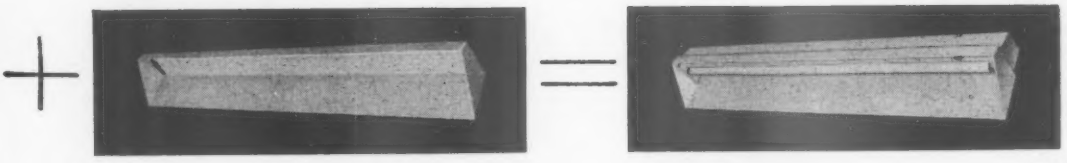

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AP 63

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and keeps warm and
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Borough Surveyor,
S. F. Dixon, M.T. MUN.E., L.R.I.B.A.
Chief Assistant Architect,
R. E. Carlick, A.R.I.B.A.

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MOTROPOLIS

A study of the Traffic Problem

Contents

MOTROPOLIS

Can we get out of the jam?

Is Motropolis, the motorized city, going to be dominated and destroyed by the motor, or is it to be a city in which civilized man lives a civilized life, using the motor vehicle sensibly and economically as a tool for mobility? One of the most useful and efficient tools ever invented is today being used wastefully and destructively. Politicians, administrators, engineers and planners, even architects who are alive to the aesthetic implications of the disrupted city, are apparently blind to the immensity and complexity of the problem the motor vehicle raises. In this article Malcolm MacEwen offers no cut-and-dried solutions, because research and clear thinking about Motropolis must come first. He shows from American experience that the attempt to solve traffic congestion merely by spending money on roads is a bottomless pit, and questions whether any solution can be found if we allow public transport to be squeezed almost to death, and rely excessively on the private car for personal transport. Malcolm MacEwen also

foresees disaster if traffic continues to be treated as primarily an engineering problem. It is, he believes, a planning problem, to be attacked from many sides by a diversity of skills; and the architect, because he cares for cities, can contribute much in the struggle to control the powerful destructive forces embodied in the motor car today.

A FOOL'S PARADISE

It seems to be taken for granted by most people who talk about the traffic problem that a workable and completely acceptable solution can be found, provided enough money is spent on roads and enough care is taken in their location and design. The RIBA is anxious that architects should be given the opportunity to make sure that the new structures look all right, and that they do not carve the city into meaningless fragments or march unfeelingly across the landscape. The motoring and road transport interests campaign energetically for two panaceas—the construction of motor roads and the training of more traffic engineers. Even the Select Committee on Estimates, which put its finger unerringly on the lack of research and scientific planning behind the Government's road programme, and suggested that higher priority be given to removing urban bottlenecks, implied that if bottlenecks could be removed the traffic problem would, somehow, be solved.

" We have had enough planning, now we want some action . . . Now is the time to get the bulldozers to work because even if a fleet of bulldozers was turned loose in London and all the drivers were blindfolded they could not do very much unnecessary work because of the immensity of the problem."

Col. S. Maynard Lovell, Past President of the Institution of Highway Engineers

" Our problem is so urgent that we cannot stop to think."

J. H. H. Wilkes, Somerset County Surveyor (Urban Motor Roads Conference, 1956)

All those who take this simplified view of traffic problems are living in a fool's paradise. The motor vehicle, and more particularly the private motor car, is daily effecting a revolution and creating new problems of unparalleled complexity to which no simple answers can be found. The misuse of the motor car, and our failure to plan and reconstruct our cities to make the best use of all forms of transport, has created a fantastic paradox that the more we use an instrument whose sole justification is speed, the slower we are able to move.

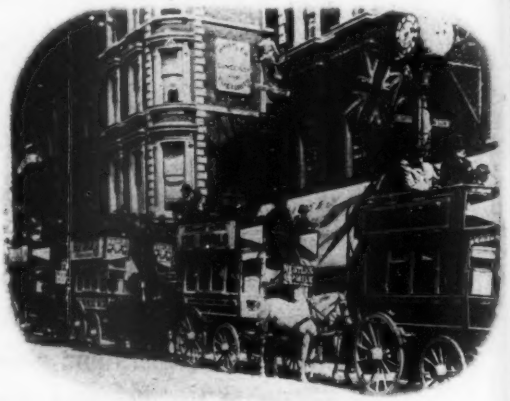
In 1914 the London General Omnibus Co. scheduled its services at 8¼ m.p.h. Today, after 45 years of speed-up and technical advance, omnibuses in central London average 8¼ m.p.h., and very much less in rush hours.

The increasing use of the private car (or motor cycle) for journeys to and from work is not only increasing congestion on the roads, but is driving the public transport services steadily towards bankruptcy. The logical end of this process would be complete reliance on the private motor vehicle for all personal journeys. This has already happened in parts of the United States, and it can happen here if present trends continue. Yet neither government, local planning authorities, traffic experts nor anybody else recognize that European and American experience and theory afford no foundation for the belief that an acceptable solution exists for the problems that arise when there is one or more cars for every family, and public transport is being squeezed out of existence. For at this point, if not before, it seems to be physically impossible (except perhaps at unbearable cost and disastrous damage to the civilized qualities of the city) to provide the physical space required for the circulation and storage of all the vehicles that would attempt to use the central areas. The London Transport Executive has estimated that if only 25 per cent of London's daily commuters were to arrive by car (7 per cent do so now) the parked cars would occupy 1.9 square miles.

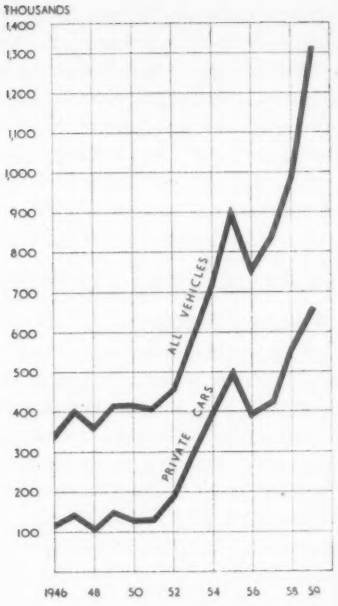
The purpose of this article is not to offer any new cut-and-dried solution, but to examine this process of motorization, and to emphasize above all the need to place the study of traffic problems and the preparation of road-building programmes on a completely scientific basis.

The problem

The first thing we have to do is to attempt to forecast as accurately as we can the future growth of motor traffic. For some unexplained reason the Ministry of Transport has never acted upon the scientific estimates of the Road Research Laboratory, and has consistently under-estimated the rate of growth. There are today some 8½ million motor vehicles, of which nearly 5 million are private cars. There is one car to every 10 people, and we have the most crowded roads in the world (42 vehicles per mile of road at the end of 1958, or about one vehicle to every 42 yards

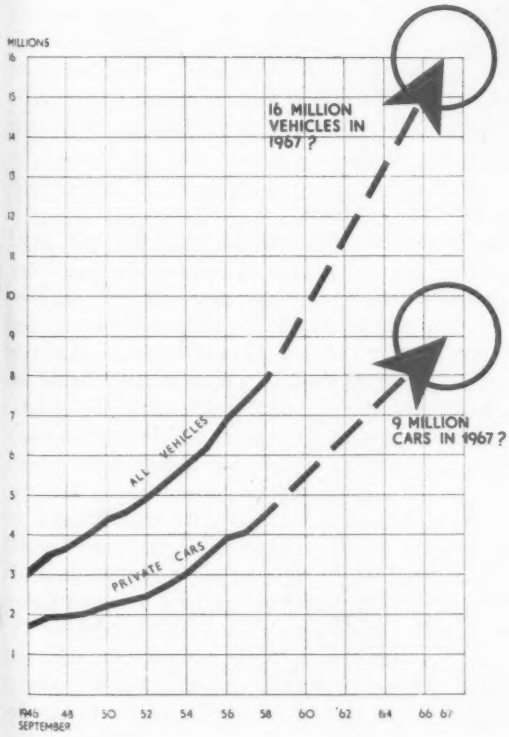


Picturesque? Yes. Slow? Not by current rush-hour standards. London's last horse buses, seen in the Strand, averaged about 4 m.p.h., quite a respectable rush-hour figure in present-day Central London.



Above: New vehicle and private car registrations, in thousands. The figure for 1959 is calculated by doubling the number of registrations in the first six months. The sharp increase in registrations this year has been swollen by a relatively big increase in the number of scooters.

The number of cars registered this year is easily a record, but the automation of the motor industry has still a long way to go; and it depends for its economies on an ever increasing volume of production.



Left: Total vehicle and private car registrations, in millions, projected to 1967 on the assumption that new registrations continue to multiply at the rate of some 8 per cent per annum, compound. The sharp increase in new registrations this year suggests that the rise may be even more rapid. No plans exist to accommodate these vehicles, either in motion or at rest.

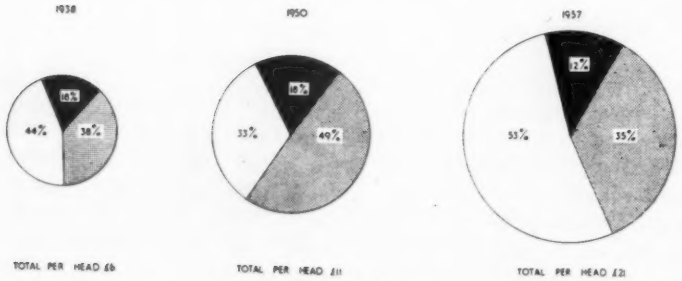
of road). The Road Research Laboratory pointed out in 1957 that motor vehicle registrations had been increasing fairly steadily at the rate of 8.2 per cent compound per annum since 1946, and that overall vehicle mileage had been increasing almost as fast, namely at 7.4 per cent. At this rate the number of vehicles doubles in nine years and trebles in 15, so that one might expect, if the trend continues, 16 million vehicles in 1967 and 24 million in 1974. These figures are not so fantastic as one might suppose, for even trebling the number of cars would not bring the level of car ownership up to the American standard, which has already reached more than one car to three people. Congestion, moreover, multiplies more rapidly than vehicle registrations—according to the Road Research Laboratory the cost of delay increases more than twice as fast as the volume of traffic.

There is an ugly rumour afoot that Americans cannot walk any longer. This is an exaggeration . . .

Progressive Architecture, July 1959

Neither the government nor the local authorities have ever based their road planning on these facts and forecasts. At the end of the war the Ministry of Transport estimated an increase in traffic over 20 years of 75 per cent over 1933 in urban areas and 45 per cent in rural areas. As recently as 1954 the Ministry instructed highway authorities to plan for a future increase of 75 per cent in the traffic over 20 years. By the end of 1958, only four years later, the number of vehicles had increased by 50 per cent, and traffic by nearly as much. On July 3, 1957, Mr. Harold Watkinson, the Minister of Transport, forecast that there would be 8 million vehicles by 1960, a figure that was already reached by the end of 1958 or early in 1959. On June 2, 1959, G. H. R. Nugent, Parliamentary Secretary to the Ministry of Transport, forecast that there would be 12½ million vehicles, including 7½ million cars, by 1969, and added that the Ministry was now in process of revising its 1954 assumptions to "something a good deal higher." What the Ministry seems to overlook in its estimates, and still more in its programmes (which appear, as I will show later, to have no relation even to its own estimates), is the enormously powerful influences fostering the continued expansion of the motor vehicle industry, and consequently of traffic.

Personal expenditure on transport is rising, but the distribution of it is changing—less on rail (grey), less on other forms of public transport (black) despite more air travel, more on private motoring (white). (From Barclays Bank Review.)



FIVE REASONS FOR EXPANSION

1. Consumer demand

Everything points to a further increase in the demand for private cars, which are more and more regarded as essential for a reasonable standard of living, and the outward badge of success. Relaxations on hire purchase and a reduction in purchase tax have resulted in a phenomenal increase in new vehicle registrations (see p. 257) in the first half of this year, when 655,613 new vehicles were registered. Even so the industry was unable to satisfy the demand. Since then the first of the cheaper models designed for the working-class market, the BMC Mini-car, has appeared. The mass production of cheaper cars will release large numbers of even cheaper second-hand cars for those who cannot afford new ones. There is still ample scope for further reductions in what earlier generations would have regarded as penal level of taxation—50 per cent purchase tax on private cars, and 2s. 6d. a gallon on petrol.

2. Commercial vehicles

A revolution has taken place in the carriage of freight. The Ministry of Transport survey of the carriage of goods by road published in July 1959 showed that for the first time in our history more goods are now carried by road than by rail (56 per cent. by road, 44 per cent. by rail: in 1952 the proportions were reversed). Nobody imagines that railway modernisation is likely to reverse this trend. Whatever place railway goods transport will occupy in future, every building is now, and will be, serviced by a multitude of motor vehicles.

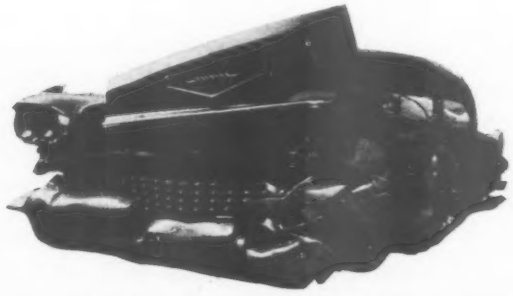
3. Productive capacity

The motor manufacturers, to meet the anticipated demand both at home and abroad, have increased their productive capacity enormously. A few years ago they had exhausted the economies to be achieved by line flow production and turned to automation, which calls for much greater capital investment and greatly increased production to achieve a lower cost per unit. Capital investment in motor vehicle manufacture, average £20 million a year from 1948 to 1953, rose in 1957 to £70 million, and this process seems likely to continue. The result has been a dramatic increase in the average weekly production of cars from 13,600 in 1956, to 16,600 in 1957 and 19,800 in 1958. In April this year weekly production reached a record figure of 25,1000. Production of the BMC mini-cars is planned at the rate of 4,000 a week, but this will almost certainly be greatly increased. *The Economist* has pointed out that 4,000 a week is too few to partake

of the economies of scale inherent in producing 3,000 Volkswagens *a day*. Altogether in 1958 Britain produced 1,050,000 cars, 297,000 commercial vehicles and 15,100 buses. Of these, 487,000 cars and 112,000 commercial vehicles were exported.

4. Motor vehicles as a mainstay of the national economy

In the US, motor transport now consumes one sixth of the entire national income, in Britain more than one eighth. Personal expenditure on transport in Britain has almost doubled in eight years, rising from £11 to £21 a head between 1950 and 1958. But within this total the proportion spent on private motoring has risen from 33 per cent to 53 per cent. Both in Britain and in the US the motor industry has become one of the mainstays of the economy, so that its continued expansion becomes the objective of government policy. It is one of the main supports of the export trade, which must be sustained by big home sales to maintain production at a profitable level that makes prices competitive. When recession threatens, the motor industry is the pump-primer of the economy: apparently disregarding the consequences in terms of congestion, delays and accidents, the government stimulates motor car production, as it did last year and in this year's Budget, by easing hire purchase restrictions or cutting the Purchase Tax.



"I am sure that there is, in effect, a desirable level of automobile accidents . . . I doubt that the present total of deaths, of which the automobile accounts for 2 or 3 per cent, is undesirably large for the well-being of society, and may in fact be undesirably small."

John D. Williams, Head of Mathematics Division, the Rand Corporation, on "The Nonsense about Safe Driving," **Fortune,** *September,* 1958.

5. Motor vehicles as an index of prosperity

Politically, the government has acquired an interest in the expansion of the motor industry. The Minister of Transport has proclaimed the objective of making Britain "a car-owning democracy.' An MP has defined the pedestrian in a Conservative Britain as the man who has parked his car and is walking to his destination. The number of cars on the road is now taken as an index of national prosperity, so that any falling off in the rate of growth would be intepreted as a sign of political failure. Lord Derwent, the Chairman of the British Road Federation, said at its annual meeting this year: "We must be realistic and accept that a rising standard of living carries with it a vehicle birth rate—at present one every 50 seconds of the day and night—which takes its course as inexorably as human multiplication." Is this realism, however, or fatalism? It is not a bit too late, when the fifteenth child arrives (apparently by some inexorable process of multiplication) to call in the Family Planning Association? 100 million cars may not be 100 times better than 1 million: they may well be 100 times worse, for if it is a fallacy to despise the machine it is also a fallacy to suppose that human happiness can be measured by the number of machines and not by the quality of life.

THE COST OF CONGESTION

These facts all show, however, that if present trends are allowed to continue we must anticipate a continued and rapid growth of motor traffic, probably far more rapid than the Ministry of Transport forecasts. It follows that, unless the road system and our town plans are adapted in the next few years to cope with this increase, the price that we are paying for the misuse of the motor vehicle is bound to go up too—not merely at the same rate, but possibly even faster than the increase in traffic.

The Road Research Laboratory estimated in 1957 that traffic congestion cost at least £200 million a year (£500 million including an allowance for time lost in traffic delays by people outside their working-time) and is increasing at more than 14 per cent a year. The cost of delays, on this calculation, would quadruple in ten years if traffic doubled. Clearly this degree of inefficiency is a heavy burden on industry and on national prosperity, and shows the absurdity of encouraging unlimited expansion of motor traffic without corresponding measures to enable it to move.

How much is life worth?

The Laboratory also estimated the cash cost of accidents at £130 million in 1958. But the real price of the misuse of the motor vehicle cannot be reckoned in cash. What value can be put on the quarter of a million lives lost on the road this century, or the three million injured, and the 72,000 killed since the war (one new town of dead for every 15 constructed for the living)? Few things are more shocking than the acceptance of casualties on this scale as a regrettable but inevitable price to pay for modern transport.

Safety propaganda and other measures have succeeded in preventing casualties from keeping pace with the rising volume of traffic, but no effort is being made in research or construction commensurate with the size of the problem. Yet solutions can be found, although their application may take a long time and cost a lot of money, if we are prepared to separate vehicles from pedestrians, separate streams of traffic and different kinds of traffic from each other, apply scientific knowledge to eliminate the consequences of human fallability, and cease to give traffic priority over life. We can prevent ships colliding in fog, fly aircraft through fog and darkness, guide missiles across continents and through space. The Road Research Laboratory is sufficiently impressed by the

possibilities of electronic vehicle control to be constructing a test track in which the basic elements of an electronic guidance system are embedded in the roadway.

The cult of the back-double

The overcrowding of the main roads leads to the penetration of residential areas by heavy traffic, as motorists try to escape from the infuriating delays by discovering new short cuts or back doubles through innumerable residential roads, without realizing that they are destroying the peace and safety of thousands of families. The Ministry of Transport and the local authority road engineers encourage the use of these "relief routes," and even try to improve them, because they know that existing or even planned main roads cannot carry the traffic. In their minds traffic is the overriding priority.

Neglect of knowledge

Again, if we are serious about restoring or creating civilized conditions (and saving human lives) why is it that nearly every layout being approved today for housing or central area redevelopment fails to segregate pedestrians from vehicles? Why are the pedestrian precincts at Stevenage and Coventry almost unique? Why is the second Roehampton estate, one of the finest architectural achievements of the LCC, already almost overwhelmed by parked cars and moving vehicles? It is not that we lack the knowledge: we simply lack the will.

The motoring commuter

In London the 70,000 people who travel to work by car are making it difficult for public transport to carry the remaining million who go by public transport. As the buses are impeded by congestion more people transfer to tubes and railways. Conditions for passengers in the rush hours have become so intolerable that more and more people turn to the car or the scooter, thus giving public transport another push towards the grave, and traffic congestion another push towards complete solidification.

"Traffic congestion is not a disease . . . It is a manifestation of normal healthy evolution, of our high and still improving standard of living."

Sir Herbert Manzoni, Birmingham City Engineer

The motoring commuter, spending anything from half an hour to an hour or more at the wheel, morning and evening, is not a very happy man either. His time at the wheel is a dead loss; he can neither read nor think, and the millions of man hours wasted in this way must be stupendous. His journey becomes slower every year, the difficulty of parking is baffling and frustrating, he is constantly harried by the police and acquires a bland indifference to the law, the wear and tear on his body and mind are considerable, door-to-door travelling robs him of the only physical exercise many people take.

CRISIS IN PUBLIC TRANSPORT

The financial and economic crisis of public urban transport is most acute in London, but the same factors operate everywhere. An increase in the uneconomic rush-hour traffic is accompanied by a fall in traffic at other times (caused by increased use of personal transport, television and other changes in habits). The total number of passengers carried by London Transport fell catastrophically from 4,536 million in 1950 to 3,176 million in 1958, and every increase in fares or cut in services merely hastens the fall.

But the spate of office building in central London permitted by the LCC and the City Corporation (both of which admittedly lacked the resources to control it effectively) has made nonsense of the official policy of dispersal. The following table shows the number of people entering central London between 7 a.m. and 10 a.m. on weekdays:

	1952 (000s)	1958 (000s)
British Railways	380	440
Underground	450	475
Road Services	290	235
	1,120	1,150
Motor Car	45	80
Motor cycle, scooter	10	20
	1,175	1,250

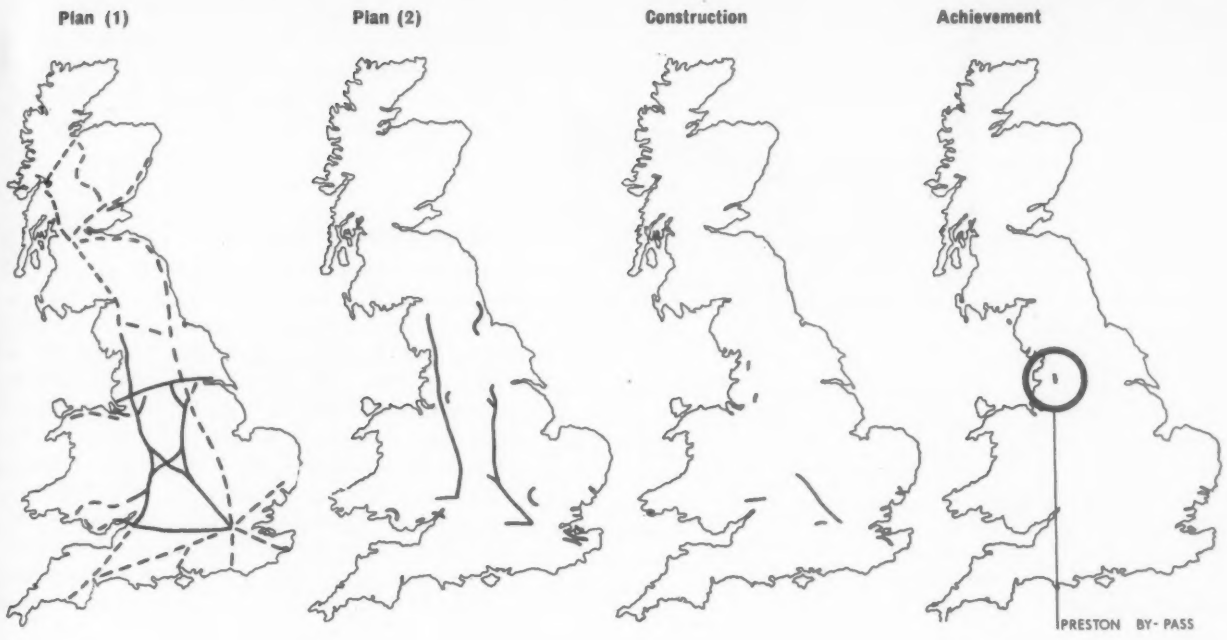
In six years the rush-hour flood increased by 75,000 people, which suggests that jobs in the centre were increasing more rapidly than residents by 12,500 a year. While the numbers travelling by personal transport increased by 45,000, the railways and tubes had to carry an additional 85,000 sardines, and the buses, affected by street congestion (and by the bus strike), lost 55,000. The result of the public's switch from buses to cars, scooters and even pedal cycles is that although 17,000 more vehicles were entering central London in the morning in July 1958 than a year before, they carried 38,100 fewer people—a startling commentary on the wasteful use that the private car makes of the street.

How healthy is congestion?

We have become inured to the destruction of civilized life, to the danger inherent in the use of the same tracks by pedestrians and lethal vehicles, to the noise, the smells, the fumes, the waste of time and effort. Our sense and our sensibility have both been deadened, to such an extent that congestion is seen by some "experts" as evidence not of disease but of health, and motor transport is no longer seen as a means to an end but as an end in itself.

Harold Watkinson, in a debate on traffic congestion on May 7, 1959 said in the Commons:

"It is worth considering that if we did not have a problem of acute traffic congestion in our cities we would probably be a great deal more worried than we are today, because traffic congestion is at least a sign of expanding and lively economy. Do not let us regard it, therefore, in too tragic a manner. It is a by-product of an advanced technological way of life."



The Victorians built 350 miles of railway a year for 20 years. These maps, redrawn from a map supplied by the Roads Campaign Council, show our achievement in road building: left to right, 1, the original 1946 Ministry of Transport 10-year plan, with motor roads in black and roads to be improved on present alignment in dotted lines; 2, the current motor road programme (at June 1, 1959; the road programme also includes some other major works, including double-tracking much of the Great North Road, the Forth Road Bridge, and the Thames tunnel); 3, motor roads under construction; 4, motor roads completed. The London-Birmingham motorway opens next month.

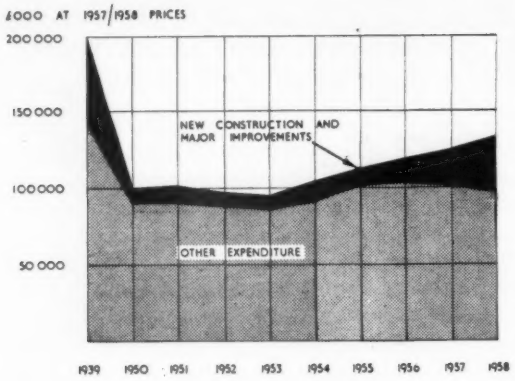
There is, of course, an element of truth in this argument: more vehicles are a sign of industrial activity and increased purchasing power. But far from congestion being a by-product of an advanced technological way of life, it is the direct result of our failure to organize an advanced technological way of life; it is one of the clearest signs that our society is as yet incapable of mastering the machine.

The truth, as I shall now show, is that the government's programme is not, and never has been, scientifically designed to solve anything. The Labour Party, it might be added, has never shown any signs of clear or independent thinking either.

THE LACK OF RESEARCH

Before scientific design can begin there must be research and analysis of the data. But only a fragment of the necessary research has been done. Clearly research must go far deeper than studying traffic flows and forecasting future traffic growth, for nothing less than a new road system is required, which must have the most profound effects on the entire economy, the vitality of the railways, the location of employment and homes, the structure and growth of cities. The Ministry of Transport is not concerned with these questions, the Board of Trade is not interested, the Ministry of Housing and Local Government is nominally responsible for land use planning, but it has only a rudimentary research organization. Nobody is making an overall study of these complex problems. The Select Committee on Estimates complained that the studies on traffic flow and the financial and economic savings likely to result from the London-Birmingham motor road were not undertaken until the road had been begun (a case of the survey following the plan). But even more serious is the neglect of more fundamental studies.

The annual reports of the Road Research Board have repeatedly drawn attention to the fact that research even into road traffic is wholly inadequate. In its report for 1955 it said: " little information exists to show the pattern of traffic in the London Area as a whole. There is a pressing need for a large scale origin and destination survey in the London area to determine where traffic comes from and where it wants to go. In the absence of this information there can be no assurance that any system of roads planned and executed to relieve congestion would in fact achieve this object." In 1957, and again in 1958, the Board urged the need for research to overcome " the paucity of data " on urban road conditions. Yet, when the London Roads Committee reported in July 1959, it had to confess: " We have found that the basic information on present and future traffic needs required to take a reliable view of the application of motorways to London is inadequate." What this means is that, in present conditions, almost any solution adopted is likely to be wrong.



Our road construction programme, it is claimed, is the biggest in history. It is true that we are spending more pounds every year, but in constant 1957-58 *prices (in £000s) we spent much less on roads in* 1958 *than in* 1939. (*From Barclay's Bank Review.*)

ESTIMATED REQUIREMENTS: ACTUAL ACHIEVEMENT

Nevertheless, estimates have been made of the highway needs of the country and of their cost. At a Conference on "The Highway Needs of Great Britain" in 1957, Dr. W. H. Glanville and R. J. Smeed, Director and Deputy Director of the Road Research Laboratory, gave a paper on "The Basic Requirements for the Roads of Great Britain" Because, as they said, there were many gaps in their information about urban areas, they confined their esimate to rural roads. On the assumption that traffic would double within 10 years (an assumption to be contrasted with MOT optimism) they calculated that £120 million a year would be required to catch up in 10 years with traffic congestion in rural roads by providing the additional traffic lanes required.

Another paper at the same conference, by Rowland Nicholas and J. H. H. Wilkes, estimated the cost of an adequate 20-year national highway programme at £3,500 million, including a guess at £1,000 million for urban requirements. As the inner London A ring road alone would cost £150 million, it looks like a gross under-estimate. It was based on the absurd 1954 assumption that in 20 years traffic would increase by only 75 per cent.

Actual performance

As against these estimates, probably under-estimates, totalling £295 million a year for the first ten years, the government's road programme is expected to reach £75 million a year next year, and then to continue at an annual rate of not less than £70 million. The five major projects which make up the major part of this road programme are only a small part of a motor road programme prepared some 20 years ago to meet pre-war conditions, published with a fanfare in 1947 (when the Ministry was planning for traffic levels far below those reached by 1959), pigeon-holed for ten years, and now being dusted off and brought out in bits and pieces. No figures are available of the total sum spent on new construction, for in addition to the Ministry of Transport's and the Scottish Office expenditure, local authorities also make a relatively small contribution.

LONDON'S ROAD "PLAN"

The failure to relate road programmes to scientifically established needs is ingloriously illustrated by the fate of the road plans for London produced by Sir Charles Bressey in 1938 and by Sir Patrick Abercrombie in 1943 and 1944. The Bressey plan was a ruthless engineering plan, disregarding vital planning considerations and concentrating entirely on through traffic, which is the least difficult part of the problem to solve. Within these limits it attempted to solve London's traffic problem on the realistic assumption that traffic would increase by 400 per cent over the 1937 level. Its estimated cost in 1938 was £160 to £230 million; it might be three times as much today. Abercrombie took the Bressey plan as the basis of the road proposals in his County of London and Greater London Plans, although he greatly modified it.

The government rejected his A ring road in 1950, at the height of the economy drive, and directed the LCC, which was then preparing its Development Plan, not to include in it any novel proposals of this kind. The LCC had therefore to abandon Abercrombie, and prepared a watered-down "ultimate plan," which was an attempt to make the existing horse-era road system carry more through traffic by a series of widenings and improvements, mainly at intersections. This was designed only to cater for a 50 per cent increase in traffic over 1949, to cost £300 million, and to be executed over half a century! It hardly began to remove the basic vehicle-pedestrian conflict, or the congestion caused by traffic penetrating the thousands of minor streets where its movement is generated.

As an immediate step, the LCC included in the 1951 plan proposals costing £90 million over 20 years. Government economies prevented even these twice-watered proposals being started until four years ago. Bressey and Abercrombie, whatever their mistakes or limitations, did at least attempt to devise a solution based on a realistic assessment of future traffic trends. The new approach, which does not attempt to devise a solution, ignores future traffic trends and merely attempts to work out the best way to spend a sum of money arbitrarily determined by the Ministry of Transport (or, more acurately, the Treasury). This is seen in its greatest absurdity in the report of the Committee on London Roads, of which Mr. Nugent was chairman. It was hamstrung by the Ministry, being authorized only to consider "present proposals for the improvement of the road system," and so was tied from the start to the watered-down 1951 plan, and limited (no doubt by the Ministry) to an expenditure of £6 million a year, or £120 million over 20 years, equal to the current rate of expenditure, and equal in real terms (after allowing for price changes) to little more than

one-third of the watered-down "ultimate plan." It was confined to the LCC area and did not consider London's problems as a whole. All the committee in fact did was to arrange the 1951 proposals in order of priority (it seems almost unbelievable that this had never been done before), and to plan an accelerated £10 million a year, £200 million programme in case the government would allow what was (no doubt humorously) called "an even bolder attack" on the problem.

It is rather as if a charitable society, charged with the relief of a starving man, had set up a committee to decide whether 6d. would be more wisely spent on two bananas or a bag of chips, instead of first discovering the cost of a square meal and then discussing how to raise the money.

The improvements on the existing road system were once more conceived almost entirely as measures to improve the flow of through traffic, and not as part of a comprehensive plan to bring traffic under control within a safe and civilized environment. The Committee claimed that the improvements would increase traffic capacity "of the roads and intersections affected" by about 50 per cent over 1958 volumes (*not* London traffic as a whole) but warned that "improvement of roads will not necessarily increase journey speeds substantially." In other words, traffic speed and traffic congestion will be much the same when the plan has been completed as they are now, because increased traffic will cancel out the improvements. The Committee referred vaguely to the desirability of segregating pedestrians from vehicles, as in the Barbican plan, but confined its recommendations to a pious hope that segregation would be "considered" whenever large-scale redevelopment in congested areas takes place. Even its sensible emphasis on public transport as the basis of planning was largely nullified by the feebleness of its recommendations, and only the LCC members of the committee took the parking problem seriously enough to suggest that government money be put into multi-storey garages.

The decision taken in 1951, and affirmed in 1959, to base London's development on the existing street pattern inevitably means that nothing can be done to safeguard a future, more radical solution, which thus becomes far more difficult and expensive. The Committee found, for example, that since 1948 so much new building had taken place along the line of the Abercrombie A inner ring road that a new alignment would now have to be found. The planning and architectural objections to this road are admittedly formidable: but the fact remains that unless immediate programmes are related to an ultimate solution the ultimate solution is made more, not less, difficult. There can be no doubt that sooner or later solutions that are now rejected as visionary and impracticable will have to be adopted. The realists are those who see this, and the impractical muddle-heads are the so-called "realists" who refuse to look the traffic problem in the face. The new London Roads Plan is their monument, a public exhibition of their decision to abdicate leadership and responsibility.

AMERICA'S $41 BILLION PROGRAMME

The next question that must be asked is whether a much larger road building programme would in fact solve the problem. The only place in the world where an attempt is being made to provide for the needs of a society in which nearly every family and nearly all adults have cars, and use them for most purposes, is the US. The conditions, of course, are very different. The US has a great deal more space than we have and a much larger national income. It also has much weaker planning legislation, less public support for measures to protect the countryside or places of architectural interest, and it has a more powerful motor industry. But the basic problems have much in common, and our small country is far more vulnerable. One Los Angeles would obliterate East Anglia. Today the US Government is engaged on a 12-year programme, running from 1957 to 1969, to build a national inter-state system of 41,000 miles of controlled access super highways at a cost to the Federal Government estimated in 1956 at $25 billion ($25,000,000,000, £9,000 million).

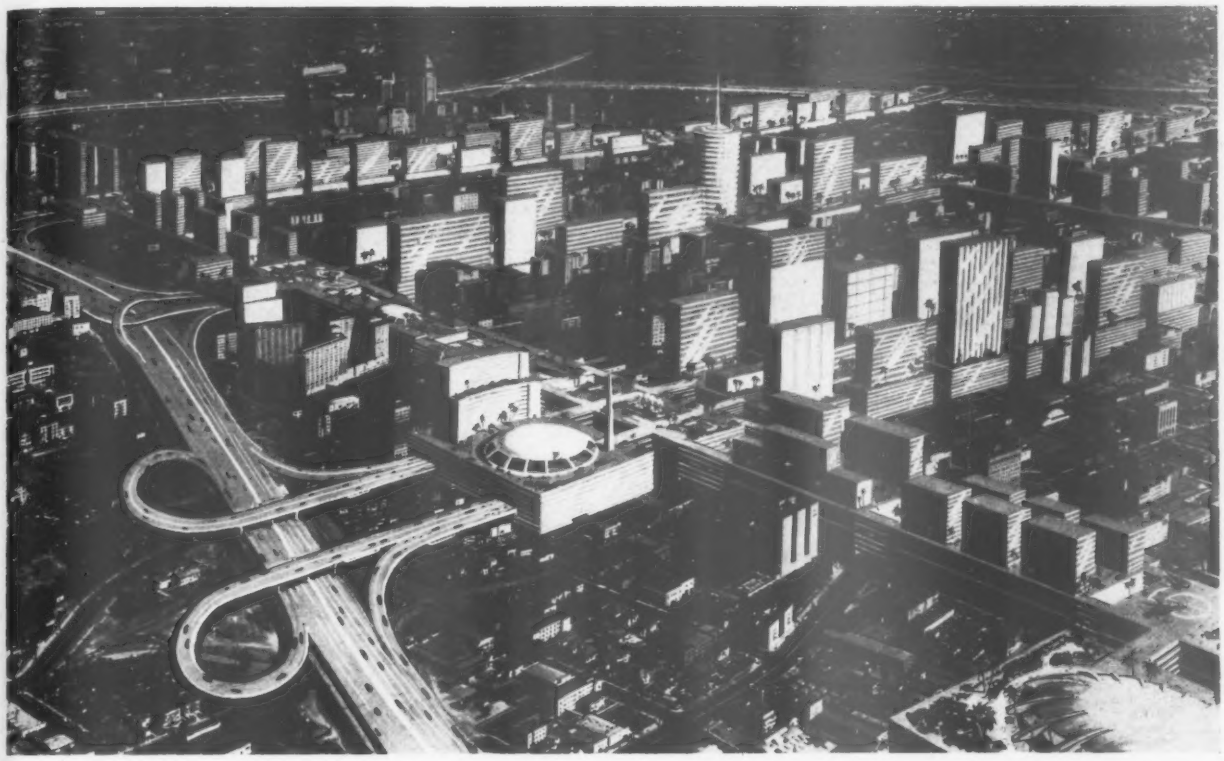
This is by far the largest public works programme in history, but already in 1958 it was found necessary, owing to the rise in costs and (much more important) under-estimation of the increase in vehicles and traffic, to raise the programme to $41 billion. Half of this will be spent on urban motor roads. If to this is added other federal, state and local expenditure on new and improved roads, the entire current highway programme of the US will cost over $100 billion. Annual expenditure will average something like £3,000 million sterling, at the current rate of exchange. But even so the adequacy of this programme, and even the possibility of achieving any solution of the urban problem along these lines, is now being seriously questioned.

Is it a solution?

The new inter-state system will provide a national network of motor roads, but so much money is being spent on superhighways that less money is available for city streets. "The consequences of their neglect" says *Fortune* "would be that traffic would pour in greater and greater volume on spacious superhighways only to join the jam on local thoroughfares." Despite this programme, and despite all the efforts of traffic engineers to organize the more efficient use of the streets for traffic (by means, for example, of one-way streets and reversible lanes for rush hour traffic), the advance of the automobile (67.8 million in 1959, 100 million forecast for 1975) continues to outstrip the advance of the road system. *Fortune* thinks that the US Government "may be rushing blindly into some formidable problems.

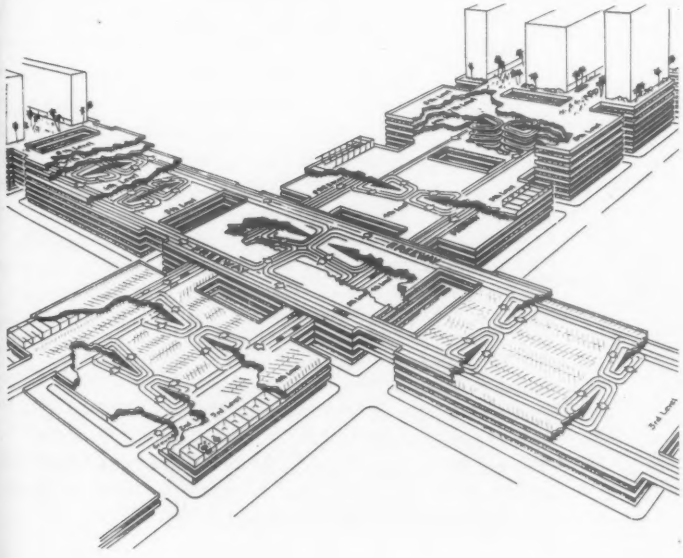
The most striking fact to the outside observer is the growing recognition inside the US, which is after all the physical and spiritual home of private enterprise, that the urban problem cannot be solved without town planning, urban renewal and a great extension of high speed public transport for the commuter services. The effects of motor traffic on the railway passenger services has been so devastating that a report published in 1959 by the Interstate Commerce

(*Continued on page* 266)

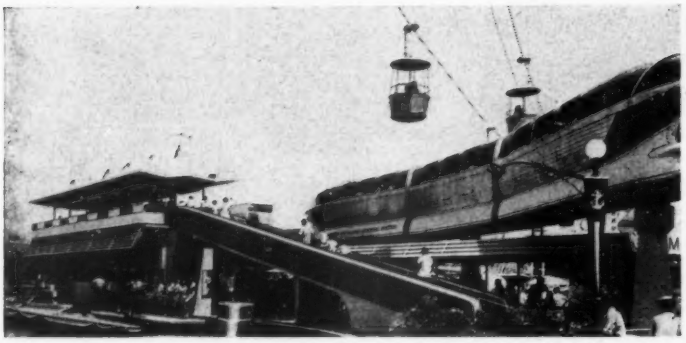


' Here, nestled under its blanket of smog, girdled by bands of freeways, its core eviscerated by concrete strips and asphalt fields, its circulatory arteries pumping away without focus, lies the prototype of Gasopolis, the rubber-wheeled living region of the future. . . . When Lincoln Steffens went to the Soviet Union just after the Bolshevik Revolution he proclaimed " I have seen the future—and it works." Today's visitor to Los Angeles might paraphrase Steffens and say " I have seen the future—and it doesn't work." '

Harrison Salisbury, New York Times, March 3, 1959



The ultimate logic of planning for the private car as the primary means of personal transport is expressed in this plan (above) for Los Angeles by E. M. Khoury and Associates, consulting engineers, Los Angeles. The air view (opposite page) looking along the Harbor Freeway from the opposite direction, shows the central business area as it is today, with two-thirds of it given over to parking lots. Unlike Victor Gruen, the designer of the Fort Worth plan, who aims to restrict urban sprawl, Mr. Khoury believes that it cannot and should not be contained. He plans for the time when Americans can commute from as far as 300 miles away, possibly on moving belts that may supplement today's freeways in the coming Nuclear Age, and drive their cars to within a block of their offices. His basic principle is to " knife through " the urban areas with elevated motor roads in two directions in a grid located at four block intervals and superimposed on the existing streets, which would continue to function, thereby supplementing the existing street traffic system with another completely independent traffic system in the central business districts. The photograph shows his motor roads running through new and existing tall buildings, within which one or more levels are used for motor roads, free-flowing and void of traffic lights, and up to eight levels for parking, with office buildings and pedestrian walks above. The cut-away drawing shows a 4th floor motor road in the wide block and a 5th-floor motor road in the narrow block. The plan illustrated here will ultimately have parking spaces for half a million cars and can, it is claimed, circulate two million cars in any 24-hour period. There are no ramps in the parking areas, the cars being driven from one floor to another by an ingenious use of warped decks in the centre of each block.



The Disneyland-Alweg monorail system, here seen in the Disneyland fairground at California, is not a mere fairground stunt. Monorails have been proposed by commissions which have studied traffic and public transport problems in Detroit, San Francisco and other cities. They are essentially an overhead railway running over an existing street system, and have serious technical drawbacks (particularly the difficulty of rapid changing of points). Also shown is the Stephen-Adamson walkway system, which carries 3,600 passengers an hour.

Commission Examiner, Howard Hosmer, forecast that by 1970 the railway passenger coach would have joined the stage coach in the museum. He only gave the suburban railways services a slightly longer run of life. All over the US the suburban train services are faced with financial collapse. Lawrence Lessing, writing in *Architectural Forum* (January 1959) said that the cities were now facing "the spectre of the days when the trains might cease running," when the new civic centres would become dead ends and the city itself would approach strangulation; for "without effective mass circulation modern metropolises, already struggling in the toils of anarchic private traffic could not survive. Merely to park their cars, if everyone drove into town, would require, it is estimated, three out of four buildings to be devoted to parking."

Victor Gruen, the American architect and planner who designed the plan for Fort Worth and other American city centres, calculated in *Progressive Architecture* that if the advocates of increased automobile traffic should ever succeed in bankrupting the shaky public transport system it would be necessary to demolish every building in downtown Manhattan, build nine levels of transportation space, and then construct new offices and other buildings on top. He added that even so there would not be enough parking space, and suggested that revolutionary public transport solutions could be found at a fraction of the cost of what will have to be spent on new urban motor roads. Far from demanding more parking garages, he thinks that in New York it should be forbidden to build any more, because they only add to the traffic congestion.

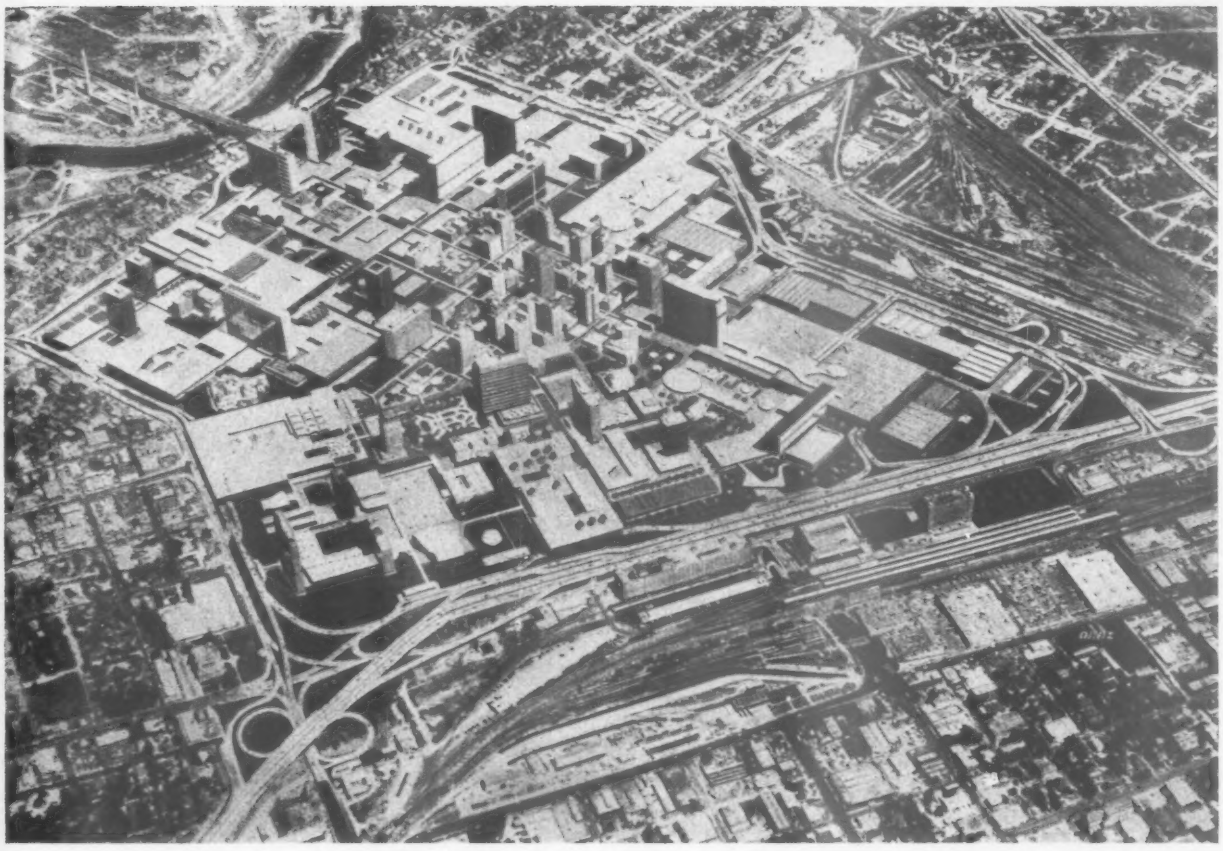
The American highway authorities are now spending large sums on research to assess their traffic needs 20 years ahead. And nearly every authority is recommending urgent measures to revive the public rapid transit railway systems to which current road building and the spread of low density suburbs continue to deal body blows. The striking thing about these American reports is that, unlike the London Roads Committee's report, they first attempt to work out a complete technical solution (admittedly it is too often a purely engineering solution) and only consider the financial implications afterwards. They do not start with the assumption that the problem is insoluble, and that enough money can never be provided.

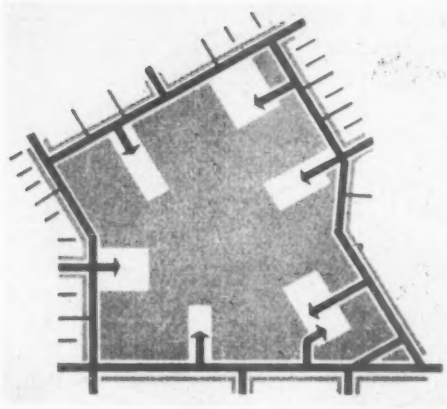
This startling diagram is reproduced from the Transportation Plan of the National Capital Planning Commission for the Washington (D.C.) region, and shows the motor road pattern that would be necessary by 1980 in an "auto-dominant system"—i.e., if private cars continue to multiply and no new public transport is provided. The figures show the number of lanes required on each highway: at one intersection the four highways would have 10, 12, 14 and 18 lanes. No wonder the Commission reported that a highway system to take the projected traffic volumes was hardly feasible even as engineering, and "out of the question" as planning.

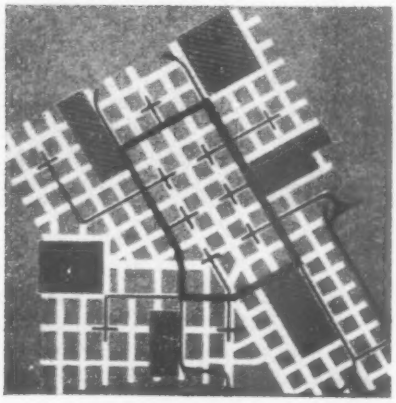
"Auto-dominant" system is "infeasible"

In Washington a special commission on transportation in the national capital region, which reported this summer, projected traffic flows for 1980 and came to the conclusion that it would be "infeasible" to provide the number of traffic lanes and parking spaces required for an "auto-dominant system"—*i.e.*, a system in which public transport continued to dwindle, and the private car was used for nearly all journeys. It has recommended, in addition to an enlarged urban motor road system, the provision of four railway lines (partly in tube) and a system of express buses which would have absolute priority in the rush hour over private traffic on the motor roads.

In Detroit, the home of the automobile, where every attempt to provide a speedy suburban rail service has been blocked for 30 years, the Rapid Transit Commission has recommended the construction of an elaborate suspended monorail system to solve "a transportation crisis of mountainous proportions, actually strangling the economy as well as traffic movement in the community."







The plan for downtown Fort Worth, by Victor Gruen and Associates, was the first for any city based on a scientific assessment of future traffic volumes. The solution was to turn the entire downtown area into a pedestrian island, surrounded by a vast ring road, penetrated on the surface by six parking garages, and loopways for buses, and served below ground by a one-way tunnel loop with spurs servicing every block. It was assumed, not that everybody would travel by car, but that the proportion of commuters using rapid public transport would rise from 17 to 50 per cent. Diagrams show (left, top) six parking garages directly approached from the loop road and (below, left) the underground one-way tunnel with spurs servicing each block.

The commuter's dilemma

American motorists seem to be coming to similar conclusions. A sample survey of motor car commuters conducted by *Fortune* in Los Angeles, San Francisco and Washington as long ago as 1957 produced the startling result that about one-third did not enjoy driving in today's traffic, and would almost certainly switch to public transport if it came reasonably close to competing with the car in time, cost and convenience. Another third found driving to work convenient, but even so would seriously consider switching to a first-class public transport system. And two-thirds (66 per cent in Los Angeles, 78 per cent in San Francisco, 47 per cent in Washington) believed that the transport and traffic problem in their area

The approach to the bus station in New York. This photograph was issued by the RIBA to show how the vast new scale of the motorways contrasts with the residential scale of the buildings in the foreground.

could best be solved by a new public rapid-transit system.

The fundamental difficulty about reviving transport in the US, however, was explained at the British Urban Motor Roads Conference in 1956 by Glenn C. Richards, Director of Public Works, Detroit: "With a density ranging from two to six families per acre in the suburbs, mass transportation is often costly to provide and difficult to maintain as a self-sustaining operation." This may be compared with the experience of London Transport that the new towns have been laid out without thought for the efficient operation of public transport.

The conclusion to be drawn from the American experience seems to be that road building *by itself* can prove a bottomless pit, and that no matter how much money is sunk in it no solution can ever be found so long as other measures are not taken to bring the volume of traffic within manageable limits. Another seems to be that we must not allow our own public transport system, still one of the best in the world, to be destroyed in the vicious circle of declining traffic, rising fares and reduced services.

IS THERE A SOLUTION?

If American experience offers no solution, is one to be found in any of the innumerable plans and theoretical exercises that have been made to provide for highly motorised cities? Certain little guidance is to be found in the British development plans which have been crippled by restrictions on capital expenditure and out-of-date thinking. Many road plans have been lying in pigeon-holes for 20 years or more. What can be said with certainty is that completely new physical forms, new planning and architectural solutions are required for any plan which attempts to provide a complete solution for a highly motorized city—complete in the sense that not only does the through traffic flow, but fully civilized conditions are restored for all human activities, within an aesthetically satisfying environment, that would end the lethal conflicts on the street. In an existing city this would mean reconstruction, because the problem is not merely to enable traffic to circulate on the main highways, but to enable the motor vehicle to penetrate to, and to serve, every building in the city. An essential ingredient in any workable solution is the exploitation of two or more levels to provide the extra space that motor vehicles in large numbers require.

A Berlin Project

The project by Boissevain and Osmond, with Johnson-Marshall and Buchanan, described and illustrated on page 285, probably represents the maximum that can be done to cater for motor vehicles in a city centre while providing fully civilized conditions. To apply it to a British city would require almost total reconstruction, block by block, over many years.

Fort Worth's Achilles' Heel

Victor Gruen's abortive plan for the centre of Fort Worth is regarded in this country as one of the most advanced plans yet devised for a motorized city. It girdles the centre with a vast motor road, turning the centre into a pedestrian precinct penetrated only by parking garages and loop-roads for motor buses. An essential and costly feature of it is the construction of underground roads for truck deliveries to all buildings. Yet even this plan is only workable on the assumption, which he makes, that the American motorists will switch in large numbers from their beloved automobiles to public transport. Gruen provides central parking space for 60,000 cars for a city of 1,200,000 (10,000 more than the number of cars parked daily in central London!), but even so he assumes that half of all the people now travelling to the centre by car will do so by express bus. As only 17 per cent of them travel by bus today, Gruen is assuming that the number of people using public transport will be trebled.

Cumbernauld's forecast

The revised plan for the Scottish new town of Cumbernauld is based on the first realistic traffic analysis ever made for a British town that attempts to forecast traffic movements in detail for 15 years ahead, on the assumption that car ownership will by then have reached the level of 0·7 cars per family. As the article on pages 278-284 shows, a motor road system making full use of grade separation* at major intersections is required to keep traffic moving at the peak hours even in this fairly compact little town of 70,000 people (where net densities average 70 or 80 to the acre). Traffic densities will require at one point as many as four lanes in a single direction. And all this is based on the assumption that 13 per cent of those travelling to work go on foot and 42 by public transport.

Birmingham's "solution"

The Birmingham inner ring road, also examined in this issue on page 288, is much more typical of the kind of solution now offered by British highway engineers. Ernest Davies, chairman of the All-Party Roads Study Group in the House of Commons, has commended it to roads authorities as a model to be followed, and evidence that motor roads need not spoil "amenities." Yet it is out of date before it is built.

THE BRITISH WAY—TINKERING

One of two things seem to be likely to happen in this country. Things may go on much as they are for some time. So far the government funks the big decisions. It dare not go all out building roads, because the Chancellor will not provide the money. It professes to believe in public transport, yet fails to provide conditions that will enable public transport to survive. It dare not restrict traffic growth, because it fears the motoring vote, the lobby pressures, and unemployment. So it continues to tinker with the problem—a few miles of motor road here, some road widenings there, some costly, extensive and out-of-date roundabouts, a few flyovers to prove that we are not behind the times, the leisurely introduction of parking meters. The number of vehicles will increase while congestion alone imposes some limitation, if not on their number, then on their use. The result of drifting in this fashion will be disastrous intensification of all the evils from

* This means separation of traffic streams on different levels.

which we now suffer, and a continuous loss of mobility. We will be paying the price without reaping the benefits. Bit by bit we shall see the further dispersal of the city, the suburbanization of the countryside to which unlimited "motorization" logically leads.

The government may, on the other hand, take some of the advice that is being pressed upon it. It will probably foster the training and use of traffic engineers: very useful people, but like all specialists with their limitations. The government may also accept the advice of those who are urging it to spend £500 million a year or more on road construction. We need not boggle at the amount of money: it is no more than motorists already pay in taxation, and only half what they will be paying in a few years time. Unless we are prepared to spend money boldly on something like this scale, the problem of the cities can never be tackled at all. The danger is that a big road programme, by itself, could wreck frightful destruction and still fail to solve the problem, which is by no means confined to the great cities. Nearly all towns have an acute traffic problem, and everywhere, if the money were made available, the Ministry of Transport, the local authorities, the engineers and the police would attempt, by means of motor roads, road widenings, roundabouts, flyovers, relief roads, garages and so on, to obtain some relief: bashing away here, there and everywhere in the blind faith that if they only bash hard enough and long enough, everything will come all right. Unfortunately, it won't.

HIGHWAY ENGINEERS AS PLANNERS

Such a motor road programme, if undertaken within the existing planning framework, would make the Minister of Transport and the highway engineers the master planners of the future, laying down the highways that determine future development. The road-building programme would not be designed within the framework of balanced national and regional plans for economic development and land use. It too could lead to more rapid suburbanization, and the spread of the conurbations. This is, in fact, happening now.

Few highway engineers, even when trained as traffic engineers, are planners, and most of them do not even pretend to be. Unfortunately, too, so few roads have been built in the last 20 years that the profession has failed to attract the best talent. Most engineers see their job as designing the most efficient route from A to B to cope with the estimated volume of traffic. Engineering, not planning or architectural criteria, will nearly always determine the route, the siting and the design. The location of intersections, where the new motor roads connect to the normal road system, will be of decisive importance in creating new growing points for urban development. The new roads will generate completely new traffic, which its designers will probably not have foreseen.

In Northampton, for example, the Chamber of Commerce has suddenly awoken to the fact that the new London-Yorkshire motorway has created wonderful new opportunities for industry and commerce because Northampton lies only a mile or two to the east of the motorway, and about midway between Birmingham and London. Will the new road not also increase London's magnetism and the drift of population to the south-east? Could the new road not even become the central urban motor road of a new London-Birmingham conurbation? The new road system can be a powerful lever in stimulating industrial growth in towns where industry is languishing, or should be encouraged. Routing the Birmingham-Preston motorway near Nelson and Colne, for example, might give this declining cotton town a new lease of life.

Hard to believe

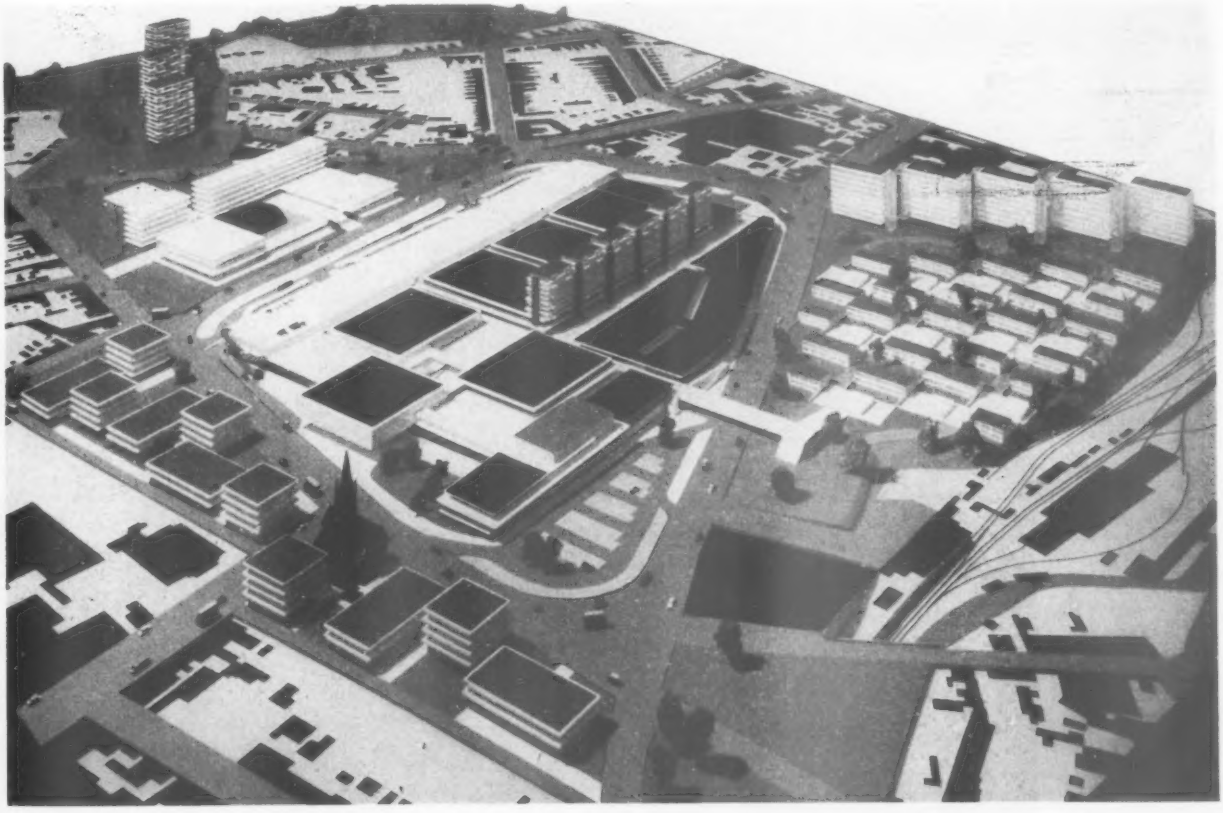
Even in its present tinkering the Ministry of Transport reveals its limitations. The London-Birmingham motor road has been built before any decision has been taken about its connections with the London road system. Not until the eve of its opening did the Minister announce a plan for a motor road through Hendon to by-pass the notorious bottleneck at Apex Corner, Mill Hill. But it will be four years at least before it is in use. Earlier this summer the Minister said that he was considering extending the motor road to Marble Arch, to the very heart of London. It is almost impossible to credit that such a folly is possible, as to funnel traffic straight from the motor road into the West End, straight into the tangle of Oxford Street and Mayfair, without (as already shown) the basic research data, without the provision of any new routes to distribute the traffic to a variety of destinations, and without any plan for dealing with the problems of the West End itself. Yet it is well known that the economic benefits of new roads can be reaped only by building a complete system and not by building disconnected bits and pieces of new road.

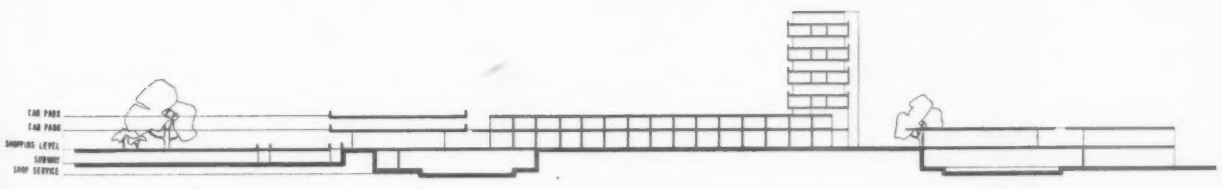
The Minister of Transport, in his understandable impatience with the absence of any single traffic or road authority for London, and the necessity to negotiate with a multiplicity of authorities over the smallest sign or road improvement, has asked for the creation of a London traffic authority. If this was a department of a regional authority endowed with effective planning powers there would be everything to be said for it. But it is far more probable, judging by past precedents, that it would be an independent *ad hoc* authority in which the voice of the highway engineer would be dominant.

A PLANNING PROBLEM

The alternative to carrying on as at present, or greatly expanding the road programme as an isolated operation, is to attack the problem of traffic in the towns and cities as part and parcel of the entire town planning, urban renewal problem, on the basis of carefully prepared national and regional plans. Instead of allowing private motoring to develop to the limits ultimately imposed by productive capacity, consumer demand and traffic congestion, and then vainly attempting at fabulous cost to build enough roads and parking garages to keep up, we should assess our transport requirements and plan our transport system as a whole. We should recognize that in towns and cities public transport is more efficient than the private car for the mass movement of people, and must be

High Street, West Bromwich, as the plan shows, is typical of hundreds of British shopping centres. It is a long, narrow, dangerous and ugly development along the main Birmingham-Holyhead trunk road, carrying dense and heavy traffic. The shaded area between High Street and Pitt Street is undeveloped slum property. James A. Roberts, in association with W. H. Greenwood, the Borough Engineer and Surveyor, has prepared a plan for West Bromwich Corporation (in conjunction with Property and General Investments Ltd. and George Wimpey & Co. Ltd.) to close High Street, make a clean sweep of buildings in the area, and create an 18-acre pedestrian shopping precinct. The model (below) shows the precinct from the south-west bounded on the north by Pitt Street, beyond which lies the Civic Centre. The main feature of the design is the pedestrian shopping platform, on ground level at the bus station, but (owing to the fall in the ground) at first floor level to the south. The lower level is used for goods deliveries to the shops. There is a two-storey car park for 1,000 cars between the bus station and the shops. The design includes six blocks of 8-storey flats, a cinema, dance hall, restaurants and public houses. The greatest weakness of the scheme arises from the Ministry of Transport's reactionary ideas for dealing with through traffic. For the next 20 years the roads surrounding the precinct will continue to carry the Birmingham-Holyhead trunk road traffic. After 20 years Pitt Street will become part of an inner loop road to divert through traffic north of High Street. Local traffic will still circulate round the precinct, and the Civic Centre, although connected to the precinct by a subway, will be separated from it by a very heavily trafficked double carriageway trunk road. The group architects who have worked with Mr. Roberts on this design are P. Bailey, R. S. Evans, G. A. Gould and A. B. H. Round.





Randolph Crescent (left and centre left) is one of the entrances to Edinburgh's famous Georgian new town. Kenneth Browne shows (bottom left) how the Crescent will look if Edinburgh Corporation carries out its plan to cut down the trees, flatten the mound and build a roundabout. This would enable 4,000 vehicles an hour to pour through Ainslie Place into Queen Street, turning some of Edinburgh's best domestic crescents and streets into main arteries. Kenneth Browne shows (below) how Ainslie Place will look with a tarmac swathe and a lowered carriageway. The plan was designed by the City Engineer, W. P. Haldane, and is supported by the Planning Officer, T. T. Hewitson, who is an architect. Edinburgh, presumably regarding Birmingham as a model to follow in road engineering and planning, called as a witness at the public enquiry Norman Brand, engineer-in-chief of the Highways and Surveys Section of the Birmingham Public Works Department. Mr. Brand's expert opinion was that the roundabout solution would be "good for 10 to 15 years." In other words, the destruction of trees that have taken more than 100 years to grow would only purchase a temporary respite. This is a classic example of the engineering "solution" which damages the city without achieving any lasting benefits even for the traffic.

given more help and encouragement. We should treat the private car not as a toy but as a superb tool, though not the only one, for personal transport, and use it to the greatest advantage by taking rational decisions as to its production and by learning to use it economically and constructively, not wastefully and destructively. We should make a serious effort to control the development of the city in such a way as to make a great many journeys unnecessary, and provide an efficient road system for all the vehicles that are on the road. And we should attempt, by judicious use of sticks and carrots (by restricting the private motorist where necessary, and simultaneously offering him a better service by public transport), to bring about a balance between the capacity of the road system and the number of vehicles on it. The traffic problem, in short, cannot be attacked in isolation by traffic authorities building roads, but is at root a planning problem to be attacked from many sides simultaneously, as a team job in which many skills and professions would work together, as the job is in fact being tackled at Cumbernauld.

If this is so, then the primary responsibility shifts from the Ministry of Transport to a Ministry responsible for national planning, to which the other Ministries would be subordinate. As no such Ministry exists, clearly one must be created, and given the wide powers required. It follows, too, that the planning of highways by local authorities should be the function (as it already is in London) of the Town Planning Committee, and that the RIBA is right to insist on planning by a team in which the voice of the architect-planner is heard from the outset.

Should public transport "pay"?

The Ministry of Transport does recognize, in words at least, that moving people in the cities is primarily the job of public transport. The London Roads Committee Report foresees public transport carrying additional passengers as motorists find it more difficult to park their cars in the streets. But how is public transport to do this job? It is hopelessly overloaded at rush hours now, and it is not tolerable to squeeze even more passengers on to an overloaded service. Public transport has to be reconstructed too. People will only use it if it is quicker and better than the private car. This can hardly be expected to happen if the one criterion applied by the government is "Does it pay?" For narrow calculations of profit and loss ignore the wider costs, born by the community, if public transport is withdrawn and a road system has to be provided for an unlimited number of private cars. Public transport is as essential to the city as water or drains. The road and railway services are intimately connected. Yet in framing its so-called plan for London's roads the London Roads Committee, limited by its terms of reference, ignored the railways, which alone at the present time can transport large numbers of people more quickly than the private car. We cannot possibly know what roads we should build unless we also know what railways we intend to build, and to consider one without the other is lunacy.

Road and rail

Our public transport systems grew up in the days of unplanned private enterprise, and were never designed to serve the needs of the city today, let alone the city of tomorrow. In the 1920s and 1930s, tube railways were thrust out into open farmland where land speculators made fortunes, while existing communities were denied essential services which they still lack. No new tube railway has been built for many years, although the London Plan Working Committee of the British Transport Commission 10 years ago recommended the construction of 49¼ miles of new tubes as first priority, and a further 53½ miles as a lower priority. None of these new tubes has been built, because successive Ministers of Transport have been obsessed by the need to make the railways "pay," and issue Canute-like edicts from time to time ordering the British Transport Commission to balance its accounts.

New tubes do not pay only in the sense that while receipts cover operating costs they do not cover capital charges. No other country in the world expects them to "pay" in this sense. The proposed Victoria tube, which would cost £55 million, would carry as many passengers as a 14-lane motor road at a smaller capital cost and without damage to buildings on the surface.

It is surely fantastic to say that in the 1960s, when man has achieved such a command over nature, we can no longer afford to do what the Victorians did when they created a new communications system with only a fraction of our scientific knowledge and power-driven mechanical aids. Most large cities need a basic network of high-speed railways below or above ground, and other high-speed communications; the only reason we are not building them is because our economic and financial knowledge and judgment, and our sense of urgency, lag sadly behind our technical knowledge.

PLANNING WITH THE MOTOR VEHICLE

It is not possible within the scope of this article to explore the fascinating range of possibilities that will have to be considered in attempting to find our way out of the jungle. But it is possible to state some general principles.

The first is that we have to plan with the motor vehicle and not against it. The ownership of a motor car has become an almost universal ideal that is rapidly being attained, because a car provides an infinitely flexible and convenient means of personal transport. If cars become so numerous, and are used in such ways that insoluble problems are created, then we must not oppose the motor vehicle as such, we must find more rational ways of using it. We are still only at the beginning of the motor era, in its initial anarchical period, and it would be wrong to suppose that the habits and outlook of today, the way we use cars and own them, will necessarily persist in the future. The taxi, the hired car, the shopping delivery service and other devices not yet known to us can all diminish the use of the privately-owned car.

On the other hand, measures to control traffic, and above all private motor car commuting, must go hand

in hand with any plan for reconstruction. It can hardly be doubted that in the next century it will be unthinkable for small children, mothers with prams, old people and everybody else to share the same tracks as motor vehicles (or atomic vehicles or hover-vehicles or whatever is the latest thing by then), or for vehicles to penetrate everywhere and to use the streets night and day as free garages. The paradoxical truth is that freedom of movement can only be achieved by measures of control, whereas anarchy confers only freedom to be stuck in traffic jams.

A lot of time and breath has been wasted in wrangling about relatively trivial measures to clear the streets of parked vehicles and to remove other sources of obstruction. Immediate restrictive measures are in fact unavoidable, but we must avoid imagining that even if we have cleared the existing streets we are much nearer a solution. Temporary measures only make sense if we use the breathing space to work out and apply long-term solutions.

" It is really idle to talk about doubling our standard of living in 25 years if, at the end of it, we are simply to find ourselves enjoying it in a desert of concrete and mechanical clutter."

W. F. Deedes, M.P., House of Commons, March 17, 1959.

Pedestrian (Tory)

" Under Conservative prosperity the only pedestrians who will exist soon will be those who have parked their cars and are walking to their destination."

Capt. R. Pilkington, M.P., House of Commons, March 17, 1959.

Pedestrian (Labour)

" Nobody in the Ministry of Transport is paying any attention at all to the interests of the pedestrians."

Percy Collick, M.P., House of Commons, March 17, 1959.

We must say ' keep out '

There are many places where, even if cash and resources are available, reconstruction will be too destructive of existing buildings to be tolerable. We have to tell the motor car to " Keep Out," and find a workable compromise. There are other places where reconstruction, although possible and desirable, cannot be done immediately because there are real financial and economic limits to what can be done even if we are prepared to spend money on bold solutions. In these places, too, there will be no alternative to severe restrictions on the use of the motor vehicle if moderately civilized conditions are to be restored. The closing of shopping streets in American towns to create pedestrian " malls," although not a permanent solution, is an example of a restriction which enlarges the community's freedom.

Somehow a balance must be struck between the volume of traffic and the capacity of the road system. Today, by producing cars without limit and hardly producing any roads at all, we are behaving like the man who buys a Rolls and grudges the money for the petrol. Building roads is clearly only a part of the solution. The energetic improvement of the public transport system, which could be developed in several new ways, would at least make motorists think twice about using cars in ways that cause congestion.

The current effect of the motor car is to extend low density suburban living. But the right way to use the motor car may be to link together high density pedestrian precincts, both in central and suburban areas. For the pedestrian will not, and often cannot, walk a very long way: the precinct will only work if distances are short and densities high. Higher densities, moreover, provide a sounder economic basis for public transport.

Why be timid ?

We need not be frightened by the prospect of building new motor roads in town or country, or of reconstructing our cities. We should be excited by it, if we build in the right way and for the right purpose as part of a comprehensive plan. The danger of destroying much that we value in town and country is very real, but there is also a danger that we refuse the major challenge of our times and fail to reconstruct our cities to meet the needs of 20th or 21st century man.

Planners, engineers and architects have become so accustomed to the crippling limitations and frustrations imposed on their vision and design by a generation of cheese-paring economies that many of them have lost, or never had the chance to acquire, the habit of going for the bold solution. The bold solution will often be the only real solution, but what is the point even of discussing it when one knows in advance that neither government nor local authority will pay? Technicians are being compelled to squander their skill in devising makeshift expedients.

What we need is reconstruction on a bigger-than-Haussman scale, carried through, not by dictators or speculators, but by an educated and enthusiastic democracy, not in London alone but simultaneously in towns and cities all over the country. We need to show boldness excelling the Victorian railway builders, and respect for town, country and people that the Victorians never showed. If we decide to go in for such large-scale reconstruction the full results may take decades to achieve, but each step will have a fair chance of leading to the final goal and not to deeper confusion. Here will lie architecture's greatest opportunity.

The town planner and architect can only solve the problem of town design if they are given a soluble problem and a workable brief. The basic decisions have to be taken by politicians. But the town planner and the architect, because they understand towns and cities better than other people, have most to contribute to a solution.

Conclusions

Some of the conclusions to which this analysis points are:

1. The attempt to use the private car for all, or nearly all, personal journeys presents town planning and architectural problems for which no workable and acceptable solution has yet been found.

2. No solution is likely to be found unless full use is made of a modernized public transport system for the mass movement of people in cities.

3. No solution is going to be cheap, quick or easy, but the right solution, even if it is dearer at first, will be cheaper in the long run. The government will have to spend far more, not on roads alone, but on comprehensively planned reconstruction in which use will frequently be made of multi-level traffic circulation.

4. A great research programme, not confined to ascertaining existing or projected traffic movements, must precede any large-scale road programme. While this might be undertaken jointly by the Ministries of Housing and Local Government and Transport and the Board of Trade, a Ministry of Planning is required.

5. Traffic is a planning problem. Any solution determined mainly by engineering considerations, giving insufficient weight to planning and architecture, will be blindly destructive and cannot achieve its aims.

6. Solving the traffic problem is a team job, in which the architect must play his part from the start. It is not the job of any one profession or skill.

7. The problem must be attacked simultaneously from several directions. The means employed will include the creation of a new communications system in the cities as part of a programme of planned urban renewal, a more rational location of homes, workplaces, shopping and entertainment, and the attainment of a balance between the number of vehicles in use and the capacity of the roads and garages to accept them.

8. The price of freedom for everybody to use the motor vehicle is some restriction on its selfish, unreasonable, or wasteful use by individuals. It is more important to save the city from disruption than to save the motorist five seconds or even five minutes.

A team of engineers, architects, planners and others at Cumbernauld New Town, working under Hugh Wilson, the Chief Architect and Planning Officer, has revised the basic town plan on the basis of the most thorough traffic analysis ever made in this country. Peak hour traffic movements were projected for 15 years ahead, on the assumption that the number of motor vehicles would continue to grow at the same rate in the future as in recent years, and revealed surprisingly high flows for a town of only 70,000 people, which could best be handled by an urban motor road and a multi-level shopping centre. The new plan is described in the article by A. K. Gibbs, A.M.I.C.E., A.M.I.Mun.E., A.M.T.P.I., D.P.A., the Chief Engineer, to which Hugh Wilson contributes an introduction.

CUMBERNAULD NEW TOWN, MARK II

A plan to master the motor car

Introduction by L. Hugh Wilson, chief architect and planning officer

To appreciate the background to the following article by the Chief Engineer, it may be helpful if I describe briefly the office organization as it affects the design of the various projects in the New Town.

At Cumbernauld we believe in and practise team working. The whole of the technical staff of the Corporation: architects, architect-planners, engineers, quantity surveyors, landscape architects, etc., operate in one department. Each profession is divided into groups, generally on a geographical or functional basis, and at all levels the office is organized in teams consisting of members of the various professions engaged on a particular project. This applies to every job whether it be a housing scheme involving roads, drainage, buildings, pavings and planting, or the new sewage works for the town.

The work of the department is co-ordinated and controlled by four "Chiefs of Staff," the Chief Engineer, Tony Gibbs, the Assistant Chief Architect, Dudley Leaker, the Assistant Chief Planning Officer, Allan McCulloch and the Chief Quantity Surveyor, Jack Denton. To these can be added the Consultant Landscape Architect, Peter Youngman, who visits the office at regular intervals. Detailed co-ordination takes place at group level but the project teams are encouraged to take responsibility and make the maximum contribution to their particular project within the policy brief given to them.

Major projects such as the overall planning of the town, including the road proposals, involve the attention of many minds and indeed major decisions are only taken after discussions attended by all members of the staff at group or more senior level, some 16 in all at present. These meetings are often lengthy, always lively and usually provocative but in the end we believe that we achieve a synthesis not possible by other methods.

Even if discussions at the early stages tend to be drawn out there is the very important compensating advantage that once a decision is made it is known to and accepted by all those concerned with the scheme. There is also the assurance that a scheme, of whatever magnitude, has been thoroughly considered and should work when it becomes one of the actual elements of the town.

The office, in fact, consists of a number of "town designers" each of whom is making his or her own particular contribution to the final result. These contributions are all essential in our view in the firm belief that it is not possible for any one profession to act in isolation on any of these problems.

In the particular context of the road proposals it may be mentioned that the traffic analysis was prepared by traffic engineers on the basis of population information supplied by planners. The "desire paths" were presented in visual form by the central area architects. The final road plan was evolved as part of the general planning proposals for the town after detailed consideration of lines and levels of roads and junctions and their effect on the size of school catchment areas and the layout of housing and industrial areas. Some attention was also given at this stage to the possible position and treatment of embankments, cuttings, underpasses and bridges. All the professions were involved in this work and their interest continues as various aspects of the scheme are considered in final detail.

For me, and I hope for my colleagues in the office, team working is a stimulating and rewarding experience.

Fig. 1. The original basic plan.

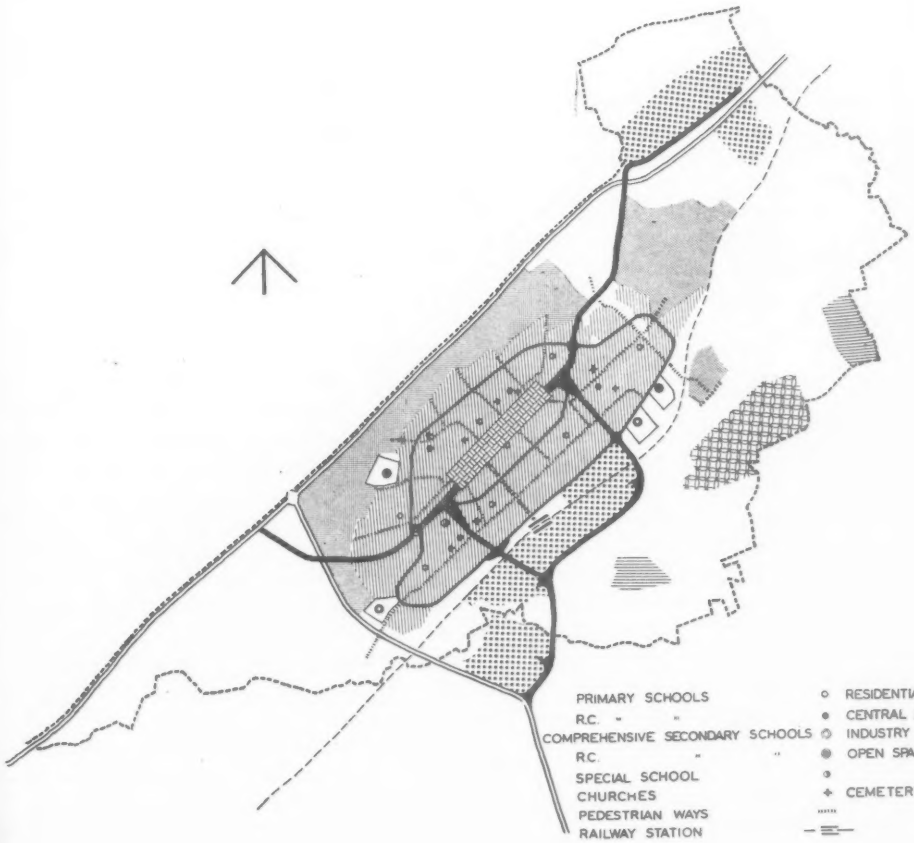


Fig. 2. The revised basic plan.

CUMBERNAULD NEW TOWN, MARK II

The new road plan

by A. K. Gibbs, chief engineer

Cumbernauld is being built to assist in the relief of congestion in Glasgow, and 80 per cent of its population of 50,000 will come from Glasgow. It is to be a balanced community, with its own industries and the other provisions appropriate to a town of 50,000.

The designated area, roughly triangular in shape, consists of some 4,150 acres of hilly land but due to coal and fireclay workings, areas of peat, steep slopes and the presence of deep glens which hamper local communications, the area of land which can be developed comprehensively is considerably less. The general concept of the town which has evolved is that of a compact urban centre located astride the broad hogsback of the principal hill, an oval some 2 miles long and 1 mile wide with an area of about 930 acres. This site will contain the houses, shops, schools and some industry for the 50,000 population, nett residential densities averaging 85 persons per acre. The town will eventually expand to 70,000.

The neighbourhood system of planning is not being adopted, all the inhabitants being within easy reach of the central area where the principal commercial and public buildings will be situated. Nearly three quarters of the population will live within one-third of a mile of the centre. Local shopping needs will be met by the provision of "corner shops" distributed throughout the housing areas. There are two main industrial areas north-east and south-west of the main hilltop. Playing fields, including secondary school sites, are situated on the flat land surrounding the hilltop.

It is a fundamental principle of the plan that pedestrians and motor traffic should be separated to the maximum extent possible and, consequently, a completely separate system of pedestrian ways is being provided throughout the town, while conversely, footways will only be provided alongside main roads in exceptional cases. The corner shops, primary schools, churches, pubs and other elements meeting the communal needs of the population, will be associated with the pedestrian ways, many of which will pass through or terminate in the pedestrian precinct of the town centre. Where a pedestrian way crosses a road other than a housing development road, it is intended to provide an under or overpass. Many of the bus stops will be located at the interchange facilities provided by these crossing points.

No separate provision has been made for cycle traffic since it is felt that the very hilly nature of the site is likely to reduce the use of pedal cycles to a minimum. On the other hand, it is felt that there may be a considerable number of motor cycles and mo-peds but these, of course, must use normal roads.

Various patterns were considered for the town road system and the original basic plan envisaged three radial roads providing connections to the adjacent trunk roads, the A.80 Glasgow/Stirling road, and the diverted line of A.73 which with its connections to A.74 and A.6 is a major link to the south. It was intended that these radial roads should be linked by an outer ring road serving most of the housing areas and an inner ring road, encircling the central area, to obviate congestion.

Consideration was given at this time to the creation of a through road along the hilltop of the character of an urban motorway. This idea was, however, rejected because it was felt that it would be impossible within the compass of the limited area at Cumbernauld to get sufficient traffic on to the road to justify the lower return for general use provided by such a road. This assumption now appears to have been unjustified since in the present plan the radial roads are virtually urban motorways.

The first traffic analysis was undertaken in relation to the original basic plan for two principal purposes:

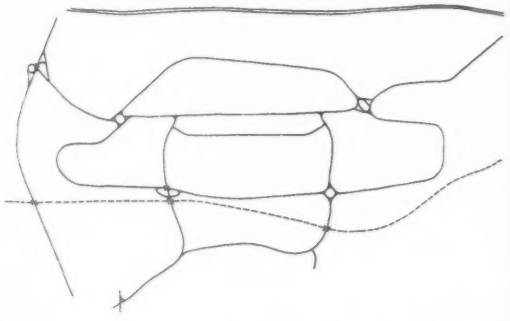


Fig. 3a. The ultimate road plan (Fig. 3b, opposite) is designed to be built in stages. This drawing shows the first stage in which, apart from the A80 Glasgow-Stirling road (at the top) only single carriageways are built and several flyovers omitted.

1. to test statistically the correctness of the assumptions implicit in the basic plan in their bearing on the road proposals;
2. to provide a basis for the design details of the road pattern, such as widths of roads and form of the various junctions.

In the absence in this country both of established techniques for this particular type of analysis and of statistics of what may be termed journey-motivation, we were forced to develop our own techniques and to

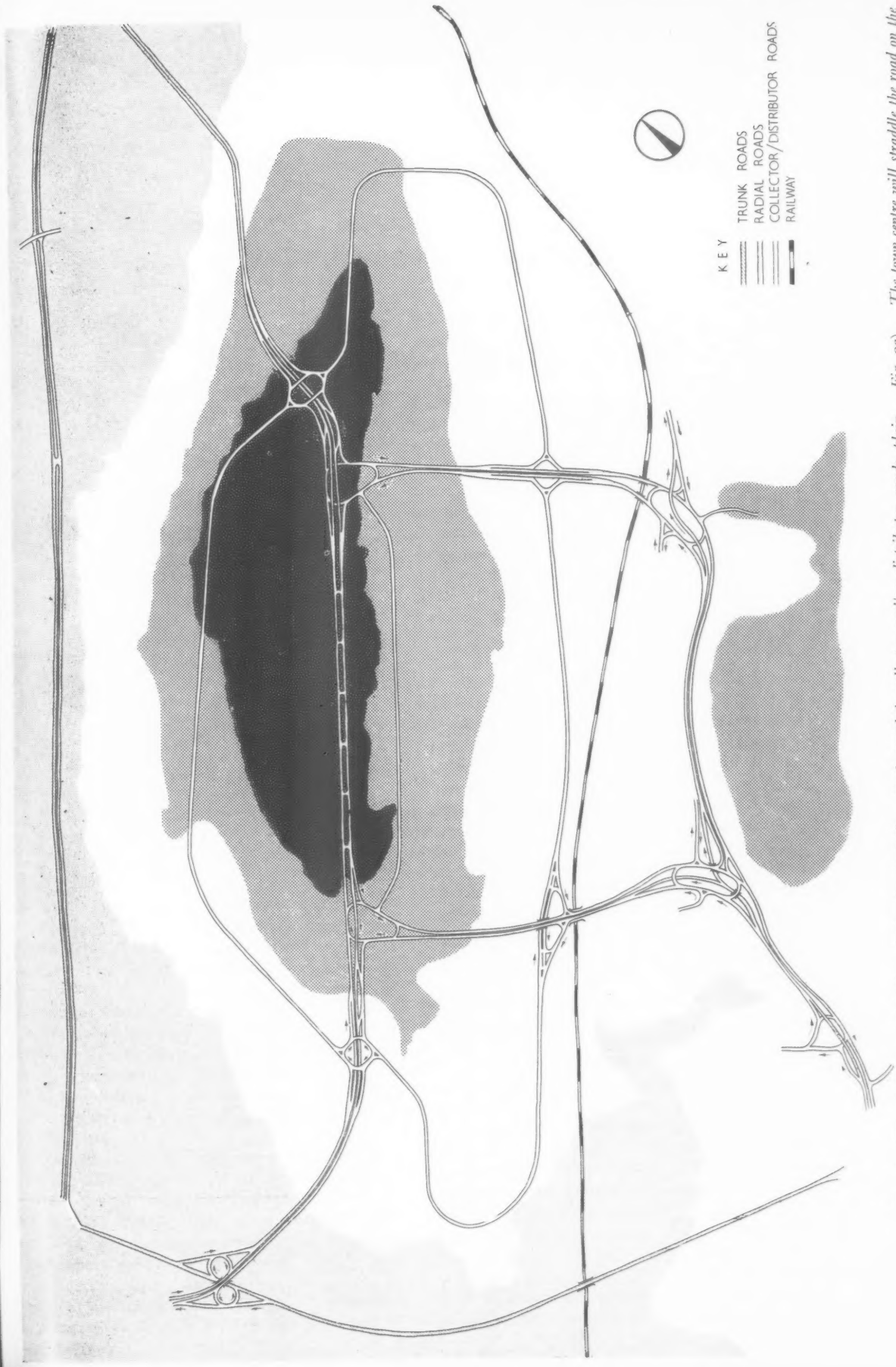


Fig. 3b. The ultimate road pattern (approximate scale 1/25,000). Trunk roads are shown cross-hatched, radial roads mottled, collector and/or distributor roads plain. The road pattern is designed to be built in stages (see Fig. 3a). The town centre will straddle the road on the hill top: contours at 450, 400, 300 ft.

make our own assumptions. Obviously, it is in the latter that the greatest probability of error lies, since in many cases they rest on projections of imperfectly established present day trends.

The basic assumptions of the analysis are:

1. An ultimate population within the designated area of 70,000 persons of whom 50,000 will live on the main hilltop and the others in a series of satellite villages clustered around the main hilltop. (The figure of 70,000 allows for natural growth beyond the target population of 50,000.)
2. The average family size will be 3·5 persons.
3. That 70 per cent of the families will own cars.
4. The working population will be 45 per cent of the total population.
5. That commuting in an out of Cumbernauld will take place to the extent of 7,000 persons in each direction (approximately 20 per cent of the ultimate working population).

It was also assumed that the proportion of car owning families would increase with higher incomes and that the higher income groups would tend to make greater use of their cars. The analysis envisages that 63 per cent of the cars in the town will be in use at the peak hour and that 45 per cent of the population will be travelling from work by car (17 per cent as passengers) while 42 per cent will be travelling by public transport. Assumptions were also made as to the number of people who would walk to work, depending on the relationship between home and place of work. The total number of walkers was assessed at over 4,000.

It is impossible in this short article to describe the whole of the traffic-analysis since this, with its revisions, runs to nearly 100 pages. Briefly however, the analysis is a study of the movement of the working population while returning home from work on a typical weekday, with particular reference to private vehicles. Allowance has been made for commuting traffic, public service and commercial vehicles and an element of shopping and pleasure traffic. Vehicular movement is related to places of work and homes of the work people and is directly related to the assumptions as to densities, working populations, etc. of the planning proposals. The most likely routes of traffic moving between work and home were assessed and the total flows arrived at by summing these individual elements.

The analysis of the original basic plan threw up one major problem, related to the road proposals in and around the central area. As originally planned, there would have been eight junctions on the inner ring road and if the analysis was correct at least five of these junctions would have had to provide for grade separation, unless the provision of surface roundabouts with weaving lengths capable of handling flows up to 4,500 vehicles per hour was to be contemplated. Multi-level junctions are costly to provide and require a lot of space, both sound reasons for keeping their number to a minimum.

At this juncture the comments of the Road Research Laboratory were obtained, since, at many other analysis points, flows surprisingly high for a town of the size of Cumbernauld, were foreshadowed. The implication

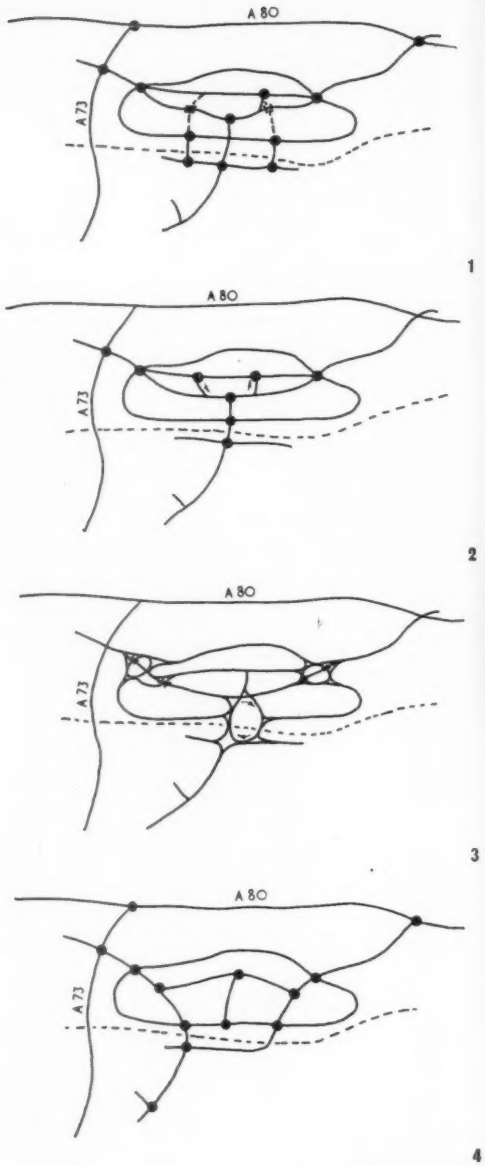


Fig. 4. These four diagrams show alternative layouts that were considered when the traffic analysis revealed the inadequacy of the original road pattern to carry the heavy volumes of traffic anticipated. In scheme 1 residential areas were divided into pockets unrelated to any social grouping. Scheme 2 brought considerable volumes of traffic unnecessarily close to the central area. Scheme 3 attempted to solve the problems arising at junctions without resort to multi-level solutions: the roundabouts were very large, and left awkwardly shaped parcels of land within them. After careful analysis Scheme 4 was chosen.

was that either the analysis was very much an over-estimate or alternative solutions to the central area roads would have to be worked out.

The reference to the Road Research Laboratory was most useful and encouraging. They said that in their view, the analysis, if anything, tended to be an under-estimate. This meant that since the basic assumptions on traffic were not pitched too high, re-thinking of some aspects of the plan was necessary.

Among much useful comment the suggestion that consideration should be given to separating local through traffic from traffic which had a destination in the town centre was particularly significant, since it confirmed our own ideas as to possible reasons for the surprisingly high flows through the junctions.

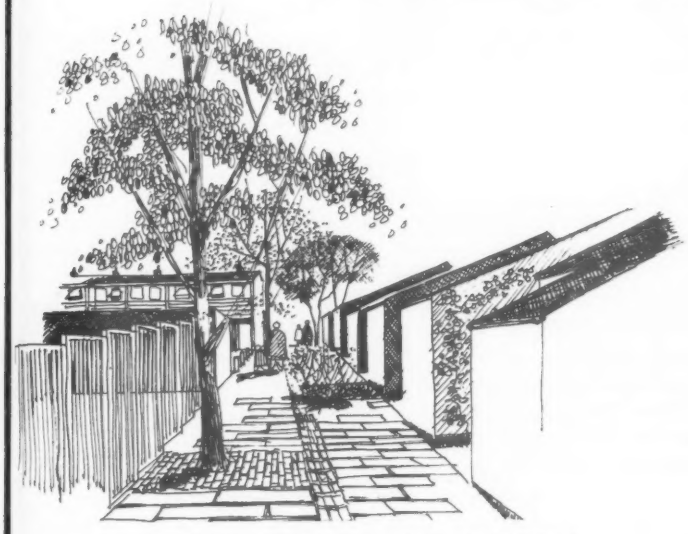
Re-analysis of the central area traffic flows confirmed the presence of traffic which had no business in the town centre, and that the volumes of traffic in the junctions were being exaggerated because some streams passed through a number of junctions.

A great deal of re-thinking about the road proposals now took place and although the problem was apparently limited to the central area, in the long run the whole of the road plan came under review. The first approach to the problem was largely intuitive. If difficulties arose through having a large number of junctions, why not reduce the number of junctions to one? This in effect meant reducing the inner ring road to one junction which would have been located within the town centre complex. This solution was considered impracticable, the major problems being the amount of traffic in the weaving lengths and the difficulty of providing access to the car parks and the service areas of the town centre.

To assist in the development of a more suitable pattern, desire line diagrams were prepared indicating ideal paths for traffic moving about the town for varying purposes. When alternative solutions were considered against this background, certain consistent elements appeared, *e.g.*, the need in each alternative for the greater part, if not the whole of the outer ring road.

During these processes too, the need to keep functions of the various roads absolutely clear cut became apparent and there emerged the principle of a hierarchy of roads:

Development road.
Collector and/or Distributor road.
Radial road.
Trunk road.



Above, footpath access to houses in Muirhead.

Fig. 5. Detailed housing layout at Seafar 1. Scale 1/2,500.

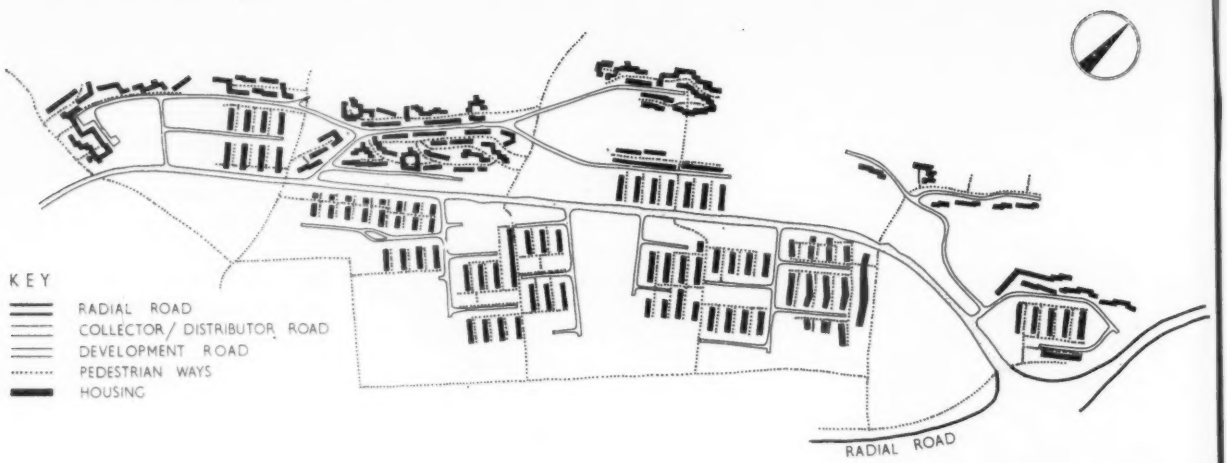
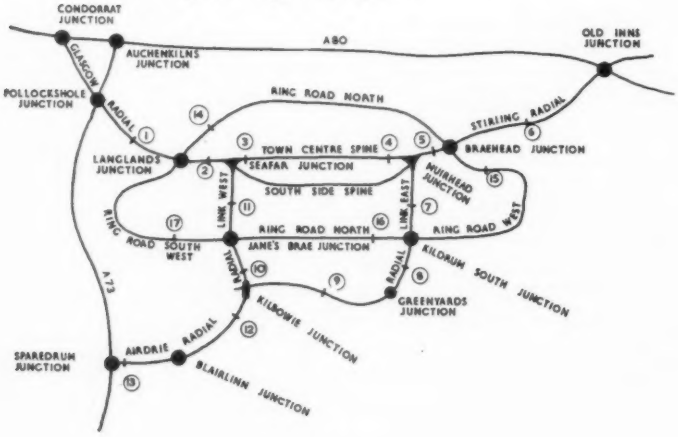


Fig. 6. Housing layout on northern slopes, showing separate road and footpath systems. Scale 1/10,000.

A considerable number of alternative plans were produced. These were gradually reduced to four main patterns. These are shown on Fig. 4. These four alternatives were worked up in detail and estimates of traffic flows at the junctions were prepared. Eventually, Plan No. 4 was chosen as forming the best basis for the road plan when considered in relation to other planning considerations.

These were now considered in detail against the selected pattern. The northern slopes of the hilltop site, the detailed design of which was well advanced, were little affected by the alterations but all previous ideas for the central area and the southern slopes had to be amended. The three roads across the southern slopes were found to divide the central area inconveniently. The alignment of the outer radial links was amended and the central road replaced by a distributor/collector road running parallel to the axis of the hill. For the central area various approaches were examined, keeping in mind the fundamental principle that vehicles and pedestrians should be separated. The proposal which is now being considered in detail is a linear centre along the ridge of the hill. This would exploit the natural levels of the site by arranging for vehicular roads and car parks at low level to be approached from the main radial road system, with pedestrian access from the higher ground on the northern side of the centre and at ground level on the southern side, interchange between the two levels taking place through a multi-level shopping complex. Such a plan would also provide sites for public and commercial buildings having vehicular access on the lowest floor and pedestrian access above.

Fig. 7. Traffic census points.



It is also considered necessary to give the maximum protection from weather in the Scottish climate and this might be done by the provision of housing in various forms above the shopping areas. In this position full advantage would be taken of the magnificent views.

In the plan which has emerged, the functions of the various elements of the hierarchy of roads referred to previously, are clear cut. The development roads provide access to building sites but are not through roads for traffic. As far as possible the pedestrian paths are not crossed by roads, even within the development areas. In many of these areas the pattern which emerges is of motor vehicles moving towards the periphery of the area while pedestrians move inwards towards the main footpaths. This principle is illustrated on the accompanying plans (Figs. 5. 6). Distribution and collection within the main hilltop is done by the outer ring road, the south side spine and the town centre spine. These roads provide access to local development roads only and not to building sites.

Without being so conceived, the radial and radial link roads have emerged as urban motorways in form, in that there are no connections to them except at the junctions which are limited in number. These roads take traffic from one part of the town to another and lead it to the national trunk road system. Thus, the function of each element of the hierarchy is clearly established, and a motorist passes from one kind of road to another, unable to by-pass any type.

A fresh analysis was then carried out to test the efficiency of the new plan. The analysis showed that reduction in the number of junctions had not materially increased the flows at those which remained and that more efficient connections between industrial and residential areas were provided.

The magnitude of the traffic flows at a number of census points (shown on plan, Fig. 7) within the town is shown in the following table.

Summary table of peak-hour flows on main road network

Census Point No.	LOCATION			Total mixed v.p.h.	Total p.c.u.'s per hour.
	Main Radials, etc.	*Inward*	*Outward*		
1	Glasgow radial (outer)	470	930	1,400	1,680
2	,, ,, (inner)	290	2,410	2,700	3,280
3	C.A. Spine (S.W.)	500	1,720	2,220	2,690
4	,, ,, (N.E.)	360	1,970	2,330	2,800
5	Stirling radial (inner)	640	2,290	2,930	3,530
6	,, ,, (outer)	1,360	1,170	2,530	3,010
7	Radial link east (inner)	1,250	820	2,070	2,510
8	,, ,, ,, (over railway)	1,880	510	2,390	2,900
9	,, ,, ,, (outer)	2,190	350	2,540	3,080
10	Radial link west (over railway)	2,340	250	2,590	3,140
11	,, ,, ,, (inner)	1,770	520	2,390	2,790
12	Airdrie Radial (inner)	2,600	490	3,090	3,740
13	,, ,, (outer)	700	970	1,670	2,030
	Ring Roads	*Clockwise*	*Anti-Clockwise*		
14	Ring Road N. of Langlands Junction	1,040	Negligible	1,040	1,190
15	,, ,, E. of Braehead Junction	890	,,	890	1,020
16	,, ,, S.W. of Kildrum South Junction	290	330	620	760
17	,, ,, S.W. of Jane's Brae Junction	940	Negligible	940	1,070

The table gives adjusted figures for passenger car units per hour, since the Ministry of Transport base their standards of road layout on a unit known as the passenger car unit in which passenger cars and motor cycles are the equivalent of one car while heavy goods vehicles and public service vehicles are equal to three private cars. (In the analysis and in this article the word "car" should be taken as including motor cycles since from traffic capacity standpoint they are of equal value.) On certain of the roads there are, of course, tidal tendencies and in many cases a morning peak not far short of the evening peak occurs. This is particularly true on the Airdrie radial and in this case the possibility of providing lanes with reversible flows to accommodate the morning and evening peaks has been suggested.

The flows on the radial roads are very largely due to the assumed commuting pattern. Since the directions in which this pattern may develop are so very conjectural, the volumes on the outer sections of the radial roads are to that extent in doubt.

The peak hour figures revealed by the analysis are surprisingly high for a town of only 70,000 population. It is difficult to give instances of what these estimated flows mean, in terms of traffic flows experienced in towns today, but the following examples may exemplify the problem.

			v.p.h.	v.p.h. per lane
1. Road 21·7 ft. wide.	Saturation flow.	Glasgow	1,910	955 (*)
2. Ditto	Ditto.	London	2,500	1,250 (*)
3. Victoria Embankment at Northumberland Avenue			984 v.p.h. per lane (†)	

4. As far as is known the only two-lane facilities that have accommodated an average of more than 1,000 vehicles per lane per hour or a total volume exceeding 2,000 vehicles per hour are in America.‡

Colorado St. Bridge, Pasadena, Cal.	Av. per lane	1,215 v.p.h.
Sumner Tunnel Boston, Mass.	Av. per lane	1,200 v.p.h.
Posey Tube, Alameda, Cal.	Av. per lane	1,350 v.p.h.

Cumbernauld's road system, while introducing no new principles, does perhaps apply known ones in a more wholehearted fashion than has been customary. This is particularly true in relation to the junctions where the constant endeavour of the traffic engineers has been to avoid impeding the free movement of traffic throughout the town. Any tendency for one junction to seize up would quickly be transmitted to others since the distance between them is so limited that there is no "reservoir" capacity along the intervening carriageways.

The maximum flow which can be accommodated within a weaving length of a roundabout has been the subject of research and argument and while flows in excess of 2,500 vehicles per hour have been obtained, it is doubtful if such solutions should be envisaged in a plan for a new town since several of the junctions would require weaving lengths with capacities in excess of 3,000 vehicles per hour and in one case, 4,000. It is felt that the ultimate plan should allow for grade separation at these junctions.

As an example of large flows at roundabouts, one weaving length at Hyde Park Corner can accommodate flows of 745 vehicles per hour per lane. This was obtained experimentally by switching off the light signals. ¶

The road plan looks forward some 15-20 years although because the population build up by natural growth from 50,000 to 70,000 will be slower than the development of the town, there is a considerable safety margin for some period beyond the end of 20 years. Special consideration will be given to any point where the analysis shows that dangers of congestion could arise with the ultimate population of 70,000. The whole system has been designed so that it can, if necessary, be brought into operation by stages and all the junctions are capable of phased development to the ultimate proposals although the first phase may vary from a simple T junction to the roundabout section of a fly-over roundabout.

Peak hour flows at a typical junction are shown in Fig. 8a. It will be seen that the design of this junction gives priority to the major traffic stream in

* G. Charlesworth and F. V. Webster: "Some Factors affecting the Capacity on intersections controlled by Traffic Signals." Theme IV, Question 7, at the International Study Week in Traffic Engineering 1958, Copenhagen, Denmark.

† A. J. H. Clayton: "Road Traffic Calculations," Road Paper No. 3, Journal Inst. CE. No. 7, June, 1941.

‡ Highway Capacity Manual, US Department of Commerce, Bureau of Public Roads, Washington.

¶ A. J. H. Clayton: "Working Capacity of Roads," Road Paper No. 48 Proc. ICE, October, 1955 (No. 3), Volume 4, Part 2.

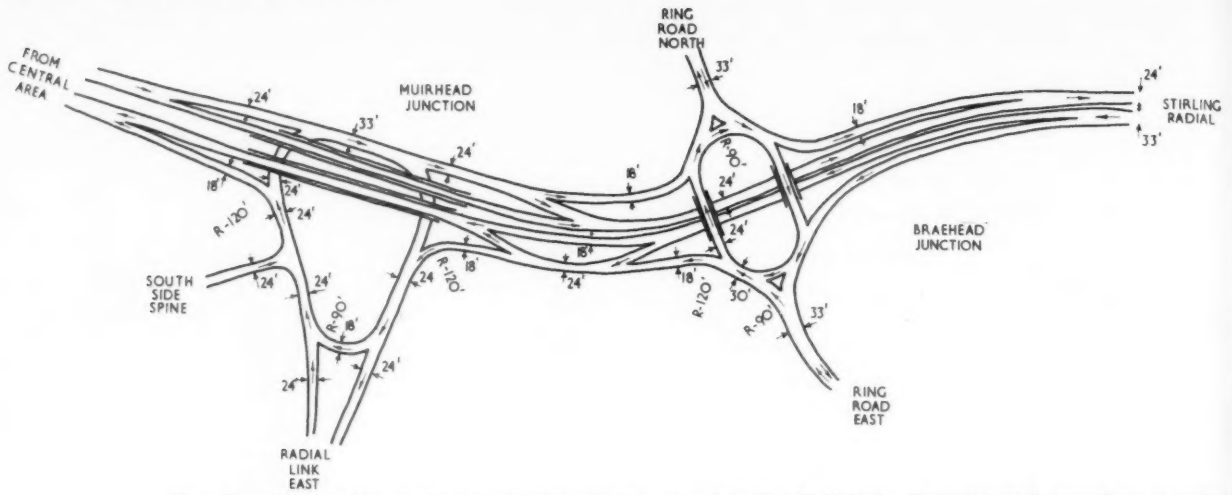
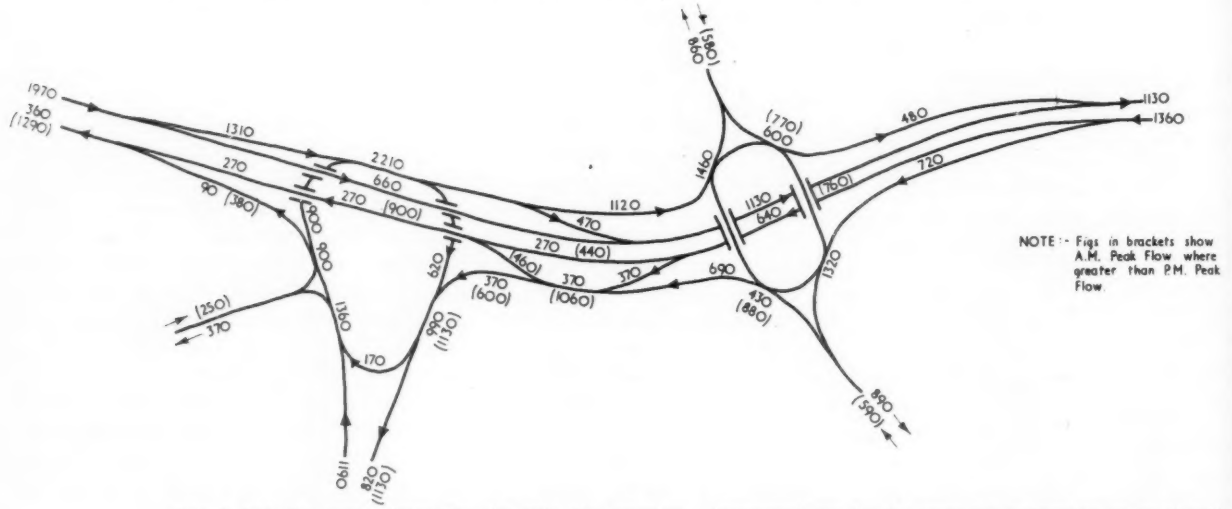


Fig. 8a. Typical layout of major junction complex, at Muirhead and Braehead. Widths of carriageways shown in feet.



that it has the most direct line through the junction and this principle has been applied to all junction design.

The scale of roads and junctions present considerable visual problems quite apart from the barriers which they form to the movements of pedestrians about the town. The configuration of the ground necessitates the construction of the roads on embankments and in cutting to achieve reasonable gradients. In places these will be of considerable height or depth. It is considered to be impracticable to provide buildings to compete in scale with the road pattern except possibly in the central area. It has been decided to plant continuous tree belts alongside the major road-works. These will clothe the slopes of embankments and cuttings and will simultaneously give vertical definition to the housing areas and longitudinal continuity in scale with the carriageways they define.

It is difficult to relate the solutions which appear appropriate for a new town at the beginning of its life to conditions obtaining in our existing towns, but certain aspects of the road plan for Cumbernauld seem to be fundamental to their problems too. Firstly, pedestrians and motor cars do not mix and every effort should be made to keep them apart, but in such a way as to cause both the minimum unnecessary inconvenience. In the town the pedestrian route should be direct and easy, he likes to cut off the corners; the motor car can be made to take the longer journey. Secondly, multi-purpose roads should be avoided, because of their inefficiency. Many of our towns are saddled with main radials which are expected to serve as trunk roads, as local through roads, as collectors and distributors, and even as development roads. Thirdly, it is now clearly recognized that in urban conditions in particular, it is the junctions which limit the capacity of a road, and attention given to them may well prove more productive than widening of the roads between, provided that these roads are not used as parking areas.

It would not be right for me to conclude this article without some reference to the assistance which I have received in its preparation. In his introductory remarks Hugh Wilson has referred to the method of team working practised at Cumbernauld. This article is no exception to the rule.

There can hardly be a member of the staff whose work has not impinged in some way on the problems which this article describes but I feel I must particularize in mentioning Geoffrey Crow who has contributed so much to the traffic engineering considerations at Cumbernauld.

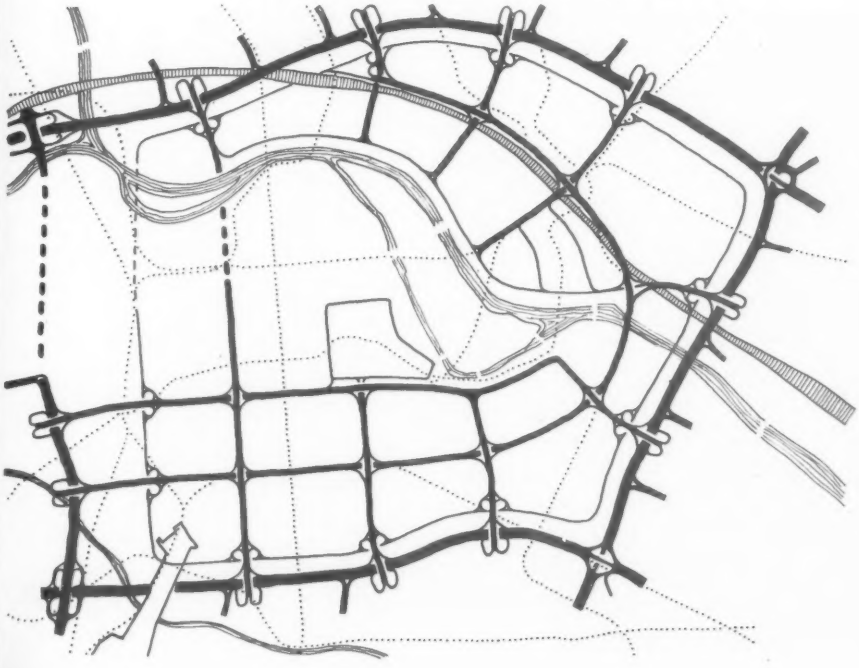
A competition for replanning the centre of Berlin, held last year, provided exceptional opportunities for a radical approach to the solution of the traffic problem in a blitzed metropolis. One of the British entries, by Messrs. Boissevain and Osmond with Percy Johnson-Marshall in consultation with Colin D. Buchanan, proposed to create a civilized environment within which the pedestrian could walk the length and breadth of the city centre on an elevated platform without encountering a motor vehicle, and the vehicles could circulate or park with complete freedom on ground level. The authors of this design have contributed this account of their solution in which road building is part of a comprehensive, three-dimensional plan.

A plan for a two-level city

A basic factor in working out a solution was that the modern city has become dependent for its functioning to an extraordinary degree upon motor traffic. The situation demands a radically new approach in design. It is wishful thinking to imagine that the construction of a number of trans-city expressways, and a ring road of arterial character, will suffice to insulate the centre of the city against penetration by large volumes of motor traffic. Some through-traffic may be removed by such roads but the city centre itself is a vast generator and attracter of traffic, spreading its influence not merely to all the rest of the town but to the surrounding countryside and far afield to other towns.

This traffic must be accommodated within the centre, it cannot be diverted or by-passed. Some order can be given to the circulation by the grouping or zoning of buildings and land uses, but even so the problem remains to contrive the distribution of a large number of vehicles to a host of destinations spread over the central area. This traffic, even if distributed through modern motorways of conventional design with shops, offices and commercial buildings along the frontages, still gives rise to the vicious destruction of city amenities. The rapid growth of motor traffic has indeed rendered out of date (in metropolitan areas) the traditional arrangement of buildings in streets that has endured for hundreds of years.

Fig. 1. The main road pattern for central Berlin in the scheme by Boissevain and Osmond, with Percy Johnson-Marshall and C. D. Buchanan. Pedestrians can circulate throughout the central area on a first-floor podium. The plan for a typical development block is shown in Fig. 3. The main line railway runs E.W. north of the river. Underground railway in dotted lines.



It seemed to the authors of the plan that the possibilities of dealing with motor traffic in a large city centre by means of so-called one level "precincts" were strictly limited even allowing for the concentration of some movements into public transport in the form of buses and underground railways. In conditions of heavy motorization conventional precincts become overwhelmed by their own legitimate traffic, and the precincts bounding roads become torrents of vehicles effectively preventing communication between precincts. One consideration stood above all others and that was to restore civilized conditions for the pedestrian, and when this was pursued in earnest it soon became clear that the only certain method of achieving it was by elevating the whole of the pedestrian circulation above the vehicular circulation.

This not only avoids all the savage conflicts with vehicles in which the pedestrian is involved in on-the-level arrangements, but it also releases a great deal of space for vehicular use. No great amount of argument is needed to show that more space is one crying need if the motor vehicle is to be accommodated in city centres and there is sense in seeking it in a vertical rather than a horizontal direction. Thus was evolved the first principle of the plan—to give over to vehicular traffic virtually the whole of the ground area, and to build the city above and to some extent beneath the vehicular plane.

However, it was also necessary to have order and method in the ground level vehicular circulation. The requirements were large parking areas, goods facilities closely related to the buildings, but stops also related to buildings, and main circulation ways. It was considered that the last should be in the open air to avoid claustrophobic effects and ventilation difficulties, and should also be designed to give free flow with easy turn-offs to parking areas, etc., and without

THIS IS

A MOVIE MOGUL'S LIGHTER

Every half hour he reaches forward to light a fresh Havana* and in so doing shifts his not inconsiderable weight ("damn quacks always trying to make me give up this and that") forwards once, and backwards once.

The strain imposed on the legs of his chair would long since have worn holes in the floor covering, had he not, in the impoverished days before his first million, had the foresight to invest in Runnymede Rubber flooring; which is more than a match for a movie mogul's cigars.

* *Keen students of sociology will note the "nouveau riche" habit of lighting a cigar with a lighter, not a match.*

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6 Old Bailey, London, EC4. *Telephone: CITy 2471*

any one-level intersections, right-hand turns or other bugbears which play such havoc when traditional street patterns are called upon to cope with motor traffic. An obvious part of the solution was to divide the area into roughly rectangular blocks, each with its first-floor pedestrian podium, with the buildings rising from the podium, and the ground area under the podium devoted to parking, goods facilities, drainage and moving walkway connections to underground railways as necessary. The main circulation ways would run between these blocks, and pedestrian communication from block to block would be continuous by means of light bridges at first-floor level.

The problem, however, was to devise a workable circulation system amongst the blocks, allowing for both fast, free travel and easy access into the blocks. The basic solution eventually adopted was in effect to insert each block *between the carriageways of a dual-carriageway road with reversed flows*. This sounds complicated but is explained in the following simple diagrams which, it should be remembered, are designed for right-hand rule of the road:

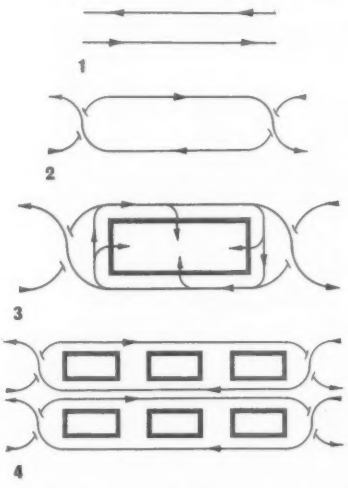

Fig. 2. (1) *A normal double carriageway road (traffic keeping to the right, as in Berlin).* (2) *A double carriageway road with flows reversed over a section.* (3) *A development block is inserted between the reversed carriageway* (4) *The process can be continued.*

In Fig. 2(3) fast travel is possible past the block in the main directions, at the same time it is possible to enter the block or circulate round the block *from or on a slow inside lane*. The flows have to be reversed in order to allow this take-off from the slow lane. Fig. 2(3) provides all that is basically necessary to serve a sizeable city-block from a fast traffic road without interference with the flow of traffic on that road. This can be repeated to accommodate more blocks in Fig. 2(4).

From this basic unit there was developed the comprehensive plan of development blocks and highways shown in Fig. 3. The system is contained within a ring road linked to main arterials radiating out of the city. Intersections of the central roads with the ring road are necessarily elaborate, but the intersections at the

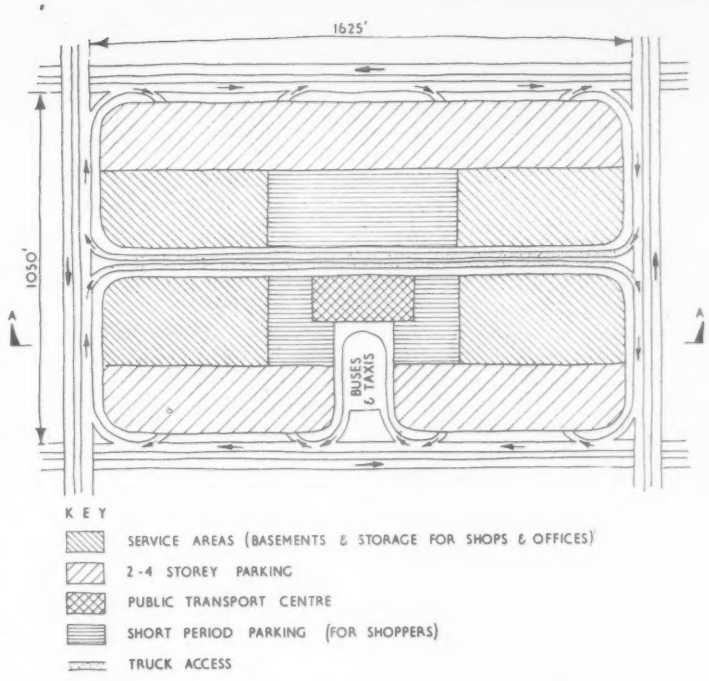

Fig. 3. A typical development block, approximately 50 acres in extent, at ground level showing how the traffic circulates round the block in the reverse direction to that followed in a normal roundabout (traffic is shown observing the German rule of the road: in Britain the flows would be in the reverse direction), entering the block from the slow lane. The plan is diagrammatic only. Section A-A on page 287.

Moor House, an office block in the Barbican, London (architects, Lewis Solomon, Kaye and Partners), has a first floor platform that will eventually be connected to an elevated pedestrian walkaway system covering the entire Barbican. This shows that it is possible, with comprehensive planning and tight control, to build today for the segregation of vehicles and pedestrians.

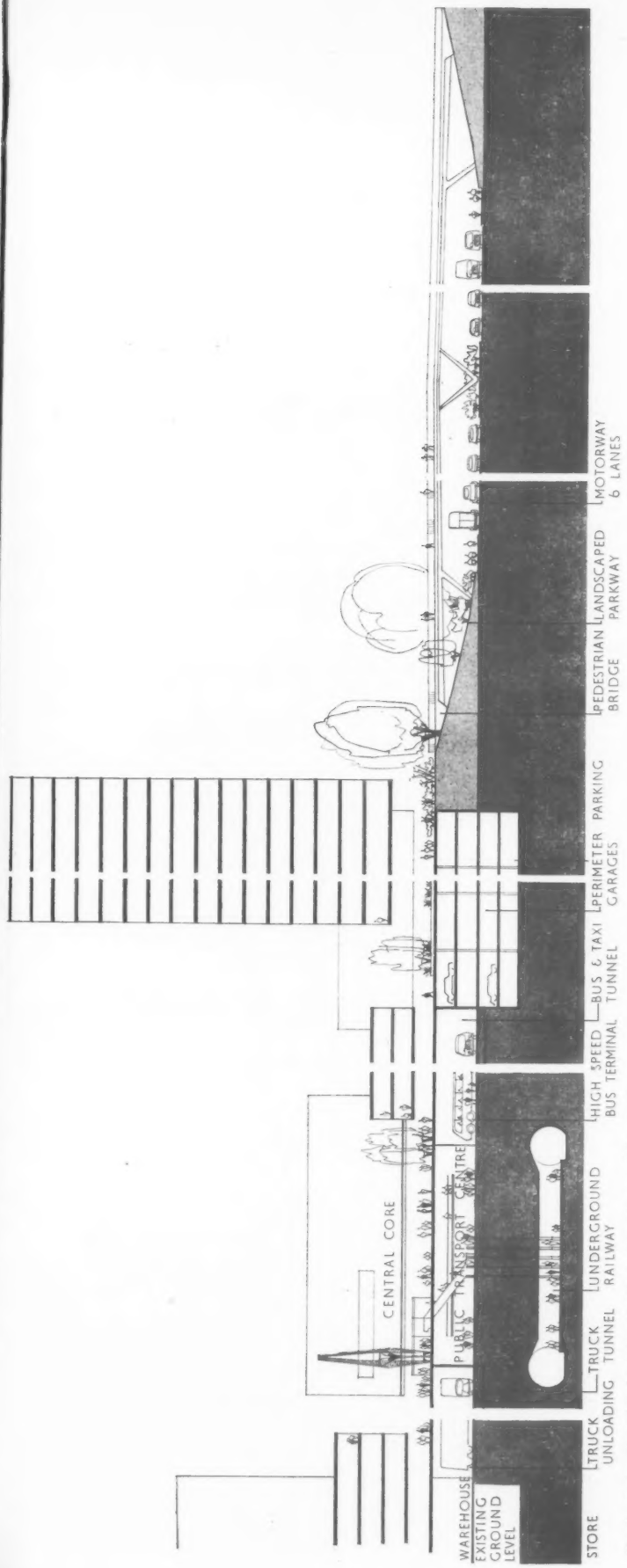

Fig. 4. Section through a development block to show the use of three levels.

four corners of each development block are fairly simple. It is virtually impossible to devise a plan which does everything. There has always to be a sacrifice of some kind, and in this case the disadvantage is that development blocks can only be circumnavigated in a clockwise direction and so travel from one block to another may, depending upon the point of starting, involve a journey right round a block instead of a simple movement across the street.

The ground level traffic arrangements for a typical block are shown in Fig. 3, which also shows the connections to the main ring road. A development block would be of the order of 50 acres, would contain space for some 10,000 parked cars, and might support a day-time population of 20,000 people. Fig. 4 is a cross-section of a typical block.

The main lesson of this entry would seem to be that even given a desperate attempt to simplify the highway arrangements there nevertheless emerges a very complex and very expensive system which is a complete break with tradition, and yet, paradoxically, the pedestrian podiums could provide a setting for the grouping of buildings and open spaces in the best classical manner, entirely free from the menace of motor traffic.

Finally, there is the question of the applicability of the system to existing cities. It is obvious that it calls for the technique of comprehensive development which is already embodied in planning legislation. By this means an area of urban decay and blight large enough for at least one of the basic units would be designated, acquired, cleared, and rebuilt in accordance with the new principles, including a municipal core of lifts, escalators, and all utility services. Sites could then be leased to developers with leasehold conditions to ensure compliance with the intentions of the scheme. The new upper level would be connected by pedestrian bridges to a new system of upper level pedestrian walkways which would be built over the pavements in the existing conventional streets. The pavements would become additional road space and all access to buildings would be at first-floor level. All new applications for development would be expected to fit in with this new conception.

If this is thought too utopian an idea, it is worth remembering that the joint LCC/City Corporation Barbican scheme is now being implemented in similar fashion, and that several large buildings in the area are at present under construction which, when integrated by pedestrian bridges, will achieve the object of separating the pedestrians from the motor vehicle by an extensive upper level system.

Birmingham's inner ring road, designed by the Corporation's Public Works Department (Chief Engineer Sir Herbert Manzoni), is in many ways typical of the solutions offered by British highway engineers for urban traffic congestion. It is 3¾ miles long, and the first section of it is now being built. In this article Leslie B. Ginsberg, the architect, who is head of the Birmingham School of Planning, studies the road from the standpoints of planning and architecture, and concludes that it "looks like being the biggest traffic and town design tragedy to afflict an English City." There is not a single architect in the town planning section of the Public Works Department, and Mr. Ginsberg suggests that town planning should become a separate department with its own chief officer.

THE BIRMINGHAM RING ROAD

Town planning or road building?

". . . A merry road, a mazy road,
and such as we did tread,
"The night we went to Birmingham
by way of Beachy Head . . ."

G. K. CHESTERTON

Birmingham has long been famous for its impassable centre and almost impossible one-way system: since 1918 the City Fathers and the Public Works Department have been trying to solve the problem, finally deciding on the Inner Ring Road Scheme in 1943. This is simply a very wide and complicated road consisting of twin three-lane carriage ways, having parking lanes either side, and 15-ft. wide pavements. It is punctuated with nine enormous roundabouts, several of them very complex, and completely surrounds the core of the city, picking up all the radial routes as they enter the central area. (Fig. 1.).

This is no Geddesian surgery, but a major operation: a gash around the centre 110 ft. wide, 3¾ miles long, involving the widening of a few existing roads, but mostly cutting a line of least resistance through the blight and down-at-heel properties that always exist on the edge of the central area plateau of values (Plan, Fig. 2.) Parliamentary approval for the project was given in 1946 but actual construction only began two years ago. Thus the road was over ten years on the drawing board, giving the designers ample time to study the latest techniques of highway engineering, including traffic survey and traffic control and vehicular and pedestrian segregation, as well as the problem of relating a new road to the adjoining buildings. Indeed this could have been the English answer to those "highwaymen" across the Atlantic who are destroying the souls of the American cities with their monstrous routes.

Unhappily this looks like being the greatest traffic and town design tragedy yet to afflict an English city. There

Fig. 1. A view from the north-east of a model of the ring road, showing in the right foreground the proposed roundabout in front of the Corporation Street fire station. This view shows very clearly the "perimeter" nature of the ring road development, and the formation of building sites comparable with the worst that Haussman achieved in the 19th century. The Smallbrook Street section, now under construction, is on the extreme left.

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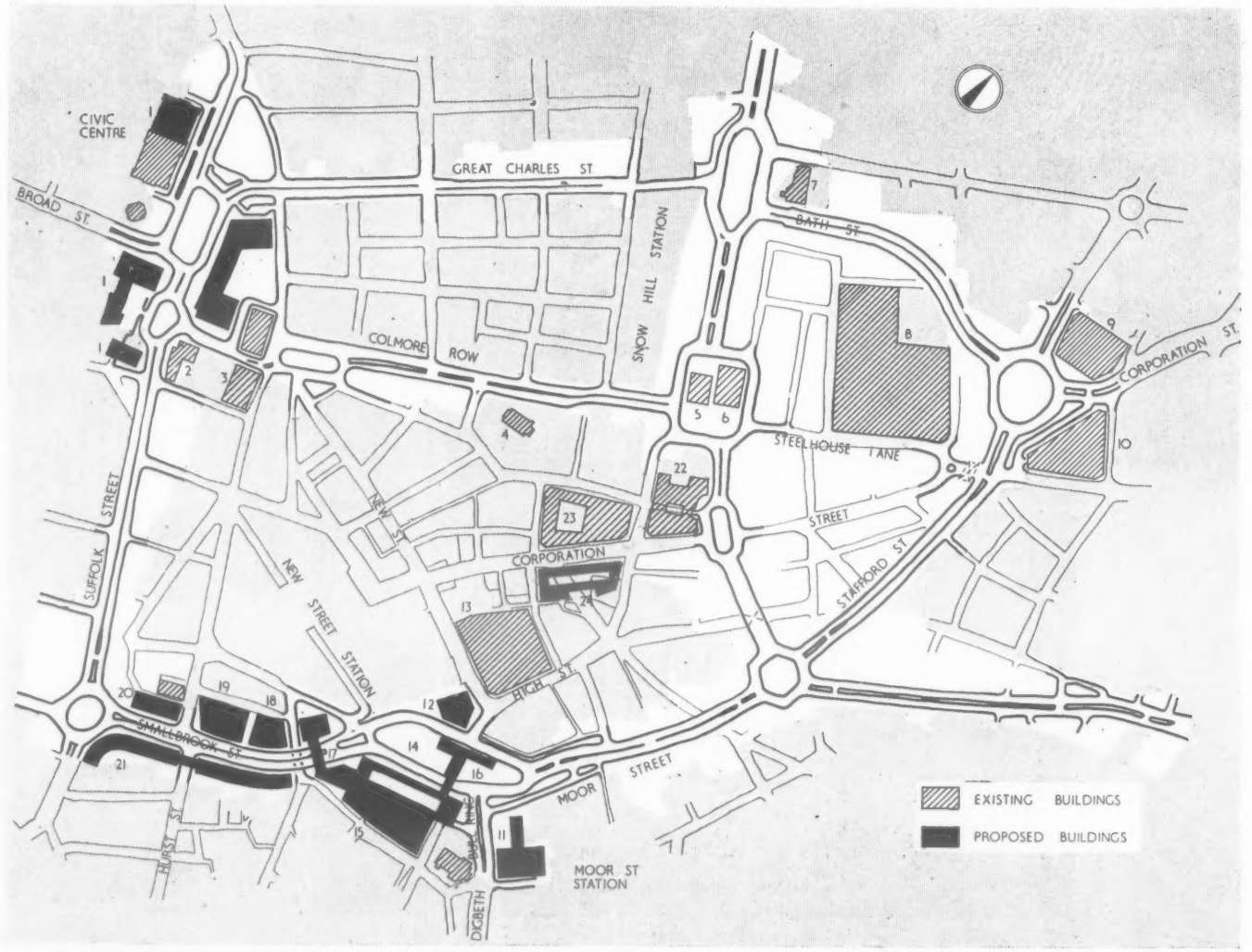

KEY.

1. Civic Centre
2. Office block
3. GPO
4. St. Philip's Cathedral
5. Office block
6. Cinema
7. St. Chads
8. Hospital site
9. Office block
10. Fire station
11. Multi-storey car park and hotel
12. Rotunda office block
13. Big Top
14. Site of existing market—future garden
15. Proposed new market complex containing offices, shops and car park
16. Open retail market
17. Office block with lower level long distance bus station
18. Norwich Union offices (under construction)
19. Theatre
20. Offices and shops
21. Ringway Centre—offices and shops (under construction)
22. Lewis's store
23. Rackhams (Harrods) Ltd. (under construction)
24. Offices and shops

Plan (scale 1 in. = 600 ft.) of the Birmingham central area showing the line of the Inner Ring Road and other road improvements. The land liable to acquisition (including land purchased in the 19th century for the construction of Corporation Street) is shown white. The depth of land acquired is too shallow to allow satisfactory comprehensive development, and seems to pre-suppose the development of frontages on an urban motor road.

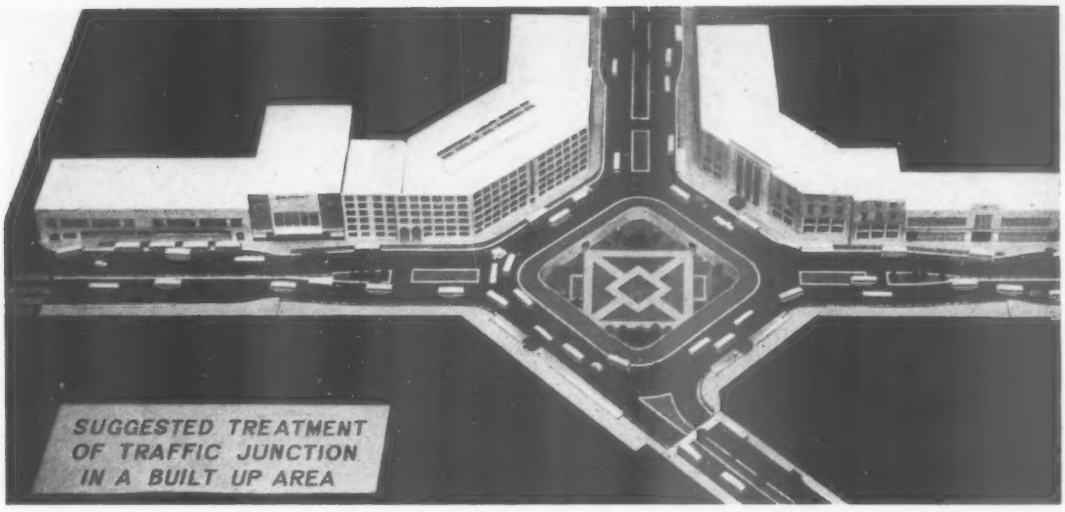

Fig. 3. This is Birmingham Public Works Department's model of suggested treatment for a roundabout in a built-up area. At least five of the nine major junctions on the ring road derive their design from this conception, although the ring road has six lanes, not four as shown here. The excellent idea of the sunken garden approached by pedestrian subways is offset by the extraordinary garden plan and the completely inadequate architectural conception of the surrounding development.

does not appear to have been any real traffic survey, nor assessment of future probable needs: only the most limited volumetric counts and the feeling that a new pipeline would somehow clear the other choked lines. There is no attempt to keep pedestrians away from the road except by means of ugly underpasses at junctions. Already doubts have been cast on the adequacy and multiplicity of roundabouts (Fig. 3), and the need to replace them with flyovers in the very near future. Indeed the road (Fig. 1) has a very "1920" look about it, and with its lining of commercial and civic buildings takes one back to the leisurely almost pre-motor car days of Edwardian Aldwych rather than a modern urban highway.

The Manchester City Surveyor, Mr. Rowland Nicholas, criticized the lining of these roads with development in 1956 during the "Conference on the Highway Needs of Great Britain" held at the Institute of Civil Engineers, when he said: "It is surely a matter of great concern that in examples of post war proposals intended to handle large traffic flows there are included roundabouts with shopping and office frontages. Nothing could be more ludicrous."

The then chairman of the Public Works Committee, Ald. F. Price, took the view, in reply, that Mr. Nicholas's outlook about frontage development on ring roads was wrong. Had Birmingham followed Mr. Nicholas's ideas, he said, their road plan would have been as dead as a dodo. It would have brought in no income to speak of, and the rate burden would have been so great that opposition within the city would have prevented the road being built at all.

This of course is true, but why should a road have to be paid for by adjoining development, especially when such development occupies so narrow an area as it does in this case? This is probably the main reason why this and similar road "improvements" in our cities will be such a failure, unable either to cope with the traffic problem or to promote good redevelopment. One may be tempted to blame the Ministry of Transport for being niggardly with its grants, but in fact the City of Birmingham only applied for powers to acquire and develop the 80 or so acres immediately within and adjacent to the proposed route. Never at any time does there appear to have been an attempt to acquire or negotiate for sufficient land to develop in depth.

Among the reasons for this narrow-minded outlook are the desire of the road engineers to get on with their job, and the division of function and responsibility as between the Ministries of Housing and Local Government and of Transport, and within the local authority. In my view there should be one body through which applications for land for *all* development should be channelled: at present land for housing, land for roads and land for very limited "town planning purposes" are all acquired or negotiated for by separate departments under different Acts and paid for in different ways.

Planning is a comprehensive operation, and while the dynamic in a particular instance may be a road, nevertheless that road is really only a fragment of the redevelopment or new planning that it must engender. It is therefore not just a highways matter but is a planning matter in the widest sense, and at present neither government nor City think in these terms when it comes to land acquisition. It is only by comprehensive planning that any developer, private or public, can build satisfactorily, and can build with profit, yet our "Pangloss" type developers and so-called planners carry on designing and developing in separate, almost watertight, compartments.

The Birmingham Public Works Department recently held an exhibition of its work in the City Museum and Art Gallery, where it showed a model (Fig. 1) of central area redevelopment and the ring road. This was lined with buildings—many intended to be "new," but with the hangover of the '30s close on the designers' heels they looked as corney as possible, with regular height lines, corner splays, and all the other paraphernalia of pre-war bye-law planning that have been swept aside by the floor space indices or plot ratios used in so many other cities but not, apparently, in Birmingham.

The Public Works Committee might have felt it worthwhile giving a guide to developers by producing a more imaginative "outline model," in co-operation with A. G. Sheppard Fidler, the City Architect. But no, the only developments departing from this model were the separate and independent schemes of private development companies, at various scales and without clear orientation. Though these buildings were for sites along the ring road or in the central area, no ordinary person could possibly have been able to appreciate their sit-

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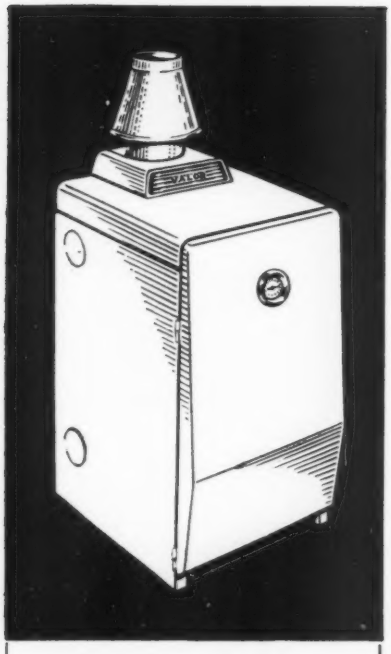

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Fig. 4 (left). The Birmingham Corporation, as usual, wanted a six-storey frontage for these new offices by J. Seymour Harris and Partners (for Corporation Street Estate Co. Ltd.) to line up with Victorian buildings on either side. The design shown here became possible when a larger plot had been obtained and a side street closed. It includes an arcade, a pedestrian precinct and a fountain garden court.

Fig. 5 (right). The disjointed canopies of this unhappy junction between two post-war buildings in New Street shows that planning controls have not been used to achieve any architectural integration.

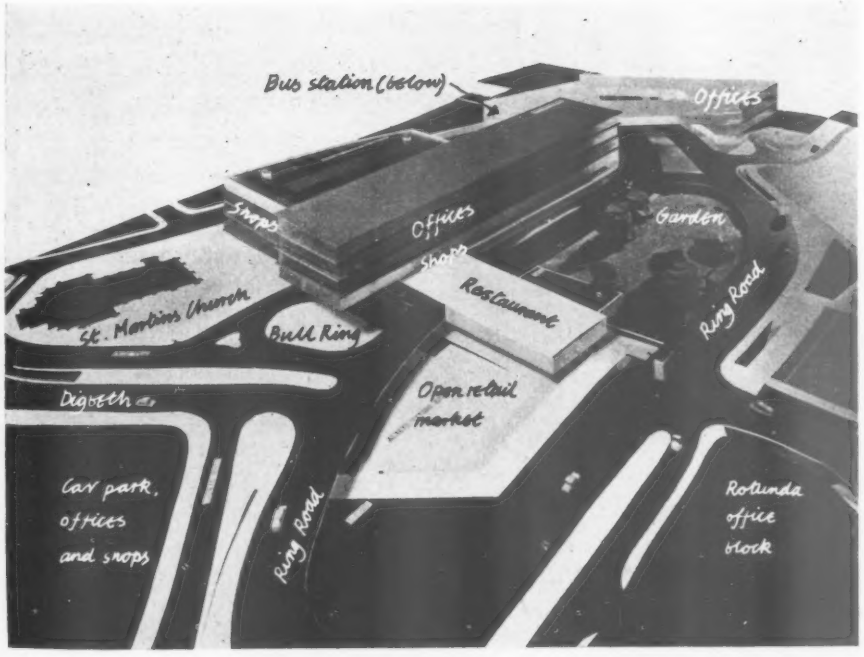

Fig. 6. Model of the proposed Market site development by James A. Roberts. The present market, which is to be demolished, is on the island site. It is by no means certain that there will be any integrated architectural design for this area, as the Estates Department is inviting developers to submit plans for its development either as a whole or in parts.

ing, and inter-relationship—or lack of it. Significantly not shewn was the City Architect's project for the Civic Centre area, a barren wilderness of pomp and roundabouts which Mr. Sheppard Fidler is attempting to close up with a series of administrative and cultural precincts.

It is obvious that there is in fact no overall plan for the redevelopment of the central area and the ring-road. This raises a fundamental issue in the whole strategy of town planning. Private enterprise must at present remain as one of the driving forces behind the development of shops and offices, as well as much else in central area building. All good planners realize this, and are slowly learning how to use the varied demands and needs to build up a co-ordinated whole instead of the congested chaos of the past. In Birmingham the city authorities are doing all in their power to attract developers, but the sites are often expensive, have only 75-year leases, and frequently are of awkward or inadequate shape. They try to encourage the developers by giving them as free a hand as possible: the only rules they lay down concern building "bulk," loading and unloading of commercial vehicles, and a minimum of town planning and building bye-laws. This method of planning by negative controls has never achieved anything worthwhile.

In discussions with large-scale developers and their architects it has become obvious to me that they would welcome some measure of guidance. But the City Architect's advice is not sought until too late, and guidance in the earlier stages, not advice in the later ones, is what is wanted.

The city has such a large programme of housing and industrial re-location, both in the five great redevelopment area outside the centre and on the outskirts, that the City Council is reluctant to undertake comprehensive planning in the central area. It also fears the political consequences of public resentment of compulsory purchase orders. Thus planning in the centre is generally the result of negotiation, in which the Estates Department tries to persuade private owners to co-operate with one another and with the Corporation to develop sites. Such has been the case with Rackham's (Harrods) Ltd. new block by T. P. Bennett & Son and the Corporation Street Estate Co's building by J. Seymour Harris & Partners (Fig. 4). Having organized the site, the developer's architect then produces his outline design, generally without knowing anything of the intentions of the city with regard to that area. Usually the city has no design, no ideas regarding massing, relationships of parts, etc., except that in the case of certain existing streets, building lines, corner

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Fig. 7. New buildings on the High Street skyline seen from Digbeth. This view, of the main approach to the city from the south-east, shows the "Big Top" in the centre. In spite of the proposed new development (shown in Fig. 8) on the right, the skyline will remain almost unaltered.

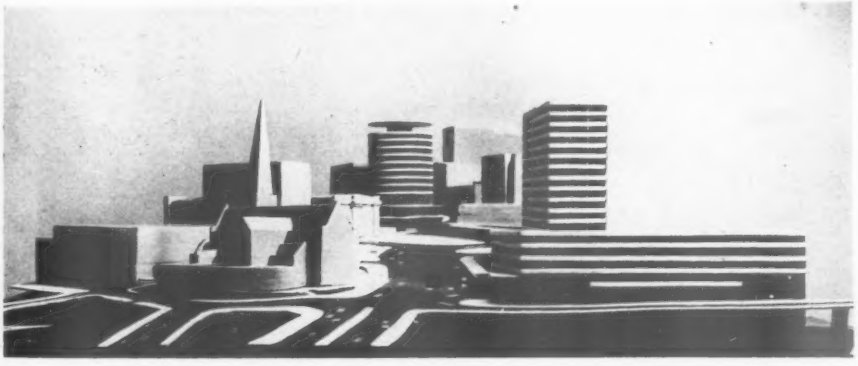

Fig. 8. Proposed development by James A. Roberts for the Bullring-market area shown on Fig. 7. The existing St. Martin's Church and the old market are on the left, proposed Rotunda offices and multi-storey car park, offices and hotel on right.

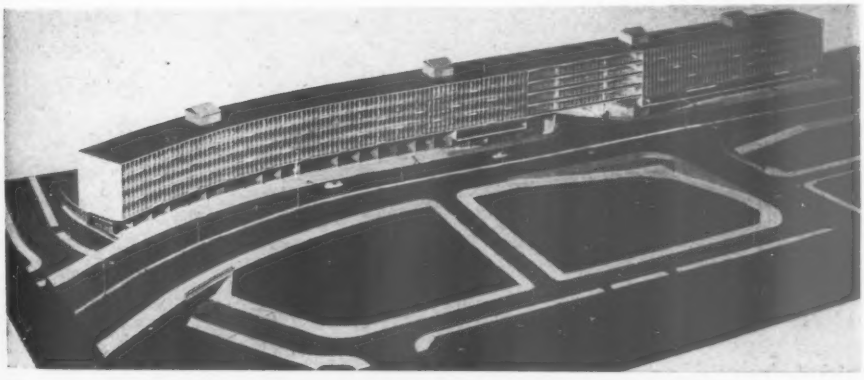

Fig. 9. Model of "Ringway Centre," shops and Offices by James A. Roberts, now under construction. The architect has done his best with an almost impossible site—a thin strip of ribbon development fronting an urban motor road. The bridge, right centre, is seen under construction in Fig. 11.

splays and minimum heights are generally laid down. In the case of the building illustrated in Fig. 4 the original intention was to retain a five or six storey façade to Corporation Street, in keeping with the Victorian façades—though these are all tumbling down in the near future. In the case of the "Big Top" this same request was made, and the architect acquiesced, with the result that this building now looks rather a lump (Fig. 7).

It is only after planning applications have been approved in principle by the Public Works sub-committee responsible that the City Architect is asked for his comments. As he is not responsible for planning the Central area and does not have an outline plan to guide him, his comments are reduced usually to quite small matters of detail. At that stage any real contribution to town design is impossible (Fig. 6) and even in cases like the notorious pseudo-Georgian T. I. House advice is not taken by a hard bitten Committee intent on getting as much built as possible at least cost to the ratepayer, which may mean with as little attention to aesthetic qualities as possible.

On the Ring Road itself the pace has been set by the first developers, and by chance rather than by planning a whole series of adjoining buildings (including Ridgway Centre and the awkward Market site roundabout) may all be designed by James Roberts, in association with Sydney Greenwood. This may result in a more integrated design than the City deserves. It is quite fortuitous and has not been inspired by the Town Planning Department and may still be ditched by the Estate Department which is now advertising for developers to plan this area, either as a whole or in bits and pieces.

The main approach to the city from London and the south-east by road or rail reveals a most horrible skyline (Fig. 7), hardly one plot back from the ring road—the result of the misapplication of planning controls since the war. But, if Mr. Roberts' developers' schemes are acceptable to the City, the Market site, the Bullring and the Digbeth approach should be most interesting, with a hotel tower on its car park podium facing the old church, the new Market using different levels and open spaces, and the Rotunda office block forming a climax to the entry to the city (Fig. 8). This series of buildings then links up with the Ridgway Centre (Figs. 9, 10, 11, 12) a block of offices and shops on the Inner Ring Road frontage, on a site that is both narrow and inadequate.

Unfortunately, the skyline already referred to is unlikely to be much altered, and there is no reason to suppose that further Ring Road development will be of this calibre.

So far as one can tell the roundabouts

Fig. 10. Smallbrook Street, the first section of the Ring Road to be built with "Ringway Centre" on the right. The road is temporarily used as a car park. The view down the street will later be closed by a continuation of "Ringway Centre."

Fig. 11. The offices of the Ringway Centre form a bridge over Hurst Street where it debouches into the Ring Road. Pedestrian subway on left. Note the curious lack of integration between the design of the building and that of the subway and parapets, each being from different offices.

Fig. 12. Pedestrian underpass at junction of Hurst and Smallbrook Streets, entered from subway seen in Fig. 11. This subterranean rendezvous probably resulted from a visit by members of the Public Works Committee to Vienna where they saw the Rondo under the Ringstrasse. The underpass houses lavatories, telephones and (it is hoped) display kiosks.

have not been planned at all except as engineering schemes, though even something on the lines of the LCC's Elephant and Castle scheme repeated with nine variations like a string of beads would be better than the stereotyped splays and sight lines that are likely. The effect of sloping pedestrian underpasses, and later on of flyovers cutting across the elevations of new buildings does not appear to have been given any thought at all. Yet with the Corporation's ownership of even the limited amount of land it has acquired, a minor version of the City of London's Route 11 should have been possible, with upper level walkways, an interesting pattern of towers and courts, and some much needed related open spaces. As it is, the only common item will be a car park under part of the road.

The ring road will alter the face of Birmingham and set the standard for at least three quarters of a century. Post-war development in Birmingham has been of a pretty low standard so far, with notable exceptions like the Calthorpe Estate by John Madin, some of the more recent corporation housing and schools, and the buildings mentioned previously. Even in the mazy roads of the Midlands good work is possible.

Birmingham has a terrific record of public works—ever since Hanson built the Town Hall and Chamberlain carried through the Corporation Street Improvement Scheme. The present programme for housing, the five re-development areas and the ring road itself represent an enormous weight of work. But quantity is not enough: quality is what makes a city great and beautiful. In their own time the much quoted examples of Bath, Bloomsbury and Bournville were all large scale private enterprise developments that had to pay their own way, and at the same time are good examples of town design. Birmingham Corporation is probably the largest single freeholder in the central area and as such is in a wonderful position to create and carry out an overall redevelopment scheme for the centre that would make this city one of the finest in the country.

"Piecemeal town planning will not do" said the Minister of Housing and Local Government when he attended the Jubilee of the Department of Civic Design at the University of Liverpool. He continued: "There is no merit in preventing ugliness if the inspiration is not there to create beauty and excellence." Yet Birmingham is committing both these faults.

First and foremost there is administrative schizophrenia. There are also Committees in danger of overreaching themselves in their quest for power. There is no single department charged with Town Planning in its full sense, but a dozen departments concerned with different aspects, yet without a single head. Public Works are responsible, *inter alia*, for Roads, Town Planning, and Redevelopment—all separate sections. The Redevelopment section, however, is *not* concerned with the central area. Town Planning is concerned mainly with the statutory and regulatory aspects of the Survey and Development Plan, and has only a small staff, with less than six qualified town planners, and not a single architect on it. Architectural Control is undertaken purely in an advisory capacity by the City Architect.

The Estates Department, like the outside developer, is the key to realisation, and the work of that department may have more to say in the plan than either the so-called "town planning" or "architectural" sections. When the client and his architect are imaginative and willing to negotiate fully, some very good things can result, but it is entirely dependent on the outside architect having a good overall conception and producing an imaginative and flexible scheme to begin with. A central area moreover does not consist of a series of self-contained sites, but a complex of integrated ones, and here the system fails.

A Town Planning Department established in its own right is obviously the main need. It would not provide the whole answer with a wave of the magic wand, but could create the atmosphere and situation in which proper town planning can be carried out. It should be an independent department with its own committee and chief officer: it should include the present so-called Town Planning Section and the Redevelopment Section of the Public Works Department together with their committees. It should have strong liaison sections with the Engineers for roads and services, the Architects for civic design and housing and Estates for realisation.

In this way the various aspects of development would be put in their proper perspective, the monstrous overburden of work on planning would be taken off Public Works and placed where it could be effectively dealt with, without bias or intrigue towards or away from engineering, architecture or estate development.

In the final analysis, it is the need to think comprehensively, to plan as a whole, and to destroy the narrow boundaries of departmental thinking that will be essential before a good plan can emerge that will be a real plan—not just a road plan, not just a plan for profitable rentals, not just a plan for motorists, or a plan for pedestrians, but a plan that attempts to solve all present needs in a creative and beautiful way.

WATER SUPPLY AND SANITATION | BASINS

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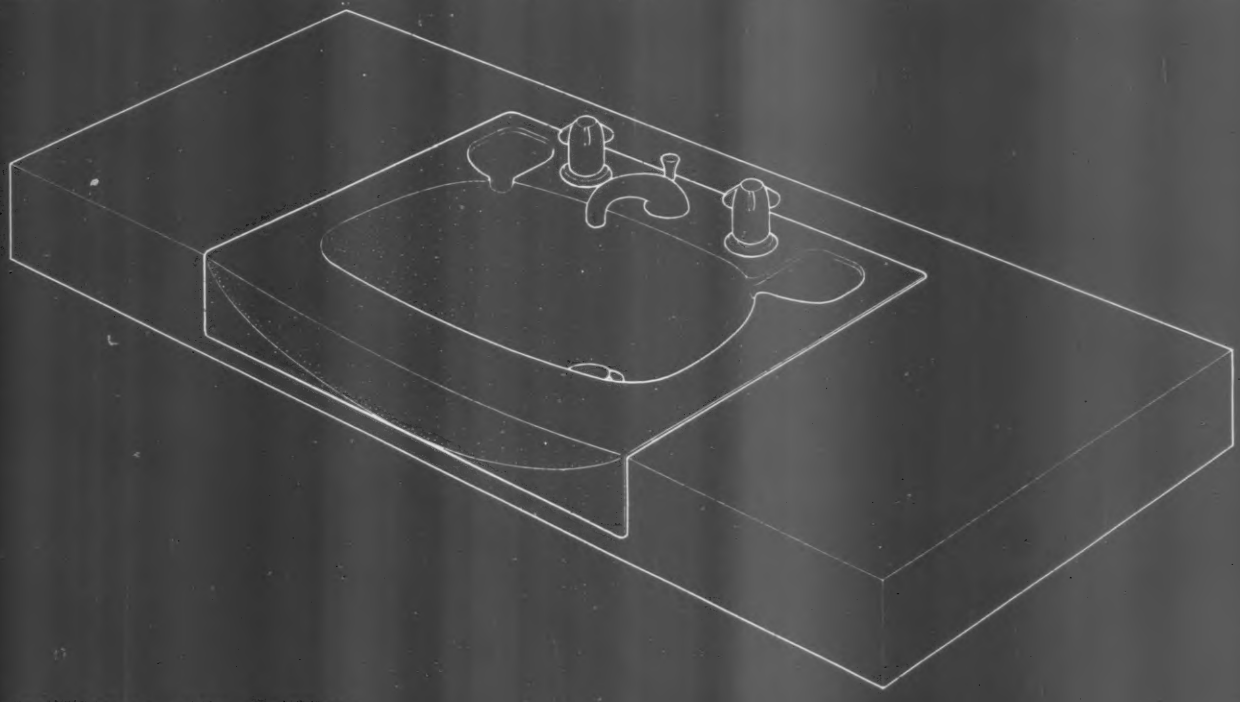
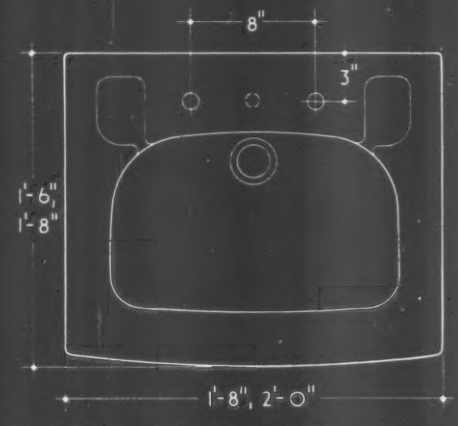
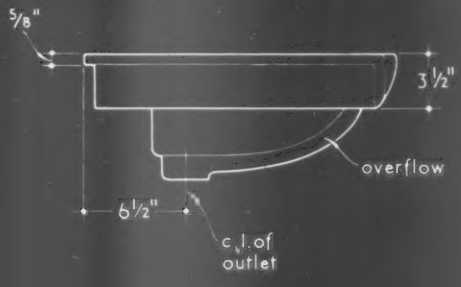
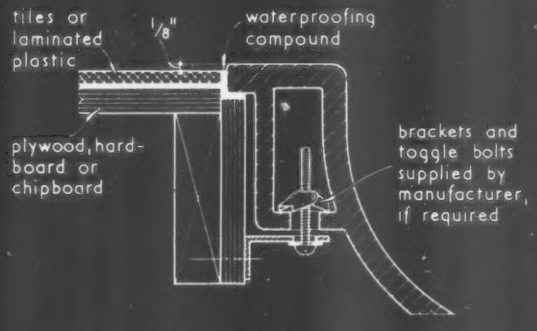


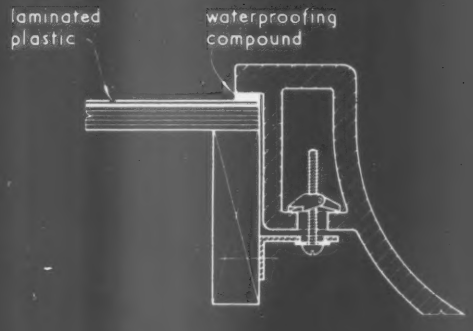
PERSPECTIVE VIEW OF BASIN.





PLAN AND SIDE ELEVATION.





TYPICAL FIXING DETAILS.

CAVENDISH LAVATORY BASIN. Manufacturer: Shanks and Co. Ltd

33.S2 ·CAVENDISH· LAVATORY BASIN

This Sheet describes the Cavendish lavatory basin which has been designed for fitting into a table top. The drawings on the face show the appearance of the basin, its dimensions and alternative methods of fitting it into a tiled or laminated plastic table top.

Construction and Design

The basin is in vitreous china with Sheerline chromium-plated fittings. The latter may be a combined ½-in. supply and 1¼-in. waste fitting, or ½-in. taps and a 1¼-in waste with plug and chain. The overflow is situated at the front of the basin. Fixing brackets and $\frac{3}{16}$-in. toggle bolts can be supplied if required.

Sizes

There are two sizes of basin as shown on the plan and side elevation on the face of the Sheet. The heights from the floor to the tap inlets are 2 ft. 3¼ in. for basins with combined fittings and 2 ft. 4½ in. for basins with separate taps: the heights from the floor to the waste outlets are 1 ft. 8¼ in. and 1 ft. 9¾ in., respectively.

Fixing

The fitting in which the basin is to be fixed should be so designed that the top of the basin is 2 ft. 7 in. from the floor. The surface on which the tiling or laminated plastic table top is laid should be plywood, hardboard, chipboard or other non-warping material. With tiling, the top of the basin should be ⅛ in. above the surface of the tiles. The tiles should be fixed by a suitable adhesive and when this has dried the joints should be pointed with waterproof cement. Where laminated plastic is used to finish the table top, it may be scribed to butt against the basin ⅛ in. from the top, as with tiles, all joints being sealed with waterproofing compound. Alternatively, the laminated plastic surface can be carried under the flange of the basin. The basin can be fixed to the framework of the table by brackets and toggle bolts supplied to order with the basin, or by any other suitable method.

Colours

The basins are available in white and six colours: corn yellow, mist grey, jade green, arctic blue, primrose and shell pink.

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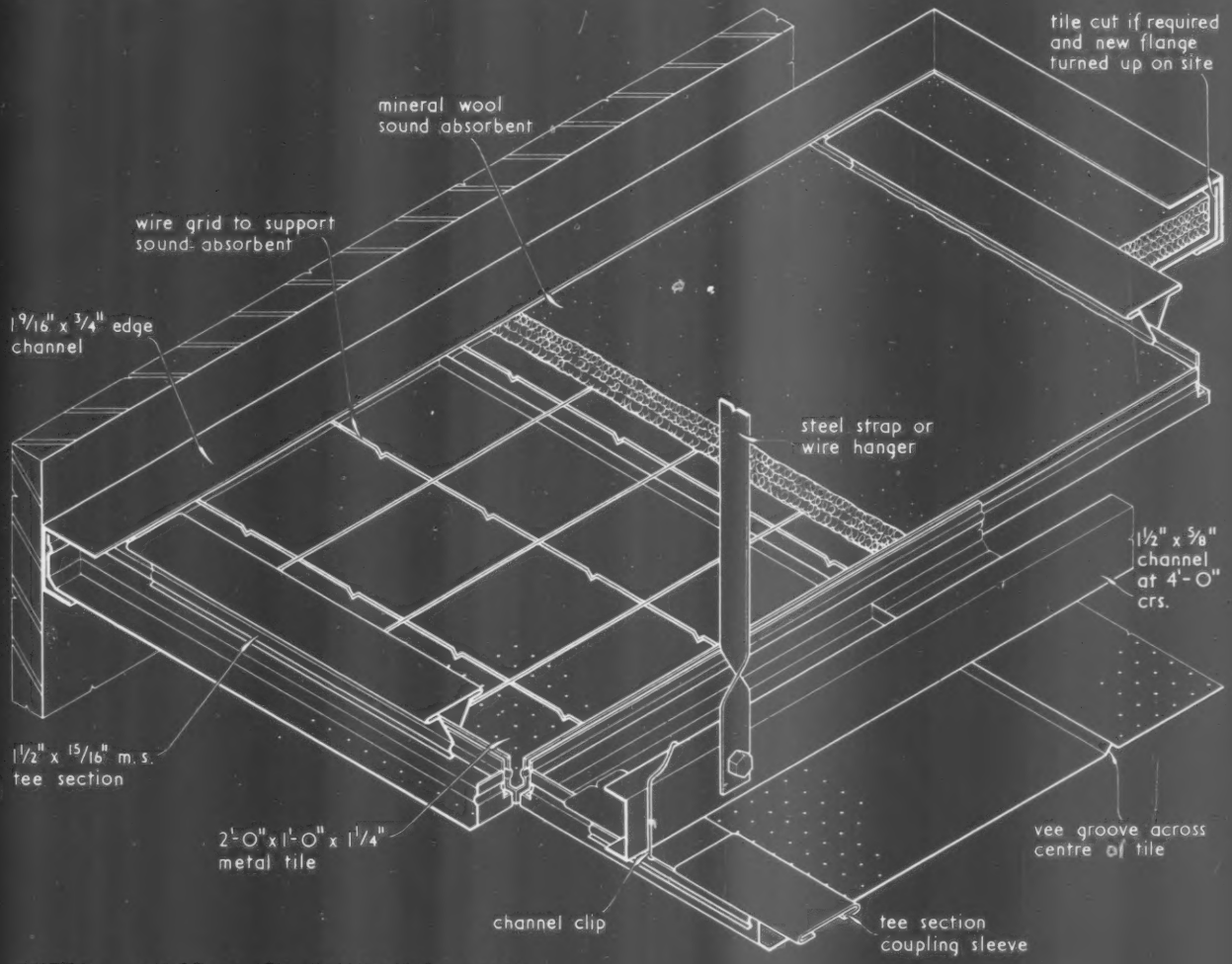
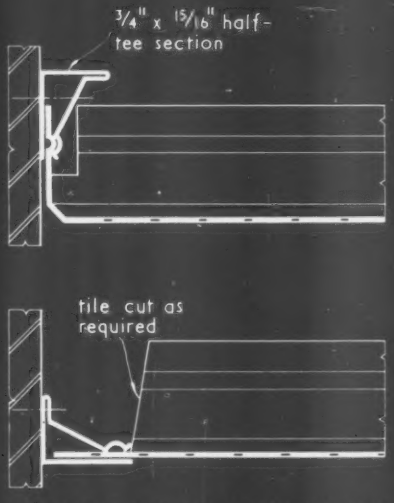
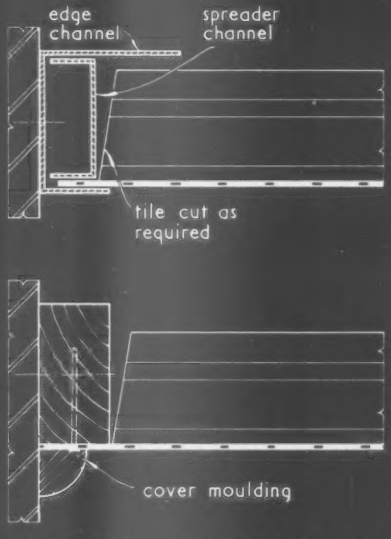


GENERAL ASSEMBLY OF COMPONENT PARTS.



APPLICATIONS OF HALF-TEE SECTIONS.



ALTERNATIVE FINISHES AT WALLS.

·CELOTEX· INCOMBUSTIBLE METAL ACOUSTIC TILES.

Compiled from information supplied by Celotex Limited.

27.B14 ·CELOTEX· INCOMBUSTIBLE METAL ACOUSTIC TILES

This Sheet describes Celotex Incombustible Metal Acoustic Tiles and the system of fixing. The tiles can be fixed direct to the structural members or as a suspended ceiling and all tiles are demountable.

Components

Tiles: The tiles are in the form of trays manufactured from bright steel sheet, bonderised and stoved two coats on the exposed faces and one coat elsewhere. They are 12 in. by 24 in. with an even pattern of 676 $\frac{1}{8}$-in. diameter perforations per square foot. The tiles have chamfered arrises on the underside and a central vee groove so that the finished ceiling has an appearance of 12-in. squares divided by vee joints. The upstands of the trays are provided with a continuous groove which locks into the spring tee sections where required. A pad of mineral wool, normally 1 in. thick, is laid in the tray, supported on a wire grid to give a $\frac{3}{8}$-in. air space.

Main channels: $1\frac{1}{2}$ in. by $\frac{5}{8}$ in. by 20 gauge channels at 4 ft. 0 in. centres are normally supported by strap-hangers, at 4 ft. 0 in. centres along their length, to take the tee sections, which are fixed to them by spring wire channel clips, as shown. The channels are levelled to give a flat ceiling.

Spring tee sections: These are $1\frac{1}{2}$ in. wide by $\frac{15}{16}$ in. deep, shaped, as shown on the drawing on the face of the Sheet, to clip over the upstands of the 12-in. sides of adjacent tiles. The standard lengths available are 6 ft. 0 in., 8 ft. 0 in., 9 ft. 0 in., 10 ft. 0 in., and 11 ft. 0 in. Half-tee sections $\frac{3}{4}$ in. by $\frac{15}{16}$ in. are available for finishing at vertical surfaces. Lengths of tee section are jointed with coupling sleeves.

Edge channels: These are $1\frac{9}{16}$ in. by $1\frac{1}{2}$ in. by $\frac{3}{4}$ in.
All metal components are tight-coated galvanised cold-rolled mild steel.

Lighting Fittings

Siemens Edison Swan have produced a range of light fittings for integration with Celotex Incombustible Metal Acoustic Tiles. Perspex troughs which are fully interchangeable with the metal tiles can be clipped into the spring tee sections where required, the lighting boxes and gear being positively located on the tees. Alternatively, a spotlight may be incorporated in a metal tray. 16 gauge channels instead of the normal 20 gauge are used with Siemens/Celotex lighting. Special reference should be made to the manufacturer where light fittings are to be suspended from the ceiling structure.

Sound Absorption

The following table is extracted from the National Physical Laboratory's Report, reference S.1418, 11th December, 1958, on tests carried out on the tiles:

	Reverberation absorption coefficients (to nearest 0·05) for frequency bands in region (c/s)					
	125*	250	500	1,000	2,000	4,000
(*a*)	0·10	0·30	0·65	0·75	0·65	0·45
(*b*)	0·25	0·75	0·85	0·85	0·75	0·50

* The accuracy is subject to reservation at this frequency where the measurements present special difficulty.
(*a*) with 1-in. mineral wool, tee sections screwed to wall, face of tile $1\frac{5}{8}$ in. from wall.
(*b*) with 2-in. mineral wool, tee sections screwed to 1-in. thick horizontal battens, face of the tile $2\frac{5}{8}$ in. from wall.

Fire Resistance

A ceiling constructed of the tiles was tested at the Department of Scientific and Industrial Research and Fire Offices' Committee, Joint Fire Research Organisation and gave a fire resistance in excess of two hours, in accordance with B.S. 476, Part 1, 1953 (Test No. F.R.O.S.I. 1243). For full details of the test, application should be made to the manufacturer.

Colour and Finish

The finish is semi-matt and the standard colour is white, but any colour in the British Standard range (B.S. 2660 : 1955) can be supplied to order.

Maintenance

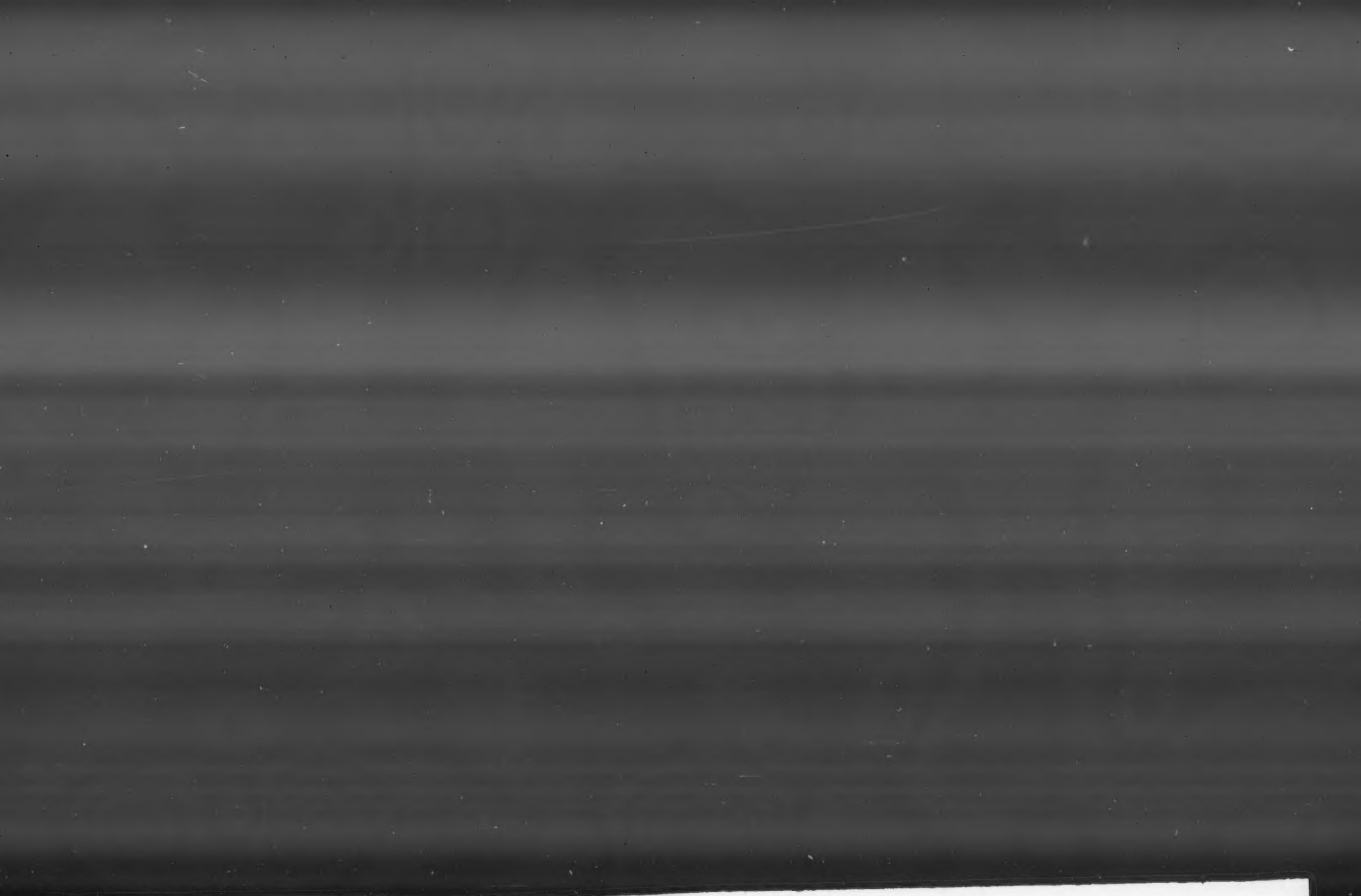
The tiles can be cleaned when required with soap and water using a damp (not wet) sponge. Any tiles can be removed for access by inserting a special removal tool into the perforations and giving a firm but gentle pull.

Further Information

Details of special fixings are available from the manufacturer who will also supply a list of approved specialist fixing contractors.

Compiled from information supplied by:

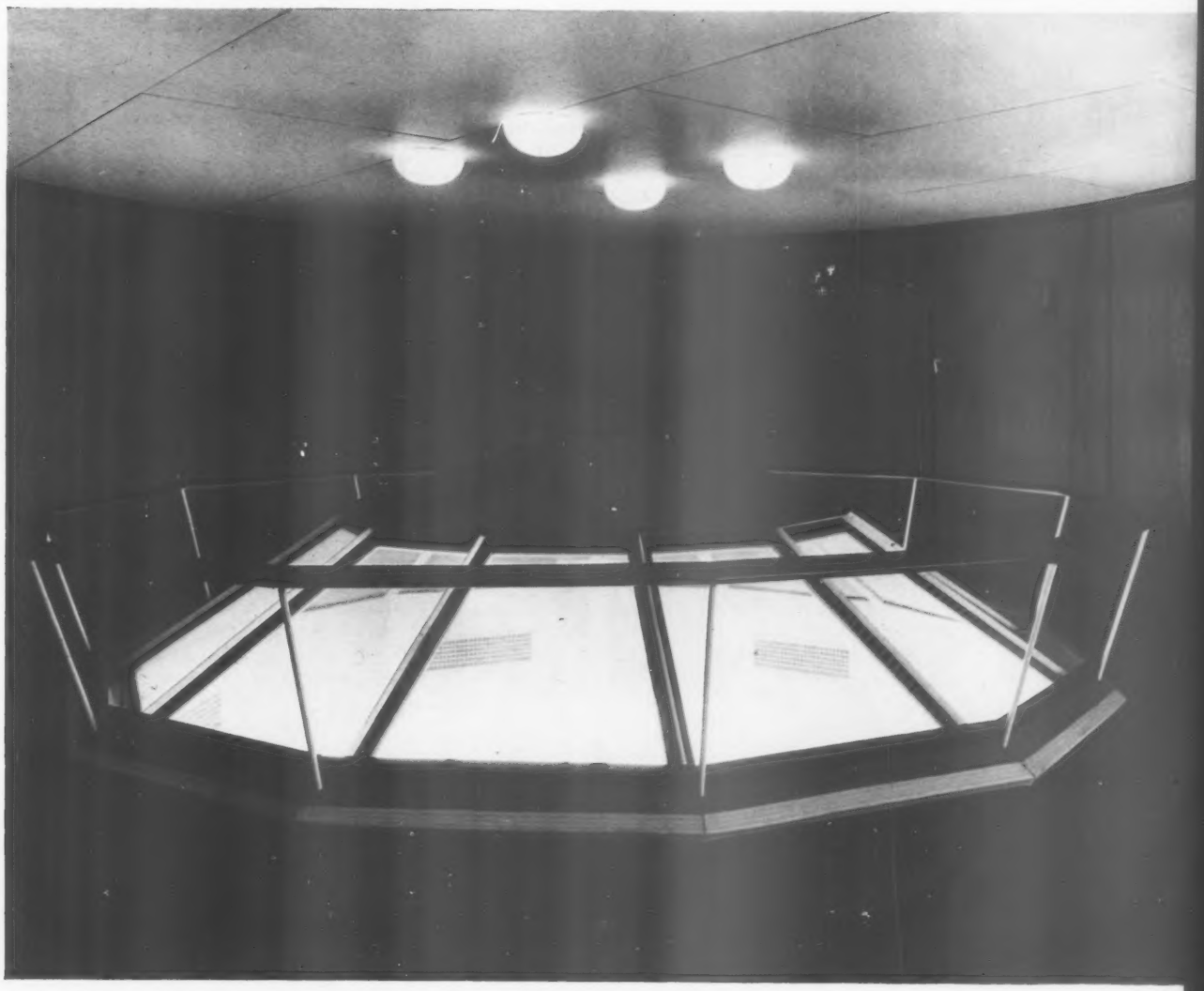
Celotex Limited.
Address : North Circular Road, Stonebridge Park, London, N.W.10.
Telephone : Elgar 5717.



working detail

OBSERVATION DOME: HOSPITAL IN EDINBURGH

Basil Spence and Partners, architects

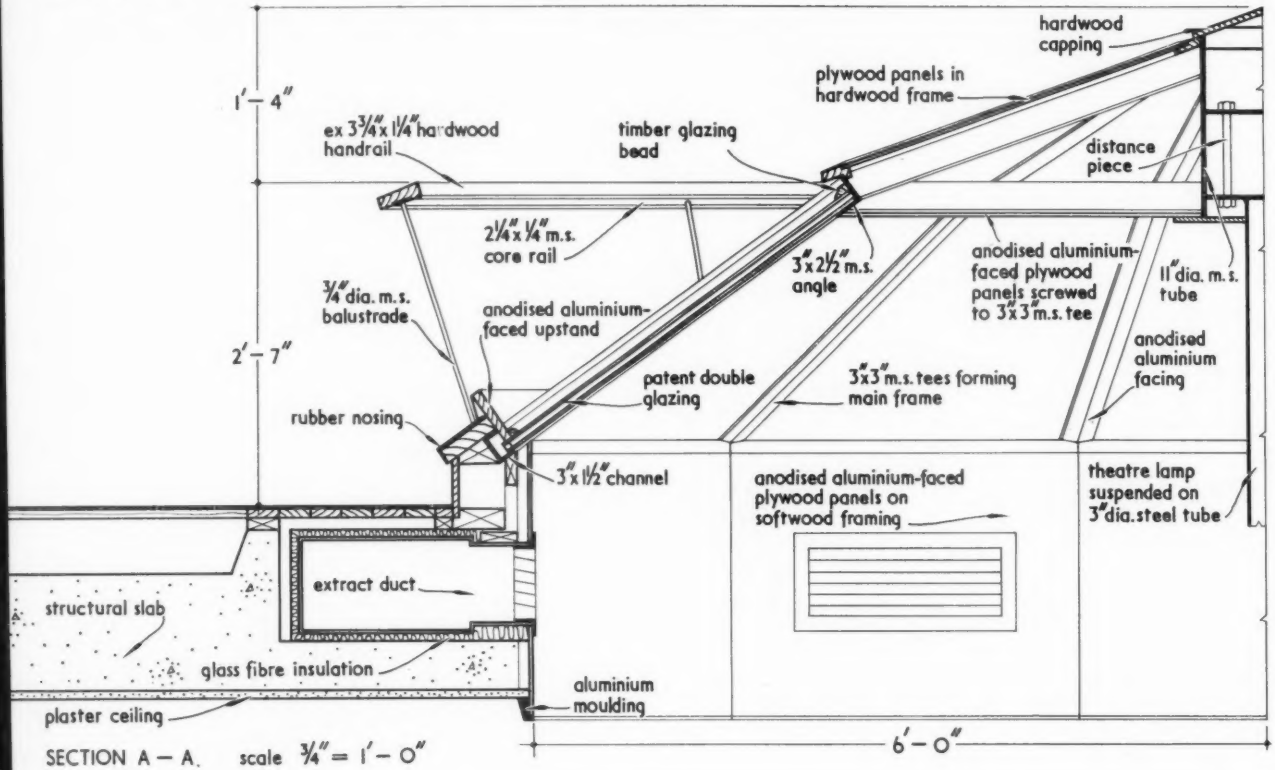


This detail is distinguished for its elegant accommodation of so many different functions: the suspension of the theatre lamp, the ring of extract ducts, the double glazing of the observation panels themselves and the rail for the students to lean upon.

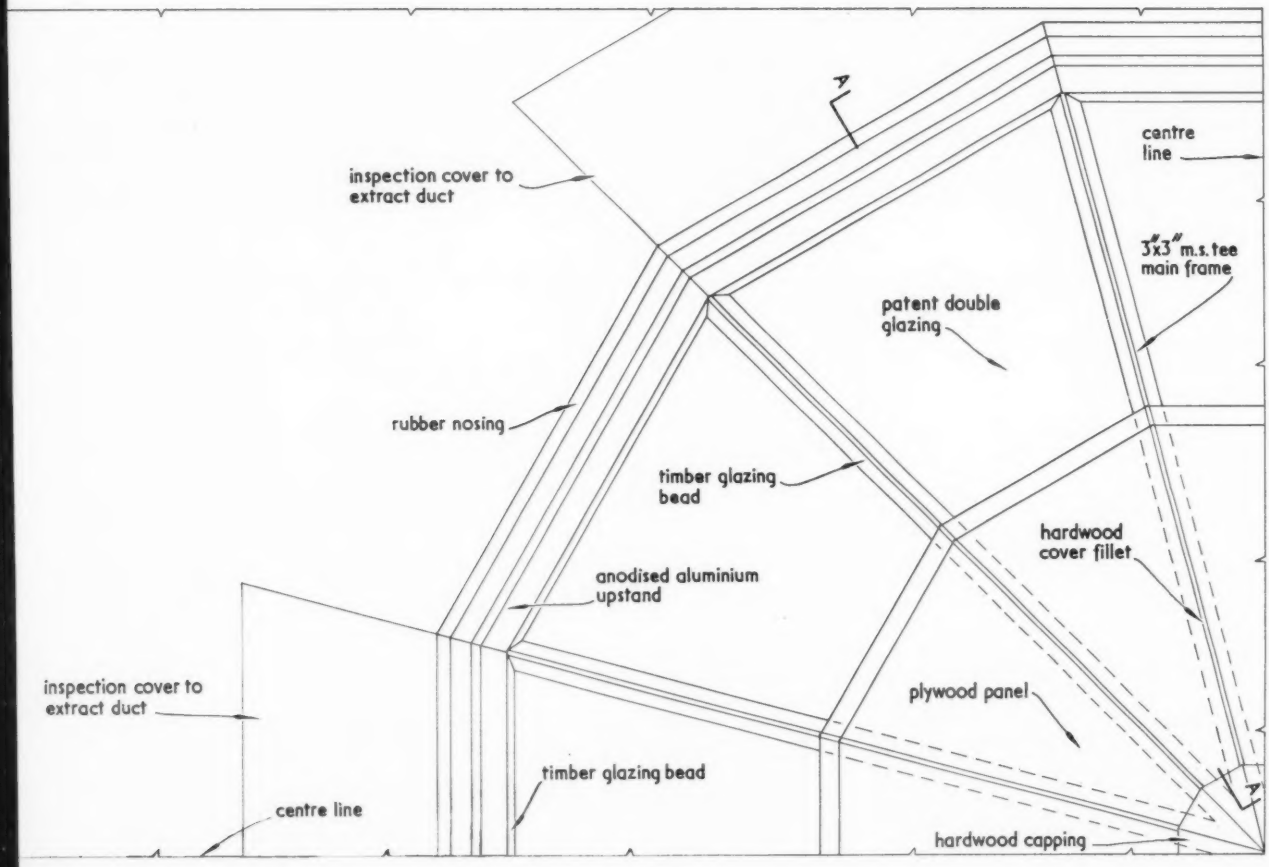
working detail

OBSERVATION DOME: HOSPITAL IN EDINBURGH

Basil Spence and Partners, architects



SECTION A – A. scale ¾" = 1'–0"



PLAN. scale ¾" = 1'–0"

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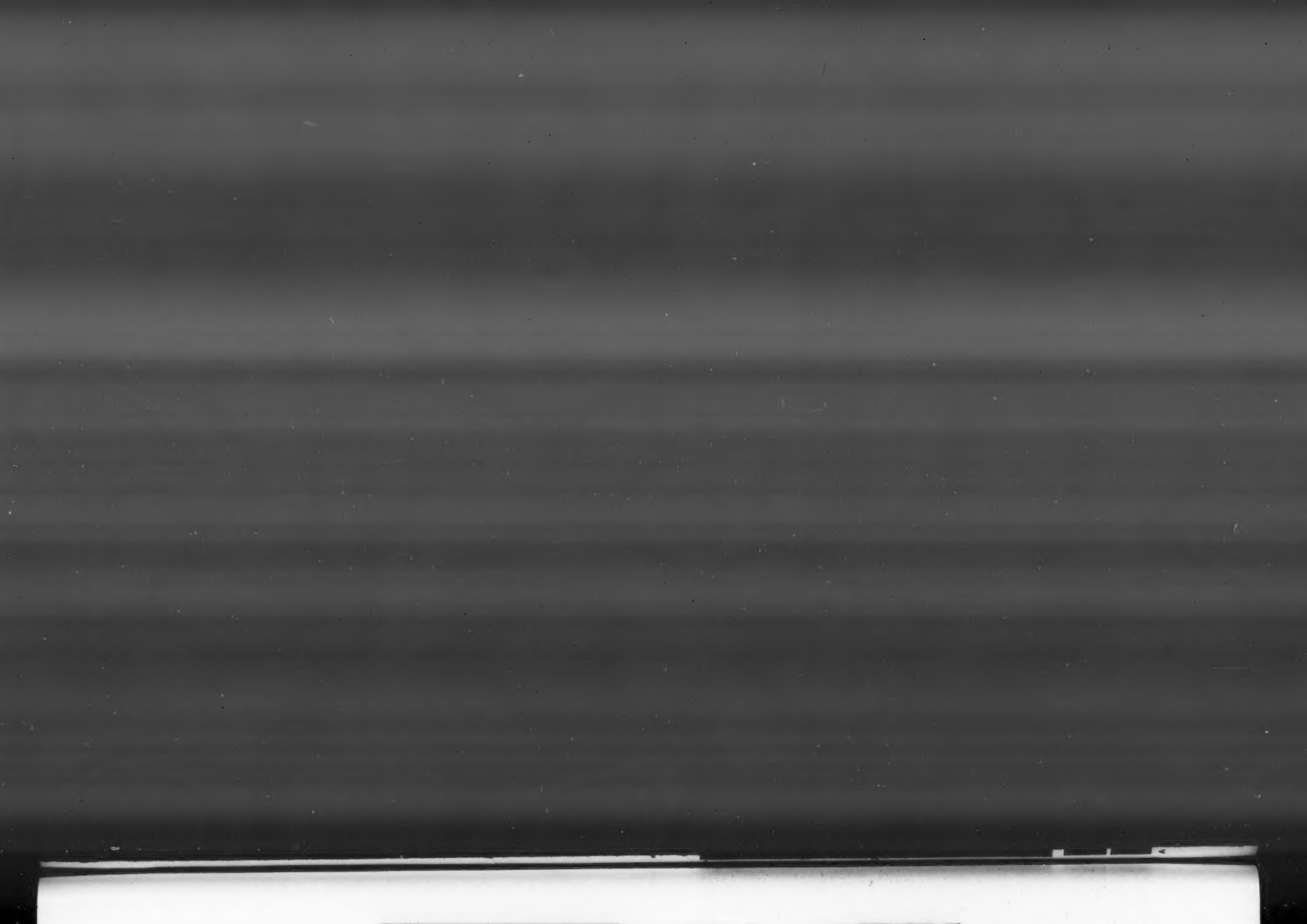

LETTERS

Stanley G. Cook, A.R.I.B.A.

A. B. Davies, A.R.I.B.A.
Chief Architect/Planner, Basildon

Speculative Housing

SIR: I note in your report in the "Small House" Competition, that the assessors deplored the fact that insufficient attention was given to the lower end of the cost range. To me, this fact seriously depreciates the value of the Competition, as the greater number of people cannot afford over £3,000 plus land cost.

I have been struck by the straightforward simplicity of the house at Abington, Cambridgeshire (AJ, September 17), and yet the cost is £5,354 plus land. Your own conclusions are that it costs around 55s. per foot super for well built single storey dwellings of around 1,000 sq. ft. floor area; similarly for two storey dwellings of twice the area.

With the results of the Competition in mind, I would suggest that the AJ might see fit to commence where the assessors have left it, and in the first instance conduct a cost analysis of existing speculative work (as it is offered on today's market, restraining one's comment on the design), as a basis for further advance in this matter. I feel it would be valuable to compare the result with the analysis of "good building."

Beckenham STANLEY G. COOK

The Radburn System

SIR: In your issue for August 20 under the heading of "The Radburn System" in which the "Child's Eye View" exhibition at the Housing Centre was reviewed your correspondent said, after referring to Sheffield and Coventry as the two most successful British Radburn schemes, "It is particularly tragic that in none of the British new towns do we appear to have attempted any fully-fledged Radburn experiments, or any other large-scale experiments in their residential layouts." This statement shows an astonishing lack of awareness of the development which has been taking place in Basildon for the past nine years.

Although no longer strictly "Radburn," since much new thought has gone into the evolution of the service square from the American super block, the large number of these rear access squares both completed and under construction in Basildon forming the greater part of the housing development in the New Town can hardly be described as other than a large-scale experiment in residential layouts which most decisively comes to terms with the motor-car, not only for the present but for many years ahead, and clearly recognizes as a crime the making of unsafe roads and footpaths "thereby bringing safety and a desirable precinctual quality" to areas which, although still perforce largely two-storey, are no longer "dull, monotonous and grossly

A. B. DAVIES

Basildon *Chief Architect/Planner*

DIARY

New Towns Exhibition. Organized by the Town and Country Planning Association, in the Main Gallery of the Royal Academy, Burlington House, Piccadilly, W.1.
OCTOBER 2 TO 17

Housing Centre AGM. Presidential Address by Sir William Holford. 13, Suffolk Street, S.W.1. At 5.30 p.m. OCTOBER 6

Exhibition of Swiss Industrial Architecture. At the RIBA, 66, Portland Place, W.1. Monday to Friday, 10 a.m.-7 p.m.; Saturday, 10 a.m.-5 p.m. OCTOBER 6 TO 17

The 50s: What Happened to the Avant Garde. Talk by Lawrence Alloway at the ICA, 17/18, Dover Street, W.1. At 8.15 p.m. OCTOBER 8

Paper on The Basilica Saint Pius X at Lourdes by M. Jean Chaudesaigues, at the *Societe des Ingenieurs Civils de France* (British Section) jointly with the CCA in the Lecture Theatre of the ICE, Great George Street, S.W.1. OCTOBER 8

Acknowledgments

Acknowledgments are due to the following for permission to reproduce drawings and photographs: Victor Gruen and Associates (photograph and diagrams of Fort Worth, p. 267); Birmingham Corporation Public Works Department (photographs of models and plan of Inner Ring Road, pp. 288 and 289); London Transport Executive (photograph of horse buses, page 256); Roads Campaign Council (lower photograph, page 254).

Announcements

PROFESSIONAL

J. Redpath, M.B.E., A.R.I.B.A., joins the Directorate General of Works, War Office, on October 19 as the directing architect in charge of the group responsible for the design and construction of projects overseas.

Hugh McAteer, A.R.I.B.A., has been appointed to Her Majesty's Overseas Civil Service as a Building Surveyor in the Public Works Department, Hong Kong.

The telephone number of H. Owen Luder, A.R.I.B.A., is now Victoria 2171/2.

R. D. Russell & Partners, have now moved to 28/30, Little Russell Street, London, W.C.1 (telephone Chancery 3553).

Turner and Kitching, A./A.R.I.B.A., have now moved to 137, Windmill Street, Gravesend, Kent. The telephone number remains Gravesend 6996.

T. G. Richards, Dip.Arch., has commenced practising from 36, Lamb's Conduit Street, London, W.C.1 (telephone Holborn 4881) where he will be pleased to receive trade catalogues.

TRADE

Copperad Ltd. have acquired the entire share capital of the Manwood Miller Group of Companies.

The Nuralite Roofing Co. Ltd. have appointed the following four representatives: E. L. Arnold, Major H. G. Eccles, R.E. (Ret'd), A. W. Warden and Captain C. H. Holden, R.E. (Ret'd.).

Mellowes & Co. Ltd. have moved their London office to 16/19, Gresse Street, London, W.1 (telephone Langham 7231/5).

The Northern Aluminium Co. Ltd. has moved its London Areas Sales Office to 50, Eastbourne Terrace, London, W.2 (telephone Paddington 3281).

John Laing and Son (Holdings) Ltd. announce that the name of their subsidiary company, John and David Martin Limited, Lowther Road, Stanmore, Middlesex, has been changed to The Laing Housing Company Limited.

Bernard Wardle (Everflex) Ltd., of Caernarvon, North Wales, have appointed J. Paterson as Sales Representative, he will work in South-East England.

The DP Battery Co. Ltd. has moved to new premises at 137, Victoria Street, London, S.W.1. The telephone number and telegraphic address remain unaltered.

Stramax Ceilings (GB) Ltd. have opened a London office at 170/172, Falcon Road, Battersea, London, S.W.11 (telephone Battersea 2587).

Chamberlain Industries Ltd. have appointed G. E. Hart as Technical Sales Director of the Company.

A. Ansell, Manager of the Manchester and District Branch Office of George Ellison Ltd. has retired. He will be succeeded by Mr. Scott and Mr. Oulton who have been appointed Managers of the Manchester and Newcastle Branch offices respectively.

Compoflex Company Ltd. have opened a London Warehouse at Angel House, Pentonville Road, London, N.1 (telephone Terminus 0533/4).

John Jowett has accepted an appointment as timber consultant with F. & H. Sutcliffe Ltd., Wood Top, Hebden Bridge, Yorks. Frederick W. Downing and Bernard P. Heaphy have been appointed directors of Bovis Ltd.

The UAM Group has changed the name of its exports subsidiary, Universal Asbestos (Overseas) Ltd. to UAM Overseas Ltd.

Percy Bilton Ltd., civil engineers and building contractors, have moved to Bilton House, 54/58, Uxbridge Road, London, W.5 (telephone Ealing 7777).

The Contracts Department of G. T. Crouch Ltd. has now moved to Kingston House, Stephenson Way, Three Bridges, Crawley. The telephone number remains unchanged. This is the new Head Office for the Contracts Division of the Company.

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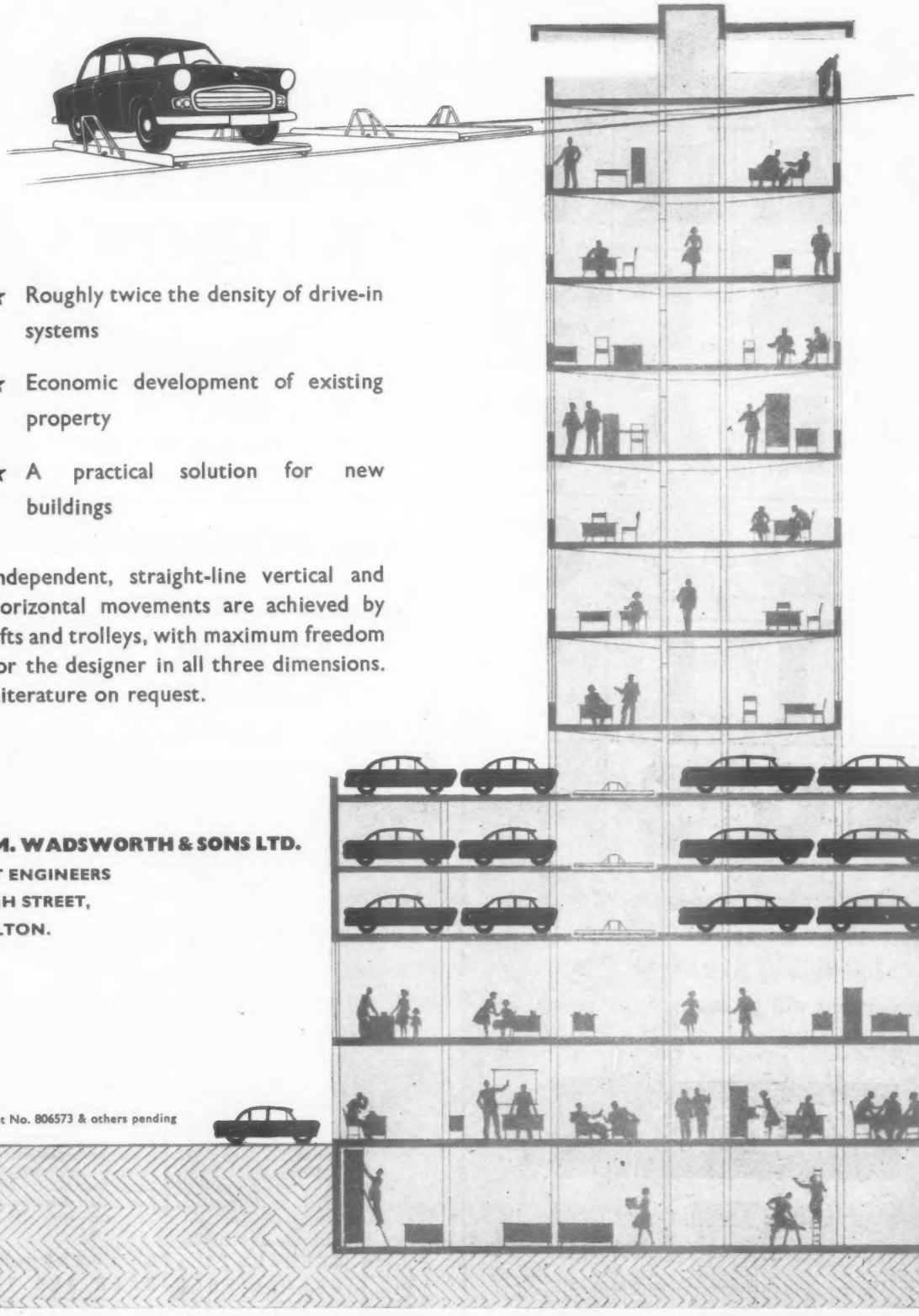

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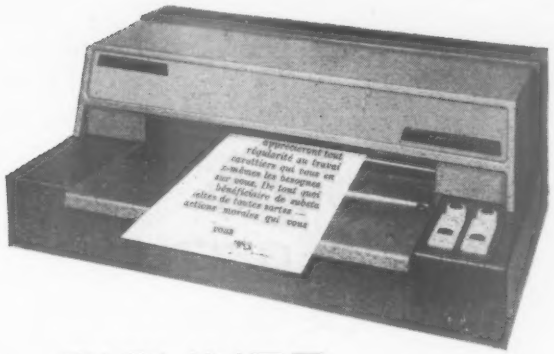

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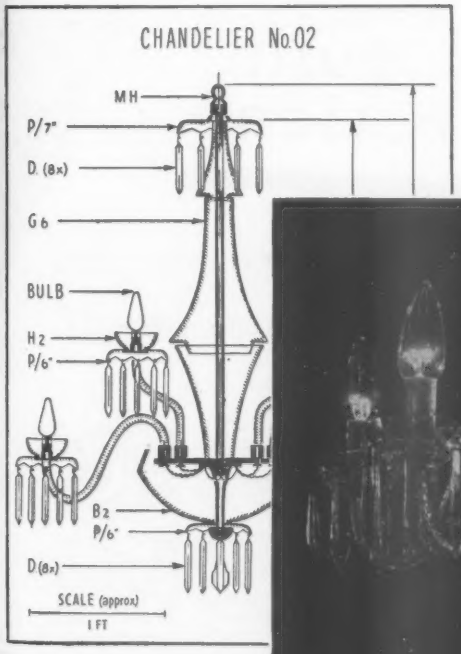

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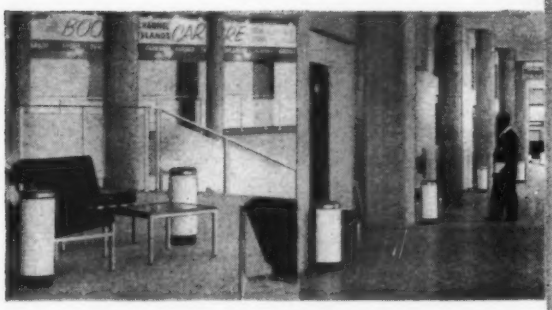

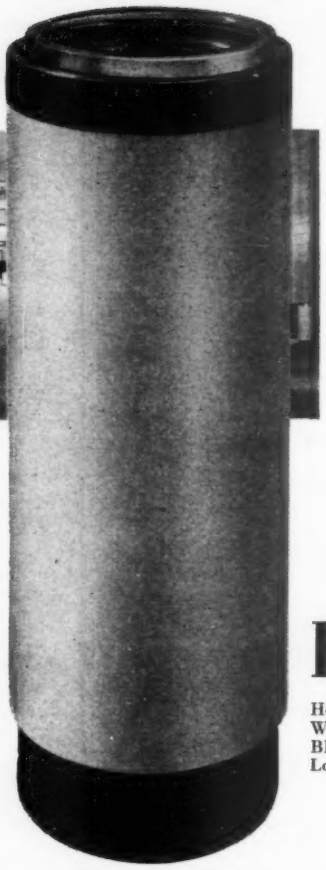

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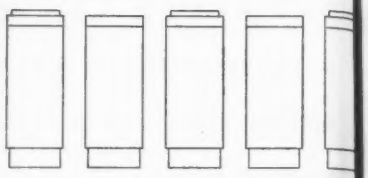

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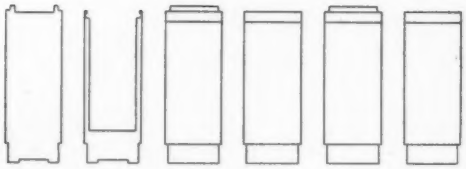

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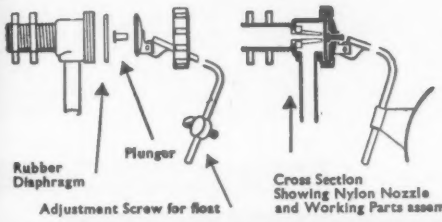

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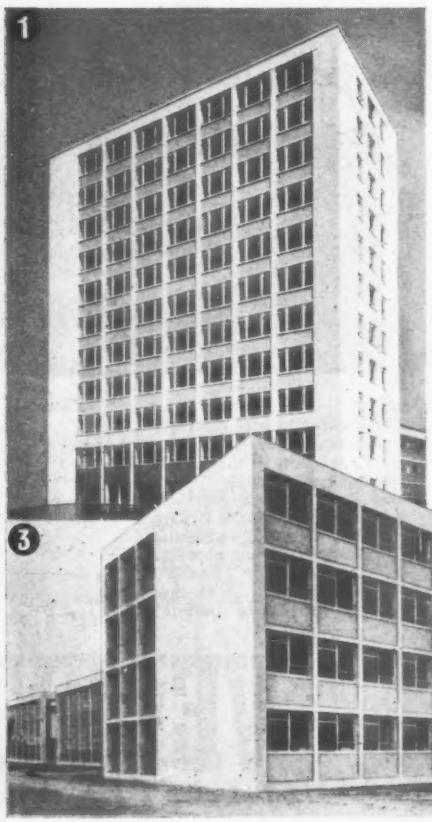

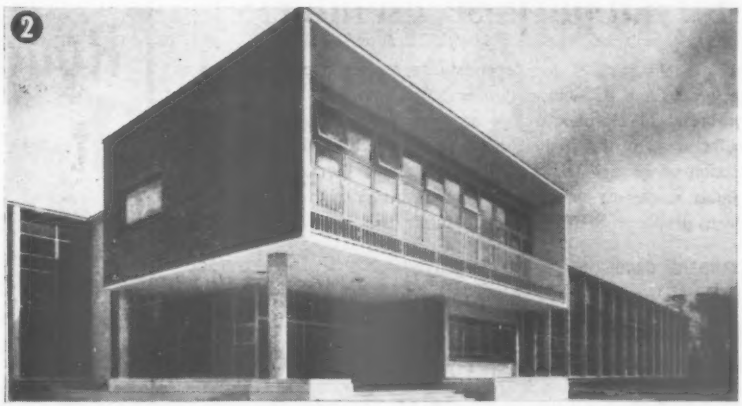

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1. SPECIAL GRADE (£785—£1,070 p.a. plus £30 p.a. London Allowance). This grade is particularly suitable for newly qualified Assistants.
ARCHITECTS. Must be A.R.I.B.A. and experienced in design and detailing.
2. GRADE II (£765—£880 p.a. plus up to £30 p.a. London Allowance, according to age).
ARCHITECTURAL ASSISTANTS. Must be of good general training, preference given those who have passed Intermediate R.I.B.A.
BUILDING SURVEYORS. Preference given those who have passed Intermediate R.I.C.S. (Bldg. Sub-Div.). Capable drafting specifications in all trades, preparation schedules of dilaps., detailed estimates for general maintenance works and surveys of properties.
Candidates will be appointed at the appropriate point within the scale according to age and ability.
Full details, present salary and three copy testimonials to County Architect, County Hall, Kingston, as soon as possible. 5790

RE-ADVERTISEMENT
COUNTY BOROUGH OF WEST HAM
BOROUGH ARCHITECT AND PLANNING OFFICER'S DEPARTMENT
CHIEF ASSISTANT PLANNING OFFICER
£1,320—£1,485 p.a.
APPLICATIONS INVITED from TOWN PLANNERS possessing drive, initiative, and ability, preferably with experience in replanning urban areas, to be in charge of the Town Planning Section of the Department.
APPLICATION FORMS AND PARTICULARS from:
THOMAS E. NORTH, O.B.E., F.R.I.B.A., Dist.T.P., M.T.P.I.,
Borough Architect and Planning Officer,
70, West Ham Lane, Stratford, E.15,
returnable by 12th October, 1959. 5778

CWMBRAN DEVELOPMENT CORPORATION
APPOINTMENT OF ASSISTANT ARCHITECT, A.P.T. III/IV
Applications are invited for the above superannuable post in my Department in the salary range £880—£1,220 with a commencing salary according to qualifications and experience.
Candidates should be Associates of the R.I.B.A. with suitable office experience and should have had good experience in shop design construction and layout and Town Centre development.
Housing accommodation will be made available to the successful applicant if needed.
Applications stating age, experience, details of present and former employment (together with applicable salaries) and the names and addresses of two referees must reach the undersigned by first post on Monday, 12th October, 1959.
J. C. P. WEST, A.R.I.B.A., M.T.P.I.,
Chief Architect.
Victoria Street,
Cwmbran, Mon. 5780

BOROUGH OF ERITH
(*a*) 2 SENIOR ENGINEERING ASSISTANTS, A.P.T. IV.
(*b*) 2 SENIOR ENGINEERING ASSISTANTS, Special Grade.
(*c*) 2 JUNIOR ENGINEERING ASSISTANTS, A.P.T. I.
(*d*) 2 ARCHITECTURAL ASSISTANTS, A.P.T. I
Applications are invited for the above appointments in accordance with the grades shown, plus London weighting.
The Council has an extensive programme of capital works, including main drainage and highway improvements.
Provision of housing accommodation will be considered in connection with appointments *a* and *b*.
The Grade IV appointments are temporary but of at least two years duration and with the possibility of permanency.
Applications, with copies of two recent testimonials, should be delivered to the Borough Engineer and Surveyor, not later than Monday, 5th October, 1959.
J. A. CROMPTON,
Town Clerk.
Town Hall,
Erith,
Kent. 5806

COUNTY BOROUGH OF EAST HAM
BOROUGH ENGINEER'S DEPARTMENT
Applications are invited for the following temporary appointments:—
SENIOR ASSISTANT ARCHITECT, Grade IV, £1,065—£1,220.
ARCHITECTURAL ASSISTANT, Grade II, £765—£880.
London weighting is paid in addition, and salaries in excess of the minima may be paid according to qualifications and experience. The appointments are for work on a new Technical College and are expected to be for a period of not less than 3 years.
Further details and application forms returnable by 9th October, 1959, from the Town Clerk, Town Hall, East Ham, E.6. 5906

LONDON COUNTY COUNCIL
ARCHITECTS, Grade III (up to £1,135, commencing according to qualifications and experience), for Housing, Schools and General Divisions. Full varied programme of new work including Schools, Multi-storey Flats and Town Development. Particulars and application form from Hubert Bennett, F.R.I.B.A., Architect to Council, AR/EK/57/59, County Hall, S.E.1. (1132.) 4615

BOROUGH OF WREXHAM
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT
Applications are invited for the following appointments:
(*a*) TWO ENGINEERING ASSISTANTS. Salary Special Grade (£785—£1,070 p.a.). Candidates must have passed the Final examination of the Institute of Municipal Engineers and have a general experience of Municipal Engineering
(*b*) ONE ARCHITECTURAL ASSISTANT. Salary A.P.T. Grade II (£765—£880 p.a.). Candidates to have Intermediate R.I.B.A. or equivalent.
Housing accommodation provided if required.
Applications stating age, experience, qualifications, etc., and the names of two Referees to the undersigned not later than first post on Monday, 12th October, 1959.
PHILIP J. WALTERS,
Town Clerk.
Guildhall,
Wrexham.
15th September, 1959. 5825

BANFF COUNTY COUNCIL has vacancies in the County Architect's Department for qualified ARCHITECTURAL ASSISTANTS on the J.I.C. Professional Assistants Scale, and for part qualified ARCHITECTURAL ASSISTANTS on scales appropriate to experience, age, etc. Consideration may be given to housing of qualified applicants.
Applications with particulars of age and experience, etc., together with copies of three recent testimonials to be sent to A. M. Wilson, A.R.I.B.A., County Architect, 13 Cluny Square, Buckie, within 10 days of this advertisement. 5849

COUNTY COUNCIL OF ESSEX
ASSISTANT ARCHITECTS
For the extensive development in this County, a large programme of public building work is in progress. Assistant Architects are required who are interested in taking part in the design and building of Health Centres and Clinics, Ambulance, Fire and Police Stations, Libraries, Colleges and Schools.
Previous Local Government experience not essential.
Salaries from £785 to £1,070.
Forms of application from County Architect, County Hall, Chelmsford, Essex, returnable with copies of three testimonials by 15th October, 1959.
Canvassing disqualifies. 5912

BOROUGH OF SOLIHULL
APPOINTMENT OF HEATING & VENTILATING ENGINEER
Applications are invited for the above post in the Borough Surveyor's department at a salary in accordance with A.P.T. Grade V (£1,220—£1,375 per annum) commencing according to experience and qualifications.
Applicants should be fully qualified members of the Institute of Heating and Ventilating Engineers with considerable experience in the design, specification and supervision of installations for local authority buildings, and in their maintenance.
The appointment is subject to the provisions of the Superannuation Acts, to the National Scheme of Conditions of Service and to one month's notice in writing.
In appropriate cases housing accommodation will be made available as soon as possible and half removal expenses paid.
Applications giving full particulars of past experience, together with the names and addresses of two referees should be addressed to the Borough Engineer and Surveyor, 90, Station Road, Solihull, to arrive not later than 9th October, 1959.
W. MAURICE MELL,
Town Clerk.
The Council House,
Solihull.
19th September, 1959. 5910

CITY OF LEICESTER
CITY ENGINEER'S & SURVEYOR'S DEPARTMENT
MAINTENANCE SECTION
Applications are invited for the appointment of MAINTENANCE ASSISTANTS in the City Engineer's and Surveyor's Department.
(*a*) ONE ASSISTANT, Grade A.P.T. III (£880—£1,065 per annum).
(*b*) ONE ASSISTANT, Grade A.P.T. II (£765—£880 per annum).
Candidates for appointment (*a*) should be Members of the R.I.B.A., R.I.C.S., or equivalent, and appointment (*b*) must hold Intermediate examination or equivalent.
The appointment will be subject to the provisions of the Local Government Superannuation Acts 1937 and 1953.
Applicants should be architecturally trained and have a good knowledge of and be fully experienced in the maintenance of Public Buildings, alterations and additions to properties, preparation of plans, specifications, estimating and schedules, etc.
Previous Local Government experience would be an advantage.
Applications stating age, qualifications, training and experience, together with the names of not less than two persons to whom reference may be made, should reach the undersigned not later than Monday, October 12th, 1959.
Housing accommodation may be made available if required.
JOHN L. BECKETT,
M.Inst.C.E., M.Inst.Mech.E., M.T.P.I.,
City Surveyor.
Town Hall,
Leicester.
September, 1959. 5911

LONDON COUNTY COUNCIL—PARKS
ARCHITECTURAL AND BUILDING SURVEYING ASSISTANTS. Good draughtsmen with experience of preparation of working drawings and specification and supervision of contract work. Up to £895. Apply Chief Officer, Parks Dept., County Hall, S.E.1. (WAT 5000, Ext. 8076). (2083). 5907

LONDON TRANSPORT require ARCHITECTURAL ASSISTANTS. Candidates must be qualified to R.I.B.A. Intermediate standard and have previous office experience.
Salary range £814 p.a.—£979 p.a.
Free travel; Medical examination; 38-hour week; Contributory Superannuation Scheme; no Saturdays; good Dining Club, and sports facilities.
Please apply to Staff and Welfare Officer, (F/RV 752/1), London Transport Executive, 55 Broadway, London, S.W.1. 5795

HAMPSHIRE COUNTY COUNCIL
TECHNICAL ASSISTANT required for pensionable post in North-East Area Planning Office at Basingstoke, A.P.T. II (£765—£880). Candidates should have passed the Intermediate examination of the R.I.B.A. or of the T.P.I., and have had architectural experience in the Planning Department of a Local Authority. In approved cases, the County Council assist with removal and other expenses.
Applications, stating age, education, qualifications and experience, together with a copy of one testimonial and the names of two referees, should reach the Clerk of the County Council, The Castle, Winchester, by 14th October. 5942

LIVERPOOL REGIONAL HOSPITAL BOARD
ASSISTANT ARCHITECTS
Salary £730 p.a. to £1,055 p.a. (under review)
Required for appointment to established and temporary posts on the staff of the Regional Architect, T. Noel Mitchell, B.Arch., F.R.I.B.A.
Candidates must be qualified Architects and the starting salary will be dependent on age and/or experience.
All posts are subject to the N.H.S. (Superannuation) Regulations.
Applications stating age, qualifications, present post and salary, previous appointments and names and addresses of three referees (two technical) to me at 55, Castle Street, Liverpool, 2, by 9th October, 1959.
VINCENT COLLINGE,
Secretary to the Board.
5892

LINDSEY (LINCOLNSHIRE) COUNTY COUNCIL
ARCHITECT'S DEPARTMENT
Large and interesting programme of work requires ASSISTANTS with Final qualification Special Grade, £785—£1,070, or Intermediate R.I.B.A., Grade A.P.T. II, £765—£880 on the permanent staff.
Commencing salary within the grade dependent upon qualifications and experience. N.J.C. Conditions of Service. Canvassing will disqualify. Candidates must disclose in writing whether to their knowledge they are related to any Member or Senior Officer of the Council.
Applications stating salary required, giving age, qualifications, experience, present post and salary, and the names of at least two persons to whom reference can be made, to be sent not later than 6th October, 1959, to the County Architect, County Offices, Lincoln. 5877

BOROUGH OF WILLESDEN
BOROUGH ENGINEER & SURVEYOR'S DEPARTMENT
Applications are invited from suitably qualified and experienced persons for the following permanent appointments:—
ASSISTANT ARCHITECT within Special Grade (£750—£1,030 p.a.)
London weighting, maximum £30 p.a. is payable in addition to the above salary.
The Council is unable to assist with housing accommodation.
Forms of application and conditions of appointment may be obtained from the Borough Engineer & Surveyor, Town Hall, Dyne Road, Kilburn, N.W.6. Applications to be returned to the undersigned not later than 9 a.m. on Monday, 12th October, 1959.
R. S. FORSTER,
Town Clerk.
18th September, 1959. 5898

BOROUGH OF OLDBURY
BOROUGH SURVEYOR'S DEPARTMENT
ARCHITECT'S SECTION
Applications are invited for the following appointment in the Architect's Section of the Borough Surveyor's Department.
ARCHITECTURAL ASSISTANT, A.P.T. Grade II (£765—£880 per annum).
Candidates should preferably have passed the Intermediate Examination of the R.I.B.A. and be capable of preparing working and detailed drawing and specifications.
The appointment will be superannuable, subject to the National Scheme of Conditions of Service, and to the selected candidate passing a medical examination.
Applications, giving particulars of age, qualifications, experience, and the names of two referees, should be delivered to the undersigned not later than Monday, 5th of October, 1959.
Housing accommodation will be made available to married applicants if required.
KENNETH PEARCE,
Town Clerk.
Municipal Buildings,
Oldbury,
Nr. Birmingham.
September, 1959. 5900

AYCLIFFE DEVELOPMENT CORPORATION
(New Town of Newton Aycliffe)
ARCHITECTURAL ASSISTANT
An Assistant Architect is required for neighbourhood and town centre work.
The salary for this appointment will be in accordance with the Whitley Council for New Towns Staff scale determined by the qualifications and experience of the successful applicant.
Housing accommodation if required.
Applications giving details of age, qualifications, education and experience together with the names of two referees to reach the undersigned by Saturday, 10th October, 1959.
A. V. WILLIAMS,
General Manager.
Newton Aycliffe,
Nr. Darlington,
Co. Durham. 5868

ARCHITECTURAL DRAUGHTSMAN required by BERMUDA GOVERNMENT, CROWN LANDS CORPORATION on contract for two tours each of 3 years in first instance. Salary £1,500 (Fixed). Leave on full salary. Free passages. Candidates 30-50 years must have had at least 10 years' experience of combined architectural drawings and field work on dwellings and small factories. Write to the Crown Agents, 4 Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience and quote M2B/50760/AG. 5866

BOROUGH OF SLOUGH
TWO ASSISTANT ARCHITECTS required for housing and redevelopment and general building work. Applicants should have good experience in design and supervision. Knowledge of multi-storey flat construction an advantage. Salary in accordance with the "Special Classes" Grade (£785—£1,070). Must be A.R.I.B.A. Housing provided for married candidates.
Applications, giving names of 2 referees, age, qualifications and experience to Borough Engineer, Town Hall, Slough, Bucks, by Monday, 12th October. 5867

DEPARTMENT OF HEALTH FOR SCOTLAND. The Architectural Division which covers work on housing, hospitals, schools, local authority buildings, agricultural colleges and State Institutions and includes development work, has vacancy in Edinburgh for an ASSISTANT ARCHITECT. Salary range £805—£1,260. Write Establishment Officer, Department of Health for Scotland, Room 30, St. Andrew's House, Edinburgh 1, for application form. Closing date Friday, 23rd October, 1959. 5856

COUNTY BOROUGH OF SOUTHEND-ON-SEA
EDUCATION COMMITTEE
MUNICIPAL COLLEGE
Principal: T. L. MORGAN, M.Sc., A.M.I.C.E., A.M.I.Struct.E.
Applications are invited for the appointment of a LECTURER in the School of Architecture.
Candidates should be Associates or Fellows of the R.I.B.A. and/or hold a degree or Diploma in Architecture, and should have had at least three years' experience in professional practice. The appointment is for a Studio Master with special interest in Building Services.
Salary in accordance with the Burnham Technical Scale, £1,370 × £35—£1,550.
Further particulars and form of application may be obtained from the undersigned (stamped addressed foolscap envelope).
Completed forms to be returned to the Principal, Municipal College, Victoria Circus, Southend-on-Sea, within fourteen days of the appearance of this advertisement.
D. B. BARTLETT,
Chief Education Officer.
Education Office,
Warrior Square,
Southend-on-Sea. 5875

COUNTY BOROUGH OF BOOTLE
BOROUGH SURVEYOR'S DEPARTMENT
Applications are invited for the appointment of an ARCHITECTURAL ASSISTANT on Grade A.P.T. IV, £1,065 to £1,220 per annum.
Preference will be given to those having experience in the design and planning of schools.
Application forms from the Borough Surveyor, Town Hall, Bootle 20, Lancs, are returnable by Friday, 16th October, 1959.
By Order,
HAROLD PARTINGTON,
Town Clerk.
5857

COUNTY BOROUGH OF ROTHERHAM
ARCHITECTURAL ASSISTANTS
Applications are invited for the following appointments:—
(*a*) ARCHITECTURAL ASSISTANT, A.P.T. I (£575—£725) to Special Grade (£750—£1,030).
(*b*) SENIOR ARCHITECTURAL ASSISTANT, A.P.T. IV (£1,065—£1,220).
Candidates for (*a*) are required to have passed Parts I and II of the R.I.B.A. Final examination and (*b*) to be Associate Member of the R.I.B.A. with good general experience in design and construction. The commencing salary in the grades will be according to capabilities and experience.
Housing accommodation will be available if necessary for the higher grade appointment.
Applications to be endorsed "Architectural Assistants," stating age, qualifications and details of experience, together with names of two referees, should be received by me not later than Friday, 9th October, 1959.
Canvassing will disqualify.
JOHN S. WALL,
Town Clerk.
Municipal Offices,
Rotherham.
18th September, 1959. 5869

COUNTY BOROUGH OF NORTHAMPTON
SENIOR ASSISTANT ARCHITECTS
A.P.T. IV (£1,065—£1,220)
Applications are invited for two responsible appointments in (*a*) Education & General Section which has an interesting programme of new schools and municipal buildings and (*b*) Housing Section; the Council's current programme includes multi-storey flats in redevelopment schemes.
Full particulars and application forms, returnable by 17th October, from Borough Architect, Guildhall, Northampton.
C. E. VIVIAN ROWE,
Town Clerk.
5913

CITY OF SHEFFIELD
Applications are invited for the following post on the staff of the Estates Surveyor, Mr. W. H. Rothwell, B.Sc., F.R.I.C.S.:—
PROPERTY ASSISTANT (Agricultural) Grade A.P.T. I (£610—£765)
Applicants should be experienced in the management of Agricultural property, particularly in the maintenance and improvement of Farm Buildings and/or should have passed the Intermediate R.I.C.S. (Land Agency) or A.L.A.S. (Parts I and II).
The posts are superannuable subject to N.J.C. conditions of service and to medical examination.
Applications stating name, address, age, qualifications, experience, previous and present positions with dates and salaries and the names and addresses of two referees should reach the undersigned not later than 15th October, 1959.
JOHN HEYS,
Town Clerk.
Town Hall,
Sheffield, 1. 5929

COUNTY BOROUGH OF GREAT YARMOUTH
SCHOOLS ARCHITECT'S DEPARTMENT
Applications are invited from Associate members of the R.I.B.A. for a SENIOR ASSISTANT ARCHITECT within Special Grade (£785—£1,070).
Candidates must have a thorough knowledge of school design and construction with at least five years' experience.
Housing accommodation will be available to the successful candidate if married. Assistance with removal expenses may be made in suitable cases.
Full details of present and past appointments, age, qualifications and experience, together with the names of two referees, should reach the Schools Architect, 22, Euston Road, Great Yarmouth, by 6th October, 1959.
D. G. FARROW,
Chief Education Officer.
22, Euston Road,
Great Yarmouth. 5916

SOMERSET COUNTY COUNCIL
COUNTY PLANNING DEPARTMENT
Applications are invited for:—
(*a*) Four SENIOR ASSISTANTS to fill one new post on Development Control work in each Area Office at Radstock, Taunton, Weston-super-Mare and Yeovil. Salaries £1,065—£1,220.
(*b*) One SENIOR ASSISTANT for headquarters development plan section. Salary within scale £785—£1,070.
(*c*) Two JUNIOR ASSISTANTS, one headquarters, one Area Office, Radstock. Salaries £610—£765.
Applicants for
(*a*) must be Corporate Members of the T.P.I., R.I.C.S. or R.I.B.A. and have had considerable experience,
(*b*) must hold appropriate professional qualification or degree,
(*c*) should have been trained in a planning department or office of an engineer, architect or surveyor and preferably have passed the Intermediate examination of an appropriate professional institution.
All posts are permanent. Application forms obtainable from the undersigned to be returned by 12th October, 1959.
R. W. DALE,
County Planning Officer.
41, Upper High Street,
Taunton. 5925

CORBY DEVELOPMENT CORPORATION
There are vacancies on the staff of the Chief Architect for SENIOR ASSISTANT ARCHITECT, ASSISTANT ARCHITECTS, ARCHITECTURAL ASSISTANTS, and ARCHITECTURAL PUPIL.
The appointment of Senior Assistant Architect will be made within A.P.T. Grade V (£1,220—£1,375). Appointments for Assistant Architects will be within A.P.T. Grades III (£880—£1,065) or IV (£1,065—£1,220). Architectural Assistants will be within Grades A.P.T. I (£610—£765) or II (£765—£880), and the Architectural Pupil will be within the General Division (£210—£595) with a minimum of £430 per annum at age 22. Commencing salaries within these grades will depend upon qualifications and experience.
Minimum qualifications for Senior Assistant Architect are A.R.I.B.A. Assistant Architects should have final examination of R.I.B.A., and Architectural Assistants should have Intermediate examination of R.I.B.A.
Appointments are subject to superannuation under the Local Government Superannuation Scheme.
Housing is available. Removal expenses paid.
Applications stating age, education, training, qualifications, experience, appointments held and salaries, together with the names of two referees, must reach the undersigned by 12th October, 1959.
R. F. BROOKS GRUNDY,
General Manager.
Spencer House,
Corby, Northants. 5862

DURHAM COUNTY COUNCIL
ARCHITECT'S DEPARTMENT
ARCHITECTURAL ASSISTANTS
A.P.T. IV—£1,065 to £1,220. A.R.I.B.A., with adequate experience.
Special Grade, £785 to £1,070, qualified.
A.P.T. II—£765 to £880.
Forms and further particulars from the County Architect, South Street, Durham. Closing date 9th October, 1959. Canvassing members of the Council is prohibited.
J. K. HOPE,
Clerk of the County Council
5923

WARWICKSHIRE COUNTY COUNCIL
ARCHITECT'S DEPARTMENT

Applications are invited for the following appointments:—

1. ASSISTANT ARCHITECTS—Special Grade (£785—£1,070).

Applicants must have passed Parts I and II of the R.I.B.A. Final or special examinations or their equivalent at one of the recognised schools of architecture. The successful applicants will work in teams on large projects, but opportunity will be given to men with enthusiasm and ability to design, and carry out smaller projects under a Group Architect.

2. ASSISTANT HEATING ENGINEERS—Grade A.P.T. III (£880—£1,065).

Applicants should have had some years in the design of heating and water supplies.

The commencing salary can be within the grade according to ability and experience. Application forms and other conditions applicable to the appointments can be obtained from G. R. Barnsley, F.R.I.B.A., County Architect, Shire Hall, Warwick.

L. EDGAR STEPHENS,
Clerk of the Council.

Shire Hall,
Warwick. 5946

BOROUGH OF CLEETHORPES
BOROUGH ENGINEER & SURVEYOR'S DEPARTMENT
ARCHITECTURAL ASSISTANT

Applications are invited for the above appointment, salary A.P.T. II (£765—£880). Applicants should have good general experience particularly in the preparation of drawings and specifications for municipal housing and buildings including flats.

Preference will be given to Applicants who have passed the Intermediate examination of the Royal Institute of British Architects.

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

Applications, stating age, qualifications and experience, together with the names and addresses of three persons to whom reference may be made should be delivered to the undersigned not later than Monday, 12th October, 1959.

G. SUTCLIFFE,
Town Clerk.

Council House,
Cleethorpes.
22nd September, 1959. 5926

COUNTY BOROUGH OF CROYDON
ARCHITECTURAL ASSISTANT

Applications are invited for this appointment in the School Architect's Section from persons of the R.I.B.A. Intermediate examination standard.

Salary commencing according to qualifications and experience between £630 per annum and £910 per annum on a scale rising (when fully qualified) to £1,100 per annum.

Application forms from Chief Education Officer, 19, Katharine Street, Croydon. Closing date 19th October, 1959.

E. TABERNER,
Town Clerk.
5956

COUNCIL OF THE COUNTY OF ABERDEEN

Applications are invited for appointments (2) as ARCHITECTURAL ASSISTANT in the County Architect's Department. Salary £905 × £35—£1,185 per annum. Placing on the scale may be given according to experience. Applicants must be Associates of the Royal Institute of British Architects. The appointments are superannuable. Application forms and conditions of appointment may be obtained from the undersigned. Closing date, 14th October, 1959.

JAMES L. CRAIG,
County Clerk.

County Buildings,
22 Union Terrace, Aberdeen. 5935

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE
OFFICE OF THE COUNTY ARCHITECT

The Council require SENIOR ARCHITECTS in salary grades A.P.T. V (£1,220—£1,375), A.P.T. IV (£1,065—£1,220) and Special Grade (£785—£1,070) for their extensive and interesting building programme which includes schools, colleges, old people's and children's homes, clinics, ambulance, fire and police stations, and other public buildings. Architects appointed will be employed at the Central Office in Wakefield solely upon capital works, dealing with building projects from sketch plans to completion.

Applications are also invited for the undermentioned posts at the Central Office:—

JUNIOR ARCHITECTURAL ASSISTANTS. Grade A.P.T. II (£765—£880).

Applications to be submitted as soon as possible on forms to be obtained from and returned to the undersigned.

A. W. GLOVER, F.R.I.B.A.,
County Architect.

Bishopsgarth,
Westfield Road,
Wakefield. 5949

GOVERNMENT OF NORTHERN IRELAND
(A) ASSISTANT ARCHITECT, Class II
(B) ARCHITECTURAL ASSISTANT

Applications invited for above posts in Chief Architect's Branch, Ministry of Finance. Posts (A) are pensionable and candidates must be Registered Architects by examination with at least two years' experience in an Architect's Office in preparing working drawings. Salary scale £805 (at age 25)—£1,095 (age 34 and over)—£1,260. Existing pension rights may, in certain circumstances, be transferred.

Candidates for unestablished posts (B) should have recognised architectural training and fair experience. Salary scale £585—£905; appointees who have passed R.I.B.A. Intermediate examination start at £730.

Preference for ex-Service men. Application forms for *both* posts obtainable from Director of Establishments, Room 271, Stormont, Belfast. 5939

MIDLANDS ELECTRICITY BOARD

Applications are invited for the following superannuable appointments in the Architectural Section of the Chief Engineer's Department, Board Headquarters.

(a) SECTION LEADER—ARCHITECTURAL

Applicants should be Associate R.I.B.A. and have had considerable experience in design, construction and contract administration and be capable of handling building projects from sketch plans to final completion.

Salary £1,055—£1,155 per annum (N.J.B. Schedule "D" Grade 3).

(b) SENIOR DRAUGHTSMAN—ARCHITECTURAL

Applicants must be good draughtsmen, preferably of R.I.B.A. Intermediate standard, capable of producing accurate working drawings, working as assistant to a senior architect.

Salary £790—£890 per annum (N.J.B. Schedule "D" Grade 5).

These posts offer interesting and responsible work in connection with the Department's building programme which is primarily concerned with the building of office blocks, workshop and stores depots, transport garages, welfare buildings and Service Centres.

Apply, by letter, within 14 days, stating age, experience, present salary and position, to The Secretary, Midlands Electricity Board, Mucklow Hill, Halesowen, Nr. Birmingham.

S. STEPHENS,
Secretary.
5947

BEDFORD CORPORATION

Applications are invited for the following appointments in a progressive and expanding County Town, the population of which exceeds 60,000 and is increasing at about 1,000 per annum. The present annual expenditure on new capital works is at the rate of £700,000 per annum.

(a) PRINCIPAL PLANNING ASSISTANT
A.P.T. V (£1220–£1375)

(b) TWO SENIOR ASSISTANT ENGINEERS
A.P.T.IV (£1065–£1220)

(c) TWO SENIOR ASSISTANT ARCHITECTS
A.P.T.IV (£1065–£1220)

(d) SENIOR QUANTITY SURVEYOR
A.P.T.IV (£1065–£1220)

(e) ASSISTANT ENGINEER
A.P.T.III or Special Grade (£880–£1065) or (£785–£1070)

(f) SURVEYOR/DRAUGHTSMAN
A.P.T. I or II (£610–£765) or (£765–£880)

(g) ARCHITECTURAL DRAUGHTSMAN
General Division or A.P.T.I. (£210–£595) or (£610–£765)

The appointments in A.P.T. IV and A.P.T. V will include a car allowance in the order of £100 and the offer of housing accommodation. The A.P.T. III or Special Grade appointment will also include the offer of housing. In each case the commencing salary and grade will depend on qualifications and experience while a contribution may be made towards removal expenses.

Further particulars and application forms, with an indication of the appropriate post, should be addressed to—

F. W. Dawkes, Borough Engineer and Surveyor, Newham House, Horne Lane, Bedford, to whom completed forms should be returned not later than noon, Wednesday, 14th October, 1959.

CORPORATION OF GLASGOW
ARCHITECTURAL AND PLANNING DEPARTMENT
ASSISTANT ARCHITECTS
ASSISTANT CIVIL ENGINEERS
ASSISTANT QUANTITY SURVEYORS

Vacancies exist for a number of Assistants as above, minimum qualification Intermediate examination of the appropriate professional body. Salary scale £675—£1,240 per annum with placing according to 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.
5915

BOROUGH OF SOUTHGATE
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT
FIRST ARCHITECTURAL ASSISTANT

Applications are invited for the following appointment in the Department of the Borough Engineer and Surveyor:—

A.P.T. Grade IV, £1,065—£1,220 plus London weighting.

The post is permanent and superannuated and the starting salary will be fixed in accordance with qualifications and experience. Applicants must be Associates of the Royal Institute of British Architects.

Forms of application may be obtained from the Borough Engineer and Surveyor and should be returned to the undersigned not later than 12 noon on Monday, 12th October, 1959.

Canvassing, directly or indirectly, will be a disqualification.

GORDON H. TAYLOR,
Town Clerk.

Town Hall,
Palmers Green,
London, N.13.
September, 1959. 5959

CAERNARVONSHIRE COUNTY COUNCIL
COUNTY PLANNING DEPARTMENT

Applications are invited for posts of:—

(a) SENIOR PLANNING ASSISTANT, A.P.T. III/IV (£880—£1,220).

Applicants should be corporate members of the Town Planning Institute or hold an equivalent qualification. They should have had experience in preparation of development plans, particularly town maps and preferably including comprehensive development areas.

(b) PLANNING ASSISTANT, A.P.T. II (£765—£880).

Experience is required either in development control, including the preparation of layouts and amendment to elevations or in preparation of town maps.

(a) and (b). Commencing salary according to qualifications and experience.

Housing accommodation may be available if required.

Further particulars and application forms from Clerk of County Council, Caernarvon. Closing date 19th October. 5945

Architectural Appointments Vacant

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

ARCHITECTURAL ASSISTANT, London. Final standard. Industrial and commercial. Progressive and interesting. Salary according to experience and ability. Box 4329.

LLEWELLYN SMITH AND WATERS require Senior and Junior ASSISTANTS for a widely varied programme of work. Salary according to experience. Please write stating qualifications, experience and age to 103, Old Brompton Road, S.W.7. 4622

ERIC FIRMIN & PARTNERS require ASSISTANTS for interesting work on industrial and commercial projects. Five-day week. Luncheon vouchers. Salary according to experience. Please apply 5, Holborn Circus. City 8811. 5250

REQUIRED in Oxford office of W. H. Watkins, Gray & Partners, ASSISTANT to work on Advanced Technical Laboratory. Apply in writing to 57, Catherine Place, S.W.1, or ring for appointment Vic 7761. 3966

EXPERIENCED ARCHITECTURAL ASSISTANTS required, one Qualified and one of at least Intermediate standard, for Branch Office, Birmingham, engaged on a varied and interesting programme of Commercial projects. The positions are pensionable and a five-day week is in operation. Applications, giving full particulars, to G. S. Hay, F.R.I.B.A., Chief Architect, Co-operative Wholesale Society Ltd., 1, Balloon Street, Manchester, 4. 4307

SEVERAL Senior and Intermediate ARCHITECTURAL ASSISTANTS are required for commercial projects including Hotel, Theatre and extensive development schemes of offices and light industry, etc., in London Architect's office. Holiday arrangements will be recognized. Five-day week. Salary according to experience. Telephone City 8811. 4151

SOUTH KENSINGTON Architects' Office require experienced Intermediate ASSISTANT with good ability in design. Apply: R. Mountford Pigott & Partners. KENsington 1242. 4448

ARCHITECTURAL ASSISTANT, Intermediate standard. Busy London office. Good prospects. Box 4330.

ARCHITECTURAL ASSISTANT required from about Intermediate standard to recently qualified, for interesting and varied work in practice mainly concerned with commercial projects. Five-day week. Congenial working conditions. Salary by arrangement. Apply in writing giving full particulars, age, to J. Alfred Harper & Son, Union Chambers, 63, Temple Row, Birmingham. 5629

J. M. AUSTIN-SMITH & PARTNERS, 29, Sackville Street, London, W.1, have vacancies for qualified ARCHITECTURAL ASSISTANTS with office experience. Opportunities for designing and taking responsibility in running and supervising contracts. Salary according to age and experience, but in range of £800—£1,000. Please apply in own handwriting. 4834

EXPERIENCED ASSISTANTS required, one qualified and one Intermediate-Final R.I.B.A. standard, for interesting development work on industrial and commercial projects. Sound knowledge of building construction and good draughtsmanship essential. First class working conditions in new office building. Five-day week. Luncheon vouchers and superannuation scheme. Apply giving full details to Staff Architect, Percy Bilton Ltd., Bilton House, 54/58, Uxbridge Road, Ealing, W.5. 5532

A SENIOR ARCHITECTURAL ASSISTANT required immediately. The applicant will work under the direction of the District Architect on the design, preparation of drawings, details, etc., for the Company's New Retail Stores and Extensions, and be responsible for his jobs from initial stages to completion. Apply stating age, experience and salary required to the District Architect, T. W. Woolworth & Co. Ltd., Architect Department, 47/49, King Street, Dudley, Worcestershire. Telephone: Dudley 55951. 5597

SEELY AND PAGET require experienced and responsible ASSISTANT for Training Colleges and other varied work. Intermediate to Final standard preferred. Salary by arrangement. Write: 41, Coth Fair, E.C.1, or telephone—MET. 8511. 5635

ARCHITECTURAL ASSISTANT, capable of leading a team and working up principally domestic and other tropical designs, possibility of overseas service. Tel.: WELbeck 1681. 5765

SENIOR and JUNIOR ASSISTANTS urgently required by expanding old established firm of architects in West End of London. Contemporary outlook and enthusiasm essential. Apply with details of experience and salary required to Box 5607.

ASSISTANTS

ASSISTANTS required in the Architect's Department of the Appleby-Frodingham Steel Company for work on expansion and development projects embracing office, amenity, laboratory and various classes of industrial buildings.

Applicants should be competent draughtsmen with a sound knowledge of modern building techniques and services.

The positions are permanent for suitable applicants and a pension scheme is in operation.

Applications, giving age, experience and salary required, should be made in writing to the Employment Officer, Appleby-Frodingham Steel Company, Scunthorpe, Lincs. 5707

EXPERIENCED ASSISTANT required by Architect in East Sussex. Pleasant small office and congenial working conditions. Salary range £500-£750 according to ability. Box 5779.

KEEN, ARCHITECTURAL ASSISTANTS Final and Intermediate standards with desire for responsibility wanted immediately. Only good draughtsmen welcome. Site experience available, as well as drawing office. Five-day week. Details to Felix Walter, F.R.I.B.A., 4, Raymond Buildings, Gray's Inn, W.C.1, or phone HOLborn 0535/6. 5784

ARCHITECTURAL ASSISTANT. Inter. R.I.B.A. standard required. Good draughtsmanship essential. Apply in writing, giving details of training, experience and salary required to Vigers & Co., Chartered Surveyors, Architects, 4, Frederick's Place, Old Jewry, E.C.2. 5764

ARCHITECTURAL ASSISTANT required for busy London office. Intermediate standard or higher. Salary by arrangement. Box 5713.

ARCHITECTS DEPARTMENT OF F. W. WOOLWORTH and CO. LIMITED, shortly moving from West End to Administrative Offices in
NORBURY
require the following Staff.
SENIOR ASSISTANTS (INTER: R.I.B.A., OR EQUIVALENT).
JUNIOR ASSISTANTS.
5-Day week. Canteen facilities. Superannuation Scheme.
Apply in writing stating age, experience and Salary required. Box 5730.

CONTEMPORARY Office requires enthusiastic ASSISTANTS willing to accept responsibility. Several vacancies are open and applications are welcomed from both qualified and student members. The office is in pleasant out of town surroundings and works a five-day week. Salaries by arrangement. Apply with details to Morrison & Partners, St. Alkmunds House, 103, Belper Road, Derby. 5672

ASSISTANT of R.I.B.A. Intermediate or Final standard and salary required, to Gunton & Gunton, F/F.R.I.B.A., F.R.I.C.S., Empire House, St. Martin's le Grand, E.C.1. 5683

SCAR GARRY & PARTNERS require Qualified and Intermediate standard ARCHITECTURAL ASSISTANTS for office and flats developments. Salary according to experience and qualifications. Ring WELbeck 2507 for an appointment. 5703

ARCHITECTURAL ASSISTANT required for busy practice. Good detail draughtsman with sound all-round knowledge in the architectural field and must be capable of working with minimum supervision. Opportunities for first-class experience, including visits to sites and general supervision. Apply MAYfair 3567. 5689

W. H. WATKINS, GRAY & PARTNERS require ASSISTANTS of Intermediate standard for interesting hospital work, salaries according to experience and capabilities, pension scheme in operation. Write or 'phone: 57, Catherine Place, S.W.1—VICtoria 7761. 5746

MANCHESTER PRACTICE requires ASSISTANTS, with some office experience, for work on various projects, mainly contemporary. Able to carry schemes through from sketch design stage with supervision as required. Medium-sized office with congenial atmosphere, offering all-round experience to enthusiastic types, with good salaries to suitable applicants. Brief details (in confidence) to Box 5738.

BOISSEVAIN & OSMOND, WHOSE HEAD OFFICE IS MOVING TO EPSOM, REQUIRE A SENIOR ASSISTANT WHO HAS A GENUINE AND CREATIVE INTEREST IN ARCHITECTURE AND A SOUND UNDERSTANDING OF ORGANISATIONAL PROBLEMS. THE PRACTICE IS VARIED AND INCLUDES A COLLEGE OF FURTHER EDUCATION AND A LARGE SHOPPING CENTRE. THIS APPOINTMENT COULD OFFER WIDE SCOPE FOR A MAN OF INITIATIVE AND ABILITY. PLEASE REPLY IN WRITING TO 2 FIELD COURT, GRAY'S INN, LONDON, W.C.1. 5752

COVELL & MATTHEWS require ARCHITECTURAL ASSISTANTS for work on central area projects. Salary range: £550—£850. Five-day week. Telephone REGent 2291 for appointment. 5757

ARCHITECTURAL ASSISTANTS from R.I.B.A. Intermediate standard are required by firm engaged on school and church contracts in their Manchester and Nottingham Offices. Applicants should reply, stating qualifications, experience, age, salary, etc., to Reynolds & Scott, F./A.R.I.B.A., 9, Albert Square, Manchester 2. 5758

CONTEMPORARY Sheffield Architects require qualified ASSISTANTS with office experience for work on major schemes. Pension scheme in operation. Salary range £800—£1,100 according to experience and ability. Full particulars to Hadfield Cawkwell & Davidson, 17, Broomgrove Road, Sheffield 10. 5759

SENIOR ARCHITECTURAL ASSISTANT capable of making site surveys, preparing sketch plans, working drawings and specifications, and supervising work in progress. Applications stating age, experience, qualifications and salary required to R. E. Akerman, F.R.I.B.A., Chief Architect, United Dairies Ltd., 31 St. Petersburgh Place, W.2. 5760

ARCHITECTURAL STAFF urgently required in all grades in busy Office. Bonus and Pension Schemes in operation. Write stating experience and salary requirements to Firth, Son & Blackburn, A.A.R.I.B.A., Broadway House, Crackenedge Lane, Dewsbury. 5761

ASSISTANT wanted with some office experience. Write brief details to Eric Lyons, Mill House, Bridge Road, Hampton Court, Surrey. 5763

ARCHITECTS AND ASSISTANTS required. Minimum Inter Standard. Very large programme commercial, industrial and residential work. Good salaries and bonus to right men. Five-day week. Box 5772.

ERDI & RABSON require SENIOR ASSISTANTS in their City Office to take charge of schemes from sketch plans to completion. Salary up to £1,000. Phone for appointment CITY 2639. 5768

APPLICATIONS are invited from SENIOR QUALIFIED ARCHITECTS and also from those of Intermediate standard for vacancies with a leading commercial concern in London. The posts offer excellent opportunities for those who combine practical experience with a high standard of design. Please apply to Box 5781, giving details of experience and salary.

GAULDIE, HARDIE, WRIGHT & NEEDHAM require the following staff for varied town and country practice in eastern Scotland.
1. ASSISTANT ARCHITECTS, salary range up to £900.
2. ARCHITECTURAL ASSISTANTS, salary range from £600 upwards, dependent on experience.
Replies to Castle Hill House, 1, High Street, Dundee. 5801

RAMSEY, MURRAY, WHITE & WARD require a qualified ASSISTANT. Age 25-30. Salary according to experience. Apply in writing to the Secretary, 32, Wigmore Street, London, W.1. 5799

A KEEN ASSISTANT of Intermediate to Final standard, who would like to escape from London, required by C. F. Boniface, A.R.I.B.A., Bank Chambers, High Street, Egham, Surrey. 5798

EXPERIENCED ARCHITECTURAL ASSISTANT required to work directly under Chief Assistant in small practice. Work includes Television Centres, site surveying and supervision of small projects. Salary up to £800, according to experience. Write to Treadgold & Elsey, 1 Vine Street, Uxbridge, Middx., giving particulars of experience and salary required. All letters will be acknowledged by return. 5802

SENIOR ARCHITECTURAL ASSISTANT required. Should be capable draughtsman, good colourist and able designer. The post will qualify for the Company's Superannuation Scheme. Excellent canteen and social club facilities are available and a five-day week is worked. Salary according to ability and experience. Apply giving details of age, experience and salary required to Reginald E. Southall, A.R.I.B.A., Chief Architect, H. & G. Simonds, Limited, The Brewery, Reading. 5816

W. H. SAUNDERS & SON are expanding their London practice and require additional staff of Intermediate and Final grades for their new offices in Gt. Newport Street, W.C.2. Applications giving full particulars and salary required should be addressed, in the first instance, to R. W. Leggatt, A.R.I.B.A., A.M.T.P.I., at 49, Commercial Road, Portsmouth. 5803

SENIOR ARCHITECTURAL ASSISTANTS required in salary range £700—£1,000 to take control of varied and interesting jobs of all sizes. Experience in colour and design of interiors and fittings and good presentation draughtsmanship an advantage. Five day week, excellent working conditions and holidays. Please write giving full details of experience and qualifications to Deacon & Laing, 65 Goldrington Road, Bedford. 5817

MANCHESTER Brewery Company require one ASSISTANT ARCHITECT and one ARCHITECTURAL ASSISTANT for work on new and existing properties—age not over 45. Non-contributory pension scheme. Salary by arrangement. Box 5822.

ARCHITECTURAL ASSISTANT required age 25 to 45. Full qualifications not essential provided experienced and capable of working on own initiative to assist on speculative housing and flat schemes—excellent prospects, superannuation scheme available. Apply: Architectural Department, Sir Lindsay Parkinson & Co. Ltd., 6, Lambeth Road, S.E.1. 5789

A. M. GEAR & ASSOCIATES have vacancies for (1) ARCHITECTURAL ASSISTANT of about Final standard interested in the development of new building techniques. Previous office experience not vital. (2) ARCHITECTURAL ASSISTANT of about R.I.B.A. Intermediate standard with 2/3 years office experience. (3) STRUCTURAL ENGINEERING ASSISTANT interested in working on the development of new building techniques. Apply: A. M. Gear & Associates, 12, Manchester Square, London, W.1. 5791

EXPERIENCED ASSISTANT ARCHITECTS are required in the design office on work mainly in the domestic field, including the co-ordination of estate and plan design. There will be ample scope for initiative. Apply in writing, giving age, experience and salary required to Chief Architect, A. J. Wait & Co. Ltd., Wellington Crescent, New Malden, Surrey. 5829

RONALD WARD & PARTNERS have immediate vacancies for ASSISTANT ARCHITECTS with initiative and some experience, for interesting, commercial, industrial and civic projects. Salaries commensurate with ability. Apply, 29, Chesham Place, S.W.1. BELgravia 3361. 5638

GUY MORGAN & PARTNERS urgently require ARCHITECTURAL ASSISTANTS in their London office. Salary range £600—£1,200. Phone Sloane 0624 for appointment. 5827

QUALIFIED and INTERMEDIATE ARCHITECT'S ASSISTANTS required for work on a large office development in Morden and on flats. Five-day week. Salary according to experience and capability. Ring MUSeum 0298 for appointment, or write to A. Green, A.R.I.B.A., 23, Fitzroy Street, W.1. 5830

LESLIE GOODAY, A.R.I.B.A., F.S.I.A., requires ASSISTANT of Intermediate standard. Apply in writing to: 17, Sloane Street, London, S.W.1. 5846

ASSISTANT ARCHITECT (Associate) required by Leonard J. Multon & Partners, of 6, Greenfield Crescent, Edgbaston, Birmingham. The position offers scope for advancement in an expanding office engaged on large scale projects. Working conditions are exceptionally good, in a recently built Studio Office. Please apply in writing, stating experience and salary required. 5841

CROYDON. Experienced and competent ARCHITECTURAL ASSISTANT required. Write stating fullest particulars to Graham Crump and Denis Crump, F/A.R.I.B.A., Chartered Architects, 43, George Street, Croydon. 5792

BUSY practice, Bedford Row, W.C.1, requires ARCHITECTURAL ASSISTANT with 3-4 years' experience. Good draughtsman, surveys, working drawings, details, etc., exceptionally varied work. Tel. CHA. 7611. 5896

ARCHITECTURAL ASSISTANT required immediately for Private Practice in Canterbury. Previous experience essential. Apply giving details to John C. Clague, Chartered Architect, Lloyds Bank Chambers, Herne Bay, Kent. 5889

ARCHITECTURAL ASSISTANT. Qualified or Final standard. Interesting Industrial and Commercial. Salary according to experience and ability. Write, Berry, Crane & Noble, Suckling House, Norwich. 5890

NEWCASTLE UPON TYNE.—ARCHITECTURAL ASSISTANT required to work on varied and large projects. Experienced and fully qualified. Reply, stating salary required, to Waring & Netts, 36, Jesmond Road, Newcastle upon Tyne, 2. 5891

QUALIFIED ARCHITECTURAL ASSISTANT required for Brewery Architect's Office. Largely licensed houses and hotels; previous experience in brewery work desirable but not essential. Full details, age and salary required, to the Architect, Thomas Ramsden & Son Ltd., Stone Trough Brewery, Halifax. 5893

CHARLES B. PEARSON & SON require an ASSISTANT in their London Office. Intermediate or Final standard. Opportunity for wide experience in small office working with young people. Telephone: AMBassador 2559 for appointment. 5894

ARCHITECTURAL ASSISTANTS required for office in the Leigh area. Work includes Industrial and Commercial Developments, and applicants will be required to prepare working drawings and details, with the minimum amount of supervision. Write fully, giving age, experience and salary required, to the Building Manager, Lowton Construction Company Limited, Lowton St. Mary's, near Warrington, Lancashire. 5897

INTERMEDIATE R.I.B.A. ASSISTANT urgently required with initiative and design ability. Large and varied programme of work. Salary £468—£520 p.a. Modern office with latest equipment. Rowland D. Herbert, F.I.A.S., A.I.A.A., M.Inst.R.A., 7, Land of Green Ginger, Hull. 5914

THE services of an A.R.I.B.A. are required by medium-sized developers in Surrey and Sussex. Residence in West Surrey an advantage. Remuneration by arrangement. Apply Box 5920.

MONRO & PARTNERS require Intermediate ARCHITECTURAL ASSISTANTS for their London and Watford Offices. Salary £700—£900 according to experience. Five-day week. Apply in writing to 32, Clarendon Road, Watford. 5899

IF you want to join in the hurly-burly of modern architecture and gain practical experience, then telephone SLOane 0833, where there is a vacancy for an ASSISTANT requiring a salary of £700—£900 per annum. 5901

ARCHITECTURAL ASSISTANTS required by large Midlands Brewery Company. Please reply, giving details of qualifications, age, experience and salary required, to Box 5902.

ASSISTANTS of Intermediate and Final standard required for large and small educational jobs, some overseas: at first in London and later in Guildford office. Write to Frank Rutter, F.R.I.B.A., 2, Finchley Road, London, N.W.8. 5904

CHIEF ASSISTANT ARCHITECT required. Salary range £1,050—£1,200. Full details to Naylor, Sale & Widdows, St. Mary's Chambers, St. Mary's Gate, Derby. 5905

LEEDS—ASSISTANT ARCHITECTS

SENIOR ASSISTANT: To work in general practice and on University, Hospital and School programmes. Planning, working drawings, site supervision. A.R.I.B.A. Salary range £1,050 to £1,500 to discuss.

ASSISTANT: To work in general practice and on University, Hospital and School programmes. Planning, working drawings. A.R.I.B.A. or equivalent standard. Salary range £900 to £1,050 to discuss.

Write, stating age and experience, to Jones & Stocks, F/F.R.I.B.A., 7, Blenheim Terrace, Leeds, 2. 5908

SIR ROBERT TASKER & PARTNERS immediately require ARCHITECTURAL ASSISTANTS (Final and Intermediate) in office with varied practice. Write to No. 3, Field Court, Gray's Inn, W.C.1, or telephone Chancery 5957 stating salary required. 4913

COVELL & MATTHEWS require capable and enthusiastic, senior and junior ASSISTANTS, to work on large central area redevelopment projects. Salary according to experience. Five-day week. Ring REGent 2291. 5519

DIAMOND, HODGKINSON & PARTNERS require experienced SENIOR and JUNIOR ASSISTANTS of contemporary outlook for varied work, including Housing and Estate Development, Flats, Churches, Interiors and Industrial Design projects. Write, with details of age, experience and salary required, to 50, Baker Street, London, W.1. 5917

ENERGETIC ASSISTANT with good all round experience, required in small City office. The work is varied with a bias towards speculative housing development, and the future prospects are bright. Salary according to experience up to a maximum of £950 p.a. Write in first instance to Alan S. Raimes & Associates, 6, Holborn Viaduct, London, E.C.1. 5928

ASSISTANT ARCHITECTS for busy Sheffield office. Final or Intermediate standard. Box 5909.

SENIOR ASSISTANT (age 25/40) with office experience and ability to take charge of work is required in Brewery Architects' Department, London. Varying and interesting projects for hotels and public houses, including interior design and furnishing. Write with full particulars and salary required to Box 5918.

ARCHITECTURAL ASSISTANT (Intermediate standard) required in Brewery Architects' Department, London. Must be good draughtsman with sound knowledge of building construction. Write, stating age, experience and salary required, to Box 5919.

SIR WILLIAM HALCROW & PARTNERS require ARCHITECTS and ASSISTANTS to join design team in London working on 600 MW power station project in Buenos Aires. Applicants should send relevant particulars in envelope marked "B.A. Group" to: A. Bryett, Esq., A.R.I.B.A., Sir William Halcrow & Partners, 47, Park Lane, London, W.1. 5922

ARCHITECTURAL ASSISTANT, Intermediate/Final standard, required by busy provincial architects in general practice for varied work on schools, housing and domestic buildings. Able to work on smaller projects with minimum supervision. Good experience of all aspects for man with initiative and enthusiasm. School training unessential, but an advantage. N.C. Pension Scheme. Write, stating salary required, to: Bothams & Brown, 32, Chipper Lane, Salisbury. 5921

ASSISTANT—Intermediate to Final—required for country practice, salary according to experience. Write with experience, age and salary, to Forsyth Lawson, Cunningham & Partners, Banbury. 5934

LONDON Bank Architect's Office has vacancies for two ASSISTANTS experienced in preparation of working drawings and specifications. Commencing salary £750/£850 with good prospects of advancement. Reply in writing, stating age, experience and salary required. Box 5930.

ARCHITECTURAL ASSISTANT REQUIRED

A JUNIOR ARCHITECT, Intermediate or Final A.R.I.B.A., age 24/26, required by Bank Premises Department. The work will consist of preparing surveys of the Bank's premises for alterations and re-building, all working drawings and general maintenance work. Good prospects to suitable applicant. Pension Scheme. Reply, giving full particulars and salary required, to The Manager, Premises Department, Yorkshire Bank Limited, Infirmary Street, Leeds, 1. 5931

ASSISTANTS required for busy Architect's City office; Laboratory and Industrial projects. Intermediate standard or above. Apply to: Secretary, Fairtlough and Morris, Temple Chambers, Temple Avenue, E.C.4. FLE. 6396. 5932

ARCHITECT'S ASSISTANTS required for busy office: varied practice including Industrial, Housing, etc. Write, stating experience and salary required, to Francis W. Keyworth, L.R.I.B.A., 31, Friar Lane, Leicester. 5884

HARRY S. FAIRHURST & SON have a vacancy for a SENIOR ARCHITECT in their Manchester Office. The work is interesting and varied including academic, scientific, commercial and domestic buildings. Applicants should be experienced and able to take responsibility. Please write, giving the usual details, to 55, Brown Street, Manchester, 2. 5943

GOLLINS, MELVIN, WARD & PARTNERS require an ARCHITECTURAL ASSISTANT for their Sheffield office. Write: 281, Glossop Road, Sheffield, 10, or telephone Sheffield 29922 for an appointment. 5944

EXPERIENCED ARCHITECTURAL ASSISTANTS required with a good sense of design and a sound knowledge of building construction. C. H. Elsom & Partners, 10, Lower Grosvenor Place, S.W.1. VIC. 4304. 5940

ARCHITECTURAL ASSISTANT required. R.I.B.A. Final standard. Excellent opportunity with prospect of partnership occurs for the right young man to work on large and interesting projects. Apply, stating age, experience and salary, to Vine & Vine, F.F./A.R.I.B.A., Tudor Chambers, Station Road, London, N.22. 5941

ARCHITECT'S ASSISTANT required urgently, in small office dealing with wide variety of Contracts. About Intermediate standard. Opportunity for capable assistant to gain valuable practical experience. Apply Bostock & Partners, Central Hall Buildings, Station Approach, Southall, Middlesex. 5936

ARCHITECTURAL ASSISTANT of Intermediate standard required by Staff Architect to Property Development Company in London. Write, giving full details of age, experience, training and when available, to Maurice Alexander, F.R.I.B.A., 38, Upper Grosvenor Street, W.1. 5886

ARCHITECT'S Office with modern approach to design requires ASSISTANTS of Intermediate and Final standard, London or Reading, for interesting and varied work. Salary £500 to £1,000 per annum according to experience. Apply Eric G. V. Hives & Sons, 46, Queen's Road, Reading. Telephone 55484/5. 5885

ARCHITECTURAL ASSISTANT required with Final qualification; must have contemporary outlook. Salary according to age and experience. John H. Rendle, A.R.I.B.A., A.R.I.C.S., Lichfield Chambers, 1, Leicester Street, Walsall. Tel.: Walsall 2610. 5933

NORMAN & DAWBARN invite applications from ARCHITECTURAL ASSISTANTS at Intermediate/Final standard with at least three years' office experience. Salary £850/£950 p.a. Write to: 7, Portland Place, W.1, giving full particulars. 5863

ASSISTANT ARCHITECT, Intermediate R.I.B.A. level, required by Richard Costain Limited. Attractive salary and good promotion prospects. Write, stating age and details of experience, to Personnel Officer, 111, Westminster Bridge Road, S.E.1. 5887

ASSISTANT between Intermediate and Final R.I.B.A. standard required immediately Architect's West End Office. Five-day week, lunch vouchers, varied work. Phone TEMple Bar 3785 for interview. 5864

INTERMEDIATE ASSISTANT required. Opportunity for progression. Established office with wide range of work in London and Home Counties, including Industrial, Medical, Domestic and Commercial. Five-day week. Three weeks annual leave. Write, giving full details of training, experience and salary required, to: E. William Palmer and Partners, Chartered Architects, 8, The Town, Enfield, Middlesex. 5870

ARCHITECTURAL ASSISTANT at Final standard required by Buckinghamshire office. Interesting and varied work with scope for initiative and responsibility. State age, experience and salary required to Box 5871.

£1,000 starting salary is offered to a qualified and experienced ARCHITECTURAL ASSISTANT, capable of working with minimum supervision in a rapidly expanding small private practice. Write or telephone for an appointment to Walter F. Price, 23, Beaumont Street, Oxford. Tel. 49032. 5872

ARCHITECTURAL ASSISTANTS required by Messrs. Beard, Bennett & Wilkins. Applicants must be qualified, have good design ability and experience in administration of complete Contracts. Write to 101, Baker Street, London, W.1, giving particulars of experience and salary required. 5873

LONDON Brewery Company in S.W.14 area requires SENIOR ASSISTANT in Architect and Surveyors Department for work in connection with industrial and administrative buildings. Applicants, age not to exceed 45, must be well versed in the preparation of detail working drawings, possess a sound knowledge of building construction, surveying and specification writing. Successful candidate will be considered for permanency and pension scheme on completion of six months' probationary period. Five-day week, luncheon allowance and cost of living bonus at present in operation. Basic salary £700-£990 p.a. according to experience. Reply stating age, experience and past and present appointments in chronological order to Box 5874.

SMALL enthusiastic office requires keen and energetic ASSISTANT for varied work including churches, community buildings, etc. Pleasant working conditions, pension scheme, house available. Intermediate or Final standard, salary range £700 to £900. Apply Selby J. Clewer, F.R.I.B.A., Bournville Village Trust, Birmingham, 30. 5876

ASSISTANT ARCHITECT, Intermediate to Final standard with some office experience, required. Apply in writing, giving details of experience and salary required, to David E. Nye & Partners, 172, Buckingham Palace Road, S.W.1. 5878

QUALIFIED and unqualified ARCHITECTURAL ASSISTANTS required for interesting range of contemporary work. Please write stating age, experience and salary required, to Michael Lyell, A.R.I.B.A., A.A. (Hons.) Dipl., 16, Yeoman's Row, Brompton Road, S.W.3. 5879

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