# ARCHITECT OIRNA



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

and COMMENT

stragal's Notes and Topics

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SECTION TECHNICAL

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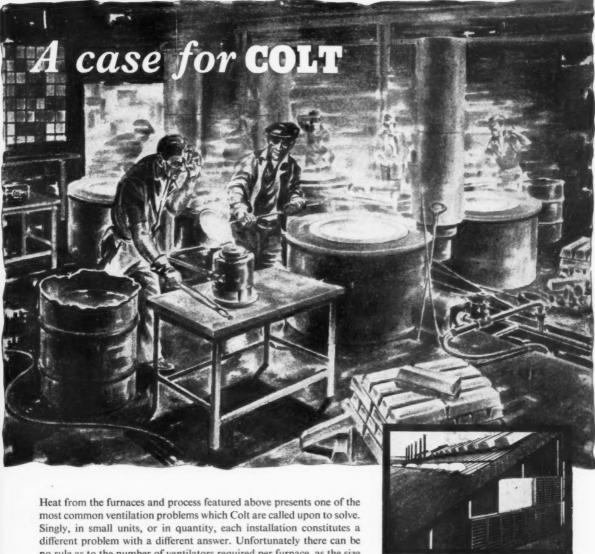
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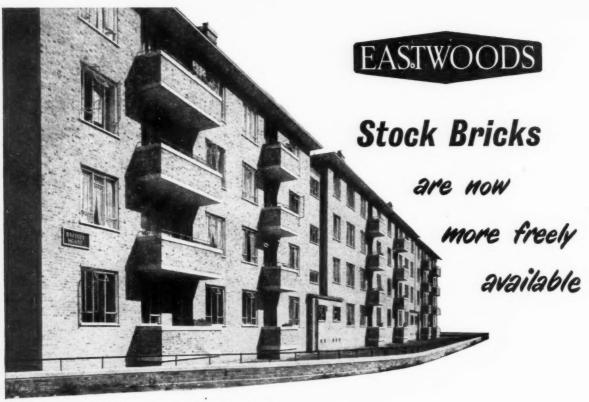


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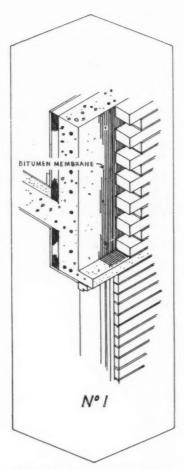
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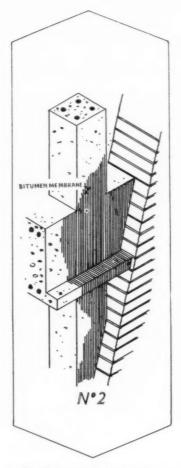
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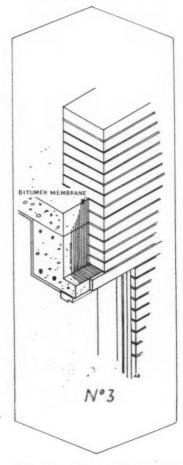
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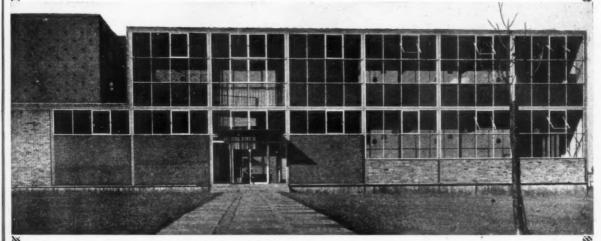


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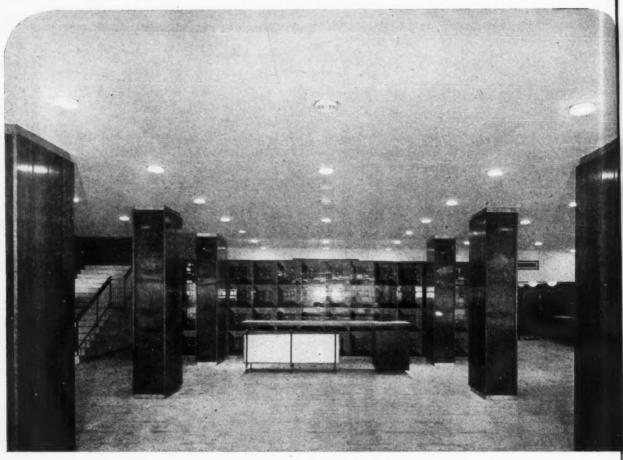
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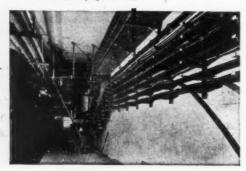
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A view of the Velindre Works showing extension to the Cold Reduction Plant under construction.

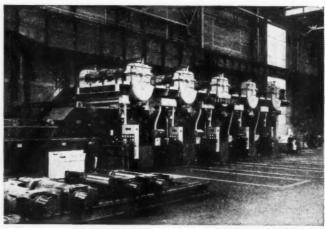
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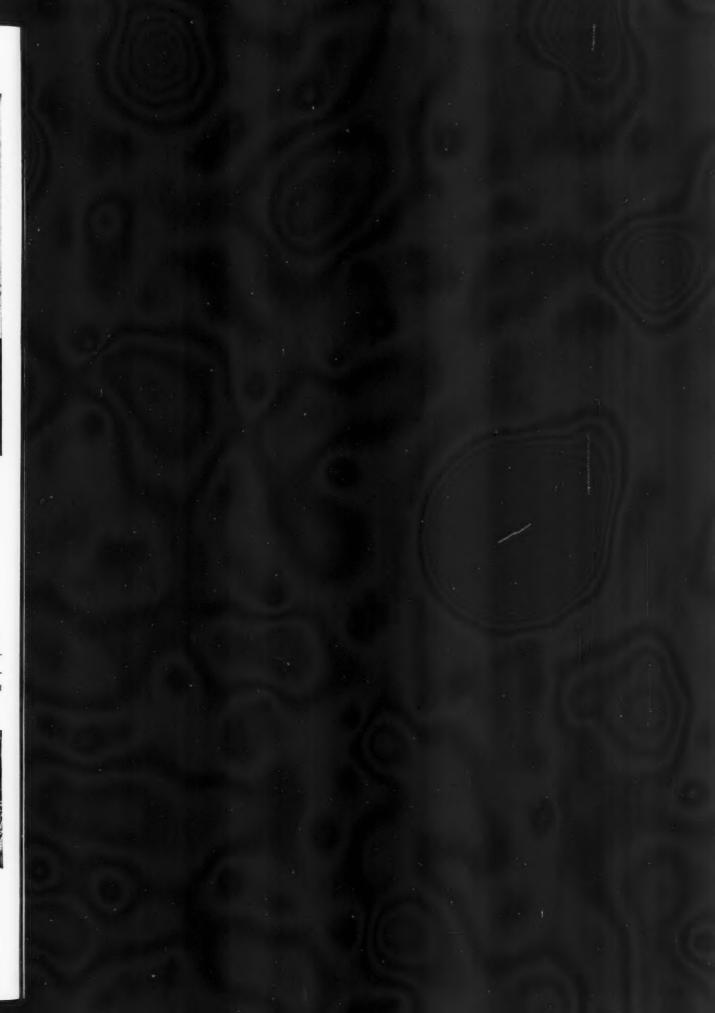
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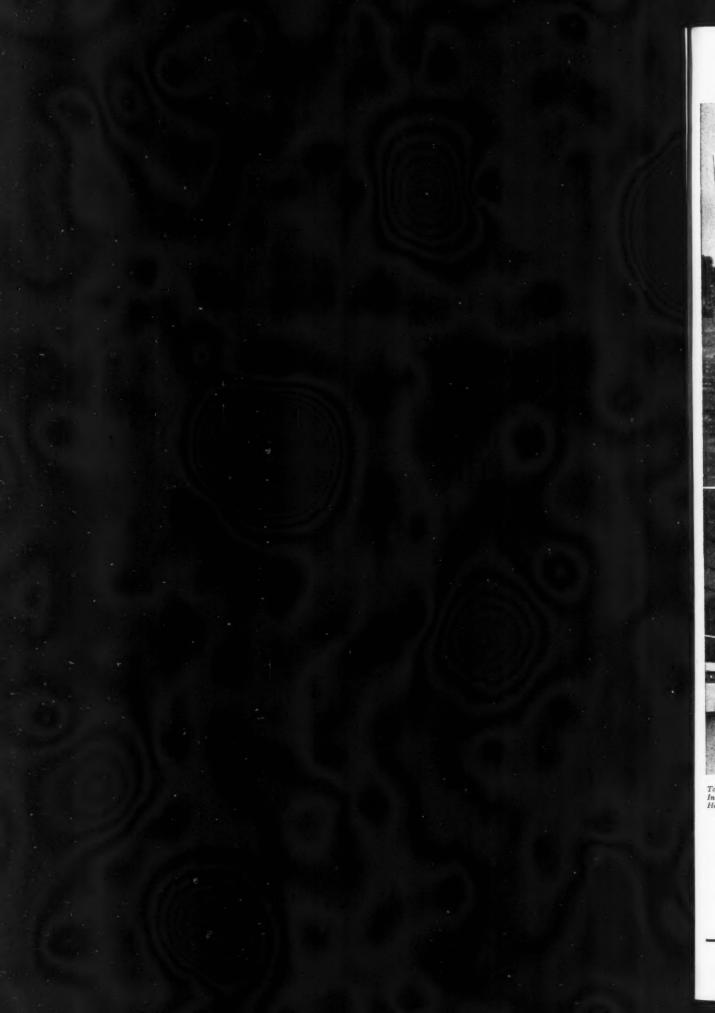






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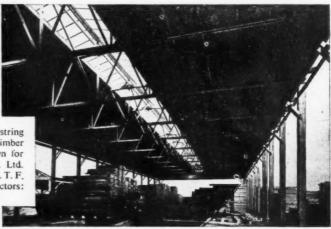
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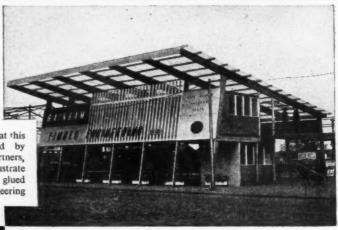
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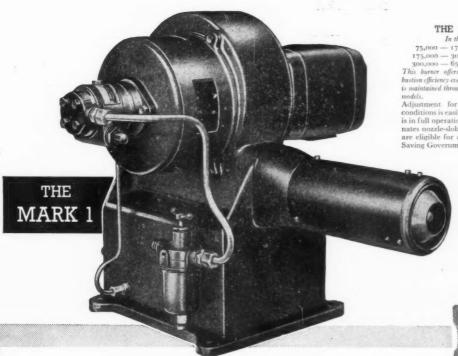
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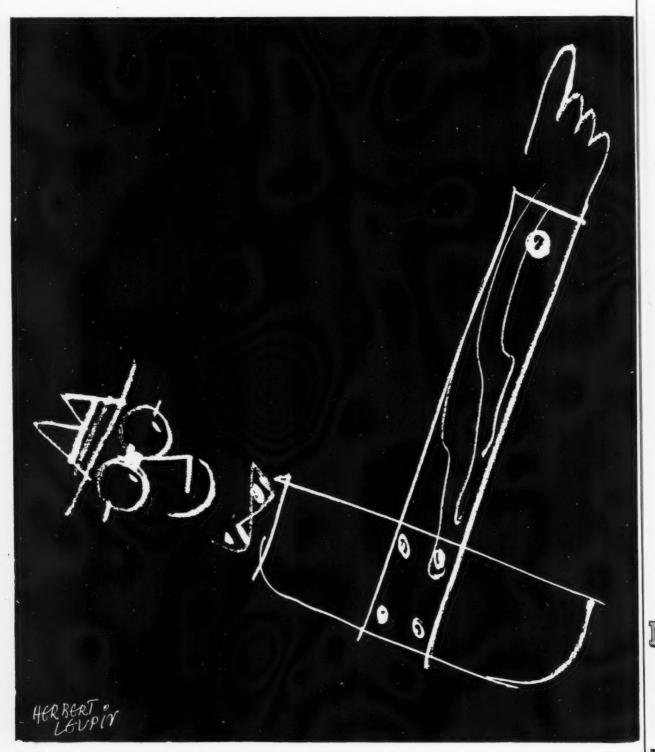
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# Now-Span 22 feet

# with ROBERTSON Long-Span Q-Deck



ROBERTSON Long-Span Q-Deck assures economic construction when building design takes into account the outstanding advantages offered. Centres of support may be as much as 22' 0" (the maximum length of Long-Span Deck).

Robertson Long-Span Q-Deck units on load bearing walls are ideal for school construction and other types of buildings where the elimination of intermediate supports is an advantage.

Long-Span units embody all the other advantages of Robertson O-Deck.

The Robertson method of weatherproofing or alternatively, mineral-surfaced felt laid on  $\frac{3}{4}''$  fibre board is available as a finish.

Long-Span Q-Deck is also suitable for other types of insulation and weatherproofing. See publication QD3A.

Robertson Long-Span
Q-Deck units are 2 ft. wide
and made from combinations
of 16-20 B.G. steel, in
sections and lengths
to meet span/load
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		MAXIMUM CLEAR SPAN	MAXIMUM CLEAR STAIL Loading 30 lbs. per sq. ft.
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THREE	LSD 150	13 ft. 6 ins.	17 ft. 6 ins.
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ROBERTSON THAIN LIMITED, Ellesmere Port, Wirral, Cheshire

Telephone: Ellesmere Port 2341 Telegrams: 'Robertroof'
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QD 21







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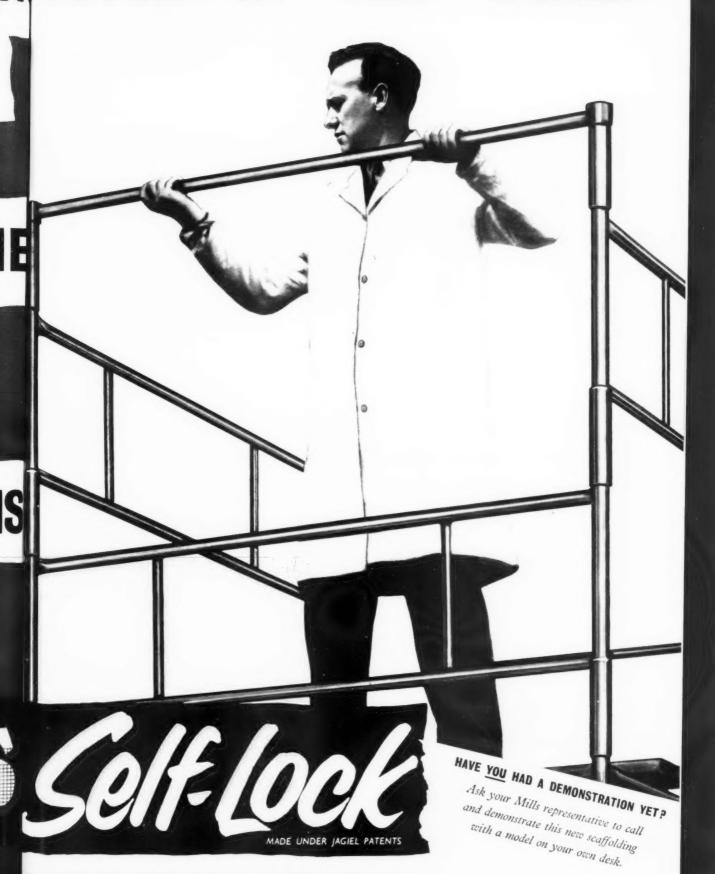
There's nothing to lose, nothing to work loose, no fastening devices to forget to tighten up. All load is taken on the upright members and the structure remains rigid under strains far in excess of those encountered during normal working conditions.

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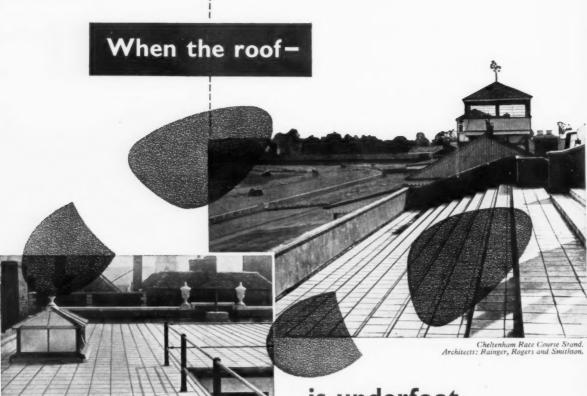
Even the biggest job needs only a two-man team; one to handle the frames and Lowest-ever labour costs! one to put them in position. The scaffolding is self-aligning; frames stack compactly and transport conveniently.

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AMMERSMITH GROVE, LONDON, W.G. Telephone: RIVERSIDE 3011 (10 lines)



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- Built-up roofing undertaken on buildings of any shape or size—anywhere in Britain.
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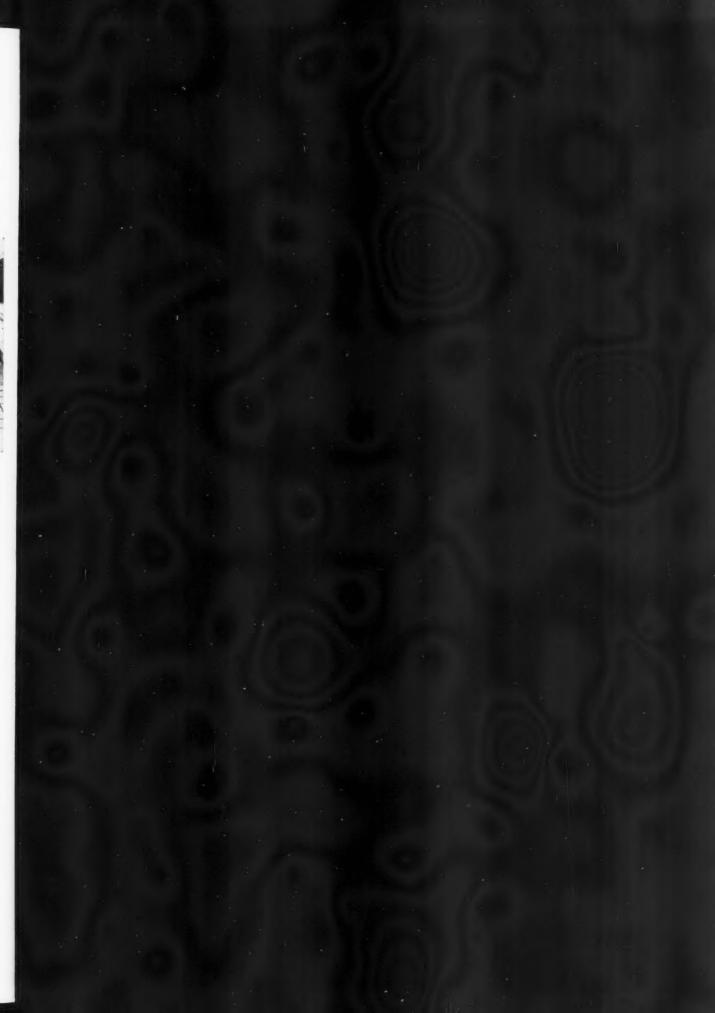
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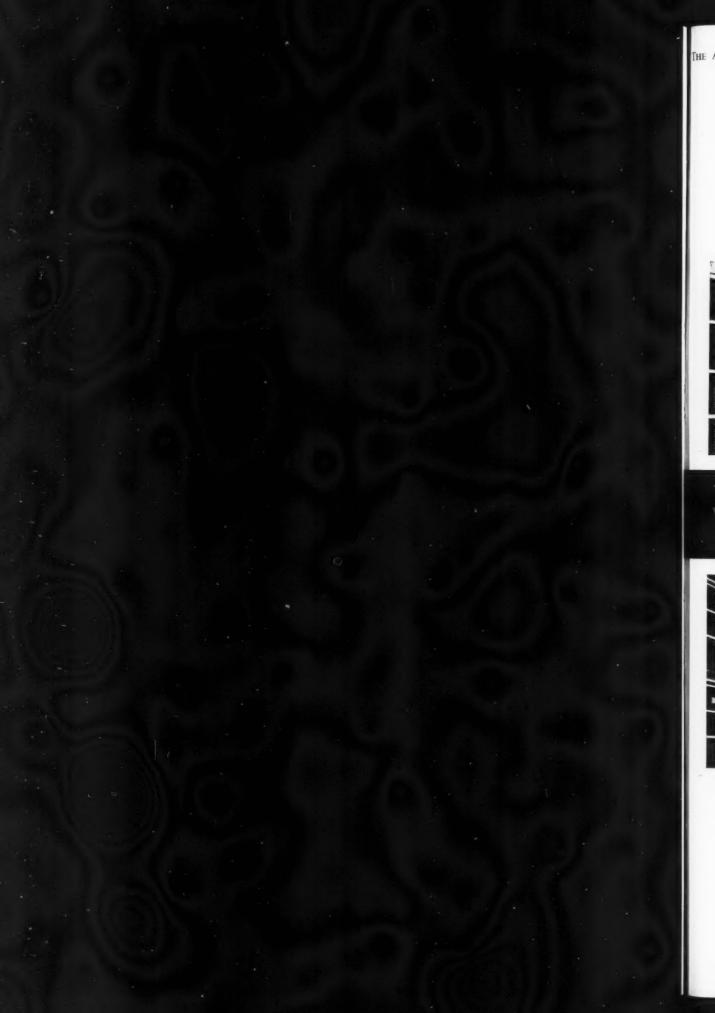
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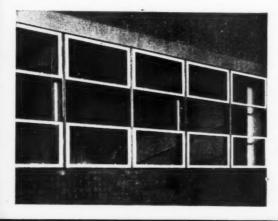
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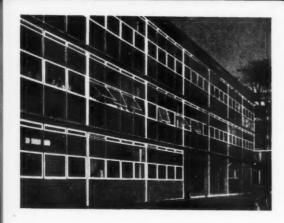


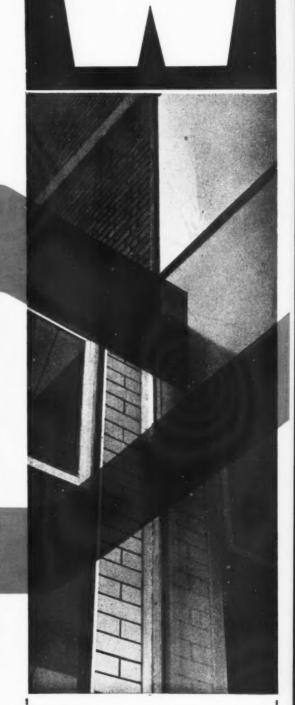


THE ARCHITECTS' JOURNAL for November 29, 1956



WINCILATE at Mayfield





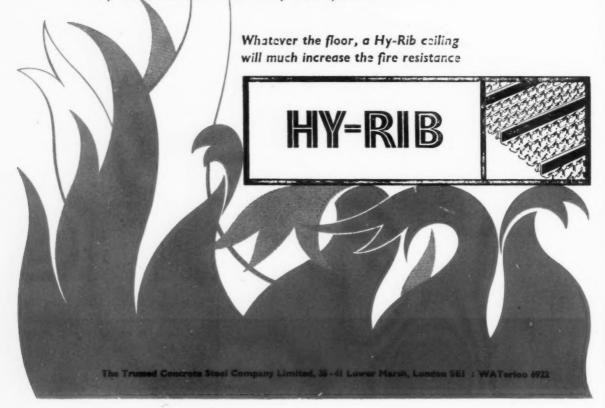
For crisp horizontal trim to the Mayfield Secondary School at Putney the architects, Messrs. Powell & Moya, A/ARIBA specified WINCILATE for facings and fascias.

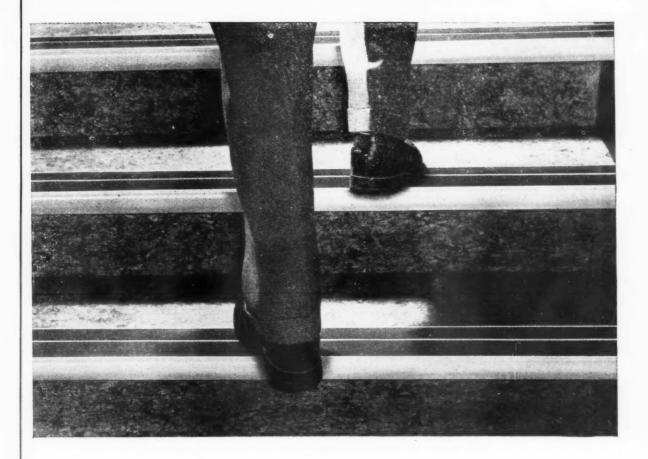
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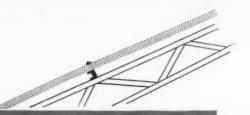


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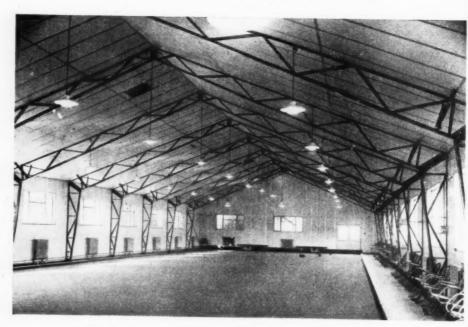


Photo: Bowls Pavilion, Bexhill-on-Sea. Architect: Kenneth G. Higgs. A.R.I.B.A. Bexhill-on-Sea.

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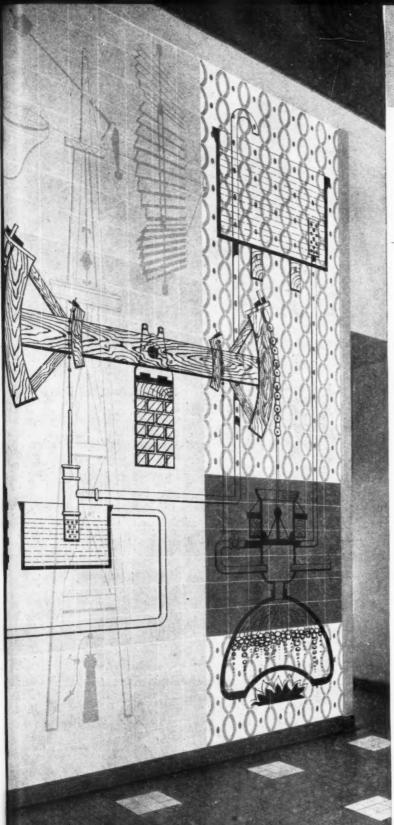
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Designed by Kenneth Barden, A.R.C.A., A.F.S.(Eng.), A.I.B.D.

Floor:  $3'' \times 3'' \times \frac{1}{2}''$  blue and white

vitreous tile: a proportion with non-slip aggregate.

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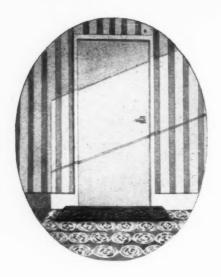
ARCHITECTS: SCHERRER & HICKS, F/F.R.I.B.A.

CONTRACTORS: JAMES WHIFFEN & SONS LTD.

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The plastic cisterns are made in a range of four models, the 'streamlined' model in three patterns — front and side action low level, and high level. These are in 2, 24 and 3 gallon capacities to BSS1125, to meet all water regulations. The well-bottom pattern, 2 gallon capacity only, is designed primarily as a replacement for existing installations.







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HOUSE AT WELWYN GARDEN CITY

In this fireplace wall, built in brickwork, the flue is shown expressed. Note also the brick risers to the steps on the right.

Architects:

Architects' Co-Partnership.

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(Photos: "Architects' Journal")

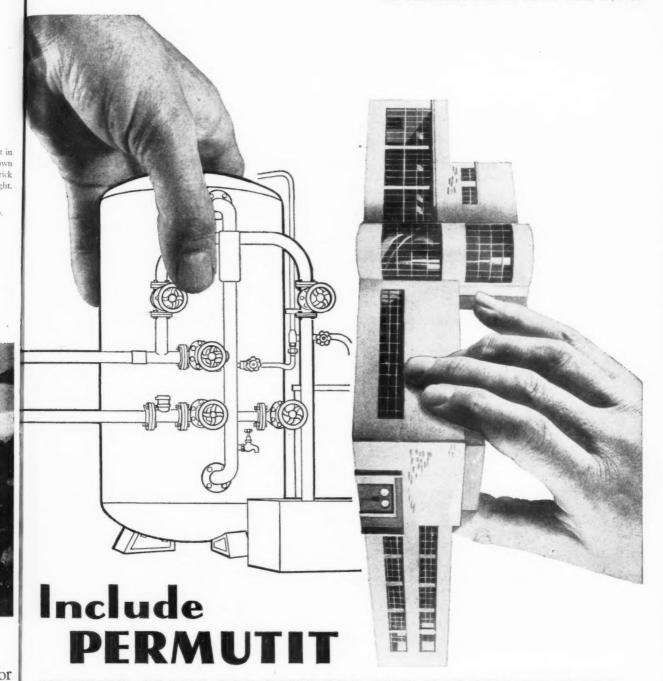




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Issued by The National Federation of Clay Industries, Drayton House, W.C.1



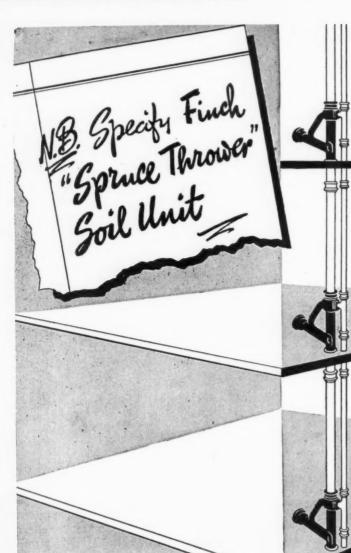
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# ACME clay roofing tiles

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Thurne Mill, Thurne Staithe, Norfolk Broads

# Talking of Snowcem



... there seems to be no end to the different types of structure on which it can be used. Thurne Mill, a prominent landmark on the Norfolk Broads, is perhaps one of the more unusual ones. The mill was built in 1820 for land draining purposes and worked for nearly 120 years. It was allowed to become derelict but the owner, Mr. R. D. Morse, is now restoring this picturesque building and has painted it with Snowcem inside and out. He says: "Snowcem has given excellent results."

SNOWCEM is easily applied to concrete, cement rendering or suitable brickwork by brush or spray. Available in seven colours. White, Cream, Mid Cream, Buff, Pink, Silver Grey and Pale Green.

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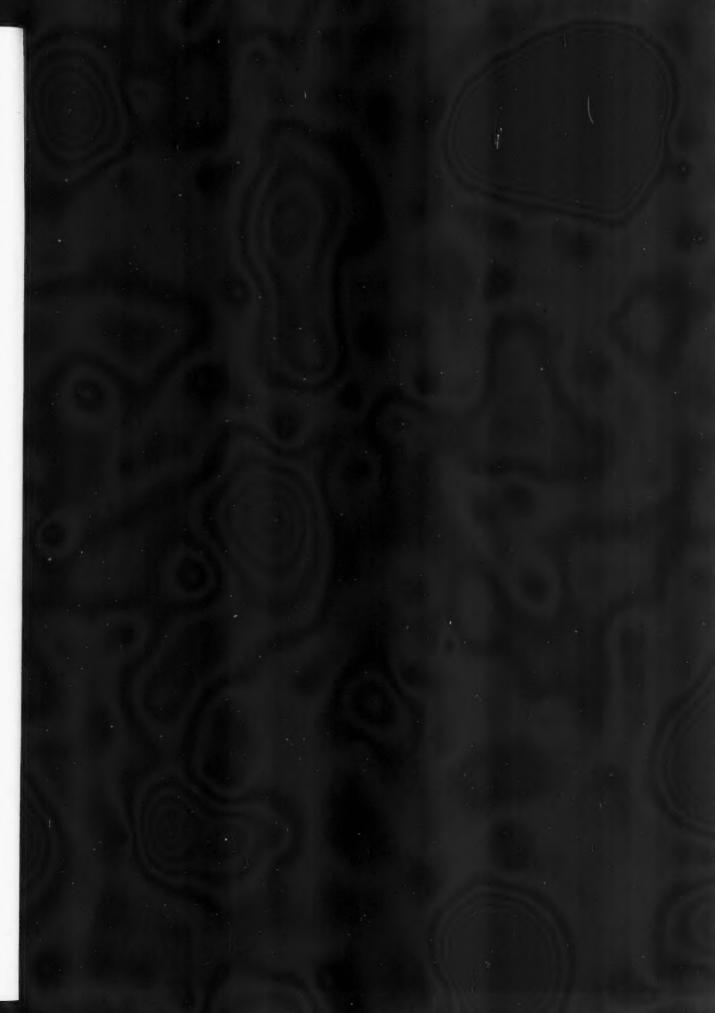
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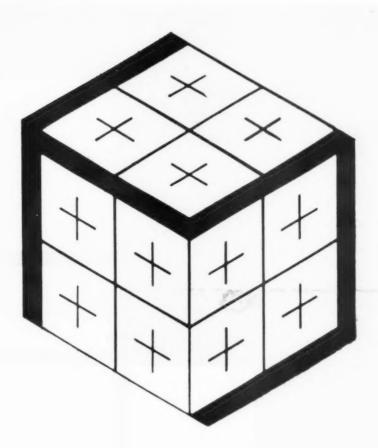
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Dry construction needs

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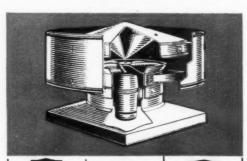
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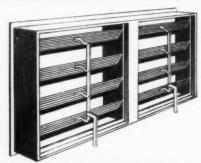
A full range of mountings is available for flat, ridge or sloping roofs. Special sizes can be made to order.



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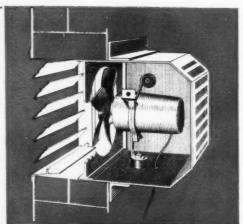
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Greenwood-Airvac

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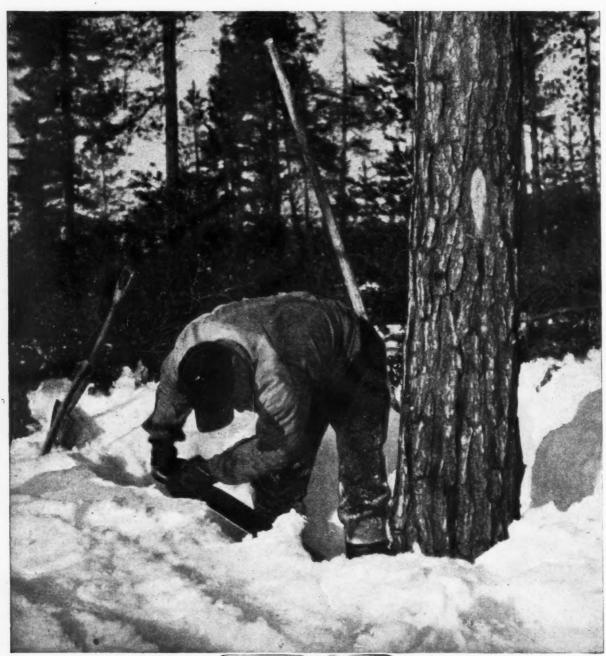
Hard winters make press headlines—but they simply make no impression on the frostproof Fordham. Now fitted as standard with the Fordham All Polythene Syphon and the Fordham All Polythene Ball Float-which are virtually indestructable, will not corrode even in acid, and cannot jamb even in extremes of heat and cold.

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The unique Metsec construction helps you to build faster, save steel, yet pay less.

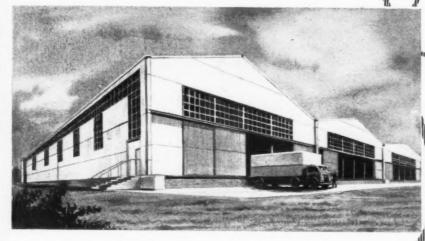
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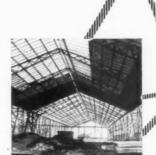
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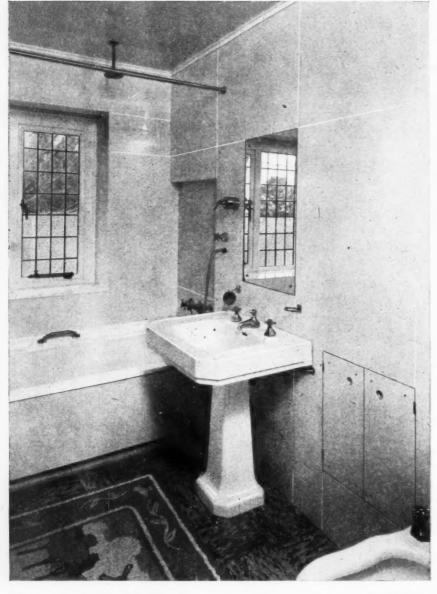
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# GLASS in Domestic Bathrooms



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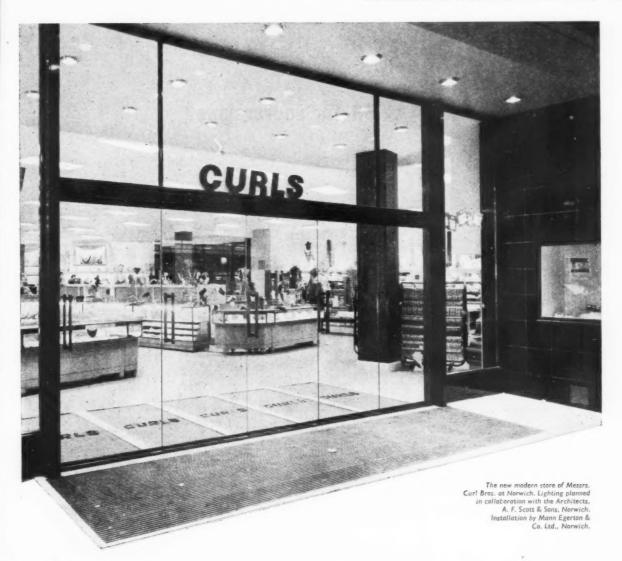
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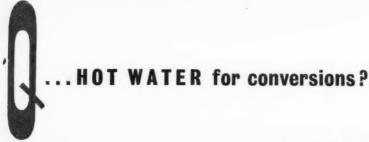
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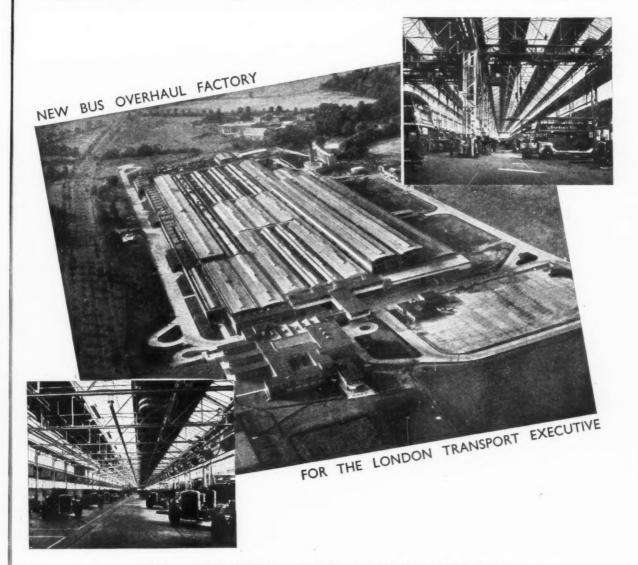
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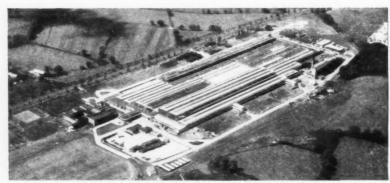
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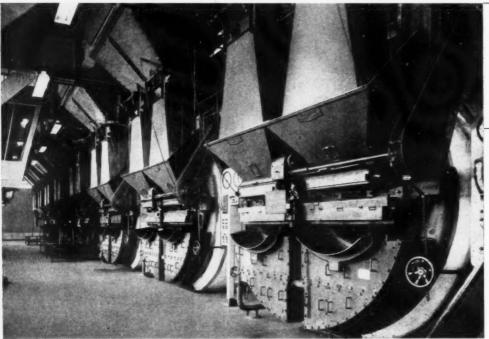
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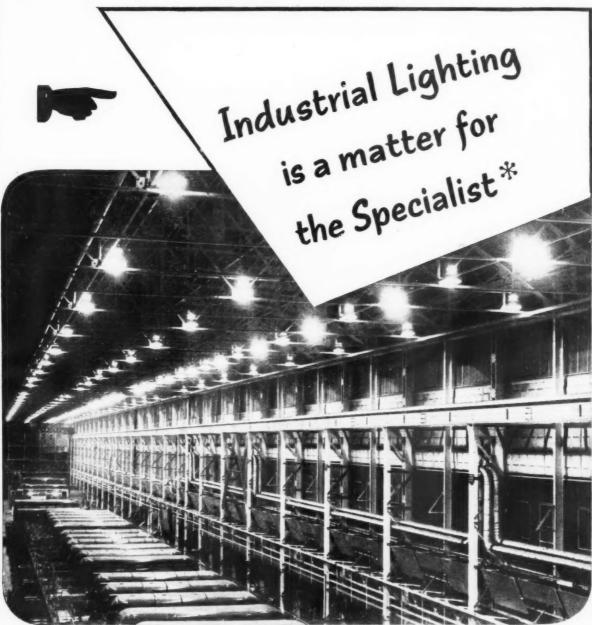
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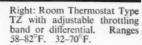


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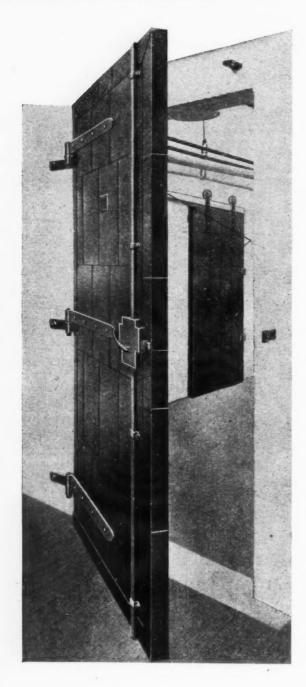
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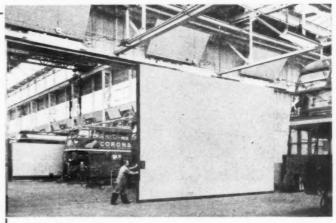
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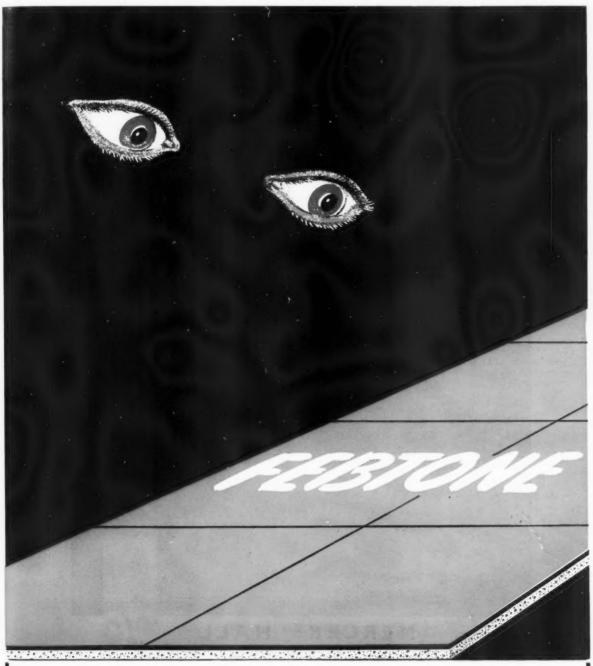
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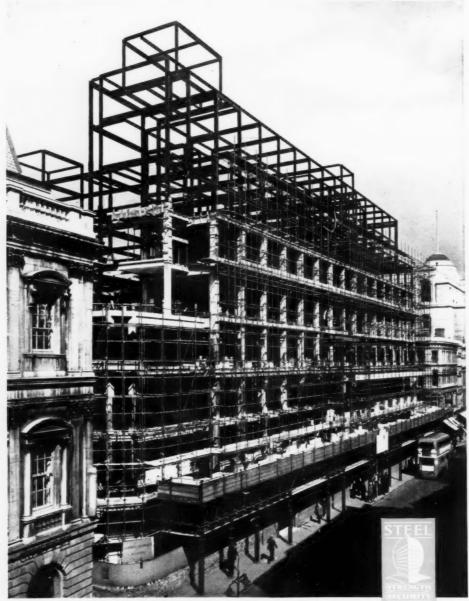
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#### JOSEPH EMBERTON

Joseph Emberton collapsed and died after addressing members of the Architecture Club after a dinner on Tuesday, November 20. In the obituary below Professor Basil Ward pays tribute to Joseph Emberton and acknowledges the position he holds in the development of modern architecture in England.

Joseph Emberton was indeed a pioneer in the modern movement in England, though his work was of a formalist rather than of a constructivist nature. should be said because modern architecture is significant, and develops as a style, in strict proportion to the regard paid in practice to modern materials, modern techniques and modern engineering concepts of structure. Clearly, the dividing line between formalism and constructivism is difficult to draw because we are dealing with something that is more of an art than a science. However, the confirmed formalist shows himself as being less concerned with structure than he is with abstract form in his building design. Structure to the formalist is a necessary consideration but it is secondary to his feeling of need to manipulate and arrange form. The Renaissance is a historical example of formalism, particularly in the Baroque period. Nevertheless, close and passionate preoccupation with the then highest forms of structure, the arch, the vault and the dome, is evident in all the significant examples of the style. Furthermore, the Renaissance architect worked within the disciplines imposed upon him by a generalized style which was an element in a strongly marked social culture. Lethaby showed great prescience when he said that the noblest thing that came out of the Renaissance was engineering. In the nineteenth and twentieth century which followed. formalism is a quite different story. Art and science divided. In architecture there was a bias towards romantic eclecticism and a preoccupation with the academic and historical. Individual taste based on "freedom" and knowledge was a thing to be sought after. The disciplines of the Renaissance were gone and the formalist became self-conscious.

Something of this modern formalism is evident in Emberton's work. It is not unlike that of the nineteenth and early twentieth century German work charac-





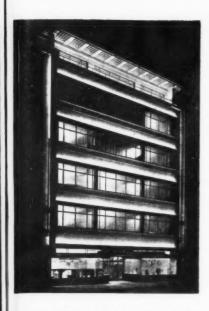




Joseph Emberton strongly advocated high densities and high building. Top, are his twelve-storey flats in Old Street, Finsbury, for the Finsbury Borough Council, where he designed to a density of 200 persons to the acre. These, built in 1953, were probably the best known of his post-war work. His first major building, following the dissolving of his partnership with P. J. Westwood, was the Royal Yacht Club pavilion at Burnham, above left, designed in 1931, a steel-frame building with rendered brick walls, despite the suggestion of monolithic concrete implied by the fenestration of the end elevation. Other major works in the 'thirties were a garage at Olympia, left, the exuberant Casino at Blackpool, above right, and the two shops, which have hardly yet been excelled, for Messrs. Simpson, in Piccadilly, top, opposite page, and for the Gramophone Company, bottom, opposite page, in Oxford Street

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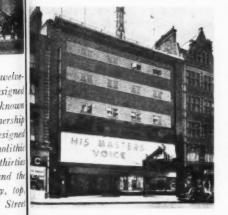
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terised by the architecture of men like Erich Mendelssohn. But the important and valuable thing about Emberton was his strong sense of the architectonic. This did not allow him to water down his work with the sort of compromise that one sees in the work of some of his contemporaries when attempting to use modern forms. Because of this, Emberton has made a niche in the history of architecture in this country. The Royal Yacht Club Pavilion at Burnham, completed in the early 1930's, is a remarkable building. It shows Emberton's understanding of the need to be functional and his appreciation of the aesthetic value of space in its relation to form. At Olympia can be seen a strong trace of Messrs. Simpsons remantic formalism. in Piccadilly and the H.M.V. Co.'s building in Oxford Street are surely two of the finest buildings in London.

Emberton was not well known to his contemporaries in the movement. He was something of a lone wolf, but this is understandable for he was a sensitive man with a passionate belief in architecture; and culturally, the general public, during the main period of his career, cannot be said to have been sympathetic to new forms of art and was perhaps as philistine as any since the eighteenth century.

BASIL WARD, Professor of Architecture, Royal College of Art.



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

#### The Editors

#### THE CASE FOR GAS

O the British architect the issue "what fuel to choose?" is inextricably and—it seems to him—wilfully confused. One fact which has emerged, however, is that for the calculable future the correct pattern is certainly a composite Each of our four main fuel types has an indispensable part to play and none is likely wholly to oust any of the other three. At the back of this issue we print the first of a series of supplements on domestic heating which has been prepared by the Gas Council. Our share in this supplement is fully explained in the editorial which immediately precedes it. What concerns us here is to set down in general terms what we believe to be the inescapable facts about gas and coke which all architects must bear in mind when choosing fuel for domestic use. The first point is that though there may at first sight be a certain conflict between the national and the consumer's interests, it is never in the consumer's best interest to leave the national interest wholly out of account, for if you do so you make him a vulnerable target for the next national fuel crisis.

From the nation's point of view the case for the greater use of gas for domestic purposes is based on three main considerations. First, that despite the development of atomic energy and the increasing importation of fuel oil, the nation's fuel economy will continue to depend chiefly on the use we make of coal; and that the gas/coke method gives approximately twice the heating service for a given ton of coal at the pit head than that supplied by the generation of electricity or by the burning of bituminous coal. Second, that the gas/coke reduction of coal produces by-products in the form of chemicals, drugs, dyestuffs, fertilisers, etc., which are essential to our way of life and some of which cannot be produced by any other method. Third, that despite the development of downdraught fires for burning bituminous coal smokelessly, smoke abatement depends in practice on a vastly increased supply of coke; but this cannot be got unless there is a proportional increase in the

Unfortunately only the first of these considerations concerns directly the occupier of a building who has to choose his fuel, and the truth of it is at least partly concealed from him by anomalies in the price structure. It is here that the lack of a national fuel policy makes the architect's task so much more difficult.

In the light of the foregoing facts the gas/coke combination (gas for intermittent-, coke for continuous-heating) ought to be half as expensive as electricity or coal. But in practice it is not; and indeed the recent sharp rise in the price of coke has further reduced the margin. Again, every motive of national expediency suggests that our electrical resources are better used for industrial power than for domestic heating: yet in practice domestic heating is charged at a *lower* tariff rate to make electricity competitive in this field and industry is made to pay the difference. If fuel prices were to reflect the true economy of the situation they would be less subject to these sudden changes which make such nonsense of our calculations.

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CINDERELLA STYLE

American real-estate developers have been pushing good modern house design over the last few years, and we have expressed our high opinion of such progress in these columns. It now appears, however, from an advertisement in the *House and Home* publication, "57 Houses for '57," that the

latest sales gimmick is the conversion of modern houses to what is called "Cinderella style." To quote: "When Big Builders Jerry Snyder and Max Levine (1,530 houses 1955) found almost no takers for a new Orange County, Calif. subdivision of handsomely modern homes, they redesigned most of them into Cinderella style."

The kind of features which achieve this transformation are smaller windows, conventional rather than one-way pitch roofs, barge boarding, false gables, etc. The results, as you see on these pages, are quite hideous, so no doubt they will sell. Let us hope they will not give a lead to builders in this country when and if the housing programme gets near saturation point.

ESCAPE FROM W.C.1. 1956

Congratulations to the editorial board of the AA Journal for having broken spectacularly with their parishmagazine tradition in the November issue, most of which is devoted—as some of you will know by now—to a reappraisal of the work of the Connell, Ward and Lucas office in the 'thirties. It is the drastic nature of the break that compels admiration, the complete making over of the bulk of the editorial pages to one single historical study. It

was also a study that needed doing, because Connell, Ward and Lucas have had a raw deal in books on the 'thirties, and have rarely been studied as they deserved.

But—and this is a big but—one begs leave to doubt if this extended study, the work of many hands, is the study they deserved. The dates of buildings vary from page to page, and of the dozen-and-a-half buildings illustrated, only four are accompanied by the plans—though the accompanying texts seem to set great store by the planning.

One author criticizes the Picturesque, but in ASTRAGAL'S opinion the planning of "High and Over" and "New Farm" are in the Picturesque tradition, corridors and all. The planning of the ground floor of "High and Over" is almost Lutyensian, while the way you come up to its centrally-placed entrance at the crutch of the Vee formed by the arms of the building is pure Edward Prior. In fact, "High and Over" is the one thing that the author of this article is out to prove that it isn't, the lost link between our Nineteenth Century tradition and the Modern Movement.

NO PLACE LIKE ROME

Because ASTRAGAL knows several architects who have laboured with Colonel Ward-Perkins in the excavations at Leptis Major, he lent a dutiful ear to the Third Programme defence of Roman architecture and its achievements by this great man. As head of the British School in Rome he has, so to speak, a vested interest in getting Roman architecture a good name, and many of his listeners must have resolved to start thinking of the Romans as something more than engineers with a genius for cribbing from the Greeks, and to give them credit for having invented interior spaces.





In America, this has become . . . . . . . . . . . . . . . . . this. In his first note ASTRAGAL explains why, and also why . .

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Certainly ASTRAGAL made this resolve, until he ran into his Scholarly Spy, who thought the whole business was terribly parochial. "It's only in England," said SS, "that a Romanist has to defend himself against Hellenists. On the Continent Roman architects have been given full credit for their inventions since before the turn of the century. There wasn't much in either talk that isn't to be found in the works of Auguste Choisy, who wasn't even mentioned, and yet it is notorious that Choisy's *Histoire* is the most-read book at the British School."

It's only fair to add that, like all art historians, my SS has a permanent chip on his shoulder about the lack of a Rome scholarship in Art History. For all that, Choisy will come to bed with me next time influenza strikes.

#### **BUOYANT PAINTERS**

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Readers who completed second-year French at school will remember Yvetot as the home town of a nursery-rhyme King who did not take the burdens of majesty very seriously. To judge from the picture above, his spirit of genial fantasy still prevails, since it shows a French Army balloon which was borrowed by the builders of the new church there to use instead of a scaffold for painting the ceiling. Notes and queries: Why doesn't it turn upside down when the man gets on top; how do you paint in the corners; what happens when the buoyancy changes as the air temperature changes?

#### PARDON MY PLEASURE

ASTRAGAL was visited the other day by Miss Doris Carlton, National Park Service, Washington 25, D.C. She has been over here on a working holiday to find out something about our National Parks and their administration.

Two things in particular have sur-



Do it yourself. All you need to paint a high ceiling. See "Buoyant Painters."

prised her: first, that hardly anyone here seems to have heard about, or to have taken any interest in, the special issue of the Architectural Review for July, 1950, on the Thames and its proposals to make the upper river a National Park; that issue, she says, is regarded as a kind of bible in her department. Secondly, that even many people who actually live inside a National Park here are unaware of the existence of these parks. Politely they tell her that what she means by the term National Park is National Trust. All the same, Miss Carlton thinks we are lucky in our planning legislation which does give far more power to create National Parks in the right way than is yet possible in the States.

She is still surprised by her good luck in securing her job. It is wonderful, she thinks, to work just for people's pleasure. One of the things that did not surprise her here was the indigenous puritanism which is as endemic in the USA as in the UK. It affects the creation of National Parks. She finds that here, as in her own country, no one openly claims to want such parks merely for leisurely enjoyment; some excuse for work must always be made; a park must first have an "economic" purpose, or an "educational" purpose, or at least some sort of "moral" reason for its existence. In the States, one gathers, everything moral is finally reduced to dollars. For example, when a great artificial lake is built to produce power, it is rightly used also for recreation. But in preparing the plans the authorities bring everything down to cash—even to the costing of pleasure, e.g. how much would holiday makers spend at a new lakeside hotel. That a family might spend almost nothing by setting up a tent on the shore, and in so doing obtain far more pleasure than in a costly hotel, is one of those imponderables which are conveniently





#### NOTHING ON NELLY

Whatever the art-snobs may think of it, this year's winter show of "British Portraits" at the RA is a guaranteed popular success, containing as it does a fine footless Sutherland, the Annigoni "Royal Pose for Fishmongers" (as a rude fortnightly called it) and-the ultimate show-stealer, Gwynn's Picture naked with a Cupid" by Sir Peter Lely, which should be the biggest thing since Forever Amber. Quite frankly, it needed something like this to keep OLD ASTRAGAL from losing heart; five hundred years of the English face looking vague, horsey, unscrupulous, batty, mean, pie-eyed, or droop-jowled is a bit much on a cold November morning.

A thought though, and a talking point. On the evidence of this exhibition the English face lends itself far better to sculpture than to painting—or is it that the sculptors were nearly all foreigners?

#### COURAGE, RACE AND DAY

There are so many magazines nowadays using the word Design in their titles that one more won't appreciably add to the chaos. New to ASTRAGAL, though it has reached issue No. 36, is Design Quarterly, which comes from the Walker Art Center, Minneapolis. This issue, devoted to "Eight British Designers," has a barely coincidental connection with America's "Designs from Britain" exhibition. It is a curious experience to see so many old favourites-Race and Day furniture, Courage bottles, bits of the BIF, CoID's "directionless" arrow-represented in a smooth typography and format.

In his introductory article, William de Majo is perhaps a bit too pleased about the SIA, but he makes some good points about the difference between US and British attitudes to design under the indicative heading of "Design for Prosperity versus Design for Posterity." That is a good phrase. I suggest we note it, applaud it, and then bury it, before it is rendered meaningless by constant repetition on both sides of the Atlantic.

#### KEEPING UP WITH THE JONES'S?

Last week ASTRAGAL gave muchmerited praise to Eric Brown's recognition-earning school of architecture at Kingston. Now he must take up the cudgels on behalf of the Birmingham School. The JOURNAL editors rightly, if rather sweepingly, condemned in a recent leading article "the way in which teaching, research and practice are kept separate and apart." They had forgotten, of course, that brilliant and enlightened little school in Birmingham directed by Douglas Jones which, in addition to providing the full five-year course in architecture, gives its students practical experience (by letting them undertake the designing and supervising of buildings as part of their syllabus), and also carries on its staff a research Fellow-currently engaged on modular-co-ordination.

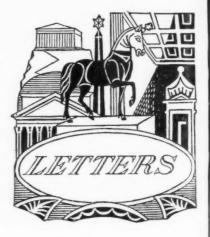
Here is one school which is achieving very largely what the JOURNAL had in mind, and it is significant that the school has considerable support for its endeavours from the local architectural society. This is hardly surprising, as ASTRAGAL knows of at least one very important London office which rates the Birmingham graduates on its staff as second to none. Of course this single Birmingham swallow makes no research summer. But it represents, surely, the beginning of a trend which eventually will abolish the hazardous system of articled pupillage and the rift between teaching and research.

#### WHIMSICAL BARRE

Monsieur P. R. Barré, a French business man from Dublin, has come to London with a strange idea. It is also a topical idea, for it has to do with canals. Or rather it has to do without You don't need water in canals, says Monsieur Barré. All you have to do is to bring the canal bottom up to the top, so to speak, and turn it into a track. You can then float large ships along the track by using plenty of air. The air must be nicely wrapped up in a set of giant cylindrical bolsters, made of closely-woven wire mesh gummed up with some sort of rubberized stuff. If you pull the ship over these rollers with a pair of tractors you will find that every so often a spare roller comes away from the back (or stern). You then nip along to the sharp end (or get the boy to do it) and carry on as before.

If this sounds crazy, don't forget that long before Marconi was born the earth was pretty well flat.

ASTRAGAL



16 Norfolk Architects and Students

A. Godfrey Imhof

David Stern, A.R.I.B.A.

C. D. Morgan, of the British

J. Campbell Hutchison, Charles Toner and H. Connell, A. A. A.R.I.B.A.

Peter D. Cowan, A.R.I.B.A.

B. Godding and Howard Goodman, Students R.I.B.A.

# Norfolk's First Bronze Medal: "Opinion Is Not Unanimous"

The jury which awarded the first RIBA bronze medal in Norfolk looked at—and rejected—Taylor and Green's rural housing schemes for Loddon RDC. In last week's issue ASTRAGAL deplored the fact that although these schemes are internationally-known and commended, their architects must do without honours in their own county.—ED.

SIR,—We, the undersigned members of the Norfolk Association of Architects, wish to express our wholehearted agreement with the views expressed by ASTRAGAL in your issue of November 22 regarding the award of the first architecture bronze medal for this area, and assure you that opinion in Norwich is far from unanimous on the award.

In particular, we would support your suggestion that the jury should consist of architects from outside the area concerned.

MICHAEL GOOCH (A), CYRIL HEATHCOTE (A), JOHN HARRISON (A), H. J. BARBER (A), JAMES F. VANSTON (A), KENNETH E. GRAHAM (A), GRAHAM A. KEITH (A), R. P. THOMPSON (A), A. C. MILLER-FORWARD (A), BRIAN ANNABLE (A), R. W. FOYSTER, E. J. CORNISH, Student, R.I.B.A., JOHN H. POGSON (A), D. BARDSLEY, SHEILA M. GOOCH (A.)

# Who Chose Loddon Architect?

SIR,—I was most interested to see your continuing fight for better architecture in Britain, particularly in connection with the Loddon school and housing.

It seems to me as a non-professional en-

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thusiast for good architecture that one must start with the right choice of an architect for the job.

May one, therefore, enquire how the architect was selected by the Norfolk County Council for the school at Loddon? Did they consult the RIBA or not?

A. GODFREY IMHOF.

London.

#### Quicker, Lighter, Better Baths

SIR,—The recent discussion on sanitary fittings at the Building Centre prompts me to ask how much longer we will have to plerate the cast-iron bath. Although much merate the cast-from Jann. Although much improved in design since the war, the method of production has changed little for a century: the glaze is still applied by hand to the white-hot iron and the standard of finish appears to be less consistent than most items of building equipment; dimp-ling, distortion and damage being rather the rule than the exception.

Manœuvring the four-man load has never been an easy job in an incomplete building, and since the bath has to be fitted before finishes are applied it is very vulnerable to

We now have car-bodies, dinghy hulls, and chairs made of moulded plastic-reinforced glass fibre sheeting; is it technically impossible to manufacture a bath of the same material, light to handle, quick to produce, and more certain in finish and cheaper than the "cast-iron colossi" of today?

DAVID STERN.

London.

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#### Urban Motorways

SIR,—I have read with very great interest your article on the Urban Motorways Conference held by my Federation recently, contained in your issue for November I. I would like to stay that I am in entire agreement with the views expressed.

I feel sure that you will be interested to know that at the conclusion of the Con-ference the following resolutions were arried unanimously:

(i) Resolved that this Conference is of the opinion that: The economic needs and traffic problems of large cities demand the construction of urban motorways.

(ii) Resolved by the United Kingdom delegates to this Conference that the British Road Federation, as spokesman for this Conference, do call upon H.M. Govern-

(l) to acknowledge and accept the opinion expressed in the first resolution passed by this Conference;

(2) immediately to take steps to carry those motorways which have already been planned and authorized into cities they are designed

(3) to take steps to collect sufficient data to provide a general foundation upon which to plan and build further urban motorways in the shortest possible time and in particular to obtain advice and reports upon:

(a) the traffic needs and deficiencies of Britain's greater urban communities;

(b) methods to be employed to obtain the finance required;

(c) the legal problems involved;

(d) the economic benefits to be derived from the existence of such further urban motorways; and

(e) such administrative machinery as their existence will require.

C. D. MORGAN.

#### The RIBA's Increased Subscription: "It Should Be Graduated" . . .

SIR.—With the increase of members' subscriptions taking effect from January 1, 1957, we feel that now more than ever these subscriptions should be graduated in accordance with the services rendered by the Lectivity in particular, granging by the Institute in particular geographical

areas. We note that members in "Transoceanic Dominions " pay a reduced subscription because, presumably, they cannot avail themselves to the same extent of the services of the Institute. We see no material difference in the position of fellows and associates in Scotland, or, for that matter, those areas of England outside the Home Counties, where membership of the Institute satisfies nothing more than the need for a practising professional qualification.

professional qualification.

In our opinion, too, a qualification which has been attained at expense and a certain amount of toil should not be dependent upon the annual payment of an inflated subscription. It would be interesting to know how many of the younger school of architects in the provinces would afford the luxury of membership of the RIBA if such did not constitute evidence of their quali-

luxury of membership of the RIBA if such did not constitute evidence of their qualification. We feel sure that many look forward to the time when registration (at a fee of £1) will, by itself, suffice.

Surely, even now it is not beyond the powers of the Institute to introduce differential scales of subscriptions, so that members may pay according to the services provided for them. To us in Scotland a Kalendar and 12 copies of the RIBA Journal do not add up to six guineas.

J. CAMPBELL HUTCHISON CHARLES TONER

CHARLES TONER H. CONNELL.

#### . . . "A Bitter Pill"

SIR,—I have lately received a communica-tion from the RIBA which informs me that I shall be paying six guineas for my associate's subscription, instead of four as hither-

The pill is a bitter one indeed, and it seems that even learned and professional bodies are not above taking advantage of the inflationary tendencies; which are, of course, entirely due to the legacy of the National Health Services Health Service.

Health Service.

While maintaining a stiff upper lip and a straight bat—for, after all, only cads whine when the head pre. says it's for the good of the house—I do feel that this sort of thing is what has brought the Empire to the brink of whatsoever it's on the brink of.

PETER D. COWAN.

Middlesex

#### . . . "An Added Burden"

SIR,-Many members and students of the RIBA must feel, as we do, that the in-creased fees are an added burden in the present day struggle against the rising cost of living.

of living.

Quite a considerable proportion of the money received in fees by the RIBA goes into the production of the Kalendar—10s., 6d., and the Journal—30s. per year. It is surely not necessary for every member and student to possess a Kalendar and, let's face it, the circulation figures of the RIBA Journal, if it were placed on the competitive market, would be very small indeed.

RIBA Journal, it it were placed on the competitive market, would be very small indeed. We suggest that the compulsory subscription to these productions is an imposition and that they should be supplied to order only, thereby effecting a considerable reduction of the RIBA fees.

B. GODDING HOWARD GOODMAN.

Middlesex.



#### OXFORD

### Matthew, Martin and Holford Withdraw from Jury

Last week we announced that an architectural competition might be held to secure a design for the layout of the Keble Road triangle, in Oxford, which is to be developed as a new science area for the university. We pointed out that a resolution to this effect, which had been submitted by 68 members of Congregation, would be debated on December 4. And we added that the resolution asked that Professor Sir William Holford, Professor J. L. Martin and Professor R. H. Matthew should be asked to join a jury to advise the university on the conduct of the competition, and in assessing the plans submitted

conduct of the competition, and in assessing the plans submitted.

We have since received the following letter from Professor Basil Ward:

SIR.—Regarding the note under "News" in the JOURNAL of November 22, I have to point out that I am appointed by the University to advise on the planning of the Keble Road triangle in Oxford; furthermore, I am appointed architect for the first building, which is designed to be an integral part of the whole layout.

I have letters from Sir William Holford, Professor J. L. Martin and Professor Robert Matthew informing me that they had been approached by the sponsors of the resolution you refer to, but that now they know I am involved they have withdrawn from the matter.

from the matter.

Yours faithfully,
BASIL WARD.

IUA

#### The Fifth Congress

Moscow will be the headquarters of the September 1, 1957. The fee will be 64 roubles (about £5 17s. 6d.) for architects in member countries of the IUA; 74 roubles for architects from non-member countries and observers; 42 roubles for the members of families of those attending the congress, and 22 roubles for students.

During the congress, whose theme is "Construction and Reconstruction of Towns, 1945-1957," there will be four exhibitions in Moscow: the travelling IUA exhibition, a special exhibition on the theme of the congress, an exhibition of the entries for the students' competition organized by the IUA, and a Russian exhibition of architecture and town planning.

The cost of living in Moscow during the congress will be between about £3 12s. 6d. and £6 per day. The organizing committee will be issuing information about hotels and hostels quite soon.

London.

Your th the

#### COMPETITION

# Write on the Wall and Win

Professor Sir Patrick Abercrombie and Sir George Pepler will help to judge a £400 competition for illuminated sign design organized by the Electrical Sign Manufacorganized by the Electrical sign Manufac-turers' Association. The lettering is to be placed on sketches of the two buildings re-produced below. The top one is a garage and motor showroom: its lettering will be judged by Arthur B. Hall, president of the motor trade association, in addition to the five other judges—Lord Luke, president of the Advertising Association; F. F. Newlands and K. J. Oldham, chairman and vice-chairman respectively of the Electrical Sign Manufacturers' Association, and the two judges already mentioned.

Mr. Hall will not take part in the judging of the signs on the store for music, radio and television. His place will be taken by F. C. Woodward, president of the Radio and Television Retailers' Association.

Anyone who wants full details of the com-

Anyone who wants full details of the competition—and anyone can go in for it—should write to the Electrical Sign Manufacturers' Association, 23, Bedford Row, W.C.1. The closing date is January 31,



#### RIBA

#### The President's Tour

The president's tour programme has been approved by the Council. Kenneth Cross, who will be accompanied by the RIBA's secretary, C. D. Spragg, is to visit Malaya, Australia, New Zealand, America and Canada. The visits will be made in April

# Architects' Sign Boards

Architects' sign boards can now be made locally. If you do not want to have your complete board supplied by the Lettering Centre you can obtain from the RIBA a printed full-size drawing of the board and an alphabet in the approved style of lettering. an alphabet in the approved style of letter-ing. Alternatively, you can get a board completed, but without the name of the architect, and a drawing of the alphabet. More details will be published later.

#### New Allied Society

•The Institute of Northern Rhodesian Architects will become an allied society from January 1, 1957.

A RIBA bronze medal has been awarded to Lavender, Twentyman and Percy for the research laboratory they designed for Guest, Keen & Nettlefolds Ltd. The award was made by a jury appointed by the Bir-mingham and Five Counties Architectural Association

# Festival of Women

The Festival of Women, which is to be held at Wembley in May, will have an exhibit planned with the help of the RIBA. A prefabricated house will be built "to bring out the theme that in the housing industry increased productivity could come only from prefabrication." The RIBA will also prepare a book explaining the work of an architect and his rôle as the designer and co-ordinator of prefabricated materials and components.

#### Future Exhibitions

French and Finnish exhibitions will be seen at the RIBA's headquarters in February and April respectively.

## Competition for Publications?

The RIBA Council has approved a proposal by the Science Committee that the Building Centre should be approached with a view to collaborating in the organization of a competition for trade and other technical publications. The competition would be in three classes: (i) Literature consisting mainly of technical information produced by associations of manufacturers or inde-pendent bodies, and intended to give information on design, methods of application, standards of workmanship, etc., of a class or group of products. (ii) Literature offering technical information on the product of a single manufacturer. (iii) Literature primarily of an advertising nature designed to bring a producer's name and product to the notice of the architect. The prizes would he certificates.

### Appointments

The following appointments have been made:

European Productivity Agency: Conference on Building Management: Rotterdam:
RIBA Representative: Howard V. Lobb.
Joint Committee on Materials and their
Testing: RIBA Representative: Frank
Heaven, in place of Professor W. N.

RIBA Architecture Bronze Medal: The South Eastern Society of Architects: RIBA Representative on Jury to consider Award: E. Steward Smith, President, Berks, Bucks

E. Sieward Smith, President, Berks, Bucks and Oxon Architectural Association.

Code of Practice for Structural Use of Timber in Buildings: F. L. Felgate.

Code of Practice for Brickwork: D. J. Green and R. N. Wakelin.

BSI Committee CEB/12: Water for making Concrete: Frank Heaven.

M/53: Kitchen Tables and Stools for M/53: Kitchen Tables and Stools for School Catering: Mrs. G. M. Whitley, in place of G. Newell (resigned).

#### QUANTITY SURVEYORS Annual Dinner

Last week, at the Chartered Quantity Surveyors' dinner, Col. Ackland—a member of the QS Committee—proposed "the Guests" and then rolled them in the aisles with a and then folied them in the asses with a stream of (mainly technical) jokes—for which, apparently, he is famous. Patrick Buchan-Hepburn, Minister of Works, then replied for the guests. At last year's dinner, Duncan Sandys challenged the quantity surveyors to investigate the difference between house and flat costs, and later they a research committee. This time the Minister also picked a hot subject. He said he had been initiated into "the tribal mysteries of quantity surveying," had seen a bill of quantities and even knew what an elemental bill was. "But," he went on, as the mur-murs died down, "this is an animal I must stroke gently if I'm not to get bitten." The surveyors could look smug this time for they have an elemental bills panel already in being.

RU

Later, the Minister spoke of his interest in what the RICS are doing with the RIBA on early-in-the-career joint training (surveyors early-in-the-career joint training (surveyors caught out?). Then he returned to the question of whether "the present style of bills can be improved," suggesting that research on these problems was of the greatest importance before we can say that millions of pounds are not being wasted in the "chain" of building.

Even Kay Cavendish, brought in to entertain, asked "what are vital statistics in quantity surveying?"

quantity surveying?

#### TIMBER HOUSES

### Experiment at Farnham Royal

An experimental terrace of five timberframe houses is to be put up at Farnham Royal. This is to be done under Cleeve Barr, the senior architect in charge of the LCC's research and development department. When Mr. Barr was in Canada last year he found that by comparison with conventional methods of all-brick construction, timber framing offers important economic advantages of fast erection and better insulation.

#### LETCHWORTH

#### To House Londoners

Some of London's overspill population may Some of London's overspill population may be rehoused at Letchworth Garden City. The LCC and the MOHLG have offered financial help to the Letchworth UDC for the development of a £3 m, estate.

It is expected that Letchworth Council will

approve this scheme for 1,500 dwellings. Tenants would be nominated on the Industrial Selection Scheme, which means that jobs and houses will go together. The LCC says it would try to transfer industry to the Letchworth area

#### BBC

#### Architect on Brains Trust

Basil Spence will be one of the members of the television panel, on Sunday afternoon, in the BBC Brains Trust.

#### AA LECTURE

#### Hopscotch on the Pond

Holger Blom, the architect who designs Stockholm's parks, recently gave an informal lecture at the AA. He used slides to show how he designs parks for four purposes: first, to separate neighbourhoods and to act as noise barriers; second, for walks, recreation and playgrounds; third, for assembly—open-air theatres, festivals and so forth—and fourth, as settings for old buildings. His slides included the now familiar play sculptures of Moller Nielsen; fascinating children's sand pits, shaped as snails and boats; small amphitheatres served by a motor-drawn travelling stage; paddling pools (used for roller skating and hopscotch in Holger Blom, the architect who designs (used for roller skating and hopscotch in winter), and dozens of views of excellent landscaping. He will be giving a further talk on his work next spring at the RIBA.

The Chartered Surveyor in Local Government. Talk by H. E. G. Stripp. At the RICS, 12, Great George Street, S.W.I. DECEMBER 3 5.45 p.m. The Use of Pre-cast Concrete. Talk by J. C. Maxwell-Cook. At the ISE, 11. Upper Belgrave Street, S.W.1. 6.30 p.m.

DECEMBER 10



Comprehensive School at Tulse Hill, London, S.W.2

The comprehensive school for 2,210 boys in Upper Tulse Hill, Lambeth, S.W.2, was designed by the former architect to the LCC, Dr. J. L. Martin; F. G. West, deputy architect; the late S. Howard, former schools architect; G. F. Horsfall, assistant schools architect; 7. M. Kidall, architect-in-charge; T. H. Humphreys, senior structural engineer; heating and electrical consultant, J. Rawlinson, chief engineer to LCC; landscaping, L. A. Huddart, chief officer, LCC Parks Department; quantity surveyors, H. H. B. Stewart & Co. Above: the tall classroom block and single-storey administrative block, from the south-east. The school, which opened at the beginning of this term, is the tallest LCC school and is thought to be the tallest school in the country. As the site, which is on high ground, commanding fine views of central London to the north and over Kent and Surrey, is 8.4 acres, or some 3½ acres smaller than the

MOE minimum for schools of this size, the teaching accommodation is planned in a nine-storey block and the maximum of open space is preserved around the building. On the north side of the tall block are four staircase and lift towers (each lift large enough to carry a whole class) and horizontal corridors occur only on the first, fourth and seventh floors. Apart from the teaching block there are separate buildings for the assembly hall (also used for dining), workshops and gymnasia. The estimated cost is £608,275, excluding furniture and equipment, which will cost £54,358. The nett cost per place on tender was £239 (MOE cost per place limit when school was planned, f.240). Actual nett cost on tender, f.527,738. Additional costs on tender, £51,537, total building cost, £569,275, fees and administrative expenses £39,000. General contractors, superstructure, Rush and Tompkins Ltd., foundations, Leslie & Co. Ltd.

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"CAPELLO", TORQUAY, DEVON

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ARC

Edit

Architect: Edward Narracott, F.R.I.B.A.

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# INFORMATION CENTRE

A digest of current information prepared by independent specialists; printed so that readers may cut out items for filing and paste them up in classified order.

#### 7.55 practice ARCHITECTURAL PRACTICE

The Architect in Practice. Arthur J. Willis and W. N. B. George. 2nd ed. (Crosby Lockwood & Son Ltd. 20s.)

This book covers much the same ground and appears to have the same purpose as the standard work by Hamilton Turner. The twenty five chapters follow the sequence of office work from site surveys to "Presenting the Accounts." There are chapters on Approximate estimates, Acts of Parliament, Contracts, the Quantity Surveyor, Consultants, Specifications, Tendering, Work in Progress, Certificates and Variations. There is one chapter on Competitions, two on Law, three on Office Organization and one each on Public Service, Finance, Partnership and Structure of the Building Industry. An appendix gives specimen letters, clerk of works report forms, variation orders, schedules and accounts. There is a bibliography which fails to mention the AJ Guest Editor articles on architectural practice (May 19, June 30, 1955).

The picture of architectural practice that emerges belongs to a passing era. The authors seem more often than not to envisage a young architect in private practice designing a private house in traditional construction in the palmy days when p.c. sums and specialist sub-contractors were a distant minority, and the builder was addressed as Mr." not "Esq." (page 183).

Modern problems are not wholly ignored. Programming and progress charts get three quarters of a page (but foundation stone and opening ceremonies get twice the space). Local authority offices have a whole chapter

(but are portrayed as so rigid with red tape that personal initiative is impossible). Discrepancies between approximate estimates and tenders and high costs are discussed on pages 90 and 99 (but in terms that suggest these problems to be beyond solution). Cost analysis and cost planning are not mentioned. Granted its terms of reference (illuminated by a quotation from Plato's Republic in the preface) the advice given in this book is commonsensed, reliable and humane; but unexceptionable. It provides no guidance for those problems that portray the great change now taking place in architectural practice. For example the programming of site work is now widely recognized to be necessary but this book recommends preparation of the progress schedule "following the first site meeting"! The office progress chart is speedily dismissed: "It is quicker to ask whoever is dealing with the job how it is getting on "! If the reader looks for advice on systems of classifying his own or incoming information, he will not find it. No distinction is made between the very different problems of the large and the small

To be fair, some of these problems are such that they could only be tackled by a full time worker or research team, but no text book should pretend that they hardly exist.

#### 8.52 surveying and specification

#### ESTIMATING

Spons Architects & Builders Price Book. Edited by Davis, Belfield & Everest. (E. & F. N. Spon Ltd. 82nd, edition, 1955-56. 285.)

This latest edition, which includes the wage advance of April this year, continues as before "completely revised and brought up to date". But there is one new section of considerable significance: seven closepacked pages in the "Approximate Estimating " section, called "Comparative Prices" which contain costs per yard super of wallings, finishings, floors, roofs or components thereof. Thus a foamed slag block wall is 17s. 9d., vertical cedar shingles on battens 27s. 0d., coloured plyglass 143s. 3d., 24 w.g. copper roofing 76s. 0d., and so on. The prices are inclusive of sundry labours and relate to the £60,000 "normal" job in the London area, which is the basis for the measured rates in the book.

This new section is a welcome advance in the campaign for better cost control by architect and quantity surveyor. The authors promise that, if popular, the feature will be developed and extended in later editions. One wonders, of course, how these unit prices fit into the framework of cost analysis. If a price per sq. ft. of floor area is multiplied by the floor area, then divided by the actual area of, say, internal partitions, you get an overall unit price for partitions. If preliminaries and contingencies for the job are excluded from this, it presumably corresponds to the new Spons units? Guidance on this point will be welcome in the next edition. Meanwhile, congratulations to the authors and publishers.

#### 17.109 construction : General

#### BUILDING CONSTRUCTION

Building Construction: Elementary Course 1. G. A. Mitchell and A. M. Mitchell. 22nd Edition. (B. T. Batsford Ltd. 18s.)

"For upwards of half a century this work has been recognized as a standard textbook for Architectural Students and young Craftsmen training for entry into the Building Trades, also as a handy general reference for Builders, Architects, Quantity Surveyors, and Civil Engineers." With this prefatorial statement, "Mitchell" leans gently on its

Classic textbooks present a difficult problem for publishers, for they have an uncontrollable momentum; they contain a quantity of illustrations which can only be economical if the sale of repeated, little-altered editions is guaranteed. When things become too outof-date, the publisher is obviously faced with a gamble. In 1950, when "Mitchell" went into its 20th edition, it reappeared with every one of its illustrations redrawn, and yet in a price range which made it a miracle of publishing. Surely the decision to redraw should also have been the occasion for some serious rethinking: the opportunity does not come often. The publishers, however, were unfortunate in their choice of revisers, for the organization of the book was unaltered. and the new illustrations were merely the old ones dressed up in "a more up-to-date style of draughtsmanship."

What purpose does this book serve? The quotation which starts this review is unacceptable, because no book can adequately answer the needs of all these people at the same time. Architectural students and architects require an explanation of basic principles, which might be followed by a review



# OLD PEOPLES' HOSTEL

(GOODWINS ROAD . KING'S LYNN)



Architect: C. H. Thurston, Esq., L.R.I.B.A., F.R.I.C.S., County Architect, 25, Thorpe Road, Norwich. Contractors: Oliver Staines & Son, Station Street, Swaffham.

For the prevention of rising dampness in the floors of the above hostel, the County Architect specified the inclusion of  $4^0_{.0}$  of 'PUDLO' Brand waterproofer to the cement in a 1.2.4. mix. The finishing screed 1″ to  $1\frac{1}{2}$ ″ thick will receive various patent floor tiles.

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#### technical section

of traditional and current techniques to allustrate the way in which those techniques fulfil the principles. This would encourage an understanding of the way in which design and technique are related, so that decisions taken on questions of design may be appropriate to whatever technique is chosen. On the other hand, trainees for the building trades have to learn the use of tools and the handling of materials, guided by different but equally important principles. In any case, techniques have now become so specialized that a whole book is required for each trade. The trades structure in the building industry is now so important a matter that very misleading impressions can be given by ignoring it. To take an example from this book, the reluctant statement "... although there is much to be said for sound individual craftsmanship, the machine must be given its due place" introduces a descriptive section on woodworking machinery under the heading "Joiners' machines." One can imagine the surprise of the young joiner on causing a strike of woodworking machinists (whose existence goes unacknowledged) through his new-born desire to give the machine its due. Questions of principle apart, there is much of the factual matter which is inaccurate or wrongly biased. The assertion, for example, that "Screws . . . are used instead of nails where any vibration in fixing would be objectionable, or where piece's are required to be taken apart occasionally" is, to say the least, an understatement.

The general impression is that "Mitchell" is still a piece of propaganda for the good old days; the fact is betrayed by a surfeit of Gothic tracery, stone niches, brick relieving arches, 9 in. by 6 in. carpentry (still no mention of the balloon frame), exposed lead plumbing, and so on. The latest reviser is an architect. Is he really aware of the responsibility entailed in the production of a book of this kind?

#### 18.184 construction: theory

#### VIBRATION OF CONCRETE

The Vibration of Concrete, (Institution of Civil & Structural Engineers. 1956. 8s.) Report by the joint committee of the two engineering institutions on vibration, of interest to architects and engineers.

A joint committee on this subject was first set up in 1935 and results were published in March, 1937, and April, 1938. The present committee have not carried out any experimental work but have had representation from the Cement and Concrete Association, the Road Research Laboratory, BRS and other investigators. They have therefore based their decisions on the knowledge and experience of their members, by visits to works where vibration was in progress and from a study of existing literature. There is thus little in the report which has not been published elsewhere in some form or other, but it serves as a useful marshalling of the points relating particularly to vibration.

It is essential to have the correct grade of mix for vibration and the major part of the report is devoted to specifications with regular and gap graded aggregates. Formwork is considered with relation to the different types of vibrator. Non tilting, tilting drum and pan mixers are considered and the report states that there is a need for a new type of mixer especially designed to deal with lean dry concrete,

The actual vibrators are then reviewed. These are classified as immersion vibrators, clamp-on vibrators, surface vibrators, table vibrators and other types. "Other types." covers such things as tables which impart shock rather than vibration and pneumatic and electric hammers. The report says that the characteristics of vibration are not necessarily of the same relative importance for the different types of vibrators. It is not possible to formulate the requirements of vibration as such, and it was not found possible to define completely the best vibration characteristics for any of the types of vibrators considered. It seemed clear that most vibrators in use at the moment have been designed and developed by trial and error methods and the report suggests that a scientific investigation would do much to assist manufacturers in developing equipment having the right amplitude, frequency and wave form as well as the most suitable physical shape. The practical notes on placing of concrete for compaction by vibration, revibration and over-vibration and rate of placing vibrated concrete are very sound. It must be appreciated that this report has been written with the size of job in mind where control of concrete quality is practicable; this would not apply to most of the smaller structural works.

#### 18.185 construction: theory

#### CONCRETE DESIGN

The Ultimate-Load Theory applied to the design of reinforced and prestressed concrete frames. A. L. L. Baker. (Concrete Publications Ltd. 1956, 18s.)

Text book on ultimate-load theory applied to structural concrete, of interest to engi-

The ultimate-load theory as applied to steel structures has had sufficient publicity in latter years to be known, if not necessarily understood, by all. The application of this method to concrete frames has been developed by Professor Baker at Imperial College during the last few years and several interim reports have been made on the progress of his researches to the various engineering institutions. He now feels that the research has advanced sufficiently to provide in book form a complete review of the subject and to offer formulæ for design

Factors of safety and load factors are discussed in the first chapter and the use of the load factor is justified. A system of "weighting" such items of construction as workmanship, load conditions, importance

of member to whole structure, warning of failure and reduction of strength, also the seriousness of failure, whether resulting in danger to human life or in monetary loss, is put forward to decide the appropriate load factor. It should be noted that this was not the method favoured by the Institution of Structural Engineers committee on Structural Safety.

Chapter II considers the ultimate strength in bending in beams on the basic assumptions that concrete has no strength in tension and that the distribution of compressive strain in the concrete is linear. Formulæ are derived for the ultimate strength of both reinforced and prestressed members.

The next three chapters cover plastic deformations of hinges, theory of plastic hinges setting out a method of design, and expressions for the rotations of plastic hinges.

The final chapter gives examples of the methods described in the book and advice on shear, combined bending and compression and plastic hinges in slender columns. These latter points are the subject of further research but it is not thought that much variation of design figures quoted in the book will be required.

The draft code of practice for reinforced concrete suggests the use of ultimate design and if the average engineer is not yet prepared to swallow whole the contents of Professor Baker's book he will at least find therein much to chew.

#### 20.230 construction: complete structures

#### CONCRETE STRUCTURES

Single Storey Industrial Buildings. (Cement and Concrete Association. Free.)

This booklet, produced with the CCA's usual high standard of presentation, puts forward the case for concrete for the structures of single storey factories. It illustrates 43 completed factories of several types: precast frame, in situ frame, cylindrical and northlight shells. The absence of full technical descriptions or detailed drawings. however, makes the book of little technical value to architects, but it should be a useful string to the bow of any architect attempting to describe the possibilities of the material to a client.

#### 24.201 lighting

#### LIGHTING IN SUSPENDED CEILINGS

Lighting in Service Ceilings. Derek Phillips. (Light and Lighting. October, 1956.)

This is a very useful review of systems developed in this country, the United States and Canada for including artificial lighting as an integral part of suspended ceilings. General principles are given and the ceilings are dealt with under four main headings: (a) completely luminous ceilings, (b) acoustic ceilings (with or without heating) with recessed lighting units, (c) fireproof ceilings, and (d) ceilings for special purposes.



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#### THE HANDLING OF ARCHITECTS' INFORMATION

#### 3. information arising from jobs

In the first two instalments of his report\* the author, the late Michael Ventris, O.B.E., discussed the handling of information coming from outside sources-trade literature, books, periodicals and the like. In this, the last instalment, he discusses information arising within the office: what information should be extracted from jobs and how. He describes the operation of a job history file, a specification file and a technical development file: of the office information book and office standard detail sheets. Lastly he remarks on the need to overcome the architect's innate "information resistance" by better information handling in schools, and on Arthur Ling's suggestion for the setting up of local information centres. The report as a whole is rounded up by a table summarising how to classify and store all the different classes of information mentioned in the report.

#### Job files

55. In a small office the files for a particular design and construction job generally consist of correspondence and minutes of meetings etc. divided under client-authorities -general contractor-nominated sub-contractors and suppliers-QS & Cost-consultants-site and clerk of works. At the end of the job these files may be simply put away, together with copies of the contract documents, and not referred to again except where prompted by one of the architects' memory. In an office with information staff, it is better to try and systematically extract from the job records information which can be of further use, particu-

- (a) Experience in planning the building type.
- (b) Experience in methods of construction and detailing.
- (c) Cost of the job both in client's money and office time.
- (d) Register of firms and specialists employed.

This can be done in three ways:

- (i) The normal job files are analysed at the end, and any useful information transferred to cards or sheets.
- (ii) Pro-forma cards or sheets are included in the files, filled as the job progresses, and extracted at the end.
- (iii) A separate Job History File is kept, compact enough to be kept in its entirety-though some of its sheets may be duplicated and filed separately.

#### Job history file

56. The advantages of such a file are that the progress of the job against a fixed procedure and programme can be more easily checked; the job is easier to pass on to a second person; and a succinct record of the development of the job will help in writing it up for publication (e.g. in such articles as the AJ series on Hertfordshire schools). The job history file is additional to the correspondence files mentioned in Section 55, and to certain other job records: certificates and variation orders: records of office time (Section 57); specification notes (Section 60); drawings and drawing register; and possibly a reference file consisting of relevant circulars, pamphlets and cuttings temporarily annexed to the job.

Some offices may keep only a single set of correspondence files to cover all jobs, particularly where a continuous development programme is involved. This makes it difficult to assemble all the files on a single job for meetings

It may of course be difficult to introduce a particular system for the job files in public offices where filing policy is governed by a separate administrative department.

Side-by-side with the official job history file, the job captain or design team may maintain a personal design file, containing rough notes and sketch plans in chronological order. Architectural schools should encourage students to keep a systematic record of the workings and not confine these to the backs of envelopes and odd scraps of detail paper. Admittedly regimentation can be taken too far, and allowance must be made for the different personalities of designers; but in any kind of team work, where the reasons for a particular decision must be justified to others, a detailed record saves time and argument.

The job history file would contain records of all meetings, memos and telephone messages (preferably on printed forms with an action column), together with copies of data and reports vital to the progress of the job, chosen in accordance with an agreed policy. It may be necessary to cross-reference between the job-history file and the correspondence files or the technical development files (Section 61). Where letters, memos and reports originate in the office, it is easy enough to make extra carbon copies and file them in two places; material from outside may be too laborious to copy out, though large offices may make use of the newer types of rapid photocopying machine. The following sections include various items which may be included in a job history file, and which might afterwards be extracted and filed separately under subjects.

(a) The American Institute of Architects suggests that their Agenda for Architects (a reprint of part of the Handbook of Architectural Practice) should be inserted at the beginning of each. This might be copied

<sup>\*</sup>Published in our issues of November 15 and 22, 1956.

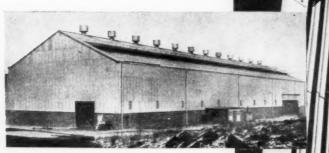
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by offices with an Information Book, or where procedure can be extracted from "Codes for nominated architects" supplied by local authorities.

- (b) A copy of the progress schedule of the job through the office (in addition to any presentation on wall-charts), followed by progress checks at intervals (see Clive Wooster's *Programming for Architects*, AJ, October 13, 1955).
- (c) A succinct job history sheet, possibly divided into three parts (sketch design, working drawings, contract), and including a final statement of the architect/client and client/builder accounts. For examples see Willis and George, p. 241, and the AJ for May 19, 1955.
- (d) Check lists for client's requirements (see Willis and George, pp. 5-6); a detailed statement of the brief including its financial aspects (balancing of capital and maintenance costs, etc.).
- (e) Reports of preliminary investigation of the building type, bibliographies, visits, etc.
- (f) Check lists for site survey (see Willis and George, pp, 19-20) and survey of local conditions; on large jobs this is increasingly the field for a consultant.
- (g) A copy of preliminary reports and sketch schemes presented to the client. If these are bulky they may be bound and kept in the library as a series.
- (h) A copy of the builder's progress schedule as planned and as kept (in addition to any presentation on wall charts); schedules for the ordering of materials and of p.c. and provisional items; etc.
- (i) Copy of a questionnaire filled up on completion, giving list of specialist firms and degree of satisfaction (see section 17b).
- (j) Copies of any other post-mortems held on job; records of client's, comments, maintenance, etc.
- (k) Copy of the *client's hand-out*, giving record of drawings, list of specialist items for repair or replacement purposes, and operating and maintenance instructions.
- (1) A copy of the cost plan and final cost analysis.

#### Office job costing and programming

57. Staff time sheets, clerically converted in the payroll record, combined with a record of expenses and overheads, will enable the cost of each job in money to be calculated. This may be compared at intervals with the architect's *budget estimate form* calculated at the beginning of the job on the basis of the expected fee, and expressed graphically on a wall chart in which the cost and time programme for each job has its own separate series of lines.

Many offices feel that such a precise budget estimate cannot be made mechanically (since some jobs with large fees may be quick to produce, whereas it may be worth doing a small job in great detail for prestige reasons), and prefer to programme office work in man-days (or half or quarter days) on the basis of the time found by experience to be necessary to produce a reasonable job. This will also be the case in public offices where the architect's "fee" for each job is not in fact calculated. 58. For a very detailed job programming, as described in the Guest Editor's article of June 30, 1955, and Clive Wooster's for October 13, 1955, it is necessary for the

staff time sheets to be divided daily not only under jobs but also under aspects and elements of each job. These enable periodical checks to be made on the progress of design and working drawings, and modifications to be made in the office programme—which is of course designed with one eye on the proposed programme for constructional work. Final records of the number of man-hours spent on the job, filed with the job history, form a guide for the programming of future jobs.

59. In some offices, copies of the budget estimate, office cost to date, office programme and progress checks for *all* jobs may be included in a single book kept by a senior member of the staff, who thus has a picture of the progress of all work going through the office.

#### Specification

60. A file of *specification notes* (perhaps on a pro forma supplied by the quantity surveyor) should be built up from the beginning of working drawings.

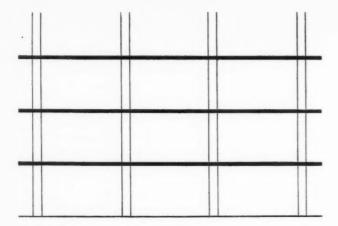
The American Institute of Architects issues books of *Specification Work Sheets* (Doc. No. 340) from which the master copy for individual specifications can be assembled, by deleting and adding special items. Some large offices in this country maintain similar loose-leaf stocks of their own specifications, either for all trades, or for certain critical items on which they have special experience or methods. Their preparation may require full-time staff. The sheets for each trade can be accompanied by notes explaining how they are to be used, and the reasons for certain provisions. Draft specifications may also be maintained on cards. There is a tendency in the small office to base new specifications closely on old ones without time to re-think the clauses to suit the new job.

Manufacturers' literature should, wherever necessary, contain their own standard specification for the product, its transport, storage, assembly and finishing (for inclusion in the architect's specification), and for its operation and maintenance (for the client's hand-out). Schedules for doors, windows, finishings, etc., may be built up in the specification file.

In offices which are experimenting with elemental bills and with drawings-cum-specifications or drawings-cumbill, special methods will be used in preparing them and extracting future "information" from them; and it will be interesting to hear their further experience.

#### Technical development files

- 61. Where an office is engaged in development work (i.e., the evolution of structural and planning solutions designed for a building programme rather than for a single job), the preliminary work in *each* separate programme of investigation will require a separate set of *technical development files* distinct from the files for single jobs. These files may either replace, or run parallel to, correspondence files with particular manufacturers, consultants, etc., party to the development. They can be divided into two series:
- (a) Structure and components, containing research data, trade literature, correspondence and discussion leading to a choice for particular elements (e.g., windows, roof



# Structure q.p.

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# q.e.d. Truscon

#### technical section

coverings), or dealing with special aspects (e.g., mining subsidence).

(b) Planning requirements, divided under building type (e.g., primary schools) and their different rooms.

Even where offices are not engaged in development work in the true sense, it may be useful to have a set of such technical files (distinct from trade literature and from periodical cuttings) on to which generally useful data accumulated on individual jobs may be transferred.

The technical development file on a particular element (e.g, windows) may in fact become too bulky for reference on the drawing board, and its main function may be to provide the basis for a digest of information in the technical section of the Information Book (Section 73e) or in standard drawings.

#### Post-mortems

- 62. It may be necessary to record experience gained on complete jobs by collating cost records, site records, reports and instructions, and by discussion by the architects and client of the completed building:
- (a) An appreciation of the buildability of the design in terms of cost, time and ease of erection.
- (b) Criticism of individual details (Section 72).
- (c) Criticism of the visual qualities of the finished
- (d) User satisfaction with planning, equipment and finishes.
- (e) Running costs.
- (f) Long-term maintenance experience and costs, which in a public department may be fed back from the maintenance department.

#### Other records of jobs

- 63. If cost data are kept by the Information Room, rather than separately by the QS, then extra copies of sub-contractors' and suppliers' quotations, together with any cost comparison data compiled on particular jobs, may be included in a set of cost data files divided under elemental headings similar to those of the technical development files. These may include selected lists of firms asked to tender for particular items, and of those blacklisted.
- 64. Another file may contain a record of all main contract tenders, combined with selected lists of con-
- 65. There may be further lists of consultants, clerks of works etc. used on particular jobs.
- 66. Some offices keep a separate series of correspondence files for initial correspondence with contractors, specialists etc. before they are selected for the lists for particular jobs. It may also be worth keeping a note of those employed on major buildings illustrated in the press.
- 67. A full cost analysis may be included on the Job History Sheet or filed separately.
- 68. The Job History Sheets (Section 56c) filed in the Information Room may also contain:

Costs per sq. ft. or cu. ft. (rather than as separate Cube Index Cards).

Ref. nos. of black and white photos taken of the job (Sections 81-82), and of colour transparencies.

Periodicals or books in which the building is illustrated,

#### Drawings of past jobs

- 69. Drawings of old jobs may have to be referred to for a number of reasons:
- (a) To check on past planning, design or structural solutions for use on new jobs.
- (b) For publication purposes.
- (c) To sort out problems of maintenance, alteration or litigation.

In large jobs, these factors may have monetary value, which may make it advisable to ensure fire protection of the records.

It is widespread practice to roll up the drawing negatives at the end of a job and to store them away in a fairly inaccessible place-if necessary keeping a set of prints together with the job files and contract documents. Often the drawings are rolled simply in brown paper; or they may be kept in cardboard or metal tubes, or in one of the tubular pigion-hole fitments now on the market. The disadvantage of these is that tightly-rolled drawings are very difficult to consult; an alternative is to keep the negatives hanging in groups vertically on some kind of " coat-hanger."

70. There is a danger of storage methods becoming too elaborate, dust-inviting and space-consuming. The most compact and fireproof method of dealing with old job drawings is to have half or quarter plate film negatives made from them (outside the office, or with one's own Statfile equipment) and throw the originals away. The negatives can be looked at in a viewer, or blown up again to full-size if necessary. They can be filed in drawers as they are, or in envelopes, or mounted in envelopes on foolscap sheets in separate files. The number of the negatives will correspond to that of the original drawings, and the shelf list to the collection will consist of the cards or sheets of the drawing register, transferred from the "current" to the "dead" section. The use of standard drawing sizes makes storage and photographic reduction much simpler.

#### Standard drawings

71. There is an understandable prejudice in many offices against the imposition of standard drawings. They may needlessly inhibit the designer's inventive powers, and on non-repetitive jobs they may in fact be difficult to apply sensibly without constant modifications. They may be necessary where dimensions of assemblies are determined by bulk purchase items, Meccano systems and other inflexible requirements, and where plan or detail solutions are determined by rigid legislation or policy from above. Even in these cases it may be good psychology to call them information sheets rather than standard details.

#### Indexing of details

72. Where no standard drawings are in use, it may nevertheless be useful to see at a glance a range of details which have been found to work well. This will prevent the solution to the same problem being needlessly worked out quite independently on different jobs, and without the

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#### technical section

benefit of past failures. In the small office the staff will remember "what we did on the last job": in the larger office it may be necessary to file systematically the most interesting detail solutions.

A possible method is for job captains to submit potentially useful details for discussion at the contract stage or thereafter. If accepted (e.g. at a weekly meeting), an extra print would be marked with the stamp "LIBRARY/Date/Ref." and classified in groups under elements or under the AJ's classification of working details. The detail would be regarded as provisional until initialled by the job captain at some fixed time after completion when any modifications made in actual construction, would be sketched in, and a post-mortem on how it works and looks (e.g. "lets the water in here," or "ought to be 2 inches thicker," etc.).

If drawing records are kept on photographic film, then a second negative of such details will be kept, classified under elements. In either case an index sheet or cards will be needed to keep a check on inventory and borrowing.

If such detail indexing is introduced, it may be necessary to ask a committee to work through the backlog of *earlier* jobs and see if any details are worth extracting. In addition to constructional details, a separate file may also be kept of duplicates of drawings where they illustrate *planning* solutions which are likely to be useful again (e.g., layouts of kitchens or workshops).

#### Dissemination of information

- 73. An *information book* for the guidance of staff is a useful feature even in a small office. In a large office it will have several distinct sections, preferably in looseleaf form, which can be broken down into separate books and distributed round the office.
- (a) Office organization: names of personnel, salaries, leave, hours, etc.
- (b) Records management, including manual of filing operations, lists of records in use, operating instructions for information room, etc.
- (c) Job management, giving standard procedure at all stages of the job; including check lists, form of letters, standard forms, draughtsmanship, etc.
- (d) Planning standards for particular building types in which the office specializes.
- (e) Technical information book, giving standard details in reduced facsimile, data derived from the technical files, assembly of Meccano systems, etc.

In a public office it is a good thing if all administrative circulars can be designed to fit into the appropriate parts of the information book, but it may be difficult to get this principle adhered to.

#### Internal bulletins

74. A considerable amount of information and experience may be exchanged between different sections of the office at regular meetings, and these may be minuted. In large offices, or groups of offices separated in different places, these may be supplemented by a regular bulletin published by the staff of the Information Room from information they have collected.

In addition to pointing out new items of information which have come in from outside, one of the most useful functions of such a bulletin is to circulate confidential information on the cost and performance of products and firms which have been used on jobs. The laws of libel may prevent such bulletins being made available to outside architects, unfortunately.

75. Exhibition space may be provided at key positions in the office, where the librarian posts drawings of current schemes, references to new trade literature, press cuttings and notices of meetings, etc.

#### Education in the use of information

76. Even in offices with lavish information services it may be difficult to get architects to use them, owing to their natural "information resistance"—the feeling that it is easier to produce a design decision sitting at the drawing board, from memory, commonsense and rule of thumb, than to have to take a walk each time and check on the latest state of knowledge.

Part of this "information resistance" is developed or confirmed by habits of work in the architectural schools. Ideally the architectural student should be encouraged to use the school library in the same way as he would use the Information Room of a large and efficient office. Often the library's budget is so small as to render this hope farcical; and in some school libraries there may be a feeling that Vitruvius (and basic principles) are more important to the student than Wallspan (and overspecific applications). But buildings today can normally only be conceived in terms of the industrial components that exist (which means an efficient collection of trade literature and samples), and of the latest findings of the research organizations: experienced staff must be at hand to help the student use this material sensibly. Adequate indexing and abstracting services to periodicals are essential, and books on technical subjects which are more than, say, 10 years old should be thrown away or relegated to top shelves or the lumber room.

A school library cannot of course preserve realistic records of actual past jobs as the office does. It is vital, however, that some information on *costs* should be provided, so as to train the student to appreciate the relative costs of everything he designs. Just how this is to be done is a tricky question, since even the architect is at sea. An efficient school library can act as a useful information centre for architects' offices in the neighbourhood.

#### Sharing of information

77. A great deal of useful information and experience is usefully exchanged between architects at meetings, colloquia and in day-to-day contact: much of it is understandably, libellous and cannot be reproduced on paper.

78. Arthur Ling suggested, at The British Architects' Conference for 1956, held at Norwich, that any nonconfidential information available in the centre being set up in his Coventry office might be consulted by private architects in the neighbourhood, perhaps for a fee. He proposed that a network of such public information centres might be set up all over the country, in the offices or institutions best suited to local conditions. It would be



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#### technical section

valuable to have further views on this suggestion. Is a new central service needed, or can the Building Centre, BRS and RIBA between them handle all reasonable enquiries? The voluntary exchange of cost information (e.g. at the RICS) has been frequently discussed, but the AJ cost analyses represent the only regular channel at the moment.

79. Unlike many scientists, the architect is not normally expected to enlarge his prestige by writing up his work. He has to be coaxed into publicizing his experience in lectures, in the technical press or before sub-committees. A qualified architect librarian may be responsible for helping to prepare press hand-outs and senior architects' lectures. Sheppard Fidler asked at the Norwich conference that large offices might be given guidance by BRS. MOE, etc., on subjects on which they might accumulate useful data for dissemination.

#### **Public relations**

80. The library will maintain a series of press-cutting books, arranged chronologically or under different building types.

81. It will also maintain a collection of albums for its own photos of completed jobs on the same basis. Photostats of basic drawings can be combined with these or stuck in parallel albums. Negatives of office photos can be kept in the same way as film negatives of drawings (Section 70), and require an index book.

82. Progress photographs taken on jobs may form a separate series.

83. A further collection of ever-increasing value is that of 2 in. × 2 in. colour transparencies in boxes or cabinets, similarly indexed.

#### Conclusion

This description of an Information Room for a large office may have appeared to contain a bewildering variety of files, indexes and operations: probably no office can afford them all, and the small office can manage very few of them. I have thought it easiest to provide a full list for discussion, from which each office could pick out the items that make sense for its own needs. Here is a résumé of the whole range, with suggestions as to how they may be kept and classified, and with the numbers of the sections of this article in which they were discussed. Those marked with an asterisk can probably be kept by a small office without a full-time librarian.

OUTSIDE MATERIALS	WHICH CAN BE	E HANDIED AS	THEVADE

Trade pamphlets	in vertical files	by elements	11
Trade catalogues	on shelves	by elements	16
Samples	on shelves	by elements	18
Directories and yearbooks	on shelves	by title	17
Publications of trade and research organizations	variously		20
<ul> <li>HMSO (incl. DSIR)</li> <li>publications</li> </ul>	in box-files	by series and date	21, 25
* HMSO and BSI cata- logues	in box-files	by date	25
* Publishers' catalogues	on shelves	by firms	24
Full BSS	in drawers or boxes	by numbers	21
* Codes of practice	in box-files	by numbers	21, 26
<ul> <li>Text books and other books</li> </ul>	on shelves	by subject and author	. 22
* Periodicals	on shelves	by series and date	29

#### OUTSIDE MATERIAL REQUIRING ASSEMBLY INTO BOOKS OR

* BS Handbook No. 3	in own binder	by numbers	21, 26
<ul> <li>BRS Digests</li> </ul>	in binder	by numbers	21
* Specifile	in own binder	by own headings	3
Manufacturers' price lists	in binders	by firms or elements	7, 19a
Building Centre Infm. Sheets	in binder	by elements	17
<ul> <li>Printed indexes to periodicals</li> </ul>	in binder or bound in		43
* AJ Information Sheets	in own binders or with trade pamphlets	by AJ numbers	35
* AJ Working Details	in binders	by AJ headings	36
* Technical cuttings	in vertical files	by elements	37
RIBA Journal Practice Notes and index	in binder	by date	
Special series of articles	bound and treat	ed as books	37
* Published cost analyses	in binder or vertical files	by building types	19, 38
* Building type cuttings	in vertical files	by building types	38
RIBA & MOW Library bulletins	in binders	by date	24
* Current prices and rates	folder for curren	t issue	19
A & BN Information Digests	in binder	by date	24

#### OUTSIDE MATERIAL REQUIRING SCISSOR AND PASTE

WORK			
Product news from "The Industry," "Mosaics," etc.	in loose-leaf or on cards	by elements	2, 4, 39
AJ Information Centre	in loose-leaf or on cards	by AJ numbers	41
Other printed abstracts	on cards	by subject	41

#### EXPERIENCE DERIVED FROM OFFICE JOBS AND RESEARCH

Job programming	variously		57-59
Job history files	in binders	by jobs	56
* Job history sheets	in loose-leaf or on cards or visible records	by jobs	190
Reports to clients	bound	by jobs	56
Studies of comparative costs	in vertical files	by elements	19b
Quotations	in vertical files	by elements	19b, 63
Tenders received	in vertical files	by jobs	19b
Lists of contractors etc.	in vertical files	by categories	64-65
* Cost analyses of own jobs	in vertical files	by building types	190
Records of job post- mortems	in vertical files	by jobs	56, 62
* Technical development files	in vertical files	by programme and elements or building types	61

			types	
	Selected details	as prints or in	reduced form	69b
*	Dead job drawings	in rolls, or tran	sferred to film	69-70
*	Photographic negatives	in envelopes	by jobs	81
*	Colour slides	in boxes or cab	inet, variously	83
	Press cuttings	in albums	by date	80
*	Photos of completed jobs	in albums	by building types	81
	Plans of completed jobs	in albums	by building types	81
	Progress photos on jobs	with post-morte	ems	

#### GUIDES TO OUTSIDE INFORMATION CONCOCTED BY THE INFORMATION ROOM

Record sheets for products	in binders	by elements	8
Directory to outside organizations	loose-leaf or b	oound	28, 49
Catalogues of books and pe	eriodicals in loca	1 libraries	

#### INTERNAL INFORMATION CIRCULATED BY THE

	Office Information Book Specification work sheets	singly	by	trades		73
	Standard drawings	smgry	Uy	trades	69b,	
	Internal bulletins				9,	74
	Guide to internal informatio	n sources				5.
0	PERATIONS REQUIRING	RECORDS	AND	STATIONER	Y	17
	Librarian's enquiry notebook	notebook		y date or subject		5

Loan record for an items	of annobort min	,
	date	
Borrowers' loan cards		15
Statistical record of loans		24
Circulation slips for periodicals, etc.		30

.10 ON.

#### technical section

Requests to firms for information	in vertical correspondence files	by firm or elements	1, 66	Hand
BS1311 complaint cards			6	AJ G
Correspondence with orga	inizations		50	
Questionnaires to job arch	nitects		56i	ABC
Record of books, etc., for			24	Build
Borrowing from other libi	raries		28	Duno
Periodicals order book			24	Docu
				Com

INDEXES FOR CROSS-REFERENCE AND INVENTORY

r			

Subject key to trade literatu		in notebook or strip	17-
Subject key to book classific Subject key to cuttings, etc.	ation	index	1/2
Shelf list for trade literature and samples	on cards	by elements	17b
Trade literature and samples	on cards	by firms	17c
Trade literature and samples	on cards	by trade names	17d
Trade addresses	on cards	by firms	17e
Shelf list for books	on cards	by subject	23
* Drawing register, dead jobs	on cards or sheets	by jobs	70b
Index to details file	by elements ar	nd building types	72
* Inventory of black-and-white	e negatives and	colour slides	31-83
Office's own selective subject	t index to publi	shed information 4	3, 53

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Handbook of Architectural Practice. American Institute of Architects. 7th edn., 1953.

AJ Guest Editor series on Costs, 1954-56.

ABC. Abridged Building Classification for Architects, Builders, Civil Engineers, Bouwcentrum, Rotterdam.

#### Documentation and filing

Commercial and technical libraries. Lamb. George Allen & Unwin, 1955.

Facts, Filing and Action. Part II: Filing, indexing and circulation, Holmstrom, Chapman & Hall, 1953.

Records Management and Filing Operations. Odell & Strong, McGraw Hill, 1947.

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ASLIB Proceedings.

ASLIB Conference Reports.

Journal of Documentation (ASLIB).

Special Libraries (U.S. Special Libraries Association).

American Documentation (American Documentation Institute).

O & M Bulletin (O & M Division of H.M. Treasury).

#### The Gas Council on Domestic Space Heating

On the opposite page is a supplement on domestic space heating which is sponsored by the Gas Council. This is the first of a series of supplements which have as their object to give a full technical description for architects of the different uses to which gas and coke can be put. Like Information Sheets, these supplements are a journalistic hybrid: they are "advertisements" in the sense that the space they occupy is paid for by the sponsors and that their ultimate object is to foster the greater use of gas; but they are "editorial" to the extent that the means chosen is to provide as much reliable information as possible and that this information has in fact been "approved" by the JOURNAL'S specialist editor for heating and ventilation. We welcome this series of supplements, not because we have any particular editorial bias in favour of gas as against other fuels, but because we believe that gas and coke have a part to play in the nation's pattern of fuel use and that it is of value to have this part intelligently presented by those who are best qualified to do it. We hope that readers will extract and keep these supplements for future reference. For this purpose a special binder can be obtained, free of charge, on application to the Publicity Manager, Gas Council, I Grosvenor Place, S.W.I. Alternatively, readers may apply through the business reply folder at the back of this issue.

#### THE CASE FOR GAS

Until 1940 the choice of heating system was a matter which could be decided entirely on personal preference and technical consideration of the building to be heated. All types of fuel were in ample supply-in fact at times the surplus production of coke had necessitated dumping at sea, and unemployment in the mining villages was chronic. Changes since the war have reversed this and an overall shortage of all forms of fuel and power seems likely to be a permanent feature, at least for the rest of this century. The latest published appreciation of the rate of atomic energy development suggests that it cannot be fast enough to fill the gap caused by the known rate of increase of industrial power demand, and it is now more widely accepted that the standard of living of this or any country is very closely related to the industrial power available per head of the population. Until, therefore, the community has the wisdom to formulate and abide by a national fuel policy, designed to use what fuel we have to the greatest national advantage, it is only sensible that designers give thought to the effect of choice of heating system on the welfare of the community as a whole.

Broadly, all our fuel and power is derived from oil or coal. Alternative sources-water power, peat, shale and brown coal, tides and wind-are relatively unimportant in quantity and only capable of being harnessed slowly. Virtually all oil is imported; there is at present plenty of it in the world and no fundamental difficulty in finding a way of paying for it in exports, but there seems likely to be a fairly long term shortage of tankers to fetch it and there are innumerable political pitfalls that may quite well continue to crop up even when the immediate crisis is solved, as it must and will be. Oil is essential for road transport, shipping, fishing and farming and some industrial processes and, ultimately, in periods of shortage, it will have to be directed to these uses leaving only the surplus for those purposes for which power and heat derived from coal can be used. Space and water heating are certainly two purposes for which no exceptional priority can be expected when there is insufficient oil available in the country for all purposes.

Since we are likely to have an overall shortage of coal for the next fifty years, it is desirable to use what we have to the greatest advantage. Full structural insulation and

efficient appliances at the consumer's end are vital not only to reduce heating costs but also to reduce the national fuel shortage. What is perhaps more important is to ensure the maximum overall efficiency in terms of coal as

At the end of the war a good deal of inquiry was directed to the problems of fuel supply and the results were published in a number of official reports. Those covering the heating of buildings-notably the Egerton Committee and the Building Research Station experimental work at Abbots Langley-are well known to architects and builders. Those covering fuel policy as a whole-for example the Ridley report—are less often referred to. They do, however, assemble the facts on which it is possible to make a logical choice of fuels for space and water heating and lay down what might be called the basic rules of national good housekeeping.

The calculation of overall efficiencies of generation and distribution is a complicated matter and authorities vary greatly in the methods they adopt and the values they place on by-products and so on. For instance, electrical generation can make use of very low grade small coal a

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gas plants tend to call for rather special and scarce grades, although a far wider selection is now accepted. Again, at the moment, it is not easy to evaluate the real effect of the imported fuel oil used for generation of some part of our electric power and for the enrichment of low thermal value gas. The fuel required to transport coal to the point of use, and the thermal value of the by-products of gas manufacture are all points on which economists can and do argue, but the broad picture established in the Ridley Report in 1952 was clear then and there is unlikely to have been much relative change since. This was that the combined overall efficiencies of generation and distribution were about 48.4 per cent. for gas and 19.54 per cent. for electricity based on the coal used. Making all allowances for the points on which argument is possible a ton of coal used in a gas works produces over twice as much useful heat and power as it would converted to electricity. This calculation takes no account of the economic value of the by-products which are lost when coal is burnt in a boiler or domestic grate. These range from drugs and dyestuffs to explosives, fertilisers, paints and disinfectants. For most of them there is no other source of alternative available in this country and they form an important section of our list of exports of high value manufactured goods.

The Ridley report also evaluates the efficiency at the consumer's premises in terms of coal requirements at the pit head.

We reproduce below a table drawn from page 98 of this report, which presents the comparative cost of providing a complete domestic fuel service for one of the BRS experimental houses at Abbots Langley using different combinations of appliances. The right hand column of figures (described as "Annual Coal Equiv.") represents in effect the thermal value of the amount of coal which has to be mined to provide the gas, electricity, and solid fuel needed to give the same domestic fuel service. It is assumed that all houses have electric lighting.

From this it is clear that to give a complete domestic fuel service by means of an all electric installation or of the combination grate using bituminous coal, will require twice as much coal to be mined as will be needed to give the same heat service using a combination of gas and coke. All the other combinations of appliance fall between these limits.

It is clear that in terms of coal at the pithead the most economic installation would be coke fired automatic boilers for the larger central heating plant and gas fires for the intermittently used domestic room.

#### Smoke abatement

Since the war virtually all new houses and a high proportion of old houses have been fitted with at least one improved open fire, with or without a back boiler. In addition, a large number of closeable stoves and small domestic boilers have been installed, so that the demand for coke tends to exceed supply and in most cases the open fires are fed with bituminous coal. Until coke supplies can be increased, further improvement in smoke abatement from these houses is impossible. Any increase in coke production without a corresponding increase in gas production and consumption is economically impossible. Popularization of a correct pattern of coke and gas usage is now seen to be the best hope of a reduction in atmospheric pollution in the next fifty years.

#### Peak loads

However a fuel policy is planned, there must be both seasonal and daily peak demands. All solid fuels and oil can be stored to cover the seasonal demands, and gas can be stored to cover daily peaks. Peak demands for electricity can only be met by installing standby generating plant, the cost of which must ultimately increase the charges made for normal continuous process power. Plant used for only a few hours or a few days in the year cannot be financed economically. Unfortunately, much of the heating load, both for domestic and office premises, provides a poor load factor and coincides with other daily and seasonal peaks. Once again, there are clearly national advantages in carrying much of this heating load by coke for the larger units and gas for intermittent services and the provision of radiant heat.

#### Capitalization

There is now an acute shortage of capital available for investment in new and improved plant, and interest rates are high. At the same time, if we are to maintain or improve our standard of living, we must have more power. It requires nearly twice the capital to put up an electrical generating station as to provide a comparable capacity carbonizing plant. In the 11 years 1940-1950 the domestic consumption of electricity increased by the

House	Space Heating	Water Heating in winter	Water Heating in summer	Cooking	Capital Cost in the house*	Annual Coal Equiv. therms
1	Gas convectors, gas fire in one bedroom	Gas multipoint	Gas multipoint	Gas	E 150	1,350
2	Electric convectors and radiant fires	Electric	Electric	Electric	110	1,850
3	Combination grate (coal)	Grate boiler	Grate boiler	Combination grate	120	1,800
4	Improved open fire (coke) with back boiler radiators, with gas fire in one bedroom	Back boiler	Back boiler	Gas	130	1,000
5	As 4	Back boiler	Gas multipoint	Gas	150	900
6	Improved open fire (coke); gas fire in one bedroom	Gas multipoint	Gas multipoint	Gas	1 30	900
7	As 4 but with electric fire in one bedroom	Back boiler	Electric immersion	Electric	140	1,050
8	Inset stove (coke), electric fire in one bedroom	Electric storage	Electric storage	Electric	130	1,200
9	Improved open fire with back boiler (coal)	Back boiler	Gas circulator	Gas	110	1,050

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equivalent of 5-million tons of coal a year. Had this been taken as gas the capital costs of new carbonizing plant would have been about £70 million. In fact the electrical generating plant cost about £140 million. In either case the same amount of coal would have had to be mined, but if it had been used partly for gas making and partly to offset imports there would have been available not only increasing quantities of coke but also improved supplies of important and easily exportable byproducts which in fact were lost. Put another way, had the domestic and space heating load been mainly

taken by gas and coke, surplus capital would have been available and less extensive borrowing would have been necessary.

If it be accepted that the rate of increase in power available to industry is directly proportional to the increase in the standard of living, it is clear that a rational pattern of fuel use is as much to the advantage of the private individual as it is to the community at large. Some combination of coke and gas for space and water heating with electricity for lighting and industrial power would seem to fill all the requirements for such a pattern.

#### DOMESTIC SPACE HEATING

#### 1. fires and unit heaters

The authors begin their review of the use of gas in domestic space heating by describing eight respects in which our heating needs have changed since the war and by pointing the accuracy with which we meet these needs than in the improvement of the theoretical efficiency of appliances. They

The results of several inquiries on domestic heating reported since the war have suggested desirable standards of heat service. They were, however, based on pre-war conditions, and changes which are now taking place must ultimately affect heating techniques. These are eight in number. For convenience sake we tabulate them here in two parallel columns.

#### Pre-war considerations

1. Except in certain textile did not generally go out to work after marriage and in tenancies let at weekly rents it was exceptional for the property to be wholly unoccupied during the day.

#### Post-war considerations

Many married couples go out manufacturing towns women to work during part or all of their married life and it is common for the house to be unoccupied for five or six days in the week and for children to return to the empty house at different times from their parents. Open fires and appliances requiring regular stoking are of little benefit; continuous whole house heating, however efficient, may be wasteful if there is little continuous occupation. An immediatelyavailable high-intensity source of radiant heat may well be essential to provide a limited area of thermal comfort when the room is to be used for short periods. Even if there is a source of general background heat, such a radiant heater is useful when the background heater is warming up or for between seasons use.

next discuss comfort conditions, with particular reference to intermittent heating, and give full data for the correct sizing of gas fires for the different rooms in the house. The second part of the supplement is devoted to a description of the performance and method of fixing of each class of gasout that economy is to be found more in and coke-fired room heating appliance now on the market, but omitting all reference to central heating, a subject which is reserved for a second supplement.

#### Pre-war considerations

2. Any form of complete heating system for the whole house or even good comfort conditions for one room were beyond the financial means of a very large number of weekly tenants and were not normally demanded.

# Post-war considerations

Egerton standards are now expected in almost all houses and, so long as full employment can be maintained most occupiers can afford such standards.

3. Fuel was relatively cheap and production exceeded effective demand.

Fuel is likely to remain dear and scarce so that not only must efficient appliances be chosen, but the services provided must be suitable for the way of life of the occupants of the house. The most efficient continuouslyburning space heater is inefficient if the house is only fully occupied on Saturday afternoon and Sunday. From the national point of view this efficiency must also be measured in terms of fuel at the source, not in terms of appliance efficiency or even room or house efficiency. The price of gas is now nearer to that of coke than ever before.

4. The open fire and solid fuel cooker could be used with a wide range of fuels and would give at any rate some service during periods of unemployment and failure

Family incomes are relatively higher so long as the policy of full employment lasts. There will, however, always be periods when re-deployment of labour or illness

0

#### gas supplement

#### Pre-war considerations

of family income.

Boxwood, salvage coal and ashes, paving blocks could all be burnt when available.

must lead to reduced incomes in a proportion families. Unemployment benefit is now a smaller

#### Post-war considerations

must lead to reduced incomes in a proportion of families. Unemployment benefit is now a smaller proportion of normal employed wages than before the war. Heating systems which cannot be adjusted for partial use and schemes in which every appliance in the house can only be operated with high value special fuels can all be embarrassing at times of failure of fuel supply or family income.

 Smoke abatement, which was much discussed, had little practical effect on the design of domestic heating units. It is now clear that smokecontrolled areas of one type or another will be brought into effect in places within the life of most houses now being built.

 Large buildings of public resort were often not expected to be heated, or at best a low standard of comfort conditions was tolerated.

There is a demand for far higher standards of comfort despite the relative increase in the cost of fuel. These are impossible to meet with existing central heating plants in discontinuously used buildings such as churches, halls, libraries where the preliminary warming up time is considerable, and recourse to radiant sources may often be desirable.

7. Few multi-storey blocks of property let at weekly rentals were being erected and these were of moderate height, rarely over four stories.

A higher proportion of all housing is now of flatted construction and the heigh are far greater, favouring to use of gas as opposed to

A higher proportion of all housing is now of flatted construction and the heights are far greater, favouring the use of gas as opposed to solid fuel because of the saving in flue space and cost and the problem of fuel storage.

8. Space heating was in fact rarely used in more than one room.

There is a demand for space heating in more than one room even when whole house heating is not desired. It is desirable to make full use of a greater part of the house so that, for instance, children may use a bedroom for homework, and elderly people or lodgers may have a measure of privacy. Such heating is required intermittently only.

These changes seem to emphasize the need for (1) a flexible scheme which can be used or not, as the occupier wishes, and which can be made to provide at least minimum cooking and heating services if supplies of the preferred smokeless fuel are unavailable or cannot be purchased for temporary economic reasons.

Carrying the main space and water heating load by a coke-fired unit fills all these requirements and is probably cheaper in first cost and in running cost than any available alternative. (2) Intermittent space heating provided by radiant gas fires will give a measure of immediate comfort. (3) Alternatively, the newer, high-efficiency convector-type fires give an appreciable proportion of immediately available radiant heat, as well as convection heat for longer-period use.

#### **Comfort conditions**

It has been the practice in the past to consider the efficiency of the appliance, but recent work at Abbots Langley has reinforced the point of view that the appliance cannot be considered apart from the room or house as a whole. The occupant of a room is concerned with the efficiency of the appliance coupled with the room-in fact the heating appliance is the room. For example, Dufton has drawn attention to the difficulty of providing comfort conditions in intermittently used and heated rooms such as dining rooms. If the construction is traditional, having a high thermal capacity the rate of heating up is slow and in the initial period body heat will be lost to the colder walls. A considerable pre-heating period will be necessary before full comfort is assured. If the same room is panelled or even hung with a very heavy flock wallpaper, adequate comfort conditions can be obtained almost as soon as a source of radiant heat is provided, at any rate for occupants not shielded from the heater by furniture, Again, the heat distribution and thermal gradients provided by an appliance will affect the comfort obtainable from it. Comfort is also dependent upon adequate but not excessive ventilation. Inadequate ventilation or ventilation dependent solely upon windows can, in bad weather, cause waste of fuel and intolerable conditions. Flues of the usual 9 x 9 type with no restriction fitted generally give excessive rates of air change. Gas fires necessarily give a degree of control over flue-induced ventilation rates.

Methods of calculating the desirable size and heat input required from heating appliances are laid down in the Codes of Practice for Solid Fuel and Gas Heating. At the same time, it must be recognized that the codes are based on air temperatures and not equivalent temperatures, assume a steady state condition, and take no direct notice of air temperature gradients or thermal capacity in discontinuous heating. This may well be justified under conditions of continuous whole house heating, particularly with central heating using well-disposed radiator surfaces, but it is less satisfactory in conditions of discontinuous use. For instance, it ignores the obvious practical advantage of having a zone of reasonable comfort in front of a source of radiant heat before full air temperature and comfort is established, and takes no account of the conditions of wall surfaces, shape of room and so on. Unfortunately, today it is a fact that continuous heating is a rare condition and intermittent heating is normal and likely to remain so.

It seems that a practical solution under present circum-

stances is to provide reasonably-insulated structures with low-thermal-capacity wall surfaces, and to provide a combination of high-temperature radiation and some convection. The convection may be provided by the radiating appliance or as background heat from another source. If the background heating can be continuous it will ensure a dry structure, and reduce the likelihood of condensation on cold surfaces. In any event, the radiating appliance should be of ample capacity and generally larger than is needed to maintain a steady state. If it is easily and accurately controllable there will be much convenience and no waste. Such an arrangement will be suitable for any occupier, whatever his preferred thermal habits, and for any external weather conditions.

#### Heat requirements

Owing to variations in aspect, room exposures and methods of construction, any generalized table to simplify the sizing of heating appliances can only give approximate guidance. Some judgment must always be used when the conditions vary from those on which the tables are based. There is no doubt that heat losses should always be calculated and this is essential for central heating schemes. At the same time, work at Abbots Langley has shown the very wide variations in the heat service required by different families in similar houses, even when there was a fairly high standard of living; far greater variations are likely where there is serious illness or unemployment. It is therefore becoming clear that when property is built for unknown occupiers the variations in heat requirements are such that accurate heating calculations provide only an approximate basis. A very high standard of heat service can, however, be obtained by installing more ample appliance capacity to give rapid heatingup when used intermittently. If the appliance is truly flexible and the control simple to operate and immediate in action, the result will provide a service which suits almost any occupier and which will be in the true sense highly efficient.

The following table of sizes for gas fires is based on the Code of Practice for normal domestic requirements in rooms of normal size and construction; with ventilation rates between  $1\frac{1}{2}$  and  $2\frac{1}{2}$  changes per hour, and built to the following standards.

#### General assumptions

Type of building:	Two storey
Exposure:	Normal, South of England
Air change:	Two per hour
Window area:	One fifth of external walls
External walls:	Two
Chang of roomer	Approximately square

#### Standard of heat insulation in the building

	Transmittance * Heat required i	" U" Values in B.Th.U./sq. ft./ "I	F./h
	Standard 1	Standard 2	
External walls	0.34	0.15	
Internal walls	0.46	0.46	
Ground floor	0.35	0.15	
First floor	0.29	0.20	
Glass windows	1.00	1.00	

TABLE 1: SIZES OF GAS FIRES FOR DIFFERENT ROOM SIZES. BUILDING STANDARD 1

	1	2	3	4
		_	Gas fire,	Background
Room size	Gas fire, no	Convector fire,	background	heating required
(ceiling height	background	no background	heating	with fire in
8 ft.)	heating	heating	required	col. 3 B.Th.U/hr.
10 × 10	24	24*	24*	_
12 × 12	28	24	24	1500
14 × 14	36	28	28	2000
15 × 16	48*	32	32	2500
16 × 18	48	36	36	3000
BUILDING	STANDAR	D 2		
	1	2	3	4
10 × 10	24*	24*	23*	_
12 × 12	24	24*	24	Name .
14 × 14	28	24*	24	1500
15 × 16	32	24	24	1750
16 × 18	36	28	28	2000

#### Notes on the use of Table 1

- 1. The table gives broad guidance for average conditions and the gas rates of the fires are rounded off to the nearest 4 cubic feet per hour. The gas rate multiplied by 500 gives the heat input rating to the fires in B.Th.U. per hour.
- 2. Columns 3 and 4 are intended to be taken together; column 4 refers to the additional heat required as background heat, when a purely *radiant* fire had the rating in column 3.
- 3. The figures refer to fairly long periods of heating, *i.e.* about 6 to 8 hours per day. For more intermittent use it is desirable to choose a larger fire and so to increase the margin for preheating.

It is very difficult to give an accurate assessment of preheating margin necessary but the following figures may be used as a guide.

(i) For bedrooms, etc., where very short period heating may be required. Increase rating by 30 to 40 per cent.

(ii) 2 to 4 hours heating period. Increase rating by 20 to 30 per cent.

In the table the examples marked with an asterisk already have a reasonable margin and further addition should not generally be necessary.

The application of the factor is as follows:

Suppose the tabular figure is 32 cubic feet per hour and intermittent use is anticipated, say 2- to 4-hour periods, the gas rate should preferably be  $32 \times 1.30 = 41.6$  cu. ft. per hour, but a gas fire near this rating may not be obtainable. If the next larger is chosen a shorter preheating time will result.

- 4. For the larger rooms it is sometimes difficult to give general warmth by a single radiant type fire. In such cases a convector fire or a radiant fire plus background heating or two radiant fires will give better results.
- 5. Where a central heating system is being used to provide background warmth the use of a gas fire in living and dining rooms provides for between-season heating and for rapid warming up for short periods of use. The gas fire adds flexibility to an otherwise inflexible system.

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#### Extension of table to other situations

(a) Only one external wall: for the better standard construction the difference is insignificant. For the lower standard the effect of one external wall instead of two is to reduce the heat requirement by 10 per cent, for the larger rooms and 20 per cent, for the smaller. For three external walls in the lower standard of insulation add 20 per cent, to the figures in the table.

(b) Window size: variations can be ignored except where the window area exceeds, say, 50 per cent. of floor area. Such cases should be calculated.

#### Living room standards

If heated solely by radiant heat, the heat output should balance heat losses when room temperatures are 60 degrees F. and external temperatures are 30 degrees F. Incidental heat gains may be considered to cover 5 degrees F. If background heating is provided, a further 10 degrees F. is due to that source, making a calculated 15 degrees F. rise to be covered by the radiant appliance. These figures are such that "Equivalent" temperatures of 62 degrees F. to 66 degrees F. can be obtained with air temperatures of 55 degrees F. to 60 degrees F. It is considered that this standard should be obtainable in living rooms, kitchen living rooms and at least one bedroom.

Note: The "equivalent temperature" is used as a comfort index and takes into account radiation, air temperature and air movement.

#### Other rooms

For other bedrooms, and rooms not to be used regularly, the radiant heat output should be not less than 5,000 B.Th.U's per hour for rooms up to 100 sq. ft. floor area and not less than 7,000 B.Th.U's per hour for larger rooms.

#### Kitchen and hall

In normal houses up to, say 1,200 sq. ft., heaters

having 4,000 to 6,000 B.Th.U's per hour output each should be adequate for the kitchen and hall.

#### **Bathrooms**

Adequate service in the average sized bathroom may be provided by a heated towel rail of 1,000 B.Th.U3 per hour output or a radiant heater of 2,500 B.Th.U3 per hour used intermittently.

#### Supplemental heating

Where normal heating is by solid fuel, a plug point beside the fire will allow the use of a gas poker for fire lighting or a small portable heater for between season use. Alternatively, it may be better to provide a radiant heater of adequate size to take the whole heating load at any season so that comfort condition may be rapidly attained when the room is used intermittently.

#### Ventilation

All flued gas fires provide adequate ventilation in dependently of external weather conditions and of the occupants use of windows and doors in bad weather. They reduce the excessive ventilation due to 9 in. x 9 in. or other unnecessarily large flues,

#### Comfort distribution

Some measure of variability in heat distribution seem necessary for comfort. Radiant heat should be mainly at low level and over a wide horizontal angle. Table 2

#### TABLE 2: RADIANT HEAT DISTRIBUTION

	Proportion of total heat emitted			
To:	Gas fire	Coke fire		
Floor	0-40	0-20		
Ceiling	0.15	0.38		
Wall opposite fire	0.22	0.14		
L.h. wall	0.12	0-15		
R.h. wall	0-11	0.13		

#### TABLE 3: HORIZONTAL INTENSITY, B.TH. U's/SQ.FT. H.

		Direc	tly in f	ront of fire				45° 1	o side o	of fire				
		3 ft. e	away		6 ft.	away		3 ft.	away		6 ft.	away		
		Heigh	ht abov	e floor leve	l In feet							3 55 25 55		
Type of fire	Heat input, Btu/h	1	3	5	1	3	5	1	3	5	1	3	_	
Hearth type	15,000	380	270	115	95	85	70	225	160	55	55	55		
Hearth type	7,500	170	120	55	45	40	30	100	75	25	25			
Panel type (2 ft from floor)	15,000	260	325	205	75	85	80	160	210	130	45			

compares this factor for gas and coke fires. Table 3 the horizontal intensities of gas fires.

The vertical gradients are of a desirable character and there is some variety with position and thermal comfort with reasonable aid temperature.

# TYPES OF GAS HEATING APPLIANCE AVAILABLE

#### Flued gas fires

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Table !

- 1. Conventional type giving little but radiant heat.
- (a) Hearth pattern.
- (b) Panel type for fitting in wall recesses.
- (c) Portable fires.
- (d) Combined gas and coke fires.
- Convector fires, giving radiant heat plus a substantial amount of convected heat in warm air circulation.
- (a) Hearth type radiant fires: In these, refractory elements are heated to incandescence so that high temperature radiant heat is emitted. They are capable of a high heat output, which is available within a very short time of lighting and they are instantly controlled to any desired temperature. While they can be used for continuous heating, their greatest value is for intermittent use in, for instance, dining rooms and bedrooms. The more recent designs using non-aerated burners playing on horizontally disposed bars, and in which most of the radiation comes from the refractory insulated back brick, have advantages of economy in maintenance. The radiant efficiency of this type should be from 40% to 45% together with some 3% of convected heat from the casing and some advantages from the flue heat.

The range of sizes available give heat inputs to the fire of between 12,000 and 32,000 B.Th.U's per hour in steps of about 4,000 B.Th.U's—or say 5,500 to 15,000 B.Th.U's per hour as radiant heat to the room in steps of about 1,750 B.Th.U's per hour. The radiant efficiency remains fairly steady over a wide range of gas rates. 50% of maximum output is obtained in 3 minutes of lighting and 90% in about 18 minutes. (b) Panel type fires: similar to the hearth type fires

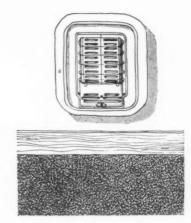


Fig. 3. Panel type fire.

but arranged to be fitted into a recessed concrete block and usually fitted to the narrow type precast concrete block flues. Panel fires are usually fitted at about 2 ft. above floor level, but there are many advantages in a higher position which provides better heat distribution by reducing the shielding effect of furniture. In bedrooms there would be less risk of bedding coming too near the fire, which, however, is provided with a guard, and they are more easily lit and controlled by invalids and elderly people who may find it difficult to reach floor level. In any event there is an advantage in placing the control tap at near hand level when elderly people are likely to use it.

Efficiencies and general characteristics are the same as for hearth types apart from changes in heat distribution due to their higher position in the wall. Heat input ratings range from 12,000 to 24,000 B.Th.U's per hour in steps of 2,000 or 4,000 B.Th.U's per hour.

(c) Portable hearth fires: designed to stand freely on an existing hearth and to discharge products of combustion to the existing flue. Connections to the gas supply are by approved type flexible tube. They are primarily radiant heaters but give some convection

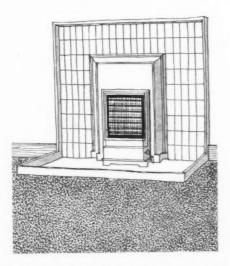


Fig. 1. Hearth type fire with block type radiants.



Fig. 2. Hearth type fire with horizontal radiants.

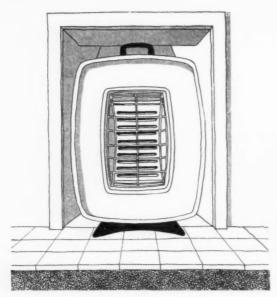


Fig. 4. Portable hearth type fire.

from the casing surfaces. The test bench efficiency lies between 40 per cent. and 45 per cent. but in practice is higher depending on the amount of convected and flue heat entering the room. The sizes are limited by consideration of portability and by the fact that they might be used fluelessly. Input ratings are from 10,000 to 12,500 B.Th.U's per hour, the latter being the maximum permissible limit.

(d) Combined coke and gas fires: this is a coke grate having a combined gas fire and using a single flue. The gas unit provides a measure of flexibility of service which is not normally available from a solid fuel fire and is of service for short period and mild weather heating, or for use late in the evening when refuelling of the coke fire could be wasteful. The heating capacity of the gas component is smaller than that of a normal gas fire, but when maximum output is required in cold weather, the solid fuel component is available and adequate.

#### 2. Convector gas fires

The principle of adding a convection component to radiant gas fires has long been known but it is only recently that the inherent efficiency has been seen to balance the greater first cost. The basic idea is illustrated in Figure 6. The character of the radiant fire remains, but a duct allows air warmed from the back of the fire back and the flue to flow into the room. Designs have not yet become fixed, but the policy has been to provide the convectional radiant heater and then to take what convection heat is possible from the back, sides and flue. The result has been an addition of between 20 per cent. and 30 per cent. to the effective room heat compared to the purely radiant type. The radiant output lies between 66 per cent. and 82 per cent. and the convected output between 18 per cent. and 34 per cent, of the total useful heat, the convection/radiation ratio lying between 0.23 and 0.51. Test bench efficiencies range between 50 per cent. and 56

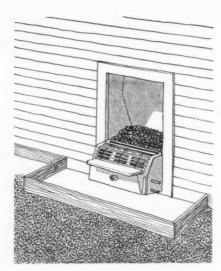


Fig. 5. Combined coke and gas fire.

per cent. but the practical results can be better owing to the availability of useful heat from the surround and internal flue. For this latter reason and with relatively long period heating overall efficiencies can approach 70 per cent. The subject is dealt with more fully in the papers on the Abbots Langley experiments. Range of heat input lies between 16,000 and 18,000 B.Th.U's per hour. These, owing to the higher overall efficiency, particularly when used with internal flues in lightweight structures, compare with normal gas fire input ratings of 19,000 to 22,000 B.Th.U's per hour. The heating up period of the radiant factor is the same as for conventional gas fires while convection output reaches 50 per cent. within 10 minutes and 90 per cent. within 50 minutes.

Convector fires offer slightly better general comfort conditions than purely radiant fires and at a lower fuel consumption.

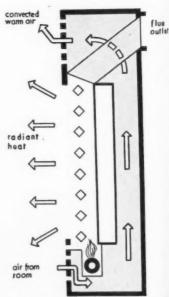
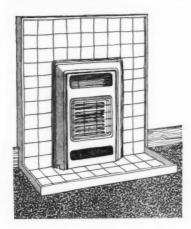


Fig. 6. Operation of convector fin.



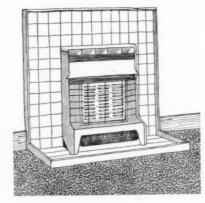


Fig. 7. (extreme left) and Fig. 8 (left). Two types of convector fire.

Balanced flue convector heaters: the principle of the balanced flue convector heater is shown below. The whole heater body is sealed from the room and combustion air and the products of combustion pass through the wall to the outer air and are arranged and terminated so that the external wind pressure effects are balanced. This avoids the need for a conventional flue. Heat outputs are almost wholly by convection, although up to 10 per cent. radiation is possible from dull hot surfaces. The temperatures of the convected air and any radiant surfaces are higher than with conventional hot water radiators but the

general thermal effect is similar. They provide greater flexibility than is possible with a central heating system, for instance one unit alone can be in use, but they are not well adapted for short period heating of, say, less than four hours.

Domestically these heaters are suitable for background heating and are normally only fixed on external walls. However, it has been proved that they can be successfully used when fitted to a common duct, open to the air at both ends, and it is hoped that this method of installation will soon be permitted.

Home-produced appliances have input ratings between

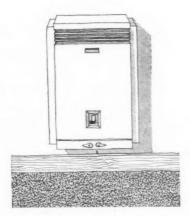
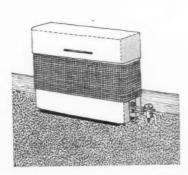


Fig. 9 (above) and Fig. 10 (below). Two types of balanced flue convector heater.



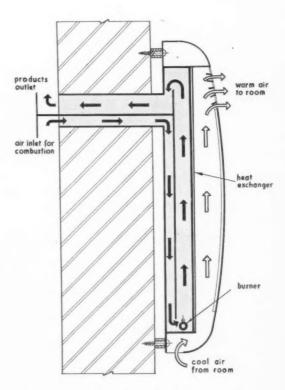


Fig. 11. Operation of balanced flue convector heater.

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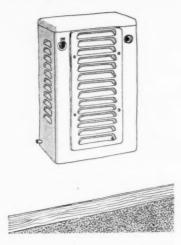


Fig. 12 (above). Unit type convector with fan-circulated warm air.

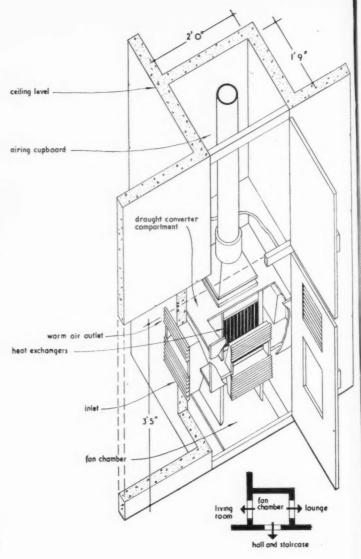


Fig. 13 (right). Cutaway axonometric showing layout of convector "wholehouse" heater with fan-circulated warm air.

5,500 to 9,500 B.Th.U's per hour. Continental types which have been imported have input ratings as high as 21,500 B.Th.U's per hour.

Convector heaters with fan-circulated warm air: for larger rooms or for houses where background heating is required for several rooms on one floor, gas heaters having an electric fan to increase and control air circulation are now available. Primarily intended for one large room in which a single appliance is unlikely to be successful, they can be used with the aid of ducts to heat any one or all of a series of smaller rooms. The whole of the heat can be used in one room to provide a rapid service for intermittent use; alternatively, a source of high temperature radiant heat can be used. They can be arranged for thermostatic control and have great flexibility in output.

Bench efficiencies of 75 per cent. have been obtained with some extra heat available from flue and casing surfaces. Input ratings lie from 18,000 to 22,500 B.Th.U's per hour and air circulation lies between 6,000 and 7,000 cu. ft. per hour.

Flueless heaters: for halls and as background heaters in large rooms, flueless heaters provide an economic source of convection heating and the saving in the fuel costs can be considerable. Their use is restricted to rooms having ventilation. Continuous heat input must not exceed 500 B.Th.U's per hour for 100 cu. ft. of heated space in living rooms but for halls and passages where ventilation is likely to be greater this may be doubled. The portable types are designed for use with a flexible tube connection fitted to an approved plug type outlet, but there are many types designed for

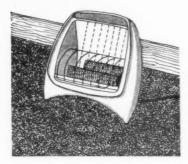
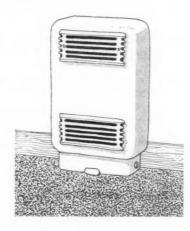


Fig. 14 (above) and Fig. 15 (below). Two types of portable free-standing heater.



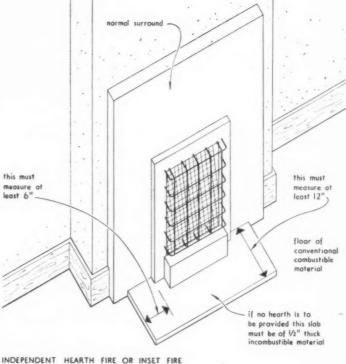


Fig. 16 (right). Diagrams illustrating the regulations for fixing hearth and panel type fires.

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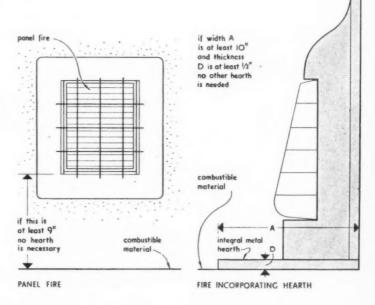
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fixing to the floor or wall and connected to a rigid gas supply.

They also have their place for short period heating of smaller and less often used rooms, for partial heating during mild periods when central and solid fuel installations cannot be used economically and for

shop and office use. They have a high thermal efficiency, figures of up to 90 per cent. being normal.

Portable free standing heaters: Small heaters of the bowl reflector type with input ratings from 3,000 to 4,000 B.Th.U's per hour and larger types usually

having a heated radiant and reflector with input ratings of 6,000 B.Th.U's per hour equivalent to about 5,400 B.Th.U's per hour to the room. Some 30 per cent, to 35 per cent. of the heat available is by directed radiation and 65 per cent. to 70 per cent. by convection.

Fixed "gas radiator" flueless heaters: These are designed for secure fixing to the floor or wall and for rigid connection to the gas supply. They heat mainly by convection and are available with ratings between 6,000 and 10,000 B.Th.U's per hour, with smaller wall fixing types mainly for background heating of 2,000 to 3,000 B.Th.U./hr. Oil-filled types similar to conventional hot water radiators are also made.

These notes cover the various types of independent space heating appliances. All can provide excellent comfort conditions at reasonable capital and running costs. Above all, they have the advantage of great flexibility. Not only can the heat input be regulated according to weather requirements, but they can give a very wide variation in thermal comfort conditions to suit whoever may occupy the premises in the future. At present, when only a small proportion of the population have experience of and can afford a full central heating service, this flexibility seems essential if the building is to prove satisfactory to a wide variety of future occupiers who, in most cases, take the accommodation available and cannot select the heat service they would prefer.

#### NOTES ON FIXING REQUIREMENTS Fire precautions

(Based on the London Gas Undertakings (Regulations) Act. 1939.)

Gas fires fitted on a floor which is not incombustible must have a "hearth" slab of incombustible material of at least ½-in. thickness and projecting 12 in. in front of the radiants and 6 in. on either side of the appliance, unless (a) the radiants are at least 9 in. above the floor, (b) the appliance has an integral hearth projecting 10 in. forward from the back rim of the appliance and finished 11 in. above the level of the floor (see Fig. 16 on page 785).

#### Panel fires

Panel fires must be fitted into a prepared recess formed of incombustible material and have an unobstructed outlet of not less than 20 sq. in. to a flue of this size or greater. The weight of the fire must be taken by adequate rag bolts cemented into the structure. Wood or fibre plugs are not suitable.

#### Convection heaters

Some flueless types of convection heaters are designed for use as portables. If, however, they are to be used only in one place, it may be advantageous to fix them. Vertical types placed in corridors should be fixed where possible. Under the London Gas Undertakings (Regulations) Act, 1939, flueless heaters may not be

fitted in a habitable room or office unless the room is ventilated by a flue or central ventilating system or by one or more apertures to the open air or to a ventilated lobby or corridor. The sides of the apertures must be not less than those given in Table 4.

TABLE 4

Volume of room	Area communicating to open air	Area communicating to lobby or corridor
Up to 2,000 cu. ft.	20 square inches	40 square inches
For each additional 1,000 cu. ft. or part thereof	10 square inches	20 square inches

The continuous gas rate of a flueless heater in a habitable room or office must not exceed 500 B.Th.U's per hour per 100 cu. ft. of room space. For halls, passages and shops this may be increased to 1,000 B.Th.U's per 100 cu, ft. of space. Kitchens and places where food is cooked are included in habitable rooms.

#### SMALLER COKE-FIRED SPACE AND WATER HEATERS

Coke fires: Coke can provide full heating domestic hot water and cooking service for any house. The present section deals with space heating appliances burning coke comparable in service to normal sizes of domestic gas fires and to combined duty appliances where the space heating units have been fitted with a boiler.

Coke boilers, whole house heaters and cookers are dealt with later.

Appliances available include: Inset open fires.

Free standing open fires. Openable heating stoves.

These appliances may be without or with boilers which can be used for domestic hot water supply or for a limited radiator service. In certain cases appliances are fitted with large back boilers which can carry both domestic hot water and some radiator service.

In selecting the appliance it is essential to make certain that there is sufficient capacity to deal with the total required load. An attempt to take too high a proportion of heat for a subsidiary purpose may defeat the primary purpose of the installation.

#### Inset open fires

Ratings are more difficult to define in the case of open fires than for boilers or gas fires owing to variations in use and in user habits. Table 5 (page 787) will serve as a guide.

Lighting: all approved types are fitted with gas ignition

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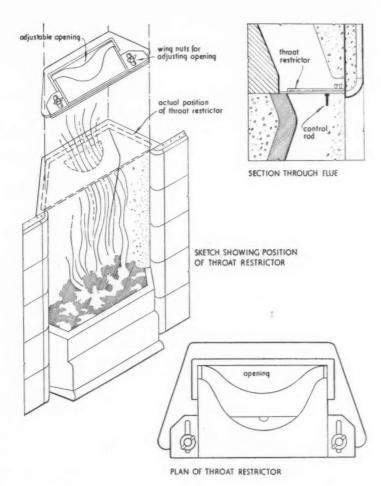


Fig. 17. Diagrams illustrating the fixing of inset open fires.

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	Services provided		
	Space heating		Domestic hot water
Appliance		Maximum recommended room size in cu. ft.	Storage in gallons
Inset open fire	By radiation	1750	
Inset open fire with back boiler	By radiation	1500	25/30
Convector open fire	By radiation and convection to same room	2250	
Convector open fire with back boiler	By radiation and convection to same room	2000	25/30
Open fire with large surface area back boiler	By radiation	1500	
	By hot water radiators	Additional heating from about 35 sq. ft. radiation surface (including pipe runs)	25/30

the: orthodox construction is assumed and the size of the room to be heated can be increased if: (a) the house is fully insulated with well fitting doors and windows and solid floors. ("Egerton Standards".—Post War Building Studies No. 19: Heating and Ventilation of Dwellings.)
(b) the chimney ventilation rate, which is generally excessive, is controlled by restricting the throat.

Installation: most approved open fires can be placed within an existing Milner type fireback, if it is in good condition, or where necessary can be supplied complete and built into the usual 223-in. wide structural opening. Where a new back is fitted, a piece of cardboard or corrugated strawboard should be wrapped round the back of the firebrick before the space between it and the structural brickwork is filled with weak lime mortar. This provides a space for thermal expansion and greatly reduces the risk of the fireback cracking. The bottom grate should be cut so as to fit the fireback, leaving a 1-in. gap on three sides to allow for expansion of the cast iron.

The fire must be fitted firmly to the hearth and pointed up with an air-hardening fire cement and the rest of the appliance must fit closely to the fireplace opening or iron frame to prevent any air leakage into the ash pit, which would nullify the effect of the air intake control on the ashpit door.

The throat must be smoothly finished and should not exceed about 45 sq. in. in area and the flue itself

Fig. 18. Installation details of inset open-fire.

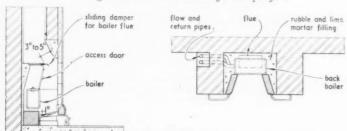


Fig. 19. Installation details of inset open-fire with back boiler.

should be 9 in.  $\times$  9 in. unless a special block flue is used. Large flues which allow an excessive ventilation rate can be restricted by the use of a ventilation control unit.

#### Back boilers

All these fires can be fitted in front of back boilers for domestic hot water or additional space heating by radiator service providing the unit conforms to certain minimum dimensions. The base of the boiler flue should be not less than 1 in. above the top surface of the bottom grate and the flue way must be carefully formed to the sizes required for the particular make of fire selected. The brickwork, which should be in fire-brick in lime mortar, must be accurately laid and all joints well flushed up and straight. A damper to control the flue way is essential and must work freely and there must be a removable cast iron back plate to allow for flue cleaning and the removal of the boiler hand hole cover for descaling and cleaning.

Self-contained boiler flue units are now available and greatly reduce site work and risk of air leakage.

A larger unit is available to give full heating for one room up to 1,500 cu. ft, together with some radiator service elsewhere or with supplementary heat by the radiator in the room in which the appliance is fitted up to a total volume of 2,000 cu. ft. Adequate control valves must be incorporated in the pipe system so that

the space heating output may be cut down at the time of maximum demand for domestic hot water. These can be manually or thermostatically controlled to reduce the flow to the radiators when the boiler flow temperature falls to a pre-set level. Indirect hot water cylinders are necessary; gas attachments for summer water heating can be fitted.

#### Convector open fires

Convector open fires have a somewhat higher overall efficiency due to the airways surrounding the back and sides of the fire grate, which are arranged to take cold air in at floor level and to deliver it, when warmed, at higher level in the same (or, occasionally, another) room. These fires are available in various types:

- (a) Inset single cased, requiring a good deal of site work.
- (b) Inset double cased, which are almost wholly self-fitting.
- (c) Free-standing double-cased, requiring a minimum of setting. They can be placed in most existing fire surrounds.
- (d) Free-standing single cased, which can be placed in most existing surrounds and recessed.

Types a, b and d may have boilers fitted.

Where type (a) are used the space between the appliance and the finished face of the fireplace opening must not exceed 2 in. and all joints must be carefully made and sealed, particularly joints between the convection chamber and the flue, and where flow and return pipes pass through brickwork. A removable access plate is essential for cleaning out the boiler and flue ways.

All open fires, with or without boilers, take No. 2 broken coke, although in emergencies other fuels can be used. Where a gas ignition burner is used, a good fire can be obtained in 20 minutes with a drawplate and 40 minutes without. The boiler flue damper must be shut when lighting-up. Because of the bulky nature of the fuel a deep fire bed is required to give the best performance and the rate of burning should be controlled by the air control on the ashpit door, not by the amount of fuel added. Ashes must never be left to accumulate until they touch the bottom grate from below. If they do, the life of the bars will be shortened. Most designs of fire can be banked up to keep in overnight without attention, sometimes with the aid of a deepening or cover plate.

#### Openable stoves

Continuous burning heating stoves designed for low combustion rates can give the most economical heat service, either for one room or as a background heater for the whole house when placed in a hall. Most of the heat output is by convected air entering the jacket at low level and emerging from the top, but when run with the doors open there is much of the high temperature radiation effect of the open fire. Almost all makes can be fitted with a boiler which can supply either radiators or domestic hot water, or both if an indirect cylinder is fitted.

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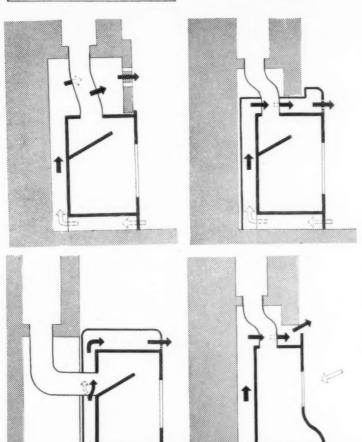
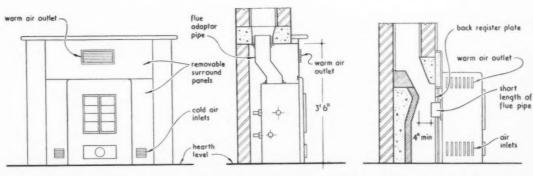


Fig. 20. Sectional diagrams showing the air flow of four types of openable convector solid fuel stove. Above, extreme left; inset model single-cased; above left, inset model double-cased. Extreme left, free-standing model, double-cased; left, free-standing model, single-cased.

Ratings: the space heating output is proportional to the firebox fuel capacity. Hot water output is designed to meet normal family requirements with a 25-30 gallons hot water storage capacity and may be calculated with reference to Table 6. The highest room heating efficiencies are obtained when running with the doors closed. The rate of combustion is controlled by the air intake control on the ashpit door. If the ashpit door is left open, or the control is opened excessively, very high temperature can be quickly attained and damage may result.

	With convection to same room				
Maximum Room size, cu. ft.	With back boiler Fuel capacity, cu. ft.	Without back boile Fuel capacity, cu. ft.			
1.500	0.51	0.35			
1,900	0.57	0.40			
2 100	0.63	0.45			
2,400	0-59	0.50			
2,700		0.55			
3,000	_	0.60			



stove with back boiler and front access. Fig. 22 (above openable stove in front of an existing fireplace recess.

Fig. 21 (above). Installation details of inset openable right). Sectional diagram showing fixing of free-standing

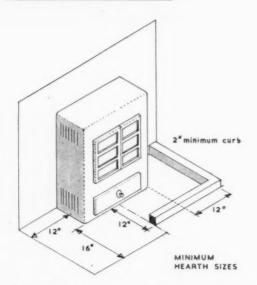


Fig. 23. Diagram showing the fire precautions recommended in the code of practice for the installation of openable stoves.

Installation: with inset type stoves, great care is needed to ensure an airtight fit between the flue pipe and the structural flue and between airway and any pipe work to prevent smoke or dust getting back into the room, and to prevent loss of warm convected air into the chimney. If a stove is placed in front of an existing fireplace, the hearth must extend at least 12 in. in front of the stove and there must be a curb standing 2 in.

above hearth level unless the hearth extends at least 16 in. in front of the stove. Alternatively the stove can be stood on a concrete slab six inches thick and extending 12 in. in front and 6 in. to the sides of the stove, if provided with a 2 in. curb or else 16 in. front extension and 12 in. side extension.

There is, as yet, no standardization of stove dimensions, but almost all will fit within a recess 24 in. wide, 18 in. deep and 42 in. high, for models without boilers, and 36 in. wide for models with boilers. The depth allows 3 in. clearance between the back of the recess and the appliance.

There are advantages if the back of the recess can be formed of a removable panel to provide easy access to the boiler and flue for cleaning. Such a panel, if it can be in a hall or kitchen, will provide some useful warmth and will save removing the stove for maintenance. The panel, which must be fire resisting, should be securely fixed, preferably on a soft bedding strip within an angle iron frame to prevent damage to plaster when it is moved, and to prevent air leakage which "streaks" the wall finish.

#### Coke sizes

Coke is normally sold as:

No. 1 Large—over 13 in.

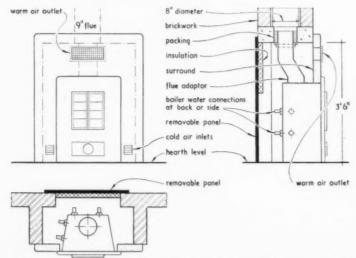
No. 2 Broken-1 in. to 2 in.

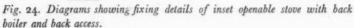
No. 3 Boiler Nuts-1-in. to 11-in.

No. 4 Forge $\frac{3}{8}$ -in. to  $\frac{3}{4}$ -in.

No. 5 Breeze-5-in. down.

Stoves with firebox capacity below 0.5 cu. ft. work best with No. 3 graded coke. Larger size stoves take No. 2.





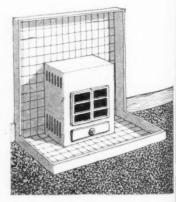
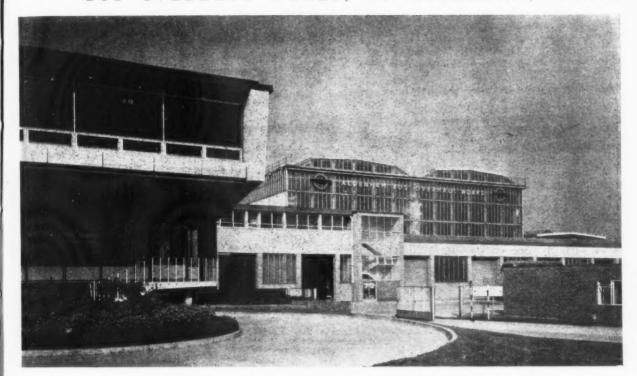


Fig. 25. Solid fuel openable stove.

#### HERTS BUS OVERHAUL WORKS. AT ALDENHAM.



The Bus Overhaul Works at Aldenham, which was a clear headroom of 50 ft. beneath the roof structure, officially opened a month ago, is the largest factory for the overhaul and repair of buses in the world. The scheme was designed by the LTE Architect's Department, Thomas Bilbow, Architect to the LTE; K.J. H. Seymour, architect-in-charge: A. Merrill, resident architect: A. V. Bond and A. McBeth, structural engineers: A. A. M. Durrant, chief mechanical engineer (road services); H. Carter, heating and ventilation; J. H. Coombs and Partners, electrical consultants; J. D. and D. M. Watson, drainage consultants; A. L. Currie and Brown, quantity surveyors. In the aerial view below, taken from the northeast, the main works, which cover an area of approximately 17 acres, are centre; administrative offices, canteens, hostel, medical centre, etc., are bottom left; and the boiler house is top right. Above, the fully-glazed eastern end of the high bay of the main works, in which there is

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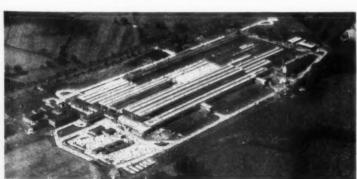
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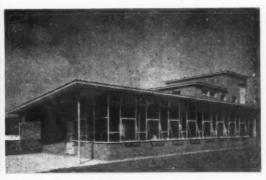
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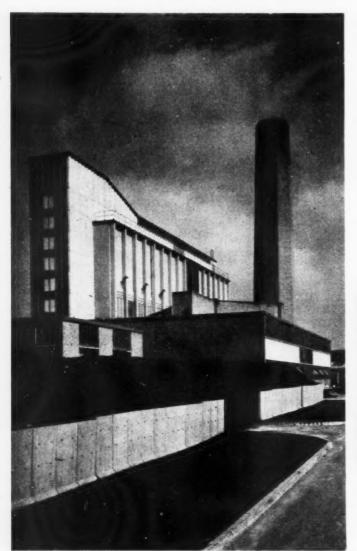
0. 2.

enabling a bus body to be lifted by overhead travelling crane and carried over a row of other bodies, as seen on page 792, right. Page 792, left, the boiler house to the north of the main works. This building has a steel frame, clad in brickwork, patent glazing and asbestos cement sheeting. On the extreme left is the elevator tower in which fuel is conveyed to r.c. bunkers over the boilers. Below, one of the staff canteens with windows facing south and east. The canteens at present cater for a staff of 1600, but eventually it is expected that a staff of approximately 2500 will be employed at the works. The circulation of buses requiring overhaul is shown on the ground floor plan of the works, opposite. The nucleus of these works consists of a railway depot built before the last war in connection with the pre-war scheme for extending the Northern Line to Elstree. When it became

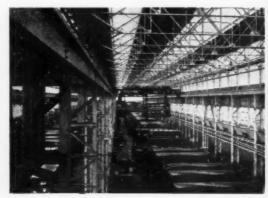




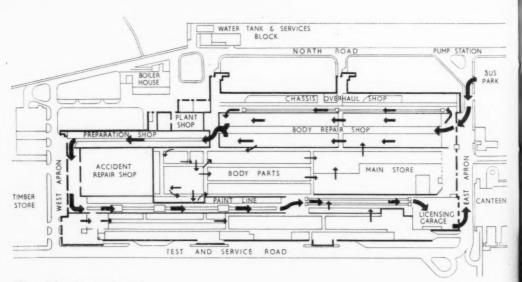
#### BUS OVERHAUL WORKS AT ALDENHAM: continued



obvicus that the bus overhaul works at Chiswick were quite inadequate for the enlarged fleet of buses, now numbering 8000, it was decided to extend the original building. The first construction contract was let in May, 1952. The factory is of steel-framed construction, with cladding of aluminium patent glazing and an asbestoscement and glass-fibre "sandwich" used for walls and roof. This consists of double corrugated asbestos-cement sheets fixed on purlins at 6 ft. 3 in. centres, insulated with a bitumen-bonded glass-fibre blanket, giving a calculated "U" value of 0·18. The steel frame is aligned as far as possible to the original factory grid and internal clear headroom is about 20 ft. (similar to that in the original building). In the staff buildings and canteens the

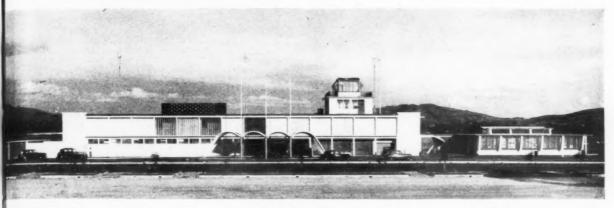


steel frame is mainly concrete-encased. The cladding to the timber store will be illustrated as a Working Detail in a later issue of the JOURNAL. The general contractors were Tersons Ltd. For sub-contractors, see page 808.



Ground floor plan, main works

#### AIRPORT TERMINAL BUILDING AT KUALA LUMPUR





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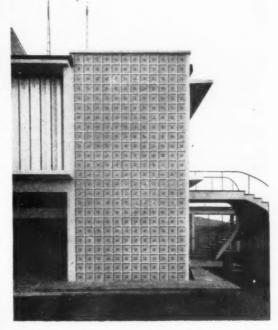
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half and half between the two. The scheme consists of two buildings connected by a covered way. The larger building houses the passenger and public lounge and viewing terrace, together with air traffic and customs facilities. The smaller building (page 794, bottom right) is provided for passengers in transit and is completely mosquito-proofed as a precaution against the importation of yellow fever. An effort has been made to ensure good cross

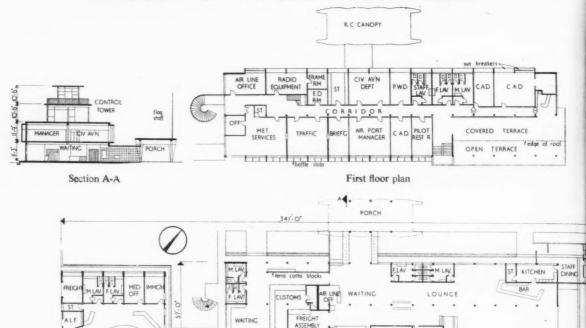
Increased air travel in Malaya has resulted in the hopelessly inadequate aerodrome buildings at Kuala Lumpur being demolished and replaced by the new airport terminal buildings illustrated here. At the opening on August 1, 1956, the Minister of Transport, Ong Yoke Lin, said that the buildings and the aircraft parking apron cost 950,000 Straits dollars (£114,000), divided





ventilation throughout the building. This is essential in the humid-tropical atmosphere of Malaya. On the entrance side (top) exterior walls and windows were dispensed with in favour of aluminium adjustable sun breakers (seen extreme left, above). These are hand-operated and are adjustable through 180°. Because of their interlocking nature, they resist rain and yet provide necessary ventilation. Left, on the elevation facing the runway aluminium projected "push out" windows were

#### AIRPORT AT KUALA LUMPUR continued



ONCRETE

Ground floor plan [Scale: 16 "= 1' 0"]

TRANSIT LOUNGE

used. These are protected by a reinforced-concrete "egg crate" projection which is designed to eliminate direct sunlight after 10 a.m. The structure is in reinforced concrete throughout, including the barrel-voulted intrance porch (centre left p. 793) and the cantilevered external staircase (bottom left). Finishes to the buildings were selected for their durability, floors of public and passenger areas being of mosaic tiles and broken marble. Office floors are of thermoplastic tiles. External finish is cement and sand rendering and internal partitions are lime-plastered or tiled. The colour scheme is basically black, white and grey with areas of light blue, terra cotta,

yellow and brown. The aerodrome is International Civil Aeronautics Organisation classified, and runways are long enough for Constellation and Britannia aircraft. The aircraft parking apron was constructed at the same time as the building and was designed and executed entirely by the Public Works department. This was not part of the building contract. The airport was designed in the office of the Director of Public Works, Federation of Malaya for the Department of Civil Aviation. Architectin-charge, Stanley P. Merer, structural design by Design and Research Branch, PWD, quantity surveyors, Q.S. Department, PWD.





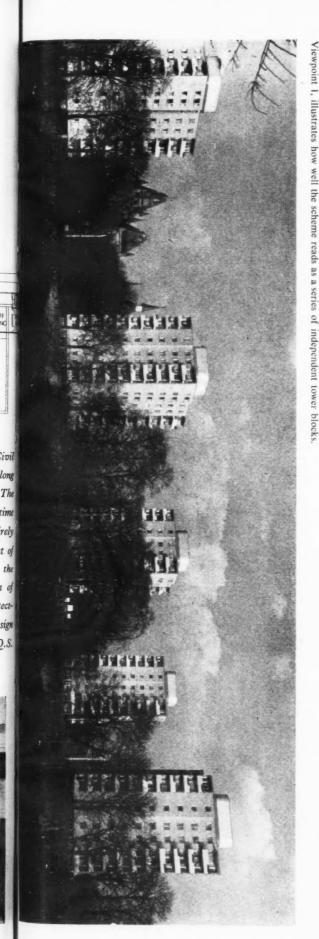
KENNETH GRIEB architects-in-charge; consultants (structural) OVE ARUP and PARTNERS; (heating) OSCAR FABER and PARTNERS

council; M. J. WHITFIELD LEWIS, principal housing architect; CLEEVE BARR, assistant housing architect; MRS. R. STJERNSTEDT, OLIVER COX and on the fitzhugh estate, trinity road, london, s.w.17, for the london county council; designed by dr. J. L. Martin, architect to the

building illustrated

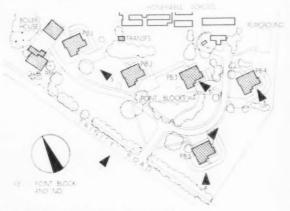
The Fitzhugh Estate at Trinity Road, Wandsworth, which is the first LCC estate to be analysed in the Journal, stands on a site of approximately ro acres adjoining Wandsworth Common. The scheme consists of five eleven-storey blocks carefully sited to preserve the open character of the Common and to limit disturbance of the existing trees. Accommodation for approximately 630 people is provided. Each block consists of a central core containing two lifts, two staircases, two refuse chutes and a duplicate

system of mechanical ventilation. There are four flats per floor except on the ground floor, which generally has three one-room flats, except block I, a laundry and stores for tenants. The structure of the blocks was worked out in collaboration with the general contractors, Wates Ltd., who proposed pre-casting a considerable proportion of the concrete work. This method of construction enabled them to use to advantage a 300-ft. tower crane and contributed to rapid completion of the structure.





Opposite page (viewpoint 2): the west and south facades of block 4 showing the larger balconies of the three-room flats and the smaller balconies of the two-room flats. The setback in the centre of the elevation defines the junction between the two flats. On the ground floor can be seen the single-room flats. The roof house contains lift motors and water storage. Central heating is provided in each flat by radiators in the living room and a skirting coil in bedrooms. Water heating is by a 25-gallon calorifier in the kitchen of each flat.



Key plan showing photographic viewpoints

Above right (viewpoint 3): the general construction consists of reinforced concrete crosswalls, edge beams and columns. The external walls are of cavity construction, using white flint lime facing bricks and three-inch clinker-block inner leaf. The outer leaf is supported on concrete nibs which are masked by brick tiles. Windows are generally of wood; staircase windows are metal. The projecting balconies are hung between cantilevers projecting from the reinforced concrete cross walls, and have ribbed, zinc fronts to the balustrades and glazed ends. Below (viewpoint 4): blocks



FLATS at TRINITY ROAD, LONDON S. W. 17 designed by DR. J. L. MARTIN, architect to the council

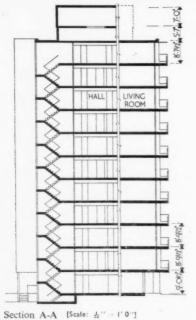
5 and 4 from the south. On the ground floor of each block are 3 one-room flats and on upper floors are four flats, three with two bedrooms and one with one bedroom. The balconies on the right are to three-room flats.





Above (viewpoint 5): the south side of block I showing the window to one of the two staircases which with the lifts, forms the central core. The main entrance is to the right of the central staircase and can be seen in the close-up view of block 3 (viewpoint 6, below). The door on the right leads to the tenants' stores and laundry.

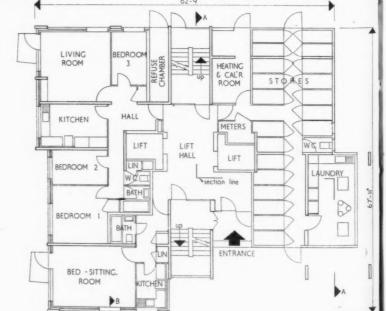




LIFT WELL ON Roofhouse plan (lower level)

Roofhouse plan (lower level)



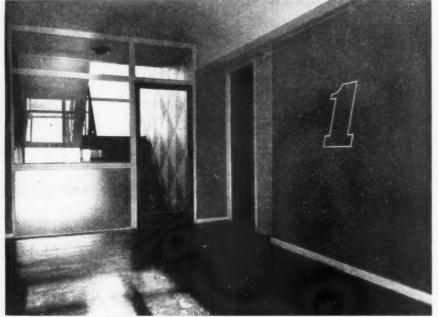


Below: ground floor plan [Scale: 1.6" = 1'0"] Above: typical upper floor plan

The resis ing h



The interior of the entrance hall, showing the main entrance doors, fire-resisting screen and escape doors. There are two lifts which stop on alternate floors in the enclosed central landings.

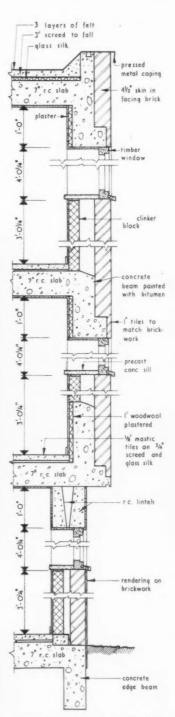


The two staircases (above and below left) are similar and open on to the central landing via glazed fire-resisting doors, which also serve as a sound barrier between the stairs and landing and assist in reducing heat loss. Refuse chutes are accessible from the staircase half landings outside the glazed screens. Below right, a staircase, showing the precast flight and half landing and the simple steel and hardwood balustrade. The wall decoration is paint on plaster.



plan





Detail section B-B [Scale: \frac{1}{2}" = 1' 0"]

#### FLATS

at TRINITY ROAD, LONDON,
S.W.17
designed by DR. J. L. MARTIN

architect to the council



On each of the upper floors there are three similar three-room flats and one two-room flat. Bathrooms are disposed around the central core and are mechanically ventilated. In the larger flats the balcony is the full width of the living room (above). On the ground floor there are generally three one-room flats, tenants' stores and a laundry (right). Typical kitchen, showing vertical duct and dresser.





at TI design archi

#### FLATS

at TRINITY ROAD, LONDON S.W.17 designed by DR. J. L. MARTIN architect to the council

## CLIENT'S BRIEF: his stated requirements

The Ministry of Housing agreed to the use of the site for housing on the understanding that it was to be laid out so as to preserve, as far as possible, the sense of spaciousness in keeping with the character of Wandsworth Common, of which it forms part. The net density of the part of the site actually used for housing is 105 persons per acre.

## SITE: topography, surroundings, access, planting

The site covers an area of approximately 10 acres. It is roughly triangular in shape, with a slight fall towards the north-east. Access is from Trinity Road, which forms the south-western boundary of the site. To the north, the site is bounded by Honeywell School. The south-region, main-l ine railway skirts the extreme north-west corner of the site, which is occupied by the boiler house.

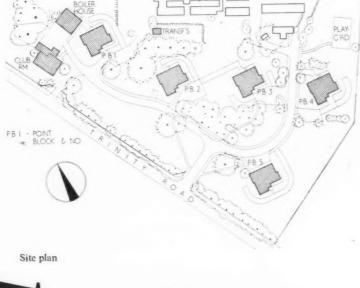
#### PLAN: general appreciation and relation of units

Each block of eleven floors consists of a central

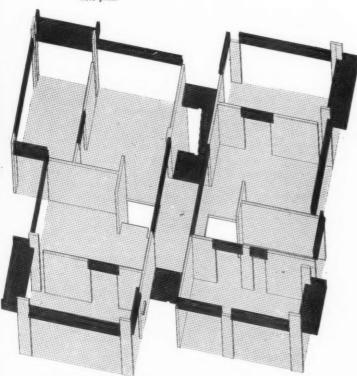
hall containing vertical circulation and services. There are two flats each side of the central hall. There are three similar three-room flats and one two-room flat on each upper floor. The layout was dictated by the shape of the site and a desire to preserve as many of the existing trees as possible. The open layout chosen has resulted in the five eleven-storey blocks being so disposed as to read as definite separate towers. The blocks are orientated so that the central landings run north and south and no living rooms face each other. The ground floor of the south-west block differs from the others in having the main entrance from the north side approached from the road. The boiler house, garage and clubroom form a low group tucked away in one corner of the site, to free the ground around the blocks as much as possible.

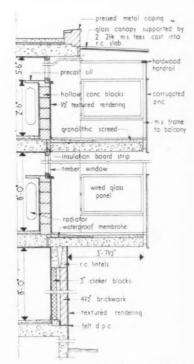
## MAIN CONSTRUCTION: general appreciation

Although working drawings, specification and bills of quantities were based on in situ concrete, internal structural walls and floors, with columns and beams framing the external walls, the contractors, Messrs. Wates Ltd., made certain proposals, based on their experience on multistorey flat construction, for using a tower crane and precasting a considerable part of the concrete work. A revised scheme of structural details was subsequently worked out by the architects in collaboration with the contractors and the consulting engineers, Ove Arup and Partners. An article on the construction of these flats, illustrated with progress photographs, was published in the A.J. Technical Section on February 3, 1955.



HONEYWELL





Above: detail section, typical balconies [Scale: \( \frac{1}{2} \) 0"]

Axonometric sketch of concrete structure. Precast units, dark tint and in situ work, light tint. [Scale: 40" = 1'0"]

				cost per sq. it.	5	a
				preliminaries and insurances	3	81
TRUCTURAL E	ELEMENTS			contingencies		113
Vork below ground floor vel: foundation type	Location	Materials	Finish	Reasons and comments		
asement						
Rafted	Blocks 1, 2 and 3 Blocks 4 and 5	Reinforced concrete Reinforced concrete		Sub-soil conditions varied at different parts of the site from gravel to London clay		
				work below ground floor level	3	7
External walls and facings	Location	Materials	Finish	Reasons and comments		
air-faced brickwork	Upper floors	White flint lime bricks	Bucket handle joint	Cost included in frame		
Tyrolean rendering	Ground floor	Fletton bricks	Tyrolean rendering, painted with emulsion compound			
	Entrances		Terrazzo tiles and glazed patterned tiles			
Frame or bearing element	Location Materi	als Beam spans	Column grid	Reasons and comments		
Columns and edge beams	External face Reinfo	rced concrete Various	Various	Economy and speed of construction		
Cross walls	Internally Reinfo	rced concrete				
	ground floor slab,	frame, external walls an	d facings, roof constru	ction, lift wells, and partitions	18	9
Upper floor construction	Location	Materials	Finish	Reasons and comments		
Slab		7-in. reinforced concrete		Economy and sound insula- tion		
Staircases	Location	Materials	Finish	Reasons and comments		
Precast flights	Two per block	Reinforced concrete precast flights and half	Granolithic	To obtain good standard of finish and to help speed of		
Height: floor to floor = 8	Ife olin	landings		construction		
reight, hoor to moor = e	11. 92 111.			staircases	1	5
D. C.	*		P			
Roof construction Flat slab	Location All blocks	Materials Reinforced concrete	Finish  1-in. glass silk quilt.	Reasons and comments		
	THE OWNERS	Actinoistic Contract	Screed to falls. Asphalt			
				roof screed and covering		5
Balconies	Location	Materials	Finish	Reasons and comments		
Private balconies on upper floors	Open off living rooms on south east and west elevations.	Reinforced concrete on cantilevers projecting from cross walls and columns	Granolithic screed to falls Balcony fronts. 14 z.g. corrugated zinc on gal- vanised m.s. frame. Hardwood handrail. Returns to balconies in wired r.c. glass	Floor of balcony spans between cantilevers		
		staire	ase and balcony balust	rades, roof ladders, guard rails	2	0
				balcony asphalt		2
Roof lights	Location	Materials	Finish	Reasons and comments		
Dome lights	Roof houses	Circular glass dome lights				
				dome lights		1
Windows	Location	Materials	Finish	Reasons and comments		
All blocks	External generally	Standard LCC range timber	Painted			
	Staircases	Metal	Painted			
				staircase metal windows		
				wood windows	1	
				window boxes		

cost per sq. ft.

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External doors	Location	Materials	Finish	Reasons and comments		
II blocks	Private balconies	Timber (glazed)	Painted	Cost included in internal doors		
	Main entrance	Timber (hardwood) glazed	Oiled			
	Staircases (fire escape)	Metal, glazed Georgian wired reinforced cast	Painted			
	Tenants' stores, service	Hardwood vertical	Oiled			
	rooms Refuse chamber	boarded Ply-faced	Painted			
ilazing	Location Cut off doors to stairs	Materials Georgian wired polished	Finish	Reasons and comments Fire regulations		
	Staircase windows	Lower panel. Georgian				
		wired reinforced cast glass. Upper panel. \(\frac{1}{2}\)-in. drawn plate		N.B. half lower pane opens for cleaning		
PARTITIONIN	l C			glazing	1	-
AKITITONI						
internal partitions	Location	Materials	Finish	Reasons and comments		
	Between flats (ground)	Double skin 2/2 in. clinker, 2-in. cavity	Plaster	Sound insulation. Cost included in frame and finishings		
	Between rooms	2-in. clinker blocks	Plaster par	titions included in frame and finishings		
			, , , , , , , , , , , , , , , , , , ,			
Screens	Location	Materials	Finish	Reasons and comments		
Fire-resisting screens		Metal frame Georgian wired polished plate glass	Painted	Fire regulations		
	Between stair and central hall	Hardwood glazed door	Oiled			
				metal screens		4
W.C. doors and partitions	Location	Materials	Finish	Reasons and comments		
Flush doors	In flats	Hardboard with vent slot		Vent inlet for ventilation system		
Internal doors	Location	Materials	Finish	Reasons and comments		
	Entrance doors to flats	Flush hardwood veneer	Sealed			
	Kitchens	Timber framed and glazed	2700			
	Generally	Flush hardboard faced	Painted	all doors	1	
T	Location	Materials	Finish	Reasons and comments		
Ironmongery	Generally	LCC standard fitments	2 1/113/1	Reasons and comments		
				ironmongery		,
FINISHINGS						
Floor finishes	Location	Materials	Finish	Reasons and comments		
	Entrance hall, ground floor	Quarry tiles				
	Stairs	Granolithic				
	Halls, upper floors	Thermoplastic tiles				
			thermopla	stic tiles, screeds and sound insulation	3	
	•			granolithic quarry tiles and screeds		
Wall finishes	Location	Materials	Finish	Reasons and comments		
	Ground floor, entrance lobby	Terrazzo tiles				
	Staircases	Fair-faced concrete	Painted			
	Flats	2 coats plaster	Painted			
	Entrance halls	2 coats plaster	Painted			
				external render plaster on internal walls	1	
				wall tiling		

Location Generally	Materials  Bonding plaster and	Finish Twice whitened	Reasons and comments		
	finish $= \frac{1}{8}$ in.		Detection of order to the		
Half landings to stairs	Acoustic board		granolithic-surfaced stairs		
			plaster on internal soffits		5
Location	Materials	Finish	Reasons and comments		
Generally	Oil-bound distemper		The colours for the base and		
Kitchen and bathroom	Emulsion paint		pattern on the staircase are different for each block		
Staircases	Emulsion paint				
				1	4
			external decoration		2
Location	Materials	Finish	Reasons and comments		
Ground floor		Floor 6 in. × 6 in. quarry	Self cleansing		
		Walls 6 in. × 6 in. white glazed tiles			
			ommunal laundry aguirmant		•
			ommunar raundry equipment		8
Location	Materials	Finish	Reasons and comments		
Ground floors	Timber doors. Expanded metal vents	Painted			
			wrot framing		5
			general finishings	1	10
Location	Materials	Finish	Reasons and comments		
Kitchen	Hardwood worktop				
			19.1		•
			Kitchen equipment	'	2
Location Balconies	Materials	Finish	Reasons and comments		
Location Balconies	Materials 3-in. aluminium r.w.p. special balcony-drainage unit	Finish	Reasons and comments		
	3-in. aluminium r.w.p. special balcony-drainage	Finish	Reasons and comments  rainwater goods		1
Balconies	3-in. aluminium r.w.p. special balcony-drainage unit		rainwater goods		
	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent	Finish Finish	rainwater goods  Reasons and comments  Ground floor slab run		1
Balconies	3-in. aluminium r.w.p. special balcony-drainage unit  Materials	Finish	Reasons and comments Ground floor slab run independently to manholes		2
Balconies	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit.	Finish	rainwater goods  Reasons and comments  Ground floor slab run		4
Balconies	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit.	Finish	Reasons and comments Ground floor slab run independently to manholes		
Balconies  Location In internal ducts	3-in. aluminium r.w.p. special balcony-drainage unit  Materials  4-in. soil. 3-in. vent spruce thrower unit. Copper waste	Finish soil, ventilat	Reasons and comments Ground floor slab run independently to manholes ing and anti-syphonage pipes		
Location In internal ducts  Location	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit. Copper waste	Finish soil, ventilat	Reasons and comments Ground floor slab run independently to manholes ing and anti-syphonage pipes  Reasons and comments Limits amount of draw-off		
Location In internal ducts  Location Under kitchen sink	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit. Copper waste  Materials Galvanized iron	soil, ventilat  Capacity 25 gallons	Reasons and comments Ground floor slab run independently to manholes ing and anti-syphonage pipes  Reasons and comments Limits amount of draw-off of hot water		
Location In internal ducts  Location Under kitchen sink  Location	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit. Copper waste  Materials Galvanized iron  Materials Galvanized iron. Special	Finish  soil, ventilat  Capacity 25 gallons  Capacity Each 530 gallons	Reasons and comments Ground floor slab run independently to manholes ing and anti-syphonage pipes  Reasons and comments Limits amount of draw-off of hot water		
Location In internal ducts  Location Under kitchen sink  Location Tank houses	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit. Copper waste  Materials Galvanized iron  Materials Galvanized iron. Special circular tanks	Finish  soil, ventilat  Capacity 25 gallons  Capacity Each 530 gallons	Reasons and comments Ground floor slab run independently to manholes ing and anti-syphonage pipes  Reasons and comments Limits amount of draw-off of hot water  Reasons and comments	1	
Location In internal ducts  Location Under kitchen sink  Location Tank houses	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit. Copper waste  Materials Galvanized iron  Materials Galvanized iron. Special circular tanks	Finish  soil, ventilat  Capacity 25 gallons  Capacity Each 530 gallons	Reasons and comments Ground floor slab run independently to manholes ing and anti-syphonage pipes  Reasons and comments Limits amount of draw-off of hot water  Reasons and comments sphalt tanking to tank room	1	
Location In internal ducts  Location Under kitchen sink  Location Tank houses	3-in. aluminium r.w.p. special balcony-drainage unit  Materials 4-in. soil. 3-in. vent spruce thrower unit. Copper waste  Materials Galvanized iron  Materials Galvanized iron. Special circular tanks	soil, ventilat  Capacity 25 gallons  Capacity Each 530 gallons  a water installation, was	rainwater goods  Reasons and comments Ground floor slab run independently to manholes  ing and anti-syphonage pipes  Reasons and comments Limits amount of draw-off of hot water  Reasons and comments sphalt tanking to tank room ste pipes and storage cisterns	1	
	Half landings to stairs  Location Generally Kitchen and bathroom Staircases  Location Ground floor  Location Ground floors	Generally  Half landings to stairs  Acoustic board  Location  Generally  Gil-bound distemper  Emulsion paint  Emulsion paint  Emulsion paint  Count floor  Materials  Ground floor  Location  Ground floor  Materials  Materials  Materials  Ground floors  Materials  Materials  Materials  Materials  Materials  Materials  Materials	Generally  Half landings to stairs  Acoustic board  Location  Generally  Generally  Oil-bound distemper  Emulsion paint  Staircases  Emulsion paint  Staircases  Materials  Finish  Floor 6 in. × 6 in. quarry tiles Walls 6 in. × 6 in. white glazed tiles  Location  Materials  Finish  Floor 6 in. × 6 in. white glazed tiles  C  Location  Materials  Finish  Finish	Bonding plaster and finish = 1 in.   Twice whitened   Reduction of noise level on granolithic-surfaced stairs   plaster on internal soffits	Generally Half landings to stairs  Acoustic board  Acoustic bo

Refuse di Two refu block

Fire: str

Boiler t

Draina

Natura Bathro mecha:

Wiring

Ventile

Lifts

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sanitary fittings

efuse disposal: method	Type of refuse	Waste recovery	Materials and installation	Reasons and comments		
wo refuse chutes per lock	Domestic	Standard bins in refuse chambers at foot of chutes	Glazed pipe, concrete surround, hoppers and vent pipe and m.s. extensions to linings	t		
				refuse chutes		3
me structural precautions	Grade of protection ap	paratus Sprinkle	ers R	easons and comments		
				dry fire mains		4
				lightning conductors		2
Boiler type and capacity	Location	Head load and fuel type	Stoking method	Reasons and comments		
Three welded-steel boilers	Separate boiler-house	3,370,000 B.T.U's. Anthracite	Underfeed	Also to serve the new Spencer Park school on an adjacent site north of Honeywell School		
bo	iler house construction an	d plant, mains, heating	and hot water installatio	on and mechanical ventilation	8	
rainage: type of system	Location	Materials	Finish	Reasons and comments		
Combined	To public sewer			drainage excluded		
Ventilation	Location	Materials	Finish	Reusons and comments		
Natural in kitchens	Air bricks in external walls					
Bathroom and w.c. mechanical	Internal ducts					
Wiring and switching types	Location	Materials		Reasons and comments		
Conduit	Throughout			electrical installation	2	
Lifts	Location	Capacity and speed	Motor room position	Reasons and comments		
Two per block, stopping at alternate floors	Central landing	8-person	In roof house			
			su	pply and installation of lifts gas installation	5	
		to	otal net cost per sq. ft. of	f floorper block £88,173 25,409 sq.	69	
THERMAL INS	ULATION			20,400 540	***	
Туре	Location	U-Value		Reasons and comments		
Alain brick warning	External walls	0.27				
4l-in. brick, varying cavity. 3-in. breeze lining						
cavity. 3-in. breeze lining	USTICAL TREAT	MENT				
SPECIAL ACO  Sound absorption material	Location		tion coefficient	Reasons and comments	_	
SPECIAL ACO  Sound absorption material Glass silk quilt	Location Floors	Absorpt	tion coefficient	Reasons and comments	-	
SPECIAL ACO  Sound absorption material  Glass silk quilt  Acoustic board	Location Floors Stair landing ceilings	Absorpt	tion coefficient	Reasons and comments	_	
SPECIAL ACO  Sound absorption material  Glass silk quilt  Acoustic board	Location Floors Stair landing ceilings	Absorpt	tion coefficient	Reasons and comments		
SPECIAL ACO  Sound absorption material  Glass silk quilt  Acoustic board  TIME SCHEDU  Tender date	Location Floors Stair landing ceilings  LE  Work commenced	Absorpt Work c	ompleted	Type of contract	-	
SPECIAL ACO  Sound absorption material  Glass silk quilt  Acoustic board  TIME SCHEDU  Tender date	Location Floors Stair landing ceilings	Absorpt Work c				
SPECIAL ACO  Sound absorption material  Glass silk quilt  Acoustic board  TIME SCHEDU  Tender date	Location Floors Stair landing ceilings  LE  Work commenced	Absorpt Work c	ompleted	Type of contract	-	
SPECIAL ACO  Sound absorption material Glass silk quilt Acoustic board  TIME SCHEDU  Tender date August 31, 1953	Location Floors Stair landing ceilings  LE  Work commenced	Absorpt  Work c  Septeml	ompleted	Type of contract LCC, competitive tender		
SPECIAL ACO  Sound absorption material Glass silk quilt Acoustic board  TIME SCHEDU  Tender date August 31, 1953  RATIOS	Location Floors Stair landing ceilings  LE  Work commenced December, 1953	Absorpt  Work c  Septeml	ompleted ber, 1955	Type of contract LCC, competitive tender		
SPECIAL ACO  Sound absorption material Glass silk quilt Acoustic board  TIME SCHEDU  Tender date August 31, 1953  RATIOS  Area of enclosing walls	Location Floors Stair landing ceilings  LE  Work commenced December, 1953	Work of Septemb	ompleted ber, 1955 windows (including external do	Type of contract LCC, competitive tender		

#### COST ANALYSIS

Total ness dwelling floor area per block (excluding balconies, ducts, etc.) 25,409 sq. ft.			Tender cost of superstructure installations and finishings		
Outside works		Drains	Children's playground		
(10,791		£3.976	£1,046		
Garages		Club room	Transformer chamber		
(1,380		£3,862	£742		
Roads		Estate workshop	Proportion of boiler house and equipment allocated to the adjoining school project		
£4,533		£333	£5,725		

Cost per foot super of floor area

£3 98. 41d.

#### COST COMMENTS

The cost analysis of these flats will be discussed and compared with two-storey housing costs in an article to be published in a later issue of the JOURNAL.

#### SITE ORGANIZATION

Site labour and equipment: The site proved to be a very compact one, and was efficiently run with a relatively small staff. Operating under site management were: a resident agent, a resident engineer, supervising all reinforced concrete constructional work including also control of site precasting yard, a general foreman, supervising foundation work up to ground level, and two general foremen supervising general building work and the internal construction of blocks up to the hand-over stage. Also a visiting concrete engineer-consultant paid regular visits to the site. Trades foremen and gangers : operatives coming within this sphere are key men and have been in regular employment with the company for many years. The men in question were allocated as follows: a foreman carpenter, supervising 1st and 2nd fixing; two foremen carpenters, supervising shuttering; a bricklayer foreman, supervising brickwork to the exterior cladding to all blocks; a bricklayer foreman supervising internal brickwork; a steel fixer foreman, supervising all bending and fixing, including works both in the structure and the pre-casting yard; a ganger for concrete placing, a ganger for general work, and a foreman for supervising plastering. Foremen were provided by sub-contractors for carrying out all specialist operations. The usual clerical departments operated, namely: cashier/wages/ time-keeping department, costing and incentives department and storekeeper. The main equipment and plant on the site consisted of the following items (in certain instances they were specially ordered for this particular contract). The contract generally was planned around a Jules Weitz tower crane, since experience has proved that for the construction of multi-storey blocks it is the most efficient and practicable piece of plant available. The G.26 Jules Weitz tower crane, on this contract had a maximum height of 123 ft. under the hook. The maximum loads being 60 cwts. at 23 ft. radius and minimum loads 17 cwt. at 65 ft. 6 in. radius. The crane was mobile. Length of time on job, March

1954, to March, 1955. Concreting equipment: one weigh batching plant, together with suitable crane and grab for loading the aggregate. One 20-ton bulk cement silo. Two 14 10 mixers. As an alternative to tubular scaffolding, a system of suspended cradles was used on each of the four elevations of the blocks, which in turn were used by bricklayers and painters. A high-speed hoist was used for each block and largely came into operation once the crane had finished the reinforced concrete constructional work and moved to the next block. Various steel concreting skips were used, being specially designed by the general contractor and used in conjunction with the crane. Some skips had side outlets: others had centre outlets. They were used according to the type of shutter to be filled. Considerable time and attention, particularly at the pre-planning stage, was given to the design of shuttering, thought being given to sizes and quality of various shutters, column shutters, telescopic centres and floor shuttering.

Sub-letting: The work sub-let (as distinct from architect-nominated) was relatively small, and in the main consisted of the following: asphalt and roofing, glass and glazing, plumbing, painting and decorating, road and path surfacing, plastering. From the foregoing it will be observed that apart from plastering and painting the remaining ones are generally those which are regarded as of a specialist character. The subcontractors are broken down into two partsthe specialist contractors on the one hand, and plastering and painting contractors on the other. It was eventually found necessary to have two plastering contractors on the site to maintain general progress, and to enable the contract to be finished by the stipulated date. At one stage there was one contractor only, who found it impossible to give the required weekly progress. Both firms were appointed as a result of many years' association with the general contractor, who knew that they would be prepared to co-operate in the general programme. There was in fact a small Wates staff of plasterers employed on the site, but in view of the size of this particular contract it did preclude using them to any major extent. In the case of painting, here again the work was sub-let to a firm who over a period of many years had done quite a lot of work for the general contractor and would fit into the site organization.

Job management: The pattern of the job management was quite broad. Apart from the site

organization and the work carried out by the agent and his staff, in accordance with nor practice, there were various visiting manage and engineers to the site throughout its term operation. There were periodic visits by general manager; weekly visits by the an manager; periodic visits by the plant man and the personnel manager and the chief buve There were also weekly visits by a costing an incentive supervisor. Pre-planning took place of head office over a period of several months prior to the commencement on site when the bas principles and planning were established. The agent carried out this planning as carefully possible, covering such things as: 1. Types an design of plant and the release of plant at the requisite planned date. 2. New ideas for co struction, re quantity, quality, control operations and time line of job. 3. Welfare 4. Sub-contractors. In addition to the preplanning mentioned and the normal method of charts, etc., a further aid to management consisted of wooden models of the structure to acquaint all staff of the construction. There we a model depicting the foundations, and the foundation walls up to basement level. There was also a model depicting a typical floor showing columns, beams, and stairs, esc section in varying colours illustrating in sin work and precast methods. This was found to be a practical way of illustrating to both men as management the type of construction, and is the early stages it helped the efficiency of the work quite considerably.

Progress charts: Considerable emphasis was placed upon the use of charts. There were a number of types in use: (#) those showing the overall plan, and (b) others down to a daily and hourly basis of operations.

Incentives and costing operated throughout to length of the contract, the agent being directly responsible, but there was, nevertheless, a department on the site for handling this work. In addition, it will already have been noted that there was a visiting supervisor who made weekly visits. Co-ordination meetings were held each week. Principal site foremen, including sub-contractors' foremen, were present, with the company's agent taking the chair. Progress for the past week was reviewed, as well a planning and alterations for the following wed There were also periodic site meetings between the LCC architect and the company's are manager and agent.

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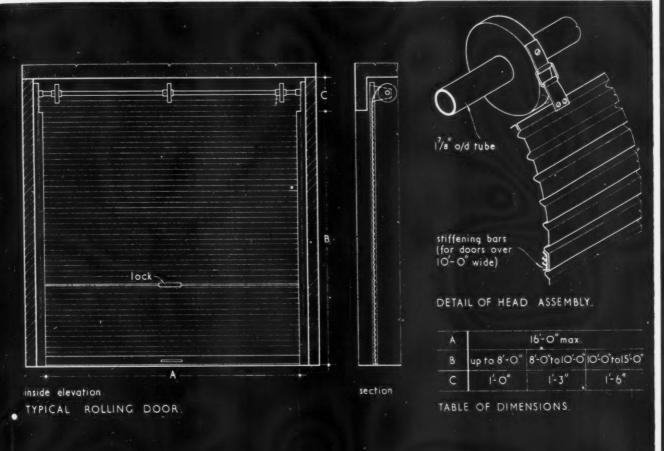


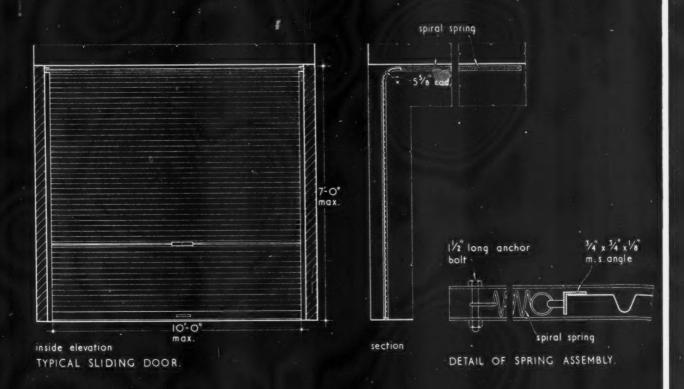


#### DOORS ROLLING SHUTTERS

The Architects' Journal Library of Information Sheets 595.

Editor: Cotterell Butler, A.R.I.B.A.





#### 23.H7 ROLLING AND SLIDING DOORS

This Sheet describes two types of push-up door. One type rolls at the head and the other slides back horizontally at the head. Both types use the same metal curtain.

#### General

Rolling Door: The curtain is rolled over the top shaft by means of flat spiral springs contained in drums which revolve on the shaft. Headroom of 1 ft. 0 in. to 1 ft. 6 in., according to height of door, is required to accommodate the coil when the curtain is rolled up; see face of Sheet for sizes. The sides of the curtain run in vertical channel guides.

Sliding Door: The vertical channel guides are continued horizontally at the head of the door so that the curtain slides back without rolling. No extra headroom is required with this type. A spiral counterbalance spring anchored to the rear end of the channel is attached to the curtain.

#### Construction

#### Rolling Door

Springs and drums: The spring shaft is 1\frac{1}{4}-in. class A steel tube and the spring drums are pressed steel. The springs are of highest quality steel and of flat spiral construction, their total movement being only 12 per cent of their length, thus obviating danger of fatigue. The spring tension can be adjusted to meet individual requirements. The number of springs depends on the size of the door.

Guides: These are extruded aluminium sections, in which the curtain runs on nylon rollers and leather straps.

#### Sliding Door

Springs: The tension spiral springs, of which a detail is given on the lower face of the Sheet, are cadmiumplated.

Guides: These are of 16 g. cold-rolled steel section.

#### Curtain

The curtain is made from large sheets of 24-g. corrugated aluminium alloy, riveted together where necessary. The outer faces of the sheeting are in pure aluminium to resist corrosion. The tensile strength of the sheet is 28 tons per sq. in.

The curtain is reinforced by a stout bottom bar and where the width of a door exceeds 10 ft. 0 in. stiffening bars are provided as shown in the drawing on the upper face of the Sheet.

Lock: A two-directional double-throw lock is available for use with either type of door. It can be operated from both inside and outside. It is usually fitted approximately 2 ft. 6 in. from the ground and can be supplied in a number of differs.

#### Fixing

Rolling door: 1 in. by 3 in. timber battens should be fixed to the jambs to the full height of the guides (B + C) in the drawing on the face of the Sheet). The guides are screwed to the battens, care being taken to ensure that the guides are plumb. The shaft is attached to the guides with two bolts. The curtain slides into the guides and is secured with one screw to each spring drum. The handle is fitted to the curtain and the spring drums, being loaded, must be released by removing the securing pins.

Sliding door: The vertical and horizontal channels are fixed to the walls and ceiling, the curtain slid into position and the two springs attached.

#### Applications

Both rolling and sliding doors may be used for closing shops, warehouses, garages, bars, etc. The rolling door requires headroom (as shown in the drawing) but the sliding door requires none and may be fixed direct to the ceiling. Wicket gates are unnecessary, as the doors themselves are very light to manipulate. Where very wide openings exist, removable pillars can be supplied so that any number of doors can be installed.

#### Finish

The sheeting of which the curtain is made is hammered ("stucco" finish) and requires no other finish. If, however, it is desired to paint the doors, this finish provides a suitable base. Before painting, the surface must be degreased and primed according to a suitable specification for painting aluminium.

#### Maintenance

Guides, springs and drum bearings should be greased about once a year.

#### **Further Information**

The manufacturer maintains a Technical Information Bureau which is available to answer questions dealing with this subject generally.

Compiled from information supplied by:

#### Golmet Limited.

Address: Virginia Park, Caerphilly, Glamorganshire. Telephone: Caerphilly 2381-3.

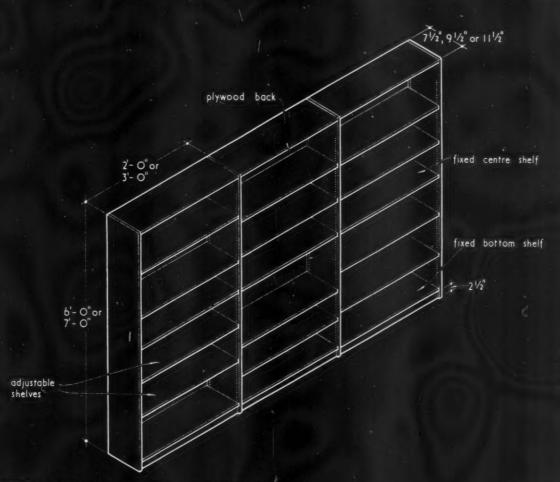
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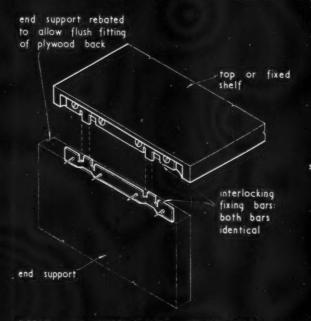


#### FURNITURE AND FITTINGS TIMBER LIBRARY SHELVING

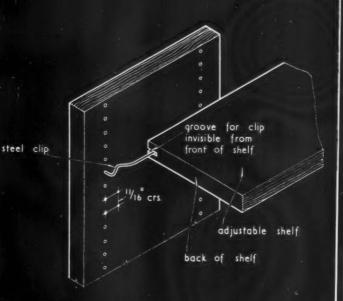
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ISOMETRIC SKETCH OF TYPICAL SHELVING ASSEMBLY.



DETAIL OF INTERLOCKING FIXING BARS.



DETAIL OF ADJUSTABLE SHELF FIXING

LUNDIA PREFABRICATED LIBRARY SHELVING.

Manufacturer: Remploy Ltd.

#### 42.C6 · LUNDIA · PREFABRICATED LIBRARY SHELVING

This Sheet describes Lundia library shelving available in prefabricated units which may be built up initially or by degrees to form an installation of any size. The design of fixings is extremely simple and they are completely invisible when the fittings are assembled. The positions of all shelves except two in any unit are adjustable.

#### Construction

One unit consists of top, ends, fixed bottom shelf with plinth, fixed centre shelf, back and adjustable shelves: the number of adjustable shelves is to order but four is usual. Top, ends and all shelves are in  $\frac{13}{16}$ -in, abura. The back is in 5 mm. plywood. Fixing is by means of the steel interlocking bars shown in the drawing on the lower left of the face of the Sheet. The bars are identical, one being screwed to the end support and the other housed in the end of the shelf. They can be fitted into each other quite simply without the use of any tools and are completely invisible when fixed.

Adjustable shelves: The adjustable shelf has a groove along both ends which stops  $1\frac{1}{3}$  in. short of the front of the shelves. The steel clips are placed in any desired position in the fixing holes provided at  $\frac{11}{16}$  in. centres and the shelf slides on to them as shown in the drawing on the lower right of the face of the Sheet. Again, the fixing is invisible from the front of the shelving.

#### Sizes

The shelving may be obtained 6 ft. 0 in. or 7 ft. 0 in. high by 2 ft. 0 in. or 3 ft. 0 in. wide by  $7\frac{1}{2}$  in.,  $9\frac{1}{2}$  in. or  $11\frac{1}{2}$  in. deep.

#### Fixing

When the top and fixed shelves have been fitted together as previously described, the plywood back is fixed with panel pins lightly hammered into position. Where it is desired to extend a unit, an intermediate shelf support with fixing bars on both sides replaces the end support.

#### Finish

All surfaces are sanded and treated with grain filler, and, when dry, lightly resanded and finished with clear cellulose lacquer. This gives a medium-gloss finish preserving the natural colour and grain of the wood.

#### Applications

Owing to the ease with which the units can be assembled, shelving may be rearranged or extended to meet the requirements of any layout.

Compiled from information supplied by:

#### Remploy Limited.

Address: 25-28 Buckingham Gate, London, S.W.1. Telephone: Victoria 6621.





#### working detail

WINDOWS: FLATS IN LONDON, S.W.1

Powell and Moya, architects

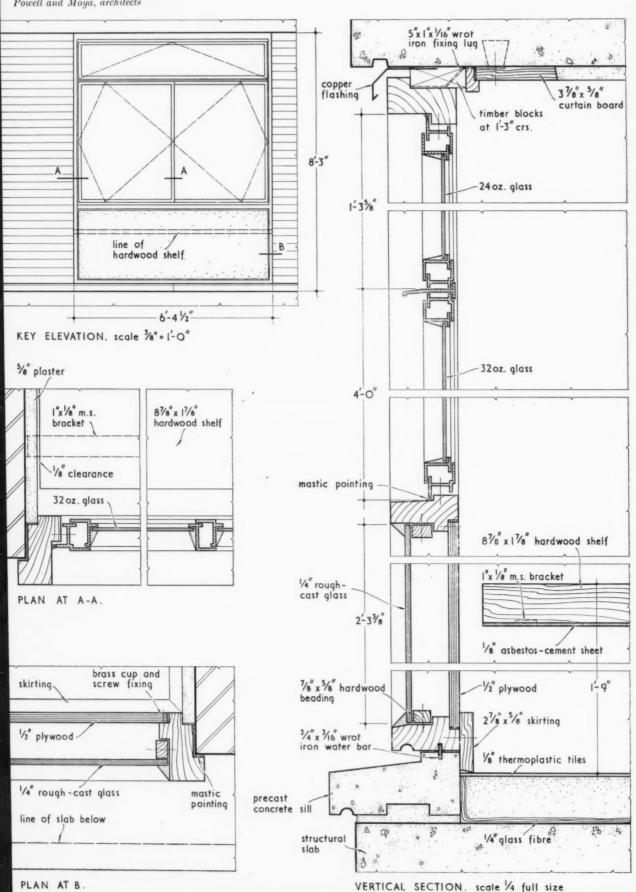


These glazed panels are from the front facade of the same block of flats as the panel wall illustrated as a Working Detail on October 10, 1956. It will be noticed that there is no multion but that the two main opening lights in each unit close one against the other. The opaque panels beneath the windows are glazed on the outside and closed with plywood on the inside. The outside face of this plywood is painted cypress green (5.0 G 2/2) on all panels with rubber-based paint, the differing shades in the photograph being due to reflection. The brick and concrete surfaces surrounding the panel are painted one coat of bituminous paint to a depth of 1 ft. from the outside face of the building. A seat-cum-shelf of West African mahogany is fixed behind the window, with a radiator beneath. Permanent ventilation is provided over the head of the panel frame which is separated from the structure by blocking pieces with gaps between.

#### working detail

WINDOWS: FLATS IN LONDON, S.W.1

Powell and Moya, architects



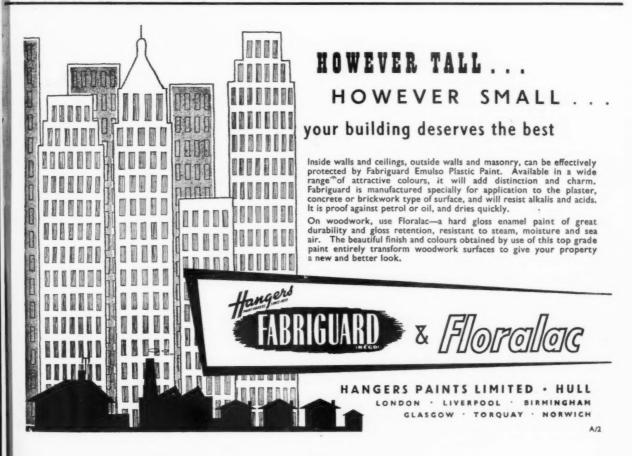




#### Contractors

Bus Overhaul Works, Watford By-Pass, Aldenham, Herts, for the L.T.E. (pages 791-792). Architects: Thomas Bilbow, F.R.I.B.A., Architect to London Transport. Architectin-charge: K. J. H. Seymour, F.R.I.B.A. Resident architect: A. Merrill, A.R.I.B.A. Structural engineers: A. V. Bond, A.M.I.STRUCT.E., and A. McBeth, A.M.I.STRUCT.E. Engineering planning and design: A. A. M. Durrant, C.B.E., M.I.MECH.E., M.INT.T. Chief mechanical engineer (Road Services), heating and ventila-H. Carter, M.C., tion: A.M.INST.C.E.. M.I.STRUCT.E. New works engineer, consultants, electrical: J. H. Coombs & Partners. Drainage: J. D. & D. M. Watson. Quantity surveyors: A. L. Currie & Brown, General contractors: Tersons Ltd. Main steelwork contractors: The South Durham Iron & Steel Co. Ltd. Sub-contractors: Aluminium skirting: Northern Aluminium Co. Ltd. Architectural metalwork: Luco Art Metal Co. Ltd. Asphalt tanking and roofing: General Asphalte Co. Ltd. Asbestos side and roof sheeting: Universal Asbestos Manufacturing Co. Ltd. Asbestos side and roof sheeting fibreglass insulating blanket: Brock Roofing Ltd. Blinds (Venetian): Tidmarsh & Sons. Boilers, pressure vessels: Danks of Netherton Ltd. Boiler house chimney (erection): Poulton & Sons Ltd. Boiler instrumentation: George Kent Ltd. Cat ladders, grid flooring, etc.: S. W. Farmer &

Sons Ltd. & Light Steelwork (1952) Ltd. Calorifiers and steam generators: Hartley & Sugden Ltd. Canteen equipment: Denham & Sons Ltd. Coal handling equipment: James Hodgkinson (Salford) Ltd. Grilles: Richard Crittall & Co. Ltd. Plastic finish: Regent Surfaces Co. Ltd. Doors (domestic): John Sadd & Sons Ltd. & Bakers of Wycombe Ltd. Doors (sliding): Rippers Ltd. Doors (steel): John Booth & Sons (Bolton) Ltd. Doors (aluminium faced ply): Flexo Plywood Industries. External drains: Francis Jackson Contractors Ltd. Electrical installation: T. Clarke & Co. Electric controls: Electric Apparatus Co. & Allen West & Co. Ltd. Expansion joints to roads, etc.: Line & Sign Co. & Expandite Ltd. Facing bricks (Tuscan): London Brick Co. Ltd. Facing bricks (brown): W. T. Lamb & Sons Ltd. Fencing: Fencing (Shepperton) Ltd. Fans: G.E.C. Ltd., Keith Blackman & Co. Ltd. & Matthews & Yates Ltd. Fibrous plaster: James Walker (Architectural Decorations) Ltd. Floors (lino tile): Inlaid Rubolin Flooring Ltd. Floors (quarry tile), wall tiling: Carter & Co. (London) Ltd. Floors (granolithic pavings, etc.): Metarock Ltd. Floors: (wood strip): Acme Flooring & Paving Co. (1940) Ltd. Glass dome lights: T. & W. Ide Ltd. Grilles, guides and angle kerb: General Iron Foundry Ltd. Heating and hot water service installation: Hopes Heating & Engineering Ltd., G. N. Haden & Sons & Norris Warming Co. Ltd. Hose drying tower: Tubewrights Ltd. Hollow roofing and flooring: Concrete Ltd. & Fabricrete Products Ltd. Induced draught plant and grit arrestors: Davidson & Co. Ltd. Ironmongery: Comvn Ching & Co. (London) Ltd. & Nettlefold & Moser Ltd. Insulation: Fibreglass Ltd. & Versil Ltd. Lettering: Fredk. B. Hall & Co. Ltd. Light fittings: Falk Stadelmann & Co. Ltd., General Electric Co. Ltd., Merchant Adventurers of London Ltd., Troughton & Young (Lighting) Ltd., Strong Electric Corporation (Gt. Britain) Ltd., Verity's Ltd., H. W. Field, British Thomson-Houston Co. Ltd. & New Era Ltd. Lift (goods passenger): Wm. Wadsworth & Sons Ltd. Manholes, covers and frames: Broads Manufacturing Co. & Dover Engineering Works Ltd. Patent glazing: British Challenge Glazing Co. Penstocks and pipe specials: William E. Farrar Ltd. Piling: Franki Compressed Pile Co. Ltd., Cementation Co. Ltd. & Piling Construction Co. Piping: Stewarts & Lloyds Ltd. Pumps (circulating): Rhodes, Brydon & Youatt Ltd. Radiant panels, convectors, unit heaters: Copperad Ltd. Radiators: Steel Radiators Ltd. Removal of camouflage paints: The London Stone Cleaning & Restoration Co. Road reinforcement: Twisteel Reinforcement Ltd. Road lighting: Metropolitan-Vickers Electrical Co. Ltd. Felt roofing: Ruberoid Ltd. Sanitary fittings: Standard Range & Foundry Co. Ltd. Sewage ejector equipment: Hughes & Lancaster Ltd. Sliding door gear: P. C. Henderson Ltd. & Geo. W. King Ltd. Sprinkler in-



stallation, fire hydrants and mains: Mather & Platt Ltd. Steel fire protection: Turners Asbestos Cement Co. Ltd. Storage wall to coalyard and 'cycle park: Stelcon (Industrial Floors) Ltd. Terrazzo stairs and w.c. partitions: Art Pavements & Decorations Ltd. Valves, low-pressure hot water: Hattersley (Ormskirk) Ltd. Valves, automatic control: Spirax-Sparco Ltd., Satchwell Ltd., & Thermo Controls Ltd. Ventilation: J. Jeffreys & Co. Ltd. Wall tiling: Carter & Co. (London) Ltd. Windows (metal): W. James & Co. Ltd. Vehicle inverters and hoisting appliances, body inverters, body grabs and work transfer conveyor: Geo. W. King Ltd. Overhead runways and job crane: Clark Ellard Engineering Co. Fencing: Peerless Fencing Co. Ltd.

Fitzhugh Estate, Trinity Road, Wandsworth, London, S.W.17, for the London County Council (pages 795-806). Architect to the council: Dr. J. L. Martin, M.A., F.R.I.B.A. Principal Housing Architect: H. J. Whitfield Lewis, F.R.I.B.A. Assistant Housing Architect: Cleeve Barr, A.R.I.B.A., DIP. ARCH. Architects-in-charge: Mrs. R. Stjernstedt, A.R.I.B.A., A.M.T.P.I., Oliver Cox, A.R.I.B.A., and Kenneth Grieb, A.R.I.B.A. Consultants, structural: Ove Arup & Partners. Consultants, heating: Oscar Faber & Partners. Clerk of Works: J. M. Jarvis. General contractors: Wates Ltd. Sub-contractors: Dampcourse slates: Bernard Exton Ltd. Asphalt and roofing: Durastic Ltd. Bricks: London Brick Co. Ltd. Glass and glazing:

Faulkner Greene & Co. Ltd. Patent flooring: Armstrong Cork Co. Ltd. (Accotile) and Rowan & Boden Ltd. Wood block flooring: Horsley Smith & Co. Ltd. Precast stairs: Liverpool Artificial Stone Co. Central heating and fixtures: Benham & Sons Ltd. Electric wiring: Haines & Sheppard Ltd. Boilers: Hartley & Sugden Ltd. Mechanical stokers: Riley Stoker Co. Ltd. Door furniture: Childs Constantine & Co. Casements West Bromwich Casement & (metal): Engineering Co. Joinery: H. Newsum & Sons & Co. Ltd. Sanitary fittings: L.C.C. Supply. Kitchen furniture: Walter Lawrence & Son Ltd. Dry rising mains: S. Dixon & Sons Ltd. Light metal work: Messrs. Smith (Horley) Ltd. Painting: J. W. Alder & Sons. Lifts: Bennie Lifts Ltd. and J. & E. Hall Ltd. Plumbing: Z. D. Berry & Sons Ltd. Joinery: H. Newsum & Son Ltd. and Builders Supply Co. Tiling: Carter & Co. Ltd. Road and path surfacing: Constable Hart & Co. Plastering: Greenslade Bros.; J. T. Webb & Son. Chain link fencing: W. A. Skinner & Co. Tower crane:

#### Announcements PROFESSIONAL

C. Y. Dawbarn, M.A., B.ARCH., A.R.I.B.A., and R. C. Blair, T.D., B.ARCH., A.R.I.B.A., have moved to 15, Tithebarn Street, Liverpool, 3 (telephone: Central 8757).

J. F. Watkins & Partners, F/F/A/A.R.I.B.A., announce that from December 3 their address will be: 80, Easton Street, High Wycombe.

#### TRADE

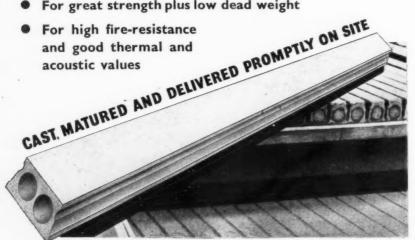
A new company known as Sound Control Ltd. has been formed by the Thermotank Group to provide architects, designers, plantengineers, and industry generally, with a complete service covering all aspects of Their activities will architectural acoustics. include noise investigation and analysis; the planning, manufacture and installation of equipment designed to obtain the maximum possible noise reduction and to ensure the maximum control of transmitted sound, and the acoustic correction of auditoria and other rooms. The new company will operate Works, West Drayton, Colneside Middlesex.

Philips Electrical Ltd. announce that their Electro-Acoustic Division has been merged with the Musical Equipment Department The latter will in future be responsible within the framework of the company. Television and Radio Division, for the marketing, etc., of all E.L.A. products.

The U.A.M. Group, which includes the Universal Asbestos Manufacturing Co, Ltd, and Union Fibre Pipes (Great Britain) Ltd, of Tolpits, Watford, Herts, announce that from December 3, R. J. Sutton will be their representative in Lincolnshire and Notting hamshire. He will be based at the Group office, 153a, Corporation Street, Birmingham (telephone: Central 5949). Mr. Sutton succeeds C. W. Giess.

Henry Hope & Sons Ltd., of Smethwick announce the opening of a new Branch
Office at Brighton. The Manager of the new
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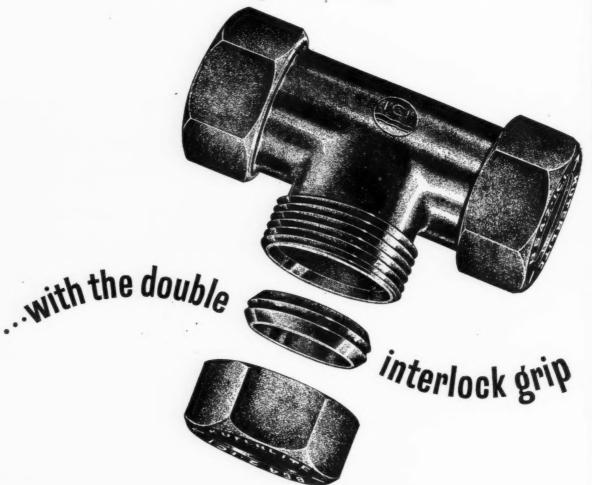
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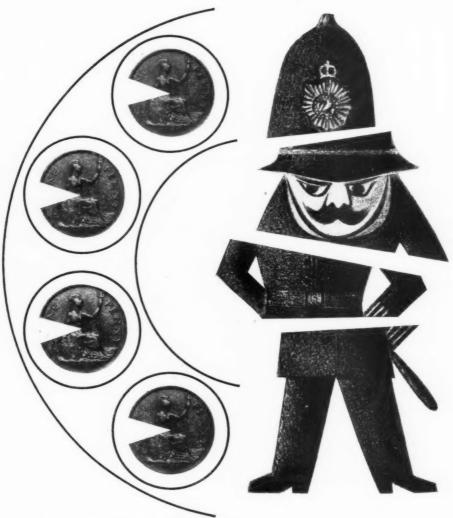
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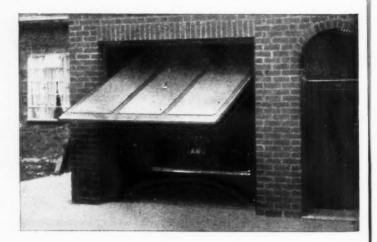


# RADIAL SLIDING DOOR GEAR

Illustration on left shows ELLARD "Radial" Sliding Door Gear fitted to a private garage. Sliding doors are of great advantage in protecting cars against damage caused by accidental swinging of hinged doors. In addition, valuable working space is offered where it is most desired, at the entrance to the garage. Note also how ELLARD Door Gear provides easy access to and from the garage by a personal entry door. ELLARD "Radial" Sliding Door Gear is low in price and gives long service without maintenance. This gear is also suitable for the larger openings of commercial and industrial garages.

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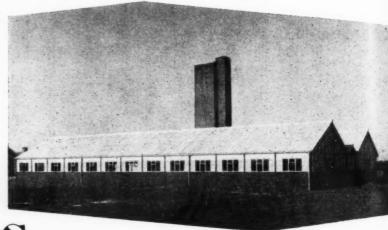
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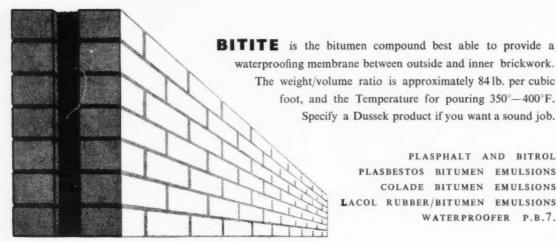
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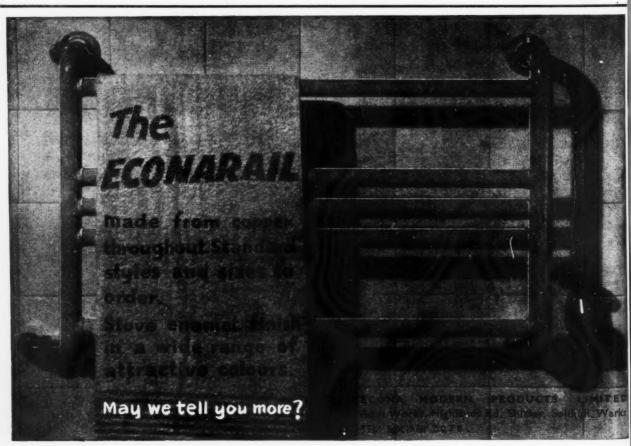


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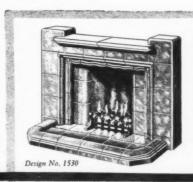
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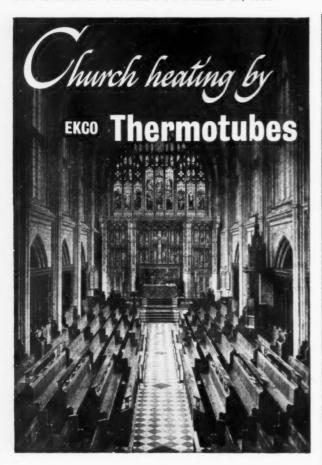






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Dowelled-Easphone-London





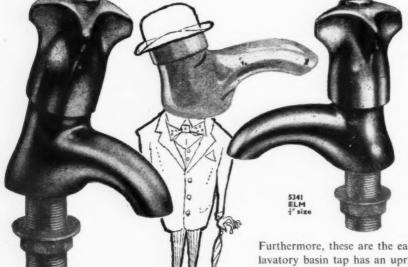
## photo murals

are the vogue for interior décor of all buildings—municipal and business, restaurants, clubs, schools, shops, the home, etc. They are hung like wallpaper. Autotype (established 1869) specialises in their production and can submit subjects to choice.

Full details and illustrated folder from

AUTOTYPE

AUTOTYPE CO. LTD., BROWNLOW ROAD, W.13. EALing 2691-2-3



# We're No Snobs

. . . even though we do our job with "raised" noses, we take pride in the fact that we're at once both aristocratic in appearance and very practical in our work . . . we've even banished the old phobia of stale water lying in the nose and on top of the tap seat.

Furthermore, these are the easiest-ever Taps to clean . . . the  $\frac{1}{2}$ " lavatory basin tap has an upright head and the  $\frac{3}{4}$ " bath tap has a slightly inclined head allowing for easy operation where space is limited between the tap and a wall or partition.

Hats off to SANBRA for ingenuity in design . . . their claim "as Modern as Tomorrow" is truly merited.

Sanbra

SANBRA LTD · ASTON HALL RD · BIRMINGHAM · 6

Designers & Manufacturers of a Complete Range of Fine Quality Plumbers' Brassfoundry.



DE HAVILLANDS, HATFIELD

Control Room and Central Offices

AIR CONDITIONED
BY

HOPE'S
HEATING &
ENGINEERING LTD



HOPE'S HEATING & ENGINEERING LTD
Smethwick, Birmingham & 17 Berners St., London W.1. Branch Offices at Leeds, Cardiff & Hull

## **GLASCRETE**

Reinforced Concrete and Glass

**WINDOWS** 

at

Hollingbury School, Brighton

Borough Engineer

D. J. Howe, Esq., M.Inst. C.E. M.I.Mun.E.

The windows to the staircase were formed in our mullions type 222 and were glazed with broad reeded glass.



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Data, applications and possibilities of Glascrete are given in our interesting Brochure P.47 which we shall be pleased to send on request.

#### CLASSIFIED ADVERTISEMENTS

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

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

Public and Official Announcements

Public and Official Announcements

25s. per inch; each additional line, 2s.

THE ARCHITECTS JOURNAL RESEARCH
BOARD invites applications for two Fellowships.
The first will enable the holder to work on the
following: Information for the Architect: What
Does He Need and Where Will it Come From.
This is a continuation of the Board's first Fellowship which has become vacant through the death
of the holder, the late Michael Ventris, O.B.E.
This Fellowship is open to anyone in the Englishspeaking world who has completed a course
qualifying him (or her) for registration as an
architect and has had three or more years' practical experience after qualifying.

The subject of the second Fellowship is open
to the choice of applicants, the main condition
being that its study must directly benefit the
architect in practice. For the guidance of applicants, the following four subjects have been considered by the Board as fulfilling this condition,
though it is not their wish that applicants should
confine their choice to these: The Influence on
Design of Building Contractors' Equipment; The
Layman's Reaction to Architectural Style: The
Effect of Rules and Regulations other than Building Law on Design in Cities; The Effect of
Engineering Services on Design.

This second Fellowship is open to anyone in the
English-speaking world who has completed a
course qualifying him (or her) for registration as
an architect, or who holds an academic or professional qualification of equivalent standing.

The value of each of these Fellowships, which
are tenable for one year or some less period by
arrangement, is £1,000, plus certain expenses. The
successful candidate may be required to work at
Edinburgh or Liverpool Universities, the Building
Research Station, Garston, or the Architectural
Association, London.

Further details and application forms are obtainable from the Secretary, Research Board, The
Architects' Journal, 9, Queen Anne's Gate, London
SW.1. Last date for the receipt of applications
is December 15, 1956.

is December 15, 1956. 915

THE CORPORATION OF GLASGOW ARCHITECTURAL AND PLANNING DEPARTMENT ASSISTANT ARCHITECTS
PLANNING ASSISTANTS PLANNING ASSISTANTS Vacancies exist for a number of assistants. Minimum qualification, Intermediate Examination of the appropriate professional body. Salary scale 2560—21,100 per annum, with placing according to age, experience and qualifications. Forms of application may be obtained from the Principal Administrative Officer, 20, Trongate. Glasgow, C.1.

City Architect and Planning Officer

PEMBROKESHIRE COUNTY COUNCIL
COUNTY ARCHITECT'S DEPARTMENT
Applications are invited for the following
appointments on the permanent staff:
SENIOR ASSISTANT ARCHITECTS, A.P.T.
Grade V (2795-2797 plus 23/%).
ASSISTANT ARCHITECTS, A.P.T. Grade IV
(2710-2885 plus 24/%).
Commencing salary according to qualifications
and experience.

Commencing salary according to qualineations and experience.

Applicants should be members of the R.I.B.A. by examination or hold equivalent academic qualifications with experience of contemporary Architectural or Structural design.

The appointment which will be subject to the provisions of the Council's Superannuation Acts and the National Joint Council's Scheme of Conditions of Service, will also be subject to a satisfactory medical examination.

Forms of application can be obtained from the County Architect, County Offices, Haverfordwest, and should be returned, duly completed, to the undersigned not later than 8th December, 1956.

H. LOUIS UNDERWOOD, Clerk of the County Offices,

County Offices,
Hwerfordwest.

7th November. 1956.

COUNTY BOROUGH OF OLDHAM
APPOINTMENT OF ARCHITECTURAL
Applications are invited for the above appointment within the range of scales A.P.T. I.—A.P.T.
IV (£543 58.—2907 28. 6d.), the point of commencement to depend on qualifications and experience.
The person appointed will be engaged on schemes for Central Area Redevelopment, for which site works will be commenced during next year

year
The National Conditions and Local Government
Superannuation Acts apply. Housing accommodation available if required.
Applications suitably endorsed, together with the
names and addresses of two referees should reach
me not later than Wednesday, 12th December, 1956,
me not later than Wednesday, 12th December, 1956,
M. L. HOBSON,
Together and the superior of the superior of

WARWICKSHIRE COUNTY COUNCIL
ARCHITECT'S DEPARTMENT
Applications are invited for the following appointments:—
(a) SENIOR ASSISTANT ARCHITECTS, Grade A.P.T. V (£814 178. 6d.—£994 5s.). Applicants must be competent designers, having a knowledge of modern methods of construction and be capable of handling large building projects from sketch plan stage to completion.
(b) ARCHITECTS, Grade A.P.T. IV (£727 15s.—£907 2s. 6d.). Applicants must be competent designers having a good knowledge of construction and be capable of handling medium sized contracts.

and be capable of handling medium sized contracts.

(c) ASSISTANT ARCHITECTS, scale £707 5s.—2861. 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 the group architect.

The commencing salaries can be within the grades according to the ability and experience. The appointments are on the established staff and subject to the Scheme of Conditions of Service of the National Joint Council for Local Authorities and the Local Government Superannuation Acts, 1937-1953. Successful candidates will be required to pass a medical examination.

The Council is unable to offer successful candidates housing accommodation.

Applications are to be on forms which 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.

LECHAN ALEGERIA BOARD

LEDS REGIONAL HOSPITAL BOARD
Applications are invited from suitably qualified
persons for the appointment of SENIOR ASSISTANT QUANTITY SURVEYOR. Salary scale 2975
× £35(1) × £30(5)-£1,160 per annum.
Applicants must hold the Corporate Membership
of the Royal Institution of Chartered Surveyors.
Applications, giving all relevant particulars including age, experience and the names of two
referees to the Secretary, Park Parade, Harrogate by 15th December, 1956.

COLLEGE OF TECHNOLOGY, BIRMINGHAM (Designated College of Advanced Technology) DEPARTMENT OF BUILDING AND CIVIL ENGINEERING

Applications are invited for the post of LECTURER in BUILDING SUBJECTS.

Substantial and wide professional or industrial experience is desired and candidates should preferably hold an appropriate professional qualification. Previous teaching experience would be an advantage.

Salary will be in accordance with the Burnham (Further Education) Scale for Lecturers—(Men) £1,200 × £30—£1,350.

Further particulars and form of application may be obtained from the Registrar, College of Technology, Suffolk Street, Birmingham, 1, on receipt of a stamped addressed foolscap envelope. Closing, date—two weeks after the appearance of this advertisement.

K. R. PILLING. Clerk to the Governing Body. 4620

CITY OF BIRMINGHAM
CITY ARCHITECT'S DEPARTMENT
Andications are invited for appointments as
ASSISTANT ARCHITECT'S and ARCHITECT
TURAL ASSISTANTS in the three Architectural
Sections of the City Architect's Department.
The large programme of work within these Sections covers the planning, design and construction of Educational Buildings; various Civic Buildings; and all types of Municipal Dwellings, including multi-storey flats, together with ancillary buildings and shopping centres in connection with the Central Redevelopment Areas and other sites.

ties.

Vacancies exist in the following Grades:—
(a) ASSISTANT ARCHITECTS, Grade A.P.T.
V (62)4 17s. 6d.—6994 5s. ner annum).
(b) ASSISTANT ARCHITECTS, Grade A.P.T.
IV (2727 15s.—6907 2s. 6d. ner annum).
(c) ARCHITECTURAL ASSISTANTS, Special
Classes, Ad Hoc Scale (£707 5s.—£361 per
annum).

annum).
ARCHITECTURAL ASSISTANTS. Special Classes, Grade A.P.T. II (£629 17s. 6d.—£711 17s. 6d. per annum).
ARCHITECTURAL ASSISTANTS, Special Classes, Grade A.P.T. I (£563 5s.—£645 5s.

(c) ARCHITECTURAL ACCURATE (1) ARCHITECTURAL CLIASSES, Grade A.P.T. I (£563 5s.—£645 5s. per annum).

Applicants for posts (a) and (b) must be Associate Members of the R.I.B.A. or hold equivalent qualifications, and for posts (c). (d) and (e) must be suitably qualified in accordance with the regulations of the National Joint Council for Architectural Assistants.

The commencing salary in all grades will be according to capabilities and experience.

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

Applications, endorsed with the heading of the post, stating age, present position and salary, qualifications and experience, together with the names of two persons to whom reference can be made, should reach the undersigned by not later than 14th December, 1956.

Canvassing disqualifies.

A. G. SHEPPARD FIDLER.

City Architect.

Civic Centre, Birmingham, 1.

CHESTERFIELD RURAL DISTRICT COUNCIL

CHESTERFIELD RURAL DISTRICT COUNCIL
Applications are invited for the appointment of CHIEF ASSISTANT ARCHITECT in the department of the Engineer and Surveyor on salar scale A.P.T. VII (1999 7s. 6d. to £1,230).
Applicants must be members of the Royal Institute of British Architects and have had experience in local authority housing.
The appointment is subject to the Scheme of Conditions of Service, the Local Government Superannuation Acts, and to the passing of a medical examination.
A car allowance will be paid on scale 2, and assistance will be given with housing accommedation.

assistance will be given with housing accommodation.

Applications, on forms to be obtained from the Engineer and Surveyor, Mr. J. B. Wikeley M. Eng., A.M.I.C.E., M.I.Mun.E., Barrister at Law should be returned to the undersigned by 200 December, 1956.

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Th

H. O. HAWKINS, Clerk of the Counc Rural Council House.

Saltergate, Chesterfield.

CORBY DEVELOPMENT CORPORATION
Applications are invited for this appointment in the Chief Architect's department, at a salary within the range £1.295 £255 to £1.625. The point of entry will depend on experience and qualifications.

The applicant should have had experience in the design and construction of large housing estates, neighbourhood centres, town centre buildings and factories, and in the administration of a busy office. Town planning experience would be an advantage. y office. advantage.

busy office. Town planning experience would an advantage.

Housing is available.

The appointment will be subject to superannuation under the Local Government scheme for which medical examination will be required Applications, endorsed "Deputy Chief Architect," stating age, education, training, qualifications, experience, appointments held and salaries together with the names of two referees, must reach the undersigned not later than 3m December, 1956.

R. F. BROOKS GRUNDY, General Manages

Spencer House, Corby, Northants.

ADMITTEGRIBAL AND ENGINEERING

Spencer House, Corpy, Northants.

ARCHITECTURAL AND ENGINEERING STAFF (Male or Female) required by the Prison Commission. Salary (men) £500 at age 21 rising to £685 at age 22 then to £790; (women) £500 at age 21, rising to £672 at age 22 and then to £722 Starting pay according to age up to 28. The women's scale is subject to the introduction of equal pay scheme

Hours 42 per 5-day week. Annual leave 3 weeks 3 days rising to 4 weeks 2 days after 10 years' service.

s days rising to 4 weeks 2 days after 10 years; service.
Qualifications: ARCHITECTURAL ASSIS TANTS. Recognised training with a good general knowledge of building construction and surveys. preferably up to Intermediate R.I.B.A. standard ENGINEERING DRAUGHTSMEN. Should preferably have obtained educational training to reliectrical engineering course standard or the equivalent in heating and ventilating course. Appointments in temporary capacity in first stance with prospects of permanency.
Regulations and application forms from Establishment Officer. E.126/2/20 Prison Commission. Horseferry House, Dean Ryle Street, London. S.W.1, to be returned by 29th December, 1956.

HAYES AND HARLINGTON URBAN DISTRICT COUNCIL
Applications are invited for:
(a) ASSISTANT ARCHITECT, Grade A.P.T. IV.

Applications are invited for:

(a) ASSISTANT ARCHITECT, Grade A.P.T. IV.

i.e., e797 158, -2907 28, 6d

(b) ARCHITECTURAL ASSISTANT, Grade

A.P.T. III. i.e., £656-£784 28, 6d, per anuum,

plus appropriate London Weighting in each in
stance, 21-25 years £20, 26 years and over £30 per

annum. Candidates for (a) must be a Registered

Architect and have a good general experience in

design and construction relating to municipal

housing and other works and capable of super
vising large building contracts; (b) must have

passed the R.I.B.A. intermediate examination and

have good experience of housing work with a

local authority. Housing accommodation will be

made available for (a) and (b) if necessary. Five
day week. Further particulars and conditions of

service and form of application obtainable from

the undersigned, which when completed must be

returned by 17th December. 1956.

Clerk and Solicitor.

Town Hall.

Town Hall. Hayes, Middlesex.

Hayes, Middlesex.

CITY OF WORCESTER
AMENDED ADVERTISEMENT
APPOINTMENT OF SENIOR QUANTITY
SURVEYOR
Applications are invited from qualified Quantity
Grade V (salary 6814 178, 64,—2994 58.). Housing
accommodation will be offered if required and a
casual users' car allowance will also be available.
Applications with the names of two referees, are
to be sent to the City Engineer and Surveyor. 22
Bridge Street, Worcester, by 17th December, 1968.

BERTRAM WERSTER.

Town Clerk.

Guildhall, Worcester.

CITY AND COUNTY OF BRISTOL CITY ARCHITECT'S DEPARTMENT dications are invited for the undermentioned

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CITY ARCHITECT'S DEFENDANCE
Applications are invited for the undermentioned
permanent appointments:

(a) SENIOR ASSISTANT ARCHITECT, Grade
A.P.T. V (2795 × 435—2970 p.a.).

(b) SENIOR ASSISTANT ARCHITECTS, Grade
A.P.T. III (£640 × 425—£765 p.a.), or Special
Scale (£690 × £30—£840 p.a.).

(c) ASSISTANT ARCHITECTS, Grade A.P.T. II
(£955 × £20—£675 p.a.).

Slatting grade will be appropriate to professional
experience and qualifications, but for post (a)
candidates must be Associate Members of the
R.I.B.A. and have had considerable experience
in design, construction, and contract administration, preferably with a large Local Authority.
Housing accommodation available, if necessary,
at an economic rent.
Further particulars and application forms obtainable from me. Applicants must state post for
which they are applying. Completed application
forms to be received by 10th December.

J. NELSON MEREDITH, F.R.I.B.A.,

City Architect.

The Council House, College Green, Bristol, 1. 20th November, 1956.

Bristol, 1.
20th November, 1956.

GOUNTY BOROUGH OF SOUTH SHIELDS
ARCHITECTS
Applications are invited from suitably qualified persons for appointments in the Architects Section of the Borough Engineer's Department.
Salaries according to qualifications and experience up to A.P.T. Grade VI (1902-41,107).
Housing accommodation may be made available to successful applicants if necessary.
The selected applicants will be required to pass a medical examination and the appointment will be subject to the provision of the Local Government Superannuation Acts 1937 and 1953, and the National Joint Council Conditions of Service.
Canvassing will be a disqualification and candidates must disclose any relationship to the members or Senior Officers of the Council.
Application forms, obtainable from the Borough Engineer, Town Hall, South Shields, should be returned to him not later than Monday, 3rd December, 1956.

R. S. YOUNG.

R. S. YOUNG. Town Clerk

GLOUCESTERSHIRE COUNTY COUNCIL
ARCHITECTURAL ASSISTANT required in
AP.T. Grade II, III, Special or IV, according to
qualifications. Applicants for A.P.T. Grade II or
III must have passed the Intermediate Examination of the R.I.B.A. and applicants for Special
and A.P.T. Grade IV must have passed the Final
Examination. Medical examination, N.J.C. Conditions of Service.
Applications giving age, qualifications, experience, present position, salary and date of appointment, previous appointments, names and addresses
of two persons for references, to reach County
Architect, Shire Hall, Gloucester, by 5th December,
1956.

GUY H. DAVIS, Clerk of the County Council

GUY H. DAVIS,

Clerk of the County Council,

4886

HER MAJESTY'S OVERSEA CIVIL SERVICE

BULLDING SURVEYOR. PUBLIC WORKS

DEPARTMENT, HONG KONG

To examine and approve plans submitted by private architects to ensure compliance with the Buildings Ordinance and to administer that ordinance under the Chief Building Surveyor.

Pensionable appointment. Salary £1,245 to £2,178 15s. p.a. plus cost of living allowance. Quarters, if available at low rents. Free passages for the officer and his family to a total cost of 5 adult fares, Generous leave. Low income tax. Candidates must be A.R.I.B.A., A.R.I.C.S. (Buildings) or A.M.I.C.E., with at least one year's post qualification experience, and aged under 45. Write Director of Recruitment, Colonial Office, London, S.W.I., giving age, qualifications and experience, quoting BCD 112/51/02. 4582

COUNTY BOROTIGH OF SOUTHAMPTON BOROUGH ARCHITECT'S DEPARTMENT Applications are invited for the following permanent appointments:—

(3) SENIOR ASSISTANT ARCHITECTS: Grade IV (£722 15s.—£997 2s. 6d.). One position requires experience of maintenance and alterations of old and historic buildings.

(b) ARCHITECTURAL ASSISTANT Grade I (£435 5s.—£625 5s.).

Applicants should hold the appropriate qualifications under the N.J.C. Conditions of Service and should state their housing needs.

Application forms from the Borough Architect, Givic Centre, Southampton. Closing date 10th December, 1956.

4879

ARGYLL COUNTY COUNCIL
Argyll County Council invite applications for the appointment of a QUANTITY SURVEYING ASSISTANT in the County Architect's Department. Salary scale A.P.T. IV-VI (2655-1870) with placing according to qualifications and experience. The post is superannuable.

The successful applicant will be given the tenancy of a four-apartment Council house if required.

Apply stating are according to the council to th

tenancy of a four-apartment countries and qualifications apply stating age, experience and qualifications along with copies of two recent testimonials to county Architect, County Offices, Dunoon, within seven days of publication of this advertisement.

A. D. JACKSON, County Clerk.
4578

METROPOLITAN BOROUGH OF
PADDINGTON
QUANTITY SURVEYOR
(A.F.T. VI—4952 to £1,137 p.a.)
Applications are invited for the above-mentioned appointment in connection with housing and other civic bujuding schemes from candidates with experience of all branches of building work and wno are familiar with a quantity surveyor's duties, including preparing bills of quantities for building works, site measurements, setting final accounts and preparing estimates of cost. Associate membership of the R.L.C.S. preferable.
Applications in writing to the undersigned by 10th December, 1956 (quoting A.513) must state age, qualifications, present and past appointments with dates and salaries, experience and names and addresses of three referees.

Town Hall,
Paddington Green, W.2.

COUNTY BOROUGH OF CARLISLE

Paddington Green, W.2.

COUNTY BOROUGH OF CARLISLE
Applications are invited for the following posts
in the City Surveyor's Department.

TWO JUNION QUANTITY SURVEYORS,
A.P.T. Grade 11 (£595×£20—£675).
Applicants should be experienced in Measurement of Works under construction and in Certification of Interim Payments, etc.

Forms from City Surveyor, 18, Fisher Street,
Carlisle, returnable not later than 6th December,
1956.

H. D. A. ROBERTSON, Town Clerk

COUNTY BOROUGH OF GLOUCESTER
CITY ARCHITECTS DEPARTMENT
Applications are invited from persons having suitable qualifications and experience for the following (alternative) appointment:—
(a) ARCHITECTURAL ASSISTANT, A.P.T. II, £609 178. 6d.—691 178. 6d. per annum (Intermediate R.I.B.A. standard).
(b) ARCHITECTURAL ASSISTANT, A.P.T. I £543 5s.—625 5s. per annum (Part Intermediate R.I.B.A. standard).
Superannuable post. Medical examination.
Municipal experience not essential.
Applications stating age, married or single, training qualifications, previous and present appointments, with copies of testimonials, or names of referees, to City Architect, Sufloik House, Gloucester, not later than 11th December, 1956.

COUNTY LONDONDERRY EDUCATION
COMMITTEE
ARCHITECTURAL ASSISTANT
Applications are invited for the above position
in the Committee's Offices in Coleraine.
Applications have passed the Intermediate
R.I.B.A. Examination. Salary within the range
£469—£761 per annum according to qualifications
and experience
Application Forms and Conditions of Appoint
ment may be obtained from the Director of Education, New Row, Coleraine, and completed forms
should be returned not later than Saturday, 8th
December, 1956.

December, 1956.

#618
BOROUGH OF ROYAL LEAMINGTON SPA
ARCHITECTURAL ASSISTANT GRADE IV/V
Applications are invited for the above post in
the Borough Engineer's Department at a salary
within A.P.T. Grades IV/V. Starting salary will
be subject to qualifications and experience. Candidates must be Corporate Members of the Institute
of British Architects.

Housing accommodation will be provided if
required. Further details and forms from the
Borough Engineer, to whom completed forms of
application must be sent to reach him not later
than December 15th, 1956.

JAMES N. STOTHART,
Town Clerk.

Town Hall, Leamington Spa.

Applications are invited for the following appointments in the County Architect's Department:

appointments in the County Architect's Department:—
ASSISTANT QUANTITY SURVEYOR, Grade VI. 1692-61.107 p.a.
ASSISTANT QUANTITY SURVEYOR, Grade III. 1695-16-16-16 p.a.
The appointments are superannuable and subject to medical examination.
A weekly allowance of 25s. and return fare home once every two months may be paid for six months to newly appointed married officers of the Council unable to find accommodation.
Applications, on forms to be obtained from F. B. Pooley. County Architect, County Offices, Aylesbury, must be returned by 15th December, 1956.

LANCASHIRE COUNTY COUNCIL

DEPUTY DIVISIONAL PLANNING OFFICER.
salary £902—£1,107, required at the Divisional
Planning Office, Accrington.

Candidates should possess a recognised qualification in architecture, civil engineering, surveying
or planning. They should have wide experience
in the preparation of Development Plans and
should possess a sound knowledge of the various
acts. regulations and orders relating to Town
and Country Planning.

The successful applicant will be expected to own
and use a car in the execution of his duties for
which a travelling allowance will be paid.

Applications stating age, qualifications, present
appointment, experience and two referees to the
County Planning Officer, East Cliff County Offices,
Preston, by 5th December, 1956.

CITY OF OXFORD
PLANNING ASSISTANT
Vacancy in City Architect and Planning Officer's
Department. Salary within range £707—4861 per
annum, according to experience. Candidates should
be qualified members of the Royal Institute of
British Architects and/or the Town Planning
Institute, although consideration will be given to
applicants who have completed the Intermediate
examination of either or both bodies, and in which
case the salary would be in accordance with the
scales laid down by the National Joint Council.
Varied duties in the Planning Section, emphasis of
work on design. Permanent pensionable post;
medical examination.
Housing accommodation will be provided, if
required.

Housing accommodates required.

The Application Forms and Conditions of Appointment from the City Architect and Planning Officer, Town Hall, Oxford, returnable by 22nd December, 1956.

HARRY PLOWMAN.

HARRY PLOWMAN, Town Clerk.

Town Hall,
Oxford.

COUNTY BOROUGH OF DARLINGTON
BOROUGH ARCHITECT'S DEPARTMENT
Applications are invited for the posts of:
(a) SENIOR ASSISTANT ARCHITECTS (A.P.T.
V., £314-£994).
(b) ASSISTANT ARCHITECTS (A.P.T. IV, £727
-£907, and Special, £707-£361).
(c) ARCHITECTURAL ASSISTANTS (A.P.T. III, £656-£734; A.P.T. II, £659-£691; A.P.T. I, £543-£625).

£543-£625). (d) JUNIOR QUANTITY SURVEYOR (A.P.T. II.

(d) JUNIOR QUANTITY SURVEYOR (A.P.T. II, £609—£691).

The Department has a large programme of work, including Secondary and Primary Schools, Housing, and New Municipal Buildings. Preference will be given to applicants for posts (a) and (b) experienced in this class of work, and who are members of the R.I.B.A.

Applicants for posts (c) should have passed Parts I and II of the R.I.B.A. Final or Special Final Examination, or other equivalent, at one of the recognised Schools of Architecture.

Applicants for post (d) should be experienced in the preparation of Bills of Quantities, Interim Valuations, and settling of Final Accounts.

Consideration will be given to the provision of housing accommodation in certain cases.

Applications, giving age, qualifications, present appointment with salary, and names and addresses of three referees, to be sent to: E. A. Tornbohm, A.R.I.B.A., A.M.T.P.I. Borough Architect, Central Buildings, Darlington, not later than 17th December, 1956.

H. HOPKINS, Town Clerk

WARWICKSHIRE COUNTY COUNCIL
COUNTY PLANNING DEPARTMENT
Applications are invited for the appointment of
a SENIOR PLANNING ASSISTANT A.P.T.
Grade V/VI (£814 V8. 6d.—£1,107 per annum).
Commencing salary will be according to experience and qualifications.
The appointment is subject to the provisions of the Local Government Superannuation Act and to the National Scheme of Conditions of Service.
The successful candidate will be required to pass a medical examination.
Applicants should be professionally qualified, with all-round planning experience. Experience in overspill and its related problems will be an advantage.
Applications together with the names and addresses of two referees should be forwarded to J. J. Brooks, County Planning Officer, Northgate, Warwick, not later than Monday, 10th December, 1956.

L. EDGAR STEPHENS.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick.

Warwick.

COUNTY BOROUGH OF SOUTHPORT
Applications are invited for the following appointments in the Borough Architect and Town Planning Officer's Department.

(a) CHIEF ASSISTANT ARCHITECT, A.P.T. V, £814 178 6d.—£994 5s.

(b) ASSISTANT ARCHITECT, A.P.T. IV, £727 15s.—£907 2s. 6d.

Applicants must be Registered Architects and/or Associates R.I.B.A.

Applicants must be Registered Architects and/or Associates R.I.B.A.

Application Forms and details may be obtained from the Borough Architect and Town Planning Officer, 99/105. Lord Street. Closing date for the receipt of applications is Saturday, 15th December, 1986.

R. EDGAR PERRINS. Town Clerk.

Town Hall, Southport.

Southport.

COUNTY BOROUGH OF CARLISLE
Applications are invited for the following posts in the City Surveyor's Department:—
2 PRINCIPAL ASSISTANT ARCHITECTS,
4727 15s.—4994 5s.
Applicants to be A.R.I.B.A., and preference will be given to those having experience in general architectural work on Municipal Buildings and Schools work.
Housing accommodation available if required. Forms of application from City Surveyor, 18, Fisher Street, Carlisle. Closing date 10th December, 1956.

H. D. A. ROBERTSON,

H. D. A. ROBERTSON, Town Clerk.

COUNTY BOROUGH OF ROCHDALE Applications are invited from suitably qualified Candidates for the appointment of a QUANTITY SURVEYOR in the Architects' Department of the Borough Surveyor's Office, at a salary on Grade A.P.T. V (£758-£870). The commencing salary will not necessarily be the minimum of the Grade and will be fixed according to ability and ex-

perience.

The appointment will be subject to the National Scheme of Conditions of Service, the Local Government Superannuation Acts, and to passing a medical examination. Canvassing is prohibited and applicants must disclose whether they are related to any member or Senior Official of the Council.

uncil.

Housing accommodation will be provided by the Housing accommodation will be provided by the Council in appropriate circumstances.

Applications stating age, qualifications, training and experience, together with the names and adresses of two persons to whom reference can be made, and endorsed "Quantity Surveyor," must be delivered to the Borough Surveyor, Town Hall, Rochdale, not later than 9 a.m. on Thursday, the 20th December, 1956.

K. B. MOORE,

K. B. MOORE, Town Clerk. 4633

GLENROTHES DEVELOPMENT
CORPORATION
Applications are invited for the following

Applications are invited for the following appointments:—

(a) TWO ARCHITECTS.
(b) ONE QUANTITY SURVEYOR.
Salary for posts (a) and (b) will be on the graderising to £1,080 per annum, maximum with placing according to qualifications and experience.
Applicants for post (a) must be Corporate Members of the R.I.B.A., with experience of the design and construction of large housing layouts and of all types of Public Buildings appropriate to New Town development. Applicants for post (b) should be experienced in estimating, preparing schedules of quantities, site measuring and settling final accounts.

of quantities, site measuring and seconds, accounts.

Houses to let available if required. Medical examination under Superannuation Scheme.

Applications giving full details of age, experience and qualifications together with the names of referees, must be lodged with the Secretary, Glenrothes Development Corporation, Glenrothes, Fife, not later than 12th December, 1956.

1956.

NORFOLK COUNTY COUNCIL require suitably experienced Intermediate (A.P.T. II) and Junior (A.P.T. I) PLANNING ASSISTANTS.

Applications, stating age, qualifications and experience, with copy testimonials or the names of two referees, to County Planning Officer, 41, Thorpe Road, Norwich, by the 5th December, 1956, 4614

Thorpe Road, Norwich, by the 5th December, 1956.

UNIVERSITY OF NOTTINGHAM
BUILDINGS DEPARTMENT
ARCHITECTURAL ASSISTANT REQUIRED.
Candidates must have reached Intermediate
R.I.B.A. standard. Commencing salary £650 to
£700 per annum. Pension Scheme. Form of application and conditions of appointment from the
Registrar, Mr. H. Pickbourne.

NORTHUMBERLAND COUNTY PLANNING
DEPARTMENT
Appointment of SENIOR PLANNING ASSISTANT, Grade V (£614-£594) on Development Plan
work, A.M.T.P.I. essential. Application forms
obtainable from County Planning Officer, County
Hall. Newcastle upon Tyne, 1, which should be
submitted by the 19th December, 1956.

4629

Tenders Invited

5 lines or under, 12s. 6d.; each additional line, 2s.

5 lines or under, 12s. 6d.: each additional line, 2s.

CITY OF BIRMINGHAM HOUSING

MANAGEMENT DEPARTMENT
CLEFT CHESTNUT FENCING
The Housing Management Committee of the
Birmingham Corporation invites tenders for the
supply and delivery of approximately 150,000 yards of
3' 6 cleft chestnut fencing, 30,000 yards of
5' 6 cleft chestnut fencing and 60,000 4' 6' stakes
to be supplied during the twelve months commencing 1st February, 1957.
The attention of persons submitting tenders is
drawn to the following points:—
(1) Delivery will be required in twelve equal
monthly instalments, but deliveries can if it
suits the supplier be made in advance.
(2) Tenders may be accepted for quantities less
than the total amount specified, but such
tenders must not be for less than 20,000 yards
of fencing and 6,000 stakes.
Forms of tender can be obtained from the
undersigned at 19-29, Summer Row, Birmingham, 3,
and should be returned by the 10th December,
1956.

J. P. MACEY, Housing Manage

RHYMNEY URBAN DISTRICT COUNCIL
"PLAS-GWYN" HIGH STREET, RHYMNEY
Tenders are invited for the adaptation, etc., of
the above premises to provide Council Offices.
The Plans, Specification and tender documents
may be obtained on application to the Council's
Architect, W. T. Bebb, Esq., A.R.I.B.A., Manor
House. Bank Square, Chepstow, Mon., accompanied by a deposit of £2 2s. (cheques etc., payable to Rhymney Urban District Council) which
will be returned on receipt of a bona fide tender.
Tenders should be sent to the undersigned in a
plain sealed envelope marked "Tender—Plasgwyn"

by 5 p.m. on Wednesday, 19th December, 1956.

The Council does not bind itself to accept the lowest or any tender.

R. K. LACEY, Clerk of the Council.

Council Offices, Rhymney, Mon. 22nd November, 1956.

Architectural Appointments Vacant

A tines or under, 7s. oa.; each additional line, 2s.

A RCHITECTURAL ASSISTANTS required.
State salary, age, experience, etc. Harvey a Scott, 2, Lynedoch Place, Glasgow, U.S. 4278

JOHN LAING AND SON LIMITED

INVITE applications for the following grades of ARCHITECTURAL STAFF for vacancies in the Architects Departments (Chief Architect: Sydney Greenwood, A.R.I.B.A.).

DEVELOPMENT ARCHITECTS & ASSISTANTS for the study and development of new forms of construction at the Research and Development Centre, Boreham Wood, Herts. All grades are required including qualified men and those seeking qualifications.

The following vacancies exist in the Architects Department at Head Office, Mill Hill, N.W.7:—

ARCHITECTURAL ASSISTANTS of Final or Intermediate R.I.B.A. standard, and some experience in one or more of the following:—office and industrial schemes, multi-storey flats and maisonettes, private and municipal housing.

JUNIOR ARCHITECTURAL ASSISTANTS who are studying for a recognised qualification and requiring practical experience.

ARCHITECTURAL DRAUGHTSMEN with adequate drawing office experience.

These positions offer excellent opportunities for advancement and a wide variety of work in a busy office. Pension Scheme. Five-day week. Canteen. Sports and Social Club facilities. Applications should be made in writing stating age, qualifications and experience to:—Personnel Manager (DA.1), John Laing and Son, Ltd., Page Street, London, N.W.7.

TEADING Timber Building Prefabricating Company requires for its Farnborough Office, an ARCHITECTURAL DRAUGHTSMAN. Applicants should be quick and accurate with a contemporary outlook. Salary according to experience. Five-day week, pleasant working conditions, staff canteen. Apply in writing giving full details of age and experience to H. & H. Blacknel Ltd., Park Place, Pinehurst Avenue, Farnborough, Hants.

A DOUNTECOTYS ASSISTANT. Intermediate

A RCHITECT'S ASSISTANT, Intermediate standard. Varied and interesting work. About £520, according to experience.—Watson, Johnson & Stokes, 5, Victoria Square, Birming-ham 2, 4485

A PPLICATIONS are invited for the following appointment:

A PPLICATIONS are invited for the following appointment:

ARCHITECTURAL ASSISTANT, of post-Intermediate R.I.B.A. standard, capable of carrying out surveys, preparing sketch schemes, working drawings, details and specifications. Age limit 36; 5-day week; dining facilities; travel.—Application, stating age and previous experience, salary required, etc., to Robert W. Ingram, A.R.I.B.A., Staff Architect, Currys, Ltd., 77, Uxbridge Road, Ealing, London, W.5. 4481 CCO-OPERATIVE WIOLESALE SOCIETY LTD. ARCHITECT'S DEPARTMENT, MANCHESTER SHOPFITTING DRAUGHTSMAN required, experienced in shop equipment and modernisation of interiors.

The position calls for the preparation of layouts and perspectives with a modern approach to store fitting problems.

The post is pensionable, subject to medical examination and there is a five-day week in operation.

Annilications giving age, details of previous

operation.

Applications giving age, details of previous experience and salary required to G. S. Hay. A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., I, Balloon Street, Manchester

RILEY & GLANFIELD require male ASSIS-TANT, maximum salary £650. Work: church, industrial, housing and public house. Telephone CHA 7328.

DOSTINTERMEDIATE ASSISTANT required, in large London Office with widely varied practice. Lewis Solomon, Son & Joseph, 2L. Bloomsbury Way, London, W.C.I. Telephone HOP 1150

MESSRS. EASTON & ROBERTSON require
ARCHITECTURAL STAFF who have had
at least two or three years' office experience.
Apply 53, Bedford Square, W.C.1. 4545

ARCHITECTURAL ASSISTANT required in Wembley. Experience in design and construction of industrial buildings and office blocks. Write stating age, experience, and salary required to Box 4553.

CLIFFORD TEE & GALE require ASSISTANTS CLIFFORD TEE & GALL require ASSASANA of with office experience to work with teams on interesting new industrial and commercial projects. Five-day week. Pension scheme available. Apply 5, Buckingham Palace Gardens, S.W.1. Tel.: Sloane 2296, Ref.: Mr. B. A. Day, 4562

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A RCHITECTURAL ASSISTANT required, with about four to five years' office experience. Write or telephone giving full particulars, including age and salary, to Hasker & Hall, Architects 13 Welbeck Street, W.1. (WELbeck 0001), 460 West End office. Good opportunity for keep and energetic young man. Salary according is age and experience. Please apply in writing in Messris. Sanders & Montague, F./A.R.I.B.A., 24 Harley Street, W.1.

Harley Street, W.1.

ANCHESTER ARCHITECT requires Associated TANT in his small office having contemporary outlook to cope with expanding practice. Now has 1 senior and 1 junior assistant and a secretary. Pienty of hard and interesting work and good opportunity for keen person. Box 4514

A RCHITECTURAL ASSISTANT required: qualified or Intermediate stage. Must have good experience, and considerable capacity for work.—Write, stating salary required, to David Carr & Stuart Matthew, 14, Lynedoch Place,

Edinburgh.

ARCHITECTURAL ASSISTANT, Intermedial standard or above, required by large Midland Brewery Company. Applicants must be competent draughtsmen. Housing accommodation available.—Please reply, giving full details of qualifications, experience, age, and salary required, to Box 4596.

MALL West End Office requires ASSISTANT (Inter. to Final standard) for preparation of working drawings, running small contracts, etc. Salary according to age and experience—Reply Pollen & Jebb, 140, Sloane Street, S.W. Sloane 6383.

4894

Sloane 6383.

A RCHITECTURAL ASSISTANT, of at least A Inter. standard, required for general practice in Wiltshire. Salary according to ability and experience. S.C. flat available.—Edwards a Webster, St. Mary Street, Chippenham.

COMPETENT ARCHITECTURAL ASSISTANT, of a Competency of the Competency of

A RCHITECT required in Walvis Bay, South West Africa.—Write for details, quoting OSS 83/3, to O.T.S. 5, Welldon Crescent, Harrow.

Middlesex. 4600

A SSISTANTS required in West End Office. Good draughtsman, about Intermediate standard, and with previous drawing office experience preferred.—Box 4598.

I NDUSTRIAL Designer requires ASSISTANT Experience in Engineering and Furniture Design welcome. 1st class draughtsmanship essential. State salary.—Box 4596.

CENTRAL ELECTRICITY AUTHORITY EASTERN DIVISION

A PPLICATIONS are invited for the following Superannuable post in the Generating (Construction) Department at Divisional Headquarters in North London:—
SENIOR DRAUGHTSMAN (ARCHITECTURAL). Salary, Grades IV/V (£735-£20—£955 pet annum).

annum).

The commencing salary will depend upon experience and qualifications.

Candidates should have had experience in the design, construction, and detailing of industrial type buildings.

Applications, giving age, details of qualifications and experience, to the Controller, Central Electricity Authority, Eastern Division, Northmet House, Southgate, N.14, to arrive by 8th December, 1956. W. N. C. CLINCH.

A RCHITECT ASSISTANT required in small private office in Victoria area. Applicants must be Intermediate standard and have had at least three years' office experience. Please apply giving full details of training and experience and state salary required.—Box 4577.

A RCHITECTURAL ASSISTANTS required.

A RCHITECTURAL ASSISTANTS required.
London and Home Counties. Salaries £500
to £750.—Box 4576.

to £750.—Box 4576.

ARCHITECTURAL ASSISTANTS wanted.
Intermediate or Final standard. Interesting and varied work. Scope for initiative and responsibility.—Write, giving details of career led date and salary required, to J. A. Matthews, A.R.I.B.A., Chesterfield House, Chipping Sodburg.

BASIL SPENCE & PARTNERS require as ARCHITECTURAL ASSISTANT with some experience for their Edinburgh office.—Replystating salary required, to 40, Moray Place. Edinburgh, 3.

A RCHITECTURAL ASSISTANT wanted, to work on new but quickly developing system of prefabrication for schools, halls, hospitals, etc. Interesting work, with excellent prospets office in S.E. London area.—Write, stating age experience, and salary required, to Box 4612.

A SSISTANT ARCHITECTS required for Intermediate standard.—Apply in writing to Oxley & Bussey, 91, Pinstone Street, Sheffield, 1 Yorks. Envelope to be endorsed "Assistant Architect."

NUCLEAR POWER. Simon-Carves Ltd. require naclear power department. The openings will suit men of Intermediate or Final R.I.B.A. level; previous experience of industrial structures will be expected. Applicants must be prepared to work in London Working conditions are good. Salaries will gauge up to £1,00 a year depending on qualifications and experience. Five-day week; three weeks' annual holiday. A Pension Fund and non-contributory Sickness Benefit scheme are in operation. Apply, quoting ref. PO49, to Staff experience of the property of the staff of the staff of the scheme are in operation. Apply, quoting ref. PO49, to Staff experience of the scheme are in operation. Apply, and the scheme are in operation. Apply, and the scheme are in operation. Apply and the scheme are in operation. Apply, and the scheme are in operation. Apply a scheme are in operation. Apply a scheme are in the scheme are in the

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4600 mediate experiALERT, practical, ARCHITECTURAL ASSISTANT required. Intermediate standard. Private Architects' Croydon office.—Write, giving particulars of experience, age, and salary required.—Box 4607.

APPLICATIONS are invited from both Senior and Junior men for appointments as ARCHITECTS with a busy Midland firm. The work is varied, covering Commercial, Industrial, Hospital, Local Authority and Domestic schemes, Assistants are encouraged to accept full responsibility for jobs from their inception to completion, including discussions with clients, contractors, and the supervision of staff. Assistance will be given with housing if required, and car allowances are available. Salaries offered are commensurate with experience and ability. Applications should be made in writing, giving details of qualifications and experience.—Box 4626.

LONDON TRANSPORT requires staff for Architect's Department:—
(a) ASSISTANT ARCHITECTS. Salary range \$290-£1,100.
Candidates must be fully qualified, with sound office experience, and be capable of supervising a small number of junior staff.
(b) ARCHITECTURAL ASSISTANTS. Salary range £750-£840.
Candidates must be qualified to R.I.B.A. Intermediate standard and have previous office experience.

ence.
(c) ARCHITECTURAL DRAUGHTSMEN.
Salary range: £340 at age 18 to £710, plus additional payments for certain recognised qualifica-

Candidates must show ability in Architectural drawing, and be studying for the Examinations of the R.I.B.A. Some office experience an advantage.

advantage.

Free travel. Medical examination. 38-hour week. Good dining club and sports facilities.—
Applications within 14 days to Recruitment and Transing Officer, London Transport, 55, Broadway, S.W.1, quoting vacancy No. F/EV 609 (a, b or c).

4613

A RCHITECTURAL ASSISTANT required for a wide variety of interesting work, including hiport, Commercial and Industrial Buildings.— Clive Pascall & Peter Watson, 24, Half Moon Street, W.1. GRO. 7343.

Street, W.1. GRO. 7343. 4627

AIR MINISTRY require TAKERS-OFF and WORKERS-UP in Quantities Division, London. TAKERS-OFF must have wide experience in all classes of work, and preferably be ABLICS. WORKERS-UP must be fully experienced and competent to work-up entire Bills of quantities. Salaries, on annual incremental basis: Takers-off from £900 to £1,640 p.a., Workers-up from £635 to £925 p.a., according to age, qualifications and experience. QUANTITY SURVEYORS and QUANTITY SURVEYING ASSISTANTS also required by Government Departments both in London and Provinces. Annual leave, sick pay, etc., in accordance with Government regulations. Forms, quoting JQS, from Room 403, M.L.N.S.. Technical and Scientific Register (J), 26, King Street, London, S.W.1.

QUALIFIED ARCHITECT'S ASSISTANT (age 22 to 30) required in progressive London office. Salary £500-£50, according to age and experience.—Box 4609.

age and experience.—Box 4609.

SLATER & UREN, of No. 5, Gower Street, W.C.I. require ARCHITECTS ASSISTANTS, with at least 5 years' ofnce experience. Write for appointment, giving qualifications.

ARCHITECTURAL ASSISTANTS and DRAUGHTSMEN required in the Architects Department of Alied Bakeries, Ltd. Applicants should possess a sound knowledge of design and construction of industrial buildings. Fension and Life Assurance scoemes in operation. 5-day week and lunching facilities, salaries between £600 and £1,100 p.a., depending on ability and experience.—Full details to Uniet Architect, Alied Bakeries, Ltd., 17, Camden Road, London, N.W.L.

A RCHITECT requires ASSISTANT, of Inter-mediate standard, for small City practice. Part-time considered.—Ring Central 8464 or write Box 4564.

A SSISTANTS urgently required, around Interstandard. 5-day week and lunch vouchers.—write full particuars, Lancaester & Lodge, 10, Woburn Square, London, W.C.1.

4585

CLERK OF WORKS.—Two Clerks of Works required for important Hospital project in the Middle East for major Oil Company. Clerks of Works must be funly experienced: one at least must have experience of engineering services. Salary to be not less than £1,200 p.a., with good cost-of-living allowance, accommodation and amenities. The contract will be for a period of two years. First-class air passages will be paid.—Box 4587.

A RCHITECTURAL ASSISTANTS required for Staff Architect's Department at Head Office of Dolcis Shoe Company. Previous shopfitting experience desirable but not essential, providing candidates have interest in Contemporary design. Inter. R.I.B.A. or equivalent standard required. Good remuneration, canteen, non-contributory pension scheme, social/sports club.—Apply in writing to Staff Manager, Dolcis, Ltd., 7/13, Great Dover Street, S.E.I... 4589

A VACANCY exists for an ARCHITECTURAL

A ASSISTANT of Intermediate standard in a small Westminster office. The work is contemporary, and is mainly of industrial and commercial character. Saiary £500—£500 p.a.—Write Box £591, or telephone £LOane 7257.

A RCHITECT'S ASSISTANTS required immediately for West End office. Experienced in preparation of working drawings, details, measurements of existing buildings. Commercial practice. Saiary range £400 to £500 p.a., according to experience.—Apply Box £538.

Ing to experience.—Apply Box 4638.

INTERMEDIATE standard ASSISTANT required in small office.—Particulars and salary required to A. J. Russell Green, L.R.I.B.A., 214, High Street, West Bromwich.

A RCHITECTURAL ASSISTANT required immediately, with experience of industrial buildings, of R.I.B.A. Intermediate standard.—Reply, stating age, qualifications and salary required, to the Staff Appointments Officer, Rolls-Royce, Ltd., P.O. Box 31, Nightingale Road, Derby.

A RCHITECTURAL ASSISTANT, Intermediate standard, required by City firm, Good salary and prospects.—Box 4639.

ARCHITECT'S ASSISTANT, of about R.I.B.A. Inter. standard, required in Architect's Department in City. Should be quick, accurate draughtsman, and used to good class work. Secure future for suitable applicant.—Write, stating age, experience, and salary required, Box 4592.

Architectural Appointments Wanted lines or under, 7s. 6a.; each additional line, 2s.

A.R.I.B.A. Aged 36. Wide experience of Estates Development, Shops, Housing and Industrial Premises. Seeks change of responsible position. Car owner.—Box 4559.

CHARTERED ARCHITECT (L.R.I.B.A.), age 43, with over 25 years' varied experience of industrial, commercial and domestic work, desires senior appointment, where he will carry rull responsibility for work entrusted to him.—

SENIOR ASSISTANT (29) requires interesting position with contemporary office or free lance work. Industrial, commercial, or domestic. Present salary £850. Car owner.—Box 4623.

A. R.I.B.A., Dipl. Arch. (28), 6 years' varied domestic, seeks position, London, to take charge any type of work, pref. at design stage. Own car. Salary £900.—Box 4604.

O PPORTUNITY wanted, with prospects partnership, in practice away from London (preferably West of England) by SENIOR ASSISTANT, A.R.I.B.A. (aged 30). Extensive London experience all types of work; at present controlling very large contracts. Would welcome interviews, any distance.—Box 4636.

Other Appointments Vacant

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

A RCHITECT or ENGINEER required to act as full-time SALES REPRESENTATIVE in the London area. Requirements:—Professional qualification and sound knowledge of modern building construction, to be able to discuss with architects and engineers the best use of advertiser's services and products; good education and social background; pleasant personality; willingness to work hard and use initiative. Age about 30.

Only architects or engineers

about 30.
Ouly architects or engineers are invited to reply. Applications will be confidential.
Earnings are unusually attractive, comprised of a good salary, commission, expenses, car, life assurance and pension, and participation in the Company's Share Bonus Scheme.
Applications should give detailed information, enclosing recent photograph or snapshot (returnable), to Concrete Limited, 16 Northumberland Avenue, London, W.C.2. Mark envelope "A" in top left hand corner.

S LIDING DOOR GEAR MANUFACTURERS.—
Full-time representation needed to effect complete liaison between Architects, Quantity Surveyors, Builders and Suppliers in Birmingham and Manchester areas. Architectural qualifications essential. Salary by arrangement. Contributory pension scheme. Write, stating experience and age. Replies treated confidentially.—Hill Aldam, Britannic Works, Haslemere Avenue, London, S.W.18.

REPRESENTATIVE.—A senior position is open to a Representative having active connection with Architects in the London area. Applicants must have experience of negotiating substantial business with eminent Architectural offices.—Apply Box 4574.

Other Appointments Wanted

4 lines or under, 7s. 6d.; each additional line, 2s. L ONG-SUFFERING SECRETARY (26), exoffice, desires a similar post in Westminster early
New Year.—Box 4617.



# 50 modern bungalows

EDITED BY FELIX WALTER, F.R.I.B.A.

THIS BOOK ILLUSTRATES AND DESCRIBES in detail a selection of examples of the most successful and interesting recently-built single-storey houses, all of them examples which show the latest developments in small house planning and design. It is edited by a practising architect with considerable experience of small house design. In his introduction and descriptive notes he pays special attention to new heating methods and to the latest ideas in planning, kitchen arrangements and so on which these facilitate. Costs are stated for each house illustrated. Size 10 ins. by 71 ins. 112 pages, over 200 illustrations in halftone and line. Price 18s. 6d. net

THE ARCHITECTURAL PRESS, 9 Queen Anne's Gate, S.W.1.

#### Services Offered

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

THIS WEEK we are available to inspect sites in the LONDON AREA.—THE SITE SURVEY CO., BLACKHEATH, S.E.3. LEE Green 7444-5.

A RCHITECTURAL, Reinforced Concrete and Steel Design and Detailing required—only buildings over £10,000. Large staff available MUSeum \$755.

NUSeum 8753.

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

A RCHITECTURAL PHOTOGRAPHY to Mono-chrome, Natural Colour and 3D. Quota-tions with pleasure.—Geoffrey Hammonds (Associate of the Institute of British Photo-graphers in Commercial Photography), The Stadios, King Street, Hereford. Tel. Hereford

SITE Surveys and Surveys of Buildings pre-pared at short notice anywhere in Britain. MUSeum 8753.

MUSeum 8753.

SURVEYS OF BUILDINGS, detailed drawings prepared, also land surveys by chain or theodolite, levelling, etc. LiV. 1839.

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

EXPERIENCED DESIGNER, with original Outlook offers free lance services for pre-paration of Interior Schemes from initial sketches to final details.—John Carter, 38D, Upper Montague Street, London, W.1. PADdington 2702.

Name PLATES, PLAQUES, CRESTS, etc., in bronze, brass and plastic, quotations and lay-outs submitted.—Abbey Craftsmen, Ltd., 78, Osnaburgh Street, London, N.W.1. Euston 5722.

#### For Sale and Wanted

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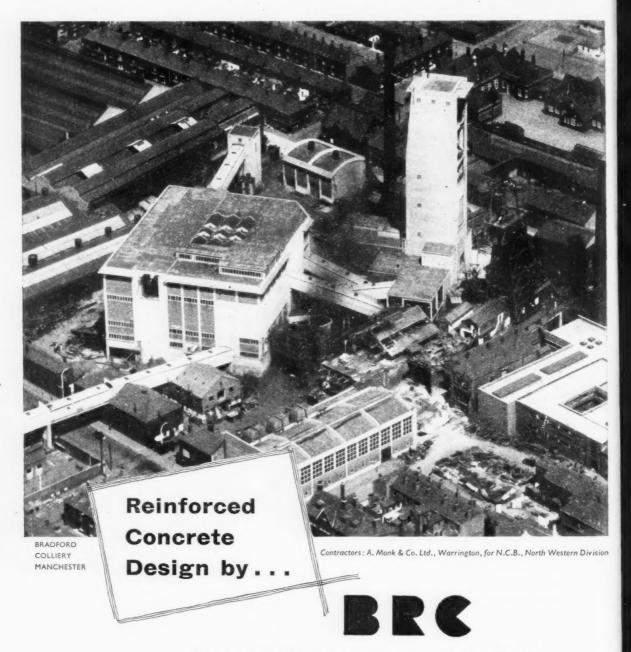
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