

# THE ARCHITECTS' JOURNAL



## Standard contents

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

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Wanted and Vacant

No. 3335]

[Vol. 129

THE ARCHITECTURAL PRESS

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

AA	Architectural Association, 34/6, Bedford Square, W.C.1.	Museum 0974
AAI	Association of Art Institutions. Secy.: W. L. Stevenson, College of Art, Hope Street, Liverpool 1.	Royal 1826
ABS	Architects' Benevolent Society. 66, Portland Place, W.1.	Langham 5533
ABT	Association of Building Technicians. 1, Ashley Place, S.W.1.	Victoria 0447-8
ACGB	Arts Council of Great Britain. 4, St. James's Square, S.W.1.	Whitehall 9737
ADA	Aluminium Development Association. 33, Grosvenor Street, W.1.	Mayfair 7501/8
ARCUK	Architects' Registration Council. 68, Portland Place, W.1.	Langham 5861
BAE	Board of Architectural Education. 66, Portland Place, W.1.	Langham 5721
BC	Building Centre. 26, Store Street, Tottenham Court Road, W.C.1.	Museum 5400
BCC	British Colour Council. 13, Portman Square, W.1.	Welbeck 4185
BCCF	British Cast Concrete Federation. 105, Uxbridge Road, Ealing, W.5.	Ealing 9621
BCIRA	British Cast Iron Research Association. Alvechurch, Birmingham.	Redditch 716
BDA	British Door Association. 10, The Boltons, S.W.10.	Fremantle 8494
BEDA	British Electrical Development Association. 2, Savoy Hill, W.C.2.	Temple Bar 9434
BIA	British Ironfounders' Association. 145, Vincent Street, Glasgow, C.2.	Glasgow Central 2891
BID	Building Industries Distributors. 52, High Holborn, W.C.1.	Chancery 7772
BINC	Building Industries National Council. 11, Weymouth Street, W.1.	Langham 2785
BOT	Board of Trade. Whitehall Gardens, Horseguards Avenue, Whitehall, S.W.1.	Trafalgar 8855
BRS	Building Research Station. Bucknalls Lane, Watford.	Garston 4040
BSA	Building Societies Association. 14, Park Street, W.1.	Mayfair 0515
BSI	British Standards Institution. British Standards House, 2, Park St., W.1.	Mayfair 9000
BTE	Building Trades Exhibition. 32, Millbank, S.W.1.	Tate Gallery 8134
CABAS	City and Borough Architects Society. C/o S. A. G. Cook, A.R.I.B.A., Borough Architect and Director of Housing, Town Hall, High Holborn, W.C.1.	Holborn 3411
CAS	County Architects' Society. C/o S. Vincent Goodman, F.R.I.B.A., Shire Hall, Bedford.	Bedford 67444
CCA	Cement and Concrete Association. 52, Grosvenor Gardens, S.W.1.	Belgravia 6661
CDA	Copper Development Association. 55, South Audley Street, W.1.	Grosvenor 8811
COID	Council of Industrial Design. 28, Haymarket, S.W.1.	Trafalgar 8000
CPRE	Council for the Preservation of Rural England. 4, Hobart Place, S.W.1.	Sloane 4280
CUC	Coal Utilization Council. 3, Upper Belgrave Street, S.W.1.	Sloane 9116
CVE	Council for Visual Education. 13, Suffolk Street, Haymarket, S.W.1.	Reading 72255
DIA	Design and Industries Association. 13, Suffolk Street, S.W.1.	Whitehall 0540
EJMA	English Joinery Manufacturers' Association (Incorporated). 40, Piccadilly, W.1.	Regent 4448
EPNS	English Place-Name Society. 7, Selwyn Gardens, Cambridge.	Welbeck 9966
FAS	Faculty of Architects and Surveyors. 68, Gloucester Place, W.1.	Welbeck 1781
FASS	Federation of Associations of Specialists and Sub-Contractors, 14, Bryanston Street, W.1.	Whitehall 6711
FBBDO	Fibre Building Board Development Organization Ltd. (Fidor), Stafford House, Norfolk Street, W.C.2.	Covent Garden 3008
FBI	Federation of British Industries. 21, Tothill Street, S.W.1.	Regent 0221
FC	Forestry Commission. 25, Savile Row, W.1.	Sloane 1002
FCMI	Federation of Coated Macadam Industries. 37, Chester Square, S.W.1.	Ilkeston 623
FDMA	The Flush Door Manufacturers Association Ltd. Trowell, Nottingham.	Ulverston 201
FLD	Friends of the Lake District. Pennington House, nr. Ulverston, Lancs.	Chancery 7583 (6 lines)
FMB	Federation of Master Builders, 33, John Street, W.C.1. Tel.: Chancery 7583 (6 lines)	Whitehall 3902
FPC	The Federation of Painting Contractors, St. Stephen's House, S.W.1.	Whitehall 3902
FRHB	Federation of Registered House Builders. 82, New Cavendish Street, W.1.	Langham 4341
GPDA	Gypsum Plasterboard Development Association. 11, Ironmonger Lane, E.C.2.	Monarch 8888
GC	Gas Council. 1, Grosvenor Place, S.W.1.	Sloane 4554
GG	Georgian Group. 2, Chester Street, S.W.1.	Belgravia 3081
HC	Housing Centre. 13, Suffolk Street, Pall Mall, S.W.1.	Whitehall 2881
IAAS	Incorporated Association of Architects and Surveyors. 29, Belgrave Square, S.W.1.	Belgravia 3755
ICA	Institute of Contemporary Arts. 17-18, Dover Street, Piccadilly, W.1.	Grosvenor 6186
ICE	Institution of Civil Engineers. 1, Great George Street, S.W.1.	Whitehall 4577
IEE	Institution of Electrical Engineers. Savoy Place, Victoria Embankment, W.C.2.	Temple Bar 7676
IES	Illuminating Engineering Society. 32, Victoria Street, S.W.1.	Abbey 5215
IGE	Institution of Gas Engineers. 17, Grosvenor Crescent, S.W.1.	Sloane 8266
IHVE	Institution of Heating and Ventilating Engineers. 49, Cadogan Square.	Sloane 1601/3158
IIBDID	Incorporated Institute of British Decorators and Interior Designers. 100, Park Street Grosvenor Square, W.1.	Mayfair 7086

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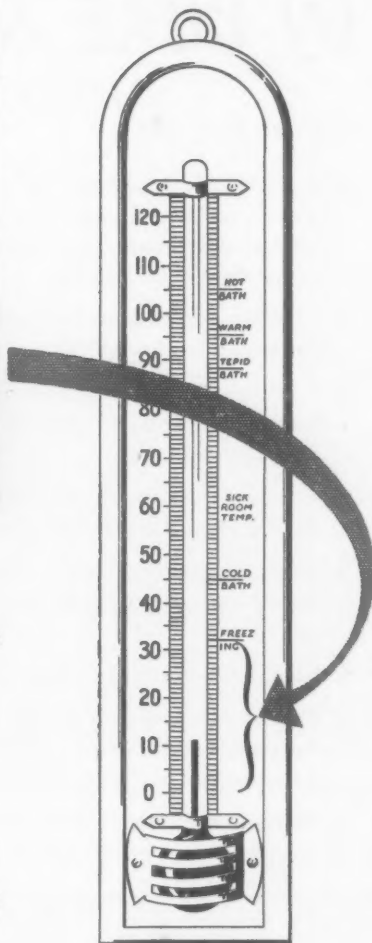


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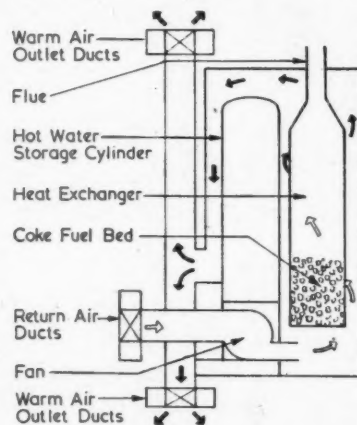
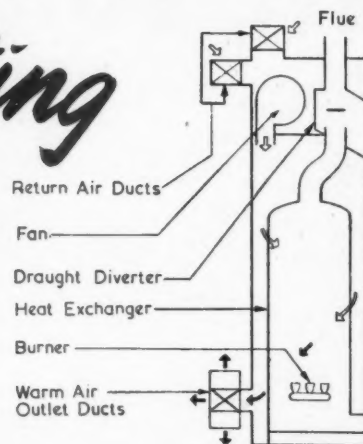


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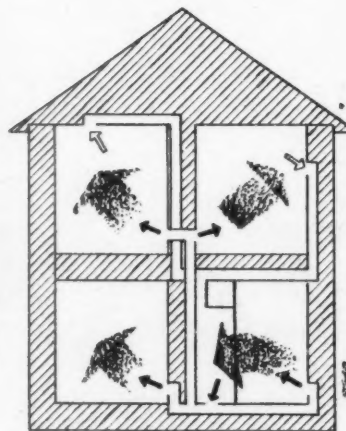
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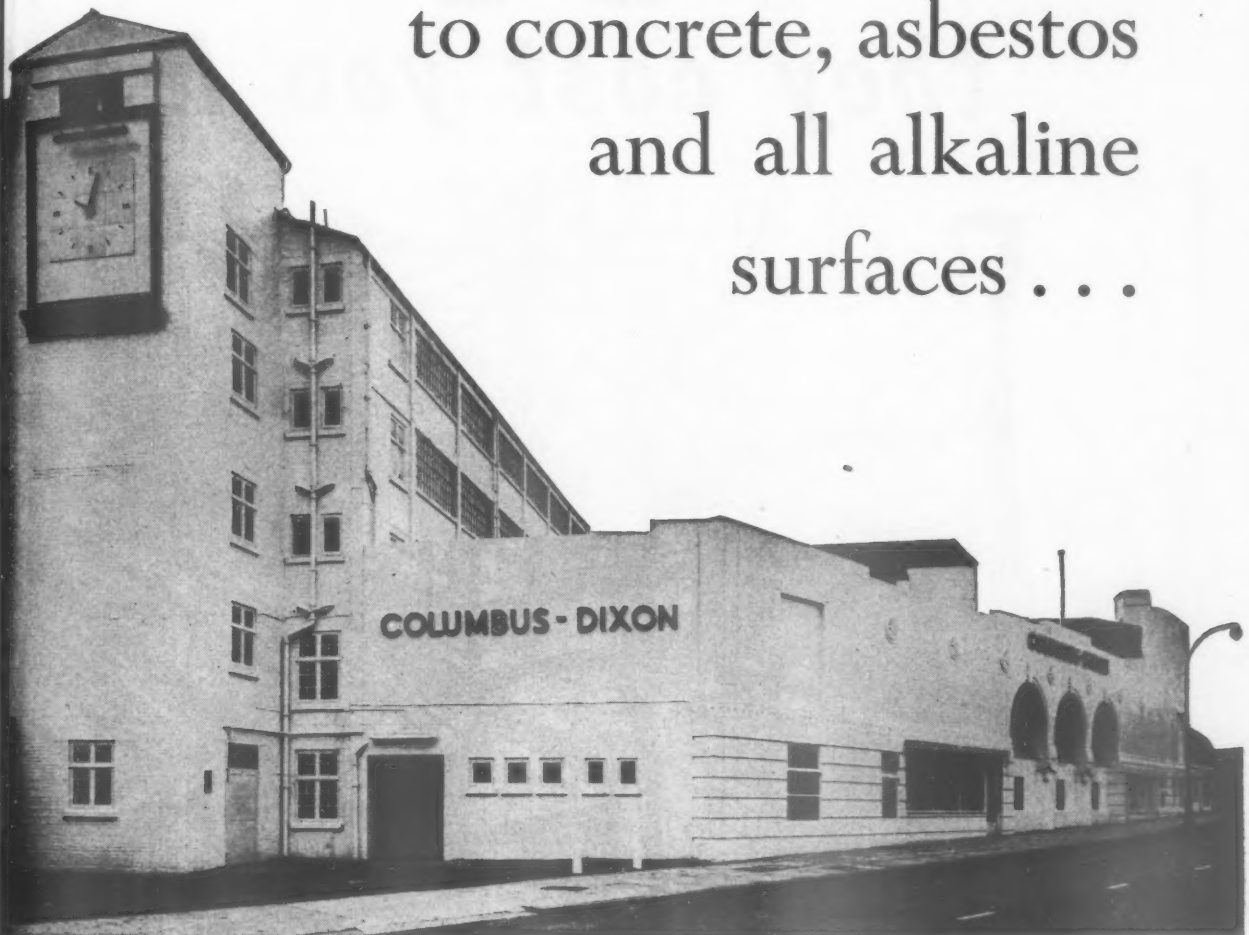
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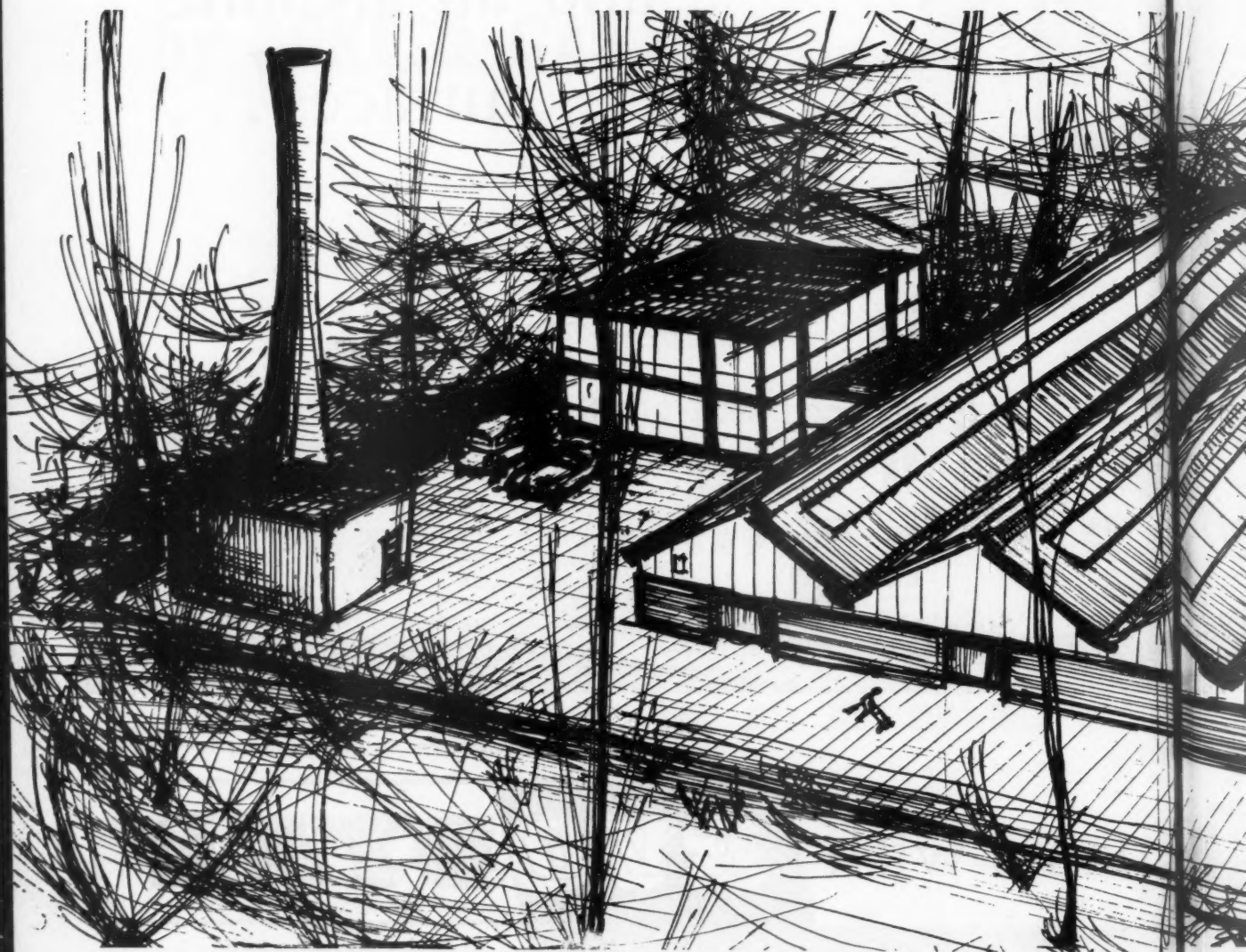
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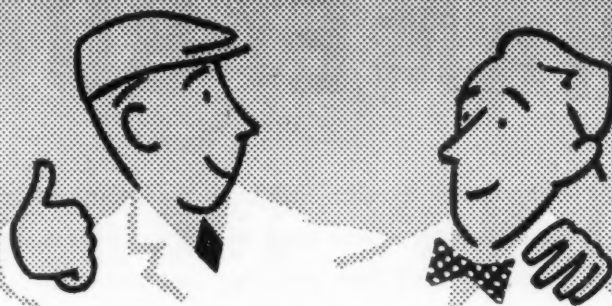


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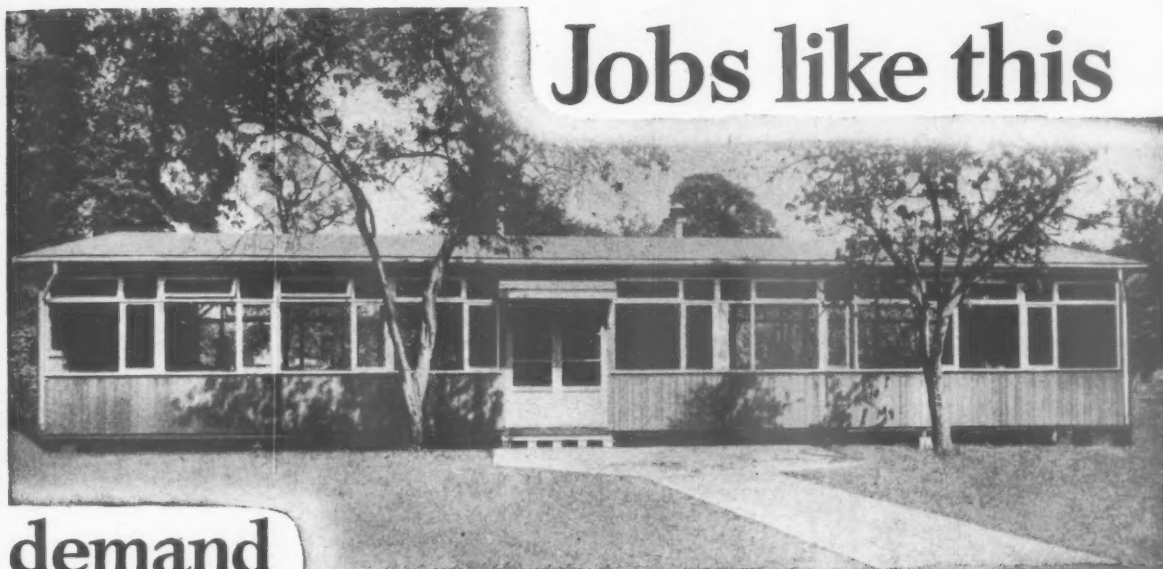
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## CASE RECORDS FROM THORNS' FILES - 2

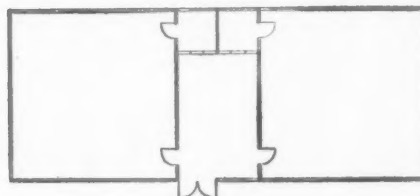
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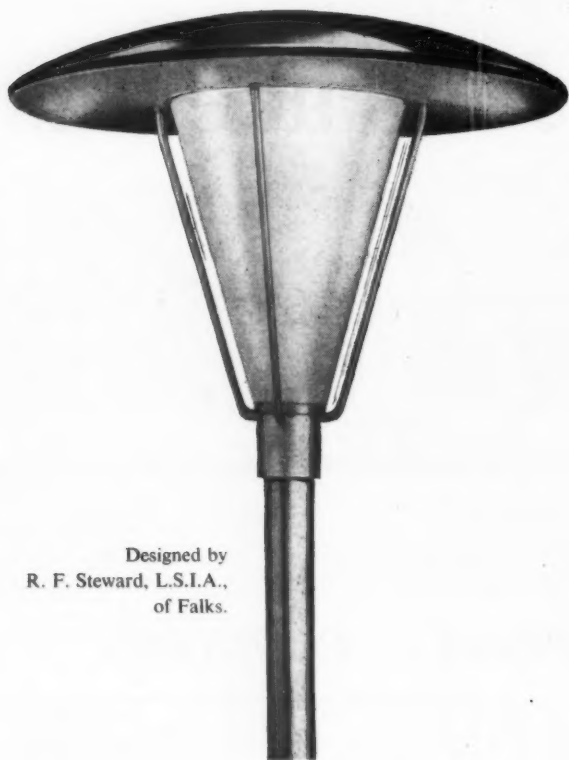
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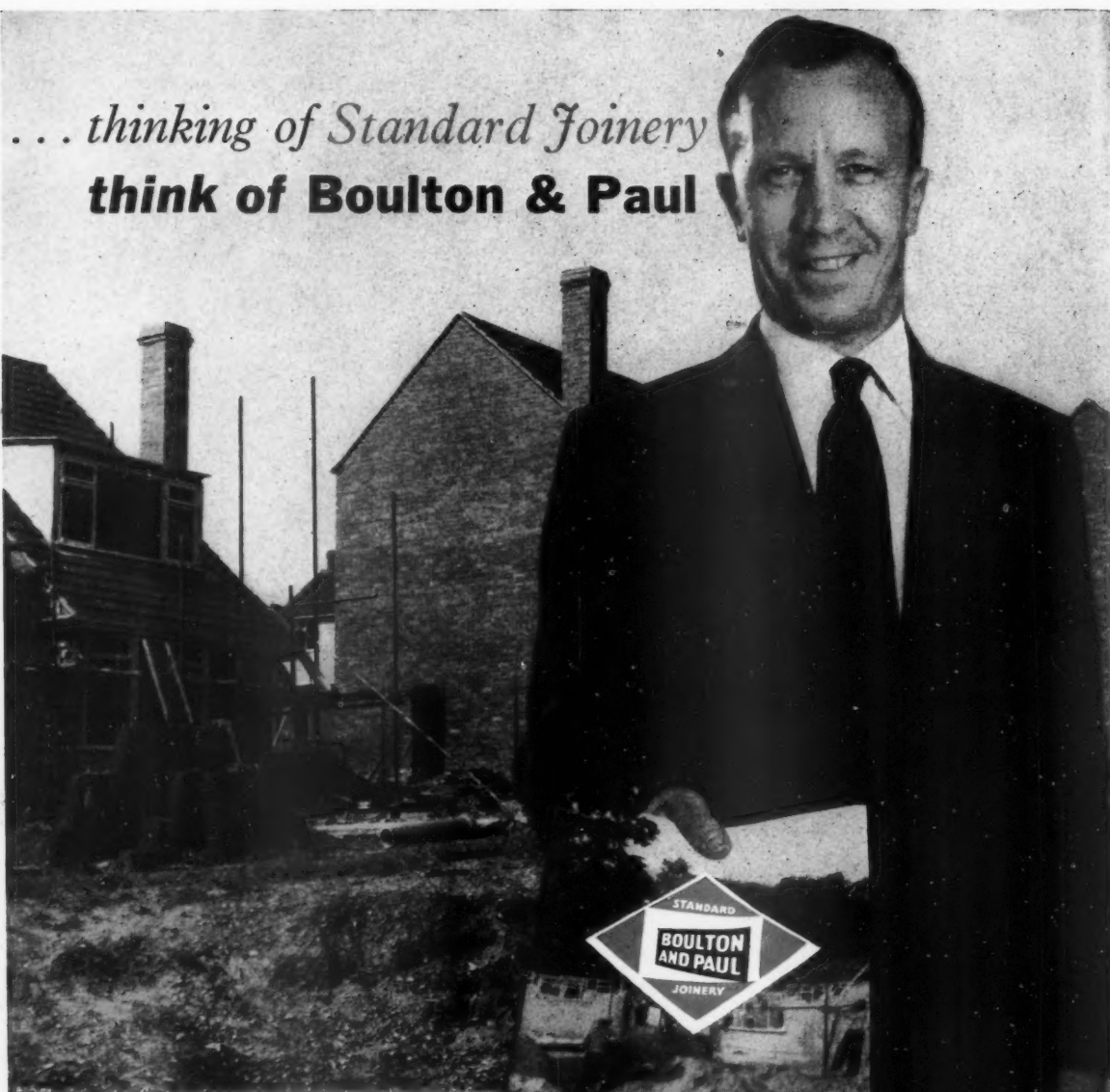
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British Lion Studios, Shepperton.

Architect:  
Oscar Garry, A.R.I.B.A.

Contractors:  
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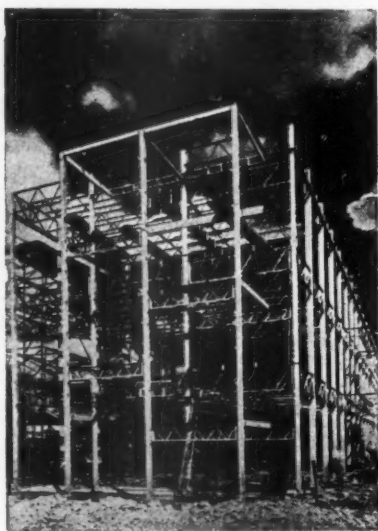
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S/GKS

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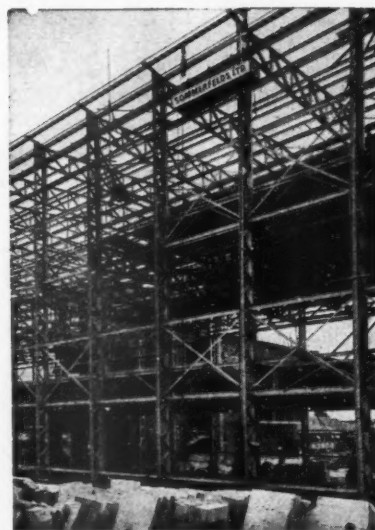
**YORK.** For the City of York a Grammar School. Sommerfelds designed the Steelwork on a 3ft. 4in. modular grid allowing complete freedom for the Architect to use curtain walling and internal arrangements.

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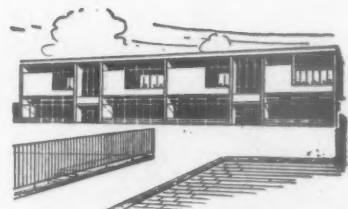
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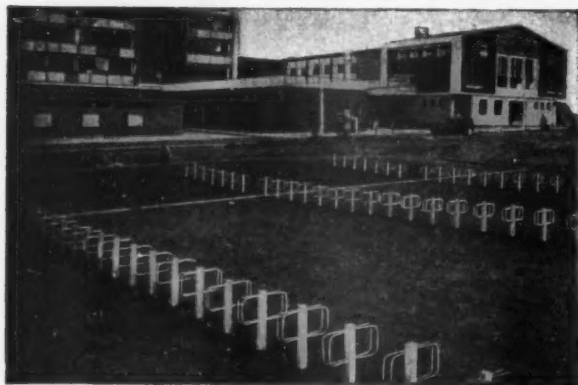
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MANCHESTER: 11 Norfolk Street, Tel.: Blackfriars 4171. OLDBURY, Near  
Birmingham. 43 Birmingham Street, Tel.: Broadwell 2191. WORTHING: 30 Manor Road,  
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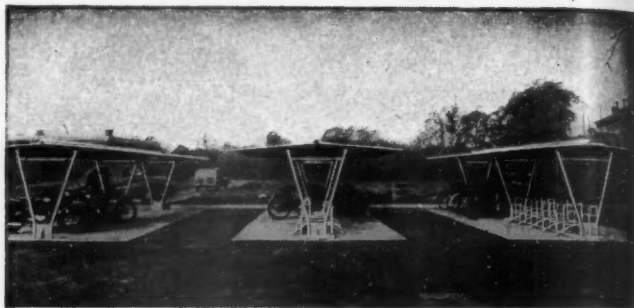
O.C.3



A Standard Maclean Metal Window installation



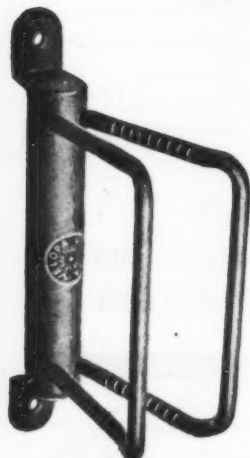
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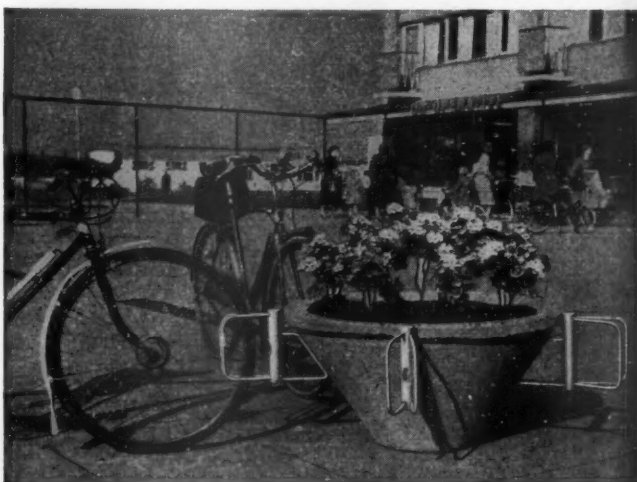
## **VelopA** bicycle holders

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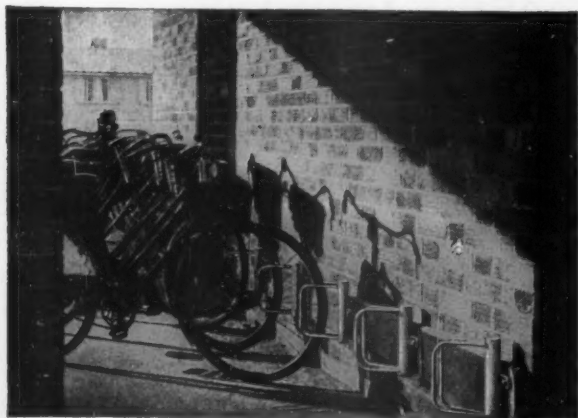
City Wall House, 129 Finsbury Pavement, London, E.C.2  
Telephone: MONarch 8822 Telegrams: Lebasco, Avenue, London  
**LONDON . MANCHESTER . GLASGOW . BELFAST**



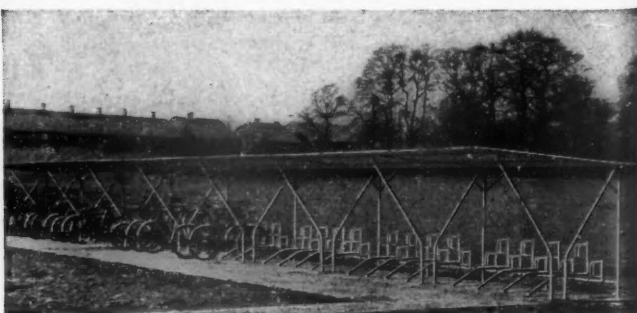
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## A NEW DESK with A BIG TOP

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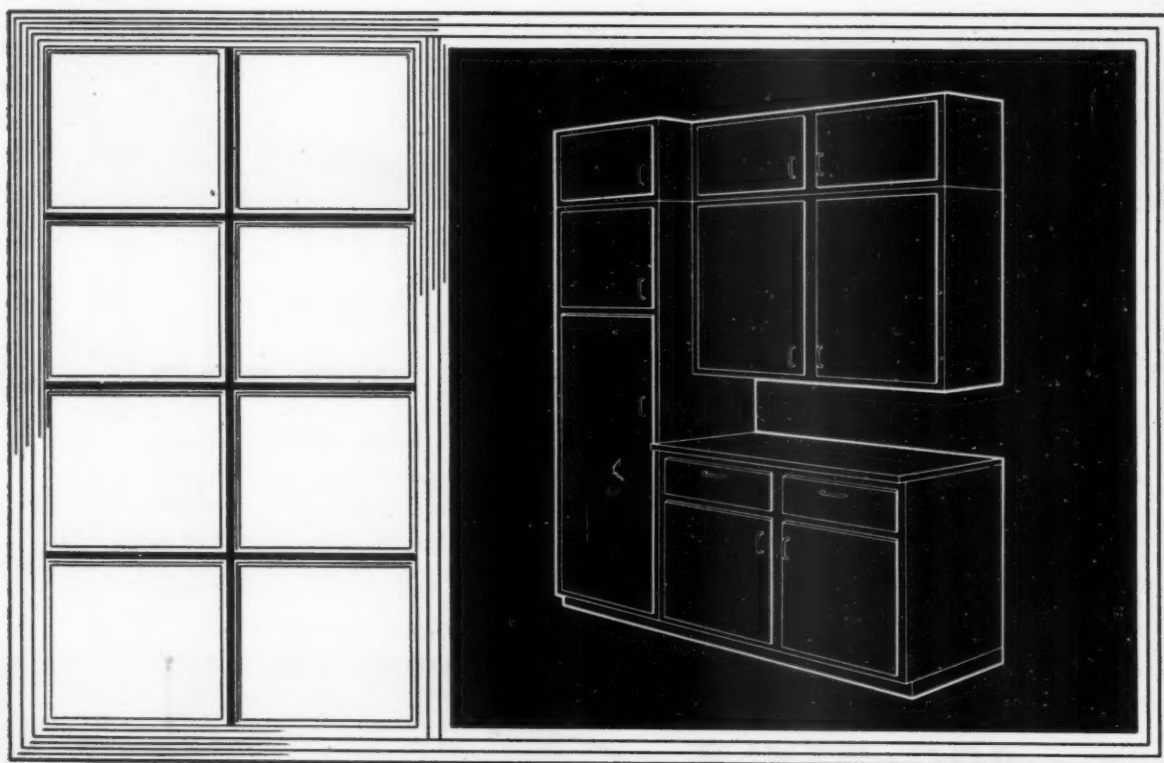
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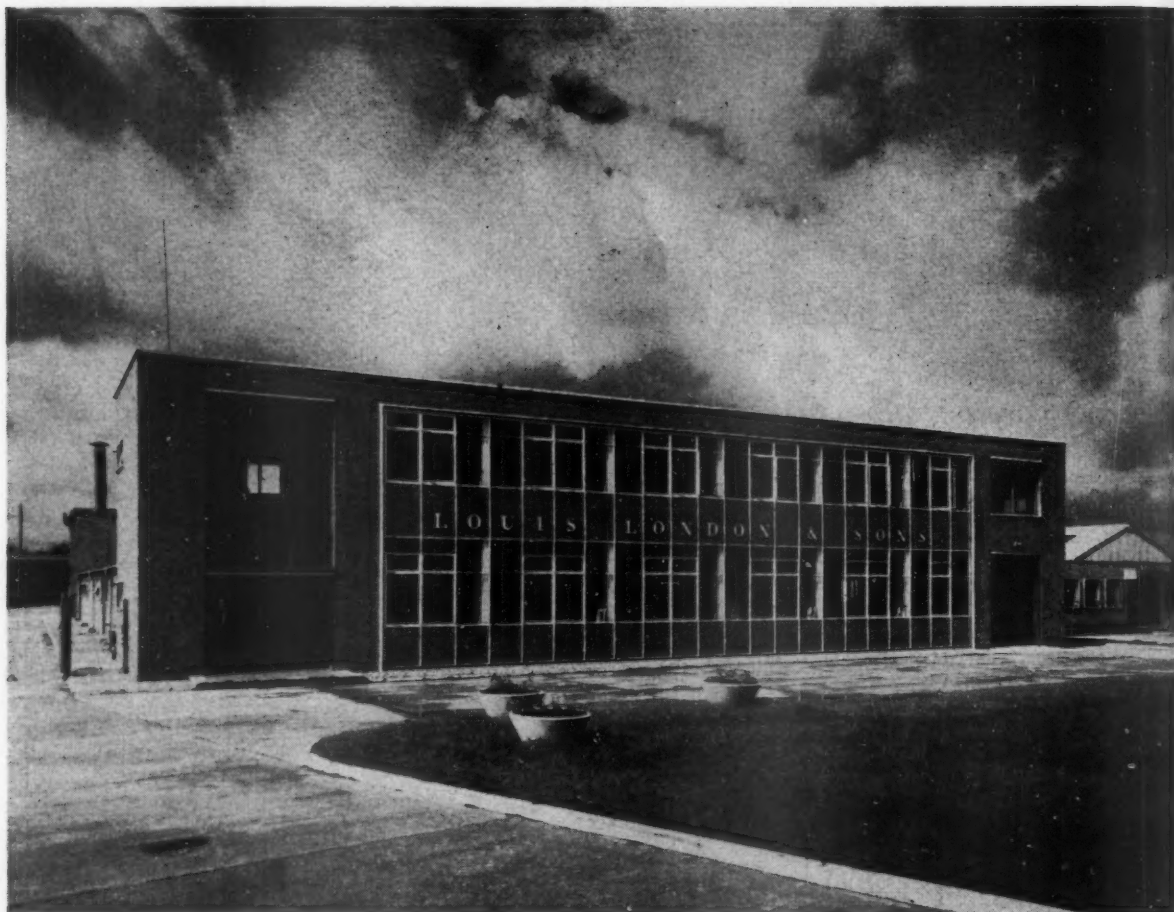
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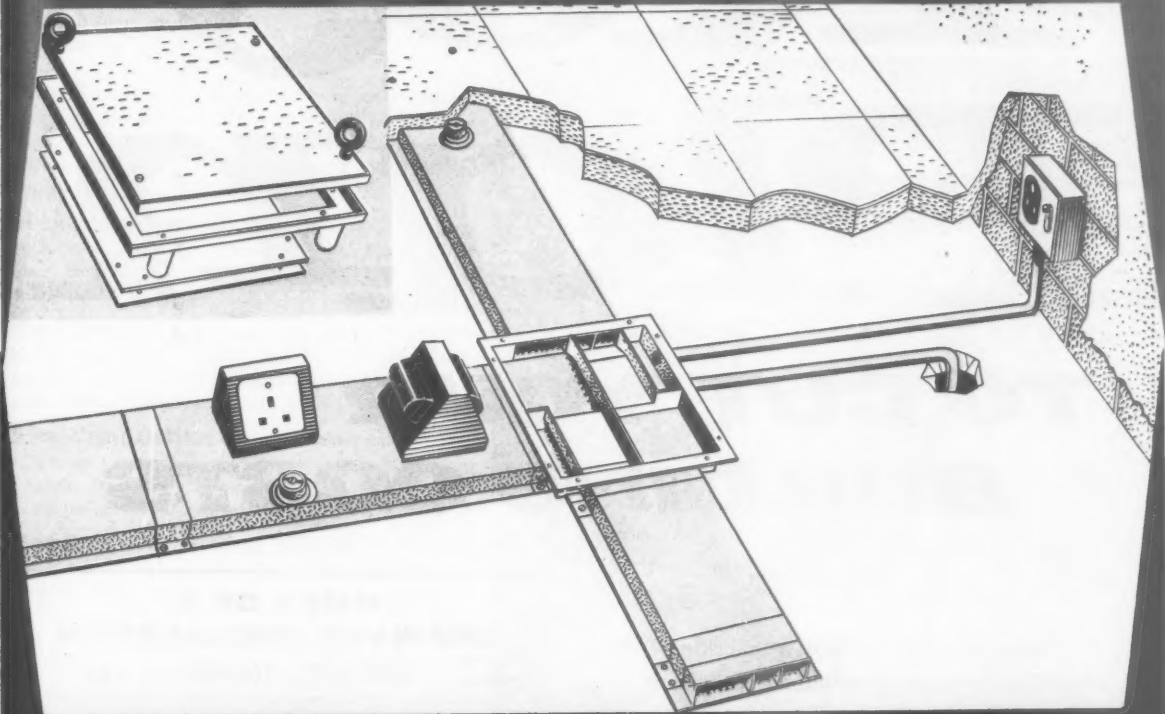
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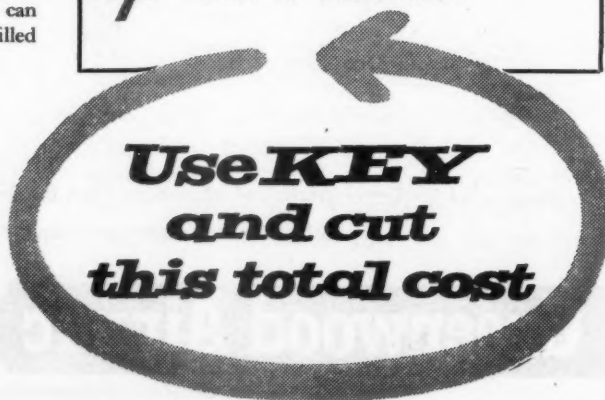
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+	COST OF HOLD-UPS
+	COST OF SITE DISRUPTIONS
+	COST OF MATERIALS



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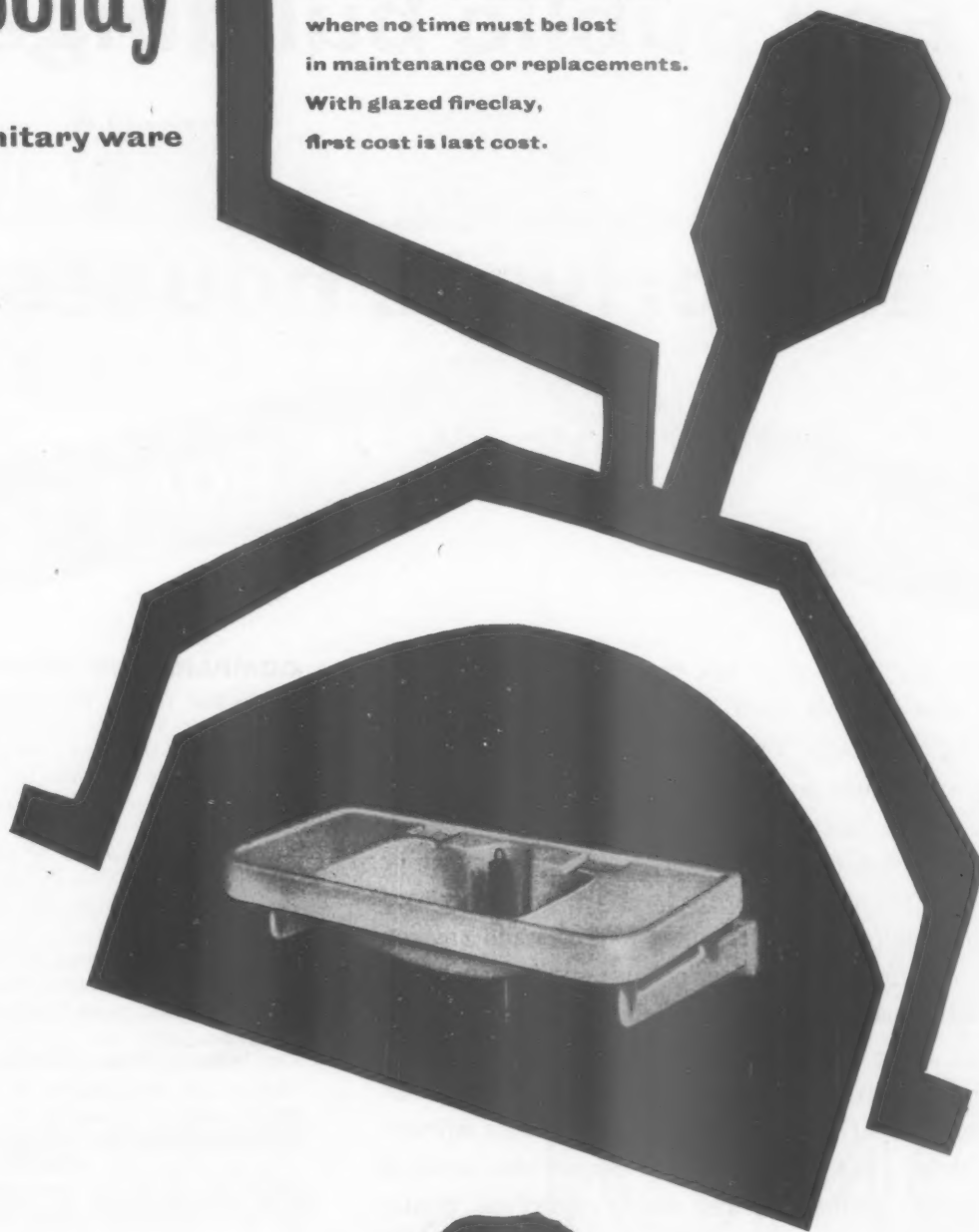
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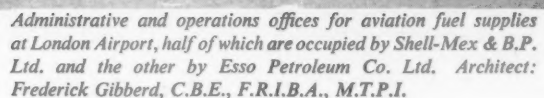


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THE ARCHITECTS' JOURNAL  
for January 29, 1959



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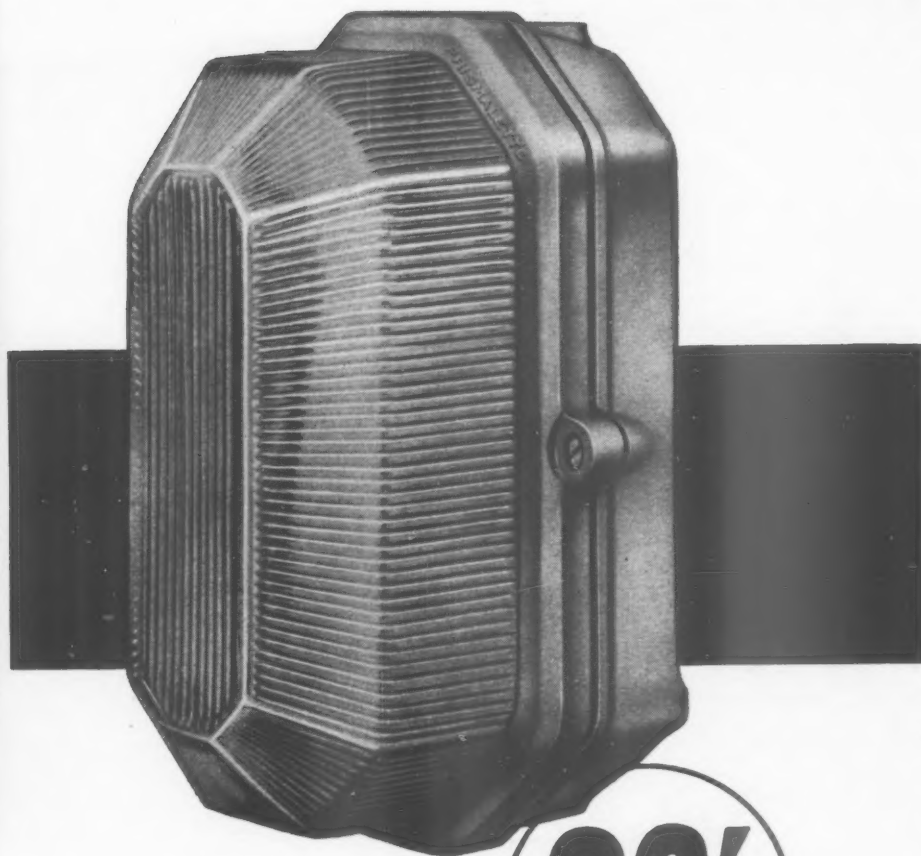
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
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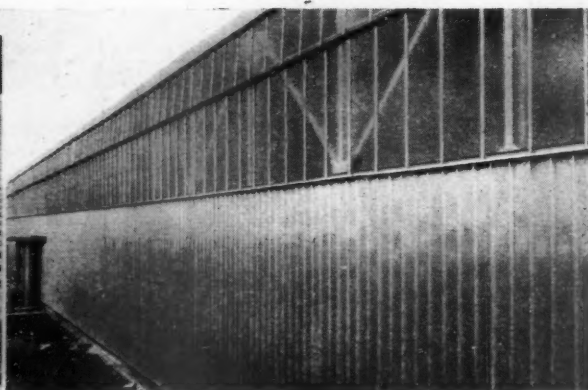
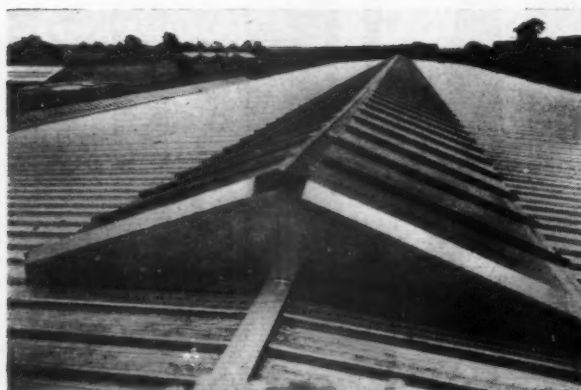
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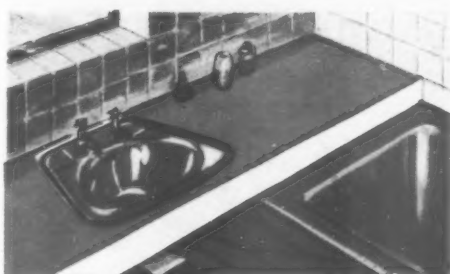
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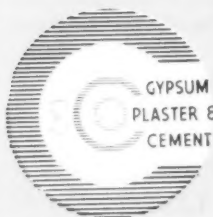


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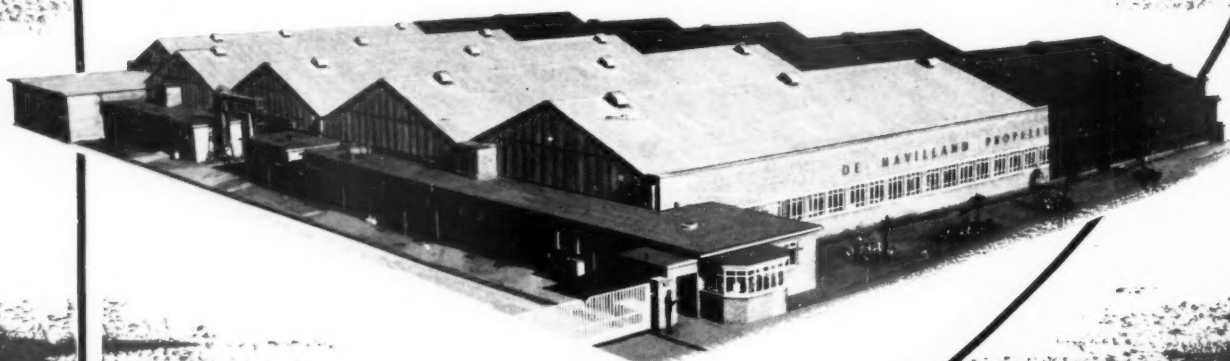
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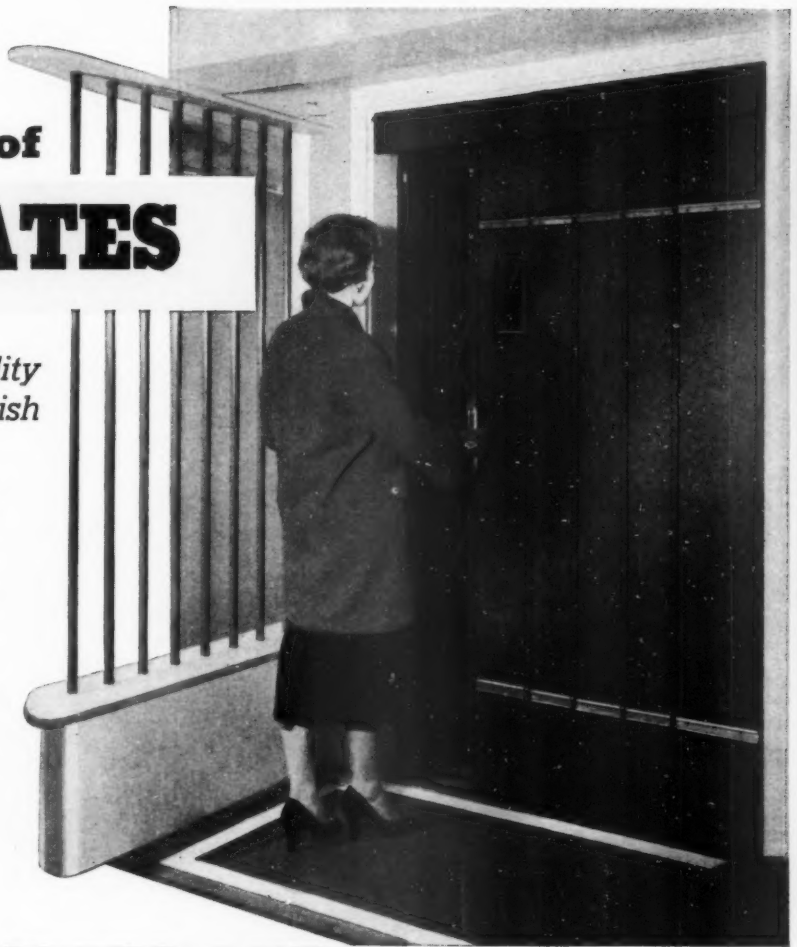
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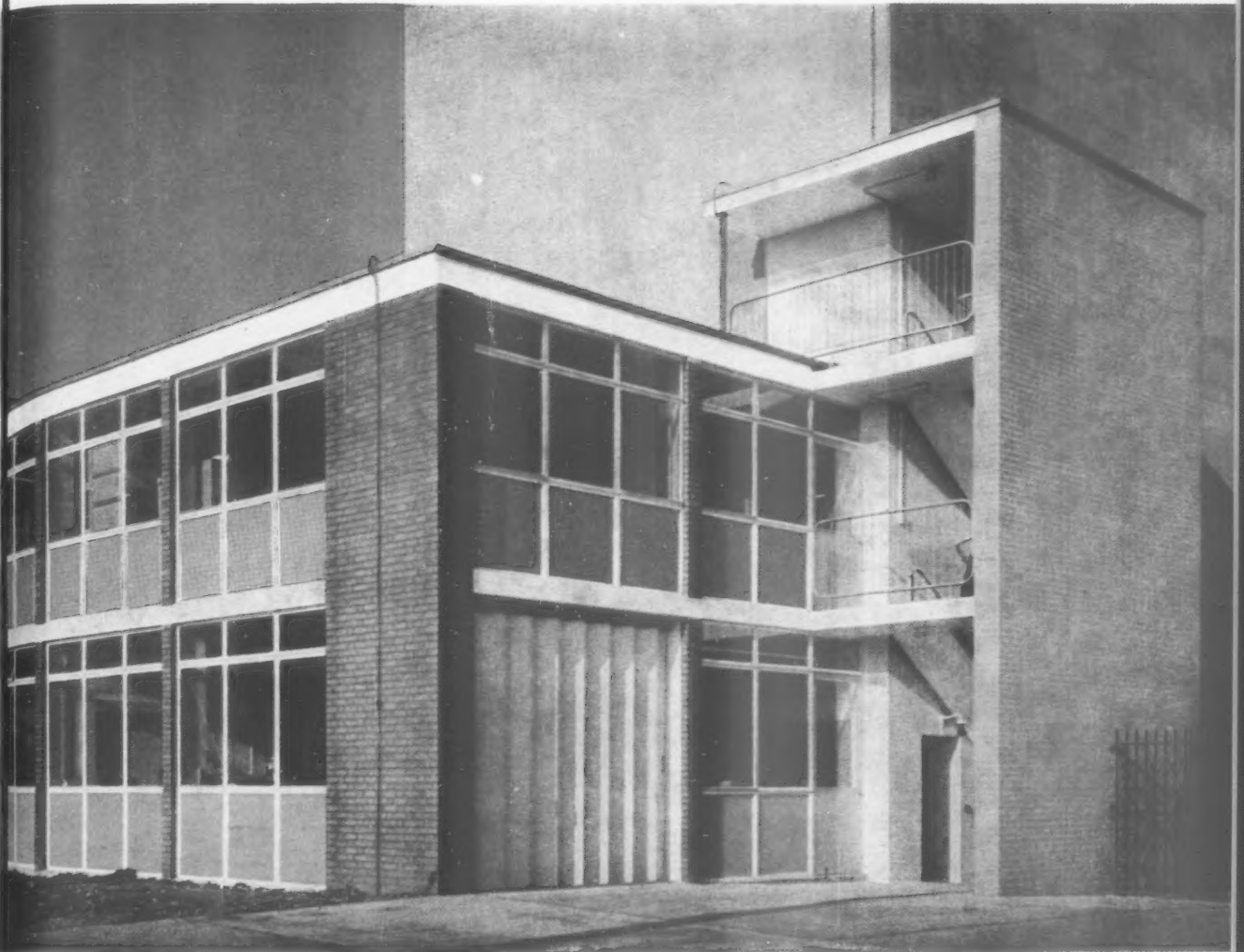
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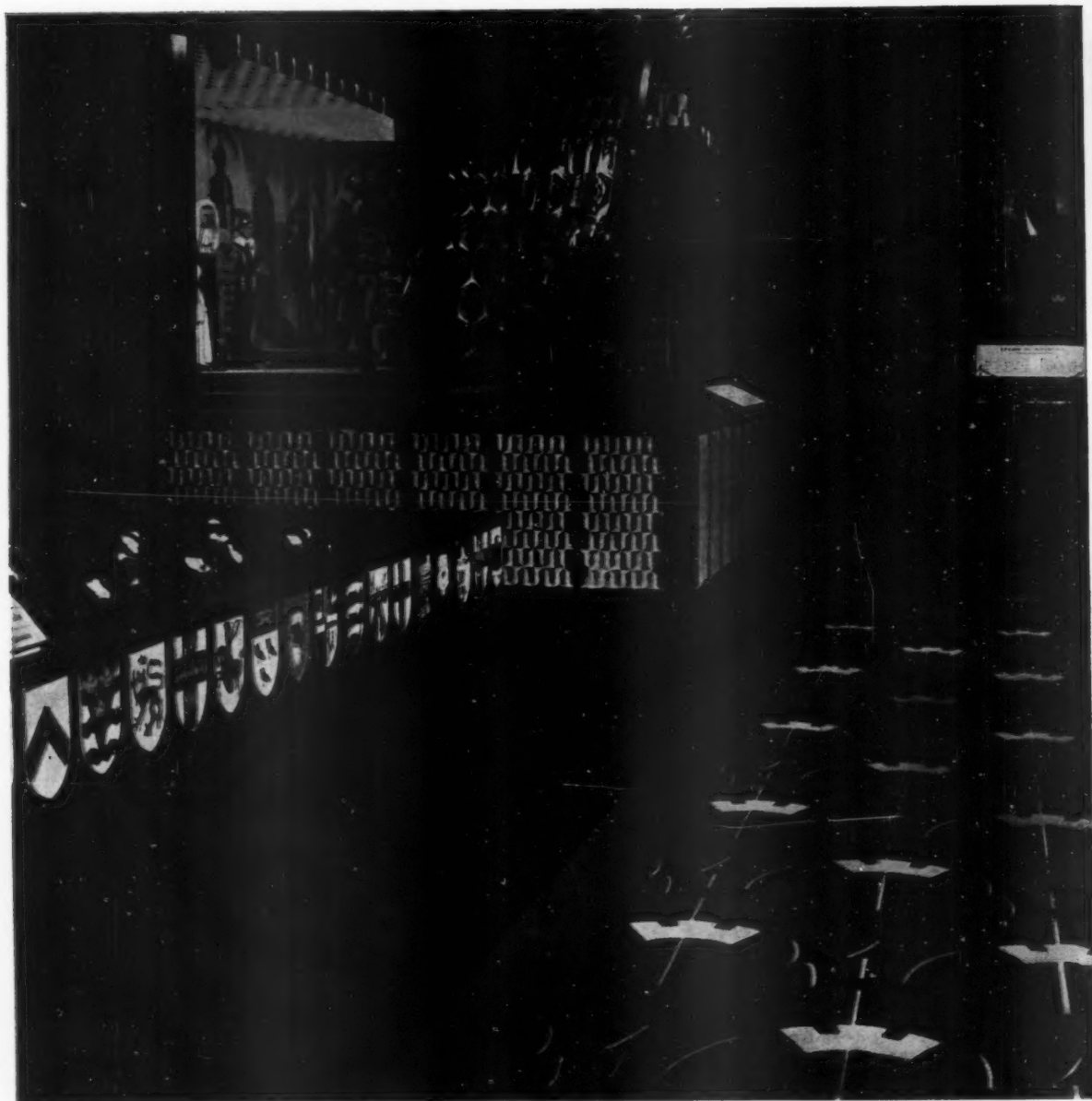
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# A J

**The Architects' Journal**

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NOT QUITE INDUSTRIAL DESIGN

## WITH KNOBS ON

Architects, a notoriously critical profession, are seldom satisfied with the standard products from which they have to choose to furnish their buildings. Ironmongery in general, and door handles in particular, are very susceptible to this dissatisfaction.

Apart from a few outstanding examples, the standard of design of British fittings is deplorably low. This fact was accentuated a few years ago by the introduction of some first-rate German and Scandinavian fittings. It was probably inevitable that the reactions of the British trade should be to produce direct copies of the most successful of them—the highest compliment that could be paid. New designs have been sponsored, but with one or two exceptions they are not of a high standard.

It was as a result of architects' dissatisfaction with the British products generally available [repeatedly expressed to the sponsors whilst they were handling one of the imported ranges] that the idea of holding an open competition for architects, designers, and students, was formed, in the hope that some of this dissatisfaction would be translated into more positive terms.

The premiums were set at a similar level to other recent design competitions, and the hope was expressed that at least one of the successful designs would be put into production, the author being retained to supervise the stages of development.

Submission was in the form of a model, and this undoubtedly deterred many would-be quick sketch entrants; why it did not deter the majority of submissions is a mystery. It is difficult to understand how some of the designs were conceived, or how they got beyond the paper sketch stage—this particularly applies to some of those submitted by architects! A large number of entries were from architectural students, and can be accepted as useful design studies of an elementary nature—it is interesting to note that half the successful designs were submitted by full-time students of industrial design.

The promoters wisely decided not to exhibit the worst of the entries, and are showing only a section of the unsuccessful ones in





addition to the eight designs which were selected for award.

No one handle was considered worthy of the top award of £100, and the sum of £250 was re-divided between eight entries in three groups.

The first group has a representation of three main lines of development: Firstly (1) a very simple bent tubular form, another (2) a competent, symmetrical design involving the interplay of two planes, and finally (3) a flamboyant but competent mannered design that one feels would date quickly.

The second group has three sound but undistinguished designs (4) (5) (6), while the third group, which seems to be a consolation section (7), contains one original design (8) which, with a first-rate drawing (8a), is the best presentation submitted, containing as it does some original thought on the method of fixing.

A few of the unsuccessful entries on display call for some comment:—

No. (9) is an example of the "squeeze a lump of plasticine" school, which in no way qualifies as a design.

No. (10). A good form which was unfortunately submitted without a name.

No. (11) is the only combined submission, clearly a result of a group project, and very much a compromise.

No. (12). A submission by a British manufacturer, presented in typical iron-monger's style.

No. (13). An idea—wood stuck on metal—lavishly presented, but lacking in any design quality.

No. (14). An original design, which contains the seeds of an idea, but was surely mounted the wrong way round!

No. (15). The only one of a series of entries from a School of Architecture which satisfied the basic requirements of a lever handle.

No. (16). There were several entries of this nature—sculptural shapes—quite unrelated to function or any known method of mounting. This example was the best finished model, but why—why go to all the trouble if it just will not work!

What conclusions are we to draw from all this?

Firstly, perhaps, that the premium was too low to attract submissions from the too few competent designers capable of working in this field. (What will happen, one wonders, to the current vitreous china competition, where the total premium per item is only slightly more than the £250 offered in this competition?)

Secondly, that this sort of design requires as much skill, competence, and knowledge of materials and production methods as that required to design a simple building.

Finally, a word of congratulation to the sponsors, Messrs. A. G. Roberts, for having the courage to hold the competition; it is not their responsibility that the results did not attain the expected standard. Let the smug British manufacturer look to his mettle (?) and be reminded that there is the Council of Industrial Design's Record of Designers gathering dust in the Haymarket—how about it!

JOHN VERNON

## The Editors

### GETTING TO KNOW THEM

THE joint meeting of architects and engineers to discuss their mutual relations which was held at the ICE last week\* was the outcome of initiative by the RIBA made some two years ago. It was possible to detect among some of the engineers surprise that the meeting should have been thought necessary; and there were many present who evidently thought that its main purpose was to reach a *modus vivendi* on the matter of fees and reciprocal responsibilities under the contract. The need for thorough-going collaboration is not self-evident to engineers, as their job when conceived (as they usually conceive it) in terms of a scientific discipline, is self-sufficient, needing no help from outside and, least of all, help from the architect. The engineer sets out with a problem to solve: if the vagaries of the architect make this problem more difficult, this is traditionally of small matter to him. The architect, on the other hand (as Richard Llewelyn Davies so ably pointed out) is by nature a parasite in that the facts which he must use to do his job properly must come from other professions: from sociologists, physiologists, chemists, from engineers and from many others. The architect is thus by nature one of the co-ordinators of our technical society and it is important that he and his professional friends should realise it. Unless the architect takes the initiative the other members of the professional building corps will be happy to go on in their own sweet way and no one (except the architect and a few other professionals of exceptional perspicacity) will be able to see that anything is wrong. It was to the credit of today's RIBA (and, indeed, of today's ICE) that the meeting took place and somewhat to the discredit of yesterday's RIBA that no similar joint meeting had occurred since 1901. It is good to learn that other meetings of the same kind are planned when, we hope, the two professions will be able to discuss in detail the real problems which confront them, beginning (as E. Jefferiss Matthews rightly suggested) with co-education.

### A BUREAU OF GOOD BUILDING PRACTICE

"With the great increase in new building materials for specialized purposes, and with the new methods of construction," said the Minister of Works, Hugh Molson, to the LMBA last week, "it is not possible for any busy architect, engineer or builder to keep himself fully informed of what is available in every branch of building and with the newest techniques of construction." Everyone, out of their client's hearing, would agree, and they would also agree that it is time to devise a means of determining what is "good building practice" and of finding a machinery for disseminating information on such practice. Plenty of machi-

\* See report on page 181.

nery exists already. But nearly all have great faults: the information is not presented in a standard way, it is too technical, unclassified, unfileable and often redundant. What is wanted is a clearing house, which collects technical findings, rewrites them in an easily understood manner, and passes the resulting fileable literature on to the right recipient, and also passes the architect's and builder's demands for further research on to the right quarter. Such a service will be expensive, as the JOURNAL knows, because it has been attempting to provide most of such a service to architects only for many years now. Has the building industry developed a sufficient sense of responsibility to undertake to help pay for such a service for all its diverse members? We hope so.



#### FELIX SAMUELY

It was with a great sense of loss and shock that ASTRAGAL read of the death of that brilliant and lovable engineer Felix Samuely. He was only 56 years of age. His name, with Ove Arup's, has been linked with modern architecture by nearly every architect who tried to take part in the modern movement. Short, plump, friendly and enthusiastic, he was popular with students (he taught for many years at the AA) as well as with architects, and could match, and indeed excel, their enthusiasms with his own. He did not see the engineer's rôle as one of fettering the architect and bringing him down to earth; he joined with the architect in an endeavour to find yet more efficient and more exciting solutions to structural problems. If some-

times his ventures were expensive, his solitary exploration across the frontiers of structural knowledge will leave us always in his debt.

\*

Others will be better equipped than ASTRAGAL to judge whether his greatest contribution to engineering was in his work on stressed concrete, or light steel frames, or lay elsewhere, but to hundreds of students of architecture, of all ages, Felix Samuely was the master of the theory of structure and a perfect companion in the adventure of building.

#### BETTER LATE

Having castigated the TCPA last week for sitting on the fence at its own conference on the Town and Country Planning Bill, ASTRAGAL is glad to see that it has now produced a policy (summarized on page 181) which reflects the anxiety widely held among planners of all kinds. The statement prompts two reflections: the first, that it would have been much better to throw this statement into the conference for discussion; the second, that the TCPA's inevitable panacea (building more new towns) has nothing to do with the problem of land ownership or land costs, and is of little relevance to many of the problems faced by planners in central area reconstruction. The TCPA has, however, set up a committee to study the whole problem of betterment, and it will be interesting to see what conclusions it comes to.

#### SCOTLAND THE BRAVE

New and expanded towns certainly are the heart, however, of Glasgow's plan to redevelop its vast slum areas, which have greater scope for imaginative planning and architecture than any

other plan in Britain. In the next 20 years the Corporation wants to rehouse 40,000 people in the city and a further 60,000 all over Scotland—not only in the new towns of East Kilbride and Cumbernauld, but also in places as far apart as Wick and Stranraer. And whatever the nationalists may say, Corby has been mentioned too.

Will this great opportunity be taken? The schemes already prepared (by Robert Matthew and Johnson-Marshall, and by Basil Spence) suggest they will. But such a slum clearance depends on the transfer of industry to other towns in Scotland. It remains to be seen if the legislative framework and the financial backing will be sufficient in a country where unemployment is quite heavy and industry is depressed. And the glossy brochure showing where industry and housing can be located in other Scottish towns is depressing to a degree, suggesting that the 60,000 overspill families will largely be accommodated in peripheral housing estates. This would be to miss an opportunity, as big as that in Glasgow, of modern urban redevelopment.

#### BACK TO THE DRAWING BOARD

There's no need to worry about the bad weathering of the Preston motorway. Alderman C. W. Doodson is "agreeably surprised" that there was "such a small amount of damage." What, one wonders, did the chairman of the Lancashire County Council Highways and Bridges Committee expect? The collapse of a bridge? The landslide of an embankment? Or is he just astonished that a motorway should remain undamaged for as long as 46 days?

\*

Readers of the *Manchester Guardian* will remember with glee the recent letter which said that "only the engineer can perceive and exploit the aesthetic properties of the road." They will remember, too, the reply by architect J. W. M. Dudding, who said that the architect didn't wish to take the engineer's job, but that engineers often did third rate work (aesthetically) and that there should be collaboration by all concerned at an early stage.

\*

Incidentally, didn't anyone think of consulting the masters of the autobahn? I enjoyed the smug comment by a German engineer who said that he had encountered and overcome similar

weather problems many years ago, and that it was only a question of adding anti-freeze to the concrete.

#### EVENING OF SUSPENSE

Did you know that the George Washington bridge was held up by four cables three feet thick? And that these cables were composed of hundreds of strands of wire pulled into position on the same principle (only in reverse) of winding knitting wool? This sort of information appeals to the schoolboy in ASTRAGAL, who had a wonderful time listening to O. A. Kerensky talking last week to the Institution of Structural Engineers.

Mr. Kerensky, giving the first Maitland lecture (Major R. F. Maitland has been the ISE's secretary for 28 years), discussed large span suspension bridges with the mind-boggling skill of a great expert. Heights were in hundreds of feet, spans were in thousands and loads were in hundreds or thousands of tons. Calculations were weeks in length, wire was thousands of miles long and costs were in millions of pounds. Architects, on the other hand, were in a minority. Mr. Kerensky mentioned them only once. Architects, he said, preferred portal construction for towers, rather than the cheaper, lighter braced towers. No doubt he had met only the elderly die-hards who are called in to wrap up exciting engineering in psychological security—the conservative gentlemen who use traditional stone cladding to make bridges look safer.

This fascinating evening was completed by the serving of a good dinner and the sight of Mr. Kerensky giving his wife £100. This is the award which, with a silver medal, will go to winners in the annual competition for a lecture on engineering research, design or construction. Every three years the Council of the ISE may nominate a distinguished member to give the lecture. Their first choice was excellent.

#### WOT, NO CHOIRBOYS?

A colleague tells me he was delighted to see a preview of a COI colour film on post-war design in Britain. He says there is hardly any commentary and that the film sets out to create a picture of this country that will shatter the illusions of foreigners who are overwhelmed by propaganda showing befeaters singing carols outside

thatched cottages. Apparently the industrial design sequences, which feature the inevitable view of Robin Day at work, lead into some brisk jazz-backed shots of schools and new town centres, ending with that unbelievable piece of modern Britain—the LCC's scheme at Roehampton.

This film sounds very promising. I wonder how typical it is of the stuff the COI sends abroad. Let's hope it will undo some of the harm done by those nasty little films of Britain at work and play which ran continuously in the British pavilion at Brussels.

#### ADVENTURES WITH GLASS

Congratulations to Pilkington's for finding a new way of making plate glass. But what a pity this cheaper method will not lead to a drop in prices until the firm has recovered its development costs. It would surely have been a better policy to spread development costs over a longer period and to make some reduction in prices immediately.

Incidentally, Pilkington's staff architect, Sven Sternfeldt, showed how adventurous continental architects are with glass when he gave an illustrated talk at the AA last week. Some of the results hardly justified the effort; in others detailing was rather lush; but it was stimulating to see walls made of 20 ft. high sheets of glass with no mullions. Some of these were suspended, to keep the glass in tension, and some were braced with toughened glass panels placed at right-angles and joined with clips.

*Guthorm Kavli has designed the demountable, timber framed "tents" to provide suitable spaces for the exhibits at the Norwegian Art Treasures at the V and A. See this page.*

#### BURNING THE CANDLE

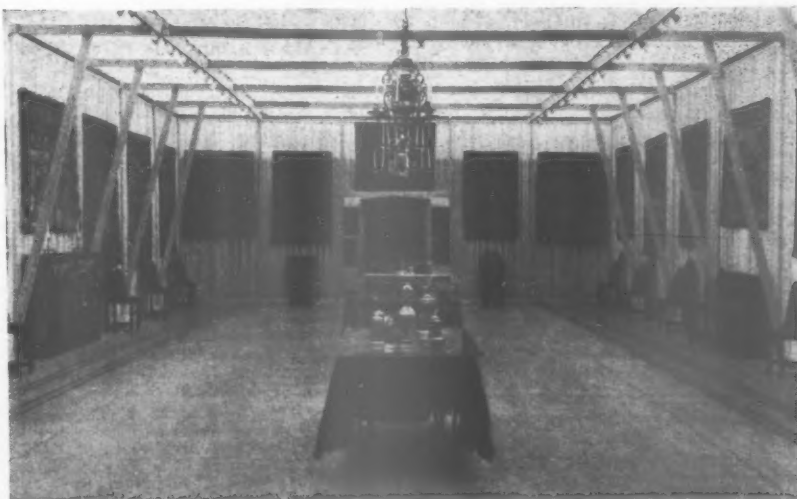
The Liverpool school has probably produced more architects—mainly in public offices—than any other. In future, those of them who practise near London will be able to meet, thanks to the newly-formed Liverpool Society. After next week's dinner in the Tallow Chandlers' Hall, members will be shown rebuilding in the City by planning officer Anthony Mealand. No-one wearing a hangover will be at a disadvantage.

#### NORWEGIAN EXHIBITION

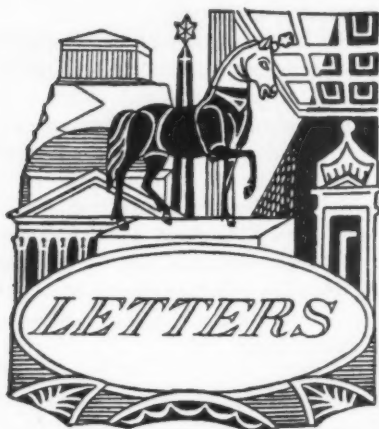
The Norwegian Art Treasures now at the V and A have a curiously domestic scale. The bulk of these are tapestries and pieces of silver plate, backed up by chairs, a fantastic baroque dresser, Viking carvings and jewellery. It's all well off the beaten track of art and connoisseurship, and should be seen for that alone. But architects should also see it for its setting, designed by Guthorm Kavli.

In order to stop the exhibits being swamped by the scale of over-large museum rooms, Kavli has designed a set of demountable, timber-framed tents. These travel round with the exhibition and assure him the right-sized spaces wherever it goes. The structure is straightforward and rather brutal, but it has some unexpected refinements. The main timbers, for instance, are not "as found," but have radiussed corners—and their narrow faces have been profiled slightly concave.

#### ASTRAGAL







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M.I.C.E., M.I.Constr.E.

## Wokingham Competition

SIR.—We are in full agreement with Mr. Tozer's comments on the assessment of the Wokingham School competition regarding costs (January 22). We are not only astonished that the assessors' report states that the winning scheme could probably not be built within the cost allowance, but that it goes on to say, that to remedy this, "the teaching area, . . . could readily be curtailed without detriment to the plan as a whole."

The winning scheme provides classrooms of 750 sq. ft.; but the admirable research into this subject by the Herts. CC has produced an economical arrangement which permits a classroom area of approximately 850 sq. ft., which teachers tell us is only just adequate for 40 infants. (Classes are sometimes nearer 50.) What could be more detrimental than cutting down classroom space? What is more important than the provision of large classrooms?

DAVID OTTEWILL,  
GODFREY GRIMA.

Herts.

## Assessors' Reports

SIR.—With reference to ASTRAGAL's notes referring to the RIBA giving orders to an assessor of a competition to make no remarks or comments upon the designs that receive an award. Over quite a number of years in which my uncle, my brother and I myself have acted as assessors in competitions no instruction of this sort was ever given. In fact we ourselves agreed that the best form in which to make an award was to give only the names of the prize winners and any commended designs, and make no further comment.

We held the opinion that if any of the competitors disagreed with the award, or required any information about it, they should write to the Competitions Committee who, if they thought fit, would ask

the assessor to answer the inquiry. I still think this is the best way for an assessor to make an award, and if the RIBA have instructed assessors to make no comment the instruction must be very recent because the assessor in the Wokingham School Competition made general comments which are referred to in a letter you published in your issue of January 22.

S. W. MILBURN.

Sutherland.

ASTRAGAL writes: The source of my information was the RIBA itself.



## Pauline Gospel

SIR.—The Pauline Gospel we acclaim—  
But oh! the Pauline form:  
Must thus be duffed honest frame  
To keep La Boty warm?

W. H. E.

Coventry.

## Nationalist Architecture

SIR.—Parts of Peter Womersley's letter refer to my short article about his two houses, and in this respect:

1. "Two Scottish Houses" was not my idea of title.
2. The 25 mile rule does not apply in this case because it takes us neither here nor there (and, if it did, the site might not be so good), but if it is an accident that these houses have appeared north of Hadrian's Wall, then let me re-emphasize that it is a fortunate one for the tribes up here.
3. "The present architectural doldrums" is surely due more to a general ineptitude than to a prejudiced rebuttal of "foreign" materials and techniques—which do appear under cloaks of "modern" propriety in many a Caledonian cottage.

As for Nationalism, well I couldn't agree more that "to try today to make a building consciously express the 'soul' of a small area . . . is a step backwards"—in fact such endeavours usually culminate in a self-destructing rat race of folksy Philistinism

nurturing a nostalgia for extravagance and maybe even "Baronial days . . . real and Victorian" (which seem exclusively attached to Peter Womersley's idea of Scottish architecture). I would simply like to see more basic analysis and thorough ground work done before indigenous materials and/or methods are rejected; indeed, their imaginative use might give rise to some interesting new forms, or it may simply help induce that rather tougher building type, e.g., the house at Cramond, Edinburgh (AJ, January 1).

But the basis of regionalism (from which we are not completely emancipated—as BRS Watford and BRS Glasgow will confirm) lies in a complete absence of self-consciousness when translating local influences in the final concept. Hereabouts, regional character (as distinct from tartanized Nationalism) may, for all I know, be as well marked by the extensive use of plastics in future as it has been by stone in the past, but it will probably have some particular properties, intuitively conceived, deriving from certain human or physical conditions peculiar to the place.

Furthermore, I am not denying the Scandinavian contributions to Toronto and Sydney or even those of "the whole host of naturalized Europeans in America"—though to my mind these are incidental to the differing character of even modern building in Denmark and Norway, Norway and Sweden, Sweden and Finland, Holland and Belgium.

Finally, I do not think the fact of my being slightly disappointed in these houses, from this one admittedly rather intangible aspect of character, is any real criticism or reason for our protracting this correspondence—particularly as neither of us is being paid for it (" . . . Scots wha' hae . . .") and, evidently Peter Womersley is no keener to be nationalized than I am!

MICHAEL D. LAIRD.

Edinburgh.

## Cube or Super

SIR.—Sometime ago I wrote to you regarding the weekly detailed cost analyses of buildings, suggesting that it would be most useful to have the cost per foot cube as well as that per foot super. I was reminded of the usefulness of having both unit rates when reading the notes you published recently on the new edition of *Spons Price Book* which, you will recollect, now includes in the Approximate Estimating Section building prices per foot cube and per foot super.

What has finally caused me to write to you again on this subject is the fact that I have just been scrutinizing the two Congregational Churches which you illustrated and analysed in your issue of December 4.

My first reaction, on looking at these costs, was to wonder why the Church at Ipswich appeared to be cheaper at 66s. 10d. a foot super than the one at Crawley for 70s. 6d. foot super. Appearances from the photographs suggested the reverse.

There seemed to be much more in this than was suggested by your first paragraph at the end of the analyses under "Cost Comments." One important point, of course, is that the Ipswich Church is analysed on a 1955 tender cost, whereas the Crawley Church is analysed on the 1957 final cost, by which date building costs had increased by some 7½ per cent.

My next step was to bring these two costs up to an equivalent estimate for 1959 both on the basis of foot super and, as near as one can on the small scale drawings, of foot cube. It was then I began to see daylight, because, if my arithmetic is reasonably correct the present day equivalent cost of these two Churches is: Ipswich 73s. foot super, Crawley 72s. foot super.

Based only on a foot super analysis, this does not tell one very much, but when you also have the foot cube rates, it will be found that the Ipswich Church works at

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3s. 9d. foot cube, whereas the Crawley Church is only 3s. 5d. foot cube. These figures seem much more in keeping with the illustrations.

I do not wish you to think that I am trying to suggest that foot cube is a better method of costing than foot super. What I am convinced of, however, is that there are as many pit-falls for the unwary in the foot super method as there are in the old fashioned foot cube method. I would therefore like to endorse the remarks in your write up of *Spons* and once more suggest that the value of your cost analyses would be greatly increased if both unit rates could be given whenever possible.

CHARLES S. COLBECK.

Bristol 4.

We think that Mr. Colbeck's interesting calculation could easily have shown very different cube rates for the two buildings. If one alters floor heights of a building it generally produces much more drastic changes in the cube rate than it does in the floor area rate. This is one reason for using floor area rather than cube. The other is that floor area is generally a more significant measure of accommodation provided (or required)—The Editors.

## Felix Samuely

Sir,—There are many who will pay tribute to Felix J. Samuely; mine is a tribute to him as a teacher and engineer of great courage.

His intellect was of enormous generosity. He gave his ideas and did not trouble himself with statements of authorship. Commercial plagiarism of his work is now to be seen in many parts of the country, but it is not difficult to recognize his structures.

His professional life was, more than most, burdened with difficulties, and with much opposition to his ideas. He was not deflected from his aims, but was often saddened by distortion of facts and the vehemence of prejudice. He did not believe that criticism and opposition to his ideas was based on malice, and always tried to overcome them by careful exposition and proof, though it is difficult to prove intuitive genius.

He found proof stimulating and shared the stimulus with others, and the outcome was usually a Samuely structure.

HERBERT HELLER.

Cheshire.

## DIARY

*Exhibition of Town and City Road Schemes.* Great Hall of the Institution of Civil Engineers, 1, Great George Street, S.W.1. JANUARY 29

*Local Government Architects' Society.* General Meeting at the RIBA, 66, Portland Place, W.1. 2.30 p.m. JANUARY 31

*President's Address to Students; Criticism by Edward D. Mills of work submitted for prizes and studentships and presentation of prizes.* At the RIBA, 66, Portland Place, W.1. 6 p.m. FEBRUARY 3

*Le Corbusier.* Exhibition at the BC, 26, Store Street, W.C.1. Monday to Friday, 9.30 a.m.-5 p.m. (Thursdays till 7 p.m.); Saturday, 9.30 a.m.-1 p.m.; Sunday, 2-6 p.m. FEBRUARY 3 TO MARCH 6

*Current Trends and Problems in American Town Planning.* Talk by Professor John Reps at the TCPA, 28, King Street, Covent Garden, W.C.2 (by ticket only). 6 p.m. FEBRUARY 3

*The Mechanization of Building Construction Processes.* Alfred Bosson Lecture by D. G. R. Bonnell at the RSA, John Adam Street, Adelphi, W.C.2. 2.30 p.m. FEBRUARY 4



## RIBA/ICE

### Architects and Engineers

On January 20 a joint meeting was held by the RIBA and the ICE at the Institution of Civil Engineers to discuss architect/engineer relationships. Two papers had been prepared for this meeting, one by E. Jefferiss Matthews for the architects and the other by Ove Arup for the engineers. Professor A. J. S. Pippard, the President of the ICE who took the chair at the beginning, explained that the meeting was the outcome of long discussions between the two bodies and that it was intended to be the first of a series. He then ceded the chair to Basil Spence who conducted the meeting.

Both speakers gave summaries of their papers and they were followed by some 16 or 17 others who had indicated in advance their wish to contribute. The meeting was packed. So much so that one speaker (S. E. Cusdin) had difficulty in getting in when summoned to the Rostrom. Inevitably, in view of the wide subject under discussion, the meeting was more significant as evidence of mutual interest and goodwill between the two professions than for new contributions to the subject.

E. Jefferiss Matthews called for some form of technical co-education between architects and engineers. He asked whether it would be feasible for the different sorts of engineer to be combined in one person "at the average level" and asked for architects to be allowed an equal say in predominantly engineering projects to that which architects normally accord to engineers in predominantly architectural projects. In the course of the evening speakers from both professions remarked that, on the whole, architects were more alive to the need for more fruitful collaboration with engineers than vice versa.

Ove Arup, speaking from a long and successful personal experience of collaborating with architects, called for four conditions: That one man—either architect or engineer—should have an undisputed leadership, that the leader should have access to all relevant information, that he should choose (or at least approve) his collaborators and that these should be available from the start. He commented on the architects' failure to see their responsibility in getting the right sort of brief from their clients ("far worse harm is done by building the wrong things than by building things wrongly"); and, on the packaged service—a subject which occupied many speakers—said that architects and engineers who work within a contractor's organization will be able to make a more effective use of the contractor's resources in solving a given problem but will not necessarily provide the best solution to that problem. For this, he felt, the free-

dom of professional people to choose their technical means was essential.

Among the subjects chosen by later speakers that of fees was the most common. S. E. Cusdin called for some joint statement on fees by the two professional bodies and he was supported by an engineer speaker who instanced the situation in France where architects and engineers work together under a protocol which defines their respective responsibilities and rewards in different circumstances. Several speakers suggested that there was at present an overlapping of responsibilities of architects and engineers which leads to the client having to pay too high an aggregate fee.

If architects on several occasions complained of a lack of understanding and respect which they received from engineers at the personal level, there was also some bitterness on the part of the engineers at the architects' failure to grant recognition to engineers at the corporate level. One engineer speaker pointed out that consultant engineers are not recognized in the RIBA Standard Form of Contract, in which they only rank as personal advisors to the architect, and another (Sir George McNaughton, Chief Engineer, MOHLG) pointed out that engineers are never made assessors in RIBA Competitions even when their presence would seem essential.

The most illuminating contribution on the theoretical side came from Richard Llewelyn Davies, who had received an engineer's training before qualifying as an architect. After denying that his five years at the AA School amounted to an "architect's training" in the real sense, he pointed out the parasitical nature of architecture (*i.e.*, in that it draws the facts which it must use from disciplines other than its own). Architecture relied on engineering for the material for structural inspiration, and architects could learn much from engineers concerning the discipline of work. Engineers, on their side, have nothing to receive from architects in the direction of specialization and research, but much in respect of design. Why, he asked, are we not getting any more Rennies and Brunels?

## FORD FOUNDATION

### Travel Grants

Those who are experienced and practising in a branch of architecture or design are among those eligible for four Ford Foundation English-Speaking Union Travel Grants for visit of up to 56 days to the U.S. Closing date for applications, May 2, 1959. Application forms from the English-Speaking Union, 37, Charles Street, Berkeley Square, London, W.1.

## TCPA POLICY

### Town Planning Bill

The TCPA has sent to the Minister of Housing and Local Government its views on the prospect for town and country planning following the enactment of the Town and Country Planning Bill now before Parliament.

The Association welcomes the fact that under the Bill all landowners will in principle receive the same price for their land, whether they sell to private or public buyers. But the Association is concerned about the prospect for effective planning, given an increasingly free market in land.

Planning decides just what land is to be developed and for what purposes. This increases its value. Where pressures for development are strong, the increase in value may be very steep.

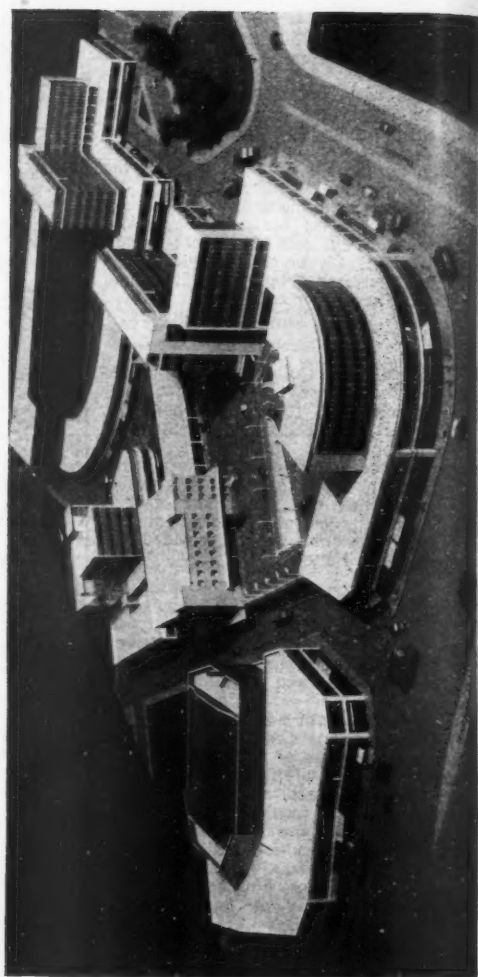
This may lead to growing pressure from owners for more land to be zoned for

(continued on page 183)

MORE BRASS AND LESS MUCK FOR BRADFORD



One of the first steps in the development of Bradford's central area to conform with the city's development plan (by city engineer, surveyor and planner, S. G. Wardley, M.I.C.E.), shown above, is the scheme, right, for the development of 10 acres at a cost of £5m. to be spent over a five-year period (developers: Hammerson Property and Investment Trust, Ltd.; architects: Clyde Young and Bernard Engle). The site as it exists at present is shown below, opposite page. Identifiable in all three illustrations is the Ritz cinema, shown centre, below, next to the shop for C & A Modes under construction in the centre, the first building in the project. The cinema lavishly embalm'd in proposed new buildings is on the left in the view of the developers' model, right, and centre left in the Corporation's model above. The present shopping streets are inadequate, particularly if Bradford is allowed to develop into a regional



shopping centre. The perimeter of the new sites are lined with two storey shops, above which stand sometimes imposingly (as on the right in the model above), and sometimes clumsily (as in the curved block) multi-

shopping centre. The perimeter of the new sites are lined with two storey shops, above which stand sometimes imposingly (as on the right in the model above), and sometimes clumsily (as in the curved block) multi-storied blocks of offices. One street has been re-aligned to enter Forster Square on the axis of the cathedral (on the left, top, which will be exposed when the existing Post Office building is removed). A park for 200 cars will occupy the roof over the ground floor of the central block. The principal shopping street will be only 60 ft. wide, to discourage cars, but will not be pedestrian only. The city engineer hopes that the inner ring roads, shown dominating the planning in his model, top (note the isolated town hall and public buildings in the roundabout, right) will reduce the present congestion. Additional garages are planned for 2,000 cars, which tops the present estimated demand for 1,700, but this does not allow for much increase in demand if the centre is a regional success.

development so that they may share in the increase. And local councils, to keep down acquisition costs, may also seek this.

Where undeveloped land is preserved, owners receive compensation based on the development value, if any, which their land had in 1947. In areas attractive to developers a considerable difference will now emerge between the amount of this compensation and the value of the land if permission to develop were to be given.

Because of this difference, owners may press strongly for permission to develop their land, or for compensation equal to the value of the land if such permission were given. The Association are concerned that dissatisfaction among owners because of differences in treatment may generate a threat to the continued protection of agricultural land, green belts and the countryside. To concede this request would involve a large increase in the compensation burden on the taxpayer, and would lead to an endless chain of compensation claims.

It recommends: The Government should clearly state that they intend to keep planning fully effective; that compensation for planning restrictions will continue on the present basis; and that owners of unzoned land should not expect or assume eventual permission to develop.

In expanding areas, development prospects over the next 15 years should now be examined and sufficient land allocated to absorb them.

The Government's strong stand to preserve green belts should, if anything, become even stronger. But a strong stand is necessary because of the great pressures to expand, especially in the larger cities. These pressures must be absorbed somewhere. The essential complement to a firm green belt policy is the building of more new towns and expansion of existing ones beyond the green belt. Without such a policy, green belts cannot long be preserved.

## BRITISH LIGHTING COUNCIL

### Lighting Demonstration Centre

A new centre has opened its doors in London this month at 16-18 Lancaster Place, W.C.2, with the primary object of providing an advisory service to architects, engineers and their clients on the subject of artificial lighting. It will be known as the Lighting Demonstration Centre, and is sponsored by the British Lighting Council. This body replaces the old Electric Lamp Manufacturers Association, which was dissolved some months ago, and includes in its list of founder members not only major lamp and fitting manufacturers, but also the British Electrical Development Association.

In comparison with the old ELMA Lighting Service Bureau (which was at 2 Savoy Hill and has now closed down), the new Centre is much more conveniently sited—Lancaster Place being the approach road to Waterloo Bridge from the Strand. It seems, however, rather a pity that the Centre has been squeezed into a smaller area than the old Bureau. In particular there is only a relatively small conference room to replace the old lecture theatre at Savoy Hill, which was a big asset for meetings, conferences and lectures. Nevertheless, in the limited space available, a series of lighting displays have been skilfully arranged by the staff of the Centre, in collaboration with Hulme Chadwick who was also responsible for the remodelling of the premises.

In addition to the display and advisory service offered by the Centre, the British Lighting Council will provide lecturers to organisations throughout the country, and will publish information on a variety of lighting subjects. There is obvious sense in the idea behind the BLC, that the light-

ing industry should be able to speak with one voice to architects and others in these sorts of ways. But to make a success of this policy the BLC should learn from the mistakes made by ELMA in the past with its Bureau. The new Centre should, for instance, attempt to achieve the highest possible standard of display by exhibits which are being continually changed and kept up to date. This cannot be done on a shoe-string budget. Equally the BLC should co-operate much more wholeheartedly with those engaged on lighting research, so that the results of such work can much more rapidly be brought into general practical application. Above all, the BLC should appreciate more fully the problem of the architect, that lighting is to him one of a number of services which he must integrate into a building, as often as not within strictly controlled cost limits. One or two really well designed low cost general purpose fittings are worth a forest of high priced so-called decorative ones.

## BASA

### Conference

The British Architectural Students Association announces a two-day conference, open to students and architects, on "the function of the architect in society," to be held at Trinity College, Cambridge, on Sunday, April 4-5. Accommodation has been booked for 75 students, members of BASA, and 75 architects. Fuller details later from Wynne R. Perrin, Permanent Secretary, BASA, The Building Centre, Store Street, London, W.C.1.

## LIVERPOOL SCHOOL

### London Dinner

The Liverpool School of Architecture Society will hold its first Annual Dinner since the war at the Hall of the Tallow Chandlers Company, 4, Dowgate Hill, Cannon Street, London, E.C.4, on Friday, February 6, at 7.0 for 7.30 p.m. Members and guests will be received by the President, Professor Robert Gardner-Medwin and Mrs. Gardner-Medwin.

Members of the Society will have received notice of the dinner already. Other old students are invited to join the Society and attend the dinner. They may bring not more than one guest. Tickets are obtainable from the Hon. Secretary, Robert Shaw, 11, Billing Place, West Brompton, London, S.W.10. The annual subscription is 10s. and the cost of tickets is £2 2s. which includes sherry before dinner and wines at table. Accommodation is limited and application for tickets will be dealt with strictly as received. Dress: dinner jackets.

Part of the industrial and commercial fittings section at the Lighting Demonstration Centre.





## MODULAR SOCIETY

*Post Mortem on Modular Assembly*

On January 14 the Modular Society held a most successful public forum at the Building Centre to discuss the Modular Assembly. (This, as readers may remember, was the trial building erected on Albert Embankment to test modular principles—see AJ for January 4.) Donald Fraser, in the chair, introduced Mark Hartland Thomas, who conducted the forum with the help of slides. These were arranged to illustrate the main problems brought to light by the Assembly, each problem being discussed as soon as the slides illustrating it had been shown.

**Keeping station**

The first problem to be discussed was that of "keeping station." This was illustrated by three offenders: a floor spring plate which cut into the floor slabs and two cleats, one of which caused the brickwork to be cut and another of which caused some wall tiles to be notched. Little of interest came to light on this head except perhaps the fact that manufacturers contributing to the Assembly had made it a point of honour not to give any special instructions to their operators; and that the architect on his side took care to see that misfits showed wherever practicable. As Mark Hartland Thomas pointed out, many of the visible defects would have been concealed by cover joints, etc., if they had been in an ordinary building.

**Minimum deviation**

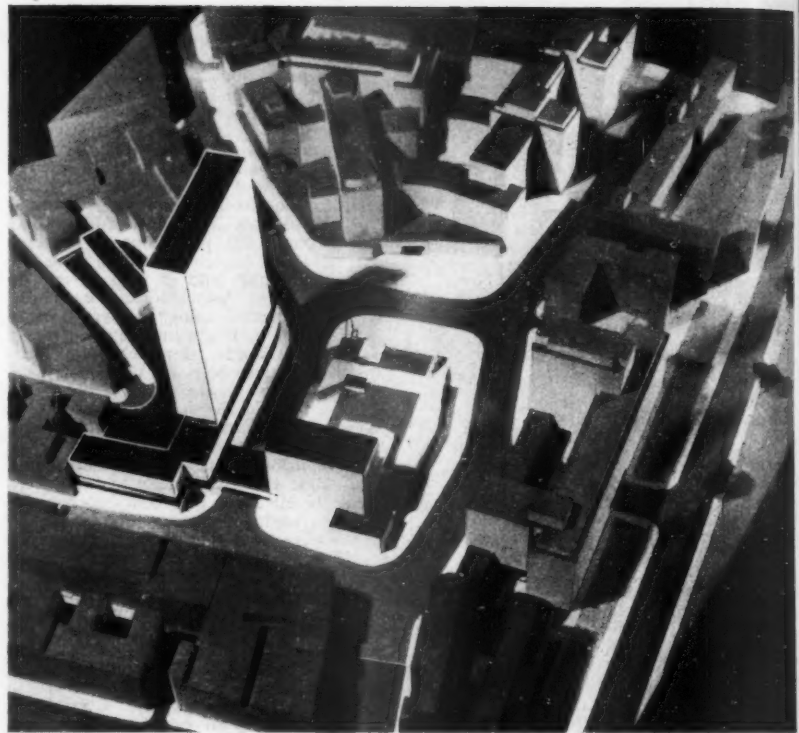
The importance of establishing the right minimum deviation for each product was illustrated by the timber curtain wall (which had an insufficient minimum deviation and had to be planed); by the hardboard flooring and by the Vitrolite wall slabs. Both of the last two were over size. In the discussion on the floor tiles an inherent difficulty came to light: namely, that floor tiles tend to spread when they are walked on. The oversizing of the Vitrolite slabs was explained by the fact that the slab-making operators were given their instructions in an unaccustomed form as "plus nothing, minus double tolerance" instead of the ordinary plus and minus.

It was also pointed out that even with the right size of slab it is not always possible to line the joints though; and that it was probably unwise to place the tiles next to brickwork, which is built to a much coarser tolerance. It is an established maxim among the fixers that it is easier to cut tiles and slabs than to "jigger about with them." P. A. Denison, of Cape Building Products, raised the difficulty of fixing close butted materials such as Asbestolux ceiling panels. These must be close butted, for otherwise there is trouble from pattern staining. But if the panels are made to a minimum deviation, then all panels except the first must be slightly off station. To adjust for this it was the practice of this firm to provide oversize panels for use round the perimeter.

**Framework measurements**

Mark Hartland Thomas said that there were three possible approaches to the problem of framework: the purist, implying an insistence that framework was not exempt from the ordinary rules of keeping station; the pragmatic which favours the specification of a minimum deviation and thence hoping for the best; and the experimental. Pursuing the experimental approach, the technical committee of the Modular Society have managed to persuade 36 members to make a survey of recent work in concrete, steel, timber and aluminium to see how far actual structures deviate from their design dimensions.

A debate on minimum deviations was precipitated by Mr. Sykes, who pointed out that if two parallel members in a frame each



It is obvious from the official description that the LCC's proposal for the redevelopment of Knightsbridge is a marked improvement upon that submitted by the principal freeholder of the area (architect: Messrs. Guy Morgan and Partners). Nevertheless this vast traffic roundabout, overshadowed to the south by a 320 ft. high block of flats resting on a five-storey podium, is hardly ideal from the pedestrian point of view. The ungainly west and inconsistent north sides of the square (Caltex and Bowater House respectively) are, of course, post-war buildings. What an opportunity has been lost by road engineers and planners to think imaginatively and comprehensively.

show a minimum deviation, then any members which connect them at right angles would have to be oversize. Bruce Martin said that the difference should be made up by packing and gave as an example Hills' beams which are always cut  $\frac{1}{8}$  in. short on the assumption that the difference will be made up by shims on site. Thomas Markus suggested that this was not contrary to modular theory since all fixings rank as "trim" and are allowed to cross module lines. It was then pointed out that it was precisely the cleats on the Modular Assembly which had caused trouble.

Ivan Tomlin then raised the problem of how to set out a modular building. There was first the difficulty of surveying (i.e., because the bounding edges of the structure must not lie on the module line, but a distance inside it at least equal to the minimum deviation): there was also the difficulty of placing any large pieces of structure (i.e., weighing up to 2 tons) in position to any greater accuracy than about  $\frac{1}{8}$  in. He was at present experimenting on a system in which the setting out was begun in the centre of the building, working thence towards the perimeter.

**Brickwork**

Examination of a close-up photograph of brickwork showed that the bricklayer was able to lose as much as  $1\frac{1}{2}$  in. in 10 ft. in order to bring his coursing back into station. There was some discussion on brick tolerances. Mr. Lawrence said that the bricks produced by his firm were slightly more true to size than average, as they were produced from a single batch. Mr. Denison said that there was no insuperable difficulty in producing bricks to smaller tolerances, but that it was common practice to work to those laid down in the BS. He said that bricks

tend to get larger as the plates wear and that a more careful watch could be kept on this. One member suggested that only the brick laying tolerances really mattered, but Mr. Fraser reported experiments which he and Sir William Holford had made on 48-in. brick panels, which established that brick size did matter, and that to meet the requirements he had had to reject all bricks with a +tolerance.

**Modular pattern repeat**

Mark Hartland Thomas used the Warerite plastic panels with their partly modular pattern to start a discussion on modular wallpaper. Why should not wallpaper be made in widths of 20 in., instead of 21 in. as at present? This would imply that all wall surfaces should be on modular planes. The objection was made, however, that wallpaper stretches and that, therefore, a paper made to modular dimensions would stretch to over size.

**Costs and costing**

The only question to be discussed under this head was whether quantity surveyors and estimators could be persuaded to give credit where wastage was saved by designing the cuts to make full use of all sheet materials. The instance was given of the 4-ft. wide Shearwater panels which were cut so that a third width and a full width filled a panel width of 5 ft. 4 in. The Shearwater representative explained, however, that the saving of wastage was more complicated than it appeared, since saw cuts amount to  $\frac{1}{8}$  in. wide. Provided the manufacturer knew in advance that his boards were going to be cut, it was not too difficult for him to provide boards that were sufficiently oversize in the first instance to allow for it.

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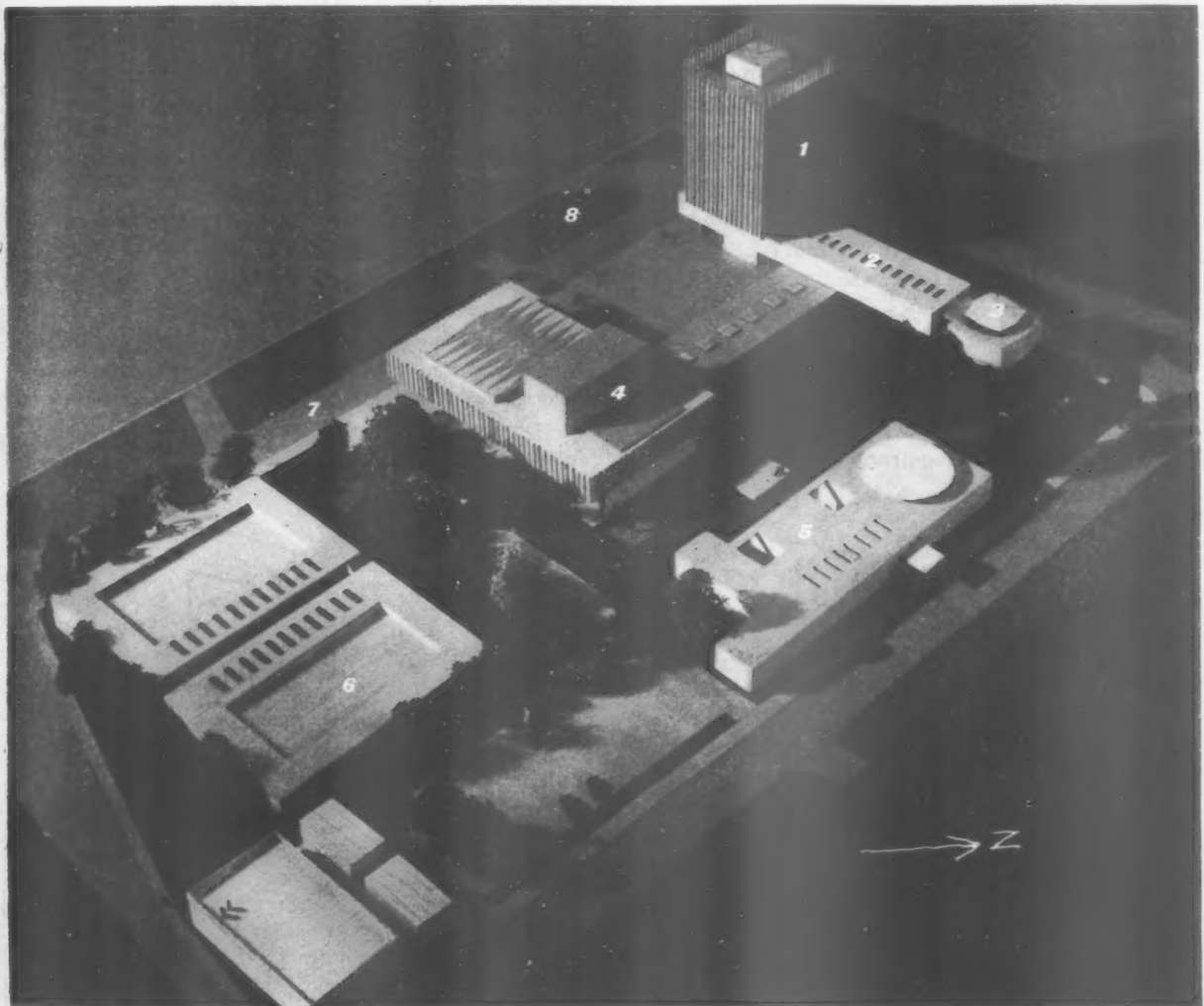
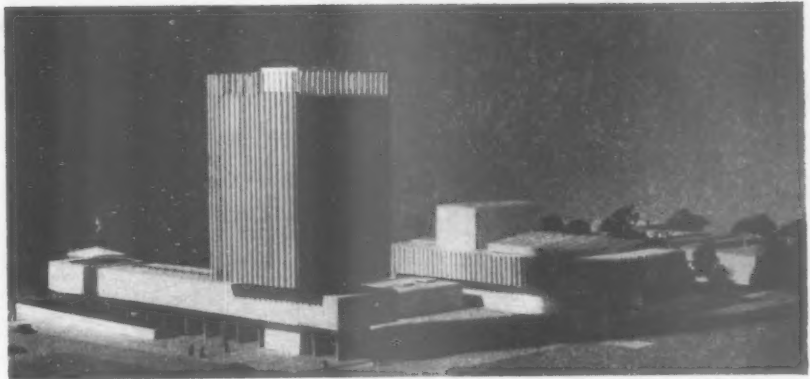
## PROPOSED CIVIC CENTRE FOR HAMPSTEAD

Basil Spence's proposed layout for Hampstead Civic Centre, on a seven-acre site at Swiss Cottage, was published last week. The accommodation required by the Council was: a civic suite and administrative block; two multi-purpose public halls (the larger, for 1,000 to 1,250 people, incorporating a stage, and a smaller for 300); three swimming pools in a separate block to replace the present Hampstead baths, gymnasium and slipper baths; public libra-

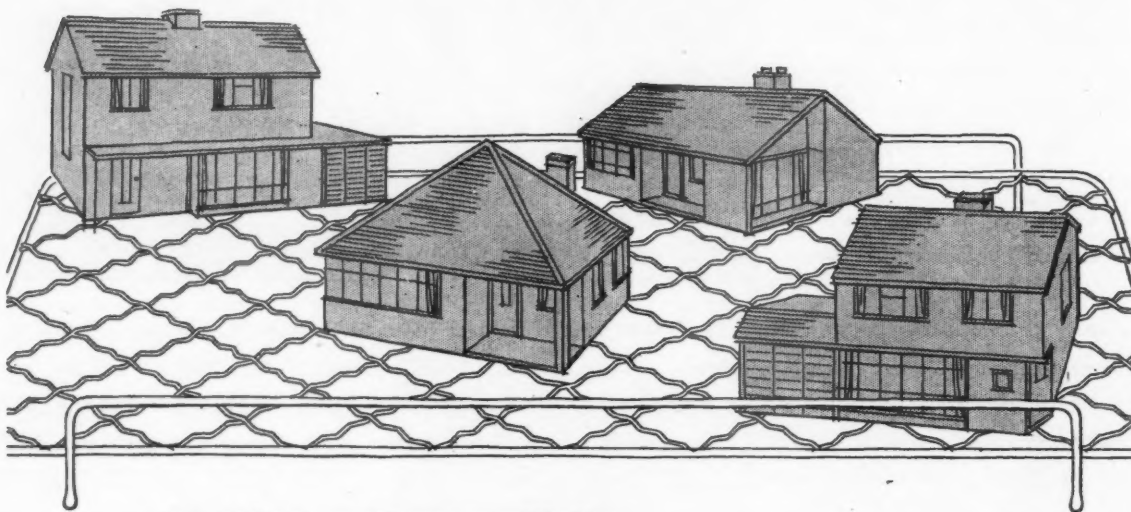
ries; parking for at least 200 cars. Below, a view from the east showing the layout of the units (see key), and (above) the main entrance to the Council offices and the tower block above, situated at the nodal traffic point of Swiss Cottage. Basil Spence envisages using the slope of the site to provide a large car park at a lower level below the principal square between the office block and the assembly halls. Unfortunately the LCC has not yet formulated

its traffic proposals for the Swiss Cottage bottleneck. Mr. Spence told a press conference that his object was to "take the starch out of town halls," to open up the civic centre and to make it a pleasant place for the public, small, intimate and democratic, to provide interesting vistas and silhouettes, and to provide sunny offices. The tower block is sited at the Swiss Cottage corner to have a dominating effect at "the gateway to London" from the north.

1, Offices. 2, Mayor's suite, committees. 3, Council Chamber. 4, Assembly Halls. 5, Library. 6, Swimming baths (gymnasium in corner). 7, Avenue Road. 8, Swiss Cottage.



## They sell like warm cakes



— bungalows and houses with the

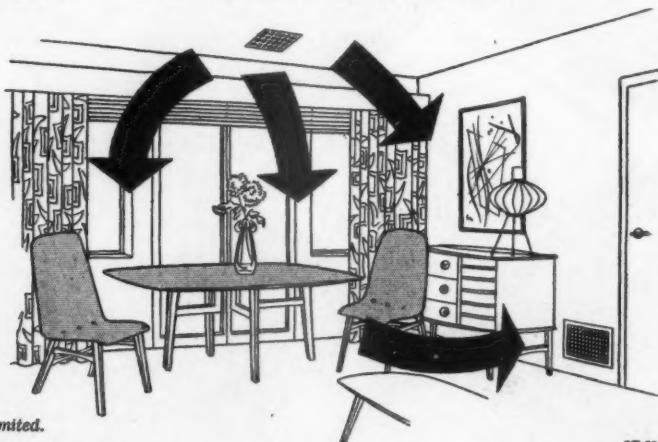
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Nearly 60 people, clients, builders and quantity surveyors, as well as architects, took part in the recent conference at Missenden Abbey, the first to be officially sponsored by the RIBA Cost Research Committee. We print below summaries of all the papers given. Main themes of discussion were: the need for a common "cost language" with an agreed terminology; much closer co-operation between architect and quantity surveyor and the possibility of a central "costs library."

## RIBA AND COST CONTROL

### Conference at Missenden Abbey

The conference was opened with a paper on the architectural profession in relation to the national economy and world conditions by PROFESSOR J. V. CONOLLY, a former aircraft engineer who now runs the Sundridge Park management school (where the joint LMBA:RIBA:RICS management courses were held). The burden of his talk was that Britain is further behind other countries in the matter of industrial efficiency than she should be and that this situation could be improved by wider understanding and practice of management skills. He set a depressing—but perhaps challenging—context for the papers which followed.

#### Techniques and methods of cost control

STIRAT JOHNSON-MARSHALL began his paper by saying "We may be no worse than we used to be, but clients, especially public clients, are more exacting than they were." He reminded the gathering that while the functional requirements of buildings have become more complex and the techniques available to build them more varied, architects have lost the initiative in control of costs. He described the Herts staff in 1945 as "pushing out into unknown technical territory" and in need of guidance, of some means of expressing costs in design terms. The method now known as cost planning, which had emerged promised to be a common technical language which he hoped would reverse the trend of separation between architect,

surveyor and builder that had developed since the middle of the last century. Discussing the essentials of cost planning, he emphasized that its aim was "even building"—the distribution of money to give even quality throughout a building.

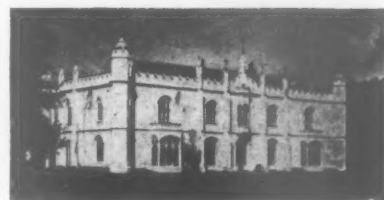
In an incisive and expressive paper, JAMES NISBET (principal quantity surveyor, MOE) put before the delegates the "frightening, yet enticing prospect" that cost control offers to his own profession of quantity surveying. He distinguished between the familiar and established procedures of preparing bills of quantities and the uncrystallized techniques of cost planning. The surveyor's present skill is closely related to the down to earth world of measurement and builders' prices, but cost control will bring him into a creative world that could become the major part of his expertise.

Nisbet noted that at present only the architect has the authority and initiative to control costs, but the q.s. has the data—which should be fed back to the design process. This latter he described as having four main phases—Client's brief—Investigation—Design—Working drawings. During the first two, the need was for a means to decide what the building would cost or what accommodation a stated sum would buy. For the client, decisions at this stage could well be the most important of his life and he therefore had a right to expect reliable advice, and adequate explanations

of cost. "Why," he asked, quoting a textbook on Professional Practice, "should an approximate estimate be 'necessarily vague'?"

During the last two phases the need was for a means of controlling the expenditure of money and such a means involved the breaking down of a total into smaller parcels enabling comparison of one building with another. Comparison, he said, was the only way in which a client could assure himself of value for money. Cost planning was essentially a way of relating information in bills of quantities (which the architect does not understand) to the functional requirements and standards of quality of the building (which the quantity surveyor does not understand). Bringing these two things closer together means not only the development of techniques and procedures, but closer identity of professional responsibilities between architect and quantity surveyor. It could mean joint responsibility to the client for the cost of a project, and perhaps the combining of offices.

R. J. WHITLEY (architect) and C. M. NOTT (quantity surveyor) then described two cost planning case histories from the Herts County office, one a divisional police station and the other a primary school. For the former, no cost limit is set by the Home Office and since so few have been built, little cost data exists. The speakers described how they set about the problem of deciding an overall cost target by basing an approximate estimate on the accom-



Missenden Abbey, a mid-eighteenth century building with "period" refurbishings of Regency date.

Successive cost plans for a Herts Police Station described by R. J. Whitley and C. M. Nott.

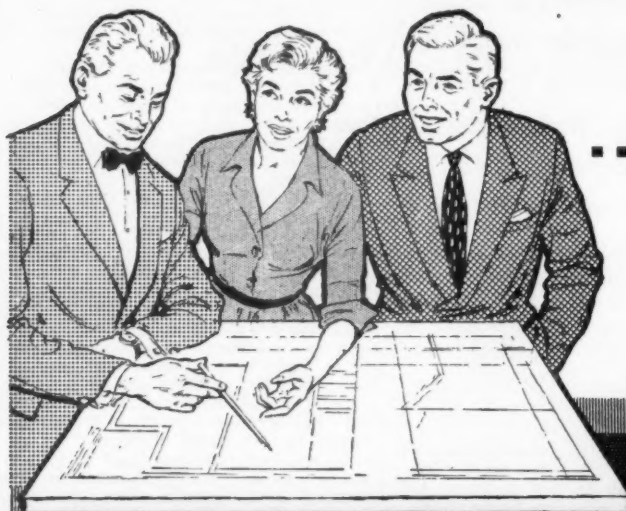
Herts C.C.—Cost planning of a divisional police station					
	1 (June 3)	2 (July 3)	3 (July 8)	4 (July 14)	5 (October 9)
Preliminaries	s d	s d	s d	s d	s d
Contingencies	2 0	6 0	4 4½	2 8½	2 8½
Pricing risk	1 6		1 3	1 3	1 11
	6 0	6 0	5 7½	5 10½	5 3½
Foundations	4 6	6 0	4 1	4 1	5 9½
Frame		4 5½	3 4½	3 4½	6½
Stairs and steps		1 5½	1 5½	1 5½	9½
Upper floors	34 3	4 2½	4 0	4 0	2½
External walls		14 9½	11 1½	11 4½	15 8½
Internal walls		8 5½	7 10½	7 10½	9 11
Roofing		9 7	7 4½	7 4½	3 5½
R.c. specialist					7 3½
Ceilings	3 0	4 0	2 6	3 9	3 9
Structure	41 9	52 11½	41 10	43 3½	47 4½
Floor finishes	5 0	5 6	4 6	4 6	4 6
Furniture	2 6	2 6	2 6	2 9	2 9
Finishes	7 6	8 0	7 0	7 3	7 3
Drainage	2 6	2 11	2 4	2 4	2 4
Plumbing	2 6	2 4	2 4	2 6	2 6
Electrics	4 6	3 2	4 2	4 8	4 8
Gas	3	2	2	2	2
Heating	9 0	8 6	8 0	8 6	8 6
Lifts	1 6	2 1½	1 2½	1 5	1 1½
Services	20 3	19 2½	18 2½	19 7 T=76s 0½d	19 3½
Special equipment	—	1 0	—	—	—
Add for better finishes	—	—	—	1 6	Incl.
Add for foundations	—	—	—	4 9	—
Totals	76 0	87 1¼	72 8	82 3½	79 2½

modation schedule and on indications of likely spans and heights given by the architects. This is cost plan 1 in the chart below, the other four representing successive stages in development. Plan 2 reflects the first sketch design, with an r.c. frame on piled foundations but its total of 87s. 1½d. was considered to be more extravagant than necessary—a fact known from the work on cost plan 1.

The next step was a systematic pruning of plan 2 by architect and surveyor jointly, resulting in plan 3. Totalling up to 72s. 8d. it showed that pruning had been unnecessarily severe. Plan 4 represents the adding back of money in places where it was best deserved, but it also shows the effect of three new factors. The first was a soil report (unavoidably late) indicating the need for more money on foundations, the second a survey showing the need to raise the whole building to meet sewer invert levels, the third a policy decision to add 2 per cent. for giving the building "prestige" standard of finish.

The fifth plan incorporates these changes together with a decision to use load bearing walls instead of a frame, and some of the specialist quotations that were coming in at that time. It will be noted that certain element targets—notably finishes and services—remain fairly constant from June to October (the design period). These, the Herts office has reasonable cost knowledge of. In the folder of papers supplied to delegates (designed by Herbert Spencer, who is to do all RIBA literature) were details of the price build-up behind most of the figures shown here. One should add





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that the tender for the police station has yet to come in, but the speakers expressed confidence in its result.

H. A. J. DARLOW (architect) and P. W. GRAFTON (quantity surveyor), who are both in private practice, were nominated to speak by the RICS Cost Research Panel, at the invitation of the RIBA Cost Research Committee. They described a cost study they have made for the design of a six-storey office building in London.

The design was worked up to  $\frac{1}{4}$ th scale, with an outline specification. An estimate of cost was then made by use of an adjusted cube rate from a similar office building in Yorkshire. Next, a number of alternative types of construction or materials for both structural and finishing trades were decided upon, some of them being described by the speakers as "academic," that is, for the purpose of the conference only.

Proposals and alternatives were then entered on to an elaborate cost study sheet, so arranged that it could show the effect of choice for one element on the cost of other elements. Indeed this interdependence of costs was the main preoccupation of the study. It means that the breakdown headings are chosen very largely to separate items for which alternatives are considered. Thus "external walling" may split into more than one "element."

When all the items had been priced, the architect made his selection, but the speakers pointed out that choice of methods for, say, the structure could have been made before completion of the pricing, since the choice was between alternatives within any particular section of the building. When all choices have been made, the cost effects of one choice on others may cause re-adjustments to costs of methods already chosen. A final stage is revision of all the costs according to more precise data as the design matures.

It will be noted that this kind of study differs from cost planning in the MOE sense, in that it is concerned more to present "market information" than to relate functional requirements to money available.

At this point in the conference, some confusion of nomenclature had begun to arise, not helped by the speakers referring to their work as a "cost plan."

#### Cost analysis and its application to cost planning and cost control techniques

CYRIL SWEETT (chairman of the RICS Cost Research Panel) began by emphasizing at length the variety of ways there were of analysing building costs. He referred to methods used by Davson in 1923, to the Storey Enclosure method, said that variety was necessary because the purposes for which analyses were used, themselves varied so much, and doubted the viability of a single method of presentation. Yet later he suggested that there "was a strong case for some form of standardization in methods of analysis at present in use." He next sounded a warning note to those who would reform the bill of quantities (its main purpose is for tendering) and thought that analyses of trade bills were unreliable because of the variety, and the unknowns of builders' pricing methods. This meant that it might be safer to use a series of analyses and it threw doubt on the usefulness or even the feasibility of a central "costs library."

He described the aim of "cost planning" as the creation of a market of alternative priced methods of construction or design solutions from which the architect can choose. He distinguished between this and what he called the MOE method of "cost control" (normally known as cost planning) which he described as "restrictive" because it "states cost targets which must not be exceeded." (This does not quite agree with what was said by Nisbet, Whitely and Nott, see above.) The exchange of labels and further criticism from builder

COST PER CUBIC FOOT			
BLOCK C		BLOCK E	
Individual total	Group total	Individual total	Group total
d	d	d	d
Preliminaries, Water and Insurances	2-843		5-075
Hoardings, Pulling down and Works on Site	3-448		3-795
Substructure and Structure			
Excavation	1-534	3-843	
Piling and special foundations	2-554	2-907	
Concreting	12-047	17-843	
Brickwork and partitions	3-341	2-060	
Flue linings	0-186	0-397	
Drainage	1-557	0-792	
Asphalte tanking	0-066	0-430	
	21-285		28-272
External Finishings			
Brick facings	1-047	0-227	
Precast concrete cladding	0-541	0-392	
Precast concrete breast panels	0-707	0-551	
Portland stonework	1-980	1-460	
Slate dressings	0-680	1-263	
Terrazzo string courses	0-050	0-037	
Marble wall linings	0-855	0-638	
York stone and tarmacadam paving	0-161	—	
Roof coverings and external plumbing	1-288	1-549	
External doors and windows including glazing and painting	8-224	8-155	
Mosaic finish to walls and soffits	0-200	0-355	
External rendering	0-140	0-365	
Escape staircase and cat ladders	0-088	2-767	
	15-961		17-759
Internal Finishings			
Floor coverings and skirtings	4-402	4-799	
Wall and ceiling plastering including grounds	1-705	2-381	
Internal waterproof rendering	0-885	0-703	
Cement glaze finish	0-278	0-446	
Mosaic finish to walls	0-158	—	
Wall tiling	0-004	—	
Fibrous plaster suspended ceilings	0-254	0-236	
Joinery, joinery sundries, doors and door frames	1-057	0-934	
Ironmongery	0-608	0-741	
Roller shutters, metal balustrades, handrails and metal sundries	1-976	1-563	
Internal painting	0-692	0-798	
Marble wall linings	0-601	—	
	12-620		12-621
Carried forward	56-175		67-522

*One of the many methods of breaking down the cost of a building described by Cyril Sweett. This one shows costs per foot cube of an office development in London.*

members of the conference that "cost really meant expenditure" further increased the confusion of terminology.

#### Research, cost planning and cost control

W. J. REINERS (Building Research Station) noted that he was mid-way between papers on "control" and on "communication," basic functions of any complex process or organism. The diagram on page 188 illustrated the weaknesses of the building process in this respect. The client has no access to cost knowledge until he appoints the architect who, in turn has cost experience of relatively few buildings. The quantity surveyor, who has such experience, is not usually appointed until the major decisions have been taken and the builder who could provide a feed back of cost experience does not see the design until it is complete. Running and maintenance costs which might influence design decisions were known to owners but not to the professions. Reiners then surveyed the nature and quality of information available. At early sketch design there were the detailed AJ cost analyses and BRS's own analyses of large numbers of building costs e.g., C. N. Craig's paper in the April, 1956, *RIBA Journal*.

He showed a scatter chart relating building costs to price to the client, of local authority houses and said there was a 50/50 chance of buildings of the same cost varying by more than 8 per cent. in their prices. He said that price/cost relationships suggested that design does influence tender price, that estimators cannot predict labour costs accurately from the kind of information they are given at tender stage. Another factor was lack of feed back from site costs to estimating. Builders vary greatly in efficiency, the best house builders taking only one-third of the manhours required by the worst. He showed that repetition of an operation and quantity of a trade have marked effects on cost and concluded his paper by suggesting that there was need for a "new language" for expressing labour and plant costs and that the architect must think operationally during his design. This

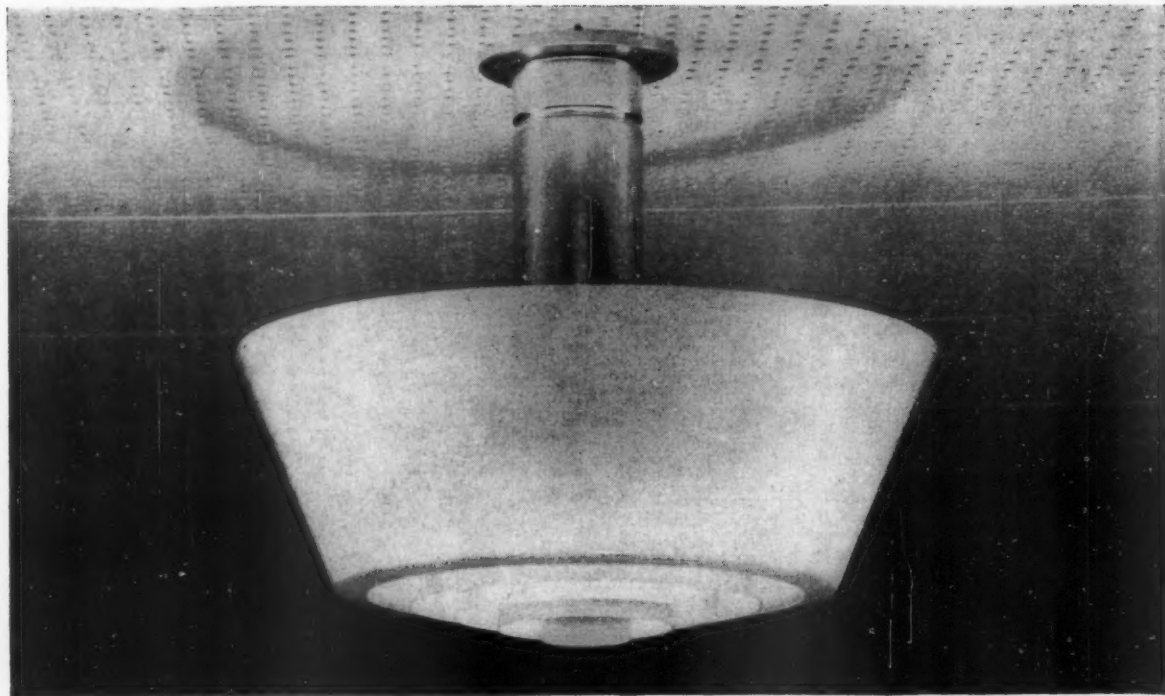
raised the question of relating an operational cost language to an elemental one.

#### The architect's responsibility for programming and contract planning

CLEEVE BARR (MOE) first drew attention to the fact that the RIBA Conditions of Engagement say nothing about programming the architect's own or the builder's work. He said that the Code should be more explicit. He suggested that contract times should be considered, either by calculation in economic terms or where this was not appropriate, by feed back from actual times taken on previous jobs. Within the overall time a programme should be prepared capable of showing both the operational time, percentage completion of the operation and actual times. There should also be charts showing the build-up of labour and the expenditure of money. To these valuable checks may be added another chart expressing the number of sq. ft. of floor area completed per man/month. He had used a target figure of 60, a good but not high rate for secondary schools.

Turning to programming for the architect's office, Barr emphasized the need for thorough investigation for the brief and the value of office "bibles" recording standards in the client's requirements. For programming, the basic data was cost per man/day of an assistant. The total office expenditure on a job would be calculated relative to fees and outgoings and the result divided by the cost per man/day. A target date for completion in the office would reveal the working days available and this related to the man days figure would show how many staff were needed (see page 666, AJ, November 6, 1958, for more detailed description of this method). At the MOE, about two-thirds of the total time for a job is taken by "design" and about one-third for contract drawings and schedules.

For this programming it was essential that actual times taken were recorded, preferably by a clerk who came round collecting figures from each assistant. The speaker concluded by referring to the importance and the difficulty of integrating cost plan-



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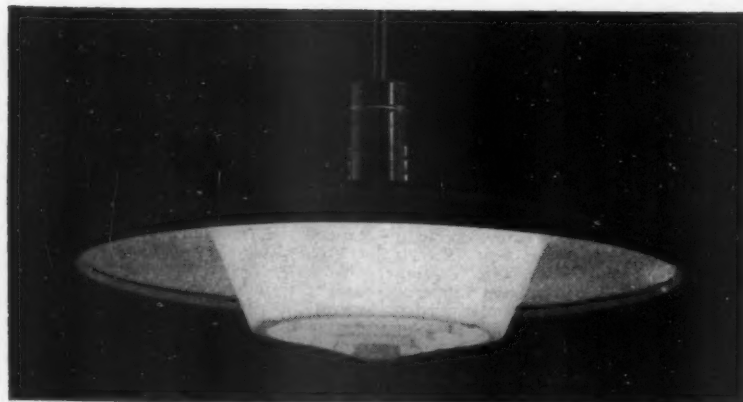
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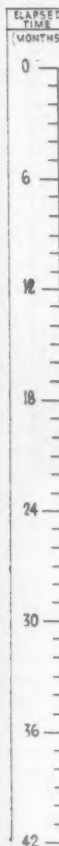
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ning procedure with this kind of programming, and said that cost planning adds to the time taken, but avoids "slashing" after the tender.

### The importance of communications in cost control

A. C. LEYTON (Organizer of Liberal Studies, Northampton College of Technology), took the delegates into what for most of them, were unfamiliar (and difficult) waters. Leyton's theme was that although, like other technical men, architects, surveyors and builders were equipped to be analytical about their work, they seldom thought to apply this faculty dispassionately to the means of communication between them (speech, writing, drawings, demeanour). He proceeded to isolate the abstract fundamentals of communication, explained that it had expressive, directive and informative characteristics. He showed that in any communication situation there are three kinds of experience—sense experience, perceptual experience and conceptual experience—and tried to make clear that since these will differ in different people (between say a foreman and an architect) any sign passing between them must be framed in a manner that takes account of these differences. He attempted to put across to his audience that if a sign is to succeed in its purpose its four aspects must appear in the order—Designator, Expressor, Motivational, Formative. This did not seem to penetrate so well as his next point which was that when a person receives a "message," his mind first relates it to his experience (to make sense of it) and then must dissociate it from his experience (to "read" its specific meaning for him). His one example of a "good" message was of an engineering firm who, with their estimates for a large plant, sent not only drawings but an elaborate model with colour references so that the clients could see what they were getting.

The cost to the client of typical buildings of various types (cost per square foot of floor area)

	Local Authority houses	High flats	School	Office block	Factory for light industry
<b>Initial costs</b>					
Land and development	5s	4s	15s	10s	1s
Construction and fees	35s	75s	70s	80s	55s
<b>Total initial costs</b>	<b>40s</b>	<b>79s</b>	<b>85s</b>	<b>90s</b>	<b>56s</b>
<b>Current costs per annum</b>					
Repairs and maintenance	4d	6d	9d	1s 0d	8d
Heating and lighting	9d	1s	9d	1s 6d	2s 3d
Management and services	1d	0d 3d	3d	6d	3d
<b>Total current costs per annum</b>	<b>1s 2d</b>	<b>1s 9d</b>	<b>1s 9d</b>	<b>3s 0d</b>	<b>3s 2d</b>
<b>Annual equivalent of initial costs converted at 20:1</b>	<b>2s 0d</b>	<b>4s 0d</b>	<b>4s 3d</b>	<b>4s 6d</b>	<b>2s 10d</b>
<b>10:1</b>	<b>4s 0d</b>	<b>7s 11d</b>	<b>8s 6d</b>	<b>9s 0d</b>	<b>5s 7d</b>
<b>Total annual costs with conversion rate 20:1</b>	<b>3s 2d</b>	<b>5s 9d</b>	<b>6s 0d</b>	<b>7s 6d</b>	<b>6s 0d</b>
<b>10:1</b>	<b>5s 2d</b>	<b>9s 11d</b>	<b>10s 3d</b>	<b>12s 0d</b>	<b>8s 9d</b>

Overall analyses of five building types shown by W. J. Reiners of BRS.

### The effect of the design process at the tender stage and before operations commence

E. J. COOK (Richard Costain Ltd.) first suggested that we should call cost control "Expenditure budgeting." He went on to say that since the ICE Code of Conduct did not forbid civil engineers from working in building firms there was a free flow of experience between commercial and consulting sides and that this ought to be the case with architects and quantity surveyors.

He then described, at speed, the way his firm had tackled certain urgent jobs, a transistor factory, the Cromwell Road air terminal and a large laboratory building. The essentials for success seemed to be these: firm and definite decisions from client and promises from sub-contractors;

careful planning of site operations; and no variations during the work; absence of bother about details and a minimum of checking. On one of these jobs the firm agreed to build only on condition that the architect "retired" when the design was complete, leaving detailing to the builder. Indeed, less fuss about detail was a leading theme of the paper. Cook said he was alarmed at the suggestion for more detailed measuring of sub-contractors' work in bills of quantities and doubtful of the value of elaborate punched card cost libraries. He said that there were too many people in building firms not directly productive—the surveyors whose main work was checking.

A chart showing the "control and communication" system of the building team shown by W. J. Reiners of BRS. The dotted portion under Quantity Surveyor is a part of the system that has yet to exist.

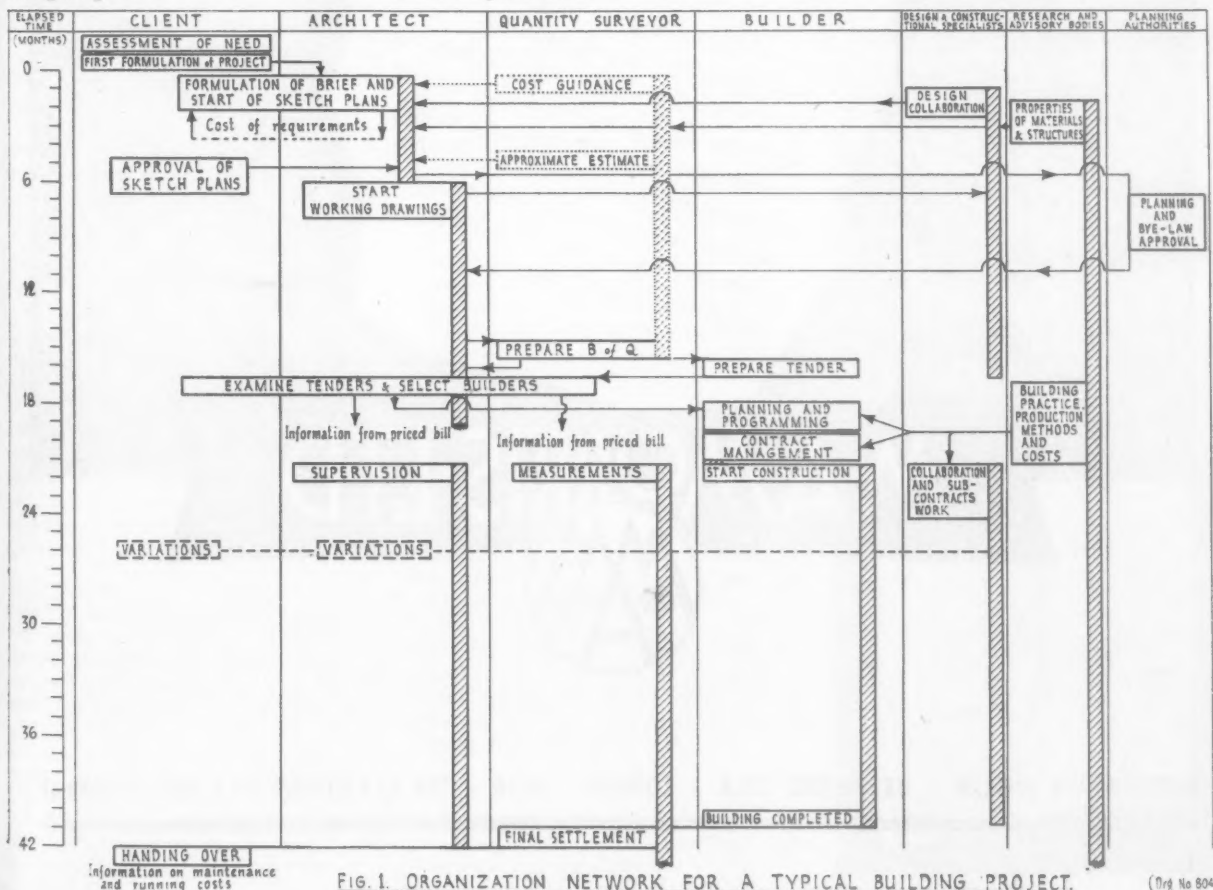


FIG. 1. ORGANIZATION NETWORK FOR A TYPICAL BUILDING PROJECT.

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## THE INDUSTRY

*From the industry this week Brian Grant reviews a leaflet on limestone and slate cladding and describes polystyrene tank lagging, radiant heaters, a combined lampholder and reflector, a bathroom cabinet, a wall-mounted w.c. and translucent corrugated sheeting.*

**Limestone and slate cladding**

I have just been sent an excellent leaflet about Westmorland slate and limestone. The High Fell green slate comes from the Coniston strata, and is available in two lightish shades of green, as well as in a barred duocolour, all three types being produced in four different finishes. The limestone is Orton Scar, a light fawn colour normally supplied in a fine rubbed finish. The leaflet includes drawings (Information Sheet style) to show fixing details, and there are also notes on suitable sizes and thicknesses for the two materials. The leaflet is clear and factual, conforms to BS 1311, and I am glad to see that it earned a certificate of merit in the recent RIBA-Building Centre competition. Good luck to any firm which provides architects with properly set out information. This particular leaflet deals with cladding, and there are two others on window sills and surrounds, and on copings and cappings. (*Limestone & Green Slate Slab Co. (Westmorland), Ltd., Appleby Rd., Kendal, Westmorland.*)

**Tank lagging**

Polyzote expanded polystyrene lagging is now being sold in ready cut panels for the lagging of supply tanks in roof spaces. The standard outfit consists of two sides, two ends and a lid, plus 12 yards of adhesive tape and a dozen dowels for fixing. The outfits are produced in various sizes to fit tanks from 10 to 100 gallons, and cost from 25s. to 79s. The material is very easy to cut if it is necessary to accommodate pipe outlets. (*Expanded Plastics Ltd., 675 Mitcham Rd., Croydon, Surrey.*)

**Electrical heating**

The illustration on the right shows one of the new Tyrad high temperature radiant panel heaters, which are now being produced in 750 and 1,500 watt sizes, for overhead suspension at heights between 10 and 12 ft. The heaters are useful for providing comfortable working conditions where air temperatures are comparatively low, such as loading docks, and the heating effect is provided very quickly after switching on. The radiating faces operate at a temperature between 450 and 500 deg. F., and the backs of the panels are insulated against heat loss, the face of the heater being finished in cream vitreous enamel. Prices of the two sizes are £5 5s. and £8, and no purchase tax is payable. (*Tyrad Electric Ltd., Imperial Court, Basil St., Knightsbridge, London, S.W.3.*)

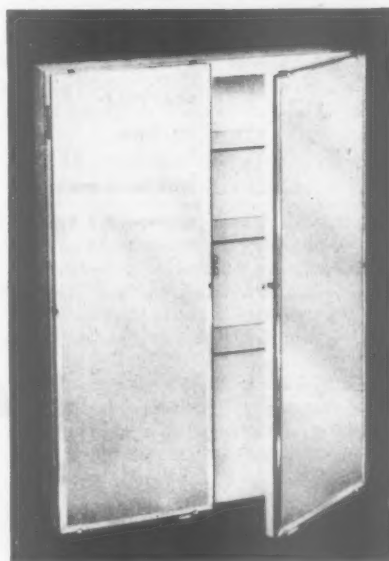
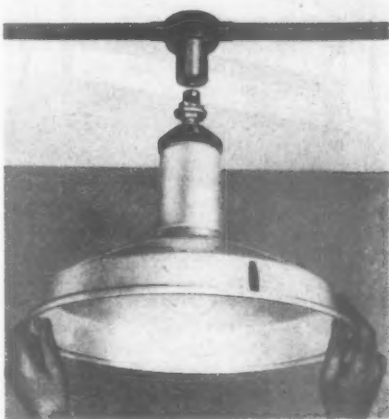
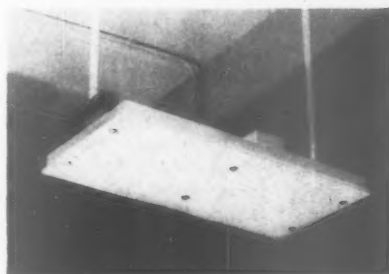
**Lighting accessories**

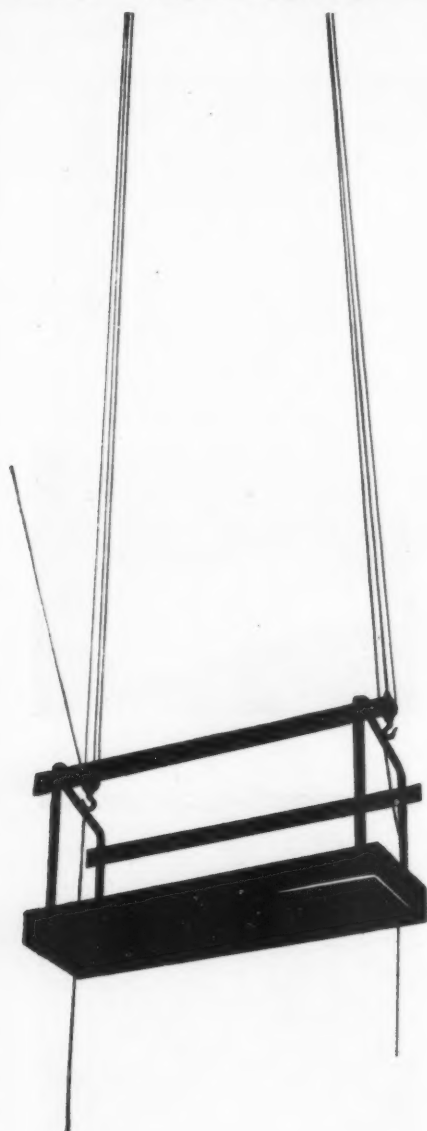
One of the difficulties of keeping industrial lamp reflectors clean is the amount of fiddling which has to be done, first of all to remove the lamp, and then the threaded ring holding the reflector. The new Discon fitting consists of a socket which is bolted to the conduit box and wired in the usual way, and which takes a bayonet fitting to carry the lampholder and reflector, the whole assembly being removed with a half turn as shown in the illustration. Heat resisting tails are provided for the wiring to the lampholder, so that the v.i.r. in the conduit stays at a fairly low temperature. Once the complete unit has been removed the reflector can be detached without removing the lamp from its holder. Price is 15s. (*Simplex Electric Co. Ltd., Blythe Bridge, Stoke-on-Trent, Staffs.*)

**Bathroom fittings**

Reasonably priced wood bathroom cabinets for building in are now being made by Willet and Robinson, of Maidstone. They are all 4½ in. deep so that they are easily fitted in a cavity wall, and their prices vary from £3 7s. to £6 14s. All models have mirror doors and internal glass shelves. (*Shield Modern Products Ltd., Craven House, Kingsway, London W.C.2.*)

*Right, top to bottom: the Tyrad overhead radiant heater; the Discon combined lampholder and reflector; bathroom cabinet by Willet and Robinson.*





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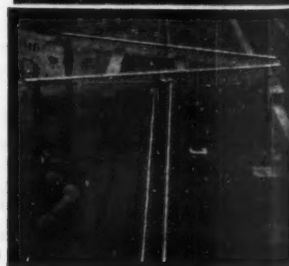
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## technical section

**Wall-mounted w.c.**

The illustration below shows Ideal's new Sanwall closet, which has been designed for schools, hotels, hospitals and other public buildings. It is a wall-mounted wash down closet made of high grade vitreous china, and the fact that it is mounted clear of the floor allows unbroken surfaces and makes for easy cleaning, as there is a



*The Sanwall closet.*

clearance of 3 in. between the lowest part of the bowl and the floor. Two types of support are made, one being buried in the wall and curving round into the floor topping, the other a simple cantilever fitting set  $\frac{1}{4}$  in. into the wall. Water inlets can be either horizontal and concealed in the wall, or vertical for direct connection to a cistern overhead. (*Ideal Boilers & Radiators Ltd., Ideal Works, Hull.*)

**Translucent corrugated sheeting**

The ordinary fibreglass polyester translucent sheeting sometimes suffers from loss of light transmission owing to the fact that the fibres are not always fully covered by the plastic and form a natural trap for dirt and also allow moisture to enter. To overcome this trouble Structural Plastics are now producing 'Rufelite-Polyply', a compound laminate consisting of the standard fibreglass polyester sheet plus a further layer of transparent polythene to cover the glass fibres and thus prevent surface deterioration. (*Structural Plastics Ltd., Eythorne, Dover, Kent.*)

**CLASSIFICATION FOR TECHNICAL ARTICLES AND INFORMATION CENTRE**

1 Sociology. 2 Planning: General. 3 Planning: Regional & National. 4 Planning: Urban & Rural. 5 Planning: Public Utilities. 6 Planning: Social & Recreational. 7 Practice. 8 Surveying & Specification. 9 Design: General. 10 Design: Building Types. 11 Materials: General. 12 Materials: Metal. 13 Materials: Timber. 14 Materials: Concrete. 15 Materials: Applied Finishes & Treatments. 16 Materials: Miscellaneous. 17 Construction: General. 18 Construction: Theory. 19 Construction: Details. 20 Construction: Complete Structures. 21 Construction: Miscellaneous. 22 Sound Insulation & Acoustics. 23 Heating & Ventilation. 24 Lighting. 25 Water Supply & Sanitation. 26 Services & Equipment: Miscellaneous. 27 Furniture & Fittings. 28 Miscellaneous.

## INFORMATION CENTRE

**6.58 planning: social and recreational  
TREE PLANTING**

*Trees in Town & City.* HMSO. 7s. 6d.  
The Ministry of Housing and Local Government is to be congratulated on producing an excellent and timely publication. It is refreshing to find them starting from the premise that trees in towns are an essential of civilized life, and that any difficulties encountered in preserving or planting them are to be looked upon as problems to be overcome rather than as reasons for doing without them. The dangers of root action and light obstruction which are so often accepted as excuses for a treeless town, are put in their proper perspective as factors to be recognized and considered on the merits of each case. The point is rightly stressed that the brutal lopping of trees only increases light obstruction, while skilled pruning can obviate it.

The need is emphasized for large trees which can dominate or frame buildings, as well as the smaller ones which may serve as "interior" decoration. These different roles which trees play in the civic scene have been analysed with a seeing eye, and illustrated with well-known photographs. Perhaps the least valuable section is the table for the selection of suitable trees. Despite a warning note that it is only intended as a preliminary guide, it suggests the possibility of selection from catalogues without personal knowledge, always a dangerous proceeding. But that is a minor criticism of a book which puts the case for the tree so clearly and persuasively that one may hope all local authorities as well as architects and town planners will heed it. Its good production and the excellent English in which it is written should make this the more likely and extend its field to interested members of the public.

**7.71 practice  
ESTIMATING TEXTBOOK**

*The Fundamentals of Estimating for Builders' Work.* D. E. Warland. University of London Press. 12s. 6d.

All books on estimating seem much alike. There is the Introduction, breathing the craftsmans approach—with hints and exhortations to carefulness. There are the unsophisticated drawings of brick arches and timber shutters, the workmanlike dividing of work into stages and the general air of learning by rote, respect for the architect and the assurance of inherited technique. They are nearly all written by teachers in schools of building and aimed at well known craftsmen's examinations. Of course, they seem to have less and less relevance to

modern building, as the years go by. I have yet to see one such book which explains labour constants with references to work measurement studies. This volume is better than many of its kind—mainly because of the brevity and clarity of the explanations given. Chapters 2 and 3 would make excellent background reading for architectural students with curiosity about what builders do in their offices. They deal with preparation of the estimate and pricing of preliminaries—that omnibus item that may contain anything from scaffolding to the holidays with pay contributions.

But the book is written primarily for building students and one must record the regret that the bulk of it—a chapter each on all the traditional trades—ignores modern techniques. No mention of standard shutter panels, plastic piping, pitch fibre drains or fibre board ceilings. This presumably is because these things never appear in exam. questions, and because traditional techniques are thought to be in the nature of "first principles" — fundamental to anything modern.

**8.61 surveying and specification  
SPECIFICATION**

*Specification 1959.* Editor: F. R. S. Yorke, F.R.I.B.A. Assistant Editor: Penelope Whiting, A.R.I.B.A. The Architectural Press. 35s.

The new edition of this indispensable work is notable chiefly for the greater attention devoted to timber. D. W. Cooper has added some new pages on timber engineering, there is more data on plywood, timber curtain walls have been added to the curtain wall section and John Stillman and John Eastwick-Field have revised the specification clauses in the carpenter and joiner section. It seems that there has been some debate between the Editor and his helpers on the possibility of substituting check lists for full specification clauses; but that after trying this out on certain trial sections, it was decided not to persevere. Doubtless this was wise. Nevertheless, we feel that the time is fast approaching when the function of the "spec" must be re-examined and when, as a consequence, the form of this publication must be re-cast. No architect can do without it: but it could be still more helpful to him.

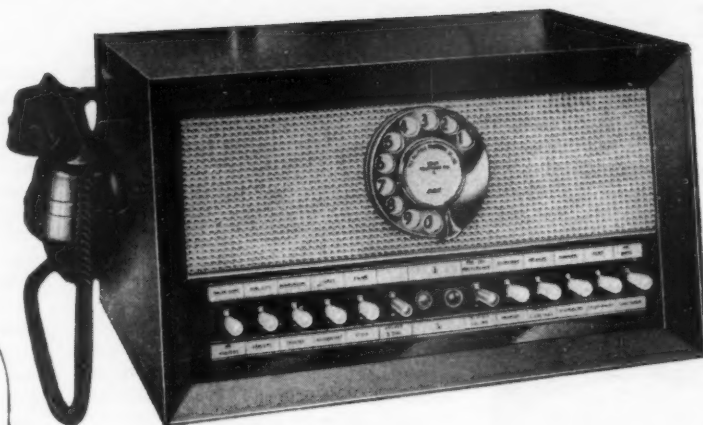
**18.200 construction: theory  
TIMBER STRUCTURAL DESIGN**

*Timber Engineering Design Handbook.* Pearson, Klotz and Boyd. Published by the Commonwealth Scientific and Industrial Research Organization, Australia, in association with Melbourne University Press, and, in England, with the Cambridge University Press. 30s.

There is certainly a need for a design handbook for the architect or engineer who would like to use timber as a structural material, but regrettably *Timber Engineering Design Handbook* does not fill this need.

The book is arranged in chapters in the following order—timber as a structural

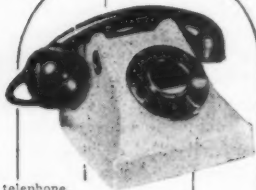
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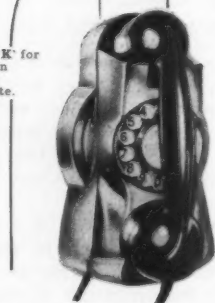


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## technical section

material; design loads and stresses; design of beams, columns, joints, trusses; glued-laminated construction; plywood construction; testing and preservation, and examples of timber structures. Each chapter, paragraph, chart and table is identifiable by a reference number. In use this degree of cross-referencing confuses rather than clarifies, and it is likely that errors have arisen simply (?) because of the volume of reference numbers; e.g., in worked solutions to examples table 2.3 "Properties of Timber Sections" is constantly referred to as table 2.2. In the matter of useful data the book is strangely unbalanced; a meagre table of "weights of miscellaneous building materials" is given (table 2.2), but it is so incomplete as to be of limited use; at the other extreme table 1.3 "Properties of Structural Timbers Grown in Australia" gives details of 40 different varieties of sp. Eucalyptus (of which only three are commercially available in the UK); if the book is to have any sale outside Australia this table should surely include all commercially available hard and soft woods regardless of their countries of origin.

The substance of chapter 4 "Design of Beams" is a series of "charts of allowable loads on beams" designed for uniformly distributed loads on simply supported beams. From them, allowable beam sizes for a given load, or an allowable load for a given beam, are obtainable. They are arranged in pairs (a pair for each strength group), the first figure of each pair is a "safe load chart" and indicates the maximum allowable loads when bending strength is the design criterion; the second figure of each pair is a "stiffness chart" and indicates the loads which produce a central deflection equal to  $\frac{1}{500}$  of the span. Unfortunately the charts cannot be used where shear is critical; and where loading and support conditions are not as mentioned above, one of 23 types of modification constant "K" have to be applied by means of formulae to modify and supplement values obtained from the charts. This modified graphical system seems over-complicated and fraught with a greater possibility of error than the more conventional methods of calculation based on properties of sections, BM values and so on.

Under "design of joints" paragraph 6.121 "intersection of centre lines of members," and again under paragraph 7.31, the point is well made that a number of members meeting at a joint should preferably be arranged symmetrically, and certainly so that their centre lines intersect on the same axis in order to avoid introducing an additional BM in the joint; in spite of this there are two examples given of nailed trusses (figs. 11.12 and 11.13) designed by the Commonwealth Experimental Building Station where failure is likely to occur through additional bending being introduced into joints in the bottom chord.

On the whole, this book is not sufficiently useful for inclusion in the English architects library.

## 7 PRACTICE

## architectural management: a method study, 3 type details and the specification

In their first, introductory, article\* the authors, W. Sinclair Gaudie and Arthur F. S. Wright, mentioned the use of "type details" to speed up drawing office practice. This week they explain how these are built up and used. They then pass to the specification, proposing an "elemental" specification, in which the items are considered by elements instead of by trades; also a card index which files often-used specification clauses in such a way as to serve also as a check list.

## PRE-CONTRACT STATE—

## COMMUNICATION: DRAWINGS (continued)

## The type detail

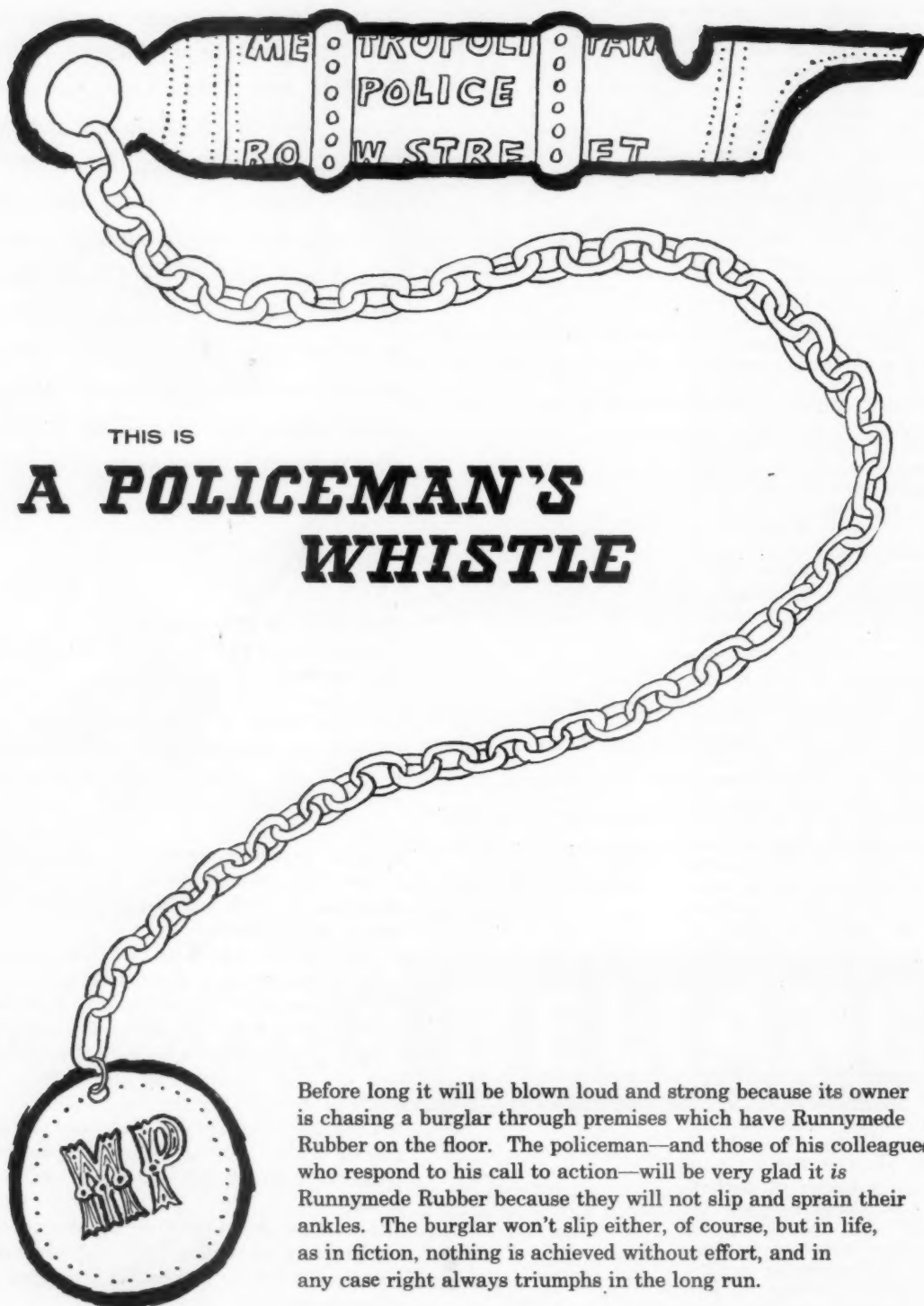
The "type detail" is a drawing which can be made to serve repeatedly on "run-of-the-mill" jobs and which for this reason can save architect-time for problems which better deserve it.

From our experience, we would lay down these rules:

1. Don't type anything unless you use it recurrently, know that it works and find you cannot obtain it simply by BS reference.
2. Don't confuse type with overall size. The whole object of the exercise is to save work *without* accepting the restrictions imposed by overall standardization. For instance, by typing only the *sections of the components* of a window, the same type-detail allows you whatever variations of size, proportion and divide as you want for any specific job.
3. Code the types so that the maximum possible number of types and variations can be shown on a single sheet. This is the hardest part of the whole process.
4. Set out the sheet so that all necessary information can be put on the translucency in the clearest possible way by: (a) deleting; (b) ringing; (c) adding figures where necessary.

These points can best be illustrated by tracing the evolution of our type window sheet. (Figs. 1 and 2.) For occasions when it was desirable to depart from the EJMA standard window, we found ourselves recurrently using the following types for which we

\* January 8, 1959. The second article appeared in the issue of January 22, 1959.

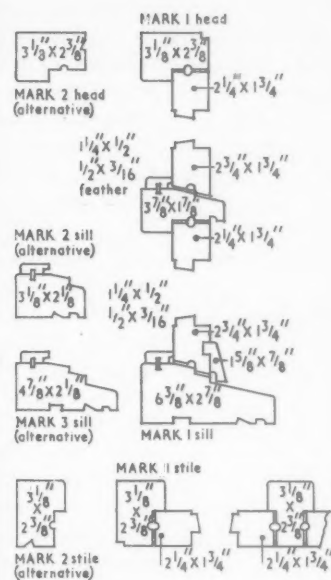
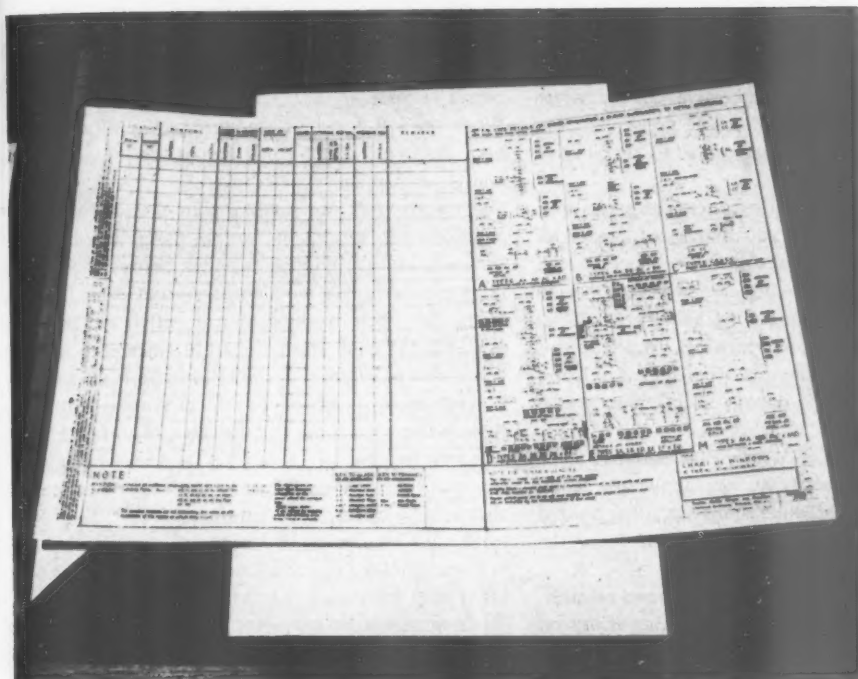


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## technical section



had evolved satisfactory details (Rule 1):

A. Sidehung o.o. casements, with or without fanlights.

B. Same, but having the fanlight (if any) closing on the head of a dead sash, to avoid a transome.

C. Inward-opening hopper, with or without dead sash under.

D. Single-glazing direct to frame, with or without additional opening lights.

E. Double-glazing direct to frame, with or without additional opening lights.

In addition, for cases where the standard metal-window surround is not suitable, we have:

M. Wood surrounds to metal windows, with or without wood transoms and mullions.

We went on to subdivide these main types.

A window in class A may be a single light, for which we have to show details of frame, sill and sash: call this AA.

It may be divided vertically *only* into any number of lights: the same details apply, with the addition of the mullion. Call this sub-type AB.

It may be divided horizontally *only* into any number of lights: the details for AA apply again, with the addition of the transome. Call this sub-type AC.

It may be divided vertically *and* horizontally, incorporating all the components already detailed: call this AD.

It follows that the drawing for AD will also give all the particulars for AA, AB, and AC by simply deleting the unwanted components and code-letters.

Furthermore, we find that in each case we commonly have two alternative frames and three alternative sills, depending on the finish of the wall-opening and the nature of the subsill. To allow these to create sub-subtypes in their own right would involve a confusing

Fig. 1 (left). Reduced version of type window sheet. Fig. 2 (right). Re-drawn version of top right hand panel of type window sheet showing sections through heads, sills and stiles.

number of permutations of code-letters. So we have simply described them as "Mark 1 Head," "Mark 2 Head," etc., the window being then described as "Type AB, Mk. 1 frame, Mk. 3 sill." (See Fig. 2.)

The essential point is that this reference supplies the details of all the vertically-divided windows on the job which require this particular combination of frame and sill—irrespective of their size or divide, which are shown on the arrangement-drawings. (Rule 2.)

The same method is followed in subdividing the other main types.

We then found that it was possible to incorporate all these details for all types in the same sheet as the window schedule. This sheet now provides details at quarter-fullsize for 100 variants of window—in addition to the information normally in the schedule. (Rule 3.) These details are arranged to occupy a space of double-foolscap size so that they can conveniently be issued, if necessary, along with the specification or quantities.

To produce a window detail for a job using one or more of these types the procedure is:

(i) Take a translucent master-print and put rings round the code letters of the types required.

(ii) Score out the components of types *not* required.

(iii) Cross out the alternative frames and sills *not* required.

(iv) Enter the particulars of size, materials and finish in the schedule part of the sheet.

(v) Enter the title and index-number in the title panel.

(vi) Print-off as many paper copies as the job requires.

A similar treatment applies to door frames. (Rule 4.)

technical section

Normal combinations of frames and stops can be divided into types and sub-types and described simply by a code-letter prefixed by the finished breadth of the combination (e.g., 4"YA) irrespective of the width and rebate size which are obtainable from the door schedule alongside. Precast work can similarly be combined with a schedule.

Doors require a sheet of their own, but the same principles apply. A certain type of framed and lined door (E2) may or may not have a mail slot (score out if not). The same door may on occasion be hung to swing both ways (ES2) or may be half-glazed (EG2) or both (ESG2). So the same drawing, by deletion of variants, can serve for them all and it can be combined with others to give, on one sheet, many variations of external door.

Door elevations are conspicuously marked "not to be scaled" since the basic designs are applicable to all normal sizes of door, and dimensions are either figured on the translucent master-print or taken from the door schedule.

With the proper use of type-details it becomes possible, on the average job, to concentrate design-effort on things which really deserve it, while the really dull bread-and-butter job can at least be done decently and with speed and competence. This is quite worthwhile in a general practice, since such jobs often bypass the architect altogether ("straightforward bit of building: not worth getting an architect—they take so much time").

A valuable side effect is the focusing of attention on odd bits of the design which ought to fit the types but don't, due to some minor aberration of plan or section. If the general design, for no good reason, is forcing a tortuous solution where a simple one would do, there is something wrong with it.

Source details have already been mentioned under "Information," and we need only add here that the build-up of the source-detail file is subject to two rules:

1. A source-detail is only a springboard for design. Never try to turn it into a type-detail unless it fulfils the essential condition of the latter, viz., that it must be capable of constant re-use as it stands. (For instance, source-details of eaves and verge treatments are handy, but to type them would involve standardizing pitches and projections to a degree which would stultify design.)
2. Don't pad out the file. The test of a source-detail is the likely extent of its future usefulness—this is no place for the free-standing fireplace in gold mosaic.

### III. Indexing, etc., of drawings

As each drawing is finished, its number is entered on a looseleaf sheet for that job, together with the date of completion and the draughtsman's initials. A separate register keeps track of the issue of the drawings. This division of function arises, in our practice, from the multiplicity of copies required under the separate-trades system, but in any case we consider it more logical than using the same pro-forma for both purposes. The description and scale of the drawing are

the immediate concern of the drawing office, while the date of issue and addressee are primarily the concern of the secretarial side, and a register cannot be in two places at once.

When the job drawings are stored away after completion, the index sheets come out of the looseleaf book and go with them.

Some years back, we gave up plan chests in favour of a home-made system of vertical filing. The drawings for each job are clipped together between hardwood laths and hung in a wooden drop-front cabinet with a lifting lid. These hanging files are lifted out from the top and put back from the front since (the job title being clearly lettered on the lath) there is no necessity to keep them in any given order. We shall probably replace this by a more sophisticated manufactured job when we find one which satisfies (at a reasonable price) the major condition that small drawing offices cannot afford filing-clerks, and therefore:

(a) It must be possible to remove all drawings for each job—or at least a considerable section of them—at one lift. Filing individual sheets is a waste of time.

(b) It must not be necessary to replace the files in a given sequence involving a conscious effort to "find the place": this is also a waste of time and temper.

The plan-chest has one residual use—storage of tracing paper in cut sheets, and of the blank translucencies of the schedules and type-details which are kept in clearly-labelled imperial envelopes.

On completion of a job, the drawings are filed away in stout portfolios, which are stored on edge. Some day these archives will push us out into the street—another powerful argument for photo-reduction.

This completes our analysis of the architect's primary communication-medium, as far as we have gone. A great deal of detailed research, experiment and fresh thinking remains to be done, especially on the "presentation" of working drawings (BSS 1192 barely scratches the surface) but the process is already beginning to pay-off quite noticeably in terms of efficiency as defined in our first article.

### PRE-CONTRACT STAGE— COMMUNICATION: WORDS

Since we are not writing a treatise on business correspondence, there is only one *written* pre-contract communication which concerns us here; that is the specification.

It is commonly assumed that the architect's draft specification can generally be no more than a series of rough notes for the quantity surveyor. This is in equal measure a compliment to the q.s. and a reflection on the architect, who carries the ultimate responsibility for failure and charges for it in his fee.

A sound and complete specification of materials and workmanship is an essential safeguard: it can also be a most useful tool for the job-supervisor—much more so than the BQ's.

We think, therefore, that the architect should prepare his own specification in full, whether a q.s. is employed or not. At this point we had better make clear what we



## technical section

mean by a "full" specification.

With all respect to the textbooks, we do not think it possible to describe contemporary construction in terms of: "Construct and fix staircase all in deal, 3 ft. 0 in. clear between stringers, having 1½-in. treads with rounded nosings and small scotia under, 1-in. risers tongued to treads and glue-blocked and bracketed to 5-in. × 3-in. carriages . . .", etc. Nor is it profitable or useful to try. With the exception of materials, the specification should not attempt to provide information which can be more satisfactorily communicated by the drawings. Its prime function is to supplement the detail drawings, not to supplant them.

The next point is the *form* of the specification. The q.s. will naturally embody it in his bills, trade by trade, but we incline to the belief that the *architect* should not prepare it in that form at all. It is more natural for him to think in terms of operations than of trades, and in fact the writing of a traditional specification-by-trades is often preceded by the drafting of an operational check-list.

This has led us naturally into the conception of the "elemental specification," divided not into trades but into the elements now normally used for cost-analysis. Each division includes all the items necessary for the execution of that element, irrespective of trade. Marginal key-letters opposite the items (M for mason, J for joiner, etc.) enable the q.s. to collate them quickly into their various trades for incorporation with normal bills of quantities. Where repetitions inevitably occur (water, sand and cement, for instance) the full item is given in the first element to which it applies and only its title thereafter. This indicates to the q.s. that it has already been described, while at the same time reminding the supervising architect of its existence in that element.

This procedure offers the following advantages:

1. It enables the architect to prepare an ample specification by a method which comes naturally to him.
2. It provides him during supervision with a working description and check-list, in a form which is more convenient than the BQ's for reference on the site.
3. It provides a ready-made amplification of the cost-analysis, by giving a full description under elemental heads, for future reference and comparison.
4. It reduces or eliminates the need for indexing the specification.

It must be remembered that such a specification is a tool, not a contract document. Its clauses obtain legal validity only by being copied into the BQ's, and in that sense it is simply an accurate and workmanlike substitute for informal notes by the architect to the q.s. Its use on the site is confined solely to the architect, to whom it is a handy check-list and collation of the descriptions given to the contractor in the BQ's: for that reason it is important that the specification clauses should be copied *word for word* by the q.s. into the bills.

In perhaps a year's time we shall have had enough experience in the handling of the elemental specifica-

tion to be able to assess how it does work in practice and exactly what form it should take.

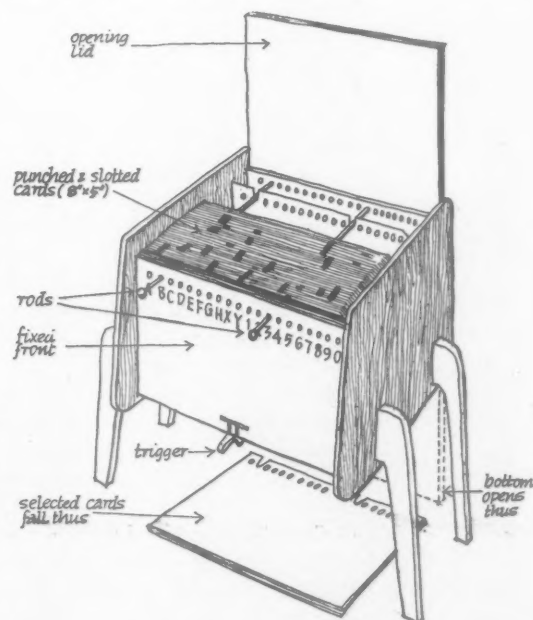
Whatever the form of the specification, the donkey-work of writing it all out must be cut to the minimum: an architect's time is wasted in defining the spacing of wall-ties for the ninety-ninth time. Our own solution so far is a card file divided by elements, containing all the clauses of general application.\* Such clauses can then be given straight to the typists, and only the "specials" written out in full.

The build-up of the card file is subject to the following rules, which have to be rigidly enforced:

1. Only items of general application should be included.
2. Clauses must be as watertight as human fallibility permits.
3. Any clause found unsatisfactory in practice must be ruthlessly weeded-out.
4. Cards must be kept up to date.

Whether the division is by elements or by trades, there is always the possibility of misplacing a card, and, since one of the advantages of such a system is that a bunch of cards is in itself a form of check-list for the commoner items in each element (or trade), such misplacement can be a major nuisance. Our solution is an adaptation of the punched cards used for statistical sorting. (See Fig. 3.) Each element is identified by a letter and number. The cards are punched along the top edge with 20 holes (10 letters and 10 numerals). On each card, the holes corresponding to the index

Fig. 3. Card index for specification clauses.



\* If there were a British equivalent of the pocket-sized Danish *Generalbeskrivelse* (which deserves an article all to itself) all this would be unnecessary.

### technical section

letter and number are slotted-out. The cards are contained in a box, also drilled front and back with holes. To select, say, B3, you push a rod through "B" and a rod through "3," press a trigger-catch releasing the bottom of the box and all the B3 cards are delivered together: the cards *not* slotted at B3 are, of course, held in position by the rods. Since the rods and slots do all the selecting, the cards can be put back in any order.

#### Pre-contract stage—Summing up

We may now outline the sort of process which emerges from our findings so far.

We work from a formal brief, embodying the client's first instructions and subsequent amendments, together with site data. During the design process, we have conveniently at hand all the relevant information available to us, including costs and erection times of any comparable buildings we have done, and including also all the information which can be extracted from consultants or specialists at this stage.

As soon as the client has approved the preliminary sketches based on this information, a print of the sketch design is used as a guide to the next stage. This next stage will probably involve problems of detailed co-ordination with specialists, or at least awareness that such problems exist: it is also the stage at which the "calibre" of the job should be deliberately assessed, if this has not become self-evident already. The function of the guide-print is mainly to clarify these issues.

Any detail in a building may be classed as either:

- (a) A special problem calling for its own individual solution, for which source-material may or may not be available.
- (b) A commonplace problem deserving no more than a standard solution.
- (c) A commonplace problem which deserves to be handled in a fresh way.

We therefore go over the guide-print very closely, and note:

1. Queries requiring immediate attention from specialists.
2. Problems of type (b) above, for which type-details are appropriate.
3. Problems of types (a) and (c) above.

A lot of this can be done by marking the guide-print with coloured pencils.

The issue of type-details takes virtually no time at all, and we can make a fair guess at the time required for the others: so at this stage we can make a reasonable estimate of the time we shall require for the working drawings. Against this estimate, we have a triple check:

- (i) Our office records of time on comparable jobs.
- (ii) The estimated amount of the fee reduced to man-hours—which, since we prefer not to work at a loss, indicates the maximum time allowable.
- (iii) The time the client is prepared to give us.

If our first guess agrees with all three, we have a very

happy state of affairs. If it disagrees with (i), we compare them again to find out why. If it disagrees with (ii), we must either reconsider the "calibre" of the job and adjust the design (preferably by amending the number of type-details) or else resolve to do a prestige job regardless of profit. If it disagrees with (iii) we must either reconsider as above, or ask for more time. If it disagrees with the lot, an agonized reappraisal is called for—the whole design approach may be faulty. The advantage of this particular drill is that it imposes discipline at a stage when the architect's thinking normally tends to be rather undisciplined and optimistic. Also, as already noted in the section on Decision, the early assessment of "calibre" makes possible the early allocation of responsibilities within the designing team. We can therefore make a sensible assessment of the work involved (instead of sailing in and hoping for the best) and try to strike a realistic balance between the ultimate ideal solution and the time which can honestly be afforded by the client and ourselves.

Deadlines for various stages can now be set, and work goes ahead on the draft working drawings, some of which will have already been sketched out during the preliminary stage. From the decisions made on the guide-print, we are able to build up the work from the right end—the detail end—so that the general plans which finally emerge as "arrangement drawings" are the culmination of a coherent design process—not the premature delivery of a litter of embryonic ideas.

The final drawings are worked-up from the drafts, being recast in the process in accordance with the four use-classes already noted: they include the schedules and the type-details. If the job has been efficiently handled, there should be no outstanding problems of design or construction beyond the draft stage, and the whole effort can be concentrated on making the drawings as clear and economical as possible. The "arrangement" drawings are the last to be completed in their final form, so that they can be accurately dimensioned and co-ordinated with the others. Specification notes are made throughout the draft stage, and collated into the full specification while the "arrangement drawings" are being completed.

In print, this probably sounds like a lot of work, but really it only amounts to giving your own operations the sort of consideration which you are expected to apply to those of other people, and in practice it is much less wearing than the traditional muddle-through. It is simply a question of facing the fact that the architect cannot build effectively without effective means of communication: cannot communicate until he has made decisions: and cannot make correct decisions without adequate and accessible information. Unless this sequence is deliberately treated *as a whole*, and his operations organized accordingly, he is unnecessarily frustrated in the exercise of his creative gift.

This applies no less in the post-contract stage, to which we turn in the next article.

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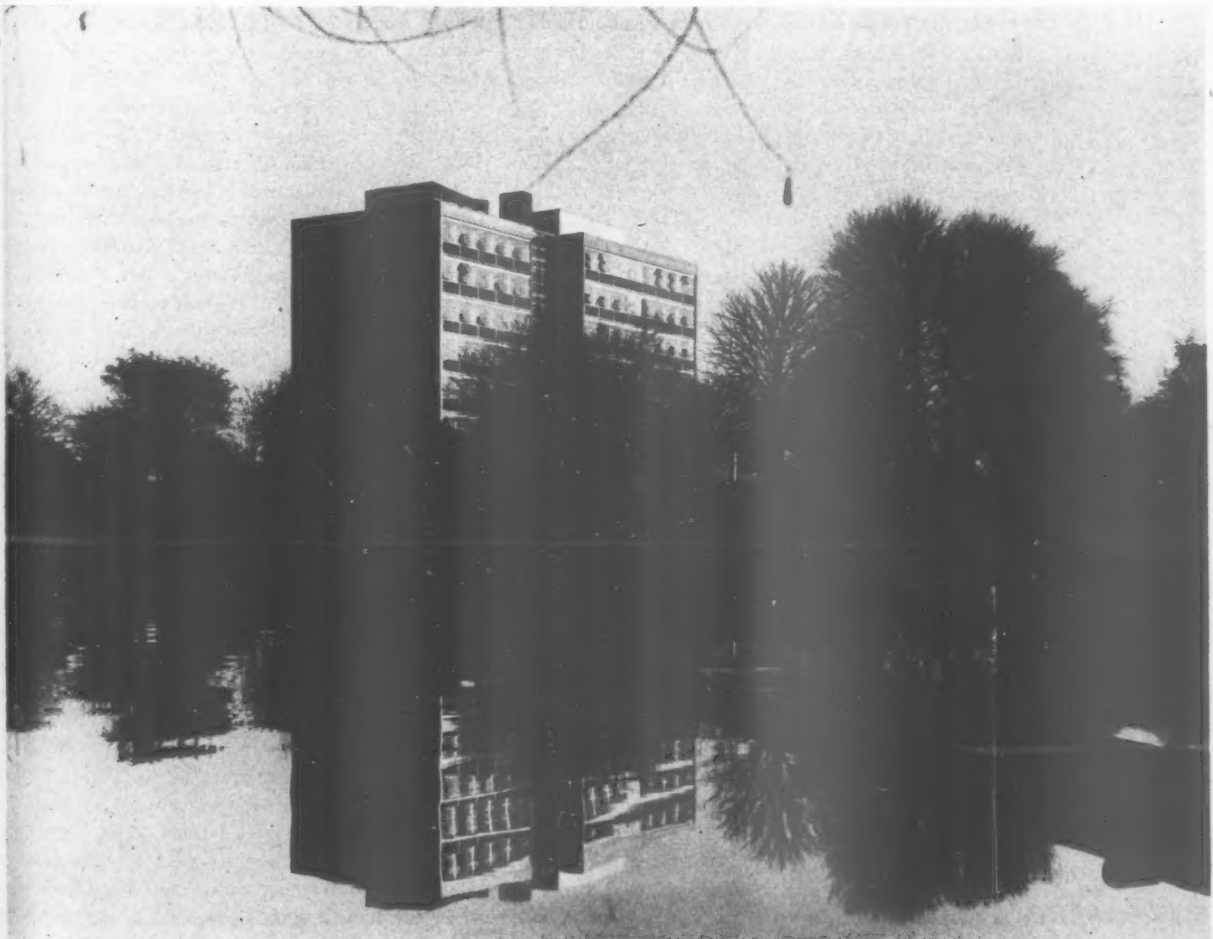
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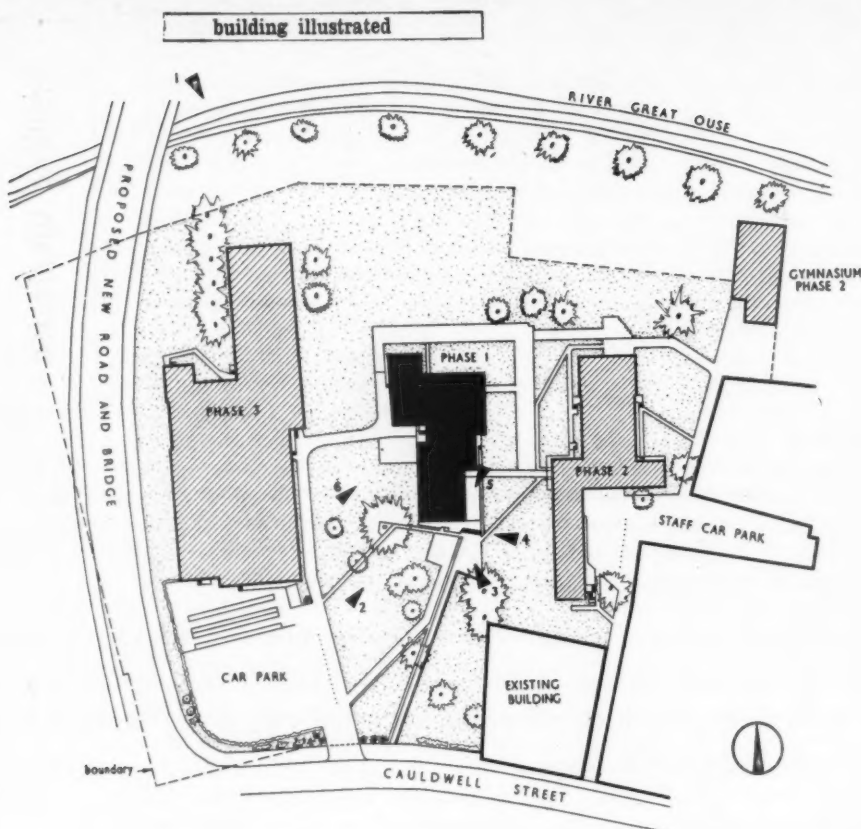
## TECHNICAL COLLEGE

at BEDFORD; designed by S. VINCENT GOODMAN (county architect); deputy architect W. G. WALMSLEY; assistant architects, 1st instalment J. H. BRAMWELL (deceased), A. W. JOHNS; 2nd instalment H. HARTLEY, A. CHRYSTAL, M. J. LONG; quantity surveyors J. H. BEBBINGTON and R. W. BURT; consultants (structural) OVE ARUP and PARTNERS; (engineering and electrical services) DONALD SMITH, SEYMOUR and ROOLEY

This 8-storey teaching block with refectory and kitchen forms the first phase of Mander College, part of a redevelopment scheme for the south bank of the Great Ouse at Bedford. Although there are a number of contentious points in its design, which are referred to in the following pages, this building is nevertheless a noteworthy architectural asset to Bedford.

*Viewpoint 1: from across the Great Ouse.*





Site plan with photographic viewpoints

**APPRAISAL:** The site is a large level stretch of land adjoining a riverside walk. The banks of the Great Ouse at Bedford have a pleasant character; land near the river is subject to floods and this has deterred building in the past, the banks being laid out as public gardens and promenades with many fine trees. The development of the south bank, of which the Technical College is a part, aims at supplementing and enlivening this character.

Mander College is to be built in three phases. Phase I, illustrated here, includes the main teaching block, the entrance hall and exhibition space, and the refectory and kitchen. Phase II, to the east, is now under construction and consists of a building containing the assembly hall and administrative offices, and a separate gymnasium. Phase III will be to the west of the 8-storey block and is planned as a single-storey workshop block for the Engineering and Building Department. Although the specific requirements of Colleges of Further Education differ, this breakdown into three main parts and the consequent use of the break-down for phasing the building seem to have become usual practice, largely dictated by central government policy. (cf. Dartford Technical College, AJ, April 28, 1955, and Colleges of Further Education at Slough, AJ, May 8, 1958, and Oswestry, AJ, June 12, 1958.)

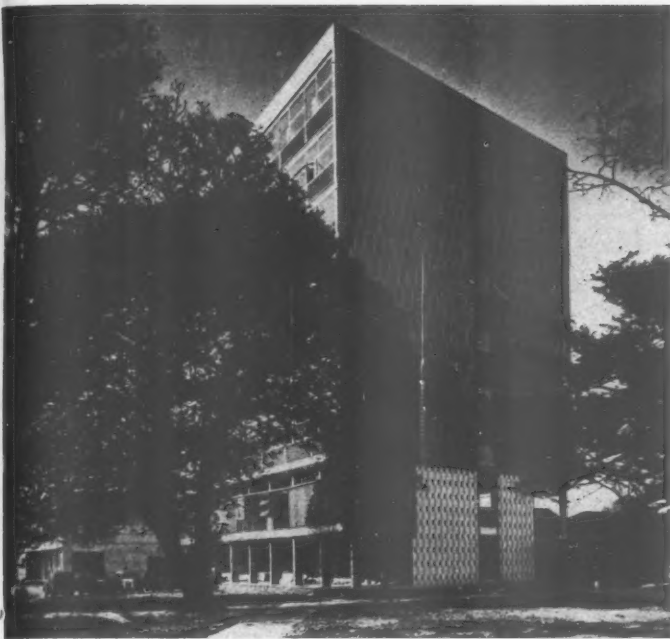
The main teaching block inevitably forms the highest and most prominent part of this type of layout and it is here that the most loving care seems to be lavished by designers. It can be overdone. A teaching block is basically a simple building, of which the main requirement is similar in some respects to that of an office block; a large number of well-lit spaces opening directly off general circulation areas. These spaces vary in size, but by small increments, from small stores and offices for staff to large laboratories and

lecture rooms. This requirement would seem to point towards a simple central-corridor plan, at least on the upper floors, with an outer wall subdivision which allows partitions to meet it at frequent intervals, and an avoidance of "column troubles," for instance, by the use of structural mullion. Such an arrangement, if combined with a continuous, uninterrupted external wall plane and careful placing of vertical circulation, has the further advantage that, should changes in use require a reshuffle of partitions, this can be done with comparative ease. Full flexibility of partitioning is not important, but it should be made possible for an expanding department to take over adjacent rooms by a reallocation of space without necessarily altering partitions.

At Bedford it would seem that a not unjustified preoccupation with the external appearance of the building as a landmark in the new townscape has tended to override some of the more practical requirements; the block is divided into two staggered "towers" of small plan area on either side of a central vertical circulation system; the columns are placed within the interior space, and the vertical subdivisions of the external walls are widely spaced.

But these considerations apart, the visual complication of the first phase (bearing in mind that the completed scheme will be large and complex) is surely setting too hard a pace for this type of building. This is a criticism which applies not to Bedford alone; the multi-storey teaching blocks of most of the colleges as yet built in this country seem to suffer from the same shortcoming. It may well be the result of construction by phases; the tall block is seen not as the visual culmination of highly complicated group of buildings, but as one building in its own right, and simplicity again gives way to unnecessary elaboration, the weakness of nearly all recent architecture in this country.

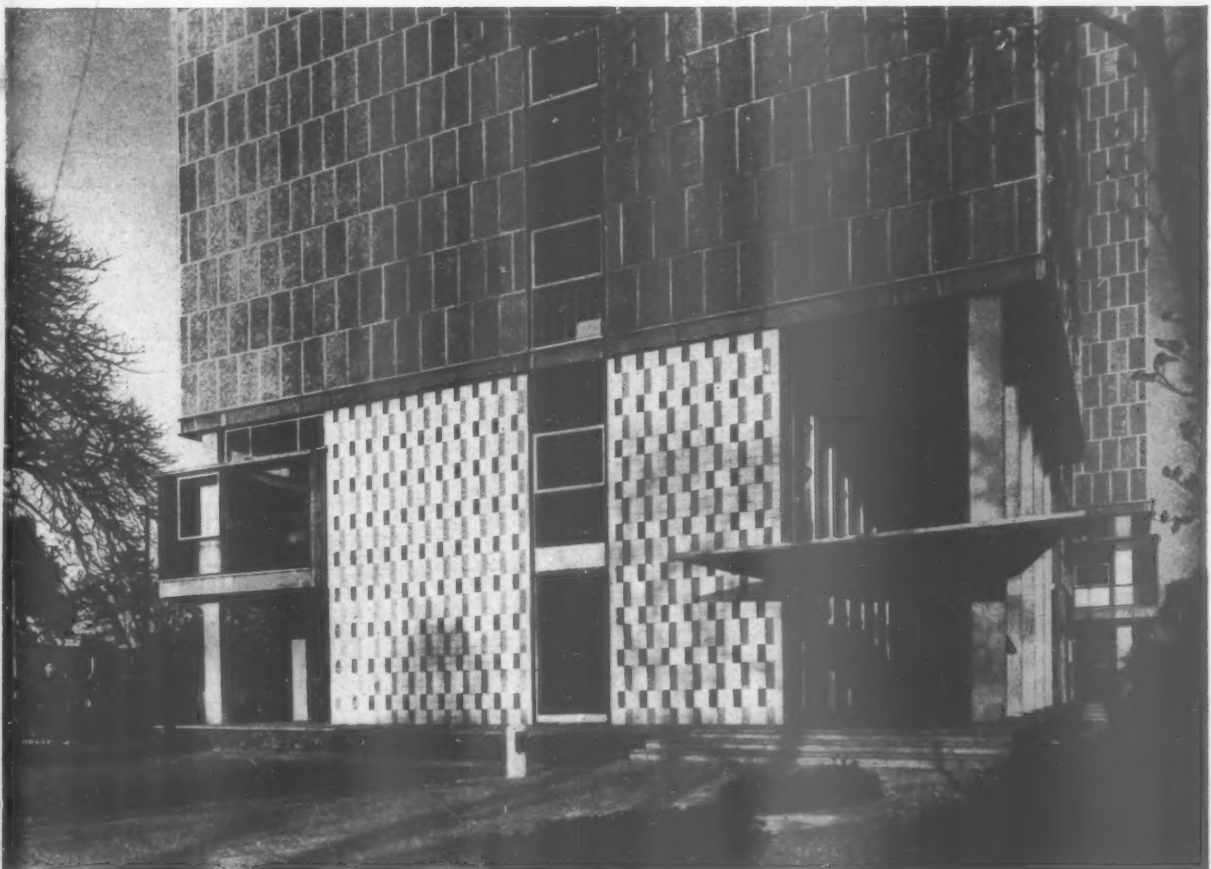




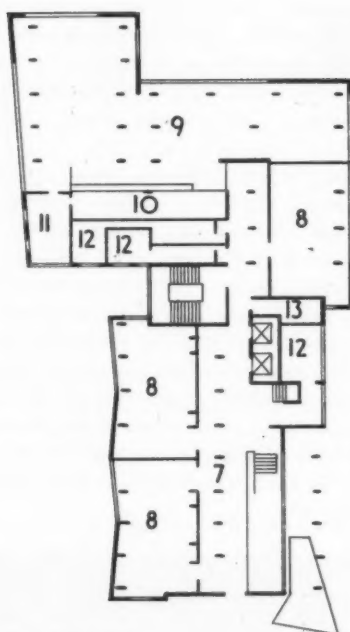
*Viewpoint 2 (above): the south-west corner of the building. The various teaching rooms are situated in the upper six floors of the building; the ground floor and mezzanine first floor contain the entrance hall, exhibition spaces and common rooms. The two-storey block seen under the tree to the left of the photograph contains the refectory at first floor level, accessible from the main block, with kitchen, boiler room and substation on the*

ground floor. The main entrance is on the east side under the canopy to the right. The visual complication appears to derive from a wish to produce a building of "point block" character; the building on the other hand has in reality a somewhat squat (i.e. broad and not very long or high) basic form; not quite a "slab" and not quite a "tower." Such a form, dictated by functional requirements, can be accepted for what it is or rejected, as so often happens, in favour of one of the two favourites. To impose the preconceived character, however, entails a resort to illusion. At Bedford a predisposition towards a tower character would seem to have had two repercussions: firstly the communal and service spaces which would normally occupy the ground floor alone have been "stretched" to occupy two floors to lend added height; consequently parts of these floors are rather thinly planned. Secondly the plan has been staggered on either side of the vertical circulation system to divide the long facades into two areas of greater height than width.

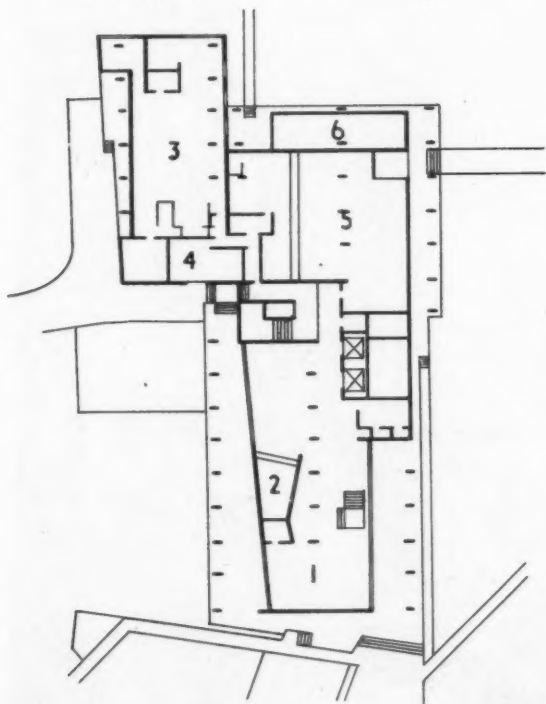
The ground and first floors are given a different character from that of the upper, teaching floors, and the problem of treating them as one unit while they have markedly different "free" plans has caused problems of articulation which it has been attempted to solve by the use of many different facing materials. Viewpoint 3 (below) of the south end of the building shows exposed aggregate concrete slabs, red coloured concrete slabs, smooth finished concrete, bush-hammered concrete, glazed tiles in three colours, reconstructed stone, rough-hewn red sandstone, cedar boarding, oiled mahogany, painted steel windows and aluminium windows. The double storey height has also created problems of scale which have remained unsolved, particularly at the main entrance.



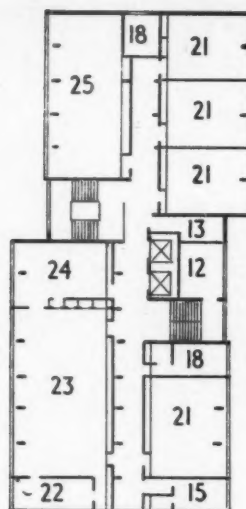
building illustrated



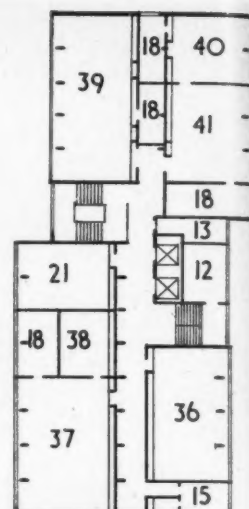
First floor plan



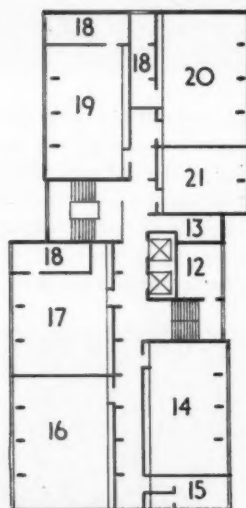
Ground floor plan [Scale:  $\frac{3}{8}'' = 1' 0''$ ]



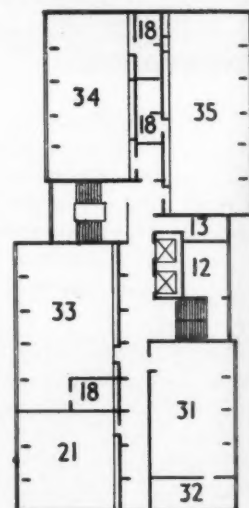
Fourth floor plan



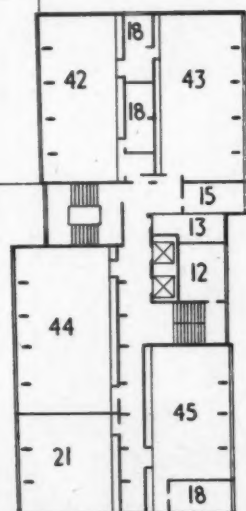
Seventh floor plan



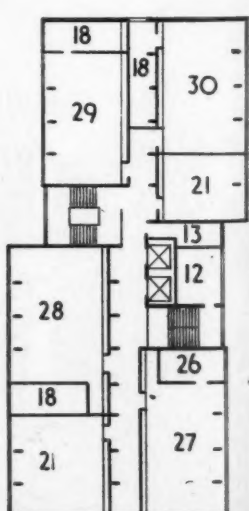
Third floor plan



Sixth floor plan



Second floor plan



Fifth floor plan

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## analysis

## CLIENT'S REQUIREMENTS

A College of Further Education on the restricted site of an existing college without interruption of any educational activities. The first phase of the project to be a multi-storey classroom and laboratory block. The second phase to be the administrative accommodation and assembly hall. The third and final stage to be workshops and gymnasium.

## PLANNING AIMS

- (a) Economical planning with minimum circulation.
- (b) Practical zoning of all accommodation in relation to noise, aspects and vistas.
- (c) Location of common rooms and cafeterias in the hub of the scheme to encourage all students to mix freely.
- (d) All cloaks to be kept to individual classrooms.
- (e) Modular system of fitment for future movement.
- (f) All services contained in central vertical duct and fed into horizontal ducts in every room. Available for future use.
- (g) Attention to groundscape, all trees retained, buildings sited upon an open parkland campus on the bank of the River Ouse.

## SUMMARY

Ground floor area: 6,278 sq. ft.  
 Total floor area: 63,096 sq. ft.  
 Type of contract: RIBA (under seal—Surety Bond).  
 Tender date: June 11, 1954.  
 Work began: October 1, 1954.  
 Work finished: May 31, 1958.  
 Tender price of foundations, superstructure, installations and finishes: £267,684 17s. 8d.  
 Final contract price: £282,509 13s. 1d.  
 Tender price of external works (including drainage) and ancillary buildings: £4,085 6s. 3d.  
 Final contract price: £4,007 10s. 5d.  
 Total: £286,517 3s. 6d.

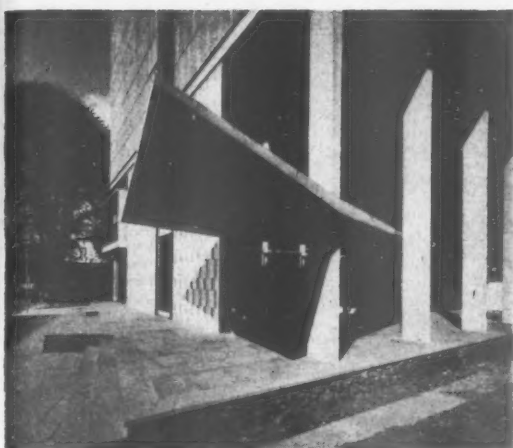
	cost per sq. ft.	s	d
Preliminaries and insurances		2	3½
Contingencies		1	10½

Work below ground floor level	1	8½
Reinforced concrete strip foundations. Plinth walls of brickwork with outer leaf of local stone (Clophill red sandstone) raise the building above the highest recorded flood level.		

## STRUCTURAL ELEMENTS

Frame or load-bearing element	3	7½
Reinforced concrete columns at 9-ft. 6-in. centres, with longitudinal r.c. beams. Columns adjacent to main entrance have granite aggregate with bush-hammered finish.		

External walls	6	2
(a) Under-window panel to east and west elevations of main building: ¾-in. bottle green laminated glass panelling with ½-in. cavity behind with back-up wall of 2-in. woodwool slab.		
(b) External walls to mezzanine floor: ¾-in. cedar boarding (oiled) with backing of building paper fixed to studding and aluminium foil sheets.		
(c) External walls to ground floor: 11-in. cavity brickwork with red sand-faced facing bricks.		
(d) End walls of main building: 6-in. reinforced concrete wall faced with exposed aggregate panels: 6-in. × 6-in. × ½-in. eggshell glazed wall tiles.		
Ratio: $\frac{\text{solid wall}}{\text{floor area}} = \frac{0.437}{1}$		



Viewpoint 4 (above) shows the reinforced concrete entrance canopy which is supported on one main column and two small circular columns. The podium on which the building stands is designed to raise the ground floor above flood level. The entrance doors and glazed wall (viewpoint 5, below) are of aluminium. Open colonnades have been planned on either side of the building at ground floor level, the reason given being that of encouraging the public to look into the exhibition hall.

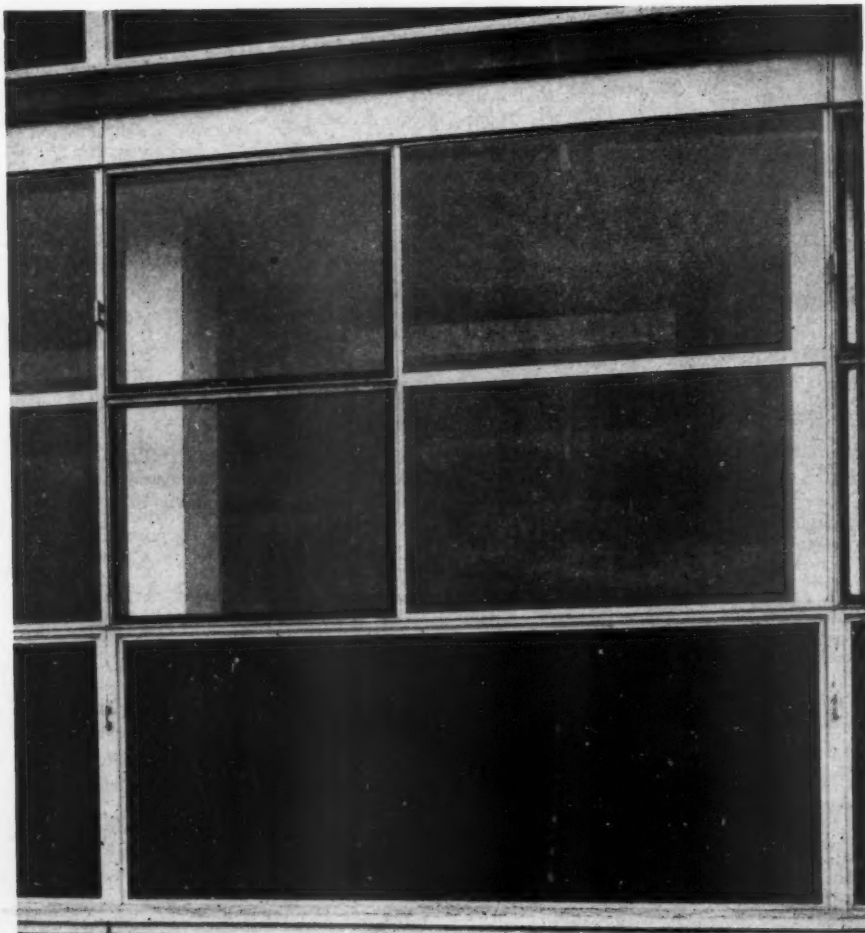


## Key to plans:

- 1. Entrance hall and exhibitions
- 2. Bookshop
- 3. Kitchen
- 4. Sub-station
- 5. Boiler room
- 6. Oil tanks
- 7. Exhibitions
- 8. Common rooms
- 9. Refectory
- 10. Servery
- 11. Wash-up
- 12. Lavatories
- 13. Duct
- 14. Typing
- 15. Head of Department
- 16. Building drawing
- 17. Advanced biology
- 18. Store
- 19. Biology
- 20. Typing
- 21. Classroom
- 22. Balances

- 23. Chemistry
- 24. Laboratory technician
- 25. Advanced chemistry
- 26. Galvo.
- 27. Advanced physics
- 28. Physics
- 29. General science
- 30. Aerodynamics
- 31. Women's crafts
- 32. Fitting room
- 33. Library
- 34. Cookery
- 35. Cookery
- 36. Drawing office
- 37. Photography
- 38. Darkroom
- 39. Design studio
- 40. Pottery and modelling
- 41. Craft room
- 42. Electrical laboratory
- 43. Radio-telecommunications
- 44. Engineering drawing
- 45. Engineering science

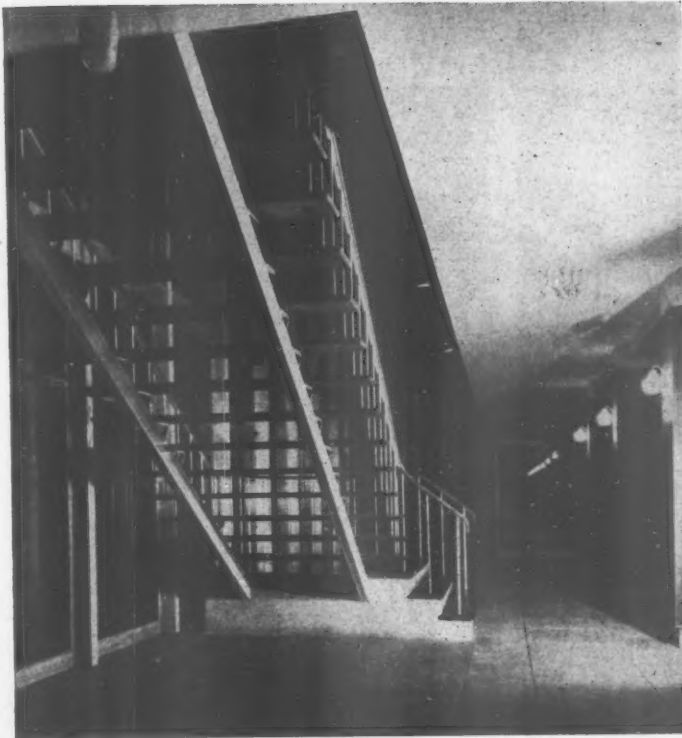
## building illustrated



The necessity of projecting the refectory and kitchen in a two-storey block (view-point 6, top left) has led to further problems of articulation at the junction with the main building, aggravated rather than alleviated by the painted abstract design on the only large area of plain wall. The cladding of the east and west walls of the upper storeys of the teaching block is arranged in bays corresponding to the column lines at 9-ft. 6-in. centres. This is shown in greater detail, bottom left: each bay has two fixed lights and two projecting top-hung opening lights. The latter have a limited opening for reasons of safety. Partitions may only meet the external face at column centres, restricting planning to a 9-ft. 6-in. module and necessitating a filler-piece between column and cladding. The framing of the cladding is of painted galvanised steel and the spandrel panel of bottle-green laminated glass, behind which is a cavity and 2-in. wood wool slabs, plastered internally.

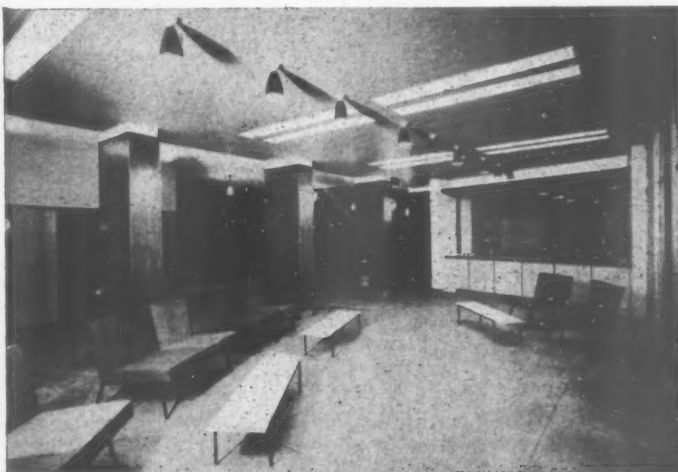


## analysis



Above, the stair leading from the entrance hall to the mezzanine first floor. This is supported by a steel carriage and has solid teak treads fixed to bent strap bearers, steel rod balusters and a mahogany handrail. All exposed steel is painted. The entrance hall, waiting, and exhibition areas on the ground floor are paved with 2-in. reconstructed Hornton stone which is continued externally to form perimeter paving. The reinforced concrete columns, on the right, have been encased in mahogany-veneered chipboard.

Below, the waiting and display area on the ground floor adjacent to the materials supply store. The furniture, purchased through the Education Department, was selected by the architects.



## Windows

s d  
4 8

(a) Steel windows generally, purpose-made and protected against rust by hot dip galvanizing, glazed from the inside with patent beads and non-setting putty. Projected top-hung and horizontal centre-hung.

(b) Aluminium anodized windows to main entrance hall.

(c) Timber windows to mezzanine floor with opening lights in steel.

$$\text{Ratio: } \frac{\text{windows}}{\text{floor area}} = \frac{0.214}{1}$$

## External doors

1 1/2

(a) Aluminium anodized glazed doors in entrance hall with check action floor springs.

(b) Steel framed door with glazed and metal panels to kitchen and boiler room.

(c) Timber firecheck door to electricity sub-station and oil storage room, in accordance with BS459 Pt. III, with teak veneer.

$$\text{Ratio: } \frac{\text{doors}}{\text{floor area}} = \frac{0.0041}{1}$$

## Upper floors

6 2 1/2

Prestressed concrete planks with hollow block filler units and *in-situ* structural topping.

Spans, 22 ft./24 ft. and 26 ft./28 ft.

Superload, 60 lb. per sq. ft.

## Staircases

2 2 1/2

(a) Reinforced concrete *in situ*, 1 1/2-in. terrazzo finish with non-slip nosings, metal balustrades and mahogany handrail. Plastered soffit.

No. of staircases, 2. Width, 5 ft. 6 in. Total rise, 92 ft. 3 1/2 in.

(b) Freestanding staircase, ground floor to mezzanine floor, with teak treads, open risers on steel carriages, metal balustrades and mahogany handrail. Width, 6 ft. 9 in. Total rise, 10 ft. 8 1/2 in.

## Roof construction

1 1 1/2

Prestressed concrete planks and hollow block filler units, as for floors. Overall thickness, 1 ft.

## Rooflights

3 1/2

8 circular dome lights.

4 continuous curved lights.

Total area, 320 sq. ft.

## Glazing

1 7 1/2

Windows, 26 and 32 oz., 1/8 in. polished plate; 1/2-in. roughcast, polished plate and georgian wired, 1/8-in. polished plate and 1/2-in. toughened glass.

Doors, 1/2-in. georgian wired and 1/2-in. toughened glass.

Total of structural elements

26s 0 1/2 d

## PARTITIONING AND FITTINGS

## Internal partitions

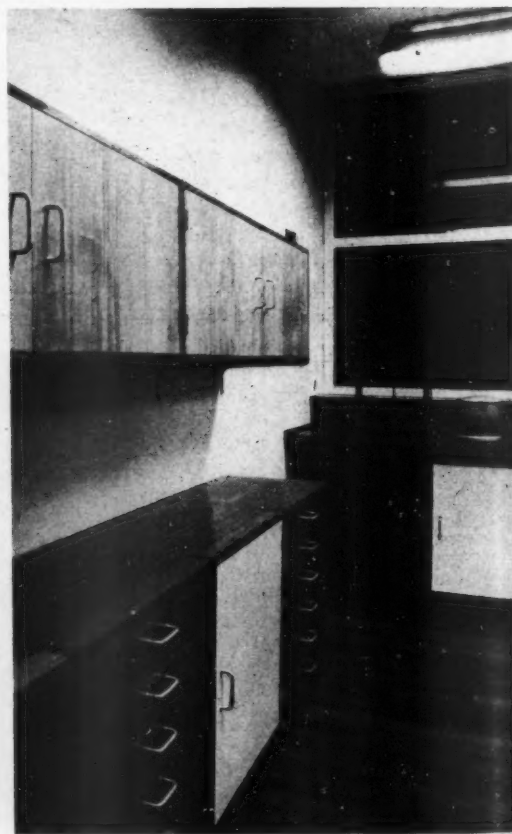
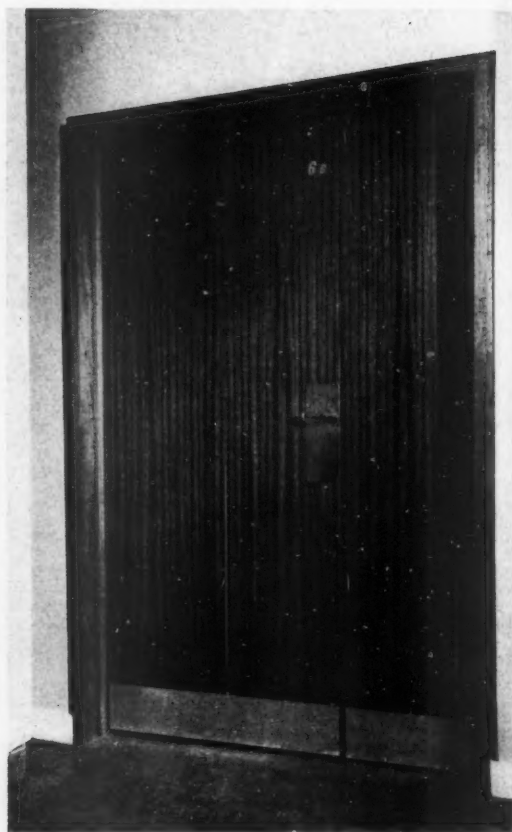
1 6

4-in. stud.

3-in. and 4-in. breeze.

4 1/2-in. brickwork

building illustrated



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## analysis

Each staircase landing is lobbied, in the way shown on opposite page, top left, to satisfy Fire Regulations governing means of escape. A pair of self-closing, half-glazed, sapele-veneered solid flush doors are set within a hardwood framed screen glazed in Georgian wired polished plate. The landing floor is of green terrazzo, as are the staircase treads and risers. The staircase enclosures are heated by curved metal radiant panels (painted in a variety of strong colours) concealing hot water pipes which run above the glazed screen.

The three other illustrations on the opposite page demonstrate the thought given to various details throughout the building; top right, a classroom door, with two leaves (sapele-veneered solid core flush doors), one 2 ft. 9 in. wide and the other 1 ft. 3 in. The narrower panel is invariably fixed, but should a greater width than 2 ft. 9 in. clear be required this panel can be unlocked to achieve a clear opening of 4 ft. No cover moulds or architraves have been used around the hardwood door frame; the plaster is stopped about  $\frac{1}{2}$  in. from the frame. A metal angle has been used to reinforce the plaster arris but trouble has arisen throughout the job where plaster has either shrunk away or spalled through excessive vibration. Bottom left, the lift control push panel, electric clock, and wall light have been grouped together between lift doors on each floor; they are set within and above two large mahogany-veneered chipboard panels. Cork tiles (sealed) have been used as a finish to the corridors but extremely heavy traffic and cleaning difficulties have made it necessary to sand off certain areas and resal after a comparatively short period of use. Bottom right, a series of free standing cabinets providing a variety of storage arrangements were designed by the architect mainly for use within the laboratories. They can be incorporated beneath bench tops running along the window wall of a room with the units located behind a deep edging strip which must, of course, be removed to allow units to be pushed beneath and is then replaced with cups and screws. Freedom in the choice of type and number of fittings is therefore possible.

## Screens

W.c. partitions of metal faced plywood.  
Patent sliding/folding screen in metal with plastic covering.  
Glazed smoke check screens to staircases, with mahogany framing.

## Internal doors

87 single doors, faced both sides with striped sapele (glazed panels in four of them), all flush faced with solid core.  
14 single, faced both sides with gaboon for painting (glazed panel in 1 of them), all flush faced with patent core.  
25 double doors, with second leaf half width.  
4 complete double doors.  
17 glazed smoke check double doors.  
All double doors are flush faced with striped sapele on both sides, and solid core.

## Ironmongery

Mortice latches, locks (and dead locks) with lever handles.  
Single and double action floor springs, pull handles, push plates, kicking plates, overhead door springs.  
All either satin chrome or anodised aluminium.  
Plastic lettering.

## Fittings

General joinery fittings comprise benches, shelving, draining boards and work top, hatch linings, tables and cupboards, matwell.  
N.B. Laboratory and classroom fittings not included.

## Total of partitions and fittings

4s 10½d

## FINISHINGS

## Floor finishes

Type of finish	Area in sq. ft.	Price per sq. yd.
2-in. reconstructed Hornton stone (including external area)	5,454	42s. 7d.
Cork tiles, 12-in. × 12-in. × $\frac{1}{8}$ in.	9,333	33s. 8d.
1½-in. terrazzo in stairs, landings, treads and risers	5,513	53s.
Quarry tiles, 6-in. × 6-in. × $\frac{3}{8}$ in.	7,389	31s. 6d.
Thermoplastic tiles, $\frac{3}{8}$ in. Nom. 1-in. gurgun timber strip	16,749	21s. 5d.
1½-in. granolithic paving	17,600	34s.
Lino tiles, 12-in. × 12-in. × 4.5 mm.	1,974	10s. 6d.
	6,795	32s.

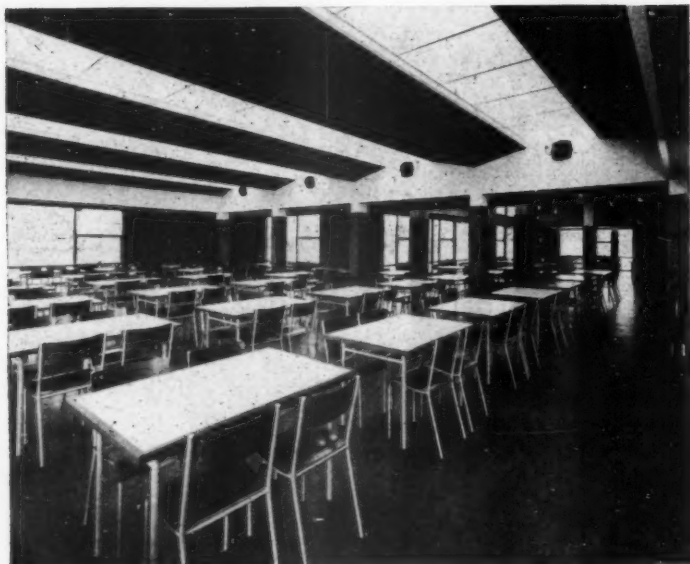
## Wall finishes

½-in. plaster with steel float finish; 6-in. × 6-in. × ½-in. glazed tiles to kitchen, lavatories and panel in entrance hall; ½-in. plasterboard and skim coat; ½-in. mahogany veneered chipboard in common-rooms, refectory and on columns in entrance hall and refectory foyer; 3-coat plaster on expanded metal lathing.

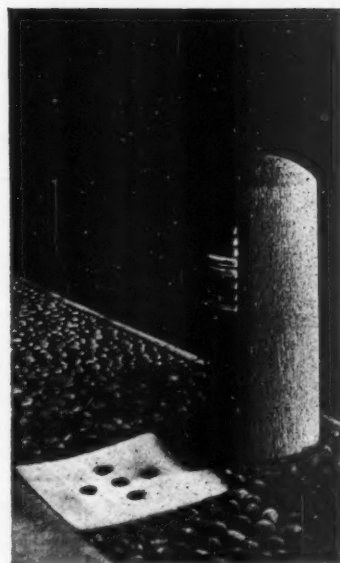
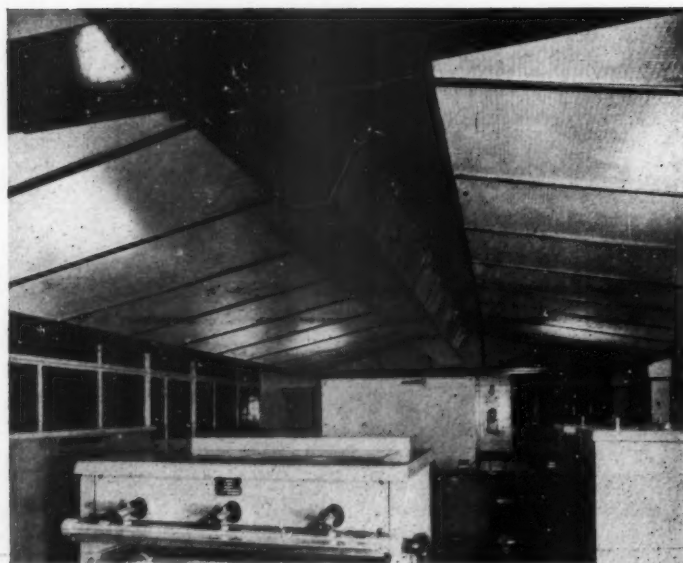
## Ceiling finishes

½-in. plaster with steel float finish.  
½-in. sprayed acoustic plaster.  
½-in. plywood.  
3-coat plaster on expanded metal lathing.

## building illustrated



The refectory, above, is entered from the first floor level and is served by lifts from the kitchen below. The room suffers from its position partly inside and partly outside the main building; columns occur in a disorderly fashion and the room changes its height so frequently that unity, as essential as intimacy in an eating place, is lost. The furniture has been designed to meet a specification laid down by the architect. The floor is finished with lino tiles, self coloured and sealed. A long low-pitched fully glazed hood, which covers the steamers, boilers and ovens, has been installed in the kitchen, below. A ventilating spine runs within the hood along its ridge. This design was proposed by the heating and ventilating consultants and developed by them in collaboration with the architects. The reconstructed stone lighting bollard, right, was developed by the architects to provide a simple and unobtrusive method of lighting the main path to the entrance hall. These bollards are set within a cobbled strip dividing the footpath from the car parking area alongside. The perforated concrete square in front of the bollard is a path drain and assists in reflecting the small pool of light provided by the louvred lighting source.



15' x 24'

12' x 12'

15' di  
3' op  
2 1/2' o  
4' ri  
4' co  
3' he  
1 1/4' o  
3' he  
open  
biolo  
2' go  
9' di  
com

elec

Plan



## analysis

## Roof finishes

Main building: 3 layers sanded bituminous felt, surface-coated with hot bitumen and finished with 1 in. sand-cement screed grooved in 2-ft. squares, V-jointed and filled with bitumen all on screed laid to falls.

Remaining flat roofs, 3 layers sanded bituminous felt with finish of white Derbyshire spa chippings.

## Decorations

Externally: metalwork, gloss paint; fairfaced concrete to south wall of 2-storey building and service lift motor room, chlorinated rubber enamel; woodwork, 3 coats linseed oil.

Internally: 2 coats plastic emulsion paint to walls and ceilings. Some walls in entrance hall, common-rooms and rooms of heads of departments have wallpaper with clear protective finish.

Woodwork, french polish and clear wax polish.

Total of finishes:

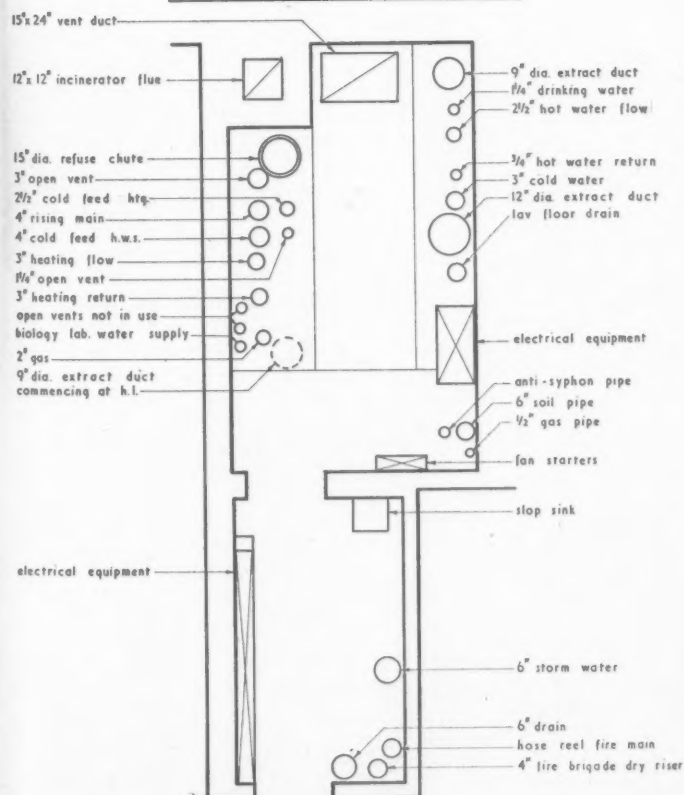
11s 11½d

## SERVICES

## External plumbing

Rainwater disposal from roof of main building at certain points direct to pipe in central horizontal duct, hence to main down pipe in vertical service duct. All rainwater pipes in cast iron.

Pressed metal flashings at eaves.



Plan of main vertical duct (Scale: ¼" = 1' 0")

s d

11

## Hot and cold water installation

Cold water from 2 pressed steel sectional tanks on the roof of the main building, each with capacity of 6,400 gallons.

Drinking water is supplied to a fountain in each lavatory and to various points in the kitchen.

An auxiliary 150-gallon tank on the fifth floor stores for water for the biology laboratory.

Hydraulic hose reels are fitted at each floor throughout the building and as pressure from the external water main is not always sufficient to reach the upper floors, a fire booster pump is provided which switches on automatically when any hose reel is brought into use. Domestic hot water is supplied from 2 500-gallon copper calorifiers throughout the building, with provision for extension to future buildings on the site.

1 9½

## Sanitary fittings

Type of fitting	No. of each type
Lavatory basins	50
Drinking fountains	10
W.c.s	34
Urinals	15
Sinks	21

s d

2 1½

1 2½

## Heating and ventilation

14 7½

The boiler house contains 2 welded steel sectional oil-fired boilers each rated at 2.196 million B.th.u./hr. and has space for two more similar boilers when building is completed.

Oil is stored in 2 mild steel rectangular tanks with a combined capacity of 12,500 galls. (about 3 weeks' supply at maximum load conditions).

Space heating installation of forced air convactor units in cupboards in classrooms. Radiators or panels are used on stairs, and in corridors and small staff rooms. The main entrance hall has an embedded floor heating system. Low pressure hot water is circulated throughout by an electrically driven accelerator.

The lecture theatre on the roof is provided with an independent plenum and extract ventilation system. Chemistry laboratories, kitchen, refectory and fume cupboards are all provided with their own independent ventilating systems.

A small air compressor/exhauster is provided for the aerodynamics laboratory and a separate compressor serves the advanced chemistry laboratory.

## Gas installation

1 1

Gas distribution mains run throughout the building from a point near the boiler house to the various laboratories and the main kitchen.

## Electrical installation

8 8½

A sub-station in the ground floor of the building feeds the main switchboard in the intake room: from there a rising main to the top floor and distribution gear at each floor.

The lighting installation consists of a mixture of tungsten and fluorescent lighting points to suit requirements of various departments. Normal teaching rooms have tungsten lighting to a level of 12 lumens per sq. ft.; laboratories have fluorescent lighting to a level of 14-16 lumens per sq. ft. and drawing offices, 17-20 lumens per sq. ft. Socket outlets in classrooms provide for occasional

## analysis

use of power; in laboratories power is supplied according to the requirements of each, and in some there is extensive experimental low-voltage installation. Cable work to these is of a size calculated to reduce voltage drop to an absolute minimum.

Cabinet type heaters have been wired so that they can be used for air circulation in hot weather. All installations have been designed for extension when the College is completed.

Type of point	No. of each type
Light points (including emergency lighting)	1,082
Class change bells	46
13-amp sockets and plugs	385
Heater units and thermostats	60

**Lifts**

2 passenger lifts carrying 20 people.  
2 service lifts linking kitchen to refectory.

Total of services: 33s 6½d

**Drainage (within curtilage of building)**

Separate surface water and soil drainage.  
Stoneware drains.

**Siteworks**

Concrete paving slabs, tarmacadam, cobbled area, bollards, hexagonal flower-pots, grassing, external drainage.

Shillings per sq. ft.:

£282,509 13s 1d (excluding external works) = 82s 8½d  
63,096 sq. ft. (measured inside external walls)

**COST COMMENTS**

It is interesting to compare the cost of the element groups of this 8-storey teaching block with those of previously analysed colleges, especially with the six-storey block at Slough.

	Oswestry (AJ, June 12, 1958)	Dartford (AJ, April 28, 1955)	Slough (AJ, May 8, 1958)	Bedford
Percentage of total cost				
Element group				
Prelims, ins. and contrns.	5	4	7	5
Work below ground	12	8	2	2
Structure	31	37	44	32
Partitions and fittings	10	18	11	6
Finishes	17	10	13	14
Services	25	23	23	41
Floor area (sq. ft.)	20,474	72,640	27,815	63,096
Tender dates	October, 1954	October, 1951	October, 1955	June, 1954
No. of storeys	2	4	6	8

s d A pattern of broad distribution of costs in these teaching blocks begins to take shape. Where the percentage for an element group falls outside the expected pattern this is printed in bold type and a possible explanation is given below.

**Structure:** The proportion of costs taken by the structural elements at Bedford does not continue the upward trend with increased storey height shown by the others. This is due to the fact that the first three schemes analysed were built around a steel frame, whereas Bedford has a concrete frame; a fact which may also partially explain the length of contract period (October 1, 1954 - July 5, 1958).

Slough's structural cost included curtain walling in the analysis, at a unit cost of 36s 2d per sq. ft. (without glazing).

**Partitions and fittings:** Unlike Slough, Bedford's analysis does not include any laboratory fittings. Dartford's 18 per cent of total cost included demountable partitions.

**Finishes:** Dartford had self-finished partitions which needed no further decoration; hence a low percentage. Oswestry's floor finishes were predominantly wood block or terrazzo.

5 6½ **Services:** The percentage cost of this element group at Bedford has travelled almost off the graph. The cost has not gone on vertical circulation—the combined costs of staircases and lifts amounts to just over 9 per cent, compared with almost 10 per cent at Slough. Most of the extra cost has gone in the heating and ventilation element (14s 7½d per sq. ft. of floor area), with forced air convectors units to classrooms and independent ventilation systems to laboratories, kitchens, refectory and fume cupboards. In addition, all the service installations have been designed for future extension.

4½ One cannot but wonder whether 41 per cent of the total cost spent on the services is a disproportionate amount of the whole, and whether this also meant that other elements had to be skimmed in some way.

1 2 When further Colleges are analysed it will be interesting to see whether they continue this cost pattern.

**CONTRACTORS**

**General contractors:** H. M. Hill & Sons (Amphill) Ltd. **Sub-contractors:** **Electrical work:** Troughton & Young Ltd. **Heating and ventilation:** William Freer Ltd. **Metal windows:** Crittall Manufacturing Co. Ltd. **Internal drainage:** J. S. Wright. **Linoleum and thermoplastic flooring:** Semtex Ltd. **Hardwood strip flooring:** Hollis Bros. Ltd. **Cork tile flooring:** Horseley Smith & Co. Ltd. **Terrazzo paving:** Art Pavements and Decorations Ltd. **Internal and external wall tiling and quarry tile flooring:** Harradine Rouse & Co. Ltd. **Exposed aggregate slabbing:** Empire Stone Co. Ltd. **Patent felt roofing:** Permanite Ltd. **Lifts:** Express Lift Co. Ltd. **Horizontal ducting:** Campbell Denis Ltd. **Shop fittings:** Eustace and Partners. **Tarmacadam:** R. E. Crawley Ltd. **Ironmongery suppliers:** James Gibbons Ltd. **W.c. partitions:** William Mallinson & Sons Ltd. **Travelling cradle:** Palmer's Travelling Cradle and Scaffold Co. Ltd. **Flush doors:** F. Hills. **Paint:** Permaglaze. **Light fittings:** Troughton & Young, Forrest Modern, GEC, Merchant Adventurers, Falks, Frederick Thomas. **Wallpaper:** Sandersons. **Slate:** Bow Slate and Enamel Co. Ltd.

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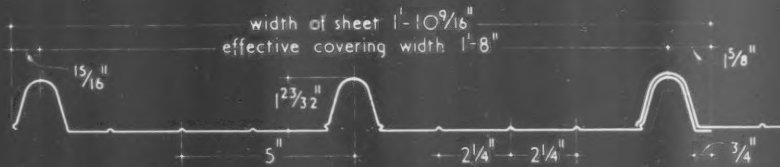




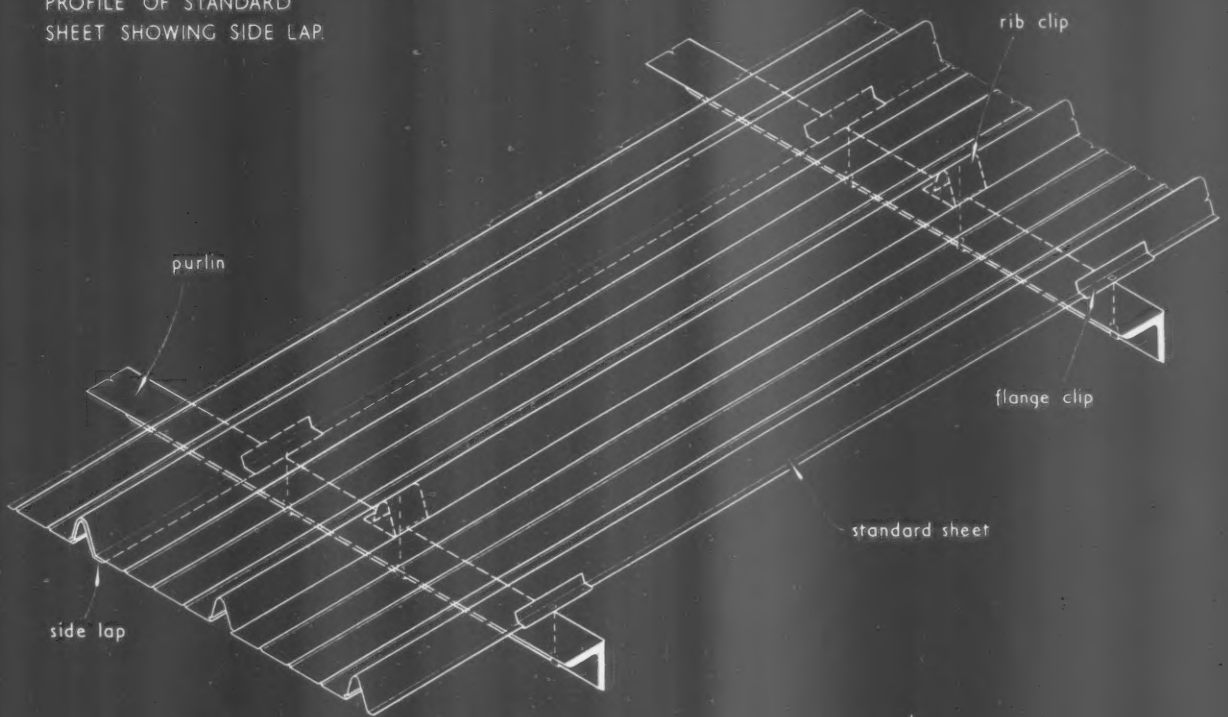
# ROOF SHEETS | ALUMINIUM | GENERAL DATA

16.B2  
16.B2

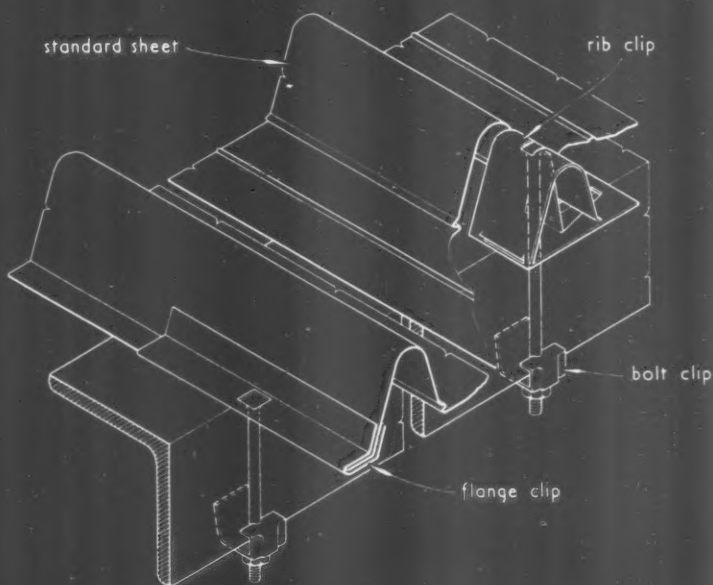
The Architects' Journal Library of Information Sheets 706. Editor: Cotterell Butler, A.R.I.B.A.



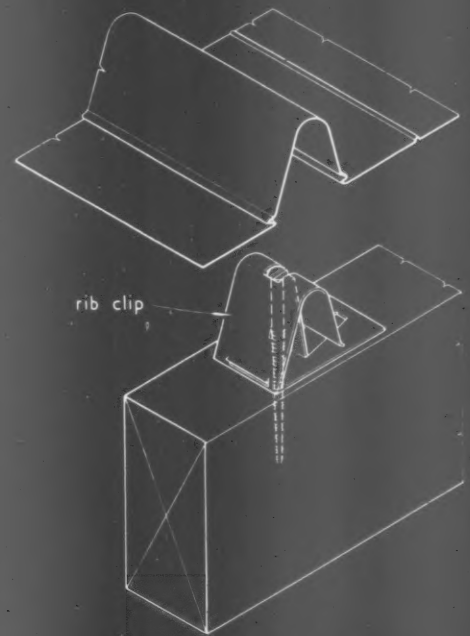
PROFILE OF STANDARD SHEET SHOWING SIDE LAP.



ISOMETRIC SKETCH OF SHEETS IN POSITION.



FIXING TO STEEL PURLIN.



FIXING TO TIMBER PURLIN.

## 16.B2 · NORAL SNAPRIB · ALUMINIUM-ALLOY SHEETING 1: GENERAL DATA

**This Sheet** describes the Snaprib roofing system. The drawings on the face show the profile of the aluminium-alloy sheets and the method of fixing. Details of treatment at ridge, eaves and other parts of the roof, as well as its application for vertical cladding, are given on Sheet 16.B3.

**Material and Construction**

The sheets are in 22 s.w.g. aluminium-alloy NS3 to B.S.1470:1955 (Noral 3S alloy) in hard temper. The profile of the sheet is as shown in the drawing, the side corrugation of each snapping over that of the adjacent sheet. The under corrugation in each case is positively fixed to the structural supports by means of the flange clip and the intermediate corrugation of each sheet, by the shaped rib clip which snaps into it. Full-width and half-width overlap sheets are available but seldom required as the sheets are obtainable in lengths to extend from ridge to eaves in most buildings (see *Sizes*): this effects a great saving in labour when fixing.

**Sizes**

The sheets are 1 ft. 10  $\frac{3}{16}$  in. wide with a covering width of 1 ft. 8 in. They are available in lengths up to 30 ft. 0 in. (or over to order) except in the Pyluminised finish, which are only available up to 15 ft. 0 in., and the Alocromed finish, which is not available over 30 ft. 0 in.

**Weight**

The standard full-width sheet weighs 1 lb. per foot run.

**Strength**

The maximum design loadings for various purlin spacings for sheets fixed by the recommended methods are as follows:

Crs. of purlins (ft. and in.)	Design loading (lb./sq. ft.)
3 6	25·0
4 0	22·0
4 6	19·0
5 0	16·0
5 6	14·0
6 0	12·0

The figures are based on a factor of about 2½ on the failing loads established in testing under conditions of reverse loading. Tests for deadloading show that the sheets will withstand loads over 80 lb./sq. ft. for purlins at 5 ft. 0 in. centres.

**Fixing**

The drawings on the lower face of the Sheet show the method of fixing the rib and flange clips to steel and timber purlins. The sheeting flange should be pierced as shown in the left-hand detail. In tropical climates and for temporary work, a special flange clip is available and the sheet flange should not be pierced. The recommended maximum purlin spacing is 5 ft. 0 in. for roofs and 6 ft. 0 in. for vertical construction. Sheets are normally laid from left to right, the rib clips being inserted

before laying for convenience. Where it is necessary to cut the last sheet at the end of a roof an allowance for an upstand of at least 2 in. should be made. Fixing accessories should be of aluminium wherever possible; the manufacturer can supply accessories designed for fixing to all types of purlin or specially made to individual requirements. No. 12 galvanised steel woodscrews should be used for fixing to timber purlins, 1 in. long for flange clips and 3 in. for rib clips.

**Insulation:** All aluminium sheets possess a high degree of natural reflectivity and, therefore, low thermal radiation. However, it is usually desirable to introduce a measure of insulation to maintain an even more equable temperature within the roofed structure and the conventional methods of insulation can be used. Where it is desired to incorporate insulating board in the roofing this can easily be done by either the under-purlin or over-purlin method. The former requires no special technique but the following points should be noted. With metal angle purlins, the normal strap hangers must be long enough to clear the ends of the bolts which project below the lower flange of the angle. For I, T and channel purlins, special fixings for the rib clips are available which have no projections below the base of the purlin. With timber purlins the insulating board can be fixed in the normal manner, there being no projections below the purlin base.

For over-purlin insulation, the insulating material may be fixed direct to the purlins, at the same time as the roof sheeting, by using slightly longer bolts than required for sheeting alone. Details of a method of insulating a roof that is already erected, are obtainable from the manufacturer.

Under normal conditions no special precautions against corrosion need be taken where aluminium comes in contact with standard insulating materials. However, where the insulation may be composed of alkafine materials, e.g. soft glass wool, asbestos board, fibreboard, unprotected strawboard or woodwool slabs, it is advisable to provide a layer of building paper or felt.

**Finish**

The sheets are supplied in a textured stucco finish as standard but plain-surfaced sheets are available to order. Both stucco and plain can be obtained, Pyluminised (matt medium grey) or Alocromed (pale green); colour matching, however, cannot be guaranteed. Both chemical finishes are suitable for normal conditions of exposure, but provide an excellent key for painting if required.

**Further Information**

Details of all special fittings and flashings are obtainable from the manufacturer who will also supply a list of accredited fixing contractors.

*Compiled from information supplied by:*

**Northern Aluminium Company Limited**

Head Office: Bush House, Aldwych, London, W.C.2.

Telephone: Temple Bar 8430

**Sales Development**

Division: Banbury, Oxfordshire

Telephone: Banbury 2242.

## GENERAL PRACTICE COST ANALYSIS

I.C2

The Architects' Journal Library of Information Sheets 707. Editor: Cotterell Butler, A.R.I.B.A.

## COST ANALYSIS, PLANNING AND CONTROL : 2

**This Sheet** is the second of a series on cost analysis. Sheet 1.C1 outlined the purpose and method and this Sheet describes in more detail the preparation of cost analyses and their uses. Sheets 1.C3 and 1.C4 give definitions of the list of elements shown on Sheet 1.C1.

**Preparation of Analyses**

The analysis is prepared from a fully-priced bill of quantities, working drawings and the specification. Alternatively, the bill may be written up in element order when it is prepared. Where the building consists of blocks of differing function, e.g. factory with offices attached, it is preferable to analyse each block separately.

**Description of element:** This is an indication of quality and should give the type of construction, materials used and items included in the element cost, e.g.

**Staircase** Cast in-situ r.c. with granolithic finish on all faces. Balustrade:  $\frac{1}{2}$ -in. m.s. bars 3 ft. high at 5-in. crs.; 2 in. by  $1\frac{1}{2}$  in. hardwood handrail.

**Cost of element:** The costs are obtained by assembling all the bill prices under their appropriate element headings on a collection sheet. Guidance in ascribing items is given by the definitions which appear on Sheets 1.C3 and 1.C4. When the collection of prices is complete, each element should be totalled and divided by the floor area, e.g.

**Staircases** 0s. 5½d. per sq. ft. of floor area.  
The total of all the element costs should equal the fraction

$$\frac{\text{£ total cost of contract}}{\text{total floor area}}$$

Where items in several elements are covered by a single price which cannot be sub-divided e.g. r.c. frame, walls and floors, it should be made clear in the descriptions what is included in, or excluded from, the element costs.

**Quantity factor:** This is a figure, appropriate to most elements, to indicate the quantity of the element, e.g.

Partitions, 4 in. : 908 yd. super  
Internal doors, single : 48  
Electric lighting points : 14

The analysis may also show a cost per unit of element obtained thus:

$$\frac{\text{cost of element}}{\text{area (or no. of items) of element}}$$

Alternatively, quantity factors for elements such as external walls may be expressed as a ratio to give some indication of planning economy, e.g.

$$\frac{\text{external walls}}{\text{floor area}} = 0.560$$

**Circumstances of contract:** A cost analysis is only complete when it gives, besides the information

described above, notes on market conditions and other factors affecting price, e.g.

Type of contract (whether based on tender or negotiated)

Use of special plant, e.g. tower crane

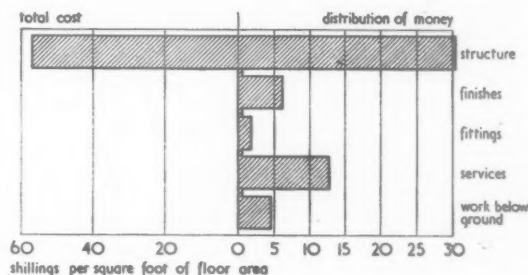
Whether labour was imported

Unusual methods of construction

Special factors affecting builders' pricing

Whether work was phased.

**The sq. ft. unit:** As stated on Sheet 1.C1, costs are expressed per sq. ft. of floor area to relate them to the accommodation provided and to enable comparisons with other buildings to be made. The alternative of showing costs as percentages of the total can be misleading because two elements of the same cost in buildings of different total cost would appear as different percentages. For quick "reading" of the cost pattern of a building, analyses can be shown graphically as follows: the diagram shows an average distribution for office blocks.

**When to Analyse**

Ideally, analyses should be prepared after settlement of the final account. Published analyses are usually based on tender because of long delays in final account settlement.

**Application of Cost Analyses**

Perhaps the most important use of analyses is the cost sense they engender in those who make regular use of them, which forms a background to the specific uses of analyses, described on Sheet 1.C1, namely

1. Tracing the causes of exceptionally high or low tenders
2. Relating expenditure to function and quality
3. Comparing the costs of different methods of construction.

All these uses involve *comparison* which may require certain checks and adjustments.

**Pricing method:** Different builders price bills in different ways. If, for example, the figure for Preliminaries in one analysis is very much higher than that of another comparable analysis, it may be necessary to apportion the Preliminaries' cost among the other elements.

## 1.C2 COST ANALYSIS, PLANNING AND CONTROL : 2

**Grouping:** If in two analyses, different elements perform the same function, comparison of costs is made by adding a number of elements together, e.g.

	s.	d.	s.	d.
frame	2	6	—	—
external walls	5	0	5	6
windows	3	0	2	9
external doors	1	0	0	10
internal structural walls	—	—	2	0
	11	6	11	1

**Quantity:** Comparison of different methods of construction will require adjustment for difference of quantity, by conversion of the element cost to a cost per unit of element, e.g.

*Electrical Services*

2s. 9d. per sq. ft. of floor area  $\times$  7,000 sq. ft. floor area

71 electrical points

= £13 12s. per point.

**Quality:** Comparisons of costs are meaningless without a parallel comparison of quality. For example, with Electrical Services, comparison of costs per sq. ft. floor area or of cost per point, must take into account the illumination levels provided, the amount of control gear, the quality of material, etc.

The architect or quantity surveyor, wishing to gain knowledge of the costs of a particular type of building, might put two or more examples side by side, as shown below (for brevity, the Services groups only are given):

Services	A.		B.		C.	
	s.	d.	s.	d.	s.	d.
Sanitary Fittings	1	1	1	2	—	10
Waste, Soil and Overflow	—	—	—	—	—	—
Pipes	1	8	1	0	1	0
Cold Water	1	0	1	1	2	0
Hot Water	1	0	—	11	2	6
Heating	6	4	8	3	7	11
Ventilation	—	5	—	—	—	—
Gas	—	1	—	1	—	2
Electrical Services	4	10	3	6	1	6
Total	16	5	16	0	15	11

Total cost of building 65 11 65 1 65 4

The comparison might prompt such questions as—

1. Since the total of element cost per sq. ft. of floor area is much the same, what factors of design, clients' requirements or contract circumstances have caused the distributions of cost to differ so remarkably?

2. Why do Sanitary Fittings in A cost 30 per cent. more than in C?

3. If Electrical Services in B and C cost 1s. 6d. and 3s. 6d., respectively, is 4s. 10d. for A disproportionate to the importance of this element?

In investigating more closely to find answers to questions like these, it is important to assess differences of quality and quantity and to be fully informed on the technical, functional and aesthetic characteristics of the buildings as a whole.

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







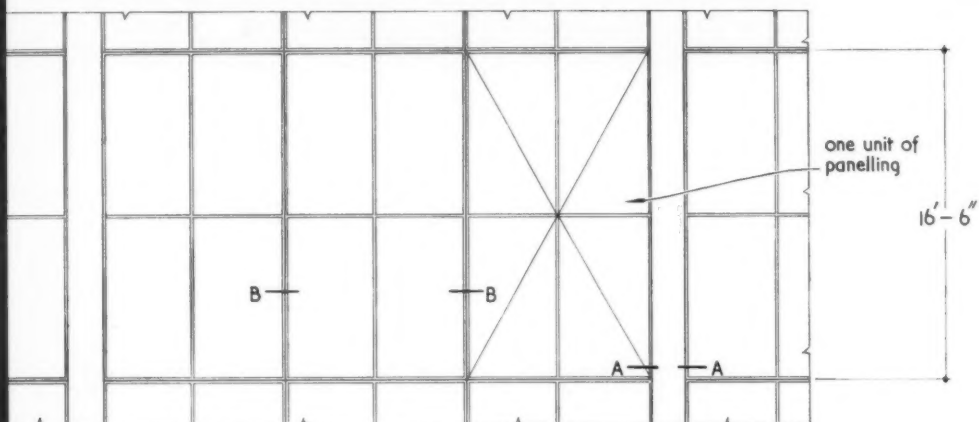
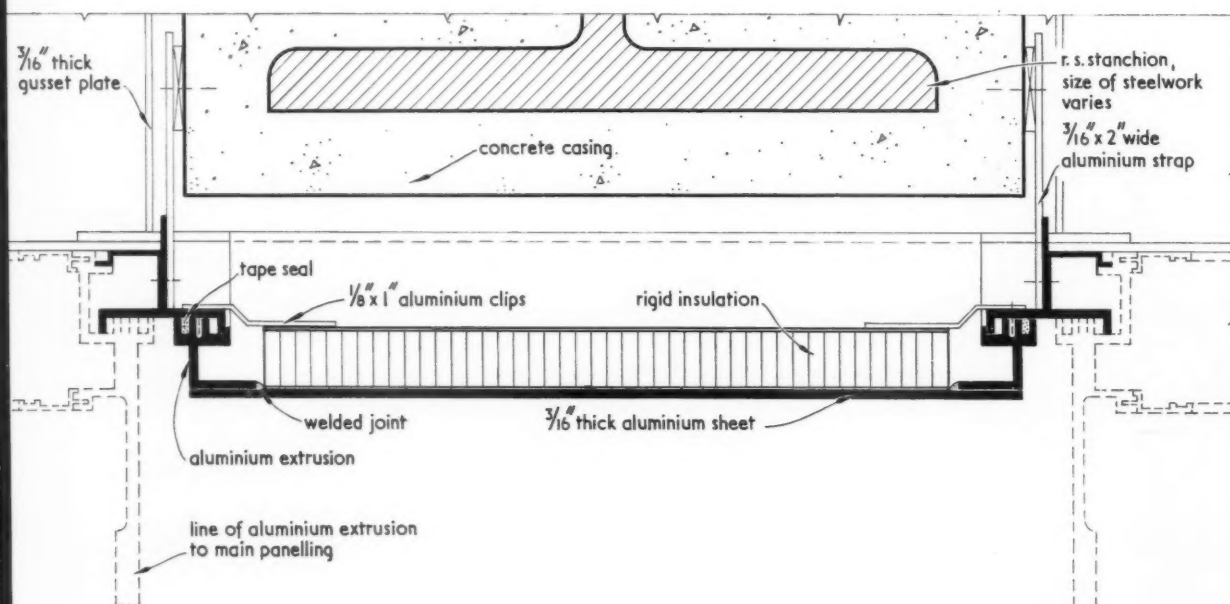
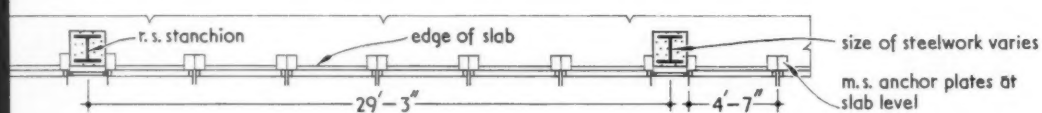
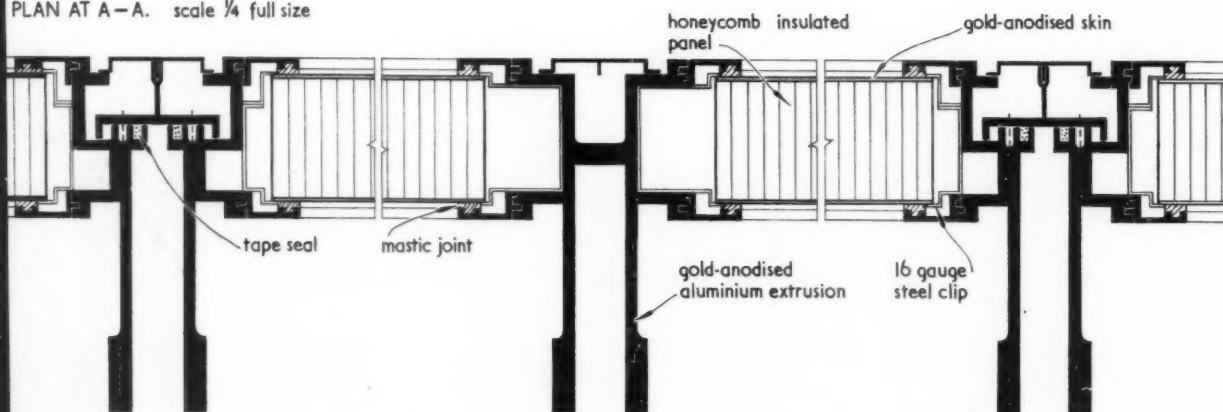
CURTAIN WALL: DEPARTMENT STORE IN DENVER, COLORADO

*I. M. Pei, architect (material supplied by Felix Moore)*

*This "windowless" aluminium curtain wall is built of panels 16 ft. 6 in. high by 9 ft. 0 in. wide. The panel stiffeners which are of the "bulked form" characteristic of aluminium, project on the outside of the wall, as the panels are designed to present a fairface surface internally. All visible surfaces of the aluminium, both inside and out, are gold-anodised.*

## CURTAIN WALL: DEPARTMENT STORE IN DENVER, COLORADO

I. M. Pei, architect (material supplied by Felix Moore)

ELEVATION. scale  $\frac{1}{8}'' = 1' - 0''$ PLAN AT A-A. scale  $\frac{1}{4}$  full sizePLAN AT B-B. scale  $\frac{1}{4}$  full size

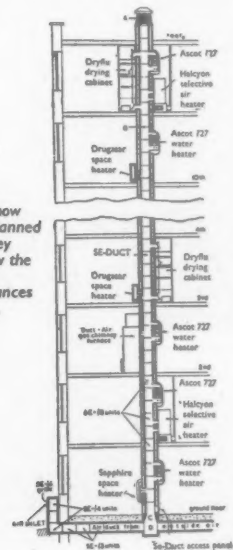


## Ascot and the Se-Duct make history

Ascot and the new Se-Duct system of vertical duct flueing made architectural history on October 27th, 1958, when a block of 160 new flats was officially opened at Anne Street, Gateshead.

Built for the Gateshead Corporation, the flats are the first multi-storey dwellings to be constructed with the Se-Duct replacing traditional flues for high efficiency room-sealed gas appliances such as the Ascot 727 water heater. As a result, improved layout and considerable savings in capital installation costs have been achieved.

Thanks to the Se-Duct system, full heat services from high efficiency gas appliances are available at the Anne Street flats at a low running cost comparable with that of a solid fuel system. These comprise 160 Ascot 727 'multipoints' and 30 Ascot 503/2 sink water heaters, as well as gas fired drying cabinets, cookers, radiant/convector fires and washboilers



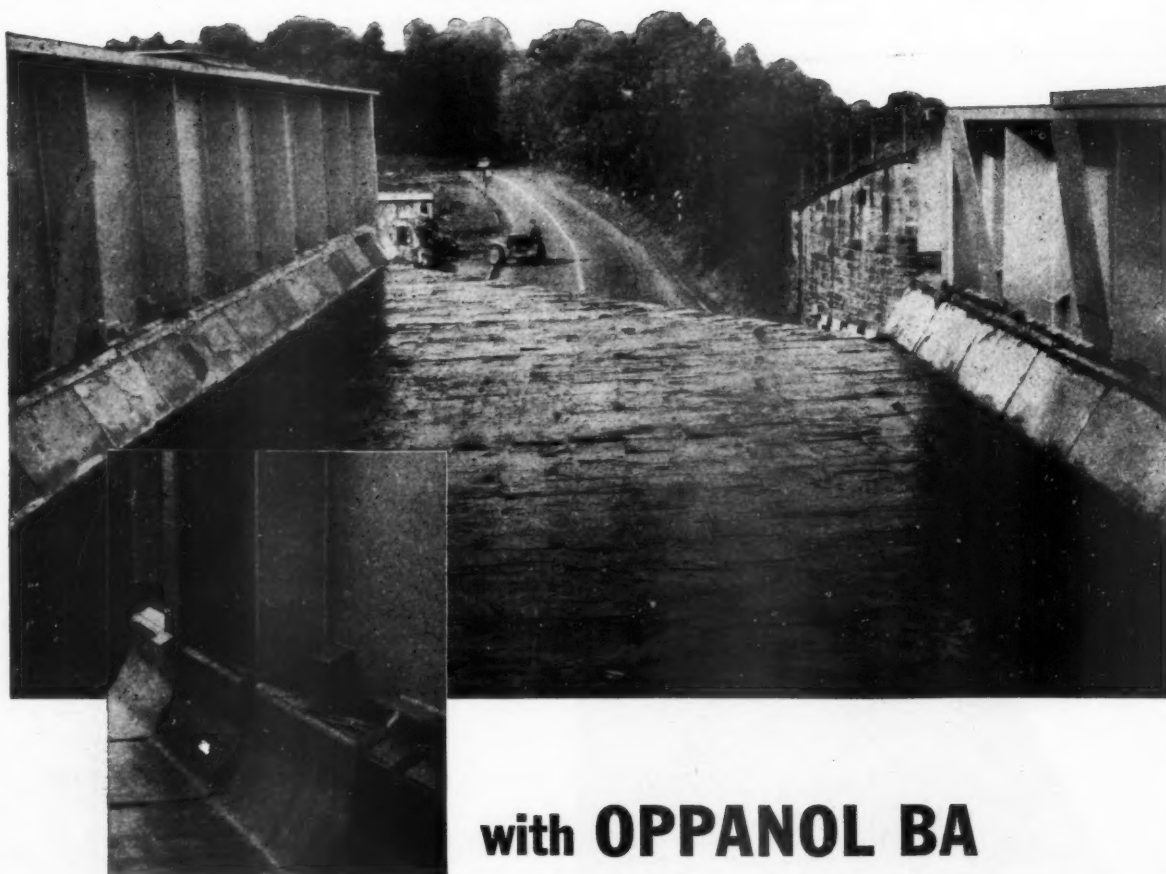
Borough Engineer & Surveyor  
& Town Planning Officer  
G. F. WINTERS, A.M.I.C.E.



A350

ASCOT GAS WATER HEATERS LIMITED, 255 NORTH CIRCULAR ROAD, NEASDEN, N.W.10

## bridging the years



with **OPPANOL BA**

## the waterproof plastic membrane

Photograph shows  
the deck before completion,  
with the bridge superstructure  
still to be rolled  
into its final position.  
(Courtesy of British Railways,  
Scottish Region)

Once laid it's laid for life.

The most durable of all waterproofing materials, Oppanol BA is now protecting the steel plate flooring on a new bridge carrying the railway over the Glasgow/Greenock Trunk Road at Langbank, Renfrewshire . . . flooring which is then covered with concrete slabs and ballast and hidden from inspection. Easily laid, Oppanol BA has the essential strength and flexibility to withstand continued vibration in a structure of this kind. It does not swell, rot or age, and its use completely eliminates the need for periodic maintenance work. Ideally suitable for proofing bridges, and for all roofs, floors, foundations, tanks and tunnels, Oppanol BA ensures lifelong protection wherever waterproofing is a problem.  
*Please write for literature and samples.*

**F. A. HUGHES & CO. LTD** 4 STANHOPE GATE LONDON W1 HYDE PARK 6090

PROGRESSIVE DESIGN FOR RAILWAY STATION AT BARROW-IN-FURNESS



The new London Midland Region Station at Barrow-in-Furness, above, has been built to replace the old station damaged in the war. A straightforward and well-detailed building, it nevertheless lacks that élan which makes so many Victorian railway buildings more expressive of the nature of railways. The building was designed by W. R. Headley, of the architectural section of the civil engineers' department; A. N. Butland, chief civil engineer. The contractors were Ed. Wood & Sons Ltd. of Derby.

## WHEN YOU FIND WOODWORM

### Specify RENTOKIL

#### TO KILL WOODWORM AND PROTECT AGAINST FUTURE ATTACK

The one-coat application of RENTOKIL at the unparalleled rate of 200 sq. ft. per gal. is a practical and proved treatment against woodworm bringing much reduced costs in time and material. Pressure injection of flight holes every few inches should also be carried out if immediate deep penetration is desired. This technique is the result of over 30 years of experience in wood preservation and development of RENTOKIL. A Treatment Service is available under a 20 YEAR GUARANTEE.

### For DRY ROT specify Rentokil DRY ROT FLUID

The only timber preservative specifically formulated to stop and prevent DRY ROT. Highly sterilising with good coverage and deep penetration, DRY ROT FLUID should be applied to all replacement timber and surrounding areas at a rate of 350/400 sq. ft. per gallon.



RENTOKIL

GOES FURTHER

Kills  
Woodworm

LASTS LONGER

For free advice and identification of specimens, write, 'phone or call

Dept. RK56

**WOODWORM & DRY ROT CENTRE**

23 Bedford Sq., London, W.C.1. Phone LANgham 5455  
or see telephone directory for local centres

## Announcements

### PROFESSIONAL

Would any manufacturers of fusible links for steel windows opening outward forward to Hartwig Stern, DIP.ARCH. (RAND), M.I.A., 714-5, Alris Building Corner Rissik and Albert Streets, Johannesburg, South Africa, illustrations and quotations of their products. The links are required for steel windows in lantern lights of concrete barrel vault roofs for factories.

Du Bosky and Kinsler, Chartered Quantity Surveyors, are transferring their practice to 28, Berkeley Square, W.1 (telephone Hyde 5771/2) on February 2 and will be pleased to receive trade literature.

Richard Nickson, M.A.CANTAB., F.R.I.B.A., F.R.S.A., A.A.D.P., has reopened a branch office in the Liverpool area, in conjunction with T. C. Ribchester. The present accommodation address is 10, Sunnyside, Ormskirk, Lancashire (telephone Ormskirk 2698).

### TRADE

The National Tile Fireplace Makers' Association, which until now has been concerned only with the manufacture of ceramic tile fireplace surrounds, is to expand its activities to cover those made of brick, stone, marble and other materials.

Ronuk, Limited, have opened a new Contract Department Depot and Offices at 31, White Road, Sutton Coldfield, Warwickshire (telephone Sutton Coldfield 6810).

The Board of Rawlings Bros., Limited, 85, Gloucester Road, S.W.7, have appointed W. L. Makin as a full member of the Board.

The North British Rubber Company, Ltd., have elected R. D. Hunt a Director and appointed him Deputy Managing Director assuming responsibility for sales and marketing.

G. A. Harvey & Co. (London), Ltd., have made the following appointments: K. Tardif, Home Sales Manager; H. Barker, Export Sales Manager; and H. F. Jones, London Area Manager.

Scaffolding (Great Britain), Limited, have opened another three depots, these are at Gosbeck Road Colchester (telephone Colchester 77142); Ware Street, Bearsted, Maidstone (telephone Maidstone 87833); and Bessemer Road, Norwich (telephone Norwich 27871). Scaffolding (Great Britain), Limited, have also appointed N. Barton as manager of their Preston depot at Victoria Street, Preston (telephone Preston 57204), and D. S. Cooper as manager of the company's Edinburgh depot at West Savile Terrace, Newington, Edinburgh (telephone Edinburgh 43191).

L. O'Connor, C.B.E., Deputy Chairman and Director of the British Coking Industry Association, has succeeded R. H. E. Thomas, O.B.E., as Chairman of the Solid Smokeless Fuels Federation.

Permanite, Limited, will be pleased to send copies of their Metal Lined Damp Course and Asphalt Roofing Folders to anyone who might be interested.

Sir Harold Wernher, B.T., G.C.V.O., T.D., Chairman of Electrolux, Ltd., has been awarded The Grand Cross of The Northern Star by The King of Sweden, for his services in fostering Anglo-Swedish relations.

The business carried on by Caxton Floors, Limited, of 45, Bedford Row, W.C.1, is now known as Caxton Reinforced Concrete, Limited.

The Worcester Branch Office of British Insulated Callender's Cables, Limited, has been allocated another telephone number—Worcester 6074. This is in addition to their present one which is Worcester 2070. The address of their Norwich office is now 56, Pitt Street, Norwich (telephone Norwich 21526); and Cardiff, Station Terrace, Queen Street, Cardiff (telephone Cardiff 24716).

Leaderflush (Doors) Ltd., have opened a London office at Bush House, Aldwych, W.C.2 (telephone Covent Garden 2243).

Burtain Ltd. have now moved their offices and stores to 4, Thames Street, Walton-on-Thames, Surrey (telephone Walton-on-Thames 4579).

Percy Bilton Ltd., Park Street, London, W.1, have appointed three new directors: J. R. Mighell, civil engineering director; R. J. Woolcott, building director and T. A. Whale, housing director.

British Plumber Limited have increased the prices of standard Plumber 45 by 1d. per square foot to 1s. 5d. and 1s. 1d. for the ½ in. and ¾ in. thicknesses, with corresponding increases for Wood Veneered Plumber.

The Leathercloth Division of Imperial Chemical Industries Ltd. has been dissolved and is now ICI (Hyde) Ltd., of which ICI is sole director and manager.

### BROUGHTON MOOR LIGHT SEA GREEN & OLIVE GREEN SLATE

Is eminently suitable for interior or exterior use where great durability and unique appearance are of paramount importance. Architects may specify its use for Facings, Foundation Stones, Paving and Flooring, Steps, Cills, Shop Fronts, Surrounds, Pilasters, Fireplaces, etc. Ask for these

Technical Pamphlets:—

1. Floorings.
2. Facings.
3. Coping.
4. Cills.
5. Riven Face Slabs.

## Essentially the Architect's slate

Here is the perfect medium for the practical expression of every Architect's dream of the ideal roof. Rock-hard and of picturesquely rugged texture Broughton Moor Slates will remain sound for centuries, needing no periodical maintenance. They are a delight to the eye and enhance the appearance of even the plainest edifice. Prices and samples gladly supplied.

### SPECIFICATION

The roof to be covered with Broughton Moor Light Sea Green best quality (coarse grained) Westmorland Slates, to be obtained from The Broughton Moor Green Slate Quarries Ltd., Coniston, The Lake District, Lancs., in random sizes about 18in. to 9in. long, proportionate and random widths, laid to a 3in. lap in regularly diminishing courses, from eaves to ridge. Each slate to be securely fixed by two stout copper nails and wide slates are to be used on the hips and verges. *Alternatives:* Seconds, Thirds, Special Peggies; Olive Green and Mixed Shades. Larger sizes also available. *Ridging:* "Bromoor" purpose made of crushed and moulded slate from the same veins is recommended.

**The BROUGHTON MOOR GREEN SLATE QUARRIES LTD.**  
Telephone: Coniston 225/6 CONISTON - Lancs. Telegrams: Cann. Coniston



# one coat less with- **SEALCOAT**



**THE  
READY-FOR-PAINTING  
HARDBOARD**



**CELOTEX HAVE DONE IT AGAIN**—with SEALCOAT, the amazing new hardboard that cuts decorating costs because no sealing or priming coat is needed. SEALCOAT Hardboard is “process sealed”, to make it ready for painting *immediately*; and is a hardboard on which most standard paints and distempers can give a perfect finish *with only one coat*!

SEALCOAT is a Celotex Hardboard. So naturally it's easy to tool and fix, naturally its surface is smooth and hard. Naturally it stays flat and keeps its shape when in position.

Available in a variety of sizes and thicknesses. If you would like further details, the Celotex Technical Advisory Service is at your disposal without obligation. Phone Elgar 5717.

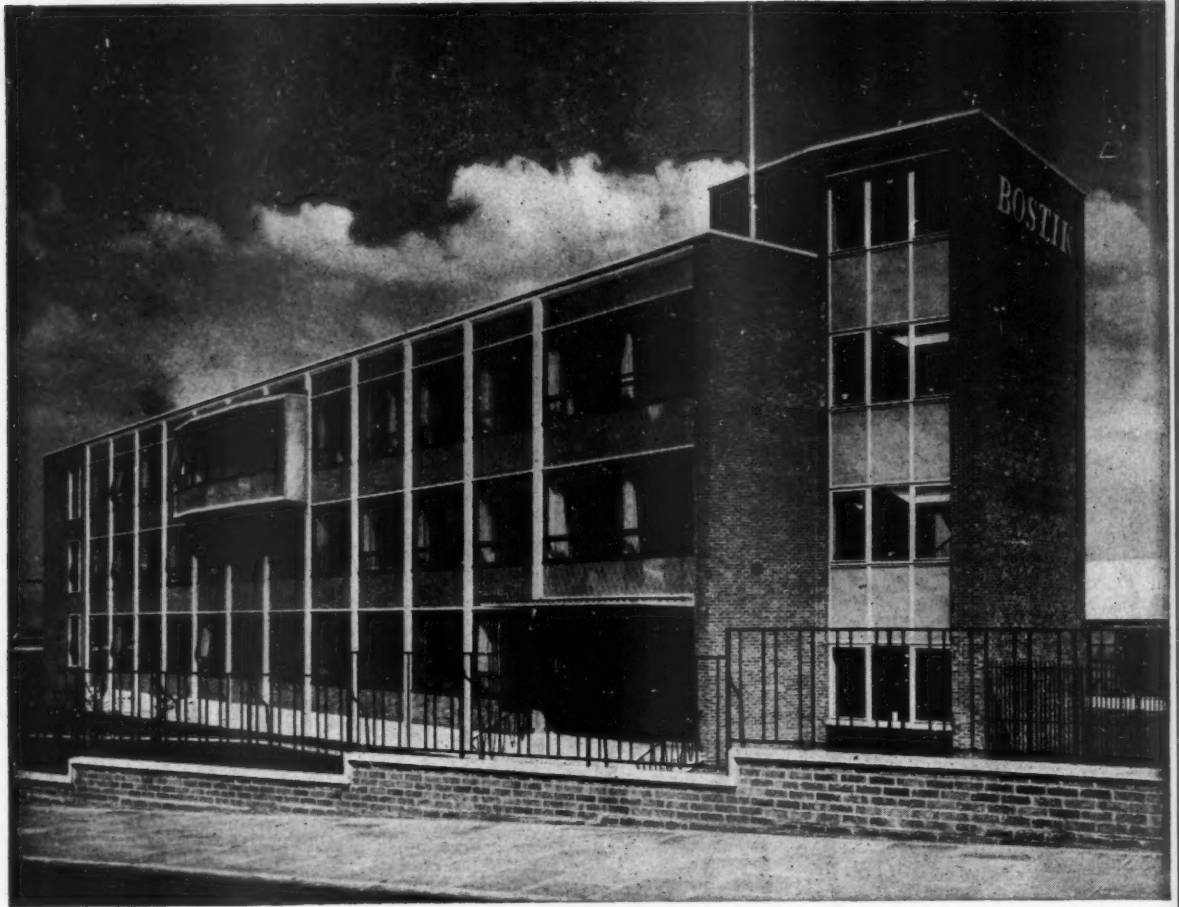
# **SEALCOAT**

## **HARDBOARD BY CELOTEX**

REGD TRADE MARK

**CELOTEX LIMITED**, NORTH CIRCULAR ROAD, STONEBRIDGE PARK, LONDON, N.W.10. Tel: ELGAR 5717

C.102



Photograph reproduced by courtesy of B.B. Chemical Co. Ltd.

## EVERY BUILDING SHOULD BE AS SAFE AS THIS . . . . .

The new B.B. Chemical Co. Ltd. factory at Leicester is really safe. They have the latest A.F.A. fire alarm system which, with its sensitive detectors in all parts of the building and the direct connection to the works fire station, will automatically call the brigade to the smallest outbreak *within minutes*.

The A.F.A. system, approved by Fire Officers and qualifying for valuable insurance rebates, is fully described in our book "If you had a fire tonight." Please send for your copy.



### AUTOMATIC FIRE DETECTION

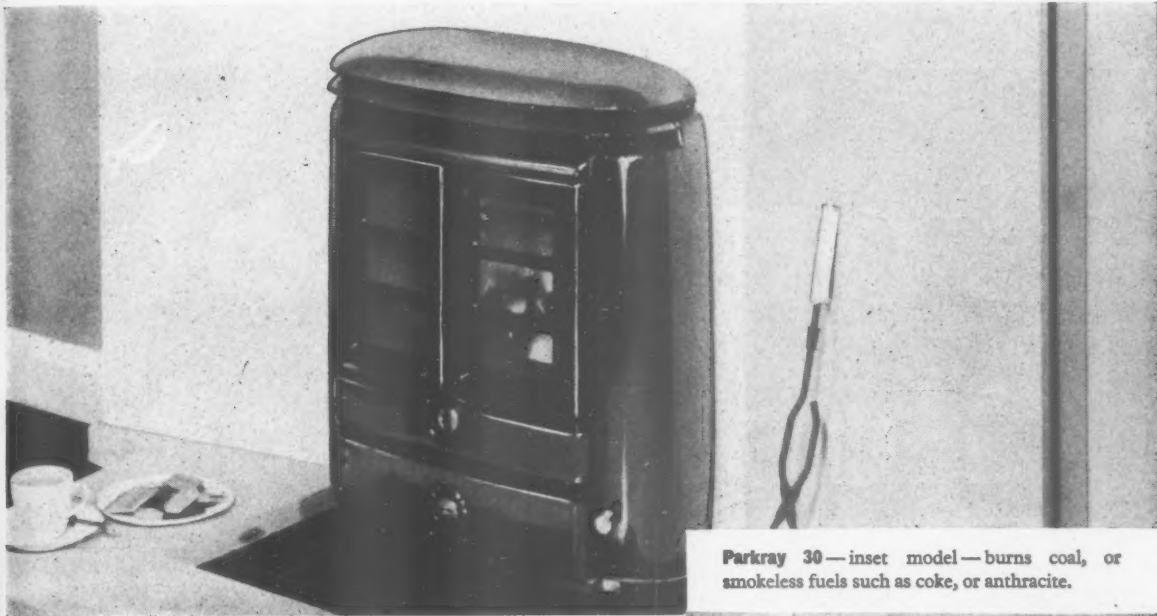
ASSOCIATED FIRE ALARMS LIMITED

Claremont Works, Claremont Road, London, E.17

Telephone: Larkwood 8373

Branches throughout Great Britain

## SLIM ROOM HEATER BRINGS THE STOVE UP TO DATE



**Parkray 30**—inset model—burns coal, or smokeless fuels such as coke, or anthracite.

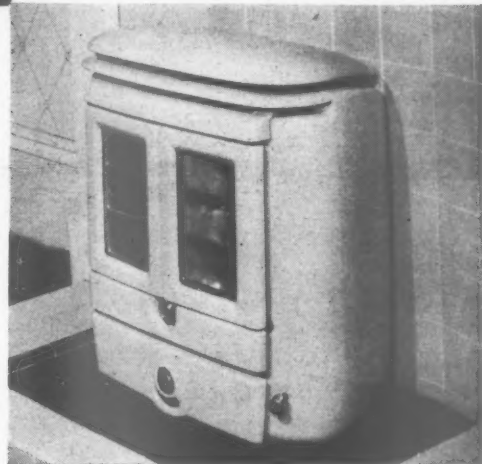
### Trend-setting new design from Radiation

The **Parkray 30**, latest thing in inset stoves, fits almost any fireplace opening yet projects only 7" on to the hearth. The heater will fit any existing fireplace opening 16" to 18" wide and 20" to 24" high—a particularly useful point if you are seeking to replace an old inefficient fire.

The focal point of many living rooms today is the television set rather than the fire. Thus a highly efficient yet unobtrusive source of heat like the **Parkray 30** is doubly welcome. It carries convected heat to every corner of the room, makes all space living space. And, of course, when the occasion demands an open fire, all you have to do is open the doors. A further practical advantage is that the **Parkray 30** does not have to be disconnected for the flue to be swept.

The **Parkray 32** is a freestanding room heater—another elegant design from Radiation that has taken all the boxy look out of the traditional stove. Both room heaters will provide full heating for rooms of up to 3,000 cu. ft.

Needless to say, both heaters effect considerable fuel saving compared with open fires or old fashioned stoves. Accessories, incorporating flue sockets and sweeping doors for building into chimney breasts or surrounds, enable the flue to be swept without moving the room heater. Prices range from £22.12.6. upwards for the inset **Parkray 30** and from £26.17.6. for the freestanding **Parkray 32**.



**Parkray 32**—freestanding model. Both have special Parkray air control—idling fire springs to life in a moment—burns for hours unattended.



Information sheets on application to: RADIATION GROUP SALES LTD., PARK FOUNDRY, BELPER, NEAR DERBY

***The Perfect Combination***

# **Combinol Gloss Paint**

**and**

# **Valspar Eggshell Lustre**

## **Combinol Gloss Paint**

Tough — Brilliant — High Gloss Finish.  
Excellent spreading power and opacity.  
Resists all weather conditions.  
Recommended for coastal and industrial areas.

## **Valspar Eggshell Lustre**

Beautiful Eggshell Lustre Finish.  
Easy to apply with wide brush, roller or spray.  
Resists steam and condensation.  
For all interior surfaces.

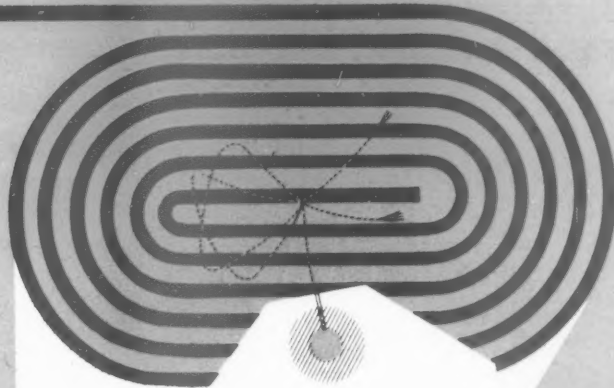
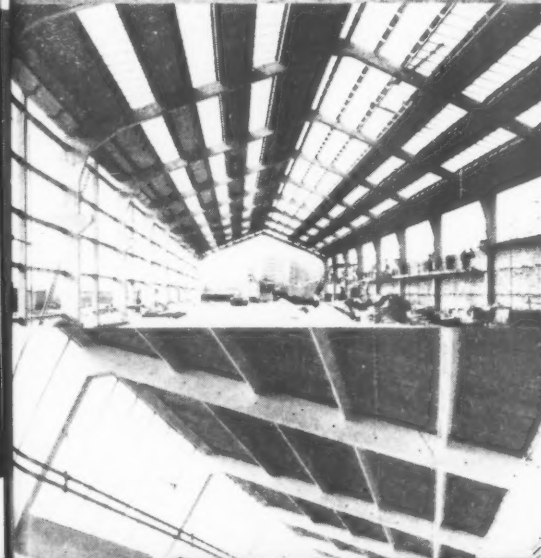
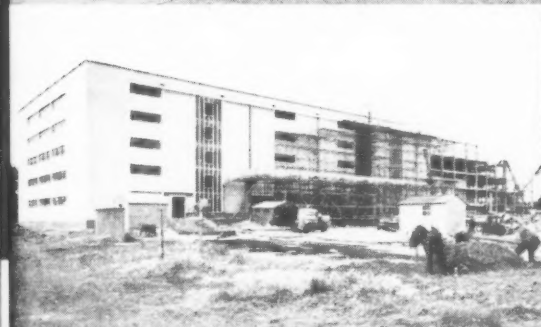
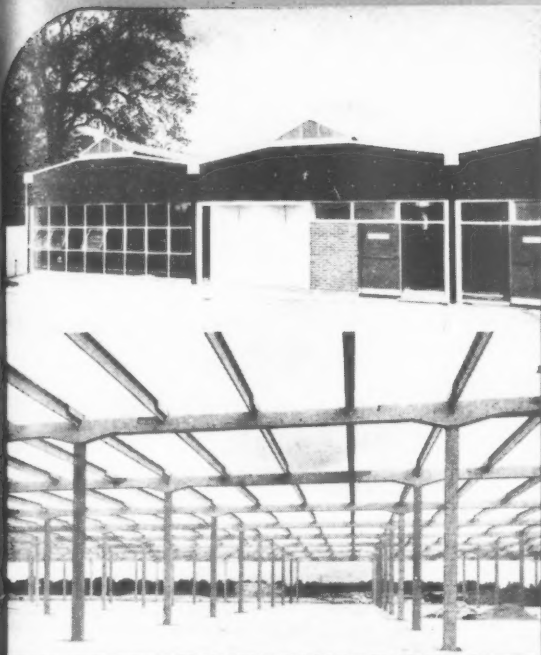
*Also available in the British Standard Range (101 colours)*

**Manufactured by Goodlass Wall & Co Ltd**









## MADE TO MEASURE

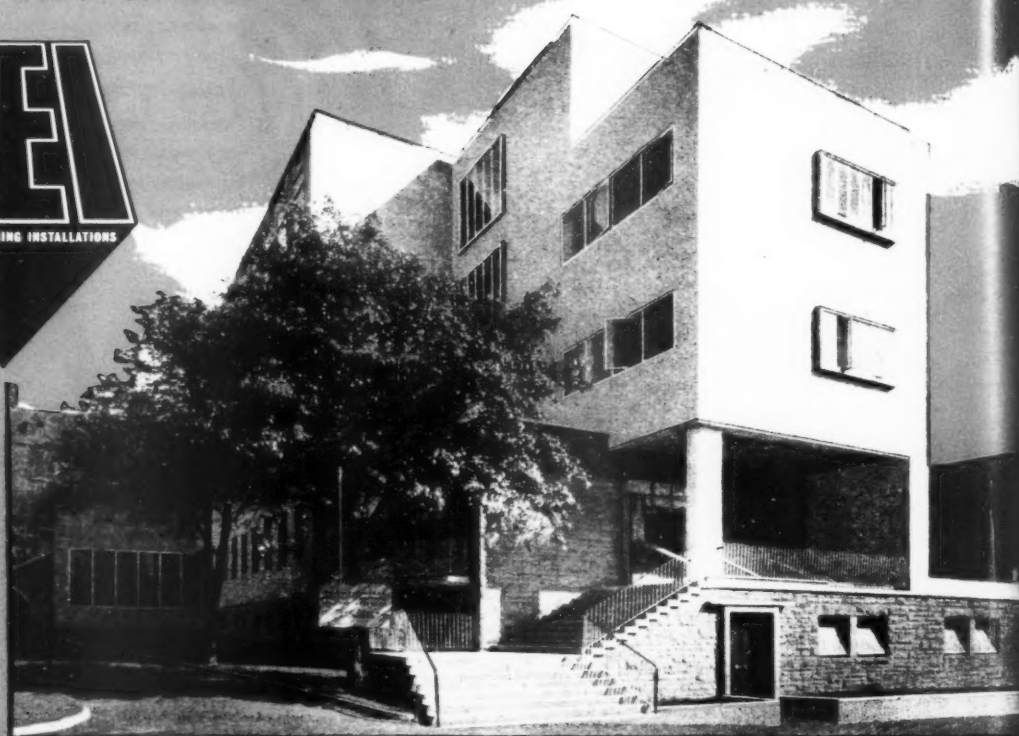
As an alternative to structural steel  
our precast framework is  
clean in design, competitive in price.  
Maintenance is virtually  
eliminated and fire risks reduced.

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we do not print a catalogue.  
Further information is best obtained  
by sending us a sketch of your  
requirements or by direct personal  
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Westminster S.W.1  
Telephone: VICTORIA 0336

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80

eighty years' experience  
of heating and  
ventilation design  
and installation



Main Plenum Heating Plant, Natural Philosophy Building, Glasgow University.

Every type of problem in designing conditions of comfort has been met, mastered and credited to the experience of S.E.I.

The knowledge gained, the resultant technical ability and the economics to be effected by experience are yours for the asking.

Here are some of S.E.I.'s activities:-

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**STEELS ENGINEERING INSTALLATIONS LIMITED**

Head Office: Crown Works, Sunderland

LONDON: 143 Sloane St. S.W.1. BIRMINGHAM: 1/2 St. Paul. Rd., Babbal Heath, 12. NEWCASTLE ON TYNE: 11 Broad Walk, Block 1.

GLASGOW: 122 Newmarket St. G.L. 2.

**STEEL**









## This is Medway

Medway is a company with unrivalled experience in the design, production and site construction of factory-made timber building systems. Several independent modular methods of construction are available for permanent or temporary structures on one or two storeys.

'Dry' construction, unaffected by weather delays, saves time and money in the construction of such buildings as offices, laboratories, social halls, pavilions, hospitals and schools (more than 70,000 children are now taught in modern Medway schools). Medway ensures rapid building, a firm schedule, economic cost and, of course, a most attractive building.

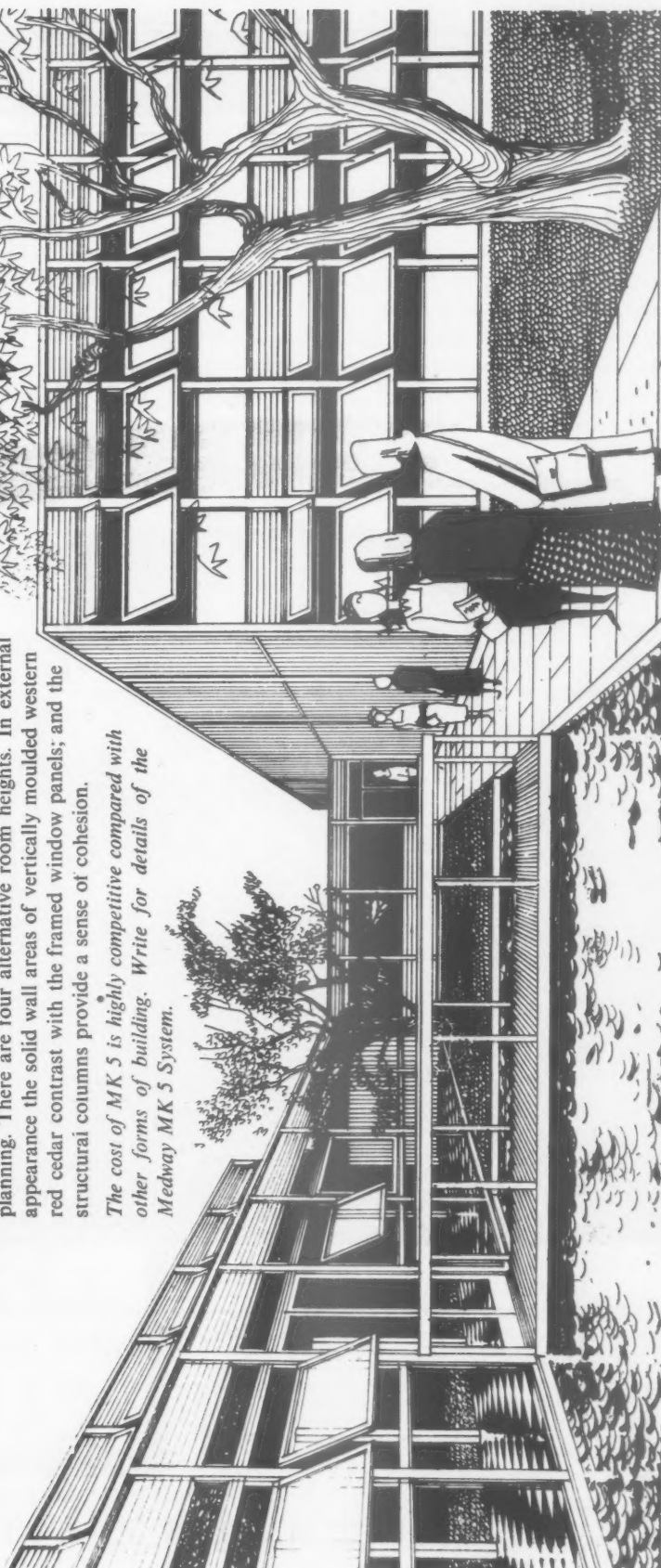
## This is Medway MK5

MK 5 is Medway's newest system of permanent construction for one or two storey buildings. With a structural frame of columns and constant depth lattice beams, construction is all-timber. There is a flat roof, a floating sound-insulated first floor and ceilings suspended below beams at constant level.

With a 6' 4" planning grid and extensive clear spans for floors and roofs, the Architect is offered a high degree of freedom in planning. There are four alternative room heights. In external appearance the solid wall areas of vertically moulded western red cedar contrast with the framed window panels; and the structural columns provide a sense of cohesion.

*The cost of MK 5 is highly competitive compared with other forms of building. Write for details of the Medway MK 5 System.*

MEDWAY TIMBER BUILDINGS



MEDWAY BUILDINGS & SUPPLIES LTD., PHOENIX WHARF, ROCHESTER, KENT. TELEPHONE: STROOD 7521  
AP33

## THEY SET A STANDARD

**O**VER 1500 years ago the Romans built the roads whose names are still familiar to us—Fosse Way, Watling Street, Icknield Way, Ermine Street and many others. Often following tracks old before the Romans came, these broad, straight roads provided vital communication for the legions, and for the administrators and merchants who followed in their steps. In road building, as in many other fields, the Romans set a standard which few have equalled since.

In cable making, too, standards are of vital importance.

For over 100 years members of the Cable Makers Association have been concerned in all major advances in cable making. Together they spend over one million pounds a year on research and development. The knowledge gained is available to all members. This co-operation has contributed largely to the world-wide prestige that C.M.A. cables enjoy, and it has put Britain at the head of the world cable exporters.

Technical information and advice is freely available from any C.M.A. member.

*Roman legionaries on the march.*



### MEMBERS OF THE C.M.A.

British Insulated Callender's Cables Ltd · Connollys (Blackley) Ltd.  
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Irwell Rubber Co. Ltd · W. T. Henley's Telegraph Works  
Co. Ltd · Johnson & Phillips Ltd · The Liverpool Electric Cable  
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*Insist on a  
cable with the  
C.M.A. label*



*The Roman Warrior and the letters 'C.M.A.' are British Registered  
Certification Trade Marks.*

## CABLE MAKERS ASSOCIATION

CABLE MAKERS ASSOCIATION, 52-54 HIGH HOLBORN, LONDON, W.C.1. TELEPHONE: HOLBORN 7633

CMA 23



## Maxweld reinforces it

The reinforcement fabric used in the reconstruction of the Derby Corporation Sewage Disposal Works at Spondon was supplied by Richard Hill.

When you require reinforcements, get the same prompt service by ringing the

Maxweld Office in your area. They will give you all the facts on the type and quantity of fabric you'll need plus a rough idea of the cost. And they're backed by the *Richard Hill Design Service* who can then draw up more detailed plans and estimates.

Ring Middlesbrough (2206), London (Mayfair 3538), Birmingham (Midland 5625), Manchester (Central 1652), Leeds (2-7540), Bristol (24977), Glasgow (Central 2179).



## Maxweld fabric

is manufactured by **RICHARD HILL LIMITED** (Est. 1868)

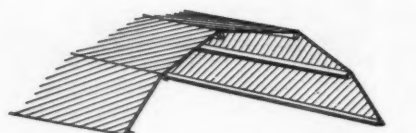
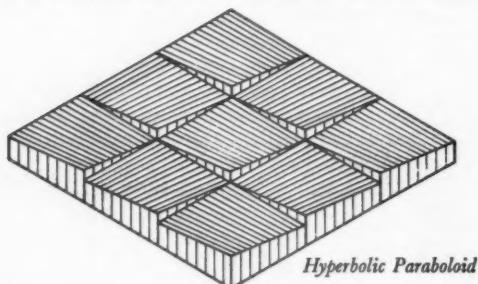
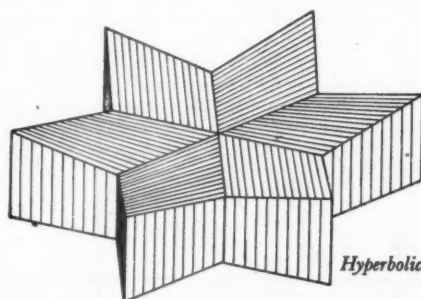
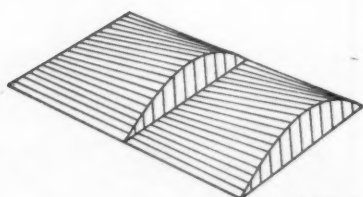
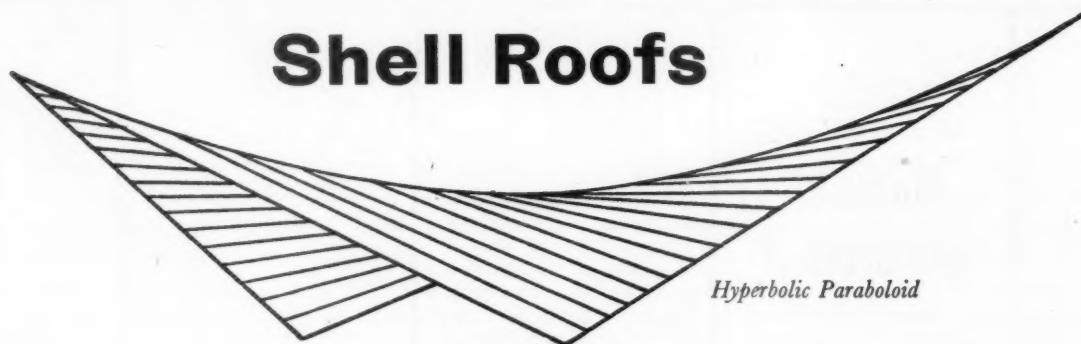
Newport Wire and Rolling Mills, Middlesbrough, Yorkshire. Tel: Middlesbrough 2206

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CRC ISMIE

# Shell Roofs



## FOR INDUSTRIAL AND PUBLIC BUILDINGS

Suitable for industrial and public buildings, these new structures in timber provide an exceptionally clear floor space.

### ***Before you decide...***

please do not hesitate to consult the T.D.A. who will gladly supply you with information on the use of softwoods, hardwoods, plywoods, modern timber design and names of timber fabricators.

**CONSULT TDA**

# BOVRIL LIMITED

*save work and wear with* **Duramel**



*In the main kitchen of Bovril Ltd.'s new canteen, walls, partitions and doors bear witness to the extensive use of Duramel.*

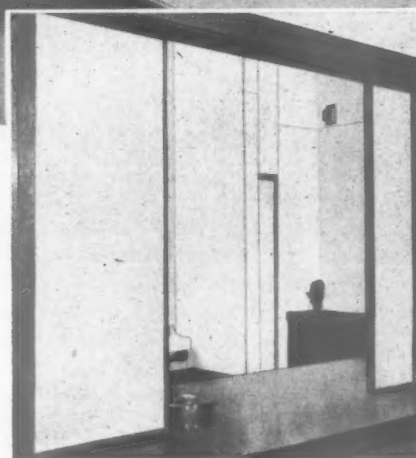
The new canteen at Bovril Ltd.'s Central London factory caters for 375. There's no time to waste. No time for unnecessary work. And these famous food manufacturers very properly insist on absolute hygiene. So they made extensive use of Duramel panels in servery, kitchen and on doors. Duramel resists steam, staining and the common chemical actions caused by foodstuffs. It is thoroughly hygienic and amazingly easy to keep clean. For any kitchen or canteen there is no better choice than Duramel.

**Easy to clean : hard wearing**

Duramel is not just another plastic. Its

melamine surface is permanently bonded *at the factory* to high-grade hardwood plywood. The technique used ensures that these two components are permanently bonded to become virtually one substance. The adhesion problems so often associated with ordinary plastics are thus completely overcome. And since Duramel is delivered ready for use, there are big savings in time, labour and expense.

Duramel is made in three different thicknesses and a wide range of colours and patterns. Your nearest distributor will be delighted to discuss its application to your own particular problems.



*Brightness, absolute hygiene and ease of maintenance are among the many advantages of Duramel.*

**Duramel**  
THE PLASTIC-FACED PLYWOOD

*The Melamine Plastic surface is bonded to first-grade hardwood plywood. It is waterproof, resistant to heat and mild acids, hygienic and wonderfully durable. Supplied in a range of colourful finishes, and plain white.*

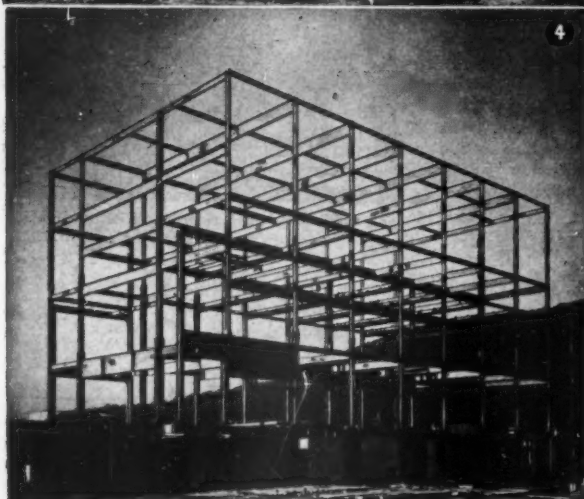
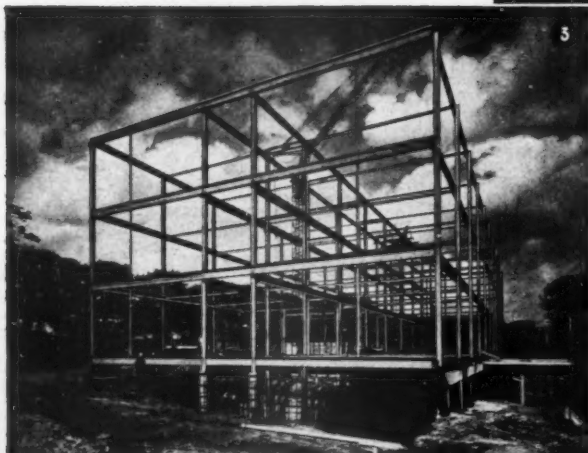
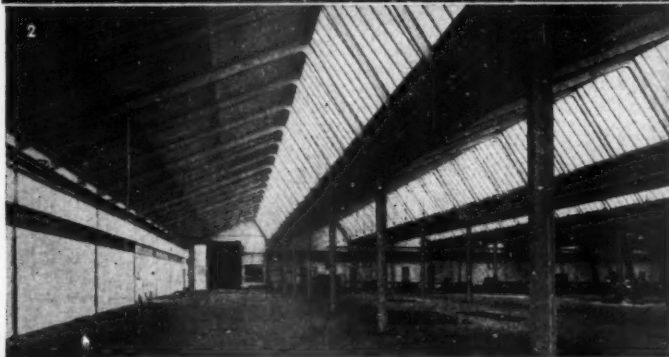
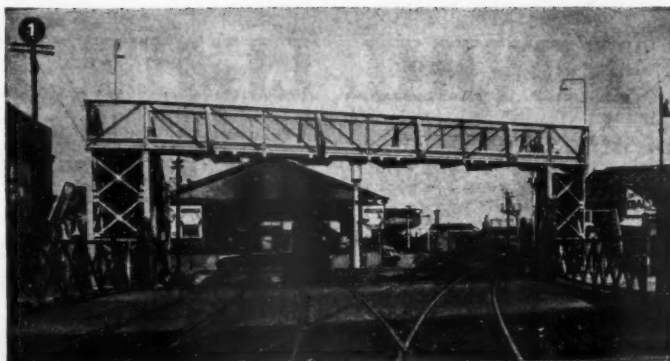
**SIZES : 72" x 48", 84" x 48", 96" x 48", 36" x 24", 48" x 24".**

For the name of your nearest distributor, write to the sole manufacturers :

**F. HILLS & SONS LTD., NORTON ROAD, STOCKTON-ON-TEES. TEL: STOCKTON 67141**

- ① Footbridge for Level Crossing in Grimsby.
- ② Interior view of factory for Messrs. Brook Motors Ltd., Barnsley.
- ③ Sowerby Bridge Secondary School.
- ④ Control Room, Services and Welfare Block, Elland Power Station.

# STRUCTURAL STEELWORK



BY  
**AUSTINS**

## JAMES AUSTIN AND SONS (DEWSBURY) LIMITED

Thornhill Iron & Steel Works, Dewsbury, Yorkshire  
Telephone: Dewsbury 1750 (7 lines)  
Telegrams: Austins, Dewsbury, Telex No. 55-129

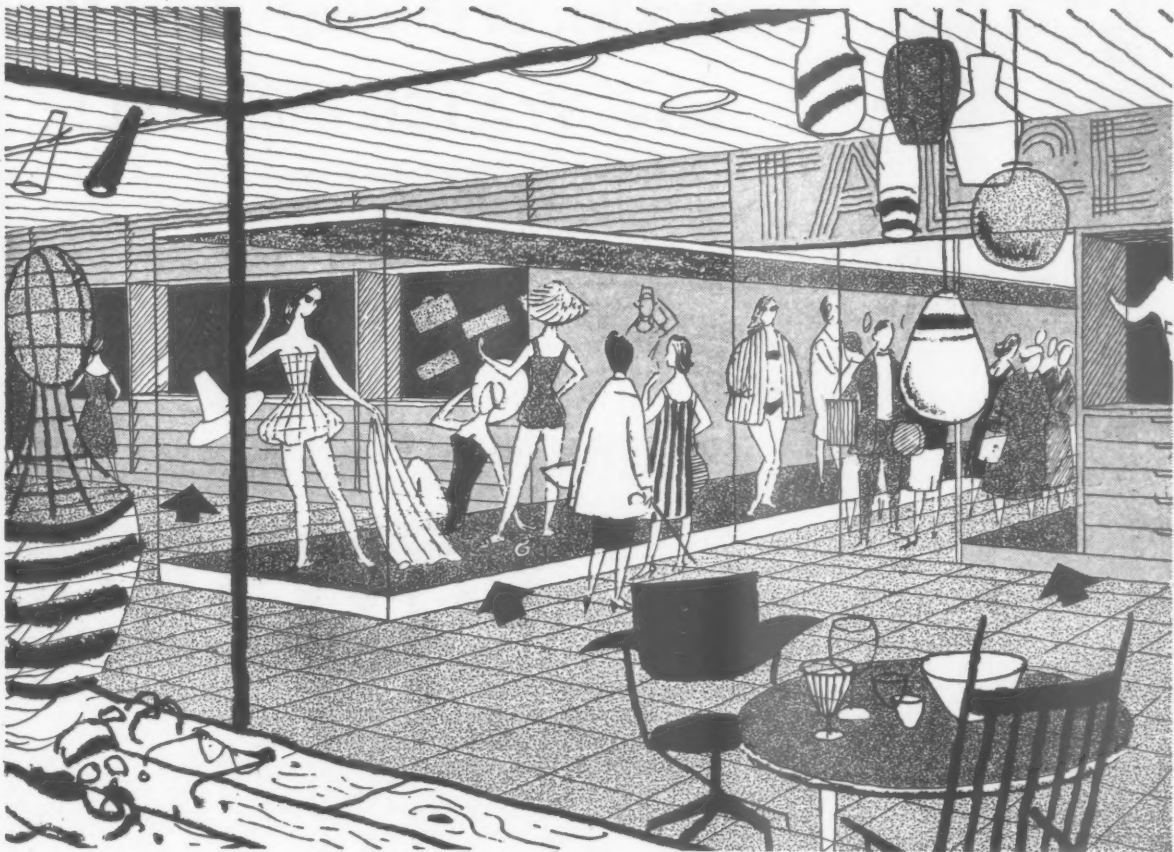


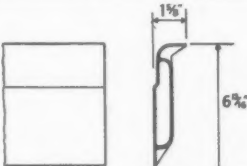
LONDON OFFICE: Kirkman House,  
54A Tottenham Court Road, London, W.1.  
Telephone: Museum 1064

H.P.3917



## When every inch of wall is wanted



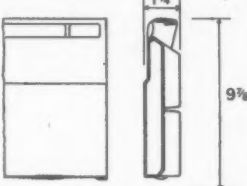


6-inch  
Type R  
(also  
available  
in 9-inch)

6"

1"

Floor line



9-inch  
Type RC

9"

1"

Floor line

---

*Manual (No. 423) on Crane Skirting Heating may be had on application to*

**CRANE LTD., 15-16 RED LION COURT  
FLEET STREET, LONDON, EC4**

*London Showrooms:*

118 Wigmore Street, London, W.1 and  
Great West Road, Brentford, Middlesex

*Branches:*

BIRMINGHAM · BRENTFORD · BRISTOL  
GLASGOW · LONDON · MANCHESTER

*Works: IPSWICH*

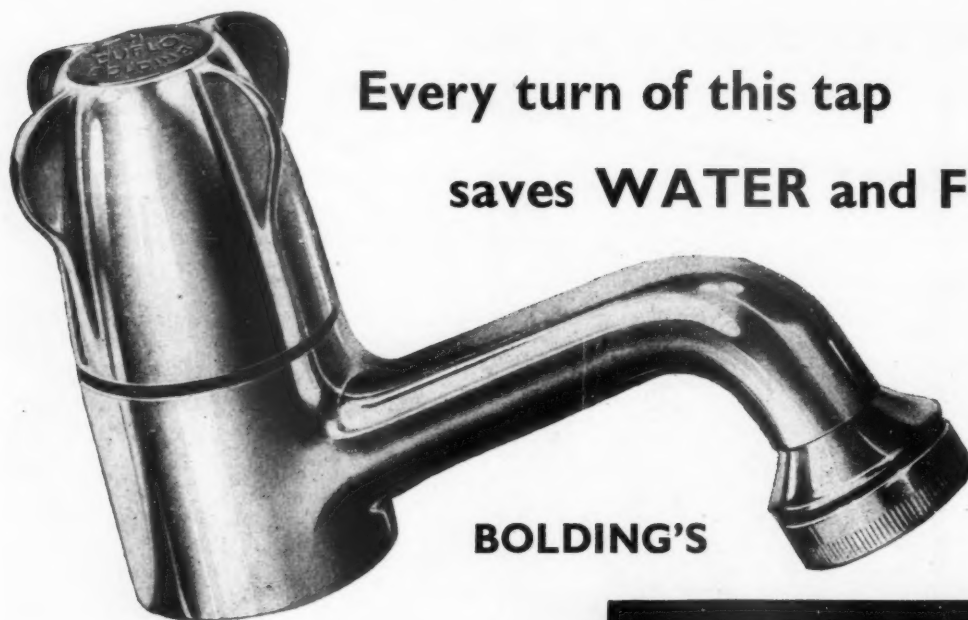
WHEREVER maximum space is a functional necessity—and there are many instances, such as shops, libraries and exhibition rooms—the problem arises of how to make provision for a heating system that gives the proper requirements of evenly distributed warmth, functions economically, and neither takes up useful wall space nor offends aesthetically by spoiling a clean-looking line.

There is one system which architects are now coming to look upon as the best answer to this problem. It has been evolved by Crane Ltd. (already well known for other types of heating equipment) and employs heating panels in place of the usual skirting boards. It is clear that this system gives the designers considerable flexibility of arrangement. The heating panels are quite unobtrusive and, being capable of encircling the entire room if necessary, eliminate 'hot spots' and distribute the warmth evenly where it is wanted. In the illustration the position of Skirting Heating panels is indicated by arrows. It will be readily appreciated how well this system answers the condensation problem here.

There are two types of panel. Type R—purely radiant—in 9-inch panels to match Type RC, and in 6-inch panels for use where less heat is required; and Type RC (radiant-convector) 9-inches high. The panels used in the example illustrated are 6-inch Type R. All panels are in 2-ft and 1-ft lengths and are made of cast iron, which gives them considerable resistance to accidental damage. The operations of calculating heat requirements and designing the pipework are in principle no different from those for conventional radiator heating systems.

Wherever the architect needs greater freedom of expression than conventional heating systems allow him, and at the same time has to pay due consideration to costs, the answer is, undoubtedly,

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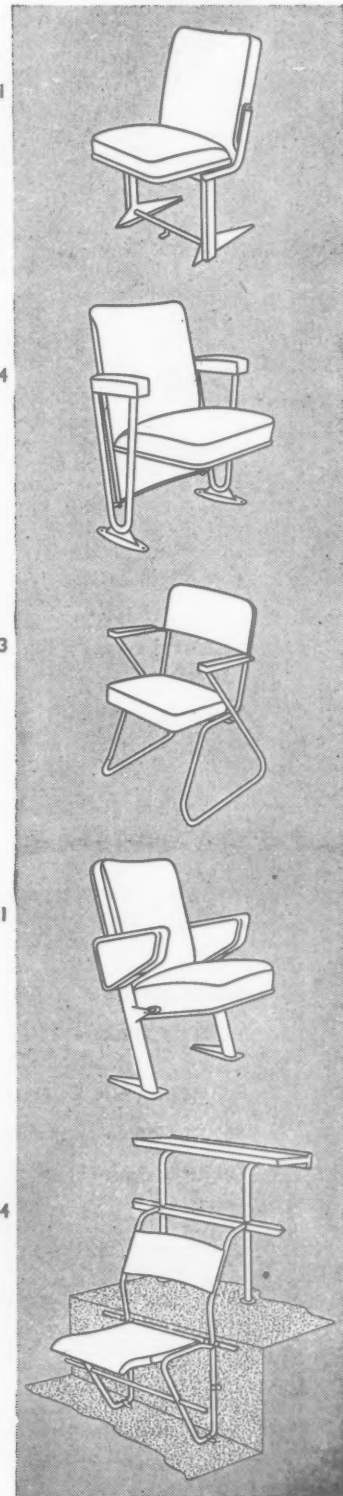
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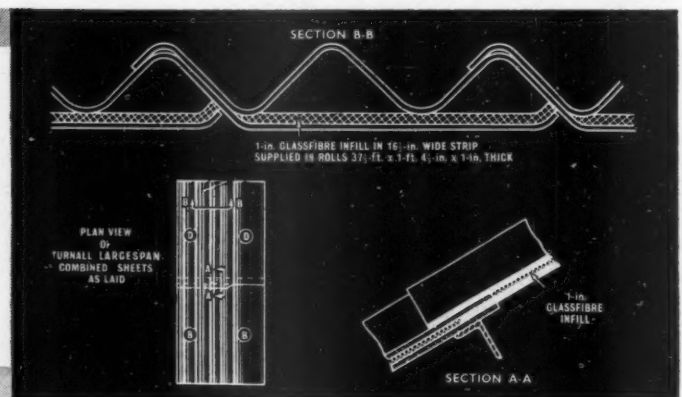
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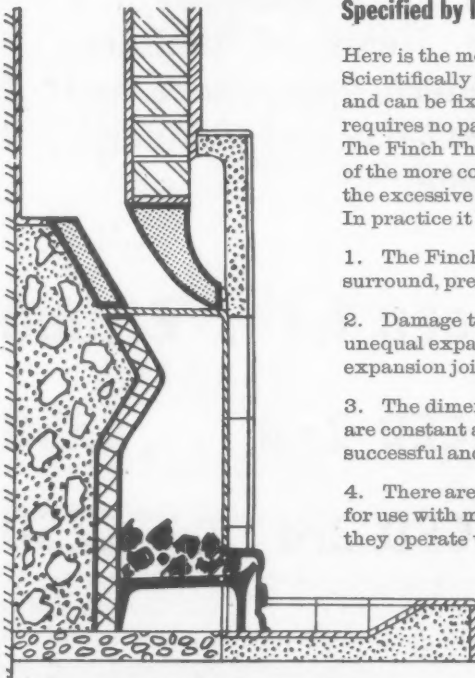
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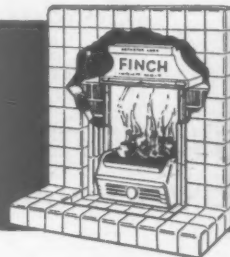
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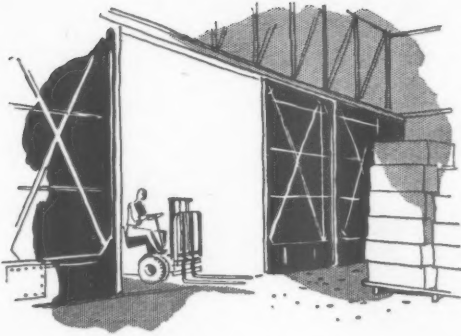
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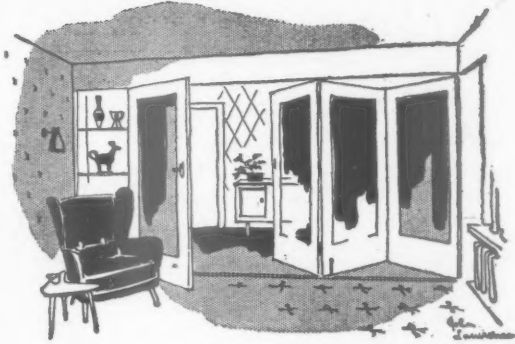
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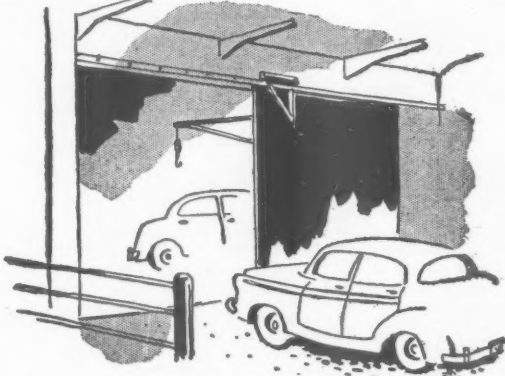
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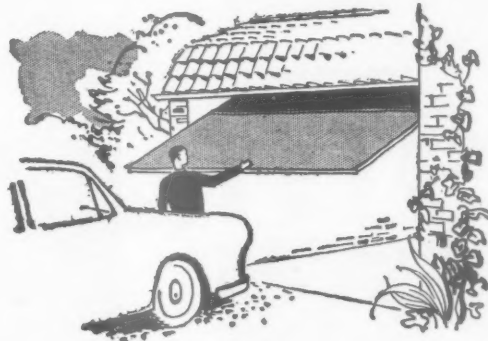
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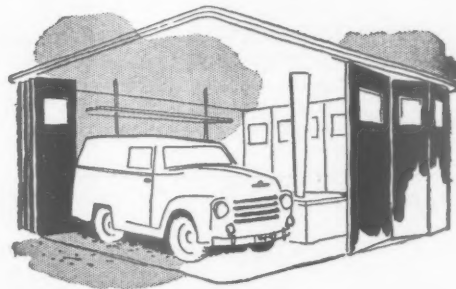
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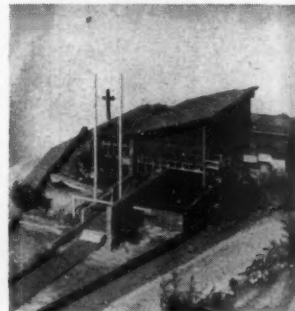


New Town Multi-storey: an office block for the town centre of Hemel Hempstead, designed by H. K. Ablett, chief architect to the Development Corporation.

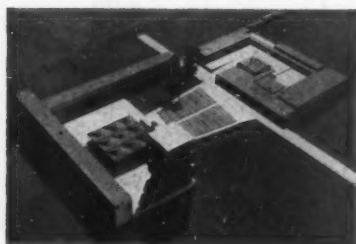
High Gorbals: a redevelopment area in Glasgow, by Robert Matthew and Johnson Marshall, one of a number of housing-schemes pre-viewed in this issue.



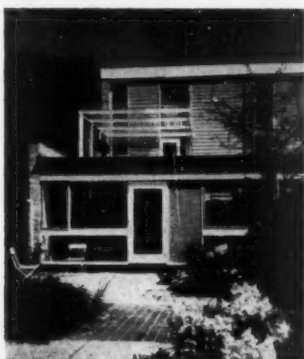
Northern Methodist: a projected church in Fulwell, Co. Durham, designed by S. W. Milburn and Partners for a Methodist congregation.



## FEBRUARY

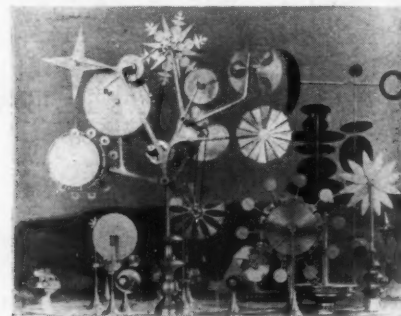


Nigerian University: Library, Arts Faculty, Administration and Students' Union buildings, and an open-air auditorium, at Nsukka, Eastern Nigeria, designed by James Cubitt and Partners, and pre-viewed in this issue.

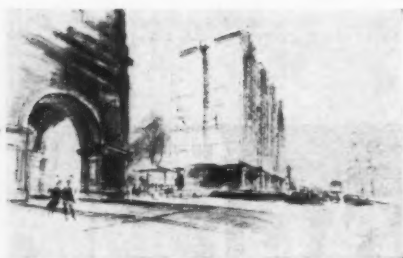


Spec and Span: this house at Teddington is among the buildings discussed in a full-dress survey of Eric Lyon's Span speculative developments by R. Furneaux Jordan.

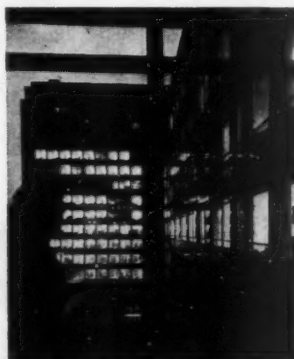
Sam Mill: the ingenious solar toy designed by the ever-inventive Charles Eames, to dramatise the potentialities of the sun as a source of energy, a cosmic mobile.



## MARCH

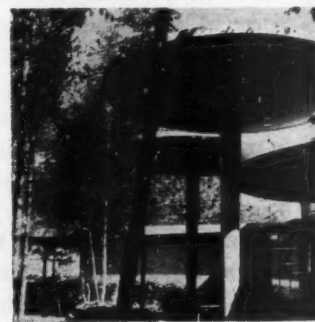


Royal College re-housed; Sir Hugh Casson's impression of the view along Kensington Gore, past the Albert Hall, to the proposed new building for the Royal College of Art. Architect: H. T. Cadbury-Brown.



High Knightsbridge: a night view of the Bowater House office block by Guy Morgan and Partners, another stage in the transformation of the London scene.

Swiss Mushrooms: entrance canopy to the Tiefenbrunnen bathing beach by Josef Schütz, an example of indivisible landscaping/architecture from Ian Nairn's article on recent work in Switzerland.



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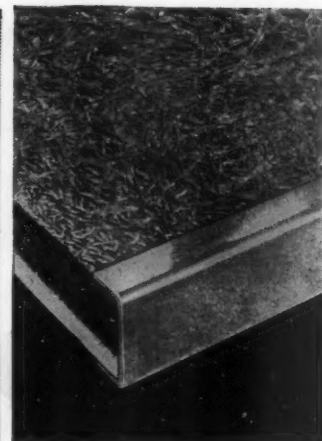
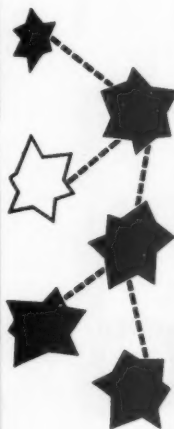
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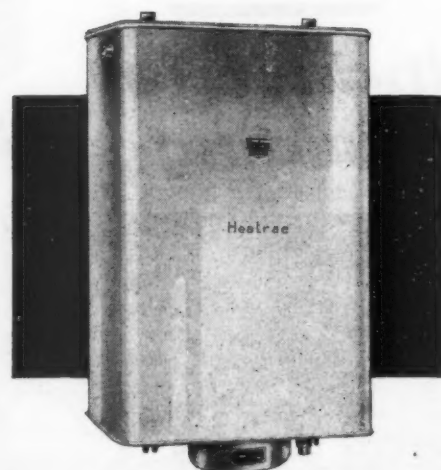
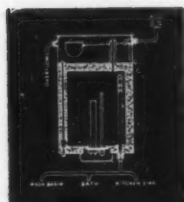
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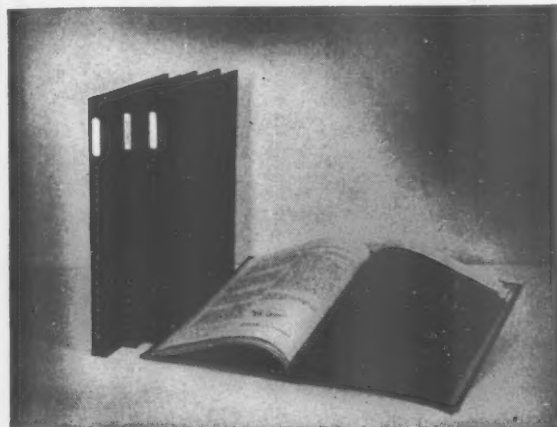
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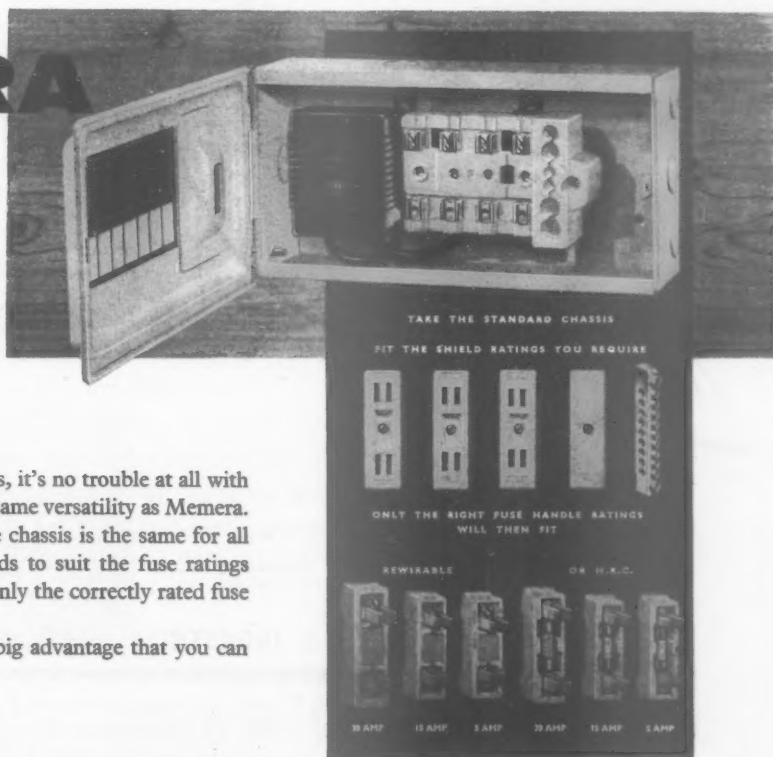
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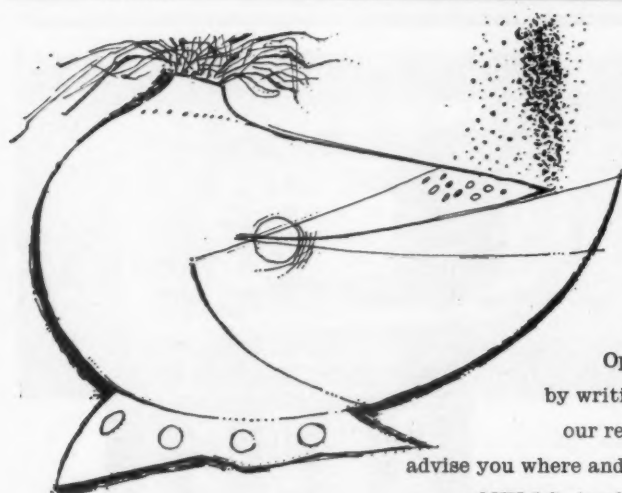
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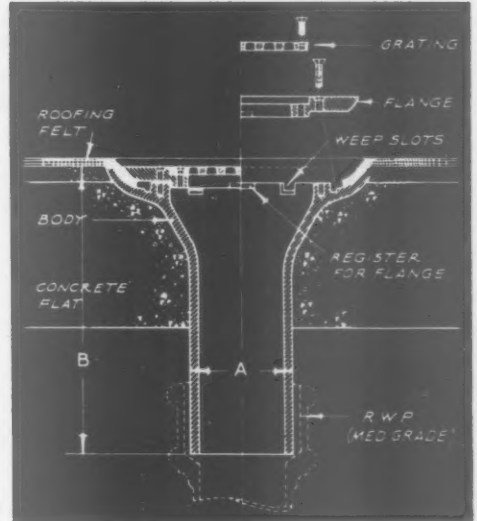
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Housing accommodation will be made available to the successful applicant if necessary.

The selected applicant will be required to pass a medical examination for the purposes of the Superannuation Scheme.

Application forms are obtainable from the Borough Engineer, Town Hall, South Shields, and should be returned to him not later than 10 a.m. on Monday, 9th February, 1959.

R. S. YOUNG,  
Town Clerk. 2655

## ASSISTANT ARCHITECT

Building and Architectural Section of the City Surveyor's Department of CORPORATION OF LONDON. Preference given to suitably qualified applicants. First class draughtsmanship and sound knowledge of construction and design essential. Salary up to £1,325—point of entry dependent upon experience.

Applications, stating age, qualifications, experience, with names of three referees to The City Surveyor, Guildhall, London, E.C.2, within 14 days. 2792

WESTERN REGION HOUSING CORPORATION  
IBADAN, NIGERIA

## APPOINTMENT OF ARCHITECT

Applications are invited from qualified candidates for the post of Architect in the Western Region Housing Corporation, with Headquarters at Ibadan and Branch Office at Ikeja.

Appointment will be on contract for two tours of 18-24 months residential service, with paid leave of seven days per month of residential service. The salary scale is £1,188 × £48 to £1,386 × £54 to £1,650. In addition, an Inducement Allowance is payable to expatriate officers of £270 for salaries below £1,285 and £300 for salaries over. The point of entry will be determined by qualifications and experience. The successful candidate will be required to join the Corporation's Provident Fund, to which the Corporation and the officer each contribute a sum equal to 10 per cent. of the officer's basic salary.

First class passages by air will, on first appointment, be provided for the officer, his wife and up to three children under 18 years of age. Free medical treatment will be provided for the officer and his family. A house with hard furnishings at rental of 84 per cent. of basic salary will be made available if the successful candidate is recruited outside Nigeria. Conditions of service generally will be those applicable to Western Region Government Officers on contract.

Candidates must have wide experience and possess one of the following qualifications:

(i) Associate Royal Institute British Architecture.

(ii) Member recognised Architectural Association within the Commonwealth.

Recent practical experience in tropical architecture is a necessity and experience in Town Planning will be considered an advantage. The successful candidate will be appointed to the Department of Architecture and Engineering and will be resident in Ibadan. The Corporation's works are carried out by contract and the duties of the post will comprise all phases of work from sketch design to preparation of final accounts, including supervision of construction. The Corporation is engaged at present in extensive housing development of all types in a new neighbourhood in Ibadan, and an Industrial and Housing Development project at Ikeja, near Lagos.

Applications, stating age, academic and professional qualifications, previous experience, present appointment and salary, together with the names of two referees, should be sent by airmail to reach the undersigned not later than 11th February, 1959. Interviews for overseas candidates will be held in London at the beginning of March.

R. H. FITCHETT,  
General Manager. 2667

P.O. Box 867,  
Ibadan,  
Western Nigeria.

## LONDON COUNTY COUNCIL

## ARCHITECT'S DEPARTMENT

Vacancies for ARCHITECTURAL ASSISTANTS, starting salary up to £860. Full and interesting programme of houses, flats, schools and general buildings.

Application form and particulars from Hubert Bennett, F.R.I.B.A., Architect to Council (BK/52/58), County Hall, S.W.1. (2158) 1949

## SURREY COUNTY COUNCIL

Applications invited for following appointments:—

1. ASSISTANT ARCHITECT, Special Grade, £700-£1,030 p.a. plus £30 p.a. London Allowance. Must be A.R.I.B.A.

2. ASSISTANT QUANTITY SURVEYOR, Grade IV, £1,025-£1,175 p.a. plus £30 p.a. London Allowance. Must be Chartered Quantity Surveyor with experience of estimating, taking off, valuing works in progress and final accounts for large public buildings, including all Specialist Works.

3. ASSISTANT QUANTITY SURVEYOR, Grade I, £575-£725 p.a. plus London Allowance of up to £30 p.a. according to age. Must have passed First Examination R.I.C.S. and had several years' experience in an approved office.

4. ASSISTANT STRUCTURAL ENGINEER, Special Grade, £750-£1,030 plus London Allowance of £30 p.a. Qualified Civil or Structural Engineer, experienced in design and detailing in steel and/or reinforced concrete.

5. ASSISTANT STRUCTURAL ENGINEER, Grade I, £575-£725 plus London Allowance of up to £30 p.a. Knowledge of detail and some design in steel or concrete.

Full details, present salary and three copy testimonials to County Architect, County Hall, Kingston, as soon as possible. 2623

COUNTY BOROUGH OF WEST HAM  
BOROUGH ARCHITECT AND PLANNING OFFICER'S DEPARTMENT

Applications invited for the established post of DEPUTY GROUP ARCHITECT, Special Grade, £750 × £40-£1,030, and London Allowance. (Commencing point in Grade according to experience and qualifications.)

Must be A.R.I.B.A. Application form and details from Borough Architect and Planning Officer, 70, West Ham Lane, Stratford, E.15, returnable by Tuesday, 10th February, 1959. 2679

## BEESTON AND STAPLEFORD URBAN DISTRICT COUNCIL

JUNIOR ARCHITECTURAL ASSISTANT  
Applications are invited for the above appointment. Salary A.P.T. Grade I £575-£725. Commencing salary according to qualifications and experience.

Applications, accompanied by the names and addresses of two referees, should be forwarded to the Surveyor, Town Hall, Beeston, Nottingham, not later than 31st January, 1959. 2697

## EAST BARNET URBAN DISTRICT COUNCIL

## SENIOR ASSISTANT ARCHITECT

Applications are invited for the appointment of a Senior Assistant Architect in the Engineer and Surveyor's Department. The salary will be within Grade A.P.T. III (£845-£1,025) plus London weighting of £20 or £30 per annum, according to age. If necessary, the Council would be prepared to consider providing housing accommodation.

Conditions of Appointment and Forms of Application, returnable by the 5th February, 1959, may be obtained from the Engineer and Surveyor, Town Hall, Station Road, New Barnet, Herts. 2680

## SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD

Applications are invited for the appointment of an ASSISTANT QUANTITY SURVEYOR on the permanent staff of the Board's Regional Architect generally in accordance with Whitley Council conditions of service. Applicants for the post must be Corporate Members of the Royal Institute of Chartered Surveyors (Quantity Surveying Branch) and have had sound practical experience in working up and checking off of quantities for contracts, checking contractors' accounts, estimating and analysing prices.

The commencing salary for the post will be within the scale £700 × £25 (3) × £30 (1) × £35 (6)—£1,015 p.a., plus London weighting allowance. Application forms may be obtained from the undersigned at 40, Eastbourne Terrace, W.2, and must be completed and returned by not later than 10th February.

E. G. BRAITHWAITE,  
Secretary. 2686

## ADMIRALTY

Good quality ARCHITECTURAL ASSISTANTS are required at Pinner (Middlesex) for work with Professional Architects on the preparation of designs for the following wide range of new works:—

(a) New Housing designs and estate layouts.

(b) All forms of single accommodation comprising sleeping messing and recreational buildings, including gymnasia, stores, educational buildings and cinema/lecture halls.

(c) Specialised buildings for technical equipment.

(d) Industrial buildings, stores and offices associated with H.M. Dockyards.

Facilities can be granted to those still studying for professional qualifications, but preference given to near qualified candidates wishing to obtain widest possible experience.

Salary according to age, qualifications and experience, ranges from £550/£870, and opportunities occur for promotion to Leading Grade, salary maximum £1,015. Five-day week. Annual leave 18 days rising to 22 days after 10 years' service. Appointments are temporary but with long term possibilities.

Candidates, who must be British subjects, are invited to apply in writing, giving details of experience, to Civil Engineer-in-Chief, Admiralty, Chamberlain Way, Pinner, Middlesex. 2704

## COUNTY BOROUGH OF SOUTH SHIELDS

## PRINCIPAL ASSISTANT ARCHITECTS

Applications are invited from suitably qualified persons for the above appointment in the Borough Engineer's Department, salary in accordance with Grade A.P.T. IV (£1,025 × £50-£1,175).

Housing accommodation will be made available to the successful applicants if necessary.

The selected applicants will be required to pass a medical examination for the purposes of the Superannuation Scheme.

Application forms are obtainable from the Borough Engineer, Town Hall, South Shields, and should be returned to him not later than 10 a.m. on Monday, 9th February, 1959.

R. S. YOUNG,  
Town Clerk. 2656

## EAST SUFFOLK COUNTY COUNCIL

## ASSISTANT ARCHITECTS

Special Grade: £750 × £40-£1,030  
Applications are invited for the above appointments; commencing salary according to qualifications and experience.

Full particulars of age, present and previous positions, qualifications and experience, together with copies of two recent testimonials to the County Architect, Mr. E. J. Symcox, F.R.I.B.A., County Hall, Ipswich, by 3rd February, 1959. 2706

## MINISTRY OF HOUSING AND LOCAL GOVERNMENT

require unestablished INSPECTORS (non-pensionable). Duties include conduct of Public Local Inquiries in England and Wales into matters arising under Housing Acts and Town and Country Planning Acts. Qualifications, one or more of the following: Registered Architect, Corporate Membership of R.I.B.A., T.P.I., I.C.E., I.Mun.E., R.I.C.S., Chartered Auctioneers and Estate Agents Institute or Land Agents Society. Practical experience in Housing design and development and town and country planning essential. Age 35 years or over. Salary (men) £1,430 at age 40 or over to £1,720. Women's rates slightly lower until 1961. Forms from M.L.N.S., Technical and Scientific Register (K), 26, King Street, London, S.W.1. Quoting J.108/8. 2773

## CAMBRIDGESHIRE COUNTY COUNCIL

## COUNTY ARCHITECT'S DEPARTMENT

Appointment of SENIOR ASSISTANT ARCHITECT, Grade A.P.T. IV (£1,025/£50/£1,175).

Applicants should be Members of the Royal Institute of British Architects and have had extensive experience of the design and construction of schools and other County buildings, and should be capable of supervising assistant staff as necessary.

The appointment is subject to the Local Government Superannuation Acts, 1937 to 1953, the National Scheme of Conditions of Service, a satisfactory medical examination and termination by one month's notice on either side. Commencing salary in accordance with experience.

Applications, stating age, present salary, present and previous appointments, details of training and experience, together with the names and addresses of two referees, should be submitted to the undersigned, not later than 3rd February, 1959.

## CHARLES PHYTHIAN,

Clerk of the County Council.

Shire Hall,  
Cambridge.  
12th January, 1959. 2675

## ARCHITECTURAL ASSISTANTS

## Required by

## MINISTRY OF WORKS

For employment in London and Provinces on design and detailing work on construction and maintenance of all types of public buildings.

Salary range £550 (age 21) to £870 p.a. London (slightly less elsewhere).

Five-day week. 34 weeks annual leave initially. Starting pay according to age, qualifications and experience. Good prospects of promotion with salaries of £1,015 p.a. and above.

Opportunities for permanent posts leading to pensions (non-contributory).

Interviews at Regional Offices where possible. Applicants should be of Intermediate R.I.B.A. standard. State age, training and experience to Chief Architect, Ministry of Works, Room 435, Abell House, John Islip Street, S.W.1. 2444

## COUNTY BOROUGH OF SOUTHAMPTON

## ARCHITECTURAL ASSISTANT, A.P.T. Grade II, £725-£845.

Applicants are required to have passed the Intermediate R.I.B.A. examination or its equivalent at one of the recognised schools of architecture, and preferably have had experience in local government housing.

Apply on application form obtainable from the Borough Engineer and Surveyor, Civic Centre, Southampton, by not later than Monday, 9th February, 1959. 2774

## COUNTY BOROUGH OF SUNDERLAND

## CHIEF ASSISTANT ARCHITECTS

A.P.T. Grade IV (£1,025-£1,175)

Applications are invited for the above posts. Particulars of the appointments may be obtained from Borough Architect, Grange House, Stockton Road, Sunderland.

Applications must be addressed to me and received at my office, Town Hall, not later than 19th February, 1959.

Canvassing will disqualify.

G. S. MCINTIRE,  
Town Clerk. 2771



# DENBIGHSHIRE COUNTY COUNCIL COUNTY PLANNING DEPARTMENT

Applications are invited from suitably qualified persons for the following appointments, viz.:-  
(a) SENIOR COUNTY PLANNING ASSISTANT, A.P.T. Grade IV (salary £1,925-£2,175 per annum).  
(b) DEPUTY AREA PLANNING OFFICER (Wrexham), Special Scale (salary £750-£1,030 per annum).

Appointment (a) is to the Headquarters Staff of the County Planning Department at Ruthin and appointment (b) is to the Area Planning Office Staff at Wrexham.

Application forms and further particulars can be obtained from me. Completed applications, giving the names of two referees, must be returned by 7th February, 1959.

W. E. BUFTON,

Clerk of the County Council.

Council Offices,  
Ruthin,

Denbighshire.

2652

**AIR MINISTRY WORKS Design Branch** requires in LONDON and PROVINCES ARCHITECTURAL ASSISTANTS experienced in planning/preparation of working drawings and details for permanent and semi-permanent buildings. Salaries in LONDON up to £1,015 for men and £935 p.a. for women. Somewhat lower in PROVINCES. Starting pay dependent on age, qualifications and experience. Long-term possibilities with promotion and pensionable prospects. Five-day week, 3 weeks 3 days leave a year. Liability for overseas service. Normally natural born British subjects. Write stating age, qualifications, employment details including type of work done to any Employment Exchange quoting Order No. Borough 100. 2653

## CITY OF SHEFFIELD

### APPOINTMENT OF SENIOR ASSISTANT ARCHITECT (HOUSING)

Grade A.P.T. IV-£1,025-£1,175

Applications are invited from suitably qualified persons for the above permanent appointment on the staff of the City Architect, Mr. J. L. Womersley.

The person appointed will be required to prepare layouts of housing areas and to design, prepare working drawings and supervise to completion all types of dwellings including multi-story flats. Preference will be given to applicants with considerable experience of this type of work.

The City's Housing Programme consists of:  
(i) Estates in outer areas comprising mixed development of houses and flats,  
(ii) estates in inner areas containing a substantial proportion of high flats,  
(iii) the redevelopment of outworn areas.

The appointment offers considerable scope to progressive architects possessing the requisite qualifications, design ability and experience.

Applications stating age, education and training, qualifications, present and past appointments (with dates and salaries), experience and the names of two referees should reach me by Monday, 9th February, 1959.

JOHN HEYS,

Town Clerk.

2764

29th January, 1959.

**GLASGOW CORPORATION TRANSPORT VACANCY FOR ARCHITECTURAL ASSISTANT**  
Applications are invited for the appointment of an Architectural Assistant.

Applicants must have served a recognised apprenticeship and have had the appropriate technical education. Experience in the design of industrial buildings will be an advantage.

The salary scale will be A.P. IV (£700 x £20-£760 per annum).

Applications, stating age, experience, qualifications, etc., should be lodged with the Subscriber not later than 14 days after publication of this notice.

E. R. L. FITZPAYNE,  
General Manager.

46, Bath Street,

Glasgow, C.2.

17th January, 1959.

2758

## BOROUGH OF SCUNTHORPE

Applications are invited for the following appointments in the Borough Engineer and Surveyor's Office:-

(a) ASSISTANT ARCHITECTS, Special Grade (£750-£1,030 p.a.).  
(b) ASSISTANT ARCHITECT, A.P.T. II (£725-£845 p.a.).

Applicants for the Special Grade posts should be fully qualified and for the Grade II appointment should be of Intermediate A.R.I.B.A. standard.

(c) QUANTITY SURVEYING ASSISTANT, A.P.T. II (£725-£845 p.a.).

Applicants should be of Intermediate examination standard and capable of all stages of working up for Bills of Quantities, site measuring, final accounts, interim certificates and junior taking off.

Housing accommodation will be available if required.

Applications giving particulars of age, experience, qualifications and appointments, together with the names of two referees should be submitted to the undersigned not later than Friday, 13th February, 1959.

T. M. LISTER,

Town Clerk.

Municipal Offices,

34, High Street,

Scunthorpe,

19th January, 1959.

2762

**METROPOLITAN BOROUGH OF BATTERSEA**  
Applications are invited for the following appointments to the permanent staff:-

(a) SENIOR ASSISTANT BUILDING SURVEYOR, A.P.T. Grade IV, £1,025-£1,175 per annum.  
(b) ASSISTANT QUANTITY SURVEYOR, A.P.T. Grade II, £725-£845 per annum.

London Weighting (£30 per annum at age 26 and over) is payable in addition for each appointment.

Applicants for appointment (a) should be Associate Members of the Royal Institution of Chartered Surveyors (Building Sub-division) and have experience in the conversion and improvement of house property and maintenance works to all types of buildings. Some administrative experience would be an advantage.

The successful applicant for appointment (b) will be engaged upon taking off and working up Bills of Quantities for conversions and improvements to existing properties and new housing schemes.

Previous Local Government experience is not essential. The commencing salary in each case will be according to professional qualifications held and to experience.

The appointments are subject to the Local Government Superannuation Acts, 1937-53.

Further particulars and application forms obtainable from the Borough Engineer and Surveyor, Town Hall, S.W.11, closing date 9th February, 1959.

2751

## BOROUGH OF WIDNES

### BOROUGH ARCHITECT'S DEPARTMENT ARCHITECTURAL ASSISTANTS

(a) Applications are invited from registered Architects with A.R.I.B.A. and Planning qualifications, mainly for work in connection with new Public Baths. Salary within Special Grade (£750 x £40 to £1,030) according to qualifications and experience.

(b) Applications are invited from candidates who have passed the R.I.B.A. Intermediate Examination. Salary within Grade A.P.T. I (£575-£725 per annum) according to ability and experience.

N.G.C. Conditions. Superannuation Scheme. Medical Examination.

Applications, quoting two referees, to Borough Architect, Brendan House, Widnes Road, Widnes, by Monday, 9th March, 1959.

Canvassing disqualifies.

FRANK HOWARTH,

Town Clerk.

Town Hall,

Widnes.

29th January, 1959.

2747

## COUNTY BOROUGH OF WALLASEY APPOINTMENT OF TOWN PLANNING ASSISTANT

Applications are invited for the above appointment on the staff of the Borough Engineer and Surveyor at a salary within the Special Grade, £750 x £40 x £1,030 per annum. Assistance will be given by the provision of housing accommodation, if required. Applicants should have had experience in a Planning, Architectural or Municipal Engineer's Office. Full particulars and Form of Application, which must be returned not later than Monday, the 16th February, 1959, may be obtained from the Borough Engineer and Surveyor, Town Hall, Wallasey.

A. G. HARRISON,

Town Clerk.

2731

## GLENROTHES DEVELOPMENT CORPORATION

**MODEL MAKER** required for Architectural and Planning Department. Salary scale £631-£811 per annum with placing. Experience in the making of scale models from plans essential. Photographs of models made by applicants should, if possible, accompany applications. Medical examination under Superannuation Scheme. House to rent available. Applications to the Secretary and Legal Adviser, Glenrothes Development Corporation, Glenrothes, Fife, by 28th January, 1959.

2722

## LEEDS COLLEGE OF ART

### SCHOOL OF ARCHITECTURE AND TOWN PLANNING

**ARTHUR LOUIS AARON V.C. SCHOLARSHIP**  
The Management Committee invite applications for this Scholarship of £250, open to past or present students, who, at the time of taking up the award, hold the Diploma in Architecture of the School. The Scholarship is awarded for travel and study in Architecture.

Applications should reach the Clerk to the Leeds School of Architecture and Town Planning, 43a, Woodhouse Lane, Leeds, 2, from whom further details may be obtained, by the 23rd February, 1959.

GEORGE TAYLOR,

Chief Education Officer.

2724

## CITY OF BELFAST

Applications are invited for the following positions in the Education Architect's Department.

**ARCHITECTURAL ASSISTANT Class I**  
Applicants must have passed the Intermediate Examination of the R.I.B.A. and should have a sound practical experience in design and construction.

Salary: £590 x £30-£770 x £35-£875.

### STRUCTURAL ENGINEER

Candidates must hold a recognised qualification in Civil or Structural Engineering, e.g. A.M.I.C.E. or A.M.S.T.R.U.C.E. and have sound experience in the design of structural steelwork and reinforced concrete, including foundation work, and should also have a practical working knowledge of site investigation and general experience of levelling work. A minimum practical experience of five years after qualifying, including three years' office designing is also necessary.

Salary: £970 x £40-£1,250 per annum.

Commencing salary fixed according to experience, etc. Superannuation contributions of approximately 6 per cent. of remuneration will be payable. Reciprocal pension arrangements exist between the Corporation and certain Public Authorities.

Preference given to suitably qualified ex-service Candidates.

Canvassing will disqualify.

Application forms, etc., obtainable from the Education Offices, 40 Academy Street.

Completed applications must reach the undersigned by Friday, 30th January, 1959.

JOHN DUNLOP,

Town Clerk.

City Hall, Belfast.

P.O. Box 234.

16th January, 1959

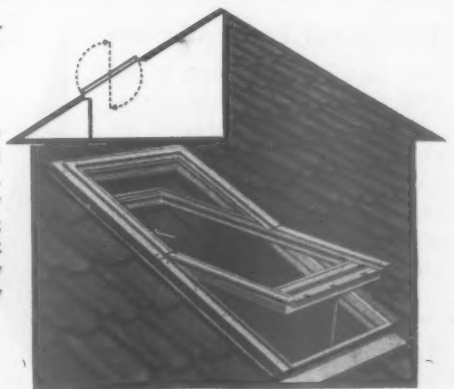
2730

Making light of it  
with... • VELUX the modern roof window, the answer to the natural lighting of roof space in new and old houses, flat conversions, drawing offices, studios and factories. Available in five "Ready for the Roof" sizes for double glazing, ensuring thermal insulation without condensation. Patent pivot hinges for ventilation control. Easy cleaning of all glass surfaces from within. Easily installed and completely weatherproof.

# VELUX

## Rooflights

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**METROPOLITAN BOROUGH OF STEPNEY  
SPITAL STREET HOUSING SCHEME**  
Tenders are invited for the erection of one block of 12 dwellings (three storeys) and one block of 45 dwellings (four and five storeys).  
Forms of Tender, with conditions, etc., obtainable from the Borough Engineer and Surveyor, Municipal Offices, 227/233 Commercial Road, E.1, upon payment of a deposit of ten guineas.  
Closing date for Tenders 23rd February, 1959.  
WILFRED REEVE,  
Town Clerk.

Contract No. 747.

**LONDON COUNTY COUNCIL  
ARCHITECTS' DEPARTMENT**  
Vacancy in Historic Buildings Section for ARCHITECT, Grade II (Salary £1,037-£1,305) to supervise work relating to Sec 29 and 30 of Town and Country Planning Act, 1947, including collecting relevant historical information, advising on proposals of private owners relating to listed buildings and preparing Building Preservation Orders. Applicants must have special knowledge of the history of architecture in England, preferably with experience in Town and Country Planning.  
Application form returnable by 14th February and particulars from Hubert Bennett, F.R.I.B.A., Architect to Council. Ref. AR/EK/6/59, County Hall, London, S.E.1. (130) 2746

**MIDDLESEX COUNTY COUNCIL  
COUNTY ARCHITECTS' DEPARTMENT**  
ASSISTANT ARCHITECTS, A.P.T. IV, £1,055 to £1,205 (if over 26). All round experience and ability to assume responsibilities of senior member of architectural group handling large building projects from sketch plan to completion. Should be A.R.I.B.A.  
ASSISTANT ARCHITECTS, Special Grade, £780 to £1,060 (if over 26) to work in teams on large or small projects. Keep assistants with ability will have opportunity of designing and executing smaller projects under Group Architects. Should have passed Parts I and II of R.I.B.A. Final.  
Also appointments in A.P.T. III (£875-£1,055 p.a.) if unqualified but experienced.  
Commencing salaries according to qualifications and experience. Established and pensionable, subject to medical assessment. Application forms from County Architect, 1, Queen Anne's Gate Buildings, Dartmouth Street, S.W.1, returnable by 18th February.

ARCHITECTURAL ASSISTANTS as supernumeraries for period not exceeding two years. Salaries up to £875 p.a. according to experience. Write immediately to County Architect, above address.  
All posts: Prescribed conditions (Quote Z.10, A.J.) 2745

**METROPOLITAN BOROUGH OF STEPNEY  
SIDNEY STREET HOUSING SCHEME**  
Tenders are invited for the erection of five terrace-blocks of 2-storey houses, two blocks consisting of four houses each and the remaining three of eight houses each, providing 32 houses in all.  
Forms of tender, with conditions, etc., obtainable from Messrs. Sydney Clough Son & Partners, 39 Devonshire Street, W.1, upon payment of a deposit of ten guineas.  
Closing date for tenders—3rd March, 1959.  
WILFRED REEVE,  
Town Clerk.

**COUNTY BOROUGH OF ROCHDALE**  
Applications are invited for the post of ARCHITECTURAL ASSISTANT on Special Classes, Grade (£750-£1,030 p.a.).  
The successful applicant, if fully qualified, will be offered housing accommodation.  
Applications, including the names of two referees, to the Borough Surveyor, Town Hall, Rochdale, by 1st February, 1959.  
Canvassing or non-disclosure of relationship to any member or senior official of the Council will disqualify. Appointment subject to medical examination.  
K. B. MOORE,  
Town Clerk.

2715

**DENTON URBAN DISTRICT COUNCIL  
JUNIOR ARCHITECTURAL ASSISTANT**  
Applications are invited for the permanent appointment of a Junior Architectural Assistant in the Engineer and Surveyor's Department, A.P.T. I (£575-£725 p.a.), the commencing point to be fixed according to qualifications and experience.

The appointment will be subject to the National Joint Council Conditions of Service, the provisions of the Local Government Superannuation Acts, the passing of a medical examination, and will be terminable by one month's notice on either side.

Applications stating age, qualifications and experience, together with the names and addresses of three referees, should be delivered to the undersigned not later than Monday, 9th February, 1959.

Canvassing, directly or indirectly will be deemed a disqualification.

JAS. SMITH,

Clerk of the Council.

Town Hall,  
Denton, Nr. Manchester. 2735

**MONMOUTHSHIRE COUNTY COUNCIL  
APPOINTMENT OF TECHNICAL STAFF**  
Applications are invited for the following posts in the County Architect's Department under the N.J.C. Conditions as follows:

ONE ARCHITECTURAL ASSISTANT, Grade A.P.T. IV, salary £1,025-£1,175 per annum  
TWO ARCHITECTURAL ASSISTANTS, Special Grade for Architectural Assistants, salary £750-£1,030 per annum.

TWO QUANTITY SURVEYING ASSISTANTS, Grade A.P.T. II, salary £725-£845 per annum.

TWO LAND SURVEYING ASSISTANTS, Grade A.P.T. I, salary £575-£725 per annum.

Forms of application, particulars of posts and conditions of service can be obtained from the undersigned.

Applications, together with three testimonials, must be forwarded to Colin L. Jones, F.R.I.B.A., County Architect, Queen's Hill, Newport, Mon., not later than Saturday, 7th February, 1959.

VERNON LAWRENCE,  
Clerk of the Council.

County Hall,  
Newport,  
Mon. 2725

**BOROUGH OF HESTON AND ISLEWORTH**  
Applications are invited for the undermentioned appointments in the Borough Engineer and Surveyor's Department:—

(a) SENIOR PLANNING ASSISTANT. Salary in accordance with A.P.T. Grade II (£725 × £30-£845 plus London weighting).

(b) PLANNING ASSISTANT. Salary in accordance with A.P.T. Grade I (£575 × £30-£725 plus London weighting).

Applicants for (a) should have passed the Intermediate examination of the Town Planning Institute or other equivalent and have had experience in a town planning department of a local authority.

The Council is unable to assist the successful candidates with housing accommodation.

Applications are to be submitted by 9th February, 1959, on forms to be obtained from and returned to the Borough Engineer and Surveyor, 88, Lampton Road, Hounslow.

D. MATHIESON,  
Town Clerk.

Town Hall,  
Hounslow. 2716

**DEVON COUNTY COUNCIL  
DEATMOOR NATIONAL PARK  
APPOINTMENT OF ASSISTANT DIVISIONAL  
PLANNING OFFICER**

Special Scale—£750 × £40 to £1,030  
Applications are invited for this post and preference will be given to persons holding an architectural or landscape qualification.

Forms of application giving further details and returnable by 9th February, 1959, from: County Planning Officer, "Bellair," Topsham Road, Exeter. 2786

**BOROUGH OF WILLESDEN  
BOROUGH ENGINEER AND SURVEYOR'S  
DEPARTMENT**

Applications are invited from suitably qualified and experienced persons for the following permanent appointments:—

(a) ASSISTANT ARCHITECT within Grade A.P.T. IV (£1,025-£1,175 p.a.).

(b) ASSISTANT ARCHITECT within Special Grade (£750-£1,030 p.a.).

(c) TECHNICAL ASSISTANT within Grade A.P.T. II (£725-£845 p.a.). (Maintenance work and improvements on schools. Intermediate R.I.C.S. (Building) is advantageous.)

London weighting, maximum £30 p.a. is payable in addition to the above salaries.

The Council is unable to assist with housing accommodation.

Forms of application and conditions of appointment may be obtained from the Borough Engineer and Surveyor, Town Hall, Dyne Road, Kilburn, N.W.6. Applicants to be returned to the undersigned not later than 9 a.m. on Monday, 9th February, 1959.

When writing for application forms candidates must state for which appointment they wish to apply.

R. S. FORSTER,  
Town Clerk.

**CORPORATION OF KIRKCALDY**

Borough Engineer's Department—ARCHITECTURAL ASSISTANT. Salary A.P. Grade V/VI (£770-£955). Applicants must be Associates of R.I.B.A. or hold equivalent qualifications and must have had good general architectural experience.

Housing accommodation made available if required and removal expenses paid.

Post pensionable; medical examination. Canvassing direct or indirect disqualifies. Declaration of relationship to member of Council or chief official.

Applications stating age, details of training, qualifications and experience and the names and addresses of two referees to Borough Engineer, Town House, Kirkcaldy, by 7th February, 1959. 2717

**CORPORATION OF LONDON**

Require ARCHITECTURAL ASSISTANT in the City Surveyor's Department. Applicants must have passed Intermediate R.I.B.A. Net and accurate draughtsmanship, with a sound knowledge of building construction, essential. Salary by arrangement.

Applications in writing stating age, qualifications and experience, with names of three referees to City Surveyor, Guildhall, London, E.C.1 within 14 days. 2728

**CITY AND COUNTY OF BRISTOL  
CITY ARCHITECTS' DEPARTMENT**

Applications invited for permanent staff posts:

(a) SENIOR ASSISTANT ARCHITECTS, Special Scale (£750 × £40-£1,030).

(b) ASSISTANT ARCHITECTS, Grade A.P.T. II (£725 × £30-£845).

(c) ASSISTANT ARCHITECTS, Grade A.P.T. I (£575 × £30-£725).

(d) JUNIOR ASSISTANT, Higher General Division (starting salary at 20 at least £350 a scale rising to £620).

Appointments will be appropriate to professional experience and qualifications. Applicants for (a) must have passed Parts I and 2 of R.I.B.A. and have had experience in design construction and contract administration preferably with large Local Authority. Applicants for (d) must be suitably experienced, age not less than 20; duties include tracing, colouring of prints, assisting with surveys and generally to work under supervision of an Assistant Architect. University School Certificate or good G.C.E. essential.

Housing accommodation available if necessary at an economic rent.

Details and application forms (returnable by 16th February) from City Architect, Council House, Bristol 1. 2720

**COUNTY BOROUGH OF WILLESDEN**

Applications invited from suitably qualified and experienced persons for the following permanent appointments:—

(a) ASSISTANT ARCHITECT within Grade A.P.T. IV (£1,025-£1,175 p.a.).

(b) ASSISTANT ARCHITECT within Special Grade (£750-£1,030 p.a.).

(c) TECHNICAL ASSISTANT within Grade A.P.T. II (£725-£845 p.a.). (Maintenance work and improvements on schools. Intermediate R.I.C.S. (Building) is advantageous.)

London weighting, maximum £30 p.a. is payable in addition to the above salaries.

The Council is unable to assist with housing accommodation.

Forms of application and conditions of appointment may be obtained from the Borough Engineer and Surveyor, Town Hall, Dyne Road, Kilburn, N.W.6. Applicants to be returned to the undersigned not later than 9 a.m. on Monday, 9th February, 1959.

When writing for application forms candidates must state for which appointment they wish to apply.

R. S. FORSTER,  
Town Clerk.

**CORPORATION OF KIRKCALDY**

Borough Engineer's Department—ARCHITECTURAL ASSISTANT. Salary A.P. Grade V/VI (£770-£955). Applicants must be Associates of R.I.B.A. or hold equivalent qualifications and must have had good general architectural experience.

Housing accommodation made available if required and removal expenses paid.

Post pensionable; medical examination. Canvassing direct or indirect disqualifies. Declaration of relationship to member of Council or chief official.

Applications stating age, details of training, qualifications and experience and the names and addresses of two referees to Borough Engineer, Town House, Kirkcaldy, by 7th February, 1959. 2717

**CORPORATION OF LONDON**

Require ARCHITECTURAL ASSISTANT in the City Surveyor's Department. Applicants must have passed Intermediate R.I.B.A. Net and accurate draughtsmanship, with a sound knowledge of building construction, essential. Salary by arrangement.

Applications in writing stating age, qualifications and experience, with names of three referees to City Surveyor, Guildhall, London, E.C.1 within 14 days. 2728

**CITY AND COUNTY OF BRISTOL**

Applications invited for permanent staff posts:

(a) SENIOR ASSISTANT ARCHITECTS, Special Scale (£750 × £40-£1,030).

(b) ASSISTANT ARCHITECTS, Grade A.P.T. II (£725 × £30-£845).

(c) ASSISTANT ARCHITECTS, Grade A.P.T. I (£575 × £30-£725).

(d) JUNIOR ASSISTANT, Higher General Division (starting salary at 20 at least £350 a scale rising to £620).

Appointments will be appropriate to professional experience and qualifications. Applicants for (a) must have passed Parts I and 2 of R.I.B.A. and have had experience in design construction and contract administration preferably with large Local Authority. Applicants for (d) must be suitably experienced, age not less than 20; duties include tracing, colouring of prints, assisting with surveys and generally to work under supervision of an Assistant Architect. University School Certificate or good G.C.E. essential.

Housing accommodation available if necessary at an economic rent.

Details and application forms (returnable by 16th February) from City Architect, Council House, Bristol 1. 2720

## Technical Information

The Certificate of Merit in the 1958 Trade and Technical Literature Competition sponsored by the R.I.B.A. and the Building Centre has been awarded to this company. Copies of the literature, as listed below, are available on request.

- No. 1 Cladding
- No. 2 Window Sills & Surrounds
- No. 3 Copings & Cappings

## High Fell Westmorland Green Slate and Orton Scar Westmorland Limestone CLADDING

Limestone & Green Slate Slab Co. (Westmorland) Limited,  
Appleby Road, Kendal. Phone: Kendal 1246



**COUNTY BOROUGH OF EAST HAM**  
**BOROUGH ENGINEER'S DEPARTMENT**  
 Applications are invited for the following temporary appointments:—  
**SENIOR ASSISTANT ARCHITECTS—**  
 GRADE IV—(£1,025—£1,175).  
**ARCHITECTURAL ASSISTANT—**  
 GRADE II—(£725—£845).  
 London Weighting is paid in addition, and salaries in excess of the minima may be paid according to qualifications and experience. The appointments are for work on a new Technical College and are expected to be for a period of not less than 3 years.  
 Further details and application forms returnable by 13th February, 1959, from the Town Clerk, Town Hall, East Ham, E.6. 2779

**BOROUGH OF TOTTENHAM**  
 Applications are invited for the following posts:—  
**ASSISTANT ARCHITECT (Unstab.) APT Special**  
 Grade—£750 to £1,030 p.a. Applicants must hold a final professional qualification.  
**ARCHITECTURAL ASSISTANT (Estab.) APT II**  
 £725—£845 p.a. Applicants must have at least passed R.I.B.A. Intermediate Examination or equivalent.  
**ARCHITECTURAL ASSISTANT (Estab.) APT I**  
 £575 to £725 p.a. Applicants must have passed R.I.B.A. Intermediate Examination or equivalent.  
 London Weighting Allowance of £20 or £30 p.a. according to age.  
 Commencing salaries within grades according to ability and experience.  
 Application form and Conditions of Appointment from Borough Engineer (A.J.), Town Hall, N.15. Applications to be delivered by Thursday, 11th February, 1959. 2821

**CITY OF LEICESTER**  
**CITY ARCHITECT'S DEPARTMENT**  
 Applications are invited for the appointment of an **ASSISTANT ARCHITECT**, salary Special Grade £750—£1,030 per annum.  
 The successful applicant will be engaged on housing work including large scale central area redevelopment.  
 Applicants must have passed Parts I and II of the Final Examination of the R.I.B.A.  
 Applications with the names of two referees should be sent to the undersigned not later than Monday, 9th February, 1959.  
**J. H. LLOYD OWEN.**  
*City Architect.*  
 19 Loseby Lane,  
 Leicester. 2795

**CITY OF BIRMINGHAM**  
**CITY ARCHITECT'S DEPARTMENT**  
 Applications are invited for the vacant position of **SENIOR ARCHITECT** to take control of the Housing Design Section. This is a post which offers great opportunities to a man with a lively interest in progressive design, new development techniques, and layouts. The architect appointed will be responsible for the design, planning and programming of the City's housing projects, which include building in the redevelopment areas (being comprehensively redeveloped to high density) as well as development of suburban sites, to a total value of approximately £6,000,000 annually. In both types of areas there is scope for great variety in the design of mixed development, including multi-storey flats and maisonettes, shopping schemes, etc.  
 The salary for this post will be within the Joint Negotiating Committee for Chief Officers, Deputies and other Senior Officers' Scale "G" (£2,790 rising by annual increments of £55 to £2,865 per annum) at a commencing salary according to experience.  
 The post, which is permanent and superannuable, is subject to a medical examination and to three months' notice on either side.  
 Applications, endorsed with the heading of the post, stating age, present position and salary, qualifications and experience, together with the names of two persons to whom reference can be made, should reach the undersigned not later than 20th February, 1959.  
**A. G. SHEPARD FIDLER.**  
*City Architect.*  
 Civic Centre,  
 Birmingham, 1. 2809

**CITY OF WAKEFIELD**  
**CITY ENGINEER'S DEPARTMENT**  
 Applications are invited for the following superannuable appointments:—  
**(a) SENIOR ASSISTANT ARCHITECTS**  
 Special Grade (£750 × £40—£1,030).  
 Applicants must be A.R.I.B.A. and preference will be given to those having municipal experience.  
**(b) ARCHITECTURAL ASSISTANTS**  
 Grade A.P.T. I (£575 × £30—£725).  
 Grade A.P.T. II (£725 × £30—£840).  
 Applicants must have passed the Intermediate R.I.B.A. Examination or parts of the R.I.B.A. Final and the salary grading will depend on the examinations passed and experience.  
**(c) SENIOR ASSISTANT ENGINEERS**  
 Special Grade (£750 × £40—£1,030).  
 Applicants must hold the Testamur of the Inst. Mun. E. or A.M.I.C.E.  
 The point of commencement for the Special Grade appointments will depend on qualifications and experience.  
 Housing accommodation will be considered in respect of posts (a) and (c).  
 Applications stating age, training, qualifications and experience together with the names of two referees to be sent to the City Engineer, Town Hall, Wakefield, by the 14th February, 1959. 2811

**BOROUGH OF WREXHAM**  
 Applications are invited for the appointment of **ARCHITECTURAL ASSISTANT**, Salary A.P.T. I (£575 to £725 per annum). Point of entry according to qualifications and experience.  
 HOUSE provided if required.  
 Applications to be submitted by 12 noon, 9th February, 1959.

**PHILIP J. WALTERS.**  
*Town Clerk.*  
 Guildhall,  
 Wrexham. 2823

**COUNTY BOROUGH OF CARLISLE**  
 Applications are invited for the appointment of **ASSISTANT ARCHITECT** in the City Surveyor's Department at a salary in accordance with the Special Scale £750—£1,030.  
 Starting salary according to qualifications and experience. Applicants should be A.R.I.B.A. and will be engaged in the first instance on work included in the Authority's Educational Building Programme.  
 Forms of application from City Surveyor, 19 Fisher Street, Carlisle, returnable to him not later than February 12th, 1959.  
**H. D. A. ROBERTSON, Town Clerk.** 2825

**SOUTH-EAST METROPOLITAN REGIONAL HOSPITAL BOARD**  
 Vacancies for **ASSISTANT ARCHITECTS**. Salary within scale £720 to £1,065. Applications by 12th February, 1959. Details from Regional Architect, 40, Eastbourne Terrace, W.2. 2785  
**THURROCK U.D.C. (Engineer and Surveyor's Department) require ARCHITECTURAL ASSISTANT under Architect to the Council.** Salary A.P.T. III: £345—£1,025 p.a. Candidates should be associates of the R.I.B.A. and must be experienced in the design, preparation of drawings and specifications of various building and architectural work undertaken by a local authority. Appointment pensionable. Housing accommodation may be provided if successful candidate resides more than 20 miles from Thurrock. Applications, stating age, qualifications, and experience, and quoting three referees, to Clerk of the Council, Council Offices, Grays, Essex, by 11th February, 1959. Canvassing disqualifies. Relationship with Members or Senior Officers of the Council must be disclosed. 2824

**CITY ARCHITECT'S OFFICE, MANCHESTER**  
 Applications invited for the appointment on the permanent staff of:—  
**(1) SENIOR ASSISTANT ARCHITECT**, salary A.P.T. Grade IV, £1,025 to £1,175 per annum.  
**(2) ARCHITECTURAL ASSISTANT**, salary A.P.T. Grade I, £575 to £725 per annum.  
 Housing accommodation for a limited period may be provided for the successful candidate for the senior post. Five-day week in operation. Removal expenses allowed. Forms of application from the City Architect, P.O. Box 488, Town Hall, Returnable by 12th February, 1959. 2808  
**CITY ARCHITECT'S OFFICE, MANCHESTER**  
 Applications invited for appointment of a **TEMPORARY CLERK OF WORKS** to supervise the erection of the New Swimming Baths, at Wythenshawe, costing approximately £250,000. Contract period approximately 2½ years. Salary Grade A.P.T. II, £725 to £845.  
 Applicants must have had recent experience as Clerk of Works on large scale building works involving extensive use of reinforced concrete.  
 Particulars and form of application from the City Architect, P.O. Box 488, Town Hall, Manchester, 2, returnable by 12th February, 1959. 2807

**BRITISH RAILWAYS**  
**EASTERN REGION**  
**ASSISTANT ARCHITECTS** with real ability in contemporary design required for office of Architect Eastern Region, British Railways, King's Cross Station. Applicants should be able to play a responsible part in design, administration and site supervision of buildings which are varied and interesting in character. Applicants should be qualified or should have Intermediate R.I.B.A. with practical experience. Starting salary £833 p.a. Five-day week and concessionary rail travel. permanency with membership of superannuation scheme to suitable applicants after probationary period. Apply in writing giving age, experience and any qualifications to Chief Civil Engineer, British Railways, Eastern Region, King's Cross Station, London, N.1. 2806

**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 100,000 yards of 3 ft. cleft chestnut fencing, 10,000 yards of 3 ft. 6 in. cleft chestnut fencing, and 40,000 4 ft. 6 in. stakes, to be supplied during the twelve months commencing 1st April, 1959.  
 The attention of persons submitting tenders is drawn to the following points:—  
 (1) Delivery will be required in 12 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 be for not less than 20,000 yards of fencing and 6,000 stakes.  
 Forms of tender can be obtained from the undersigned and should be returned by the 20th February, 1959.  
**J. P. MACEY.**  
*Housing Manager.*  
 Bush House,  
 Broad Street,  
 Birmingham, 1. 2815

**BRAINTREE RURAL DISTRICT COUNCIL**  
**TEMPORARY ARCHITECTURAL AND QUANTITY ASSISTANT**

Applications are invited from persons with sound experience in the preparation of surveys, plans, details of construction, quantities and design of housing schemes. Preference will be given to applicants with R.I.B.A. Intermediate or equivalent, N.J.C. service conditions, Salary A.P.T. II, £725 to £845 p.a.  
 Write, giving age, experience, qualifications and two referees, to me, by 3rd February, 1959. No forms. Canvassing disqualifies.

**W. HUMPHREY,**  
*Clerk of the Council.*  
 St. Peter's Close,  
 Bocking, Braintree, Essex. 2805

**CITY OF DURHAM**  
**ASSISTANT ARCHITECT**  
 Applications are invited for the above appointment. Salary within Special Grade for qualified architect or within A.P.T. Grades I/II according to experience for assistant who has passed Intermediate R.I.B.A. examination. Applicants must be capable of initiating design, working drawings and details. Housing accommodation if required. Contribution made towards removal expenses. Appointment superannuated and subject to one month's notice on either side, to passing of medical examination and to N.J.C. Scheme of Conditions of Service. Canvassing disqualifies. Applicants must disclose relationship to members or senior officers of the Council.  
 Applications stating age, training, present and previous appointments, experience and names and addresses of two persons to whom reference may be made to be delivered to the undersigned before 6th February, 1959.  
**D. B. MARTIN-JONES,**  
*Town Clerk.*  
 32, Claypath,  
 Durham. 2819

**CITY AND ROYAL BURGH OF DUNFERMLINE**  
**DEPARTMENT OF BURGH ARCHITECT AND TOWN PLANNING OFFICER**  
 Applications are invited for the post of **ARCHITECTURAL ASSISTANT**, Grade A.P. IV—V (£700—£830) with placing according to experience. Applicants should be Intermediate R.I.B.A. or equal, and should have had experience in Local Authority work.  
 Applications stating age, experience, qualifications and present appointment, together with copies of two recent testimonials, should be lodged with Leonard Howarth, Burgh Architect and Town Planning Officer, 6 Abbot Street, Dunfermline, not later than Monday, 2nd February, 1959.  
 Applicants must disclose in writing whether to their knowledge they are related to any Member or Senior Officer of the Town Council, and canvassing, either directly or indirectly, will be a disqualification.  
 Housing accommodation may be arranged for suitable applicant.

**J. DOUGLAS,**  
*Town Clerk.*  
 City Chambers,  
 Dunfermline.  
 9th February, 1959. 2820

**METROPOLITAN BOROUGH OF FULHAM**  
**TWO ASSISTANT ARCHITECTS**  
 Borough Architect's and Housing Department. A.P.T. II, £725/£845, plus London weighting £20/£30 p.a. according to age. Two years' Office experience and R.I.B.A. Intermediate. Multi-storey housing experience an advantage. Five-day week. Application forms from Town Clerk, Town Hall, S.W.6. Closing date 9th February. 2812

**LONDON COUNTY COUNCIL**  
**ARCHITECTS' DEPARTMENT**  
 Vacancies for **ARCHITECT/PLANNERS**. Tasks include three-dimensional planning within London's eight major Comprehensive Development Areas (including Stepney/Poplar, South Bank and Elephant and Castle) and other Redevelopment Areas. Work includes preparation of comprehensive layouts for all important areas of new development throughout the County including areas to be redeveloped in connection with road improvements.  
 Starting salaries up to £860 according to experience and qualifications. Application forms and particulars obtainable from Hubert Bennett, F.R.I.B.A., Architect to Council (Ref. AR/BK/7/59). County Hall, London, S.E.1. (146) 2804

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

**A** **COMPETENT ASSISTANT**, with several years' experience and capable of working with little supervision, required in Branch Office, Birmingham, engaged on a varied and interesting programme of commercial projects. Applications, giving full particulars and salary required, to: G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester, 4. 1874

**A** **ARCHITECTURAL ASSISTANT** required from about Intermediate standard to recently Qualified, for interesting and varied work in practice mainly concerned with commercial projects. Five-day week. Congruent working conditions. Salary by arrangement. Apply in writing, giving full particulars, age, to J. Alfred Harper & Son, Union Chambers, 63, Temple Row, Birmingham. 2447

**ASSISTANT required in busy West End Office.** About intermediate level. Write stating age, experience and salary desired. Box 2601.

**RONALD WARD & PARTNERS** require **ARCHITECTURAL ASSISTANTS** with contemporary outlook and willing to use own initiative. Salary range £500 to £900. Congenial working conditions. Five-day week. Apply 29, Chesham Place, Belgrave Square, S.W.1. Telephone Belgrave 3561. 2599

**LEWELLYN SMITH & WATERS** require **SENIOR and JUNIOR ASSISTANTS** for a widely varied programme of work. Salary according to experience. Please write, stating qualifications, experience and age, to 193, Old Brompton Road, S.W.7. 2446

**SENIOR ASSISTANT** required of Intermediate/Final standard in Croydon office. Varied practice of interesting work. Good draughtsman and sound knowledge of construction essential, together with ability to manage jobs. Five-day week. Salary according to experience. Apply George Lowe & Partner, 4, High Street, Croydon SE6 9J. 2611

**NORFOLK Office** requires **Single ARCHITECTURAL ASSISTANT** of about intermediate standard. Experience in Local Authority Housing an advantage. Reply with details of age and salary required to Box 2627.

**GOLLINS, MELVIN, WARD & PARTNERS** require **STAFF** to work on Hospital, Office and University projects. Age and experience are less important than design ability and enthusiasm. Five-day week, quarterly bonuses, pension scheme. Telephone Welbeck 9991 for appointment. 2622

**WILL** any **JUNIOR ASSISTANT** who prefers to work in a small Private Office, and is interested in the preservation of Historic Buildings, please apply to L. H. Bond & R. W. Read, 44, Castlegate, Grantham. 2553

**NORTH & PARTNERS**, Chartered Architects, Broadway, Maidenhead, have a vacancy in their Drawing Office for **ARCHITECTURAL ASSISTANT**. Intermediate standard. Salary approximately £600. 2575

**ASSISTANT** required in busy West End practice, about 25 years of age and R.I.B.A. Intermediate standard. Good opportunities for taking responsibility. Please write giving details of experience and salary required. Box 2580.

**JUNIOR ASSISTANT** required in busy West End practice. Good opportunities for obtaining all round experience. Write giving age, salary required, etc. Box 2581.

**ARCHITECTURAL ASSISTANTS** with three years' training, experience in Architect's Office, of Intermediate R.I.B.A. standard, and with a keen interest in Historic Architecture, required by **MINISTRY OF WORKS HISTORIC BUILDINGS AND ANCIENT MONUMENTS DRAWING OFFICES, LONDON**. Applicants must have surveying experience and a sound knowledge of construction. Work involves Surveying and Preservation of Ancient Monuments and Historic Buildings. Pay between £550 and £870 per annum, according to age and experience. Five-day week, three-and-a-half weeks annual leave. Opportunities for promotion and permanency.

**FEMALE LEARNER TRACERS and TRACERS** are also required in these Drawing Offices. Pay for Learners, £3 16s.—£5 8s. per week; Tracers, £4 4s.—£10 10s. per week, according to age and experience.

State age, qualifications and experience to Chief Architect, Ministry of Works (F), Room 435, Abell House, London, S.W.1. 2588

**ARCHITECTURAL ASSISTANT** required in Chief Architect's Office of large Company with offices in Central London. All staff facilities; five-day week. Please state age, qualifications, experience and salary required. Box 2469.

**ROBERT POTTER & RICHARD HARE**, F.R.I.B.A., have the following vacancies:

(a) **QUALIFIED ASSISTANT ARCHITECT** to work on interesting University project. Experience of multi-storey buildings an advantage.

(b) **ARCHITECTURAL ASSISTANT** for the preparation of working drawings and surveys. Intermediate R.I.B.A. standard. Initial engagement for one year contract with possibility of renewal.

Write stating qualifications, experience and salary required to De Vaux House, Salisbury, Wilt. 2664

**SENIOR ASSISTANT** with good all-round experience required for small practice in London. Applicant must be able to take responsibility under minimum supervision and be interested in the development of private housing schemes. Salary £690-£1,000 according to experience. Write in first instance to Box 2653

**SENIOR ARCHITECTURAL ASSISTANT** required with opportunities for varied contemporary work in medium-sized office. Pension scheme. Salary by arrangement. State full particulars to Hadfield Cawkwell & Davidson, 17, Broomgrove Road, Sheffield, 10. 2666

**ROBERT MATTHEW & JOHNSON**, MARSHALL have vacancies in their London office for qualified **ARCHITECTS** at various levels to work on a variety of interesting projects. Apply in writing with full particulars to 24, Park Square East, N.W.1. 2729

**KEEN ASSISTANTS** between Intermediate and Final required for display and interior design work in department stores. Box 2657.

**JUNIOR ASSISTANT** with some office experience wanted immediately. Good draughtsmanship essential. Five-day week. Write full particulars and salary required to Musman & Cousens, 12, Upper Berkeley Street, W.1. 2650

**NOTTINGHAM. ARCHITECTS and ARCHITECTS' ASSISTANTS** required:—

1. Qualified with a minimum of two years' experience. Salary £350-£1,150. Starting salary to be agreed.

2. Unqualified with a minimum of four years' experience. Salary £500-£800. Starting salary to be agreed. Bartlett & Gray, Castle Gate Chambers, Castle Gate, Nottingham. 2639

**EXPANDING** firm of architects urgently requires experienced **SENIOR ASSISTANT** to work in their Guildford office. This is an important position and the person appointed must have had experience of the design and detailing of pre-fabricated steel structures in addition to general architectural experience. The post offers good prospects and scope for initiative. Experience and ability are of greater importance than qualifications. Write in confidence giving experience and salary required to:—Scott, Brownrigg and Turner, 32, London Road, Guildford. 2699

**ARCHITECTURAL ASSISTANTS** of Final and Intermediate standard required immediately in Leigh office engaged on varied and interesting programme of Municipal Buildings, Schools, Churches, Housing, etc. Applications giving full particulars and salary required to J. C. Prestwich & Sons, M.A., F.A.R.I.B.A., Bradshawgate Chambers, Leigh, Lancs. 2641

**KUWAIT**. Qualified **ARCHITECT** required for office in Kuwait. Applicants should be capable of starting and supervising office, negotiating with Kuwait Government, Kuwait Oil Company, etc., for design and erection of buildings. Bachelor quarters provided, salary subject to negotiation according to experience. State age, experience and qualifications to L. W. VASS LIMITED, AMPHILL, BEDFORD. 2700

**MIDLAND** firm of architects seek **CHIEF ASSISTANT** for new office in Merseyside Area. Position should lead to partnership for right man. Design and organisational ability, experience and good local contacts essential. References will be required. Box 2699.

**W. H. SAUNDERS & SON** require additional **ARCHITECTURAL ASSISTANTS** in their Southampton and Portsmouth Offices, in connection with an interesting programme of work, including commercial and shopping developments and school projects.

Preference will be given to applicants showing potential ability at the design stage.

Applications giving details of experience and salary required should be addressed to: 22, Brunswick Place, Southampton, or 49, Commercial Road, Portsmouth. 2683

**EDINBURGH**. Architects require **SENIOR** Qualified **ASSISTANT** with a view to partnership after a probationary period. Box 484, Robertson & Scott, 42, Charlotte Square, Edinburgh. 2777

**INTERMEDIATE and Final standard ASSISTANTS** required. Minimum two years' office experience. Salary according to ability. Theo. H. Birks, 38, Portland Place, W.1. LAN. 7235. 2728

**ASSISTANT** for general practice. Either keen Junior or good Draughtsman up to Final standard. Ability and enthusiasm more important than qualifications. Details and availability to Saunders & Partners, 19, Queens Parade, Grimsby, Lincs. 2732

**ASSISTANT** required by Chartered Architects practising in South Coast town. Qualifications secondary to office experience (two years minimum). Pension Scheme, five-day week, £750 p.a. Apply Box 2733.

**ARCHITECTURAL ASSISTANT** required, to assist the Company Architect on new buildings and alterations connected with the development of a Chemical Works. Apply in writing, stating age, experience, etc., to the Chief Engineer, Messrs. Hickson & Welch Ltd., Ings Lane, Castleford, Yorkshire. Salary will be by arrangement. 2734

**INTERMEDIATE ASSISTANT**, with several years' office experience, required. Five-day week. Salary according to ability and experience. Details of training, experience, etc., to: Felix Walter, F.R.I.B.A., 4, Raymond Buildings, Gray's Inn, W.C.1. 2736

**RILEY & GLANFIELD** require **MALE ASSISTANT** of Intermediate standard Work: Church, industrial, housing and public house. Some general office experience is necessary. Tel. CHA. 7328. 2737

**CROYDON**.—Experienced and competent **ARCHITECTURAL ASSISTANTS** required. Write, stating fullest particulars, to Graham Crump and Denis Crump, F.A.R.I.B.A., Chartered Architects, 43, George Street, Croydon. 2744

**CHELTHAM**.—**ARCHITECTURAL ASSISTANT**, recently qualified or near Final standard, required. Salary scale £700-£800 according to experience. Rainger, Rogers & Smithson, Wellington Square. 2765

**ASSISTANT ARCHITECTS** for Co-operative Wholesale Society Ltd., Architect's Department, Cardiff. Salary scale £500-£870 p.a.

Applications are invited to fill positions at the Cardiff Branch Office. Salary according to age, qualifications and experience. The posts are superannuable, subject to medical examination. Five-day week in operation.

Applications, stating age, experience, qualifications and salary required, to: W. J. Boes, F.R.I.B.A., Chief Architect, Co-operative Wholesale Society Ltd., 99, Leman Street, London, E.1. 2740

**JACKSON & EDMONDS**, Architects, have vacancies for **STAFF** in Birmingham and London Offices. Salary grades between £500 and £750. Write, giving details of training, experience and salary required, to 116, Colmore Row, Birmingham, 3. 2742

**ARCHITECTS' ASSISTANT** of Intermediate standard, or above, required in the office of Leonard J. Multon & Partner, F.R.I.B.A., 6, Greenfield Crescent, Edgbaston, Birmingham, 15. Please telephone for appointment: Edgbaston 4188.

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Hills, F., & Sons, Ltd.....	67	0291
Hill, R., Ltd.....	65	0688
Hill, J. M., & Sons (Amphill), Ltd.	32	1193
Hills (West Bromwich), Ltd.....	78	0292
Hughes, F. A., & Co., Ltd.....	54	0634

Imperial Chemical Industries, Ltd. (Metals) .....	28	0307
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James, W., & Co., Ltd.....	89	0319
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Key Engineering Co., Ltd. (Pitch Pipes) .....	22, 23	0326
Key Engineering Co., Ltd. (Under-floor Ducts).....	24, 25	1194
King, G. W., Ltd.....	75	0327

Le Bas Tube Co., Ltd.....	6	0338
Limmer & Trinidad Lake Asphalt Co., Ltd. ....	39	0347
Limestone & Green Slate Slab Co., Ltd. ....	86	1160

MacAndrews & Forbes, Ltd. ....	89	0359
McCarthy, M., & Sons, Ltd.....	88	0361
Marley Concrete, Ltd.....	77	0370
Marley Tile Co., Ltd.....	44	0371
Medway Timber Building .....	63	0377
Merchant Adventurers, Ltd., The...	48	0379
Midland Electric Manfg. Co., Ltd.	81	0386
Morris, M. A., Ltd.....	47	0397

Natural Asphalte Mineowners & Manufacturers Council, The.....	34	0484
Newton Chambers & Co., Ltd.....	30	0990

Palmers Travelling Cradle & Scaffold Co., Ltd. ....	50	0971
Pilkington Bros., Ltd.....	42	0430
Potterton, Thos., Ltd.....	46	0171
Pritchett & Gold Co., Ltd.....	19	0644
Progressive Tours, Ltd.....	78	0959

Radiation Group Sales, Ltd.....	59	0664
Reliance Telephone Co., Ltd., The	51	0841
Rentokil .....	55	0440
Rippers, Ltd. ....	18	0470
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Rudders & Payne.....	36	1186
Runnymede Rubber Co., Ltd.....	52	0481
Rustless Iron Co., Ltd.....	20	1037

Sanders & Forster, Ltd. ....	6, 7	0489
Saro Laminated Wood Products, Ltd. ....	80	0490
Sommerfelds, Ltd.....	14	0523
Speedwell Gear Case Co., Ltd. ....	2	0529
Spon, E. & F. N., Ltd. ....	81	1190
Standard Maclean, Ltd.....	15	0993
Steels Engineering Installations, Ltd. ....	62	0750

Taylor, J., Ltd.....	88	0543
Thermacoust, Ltd.....	78	0547
Thorn, J., & Sons, Ltd.....	9	0550
Timber Development Assoc., Ltd.	66	0550
Timber Fireproofing Co., Ltd.....	26	0550
Tomo Trading Co., Ltd.....	29	0653
Turners Asbestos Cement Co., Ltd.	72	0560

Velux Co., Ltd.....	85	0930
Vermiculite Cladding, Ltd.....	88	1130

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Wardle Engineering Co., Ltd.....	31	0591
Waring & Gillow, Ltd.....	2	0593
Watco (Sales), Ltd. ....	2	0938

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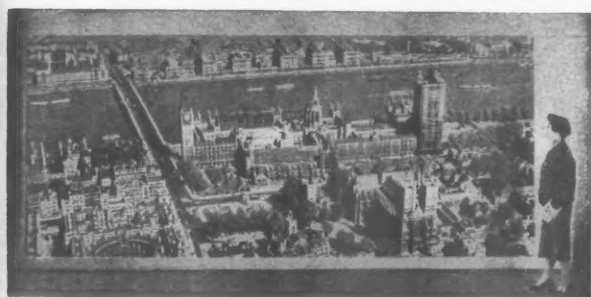
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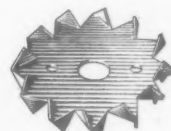
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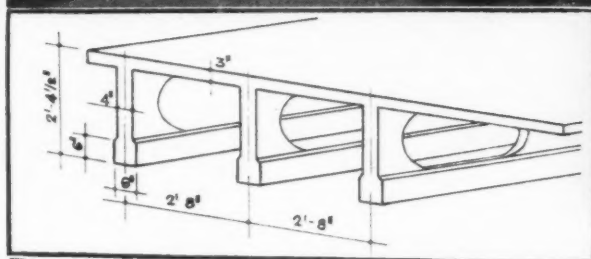
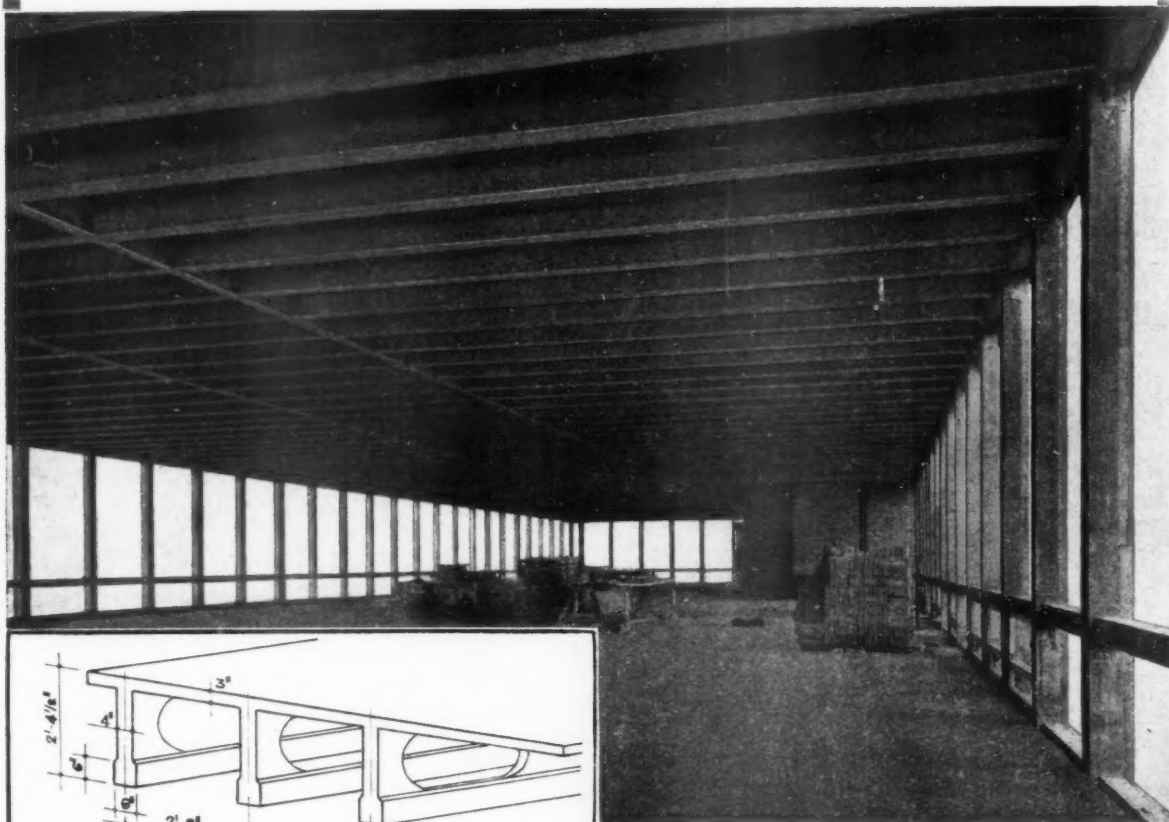
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