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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★ 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 Le one week, Lg 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. Marlborough Whitehead, "Dyneley," Castle Hill Avenue, Berkhampstead, Herts.	
ABS	Architects' Benevolent Society. 66, Portland Place, W.1.	Langham 5721
ABT	Association of Building Technicians. 5, Ashley Place, S.W.1.	Victoria 0447-8
ACGB	Arts Council of Great Britain. 4, St. James' Square, S.W.1.	Whitehall 9737
ADA	Aluminium Development Association. 33, Grosvenor Street, W.1.	Mayfair 7501/8
APRR	Association for Planning and Regional Reconstruction. 34, Gordon Square, W.C.1.	Euston 2158-9
ArchSA	Architectural Students' Association. 34/36, Bedford Square, W.C.1.	
ARCUK	Architects' Registration Council. 68, Portland Place, W.1.	Langham 8738
AScW	Association of Scientific Workers. 15, Half Moon Street, Piccadilly, W.1.	Grosvenor 4761
BAE	Board of Architectural Education. 66, Portland Place, W.1.	Langham 5721
BATC	Building Apprenticeship and Training Council. Lambeth Bridge House, S.E.1.	Reliance 7611, Ext. 1706
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. 17, Amherst Road, Ealing, W.13.	Perivale 6869
BCIRA	British Cast Iron Research Association. Alvechurch, Birmingham.	Redditch 716
BDA	British Door Association. 10, The Boltons, S.W.10.	Flaxman 7766
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
BIAE	British Institute of Adult Education. 29, Tavistock Square, W.C.1.	Euston 5385
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. Millbank, S.W.1.	Whitehall 5140
BRS	Building Research Station. Bucknalls Lane, Watford.	Garston 2246
BSA	Building Societies Association. 14, Park Street, W.1.	Mayfair 0515
BSI	British Standards Institution. 28, Victoria Street, S.W.1.	Abbey 3333
BTE	Building Trades Exhibition. 4, Vernon Place, W.C.1.	Holborn 8146/7
CABAS	City and Borough Architects Society. C/o Johnson Blackett, F.R.I.B.A., Borough Architect, Town Hall, Newport, Mon.	Newport 3111
CAS	County Architects Society. C/o F. R. Steele, F.R.I.B.A., County Hall, Chichester.	Chichester 3001
CCA	Cement and Concrete Association. 52, Grosvenor Gardens, S.W.1.	Sloane 5255
CCP	Council for Codes of Practice. Lambeth Bridge House, S.E.1.	Reliance 7611
CDA	Copper Development Association. Kendals Hall, Radlett, Herts.	Radlett 5616
CIAM	Congrès Internationaux d'Architecture Moderne. Doldertal, 7, Zurich, Switzerland.	
COID	Council of Industrial Design. Tilbury House, Petty France, S.W.1.	Whitehall 6322
CPRE	Council for the Preservation of Rural England. 4, Hobart Place, S.W.	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
DGW	Directorate General of Works, Ministry of Works, Lambeth Bridge House, S.E.1.	Reliance 7611
DIA	Design and Industries Association. 13, Suffolk Street, S.W.1.	Whitehall 0540
DOT	Department of Overseas Trade. 35, Old Queen Street, S.W.1.	Victoria 9040
EJMA	English Joinery Manufacturers' Association (Incorporated). Sackville House, 40, Piccadilly, W.1.	Regent 4448
EPNS	English Place-Name Society. 7, Selwyn Gardens, Cambridge.	
FAS	Faculty of Architects and Surveyors. 8, Buckingham Palace Gdns., S.W.1.	Sloane 2837
FASSC	Federation of Association of Specialists and Sub-Contractors, 5, Arundel Street, Strand.	Temple Bar 6633
FBI	Federation of British Industries. 21, Tothill Street, S.W.1.	Whitehall 6711
FC	Forestry Commission. 25, Savile Row, W.1.	
FCMI	Federation of Coated Macadam Industries. 37, Chester Square, S.W.1.	Sloane 1002
FDMA	The Flush Door Manufacturers Association Ltd. Trowell, Nottingham.	Ilkeston 623
FLD	Friends of the Lake District. Pennington House, nr. Ulverston, Lancs.	Ulverston 201
FMB	Federation of Master Builders. 26, Great Ormond Street, Holborn, W.C.1.	Chancery 7583
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 4041
FS (Eng.)	Faculty of Surveyors of England. Buckingham Palace Gdns., S.W.1.	Sloane 2837
GC	Gas Council. 1, Grosvenor Place, S.W.1.	Sloane 4554
GG	Georgian Group. 27, Grosvenor Place, S.W.1.	Sloane 2844
HC	Housing Centre. 13, Suffolk Street, Pall Mall, S.W.1.	Whitehall 2881
IAAS	Incorporated Association of Architects and Surveyors. 75, Eaton Place, S.W.1.	Sloane 5615
ICA	Institute of Contemporary Arts. 17-18 Dover Street, Piccadilly, W.1.	Grosvenor 6186
ICE	Institution of Civil Engineers. Great George Street, S.W.1.	Whitehall 4577
IEE	Institution of Electrical Engineers. Savoy Place, W.C.2.	Temple Bar 7676
IES	Illuminating Engineering Society. 32, Victoria Street, S.W.1.	Abbey 5215

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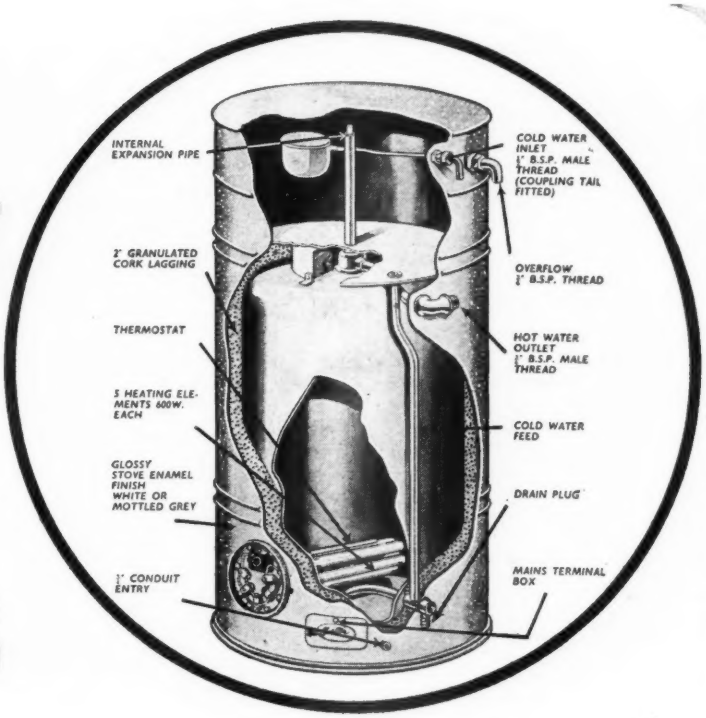

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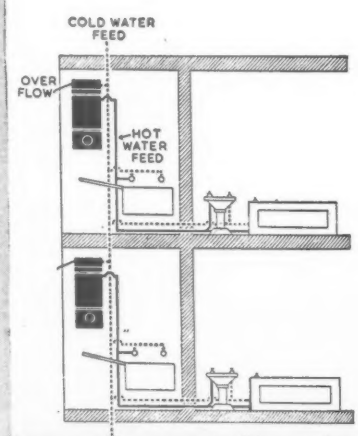
Item 2. Hot water storage tank
Item 3. 3 KW bank of electric heating elements
Item 4. Expansion pipe exhausting back into the supply tank



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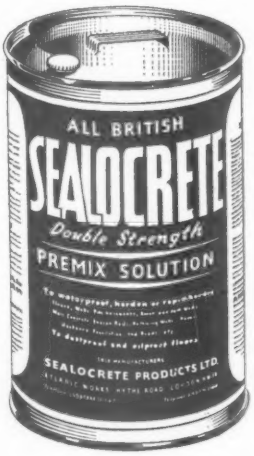

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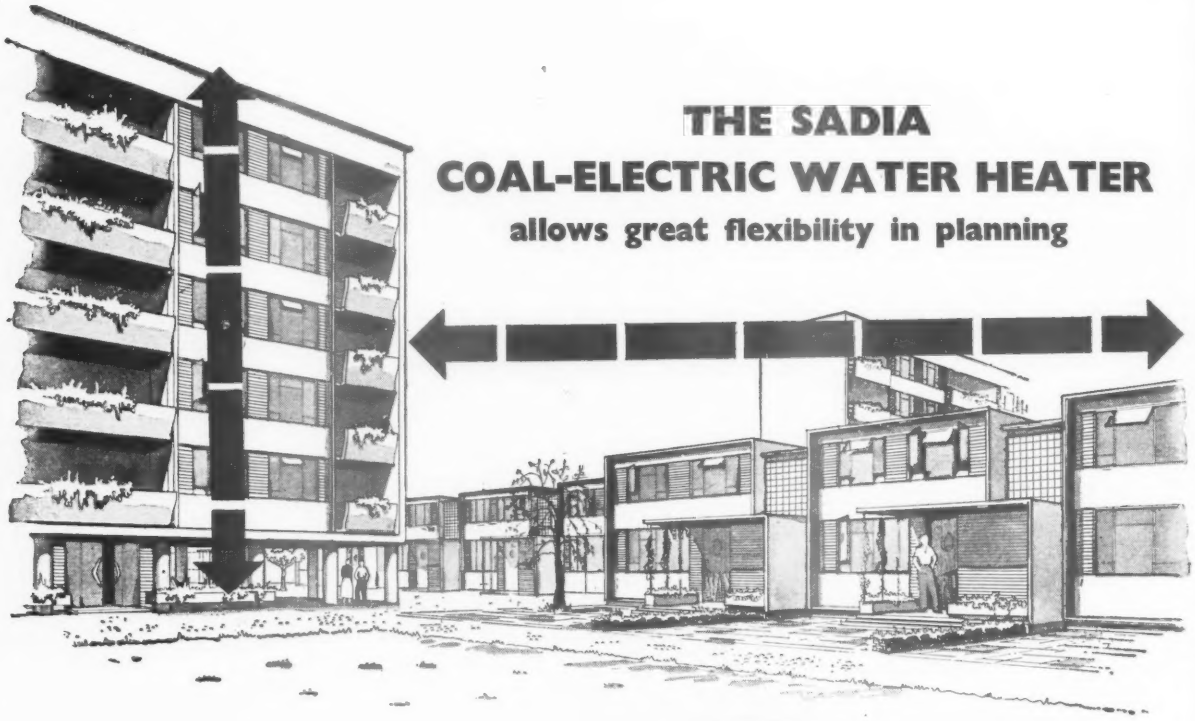
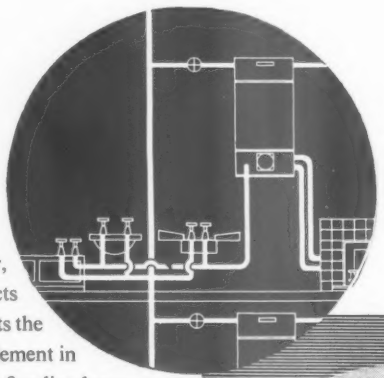


THE SADIA COAL-ELECTRIC WATER HEATER

allows great flexibility in planning



The Sadia coal-electric water heater is suitable for both houses and flats, and can be used either with a back-boiler or an independent boiler. It is a water heater planned to make the best use of available fuels. During winter, when fires are lighted, the Sadia coal-electric water heater acts as a storage tank, the back-boiler or the solid-fuel boiler heats the water, and the thermostatically controlled electric heating element in the Sadia coal-electric water heater takes over only when the fire dies down. In summer, no fires need be lighted, electricity takes over completely, and the house keeps cool.

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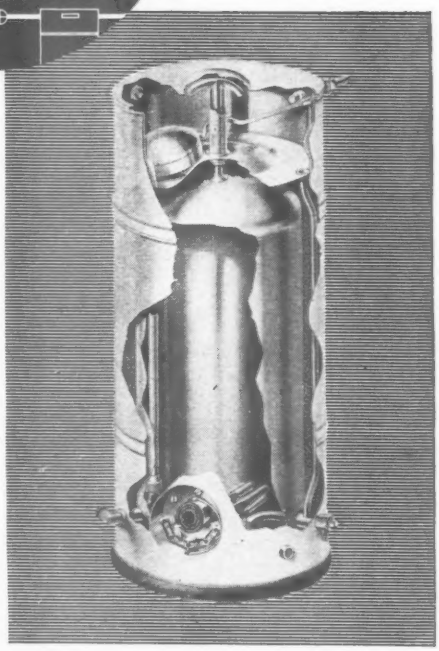

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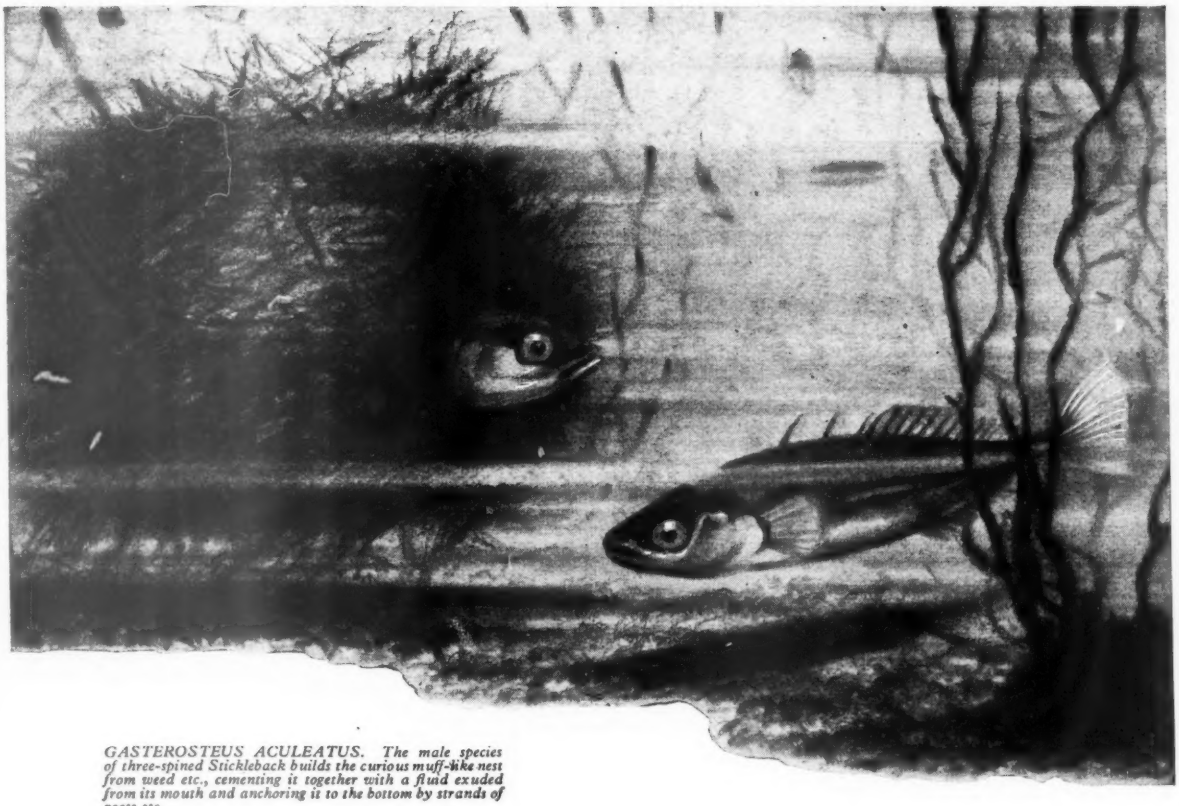

GASTEROSTEUS ACULEATUS. The male species of three-spined Stickleback builds the curious muff-like nest from weed etc., cementing it together with a fluid exuded from its mouth and anchoring it to the bottom by strands of roots etc.

NO GAMBLING

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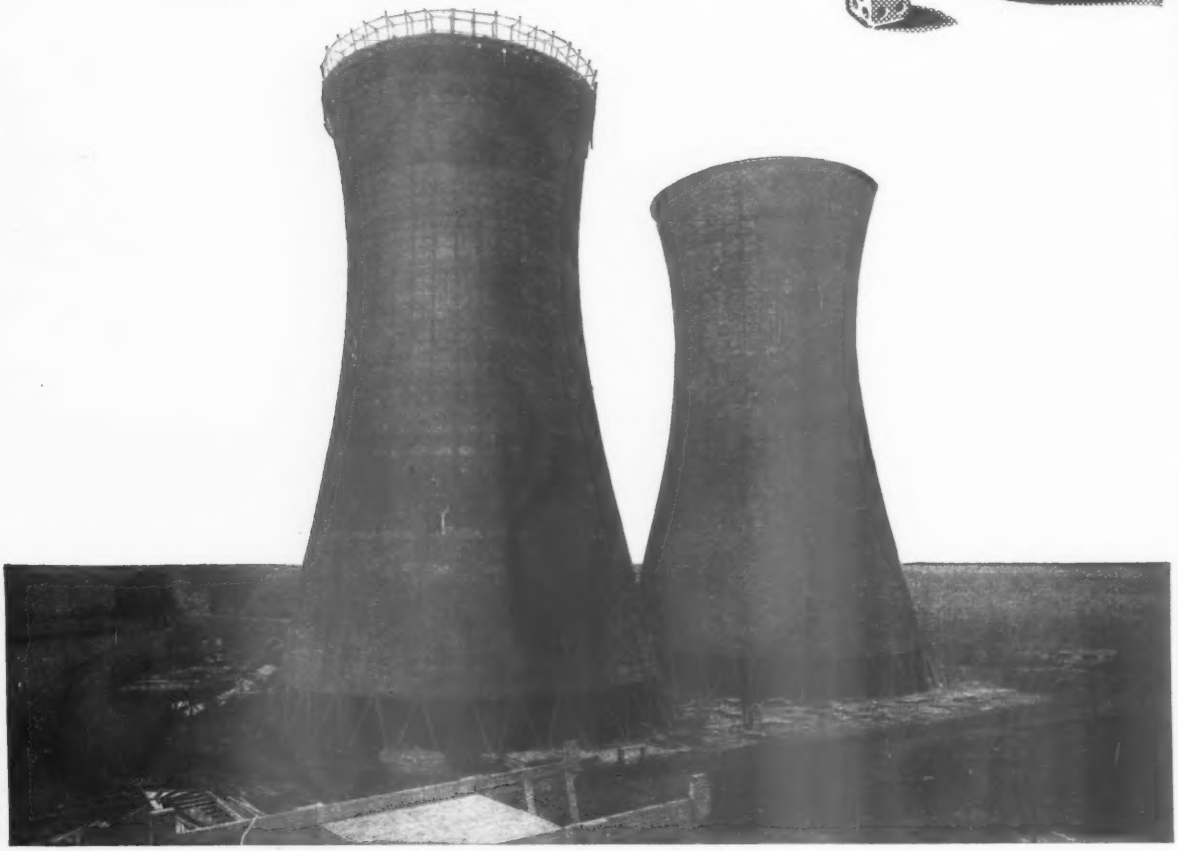

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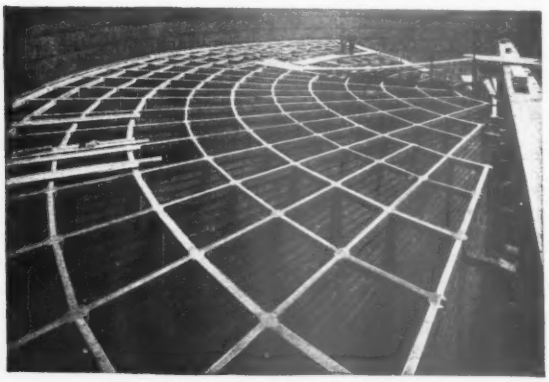

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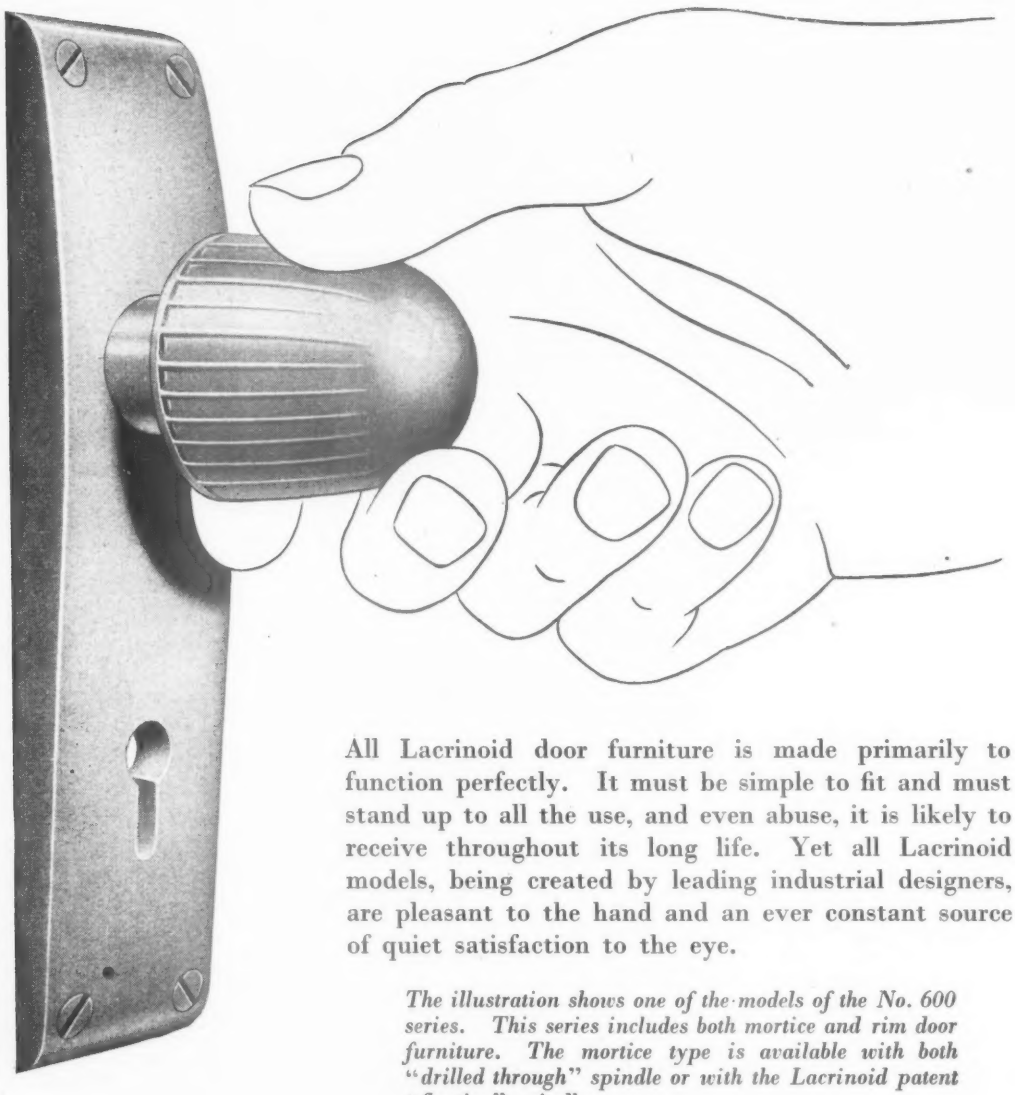

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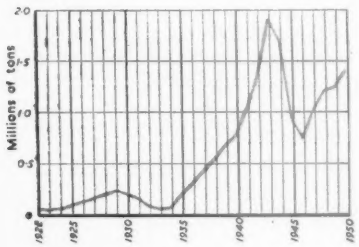
About Aluminium . . . 10

CONCLUSION

Growth of the Industry

During the half century of aluminium's commercial life, the producing industry has expanded enormously. Demand has fluctuated, but has seldom fallen below supply. The needs of war have greatly accelerated the expansion of smelting and fabricating plants, but, after military consumption fell off, the new production capacity was quickly absorbed by an increased industrial demand. This spasmodic but almost continuous growth is illustrated by the graph of world ingot production, below.

World production of aluminium is probably still below the 1943 peak (owing to the decreased capacity of certain nations), but in countries for which figures are available the whole output could at present be absorbed by the growing demands of their civilian industries, and there is, for the time being, a world shortage.



World Aluminium Production

Thus aluminium has in a few years grown to become one of the major industrial metals, and its production is, in volume, exceeded only by that of steel.

Reasons for growth

We have said that the greatest expansion of the industry has taken place in wartime, to furnish the material of military aviation. Considering aluminium as a general engineering material, however, it is interesting to account for its rapid headway.

Firstly, this progress has been made on intrinsic technical merits, by virtue of the rather extraordinary combination of properties possessed by the element and its alloys, as recounted in earlier articles. Aircraft construction is only one of the fields in which aluminium is pre-eminent, and not, in time of peace, a major one in terms of output.

Apart from the natural provinces of aluminium, there are countless tasks that the light metal can perform as well as, and often rather better than, traditional materials. For these duties, the adoption of aluminium would normally be slow, owing to a natural reluctance to change production methods to suit a new material unless it offers sweeping technical advantages. During and after a war, however, shortages of familiar materials are apt to occur and, because of such shortages, aluminium has recently entered many new spheres. Sometimes, lacking one or more of the desirable qualities of the original, it continues to be regarded as a substitute; more often an improvement is recognized, and aluminium is permanently adopted.

In this series we have summarized, for the interest of students and others, some of the main characteristics of the metal and its alloys. The articles have now been reprinted in book form, and we shall be pleased to send you a copy.

Although price is less important in time of shortage, present price trends, shown in the second graph, are of the greatest significance to the future of aluminium. From being one of the dearest commercial non-ferrous metals, aluminium has become one of the cheapest by weight, easily the cheapest by volume. Its falling cost in relation to these metals and to steel is now opening up markets that were hitherto economically unapproachable.

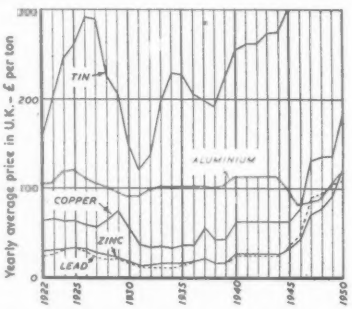
A relatively falling price is to be expected of a comparatively new material such as aluminium, and is attributable to such things as improvements in extraction and fabrication techniques, a recent example being the semi-continuous rolling of sheet. The steady development of qualities to meet special conditions of use has resulted in the present wide range of alloys, and these and other technological advances have done much to expand the market.

The Future

Aluminium has already challenged established materials in almost every industry, and it seems that, on both technical and economic grounds, this challenge will continue on an increasing scale. Though its present position is strong, its industrial importance will, as it becomes more plentiful and cheaper, undoubtedly grow.

Examples of the potential markets that have scarcely begun to use aluminium are to be found in shipbuilding, and in the mass-production of motor-cars, where the light metal is technically very attractive. The principal obstacle is first cost, but with further convergence of the prices of aluminium and steel, and growing appreciation by users of the economies (in performance, maintenance, and disposal value) resulting from the use of light alloys, more and more aluminium will be demanded by industries such as these.

The scope of aluminium is from time to time extended by the introduction of new methods in manufacture. Recent developments that may well have considerable future importance include the argon-arc welding process, assembly by high-strength adhesives (already practised by aircraft manufacturers), the development of a satisfactory soldering technique, the introduction of cold welding by pressure, and the practicability of plating aluminium with hard chromium to improve its wearing and frictional properties in machine parts. Desirable improvements in the alloys are likely to enhance such properties as ductility, fatigue- and corrosion-resistance, and not merely to raise tensile strength. This is indicated by the fact that demand is at present greatest for alloys of only moderate tensile strength that possess other appropriate qualities.



Prices of Non-ferrous Metals

The western world's capacity for producing primary aluminium is to be substantially increased in the near future. This continual expansion raises the question of the supply of bauxite, the rich ore essential to the present smelting process. Known reserves are very large, but when these have been exhausted, less rich ores abound everywhere in the earth's crust, of which they form about one-third, so there is no fear of the supply of raw material coming to an end in the foreseeable future.

As the uses of aluminium extend, there is a growing demand for information about it, and we hope that these articles will help to meet this need. We would also remind you that information on specific problems is always freely available.

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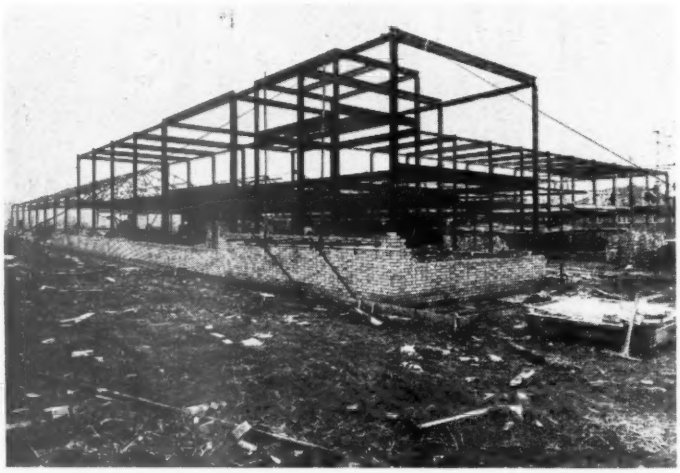

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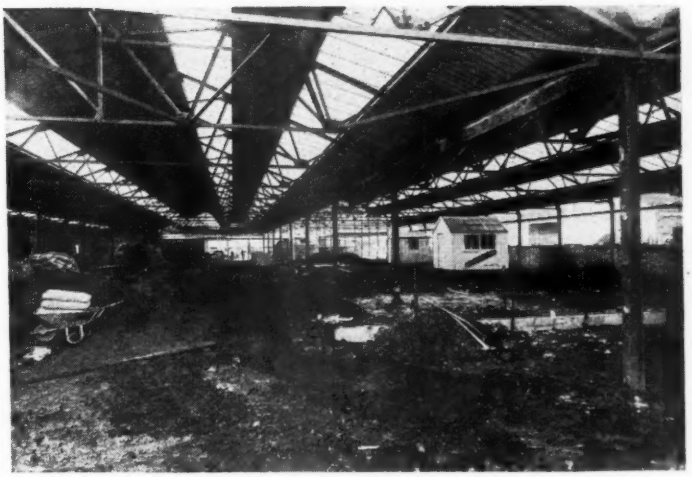

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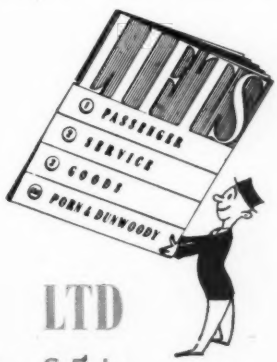

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THE ARCHITECTS' JOURNAL

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DARWIN THEORY

Most of us are used to being told that we live in an age of revolution, and too many of us—so Professor Brogan holds in his latest and most fascinating book *"The Price of Revolution"*—still regard the word revolution as synonymous with improvement. A minor example of this can be seen daily in any shopping street. When a business changes hands the new owner does not say "Under Better Management," he says "Under New Management." The implication is clear. If it is new, therefore it must be better. To doubt this is to risk the charge of cynicism, of Fascism, or worse still, of middle-age.

*

It's nice therefore to be able to report favourably upon the results—so far—of the minor revolution which broke out around three years ago when "They" got in at the Royal College of Art. For generations this area of educational Kensington had plodded cheerfully on—like a shepherd on a Christmas card in charge of a flock of what look like moth balls. The minarets of Imperial Institute Road dreamed beside the plane trees. From behind a cobwebbed pane occasionally came the clack of a shuttle on some distant loom, or the tap of a silversmith's hammer. It was a quiet place where, it was said, a student could happily spend three years without even being forced to meet a member of the staff, or in pursuing a course of study which perhaps the College had omitted from its prospectus.

*

How different the scene today. Huge grey machines throb in the Western galleries turning out—could it be lampshade frames or Giacometti sculpture?—well anyway turning out something. The glare of welding arcs in the sculptors' studios can be seen from Primrose Hill. Midinettes throng the staircase of the fashion school. Industrialists queue up for the services of students in graphic design or furniture. It is said that recently qualified students sometimes deign to return—in hand-made silk shirts with at least 2 inches of cuff showing—to see how the staff are making out.

*

In his crimson-papered office at the centre of this dynamo—like some furry, ruthlessly genial, and indefatigable insect in the heart of a dahlia—sits Principal Robin Darwin, survivor, be it noted, of the greatest revolutionary action of all—the decision that those who hold chairs of teaching at the Royal College must be expected to give at least one lecture. [Consternation in Common Room.] The first series of such lectures were given last year, and have now been published most elegantly under the title of *The Anatomy of Design* (Newman Neame Ltd., 5s.). They are uneven—very uneven—in quality. Frank Dobson's is perhaps the most engaging (if the least serious), Professor Guyatt's (recently reprinted in *The Architectural Review*) one of the most deeply felt. But all are worth reading for the authors are all, as the whiskey ads say, "men of distinction."

*

"Ah," you may say, "Distinction in their own medium perhaps, but not necessarily as writers or speakers." True enough. But though an artist must necessarily be in some degree an outcast, he need not therefore be inarticulate. Leonardo and Reynolds, Delacroix and Sickert, Augustus John and—well yes, Munnings even—have all been able to express their ideas clearly on the printed page. Of course they did not find it easy. Words are as difficult to handle as paint or stone, and many an artist might be excused for thinking that he has enough to do in learning his own craft without having to master the intricacies of another medium. But on the whole the Royal College professors emerge with credit from what I suspect for most of them is a first attempt, and in this case the price of revolution—again *so far*—seems to have been worth paying.

HERALDIC COLOURING

A Canadian visitor who saw the Royal cortège on its way from King's Cross to Westminster was impressed, he tells me, by the terrific flash of colour provided by the Royal Standard at the

centre of an otherwise sombre setting. Heraldry is one of those things we still do fairly well in this country, even if we lack the more gorgeously baroque quarterings of the succession states of the Austrian Empire. But is there not room for a new explanation—for architects—of the heraldic colour system?

*

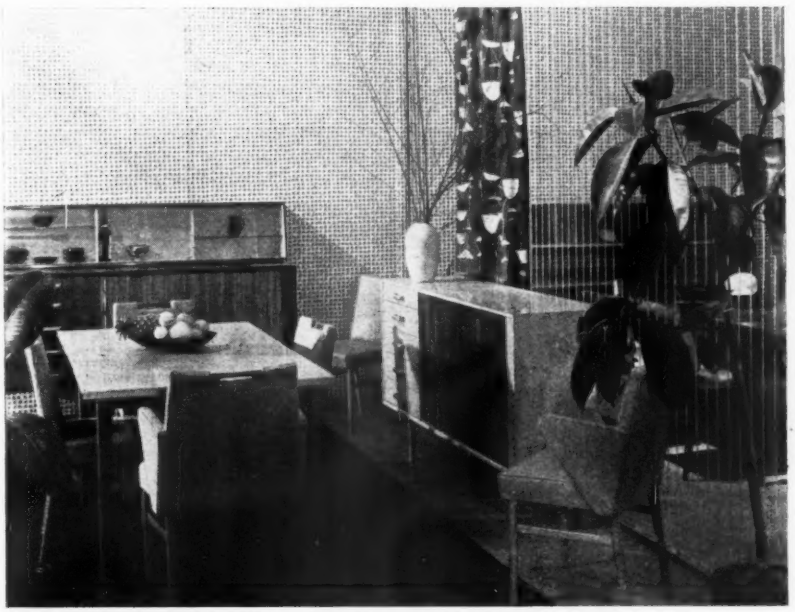
This system, with its limited palette and strict rules, was, of course, in its way, scientific and was by no means limited to armorial bearings. It was certainly used on the Norfolk screens and, I suspect, by the Primitives. It was probably the basis for that blaze of colour that once covered the churches of the grey Gothic North, and was their safeguard against garishness. At any rate it would be interesting to have an investigation, not as an archæological matter (that has been done dozens of times), but as a contribution to knowledge for the benefit of those using colour on such altogether unheraldic things as plain distempered walls. It would be interesting to see such an explanation set out side by side with Munsell and similar systems.

*

Heraldry is, incidentally, one of the subjects (though not a wildly popular one) taught to first-year students of furniture and interior design at the Stockholm School of Art. So at least I am told by recently returned spies. The latest of these looked in last week with snow on his boots, a smoked eel under his arm and the usual load of pleasant Swedish gossip. Winter has so far been mild, and Frank Yerbury has been and gone. Tulips are 2s. each; Mr. Rembrandt glows as fiercely as ever in the National Gallery; a vast new hotel has been opened; the new Underground is going ahead well; a party of English and Swedish architects and designers, flaming torches in hand and singing "Tipperary," were glimpsed happily upside down on a snowdrift, where they had been deposited by an errant sleigh; and at the airport the loudspeaker brayed "We await passenger Wells." But no, it was not who you think—it was Mr. Orson Welles, portentous, suède-shod, *en route* for Amsterdam in his search for some elusive star.

FURNITURE FIRST

"My back, which is shaped like a shield," said a girl's voice, "has five narrow shaped rails . . ." ASTRAGAL, who realizes there are some things that a gentleman just doesn't listen to, was about to walk away when he found that the voice came from a Hepplewhite chair. It was all done with gramophone records, of course. And it is part of a little educational stunt organized by the TDA at the British Furniture Manufacturers' exhibition at Earl's Court. Doubtless a useful public service, like the cartoons in those government publications for people who can't read. But if, on the TDA stand, the furniture talks (I liked the adenoidal armchair), most of the other furniture shrieks. Apart from the usual run of heavy "period" pieces and nasty, shiny, dual-purpose items, there are signs that a newcomer is joining the ranks of the Ghastly Good Taste brigade. Examples of it can be found along nearly every aisle, splaying their legs at alarming angles in an attempt to be contemporary.



This new "Hilleon" dining room suite, designed by Robin Day, is on view at the Furniture Exhibition, Earl's Court. See note below.

*

The sad thing is that the originals of these imitations are not on view. (Where are Morris's, of Glasgow, and Heals—both members of the British Furniture Manufacturers' Federated Associations?) However, those who survive the terrors of the ground floor, which include an acre or so of dusty red carpet, strewn with tables and chairs and teashoppe tablecloths, where tired visitors may rest amid daffodils and ponder on the absurdity of the slogan "Furniture First," will find consolation on the first floor. Here are some new sets of furniture designed for S. Hille by Robin Day and Ray Hille, and a pleasant stand designed in the School of Architecture, Canterbury School of Art (see photos above and on pages 236 and 242). Some of the furniture on this stand—the work of students in five schools—is a little fussy—but most of it is more imaginative than the "Bogus Contemporary" stuff I have mentioned. Congratulations to the Canterbury students who, as readers may remember, did such good work for their city's Festival exhibition last year.

*

By the way; you've heard of the piano wanted by a lady with carved walnut legs. Now the Exhibition's Press Officer has given us "a writing chair designed for a teen-age girl with traditional inlaid decoration." Ah well, you're only young once!

MISS BROMLEY TAKES HER BOW

As you will see from the announcement on page 238 RIBA public relations are now to be officially loaded on to Miss Bromley (unofficially of course, she has been carrying them ever since George Marfell went, and managing to keep her head above water with great skill and determination). Nobody will question Miss Bromley's experience and cheerful industry, and we send her our best and most solicitous wishes in the new job. But, as some of us know, she *did* have a busy time

Local or National Amenity?

The Grand Union Canal, beside which is "The Boat Inn" at Stoke Bruerne, is one of the few canals still in use. The Shrewsbury Canal is partly unnavigable, the Huddersfield Narrow is a ruin, and a Bill to abandon Rennie's Rochdale Canal—a fine engineering achievement—is to come before Parliament soon. The IWA will make a fight for its preservation, but the sort of "official" thinking it is up against was exemplified in a recent talk to the TCPA by the information officer of the Docks and Inland Waterways Executive. Disused canals, said L. A. Goss, might either be abandoned or transferred to local authorities for development as *local* amenities. It is surely a curious paradox that the national controllers of these waterways do not see that they are a part of our *national* heritage.

before, and it is difficult to see how, without help she can take on so heavy an extra load. Public relations—even under the raised eyebrows of the present Government—are very important and should be a full time job.

*

MUST IT GO?

One of the saddest victims of the official PR cuts, as witness *The Times* correspondence on the subject, is of course the Crown Film Unit. The Unit was started by Sir Stephen Tallents in the old Empire Marketing Board days, and was the early stamping ground of producers like John Grierson and Robert Flaherty, who made the documentary film into something for which Britain was internationally respected. Of the Unit's wartime efforts I saw only a few; *Target for Tonight* and—*Western Approaches* was it? Maybe the glory has departed somewhat, but it seems that part of the trouble may be due to too much administration and studio expenditure and not enough straight film-making. But pound for pounds it is probable that documentaries do more for national prestige than some of our other activities, and we can only hope that some of the Crown technicians will find their way into the BRS film unit.

*

CAMERA MYSTIQUE

I recommend a visit to the ICA in Dover Street before March 4 to see the exhibition of Cartier-Bresson's photographs. They surely prove beyond doubt that the camera lies and that photography can be an art in its own right. And if you want to argue this point, look up the correspondence on Peter Rise-Pulham's recent broadcast on this subject, published in *The Listener* a week or so ago.

*

Cartier-Bresson's photographs have an extraordinary emotional power but this is never allowed to swamp his skill in composition. (Note for example—if you go—the construction of the Paris scene of a clear cut winding staircase and the blurred whizz of a cyclist behind.) "Composition" says Cartier-Bresson—and there's no harm in architects listening to this—"must be one of our constant preoccupations right up to the moment when the picture is to be taken—and then feeling takes over." True—as we used to say in the 5th year studio— or False?

ASTRAGAL

POINTS FROM THIS ISSUE

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University Chair for R. J. Gardner-Medwin .....page 238

RIBA appoints **Assistant Secretary**.....pages 233 and 238

Designing **Power Stations** economically.....page 239

The Editors

THE SIZE OF A CONTRACT

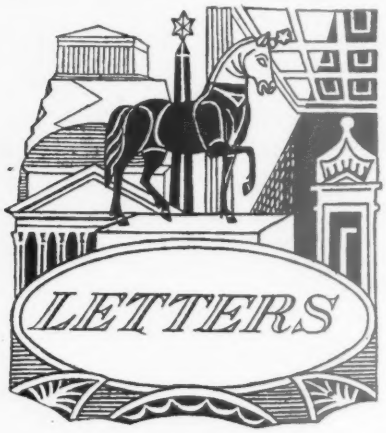
ARE the smaller local authorities arranging their house-building programmes to take advantage of the economies which can be gained by means of larger contracts? There is little evidence that they are. Here is a positive economic method of cutting costs at least for the smaller local authorities, which is still not being exploited. According to Girdwood,* local authorities could save an average of £60 a house at 1949 prices (say £75 today) on houses in contracts of 40, as compared with houses in contracts of 4.

A total of 15 per cent. of local authority traditional houses and flats in 1949 was built in contracts of from 1 to 10 houses, and a further 23 per cent. in contracts of up to 25 houses. The majority of houses built by local authorities in small towns and rural areas is in contracts of only 1 to 10 houses. According to Girdwood there is a definite relationship between the number of man-hours per house and the size of the contract (although a great many other factors affect the number of man-hours per house as well). This is obviously true. A builder can buy materials more cheaply for a contract of 20 houses than for one of 4 houses. His pricing for tender will be cheaper to carry out. He can organize his labour to better advantage, and his men should work better if they know there are other houses to follow on.

To quote an example from the other end of the scale, certain large local authorities have adopted a practice of preparing drawings for only a small but typical part of a housing scheme, and then going to tender for the whole scheme, letting the contract to one builder in two or three parts for completion over a number of years. Undoubtedly this has been done partly for political reasons, since it increases the number of "houses commenced" on paper in the current year's programme, although at the expense of the totals for future years. Smaller local authorities, however, without political motivation, might well find that some such method of organizing contracts would give them the economy to be gained from larger contracts, while allowing builders a measure of security and the possibility of advance buying of materials. The question is relevant now, not only because of economy measures to be undertaken by all local authorities, but because it is the government's declared policy to encourage the small private builder. If this policy is not to be retrogressive some means of giving effect to the Girdwood recommendations on the

* All references to Girdwood in this article are to the second report on the Cost of House Building by the Girdwood Committee from which all statistics are taken.

sizes of contracts for house building must be found—by the NFBTE, by the voluntary collaboration of local builders, or by advance planning of programmes by the local authorities and their architects or by other technical advisers.



J. Murray Easton, F.R.I.B.A.

Julius Posener

John McNicol, A.R.I.B.A.

John Milne

More About Cliches

SIR,—Surely an architectural cliché is in the eye of the beholder. A invents or perhaps imports from the Continent or America a new way of treating some feature. B borrows it and is quickly followed by the rest of the alphabet. By this time it is already dead and stinks in the nostrils of a professional élite whose hypertrophied sensitivity in detecting the faintest whiff of incipient mortification is just why they are what I said. The thing in fact has become a cliché for A when C has got on to it (B's use of it is, at first, almost flattering). Just so for B until D's rough hands have further smutched it.

But to many another architect the "thing" has just crossed the threshold of acceptability, and its adoption will, for some years, establish him amongst the avant-gardists of his locality.

So, although I am grateful to Mr. Marcus Whiffen for his purity campaign and because I am at heart (if not always in practice) a verbal puritan to the point of fanaticism and lull myself to sleep with "Seven Types of Ambiguity," yet would I fight him to the death to defend Mr. Gibberd's right to call a cliché a cliché if he thinks it is a cliché.

I write as one who in his time has sired one or two little things that he proudly believes (maybe presumptuously) to have graduated into the cliché class.

JOHN MURRAY EASTON.

London.

Astragal Corrected

SIR,—The trouble with ASTRAGAL'S "Unconscious Stone" is that it really is a "Conscious Stone." The mistake must have occurred in ASTRAGAL'S subconscious. He probably felt (subconsciously) that Godwin was (again subconsciously) a better artist than he was conscious of.

The book's motto runs indeed: "He builded better than he knew—The conscious stone to beauty grew . . ." which, really, is what ASTRAGAL means. For the rest, I entirely agree that Dudley Harbron's Life of William Godwin should be re-edited with many more illustrations and with some additional quotations from letters, lectures and essays.

JULIUS POSENER.

London.

[ASTRAGAL apologises for the slip he made on January 10.—ED.]

Housing Subsidies in Northern Ireland

The Antrim coast is not so green
As JMA may rate it;
'Tis black and white, and that is how,
If model clauses were produced,
Its planning would be stated.

Now JMA does surely know
His Ministry's control of user
Has cost the County thousands three
To one whom, on appeal to it,
His Mins'try had adjudged the loser.

So simple laws of JMA
Are proved inconsequential chatter;
For clauseless planning may be easy,
But when it comes to paying for it,
Why then, that's quite another matter!

Public debate, it's plain to see,
Would be to JMA distasteful:
My challenge made is not accepted,
Because he finds, when facing facts,
Poetic phantasy more graceful.

Belfast. JOHN MCNICOL.

[The above is a reply to J. M. Aitken's verse-letter of January 24.—ED.]

The Furnishing of Small Houses

SIR,—During the past few months there have appeared in the JOURNAL illustrations of many small houses built both for private clients and for local authorities. Photographs of the interiors often show almost as high a standard of furnishing for the latter as for the former.

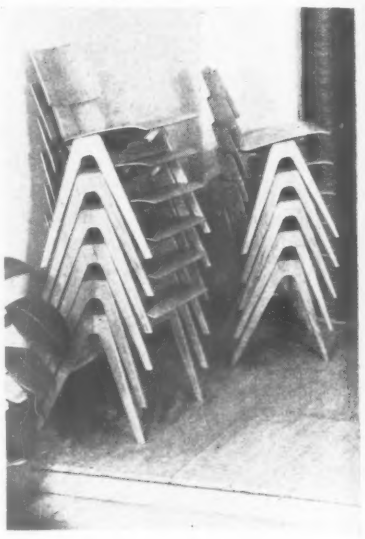
One expects a high standard of furnishing from a client of sufficient intelligence and taste to commission a house as good as some of those recently illustrated in the JOURNAL but how many tenants of local authority houses are willing, even if able, to furnish them in the manner, for example, of the two Scottish houses illustrated in the JOURNAL for January 31, 1952?

Would it not be possible to publish photographs of houses, erected by public bodies, as actually furnished by tenants? The mixture of relatives' throwouts, family heirlooms, and "modern" horrors, might well remove some of the sugar from the pill. And it might help to press home the fact that in very small houses it is particularly important to have carefully chosen furniture, not only for the sake of appearance and to avoid the overcrowding of rooms, but also to make the very best out of living in these tightly-planned houses.

JOHN MILNE.

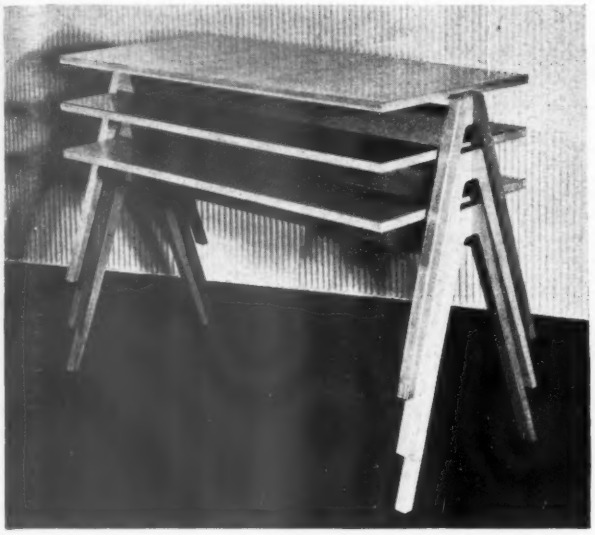
Leicester.

NEW TAX-FREE



S. Hille and Company, Ltd. is now making tax-free furniture. Designed by Robin Day, the furniture is in a simple, straightforward style. It can be seen at the British Furniture Exhibition, at Earl's Court. The photograph on this and the opposite page show living- and dining-room furniture from the new range already in production. Above, "Hill-stak" stacking chairs. Designed to accompany the dining tables, these sell at only 60s. each, which is cheaper than most tax-free dining chairs. For an extra 6s. they can be obtained with seats and backs veneered, and squab seats are also available. Opposite page: Top left, "Hillstak" stacking tables, with 4-ft. by 2-ft. tops veneered or covered in plastic. These could be used either as alternatives to the drop-flap dining-tables which Hille's also produce, as occasional tables or for work and play in children's rooms. With a plastic top, this type of table would be suitable for a kitchen-dining room. Right, side-board storage unit, with bookcase unit above. Both these units can be obtained with or without legs. The sideboard is 4 ft. 6 in. long, 1 ft. 6 in. wide and 2 ft. 6 in. deep. The dimensions of the bookcase are similar, except that it is

FURNITURE AT EARL'S COURT EXHIBITION



only 11 in. wide. These units are made of solid Agba ; drawer fronts are veneered in cherry ; and the sliding doors can be obtained veneered in Dutch elm or faced with grey or black " Vitrolite." The legs are of beech. The photograph below shows a group of furniture, including a stacking table, four stacking chairs, a sideboard unit and a bookcase unit (both standing on legs) and in the foreground is a small armless fireside chair also belonging to this range. Two or three of these placed together form a settee. All this furniture is finished with a special lacquer to make it easy to keep in good condition. It should not be polished with furniture polish, but merely wiped with a damp cloth. *More new Hille furniture on page 233.*

LIVERPOOL

Chair for Journal's Guest Editor

R. J. Gardner-Medwin (one of the JOURNAL'S guest editors for 1952), Chief Architect and Planning Officer to the Department of Health for Scotland, has been appointed to the Roscoe Chair of Architecture at the University of Liverpool.

Mr. Gardner-Medwin, who is forty-four years of age, was educated at Rossall School, Lancashire, and at the University of Liverpool, where he obtained the degree of Bachelor of Architecture with First Class Honours in Design in 1931, and the Diploma in Civic Design in 1935. In 1931 he was a finalist for the Rome Scholarship in Architecture, and was awarded the Honan Scholarship by the Liverpool Architectural Society for study in Sweden. In 1933, he was awarded a Commonwealth Fellowship for the study of City and Regional Planning at Harvard University, USA, and for two years he travelled extensively in the United States and in Canada. From 1936-39, he was engaged in private practice and served as architect to the Essex Rivers Catchment Board, Chelmsford, in connection with the erection of new administrative quarters; and as consulting architect to the Latymer Upper School Foundation, Hammersmith. He was the winner (with Clifford Holliday and Denis Winston) in 1937 of the open competition for the site layout of the first Scottish satellite town for 20,000 persons at Kincorth, Aberdeen. He has had considerable teaching experience.

From 1941-44 he served with the Royal Engineers, training with a field unit and later, with the rank of Major, in charge of construction of American base camps and hospital units.

From 1944-47 he held the appointment of Town planning and Housing Adviser to the Comptroller for Development and Welfare in the British West Indies. In 1947 he was appointed Chief Architect and Planning Officer to the Department of Health for Scotland.

RIBA

Assistant Secretary Appointed

Miss Monica Bromley has been appointed assistant secretary to the RIBA. She succeeds Robert Orme who held the newly created position for a few months last year. Miss Bromley has been public relations officer to the Institute since 1945.

Stressed Skin Construction Explained

At the RIBA last week, Felix J. Samuely, the engineer, gave a fascinating lecture on the structural possibilities of space frames and stressed-skin construction.* He showed an audience that more than filled the Henry Jarvis Meeting Room an interesting selection of slides demonstrating structural solutions to building problems which would not have been possible twenty years ago.

Whenever two slabs intersect, Mr. Samuely explained, a beam was formed, and, in this way, it was possible to construct buildings with large spans without structural framing members; the slabs themselves acting as the beams. "Folded slabs," as Mr. Samuely called them, could be formed in a variety of shapes (see Fig. 1) and the more planes there were, the smaller would be the effective spans and the lighter the slabs. Shuttering was, of course, much simpler than for shell construction with curved soffits. Provided some sort of edge beam was used—and this could take the form of an extra fold in the slab, as in Fig. 2—intermediate columns along the perimeter of the roof could be eliminated, so that only four columns (one at each corner) were required to support a rectangular roof of very large span.

At both ends, diaphragms were required, but, Mr. Samuely continued, a tie beam could be used instead; although this was more expensive as bending moments would be larger. Diaphragms could be in the form of beams, columns, rigid arches or lattice girders (see Fig. 3). Intermediate diaphragms could be used, either to increase spans or to reduce the depth of the slab. But, in order to serve their purpose, diaphragms had to be supported.

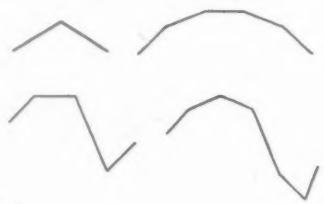


Fig. 1

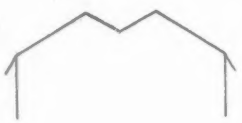


Fig. 2

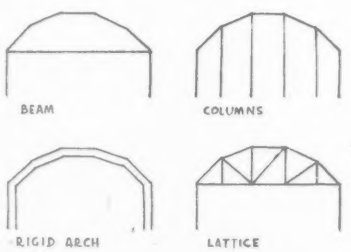


Fig 3

Stressed-skin construction, Mr. Samuely pointed out, did not necessarily have to be in solid reinforced concrete; slabs, as well as diaphragms, could be of lattice construction, either of concrete or steel. Timber could be used, too, or prestressed concrete. This method of construction was being used mainly for roofs, but it was possible to construct almost anything which wasn't completely horizontal—staircases, towers and cinema galleries had already been constructed in this way. And Mr. Samuely foresaw that, eventually, stressed-skin construction would be used even for horizontal slabs.

In reply to questions asked by G. Grenfell Baines and Edward D. Mills, who respectively proposed and seconded the vote of thanks, Mr. Samuely said that stressed-skin construction was not necessarily expensive; it could often be as economical as more traditional methods.

* This lecture will be reviewed in greater detail in the Technical Section for March 6, 1952.

IES

Showroom Competition

In memory of John Stewart Dow and in virtue of a bequest by him, the Illuminating Engineering Society offers a prize which will be awarded to the winners of a competition intended to encourage collaboration between students of illuminating engineering or those branches of engineering concerned with illumination, and students in other fields in which applied lighting plays an important part. While entries from other people are not excluded, the competition is primarily intended for students working in collaboration. The winning entry will receive a total cash award of £75 and a certificate will be presented to each member of the winning team. Certificates of commendation will be awarded to any other entries of outstanding merit.

The subject for the competition is the layout, artificial lighting and decoration of a ground floor showroom. The competition is open to anyone who, not having completed his 26th year by the opening date, April 1, can show that he is taking or has taken a course of instruction, or has had equivalent training of a nature appropriate to the subject of the competition. All members of a team must comply with these conditions.

Forms of application may be obtained from the Secretary of the IES, 32, Victoria Street, London, S.W.1. The last date for submission of entries is November 30.

OBITUARY

Hugh Montgomery

We announce with regret the death of Hugh Montgomery, who was responsible for organizing the Building Exhibition at Olympia since 1920. He died suddenly, on February 13, shortly after his arrival at Madeira where he had gone for a holiday.

The family's association with the Building Exhibition will be continued by Mrs. Molly Montgomery, the deceased's wife, and by his son, Brian.

DIARY

Annual AA Exhibition of Photographs by Members. At 36, Bedford Square, W.C.1. Monday to Friday: 10 a.m. to 6 p.m. Saturdays: 10 a.m. to 1 p.m. UNTIL FEBRUARY 22

Houses 1952. Exhibition illustrating the second appendix to the Housing Manual. At the Building Centre, Store Street, Tottenham Court Road, W.C.1. 9.30 a.m. to 5 p.m. UNTIL FEBRUARY 23

London: The Next Twenty Years. Exhibition explaining the 1951 County of London Plan. At County Hall, Westminster. (Sponsor: LCC.) 10 a.m. to 8 p.m. (except Sundays). Saturdays: 10 a.m. to 6 p.m. UNTIL MARCH 28

Twenty Years After. Professor Sir Patrick Abercrombie. At 66, Portland Place, W.1. (Sponsor: RIBA.) 6 p.m. MARCH 4

The author of the following article discusses the possibility of designing power stations that are not completely enclosed. The saving of materials thus effected, as he points out, cannot be expressed simply in numbers of bricks.

G. E. BAKER

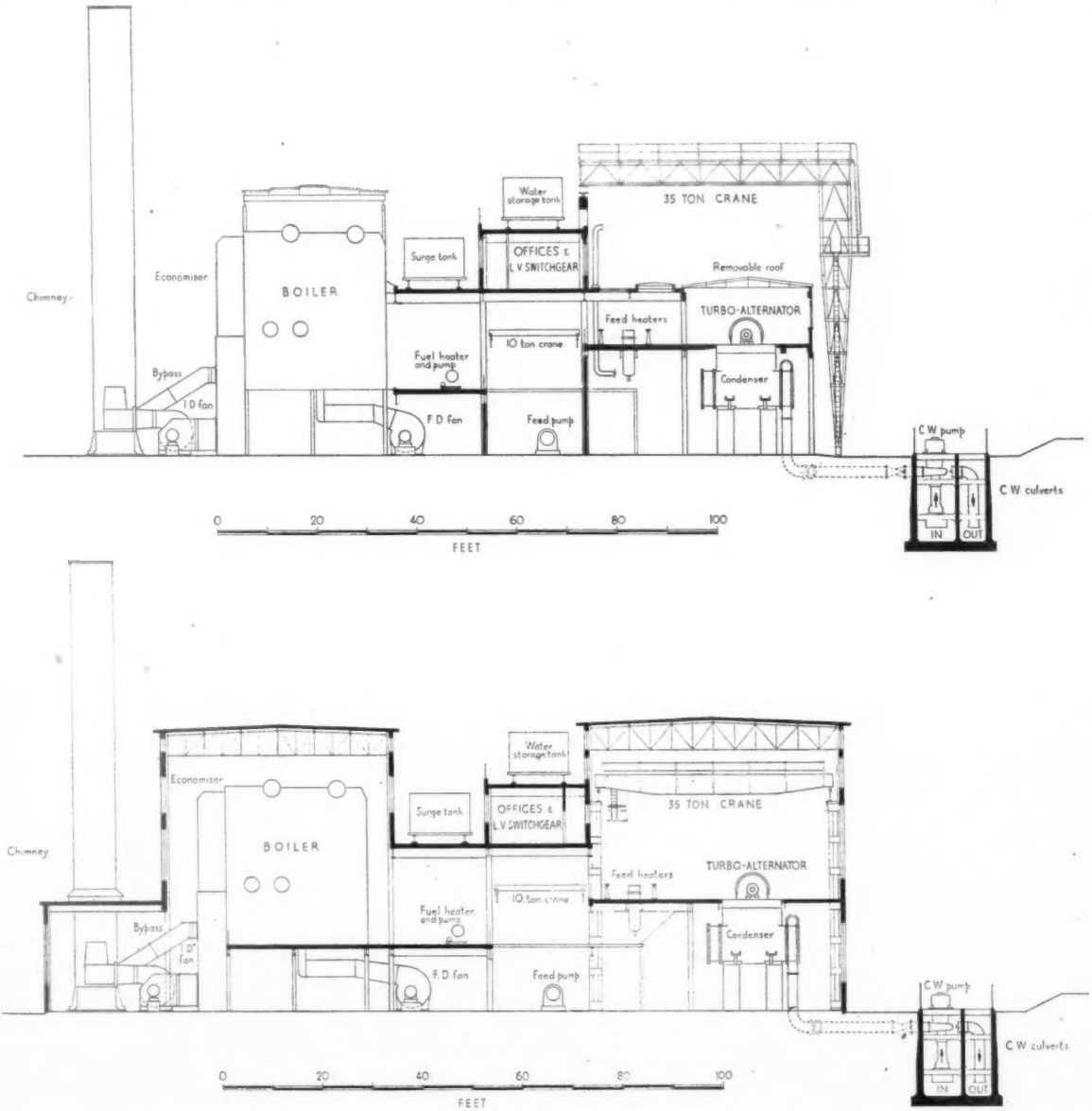
Economical Power Station Design

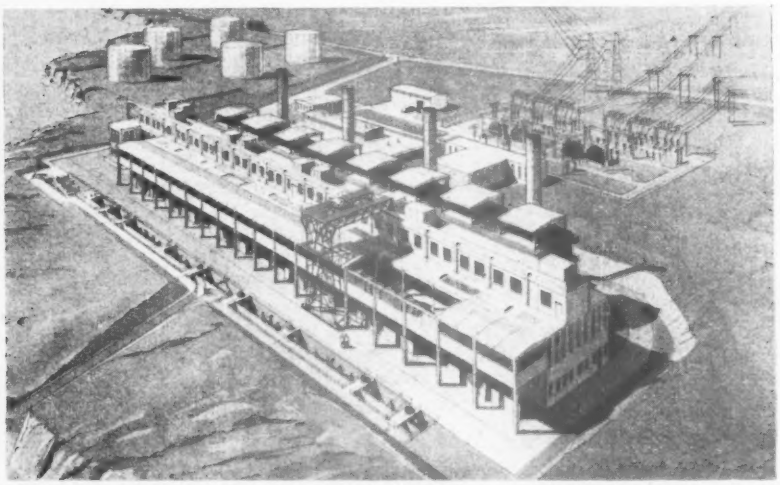
A saving in the vast expanses of wall and roof enclosing a big power station would help in the building of houses. The fuel used in the making of the type of bricks used in power stations could be used instead in the making of bricks for house-building. How could such a saving be achieved without loss of efficiency? Is it vital that every element of plant should be completely enclosed? Obviously not. Oil refineries, locomotives, dock cranes, coal transporters and many other complicated machines work in the open air, being designed to do so. Power station plant, in the main, can be similarly adapted; a great deal of high voltage switchgear can already be seen in the open. It is claimed that certain power stations in America and elsewhere have reduced enclosures by as much as 60 per cent. This saving in England would provide bricks to build 240 houses for every large power station to which it was applied.

Why, then, do we go on building enormous brick structures? Perhaps because we started doing so many years ago, when the first power stations were relatively tiny places, and it cost little to provide comprehensive shelter for machinery and men. We have continued to do so, although with increasing sizes of plant made available by scientific development the buildings have grown to the vastness of cathedrals, and account for a very much higher proportion of the total cost of the project.

It is, of course, still necessary to provide shelter for the operating staff and, as we shall see, at least some elements

The drawings below show, by means of thick black lines, how much of the building enclosing a power station is unnecessary. The bottom drawing shows the way in which a power station is usually housed; the one above it shows which features can be left in the open air if they are specially designed. On the following page is a sketch showing this principle in practice: a semi-open-air power station at Dekhelia, Cyprus.





This semi-open-air power station at Dekhelia, Cyprus, was designed by Preece, Cardew and Rider. (Civil engineers : Sir Cyril Kirkpatrick and Partners.) As the author of the article on this and the preceding page points out, a saving can be made in the vast expanses of wall and roof enclosing a big power station. This example shows how power station plant can be exposed, thus economizing in bricks and steel.

of the plant. But the ingenuity of the designer lies in so arranging his elements that the minimum of enclosure is necessary. What are these elements? Primarily boilers, and turbine-driven generating sets. Both of these can be designed to function out-of-doors, in any sort of weather; so also can such auxiliary plant as pumps, fans, transformers and certain types of switchgear. Shelter for the operating staff can be easily and economically provided. It is not during normal operation, however, that protection for men and machines is most needed.

PROTECTION OF DISMANTLED MACHINERY

The great problem in the design of a power station that is not entirely enclosed is the protection of machinery when it is dismantled for overhaul. Boilers and auxiliary plant present no great difficulties; it is the turbo-generator that sets the trickiest problem.

A steam turbine is a complex machine, running at high speeds and working to very fine clearances between fixed and moving parts. It is usually run for about a year, after which it is partially dismantled for the adjustment of bearings and examination of its working parts. This inspection and servicing, usually occupying about four weeks, should be carried out under shelter from rain, snow, frost and fog; but it also necessitates the use of the overhead travelling crane provided for lifting the heavy parts, which might weigh 50 tons or more. This crane must be at such a height as to lift large parts over other machines, either during construction or at times of overhaul. Clearly the crane must either be under the roof protecting the dismantled machine, or it must run over a light and easily removable roof, sections of which can be replaced when the heavy lifting has been done in favourable weather. In an enclosed power station the turbine room is generally some 70 feet from basement floor to roof; perhaps 50 feet wide and, depending on the number of units installed, from 300 to 400 feet long. In a power station that is not completely enclosed each turbo-generator should be separately housed in a low, light, easily removable structure, or it should be enclosed only at times of overhaul.

Boilers do not need as much shelter during maintenance; nor are they usually served by a crane. There is no dismantling, and thus there is less need for enclosing them and their auxiliary plant. An enclosed boiler house is generally of similar length and width to the turbine room, but reaches a height of 90 to 100 feet. Such enclosures—and there are other intermediate bays containing pumps, fans, switchgear, control rooms, etc., which must be provided—account for the size of the buildings which are needed to house a modern power station unless it is designed and equipped for outdoor operation.

SAVING OF BRICKS AND STEEL

The elimination of much of the enclosing material could save not only brickwork but steel. And as the loads applied to stanchions and wall foundations would be lessened, the amount of excavation and concrete needed in foundations would be correspondingly reduced. The total saving is much greater than can be expressed merely in numbers of bricks.

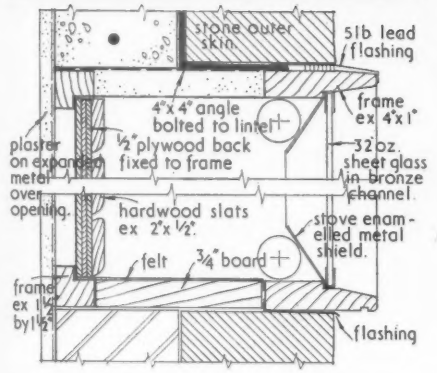
The partly open power station need not be unsightly. It can consist of clean, clear, orderly shapes and surfaces which are as pleasing to look at as the form and texture of a well designed power station enclosure. Surely with the necessity of making reductions in capital expenditure, even on essential works, we shall see a change in the design of power stations in the next few years.

SHOP IN KING

Reconstruction of premises for a firm who sell made-to-measure and ready-to-wear clothing has been carried out in Hammersmith, to the designs of David Stern. The site has a frontage of 16 ft. to King Street and tapers to 6 ft. 6 in. at the end of the long elevation to Cambridge Grove. As King Street has a one-way traffic system, importance was given to the splay corner facing the traffic flow and a trolley-bus standard was removed to assist in this. The ground floor was originally occupied by a shoe-repairer and both elevations were faced in bomb-damaged glazed terra-cotta. The clients required the maximum hanging space for suits and coats on display, and storage for 400 suits and 600 pairs of trousers. In the bespoke tailoring department there are two fitting rooms and a room where alterations are made. This section of the shop is placed at the narrow end to reduce the lengthy appearance and one wall is covered with mirror glass from floor to ceiling to create an illusion of width. The cash desk, seen below, was placed centrally to break further the long narrow appearance. Partitioning is of breeze blocks and a new floor of 1-in. by 4-in. wood blocks has been laid. The Cambridge Grove fascia, 66 ft. long, seen in the small photograph on the opposite page, is of

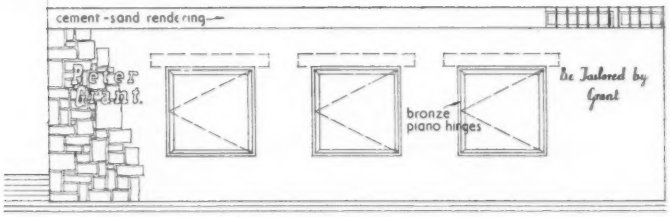
STREET, HAMMERSMITH, LONDON W.6

sand-blasted dove grey glass framed in teak with ½-in. white lines etched and painted at 5-ft. centres. Stall risers are in Staffordshire blue bricks with white pointed horizontal joints. Behind the continuous frieze of venetian blinds (seen right) which have alternative

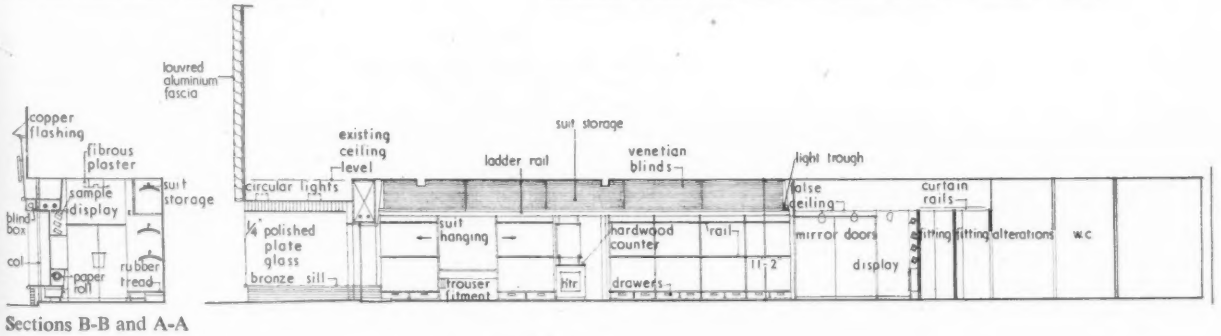


Section through small display window [Scale: 2"= 1' 0"]

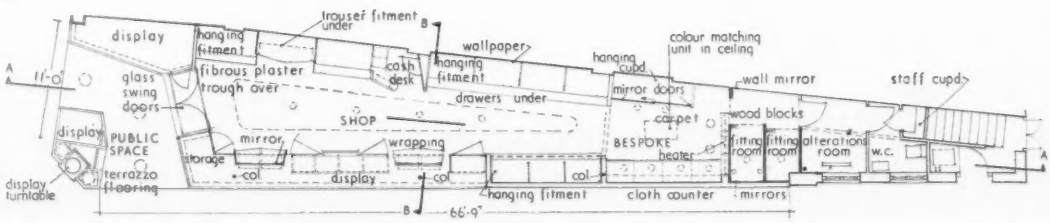
grey and white slats, are hanging rails for suit storage. Heating is by electric convector heaters and there is an extract fan in the alteration room for ventilation. The general contractors were Messrs. Alexander Black. For sub-contractors, see page 260.



Elevation of show windows to Cambridge Grove [Scale: ½"= 1'0"]



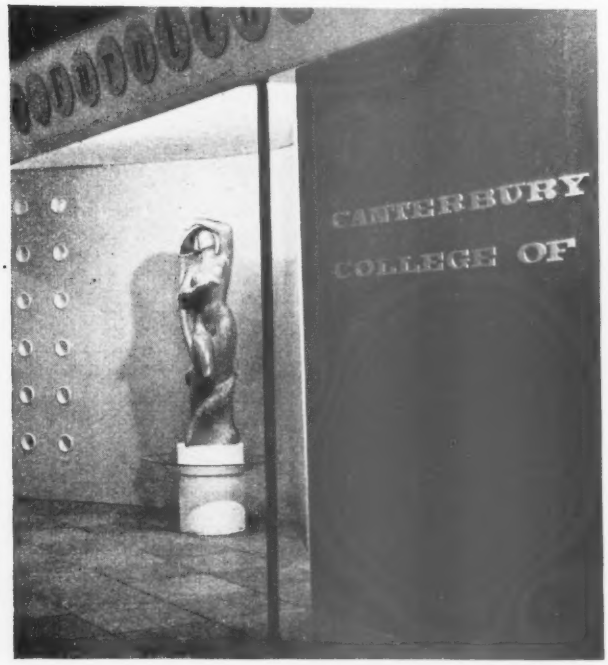
Sections B-B and A-A

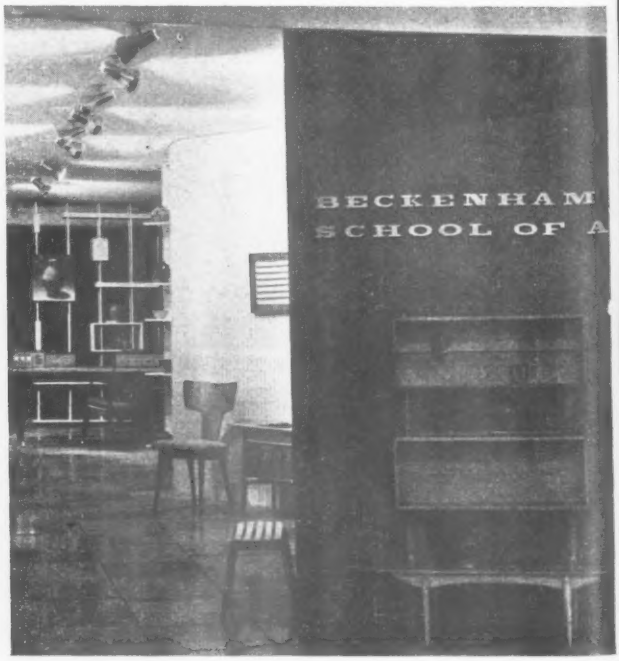


Plan [Scale: ⅛"= 1' 0"]

CANTERBURY STUDENTS DESIGN FURNITURE EXHIBITION STAND

This stand at the Furniture Manufacturers' Exhibition, Earl's Court (referred to by ASTRAGAL *on page* 233*) was designed in the School of Architecture, Canterbury School of Art, by R. W. Paine and M. R. Crux (Wood Sculpture: W. C. Day). The stand shows some of the furniture made at Shoreditch Technical College (above), High Wycombe College of Further Education (above, background), Canterbury College of Art (below, left), Beckenham School of Art (below, right) and Leicester College of Art.*





RESEARCH LABORATORY

for the UNIVERSITY OF LIVERPOOL

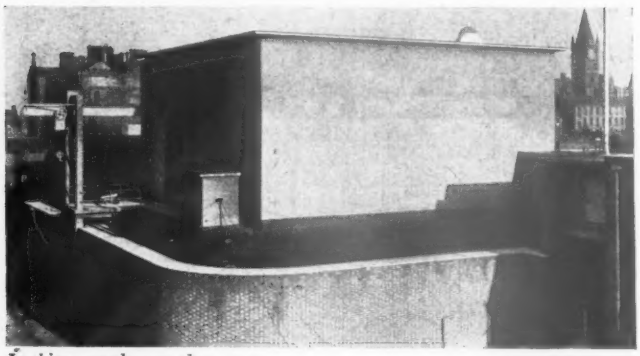
designed by PROFESSOR WILLIAM HOLFORD

supervising architect, W. M. SHENNON

assistant architects K. W. WHITFIELD, G. C. GARDINER, MARGARET HOWELL, F. L. EVANS

The development of research in nuclear physics at Liverpool indicated that investigations should be continued at much higher energies and this resulted in the design of a new accelerator capable of producing particles of 400 million volt energy. This demanded that a suitable laboratory be constructed to house new equipment and the provision of adequate facilities for the research workers. The buildings were designed in close collaboration with the staff under the direction of Professor H. W. B. Skinner, and liaison between the university, the architects and the builders was the responsibility of M. J. Moore.

The large cyclotron building looking west.



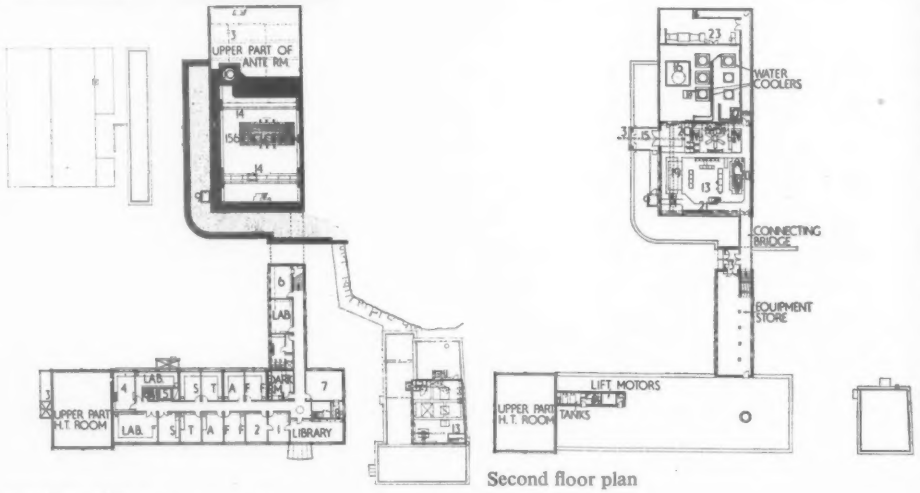
Looking north at the large cyclotron building.

SITE.—As a large proportion of the 156-in. cyclotron room is below ground level, it was necessary to excavate to a maximum depth of 30 ft. into sandstone which involved removing well over 10,000 tons of rock.

PLAN.—The laboratory block has a basement, ground and first floors and high tension section. The basement contains the boiler house, ventilation plant room, stores and high tension experimental

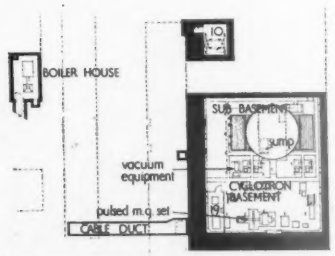
KEY

1 Secretary
2 Professor
3 Lifting block
4 Technicians' common room
5 Lift
6 Storekeeper
7 Staff common room
8 Canteen
9 Vertical duct
10 30-ton door
11 Water cooler housing
12 Ventilator room
13 Auxiliary equipment room
14 Crane
15 Loading platform
16 Lift machinery for 30-ton door
17 Transformers
18 Magnet M.G. set
19 Rectifier
20 Water circulating equipment
21 Low voltage distribution board
22 Viewing chamber
23 Air conditioning room

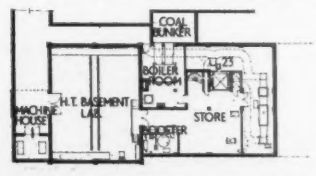


First floor plan [Scale : $\frac{1}{16}$" = 1' 0"]

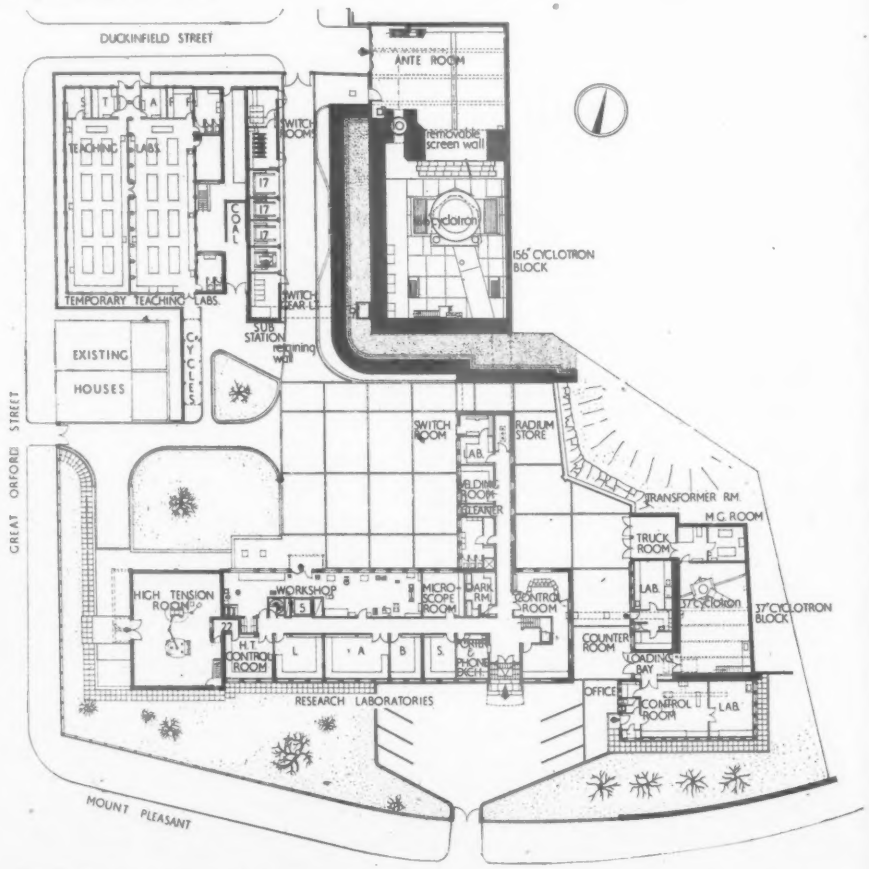
Second floor plan



Basement plan of large cyclotron block



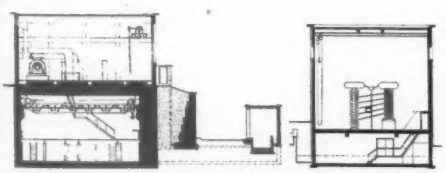
Basement plan of laboratory block
[Scale : $\frac{1}{16}$" = 1' 0"]



Ground floor plan [Scale : $\frac{1}{64}$" = 1' 0"]

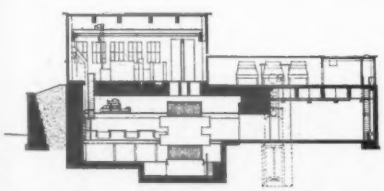
room; on the ground floor are laboratories, radium store, high tension laboratory, dark room, machine shop, 156-in. cyclotron control room, welding room and lavatories; on the first floor are laboratories, offices, drawing office, library common rooms, dark-room and lavatories; on the second is a connecting wing with the large cyclotron block, access being by means of a covered bridge which carries all necessary services. The remainder of this floor is for stores. The high tension equipment is housed in a tower at the end of the laboratory block, where it rises 21 ft. above the adjoining roof level. The 156-in. cyclotron building consists of a room with two working levels, one at adjacent road level and one 8 ft. below it, with a subsidiary pit for the magnet at 15 ft. below road level. Adjoining the cyclotron room is a large anteroom for experimental work. There is a sub-station 90 ft. long by 13 ft. wide housing four transformers and H.T. and L.T. switch-gear. The new building for the 37-in. cyclotron, which was built in 1937 and is at present kept in the old physics laboratory, is a smaller version of the 156-in. cyclotron building and has its own control room.

CONSTRUCTION.—The 156-in. synchro-cyclotron provides a number of technical problems in construction and design and also the need for screening from the radiations produced by the beam of high energy particles; 400 million volt protons in collision with atomic nuclei are capable of producing penetrating neutrons. Thick concrete shielding is required to absorb these neutrons. Concrete must be homogeneous and apertures avoided, which has necessitated expansion joints in the 5½-ft. thick roof and 6-ft. walls. These walls have an additional thickness of pulverised sandstone extending for 10 ft. on the outer face to a height of 21 ft. and retained in a 5-ft. thick brick wall. The laboratory

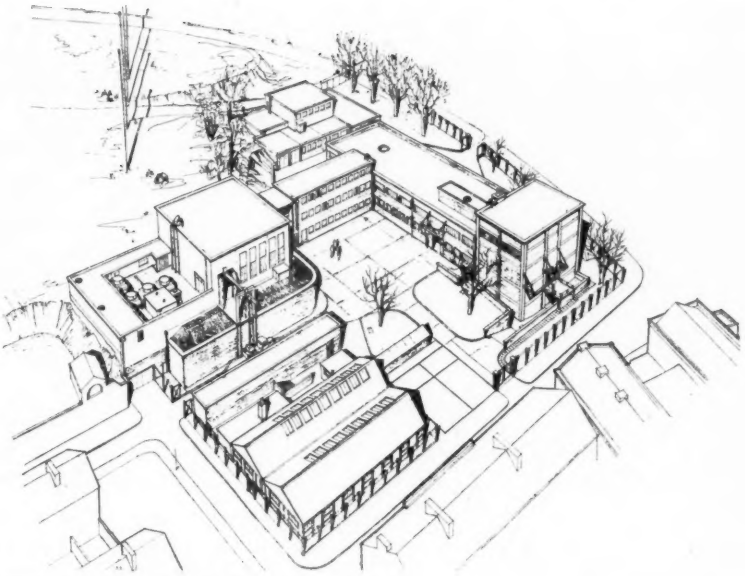


Cross section through large cyclotron block

Section through H.T. block. N-S axis



Long section facing west through large cyclotron block [Scale: 1/4" = 1' 0"]

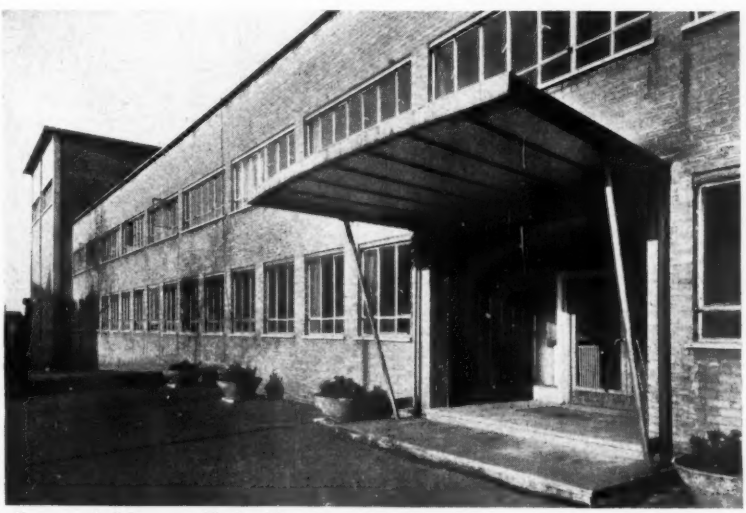


Perspective sketch of site looking south-east

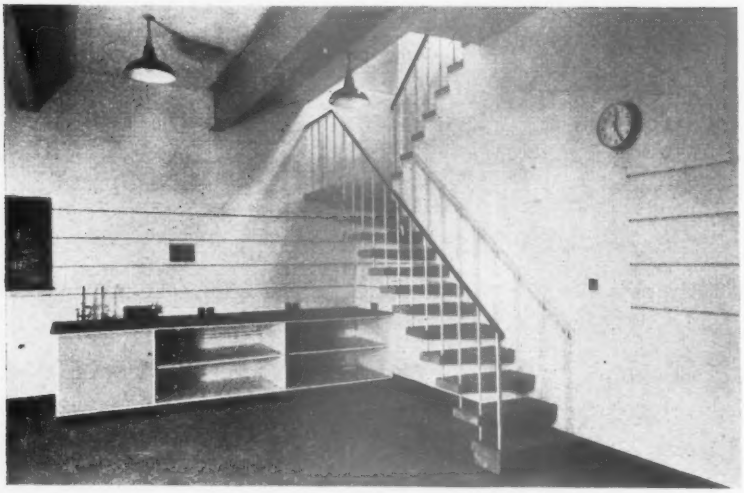
RESEARCH LABORATORY

for the UNIVERSITY of LIVERPOOL

designed by Professor WILLIAM HOLFORD



Above, main laboratory block with main entrance on the right. Below, library and reading room.



RESEARCH LABORATORY

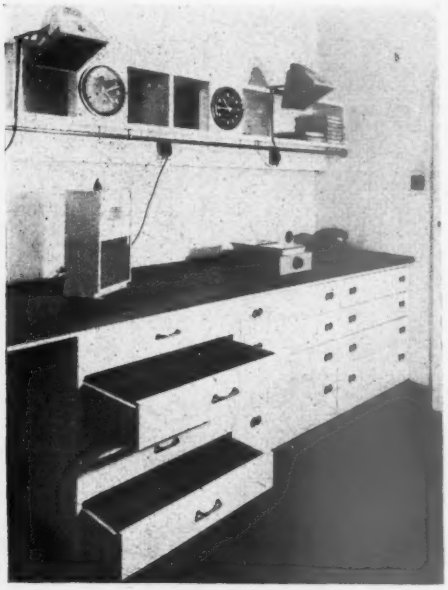
for the UNIVERSITY of LIVERPOOL
designed by Professor WILLIAM HOLFORD

has a steel frame, floors of precast concrete and walls of cavity brickwork. The wall dividing this block from the high tension room is 12-ft. concrete using barytes aggregate to provide great density.

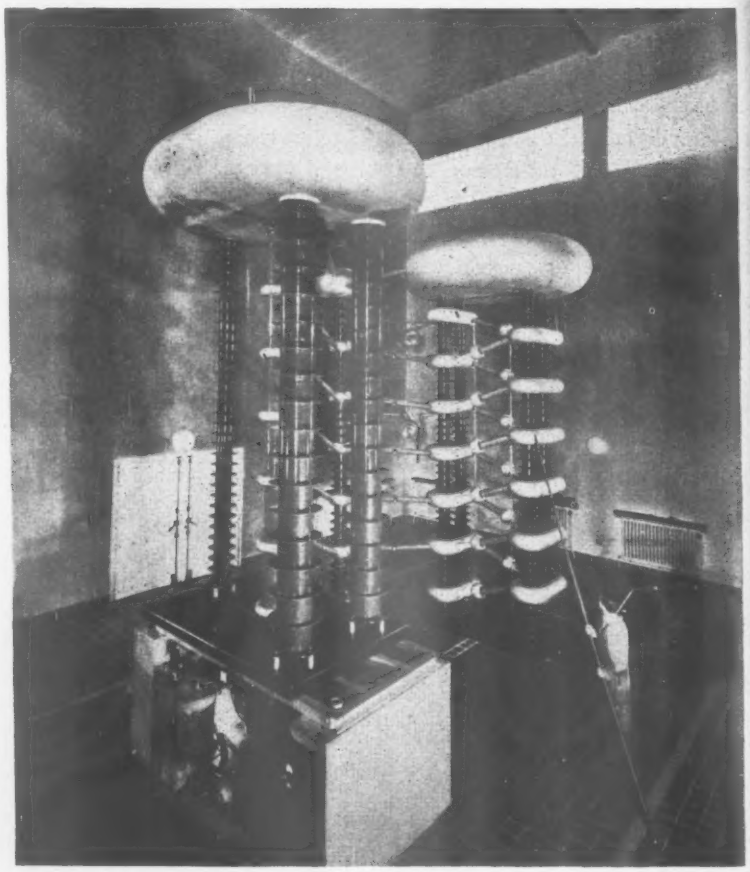
FINISHES.—In the laboratory block walls and ceilings are plastered with vermiculite plaster. Continuous metal channels in the walls at various heights support shelving, blackboards, or experimental equipment. Floors in the laboratories are composition blocks and in the cyclotron room, heather brown quarry tiles.

SERVICES.—The 37-in. cyclotron building has panel heating by hot water pipes embedded in the ceilings. Elsewhere, heating is by means of radiators. Services to various rooms are run above corridors, which have false ceilings with removable panels for easy access. Most of the premises are mechanically ventilated. The building cost approximately 6s. per cub. ft. including all furnishings and the contract system is similar to that described briefly on page 707 of the JOURNAL for December 13, 1951. The general contractors are Bovis, Ltd. For sub-contractors see page 260.

Top, stairs leading from 37-in cyclotron room to equipment room above. Below, dark room showing light-tight drawers.



Below left, control room of 37 in. cyclotron building. Below, looking into the anteroom from the 156-in. cyclotron chamber. Bottom right, the high tension room.



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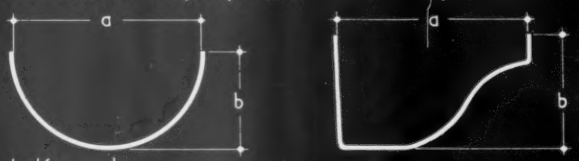
half-round and ogee gutter sections: 18 B.g. thickness

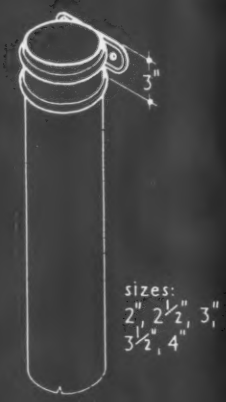


half-round ogee

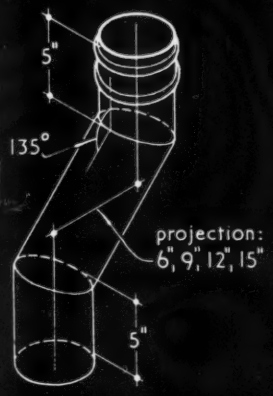
STANDARD GUTTER SECTIONS.

type	nominal size (a)	3"	3½"	4"	4½"	5"	6"
half-round	depth (b)	1½"	1¾"	2"	2¼"	2½"	3"
ogee	depth (b)	–	–	2⅜"	2¾"	3"	3½"

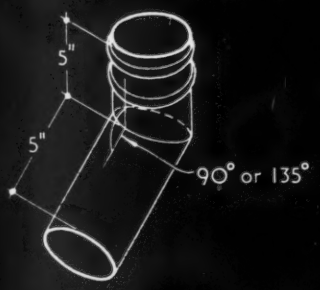
table of dimensions



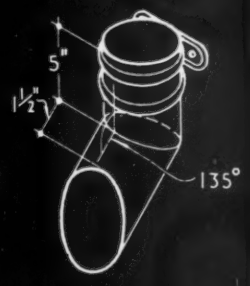
RAINWATER PIPE.



OFFSET.



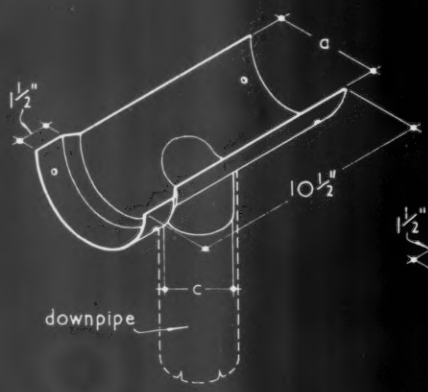
ELBOW.



SHOE.

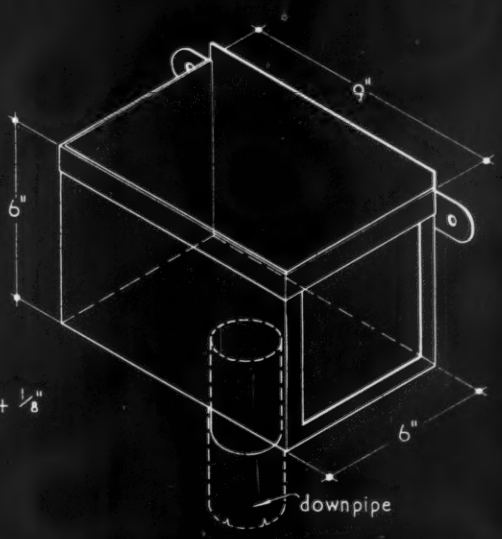
nominal size (a)	half-round		half-round or ogee			
	3"	3½"	4"	4½"	5"	6"
size of downpipe	2"	2"	2½"	2½"	3"	3"
external diameter of outlet (c)	1¾"	1¾"	2¼"	2¼"	2¾"	2¾"

table of dimensions for outlets



OUTLET.

STOP END.



RAINWATER HEAD. (not covered by B.S. 1091:1946)

LIGHT PRESSED STEEL RAINWATER GOODS TO B.S. 1091: 1946.

Manufacturer: G.A. Harvey and Co. (London) Ltd.

33.U4 LIGHT PRESSED STEEL RAINWATER GOODS TO B.S. 1091: 1946

This Sheet describes light pressed steel rainwater goods and the information given is based on B.S. 1091 : 1946. Heavy pressed steel gutters are described on Sheet 33.U5.

Gutters

Shape and Construction: There are two alternative standard gutter sections, half-round and ogee, as illustrated. Both sections are pressed from 18-gauge mild steel.

Sizes: The sizes of standard gutter sections are given on the face of this Sheet : the effective lengths in which the gutters are available are 3 ft., 4 ft. and 6 ft.

Fittings: Fittings comprise outlets, stop ends, 90° angles (internal and external) and obtuse angles (internal and external) of 135°.

Joints: These are of the spigot and socket type and are 1½ in. long.

Fixings: Gutter brackets are in mild steel and should be provided at 3 ft. maximum centres.

Pipes

Sizes: Nominal internal diameters are given on the face of this Sheet. Effective lengths are 3 ft., 4 ft. and 6 ft.

Fittings: These comprise offsets, elbows and shoes, as illustrated.

Joints: These are of the spigot and socket type and the ears are holed to take wall fixings.

Fixing: Pipes and shoes are provided at the inlet end with sockets and ears; offsets and elbows have sockets only. Wood screws in wall plugs are used to fix pipes to the wall face.

Heads

These are not covered in B.S. 1091. Heads of the type illustrated are available.

Finish

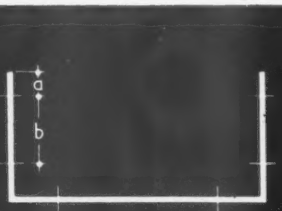
All gutters, pipes and fittings are hot-dip galvanised after manufacture.

This Series of Sheets deals with tanks, cisterns, bins, bunkers, cycle-racks, non-ferrous metal mouldings, perforated and embossed metals, woven wire screens, steel partitions and furniture, railings, fencing, gates, manhole covers, rainwater goods and ventilators.

Compiled from information supplied by :

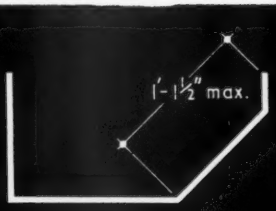
G. A. Harvey & Co. (London), Ltd.
Head Office : Greenwich Metal Works, London, S.E.7.
Telephone : Greenwich 3232 (20 lines).
Telegrams : Cheaper, Wol, London.
London Office : 58, Victoria Street, S.W.1.
Telephone : Victoria 4963.

The Architects' Journal Library of Information Sheets 352. Editor: Cotterell Butler, A.R.I.B.A.



box gutters

boundary wall gutters



for gutters over 12'-0" in effective length, distance from bend at sole to top edge must not exceed 1'-1½"

minimum distance of bolt from any bend line: 1" for ⅜" bolts; 1½" for ½" bolts

valley gutters

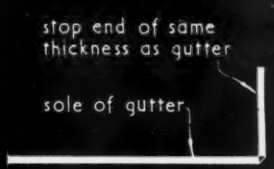
girth of gutter •		below 1'-3"	1'-3"	1'-9"	3'-0"	3'-6"	over 3'-6"
thickness of gutter		up to 14 B.g.	12 B.g.	⅛"	3/16"	¼"	5/16", ⅜"
diameters of jointing bolts		¼"	⅜"	⅜"	⅜"	½"	½"
distance from edge of gutter to c.l. of first bolt (a)	minimum	⅜"	⅝"	⅝"	⅝"	¾"	¾"
	maximum	1½"	1½"	1½"	1¾"	2¼"	2¼"
pitch of bolts (b)		2",3"	2",3"	3",4"	3",4½"	3",4½"	3",4½"

table of dimensions

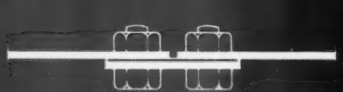
• see note on reverse

TYPICAL BOUNDARY WALL, VALLEY AND BOX GUTTER SECTIONS AND STANDARD DIMENSIONS.

pressed type



welded type

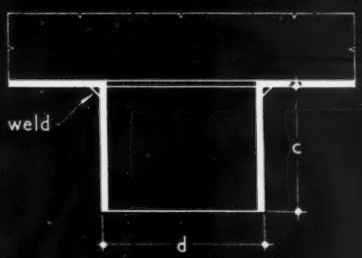


strapped type

bolted type

TYPES OF JOINT.

STOP ENDS.



outside dia (d)	3"	3½"	4"	5"	6"
length (c)	3"	3"	3"	3½"	3½"

table of dimensions

OUTLETS.

HEAVY PRESSED STEEL GUTTERS TO B.S. 1091: 1946.

Manufacturer: G.A. Harvey and Co. (London) Ltd.

33.U5 HEAVY PRESSED STEEL GUTTERS TO B.S. 1091: 1946*

This Sheet describes heavy pressed steel gutters and the information given is based on B.S. 1091 : 1946. Light pressed steel gutters and rainwater pipes and fittings are described on Sheet 33.U4.

Construction and Sizes

Any number of heavy pressed steel sections may be made up from sheet material for boundary wall, valley and box gutters. Typical examples are shown on the face of the Sheet, together with a table of dimensions and manufacturer's notes to enable the architect to design sections to meet his individual requirements as economically as possible. The sections may be obtained in effective lengths of 10 ft., 12 ft. and 14 ft.

Note.—The manufacturer recommends that gutters be designed to girth dimensions which are a multiple of 3 in.

Fittings

Angle pieces and special lengths may be made to specification. Outlets of the straight spigot type to the dimensions given on the face of the Sheet are available as standard. Special outlets may be made to order. Stop ends may be welded or bolted, as shown in the diagrams.

Joints: Pressed socket joints are incorporated in all gutters except the following which have strapped joints.

¼ in. mild steel gutters over 4 ft. girth.
⅝ in. mild steel gutters over 3 ft. girth.
⅜ in. mild steel gutters over 2 ft. 6 in. girth.

Fixing

Purpose-made steel brackets for fixing to roof structural members are supplied if required.

Finish

All gutters and fittings may be supplied untreated, painted or hot-dip galvanised after manufacture.

Further Information

The manufacturer maintains a technical department which is prepared to advise on technical problems dealing with this subject.

This Series of Sheets deals with tanks, cisterns, bins, bunkers, cycle-racks, non-ferrous metal mouldings, perforated and embossed metals, woven wire screens, steel partitions and furniture, railings, fencing, gates, manhole covers, rainwater goods and ventilators.

* *Whilst the gutters described in this Sheet conform in most respects to B.S., certain of the details have been modified to suit the manufacturer's methods of production.*

Compiled from information supplied by :

G. A. Harvey & Co. (London) Ltd.
Head Office : Greenwich Metal Works, London, S.E.7.
Telephone : Greenwich 3232 (20 lines).
Telegrams : Cheaper, Wol, London.
London Office : 58, Victoria Street, S.W.1.
Telephone : Victoria 4963.

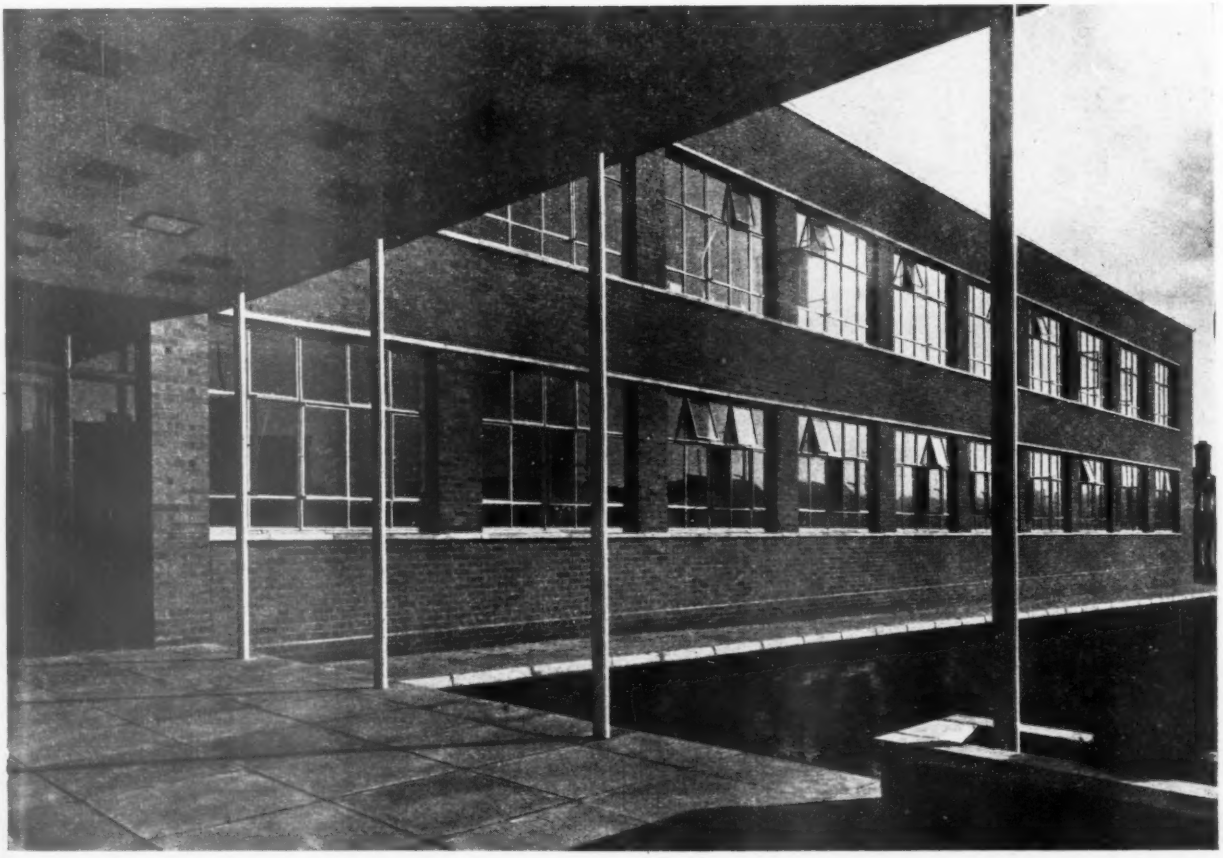
WAREHOUSE

in EALING ROAD, ALPERTON, MIDDLESEX

designed by ERIC H. FIRMIN

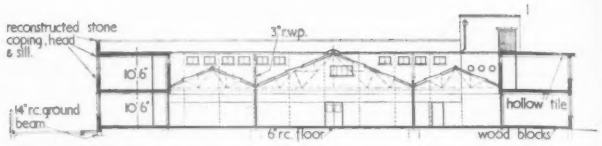
The clients, W. & J. George & Becker, Ltd., manufacturers of scientific apparatus and laboratory equipment, have their main factory in Birmingham, and this new building forms their chief warehouse and distribution centre for the south of England and overseas. The site has an area of 2½ acres and is located on the east side of Ealing Road, midway between Alperton and Park Royal stations, and in the immediate vicinity of Western Avenue and the North Circular Road.

The west facade with main entrance on the left.

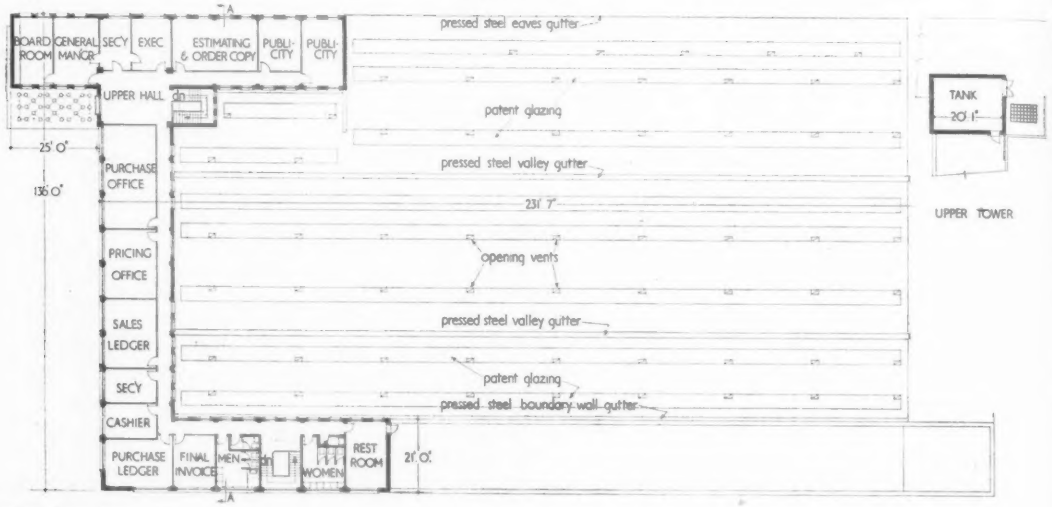


WAREHOUSE

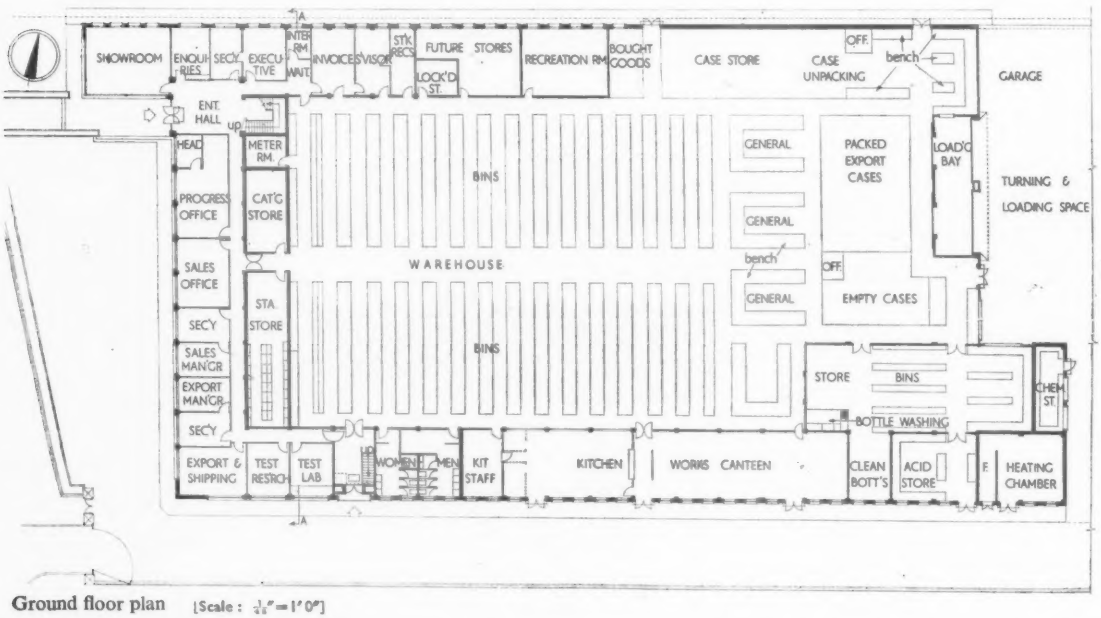
in EALING ROAD, ALPERTON, MIDDLESEX
designed by ERIC H. FIRMIN



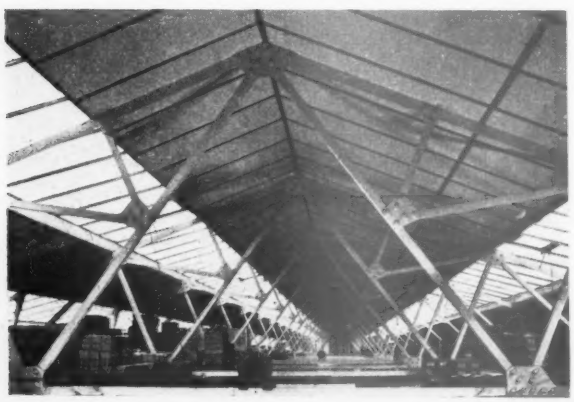
Section A-A



First floor plan



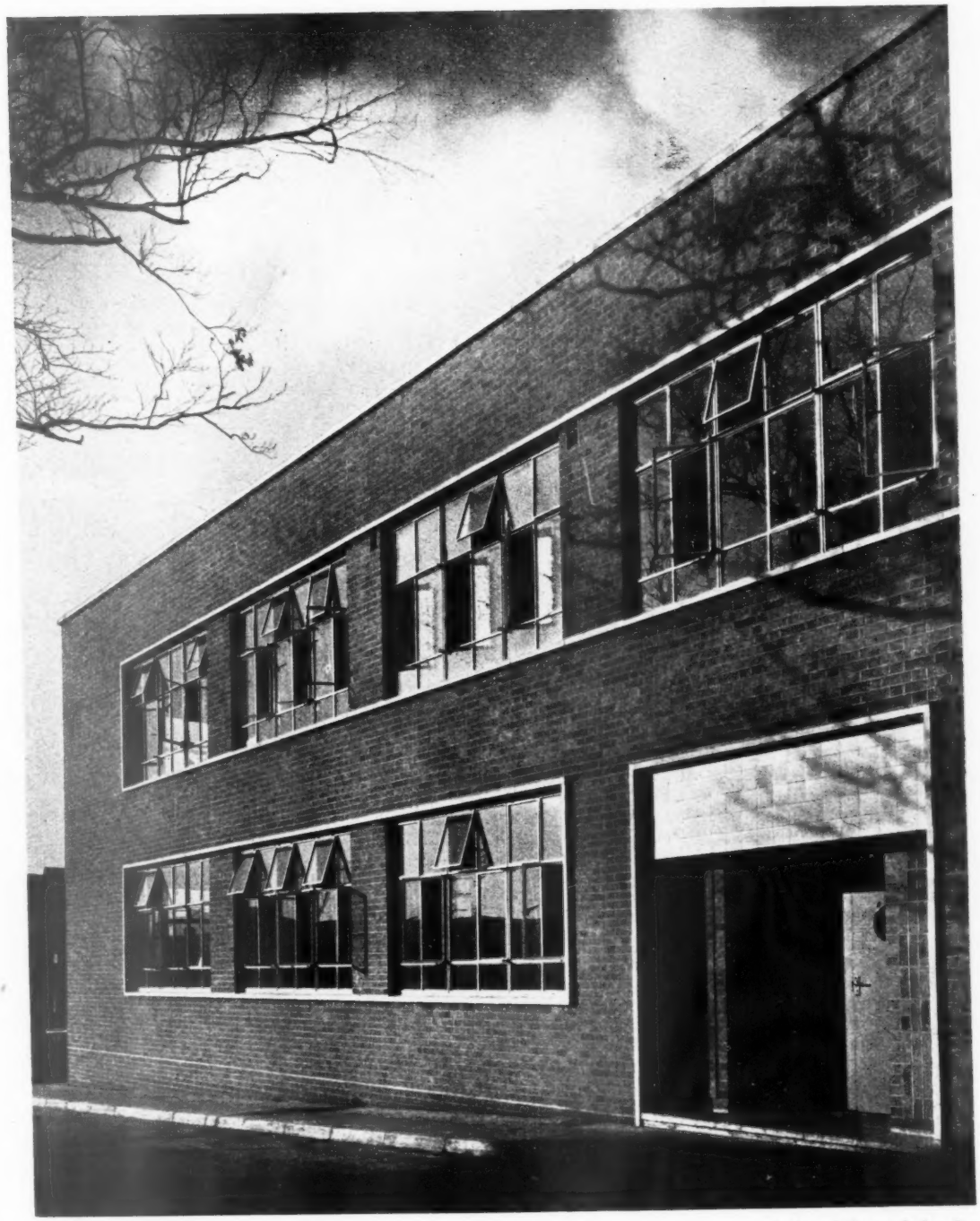
Ground floor plan [Scale: $\frac{1}{16}$" = 1' 0"]



The warehouse roof trusses from first floor office level.

SITE.—The south boundary faces domestic property and a building line of 25 ft. was adopted to preserve the amenities. This space is used for a private road to the rear of the premises. The north side of the site contains an easement of 33 ft. in width for a Metropolitan Water Board pipe track and their current operations require the construction of a 10-ft. deep retaining wall to support the whole of the north wall.

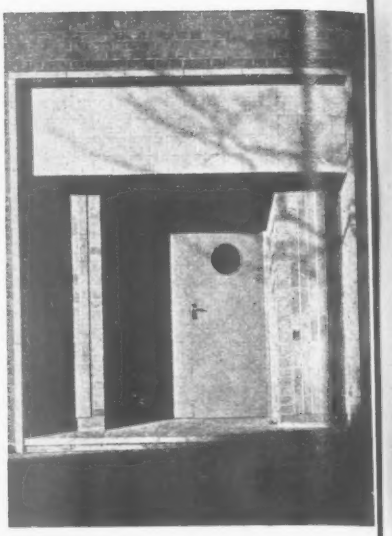
PLAN.—The building has an overall area of 38,000 sq. ft., of which the principal offices have a floor



A view of the south facade looking across the private road leading to the rear of the premises.

area of approximately 8,000 sq. ft. on two floors at the front of the building. Ancillary departments are grouped around the central warehouse area and include laboratories for testing the firm's scientific apparatus. There is a canteen for 100 people, staff dining room, recreation and rest rooms.

CONSTRUCTION.—The entire building has a steel frame and the main floor is 6-in. reinforced concrete. Suspended floors are R.C. hollow tile construction. Internal walls in the warehouse are in 4½-in. brickwork.



Above, the main entrance which faces Ealing Road. Top right, doorway on the south facade, which faces the service road. Bottom right, office corridor on the ground floor and main staircase from the hall.

WAREHOUSE

in EALING ROAD, ALPERTON, MIDDLESE

designed by ERIC H. FIRMIN

FINISHES.—The office block is faced with golden brown facings with reconstructed Portland stone dressings. The warehouse roof is covered with corrugated asbestos sheeting underlined with insulation board. The warehouse floor is granolithic and floors in the office block are finished in European beech blocks. Windows are standard metal sashes and there is a flower box with a bronze grille outside the upper entrance hall.

SERVICES.—Heating is by low-pressure hot water, with radiators in the offices and unit heaters in the warehouse, supplied by oil-fired boilers. A single duct carries electric wiring, G.P.O. and house telephone cables, public address system and impulse time clock wiring.

The general contractors were Percy Bilton Ltd. For sub-contractors see page 260.

TECHNICAL SECTION

Although certain features in building, such as large spans, are extravagant, it is difficult to make rules for structural economy. A method of construction which is economical for one particular building may be quite the reverse for another. For example, the use of reinforced concrete instead of steelwork often saves steel, but under certain circumstances a lattice construction of light steel requires less.

However, one thing can be recommended without reservations—early and close co-operation between architect and engineer. There are still architects who design large buildings and *then* call in their consulting engineer. Faced with a *fait accompli*, the engineer can only make the best of a bad job ; whereas, his early advice on some small point (such as bay-spacing) may make it possible to effect a considerable saving, without interfering with any essential planning or æsthetic requirement.

No architect likes to revise a completed scheme at his engineer's suggestion, hence this plea for *early* collaboration—to save, not only the country's raw materials, but also the assistants' time and the clients' money.

R. FITZMAURICE

This week's special feature

10 DESIGN: BUILDING TYPES
hospital ward unit

The number preceding the week's special article or survey indicates the appropriate subject heading of the Information Centre to which the article or survey belongs. The complete list of these headings is printed from time-to-time. To each survey is appended a list of recently-published and relevant Information Centre items. Further and earlier information can be found by referring to the index published free each year.

The editors of the JOURNAL *have invited three architects who have been engaged in hospital design to comment on the experimental ward block at Greenock, designed by the Nuffield Investigation into the Functions and Design of Hospitals* (ARCHITECTS' JOURNAL *for November 15, 1951*), *and to question the Investigation's director and architect, R. Llewelyn Davies. His answers* (*and the questions*) *are published below.*

QUESTIONS BY GUY ALDIS
(Regional Architect to the East-Anglian Regional Hospital Board)

MEDICAL CATEGORY

Q *No mention is made of the type of patient for whom the block is designed. Is it to be assumed that the requirements for medical, surgical, orthopædic, eye and E.N.T. cases are all identical?*

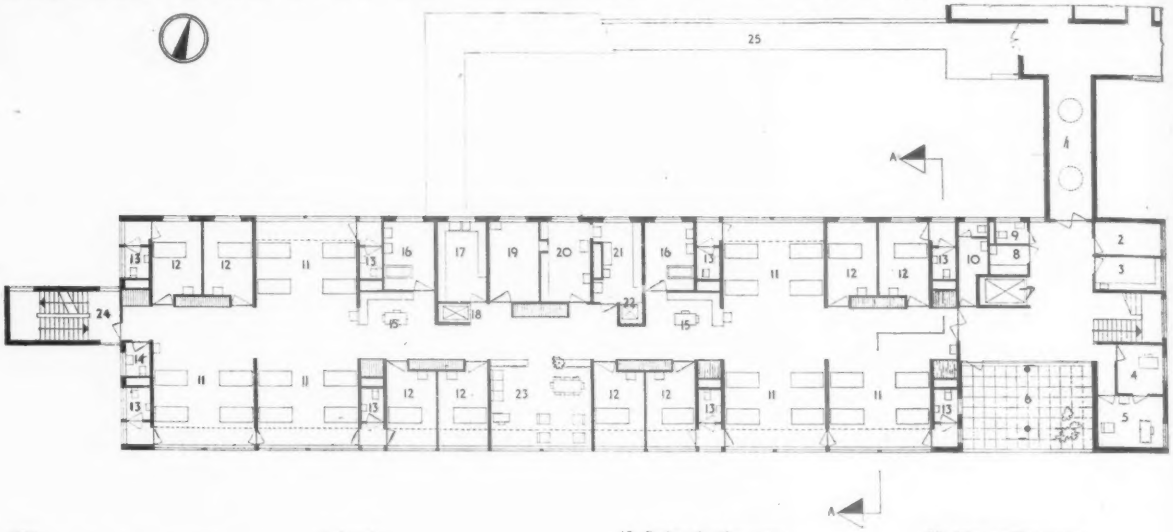
A The general pattern of the ward can be the same for most cases, although the number of single rooms, 4-bedded rooms, or open bays, can, of course, be varied from ward to ward to suit local requirements, without departing from the basic pattern. Maternity and children's wards have special requirements and must be planned differently.

VERTICAL SERVICE CIRCULATION

Q *While vertical circulation is essential, the method adopted on this experimental unit would appear to be costing something like £15,000.*

A The provision of lifts at Larkfield would be appropriate to a multi-storey building and the lifts have been put in as part of the experiment. A somewhat simpler arrangement would normally be used for a two-storey building.

HOSPITAL WARD UNIT AT GREENOCK BY NUFFIELD INVESTIGATION



KEY
1. Corridor link with main hospital
2. Store room (Doctors' room on first floor)
3. Laboratory
4. Interview room
5. Sisters' room
6. Loggia
7. Bed lift
8. Cleaner
9. Visitors' and doctors' toilet room
10. Nurses' toilet and locker room
11. Four-bed ward
12. Single-bed ward
13. Patients' toilet room
14. Nurses' toilet room
15. Nurses' station
16. Bath and wash room
17. Kitchen
18. Supply lift
19. Treatment room
20. Clean utility room
21. Dirty utility room
22. Disposal lift
23. Day space
24. Escape stair
25. Service ramp to lift rooms in basement.

The fundamental principles embodied both in the Greenock wards (above) and the alternative plan (see page 253) are : i. *Short compact planning. Ward blocks should contain at least two beds for every* 10 *ft. run ;* ii. *ancillary rooms should be in the centre to reduce walking distances ;* iii. *lavatories and washing facilities on a scale of not much less than one to four beds and decentralized so that patients can use them as soon as possible ;* iv. *adequate day space adjacent to kitchen ;* v. *one*

REMOVAL OF DEAD

Q *It is regrettable to see that over one-third of the patients must suffer the ordeal of witnessing the removal of corpses from the unit—surely this should not be?*

A The problem of how far ward accommodation should be left open and how far it should be divided into enclosed rooms is a difficult one. An open ward is more efficient and has certain psychological advantages. On the other hand, it has certain disadvantages, such as the one you mention. However, we feel that a certain proportion of open accommodation should be kept, but this can, of course, vary from ward to ward and hospital to hospital, without affecting the basic principles of planning.

DAY SPACE

Q *The day space is situated in the centre of the nurses' working area. Is it not bad that the nurses, who have to work extremely hard, should be on top of people—even if they are patients—who are relaxing? Moreover, visitors see patients who are out of bed here; why bring them through the ward?*

A The position of the day space presents another problem, the various solutions to which are equally easy to defend. There are sound arguments against a central day space, but there is the question of food service from the kitchen and, perhaps more important, the question of supervision. In modern hospitals for acute patients, the latter are ambulant at a very early stage in their recovery. They can, and should, sit up for periods each day in the day room, but, if the day room is remote and the nurses have to make special journeys to it to make sure that the patients are all right, it is not used much.

NURSES' STATIONS

Q *With the present shortage of nurses, can we hope ever to see the nurses' stations manned as the plan indicates they should be?*

A Nurses' stations are not occupied for much of the time. What is needed is somewhere where the nurses can sit down at a desk for a few minutes to write up records and so on. Nurses do not spend much of their time sitting at desks and, in our view, the provision of a special room is unwarranted in this country.

Q *The duplication of medicine cupboards, telephone booths, etc., in one ward block would appear, on first sight, to be extravagant planning.*

A The duplication of equipment at the nurses' stations derives from the experiments we wish to carry out in nursing organization.

Q *For whom is the telephone booth provided—for patients or nursing staff? If the latter, surely this will mean an increase in the amount of walking the nurses must do?*

A The telephones are for the nurses' use and the positions at which they have been provided were chosen to minimize walking distances from all points in the ward.

WARD KITCHEN

Q *Cannot progress be maintained and labour reduced by the introduction of small dish-washing machines?*

A Time studies in Sweden have shown that no economy is achieved by installing dish-washing machines for such a small unit as a ward. The way forward may be to transfer dish-washing to the central kitchen.

Q *What provision is made for the disposal of kitchen scraps and refuse? Do these have to be transported to the refuse lift in the dirty utility room?*

A Kitchen refuse is despatched, at the same time as the empty food trolley, by the kitchen lift.

TREATMENT ROOM

Q *Is the hatch practical? Its success depends upon someone being on duty both in the treatment and the clean utility rooms.*

How are instrument and dressing trolleys fed to this room, and what arrangements are made for the disposal of dirty dressings, etc?

A We believe that, in practice, the arrangements by which trays of sterilized instruments are passed through the hatch to the treatment room will prove satisfactory. Dirty dressings are placed in bins in the treatment room and taken through to the dirty utility room for disposal.

DIRTY UTILITY

Q *It is difficult to appreciate the desirability of having the following activities carried out in one room: Firstly, emptying, cleaning and sterilizing bed pans, etc.; secondly, sorting and, perhaps, listing soiled linen; thirdly, washing and cleaning surgical instruments, bowls, etc.*

A disposal lift, presumably for soiled linen, is only practicable when an attendant (a porter) is in the basement to receive it. Failing this, the room must remain cluttered up with soiled linen until the time when it is known a porter will be available in the basement. Is it practicable to have bed pan and urine bottle racks over bed pan sterilizers?

A The dirty utility room is essentially the disposal point for all dirty and infected material. In our view, it is best for all this to be in one room, rather than split up and carried out in a variety of rooms, some of which are also being used for "clean" processes. (A possible exception is, perhaps, the washing and cleaning of surgical instruments. In the alternative plan (below) it will be seen that this has been taken out of the disposal rooms and put into a portion of the clean utility room.) We believe that soiled linen should not be sorted or counted in the wards at all, but should go straight into soiled linen containers which can be taken to the disposal or dirty utility room and despatched by the lift. They can be disposed of more rapidly by lift than by the traditional system whereby a porter takes a trolley from ward to ward. Such an arrangement presupposes a central linen service, but this is already in successful use in several hospitals in this country, as well as abroad. It should be remembered in planning sluice and disposal rooms that very few bedpans are employed nowadays in general acute wards. A recent check in a provincial hospital which, incidentally, was not deliberately pursuing a policy of early ambulation, showed that an average of only 5 patients in each ward of 30 were using bedpans.

CLEAN LINEN

Q *Is clean linen to be sorted and checked in the corridor?*

A Linen is sorted and checked centrally and delivered to the wards in made-up sets. No sorting of clean or dirty linen takes place within the ward.

URINE TESTING

Q *Where is urine testing to be carried out?*

A Urine testing will be carried out in the dirty utility room, or in the laboratory.

STRETCHERS AND WHEELCHAIRS

Q *Will stretchers and wheelchairs still clutter up the corridors?*

A Stretchers will not be used, as it is proposed that all beds should be mobile. Wheelchairs, when not in use, will be parked in the day space; and lavatory chairs, in the bathrooms.

FLOWERS

Q *May a plea be made for the provision of facilities for the staff to handle flowers from the wards?*

A Space for handling flowers is provided in the alternative plan (below), and we are inclined to accept this as a real requirement in ward planning for the future.

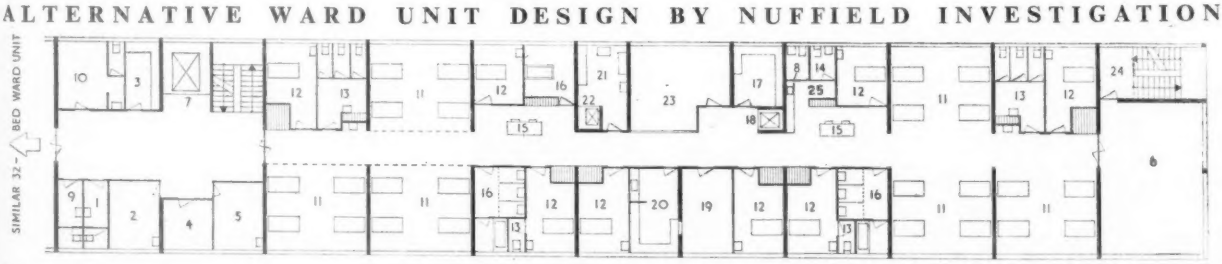
QUESTIONS BY S. E. T. CUSDIN (of Easton & Robertson)

NUMBER OF BEDS

Q *The total number of beds in the proposed unit is* 32, *which is more than the* 26 *recommended by the General Nursing Council as the maximum number of beds in a ward. Have the studies of the Trust on this point shown that with more efficient planning a sister can supervise the additional number of beds?*

A One of the principal objects of this experimental building is to afford an opportunity for experiments with a nursing organization somewhat different from that customary at the present time. It is argued that a ward of 30 or more beds throws too much load on the sister under modern conditions. On the other hand, wards with considerably fewer beds are extravagant in building, owing to the duplication of ancillary rooms, and Swedish research has shown that as the number of beds in the ward is reduced, so nurses' time is less efficiently utilized. Is there some way of reconciling these contradictory views? We do not yet know, but our experiments in Greenock may produce some helpful data.

ALTERNATIVE WARD UNIT DESIGN BY NUFFIELD INVESTIGATION



1. Doctors' toilet room
2. Doctors' room
3. Laboratory
4. Interview room
5. Sisters' room
6. Loggia.
7. Bed lift
8. Cleaner
9. Visitors' and doctors' toilet room
10. Nurses' toilet and locker room
11. 4-bed ward
12. Single-bed ward
13. Patients' toilet room
14. Nurses' toilet room
15. Nurses' station
16. Bath and wash room
17. Kitchen
18. Supply lift
19. Treatment room
20. Wash-up and clean utility room
21. Bedpan and disposal room
22. Disposal lift
23. Day space
24. Escape stair
25. Flowers

out of every four to five beds to be in a single room; vi. *the remaining beds to be in a fairly open layout for ease of nursing, and to maintain some of the undoubted advantages of the traditional British open ward. Where it is desired to use four-bed wards, partition walls can be placed as shown by the dotted lines. The value of such wards is, however, questionable once sufficient single rooms have been provided to take all seriously ill or distressing cases.*

RIGHT-HANDED NURSING

Q *The General Nursing Council have recommended that, whenever possible, patients should be nursed from the right-hand side of the bed. Has this point been considered in the single-bed wards in the new plan and found to be an invalid proposition?*

A It has not been considered necessary to adhere rigidly to the right-hand approach to the bed in the single rooms. These rooms are so arranged that patients may be nursed from either side of the bed, as the nature of the ailment may be the conditioning factor. The General Nursing Council recommendation is that " beds should be so arranged as to provide easy access to either side."

CURTAINS

Q *With any arrangement of four beds in a unit in the Rigg's plan, the patient on the inside is in an uncomfortable position if the one nearest the window has, for any reason, to be screened for a large part of the day. Presumably, the Trust have in mind that this bed would be allocated to an ambulant patient.*

A The design of the windows is such that there would be good light for the inner patient even when the patient near the window has his curtain drawn. As all seriously-ill cases are in single rooms, and treatment takes place in the treatment room, curtains would be drawn only rarely and for short periods.

STORAGE AND LIFT NOISE

Q *We shall be interested to see whether or not, in practice, sufficient accommodation has been made for storage, and whether the opening of the service lifts into the middle of the ward makes too much noise to be dealt with by normal absorption surfaces. In view of the large amount of bulk stores required to be sent to and despatched from the ward unit daily, would it not be advisable to have an enclosed space for the reception and despatch of these goods?*

A It is considered that sufficient storage has been provided in the Greenock ward plan. The doors to the service lifts and all the machinery has been very carefully selected, and it is hoped that the absorption surfaces provided will, in fact, control the noise produced by the delivery of stores. This delivery does not take place often enough for it to be necessary to have a room for reception and despatch.

WINDOW CLEANING

Q *We are interested to know whether the hospital light baffle can be cleaned easily, and, if not, whether it is likely to be a ledge on which dust can collect which later will get blown into the ward. We are interested, therefore, in Llewelyn Davies's method of keeping this surface clean. How is it proposed that this problem of dust should be solved?*

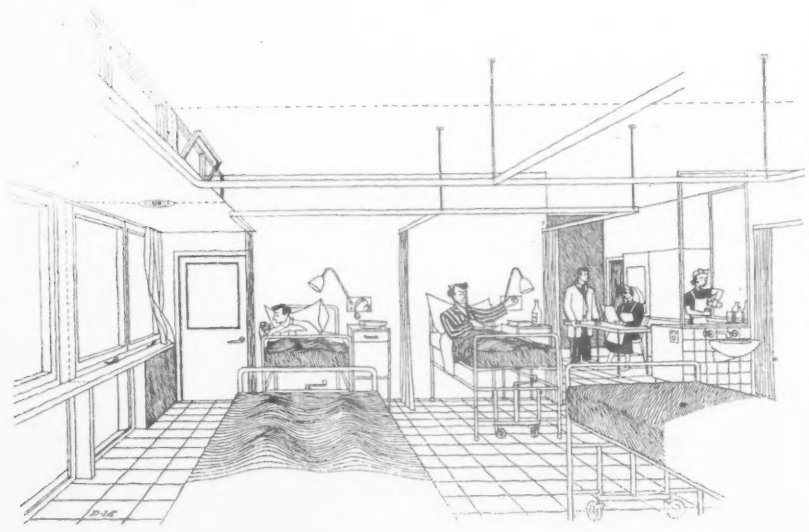
A The windows above the baffle do not open except for cleaning, so dust would not get blown about. The inner sloped surface can be cleaned with a normal domestic vacuum cleaner attachment.

HEATING

Q *Are the engineers satisfied that, with the comparatively low ceiling, comfortable conditions can be obtained with ceiling panel heating?*

A Yes, quite confident.

The patients' view of the ward.



QUESTIONS BY M. A. R. POWERS (of the Architects' Co-operative Partnership)

WARD KITCHEN AND FOOD SERVICE

Q *Direct access from the supply lift to the ward kitchen seems worth having, whatever system of food service is used. Negotiating the trolley from the lift to the kitchen, out to the wards, back to the kitchen and then out to the lift again will be irritating.*

A It is possible that direct access from the supply lift to the ward kitchen would be an advantage, but with our arrangement the lift can also be used for the supply of stores for rooms other than the kitchen.

NURSES' LAVATORIES

Q *The provision of lavatories for the nurses seems over generous. If there are to be two, should they not be adjacent to each other?*

A A lavatory and cloakroom is provided at Greenock for nurses' use on entering the ward block. This is a special local requirement due to the arrangements in the existing hospital.

VISITORS WAITING

Q *If the loggia were closed in, it could serve as a waiting space for visitors. Do you not consider this a desirable feature for every hospital?*

A It would be unnecessary in a unit of this size to have so large an area as the loggia set aside for waiting visitors.

SISTERS' ROOM

Q *While the desire for quiet is appreciated, do you not feel that the sister's room is too isolated from the unit?*

A The best place for the sister's room, under present-day arrangements of nursing, is usually just inside the entrance to the unit. The position in the Greenock plan derives from some of the experiments we wish to make there. Until our experiments are concluded, we would not wish to be too definite about this matter.

GENERAL

Q *The most serious criticism of the plan seems to be that, in making life as easy as possible for the medical and nursing staff, the patients who are not in single bed wards are so surrounded by the activities of the ward unit that they will not get a moment's peace in the twenty-four hours. However sound-absorbing the offending floors, walls and ceilings, the opening and shutting of doors and the traffic between rooms will be visually disturbing. It will seem even worse because the patients will not be able to see all*

Venetian Vogue in the Drawing Office

Control of light in all seasons of the year, control at all hours of the day (at night the sheen of the closed blinds increasing by reflection the volume and intensity of illumination): SUNWAY Venetian Blinds are being installed in offices and works as safeguards in the care of sight and as aids to efficiency in delicate, difficult and exacting planning and processing. SUNWAYS made of light metal laths, imperishably dyed in attractive colours, are easily and rapidly fitted. They add charm and comfort to buildings; they restrain sun-erosion; they quickly save their cost by reason of wiser and thriftier use of light and by virtue of an insulating effect.* The photograph here reproduced is one of the drawing office of one of the most enterprising firms in British industry. Architects, engineers, efficiency experts, welfare supervisors are invited to secure full information from

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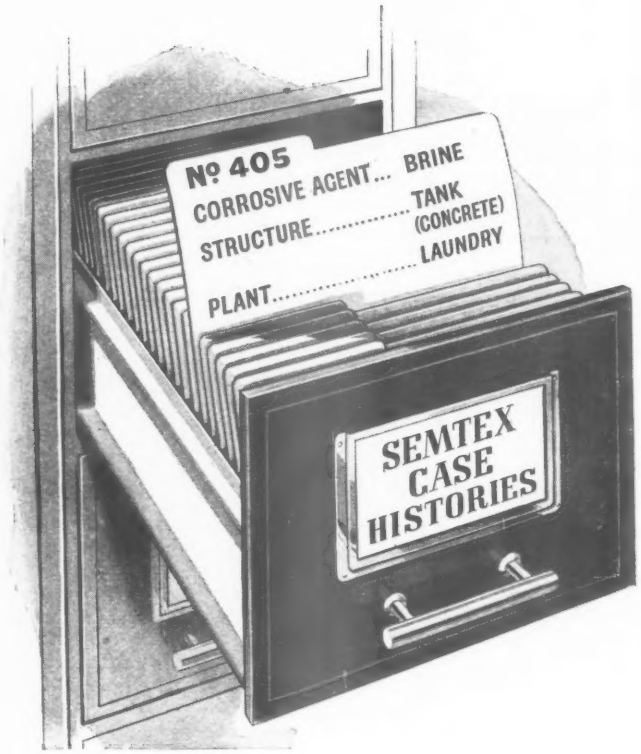
* *The American Society of Heating and Ventilating Engineers Guide, 1951, report that, "Any colored Venetian Blind with slats tilted at 45° (normal) angle will deflect 20% to 35% of solar radiation . . . thereby keeping a home (or factory) cooler in summer. The same 45° angle of a Venetian Blind will also retain 20% to 35% indoor heat in winter"*



THE PROBLEM

Brine used in water-softening processes stored in recently-built concrete tanks. Concrete attacked by the solution and sufficiently impaired to allow serious leakage of the corrosive liquid.

THE SOLUTION

Neutralising of all traces of brine by thorough cleansing of the tanks followed by careful examination of the damaged concrete. The treatment recommended was rendering of the tank interiors with a corrosion-resisting composition based on a rubber latex/cement compound. This work was duly carried out by operatives trained in the handling of this material and proved completely successful. No sign of leakage could be found upon recharging the tanks; the multi-coat *in situ* lining ensures that the corrosive agent cannot come into contact with the concrete through joints or pin-holes.

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The Industrial Division of Semtex Ltd., a Company of the Dunlop Group. The Industrial Division specialises in the formulation and application of anti-corrosion treatments. The material used on these brine tanks is only one of many developed in the Company's own laboratories. Semtex Ltd., in fact, brings to the study and resolution of difficult corrosion problems unequalled technical resources and first-class contracting facilities. This combined knowledge of chemist and craftsmen is at your disposal whatever the nature of your business or your plant.

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that is going on. A similar sort of irritation may be caused by the fact that patients will not be able to hear a conversation going on in the four beds on the opposite side of the corridor. It is possible that the æsthetically-disturbing and dust-harbouring curtains around the beds are an attempt to overcome the problems arising from having beds so closely linked with the ancillary rooms.

A This raises the very difficult questions: Are open wards desirable or not? Our view is that they are, so long as: Firstly, all seriously ill and disturbing cases are isolated in single rooms; secondly, traffic through either half of the ward is reduced by centralizing ancillary rooms and supplies; and thirdly, early ambulation is being practised. We do not regard the curtains as æsthetically disturbing—quite the contrary.

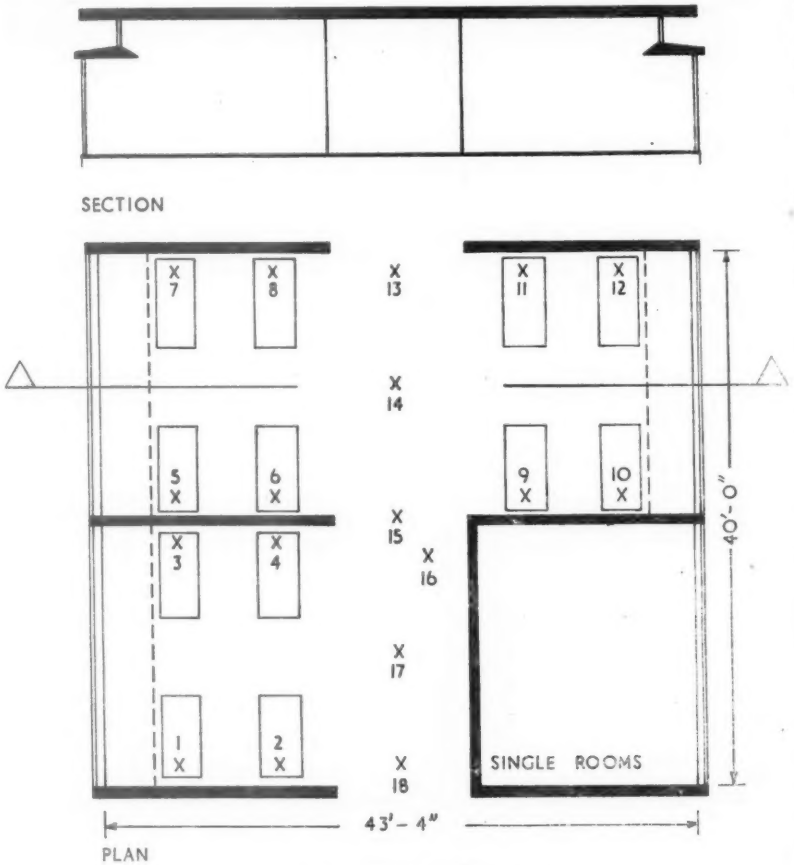
This week's special article

24 LIGHTING
daylighting a hospital ward

The work of the Nuffield Investigation into the Design of Hospitals raised a number of problems in daylighting. These could be solved only by means of measurements on the building itself or on a scale model. A model was, in fact, made at BRS and in the following article R. G. Hopkinson describes the model, the experiments and the results.

The "Riggs" layout, chosen by the Nuffield Investigation as the basis for their design of a new type of hospital ward, results in a very wide building, which makes the provision of adequate daylighting quite a difficult problem. If sky factor (*i.e.*, direct daylight without inter-reflections) alone is taken as the criterion of adequate natural lighting, it is evident that very large windows would be necessary in order to allow direct light to reach the middle of the wide ward. But other factors have to be considered.

Fig. 1. Plan and section of model. × indicates position of photo-cell.



DAYLIGHT FACTORS

—	White walls			Coloured walls, 10 ft. 9 in. with baffle
	12 ft. ceiling	10 ft. ceiling	10 ft. 9 in. with baffle	
Position 2	12·7 per cent.	11·3 per cent.	8·6 per cent.	3·2 per cent.
,, 14	12·2 ,,	10·6 ,,	8·4 ,,	3·8 ,,
,, 17	9·5 ,,	9·5 ,,	7·0 ,,	3·0 ,,

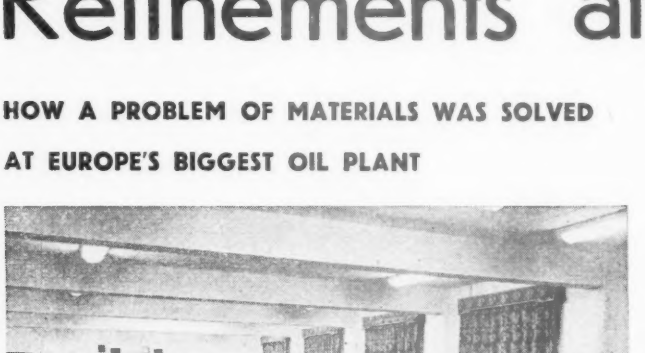
The work completed recently at BRS on problems of glare and brightness contrast demonstrated that the criteria of good lighting cannot be those of sky factor alone. Most hospitals employ a scheme of decoration in light colours, *i.e.*, colours which reflect a large amount of the light which falls on them. Consequently, parts of the ward which are remote from the windows will receive light not only from the windows directly, but also by reflection from walls, ceiling, floor, etc. The indirect component of the natural lighting will, therefore, have to be reckoned with. It is not sufficient to regard it merely as a "factor of safety," it must be allowed for in a systematic fashion.

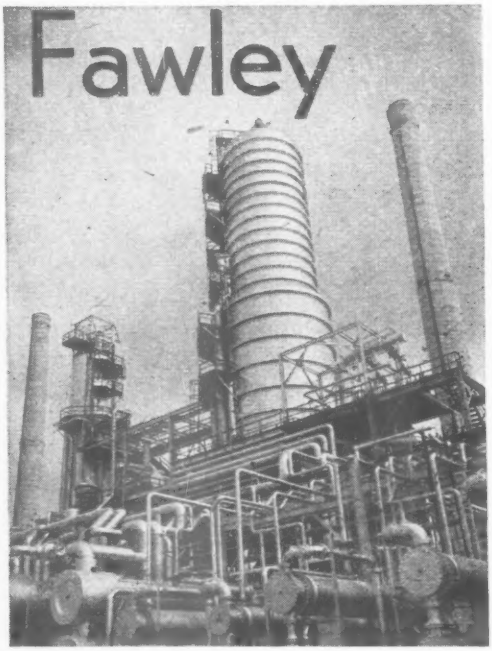
There are tables which enable the amount of indirect light to be computed from a knowledge of the layout of a room and the reflection characteristics of its surfaces, but these tables are very difficult to apply and do not allow for the fact that the ground outside a room serves to reflect light from the sky into that room. It was quite evident from an inspection of the problem which was posed by the Nuffield Investigation that direct measurements would have to be made, and it was equally evident, from a consideration of the costs of any proposed experiment, that these measurements would have to be made in a model.

Fortunately, problems of lighting like those under consideration can be

Refinements at Fawley

HOW A PROBLEM OF MATERIALS WAS SOLVED AT EUROPE'S BIGGEST OIL PLANT





THE FAWLEY REFINERY *represents one of the greatest feats of industrial enterprise since the war. Its huge Administration Building (Architects: Messrs. Lanchester & Lodge) was floored almost exclusively with Accotile.*

On the left is shown a typical Accotile floor, in the lecture and conference room. A great variety of designs may be achieved with Accotile.

THE SPEED with which the Esso Company's new refinery at Fawley was completed has in itself been a notable feature of this great enterprise. But it has involved some "tall orders" for architects and builders; for instance, in order to meet their deadline, Messrs. Lanchester and Lodge, the architects, were faced with the task of completing the entire Administration Building, from start to finish, *within a year*.

This meant that only readily available materials could be specified; at the same time, the assignment was far too important to allow any compromise where quality was concerned.

Choosing a Floor

One problem of great importance was, of course, flooring. A material had to be found which would come up to exacting requirements of design and durability and yet be readily available.

The material chosen was Accotile, the asphalt tile flooring made by the Armstrong Cork Company. Practically the whole of the Administration Building has been floored with Accotile, as well as the canteen, medical block, and laboratory administration offices. In all, rather over seven thousand square yards of Accotile were laid by Armstrong's own Contracts Department in conjunction with Gabriel Wade & English, Ltd., Southampton. Accotile was the only asphalt tile used.

Qualities of Accotile

Accotile provides an extremely durable floor (floors laid in this country in 1938 and 1939 are still giving excellent service) which has a strong resistance to alkaline moisture. Hence it can be laid without the necessity of a damp-course, although it is not a damp-course itself.

There are almost unlimited possibilities of design for Accotile and it can be laid to harmonize with existing decorations. Inconvenience is cut down to a minimum, since Accotile can be used as soon as it is laid.

Standard Accotile is easily cleaned by washing with water, and is resistant to stains and most dilute acids. Where conditions make it advisable, a special Grease Resisting Accotile is recommended.

Accotile is available in two sizes of tile (12" x 12" and 9" x 9"); in two thicknesses (⅛" and 3/16"); and in 19 different colours. In addition, Accotile Coved Skirting, supplied in 36" lengths, prevents dust collecting in corners and obviates the need for timber.

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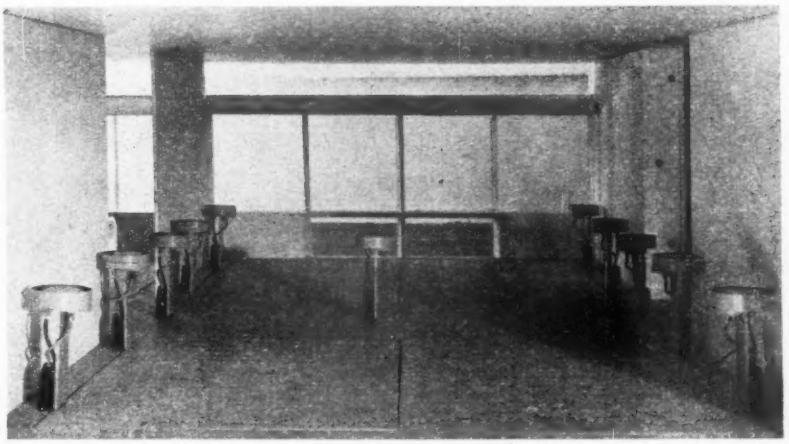
dealt with on a model scale with sufficient accuracy. The art of lighting has this considerable advantage over the arts of heating and acoustics.

SKY FACTORS

The first problem posed by the Nuffield Investigation, was, whether a ward block 43 ft. 4 in. wide, with a maximum ceiling height of 12 ft., could be provided with adequate and comfortable conditions of lighting. Direct calculation with windows the full width and height of the outside wall, and with no window bars, showed that the sky factors in the centre of the building (position 14, Fig. 1) and at the points where the inside beds would be (position 2, Fig. 1) were 3·2 per cent. in each case. The sky factor at the centre of the building (position 17, Fig. 1) was 1·7 per cent. These figures suggested that with the ceiling height of 12 ft. there should be enough direct light for the normal work of the hospital.

Not content with this, the Investigation asked whether it would be possible to reduce the ceiling height to 10 ft. and still retain adequate daylighting. Under these conditions, the sky factor at position 14 would be 2 per cent., at position 17, 1 per cent., and for the inside beds (position 2), 2·1 per cent. The sky factor at position 17 is lower than one would prefer for the type of work done in a hospital. But the sky factor takes no account of the light reflected from the ground outside or from the surfaces within the room.

A model of a section of the ward was constructed to a scale of 1 in. to 1 ft. It was of a very flexible design which enabled the ceiling height to be changed, and the windows and the internal walls to be altered to give different wall formations and window lay-out. The floor contained removable panels so that an observer could inspect the lighting conditions from within the model and so get some sort of a subjective assessment.



WINDOW DESIGNS

In the early stages of the work a number of different window designs were considered. Originally it was intended that all these should be put into the model and direct lighting measurements made for each of them. Other considerations, however, decided that a design with a baffle against sky glare should be given first priority. This baffle reduced the area of sky seen from the outer bed and it was hoped that it would help also to distribute light more evenly throughout the room. It proved to be successful for the first purpose but not for the second.

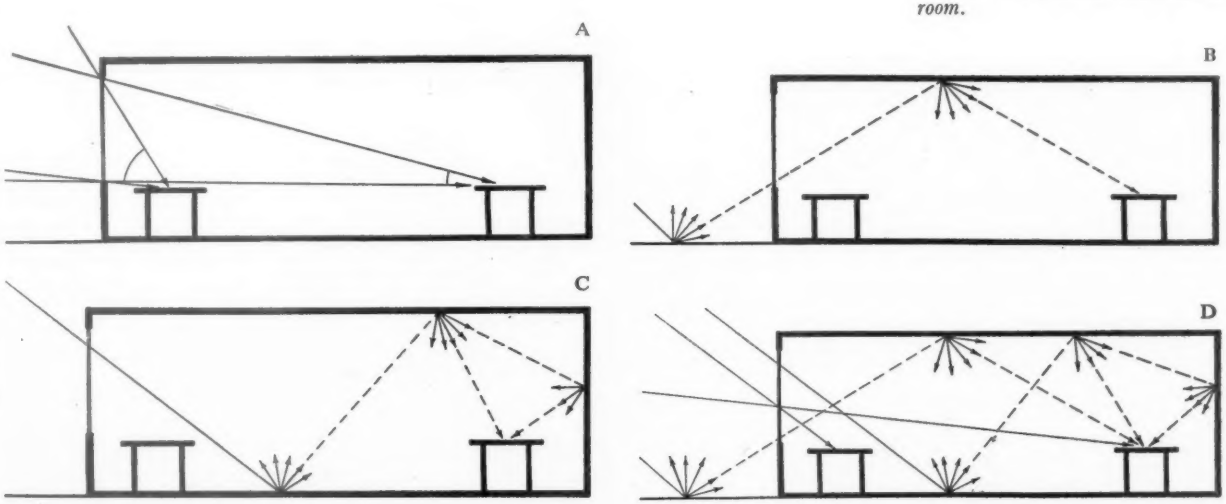
MEASUREMENT TECHNIQUE

It was necessary to design an artificial sky which would simulate not only the hemisphere of sky but also the ground outside and so give the same effect in the model as would take place in an actual building. Before going ahead a large number of detailed measurements were made with the model out of doors under the natural sky and these measurements were checked against the comparable measurements under the artificial sky. The measurements were sufficiently close for any of the problems under consideration.

The interior measurements were made with a series of photo-electric cells (Fig. 2) which were placed in strategical positions in the ward. The precise positions of the photo-cells are shown in Fig. 1. The photo-cells incorporate a special form of correction which enables light at glancing incidence to be recorded correctly. (This is normally one of the photometrist's headaches and the work on the model ward was only possible because it had been solved.)

These photo-cells were mounted in holders which could be plugged into sockets in the floor at the required

Above, Fig. 2. Below, Fig. 3. "A," light reaches working-plane directly from sky; "B," by reflection from ground and ceiling; "C," by reflection from floor, ceiling and walls; "D," directly from sky and by reflection from all surfaces both inside and outside room.



positions and in a plane corresponding to the height of a patient's head (3 ft. above floor level). The sockets were wired to a 24-way selector switch enabling the cells to be connected in turn to a micro-ammeter, so that a complete survey of the lighting in the ward could be made within a few minutes.

The lamps which supplied the light to the artificial skies were connected to a manually-controlled voltage supply which was monitored by a photo-cell mounted directly below each sky. In this way, the artificial daylighting conditions were kept absolutely constant throughout a long series of experiments.

THE EFFECT OF CEILING HEIGHT ON DAYLIGHT FACTORS

The measurements showed that, if the ceiling has a fairly high reflection factor (about 80 per cent.), if the floor is also of a light colour (for example, plain plywood, of 36 per cent. reflection factor), and if the walls are decorated in light colours, the indirect component of lighting is three or four times that of the direct component in the parts of the room remote from the windows. Considering first the 12 ft. ceiling and positions 2, 14 and 17, *i.e.*, an inside bed and 2 points in the centre of the room, it was shown previously that the sky factors were 3·2 per cent., 3·2 per cent., and 1·6 per cent. Hence, the daylight factors, *i.e.*, the sky factors plus the indirect components, are 12·7 per cent., 12·2 per cent. and 9·5 per cent. respectively. Therefore, with the 12 ft. ceiling the daylighting should be quite sufficient for all practical purposes. If the ceiling height is reduced to 10 ft. the sky factors become 2·1 per cent., 1·7 per cent., and 1 per cent. and the daylight factors, 11·3 per cent., 10·6 per cent., and 8·6 per cent. respectively.

Therefore, the change in ceiling height, although it has a marked effect on the sky factors has little effect on the total daylight factor. In other words, the indirect component is very much more important than the direct component under these circumstances. (It must be realized that this would not apply if the walls were dark, nor would it apply to positions nearer the windows; nor does it mean that the 10-ft. ceiling is giving good daylighting—this will be discussed later.)

THE EFFECT OF WINDOW DESIGN

This result may appear surprising. It is explained by the fact that as the area of the window is increased it not only admits more light into the room but it also allows more light to escape out again. A window of clear glass may be regarded as an area of black wall absorbing all light falling on its surface and, therefore, greatly reducing the integrating effect of the room as a whole. So an increase in window area will not produce a proportional increase in daylight factor, even though it has a major effect on the direct component, *i.e.*, the sky factor.

Moreover, an increase in window area below the working plane will not increase the sky factor (by definition), though it may effect a considerable increase in the daylight factor, due to light reflected by the floor and light from the ground outside reflected by the ceiling.

Fig. 3 shows some of these effects—3*a* demonstrates the direct component; 3*b* shows light reaching the remote parts of the room by double reflection by the ground outside the window and the ceiling; 3*c* shows light coming directly from the sky, through the window on to the floor, and being reflected by the ceiling on to the working plane. Fig. 3*d* shows all these together. Of course, there are inter-reflections between one wall and another which, in practice, are very important, but they are impossible to show on a diagram.

It is often insufficiently realized that an extensive area of ground acts as a useful source of light, since it reflects light from the sky or the sun, but to make the best use of this light low windows are essential. Such window openings below the working plane have no effect on the sky factor but they may materially influence the daylight.

BAFFLES

The effect of the baffle (this was described in the paper by Hopkinson, Petty and Longmore) has been to reduce considerably the total amount of light in the far parts of the room, because of the obstruction to the skylight which the baffle necessarily produces. With a 10-ft. 9-in. ceiling and baffle windows, the daylight factor at position 2 is 8·6 per cent.; at position 14, 8·4 per cent.; and at position 17, 7 per cent. Even though these figures are lower than those given by a 10-ft. ceiling with clear windows, the daylight level is still satisfactory for all but the most intricate work in the ward.

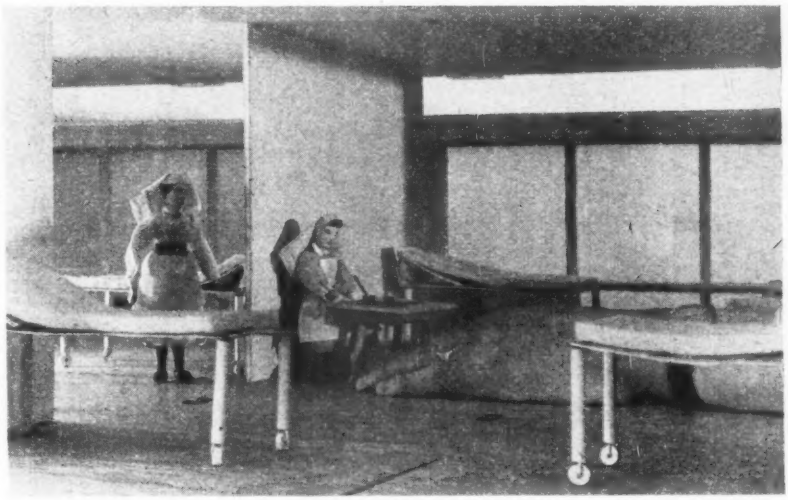


Fig. 4.

CONTRIBUTIONS OF WALLS, CEILING AND FLOOR

The part played by walls, ceiling and floor is extremely complex and the techniques used to study it cannot be described in detail. Briefly, it consists of measuring the daylight factor (*a*) with all the component surfaces of the model covered with black card, (*b*) with all the surfaces covered with white material and (*c*) with each surface in turn made white while the others are black, and with each surface in turn made black while the others are white. (Obviously the results obtained with the black surfaces should correspond exactly to the sky factor, as, in fact, they did within the permissible errors of measurement.)

The results enabled the contribution to the natural lighting of any one wall to be determined and so the precise effect of different colour schemes could be calculated. The results showed that the reflection factors both of the ceiling and the floor were very critical in determining the indirect component of lighting. The reflection factors of individual walls were of less importance than the average reflection factor of all the walls together, except to parts of the room contiguous to any particular wall.

DETAILED DESIGN

When these measurements had been obtained, it was necessary to consider the lighting design in detail. The model was made to look something like a real ward, and dummy beds and dummy staff were put in it, as can be seen in Fig. 4. The observer could stick his head up through the floor, as seen in Fig. 5, and survey the scene and make an assessment which, even if influenced by the scale and the nearness of the dummies, was, nevertheless, an advance on assessment by measurements alone.

The great width of the building and the comparatively low ceiling proposed in the design caused some difficulties. Most of the beds have windows on two sides, and these windows would, therefore, be visible whichever way the patients turn. The patients in the beds nearest the windows have a very large view of the sky, while the patients in the inner beds have direct light coming at a low angle. Both these features are undesirable. It is generally considered that the angle of incidence of direct light on the working plane should be greater than 20-25° and, although this holds primarily for tasks involving critical sight, it does seem undesirable, from this consideration alone, that the ceiling height in the ward should be less than 10 ft. This was confirmed by an inspection of the model.

The problem of the sky view is less easy to solve. The discomfort glare from large windows can only be reduced by the provision of blinds, louvres or net curtains, either to cut out or to reduce the patient's direct view of the sky. After considering these alternatives, the design with the baffle was produced, but it was obvious that screens would have to be fixed near each bed to obscure the direct view of the window from the patient, without cutting off too much light from the rest of the ward. Curtains are to be provided round the beds for other reasons and it was thought that these might serve the same purpose as the screens, provided that they are light in colour. Again, an inspection of the model suggested that this would be the case.

With all the results that were made available, both from the measurements and from the subjective estimates, the final design with the baffle window and the 10-ft. 9-in. ceiling was decided upon. The decision could not have been made on measurements alone nor could it have been determined entirely from subjective considerations. Both were necessary in arriving at a suitable compromise to satisfy all the difficult factors involved.

COLOUR SCHEMES

In the same way, various colour schemes were studied in detail in the model by inspection and, finally, one which was considered to give a pleasing effect was chosen. The model was coloured according to this scheme and a detailed set of daylight factor readings were taken. This colour scheme, which involved a ceiling and some white walls of high reflection factor (83 per cent.), some blue walls with low reflection factor (44 per cent) and a cork floor with a reflection factor of 18 per cent., gave critical daylight factors (in positions 2, 14 and 17) rather less than half those in the ward when finished with white ceilings and walls and a high-reflection floor. These values are on the low side but, even so, on most days the illumination on the inside beds will not be less than about 15 lumens per sq. ft. Provided a good supplementary artificial lighting system is available, this should not result in any great hardship.

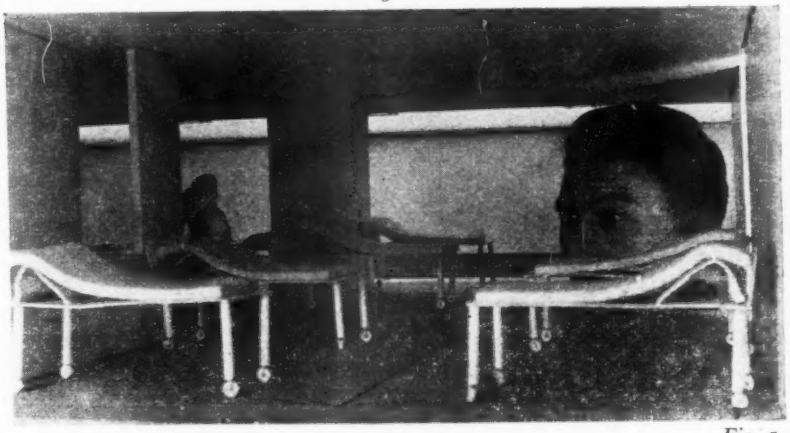


Fig. 5.

CONCLUSIONS

This is not the first time that models have been used to study interior lighting but it is, perhaps, the first time that the subjective and the photometric considerations have been so closely integrated into one whole. Some of the conclusions from the study may be worth summarizing:

(*i*) In a deep room with light walls, ceiling and floor, the effect of ceiling height on the total daylight is much less than would be estimated from its effect on the sky factor. But this conclusion must not be pressed too far.

(*ii*) If the average reflection factor of the wall, ceiling and floor surfaces is high, the contribution of any one surface is small at points other than those in its immediate vicinity. Consequently, there is considerable scope for the design of colourful schemes of decoration, if these are considered as a whole and if the average reflection factor of the scheme is kept high.

(*iii*) Conversely, if the average reflection of the walls is low, the contribution of any one wall, even if of a high reflection factor, will be small at points other than those in its immediate vicinity.

(*iv*) The scope for the design of colour schemes becomes more restricted as the ceiling height is reduced, because the proportional contribution of each wall to the total illumination increases.

(*v*) The contribution both of floor and ceiling is very large. The floor must not be forgotten in any scheme of decoration. The ceiling derives much of its illumination from the floor and the two should, therefore, be considered together.

(*vi*) The reflection factor of the ground outside the building has a considerable influence on the interior lighting. The ceiling receives light from the sky only by reflection from the ground outside. The ceiling cannot play its part unless it receives plenty of light from the ground.

(*vii*) The use of the sky factor is only a rough guide to the prediction of the probable daylighting inside a building. In the parts of a room remote from the windows, the total lighting is probably several times that indicated by the sky factor. Hence, generally, the sky factor under-estimates the probable lighting. But this is not always the case and, until some simple means of estimating the total daylighting is possible, or a model study can be undertaken, the sky factor is probably the safest measure of the natural lighting in a building.

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Buildings Illustrated

Shop at 96, King Street, Hammersmith, London, W.6, for Peter Grant Ltd. (Pages 240-241.) Architect: David Stern, A.R.I.B.A. General contractor: Alexander Black. Sub-contractors: blue Staffordshire bricks, Richard Parton Ltd.; decorative & plate glass windows & doors, James Clark & Eaton Ltd.; electric wiring, Ohmlite Installations Ltd.; electric light fixtures, Merchant Adventurers of London Ltd., Fluorel Ltd.; colour matching unit, Siemens Ltd.; air heaters, Ekco Ltd.; ventilation (fans), Vent-Axia Ltd.; plumbing, W. Carter Ltd.; internal Venetian blinds, Venetian Vogue Ltd.; sunblinds, Deans of Putney; curtains, Bowmans Ltd.; wallpapers, John Line & Sons; chairs, Ernest Race Ltd.; metal & neon lettering, L. Bloom Ltd.; cork lettering, London Industrial Art Ltd.

Nuclear Physics Research Laboratory for the University of Liverpool. (Pages 243-246.) Architects: Professor William Holford, M.A., F.R.I.B.A., M.T.P.I. Supervising architect: W. M. Shennon, L.R.I.B.A. Assistant architects: K. W. Whitfield, A.R.I.B.A., G. C. Gardiner, A.R.I.B.A., Margaret Howell, A.R.I.B.A. (37-in. cyclotron), F. L. Evans, A.R.I.B.A. Quantity surveyor: Furbur & Sons and (for 37-in. cyclotron block) Dansken & Purdie. General contractors, Bovis Ltd. Sub-contractors: structural steelwork, Redpath Brown & Co. Ltd.; electric lift, Wm. Wadsworth & Sons Ltd.; compressed air, ventilation, heating, hot water, vacuum, cold water, gas, G. N. Haden & Sons Ltd.; asphalte floors, Durable Asphalte Co. Ltd.; asphalte roofing & tanking, Penmaenmawr & Trinidad Lake Asphalte Co.; spiral staircase, H. & C. Davis; chain link fencing, Durafencing Ltd.; blinds, J. Avery; false ceilings, Beaumants Ltd.; electric light & power, Troughton & Young Ltd.; "Marquetone" flooring, Mears Bros.; floor tiling, John Stubbs; composition flooring, Granwood Flooring Co.; granolithic flooring, Houghton & James; glazing, Williams & Watson; hollow glass blocks, James Clark & Eaton Ltd.; plastering to 37-in. building, Pollock Bros. Ltd.; rubber flooring, Ioco Ltd.; switchboard cabling, Communication Systems Ltd.; steel flooring in cyclotron room, Steelways Ltd.; steel office furniture, Rubery Owen Ltd.; shutter gates, Bolton Gate Co.; "Accotile" flooring, R. W. Brooke & Co.; sprayed "Pyroc," Decorators Ltd.; sprayed asbestos, Newalls Insulation Co. Ltd.; acoustic ceiling, Gyproc Products Ltd.; felt roofing to 37-in. building and roof of 156-in., William Briggs Ltd.; plastering to laboratory block, Meta-Mica Ltd.; tanking to 37-in. building, Faldo Ltd.

Warehouse & Offices in Ealing Road, Alperton, Middlesex, for W. & J. George & Becker Ltd. (Pages 247-250.) Architect: Eric H. Firmin, A.R.I.B.A. Consulting Engineer: W. M. Monson & Partners. General Contractor: Percy Bilton, Ltd. Sub-contractors: bricks, Tucker & Co.; structural steel, Kelvin Construction Co. Ltd.; partitions, Gyproc Products Ltd.; woodblock flooring, Vigers Ltd.; patent flooring, Johnson Flooring Co. Ltd; central heating, G. N. Haden & Co. Ltd.; electric wiring, Phoenix Electric Co. Ltd.

Correction

In our issue of February 14 the name of N. Brandon-Jones, A.R.I.B.A., Chief Assistant Architect to Westwood, Sons & Harrison, was omitted in connection with the shop in East Street, Brighton.

CLASSIFIED ADVERTISEMENTS

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

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

Public and Official Announcements

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

AIR MINISTRY WORKS DEPT.
ARCHITECTURAL DESIGNER/DRAUGHTSMEN required in Designs Branch by Air Ministry Works Department. Applicants should have had several years' experience in the preparation of working drawings, details and layouts for permanent and semi-permanent buildings. Vacancies are mainly in London, but there are some in the provinces. Salaries are on ranges up to £675 per annum, with starting pay dependent upon age, qualifications and experience. Applications, stating age, qualifications, previous appointments (with dates), should be sent to Air Ministry (C20) Directorate-General of Works (W.9), Bush House, S.E. Wing, Strand, London, W.C.2, from which address further details may be obtained. 5162

NEWCASTLE REGIONAL HOSPITAL BOARD.
PREPARATION OF DEVELOPMENT PLANS.
The Board wishes to proceed with the preparation of development plans for the extension of building fabrics of the hospitals named below to accommodate in each hospital a total of 1,270 mentally-deficient patients.

(i) Northgate and District Hospital, Morpeth (at present having accommodation for 375 beds).
(ii) Aycliffe Hospital, Heighington (at present having accommodation for about 250 beds).

In the first instance the commissions will be limited to the preparation of layout plans *only* sufficient to indicate in block outline the disposition and approximate sizes of the requisite buildings, together with all necessary roads and paths. The Board cannot at present envisage that it will be possible for the construction of any major parts of the schemes to be commenced for several years, but wishes to have an agreed layout plan for each hospital subject to which any small buildings or extensions may be constructed in advance of the major development. By agreement with the architect who may be appointed to prepare the general layout plan such small buildings or extensions may be planned in detail and constructed under the supervision of the Board's Architect or of a local private architect.

Architects who are interested in receiving an invitation to act for the Board in connection with one or both of these projects should forward their names and full details of their experience of hospital design and construction (and in particular of any such experience in connection with mental-deficiency hospitals) to the undersigned not later than 15th March, 1952.

E. B. JENKINS,
Secretary.

"Dunira," Osborne Road,
Newcastle-on-Tyne, 2.
4th February, 1952. 6370

THE GLASGOW SCHOOL OF ARCHITECTURE.
LECTURESHIP IN ARCHITECTURE.
LECTURER for the Degree and Diploma Courses in the Department of Architecture in the Royal Technical College, Glasgow.
Salary scale: £600×£50—£1,150. Position on the scale according to qualifications and experience. Forms of application from The Secretary, Royal Technical College, Glasgow, C.1. 6377

COUNTY BOROUGH OF DEWSBURY.
BOROUGH ARCHITECT AND BUILDINGS SURVEYOR'S DEPARTMENT.
Applications are invited for the following appointment in the Borough Architect and Buildings Surveyor's Department:—
QUANTITY SURVEYOR. A.P.T., Grade V. Salary: £570-£620 per annum.
The appointment is subject to one month's notice on either side and to the provisions of the Local Government Superannuation Act, 1937. The successful candidate will be required to pass a medical examination.
Applications, stating age, qualifications and full particulars of training and experience, together with copies of two recent testimonials, should be sent to me not later than Tuesday, 4th March, 1952, in envelopes endorsed "Quantity Surveyor."

A. NORMAN JAMES,
Town Clerk.

Town Hall, Dewsbury.
12th February, 1952. 6399

METROPOLITAN BOROUGH OF HOLBORN.
APPOINTMENT OF CLERK OF WORKS, BOROUGH ARCHITECT'S DEPARTMENT.
Applications are invited for the appointment of a Clerk of Works, to supervise the erection of multi-storey flats in Holborn.
The appointment will be for the duration of the work at a salary of £12 per week.
Applicants must have had experience of similar work and have a thorough knowledge of all sections of the building trade including structural steelwork. They should also be capable of setting out, measuring up, taking levels, keeping records, and making reports.
Applications, together with the names of three referees to whom reference can be made should be addressed to the Town Clerk not later than 7th March, 1952. 6406

SUDAN GOVERNMENT.
The Public Works Department requires an ARCHITECT, aged 28 to 36, for service in the Sudan.
Sound experience is required in working up detailed designs from sketches and in the preparation of working drawings for buildings of a public and domestic character. Candidates should be Associates of the R.I.B.A. or hold other recognised professional qualifications in Architecture.
Appointment will be on probation for a Short Term Contract of two years, at a salary ranging from £E.1,000 to £E.1,750.
An outfit allowance of £E.50 is payable on appointment. There is no income tax in the Sudan at present. Free passage on appointment.
Further particulars and application form will be sent on receipt of a postcard only addressed to The Sudan Agent in London, Wellington House, Buckingham Gate, London, S.W.1, quoting "Architect 4/1808" and name and address in block letters. 6384

LANCASHIRE COUNTY COUNCIL—
PLANNING DEPARTMENT.
PLANNING ASSISTANT, A.P.T., I-V (£440-£620), required at Liverpool. Salary according to qualifications and experience. Candidates for Grade V should be qualified by professional examination as Architects, Surveyors, Engineers or Town Planners, and for Grades I-IV possess a University Degree or the Intermediate Certificate of an appropriate professional body.
Applications, giving present salary and two referees (preferably one should be present employer), to County Planning Officer, East Cliff County Offices, Preston, by 5th March, 1952. 6383

SOUTHAMPTON C.B.C. requires under N.J.C. Service Conditions:—
(*a*) ARCHITECTURAL ASSISTANT, A.P.T., IV (£530-£575). Suitably qualified, experienced in housing design, layout, construction and contract administration.
(*b*) ASSISTANT QUANTITY SURVEYOR, A.P.T., V (£570-£620). Suitably qualified; experienced housing work.
(*c*) and (*d*) QUANTITY SURVEYING ASSISTANTS, A.P.T., I (£440-£485). (*c*) Experienced; site measuring for builders' work. (*d*) (Male or female). Prefer, experience checking or preparing contractors' claims for fluctuations, wages and materials.
(*e*) QUANTITY SURVEYING ASSISTANTS. General Division (£150-£425). Experience in routine of Quantity Surveyor's office.
(*a*) to (*d*) Terminable one month's notice. (*e*) One week.
Apply, stating age, war service (if any). Three references to Borough Engineer and Surveyor, Civic Centre, Southampton, by 3rd March, 1952. 6391

COLLEGE OF TECHNOLOGY, BIRMINGHAM.
Applications are invited for the post of LECTURER in Building Science.
Candidates should have a Science Degree and have had experience in teaching Applied Science to students attending Architectural, Building and Civil Engineering courses, or possess suitable qualifications as awarded by a professional organisation and have had some industrial experience as well as teaching experience.
The person appointed will be required to take up duties as soon as possible.
Salary will be in accordance with the Burnham (Further Education) Scale for Lecturers (men: £900×£25—£1,000).
Further particulars and form of application may be obtained from the Registrar, College of Technology, Suffolk Street, Birmingham, 1, on receipt of stamped addressed foolscap envelope. Completed forms should be returned to him not later than two weeks after the appearance of this advertisement.

C. McCAW,
Clerk of the Governing Body.

6396

WARWICKSHIRE COUNTY COUNCIL.
COUNTY PLANNING DEPARTMENT.
Applications are invited for the following appointments:—
(*a*) PLANNING ASSISTANT. A.P.T., Grade Va-VI (£600-£710 per annum).
(*b*) PLANNING ASSISTANT. A.P.T., Grade IV (£530-£575 per annum).
The persons appointed will be stationed at Warwick and will be engaged on the County Development Plan.
Applicants for post (*a*) should hold a Final professional qualification, preferably in Planning, and for post (*b*) should have passed the Intermediate Examination of the Town Planning Institute.
The appointments are subject to the provisions of the Local Government Superannuation Act, 1937, and the successful applicants will be required to pass a medical examination. For post (*a*) the successful candidate will be required to provide and maintain a motor car, for which allowance will be paid in accordance with the Council's scale.
Applications, together with the names and addresses of two persons to whom reference may be made, should be forwarded to J. J. Brooks, M.I.Mun.E., M.T.P.I., County Planning Officer, Northgate, Warwick, not later than Saturday, 8th March, 1952.
Canvassing, directly or indirectly, will be a disqualification.

L. EDGAR STEPHENS,
Clerk of the Council.

Shire Hall, Warwick.
12th February, 1952. 6397

THE ROYAL TECHNICAL COLLEGE, GLASGOW.
DEPARTMENT OF ARCHITECTURE AND BUILDING.
ASSISTANT LECTURER in Building Subjects for the Courses in Quantity Surveying and Building.
Salary scale: £450×£25—£550. Position on the scale according to qualifications and experience. Forms of application from The Secretary. 6378

BOROUGH ENGINEER & SURVEYOR'S DEPARTMENT—POPLAR.
ARCHITECTURAL ASSISTANT (A.P.T. IV) required. Inter. R.I.B.A. (or equivalent recognised by Architects Registration Council). Details and application forms from Borough Engineer & Surveyor, Poplar Town Hall, E.3. Closing date 2nd March, 1952. 6412

COUNTY COUNCIL OF INVERNESS.
COUNTY ARCHITECT'S DEPARTMENT.
Applications are invited for the appointment of an ARCHITECTURAL ASSISTANT in the County Architect's Department, salary scale A.P.T. III (£490-£535).
Candidates should be neat and accurate draughtsmen and have had experience in the preparation of working drawings for housing and other Local Authority work.
The appointment will be subject to the provisions of the Local Government Superannuation (Scotland) Act, 1937, and the successful candidate will be required to pass a medical examination.
Housing accommodation may be made available.
Applications, stating age, qualifications and present appointment, accompanied by copies of not more than three recent testimonials, should be submitted to the undersigned not later than ten days after the date of publication of this advertisement.

R. WALLACE,
County Clerk.

County Buildings, Inverness. 6417

EAST ELLOE RURAL DISTRICT COUNCIL.
APPOINTMENT OF QUANTITY SURVEYOR.
Applications are invited for the above appointment in the Architect's Department at a salary in accordance with Grade A.P.T. V (commencing at £570 per annum and rising to £620 per annum).
Applicants must be thoroughly experienced in the preparation of Bills of Quantities, measurement, interim and final accounts.
The council will be prepared to offer assistance in the provision of housing accommodation if required and the appointment will be subject to the Local Government Superannuation Act, 1937, and to the passing of a medical examination and will be terminable by a month's notice on either side.
Applications, stating age, qualifications and previous experience, together with copies of two recent testimonials, should reach the undersigned, endorsed "Quantity Surveyor," not later than Friday, the 7th of March, 1952.

J. C. PYWELL,
Clerk of the Council.

Mattimore House, Holbeach,
Spalding, Lincs. 6415

CROWN AGENTS FOR THE COLONIES.
DRAUGHTSMAN required by the Government of Tanganyika for the Surveys and Town Planning Department for one tour of two to three years in the first instance. The appointment will be on probation for permanent and pensionable employment. Commencing salary (including present temporary allowance of 20 per cent.) according to experience and qualifications in scale: (Male) £804 to £1,008 a year, (Female) £643 to £806 a year. Outfit allowance up to £45. Free passages. Liberal leave on full salary. Local Government superannuation rights can be preserved. Candidates must have had experience as a Draughtsman or Engineering Assistant in a municipal Engineer's Office or the Office of a Town Planning Authority and must be able to develop detailed and finished drawings from preliminary sketches. Female candidates must be *single*.
Apply at once by letter, stating age, full names in block letters and full particulars of qualifications and experience and mentioning this paper to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting on letter M.27800.A. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. 6414

CITY OF BIRMINGHAM EDUCATION COMMITTEE.
APPOINTMENT OF DISTRICT BUILDING WORKS SUPERVISOR.
Applications are invited for the appointment of a District Building Works Supervisor in the Architect's Branch of the Birmingham Education Department (Architect to the Committee: Mr. A. Steele).
Salary: A.P.T. IV (£530×£15—£575).
Applicants will be required to have a general knowledge of the building trade and particularly of those branches required for the carrying out of repairs and alterations. They should be competent to inspect work, assess requirements, supervise labour and contractors' work and hold a Higher National Certificate or its equivalent.
Application forms, which may be obtained from the undersigned on receipt of a stamped, addressed envelope, must be returned not later than Friday, 14th March.

E. L. RUSSELL,
Chief Education Officer.

The Education Office,
Margaret Street, Birmingham, 3. 6413

CIVIL SERVICE.

QUANTITY SURVEYORS and ASSISTANT QUANTITY SURVEYORS are required throughout the United Kingdom by the Ministry of Works, Admiralty, War Department, Air Ministry, Ministry of Supply, and occasionally overseas by the Admiralty, Air Ministry and War Department. Although these are not established posts, some of them have long term possibilities, and competitions are held periodically to fill established vacancies.

Salaries for these professional posts in London for officers over 26 years of age range from £800 to £900 per annum in lower grades and from £900 to £1,200 per annum in the higher grades. They are slightly lower in the provinces. Salary on entry will be in accordance with age, qualifications and experience.

Vacancies also exist for QUANTITY SURVEYING ASSISTANTS and others having some experience in a quantity surveyor's office, at salaries ranging from £300 per annum upwards.

Applicants should write, quoting ref. J.Q.S., to Room 403, Ministry of Labour and National Service, Technical and Scientific Register, Almack House, 26, King Street, London, S.W.1. 6419

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

Applications are invited for the following appointments:—

(*a*) SENIOR ENGINEERING ASSISTANT, Grade VII (£685-£760 per annum).

(*b*) SENIOR ARCHITECTURAL ASSISTANT, Grade VII (£685-£760 per annum).

(*c*) THREE ARCHITECTURAL ASSISTANTS. Maximum salary offered is Grade V (£570-£620 per annum).

(*d*) TWO JUNIOR QUANTITY ASSISTANTS. Maximum salary offered is Grade I (£440-£485 per annum).

Applicants for (*a*) must be Associate Members of the Institution of Civil Engineers and/or hold the Testamur of the Institution of Municipal Engineers, and must have had considerable experience in a Municipal Engineer's office.

Applicants for (*b*) must be Associate Members of the Royal Institute of British Architects and/or be Registered Architects. Preference will be given to candidates who have had experience in the design and construction of educational buildings.

Applicants for (*c*) should at least have passed the Intermediate R.I.B.A. Examination, and have had good general experience in a Municipal architect's office. The salary grade will be fixed in accordance with experience and qualifications.

Applicants for (*d*) should have a good knowledge of Building Construction and some experience in the preparation of Bills of Quantities and measurement of work, or in a builder's office, is essential. The salary grade will be fixed in accordance with experience and qualifications.

Conditions of service are those formulated by the National Joint Council, and the appointment is on the established staff and subject to the provisions of the Local Government Superannuation Act, 1937, the successful applicants being required to pass a medical examination.

Canvassing, either directly or indirectly, will disqualify the candidates, and any known relationship to a member or senior officer of the Council must be clearly stated in the application.

Forms of application may be obtained from the Borough Engineer and Surveyor, 22-24, Nicholas Street, Burnley, to whom applications should be returned not later than Saturday, 8th March, 1952.

C. V. THORNLEY,
Town Clerk.
6418

Tenders for Contracts

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

COUNTY BOROUGH OF SMETHWICK.
TO BUILDERS AND CONTRACTORS.
PERRY HILL HOUSING NO. 2.
ERECTION OF 202 2- AND 3-BEDROOM TYPE HOUSES IN BLOCKS OF 8, 6, 4 AND 2.

The Housing Committee invite tenders for the erection of the above dwellings on land adjoining Brandhall Road and Bleakhouse Road, Oldbury, under one contract.

Bills of quantities and forms of tender will be forwarded on or about 14th March, 1952, to builders and contractors making written application by 26th February, 1952, to the Borough Engineer and Surveyor, Council House Smethwick. This should be accompanied by a crossed cheque for £2 2s., made payable to the "Borough Treasurer, Smethwick," which will be returned upon receipt of a *bona fide* tender.

Tenders on the forms provided and enclosed in the official envelopes must be delivered to the office of the undersigned by 5th April, 1952.

Detailed working drawings can be inspected at the office of the Borough Engineer and Surveyor each day between the hours of 9 a.m. and 5.30 p.m., except on Saturday, when the office is closed at 12.30 p.m.

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

E. L. TWYCROSS,
Town Clerk.
Council House, Smethwick. 6398

Architectural Appointments Vacant

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

QUALIFIED CHIEF ASSISTANT (member also of R.I.C.S. or I.A.A.S.), able to prepare Bills of Quantities and experienced Final Accounts, required in East Midlands office. Car owner. Excellent future prospects for right man. No housing accommodation available. Reply to Box 6275.

CADBURY BROTHERS LIMITED require an ARCHITECTURAL ASSISTANT with knowledge of industrial design, able to assist with a large new factory on which construction is now commencing. Write, stating age, experience and salary required to E.M.A., Cadbury Brothers Ltd., Bournville, Birmingham. 6309

BIRMINGHAM DISTRICT. — ASSISTANT wanted, Inter. standard, for small office south of Birmingham. Good 'bus service. Contemporary outlook. Articled PUPIL also wanted. Frederick Hill, F.R.I.B.A., A.M.T.P.I., A.I.L.A., Chartered Architect, 80, Bromsgrove Road, Redditch, Worcestershire. 6421

ARCHITECTURAL ASSISTANT, senior position, required immediately; salary £700-£800 per annum. Please write, stating details of experience and qualifications to J. R. Boyd Barrett, A.R.I.B.A., F.R.I.A.I., Chartered Architect, 5, Camden Place, Cork. 6350

SENIOR ARCHITECT'S ASSISTANT, with knowledge of quantities, estimating and Builders' accounts essential. Permanency after probation. Commencing salary £650 per annum, or according to experience. Applications should be made in writing, giving full particulars, to Cable and Wireless, Ltd., Electra House, Victoria Embankment, London, W.C.2. 6365

JUNIOR ARCHITECT'S ASSISTANT. Good draughtsman with office experience, working drawings and details. Permanency after probation. Commencing salary £350-£400, according to experience. Applications should be made in writing, giving full particulars, to Cable and Wireless, Ltd., Electra House, Victoria Embankment, London, W.C.2. 6366

OFFICE trained and experienced ASSISTANTS required, 30-35 years old, in Architect's Department in City. Must be used to work of good class, preparing complete drawings and specifications of new buildings and alterations, also maintenance repairs. Secure future for suitable applicants. Write giving particulars of past work, age and salary required. Box 6359.

ARCHITECTURAL ASSISTANT required for well-known multiple shoe retailers. Experience in shop-fitting and design an advantage. Permanent position with scope for advancement. Apply giving age, training, experience and salary required to Staff Director, Wm. Timpson, Ltd., Empiric House, Manchester, 3. 6401

Architectural Appointments Wanted

A. R.I.B.A., A.A.Dip. (29), seeks post in Notts or Lincs with view to eventual Partnership. 5 years' office experience. Box 381.

A. R.I.B.A., A.A.Dip., requires position in private practice London area. 5 years' office experience. Box 382.

BUILDING SURVEYOR AND ARCHITECTURAL ASSISTANT (aged 29) completing minor subject for Final R.I.C.S. this March requires position with firm of Architects or Surveyors. 3 years full-time study, 3 years' practical experience of working drawings, surveying of land and buildings, site supervision, structural surveys and reports. Final City and Guilds Builders' Quantities. Present salary £500 p.a. Box 384.

DIP.ARCH.(L'pool), age 24, contemporary outlook, 4 years' experience in private practice, seeks post in W.R. of Yorks. office. Box 391.

ARCHITECTURAL ASSISTANT, girl 24, five years' experience, Inter. R.I.B.A. standard, also capable Secretary, is anxious to work in small London office. Box 390.

ARCHITECT (42), 26 years' varied experience in housing, conversion schemes, industrial, hospital work, etc., seeks senior responsible position, own practice recently given up due to restrictions. Box 392.

SENIOR ARCHITECTURAL ASSISTANT, Final standard, 10 years varied experience, able to write specifications, use dumpy, etc.; used to handle jobs from sketch scheme to completion including site supervision. Box 394.

A.R.I.B.A. requires part-time situation, 2-3 days weekly. Box 6407.

ARCHITECTURAL ASSISTANT (27), Student R.I.B.A., approaching Final. 5 years' experience (private office) schools, housing, flats. Central or S. London. Box 393.

A.R.I.B.A., aged 36, seeks post as SENIOR ASSISTANT. Box 6410.

Other Appointments Vacant

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

QUANTITY SURVEYOR required for Architect's office in North of Scotland. Apply stating age, qualifications, experience and salary required to Box 6395.

A leading firm of Timber Building Manufacturers in the Home Counties require a DESIGNER DRAUGHTSMAN to specialise on new developments. Candidates should have had experience in the design of prefabricated timber structures of all types preferably both permanent and temporary for home and for export. The appointment offers splendid experience and opportunity for a keen imaginative and practical technician with sound drawing office experience. Please reply, in confidence, giving age, education, full details of career and present salary to Box 6400.

DRAUGHTSMAN required in the Design Department of manufacturing company in the Maidstone area, Kent. Knowledge of building detail preferable. Canteen facilities and congenial working conditions. Apply stating age, experience and salary required to Box 6392.

ESTIMATOR required by manufacturing company in the Maidstone, Kent, area. Estimating experience in connection with building contracts essential. Canteen facilities and congenial working conditions. Apply stating age, experience and salary required to Box 6393.

A SALES REPRESENTATIVE, about 30 years of age, is required for the North-East Coast. He must be resident in the area and possess architectural surveying or building trade experience. The position carries salary, expenses and commission, and a motor car will be provided. Only those with a flair for and ambition to make selling their career should apply. Box 6420.

REQUIRED by well-known Ecclesiastical Contractor skilled Man, accustomed to preparations of Drawings, Estimating and Costing, expert Woodcarver. Responsible but highly paid job to right man. Write, stating experience, to Box 6416.

Partnerships

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

ASSOCIATE (40) possessing experience which assures complete satisfaction, at present holding position of responsibility with a City Authority, desires to become an "individual" in a general practice, seeks partnership or position leading thereto. South West England preferred. Box 6387.

A.R.I.B.A., 23 years' experience, seeks appointment or partnership. Proper siting and good standard of design are essential. Box 6403.

Services Offered

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

BUILDING SURVEYOR (28), sitting Final R.I.C.S. in March, desires responsible position in a professional office. Fully experienced in the preparation of specifications, structural and sanitary surveys and reports, supervision of works in progress, settling final accounts, preparation of approximate estimates and all other aspects of building works. Box 6351.

SITUATION where 23 years' experience of sanitary fittings, fireplaces and building materials will be fully exploited, sought by energetic man. Good draughtsman with gift for perspective drawing. Knowledge of drainage, plumbing schemes and building construction. £750 p.a. E. T. Casebourne, 35, St. Michaels Crescent, Pinner. Pinner 9063. 6385

ASSISTANCE in any capacity, in estates, etc., S.E. area. A.R.I.B.A. (41), Surveying and Agricultural Building experience, offers services, whole or part-time. Own car. Free April. Resident Worthing. Box 6422.

A.R.I.C.S. (Building), M.R.San.I., A.I.Arb., 12 years' experience, studying for the Special Final R.I.B.A., offers part-time or short period assistance. Measured and working drawings, schedules and dilapidations. Own car and equipment. Box 6390.

MONK & MONK, 4, Northampton Square, E.C.1. London Wall 0348. Property consultants offer the services of their architectural staff to assist architects in preparation of surveys, working drawings, etc. 6409

CABINET-MAKER JOINER requires situation; first-class tradesman, age 44, with 30 years in the trade. Sound experience of supervision and general factory production. Apply Box 6386.

A.R.I.B.A., 18 years' experience, available for part-time assistance (Midlands). Box 6411.

For Sale or Wanted

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

NISSEN HUT: 36 ft. by 16 ft.; excellent; £95. Steel Framed Buildings: 40 ft. by 20 ft.; 60 ft. by 65 ft. Asbestos Sheeting. Lambert & Corkran (Hailsham), Ltd., Hailsham 444. 6394

MODERN Architecture in Great Britain is the subject of "Architecture D'Aujourdhui No. 39," price 18s. 6d. Subscription is £5 8s. per year (6 issues). See below. 6388

MODERN Furniture at the Triennale is the subject of recent issues of "Domus"; 10s. 6d. each, or £5 15s. per year (12 issues), or £2 17s. 6d. for 6 months. Sole agents, Alec Tiranti, Ltd., 72, Charlotte Street, London, W.1. architectural booksellers since 1895. List of Continental magazines free. 6389

COPIES of "The Building News" from 1888 to 1910 inclusive bound in stiff covers in half-year volumes. Offers wanted. Box 6404.

WANTED.—Copy of "Progressive Architecture," June, 1951, on loan or purchase. A. D. Sherwood, 17, Hardmans Road, Whitefield, Manchester. 6406

Miscellaneous

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

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