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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THE ARCHITECTURAL PRESS
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★ A glossary of abbreviations of Government Departments and Societies and Committees of all kinds, together with their full address and telephone numbers. The glossary is published in two parts—A to Ie one week, Ig 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
AA1	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. Department of Architecture, School of Building, Ferndale Road, Brixton, S.W.4.	Brixton 7048
ARCUK	Architects' Registration Council. 68, Portland Place, W.1.	Welbeck 9738
ASB	Architectural Science Board of the Royal Institute of British Architects, 66, Portland Place, W.1.	Langham 5721
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. 9, Conduit Street, W.1.	Mayfair 8641/6
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
BGF	British Gas Federation. 1, Grosvenor Place, S.W.1.	Sloane 8266
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.	
CID	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
CUJC	Coal Utilization Joint Council. 13, Grosvenor Gardens, London, S.W.1.	Victoria 1534
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. 21, Tothill Street, S.W.1.	Whitehall 9696
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
FOB 1951	Festival of Britain 1951. 2, Savoy Court, Strand, W.C.2.	Waterloo 1951
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
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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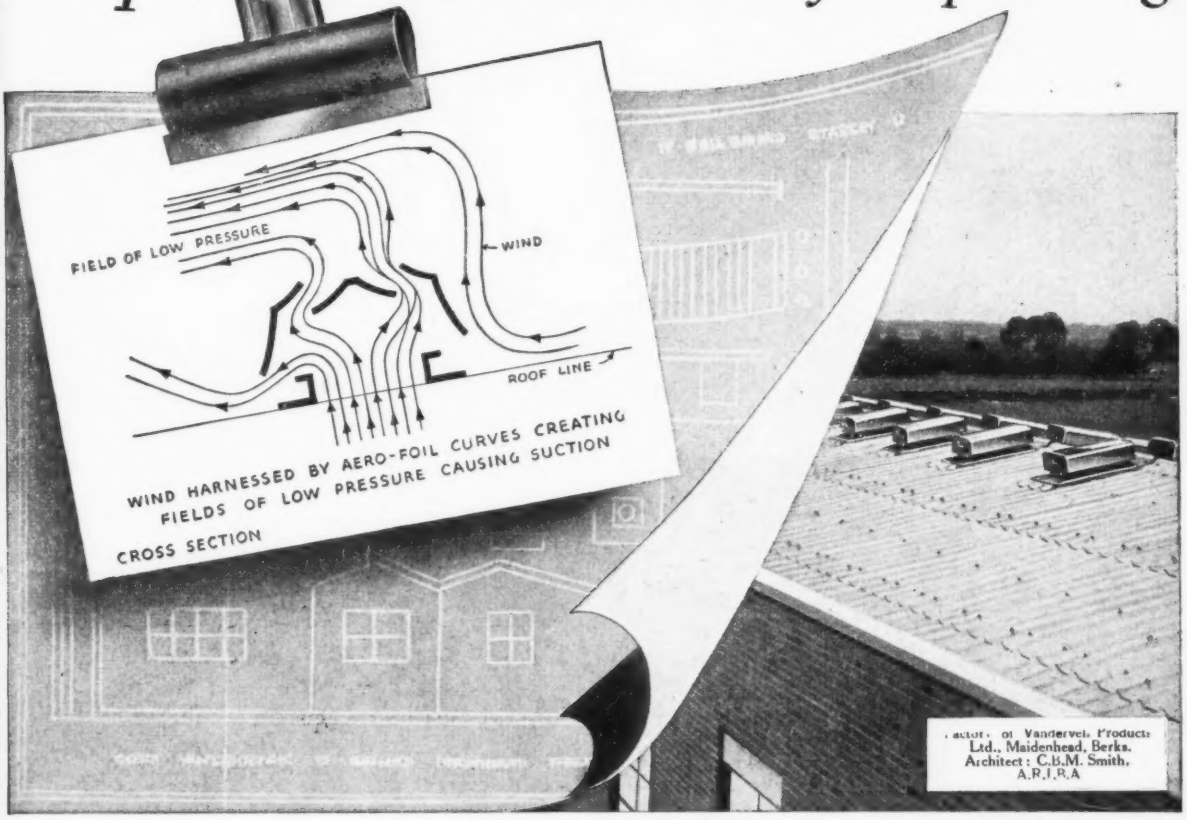

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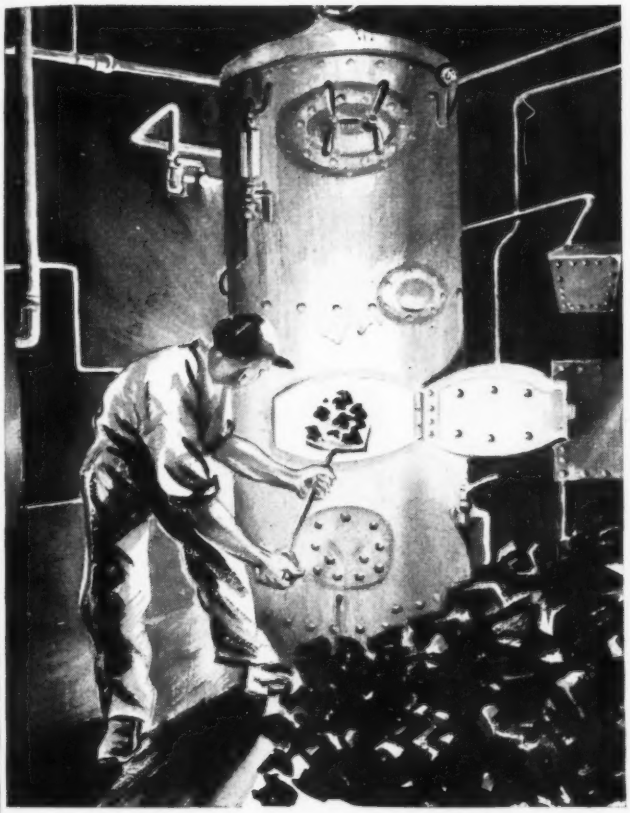

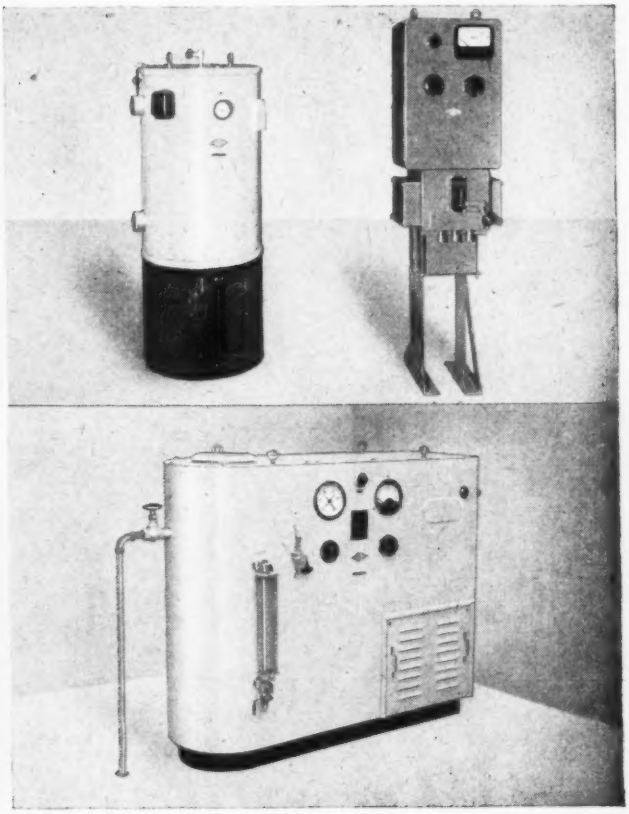

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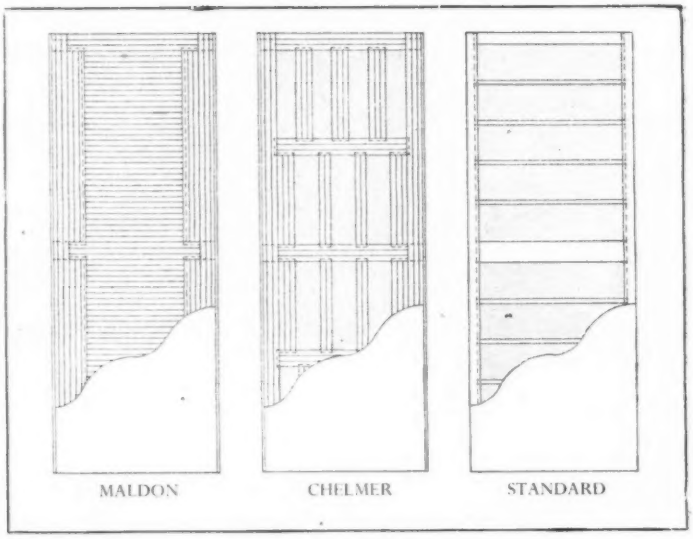

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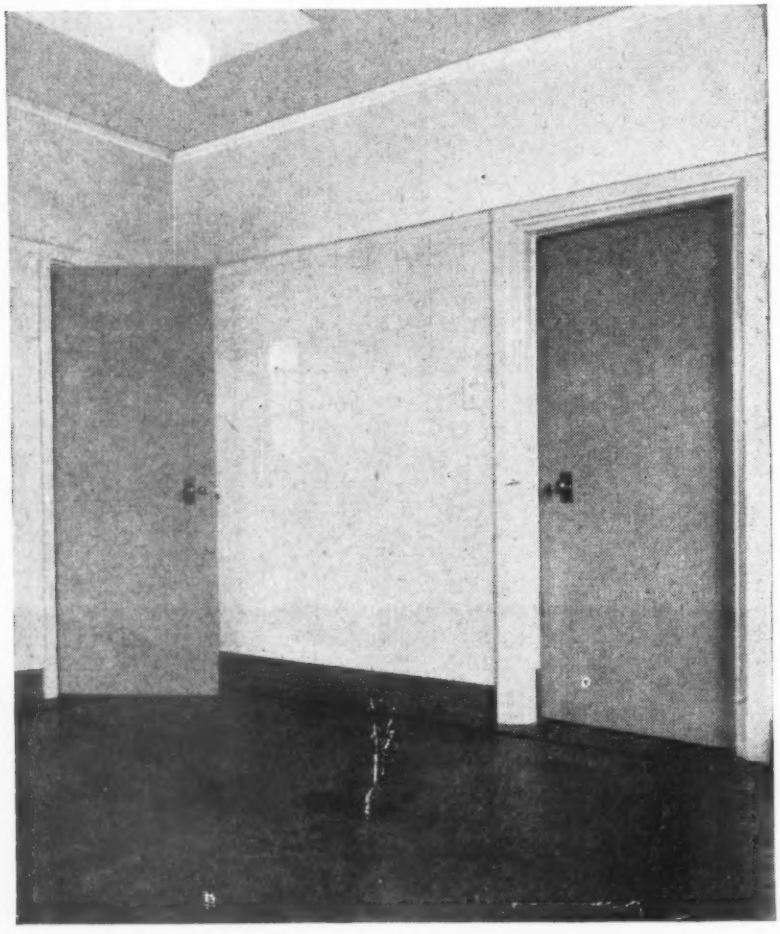

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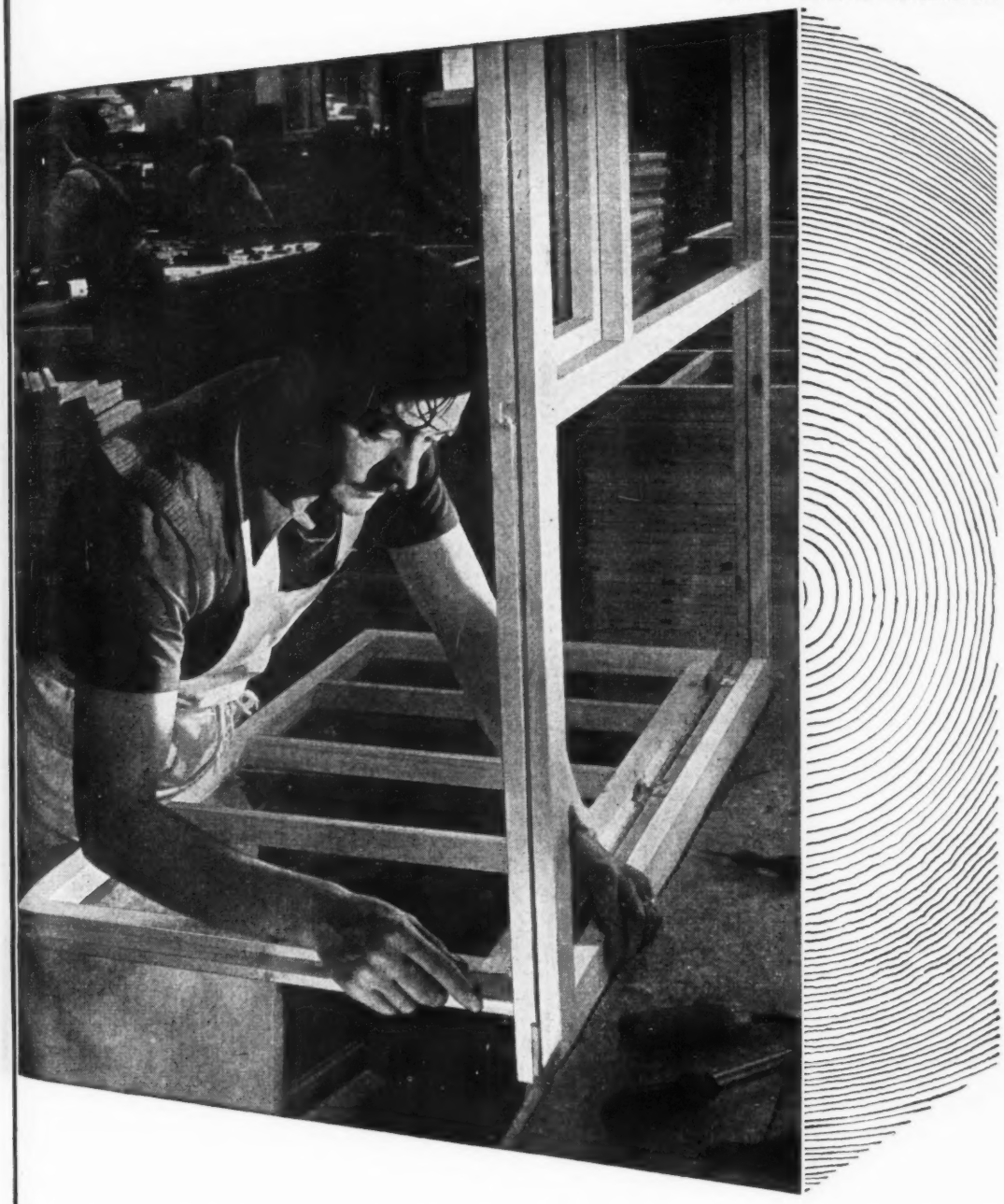

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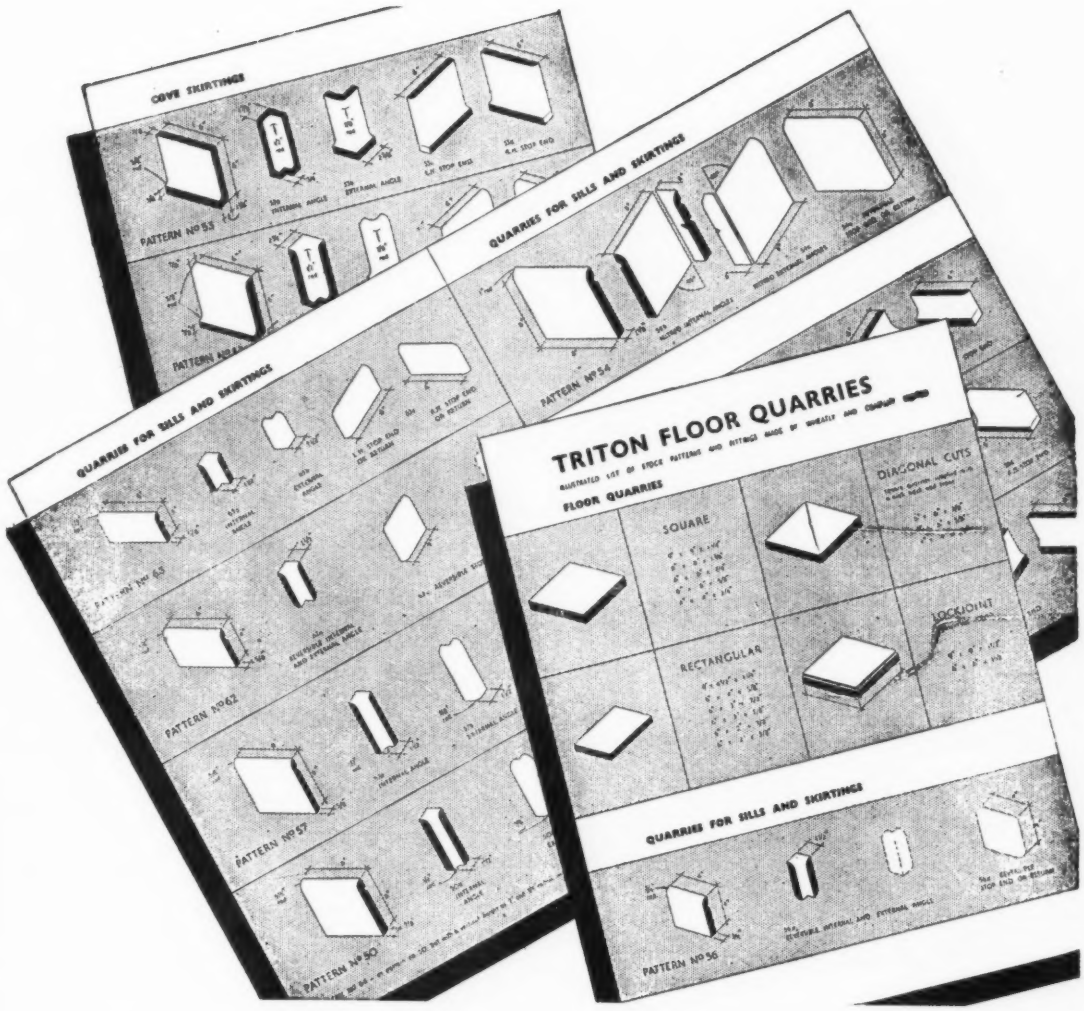

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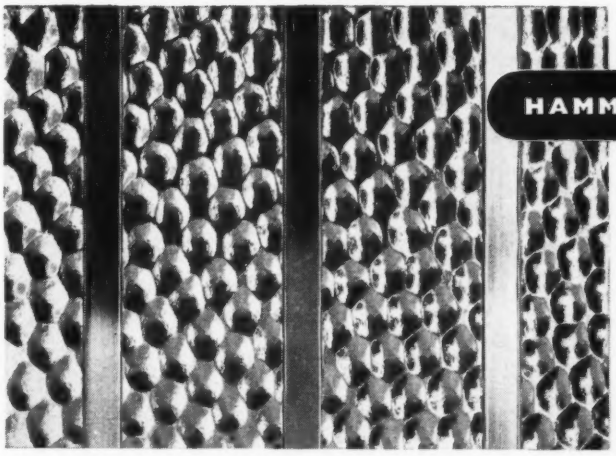

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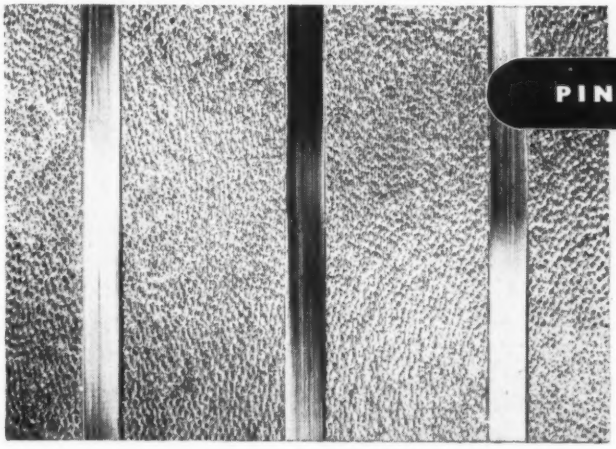

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It should be noted that although the parent glasses (No. 3 Hammered and Pinhead Morocco) fall into the Non-Formal Group, the superimposition of the stripe alters the glass fundamentally and brings them into the Formal Group.

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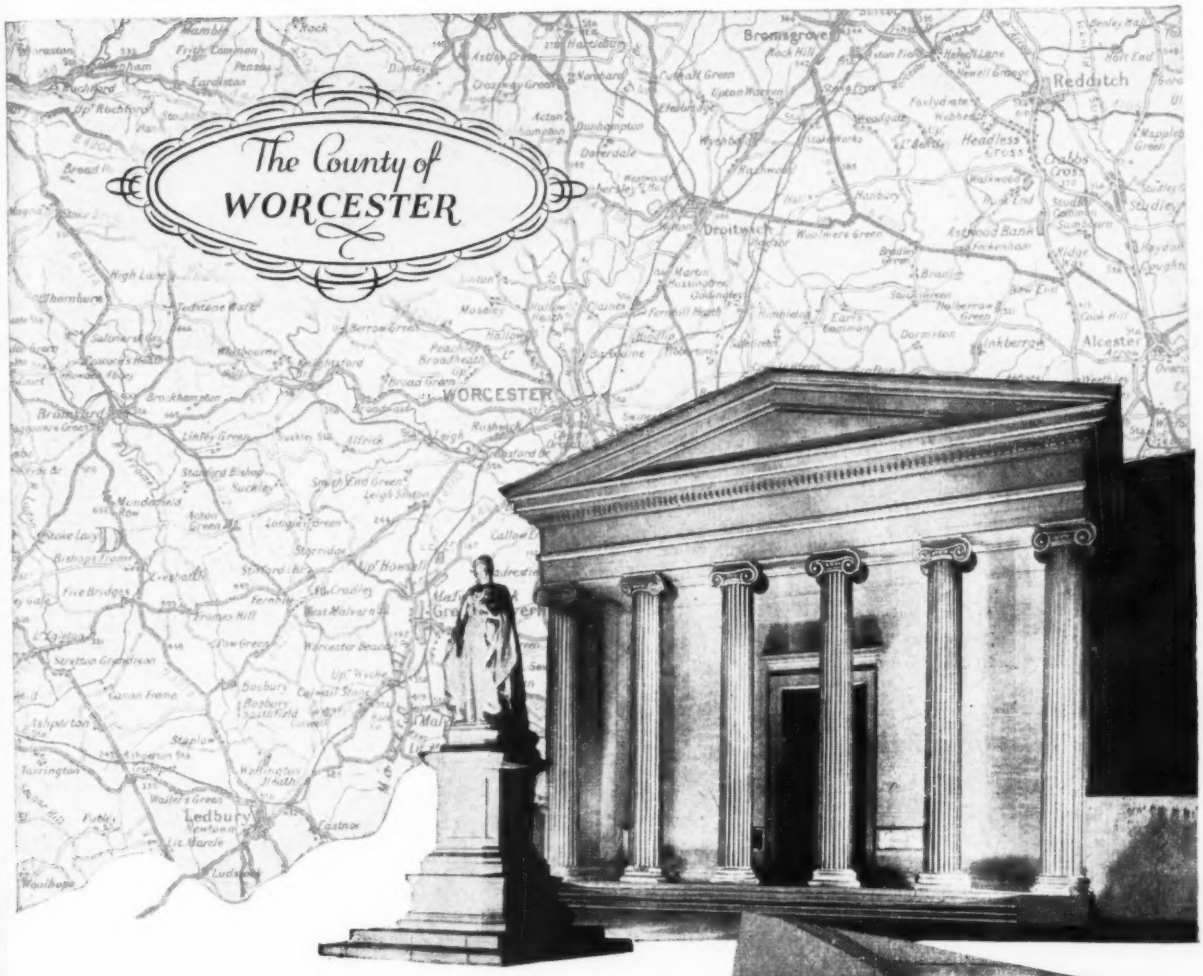


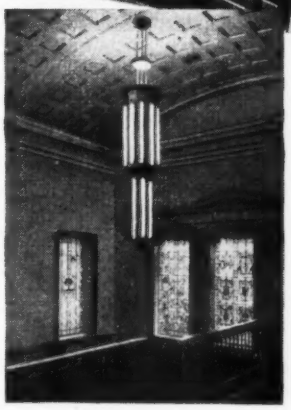
Shirehall, WORCESTER.

The Crown Court

Stately Shirehall was recently rewired to the specification of L. C. Lomas, F.R.I.B.A., County Architect for Worcestershire.

Wiring for 446 Lighting, heating and power points was installed by the Contractors, *Messrs. Abell & Smith's Electrical Co. Ltd.*, Angel Place, Worcester, who used BICC V.R.I. Taped, Braided and Compounded Cable throughout.

The Great Hall



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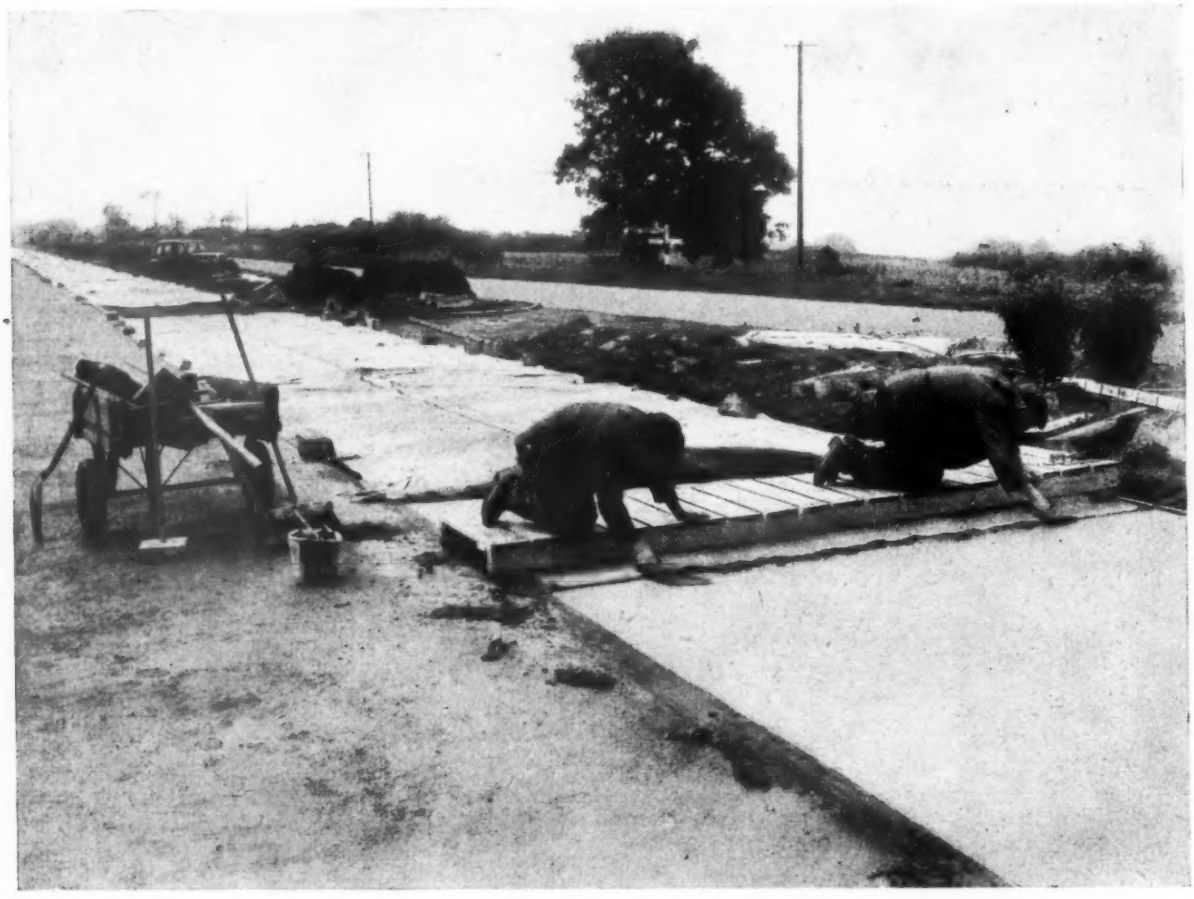
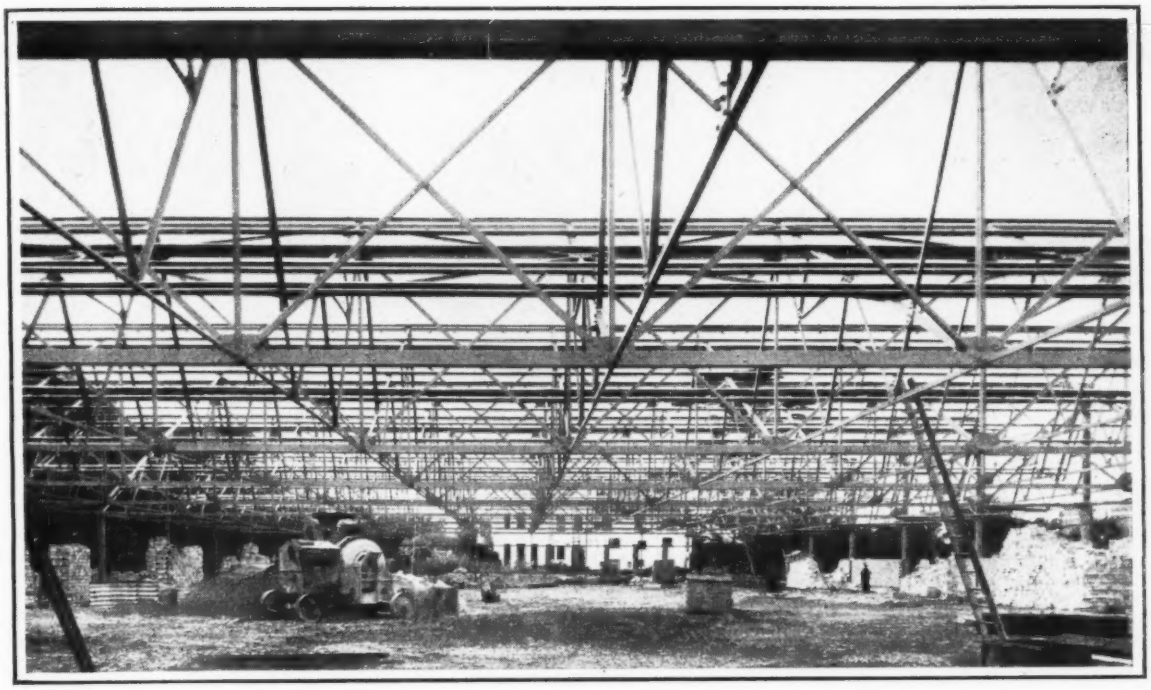


The ancient Fosse Way, running north from Leicester, existed merely as a drift way up to 1923. About that time the County Council lightly metalled it to provide a hard two-lane carriageway which did service for several years but, since it affords the most direct route from Leicester to Nottingham as well as to Lincoln and the North East, some modern reconstructional treatment was inevitable. This work was interrupted by the War and from 1943 to 1945 one of the carriageways on a "dual" section of the road was used as a park for military vehicles.

This carriageway began to fail after the War and had to be reconstructed. Owing to the extent of the job and a dearth of labour up-to-date mechanical methods were necessarily employed and included mechanical spreaders and finishers and a travelling mixer.

Curing and protection, as might be expected, was entrusted to SISALKRAFT Concrete Curing Blankets placed directly on the concrete as soon as practicable after the last pass of the finishing machine. The picture is published by kind permission of the local highway authority by whom the project was carried out with direct labour.



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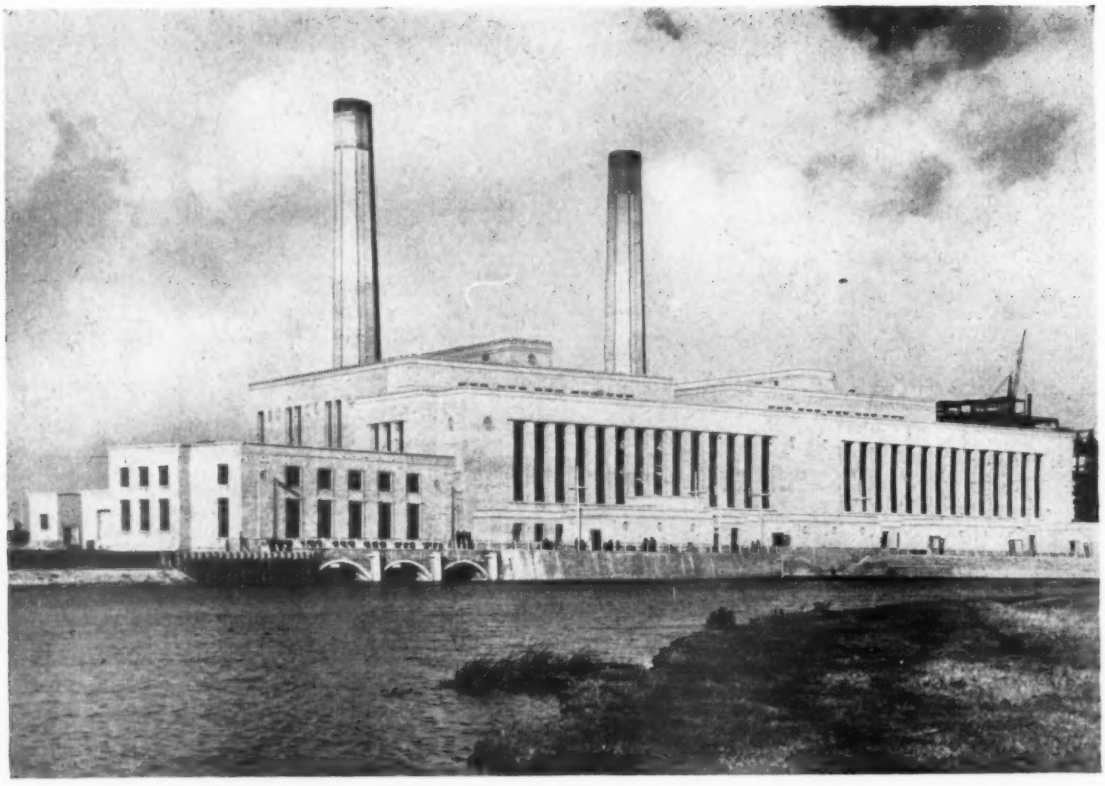

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THE ARCHITECTS' JOURNAL

No. 2926 29 MARCH 1951 VOL 113

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SOUTH BANK . . .

The Festival, according to your choice of daily paper, is going to be either a resounding success or an ill-managed and expensive flop which will only be completed a little time before it's due to close. In an attempt to be mildly objective I spent an afternoon just before Easter having a general look-round and my guess is that, barring last minute strikes or a hurricane, most of it will be there on time, with, perhaps, some details missing. Farthest behind is the area between the concert hall and Waterloo Bridge, where there still seems a fair amount of structure to be completed. On the other hand, the transport section has most of its major exhibits already in place. Aircraft, cars, boats and railway engines, including the enchanting 1840 Buddicom locomotive with lovely polished brasswork and lots of copper pipes. A triumph that this should still run.

. . . SHOULD BE READY . . .

There is still, of course, a lot of clearing up to do and quite large areas have still to be paved, but this is a fairly rapid process and an immense change could be made in a week or so. Structurally, nearly all the buildings seem complete and a lot of the heavier exhibits are already in; such things as the telescope in the Dome for instance. A slightly creepy building this, when unlit, for I suddenly found myself almost touching an 8 ft. plaster head which looked far too reminiscent of someone I don't like, added to which there is always the feeling, in the dark, that after the next step you may be 80 ft. lower down.

. . . SO KEEP THREE DAYS FREE

Structurally, the shows seems most adventurous, notably the Dome, the Fairway Café and the access bridge from the Waterloo Bridge entrance. Even now the whole impression of the site is cheerful and gay and I am beginning to hope that, if only enough people go, the Festival may really have some good effect on the general level of taste. I can warn everyone, now, that it is an afternoon's work even to look round the buildings: when all the exhibits are in it is likely to be at least a three-day job to see the show properly. How long you spend in the Battersea fun fair is none of my business. If, as seems likely, it stays open next year to cut the losses we may all have a chance to see all the sideshows.

MORE HOUSES?

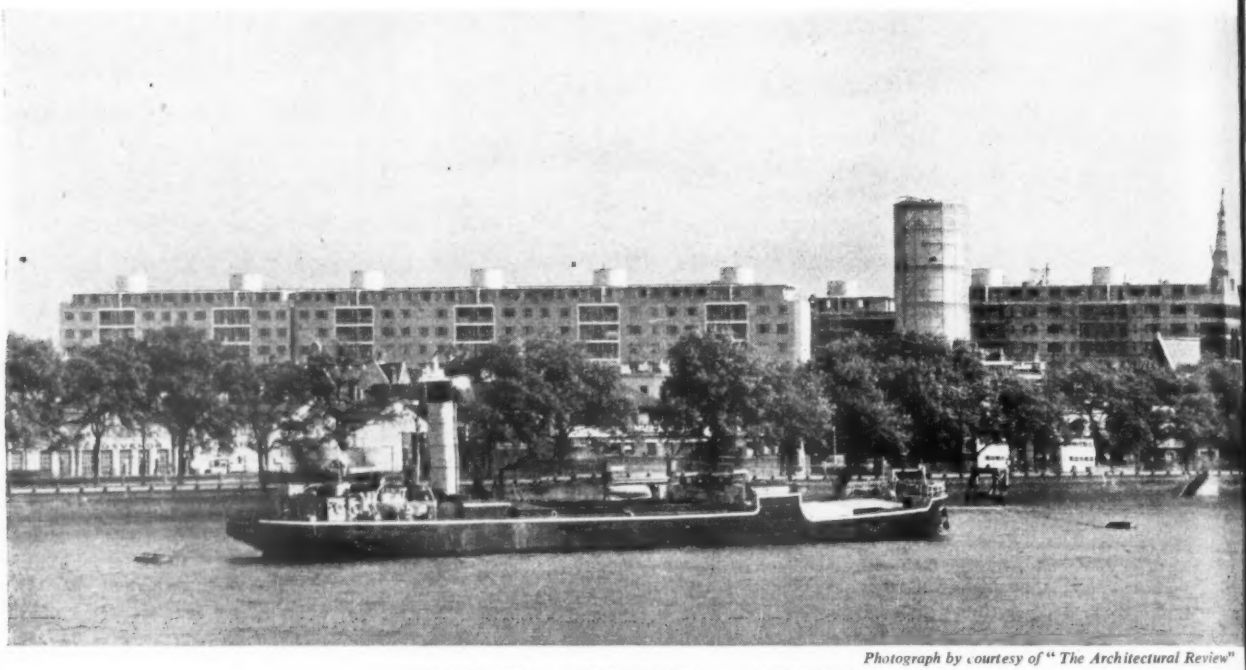
The latest Conservative Party tract (No. 105) on housing has the undeniable advantage that it has been written by an MP who is also a builder. Mr. Marples wants more houses, as one might expect. And his way of getting them would be by the abolition of controls as far as possible, the giving of freedom to private enterprise building, and the building of smaller and cheaper houses as local authorities thought fit. Among the other factors which can affect the efficiency of the industry he lists architects. But he is not, I am sorry to say, very complimentary: poor chap, he has been at the receiving end for drawings. He quotes the Productivity Team's report and makes two " respectful " suggestions, that architects should work on sites and mix with contractors, and that practical work on sites and on building costs should have a larger place in professional training. All of which is no doubt quite right, but seems more a long term policy than a method of building 300,000 houses.

The more I think about it the more certain I become that housing should *not* be a subject about which rival political parties make competitive plans for vote-catching. On looking at the Tudorbethan horror on Mr. Marples's cover I'm far from happy about the free hand for the speculative builder.

DONE WITHOUT MIRRORS

Almost every lighting showroom I go to seems to be far too full, with fittings all over the ceilings, walls and floor. Yet although there are certainly a lot of fittings about, I didn't get this feeling at Troughton & Young's new Knightsbridge showroom (opened a week or so ago to exhibit the new range) designed, as usual, by A. B. Read, who you will remember as one of the first RDI's. As one who still optimistically hankers for pre-war price levels, I was interested in the Mondolite series which has a number of interchangeable parts so that you can almost design your own fitting from the standard units. And it helps to keep the price down as well. Good.

HOUSING SCHEMES



Photograph by courtesy of "The Architectural Review"

PIMLICO HOUSING SCHEME

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Consulting Civil Engineers: Scott & Wilson, M/M.I.C.E.

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Brixton	cottages	for the Ecclesiastical Commissioners for England
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Chelsea	rehousing	for the Metropolitan Borough of Chelsea
Greenwich	cottages	for the London County Council
Harrow	housing scheme	for the London County Council
Hendon	cottages	for Messrs. Schweppe & Co.
Kensington	housing scheme	for the Royal Borough of Kensington
Lambeth	rehousing	for the Ecclesiastical Commissioners for England
Lowton St. Mary's, Lancs.	hostels, etc.	for the Ministry of Supply
Millbank	flats	for the London County Council
Paddington	housing scheme	for the Metropolitan Borough of Paddington
Roe Green, Herts.	housing scheme	for H.M. Office of Works
Rosyth	housing scheme	for the Scottish Housing Co.
Stafford	housing scheme	for Messrs. Siemens Bros. & Co. Ltd.
Wandsworth	various housing schemes	for the Wandsworth Borough Council
Westminster	housing scheme	for the Ecclesiastical Commissioners for England
Winchester	housing scheme	for the Winchester Corporation

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MILLBANK **WESTMINSTER**

PICTURE POST-CARD FROM BERGEN

"If you ever come to Norway," writes my Scandinavian agent, "don't miss Bergen. Though it never stops raining there and smells of fish, it has an atmosphere all its own. In Oslo, you will have searched in vain for beauty in townscapes and monuments, though you will have been awe-struck by the Viking ships and the Kontiki raft and excited by the powerful paintings of Edvard Munch, wondering vaguely why this genius has had so little recognition in England. In Trondheim the timber warehouses of bright and varied colours will have fascinated you and made you wish you were a painter. Everywhere you will, of course, have been impressed and a trifle cowed by the mountains and the fjords. Then you will come at last to Bergen, feeling perhaps a little gloomy, not quite tough enough to take easily to this austere, remote, majestic land."

*

"But Bergen, in spite of the rain, will soon cheer you up," this traveller assures me. "It has a gay and cosmopolitan air and turns its back on the dark valleys towards the outer world with an extroverted maritime bustle. The place has several pleasing old buildings and even one quite good modern one. A little way out and well worth visiting is the curious stave church of Fantoft, pitch black inside and somehow pagan. It is the town as a whole, however, that will intrigue you with its intricate narrow cobbled lanes of white timber houses, roofed with pantiles, wandering up and down the hills which overlook the harbours. Here and there this intricacy is broken clean through by wide ramps up which roadways zig-zag between trees and worn stairways rise to give you glimpses of the water below, busy with shipping."

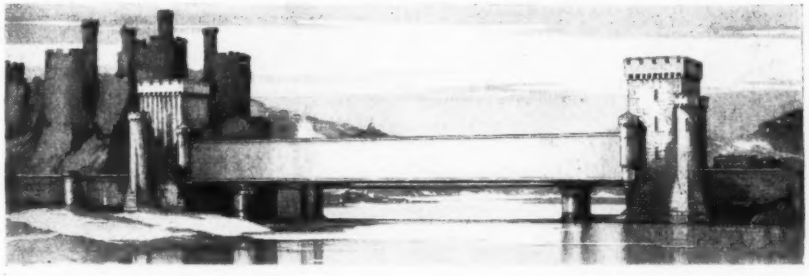
*

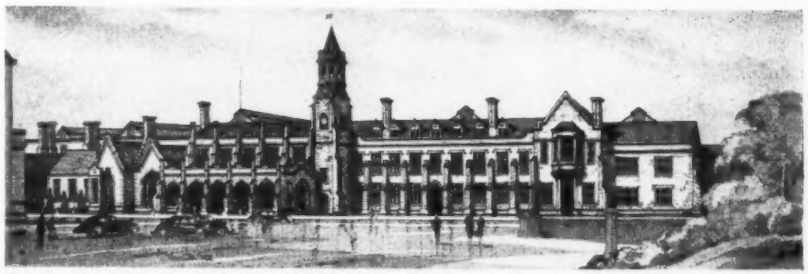
The report goes on: "The focus of interest is not so much the modern town centre where the immortal Herr Ole Bull fiddles so quietly under his shower bath, as the old Hanseatic quarter. It has changed little in appearance since the 16th century, for although the quarter was burned down in 1702 it was at once rebuilt more or less as it had been before. Here again the buildings—still used as warehouses, except for a small part which has been turned into a Hanseatic museum, are of timber. A romantic and picturesque town for sailors, shipwrights and merchant adventurers which has that unity of form, texture and purpose that Le Corbusier has called Immutability—never more striking than when seen from a ship departing on the evening tide as the lights begin to twinkle up on the steep slopes."

Warehouses and drawbridge at Trondheim. (*See note on left*).

HOW TO GET A LICENCE

It seems there is no limit to what a man will do if he really wants a licence to build. You may have missed the story recently reported in the daily Press of a desperate would-be home-owner. This man was refused a licence by his rural district council, under the 1/5





ASTRAGAL *admonished by the PRO of the London Midland Region (BR) for criticizing the pictures proposed for their railway carriages (March 8) without reproducing one, here cedes the point and publishes two (Runcorn Bridge and Citadel Station, Carlisle) confident that the indifference he feels towards them will not be shared by those younger readers who travel equipped with screw drivers.*

Picture Post-Card from Bergen

With the Easter holiday just behind us we feel this is a time to suspend for one week our policy of publishing frontispieces that have some special significance. So here, for no reason other than its pleasant pictorial qualities, is a picture postcard from the Norwegian town of Bergen. It was sent to ASTRAGAL with a "wish you were here" note (rather longer than usual) which is printed on page 383 together with another photograph from the correspondent.

arrangement, presumably because there were more deserving claimants. He thereupon got a licence from the MOW to put up some agricultural buildings and then applied successfully to the rural district council for a licence to convert them to a dwelling house.

*

I do not recommend this as a standard method for getting a licence. I suspect that many special conditions lay behind such a simple story of persistence, and most RDC's find their monthly licence limits give very little margin for fun and games.

MODEST SWEDEN

Penguin Books have produced another volume in their laudible Planning and Design series, *Building Modern Sweden,* by Bertil Hultén, a young and accomplished Stockholm architect. At 3s. 6d. this is good value and gives scale to Kidder-Smith's monument, *Sweden Builds,* which the Architectural Press published recently at 45s.

*

The new Penguin shows pictures with which readers of the architectural magazines will already be familiar. But this book is for the "weeping, weeping multitudes" of this country. Well may they weep when they compare their own conditions in Great Britain with those in little Sweden—order, good taste, shiny kitchens which work, intriguing gardens for the children to play in, no squalor and no dirty air to make the housewife's work a battle won and lost each day.

*

The illustrations in this book suggest all these things but no more. The text lacks a continuous "story," it makes no telling comparisons and comes to no didactic conclusions. If the wording were less modest, this publication might be taken for a brochure produced by a travel bureau. That the text seems to have been written for children does not weaken one's conviction that an opportunity has been lost. Perhaps more might have been achieved if a limited subject had been attempted —for instance, the Swedish Home. Not that this is a bad book at all. It just seems to lack purpose, beyond providing some limited and uncoordinated information.

ASTRAGAL

No: 8 Specialist Editor

THE DRAFT DEVELOPMENT PLANS

PLANNING offices all over the country are working hard to complete the first instalment of their draft development plans. In the meantime, opportunities are appearing for the public to take an active interest in the plans. A few of the smaller authorities have already submitted their plans to the Minister and several counties have published information about their preliminary plans. Criticism of local development plans by people outside official organizations will have the greatest effect if it can be expressed through the medium of local societies or special *ad hoc* groups.

This was suggested recently in a letter to *The Times* by the Chairman of the Executive of the Town and Country Planning Association, F. J. Osborn. He also called upon townsmen and countrymen in every town and rural area to get to know the local plan and to stimulate widespread local discussion. "Townsmen, for example," he writes, "could satisfy themselves that the future form of city reconstruction, and of the new towns and country town expansions that de-congestion requires, will promise them more pleasant and efficient living and working conditions. Countrymen could see that their new developments are so planned as to safeguard amenities and revivify declining areas."

Architects can be expected to figure prominently in the societies and groups which will provide broad criticisms of this kind. And architects, through the medium of branches and chapters of their local architectural societies, are in a splendid position to offer criticism of those aspects of the plan which would otherwise receive too little attention; for instance, the interpretation of the effects of the plan in terms of three dimensional planning and civic design. For those societies who take this kind of action, the pages of this JOURNAL will be available as a forum for discussion.

The Editors

PRODUCTIVITY: STATISTICAL RESEARCH

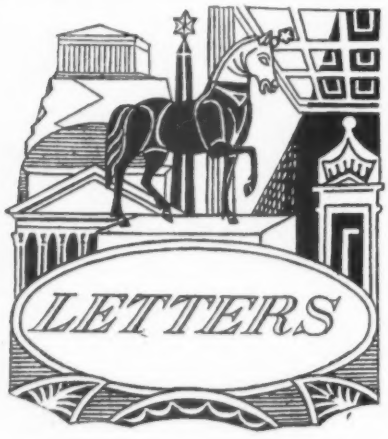
At the turn of the century, industrial output per man was roughly the same in Great Britain as it was in the USA. Since then, however, American productivity has increased at the rate of 3 per cent. per annum, while the corresponding figure for Great Britain is only 1·5 per cent. The result is that American productivity is now two and a half times ours. Moreover, during this period, productivity in the building industry has, if anything, decreased. On pages 403-406 of this issue, in a paper* originally written for the United Nations (ECE) Conference on Building Research, Dr. Bronowski describes an important but hitherto little publicised aspect of building research, which can contribute much towards increasing productivity.

At a British Association meeting Sir Ewart Smith, speaking of industry as a whole, gave three means by which

*Operational and Statistical Research in Building

productivity could be increased : " Improvement in the basic process employed, an increase in the quantity of plant and machinery used, and improvement in technical efficiency." But the building industry uses little machinery. Measured in horse-power per man, it uses only one-fifth as much as our other industries. For a house which costs £400 in labour, the total outlay on plant and machinery, including concrete mixers, lorries and, even, scaffolding, is usually less than £30. Our unskilled labourers are our machines. In the USA, the high wages of construction workers encourage the employers to use machinery wherever possible, and persuade them, more effectively than ministerial exhortations, to make their firms efficient. In Britain, most of our firms are so small —a third of the men in the building industry work for firms employing less than a dozen men—that they cannot afford large quantities of machinery.

Apart from complete re-organization of the industry, what solutions are there to the problem of increasing productivity? Recently we published an article, by R. H. James, explaining simple methods of increasing site efficiency. In this week's article, Dr. Bronowski maintains that the variation in efficiency from one site to another is so great that if all building firms could only be brought up to the *average* level of efficiency, the overall increase in productivity would be considerable. Statistical research teams can analyse why a particular builder's work is below the average level of efficiency, and can help him to raise his standard. The small team of workers at BRS who do this important, but unspectacular, work should be given every encouragement.



Embyro
Once an Enthusiast
W. Macdonald
A. G. Wise, F.R.I.B.A
Eric Ambrose, F.R.I.B.A.

Town Planning : External Students Discouraged

SIR,—Last year the APRR edited *The Town & Country Planning Textbook*, giving a bibliography of 305 publications for study. May I add another for the benefit of the Town Planning Examiners? It is Aldous Huxley's *Ends and Means*, which shows that ends never justify means but that means always determine ends. The means adopted by the TPI in the last five years have resulted not only in the frustration of the external student as affirmed by " Iconoclast " (March 8) but ineptness in executive action, falling off of public support, or negative enthusiasm in official circles of all town planning matters and the dissipation of the essential dynamic within the following.

The academic approach to the problem of qualified town planning staff is just not good enough. A student in any of the planning schools, if he has any intelligence, knows what questions he will be asked and if, through sheer laziness, he fails, he may take a *single* paper again and he knows his markings at the terminal end examinations. The external student is without these facilities and is further discouraged by the inconsistency of the set papers based on too broad a field.

London. EMBRYO.

The Town Planning Exam

SIR,—" Iconoclast's " letter (March 8) prompts me to give the following comments on the Town Planning Examination:—

1. Candidates are required to put their names on their papers.

2. The field day is more an endurance test than anything else, and to expect candidates to walk five miles or so on a hot summer day in London, and then lay out a town or neighbourhood unit on a 6-in. map in three hours the same afternoon is too much, even if an outline only is required. In any case the candidate has already done this in his set piece. Do any of our eminent planners do this in practice? Or do they? On some occasions candidates have been directed to the field day site by the least convenient route.

3. Trick questions, quoting official formulæ, but with slight errors in transposing numbers, have been set, with the inference that the formulæ quoted are correct.

4. Oral examination has varied from the discussion of beef cattle to where one is employed, or has been omitted altogether, possibly preventing candidates catching up on marks lost in written papers.

5. Examination held early July. Results often not out until November. Entries for next examination have to be in by December.

6. No information given regarding in which subjects candidates are failed.

The policy appears to be that of the "closed shop" and the creation of an artificial shortage of qualified planners.

The recent Report on the Qualification of Planners appears to envisage the creation of a caste of super-planners and one is tempted to ask (*a*) whether there will be parts enough for these and (*b*) who is going to pay the salaries to which they will be entitled?

When the TPI state there is a shortage of trained planners one would have thought that the benefit of any doubt would be given to border-line cases. As it is, many competent men are denied posts which they are capable of filling, whilst these are taken by " schools " men with academic qualifications only.

When these points were put some years ago to a PPTPI his answer was: " Quite frankly, we are only interested in university men now."

There are too many bodies now. If the TPI still feel they must continue passing only about 15 per cent. of candidates, could they not consider a licentiate class for those who have sat the examination but not obtained the high marks apparently necessary for associate membership?

Amersham. ONCE AN ENTHUSIAST.

The IRA Exhibition

SIR,—The travelling exhibition by the Institute of Registered Architects referred to by ASTRAGAL and by Mr. Ward in your issue of February 8, is sweet music which the public is bound to welcome. Congratulations to the Institute. What an exhibition could be made if all architectural professional societies were to exhibit their members' works under one roof to enable the public to learn also that the profession is unified on democratic principles.

W. MACDONALD.

London.

Stimulus to Design Wanted

SIR,—ASTRAGAL, writing about new railway architecture (March 1) draws the moral: " If you want character in the new bureaucratic building, decentralize design control and give the utmost possible freedom of expression to the man on the job." Your editorial in the same issue discusses the various shortcomings of the present competition system. Surely there is a connection here. The answer to the competition question lies very largely in providing many more competitions in which the chances of winning are reasonable—say six or eight to one. This constant stimulus to design would produce the character ASTRAGAL wants and give new blood its chance as well.

Most public buildings of any significance, even very local significance, are fit subjects for competitive architecture. Where there is a real chance of getting a job, the premium is of no great importance and could be dispensed with without discouraging competitors.

The profession should, in my opinion, place

itself in a position where it can offer any local authority or other public body at least half a dozen alternative schemes for its project, together with expert professional advice in the judging thereof, *at no cost to that body*.

I admit this would do nothing to rectify the faults of the large open competitions, except in so far as it would tend to reduce the number of entrants.

A. G. WISE.

Launceston.

Students Ridiculed

SIR,—I had the pleasure of hearing A. Graham Henderson, the RIBA president, address the students when he presented prizes at the RIBA last month.

It was an encouraging exhortation to youth and ended with the salutary advice to learn from the past.

Here, alas, the encouragement came to a full stop. The next speaker, R. E. Enthoven, who gave the criticism of the students work, felt, it is true a little doubtful about his approach, for he commenced by likening himself to an editor who disclaims responsibility for the work of his contributors. Responsibility, however, cannot be thus lightly shed.

By all means let us have bold, unprejudiced criticism. For many years students have known "how to take it" but the introduction of ridicule, particularly outside the "closed-shop" of the school cannot be expected to encourage a candidate who has spent many hopeful months upon his project. To exhibit his efforts upon a screen under the thin guise of an anonymity not extending to the student's colleagues and then say of it: "This candidate has put everything he knows into his design, reminding one of the man who ate bicarbonate with his spaghetti to cure the indigestion he was certain to get"—is certain to raise the required laugh from members of the audience who are relieved to find they have escaped the lash.

Another competitor was told his design was "Out of this world—or the other side of the Thames." Now one may feel very strongly about the demerits of the South Bank buildings and vent one's annoyance at the slightest provocation, knowing that a laugh will at once be forthcoming, but surely a criticism of students' work is hardly the place to introduce the youngsters to the internal jealousies and envies of the adults. The required laugh *was* forthcoming.

It was, however in the case of the Essay Prize that the show was completely given away. The prize was not awarded and the three candidates who no doubt had come to know why, were quickly told—or were they? Certainly laugh followed laugh. The candidates were weak on spelling. One used words which were too long—but since the critic was forced to make three efforts to pronounce the title of this work, perhaps it would not have mattered a great deal if the author's spelling had been stronger!

A second essay was too long, but since the prize has been withheld twice in the past three years, apparently on these precise grounds, it might be as well if the jury confined itself to defining their requirements: more competitors might be encouraged to enter.

Can it be that what is really needed is a general blood-letting of pomposity and an injection of the milk of human kindness into (say) half a dozen members of the RIBA juries to begin with?

ERIC AMBROSE.

London.

The EDITORS reserve the right to shorten letters from readers. Whenever possible however, they are published in full.

LCC

Improvement of War-Damaged Sites

The LCC has agreed to a recommendation made by its General Purposes Committee that £81,000 shall be spent in 1951-52 on improvement of war-damaged sites in London.

The Committee reported to the Council last week that there were 6,600 bombed sites in the country, according to a survey by borough councils. It made the following suggestions which have been adopted:—

(i) The tidying up of sites in the Council's possession, and not already provided for in programmes for temporary or permanent use in connection with the service for which they are destined, should be undertaken by the Council at an estimated cost of £5,000.

(ii) The Council should undertake the maintenance of such sites at a cost tentatively estimated at £1,000 a year.

(iii) The borough councils should be invited to prepare schemes for all other sites that might be dealt with under the War Damaged Sites Act (roughly estimated at 25 per cent. of the total of 6,600 sites, with an area of about 360 acres).

(iv) The borough councils should be informed that, in order to spread the available resources as far as possible, schemes for merely clearing and roughly levelling sites (estimated average cost about £300 an acre) would be particularly welcome, though it would be hoped that even these simple operations could be so carried out that the local population would have some enjoyment of the site: that schemes for sitting-out spaces involving, as well, provision of a surface of ash and clinker, frontage fencing and one gate, and two or three seats (estimated average cost £1,100 an acre) would be considered on their merits in relation to the general availability of such facilities in the locality, and bearing in mind that there may in certain circumstances be a greater tendency on the part of the public to keep such sites clear of debris than those that have merely been cleared and roughly levelled; and that strong justification would be expected for any proposals for more elaborate treatment of the sites.

(v) Subject to the Council's being satisfied that the total cost of each Borough Council's proposals is reasonable in relation to the considerations set out in (iv) above, the Council should agree to enter upon (or take a lease of) as many of the sites in each borough as would involve expenditure on clearance and preparation of the sites equal to half the approved cost of such work for the borough as a whole, and the borough councils should be invited to undertake the work as the Council's agents on this basis and on the understanding that they would be responsible for the maintenance of the sites.

ABT

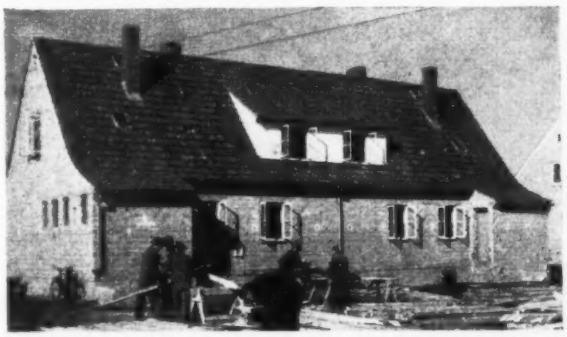
"Architect-Site Collaboration Needed" says President

The need for closer architect-site collaboration was stressed by R. J. Soper in his recent presidential address to members of the Association of Building Technicians, 5, Ashley Place, S.W.1.

"During the last year," he said, "we have seen the publication of the report of the Building Industry Working Party, which included a number of recommendations which we made to them. The need for closer architect-site collaboration—which we are particularly well fitted to achieve, the adoption of modern techniques—which we as designers must incorporate in our plans and the increasing use of mechanization on the site are rightly stressed.

"The extension of university degrees in building courses are essential to the more efficient production within the industry. No longer can the limited facilities of technical schools prove adequate to the task. I do not underestimate in any way the great part they have played and I do not underestimate the most important part they must play in the future. But the establishment in a university of a Chair of Building, concerning itself with the practical aspects of building and civil engineering works, must be realized. We have been pressing for the registration of clerks of works and have been discussing this with other interested associations.

"We have a unique part to play. No longer can technical administration be handled by non-technical men."



Refugees in Bremen building their own homes, using interlocking cavity blocks (right) made with high percentage of coarse sand and lined with fairly wide horizontal mortar joints. Walls finally plastered inside and out; open joints form good key for plaster.

PLASTICS

Architect to Speak at Convention

Gontran Goulden will give a talk on "The Architect and Plastics" during the British Plastics Convention which will run concurrently with an exhibition at Olympia from June 6 to 16. The talk will be given on June 11 at 2.30 p.m. On the same afternoon H. H. Lusty will speak on "What the Plastics Industry Offers the Building Industry."

LMBA

Technical Officer Appointed

One of the MOW's senior technical officers in the London area will be available on a part-time basis to LMBA members from April 1. The technical information officer appointed to this position is E. G. Dean. He will be available for consultation by individual members, and will visit LMBA areas. Among his duties will be the answering of technical questions, the provision of information about good building practice and the organisation of periodical lectures and exhibitions. The LMBA hopes that in his work he will build up considerable knowledge of building problems to which the Ministry's research departments will devote attention.

This plaque, which will be attached to buildings whose designers receive awards from the FOB Council of Architecture this year, was designed by H. Wilson Parker. It will also be awarded for good design in landscaping.

DIARY

Hospitality at Home. At Tea Centre, Regent Street. Exhibition of furniture and furnishings. (Sponsor, ID.) UNTIL MAY 12

Open Forum : Architecture and the Architect from the Layman's Point of View. Mrs. Joan Robins. T. Payten Gunton. At Royal Society of Arts, John Adam Street, W.C.2. (Sponsor, IRA.) 6.30 p.m. MARCH 30 (Changed from April 6)

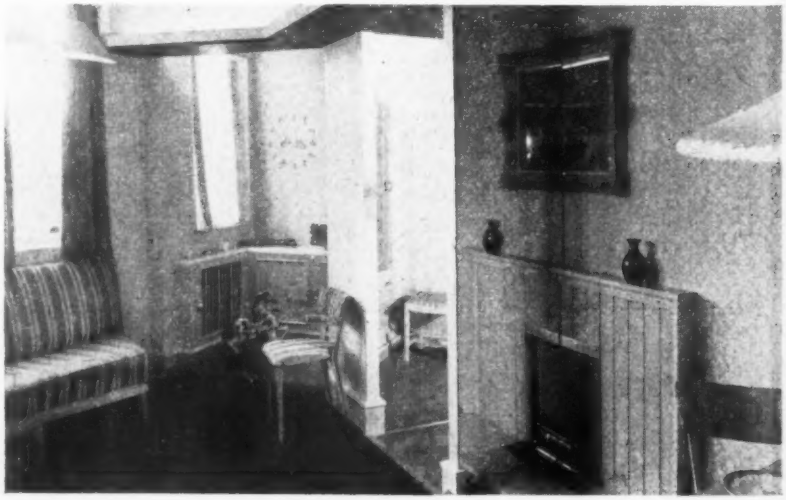
Presentation of RIBA Royal Gold Medal. To Vincent Harris. At RIBA, 66, Portland Place, W.1, 6 p.m. APRIL 3

Planning as the Instrument of Policy. Sir George Pepler. At Caxton Hall, Westminster. (Sponsor, TPI.) 6 p.m. APRIL 5

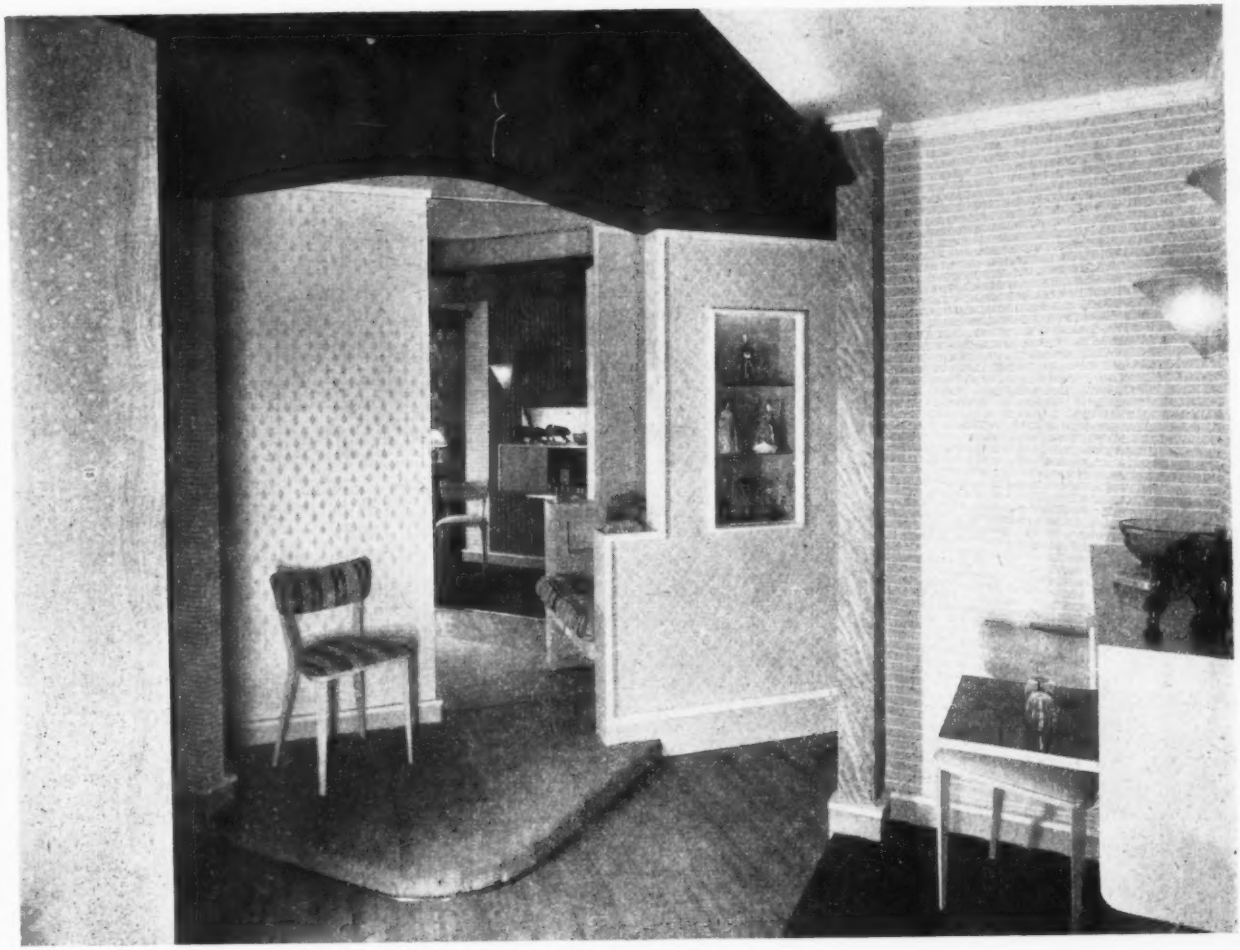
AA Annual Reception. At 34-36, Bedford Square, W.C.1. 8.30 p.m. to 1 a.m. APRIL 12

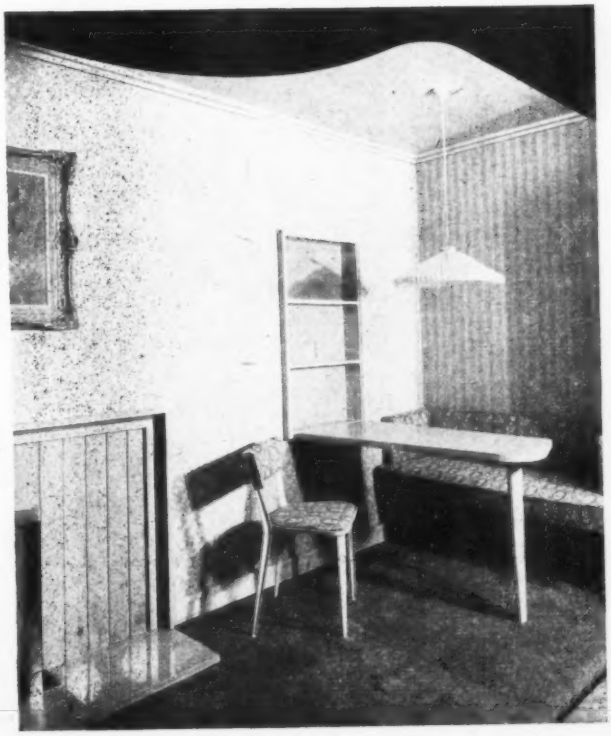
WALLPAPER EXHIBITION

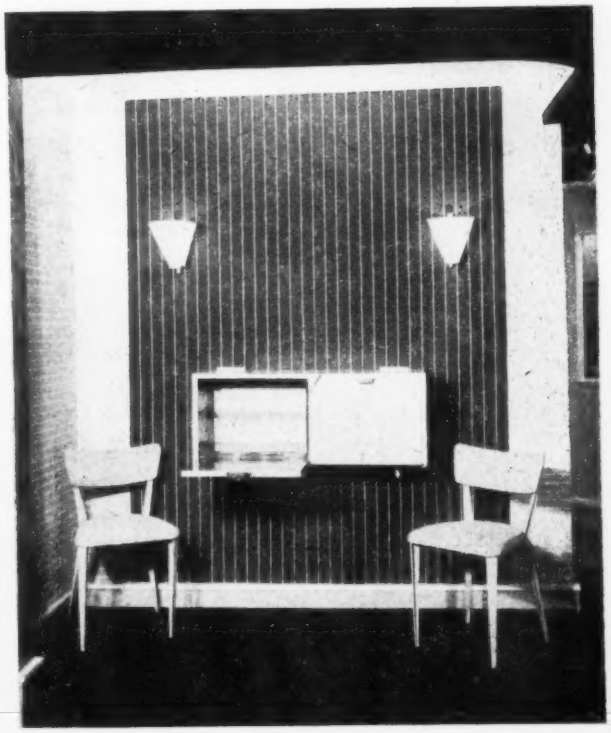
The wallpaper and interior decoration exhibition illustrated on this page and opposite was designed and produced by Alan Best (Exhibitions) Ltd. (chief designer, L. S. Dixon) for the Finch Organisation. The aim was to create, in a limited area, sections of as many rooms as possible and also to give an illusion of spaciousness. This illusion has been created largely by the use of mirrors, as seen in the photographs above and below.



EASTERN AVENUE, ILFORD, ESSEX

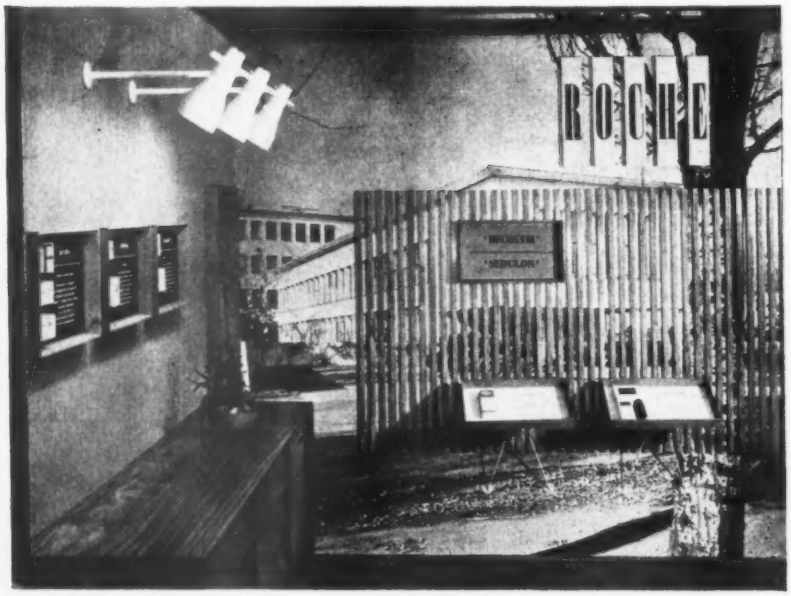






STAND AT THE MEDICAL EXHIBITION

The stand for Roche Products, Ltd., at the recent Medical Exhibition was designed by Ian Bradbery. Cedar was used for the cappings to walls and ceilings, for the boxes containing transparencies (seen above), and for the small display frames. Offram was used for the vertical supports to the transparency boxes and for the vertical slats (seen below), behind which is a large photo-montage of the Roche factory at Welwyn Garden City. The light fittings were purpose made from spun aluminium. The walls were either painted pale blue or distempered white, and the solid ceiling was yellow. The contractors were the City Display Organisation.



A correspondent in Dublin contributes the following summary of architectural and building news in Eire. We hope to follow this, in due course, with reports of a similar nature from various parts of Britain.

NIALL MONTGOMERY

Report from Eire

Last November, an architect giving evidence in a Dublin district court is reported as saying: ". . . you have practically to go to the cemetery and dig one up, if you want the services of a plasterer." Early in December, unskilled, unburied workers on the construction of a 13-acre, £250,000 cardboard factory in Kilkenny closed down a potential earning centre for 5,000 operatives by striking "for the Waterford rate." Just before Christmas 2,000 carpenters, in the Queen's Theatre, Dublin assembled, agreed to ask a shilling increase on their 3s. 3d. an hour,—plus another shilling on the day's tool money.

In other city theatres that week, painters plumbers, electricians and building workers generally went into rehearsal of a show the theme of which was still twelve pennies. "Too Soon?" asked the *Irish Times*, honoured organ of the reaction, in an editorial that just preceded the fabulous 8-week bank strike. Undeterred 12,000 building workers put in their official demand for the increases.

Late in January, the Government,—which had confused the 'flu-striken citizens by scotching the rumour that the cost of living had risen,—appointed a Prices Advisory Body. Its first action was to unfreeze cement, which shot up 5s. 6d. a ton. In February the story was that strikes and reduced imports were causing a cement shortage.

The Minister for Finance had announced in the autumn that well over eleven millions had been spent on capital development in the first six months of the financial year—mostly on housing and electricity development. In the new year, Cork City revealed that it was putting £48,000 into reserve stocks to cover housing, waterworks, sewerage, and road works during the war. Purchasing became fashionable. An English contractor operating here was in January reported to have placed an order for £37,000 worth of timber with a Dublin merchant: late that month the rumour was that there was no more timber in the Dublin yards.

Housing, of course, is always big news—bad news for the architect retained on State schemes, or employed by the type of builder who did not retire from smuggling until the government subsidized small houses. The architect's job, in the latter instance, is to legitimise for mass production a hipped, bay-windowed, Siamese monster, with interlocked roof and combined drains. He is not wanted on the site; the drawings are for the local authority, not the foreman, —who builds by ear; and a specification exceeding a foolscap page is regarded as disloyal.

That is not a picture of the Irish building industry; established firms share the archi-

tects' dislike of the tip-and-run school of construction. Excellent work is being done all the time by good builders, both for private firms and local authorities; the standard demanded by Dublin Corporation and County Council, in particular, is being raised constantly.

But here is an advertisement taken from a Dublin paper last Autumn: "Any Grant House Designed. Plans (working drawings) and Specification for twelve guineas. Box No. ——."

In such a climate, the architect who works to the Code appears to be a greedy impostor. The shocking thing is that Local Government could laugh at the anonymous design pedlar: they buy their housing,—design, supervision, final accounts,—direct from the profession, wholesale, at much keener prices!

GRANTS FOR HOUSING

Under the Housing (Amendment) Act, 1948, grants up to £275—£285 for building society members,—were made available for 5-roomed houses where the floor area did not exceed 1,250 square feet. Last November, official estimates of the total number of Grant houses scheduled for completion by the end of this year were 25,000 approximately, and 38,000 for local authorities. In December 1949, the Deputy Prime Minister put the country's current needs at 70,000 and the total at 110,000 houses.

In 1950, a further Amendment increased the floor area to 1,400 f.s., altered the valuation basis from "market value" to something nearer "cost of construction," extended the grant to purchasers of erected houses, and brought the scheme within reach of those who could not afford an initial deposit exceeding £100—£250 was the previous minimum acceptable. This appears to be popular, but not necessarily with architects.

In general the 1948 Amendment, generously conceived, had the unpredictable effect of suggesting that building was essentially a spiv operation where skill would amount to cheating. Innocence of craft is excusable in a rich man—cf. Lord Chesterfield's remarks about the Earl of Burlington,—but, for the last couple of months, the number of judgments for unpaid accounts registered in the Dublin courts against "contractors" has shown that many of these amateurs lack even the quality which lends charm to all men, wealth.

Early in February, inaugurating at Abbotstown, Dublin, a 508-bed regional sanatorium scheduled for completion in 1954, the Minister for Health, Dr. Noel Browne, gave news of Merlin park, the 426-bed, £1,000,000 Western Regional Hospital, to be finished next year, of Sarsfield court, the 490-bed, South Regional hospital on which work has begun, and of the 250-bed sub-regional hospital at Ardkeen, for the south-east area, to be finished in 18 months. His worry—everybody's—is the war, the curtailment of essential material supplies, the consequent hold-up on construction: there are thirty hospital projects in hands—one of them brought a contractor with a competitive price all the way from Glasgow.

ARCHITECTS IN THE NEWS

Architects in the news were Michael Scott, Alan Hope, David Hanly, Desmond FitzGerald, and the anonymous character who caused the RIAI Council to notice "with regret" the work he carried out without a Building Licence.

Hanly, Dun Laoghaire Borough's Town Planning Officer—reputed refuser of the Dublin Housing Architect's job, unless it were made independent of the City Architect, and the designer of a fine housing scheme recently completed in Sallynoggin—won a prize in 1946 for a £20,000 Garden of Remembrance to be laid out in Parnell Square between the Charlemont house

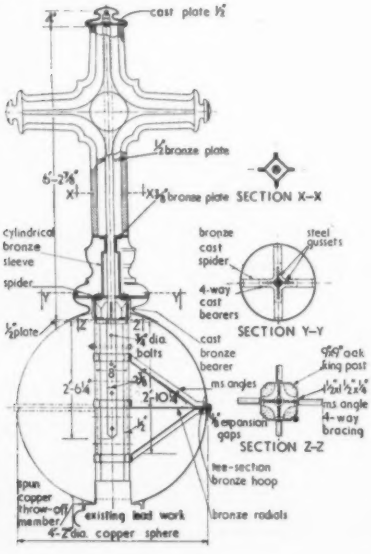
SHOWROOM AT 352, STRAND, LONDON, W.C.2

The new service department for Ronson Products, Ltd., was designed by W. M. de Majo, assisted by P. W. Harvey and J. Lubicz-Nycz. An illuminated arrow on a white fluted background (bottom, right) shows the way to the basement. The staircase carpet is silver-grey and the bright red handrails contrast with the dark panelled walls (above). On the half landing there is a semi-circular open front showcase. The main walls (bottom, left) are of natural waxed mahogany. The flooring is of screeded concrete with resilient thermoplastic tiles, while the suspended ceiling consists of pastel blue tiles. Beside the receptionist's desk is a fluted column with indirect lighting at the top. Additional lighting is given above the partition wall and by recessed lights and spotlight reflectors. There are aluminium chairs and a bench seat with back rest having concealed wall fixings. There are six partitioned service counters (seen left in photograph above) with view into the workroom behind. The general contractors were H. N. Barnes, Ltd., and the carpets were supplied by Catesby's Ltd.

NEW CROSS AND ORB FOR BROMPTON ORATORY

In 1949 it was found that the cross and orb erected with the dome of the London Oratory in 1896 was no longer perpendicular. Close inspection by the architect, Peter Goodridge, revealed that dilapidation had been caused by the omission of proper weathering. As swelling of the timber core due to moisture penetration had caused the damage, it was decided to replace the cross and orb with an all-metal construction to the same design. The height is 4 ft. 10 in., and the weight (7 cwt.) only exceeds that of the old structure by ½ cwt. The new cross and orb consist of a single hollow casting of bronze, moulded from plaster patterns and finished with 85 sq. ft. of double thickness 24 carat gold leaf. The original 9-in. sq. oak king-post had not deteriorated and was used for fixing. The makers were Messrs. Blunt & Wray. For sub-contractors see page 410.

Part Elevation and Sections



Municipal Art Gallery and the Rotunda Hospital. The scheme was shelved; Alan Hope completed the Rotunda Nurses' Home on the same site, and later, as an extension of the hospital space, some pleasantly finished prefab huts.

A newspaper sensation followed the announcement, in the new year, of the Government's proposal to raze the huts and sink the Garden. "Pupil Midwife" asked why huts and unit could not remain as part of the memorial. The dignified Maurice James Craig, vigilant lover of good building, condemned the wasteful procedure "which shows a cynical disregard for architectural amenities and those whose profession is to provide them." The *Irish Times*, in a sub-leader, pointed out that "the word 'temporary' in connection with building has lost all its meaning," adding, with a wicked glance across the river, that this was "the same disregard for the public that led the Government to deprive us of Store Street Bus Station"—Michael Scott's design. Hope, a Liverpool graduate, designer of one of Browne's largest hospitals, of the luscious Russell Hotel, etc., brought the RIAI's Triennial Gold Medal back to the firm, as it were, with his Aspro factory, complete with shell concrete northlights. This is the third award—the first went to his former partner, Freddie Hicks, who got it for the handsome St. Thomas's church—opposite Aer Lingus's city traffic office.

Last September, Desmond FitzGerald—who had won the second medal with his Dublin Airport—watched Trinity College's bigwigs lay on their green the foundation stone of his Moyne Institute of Preventive Medicine, spent the rest of the winter in America, as ECA's guest on hotel research, returned to find his appointment as assessor of a CEMA competition has led a Northern Ireland MP to ask "whether it was not possible to appoint a competent assessor from the United Kingdom?" FitzGerald, a distinctive character with no obvious animus against His Majesty's lieges, is considered a likely successor to the retiring head of National University's Architecture School, J. V. Downes.

MICHAEL SCOTT'S BUS STATION

Dublin's excitement over the "bureaucratization" of Michael Scott's Bus Station recalls the highly articulate fury of the bourgeois intelligentsia, in the 'twenties, when *Ulysses* was pirated, and in the 'thirties, when Eisenstein's *Que Viva Mexico* was mounted by Sol Lesser. The story—long, subtle, not always funny—is tied up with a change of government and the nationalization of transport. The building, baroque in siting and conception, is one of the many large gestures of the former transport dictator, A. P. Reynolds. Its fate—a symbol of the government's economy drive, described, perhaps unfairly, as the diversion of funds from industry to hospitalization and housing—shows the tenuous hold the liberal arts and sciences have on the democratic heart. A cabinet minister, in the nationalization debate, said the transport company, CEI, was a "gold mine for certain architects and engineers in this country." "The total paid in fees and expenses to these professional men—and I am sorry to say that there are balances still to be paid to many of these gentlemen—is £149,039 17s. 11d." Architects were not amused—the speaker is an auctioneer in private life—until, a few months later, a member of his party was reported as saying that, in the voting for the conversion of the bus station, "the party whip was put on, and he had to vote against his conscience, but that was party politics."

In the Senate, a Greek professor said it was ". . . the one great design we have had in this country in the past fifteen years"; an architect who is the most cultivated and intelligent woman in politics said ". . . if ever there was a monument built to those who have no consideration for the beauty

of the city, it is this building"; an economist stigmatized all CIE buildings as "sad monuments to the industrial leaders of twentieth century Dublin." Politicians' views on design don't always spring from æsthetical convictions: there is no real doubt about the quality of the team Reynolds assembled.

But the Minister's conversion of the Bus Station's function was nothing to the uses made of it by its "defenders" in the newspaper battle that followed—it simply became a stick with which to beat one's own special enemy, the Government, Trinity College, the Book Censors, the "Living Art" Exhibition, and, in one instance . . . the Bus Station. A playwright ended a letter which began "Let's pretend that I have written a long, serious play . . ." by snarling: "The Custom House, seen from across the river, is as beautiful as ever. The CIE building is invisible."

Kate O'Brien, novelist, no bus traveller, wrote from the Shelbourne Hotel to hammer the censors: "If we concede our foolish governors the lovely Golden Ass of Apuleius, do you think they might let us keep our bus station?" A jacobin told a crowd he would like to see the terminal in the lovely grounds of Trinity College. "However, he regarded them as being more suitable for a car park, and he believed that eventually they would be converted into a car park." Since the announcement, late in January, that the building is being finished by direct labour, there has been a stunned—or is it a bored?—silence.

THEATRE FOR DUBLIN

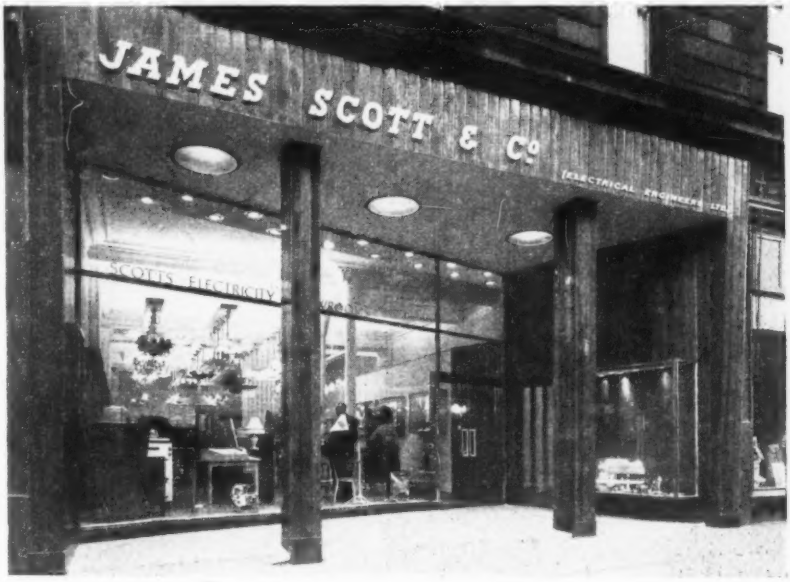
News of a £125,000 theatre for the city has come from a source that justifies a guess that Scott will be the architect and the hope that the Government will not insist on its exclusive use for artisans' councils of war. The autumn brought the perennial plea for a decent concert hall for the city: at least one such, fully detailed, is popularly supposed to be on the Raymond MacGrath drawing board. On the Duke of Leinster's lawn, an obelisk of considerable elegance, designed by him with the major Irish sculptor, Laurence Campbell, awaits formal dedication to the state's founders. Not for years has there been a whisper of the dire proposal to plant a large cathedral church on the lawn opposite the new cenotaph.

In November, with no fuss, a Liverpool firm completed an eighteen months contract for the Dublin Port and Docks Board, a £400,000 warehouse, with 6 acres in floor space, decent proportions, a handsome brushed concrete face, and that rarity, successfully detailed glass block fenestration. It was designed, of course, by an engineer, Con Buckley, whose brother, Eoghan, is Vice-President of RIAI, and the designer, with his partner, John O'Gorman, of the Perret-esque, M-gabled Bureau of Industrial Research and Standards shortly to get its formal opening.

Ireland has not the sophisticated schools the Butler Act is giving England, but the programme—praised recently in *The Times Educational Supplement*—is not bad, though it might logically be entitled to even a few of the millions going into hospitalization. Last year's best job, completed in November for the Presentation nuns in Clondalkin, Co. Dublin—a national school for 300 infants and junior girls, costing £32,000—was designed by two very good men, Nolan and Quinlan. A factory by them, well massed and finished, stands to the right of the main Dublin Airport road to the city.

The West's awake again, because of the Galway County Manager's rejection of the parish priest's scheme for a school at a road junction. The Corporation held, in camera, a special committee meeting to "iron out" the decision, issued no statement. There is absolutely no outcry for a state trial of the parish priest complete with confession of guilt in plotting against the people's town planning laws!

SHOWROOM IN SAUCHIEHALL STREET, GLASGOW



New showrooms have been constructed for James Scott & Co., Ltd. at 426, Sauchiehall Street, Glasgow, to the designs of A. B. Campbell. The frontage to the street, seen above, is set back from the pavement and has walls, fascia, pillars and pilasters clad in $\frac{5}{8}$-in. thick teak boards, $5\frac{1}{2}$-in. wide and with a $\frac{1}{2}$-in. wide recess between each board. The bases of piers and wall skirtings are of black granite. The main window is of $\frac{3}{8}$-in. plate glass and the doors are of armourplate glass. The floor is covered with 2-ft. squares of pale green terrazzo and inside with a rust coloured fitted carpet. The basement has been provided with a dais, lit by spotlights, for demonstration purposes. The spotted wallpaper covers the ceiling as well as the walls. The general showroom lighting is by fluorescent lamps in troughs, to which fittings on display are attached. The general contractors were James Crawford & Sons Ltd. For sub-contractors see page 410.

Following is an extract from a paper on Recent Research in Daylighting, by W. A. Allen and R. G. Hopkinson, read at the RIBA, 66, Portland Place on March 13.

ASB and IES

Extract from a paper on Research in Daylighting

The lighting of the working plane itself has been given most of the attention of investigators, and the basic studies, such as the early work of Koenig and the more recent work of Lythgoe, Weston and Luckish are well known. For the moment, therefore, the discussion will be confined to visual effects which are equally as important to good lighting, but which have received comparatively little attention.

The visual mechanism has been and is being studied in considerable detail, but as the experimental findings mount up, our conception of the mechanism is not clarified; —rather the reverse. Fortunately certain well-defined characteristics can be understood in the light of existing knowledge with sufficient clarity to determine the factors that govern good lighting. One of the most important which the lighting designer has to consider is the desire to divert the eyes towards light. We can call this, on the botanical analogy "phototropism," meaning the arrangement or orientation of the human observer towards the light. Phototropism is a reflex action. It follows that any lighting installation which is planned like American "Brightness Engineering" to render all parts of the field of view of uniform brightness will fail to make use of the phototropic mechanism. If it is desired to maintain attention on a particular area in the field of view—for example the workroom—it follows that the visual process itself will assist in maintaining attention if the work is the brightest part of the field of view.

There are other reasons why the brightest part of the field of view should be the working area. Investigations such as those of Koenig and Lythgoe have shown that visual perception of fine detail is at its best when the visual task is a little brighter than the surroundings. But when a conflict appears; the maximum phototropic effect arises when the visual task is very bright and the surroundings are very dark, while the maximum visual acuity arises when the surroundings are only a little less bright than the task.

Another factor is ease of seeing and the sensation of comfort. The conditions for maximum phototropic effect are not comfortable. The eyes desire a rest, but are under continual constraint to turn themselves back to the task. On the other hand the conditions for maximum acuity are again not comfortable. The eyes have no "resting place" in the uniform field of view. The ideal situation from the standpoint of comfort is a compromise, in which the visual task is the brightest object in the field of view, and the surroundings are well-lighted but to a somewhat lower level. The precise ratio of the brightness of task to that of its surroundings depends on the relative importance of visual comfort, visual acuity, and constant attention to the work.

In practice the brightest objects in the field of view have often of necessity to be the sources of light—the windows or the lighting units. The eyes will naturally gravitate towards them unless they are well removed from the direction of the visual task, but it must be accepted that this is not always possible, and indeed not always desirable. The provision of a "view window" as a visual resting place is good technique, provided full use is made of acceptable methods such as "contrast grading," for reducing any sensation of glare discomfort which might otherwise result.

In determining the optimum brightness of the objects of attention, the designer can call on a sufficient body of experimentation to supply the essential needs. The experimentation is based partly on direct experience and partly on an analysis of the factors which go to make up the visual task. These have been reduced to two by Benttell and Weston, the apparent size of the critical detail of the task, and the contrast between the detail and its background. It is thus possible to draw up a simple table relating these factors to the amount of light (illumination) necessary for the work.

A task involving fine detail on backgrounds of high reflection factor demands a very high illumination level which results in a very high brightness to the visual task. It will follow from what has been said earlier that for optimum visual acuity the surroundings to the task should also be bright. Similarly, a very high illumination on a task of high reflection factor may actually constitute a glare source if the background (*i.e.*, the general surroundings) are not bright. On the other hand, the concentrating effect of the bright task in dark surroundings—phototropism—has been noted. The table illustrates these points.

—	Background	Visual acuity	Visual comfort	Phototropic effect
Task bright	Dark	Not good	Severe discomfort	Optimum
	Medium	Approaching optimum	Optimum	Reduced
	Bright	Optimum	Reduced	Absent

The phototropic effect and the requirements of high visual acuity are thus in opposition to some extent. However, in the same way that "contrast grading" can alleviate discomfort from a glare source, contrast grading can assist the compromise inherent in the relation between the brightness of the visual task and its background.

The experiments on which this suggestion is based are complete as far as they go, but for rigid statistical confirmation much more remains to be done. The evidence so far obtained indicates that, if the immediate surroundings to the visual task (*e.g.*, the writing table, or the surround to the television screen) are sufficiently large in relation to the size of the task itself, and are of a brightness intermediate between that of the task and that of the general surroundings, a better compromise between visual acuity, visual comfort and the phototropic effect can be produced.

Here we must consider the influence of the brightness of the surroundings and of the task on one another. The eye tends to adapt to the average brightness of the field of view, and in doing so determines its sensitivity to any particular brightness in the field of view. The practical effect of this is that contrasts of superimposed areas are enhanced. If the surroundings to the visual task are brighter than the task, the eye, tending to adapt to the brightness of the surroundings, will see the task as a much darker area than a physical measurement of the task brightness would suggest. Conversely, if the surroundings are darker than the task, this will appear, by virtue of the enhanced contrast, brighter than a physical measurement of the task brightness would suggest. The influence of the surrounding brightness on the task brightness is of major importance, and detailed studies have been made which permit the effect to be appraised quantitatively.

Finally, we must consider the appraisal of the brightness of the whole field of view. If this is of uniform brightness, there is great difficulty in assessing how bright it is. The eye needs contrasts in order to assess absolute values of brightness. In judging whether the scene is bright, dull, or gloomy, the eye makes certain comparisons which are not yet clearly understood. Bright pin points of light undoubtedly give an impression of high general brightness of the whole scene, as display lighting specialists well know. Direct experiments at BRS have shown that a room lighted to a certain level of brightness with low contrasts is judged duller (*i.e.*, less bright) than a room lighted to the same level of brightness but with small brilliant sources of light in the field of view. Such sources need not cause discomfort if they are restricted in candlepower, and if they are provided with "contrast-grading" surrounds. The proper provision of "sparkle" in a room can make a real contribution to the impression that it is well lighted.

We therefore arrive at the following principles. (*a*) By good lighting we mean the most effective compromise between lighting that yields maximum visual performance, visual acuity, comfort, attention to the work, and general overall brilliance. This compromise must be related to the purpose of the lighting and the character of the building. (*b*) In arriving at the right compromise we have to consider the following points:— (i) For maximum acuity the work should be the brightest part of the field of view and the surroundings should be only a little less bright; acuity is greater the brighter the task, up to maximum daylight levels experienced outdoors. (ii) For maximum comfort the work should be the brightest part of the field and view and the immediate surroundings should grade off into the general surroundings of lower brightness. There is a limit to the maximum task brightness for visual comfort, which may be of the order of 500 ft. lamberts. (iii) For maximum concentration the centre of interest should be very bright, colourful and contrasting and the surroundings should be dark. (iv) For maximum overall brilliance there should be brilliant sources of light suitably placed in the field of view. These sources should be of low intensity (but high brightness) to avoid glare discomfort. Otherwise they should be graded into the background. (*c*) In general, where, as in work places, brilliance is not an essential feature of lighting, drabness should nevertheless be avoided. It is often a great advantage to have sparkle on the centre of interest, for example, on machines. This need for sparkle does not depend on the result of formal experimentation but there is a great deal of circumstantial evidence for it and there is a persistent tradition throughout history. Totally indirect lighting of flat surfaces tends to be soporific. Interest is aroused by variety in the brightness pattern. For this reason there is also an advantage in a view of the lighting fittings and of the windows and again for these to be of non-uniform brightness. Glare discomfort can be avoided by the use of contrast grading in the design.

Desire.	Work.	Surround.
Major acuity ..	Very bright ..	Almost as bright.
Maximum attention	Very bright ..	Dark.
Maximum comfort	Less bright ..	Graded into lower brightness.
Maximum brilliance	Bright and varied	Brilliant and varied, points of light brightness.

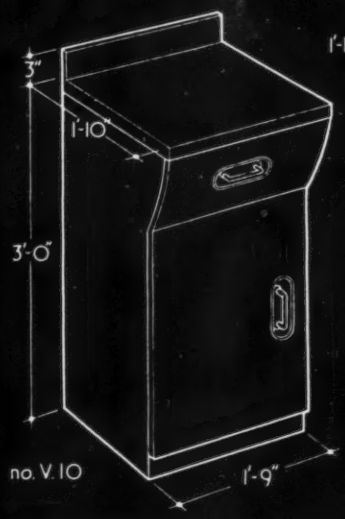
The above table was also shown during the reading of the paper.

These are principles, not design rules. It is possible that they could be constrained to fit into a series of design rules, but at the moment we do not feel that this is the basis of a good technology. Some assistance on the technological side may eventually be necessary.

SPECIALISED FITTINGS | KITCHEN UNITS

43.E15

The Architects' Journal Library of Information Sheets 303. Editor: Cotterell Butler, A.R.I.B.A.



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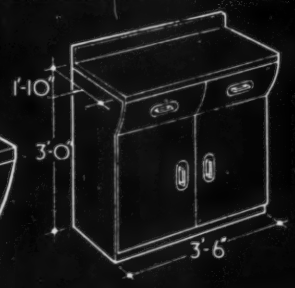

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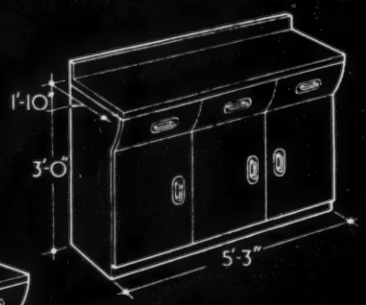

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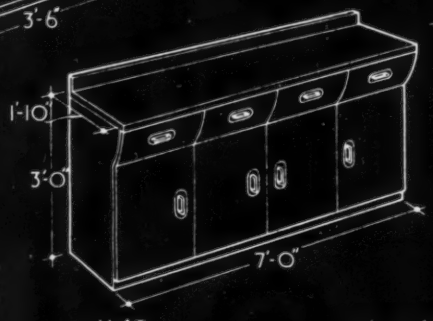
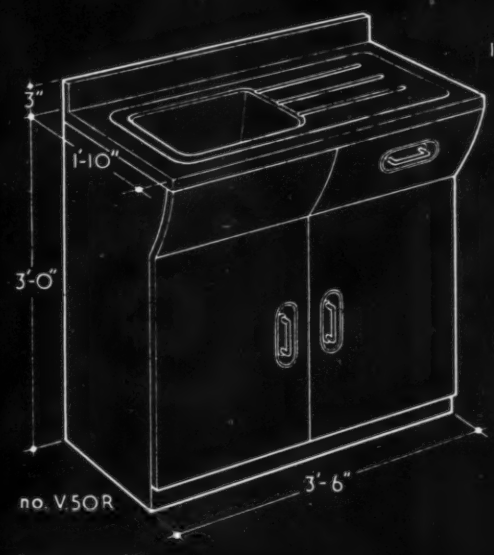


no. V.40

FLOOR CABINETS.

each cupboard is fitted with 1 shelf



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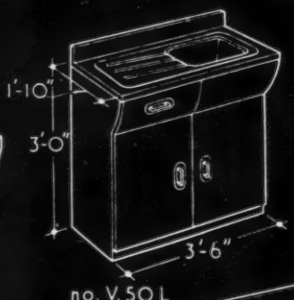

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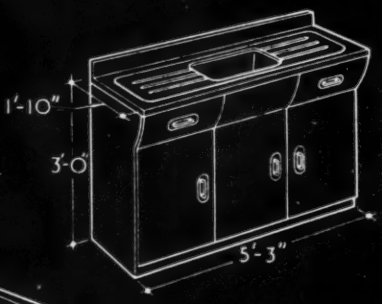

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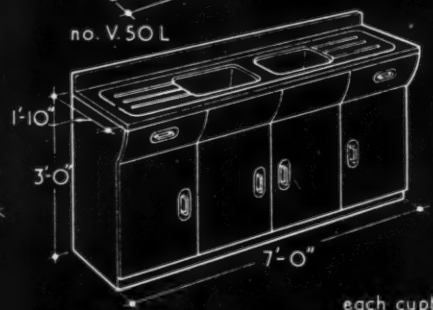
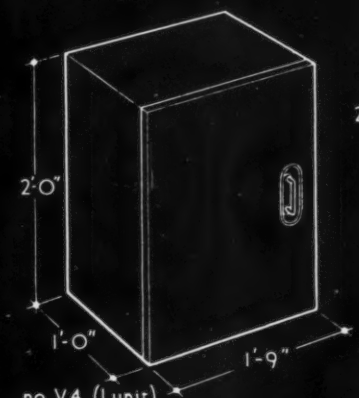


no. V. 70

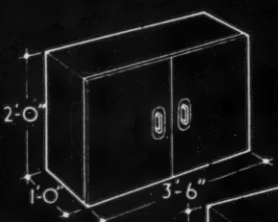
size of sinks : 1'-8" x 1'-3½" x 8" deep

each cupboard is fitted with 1 shelf except those under sinks

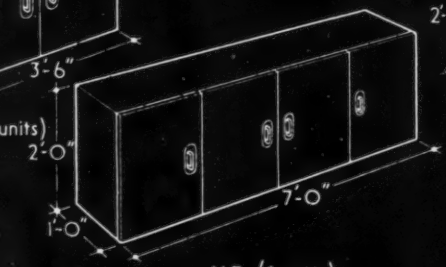
SINK UNITS.



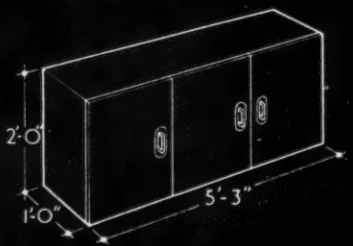
no. V.4 (1 unit)



no. V.5 (2 units)



no. V.7 (4 units)



no. V.6 (3 units)

each unit is fitted with 2 shelves

WALL CUPBOARDS.

43.E15 'ENGLISH ROSE' FLOOR CABINETS, SINK UNITS AND WALL CUPBOARDS

This Sheet, the first of two describing the English Rose range of kitchen equipment, deals with floor cabinets, sink units and wall cupboards. The English Rose gas and electric cookers, ventilating assembly, domestic boiler and refrigerator, which are designed to match the above, are described on Sheet 43.E16.

Construction Generally

The cabinets and wall cupboards are constructed of pressed aluminium. The drawer runners consist of double sets of plastic rollers running in aluminium channels. Both door and drawer fronts are packed with sound-deadening material.

Floor Cabinets

These are available in four sizes as shown. The tops are constructed from a single sheet of stainless steel in each case. The kicking strips are also of stainless steel.

Sink Units

These are available in four sizes as shown. The sinks, drainers and kicking strips are of stainless steel.

Wall Cupboards

These are available in four sizes as shown.

Fixing : The cupboards are plugged and screwed to walls through holes provided in the backplates.

Fittings

Handles : The handles are recessed and are of plastic fitted to polished stainless steel insets.

Hinges : These are concealed when the door is closed.

Catches : All doors are fitted with spring-loaded ball catches.

Finish

All aluminium components are Pyluminised and stove-enamelled cream, pastel green or white.

Compiled from information supplied by :

C.S.A. Industries Ltd.
Address : Warwick, England.
Telephone : Warwick 500.
Telegrams : Conscrew, Warwick.

LIME MORTAR | EXTERNAL RENDERING

The Architects' Journal Library of Information Sheets 304. Editor: Cotterell Butler, A.R.I.B.A.

Fine scraped texture

Medium scraped texture

Coarse scraped texture

Colorcast : sprayed by hand-machine

'STONITE' WALL FINISHING MATERIALS : GRADES

7.C1 'STONITE' WALL FINISHING MATERIALS : GENERAL DATA

This Sheet, one of a group describing Stonite wall finishing materials, gives full-sized photographs of standard Stonite finishes. Examples of special finishes and textures are given in subsequent Sheets in this group.

General

Stonite materials are all primarily lime mortars. The trowelled surface requires the removal of the surface by scraping as an essential part of the Stonite technique. To ensure correct grading, the manufacturer has laid down a complete crushing, drying and grading plant so that no variations are possible. The raw material is the dense limestone deposit from which the lime itself is burnt. An aggregate or manufactured sand of this type appears to work particularly well with a lime mortar and has the advantage that it weathers like natural stone.

Stonite renderings can be applied to almost any surface having sufficient key. The ideal is a porous brick. Wholly impervious materials such as dense concrete and blue brick will require different treatment before undercoating. The only surfaces which cannot be rendered with confidence are those bricks containing soluble salts, mainly calcium sulphate, which will cause efflorescence and, in some cases, when they crystallise out, may disrupt the rendering. Surfaces which are friable or very soft are also unsuitable since the surface of the structure itself may break away. The commonest examples of these are under-fired bricks and the clunch used in Eastern counties. Surfaces which are covered with organic matter (e.g., moss or lichen) or soot must be carefully cleaned down.

Scraped Finishes

The coverage varies from 50 to 80 sq. yd. per ton according to the texture.

The undercoat should be left rough from the straight edge of the wooden float and slightly marked with waving lines.

Granulator : The best tool for scraping large areas is the granulator, a special tool developed and supplied by the manufacturers of Stonite for the purpose.

Hacksaw blade : This is often used, the coarse hacksaw blade being inserted in a wooden block.

Expanded metal : Fine mesh expanded metal (16 gauge or thicker), tacked to a wooden float, makes a good scraper but must be kept clean.

Colorcast Finish

The coverage of this finish is approximately 200 sq. yd. per ton.

The undercoat should be left rough from the straight edge of the wooden float.

The Colorcast material is applied with a spattering machine and the resulting finish has an even and open texture. No great skill is required by the operator and the process minimises the risk of joint marks between different stages of the work.

Tests

Summary of B.R.S. Reports dated 28/9/43 and 16/6/44. Ref. B.R.S. 36/467/9.

A mixed material, stated to contain a cement binder, hydrated lime, crushed limestone aggregate, water-repellent material and pigment, has been tested for the manufacturers, The Callow Rock Lime Co., Ltd., for its suitability for external rendering on brickwork. The material has a satisfactory type of composition for use as an external rendering. For the purpose of the tests and observations of its behaviour the material was applied on brickwork panels made of four different types of bricks and on a paper-backed steel mesh. It is reasonably easy to apply though rather " short " in character as compared with a cement-lime-sand mix made with a medium building sand : plasterers may need a little experience in its application if they are accustomed to a softer mix. It is easy to finish with a scraped texture and has a uniform and satisfactory appearance when so finished.

After a period of six months the adhesion remained good on all four types of brickwork and there was only a very small amount of fine hair cracking : this was only visible on close inspection and is less frequent than on a cement-lime-medium grading sand rendering applied under similar conditions.

The general appearance of the exposed panels on brickwork has not materially changed in colour or texture during eighteen months' exposure. The small amount of fine cracking has not appreciably increased and there is only one hollow area of a few inches square on the panel of the fletton type bricks. This compares with an appreciably larger amount of cracking and of hollow areas in the case of the 1 : 2 : 8 cement-lime-sand mix. Such fine cracks as are present are not easily seen. A water spray rain penetration test carried out seven days after the rendering was applied on the paper-backed metal lathing showed the resistance to penetration to lie between that of 1 : 3 and 1 : 4 Portland cement renderings. The rendering cannot be regarded as appreciably water-repellent under very adverse conditions, but the resistance to rain penetration in practice should be satisfactory and the low tendency for cracking and the rough texture with a scraped finish will be advantageous in this respect. The further test carried out at the age of one year gave results which were closely similar to those at the earlier age.

The tests showed that the rendering material behaves well and retains a satisfactory appearance at ages up to 18 months and there is no reason to expect any further change over a period of some years.

Samples

Samples of Stonite wall finishing materials, made up of the same material as subsequently supplied, are available on application to the manufacturers who are also prepared to apply sample areas on the site in their actual position and to advise on technical problems dealing with this subject generally.

Cost

The cost of rendering with Colorcast finish is not more than that of a rendering in Portland cement and sand (1 : 3) plain face, trowelled smooth with a finishing coat in white cement or two coats of cement paint.

B.R.S. Reports

Copies of the full reports may be seen or obtained on application to the manufacturer only.

Compiled from information supplied by :

Callow and Keppich Ltd.
Address : Shipham Gorge, Cheddar, Somerset.
Telephone : Cheddar 214.
Telegrams : Cheddar 214.

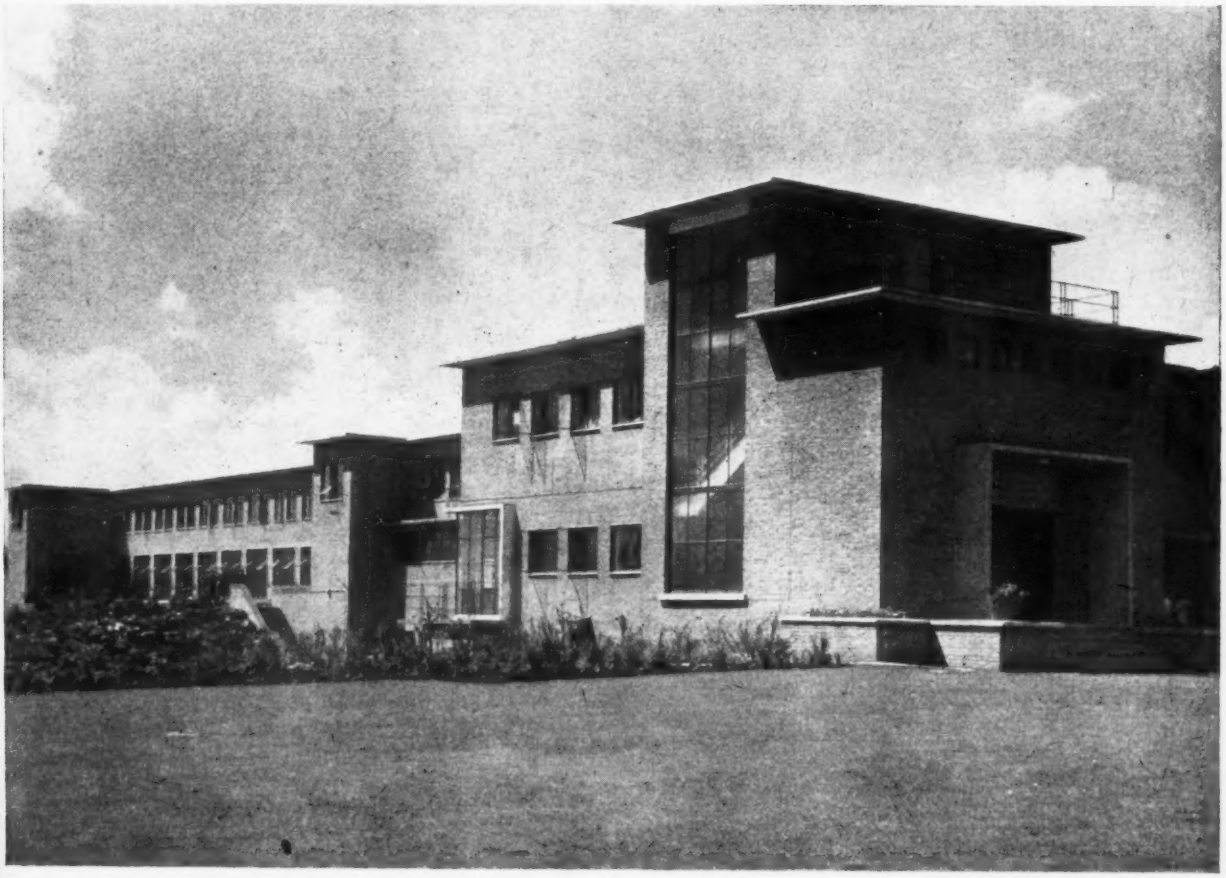
FACTORY

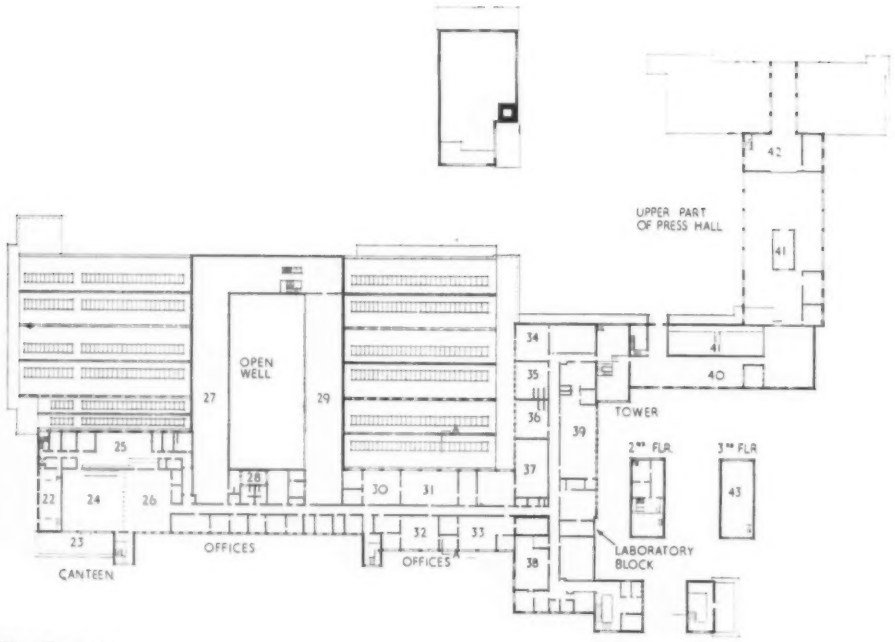
at COLEFORD, GLOUCESTERSHIRE

designed by GORDON PAYNE and PREECE

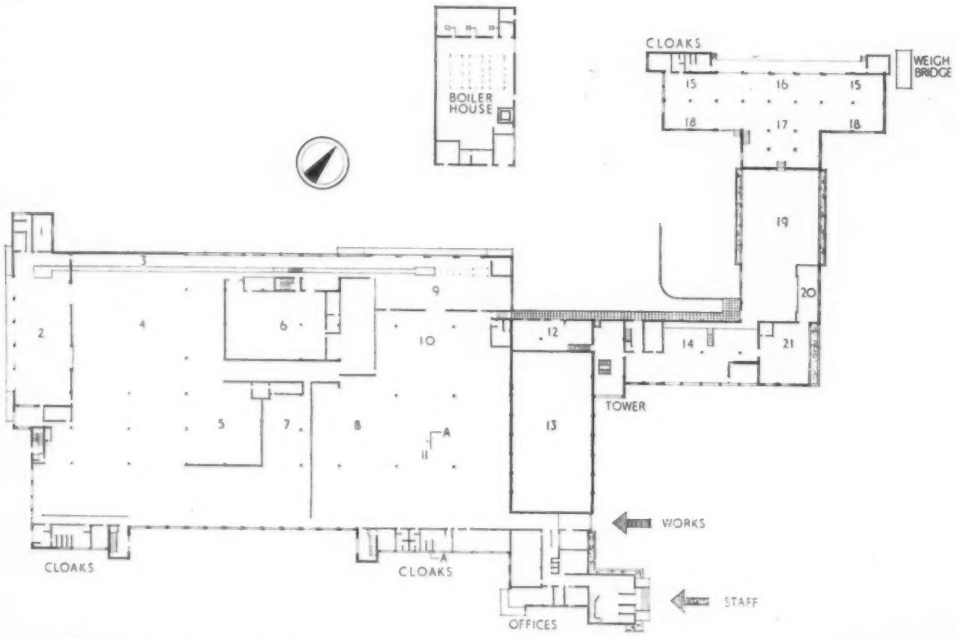
The factory for H. W. Carter & Co., Ltd., near Coleford in the Forest of Dean, is for the manufacture of fruit juices, squashes, cordials and concentrates and also for fruit canning. Vitamin products such as orange juice, blackcurrant syrup, etc., for the MOF are also produced, and a new product popular on the continent, fresh apple juice. The factory normally employs about 500 persons, with additional part-time female labour during peak periods. Considerable research and study of continental prototypes was made before construction was begun in April, 1946.

General view of main offices looking west.





First floor plan



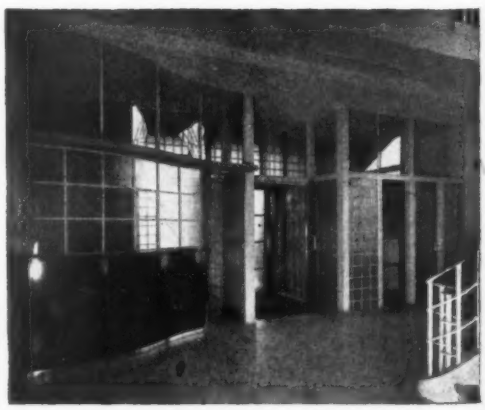
Ground floor plan [Scale : $\frac{1}{16}$" = 1' 0"]

KEY

1. Tea room.
2. Despatch dock.
3. Conveyor.
4. Storage for finished products.
5. Wrapping and cartoning.
6. Squash.
7. Filling and capping.
8. Bottle washing.
9. Unloading.
10. General storage.
11. Bottle storage.
12. Refrigeration.
13. Juice storage tanks room.
14. Mixing hall.
15. Empties.
16. Loading fruit.
17. Arrival.
18. Storage.
19. Press hall.
20. Pomace drier.
21. Centrifuge.
22. Stage.
23. Roof terrace.
24. Cafe.
25. Kitchen.
26. Restaurant.
27. Carton making and store.
28. Area.
29. Squash mixing.
30. Filing.
31. Typing pool.
32. Costs.
33. Accounts.
34. Citrus.
35. Ladie's cloaks.
36. Men's cloaks.
37. Labels.
38. Laboratory store.
39. General Laboratory.
40. Sugar store.
41. Open well.
42. Pomace storage.
43. Tank room.
44. Staff car park.

Basement plan

Bottom right, visitors' entrance hall with inquiry counter on the left and doors to interview rooms on the right.



FACTORY

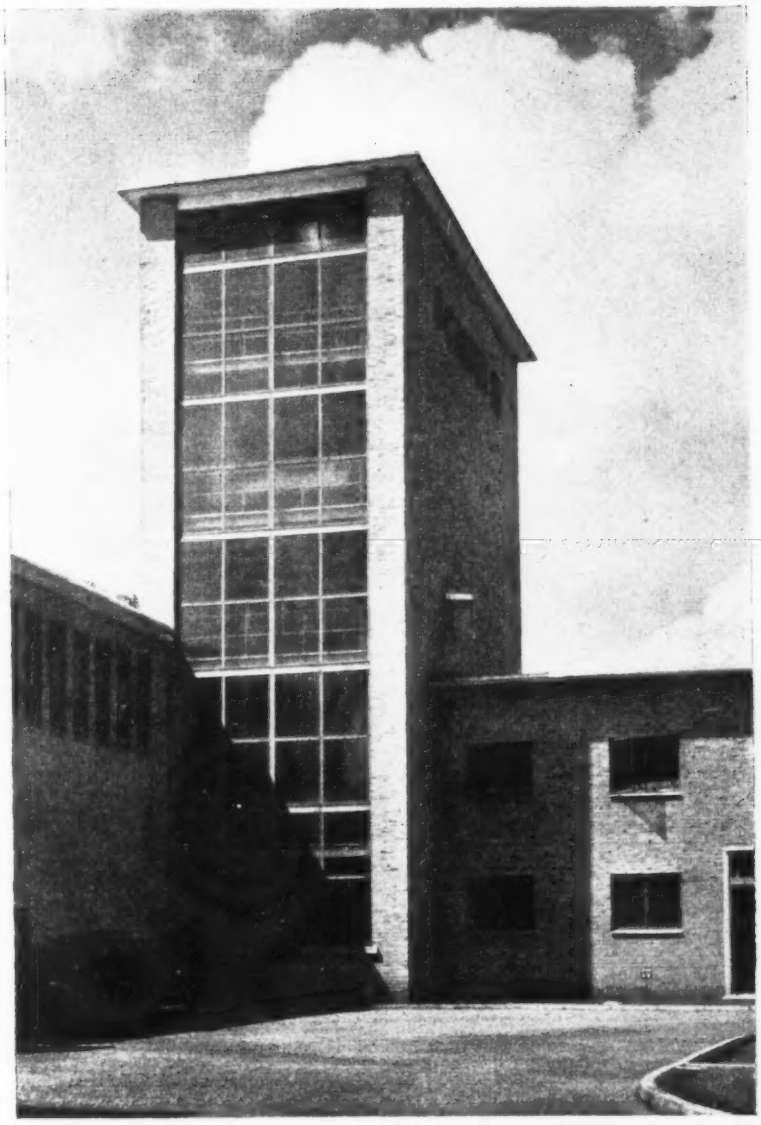
at COLEFORD, GLOUCESTERSHIRE

designed by GORDON PAYNE and PREECE

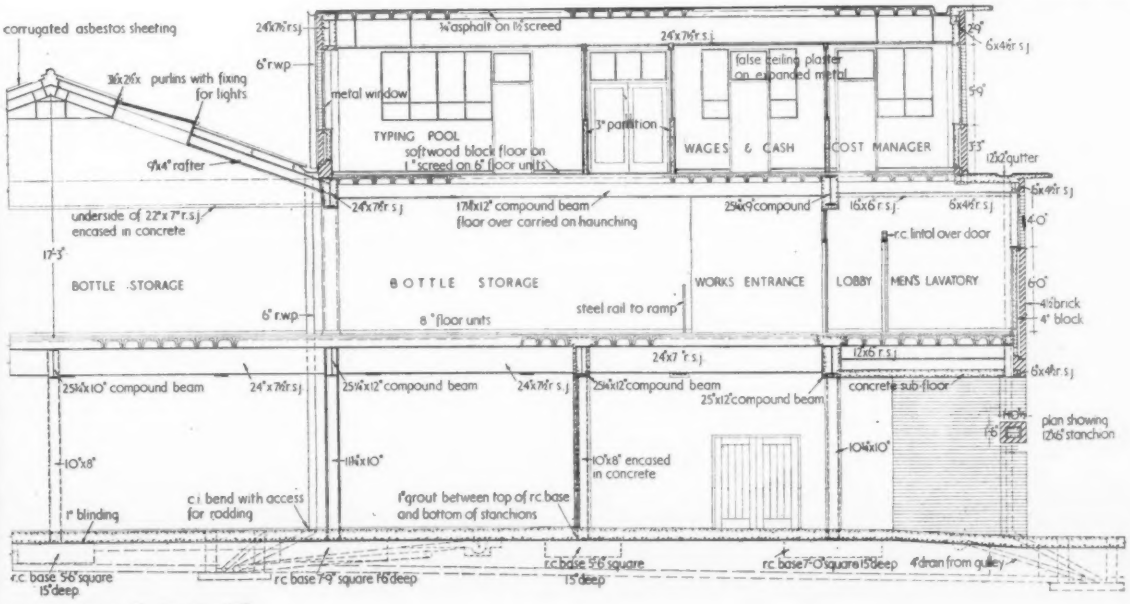
SITE.—The site, which is on top of an exposed hill, is visible for many miles around. A belt of conifers about 30 ft. wide has been planted along the south-west boundary of the site to act as a wind brake. An elaborate landscape scheme was prepared in conjunction with a horticultural consultant and over 750 trees have been planted. The area immediately round the factory, about 3 acres, consists of lawns, rockeries and rough grass planted with bulbs.

PLAN.—The plan is entirely guided by the factory processes. After the fruit has arrived, it is pulped to enable the enzyme to break down the plant cells and then pressed to extract the juice, which passes through glass pipes, is filtered, cooled and condensed and then stored in large glass tanks in the refrigeration room at 1 degree Centigrade. There is laboratory control at all stages and both routine and research laboratories are provided. The first part of the factory to be built also includes entrance halls for visitors and workers, first-aid rooms, assembly rooms, cloakrooms and lavatories. The second stage contains administrative offices, canteen and also squash manufacture and carton stores. The canteen is normally divided into two by roller shutters. One section for factory workers is self-service, the other section for staff has waitress service. When the shutters are raised into the false ceiling the room can be used for concerts, dances, etc.

CONSTRUCTION.—Most of the building is steel framed with continuous reinforced-concrete foundations owing to the risk of subsidence through old mine workings in the area. The walls are 11-in.



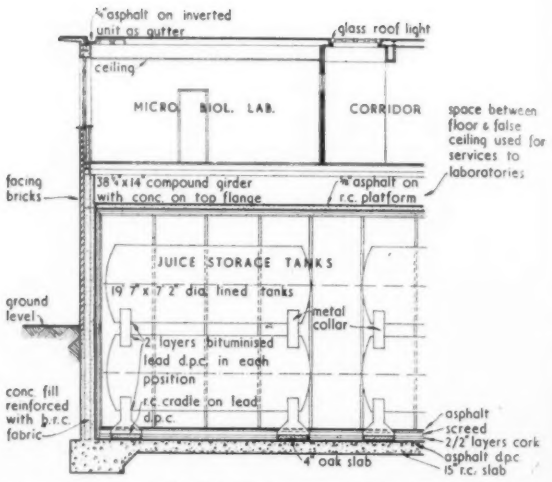
Above, the Kestner Tower, which houses the 60-ft. high plant for concentrating fruit juice.



Section A-A [Scale : ¼" = 1'0"]

cavity, the outer skin of brick and the inner skin of partition blocks. The floors and roof are of precast concrete. The factory portion of the second stage has welded frame steel trusses with a 40-ft. span.

FINISHES.—Buff coloured sand-faced hand-made 2½-in. bricks are used externally with a recessed horizontal joint and mortar of a similar shade to the bricks. The stone facings are of reconstructed stone of a pale straw colour, and the entrance doors are of bronze. The stage two factory section has patent roof glazing and is lined internally with



Part section through refrigeration room [Scale: ½" = 1' 0"]

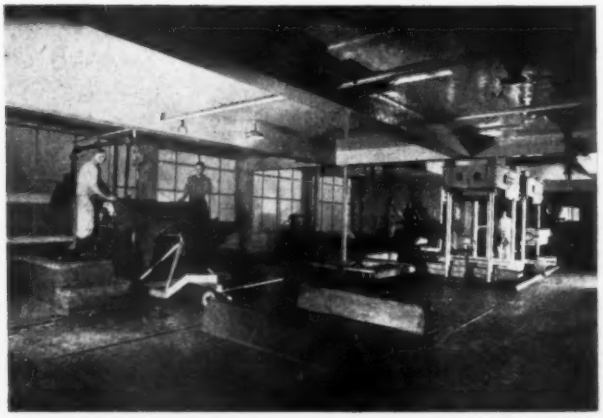
FACTORY

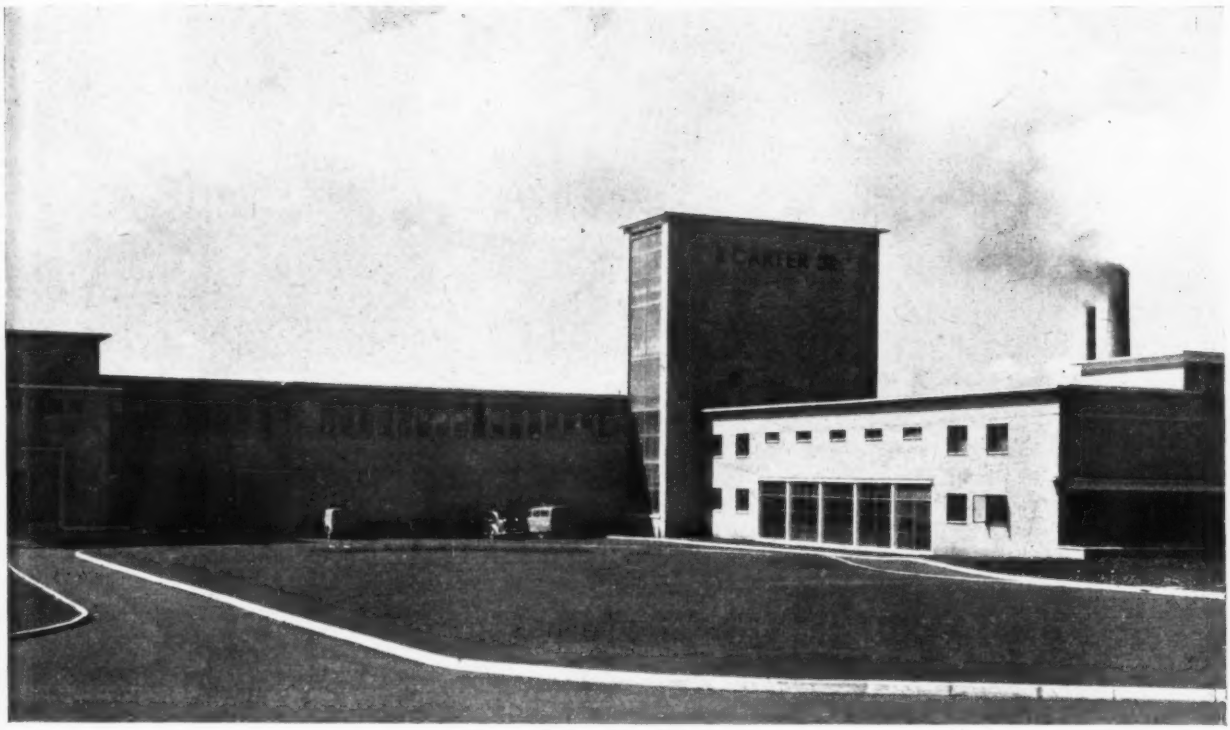
at COLEFORD, GLOUCESTERSHIRE
designed by GORDON PAYNE and PREECE

Below, the main entrance. Bottom left, staircase window on the right and balcony with french windows leading from a conference room on the left.

insulation board. The floor finishes vary according to the processes. In the fruit pressing section a very hard and dense acid-proof engineering brick is used. The acid-resisting cement originally used for jointing has not proved satisfactory and there has been considerable joint erosion. All the floors have now been pointed with a special material found by test to be resistant to concentrated fruit juices. In other departments acid-resisting asphalt is used. Flooring in the general factory area is of hardened grano; in the loading docks, metal-topped grano; in the offices and entrances, terrazzo, cork or wood blocks; in the lavatories and cloakrooms, vitreous tiles. The refrigeration room was constructed of reinforced concrete with asphalt tanking and insulated with a 4-in. thick cork lining throughout. Internally, all processing rooms have hard plaster walls. The factory areas are fair-faced brickwork; offices and the canteen are plastered. One of the main prob-

Below, the press hall, where the pulp is fed on to the platform, left, and later the juice is extracted in the presses on the right.





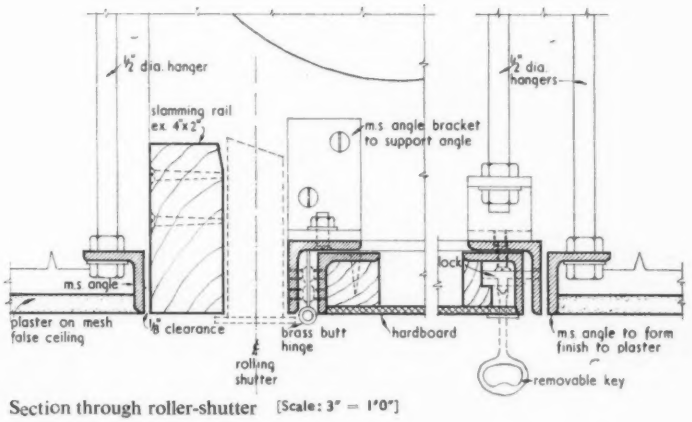
Above, view of the main entrance front. Below, the canteen, which can be divided into two by roller-shutters.

lems is to prevent the growth of mould spores which cause fermentation and spoil the process. In certain places where distemper was subjected to fruit-juice vapours, mould formed rapidly, feeding on the casein base of the distemper and so anti-fungus paints have had to be used.

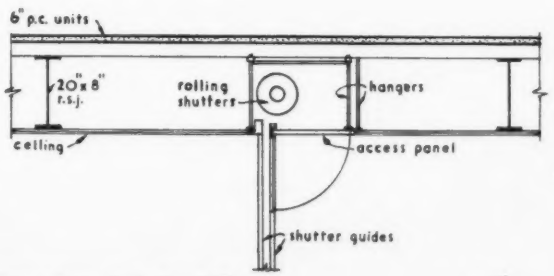
SERVICES.—In addition to the usual low-pressure hot water system and steam heating, there are special requirements, such as 300,000 gallons of water used daily. Water from a disused mine a mile away is pumped to the top of the tall tower. Normal local water supplies were inadequate. Offices are heated by low-pressure hot water radiators and the factory by steam unit heaters. Domestic hot water is from steam-heated calorifiers.

The contract price was £300,000. Approximately £2 3s. 0d. per sq. ft.

The general contractors were G. Percy Trentham Ltd. For list of sub-contractors see page 410.



Section through roller-shutter [Scale: 3" = 1'0"]



Key section [Scale: ¾" = 1'0"]

FLATS

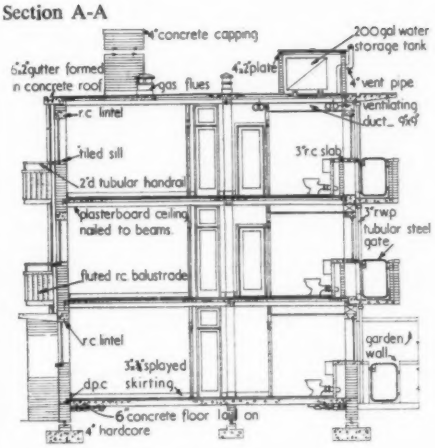
in KENTISH TOWN, LONDON, N.W.5
designed by HUGH ROBERTS and DAVIES

The St. Pancras Borough Council have acquired a number of sites in their borough where houses were demolished by enemy action. Four terrace houses, numbers 7-13, on the east side of Oakford Road, had been destroyed, and, after consultation with various authorities, it was decided to fill in the gap with a three storey block of flats in a contemporary style instead of attempting to repeat the design of the original houses.

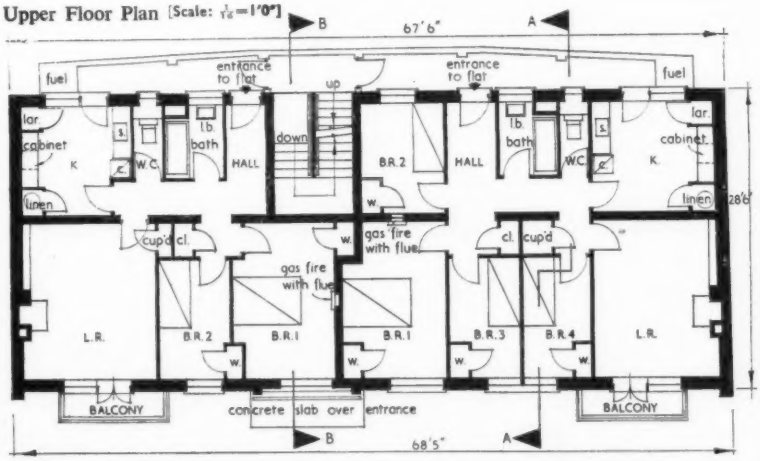
West facade facing Oakford Road.

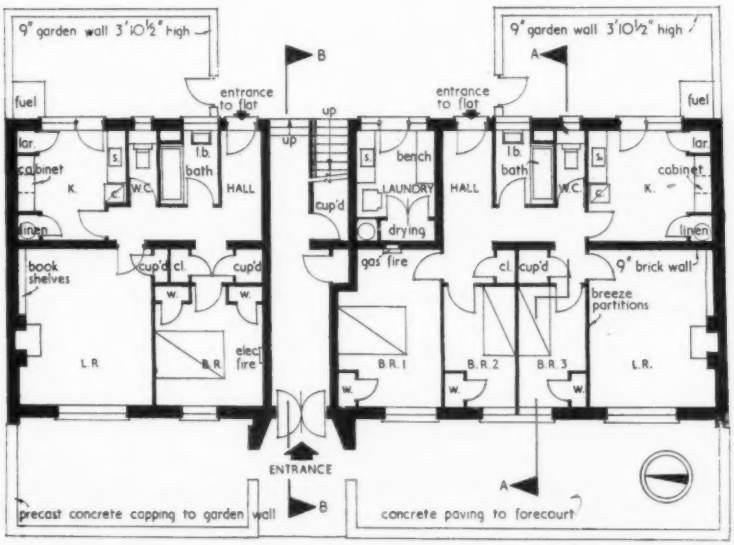
The rear facade looking south-west on to the garden and showing access balconies.

Section A-A



Upper Floor Plan [Scale: $\frac{1}{16}$ = 1'0"]





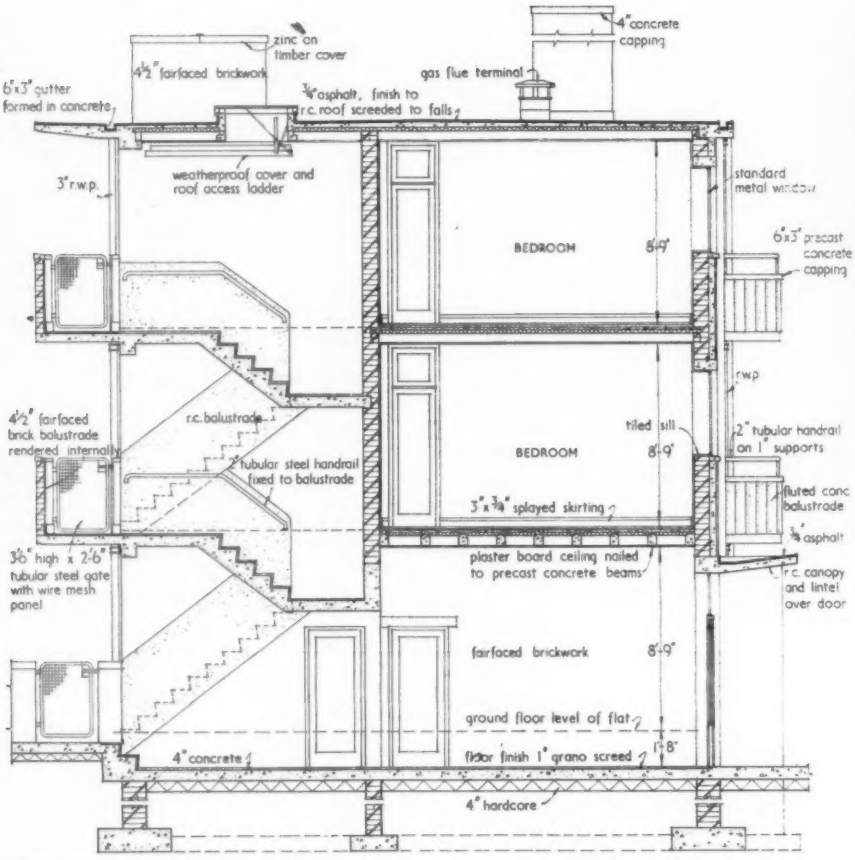
Ground floor plan

SITE.—The site has an east-west aspect, with all living rooms facing west. Existing plane trees have been retained to the rear of the block and a small garden has been laid out. Five flowering cherry trees have been planted on the west side.

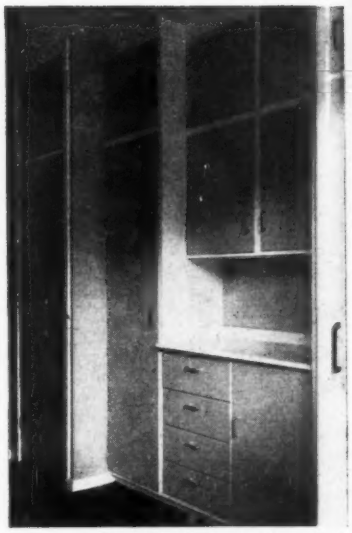
PLAN.—There is a centrally placed entrance hall and main staircase serving the six flats. This staircase gives access to main and service entrances to flats by means of balconies on the east side. There is a lock-up pram store and laundry.

CONSTRUCTION.—Walls are of load bearing 13½-in. cavity brickwork. Floors and roof are of a patent precast concrete construction.

FINISHES.—Walls are faced externally with sand-faced flettons. Balconies on the west side are faced with fluted concrete at the front and have reinforced brickwork at the rear. The windows over the main entrance are flanked by panels of blue tiles. Metal windows have been painted ivory, ironwork grey and doors to the flats are painted alternately opal green, blue and vermilion. Internally the brickwork surrounding the staircase has been left fair faced with flush jointing. Soffits, balustrades and ceilings are treated with stone paint. Walls of flats are distempered. The floor finish to the main entrance hall and staircase is granolithic, and elsewhere is in patent "asphaltic" tiles. Oil paint is used in kitchens and bathrooms.



Section B-B [Scale: ⅛"=1'0"]



Above, kitchen fittings in typical second floor flat. Below, west facade with main entrance from Oakford Road.

FLATS

in KENTISH TOWN, LONDON N.W.5
designed by HUGH ROBERTS and DAVIES

FITTINGS.—All main bedrooms have built-in wardrobes and kitchens are provided with built-in EJMA units. A wire mesh shelf is fitted beneath each sink for pots and pans. Gas or electric cookers and refrigerators can be fitted to the tenant's choice. The laundry is equipped with an electric washing machine, sink and drying cabinet.

SERVICES.—Domestic hot water is obtained from a lagged electric water heater in the linen cupboard of each flat. This heater is connected to a fireplace back boiler attached to the "Fulham" grate in each living room. The main bedroom in each flat has a gas fire, and each bedroom has an electric power point. All service and soil pipes are carried internally in ducts which have removable panels.

The general contractors were Harry Neal Ltd. For list of sub-contractors see page 410.

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TECHNICAL SECTION

The following paper was given by Dr. Bronowski at the United Nations (ECE) Conference on Building Research, held in Geneva last December. It is reprinted, by permission, from the conference report. The work which Dr. Bronowski describes is now being continued by the Operations Research Unit of BRS.

OPERATIONAL AND STATISTICAL RESEARCH IN BUILDING

By J. Bronowski

Every country and every industry makes returns which are officially called statistics. These returns usually consist of totals and averages—the total of exports, the average rise in prices, and so on. They form an interesting historical record of past events, from which present trends may vaguely be guessed; and they form little more. This paper does not recommend an increase in statistics of this kind.

This paper is concerned with modern methods of mathematical statistics, in their application to buildng research. The essence of these methods is, that in them the function of statistics is not to enshrine the past, but to forecast the future. The raw material of every science is, what has already happended; and the aim of every science is, from this material to conclude what will happen next time. Modern statistics, as it is discussed in this paper, is the technique for doing this outside the laboratory, in the field of practice.

RESEARCH ON THE SITE

Mathematical statistics is not itself an experimental method. It is a method of planning experiments and of interpreting their results; and it can be used for this purpose in the laboratory. But overwhelmingly its most important use is this, that it breaks down the walls round the laboratory, and turns the whole of industry into a field for research. Modern statistics is not an experimental method, but it enormously enlarges our concept of what is an experiment. It takes research into the everyday operations of an industry in its ordinary functioning.

This is plainly of the greatest importance in the building industry. In no other industry is there so large a gap between what can be thought out in the tidy research station and what happens to the thought in the rough and tumble of the building site. Moreover, conditions and skill and practice vary beyond belief from site to site and from one operation to another. The crux of practical building research is that it shall be done on the site in actual operations, and that it shall be done over the whole varied range of site conditions. On both counts the place of statistical methods in building research is outstanding.

THE STUDY OF VARIATION

Let me underline this at once with a practical example. For five years now, enthusiasts have been pressing new inventions on the building industry which range all the way from the electric screw-driver to the packaged house. Many of these are admirable; but few of the inventors, or, for that matter, of those who administer building programmes, have stopped to ask whether building is in fact backward because its operations are badly designed, or whether they are merely badly carried out. Which would raise output more: to step up the mechanization of the best firms, or to teach the worst firms how to organize the traditional operations more efficiently? This is typically a statistician's question; the answer will be different in different countries; but in no country is the answer known because in no country have building operations had the statistical study which must go to frame an answer. The team with which I worked took a first step towards an answer in England and Wales, by studying the differences in output from one firm to another in a representative sample. This survey showed us how large a reservoir of potential output lies untapped in the weaker firms. For example, it showed us that if we could raise the output on the worst 25 per cent. of sites to the national average, this alone would add nearly 10 per cent. to the national total of houses built each year.

This study of the variation in performance from one site to another is among the simplest pieces of statistical research, but it already reaches far deeper than the familiar official statistics which do not look beyond totals and averages. It is in fact the essence of the statistical method that it studies the *variation* of an operation, an output or a price. In mathematical statistics we take it for granted that the results obtained from any industrial process always have some inherent variability. Some of this variation can be traced back to specific causes—a strike or a hard frost or the effect of the season or of a new bonus scheme. These are the systematic effects which all scientific research seeks to isolate. And some of the variation cannot be assigned to any certain cause; it arises from a mixture of human factors, local customs and conditions, and a mass of minor influences unforeseen and unrecorded, which fuse together to give each site a character slightly but unmistakably different from another. This residual variation can be removed from building experiments only by shifting them bodily into the laboratory; and to do so is to destroy them. The power of the statistical method is that it does not seek to remove this residual variation. Instead, the statistical method accepts these random fluctuations as a necessary constituent in all field work. More than this, mathematical statistics turns them to advantage by taking just these random fluctuations as its yardstick, by which it measures whether other observed factors are indeed real or are themselves chance factors.

EXAMPLE: NON-TRADITIONAL HOUSES

An example will again be helpful. Our team studied the building, on sites of at least 50 houses each, of nine new types of houses made from other materials than brick; and for comparison it also studied the building of traditional brick houses on four separate sites. In each case, the process of building was studied operation by operation, in convenient categories—the laying of the foundations, the construction of the ground floor, the building of the external walls and so on to the roof and the finishings. This gave us nine main divisions of the house, for each of which we had the man-hours spent in each type of house—not the average man-hours alone, but the variation round that average for the same type of house on the same site. With this information we had to answer the following questions:—

(*a*) In which operations did these houses differ in man-hours from one another and from traditional houses, and in which operations were they not significantly different?

(*b*) How far were the results found for one type of house biased by conditions on the site on which it happened to be built?

(*c*) Which, therefore, were the houses which certainly saved labour and which were certainly wasteful in labour?

(*d*) And, finally, summarizing all this, what was the forecast of site-man-hours for any one type of house or for a house combining features from several types, taking into account the full range of variation found in performance and in site conditions.

To answer these questions, we had to separate the variations found into their constituent parts: those resulting from differences in design, those resulting from differences in type of house, those resulting from differences in site conditions, and the residual variation which could not be ascribed to any known factor. These contributions to the total variation were not estimated from building practice, which is a wholly useless guide in calculations of this kind; they were calculated from the data themselves. And whether the differences found were real or not was judged entirely by the numerical criterion of comparing them with the residual chance variation, and using the latter as the yardstick of what is within the bounds of chance and what is certainly significantly beyond it. Finally, our predictions had to take account of a factor of improvement which we found on every site, once the site settles down to its routine and pace.

The mathematical devices for doing all this are well known to professional statisticians. But this paper is not concerned with these, and it is not addressed to statisticians. We want here to look at the meaning and the power of the statistical approach in building research. This is diametrically opposed to the laboratory approach which seeks to eliminate variation, to keep everything constant and change the variables one at a time. By contrast, in the example just quoted the sites were actual working sites; the observations were effectively those usually made by the time-keeper; and nature presented us with a host of variables known and unknown over which we had no control, but from which we had to determine statistically those which mattered and those which did not. Equally, we had to make our predictions for just such working sites up and down the country. The record shows that we were successful. We were able to show that at least four types of house improved greatly on the man-hours of the traditional house; we were able to show in what part of the house the improvement lay, and suggest how it could be extended to the rest of the houses; and we made forecasts for future building times in other parts of the country which have since proved accurate. By way of illustration, I give one table of such forecasts (Table I, page 404).

Before leaving this example it should be underlined once again that the sites studied were all ordinary building sites, on which houses were being built in each case as part of the local building programme and not for experimental purposes. Our teams were simply given facilities to observe work in progress in the ordinary way. We did not initiate the work and we did not pay for it; indeed, the only money we spent on this important study of building times and methods was the cost of the modest salaries of our observers and statisticians.

VARIATION AND FORECASTING

In summary, then, the power of the statistical method is this. It is able to isolate simultaneously a number of factors each of which has its own influence on output, cost, or whatever is the subject of our study, when these factors cannot be varied separately and at will as they would be in a laboratory. Moreover, it is able to isolate them and to assess the influence of each, even when they interact in such a way that the effect of two factors in combination is not the same as the sum of their separate effects. For example, to introduce machines on a building site is also necessarily to change the site organization; and in studying a number of sites with and without machines we must take account of the combination of the two factors, mechanization and organization. This is an important point, but statistics can deal with it.

Further, the power of statistics is that it is a method of forecasting. Every research worker and every practical builder looks at a set of past results and from them tries to guess the trend which the future will take. Even the simplest comparison between two methods of building a wall is a forecast, for no interest attaches to comparing the two methods in the past unless we also know that they will work out in much the same relation in future. Modern statistics then is a way of making such comparisons and such forecasts under the practical conditions of actual site work. It does this by analysing the variations in past performances and finding in them a basis by which we can judge whether an apparent difference or an apparent trend is real, which means whether it can be confidently expected to go on into the future.

There is a small but striking application of this which should be remarked. Among the forecasts which statistics can make is this: Is a given line of research to yield any results at all? From time to time, every research station is asked to compare, let us say the safety of one form of scaffolding with another. The obvious way is to put each on a number of sites and to wait for the accidents. But a small computation in the statistical office will usually show that results of real significance cannot be expected in this way in less than 100 years. This small example shows how useful it is to call in the statistician when the experiment is being designed. The team with which I worked recently designed an experiment of 400 houses, in which a rather large range of factors is to be studied simultaneously. I do not exaggerate when I say that, but for their ingenious design, at least 2,000 houses would have been required to cover all the factors, and it would not have been certain then that the results would be conclusive.

TABLE I.—*Productive Times on an Average Site (Man-hours per House).*

Scheme	Foundations	Ground floor (solid)	Sub-structure	Walls	First floor	Roof	Super-structure	Finishings	House totals (excluding ancillaries)
Type 9 ..	160±20	30±5	190±20	520±170	55±20	95±30	670±175	800±80	1,660±195
Type 7 ..				445±145			780±150		1,770±170
Type 3 ..				520±120			855±125		1,845±150
Type 4 ..				530±175			865±175		1,855±195
Type 2 ..				550±180	100±10	235±25	885±180		1,875±200
Type 8 ..				575±190			910±195		1 900±210
Traditional				815±135			1,150±140		2,140±160
Type 5 ..				840±280	140±45	250±85	1,230±295		2,220±305
Type 6 ..				995±325			1,330±325		2,320±335
Type 1 ..				1,080±355	100±10	235±25	1,415±355		2,405±365

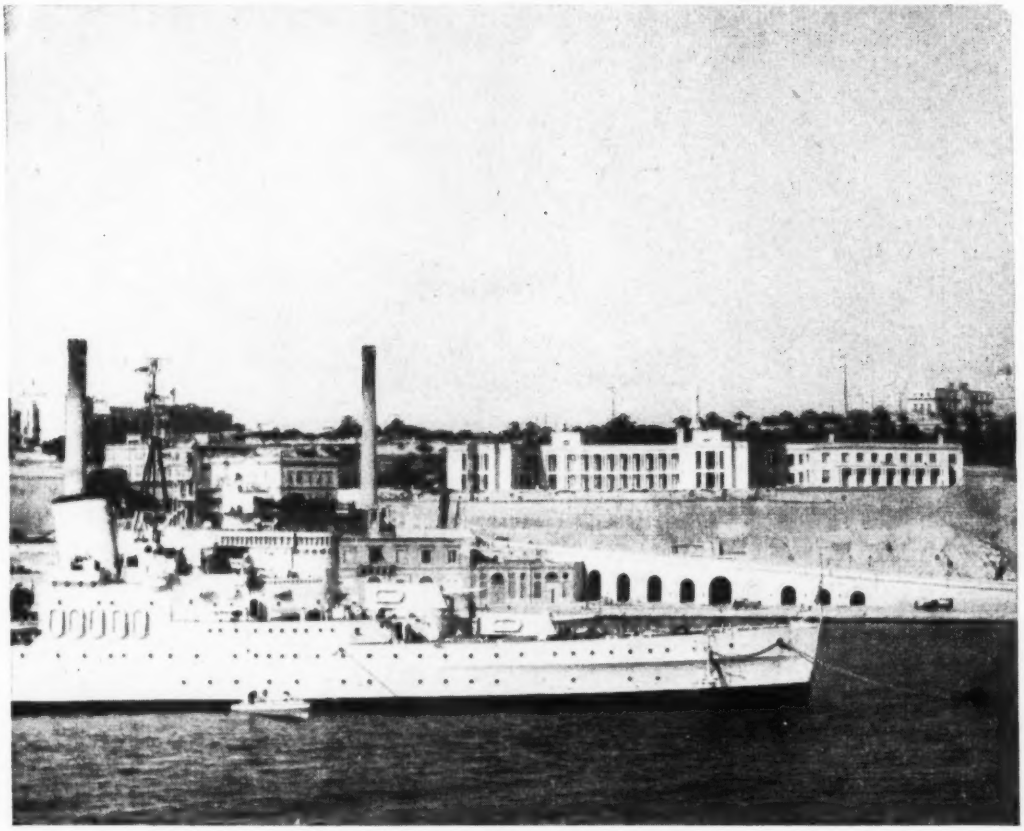
A figure $a \pm b$ means that we can confidently assert that the average time for this operation on any site will lie between $a + b$ and $a - b$ man-hours. Operations whose man-hours showed no statistical difference have been pooled.

LARGE PROBLEMS AND THE METHOD OF SAMPLING

When an experiment can be designed or when a site can be observed on which the houses contain features worthy of special study, the procedure is simple enough. We make sure that full records are kept, we hire a statistician, we discuss with him the trends and the factors which are likely to be of interest, and then we wait for his analysis. But what if we have no control over the records which someone must at last analyse? Statistics hinges on the study of variation, and variation can be calculated only if there exists a record of individual results. The work discussed hitherto is essentially small-scale work based on close timing and costing on individual sites. What application have such techniques to the large problems of industry, to productivity, to prices, to building materials and to controls? Does modern statistics have a part to play in raising the efficiency of the building industry

Below, a housing site at Stevenage. Note the confusion of building materials near the centre of the photograph

KING GEORGE V HOSPITAL, MALTA, G.C.



Architects: Adams, Holden & Pearson, FFF.R.I.B.A.

UNTIL 1939, the Admiralty were the chief users, in Malta, of 'PUDLO' Brand cement waterproofer and their high opinion of it is best signified by the fact that large consignments of this pioneer British cement waterproofer formed part of the cargoes in the convoys which fought their way through the Mediterranean. The whole of the dampcourses to this building were formed with sand and Portland cement made impervious by the simple addition of 'PUDLO' Brand waterproofer, and applied in accordance with the ordinary principles of good workmanship. The general contractors, Messrs. John Laing & Son Ltd., are amongst our oldest clients and it is also a good indication of their opinion of our product, that, in 1936, they chose it for the weatherproofing of the external walls of a very large block of offices and shops in the Euston Road, of which they were the owners as well as the builders.

'PUDLO'

BRAND

CEMENT WATERPROOFER

Used in Portland cement renderings and concrete to exclude or retain water

KERNER-GREENWOOD & COMPANY, LTD.

KING'S LYNN NORFOLK

Sole Proprietors and Manufacturers

The word 'PUDLO' is the Registered Trade Brand of Kerner-Greenwood & Co., Ltd., by whom all articles bearing that Brand are manufactured or guaranteed.

as a whole and in forecasting trends and movements, not on a few sites, but over a country or a continent?

In fact, it is here that statistical methods can be most helpful. When we are studying large collections such as all the houses of one kind built in a year, it is possible to find characteristics of the whole collection from an examination of samples chosen from it. The samples must be well chosen, and a good deal of recent statistical theory centres on the best choice of samples. A useful method is to arrange that the sample reproduces the main features of the whole collection in its geographical distribution, its distribution by size of firm and by number of houses on the sites, and that it preserves similarly the right proportion of contracts with and without bonus, with and without mechanization and so on. But we need not concern ourselves here with the details of sampling. The important point is that a small sample can be studied at first hand and, if it has been well chosen, can then give information about the complete collection. This is a method of the greatest power, and it ought to displace entirely the clumsy and uninformative method of taking a complete census of the industry at long intervals. For instance, several countries take a census of all building firms and all the work they have done once every year. The mere mechanics of such a census are frightening, and the results are never ready until it is almost time to take the next census. It would be far more efficient to split the census into twelve monthly samples, each forming a proper cross-section of the industry. These can be rapidly analysed, they give an up-to-date picture of trends in the industry, and their accuracy is excellent.

EXAMPLE: TRADITIONAL HOUSE BUILDING

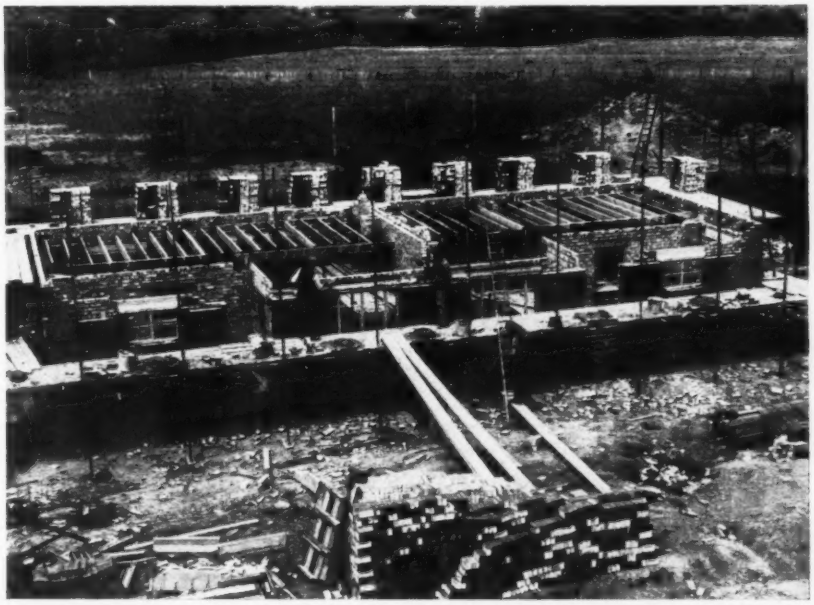
Again an example will make the point. In the two years 1947-8, there were built in England and Wales (excluding some northern regions) well over 100,000 houses of one type—the three-bedroomed brick house built for local authorities. We took a balanced sample of 3,000 of these houses, visited the 160 sites on which they stood, and extracted from the books of the builders the man-hours, the labour, material and total costs, the bonus payments and the money spent on machinery and supervision. In doing this, we met no hostility from builders; on the contrary, they were glad to have us fill in the forms instead of asking them to do it; and they all asked us to be sure and send them our results. These results, from our 3 per cent. sample, exceeded all expectation. We were able to give average man-hours and costs and their inherent variations; to find how they fell when bonus was paid; to isolate the trends both in labour and in material costs over the two years; and to show the effect of other variables, such as size of house and number of houses on a site. Table II is typical of a number of tables, which summarize some of our findings in a form which the builder can use for himself to assess how his results compare with the national average.

We put this Table in a form in which the builder could use it directly. But more than this, we made it part of our work on the sites to show the builder how much helpful information lay hidden in his own records, and how much more he had missed by not keeping better records himself. Everyone who has worked with small builders knows how ill-kept and muddled are their records, if indeed they try to keep records. Such points may seem minor incidents in the inefficiency of the building industry, but in sum they add gravely to its burden, and they are one reason why for thirty years now the list of bankruptcies in Great Britain has been headed, year by year, by builders, decorators, plumbers, and glaziers. By showing the small builder how to keep simple records, to progress his work and to make comparisons between one job and

TABLE II.—*Average Labour Content per House for Different Mid-Dates of Building, Incentive Payments and Sizes of Contract.*

	Man-hours	Labour costs
		£
Average: Labour content per house on a site of 20 houses, mid-date of building April, 1948, with incentive payment of £15 per house	3,080	390
Range of variation: 50 per cent. of contracts have labour content per house lying between (25 per cent. of contracts lie above this range, and 25 per cent. below)	2,630-3,530	330-450
For sites with mid-date of building later than April, 1948, for each period of 3 months, *subtract* (for sites earlier than April, 1948, *add*)	75	2.5
For sites where the incentive payment exceeds £15 per house, for each additional amount of £5, *subtract* (where the incentive payment is less than £15, *add*)..	60	2
For sites of more than 20 houses, for each additional 10 houses, *subtract* (for sites of less than 20 houses, *add*)	75	10
For houses of area *greater* than 935 ft. super (excluding outhouses) for each additional 10 ft. super *add* (for area *less* than 935 ft. super *subtract*).....	20	2.5

Experimental housing site at Northolt. Dudley rural houses being erected by MOW mobile labour force and observed for time and motion study. Site progress by 16th day (April 12, 1944).



Experimental housing site at Northolt. Long-fronted houses being erected by MOW mobile labour force and observed for time and motion study. Site progress by 16th day (May 31, 1944). Note contrast with the photograph at the top of the page, indicating degree of variation possible.

another, our teams brought research home to him and brought it to life. And this work, like that described in Table I, cost us nothing but the salaries of our teams.

An analysis such as that just described is helpful to builders. It is also helpful to research workers, because it shows them where productivity can be raised most easily. This indeed is the merit of all statistical work, because it allows the research worker to single out those processes which show the widest variability, and to concentrate on getting more uniform skill in these. But most of all, such an analysis is useful to those administering and planning an industry. They have discovered the power of the statistics of sampling in a number of industries in the United States, but the method is still virtually unknown among industrial planners in Europe. It is an ideal method for the large, scattered and variable building industry.

BUILDING MATERIALS

The modern statistical methods described here can, of course, be applied to other processes than house building in the building industry. Their extension to other kinds of building is obvious. But a more important extension is to the industries which make building materials. Although these industries attract less public criticism, they are equally lacking in research and in efficiency. Here statistics can make two major contributions. First, it can help to choose between alternative processes or products, and so help to rationalize the planning and conduct of an industry. And second, it can help to control the quality of a product, and thereby to overcome one of the main obstacles to efficient building, which is the variability of the quality and dimensions of the units which reach the site.

We can briefly illustrate the first function from our own work on the brick industry of Great Britain. Here the number of works is small enough to make it unnecessary to take a sample. We therefore took the output of all works and related it in each case to the man-power employed, the fuel consumed, the types of clay, of cutting process, and of kiln used. This analysis showed significant differences in efficiency, and showed that a substantial number of firms were working with low efficiency processes. The future reorganization of the industry, therefore, should begin at these firms; and it was possible from our findings to draw up alternative plans for any reorganization.

QUALITY CONTROL OF COMPONENTS

There remains the second use of statistics in research on building materials; the control of quality. There are many building materials today—such as units made from special light-weight concrete—which would be widely used if the architect were confident that they would maintain uniform quality and dimensions. The technique for controlling such variability in the factory is known; essentially it consists in regular sampling and in watching the samples for any trend which threatens to take the product outside its specified tolerance limits. But once again it is not the technique which is important, it is the principle. Enormous sums are spent daily in building and civil engineering with materials, ranging all the way from raw cement to steel trusses, which are so unpredictable that factors of safety two or three times the design factors have to be included as a matter of course. But the factor of safety is only a rough and ready statistical allowance for the probability that design loads will be exceeded and design strengths not reached. As a result, we spend on extra materials many times what it would cost to evaluate the probabilities correctly and control quality and strength appropriately. Our own team has worked on a number of such problems, including the quality control of protective paints, of clinker, and of pre-stressed floor joists for small houses. But the subject remains almost virgin. The greatest advance in efficiency which the building and building materials industries can make is in working more uniformly. And the design and control of a uniform product can be the outstanding contribution of the statistician.

Above, another view of a Stevenage housing site. If tidiness is an indication of efficiency, this does not get full marks.

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

INFORMATION CENTRE

2.115 planning: general
LAND PLANNING

Some Principles of Land Planning. F. B. Gillie and P. L. Hughes. (Liverpool University Press, 1950. 5s.)

Interesting, short book of 91 pages, by two senior members of the administrative side of the MOTCP, addressed to the lay members of the planning world rather than to the specialist.

The arguments are, in places, difficult to follow and the conclusions are vague. Nevertheless, an attempt to unravel some of the many obscure issues which beset planners is to be welcomed. Some of the main headings are: current inconsistencies; underlying concepts; fundamental problems of land planning; built-up areas; nature of the plan; question of the survey and mobilising resources. As the title implies emphasis is given to the primary task of town and country planning, the use of land and the technique required to ensure its efficient use from the standpoint of the national economy.

3.26 planning: regional and national
THE TAY VALLEY

The Tay Valley Plan. A physical, social and economic survey plan for the future development of East Central Scotland. Gordon Payne. (East Central (Scotland) Regional Planning Advisory Committee, 1950. 63s.)

Final edition in book form of the two volumes of typescript first made available in 1949. 431 pages, 88 maps and diagrams, 54 pages of photographs and drawings. (See 3.20: 27.10.49 for summary of Survey conclusions and recommendations.)

Since the first publication of this Report, there have been no major developments in the planning of the Tay Valley Region. The Department of Health has not yet made known how far the recommendations are acceptable, presumably it will wait until the local authorities each submit their own development plans later this year.

This new version of the Report (which was

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

printed in Dundee), is, generally speaking, very well produced but there are a few blemishes. It is surprising that, in the production of a report of this complexity, more consideration was not given to the problem of the reader who wishes to make full use of the book. There is no pagination to the Contents, references to chapter headings in the index are inadequate substitutes, and the absence of page headings imposes a further, needless handicap on the reader.

The series of 26 lithographed folding maps are diagram maps, well drawn and printed in few colours. There are a large number of photographs, which are, incidentally, worth a glance from anyone interested in Scotland's regional architecture; they are very good.

5.42 planning: public utilities
ROADS

Types of Roads For Town and Country. Herbert J. Manzoni (Journal of the Town Planning Institute, Jan., 1951. pp. 54-61).

Informative paper, by the City Engineer and Planning Office of Birmingham, summarizing general principles of layout and detailed design of modern types of roads, including motorways, urban roads, rural roads and parkways.

13.67 materials: timber
TERMITE ATTACK

The Protection of Buildings and Timber Against Termites. Forest Products Research Bulletin No. 24. (HMSO, 1950. 1s. 9d.)

Specialist interest but very valuable authoritative summary of existing information. Essential reading for those building in the Commonwealth.

15.86 materials: finishes
LINOLEUM

Sheet Linoleum and Cork Carpet. BS 810: 1950. (British Standards Institution, 1951. 2s.)

Revised specification. Now includes moire, jaspe and marble types. Does not include inlaid or special linoleum for table tops. Gauges revised to conform to current production.

23.145 heating
HEAT REQUIREMENTS OF DWELLING HOUSES

Heat Requirements of Houses. J. C. Weston. (Journal of Inst. of Heating and Ventilating Engineers, Jan., 1951. Vol. 18, No. 185.)

Results of an investigation into house design and construction, to provide an equation for the heat loss calculations for different types of houses.

Once again, we have to thank Dr. Weston of BRS for a valuable paper. In it, he analyses the design and construction of some 200 " local authority " houses, from the point of view of heat loss, and from this information he has evolved equations with which the average seasonal heat loss can be estimated. Since only a small part can be quoted here, it is strongly recommended that those interested in such calculations should consult the original work.

The calculations take into account the floor area, volume and exposed areas of walls, ground floor, roof, external doors, and windows. It was assumed that the houses could be built with varying degrees of insulation; five different grades were taken into account, as shown in Table I.

The heat losses from semi-detached houses are shown in a graph. The air change rate was assumed to be 3 per hour, and it was assumed that the temperature throughout the house would be the same, though this would not, in fact, be the case (bedrooms would be colder) but no more than a 5 per cent. error was expected to arise from this.

Grade	Walls		Ground floor		Roof	
	U value	Typical construction	*U* value	Typical construction	*U* value	Typical construction
A	0.43	9 in. solid brick, plastered internally	0.35	Suspended timber (1 in. nominal), lino covering	0.56	Tiles on battens, plasterboard ceiling
B	0.30	11 in. cavity brick plastered internally (unventilated)	0.35	Suspended timber (1 in. nominal), lino covering	0.56	Tiles on battens, plasterboard ceiling
C	0.30	11 in. cavity brick plastered internally (unventilated)	0·15	Solid floor, timber finish	0.30	Tiles on boards and felt plasterboard ceiling
D	0.23	11 in. cavity wall, l.w., concrete inner leaf	0.15	Solid floor, timber finish	0.22	Tiles on battens, felt, ½ in. fibre board ceiling
E	0.16	11 in. cavity wall, l.w. concrete inner leaf ½ in. plasterboard on battens	0.15	Solid floor, timber finish	0.09	Tiles on battens, plasterboard ceiling with 4 in. glass wool between joists

Table I. Grades of Insulation Used for Calculation. (*See* 23.145.)

The equation evolved was: $H = a + b A$, where H = heat loss in therms per °F., per heating season of 33 weeks; A = floor area in feet super; and a and b are constants, with values for different forms of plan and construction, as shown in Table II.

The values for the standard deviation show that for a house of 900 to 1,000 feet super, there is a 90 per cent. chance that the heat loss for the season, given by the equation above, will be within 5 per cent. of the predicted value.

The investigation was carried further, to provide an equation which would include all types of plan and construction.

It is pointed out that for some calculations the total heat requirement needs to be found rather than the heat loss. This is found by multiplying H by the average temperature difference maintained and then taking away the stray heat from solar gains, hot water, cooking and occupancy, which, according to experiences at Abbot's Langley, are roughly 150 therms per season. An equation in which this is introduced is given; so, also, is one in which the number of air changes per hour —which may be less than the 3 postulated in the original equation—is included as a variable.

The equations can be applied to the study of the value of thermal insulation. Results show that for a house of 1,000 feet super floor area, with 3 air changes per hour, 11 in. cavity walls (U = 0.30), solid ground floor with asphalt or tiled finish (U = 0.20), and tiled roof on felt, with plasterboard ceiling (U = .3), the annual requirement, based on an averaged 12°F. temperature rise, would be 730 therms per heating season. For the same house, with cavity walls with inner skin of clinker concrete blocks (U = 0.23), and 1 in. loose slag wool between the ceiling joists (U for roof/ceiling structure = 0.15), the requirement would be only 592 therms. It is properly pointed out that this reduction in heat losses may not entirely take the form of fuel saving; higher temperatures may be maintained. This does not, however, detract from its value. Further, a reduction in the average ventilation rate from 3 to 2 changes per hour reduces the annual requirement to 496 therms, only ⅔ of the original value.

The equation may also be used to show the relationship between the heat requirements for various types of grouping—for a detached house, a semi-detached house, and an inner house of a terrace (all of 1,000 square feet, and of the high standard of insulation). The seasonal requirements are respectively 113, 107 and 100 per cent. of the calculated figures.

For district heating schemes, it is necessary to calculate the heat requirement for space

Plan type	Insulation grade	*a*	*b*	Number of observations *n*	Standard deviation *s*
Semi-detached	A	8.8	0.0752	140	2.7
	B	6.9	0.0706	140	2.3
	C	6.8	0.0576	140	2.1
	D	5.5	0.0531	140	1.9
	E	4.5	0.0469	140	1.7
Terraced	A	5.4	0.0736	59	3.4
	B	4.9	0.0687	59	3.0
	C	3.5	0.0571	59	2.6
	D	3.3	0.0521	59	2.5
	E	2.7	0.0461	59	2.0
Flatted (ground floor)	A	6.7	0.0623	12	1.1
	B	4.7	0.0597	12	1.2
	C	4.9	0.0484	12	0.9
	D	4.1	0.0467	12	1.0
	E	3.0	0.0457	12	1.0
Flatted (first floor)	A	5.4	0.0797	12	1.7
	B	3.7	0.0755	12	1.4
	C	4.6	0.0604	12	1.1
	D	2.6	0.0550	12	1.2
	E	2.5	0.0449	12	1.0

Table II. Heat Loss in Terms of Floor Area. Values of a *and* b *in* $H = a + bA$, *where* H = *heat loss in therms per degree per heating season of* 33 *weeks and* A = *floor area.* (*See* 23.145.)

during the heating season, and for hot water all the year round. There have been serious under-estimates in the past. A further table gives these requirements for various types of house, with various temperature differences and U values; 150 therms per year must also be included for water heating (352 gallons per week, raised from 55° to 140°F.).

The hourly heat requirements in BThU's can be found by dividing the number of therms by the number of hours in the heating season (5,544), and multiplying the result by 100,000.

It is pointed out that though the equations may be applied to the heat requirements of an individual house, they can be used with greater accuracy for the general study of typical houses, or groups of different houses.

Tonnage Required to Provide Various Mean Temperatures and Cooking and Water Heating

Area of house	950 sq. ft.
Ventilation rate	Two changes per hour
U walls	0.23
U floor	0.20
U roof	0.15

Temperature difference, °F.	Summer water heating			
	Gas		Electricity	
	150 galls.	250 galls.	150 galls.	250 galls.
	Tons	Tons	Tons	Tons
11	3.0	3.1	3.2	3.4
12	3.2	3.4	3.5	3.7
13	3.5	3.7	3.8	4.0
14	3.8	4.0	4.1	4.3
15	4.1	4.2	4.4	4.6
16	4.4	4.5	4.7	4.9

Room Temperatures, 1948-49

Table I. (*See* 23.146)

House number	34	33	14
	°F.	°F.	°F.
Living room	57.7	58.1	61.1
Kitchen	58.6	63.8	64.3
Dining space	56.4	62.1	63.9
Hall	53.9	53.5	56.1
Landing	58.0	56.9	58.9
Bedroom 1	53.3	57.0	58.6
Bedroom 2	54.4	56.6	58.2
Bedroom 3	50.4	57.1	60.4
Bathroom	56.0	58.6	62.0
Mean house temperature difference*.....	11.1	13.5	16.0

*Living room included twice to allow for greater proportionate sizes.

Table II. (*See* 23.146)

23.146 heating and ventilation
HOUSE HEATING STANDARDS

House Heating with Limited Coal Consumption. J. C. Watson. (Heating and Ventilating Engineer and Journal of Air Conditioning. Dec., 1950, Vol. XXIV, No. 282.)

Paper examining the standard of heating which can be expected in a small house for an annual fuel consumption, for all purposes, equivalent to between 3 and 4½ tons of coal.

In view of the need for economy in the use of fuel, the annual consumption for heating, cooking and hot water supply in an ordinary house should not exceed the equivalent of 3 tons of coal. It is shown that, for a house of 900 to 1,000 sq. ft., even if well-insulated, this will provide only a minimum standard. The results which can be achieved with greater consumption of fuel are examined. These are based on typical "tenant behaviour," although there is no means of limiting the fuel consumption of the individual tenant.

Three tons of coal have a calorific value of 900 therms. Some may be used in the natural state, some as electricity, gas or coke. The average efficiency of BEA power stations, including transmission losses, is 20 per cent.; that of gas and coke production, 75 per cent. At Abbot's Langley, gas consumption for cooking during the summer averages 1·6 therms per week, and electricity consumption 23 kW.hr. This is equivalent to 40 therms of coal by gas and 75 by electricity.

It has been shown (see "Domestic Water Heating," AJ, March 2, 1950) that where gas or electricity is used, the average weekly consumption of hot water is 150 gallons at 140°F. To provide this by gas or electricity requires the equivalent of 70 or 115 therms of coal respectively. A typical "domestic" boiler would require over 250 therms of fuel to provide 150 gallons of water at 140°F. Supply consumption for combining summer cooking and hot water (150 gallons per week) is 110 therms for gas and 190 for electricity. A solid fuel cooker, providing domestic hot water, used 350 therms for the season. Therefore, assuming 150 gallons per week for summer hot water, 790 therms will remain for all purposes during the winter season if gas is used, and 710 if electricity is used.

Most cookers and water heaters make a substantial contribution to space heating. It is therefore convenient to use the concept of "system efficiency"; *i.e.*, the ratio of heat available in the house in the form of space heating to the heat supplied to all appliances. The paper "Heating Research and House Design" (see AJ, Jan. 26, 1950) gave the system efficiencies for all the installations at Abbot's Langley, with coal equivalents. Many of these installations (excluding the central heating ones on the grounds of first cost) give about 55 to 60 per cent. efficiency; 55 per cent. is shown to be a reasonable figure achieved with such apparatus as the open fire with back boiler and convection, the stove with boiler, and the open fire with back boiler and radiators. The amount of heat available in the house is therefore 0·55 × 790 = 435 therms where gas is used for summer water heating, and 0·55 × 710 = 390 therms where electricity is used. Now, making use of a heat requirement formula (see 23.145), it can be shown that these amounts of heat will give, in a reasonably well insulated, semi-detached house of 950 feet super, a temperature rise of 11·2°F. and 10·2°F. respectively, or 10·8°F. and 9·6°F. if the higher summer hot water consumption of 250 gallons per week is assumed.

At Abbot's Langley, during the occupied period, an average temperature rise of 14°F. was recorded (neglecting houses where the system efficiency fell below 50 per cent.). In three houses, however, temperature rises in the range 9½° to 11°F. were measured, and in only one did the tenants' financial circumstances influence this. A survey of 200 local authority houses showed an average of 11°F. rise (this included all types and constructions), although the average heat loss by conduction was 70 per cent. greater than that from houses insulated to the Abbot's Langley standards.

From this, it may be deduced that an average rise of 11°F. is a minimum for reasonable comfort, 13°F. to 14°F. the average, and 15° to 16°F. a quite likely requirement.

Table I shows the amount of coal needed to provide different temperature rises, using gas or electricity for summer water heating, with a consumption of 150 or 250 gallons per week. These temperature rises are the average for the whole house.

Table II shows the average temperatures in the various rooms of three of the Abbot's Langley houses, achieved with various temperature rises. These may be taken as representative. It is pointed out that the low living room temperature in houses Nos. 33 and 34 means that the rooms could only be heated to 60 or 65°F. for some four hours in the evening, then allowed to cool off till the following evening, and that by then the temperature will have dropped below 55°F.

The possibility of saving by using lighter construction, so that lower night temperatures may be used, with the same day temperatures, is being investigated, but it is not thought that the minimum average temperature rise of 11°F. could be reduced by more than 1°F.

The conclusion is that to provide solid fuel heating, and cooking and water heating by gas or electricity, in a well insulated house of 950 sq. ft., with well-fitting doors and windows, will take about 3½ to 4 tons of coal a year.

26.86 services and equipment: miscellaneous
REFUSE SHUTES

Refuse Chutes for Multi-storey Buildings. BS 1703: 1951. (British Standards Institution. 2s.)

General requirements for chute, hopper and container. Diagrams. Describes general requirements rather than standardization of components.

27.13 furniture and fittings
SCHOOL FURNITURE

School Furniture. BS/MOE 11-22: 1950. (British Standards Institution. 17s. 6d.)

Combining twelve BS's covering most requirements for schools. Size range and requirements for materials and construction. Tables of dimensions and illustrations of typical items of furniture. An important document embodying results of much thought and research.

Announcements

Mr. J. J. Cardwell, A.R.I.B.A., chartered architect and surveyor, has moved to 5, York Road, Tunbridge Wells, to which address all trade information should now be sent. The telephone number, 437, remains unaltered.

Messrs. Vulcan Products Ltd., of 24, Ryder Street, S.W.1, announce that Mr. F. S. Panther has joined their organization in the capacity of Decorating Colour Adviser.

The RIBA Cricket Club held its annual supper on March 8 at the "Unicorn" in Jermyn Street. The captain, Mr. Douglas Taylor, gave a summary of the past year's activities and welcomed the club's guest, Mr. E. L. Bird, representing the RIBA. The following were elected as members of the committe for the coming year:—Mr. D. S. Taylor, Mr. C. A. R. Norton, Mr. B. S. Smyth, Mr. R. R. Fairbairn (hon sec.). The following fixtures have been arranged for the coming season:—June 3, Blue Circle CC (AA Ground); June 27, Architectural Association (AA Ground); July 18, The Vitruvians (AA Ground); Aug. 1, RICS (College of Estate Management (Ground, Hinchley Wood); Aug. 23, Club Cricket Conference (Guildford). Any member of the RIBA who is interested in the Club is asked to contact the hon secretary, Mr. R. R. Fairbairn, 81, Piccadilly, W.1, who will be pleased to give details of membership.

Correction

On page 336 of our issue for March 15 the name of Cyril Sweett, Quantity Surveyor for the Bus Garage at Loughton, Essex, was incorrectly spelt.

Buildings Illustrated

New Cross and Orb at the Brompton Oratory, London, S.W.7. (Page 392.) Architect: Peter Goodridge, A.R.I.B.A. Makers, Blunt and Wray, in association with The Morris Singer Co. Ltd.; builders, Jno. Anderson & Sons; steeplejacks, J. Smith (Southern) Ltd.

Showroom in Sauchiehall Street, Glasgow, C.2. (Page 393.) Architect: A. B. Campbell, D.A.(GLAS.), A.R.I.B.A., A.R.I.A.S. General Contractors: James Crawford & Sons Ltd. Sub-contractors: Metal work (shop front), The Meta-Phronts Co. Ltd., (internal) The Kingston Brass Co. Ltd.; plaster work, A. C. Whyte & Co. Ltd.; plumbing, Thomas Forrester & Sons; paint work, Guthrie & Wells Ltd.; shopfitting work (front only), Archibald Hamilton (Shopfitters) Ltd.; joinery, A. B. Cant; glazing, J. P. McPhie; French polishing, John Craig & Sons; carpet laying, John C. A. Bogie Ltd.; terrazzo, Oswald Toffolo & Co.

Factory with laboratories and offices at Coleford, Gloucestershire (pages 395-399). Architects: Gordon Payne & Preece, A.R.I.B.A. Assistant architect for Scheme 1: I. M. Williams, A.R.I.B.A. Quantity Surveyors: Banks, Wood & Partners. General Contractor: G. Percy Trentham Ltd. Sub-contractors: Excavation, foundations, reinforced concrete, plaster, G. Percy Trentham Ltd.; dampcourses, Astos; asphalt, Asphalte Specialists Ltd.; bricks, Coleford Brick & Tile Co.; stone, Alexander Stone Co. Ltd.; structural steel (Scheme 1), Redpath Brown & Co. Ltd., (Scheme 2) Fairfield Engineering Co. Ltd.; tiles, Carter & Co. (London) Ltd.; patent glazing, steel windows, Hills Patent Glazing Co. Ltd.; woodblock flooring, Stevens & Adams Ltd.; patent flooring, (precast concrete), Truscon Floors; waterproofing materials (metallic liquid and asphalt tanking), George Lillington & Co. Ltd.; central heating, gasfitting, ventilation, plumbing, sanitary fittings, water supply, Arthur Scull & Son Ltd.; boilers, John Thompson & Sons Ltd.; electric wiring, W. T. Turner Ltd.; electric light fixtures, General Electric Co. Ltd.; stairtreads, Prodorite Ltd.; door and window furniture, casements, iron staircases, metalwork, cloakroom fittings, Gardiner, Sons & Co. Ltd.; folding gates, Bolton Gate Co. Ltd.; rolling shutters, Frederick Sage Ltd.; joinery, shop fittings, Cheltenham Shopfitting Co. Ltd.; textiles, furniture, Heal & Son Ltd.; lifts, Marryatt & Scott Ltd.; glass bricks, Pilkington Bros. Ltd.

Flats in Oakford Road, Kentish Town, N.W.5. (Page 400-402.) St. Pancras Borough Council. (Housing Manager, A. W. Davey, A.I.A.S., A.I.HSG.) Architect: Hugh Roberts & Davies, F./A.R.I.B.A. Quantity Surveyors: C. E. Ball & Partners. General Contractor: Harry Neal Ltd. Clerk of Works: L. Northcott. Sub-contractors: Demolition, excavation, foundations, dampcourses, plumbing, plaster, joinery, tiling (fireplaces), Harry Neal Ltd.; asphalt, Durable Asphalt Ltd.; reinforced concrete, Limpus & Son Ltd., under the direction of Messrs. Hajnal-Konyi & Myers; bricks, London Brick Co. Ltd.; glass, Pilkington Bros. Ltd. (supply), Faulkner Greene & Co. (fixing); patent flooring, Marley Tile Co. Ltd.; stoves, Eagle Range Co. Ltd. (Fulham grates); gasfitting, North Thames Gas Board; electric wiring, Barlow & Young Ltd.; electric light fixtures, Falk, Stadelmann & Co. Ltd., Wardle & Co. Ltd.; sanitary fittings, door furniture, bells, signs, W. N. Froy & Son Ltd.; casements, window furniture, Monk & Co. Ltd.; metalwork, Clark Hunt & Co. Ltd.; joinery, EJMA units, Newsum Sons & Co. Ltd.; tiling, Fred Hodge Ltd.

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.

NORTH THAMES GAS BOARD.

Applications are invited for the following appointment in the Architects' Section of the Chief Engineer's Department of Westminster: SENIOR ARCHITECTURAL ASSISTANT, minimum starting salary £650 per annum.

Applicants, who must be Registered Architects and should be studying for or have passed the Final Examination of the R.I.B.A., should be capable of preparing working and detailed drawings and specifications, and supervising and controlling the work on contracts. Experience in design and planning of industrial buildings would be an advantage.

The appointment is of a permanent nature, and pension arrangements will be discussed with short list candidates.

Applications, stating age, qualifications, and particulars of previous appointments held, must be submitted to the Staff Controller, North Thames Gas Board, 30, Kensington Church Street, London, W.8, quoting reference 9757 4341

LONDON COUNTY COUNCIL.

Applications are invited for positions of ARCHITECTURAL ASSISTANT salaries up to £680 a year) in the Housing and Valuation Department. Commencing salaries will be determined according to qualifications and experience. Engagement will be subject to the Local Government Superannuation Acts, and successful candidates will be eligible for consideration for appointment to the permanent staff on the occurrence of vacancies.

Successful candidates will be required to assist in the design, layout and preparation of working drawings for housing schemes (cottages and multi-storey flats), and will be employed in the Housing Architect's Division.

Forms of application may be obtained from the Director of Housing, The County Hall, Westminster Bridge, S.E.1 (stamped addressed envelope required and quote reference A.A.1). Canvassing disqualifies. (816) 4558

THURROCK URBAN DISTRICT COUNCIL.
ARCHITECTURAL ASSISTANT, GRADE IV.

Applications are invited for the appointment of an ARCHITECTURAL ASSISTANT, at a salary in accordance with Grade IV of the A.P.T. Division of the National Scale of Salaries, *i.e.*, £480 p.a., rising by three annual increments of £15 to £525 p.a.

General architectural experience is necessary, and applicants must be capable of preparing detailed plans and specifications and supervising housing schemes.

Candidates should have passed the Intermediate Examination of the Royal Institute of British Architects.

Housing accommodation, if necessary, may be provided for the successful candidate if he lives more than 20 miles from the Thurrock Urban District.

The appointment is subject to the provisions of the Local Government Superannuation Act, 1937, and the successful applicant will be required to pass a medical examination.

Applications, endorsed "Architectural Assistant, IV," stating age, qualifications and experiance, and quoting three references, should reach the undersigned not later than first post on Monday, 2nd April, 1951.

Canvassing will disqualify, and applicants must disclose in writing any relationship to any member or senior officer of the Council.

A. E. POOLE,
Clerk of the Council.
Council Offices, Whitehall Lane,
Grays, Essex. 2151

BOARD OF MANAGEMENT FOR GLASGOW VICTORIA HOSPITALS.

GROUP CLERK OF WORKS required to supervise maintenance of Property and Buildings of Hospitals, etc., under control of above Board. Duties include such responsibilities as the Board may decide in relation to new construction, but do not cover engineering Services and are subject to definition by the Whitley Council.

Salary scale £595-£660 per annum.

Applicants should have served a full apprenticeship to a Building Trade and have one of the following qualifications:—

(*a*) Certificate of the Institute of Clerks of Works of Great Britain.

(*b*) Higher National Certificate in Building of the Royal Technical College, Glasgow, or an equivalent qualification.

The post is superannuable and the successful candidate may require to pass medical examination.

Applications, stating age, qualifications, etc., together with three recent copy testimonials, should be lodged with undersigned forthwith.

IAN J. HAMILTON, M.A., C.A., F.H.A.,
Secretary and Treasurer.
Board of Management for Glasgow
Victoria Hospitals,
40, St. Vincent Place, Glasgow, C.1. 2187

CITY AND COUNTY OF NEWCASTLE-UPON-TYNE.
CITY ARCHITECT'S DEPARTMENT.

Applications are invited for the undermentioned appointments to deal with:—

(*a*) a large programme of normal Housing; and

(*b*) the provision of some 3,000 to 3,500 Multi-storied Flats to form a new Neighbourhood Unit, to be undertaken by a new Sub-section to be established in the Department.

Appointments under (a):

ONE PRINCIPAL ASSISTANT ARCHITECT. A.P.T., IX, £750-£900.
TWO SENIOR ASSISTANT ARCHITECTS. A.P.T., VII, £635-£710.
ONE SENIOR ASSISTANT ARCHITECT. A.P.T. VI, £595-£660.
ONE SENIOR ASSISTANT ARCHITECT. A.P.T. V, £520-£570.
ONE ASSISTANT ARCHITECT. A.P.T., III, £450-£496.

Appointments under (b):

ONE PRINCIPAL ASSISTANT ARCHITECT. A.P.T., IX, £750-£900.
ONE SENIOR ASSISTANT ARCHITECT. A.P.T., VIII, £685-£760.
TWO SENIOR ASSISTANT ARCHITECTS. A.P.T., VII, £635-£710.
TWO SENIOR ASSISTANT ARCHITECTS. A.P.T., VI, £595-£660.
ONE ASSISTANT ARCHITECT. A.P.T., IV, £480-£525.
ONE ASSISTANT ARCHITECT. A.P.T., III, £450-£495.

Applicants for all appointments in Grades VI to IX should be Associates of the R.I.B.A., and those for appointments in Grades VIII and IX of the new Sub-section, must have had considerable experience in the design and construction of large blocks of flats, and be able to act in an administrative capacity. Applicants for the post in Grade IX, table (*a*), must have had extensive experience in Housing, both in design and administration.

The appointments will be subject to the National Conditions of Service as adopted by the City Council, to the provisions of the Local Government Superannuation Act, 1937, and to one month's notice on either side. The successful candidates will be required to pass a medical examination.

Applications, stating position applied for, age, particulars of training, qualifications, experience, present and past appointments, together with copies of two recent testimonials and the names and addresses of two persons to whom reference may be made, should be addressed to George Kenyon, A.R.I.B.A., A.M.T.P.I., City Architect, 18, Cloth Market, Newcastle-upon-Tyne, 1, not later than the 14th April, 1951.

JOHN ATKINSON,
Town Clerk.
Town Hall, Newcastle-upon-Tyne, 1.
14th March, 1951. 2161

SURREY COUNTY COUNCIL.
COUNTY ARCHITECT'S DEPARTMENT.

Applications are invited for the following appointments:—

(*a*) ASSISTANT ARCHITECT, Grade VI, at a commencing salary of £595 per annum, rising by annual increments of £20/£25 to a maximum of £660 per annum, plus London allowance of up to £30 per annum, according to age.

Applicants must be Associate Members of the Royal Institute of British Architects, and should have had a good training and an adequate experience in the design and construction of modern buildings.

(*b*) ARCHITECTURAL ASSISTANT, Grade IV, at a commencing salary of £480 per annum, rising by annual increments of £15 to a maximum of £525 per annum, plus London allowance of up to £30, according to age.

Applicants must be of good general training and give full details in their applications, and preference will be given to applicants who have passed the Intermediate Examination of the Royal Institute of British Architects.

The appointments will be subject to the provisions of the Local Government Act, 1937, and the successful applicants will be required to pass a medical examination.

Applications, stating age, qualifications and experience, and accompanied by copies of three recent testimonials, should be sent to the County Architect, Surrey County Council, County Hall, Kingston-upon-Thames, not later than the 31st March, 1951.

Canvassing, either directly or indirectly, will disqualify a candidate from consideration.

The Council will be unable to provide any housing accommodation, and the successful applicants will be expected to make their own arrangements in this direction.

T. W. W. GOODERIDGE,
Clerk of the Council.
County Hall, Kingston-upon-Thames. 2127

COUNTY BOROUGH OF READING.
BOROUGH ARCHITECT'S DEPARTMENT.
SENIOR ASSISTANT ARCHITECT.

Applications are invited for the post of Senior Assistant Architect, in the Borough Architect's Department, at a salary in accordance with Grade VI (£595-£660) of the National Joint Council for Local Authorities' A.P.T. and Clerical Services salary scales.

Applications should be received by the Borough Architect, Town Hall, Reading, by Friday, 20th April, from whom particulars of the appointment can now be obtained.

G. F. DARLOW,
Town Clerk.
Town Hall, Reading.
March, 1951. 2194

COUNTY OF LINCOLN—PARTS OF HOLLAND.
COUNTY PLANNING DEPARTMENT.

Applications are invited for the appointment of a PLANNING ASSISTANT, in the Boston Office of the above Department, at a salary in accordance with A.P.T., Grade I, of the National Scale of Salaries (£390-£435 per annum).

Candidates should preferably have had previous experience in the office of a local planning authority and should be neat and expeditious draughtsmen. Intermediate Examination standard of the Town Planning Institute or other technical qualification will be an advantage.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate must pass a medical examination.

Applications, stating age, education, experience, present position and salary, together with the names of two referees, should reach the County Planning Officer at 21, Haven Bank, Boston, within 14 days from the appearance of this advertisement.

H. C. MARRIS,
Clerk of the Holland County Council.
County Hall, Boston, Lincs. 2128

GLAMORGAN COUNTY COUNCIL.
HIGHWAYS AND PLANNING DEPARTMENT.

Applications are invited for the following permanent appointment, at Headquarters, County Hall, Cardiff:—

ONE PLANNING ASSISTANT. Up to Grade A.P.T., VI (salary £595 per annum, rising by two annual increments of £20 and one of £25 to a maximum of £660 per annum), according to qualifications and experience.

The appointment is permanent and subject to the National Scheme of Conditions of Service, to the staffing conditions of the County Council from time to time in force, and to the provisions of the Local Government Act, 1937. The successful candidate will be required to pass a medical examination.

Applications, stating age, training, qualifications, experience and present salary, and accompanied by two testimonials, should be sent to the County Surveyor and Planning Officer, Mr. E. John Powell, M.I.C.E., M.I.Mun.E., at this address, and received not later than 9th April, 1951.

A. CLIFFORD WALTER,
Deputy Clerk of the County Council.
Glamorgan County Hall, Cardiff. 2184

MONMOUTHSHIRE COUNTY COUNCIL.
APPOINTMENTS IN COUNTY ARCHITECT'S DEPARTMENT.

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

THREE PERMANENT SENIOR ASSISTANT ARCHITECTS, at a salary in accordance with Grade VIII (*i.e.*, £685, rising by annual increments of £25 to £760 per annum).

TWO PERMANENT ARCHITECTURAL ASSISTANTS, at a salary in accordance with Grade VII (*i.e.*, £635, rising by annual increments of £25 to £710 per annum).

TWO PERMANENT ASSISTANT QUANTITY SURVEYORS, at a salary in accordance with Grade VII (*i.e.*, £635, rising by annual increments of £25 to £710 per annum).

THREE PERMANENT ASSISTANT QUANTITY SURVEYORS, at a salary in accordance with Grade VI (*i.e.*, £595, rising by two annual increments of £20 and one of £25 to £660 per annum).

All these posts are in accordance with the Administrative, Professional and Technical Divisions of the National Joint Council's scales.

Consideration will be given to the application of a temporary lodging allowance to the selected candidates who are maintaining a home elsewhere pending their obtaining suitable accommodation.

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

Applications, together with copies of three testimonials, must be forwarded to Mr. Colin L. Jones, F.R.I.B.A., County Architect, Queen's Hill, Newport, Mon., *not later than* Saturday, the 21st April, 1951.

Canvassing in any form will be a disqualification.

VERNON LAWRENCE,
Clerk of the Council.
County Hall, Newport, Mon.
19th March, 1951. 2193

LONDON COUNTY COUNCIL.
QUALIFYING EXAMINATION FOR THE OFFICE OF DISTRICT SURVEYOR.

Formal notice is hereby given that the next examination of persons desirous of obtaining a certificate of proficiency to perform the duties of the office of District Surveyor will be conducted in London in October, 1951, by the Board established by the London County Council in accordance with Section 77 of the London Building Acts (Amendment) Act, 1939. The minimum age limit for candidates is 25.

Possession of this certificate carries eligibility to compete for appointment to vacant positions as District Surveyor, at maximum salaries ranging from £1,200 to £1,800 a year (inclusive), or as Assistant District Surveyor (salary scale £840 by £40 to £960 a year).

It is intended to hold subsequent examinations annually.

For regulations governing candidature, the current syllabus, and application forms for the examination, or for any further information, apply to the Architect to the Council, County Hall, Westminster Bridge, S.E.1. (1451) 1715

CITY OF STOKE-ON-TRENT.
CITY ARCHITECT'S DEPARTMENT.

Applications are invited from suitably qualified persons for the following appointments to the permanent staff :—

(*a*) ASSISTANT QUANTITY SURVEYORS. Salary A.P.T., Grade VI, £595-£660.

(*b*) ASSISTANT QUANTITY SURVEYOR. Salary A.P.T., Grade III, £450-£495.

(*c*) MEASURING SURVEYOR. Salary A.P.T., Grade III, £450-£495.

(*d*) ARCHITECTURAL ASSISTANT. Salary A.P.T., Grade I, £390-£435.

Note.—Suitable housing accommodation can be made available to successful candidates for appointments (*a*).

Applications, giving date of birth, particulars of training, experience, etc., with copies of two recent testimonials, should be received by J. R. Piggott, F.R.I.B.A., City Architect, Kingsway, Stoke-on-Trent, Staffs., endorsed with the title of the appointment applied for, not later than Friday, 6th April, 1951.

HARRY TAYLOR,
Town Clerk.

Town Hall, Stoke-on-Trent.
8th March, 1951. 2169

CROWN AGENTS FOR THE COLONIES.

ARCHITECTURAL ASSISTANT required by the Government of Northern Rhodesia for the Public Works Department for one tour of 36 months. Commencing salary according to age and experience in the scale £510, rising to £865 a year, plus cost-of-living allowance, at present equal to 10 per cent. of salary. Gratuity on satisfactory completion of services. Free passages. Liberal leave on full salary. Candidates should be students of the Royal Institution of British Architects or have had five years' practical experience. A knowledge of survey work and writing of specifications would be an advantage.

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 M.27237.A. on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration. 2170

COUNTY COUNCIL OF INVERNESS.
COUNTY ARCHITECT'S DEPARTMENT.

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

(*a*) ONE ARCHITECTURAL ASSISTANT. Salary A.P.T., V, £520-£570. Candidates should have had a sound general architectural office training and experience, more especially in the preparation of working drawings for schools, housing and other local authority works.

(*b*) ONE ARCHITECTURAL ASSISTANT. Salary A.P.T., III, £450-£495. Candidates should be neat and accurate draughtsmen, and have had experience in the preparation of plans for local authority housing work.

The appointments 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 to the successful candidates.

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.
12th March, 1951. 2171

BOROUGH OF ERITH.
APPOINTMENT OF ARCHITECTURAL ASSISTANT.

Applications are invited for the above appointment at a salary in accordance with the National Scale, A.P.T., II, commencing at £420 and rising by annual increments of £15 to a maximum of £465 per annum, plus London area weighting.

Applicants, who should be capable of preparing plans, specifications, estimates and Bills of Quantities for building works, should have had a good architectural training and be neat draughtsmen.

The appointment will be subject to the National Conditions of Service, to the Council's Regulations governing staff, to one month's notice in writing, and to the Local Government Superannuation Act, 1937. The successful candidate will be required to pass a medical examination.

Applications must be on the form to be obtained, together with a list of duties, from the Borough Engineer and Surveyor, Council Offices, Erith, Kent, and be delivered to him not later than Monday, 9th April, 1951.

Canvassing, either directly or indirectly, will disqualify.

J. A. CROMPTON,
Town Clerk.

Council Offices, Erith, Kent. 2173

MODEL MAKER.

East Kilbride Development Corporation have a vacancy for a Model Maker, with experience in the preparation of architectural models. Salary scale £450-£525, with placing according to experience, etc. Superannuation and medical examination. Applications, accompanied if possible by photographs of models, to be sent to the General Manager, Torrance House, East Kilbride. 2183

FLINTSHIRE COUNTY COUNCIL.

Applications are invited for the appointment of a PLANNING ASSISTANT, in the County Planning Department, at a salary in accordance with Grade A.P.T., IV (£480 per annum, rising to £525 per annum). Applicants must have had good experience in Town and Country Planning, and particularly in the preparation of Development Plans, and should have passed at least the Intermediate Examination of the Town Planning Institute. The possession of a motor car would be an advantage in connection with the appointment, in respect of which appropriate mileage allowance will be paid in accordance with the National Joint Council's Scales. Applications, on a form to be obtained from the undersigned, are to be returned not later than the 4th April, 1951.

W. HUGH JONES,
Clerk of the County Council.

County Buildings, Mold. 2130

MINISTRY OF WORKS.

There are vacancies in the Chief Architect's Division for ARCHITECTURAL ASSISTANTS and LEADING ARCHITECTURAL ASSISTANTS with recognised training and fair experience. Successful candidates will be employed in London and elsewhere on a wide variety of Public Buildings, including Atomic energy and other Research Establishments, Telephone Exchanges, and Housing.

Salary : Architectural Assistants, £300-£525 per annum; Leading Architectural Assistants, £500-£625 per annum. Starting pay will be assessed acording to age, qualifications and experience. These rates are for London; a small deduction is made in the Provinces.

Although these are not established posts, some of them have long term possibilities, and competitions are held periodically to fill established vacancies.

Apply in writing, stating age, nationality, full details of experience and locality preferred, to Chief Architect, W.G.10/BC, Ministry of Works, Abell House, London, S.W.1, quoting reference W.G. 10/BC. 4026

CITY OF LEICESTER.
HOUSING DEPARTMENT.
388 FLATS. NEW PARKS ESTATE.
CLERK OF WORKS.

Applications are invited for the above appointment, which will be for approximately 3 years. Salary £600 per annum.

Applicants must have had extensive experience in the erection of centrally heated Multi Storey Reinforced Concrete Framed Structures.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to the termination by 1 month's notice on either side. Successful applicants will be required to pass a medical examination. Applications, stating age and experience and endorsed "Clerk of Works," together with copies of two recent testimonials, to be delivered to the undersigned not later than 10 a.m., 10th April, 1951.

Canvassing, either directly or indirectly, will be a disqualification.

J. S. FYFE, A.R.I.B.A.,
Housing Architect.

Municipal Offices, Charles Street, Leicester. 2201

BOROUGH OF HEMEL HEMPSTEAD.
SENIOR ARCHITECTURAL ASSISTANT.

Applications are invited for the appointment of Senior Architectural Assistant, in the Borough and Water Engineer's Department, at a salary in accordance with A.P.T., Grade V (£520-£570), of the National Joint Council's Scale. Candidates should be Registered Architects. The appointment will be subject to the Local Government Superannuation Acts, to the National Conditions of Service from time to time in force, and to the passing of a medical examination, and will be terminable by one month's notice in writing on either side. Application forms may be obtained from Mr. A. H. Turner, A.M.I.C.E., Borough and Water Engineer, Market Square, Hemel Hempstead, Herts., and should be returned not later than the 9th April.

Canvassing will disqualify, and applicants must state whether to their knowledge they are related to any member of the Council or to any senior officer of the Corporation.

C. W. G. T. KIRK,
Town Clerk.

Town Hall, Hemel Hempstead, Herts.
20th March, 1951. 2203

RICKMANSWORTH URBAN DISTRICT COUNCIL.
SENIOR ARCHITECTURAL ASSISTANT.

Applications are invited for this appointment at salary, A.P.T., Va (£550-£610). Grade A.P.T., VI (£595-£660) will be considered if the experience and qualifications of a candidate appear to warrant it. A car allowance will be paid. Applicants must be registered Architects, and preference will be given to those who have passed the Final examination of the R.I.B.A. Applicants should be experienced in the preparation of drawings, specifications, and estimates for building and architectural work, particularly in connection with housing schemes.

Applicants must state whether they wish the Council to provide housing accommodation, and any such request will be considered. Applications, endorsed "Senior Architectural Assistant," and giving the names of three referees, must be delivered to the undersigned by Saturday, 7th April, 1951.

C. G. RANSOME WILLIAMS,
Clerk of the Council.

Council Offices, Rickmansworth.
20th March, 1951. 2204

HAYES AND HARLINGTON URBAN DISTRICT COUNCIL.
APPOINTMENT OF ARCHITECTURAL ASSISTANT.

Applications are invited for the appointment of an Architectural Assistant, in the Department of the Engineer and Surveyor, at a salary in accordance with A.P.T. Division, Grade IV, of the Scales of Salaries (£480×£15 to £525), plus appropriate London "weighting."

Preference will be given to applicants who have passed the Intermediate Examination of the R.I.B.A.

The Council may be able to assist the successful applicant with housing accommodation, if required.

Forms of application may be obtained from the Engineer and Surveyor, Town Hall, Hayes, to whom completed applications must be returned not later than 7th April, 1951.

A. E. HIGGINS,
Clerk of the Council.

Town Hall, Hayes, Middx. 2174

COUNTY BOROUGH OF SOUTHPORT.

Applications are invited for the following positions in the Borough Architect and Town Planning Officer's Department :—

PRINCIPAL ASSISTANT ARCHITECT. A.R.I.B.A. essential. Final T.P.I. an advantage. Salary A.P.T., Grade VIII (£685-£760).

ARCHITECTURAL ASSISTANT. Intermediate standard of R.I.B.A. Salary A.P.T., Grade III (£450-£495).

Forms of application may be obtained from the Borough Architect and Town Planning Officer, Pavilion Buildings, Lord Street, Southport, to whom they should be returned not later than the 9th April, 1951.

R. EDGAR PERRINS,
Town Clerk.

2182

COUNTY BOROUGH OF WOLVERHAMPTON.
EDUCATION DEPARTMENT.

Applications are invited for appointment as ARCHITECTURAL ASSISTANT in the office of the Superintendent of Educational Buildings. Salary in accordance with Grades A.P.T., I-II (£390 to £465). Commencing salary to be fixed according to experience.

Applicants should have had experience in an Architect's office and be capable of making drawings and details, specifications, surveys and routine drawing office duties.

The appointment will be subject to the provisions of the Local Government Officers' Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination.

Applications, stating age, present salary and position, qualifications and experience, accompanied by copies of two testimonials, and the names and addresses of two persons to whom reference can be made, should be addressed to the Director of Education, Education Offices, Wolverhampton, and endorsed "Architectural Assistant." Latest date for receiving applications Thursday, 5th April.

J. BROCK ALLON,
Town Clerk.

Town Hall, Wolverhampton. 2186

BASILDON NEW TOWN.

Architects are invited to apply for the post of DEPUTY CHIEF ARCHITECT (£1,200-£1,500 p.a.) on the staff of Chief Architect-Planner of the Corporation, Noel Tweddell, A.R.I.B.A. A wide variety of work, both architectural and planning, will be available, but the successful applicant will be primarily responsible for the day-to-day coordination of a building programme of £1,000,000, and recent experience of work on this scale is essential. The appointment, which is superannuable, will be made within the salary range stated, according to experience and ability. Subsistence allowances are payable in addition to salary in certain cases, until arrangements are made for family accommodation locally. Applications should be made on the special form obtainable from the Chief Architect to the General Manager, Basildon Development Corporation, Gifford House, Pitsea, Essex, by 6th April, 1951. 2195

ZETLAND COUNTY COUNCIL.

Applications are invited for the temporary appointment of qualified ASSISTANT in the County Architect's Department. Salary : Grade V and Va, *i.e.*, £520, rising to £610 per annum, of A.P.T. Division of Salary Scale, placing according to age and experience. Written applications, giving particulars of age, qualifications and experience, and stating when applicant can take up duty, must be lodged with the undersigned not later than 30th April, 1951, with one copy of not more than three recent testimonials. Canvassing in any form will be a disqualification.

JOHN N. SINCLAIR,
County Clerk.

County Buildings, Lerwick.
14th March, 1951. 2172

MIDDLESEX COUNTY COUNCIL COUNTY PLANNING DEPARTMENT.

PLANNING ASSISTANT (A.P.T., VI, £625, rising to £690 p.a. if 26 years or over). Town Planning and Architectural experience and qualifications essential. Established, pensionable, subject to medical examination and prescribed conditions. Applications in writing, stating age, experience, qualifications, etc., with copies of three recent testimonials, to the undersigned by 5th April (quoting J.204 A.J.). Canvassing disqualifies.

C. W. RADCLIFFE.
Middlesex Guildhall, Westminster, S.W.1. 2185

BASILDON NEW TOWN.

Assistant Architects are invited to apply for the following posts under the Chief Architect-Planner, Noel Tweddell, A.R.I.B.A. A variety of work will be undertaken :—

ASSISTANT ARCHITECTS (£650-£750 p.a.). Good training, experience of housing and supervision of small contracts essential.

ASSISTANT ARCHITECT (£550-£650 p.a.). Good training and experience of working drawings essential.

The appointments, which are superannuable, will be made within the salary range stated, according to experience and ability. Subsistence allowances are payable in addition to salary in certain cases, until arrangements are made for family accommodation locally. Applications should be made on the special form obtainable from the Chief Architect to the General Manager, Basildon Development Corporation, Gifford House, Pitsea, Essex, by 6th April, 1951. 2196

COUNTY BOROUGH OF CROYDON.
TEMPORARY CLERK OF WORKS.

Applications are invited for this appointment from persons accustomed to dealing with housing contracts and building. Salary £10 10s. for 44-hour week.

Applications on forms from the Borough Engineer must be received by him not later than 14th April, 1951.

Canvassing will disqualify.

E. TABERNER,
Town Clerk.

March, 1951. 2202

Architectural Appointments Vacant

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

ARCHITECTURAL ASSISTANT, of Intermediate standard, required immediately by firm of Architects in West End of London. Salary according to experience and qualifications. Box 2079.

WANTED, for Architects' Branch Office at Andover, Hants., capable ASSISTANT, having passed Intermediate Examination standard, to take charge and work on own initiative. Must be first-class draughtsman. Write, with copies three testimonials, stating salary required, to Box 2081.

ARCHITECTURAL ASSISTANT (fully qualified) required for progressive appointment with firm of private Architects in the Midlands. Must have had good office experience; age 25-35. Salary between £550 and £750 per annum, dependent on experience. Apply, with full particulars of qualifications and experience, to Box 2141.

ASSISTANT required. Good draughtsman, capable working drawings. Office experience essential. Salary £400/£500, for general building work. Initiative essential. Reply by letter, stating age and experience, R. Jelinek-Karl, L.R.I.B.A., A.I.A.A., 22, Chancery Lane, W.C.2. 2134

JUNIOR ASSISTANT required. Capable of measuring up and general drawing office duties. Salary according to ability. Write, stating age and experience, R. Jelinek-Karl, L.R.I.B.A., A.I.A.A., 22, Chancery Lane, W.C.2. 2135

SENIOR and JUNIOR ARCHITECTURAL ASSISTANTS required (permanent position) for varied and interesting work. Write, giving particulars of experience and salary required, to Ruddle & Wilkinson, F./L./A.R.I.B.A., Long Causeway Chambers, Peterborough. 2163

WANTED, a fully qualified ARCHITECT for a well-known London Architect's office, with experience in carrying out important works and capable of taking over the organisation of a section of interesting work. Must be a capable designer, able to develop rough sketches. A permanent position is contemplated. Commencing salary £1,200 per annum. Box 2158.

ARCHITECTURAL ASSISTANTS urgently required in both London and Portsmouth offices of London architect. Applicants should be of at least Intermediate standard. Interesting work and good salary for right man. Send applications in duplicate, giving age, qualifications and experience to Box 2179.

CANADA.—Mature, qualified SENIOR ASSISTANT required for New Brunswick. Salary $3,600 p.a., free air passage. Apply Overseas Architects Service, 5, Welldon Crescent, Harrow. 2176

ARCHITECTURAL ASSISTANT, above Inter. standard, required N.E. London. Ind. and Comm. Projects. Box 2177.

ARCHITECT'S ASSISTANT in West End office. experience industrial work, salary £750 per annum. Responsible, progressive post. Box 2190.

ARCHITECTURAL ASSISTANT, of Inter. standard, required for work on designing and detailing industrial and administrative buildings. Write, stating experience and salary required, to Box 2198.

AN East Midlands Brewery require an ASSISTANT in their newly formed Architect's Department, of at least Intermediate R.I.B.A. standard. Reliable draughtsman, with some experience of maintenance, alteration and rebuilding work preferred. Salary in the region of £500, but state salary required and full particulars to Box 2200.

EXPERIENCED ASSISTANT ARCHITECTS required by an old-established Firm of Birmingham Architects. The positions offer good prospects to suitable applicants. One A.R.I.B.A. and one Intermediate standard. Applications to be in writing, stating age, training, experience and references, with salary required. Membership of the R.I.B.A. and/or school training, though desirable, not essential. Apply to Box 2206.

ARCHITECTURAL ASSISTANTS required for office in Liverpool, preferably with commercial and industrial experience. Particulars and salary to Box 2205.

Architectural Appointments Wanted

CHARTERED ASSISTANT, with considerable and varied experience, including 7 years' Chief Assistant in private practice, requires position offering greater responsibility and good future prospects. Pleasant town preferred; not London. Box 111.

FEMALE Student, R.I.B.A. (Inter.) (25) wants job in Worksop, Mansfield or Nottingham. Slight office experience. Box 2178.

ARCHITECTURAL ASSISTANT desires position in London office. Box 112.

QUALIFIED ARCHITECT requires employment, 3 days weekly. Contemporary general work. London area. Please state salary and hours. Box 113.

SOUTH COAST.—Young A.R.I.B.A., contemporary outlook, 6 years' varied practical experience, used to taking responsibility, requires progressive position leading to junior or salaried partnership with South Coast architect. Box 114.

Other Appointments Vacant

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

SALES REPRESENTATIVES required in various parts England. Only applicants of highest integrity, good manner and appearance, and ability to negotiate schemes will be considered. Preference will be given to those with : (1) established connections with Architects, Builders and Local Authorities; (2) knowledge of woodworking; (3) ability to take site measurements and prepare rough sketches; (4) possessing own car. Remuneration by salary and commission. Application forms from Peerless Built-in Furniture, Ltd., Western Avenue, Perivale, Greenford, Middx. 2191

BUILDING Contractors, operating in West End of London, require GENERAL MANAGER, to take complete charge. Knowledge of Property market a desirable qualification, but not essential. Salary up to £3,000 a year, according to experience and qualifications, and excellent prospects leading to directorship. Box 2189.

DRAUGHTSMAN (superior) required, London. Write age and salary, etc. Box 1945.

DRAUGHTSMAN, with experience in the design of structural steelwork on industrial buildings, required. A knowledge of reinforced concrete and general building construction also desirable. A flat will shortly be available. Write, stating age, experience, and salary desired, to Box 2155.

EXPERIENCED ESTIMATOR, with knowledge of Building materials, and building practice, required to take charge of Estimating Department. Reply to Bellrock Gypsum Industries, Ltd., 200, Westminster Bridge Road, Waterloo, S.E.1. 2199

DRAUGHTSMAN required by a Middle East oil company for service overseas. Should have had at least five years' experience in drawing office, and should be able to prepare detailed drawings of the following types of work : mechanical, pipe work, electrical transmission, distribution, wiring, etc. Knowledge of drawings for buildings and drainage an advantage. Salary starting £630 p.a. clear, plus living allowances. Kit allowance, pension scheme. Write, giving details and quoting K.1232, to Box "Y.F.," c/o J. W. Vickers & Co., Ltd., 7/8, Great Winchester Street, London, E.C.2. 2197

Services Offered

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

CHARTERED STRUCTURAL ENGINEER offers occasional technical services. Own office, Wales and West Country area. Box 2162.

ARCHITECTURAL ASSISTANT, residing in West London, offers spare-time services to Architects in London area. Plans, Working Drawings, Detailing from Sketches, Tracings, etc. Box 2181.

ARCHITECT (20 years' experience all types of work), recently commenced own practice, offers first-class part-time assistance to others. Own car. Central London area and to South Coast. All work confidential. Box 2180.

OUTSTANDING ACADEMY DRAWINGS now being completed, further Commissions can be undertaken by Perspectivist, Winston Walker, F.R.I.B.A., A.A.Dipl., Dipl.T.P., A.R.Ae.S., 107, Sloane Street, S.W.1. Telephone SLOane 1410. 2175

ARCHITECTURAL MODELS and Dioramas. Edward J. Ashenden, A.R.C.A., 15, Chenil Studios, 183, Kings Road, S.W.3. Tel. : Flax 6103. 2566

FREE-LANCE Surveyor offers Services to Architects requiring accurate surveys of land and buildings, levelling, contouring, etc.; own car and complete equipment. 2772

Miscellaneous

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

A. J. BINNS, LTD., Specialists in the supply and fixing of all types of Fencing, Gates and Cloakroom Equipment. Harvest Works, 99-107, St. Paul's Road, N.1. Canonbury 2061.

The Race Upholstery Unit will be pleased to report on and tender for your specialised upholstery requirements and repairs. 22, Union Road, Clapham, S.W.4. 4048

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ARCHITECTS' SMOCKS.—High grade Irish linen; zip fronts; 37s. 6d., including P.T. State chest measurements. E. Ashcroft, 167, Oldham Road, New Cross, Manchester. 2087

CIVIL ENGINEER (Liverpool area) wishes to meet young Architect view joint practice; spare time initially. Box 2192.

VERMICULITE.—Exfoliated Vermiculite in all grades, suitable for loose fill, furnace lagging, heat and sound insulation, partition block making, light weight aggregate, and many other purposes. Available for prompt delivery from London stock. John Chapman & Son, 351, Purley Way, Croydon. Croydon 5583. 2188

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