THE ARCHITECTS' JOURNAL

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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
AAI	Association of Art Institutions. Secy.: W. Marlborough Whitehead, "Dyneley," Castle Hill Avenue, Berkhampstead, Herts.	
ABS	Architects' Benevolent Society. 66, Portland Place, W.1.	Langham 5721
ABT	Association of Building Technicians. 5, Ashley Place, S.W.1.	Victoria 0447-8
ACGB	Arts Council of Great Britain. 4, St. James' Square, S.W.1.	Whitehall 9737
ADA	Aluminium Development Association. 33, Grosvenor Street, W.1.	Mayfair 7501/8
ArchSA	Architectural Students' Association. 34/36, Bedford Square, W.C.1.	
ARCUK	Architects' Registration Council. 68, Portland Place, W.1.	Langham 8738
BAE	Board of Architectural Education. 66, Portland Place, W.1.	Langham 5721
BATC	Building Apprenticeship and Training Council. Lambeth Bridge House, S.E.1.	Reliance 7611, Ext. 1706
BC	Building Centre. 26, Store Street, Tottenham Court Road, W.C.1.	Museum 5400
BCC	British Colour Council. 13, Portman Square, W.1.	Welbeck 4185
BCCF	British Cast Concrete Federation. 105, Uxbridge Road, Ealing, W.5.	Ealing 9621
BCIRA	British Cast Iron Research Association. Alvechurch, Birmingham.	Redditch 716
BDA	British Door Association. 10, The Boltons, S.W.10.	Fremantle 8494
BEDA	British Electrical Development Association. 2, Savoy Hill, W.C.2.	Temple Bar 9434
BIA	British Ironfounders' Association. 145, Vincent Street, Glasgow, C.2.	Glasgow Central 2891
BID	Building Industries Distributors. 52, High Holborn, W.C.1.	Chancery 7772
BINC	Building Industries National Council. 11, Weymouth Street, W.1.	Langham 2785
BOT	Board of Trade. Whitehall Gardens, Horseguards Avenue, Whitehall, S.W.1.	Trafalgar 8855
BRDB	British Rubber Development Board. Market Buildings, Mark Lane, E.C.3.	Mansion House 9383
BRS	Building Research Station. Bucknalls Lane, Watford	Garston 2246
BSA	Building Societies Association. 14, Park Street, W.1.	Mayfair 0515
BSI	British Standards Institution. British Standards House, 2, Park St., W.1.	Mayfair 9000
BTE	Building Trades Exhibition. 4, Vernon Place, W.C.1.	Holborn 8146/7
CABAS	City and Borough Architects Society. C/o Johnson Blackett, F.R.I.B.A., Civic Centre, Newport, Mon.	Newport 65491
CAS	County Architects' Society. C/o F. R. Steele, F.R.I.B.A., County Hall, Chichester.	Chichester 3001
CCA	Cement and Concrete Association. 52, Grosvenor Gardens, S.W.1.	Sloane 5255
CCP	Council for Codes of Practice. Lambeth Bridge House, S.E.1.	Reliance 7611
CDA	Copper Development Association. Kendals Hall, Radlett, Herts.	Radlett 5616
CIAM	Congrès Internationaux d'Architecture Moderne. Doldertal, 7, Zurich, Switzerland.	
COID	Council of Industrial Design. Tilbury House, Petty France, S.W.1.	Abbey 7080
CPRE	Council for the Preservation of Rural England. 4, Hobart Place, S.W.	Sloane 4280
CUC	Coal Utilization Council. 3, Upper Belgrave Street, S.W.1.	Sloane 9116
CVE	Council for Visual Education. 13, Suffolk Street, Haymarket, S.W.1.	Reading 72255
DGW	Directorate General of Works, Ministry of Works, Lambeth Bridge House, S.E.1.	Reliance 7611
DIA	Design and Industries Association. 13, Suffolk Street, S.W.1.	Whitehall 0540
DPT	Department of Overseas Trade. Horseguards Avenue, Whitehall, S.W.1.	Trafalgar 8855
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. 68, Gloucester Place, W.1.	Welbeck 9966
FASS	Federation of Association of Specialists and Sub-Contractors, Artillery House, Artillery Row, S.W.1.	Abbey 7232
FBBDO	Fibre Building Board Development Organization, Ltd. 47, Princes Gate, Kensington, S.W.7.	Kensington 4577
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.	Chancery 7583
FPC	The Federation of Painting Contractors, St. Stephen's House, S.W.1.	Whitehall 3902
FRHB	Federation of Registered House Builders. 82, New Cavendish Street, W.1.	Langham 4041
GBPA	Gypsum Building Products Association, 11, Ironmonger Lane, E.C.2.	Monarch 8888
GC	Gas Council. 1, Grosvenor Place, S.W.1.	Sloane 4554
GG	Georgian Group. C/o R. H. Davies, F.R.I.B.A., 44, Lowndes Street, S.W.1.	Belgravia 3081
HC	Housing Centre. 13, Suffolk Street, Pall Mall, S.W.1.	Whitehall 2881
IAAS	Incorporated Association of Architects and Surveyors. 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

Steve

IS WELL IN THE PICTURE

Many a TV celebrity would, our photographer reckons, be glad to swap faces with the photogenic Harold Stevenson*, the happy Lancashire man who has taken over Williams & Williams Maidstone area.

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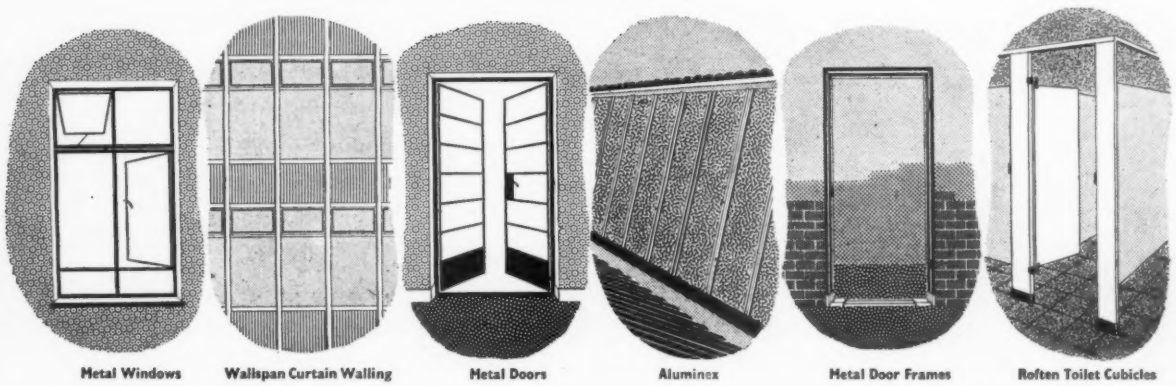

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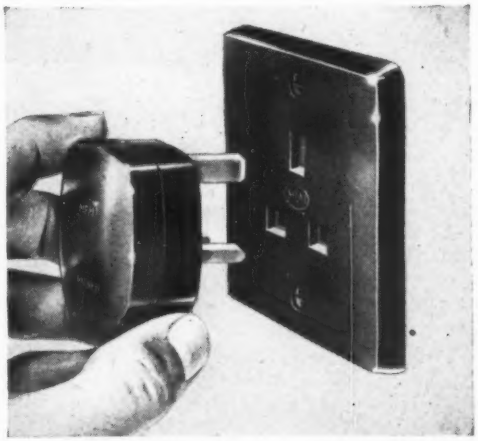

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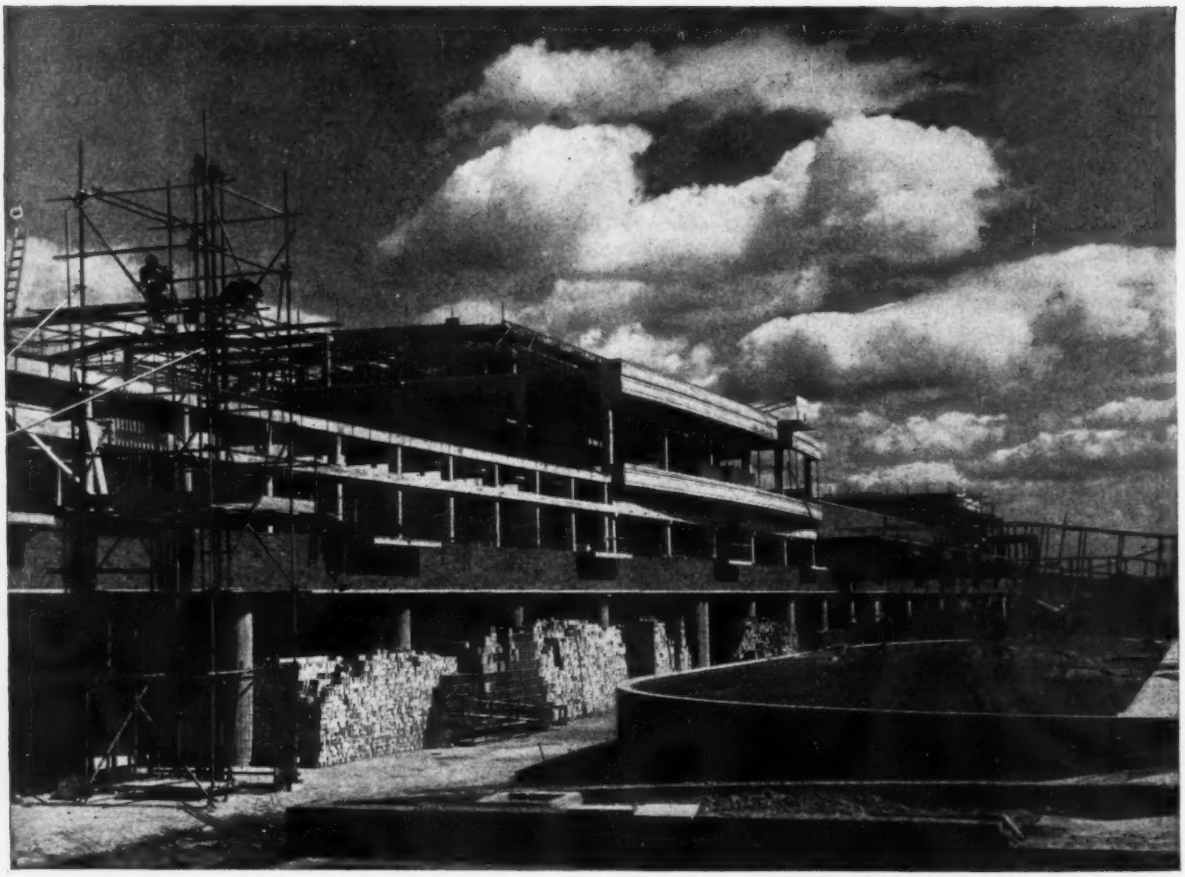

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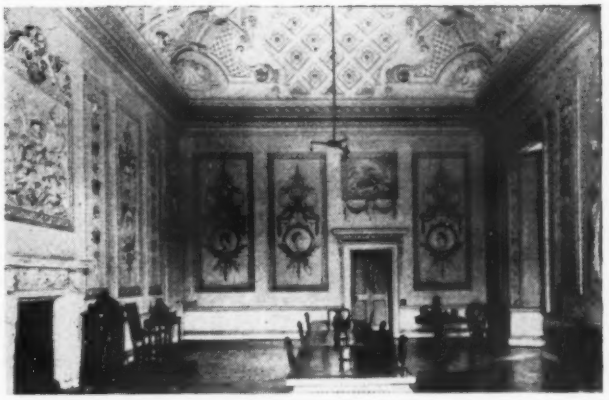

The Garter Room (above) and The Vanbrugh Corridor.

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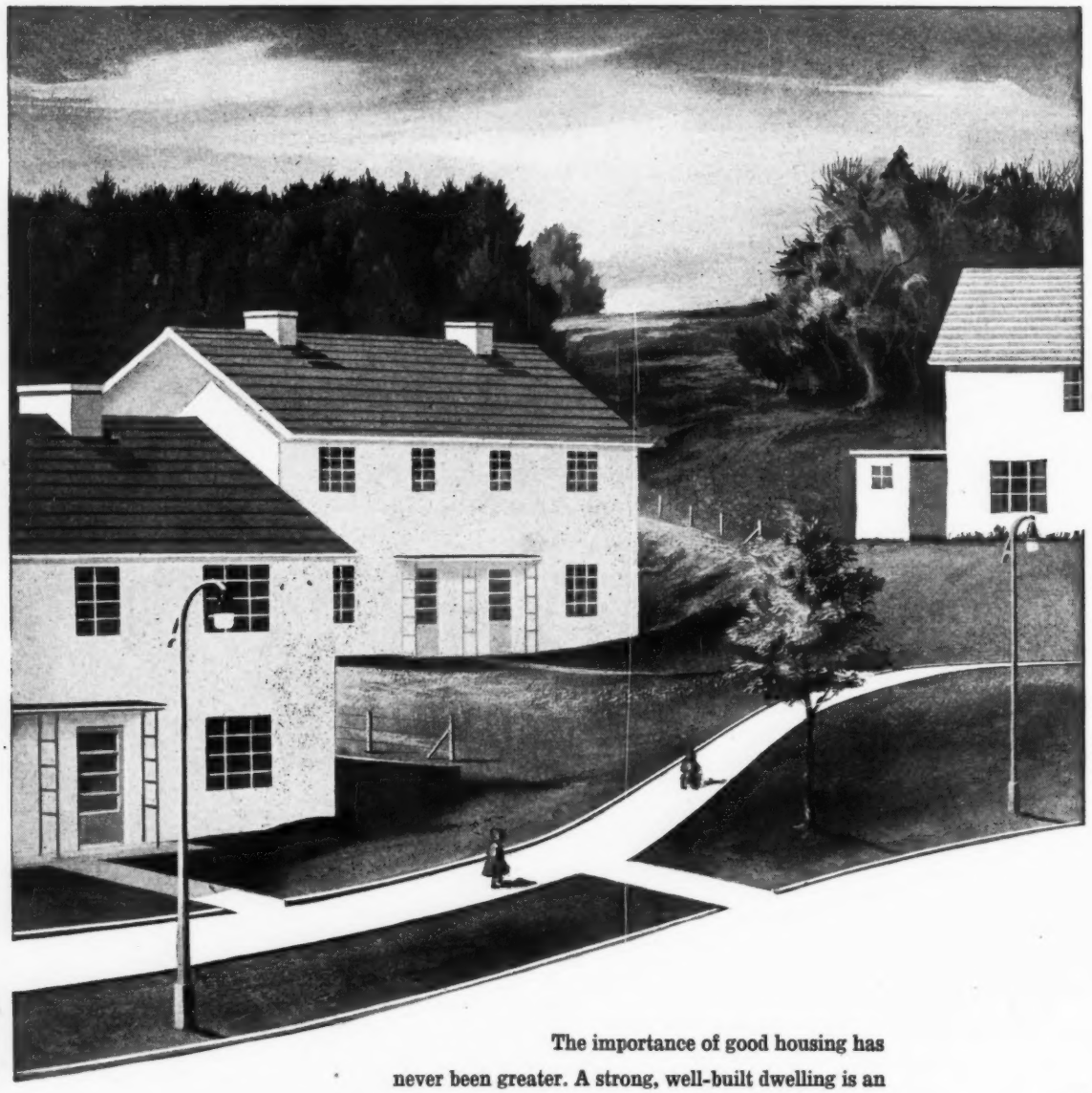

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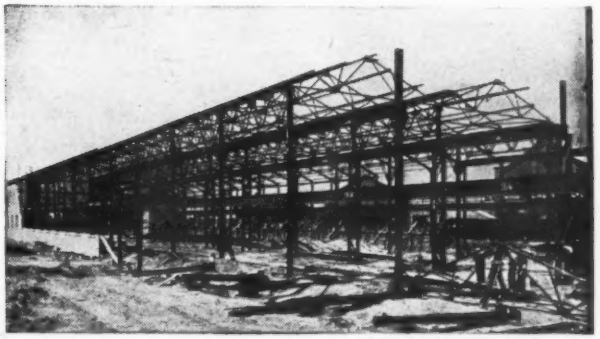

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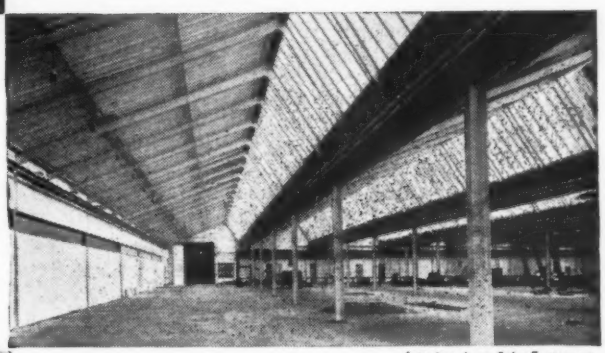

Interior view of the Factory at Barnsley, Messrs. Brook Motors Ltd.

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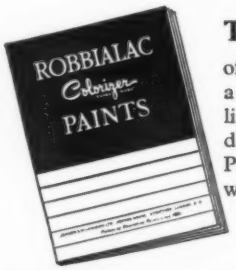

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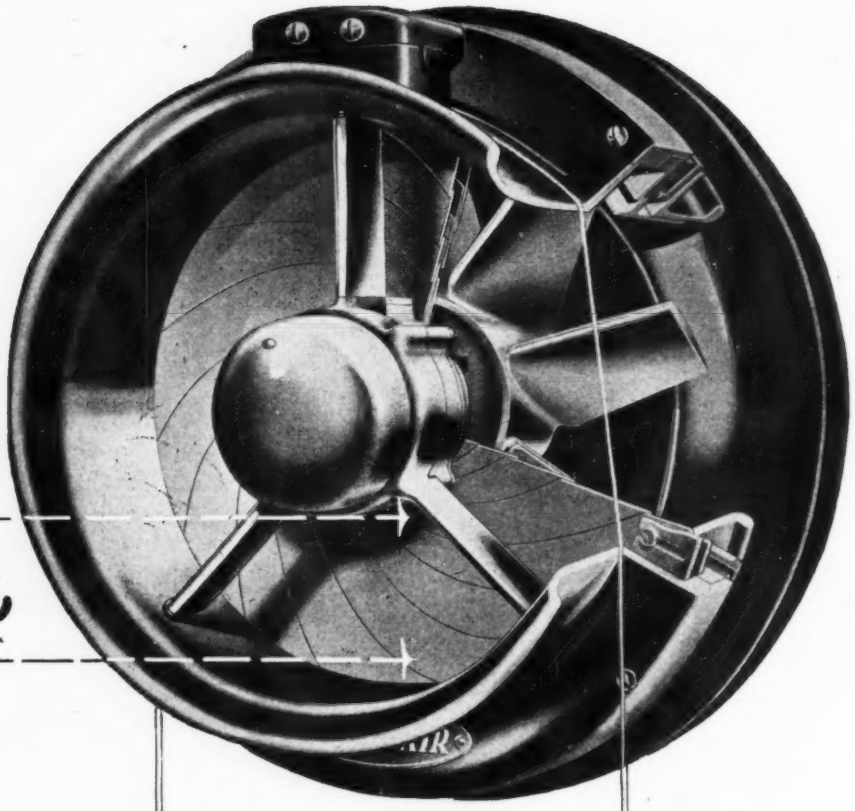

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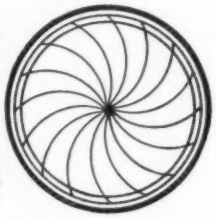

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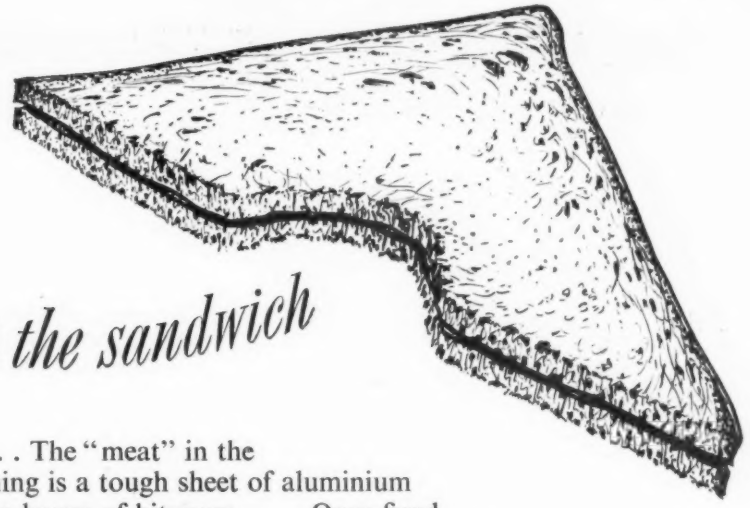

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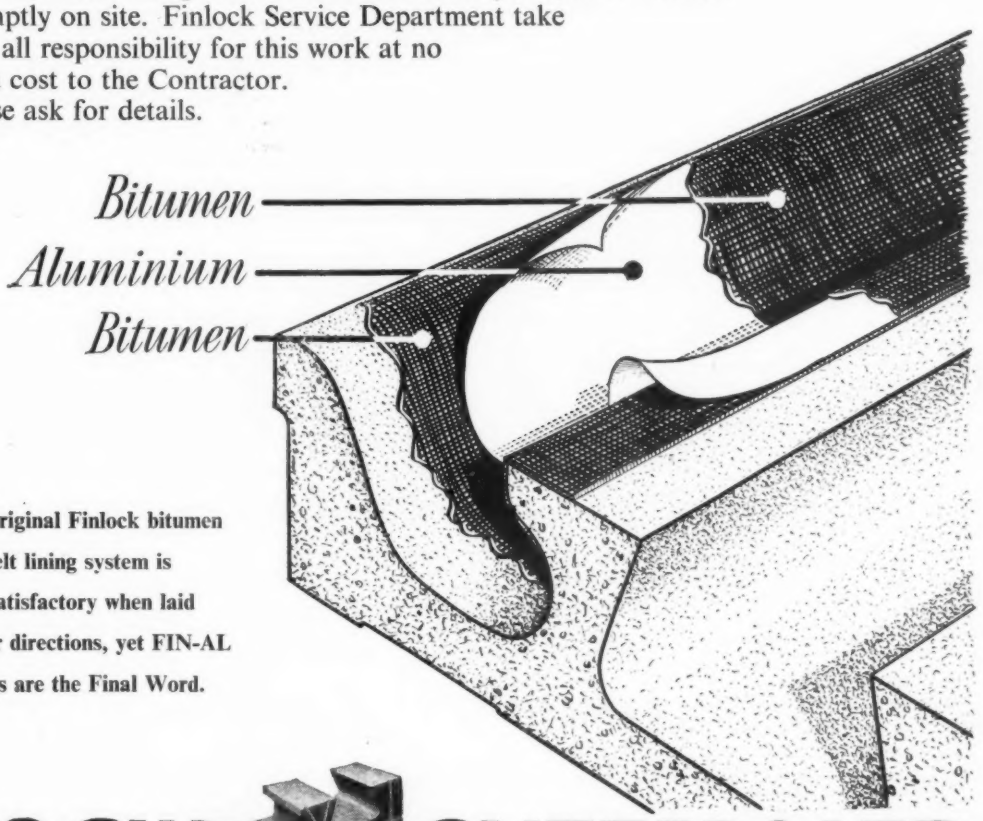

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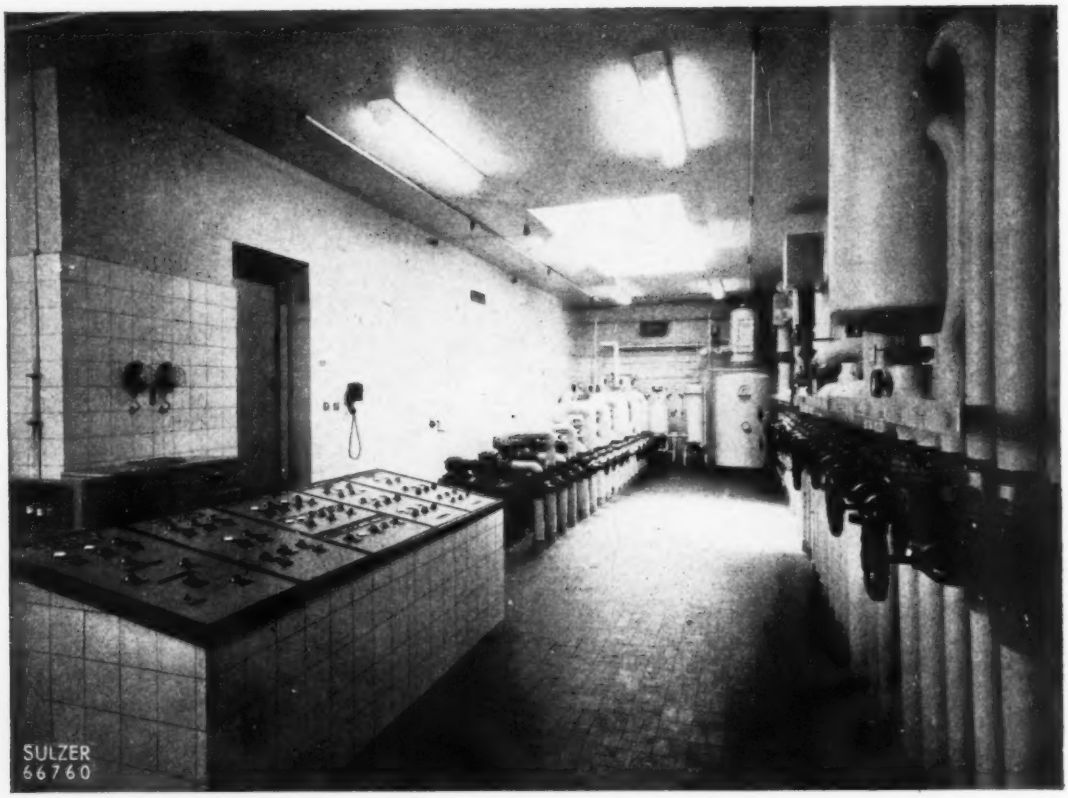

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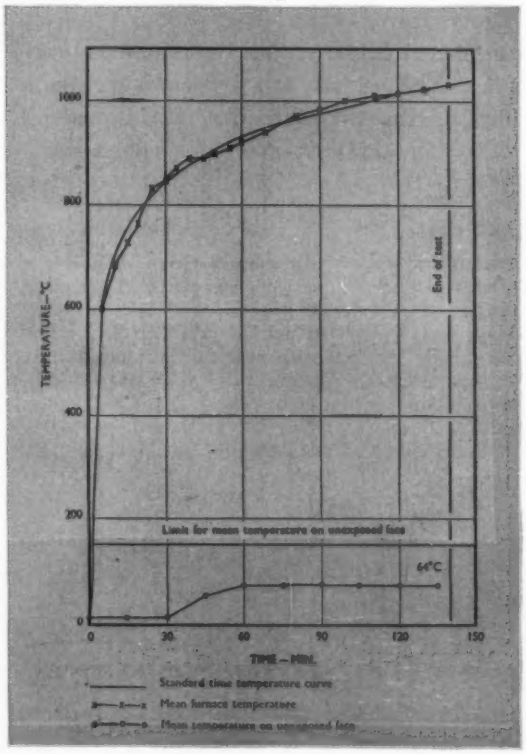

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The mean furnace temperature is shown in graph in comparison with the standard time-temperature curve of B.S.476. In the same graph is plotted the curve of mean temperature for the unexposed face.

At two hours the rise in mean temperature of the unexposed face was 64 Centigrade degrees, and the rise in temperature on a mortar joint was 69 Centigrade degrees.

CONCLUSIONS. A loadbearing wall of 4 in. "Thermalite" blocks having ½ in. of plaster on the heated face as described in this report was subjected to a fire resistance test complying with British Standard No. 476:1953. The specimen wall satisfied all the test requirements for 2 hours 20 minutes and therefore provided fire resistance of the 2 hour grade.

For further details and technical data apply to

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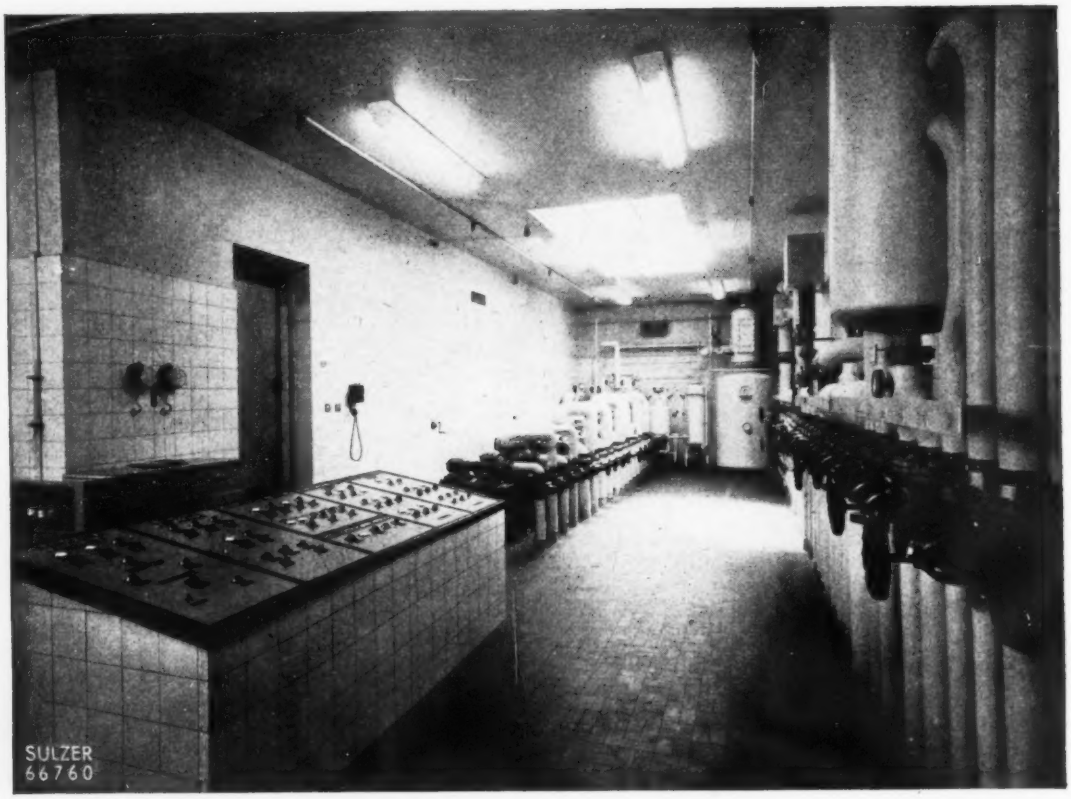

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No. 7 Fire Resistance

A standard test of a **LOADBEARING** wall of 4" Thermalite blocks

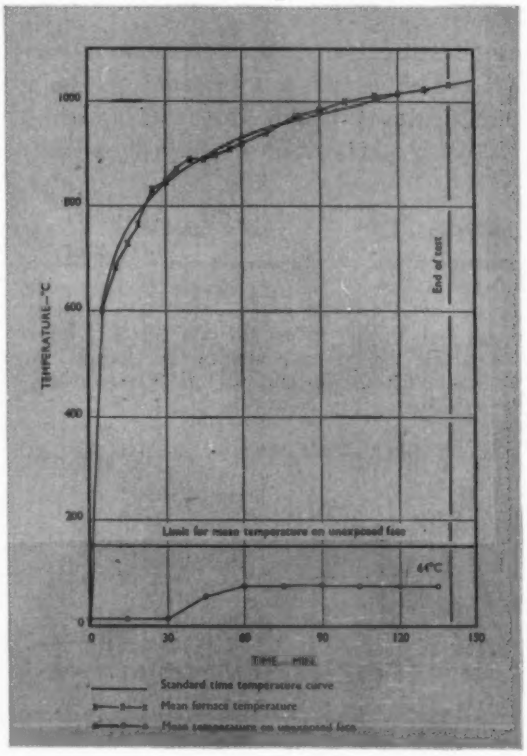
Extracts from a report of a Special Investigation carried out by the

Department of Scientific and Industrial Research and Fire Offices' Committee Joint Fire Research Organisation

DESCRIPTION OF THE SPECIMEN

The specimen wall of "Thermalite" blocks was built on a reinforced refactory concrete slab to represent one leaf 10 ft. wide by 9 ft. 10 in. high of a cavity wall. The Thermalite blocks having nominal dimensions of 18 in. × 9 in. × 4 in. thick were laid as dry as possible in a mortar of cement/lime/sand in the proportions by volume of 1:2:9. Plaster ½ in. thick was applied to one face in two coats, the undercoat having the same composition as the bedding mortar and the finishing coat consisting of two parts of anhydrous gymsum plaster to one part of lime putty by volume.

Thermalite is a lightweight aerated concrete building material in block form which is noncombustible. Details of its composition have been given and are recorded on Joint Fire Research Organisation File No. F.1025/10/126. It is stated that it complies with the strength requirements of B.S.834, the compressive strength as delivered being 750-800 lb./in.^{2}. The density is approximately 51 lb./ft.^{3}.



TEST PROCEDURE

A uniform load of 1220 lb./ft. run was applied to the wall and maintained constant throughout the heating period. The vertical edges of the wall were unrestrained. As required by B.S.476, re-application of the test load was made 48 hours after the fire test.

Test Results

The wall withstood re-application of the test load 48 hours later. The load was then increased until failure occurred by buckling of the wall at 11.3 tons.

The mean furnace temperature is shown in graph in comparison with the standard time-temperature curve of B.S.476. In the same graph is plotted the curve of mean temperature for the unexposed face.

At two hours the rise in mean temperature of the unexposed face was 64 Centigrade degrees, and the rise in temperature on a mortar joint was 69 Centigrade degrees.

CONCLUSIONS. A loadbearing wall of 4 in. "Thermalite" blocks having ½ in. of plaster on the heated face as described in this report was subjected to a fire resistance test complying with British Standard No. 476:1953. The specimen wall satisfied all the test requirements for 2 hours 20 minutes and therefore provided fire resistance of the 2 hour grade.

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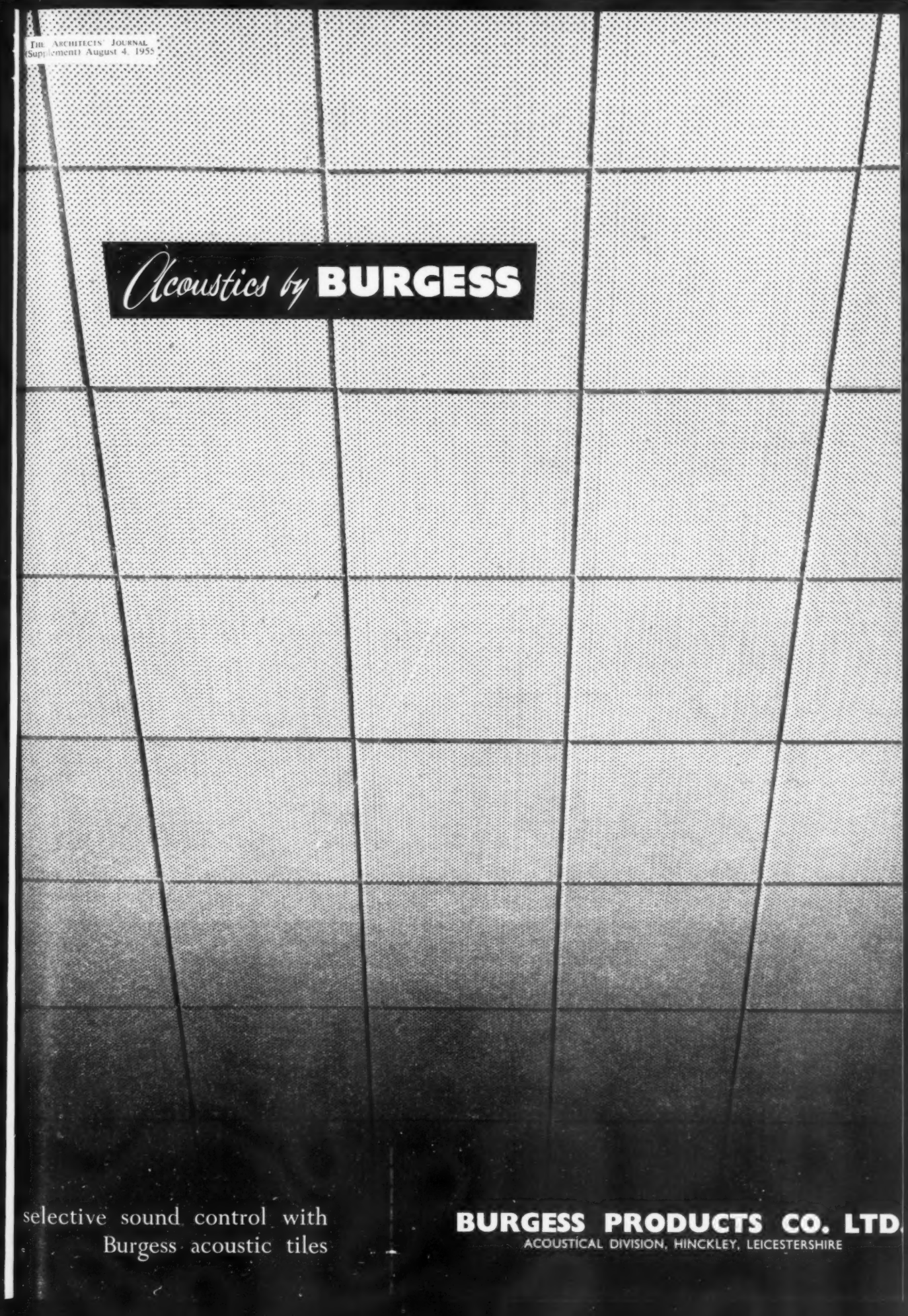
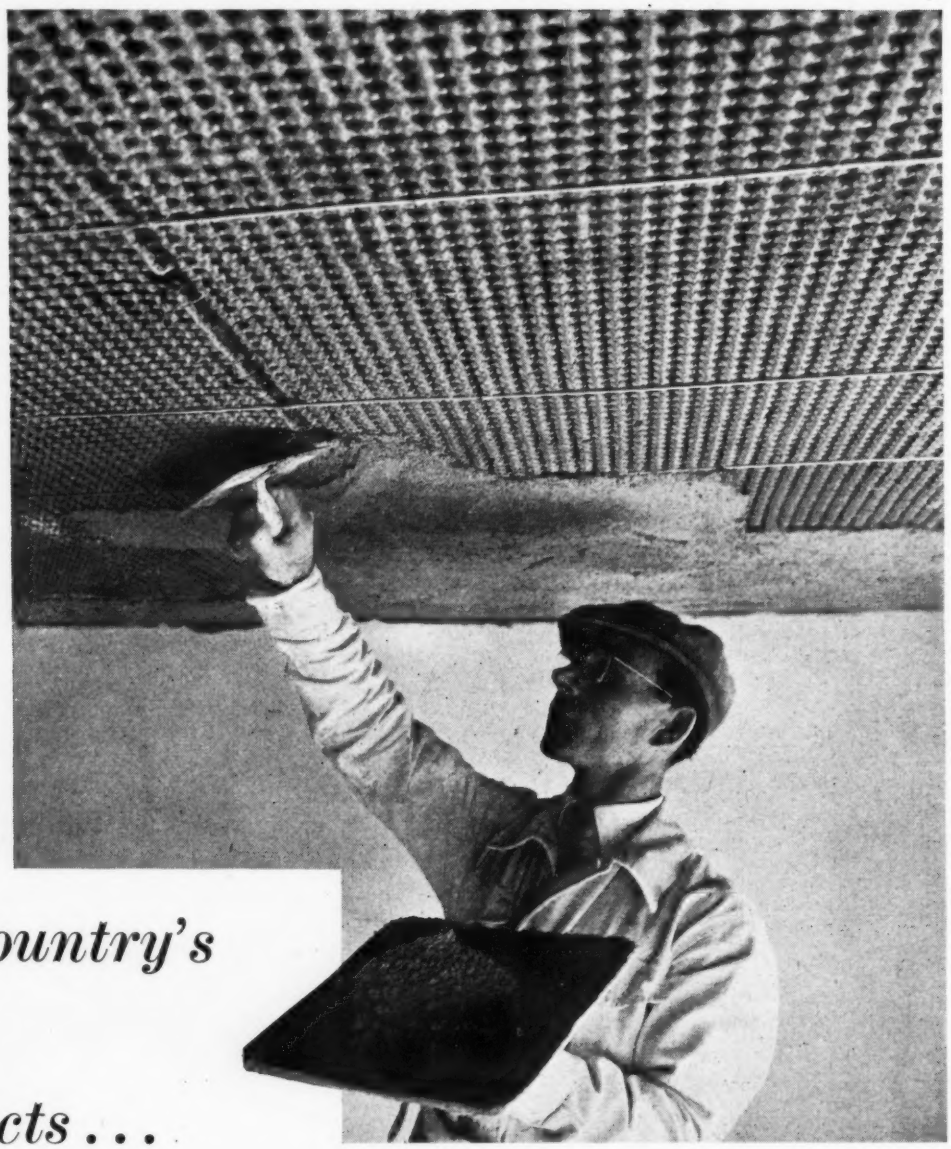
THE ARCHITECTS' JOURNAL
(Supplement) August 4 1955





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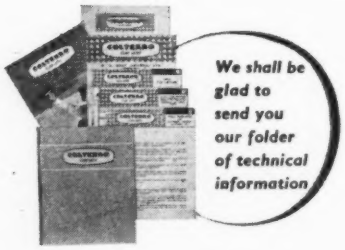

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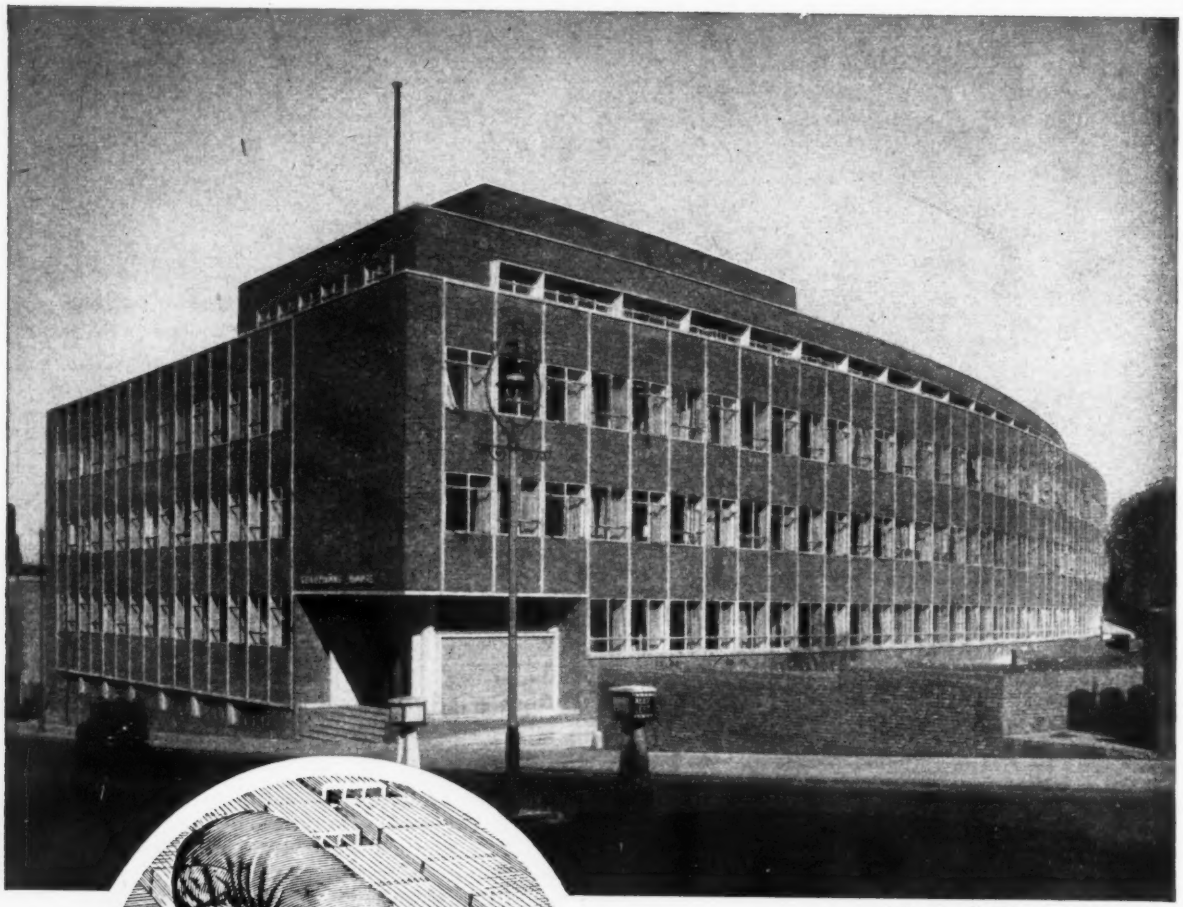

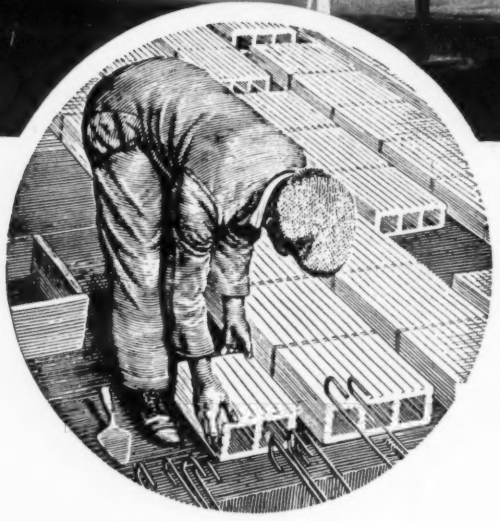

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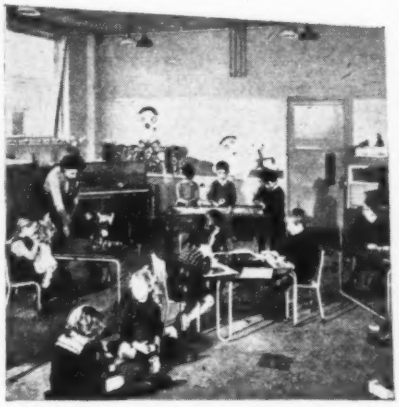

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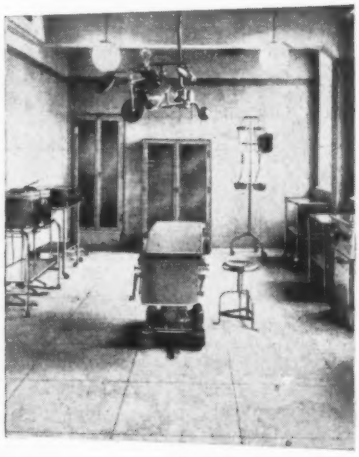

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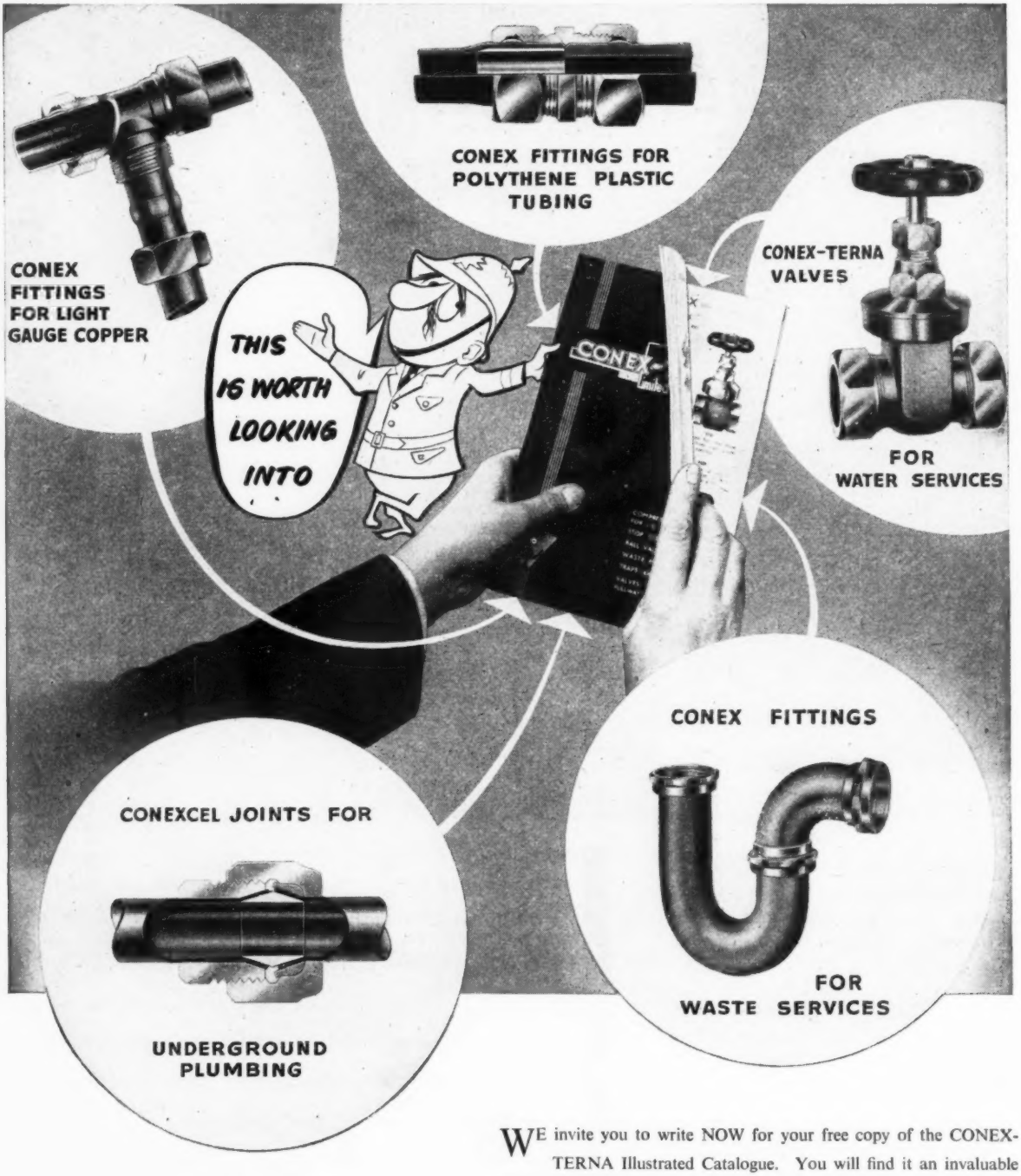

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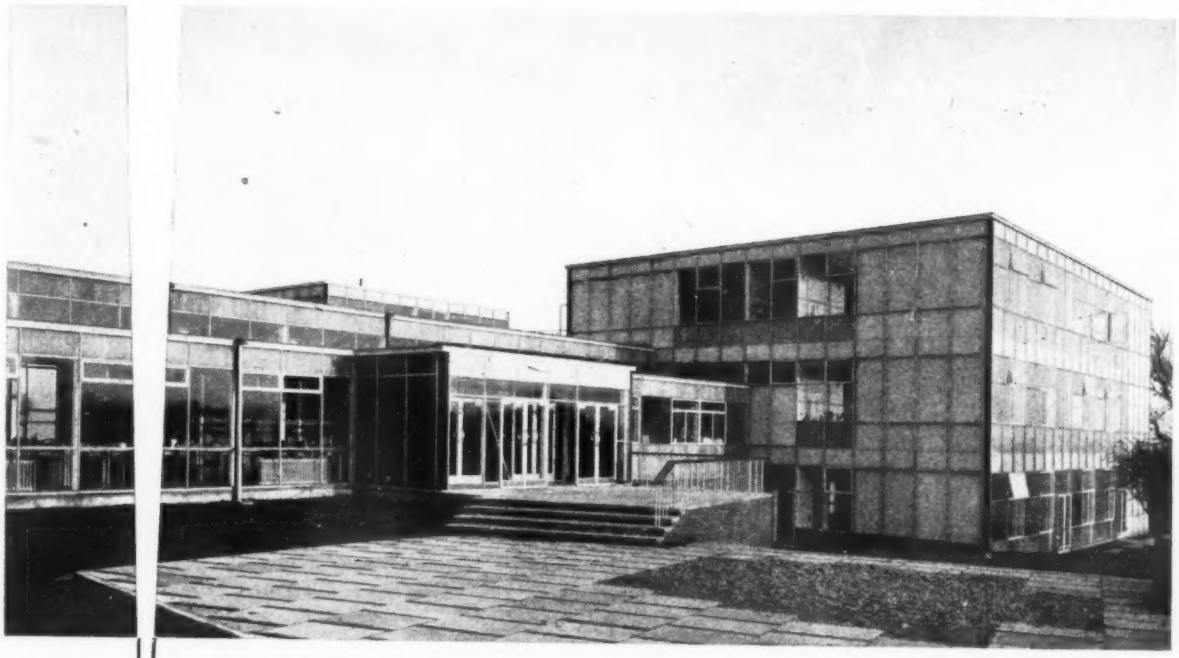

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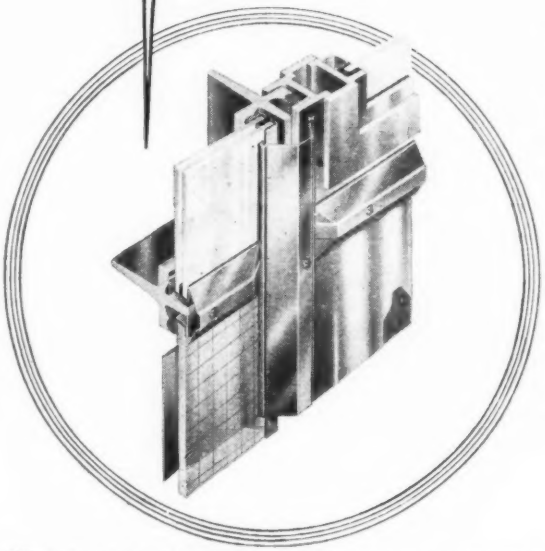

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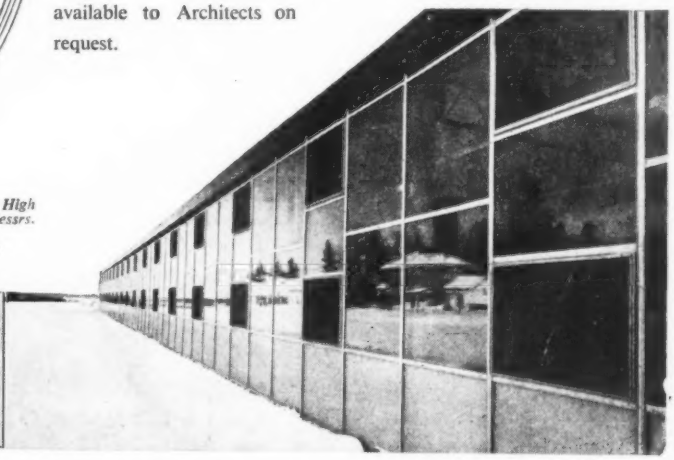
(Illustrated at top). Hurlfield Secondary Modern School for Girls, Sheffield. Architects Co-Partnership in collaboration with J. L. Womersley, A.R.I.B.A., A.M.T.P.I., City Architect.



(Right). The Wingham District High School, Toronto. Architects: Messrs. Kyles & Kyles.

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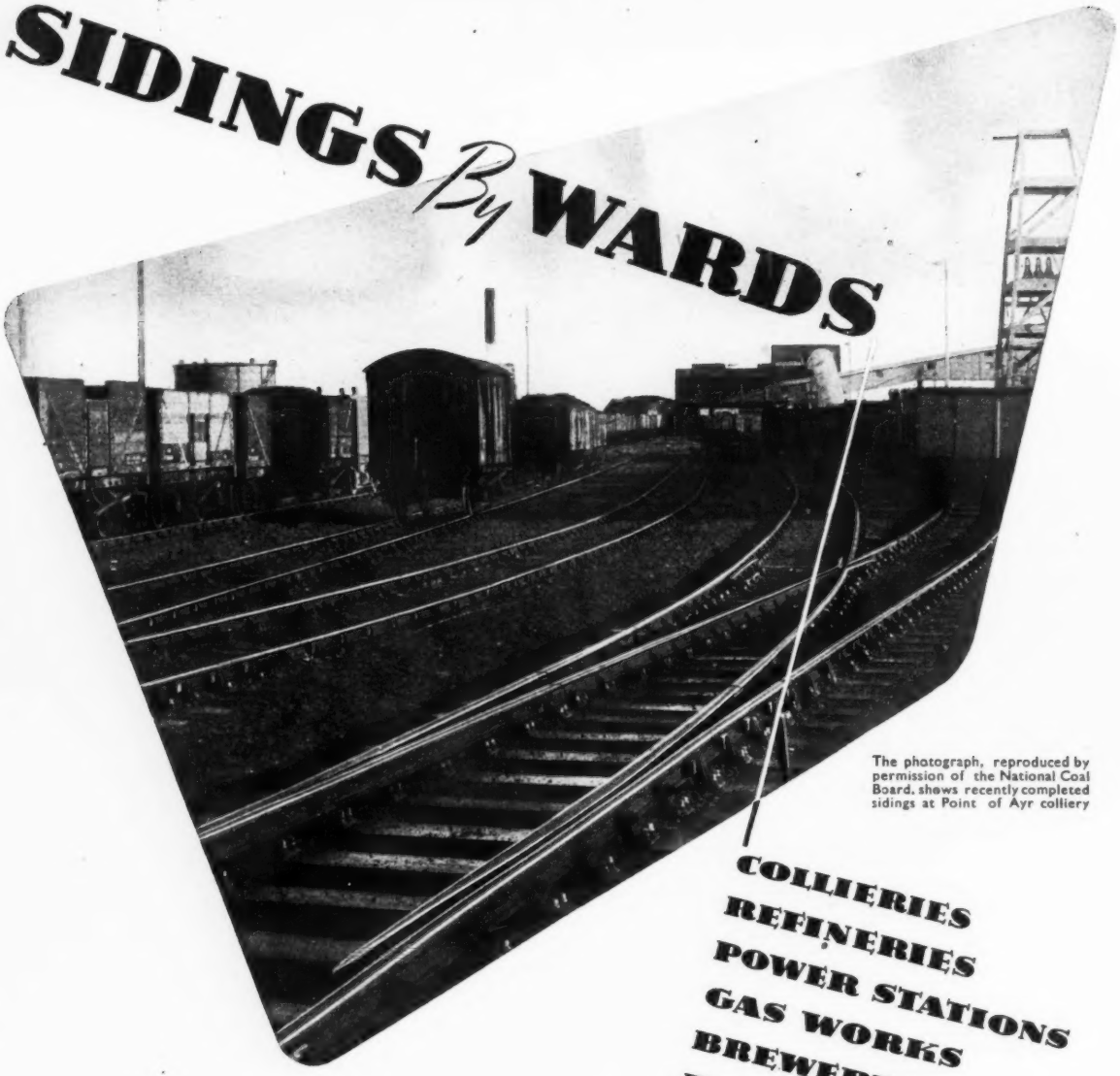

The photograph, reproduced by permission of the National Coal Board, shows recently completed sidings at Point of Ayr colliery

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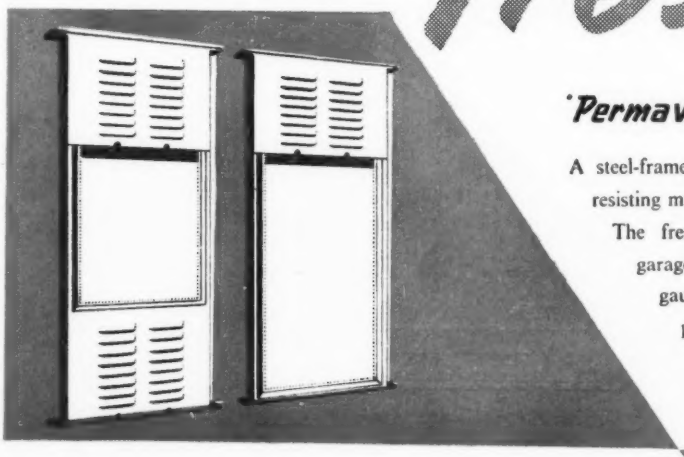

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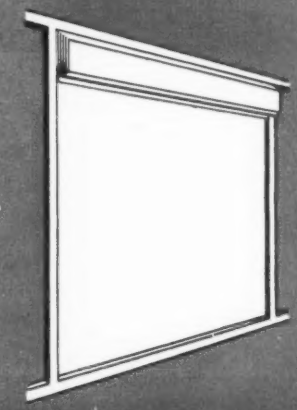

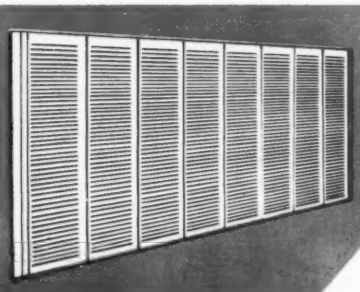

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Photo: Kings Park Primary School, by courtesy of Glasgow Corporation
Architect: Thomas S. Cordiner, F.R.I.B.A., Glasgow, C.2.

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THE ARCHITECTS' JOURNAL

9, 11 & 13, Queen Anne's Gate, Westminster, London, S.W.1 Whitehall 0611

No. 3153 August 4, 1955 VOL. 122

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CONVERSION OF ST. JOHN'S

Continued pursuit of the summer schools circus took ASTRAGAL to York, where he found that, apart from the usual rubber-necking at Georgian houses, Assize Courts, Burlingtonian Assembly Rooms, and a round tour of miscellaneous ruined castles (Sheriff Hutton, Slingsby, Helmsley, etc.) and partly burned-out Castle Howard, one of the most exciting things to do is to contemplate the future headquarters of the York Architectural Trust.

*

The Architectural Trust, which has expanded remarkably quickly, provides educational services for which there is a need, but no provision elsewhere—the Summer Schools on the care of old churches are an example, and so is the proposed study-conference on office organization which may be held next year. The building which the Trust is now bulging out of—St. Anthony's Hall—was, in itself, a remarkable conversion and rehabilitation job on a redundant medieval structure. But it was, after all, a Guildhall, and therefore easy to adapt for a civic body. The work of conversion on the Trust's future headquarters—St. John's, Ousebridge, a church which is no longer needed—should be even more remarkable. The manner of converting a three-aisle church into a library, lecture hall and office accommodation will be interesting enough, in all conscience, but the restoration and making-good which is also involved will make the complete work an extraordinarily complex affair which ASTRAGAL hopes to see properly published when it is all finished.

*

An interim vote of congratulations to York Architectural Trust, anyhow, for a bold and imaginative enterprise.

PRA ON FORM

Just as RA President Richardson cannot resist having a dig at architectural journalists and critics, ASTRAGAL cannot resist joining in the laughter created by this indefatigable reactionary's sallies. Speaking to the LMBA recently, Professor Richardson smacked petulantly not only at critics but at economy, efficiency, functionalism, building densities, the Festival Hall, glass walling, packing-case architecture, lamp posts and furniture. And yet, as was pointed out in this column only a few weeks ago, the professor said that he found the modern designs of the Central School of Arts and Crafts most beautiful. But then, he also blatantly curried favour with the master builders by saying that they were "exceptional and gifted people" with admiration and respect for masterpieces of design—unlike young professional men, apparently. The Professor, very sensibly, calls for comprehensive planning, but he thinks that London's buildings need not be more than "shells, but the elevations should be pre-determined to form comprehensive frontages." Those who now work behind under-windowed classical facades will appreciate that.

ANCESTRAL ARCHITECTS

Readers of the recent issue of the JOURNAL on the architects of the West Riding may have noticed the considerable number of firms that were family businesses, with the son now running the firm which his father or grandfather started. Sometimes the fathers, although in their eighties, are still actively concerned in the business—and jolly good luck to them.

*

ASTRAGAL was reminded of these examples of family architectural firms when he read in the *Builder* of June 10 of a centenary party given by Michael Waterhouse, of the firm of Waterhouse & Ripley, to celebrate a century of unbroken practice handed from father to son—in fact, through three generations: grandfather Alfred Waterhouse set up his plate in Manchester in 1855. He was followed by Paul, and then came the present head of the firm, Michael. Michael's son, David, joined his father's practice in 1953. "Certainly," said the *Builder*, "there is nothing in Great Britain to match this performance." Such confidence set

ASTRAGAL thinking, and sure enough he hadn't run through more than three or four names before he recalled a family of architects which, he suspected, would knock this record firmly on the head.

•

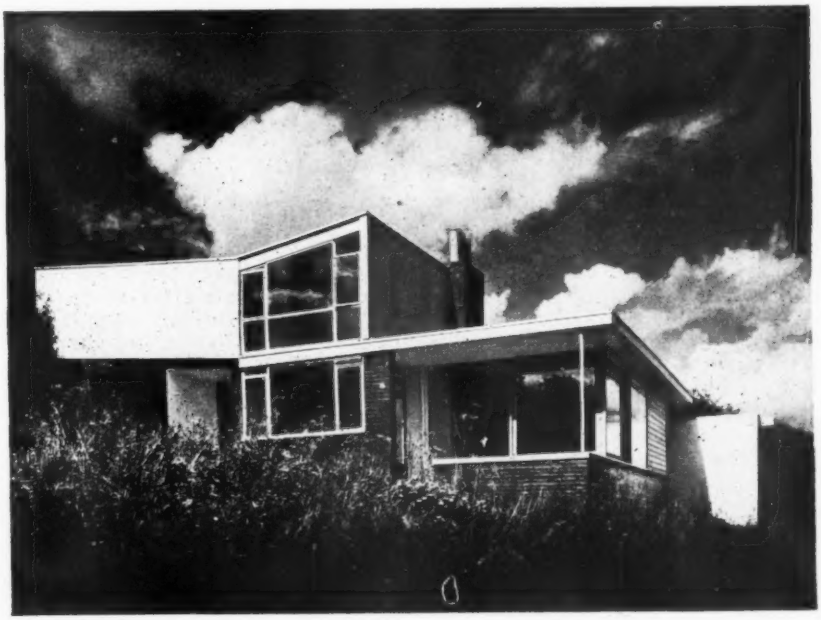
An enquiry by letter produced the following: Henry Goddard (who will be familiar to some readers for his remarkable war record as a flyer—and to others as an imperturbable lecturer at the AA, or as one of those invaluable creatures, an unbiased heating consultant) inherited a family architectural practice in Leicester in 1944, which was founded by his great-great-grandfather, Joseph Goddard, at the end of the eighteenth century. Joseph started life as a builder, apparently being apprenticed as a joiner to his father, who was also a builder, but he later became an architect. He died in 1834. He was followed by Henry, who died 1868; grandson Joseph, died 1900, and his great-grandson, the present Henry Goddard's father. When Joseph Goddard turned architect he may have spoilt another record, for it seems that the Goddard family have been *builders* since the fifteenth century, when they arrived in Leicestershire as bricklayers to help build Kirby Muxloe Castle. However, the *Builder's* claim for a record of 100 years for a father-to-son architectural practice has now been beaten by some 55 years. The family architectural tradition stands at 155 years . . . any advance on that?

BUNGALOW PATTERN BOOK

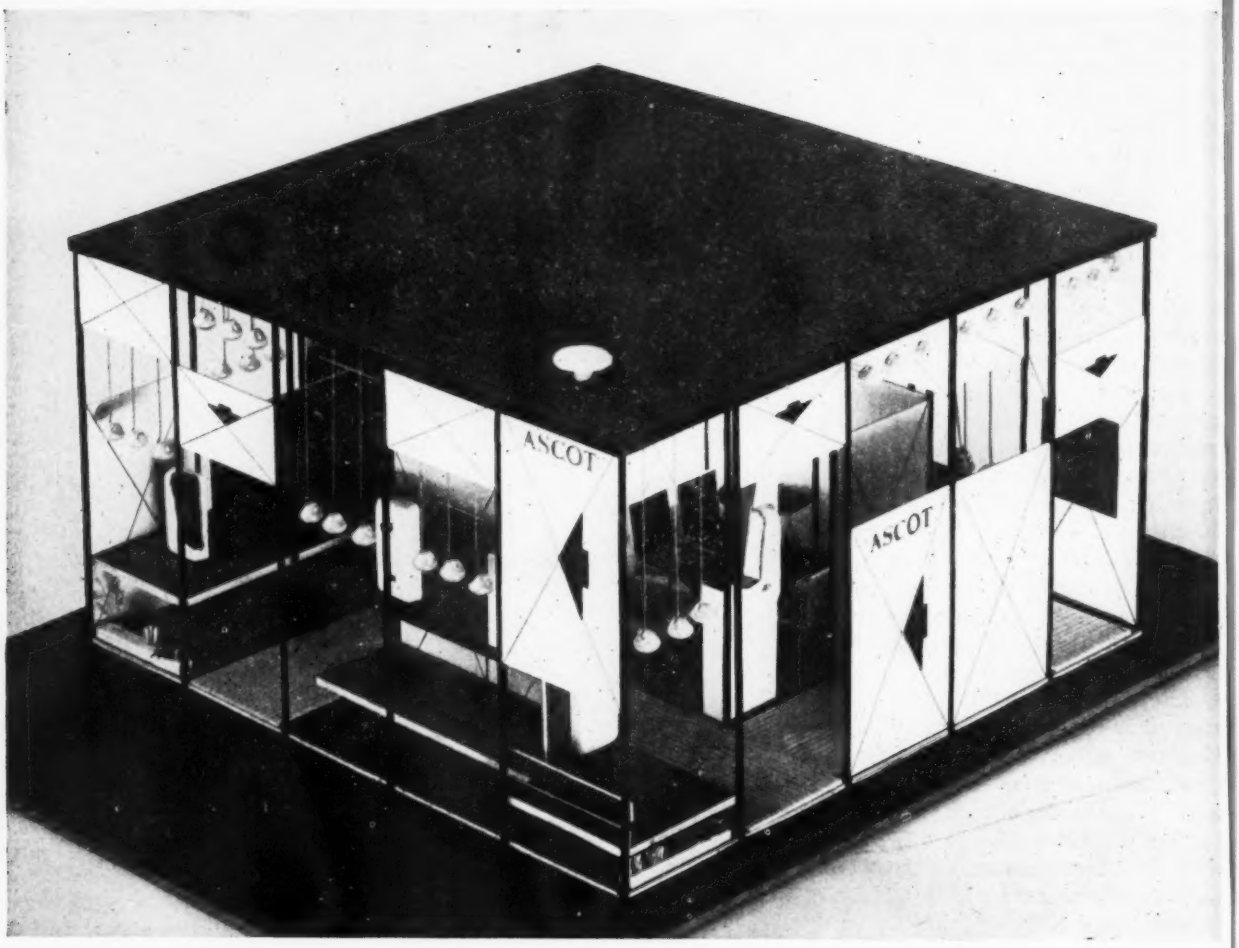
If you want to put your bungalow-desiring clients into a proper state of mind you will do well to make them a present of "Fifty Modern Bungalows,"* a book which has been put together by Felix Walter, who was, you will remember, the JOURNAL'S Guest Editor last year. The book will tell your clients the kind of thing home-builders should be wanting if they are wise: and, what is even more to the point, it will tell them what each illustrated example cost and what each is made of. It comes at a good moment—at the beginning of an on-rush of tailor-made house-building. At the time of the last on-rush, people were talking about "the two-thousand-pound house": now it is "the four-thousand-pound house." This is not bad going, if you bear in mind the change in the value of money: and, as this book shows, you can still get quite a bit more than a human kennel at the pre-war figure if the client is austere and the architect tries hard and the builder enters into the spirit of the thing. . . .

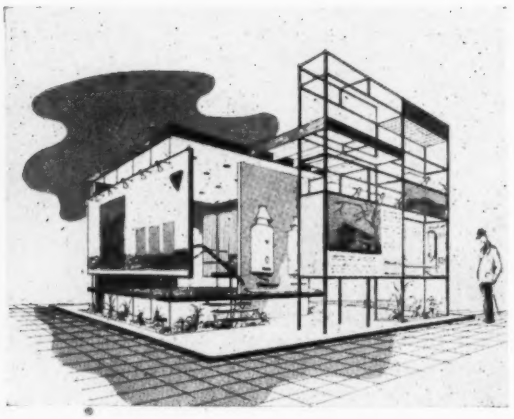
* *Fifty Modern Bungalows.* Edited by Felix Walter. Architectural Press. 18s. 6d.

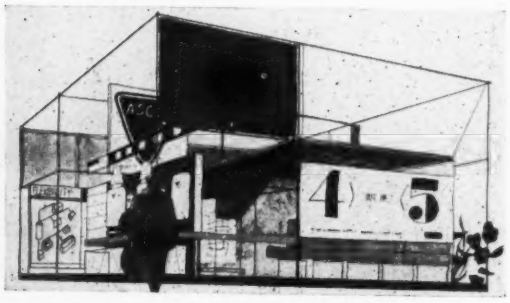
In recent years there has been a slow but steady improvement in the standard of site-huts. Even so, few come up to the standard of this hut on a building site in Rotterdam, a picture of which Rachel Caro has sent to ASTRAGAL. *Painted in white, blue and red, with fluted asbestos panels, it stands on three columns, thus keeping the ground on this confined site as free as possible from obstacles.*



Toys Hill at Sevenoaks, designed by Powell and Moya, is one of the post-war single-storey houses described and illustrated in the book "Fifty Modern Bungalows," edited by Felix Walter—last year's JOURNAL *Guest Editor—and published by the Architectural Press at* 18s. 6d. ASTRAGAL *reviews the book on the left.*







The Novelty of Neutrality

The design shown above, which won the first prize of £210 (for Dennis E. Pugh) in Ascot's competition for an exhibition stand, may seem unexciting and dull at first sight. Its dullness is, in fact, deliberate. (" I feel," writes Mr. Pugh, " that my neutrally-coloured design [black, blue and white] will, by contrast with its neighbours, catch the eye far more forcibly than it would in any scheme of bright colours.") The dullness of the stand certainly provides an exciting contrast to the brightly-coloured, geometrical collisions thought up by most of the remaining 159 entrants. After seeing the non-winning entries, many of which showed that their designers had no idea of the high cost of putting their elaborate ideas into practice, it is easy to understand why the assessors, J. Murray Easton and F. R. Yerbury (who is director of the Building Centre and consulting editor of the JOURNAL), welcomed the " extreme simplicity " as " a novel approach." The winning design, and the second (top left) and third (left) prizewinning designs, by Hugh R. Brady (£105) and W. F. Mullins (50 guineas), were on view at the Building Centre for three days last week, together with all other entries. These included a refreshingly stark stand by Alison and Peter (New Brutalist) Smithson, a number of stands which tried to sell contemporary architecture (in pictures) as well as Ascots, a stand which loyally plugged the profession (" ASCOT and the ARCHITECT . . .") and one—this wins top marks for incongruity—from which a heater strapped to a palm tree discharged into a pool.

STILL PIECEMEAL

It is no good trying to decide on the spur of the moment whether the London-Yorkshire motorway is really the top priority, or whether the seven by-passes announced recently are the ones most needed (though since Staines is not mentioned I should say they are not). Some points about new roads are good—no cyclists, horses or pedestrians, and only the minimum of building, petrol stations and such. Less good is the absence of a *minimum* speed limit and one may also wonder whether a design based on cruising speeds of 70 m.p.h. is enough for 25 years ahead when even today the heavies with their 20 m.p.h. plates often keep up a steady 40 to 50.

*

What one would really like to know is who did the planning for all this. The Minister seems to have been very cagey about it, so one may assume it was transport and road people without any advice from town planners and probably with no regard for amenity.

NO OOMPH AT THE RCA

ASTRAGAL came away from the recent exhibition at the Royal College of Art with a sad heart and heavy spirit. Accepting that the RCA is the top school of design in the country, are these various objects, ranging from solid fuel stoves to costume jewellery and bardic thrones really the best in English design? If so, the future of design in England looks black indeed. Let us hasten to add that there were plenty of good things: good silver, beautifully made furniture, nice fabrics (both woven and printed) but nearly all unoriginal and dull as ditchwater. The truth of the matter is that there is nothing youthful about these designs. Youth should excite us with its daring, annoy us with its optimism and arrogance, overreach but intoxicate, but this is all tired and lacking in vitality. None of the oomph (that dates me) which goes into their bepop (I hope that doesn't) comes into their designs. It is difficult to put one's finger on the reason for this impression . . . and ASTRAGAL feeling the fault must lie with his tired old jaundiced eyes, found he was far from being alone in this view . . . but it must, one feels, have something to do with a lack of a real sense of direction.

ASTRAGAL

POINTS FROM THIS ISSUE

The Editors

PATRONS ONCE REMOVED

"TAXATION has now virtually eliminated the private patron," said Duncan Sandys, the Minister of Housing and Local Government, when distributing housing medals recently. "Today," he continued, "the responsibility for sponsoring fine buildings rests almost entirely upon public authorities, industry and commerce. But they need to be constantly supported and encouraged."

We are constantly extolling in the JOURNAL—almost to the limit of endurance—the fine work done by public and private architects for certain public authorities such as the LCC, Herts. CC, MOE, Coventry, some New Town Corporations and one or two others. And there are a number of other public authorities whose patronage, as expressed through their architects' departments, is satisfactory, if not in the same world-beating category of those listed above. But what of the other two sources of patronage referred to by the Minister: industry and commerce? It is not easy to recall many post-war designs produced through this form of patronage which merit the Minister's description of "fine buildings." Of the two categories, industry is on the whole the more successful. There are a number of factories and industrial buildings which, if not quite of the pioneer quality of the work produced under the patronage of certain public authorities, nevertheless compares fairly favourably with much of the work of a similar industrial nature done abroad.

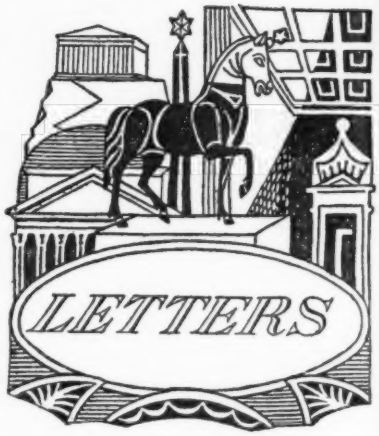
How, on the other hand, is commerce shouldering its responsibility for sponsoring fine buildings? What evidence can commerce provide of enlightened patronage? The answer is virtually none. Of buildings actually completed, we can boast only one passable department store, a fair chain of shoe shops and one reasonable office block. But by contrast we have dozens of dull chain stores and shops and dreary office buildings in all our blitzed cities and other major towns. These are the buildings which are deciding, once and for all, that those cities—Liverpool, Hull, Southampton, Portsmouth, Bristol, Exeter, Plymouth, to name a few—can be removed from the architectural map. As a result of inadequate patronage no one will visit these blitzed towns in the future to

see the fine results of past enlightened patronage, as tourists now go to Edinburgh and Bath and so many continental cities.

These English towns are being ruined, or at best reduced to mediocrity, architecturally, because they are not receiving enlightened patronage from commerce.

There was a time—until the early part of the twentieth century, in fact—when businessmen—bankers, shopkeepers and so on—took immense pride in their properties: only the best was good enough. They paid for the best materials and the best architects. The florid results of such untutored but zealous patronage are with us still—often quite fine, invariably out of date. Now, in theory, we should have better educated, more enlightened businessmen as patrons, asking not for pretentiousness, but for buildings which function perfectly, are properly sited, look well and are economical in first and maintenance costs. The equivalent, in fact, of what we are at last getting, through the intelligent use of the right kind of architect, in some of our housing and schools.

The better public authorities are getting the best housing and schools *in the world* through being good clients: enlightened patrons, in fact. We are not getting such good architecture for shops and offices and other commercial buildings because the right kind of client is often no longer there. The personal client wanting a shop, or an office, can no longer afford to build. The clients now—and this is a comparatively recent phenomenon, becoming more and more frequent, are the big insurance companies and the property investment companies, or the impersonal head offices of chain stores. They are not concerned with the buildings they finance as *architecture*, as something which men have got to work in for half of their lives and look at for the other half. They see it as a simple investment, as a structure to provide the maximum lettable floor space or the greatest sales area. A building not for themselves but for some one else. They are clients once removed from the architecture they sponsor. The deplorable results are often seen depicted on builders' boards in the city or on advertisements on the back pages of newspapers. The architects who receive this dull patronage are often comparatively unknown to the bulk of their fellow professionals. It is hard to say in this JOURNAL, but it would seem that these architects have learnt only too well to put high rentable values before any civilised requirement save when forced to comply by byelaws. The Minister of Housing and Local Government said that the patronage of commerce needs to be constantly supported and encouraged. We regret that we have not been able to give much support in this article. We are still waiting to be shown that commerce deserves any. The form of commercial patronage which now occupies the scene is a relatively new one which is constantly growing larger. We have little evidence to show that its patronage will ever be enlightened or that it will ever merit encouragement. Nor can we ignore the fact that many commercial buildings on the Continent and in the Americas are so much in advance of ours.



"Two Disturbed Architects"

"Anon"

F. J. Osborn

Chairman of Town and Country Planning Association

Part-Time Poaching

SIR,—Your correspondence columns have recently been inundated with letters by small private practitioners complaining of the ill effects of small-time, part-time "poaching" by salaried architects on their business. This, to us, seems to be nothing more than a red herring. The real issue is surely that at the present time there exists an enormous loophole for organized clients to avoid paying for architectural services according to the RIBA scale of fees by forming an "Architects Department" and paying salaried assistants very much below that scale.

As long as there exists such a discrepancy in the two forms of reward for similar services by similarly qualified persons the majority of work will not find its way into the offices of private architects.

There is obviously room for the co-existence of private, salaried and official architects, but the raison d'etre of any architects department, commercial or official, should be specialized requirements, not the undercutting of the professional scale of charges.

An indication of the proportion of the work not going to private offices can be seen by the vast number of appointments offered by official bodies and commercial firms. In this week's AJ the number of advertisements offering such appointments greatly exceeded those offered by private architects. The conclusions to be drawn are both disturbing and obvious.

TWO DISTURBED ARCHITECTS.

London.

Unfair Competition

SIR,—I am an architectural assistant whose earnest hope it is one day to practise on my own account. I do, and will, of course, observe the Code of Professional Conduct, neither touting nor advertising; it is very disconcerting, therefore, to realize that I shall be in competition with individuals and firms who are bound by no such code.

Some time ago, when I was making preliminary enquiries at the local council concerning the building of my own house, an

official kindly offered to get plans drawn up for me! The offer, I imagine, would please most laymen anxious to cut building preliminaries to a minimum.

The enclosed newspaper advertisement is evidence of unfair competition of a different kind. The firm concerned have a wide and varied field of activities; on the back page of the same newspaper they advertise the following services: auctioneers, estate agents, valuers, surveyors and property management.

ANON.

Herts.

[The enclosed newspaper cutting showed an advertisement running across three columns in an article titled: "First Factory in New Industrial Area, St. Albans." The advertisement states: The site was acquired and the new building designed and supervised for Messrs. Horace Slate Ltd. by Connells, Building Surveyors and Estate Agents, 20, Chequer Street, St. Albans." Messrs. Connells are, of course, perfectly entitled to advertise in this way.—ED.]

In Defence of Flats

SIR,—Your editorial of July 21 shows awareness that the TCPA, and I as one of its spokesmen, have said a good deal about flats. It does not show any realization of what we have actually said. So far from being "advocates of suburban planning," we have consistently opposed it. As to flats and houses, we have consistently maintained that planning and housing policy should enable people to have whichever they prefer in the proportions in which they prefer them—subject to the rents reflecting relative costs.

The TCPA position is that the overgrowth and congestion of cities forces on city dwellers a grim choice between living in a layered dwelling near work and city amenities (such as they are) and living in a pleasant garden home of the sort 90 per cent. want at the sacrifice of time and earnings in long daily journeys; our "third alternative," a measure of dispersal of workplaces and dwellings to new towns and other towns of moderate size, will enable them to combine enjoyable homes with town advantages. This measure of dispersal, and the strictest practicable preservation of open country around and between old towns and new, is the essence of TCPA policy.

Nothing could be further from a philosophy of urban sprawl. If you have not understood this, you cannot have read our statements, which, after all, are easily obtainable.

Flats, you agree, are atrociously costly. We would rejoice to see a reduction in the cost of building all round. That should cheapen both houses and flats; it could not bring the cost of flats down to that of houses. In other countries, as here, flats are more expensive than houses per unit of floor area (for equal quality), except where specially costly foundations (*e.g.*, concrete piles in Holland, or rocks in Sweden) are an important factor. Obvious extras in capital cost are the need of stronger frameworks, soundproofing, fire precautions, lifts, and a greater percentage of internal access space; and in running cost the maintenance of surrounds, caretaking, and the "communal" facilities supplied to make flat-life tolerable. The excess cost is less in some countries than here; but partly that is due to greater discrepancies between the two types in usable floor areas, quality of structure and finish, and variety of design—all things that affect acceptability where people have any choice, as in some countries they haven't.

The only bias of the TCPA is that of the honest tradesman—a bias towards pleasing the customer. What we suggest should have your support: that the subsidies for flats should be the same, for equal floor areas, as those for houses. Quite apart from site cost (which is the same for 15 houses on an acre at £3,000 as for 50 flats on an acre at £10,000), the present capitalized value of the lift-flat subsidy permits an extra building cost of about £1,200. The house subsidy is £635 (£29 8s. a year); the flat subsidy, at £10-12,000 an acre, £1,873 (£86 15s. a year). If the flat subsidy were reduced to £635 architects and builders would have a powerful incentive to get the costs down. Those who think flats ought to be built as cheaply as houses should be the last to defend an excess subsidy of £1,200. If costs were equal, or if the rents of flats truly reflected any difference in cost, I would, of course, be content to let people choose which they preferred. I am sure the vast majority would still prefer the house, but that would come out in the wash.

As to density, the TCPA accepts 15 houses a net acre as a tolerably decent maximum in new development, and recognizes that in extensive central areas a proportion of low flats could permit an acceptable density of 20 an acre, and that there could be even more in selected limited areeas. If you overdo the proportion of flats (at colossal public cost) you run a serious risk of "empties" and even derelict districts when the shortage of dwellings is overtaken and people can exercise choice. At human densities there would still be plenty of millions of people left in the big cities, and they would be more, not less, civilized. And as the housing, over the next 20 years, of 6 to 8 millions in smaller towns (also more civilized), with their workplaces, would not absorb more than 1 per cent. of our remaining 45 million acres of agricultural land, I don't see why you need be so dismal about the effect on the countryside.

It isn't new towns or country-town expansions that has been the threat to agriculture or rural amenity—they support and enliven these—but the unregulated sprawl that was a spontaneous reaction from city congestion. Look at what your own friends have done where they have had a free choice! How many accept a city flat as their all-the-year-round and only dwelling? A few do, and good luck to them—the TCPA has no grievance against anyone who likes that way of living and will pay fairly for it. We merely object to bribing them to do so with a public dole of £1,200 each. We know we can satisfy nearly everybody if we are loyal to their differing desires and apply the necessary amount of planning to the location of their workplaces and dwellings. We don't think you will ever lure many out of Subtopia by offering them Tiptoptopia.

London.

F. J. OSBORN

PWLLHELI

Poor Response to Eisteddfod Competitions

Three architectural competitions were held in connection with this year's National Eisteddfod of Wales, at Pwllheli, Caernarvonshire.

The adjudicators, Dr. T. Alwyn Lloyd and Lewis John, were disappointed that only two entries were received for each competition. (They can hardly have been surprised, for the total prize money for the three competitions was only £100.)

The first competition (prize £50), for the design of a health centre, was won by R. John Lansdown, ARIBA, of London. The second (prize £30), for "the redevelopment of any Caernarvonshire village," was won by Merfyn Hughes Roberts, ARIBA, of Birkenhead. (He chose the village of Tenmaenmawr—a health resort on the coast between Bangor and Conway.) No award was made for the third competition for a library (prize £20), which was a competition for architectural assistants only.

The adjudicators decided that no gold medal should be awarded at this year's Eisteddfod. It was to have been made by the local council as the first annual award to "the architect of a building which has made a real contribution to the architecture of the principality." Only six architects submitted entries for the medal.

SALARIES

The Whitley Scale

The following revised salary scales—to operate from March 1 last—are included in a circular issued by the Whitley Councils for the Health Services (Great Britain):

(*a*) Regional architect and regional engineer

Group 1 £1,695 × £75 (5) × £45 (1)—£2,115

Group 2 £1,595 × £75 (5) × £45 (1)—£2,015

Group 3 £1,490 × £75 (5) × £40 (1)—£1,905

Group 4 £1,230 × £50 (5) × £30 (1)—£1,510

Group 5 £1,080 × £40 (5) × £50 (1) × £30 (1)—£1,360 (applicable to the Regional Architect only)

(*b*) Deputy Regional Architect

Group 1 £1,270 × £50 (4) × £30 (1)—£1,500

Group 2 £1,195 × £50 (4) × £30 (1)—£1,425

Group 3 £1,120 × £40 (5) × £20 (1)—£1,340

For the purposes of the above salary scales the Regions are grouped as follows:—

Group 1 Four Metropolitan Regions, Birmingham, Manchester, Sheffield, Western (Scotland).

Group 2 South-Western (England), Leeds, Liverpool, Newcastle, Wales, South-Eastern (Scotland).

Group 3 Oxford, East Anglian.

Group 4 Eastern (Scotland), North-Eastern (Scotland).

Group 5 Northern (Scotland).

(NOTE. The Council transfered the South-Eastern (Scotland) Region from Group 3 to Group 2, with effect from the 1st April, 1954.)

(*c*) Principal Assistant Grade:

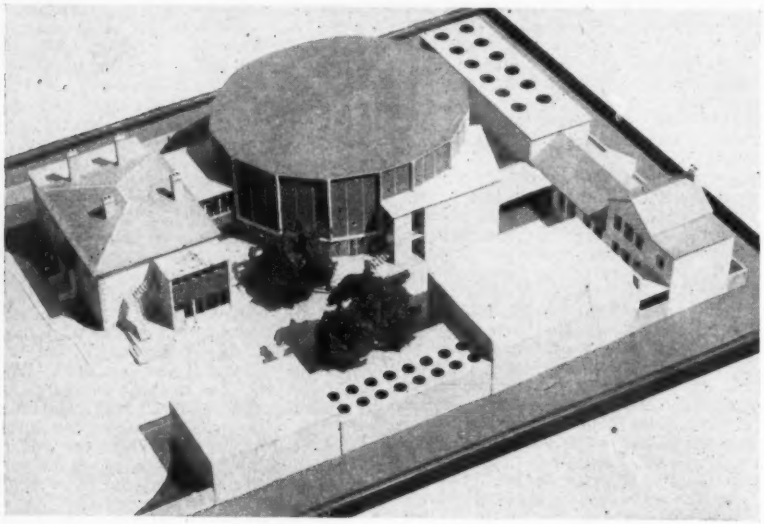
Scale I £1,130 × £40 (5) × £30 (1)—£1,360

Scale II £1,050 × £40 (5) × £25 (1)—£1,275

(*d*) Senior Assistant Grade: £920 × £30 (5) × £25 (1)—£1,095

(*e*) Assistant Grade: £640 × £25 (4) × £30 (4) × £35 (2)—£930

BUILDINGS IN THE NEWS



Proposed Theatre at Ealing

The above model of the proposed Questors Theatre at Ealing, designed by W. S. Hattrell & Partners is on view at the exhibition of theatre designs at the RIBA. The theatre is adaptable so as to provide for "picture frame" or forestage productions, or for productions with the audience on three sides, or entirely surrounding, the stage. An existing house acts as a foyer to circular theatre behind.

Irish Export Centre, Regent Street, London, W.1

The photograph below shows the Irish Export Centre at 255 Regent Street, London, W.1 designed by Michael Scott, in association with Design Research Unit.

COLONIAL OFFICE

Must it be built on Westminster site?

Nothing is happening behind the boarded-in site in Broad Sanctuary where the new Colonial Office is to be built, and the MOW says that there are no immediate plans for starting on the building.

The architectural correspondent of *The Times* has suggested that the MOW should think again about its decision to build the Colonial Office on this site—a decision which was very much criticized when it was made five years ago. *The Times* correspondent says that if the MOW were to relinquish this site "not only would London be spared the construction of a building that is not likely to be an asset architecturally, but the whole area could be replanned and the needs of the Institution of Chartered Surveyors and Middlesex Council met (the first is to rebuild its premises at the corner of Great George Street and Parliament Square; the second needs larger premises) without causing further congestion or building so high as to throw the skyline of Parliament Square out of balance. Part of the site could perhaps be kept as an open space, and there are clearly many other possibilities for its use. The important thing is that the area between Parliament Square and the Central Hall, and between Broad Sanctuary and Great George Street, should be looked at as one while there is the opportunity of doing so, and that the Ministry of Works should declare its intentions regarding the Colonial Office project before other building plans in the area are finalized."

MODULAR SOCIETY

Discussion on Lighting

At their meeting on July 19 the Modular Society were guests of the British Thomson-Houston Co. Ltd., with L. H. Hubble of that company acting as chairman. The theme for discussion was "Lighting Systems and Dimensional Co-ordination." Guest members of the panel included A. W. Booth, Cape Asbestos Co. Ltd.; J. Napier Fenning, Anderson Construction Co. Ltd.; A. P. Grant, Frenger Ceiling Co. Ltd.; J. Hollings, Gordon Buckle and Partners; D. R. H. Phillips, consultant architect to British Thomson-Houston; J. N. Read, Raphcon Ltd.; and Mark Hartland Thomas, who is of the Modular Society.

During the discussion Bruce Martin suggested that the problem of the wall switch had never really been solved, particularly in the case of partition walls, where wall switches seriously curtail flexibility, and that no one had yet designed an unbreakable ceiling pull switch.

DIARY

Building: a skilled creative job. Exhibition organized by the BC in collaboration with the MOW, LMBA and schools of building in the London area. At the BC, 26, Store Street, W.C.1. Monday to Friday 9.30 a.m.—5 p.m. Saturday 9.30 a.m.—1 p.m. UNTIL AUGUST 6

Piet Mondrian, 1872-1944. Retrospective exhibition. Whitechapel Art Gallery, E.1. Tuesdays to Saturdays only: 11 a.m. to 6 p.m. AUGUST 6-SEPTEMBER 11

International Conference on Regional Planning and Development. At Bedford College, London. Registration fee, £3. Information from Norman J. Hart, 45, Northcote Avenue, W.5. SEPTEMBER 29-OCTOBER 2

SECONDARY SCHOOL

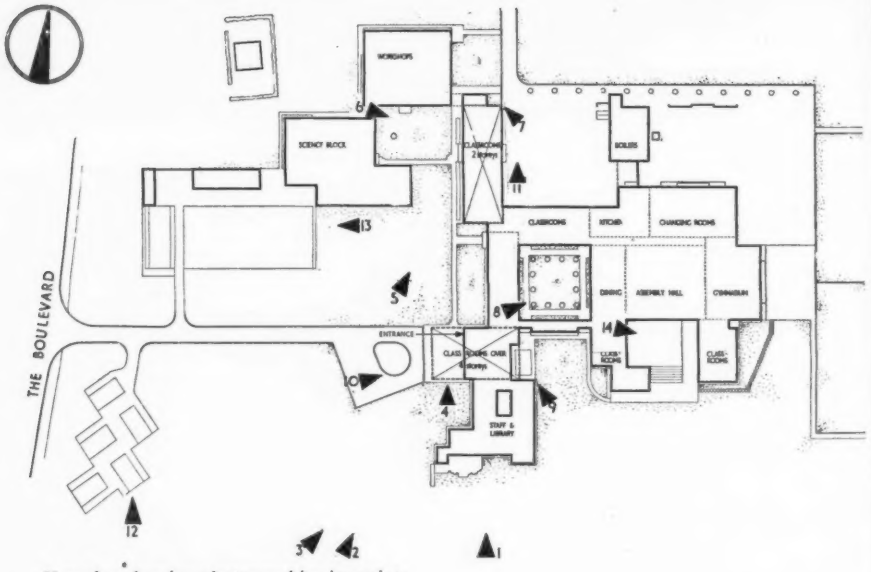
for the Worthing Borough Council and the West Sussex County Council

designed by the Architects and Building Branch, MOE

chief architect, S. A. W. JOHNSON-MARSHALL, assistant architects, MAURICE LEE (architect-in-charge), MARY CROWLEY, and JOHN KITCHIN, in consultation with F. R. STEELE, county architect, West Sussex, and G. H. KEMPTON, borough engineer, Worthing, quantity surveyors, J. NISBET and P. BATHURST, MOE, consulting engineer, A. J. HARRIS, Prestressed Concrete Co. Ltd.

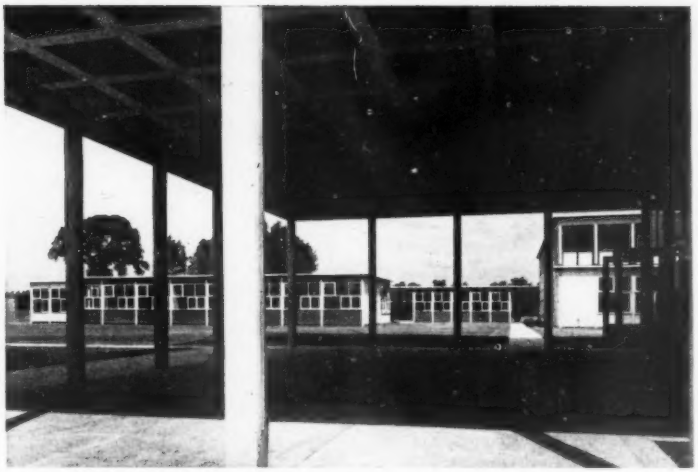
The Worthing Technical High School is the second secondary school designed by the Architects and Building branch of the Ministry of Education to be completed. Its construction is one of a series being developed by the Ministry in collaboration with contractors and manufacturers. It provides a new range of components, mainly in prestressed concrete and ordinary precast concrete, for the frame and outer walling: these are suitable for both single- and multi-storey construction. At the same time it sets out to solve a comparatively new problem—how to design a secondary technical school. Rooms grouped round intimate courtyards of varying character and are dominated by a central classroom tower. The general contractors were Gilbert-Ash Ltd. For sub-contractors see page 170.

From the south, viewpoint 2



Key plan showing photographic viewpoints

Top, viewpoint 1: this view from the playing fields shows from left to right, the science outbuildings, the science block, the four-storey classroom tower with the staffroom in the foreground and then the dining room, assembly hall and gymnasium with classrooms and courtyards in front. The courts around and in the centre of the school are designed to give shelter from these strong winds and to give self-contained interest and variety on an otherwise bleak site; they provide a strong contrast to the classroom tower. The photographs that follow were taken on a clockwise tour of the buildings, starting and finishing at the entrance porch.
Left, viewpoint 3: the drive on the left leads up to the main entrance under the tower.

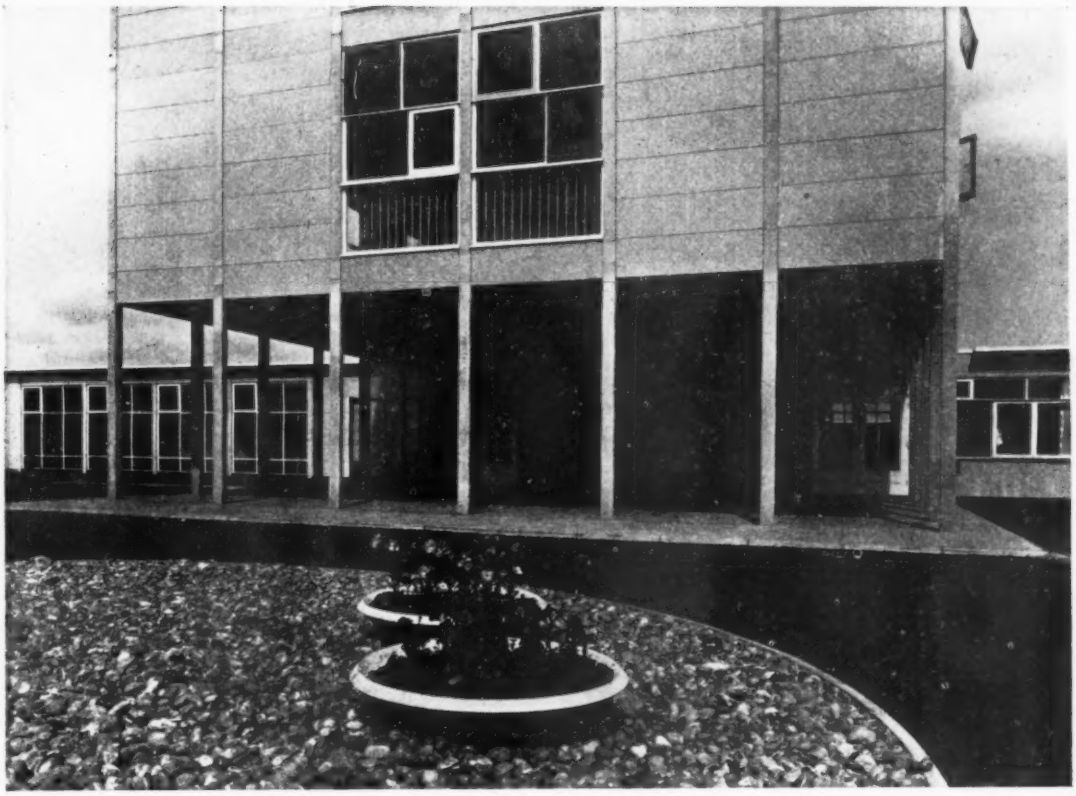


Above, viewpoint 4: the entrance porch, looking down the path to the workshops with the science block to the left. Here and in the veranda of the two-storey block the concrete frame is left uncovered and is seen against a blue ceiling. Top right, viewpoint 5: this photo of the arts and crafts building shows several of the door and window assemblies used on the job; the frames are in British Columbian pine and the opening lights, doors and sills are in hardwood. Externally, the windows and frames are painted white. Above right, viewpoint 6: one of the many intimate courts is formed by the science and the workshop buildings on three sides and the two-storey arts and crafts building on the fourth. This court can be used as an extension to the workshops and provides access for tractors to the repair shops.

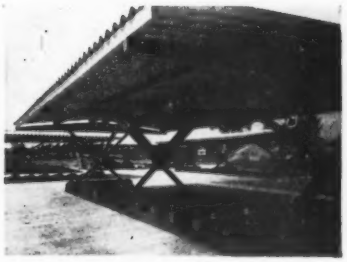
SECONDARY SCHOOL AT WORTHING

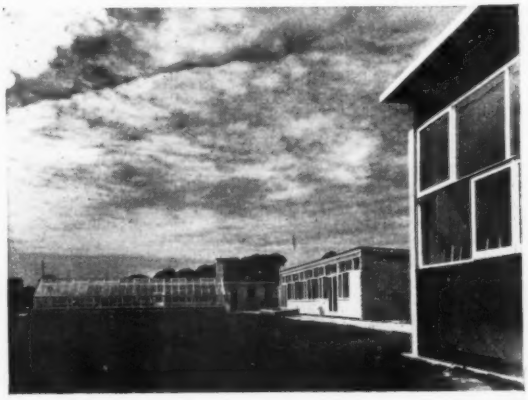
Ground and upper floor plans [Scale : $\frac{1}{16}$" = 1' 0"]

Above left, viewpoint 7: this detail of the workshops taken from the east, picks out the column spacings of 10 ft. and 6 ft. 8 in. which occur on all perimeter walls. The black Menheniot granite is one of three finishes to the concrete cladding slabs used, the other two are Derbyshire spar in white cement and calcined flint and pea gravel in white cement. Above right, viewpoint 8: the centre court is paved with a system of hexagonal components, which include kerbs and surrounds to form flower beds, together with slabs of smooth or chequered texture. The main feature is a square of twelve red-twigged lime trees which it is hoped will be pleached into a hollow square. Below, viewpoint 9: to the east of the tower is one of the quietest and most pleasant courts, entirely grassed it is enclosed on three sides and has a small pebbled pool and a corridor-cum-conservatory along its inner wall.



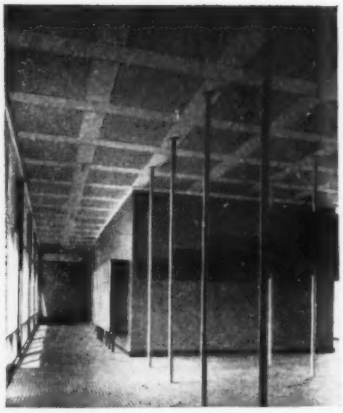
Above, viewpoint 10: the entry to the school is under the four-storey tower and on either side of the two staircases, which are faced externally with a mural in tiles by Dorothy Annan, this wall decoration blends gently with the other components of the design. The side-hung casements on the upper floors of the tower are painted yellow. There are three groups of buildings which are not constructed as the main buildings, they are not a large percentage of the total cost of the contract, but since they are a problem in many secondary schools they are shown here. Centre right, viewpoint 11: the caretaker's house at the service entrance. Bottom right, viewpoint 12: the bicycle shelters at the main entrance.

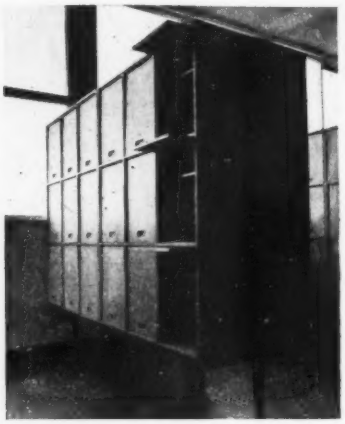




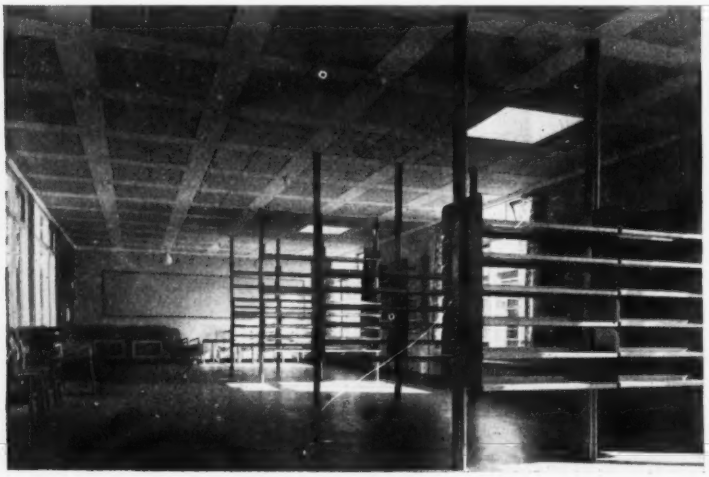
Above, viewpoint 13: this completes the photographic tour of the school, which started at the main entrance. On the right are the science laboratories. In the middle distance is the garden room and on the left are the school's greenhouses. General care of the planting is regarded as part of the school's horticultural activity. To the left of the greenhouses are the cycle sheds (shown in viewpoint 12) and the main entrance drive. This is to be planted with an avenue of double pink horse-chestnuts.

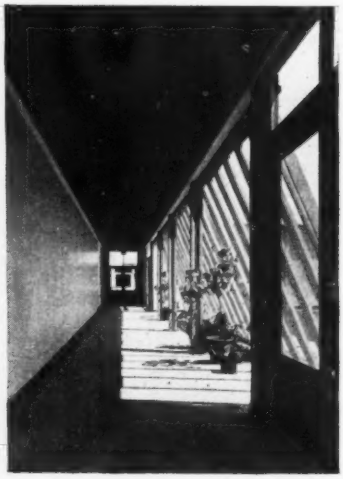
SECONDARY SCHOOL AT WORTHING

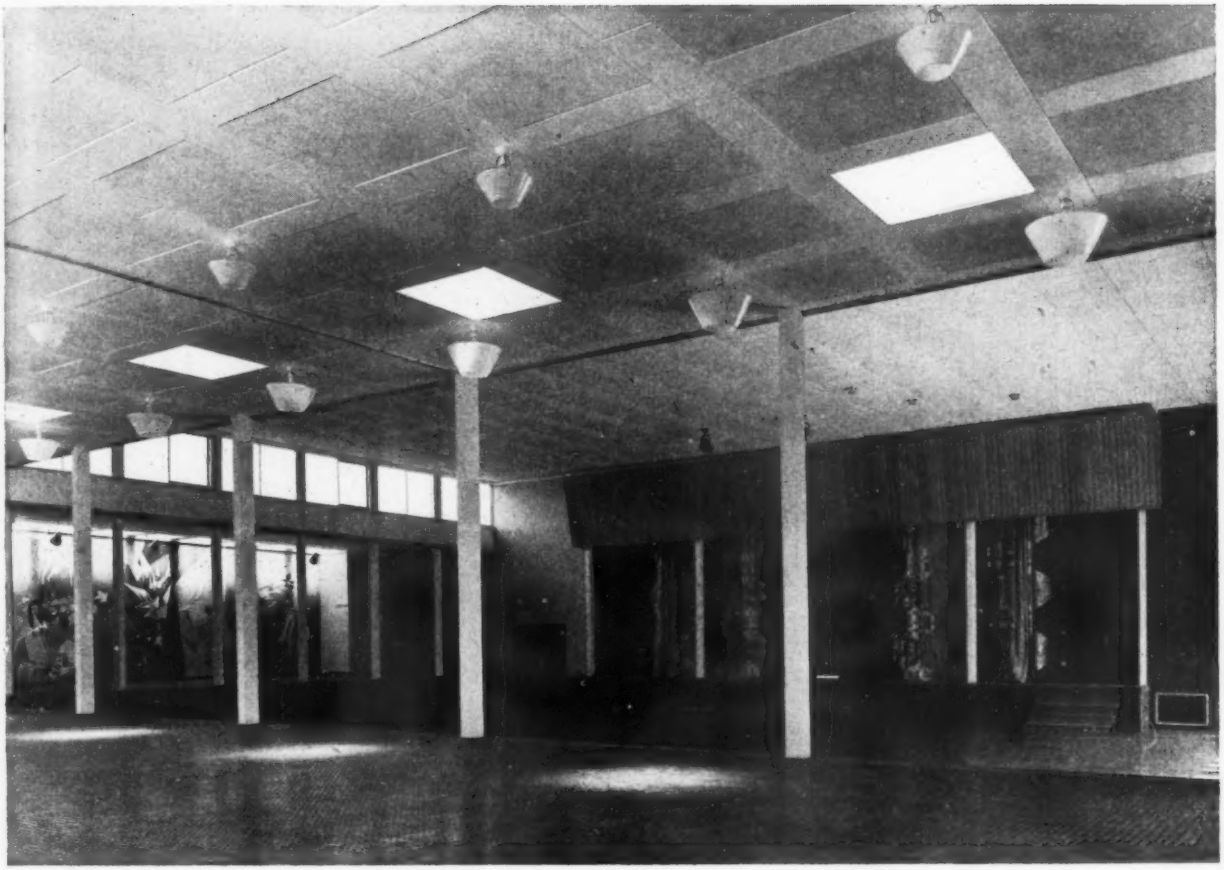




Above: inside the building and under the tower are the staff rooms, cloaks and a reception room. This room (above) looks out over the pebbled pool and from it there are glimpses of the centre court and of the smallest of all the courts which helps to light the library and is glazed from floor to eaves on all four sides. It is planted with ferns, clematis, and various textured carpeting plants. Top right: coat-hanging and lockers are separated in this school, no cloakrooms as such are provided. The lockers are shown more clearly in the next photo. Studded rubber tiles are used here and for all circulation spaces and landings. Above right: a group of lockers on one of the staircase landings. Below left: the library, unfortunately bereft of books. Alternating bays between the bookcases are for sitting: these have a window: the other bays which are for the main storage do not. The glazing on the left is to the small light court. Below right: the corridor leading from the tower to the assembly hall, the ceiling here is red, unlike most others which are white.

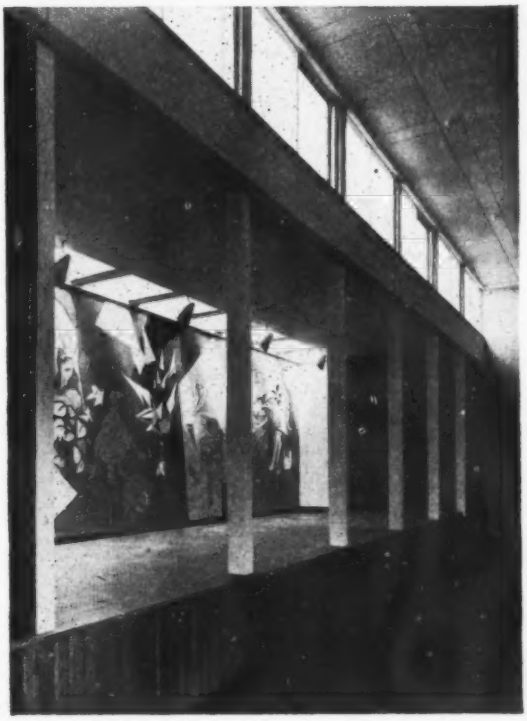




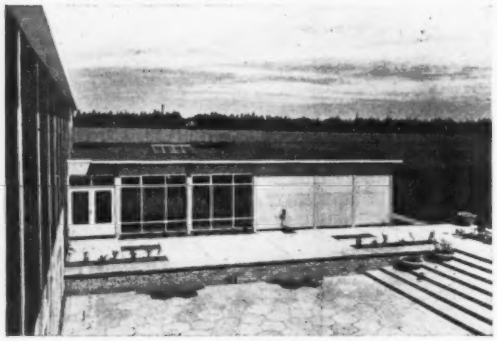


The main centre of the school is a group of inter-related spaces, which include the assembly hall (above), dining room, a sunken courtyard and the centre courtyard which adjoins the dining room and could act as an extension to it in fine weather. These together with the gymnasium which has access from and shares changing rooms with the stage, form a planning unit which provides scope for use in innumerable new ways. The floor of the assembly hall is cork and the majority of walls and the ceiling are painted white.

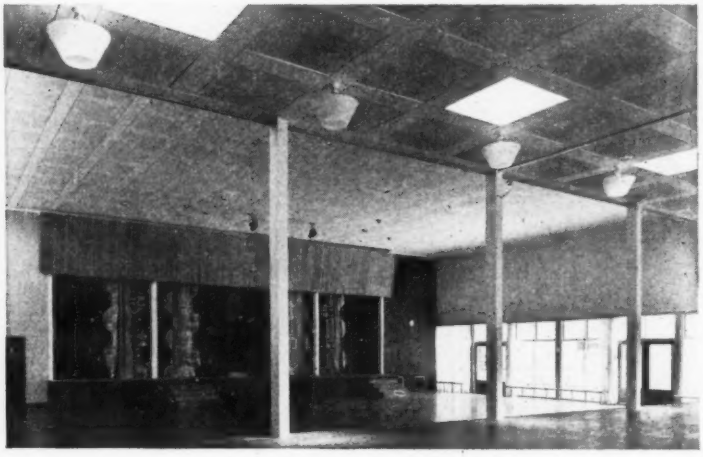
SECONDARY SCHOOL AT WORTHING



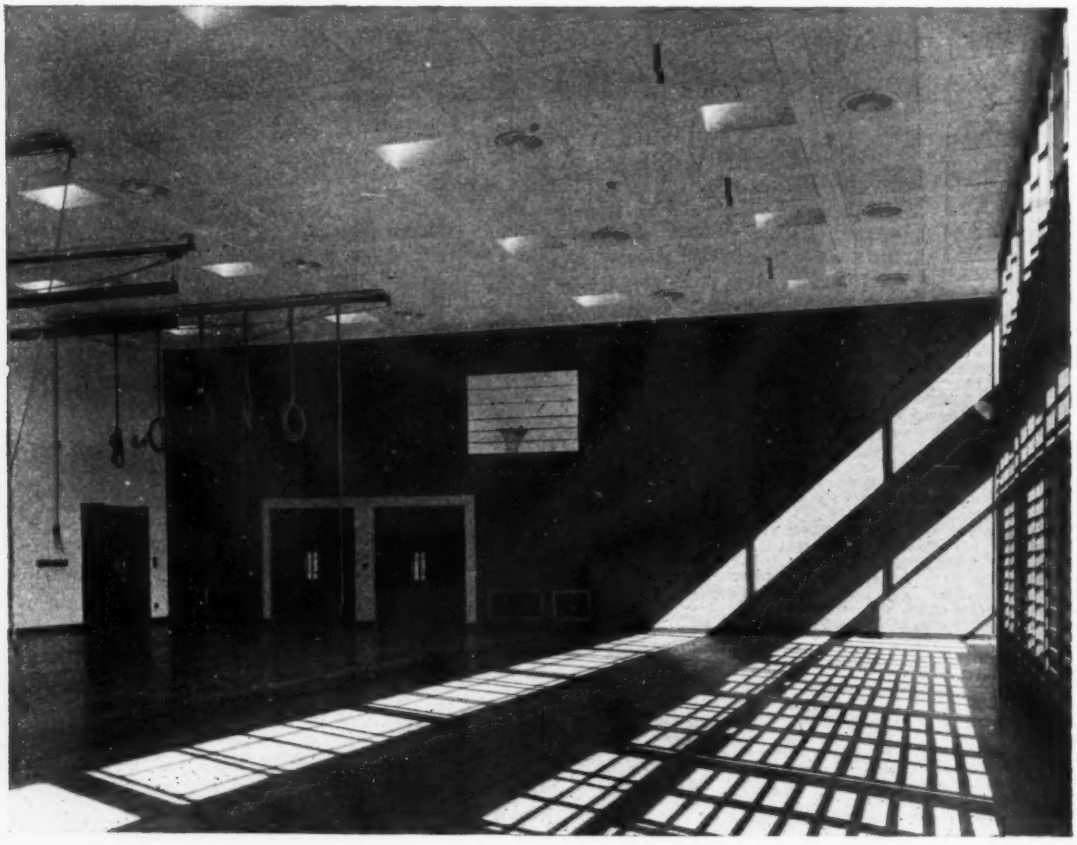
Right: the most highly illuminated and the most brilliantly coloured wall is one on which there is a mural painting by Ceri Richards. This exciting and cheerful addition to the hall will act as a stage back scene when this side aisle is used for chamber music, or other small performances.

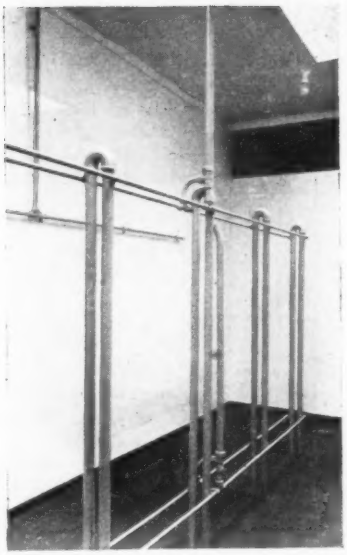


Left: viewpoint 14. Doors on the south side of the hall lead into an adjoining court which can be used as a small open-air theatre, the assembly hall stage platform is carried out and hedges of tamarisk and berberis are planted to form wings. Generous wide steps lead from the sunken court to the stage level and behind these an audience may sit on the grass mound, in addition to the adjoining and overlooking classrooms, and the floor of the court itself. Below left: the window between the courtyard and the assembly hall. The curtains are plain white cotton. Below right: the assembly hall from the dining level looking towards the sunken court. This level can provide additional seating or, due to the wide steps which lead down from it, it can be used for an orchestra or a choir.



Below: the gymnasium lies behind the stage and access to it is across the stage, its floor is $\frac{1}{8}$-in. rubber sheet backed with $\frac{1}{2}$-in. sponge rubber. This is an experimental alternative to hardwood strip.

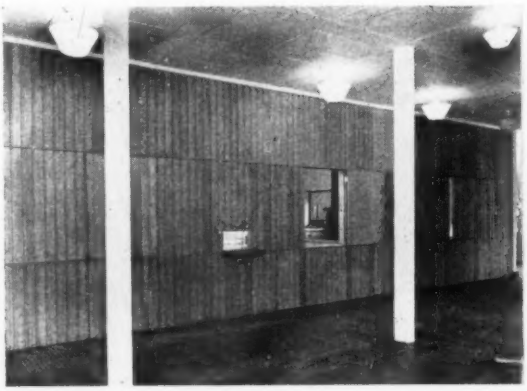


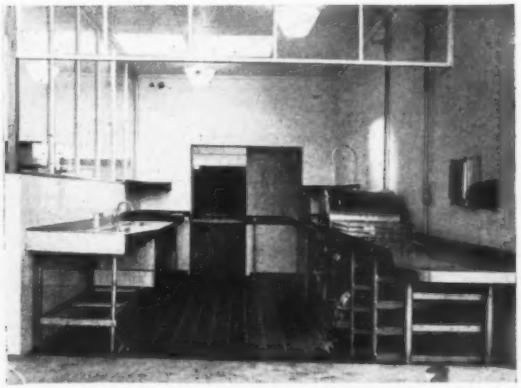


Left: in the shower rooms next to the gymnasium are these simple run-through showers for boys. Similar ones are used by the girls. The unit designed by the architects has sprays at both shoulder and ankle heights.

SECONDARY SCHOOL AT WORTHING

Below left: this screen separates the dining room and kitchen, it is in hardwood and is somewhat different to most hatches seen in secondary schools. It is a result of the new requirements of the MOE Building Bulletin No. 11. The meals service is a family service by which food is supplied in bulk to the tables, where it is served individually to the children. This obviates the large counter which is normally required. Below right: the wash-up area in which a dish washing machine with pre-rinse sink has been installed in order to study its effective use in schools. Bottom left: as one group within the school is expected to specialise in housecraft and catering, the accommodation for this consists of a housecraft room, a catering room or kitchen, a servery and a small dining room adjoining the main dining room. The kitchen is shown here. Bottom right: the servery is a long narrow room with a horseshoe demonstration servery at either end and with hatches to the kitchen and to the dining room.





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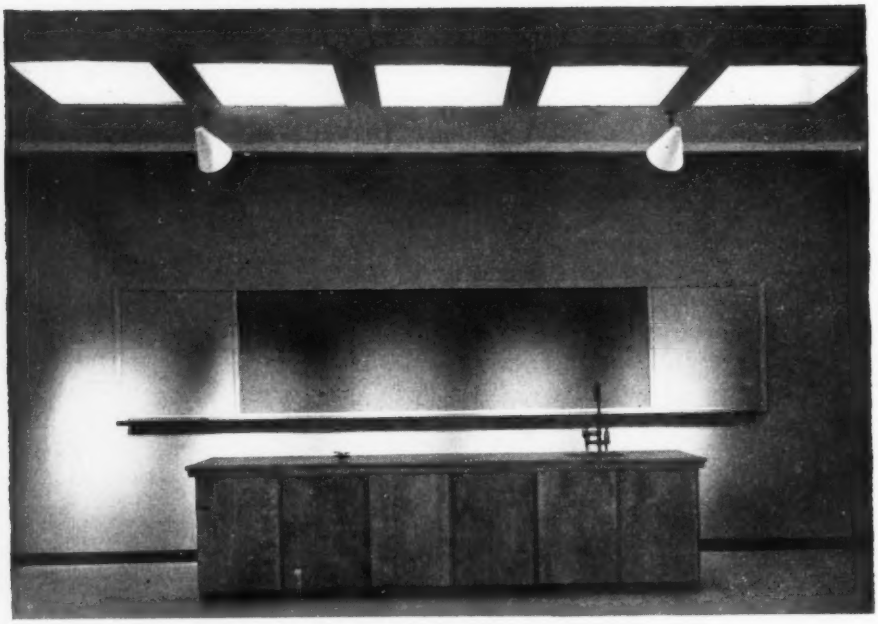
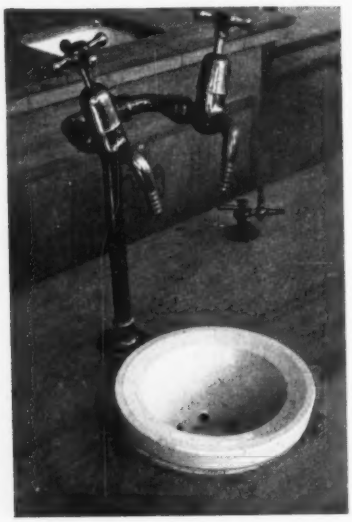




Top: one of the laboratories in the science block showing the fitted furniture designed for the school; to the left of the blackboard is a fume cupboard. The cupboards are pre-made and the tops were cut to fit on site; both are in Yugoslav beech. Above: a demonstration bench complete with chalkboard, pin-up and both direct artificial and natural roof lighting. Left: a new self-trapped dilution pot which was designed for the school and is incorporated in the bench tops.

CLIENT'S BRIEF: his stated requirements

Type of school: 4-form entry Secondary Technical School for 600-680 boys and girls from 11-16, 17 or 18 years who will come from Worthing and other areas of West Sussex.

Brief: (1951) There had been little experience in the country as a whole of secondary technical schools, and no general formula existed. Each school had to be considered as a separate problem. The main aim of this school was to provide as good a general education as possible with a common basic course for everyone during the first two years, followed by increasing specialization in courses to include Engineering, Catering, Commerce and Applied Science (Horticulture and Agriculture). It was not, however, the intention that these courses should develop along narrow vocational lines but that they should serve as a focus of purpose and interest during the wider educational process. There would be possibilities after the five-year course, of advanced work leading to Technical College, University, or other educational training. Day part-time release and Building courses would be catered for elsewhere. It was intended that there should be full freedom of transfer at all stages between Secondary Modern, Technical and Grammar School, but it was anticipated that many children who might otherwise have gone to a Grammar School would come to this school instead.

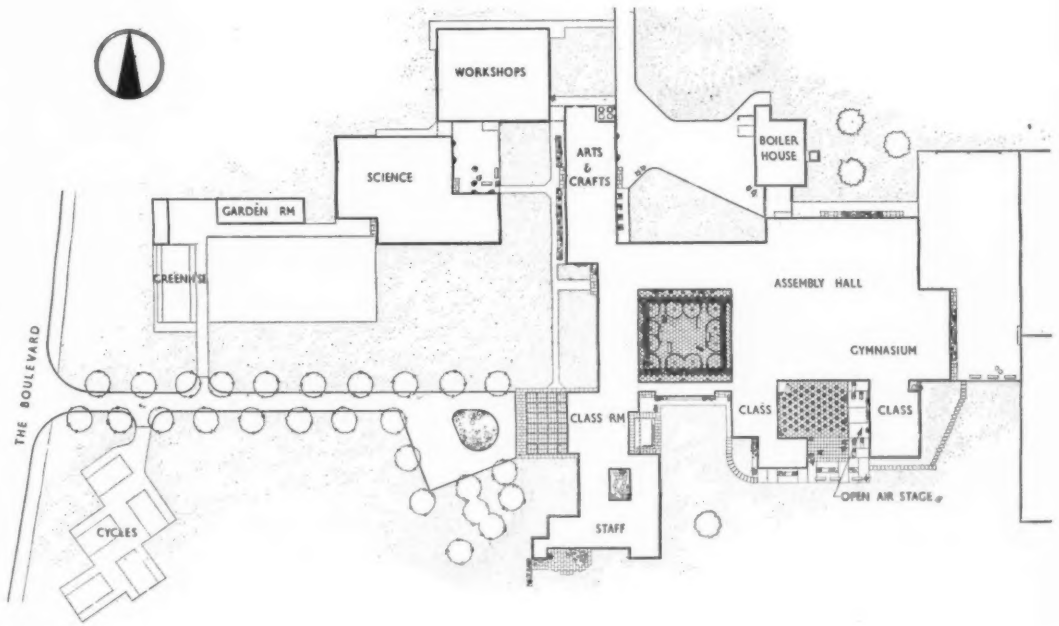
SITE: topography, surroundings, access, planting

The site lies to the north-west of Worthing, in the parish of Durrington, two miles inland on the flat coastal strip at the foot of the South Downs. It is virtually flat with a mean height above sea level of 32 ft. For several months of the year there is a strong persistent south-west wind blowing from the sea.

The site of 18 acres is part of a 32-acre field on the eastern side of which a second school is to be built in a few years' time. Before the war the district was scheduled for speculative housing development. Housing is in course of construction on the south and west boundaries. The north boundary is the Worthing-Littlehampton Road. The land to the north is mainly agricultural dominated by the South Downs.

The main access to the school is from The Boulevard on the west. The service access is from the Littlehampton Road, which is narrow and dangerous for school children at the moment, but scheduled for widening to a dual carriageway road in the future.

The only original planting on the site is an elm and a small screen of black poplars at the north-west corner. Beyond the east boundary of the site there is an established line of cupressus macrocarpa, planted as a wind break.



Site plan

PLAN: general appreciation

The character of the site influenced to a large extent the general arrangement of the plan. Because of the flatness of the ground, the lack of interest in the immediate surroundings and the prevalence of strong winds, the buildings were designed around a series of courts in an attempt to provide sheltered and self-contained interest and variety.

The main centre of the plan is the social meeting place for the whole school consisting of the hall and dining space which are separated only by a few wide steps and columns and which can be extended out into two courts, one entirely enclosed, with paving, planting and seats, and linked to other parts of the school; the other opening out to the south and forming the outdoor extension of the hall and stage, for drama and music.

A second "centre" is the court around which is planned most of the more specialized accommodation—the Science labs, workshops, and the Arts and Crafts rooms (these last including Needlecraft and Housecraft, which are planned on two floors). It is hoped that this arrangement will encourage co-operation between these related subjects. The Biology lab is also linked with a garden "workshop" and sheds, a heated greenhouse and school garden. The Housecraft room at the other side of the court is next to a kitchen and servery for Catering courses, with an adjacent classroom which can also be used as a small "restaurant" or as an extension of the main dining room.

The third "centre" is formed by the three floors of teaching accommodation over the main entrance where "home bases" are provided for such subjects as Geography, History, Maths and Commerce. The reference library at the foot of the stairs is easily available from all these rooms (but unfortunately less easily available from the workshops and Science labs).

It was hoped that music and drama might be developed, and although a separate centre for music was impossible, two rooms could be used for this purpose without too much disturbance

to the rest of the school as these are planned as a small wing to the south of the gym. Small-scale drama connected with everyday teaching of English might take place in another short wing to the south of the dining space.

The staff rooms are close to the main entrance looking out to the south on to their own small garden.

Lastly, there are the main "service" areas of the school: kitchen and boiler house, etc., with a separate drive for goods and fuel (which also gives access for deliveries to the workshops). These, together with the changing rooms, Housecraft and Catering rooms, are grouped together, being the main producers and users of hot water. Lavatories, coat pegs and children's lockers are dispersed in small standard units throughout the school. The changing rooms (each large enough for two classes at a time) are adjacent both to the gym and the hall.

A school which has to provide such a variety of courses needing specialized equipment necessarily involves more cost in equipment and more area than a school providing a more limited range of subjects. The total area per cost place is 78·73 sq. ft. The total net area of the teaching accommodation is approximately 29,420 sq. ft.

MAIN CONSTRUCTION: general appreciation

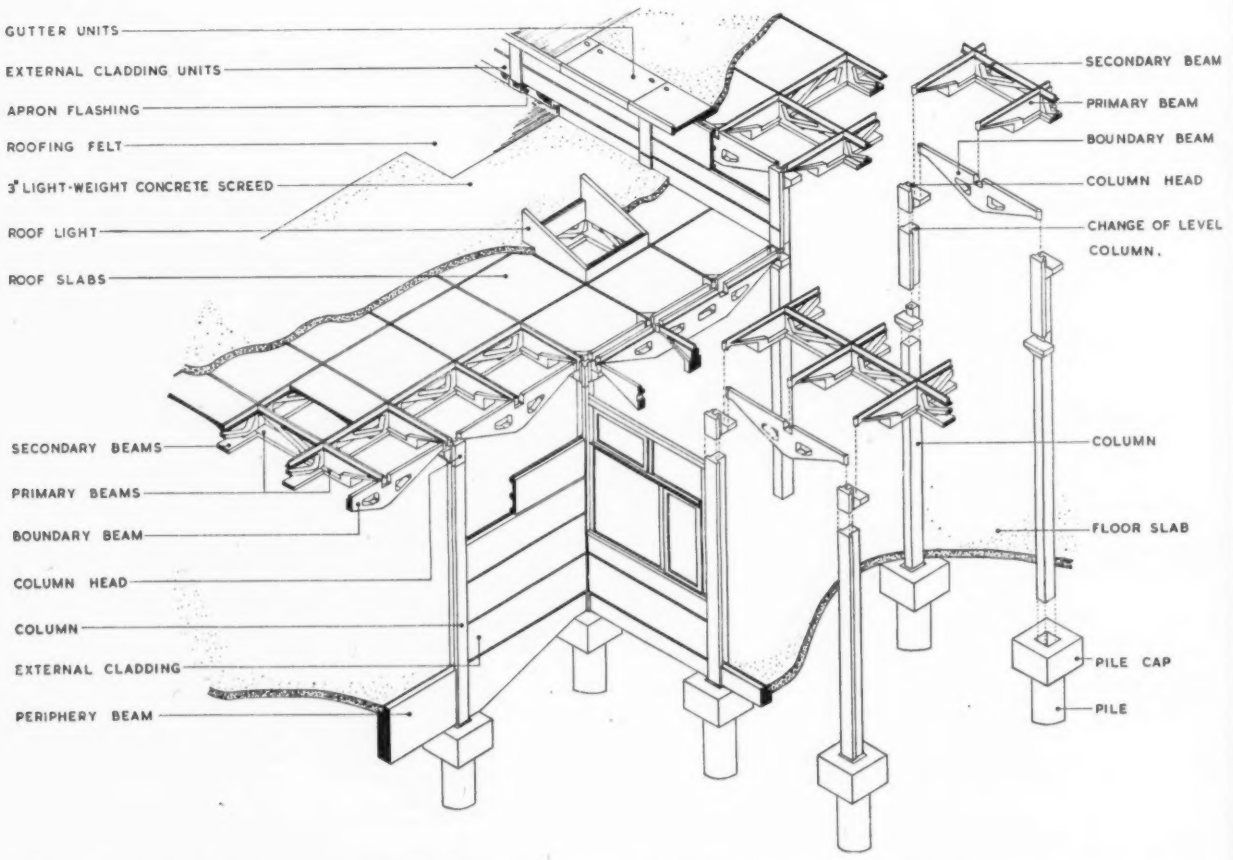
The precast prestressed concrete frame used for the first time in the Worthing Technical High School was developed by a team composed of architect, engineer, and contractor, who worked together from the inception of the project. The precast concrete contractor joined the team at a later stage. Before the development team started work, a programme of requirements, which the system would have to satisfy, was drawn up. The system was required to: (*a*) be capable of four-storey construction; (*b*) conform to the horizontal module of 3 ft. 4 in., thus allowing complete flexibility of plan within a 3 ft. 4 in. planning grid; (*c*) conform to a vertical module of 10 in. and allow flexibility of section ceiling height and changes of level in 10-in. increments; (*d*) permit spans of at least 30 ft. under roofs; (*e*) provide an open frame construction, making it possible to place outer walls, windows, or partitions at will; (*f*) have a self-centring type of floor and roof construction; (*g*) have a cladding system erected from within the building, thus eliminating the use of scaffolding; (*h*) have a full range of internal and external corners without special lengths of cladding slab; (*i*) have the necessary range of components for changes of level in section; (*j*) allow for the use of toplights in the roof structure; (*k*) allow services to pass freely through the horizontal structure between ceiling and roof or floor above (this overall dimension to be 1 ft. 8 in.); (*l*) be entirely of precast units designed for ease of handling and transport, and speedy erection on site; (*m*) provide structure as free from maintenance problems as possible; (*n*) reduce steel consumption to a minimum.

It was also required that the techniques of prestressing should be exploited to the full in order to achieve the utmost elegance and lightness of construction consistent with safety.

An appreciation was made of the problems connected with the roof and floor structure, as a result of which it was decided to develop: (1) an open truss system rather than a hollow slab, because it would allow: (*a*) lighter construction; (*b*) lighter components; (*c*) the free passage of services in all directions between ceiling and floor.

(2) a two-way grillage system rather than an independent beam system, because: (*a*) each beam would receive support from its neighbours whereas independent beams would act in isolation; (*b*) there would be a better distribution of loads resulting in reduced deflections and a greater margin of safety; (*c*) a rigid horizontal slab from which the necessary horizontal wind bracing could be achieved with precast components.

The floor and roof system which was evolved consists of a two-way grillage of post-tensioned beams at 3 ft. 4 in. centres in both directions supported on contributory beams and column heads. No scaffolding is required in construction. Once the frame is in place all other components are fixed from inside the building.



Isometric projection of the system. Roof and floor beams on 40-in. grid columns on 6-ft. 8-in. or 10-ft. spacing

MAIN CONSTRUCTION

Load bearing element

All columns are pre-cast and pretensioned with four 0·20-in. diameter high-tensile steel wires. They are of varying lengths up to 20 ft., in 10-in. increments. Their cross-section is 6½ in. × 4½ in. There are five main types: three for external walls and two for internal use. The three external wall types have two nibs 1½ in. × 1 in. added to the rectangular section to locate the cladding slabs, and are for straight walling, internal and external corners. At 10-in. vertical intervals they have two holes ½ in. and ⅝ in. diameter, respectively, cast in each side for cladding and other fixings. Of the two internal types, one has the basic 6½-in. × 4½-in. cross-section, and the other, for heavier loads imposed by multi-storey construction, is of cruciform section 6½ in. × 6½ in. along each axis. Single-storey columns are erected in sockets in foundation bases. Upper-storey columns are on bolts projecting 3 in. from the column heads below.

Location

For single-storey construction columns are at 6-ft. 8-in. or 10-ft. centres around all four sides of structural bays, and for multi-storey construction at 6-ft. 8-in. centres. It is not necessary for columns to be placed opposite one another

Height

The range of columns allows for ceiling heights from 8 ft. 4 in. to 18 ft. 4 in. and changes of level from 1 ft. 8 in. to 10 ft. in 10-in. vertical intervals. It is also possible to step the site slabs in 10-in. intervals

Column grid

All columns are placed on the inter-sections of grid lines of the 3-ft. 4-in. planning grid

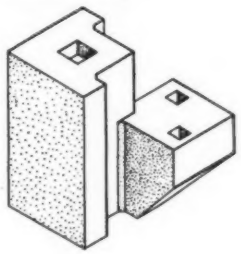
Reasons

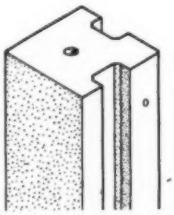
Nearly all the columns in the building are eccentrically loaded by prestressing them to attain the slenderness desired. The 4½-in. dimension of columns was required primarily so that internal columns could be embedded within the 6-in. precast plaster partitions and allow an unbroken wall surface. The other dimension of 6½ in. was calculated as sufficient for structural requirements

All columns which are storey height are surmounted by mushroom type column heads designed to cater for every possible beam-fixing condition which may arise. There are four main types: three for use with the external columns, and one which serves both types of internal column. In addition, there is a range of column heads for changes of level in the beam structure on opposite sides of any row of columns. Column heads are fixed to columns by a bolt threaded into a ferrule cast into the column. The head is bedded to the column and the bolt sleeves grouted up

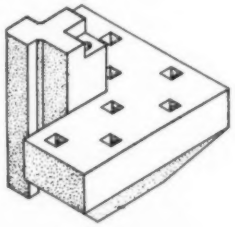
All columns

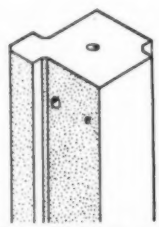
Column heads are used in order to obtain a simple pin joint between the horizontal structure and the columns. In principle, a 12-in. square mushroom table with 12 holes for steel connecting pins provides for all the beam conditions possible





External corner column





Internal corner column

Load bearing element continued

Boundary beams of ordinary pre-cast reinforced concrete span between column heads around all four sides of each structural bay. They support either one or two primary and secondary beams according to the column spacing. All boundary beams have holes which correspond to the main voids in the rest of the beam structure to allow the passage of services

Location

Boundary beams are located 2½ in. inside the module line on all four sides of each structural bay and span either 6 ft. 8 in. or 10 ft. between columns

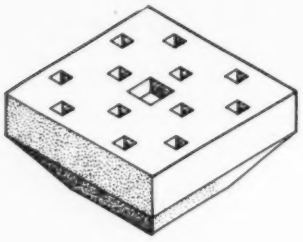
Reasons

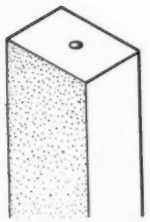
Ordinary reinforced concrete was used in this case as the spans are uneconomical for post-tensioning by the Freyssinet method and the sections unsuitable for pre-tensioning on a casting bed. At adjacent structural bays two boundary beams are used. At the exterior of the building the cladding masks the boundary beams, hence their location 2½ in. inside the module line. Where double boundary beams occur, they are carried on single columns

Primary beams are composed of standard precast units nominally 3 ft. 4 in. in length and 12⅞ in. deep, and are of two types: intermediate, and end units. Intermediate units consist of top and bottom booms, diagonal strut, and end posts. There is some mild steel tension reinforcement in the posts only. There is no other reinforcement, apart from the prestressing wires, as all other members remain in compression at all times. End units are solid and contain the stressing block and seating for connection to column head. Primary beams are assembled in a jig on the ground to the required length (in multiples of 3 ft. 4 in.) and jointed with *ciment fondu*. Twenty-four hours after jointing the 0·20 in. diameter high-tensile steel prestressing wires are placed in the grooves in the bottom boom, threaded through the stressing blocks of the end units, and post-tensioned by the Freyssinet method. Wires from the left-hand block pass along one side of the beam, round the seating of the right-hand end unit, and back to the left-hand block along the other side of the beam, and vice versa. Two or four looped wires are used according to span and load, giving a total of four or eight 0·20-in. diameter H.T. steel wires per beam. All exposed wires are then grouted up. Beams are then ready for erection. Stocks are built up on the site while column erection is in progress

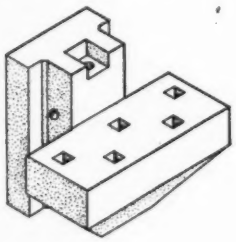
Primary beams occur at 3-ft. 4-in. centres across the narrower span of each structural bay. Maximum spans vary according to the length of the bay in the opposite direction

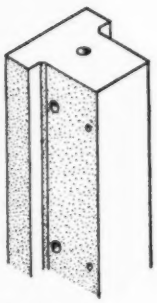
Flexibility on a 3-ft. 4-in. planning grid was a requirement laid down for the system. In order to reduce mould costs, to facilitate batch production, and ease of handling and transport, it was decided to use standard 3-ft. 4-in. basic units. By using a "string of beads" post-tensioning technique, assembly of units into beams is a simple matter as problems of shear at vertical joints do not arise





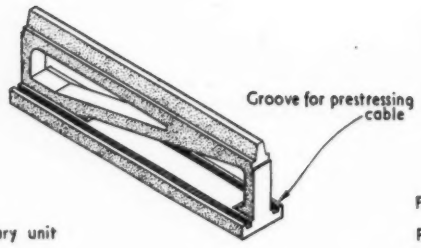
Internal column and head to take all possible connections of primary, secondary and boundary beams



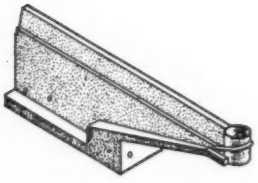


External wall column

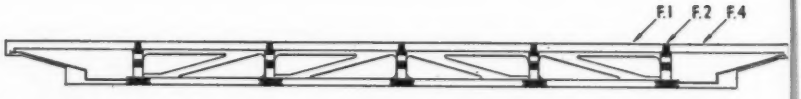
Load bearing element (continued)	*Location*	*Reasons*
Secondary beams are composed of standard precast units, similar to those for primary beams, but with the following differences: (i) The grooves for stressing wires are in the sides of the bottom boom instead of the top; (ii) The ends of each unit are profiled to the section of the primary beams so that they can be self-centred. These self-centring secondary beam units are assembled into beams between the primary beams already erected and bedded with *ciment fondu*. After twenty-four hours, prestressing wires are threaded into position along the side grooves and through holes precast in the bottom booms of the primary beams. The secondary beam is then post-tensioned. Cover is then applied to all exposed wires	In floors. Secondary beams are located at 3-ft. 4-in. centres in the opposite direction to the primary beams. In most roofs they are located at 6-ft. 8-in. centres. At intermediate positions a purlin member only, corresponding to the top boom of a beam unit, is placed in position to complete the grillage which supports the slab units	As for primary beam
Slab units which complete the horizontal structure in floors and roofs are of precast concrete nominally 3 ft. 4 in. square. They are dished on the underside and vary in thickness from 2½ in. at the edges to 1½ in. in the middle. Once in place they are subject only to compression stresses and are, therefore, unreinforced	Grouted into the square seatings formed by the beam grillage. Both top boom of the beams and the edges of the slabs are profiled at an angle to produce a keystone action: thus, the placing of these units completes the structure as a monolithic, horizontal slab, capable of withstanding all wind stresses in that plane	



F.1
Primary unit



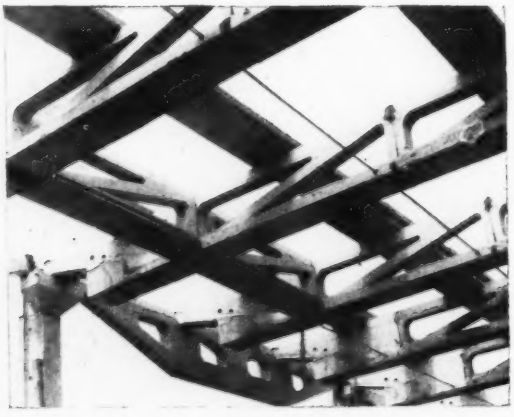
F.4
Primary end unit

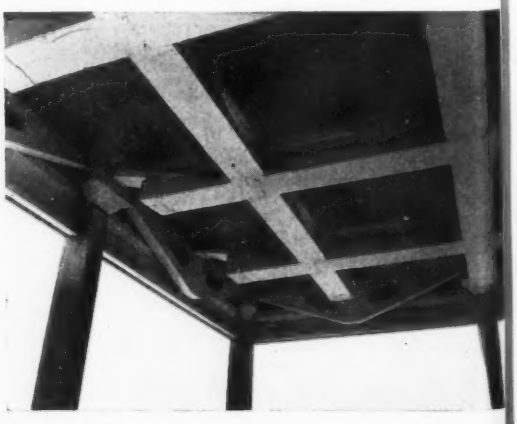


Primary Beam Assembly jointed and post tensioned on ground

Multiples of 3'-4" units up to 40'-0" span

Below left: main beams in position, secondaries being assembled. Below: the frame left exposed in the verandah of the arts and crafts building.





Foundation type	*Location*	*Subsoil*	*Depth*	*Reasons*
Cast in-situ concrete piles 17 in. diameter, with helical reinforcement. Piles were augured for about 3 ft. and then caisson-driven, small portable tripod rigs being used. Where piles were driven below the water table, a pressure head was fitted to the caisson. Column bases 21 in. square, 15 in. deep, were cast as pile caps around mild-steel starter bars projecting from piles. Each base contains an 11-in. deep socket to receive the column. Raked piles in pairs were used beneath the four-storey staircase well walls, forming A-frames to resist the horizontal component of wind pressure	Beneath each column base	Marl clay on weathered chalk as ballast	Depth of piles varies between 5 ft. and 20 ft., according to loads. The average depth is 7 ft. 6 in.	A soil exploration showed the immediate subsoil to be of an extremely unstable nature with a bearing capacity of less than two-thirds of a ton per sq. ft., with point loads at 6 ft. 8 in. and 10 ft. centres. In mid-winter the water table was found to be as little as 2 ft. 6 in. below ground level. It was hoped that an augured and reamered pile with a mushroom pad base would be possible, but it was found in exploration that the walls of the borings collapsed. It was therefore decided that a firm specializing in short-bored caisson piling, using a pressure head where necessary, would be engaged. It so happened that the whole piling operation was carried out in a drought and water was seldom met higher than 8 ft. below ground. The pressure head was therefore only necessary for the deep piles, and it was possible to bore the upper stratum with an augur. The 460-odd piles for the column bases were bored and cast by the sub-contractor, using three rigs in five weeks

Roof type	*Location*	*Material and finish*	*Reasons*
Bituminous felt roofing laid on 3-in. insulating screed on structural roof described in slab units	All roofs	Two layers of one-ply, self-finished bituminous roofing felt, each layer bedded with hot bitumen, finishing mastic. 3-in. foam slag screed was finished dead flat and composed of 6 cubic feet foam slag aggregate graded from ⅛ in. to dust to 56 lb. Portland cement, laid loosely and finished with a steel float to a density of 68·75 lb. per cubic foot	In order to achieve the required standard of thermal insulation on the roof, it was decided to use a lightweight screed of constant thickness. Consequently, a roof-covering specification suitable for a dead flat roof was selected

Outer wall type	*Location*	*Material*	*Finishes*	*Reasons*
Cladding slabs. The external skin of the outer wall, which is of cavity construction, is of precast concrete horizontal units dished on the inside and faced with stone chippings of varied kinds. The outer wall cladding slabs are reinforced, and span from column to column independently of one another. They are 1¼ in. thick with a thickness of 3 in. through the grids. The suspension of the slabs within the columns eliminates the need for special types at external and internal corners. There are, therefore, only two widths of slab, 9 ft. 7⅛ in. and 6 ft. 3½ in. for 10 ft. and 6 ft. 8 in. column spacings, respectively. There are also two depths of slab, 1 ft. 8 in. and 10 in. Thus, only four cladding slabs are required for all the conditions met with in external walling. At upstands between a high and low block of the building there is a 5-in. deep upstand slab available to take the flashings below clerestory windows. The slabs are fixed to the columns with reinforced concrete dowel pins at 10-in. vertical centres. Holes are formed in the dishing of the slabs to correspond with the holes precast in the columns. At the time of erection grout is placed in the holes and the pins then driven home. Small steel wedges are placed underneath the slab, which are removed when the grout has set. Thus, the total independence of one slab from another is ensured.	Throughout the building wherever solid walling is required	Vibrated, reinforced concrete	A variety of facings, using various stone chippings, have been developed. Three types were used at Worthing: (i) Derbyshire spa in white cement; (ii) Black Menheniot granite in *ciment fondu;* (iii) Calcined flint and pea gravel in white cement. In all cases the facings were laid and vibrated into the surface of the slabs while still in the mould and then washed before initial set	By using horizontal cladding slabs fixed directly to the columns it was possible to: (i) avoid the necessity of providing any form of cladding subframe; (ii) add stiffness to the frame and make a definite contribution to vertical wind bracing. The cladding slab in most general use is the type 1 ft. 8 in. deep. By adding a 10-in. deep slab to the range, it was possible to provide sill heights in 10-in. intervals
Eaves slabs. A range of precast, reinforced concrete eaves gutter slabs was designed. Each unit is nominally 3 ft. 4 in. long and oversails the external cladding by 12 in. 14 in. remain inboard and are bedded to the roof slabs. The slabs are secured with stirrup bolts which pass under the end units of the beams and through holes precast in the roof slabs. Their thickness varies from 1¼ in. to 3 in. at the fixing where they form a stop for the roofing screed. The forward edges are designed as a fascia requiring painting only. Standard types were designed for straight runs, internal and external corners, stop ends, clipped eaves, and rainwater down-pipes sumps	Throughout building			Oversailing eaves were chosen because: (i) it was considered best with this form of construction to take rainwater away externally; (ii) it was necessary to cover and give adequate protection to the top of the cavity walling
Concrete blocks. 3-in. precast concrete blocks were also used as an inner skin. These were of the same type as the 4-in. block used for internal walls.	Workshops block			In these areas a high standard of surface finish was not considered appropriate

Floor structure type	*Location*	*Reasons*
Sand cement screed 1½ in. thick, less thickness of floor finish laid on site slab	All floors	Finished floor level corresponds with the vertical module and external course line 1 ft. 8 in. above ceiling level. Structurally, the optimum dimension from top of beam system to course line was 1½ in.
Screed as above laid on structural floor		

Materials	*Finishes*	*Location*	*Reasons*
¼-in. cork tiles 12 in. square	Two coats phenolic plastic polish rubbed down to semi-matt surface with steel wool	Assembly hall, library and staff-room	High quality, reasonably quiet. By application of plastic polish, only mopping and occasional washing are necessary. Surface is rendered impervious to ink
⅛-in. rubber sheet backed with ½-in. sponge rubber	Self finish	Gymnasium	This is an experimental alternative to a hardwood strip floor. It is very quiet, resilient, and promises to be easy to maintain
Studded rubber tiles 12 in. square	¾-in. diameter studs at 1½-in. centres projecting ⅛ in. above ⅛-in. rubber tile base	Circulation spaces, landings and third-floor classrooms, including typewriting room	Quiet and durable, used wherever heavy traffic or impact noise is anticipated
2-mm. PVC sheet	Self finish, mottled colours	Classrooms, laboratories and administrative rooms generally	Reasonably quiet, cheaper than rubber and very durable
4·5-mm. linoleum	Self finish, mottled colours	Two laboratories	As above
3·2-mm. linoleum	Self finish, mainly mottled colours	Some classrooms and practical rooms	As above
PVC laid in-situ flooring	Steel trowelled	Workshops, changing rooms, lavatories and stores	High quality, low cost in-situ floor, available in any colour specified
Granolithic	Steel trowelled	Metal workshop	Use dictated by forge and brazing tables
Tiles, heather brown	Semi-matt	Catering room, servery and kitchen	Very hard wearing, easily cleaned, grease resistant
Tiles, non-slip	Textured, matt glaze	Showers and drying rooms	Remaining non-slip under water

Internal partition type	*Location*	*Finish*	*Reasons*
Precast gypsum plaster panels 6 in. thick made up of two outer skins ⅜ in. cast on to hexagonal plaster core. Panels are 2 ft. wide and up to 10 ft. high. Joints poured wet with gypsum plaster panels bedded in base but no vertical connections made to columns	All internal partitions with the exception of workshops, boilerhouse, and staircase wells	Smooth surface painted two coats plastic emulsion paint, etc.	Precast gypsum plaster partitions were selected for ease and relative dryness of fixing, standard of plaster surface obtained, adaptability, ability to carry suspended loads of sanitary fittings, shelves, cupboards, etc., resistance to impact and abrasion, sound reduction of 30 db., elimination of drying-out period normal for wet plastering. The use of 6-in. panels with two ⅜-in. thick skins allowed the 4½-in. wide columns to be contained within the partitions with a clearance of ⅛ in. on each side. In all but a very few cases it was possible to place the long axis of columns in line with partitions, in the remaining ¾ in. plaster appears on each column face
Precast concrete blocks 18 in. × 9 in. × 4 in.	Partitions in workshops block	Mostly left undecorated. Colour pale buff obtained from use of local Midhurst sand.	Concrete blocks used in areas where a high standard of surface finish was not considered to be appropriate and where considerable rough wear was anticipated. Mainly left unplastered and undecorated

Ceiling type	*Location*	*Material*	*Finish*	*Reasons*
A suspended ceiling system is used throughout the building consisting of square panels supported by a grillage of asbestos-wood strips 9 in. wide. The grillage is made up of bearer strips at 3 ft. 4 in. centres suspended from the soffits of the primary beams by adjustable steel clips and filler strips of identical section at 3 ft. 4 in. centres in the opposite direction supported by the bearer strips. Dry, fixed, demountable panels 2 ft. 7 in. square are supported by the grillage so formed. Where ceiling abuts a partition it is supported by a small fibrous-plaster cornice planted on the face of the partition	Areas in which good sound absorption and/or half-hour fire resistance is required	1½-in. precast vermiculite panels 2 ft. 8 in. square reinforced with mesh wire with ½-in. rebates at edges for suspension	Surface of grillage and panels sprayed one coat plastic emulsion paint	Primary beam soffits at 3 ft. 4 in. centres provide a simple means of suspension. The 9-in. width for grillage strips was adopted to allow the cutting of panels without waste from any of the range of sheet materials normally manufactured in 4-ft. widths. Thus, a wide selection of materials is available to satisfy both performance and cost requirements. In addition, panels can be cast to the necessary dimension. A further requirement was that panels should be easily demountable to allow access to all services run in the roof or floor space
	Areas of low fire risk (single-storey and top floor of multi-storey blocks) where sound absorption is desirable	½-in. fibreboard panels 2 ft. 7 in. square with 1-in. × ⅜ in. timber edge framing forming suspension rebate		
	All other areas	½-in. asbestos-wood panels 2 ft. 7 in. square with timber edge framing		

Architects' Journal 4.8.55

STAIRCASE: OFFICES IN LONDON, N.W.9

Walter Segal, architect

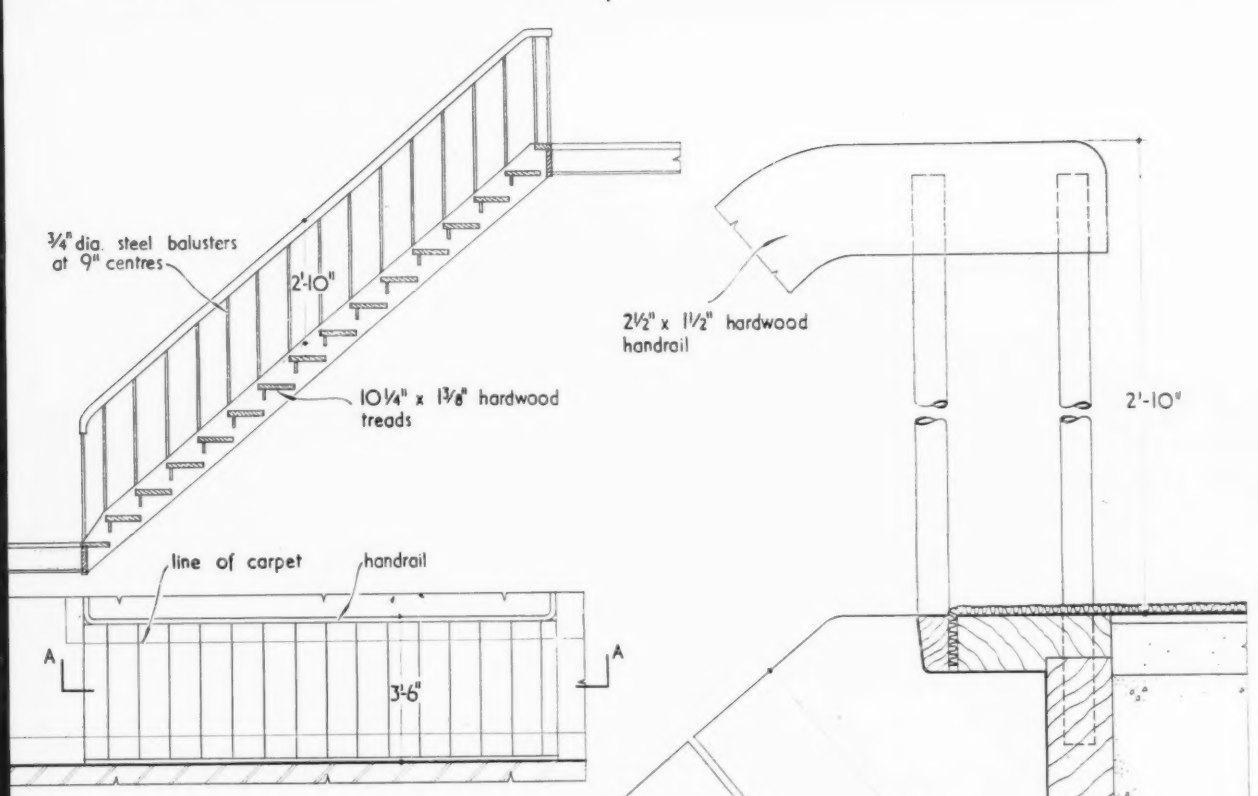
The main interest in this stair lies in its economy. The going is in fact steep (10¼-in. tread, 7½-in. riser), but this fact is concealed from anyone climbing the stair by the optical illusion created by the half-riser. The use of a vertical section for the handrail obviates the need for a handrail core.

WORKING DETAIL

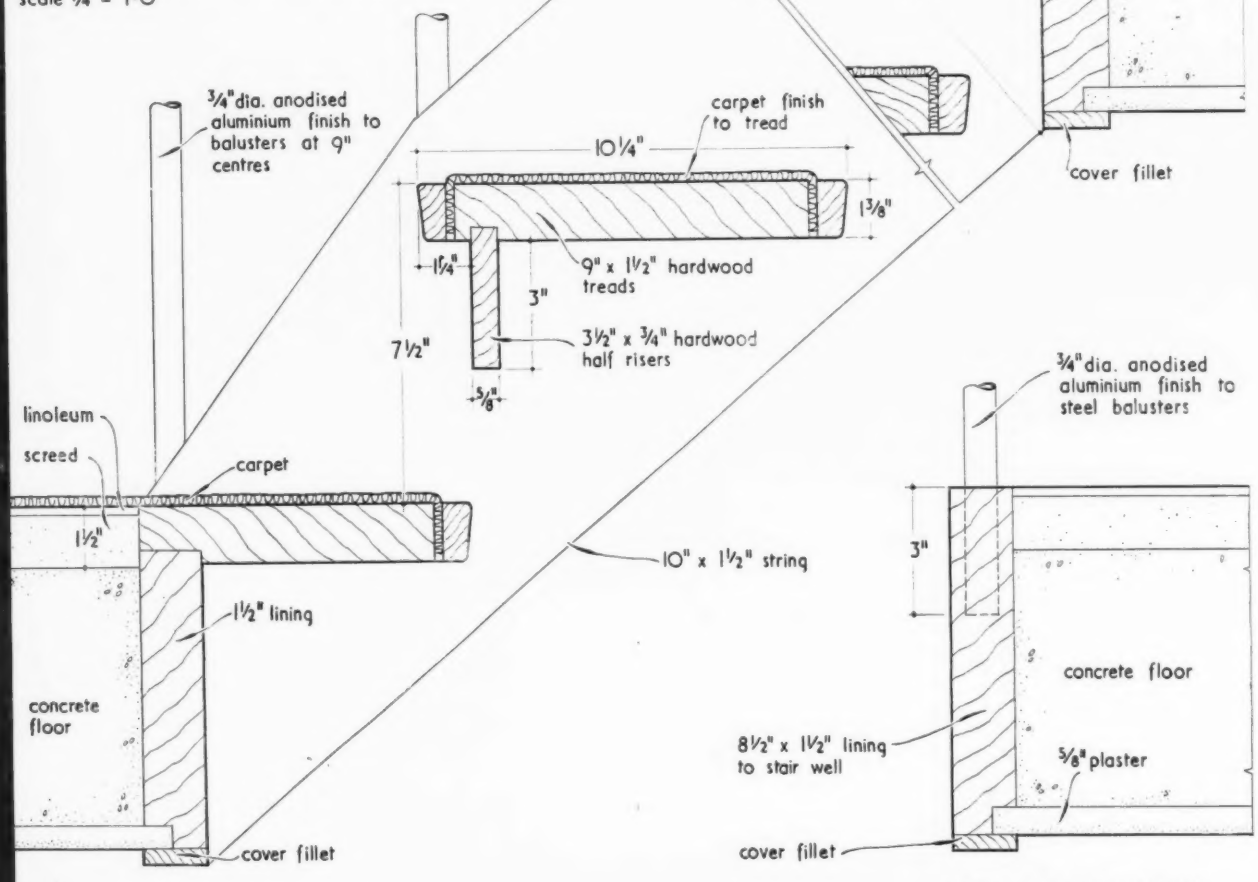
STAIRCASES: 18

STAIRCASE: OFFICES IN LONDON, N.W.9

Walter Segal, architect



PLAN AND SECTION OF STAIRCASE.
scale ¼" = 1'-0"



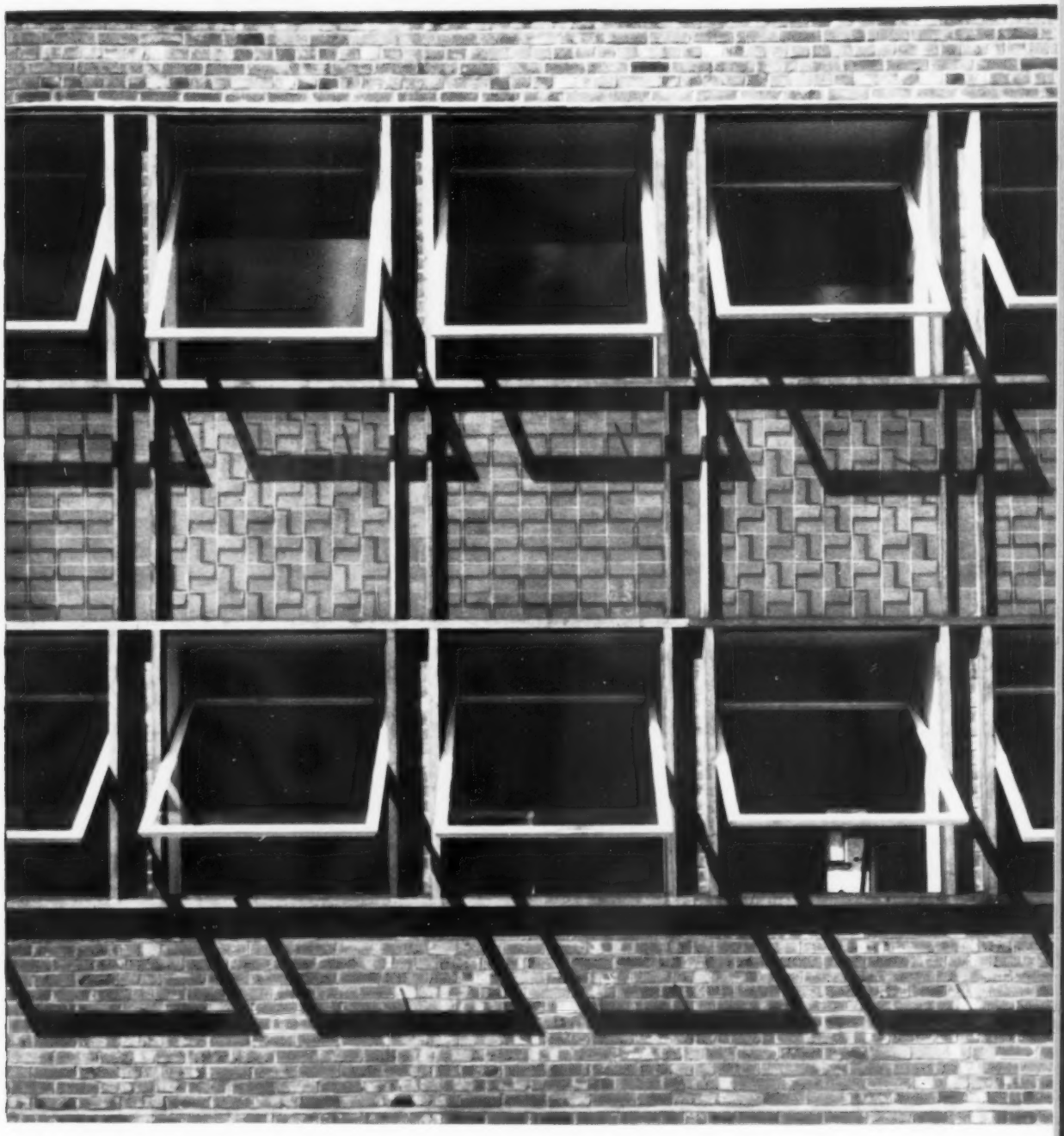
PART SECTION A-A. scale ¼ full size

DETAIL OF WELL LINING.
scale ¼ full size

WORKING DETAIL **WINDOWS: 34**

RANGE OF WINDOWS: OFFICES IN LONDON, N.W.9

Walter Segal, architect

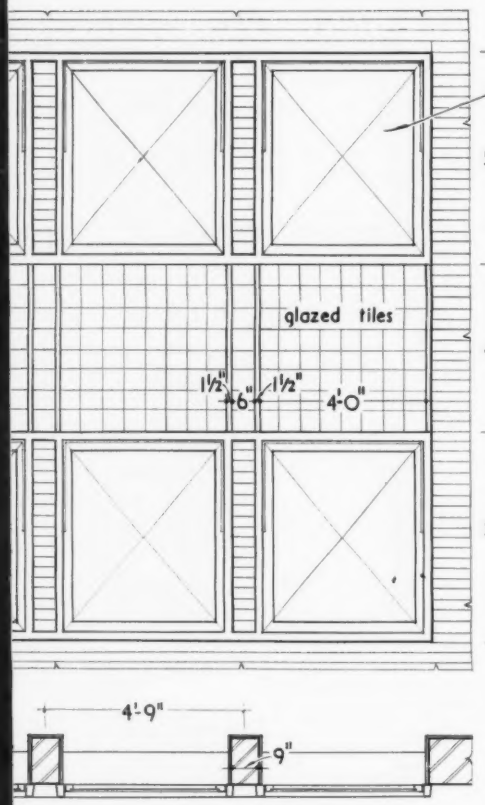


The use of 9-in. brick piers and the consequent impossibility of getting a true face on both reveals led the architect to lay the back of the wood frame flush with the outer face of the brickwork. The wood used is gurjun, which gives a minimum of movement when used externally. The fixed frames were built up in horizontal units comprising two windows each and are secured to the brickwork by means of 8-in. by 2½-in. by ⅛-in. cramps, two on either side of each window. The vertical strips connecting the two ranges of window are morticed top and bottom into the adjoining frames.

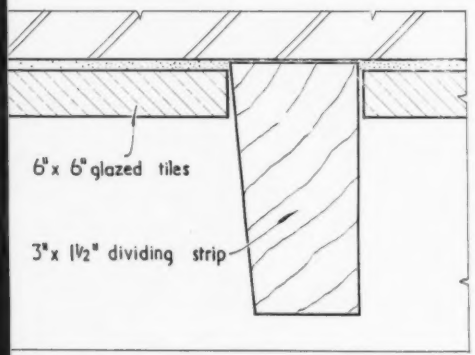
WORKING DETAIL **WINDOWS: 34**

RANGE OF WINDOWS: OFFICES IN LONDON, N.W.9

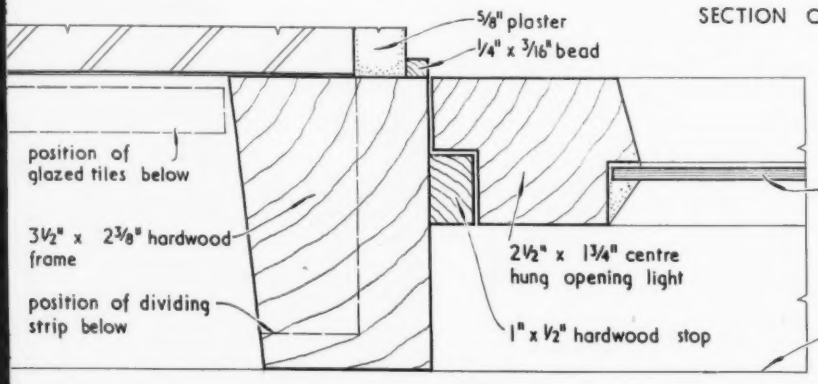
Walter Segal, architect



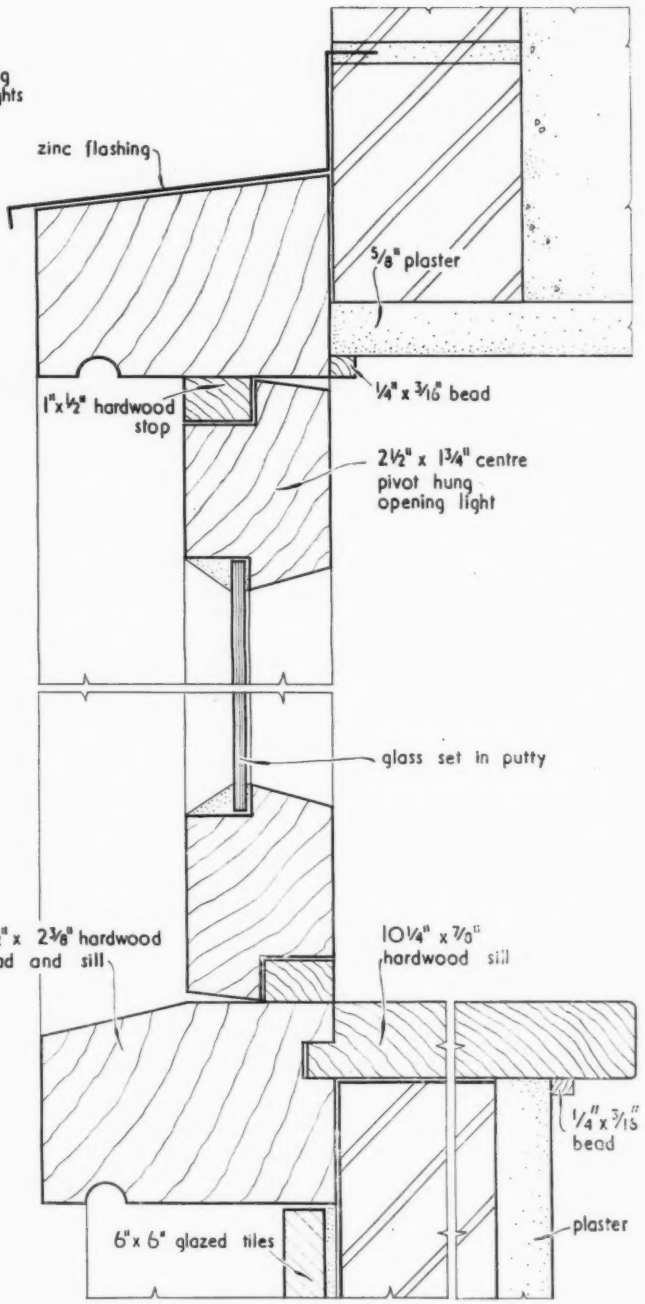
PLAN AND ELEVATION OF WINDOW. scale ¼" = 1'0"



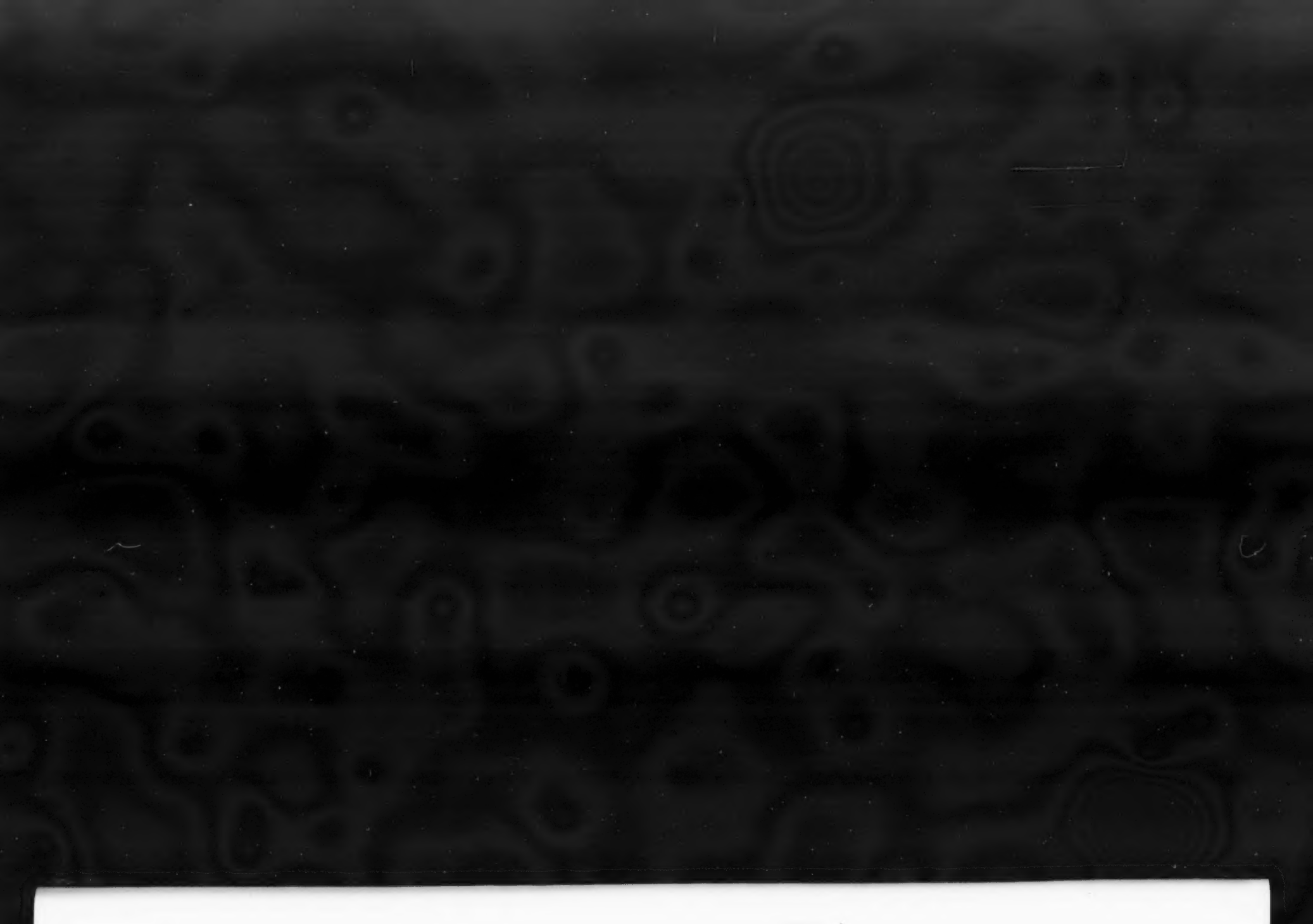
PLAN OF DIVIDING STRIP. scale ½ full size



PLAN OF WINDOW. scale ½ full size



SECTION OF WINDOW. scale ½ full size



ARTIFICIAL LIGHTING

Source and fitting type	*Location*	*Illumination level*	*Comments*
Suspended Perspex fitting with tungsten filament lamps, giving good downward component and upward light on to ceiling, together with general diffusion	Most teaching rooms, etc.	As required by "The Standards for School Premises Regulations, 1954"	Three experimental fittings have been used in limited quantities. All are of Perspex or wound from thin PVA tubing and are designed to give a good downward component, upward light to the ceiling, and general diffusion, and to comply fully with the Regulations as they affect classroom lighting
Spun-aluminium, wide-beam reflector mounted on 6-in. brass flexible tube arm giving direct illumination	Single or multi-gang over all fixed chalkboards and other important wall surfaces to boost illumination level above surroundings		
Recessed reflector with louvres giving direct downward illumination only	Assembly hall ceiling, to give direct floor illumination and, incidentally, sparkle, in association with diffusion fittings		
Recessed dispersive reflectors with protective louvres	Gymnasium ceiling		

Wiring and switching type	*Location*	*Comments*
PVC with earth continuity conductor Conduit	General, excluding lighting circuits In workshops	Suspended ceiling panels are demountable
Microgap. Single and multi-gang switches	General	

Power supply type	*How distributed*
Type AC (240-volt). One-phase generally. Three-phase to workshops	Single main intake from substation and then to local distribution boards

NATURAL LIGHTING

Wall glazing	*Location*	*Reasons and comments*
A standard range of timber windows and external doors was developed with British Columbian pine frames and hardwood opening lights, doors and sills. The range provided frames for glazing down to floor level and sills at 1 ft. 8 in., 2 ft. 6 in. and 3 ft. 4 in. High level windows and clerestory windows were also included. Main transoms were standardized at 6 ft. 8 in. above finished floor level. All lights below transom height are side-hung casements, 2 ft. 6 in. wide. All those above are top-hung casements 3 ft. 4 in. wide. In 10-ft. bays double side-hung casements opening outwards have been used. All side-hung casements include built-in Espagnolette bolts operated by lever casement turns and controlled by screw friction stays. Top-hung casements are fitted with peg stays. A simple fixing for frames is obtained by plugging the cladding fixing holes in the columns and screwing through frames	Throughout school	It was decided that either a complete timber window system or steel casements in timber sub-frames would be most suitable for the structure on account of the simple fixing conditions afforded. A range of types was drawn up and preliminary quotations invited from two joinery firms and one steel window manufacturer. The lower joinery quotation, though for good quality specification, including built-in ironmongery, was less than half the quotation submitted by the steel window manufacturer. This was accepted. All thresholds are of English oak and other sills of iroko. The opening lights and doors are framed in Agba. The initial specification for all hardwood called for the application of two coats of raw linseed oil. It soon became apparent that the agba sections were not weathering pleasantly and it was decided to paint all external hardwood with the exception of the thresholds and sills

Roof glazing	*Location*	*Reasons and comments*
A range of precast reinforced concrete rooflights kebs nominally 3 ft. 4 in. square has been designed. These kebs are structural and can take the place of concrete roof slabs anywhere on the roof. They are designed to accommodate single pitch frames of galvanized steel section with 12-in. vertical upstands on one side fitted either with fixed glazing or ventilating lights There are four basic types of kerb: one for isolated 3-ft. 4-in. square lanterns; the others, a left-hand end, a right-hand end, and an intermediate kerb, which can be added together to form strip lanterns 3 ft. 4 in. by any multiple of 3 ft. 4 in.	In the roof	The intention was to provide for both top-lighting, wherever required in the school, and for cross-ventilation. Rooflights have been used considerably in the assembly hall, the gymnasium and the workshops block, all of which are concentrically planned. The lights have made possible the use of some internal lavatories

HEATING AND VENTILATION: artificial and natural

Heat exchanger type	*Location*	*Criteria temperature*	*Reasons*
Low level (horizontal) heater battery and fan cabinet (re-circulated warmed air): (i) large with two fans; (ii) normal with one fan; (iii) small	(i) and (ii) General: that is, one normal cabinet in small areas; up to two large cabinets in large areas (hall and gymnasium). (iii) Staff-rooms	62° F. internally 32° F. externally	The method of heating gives good comfort conditions in all parts of the heated space; in particular, recent BRS tests have shown that temperature gradient is improved (with corresponding improvements in comfort conditions and reduction of fuel consumption) if warmed air is introduced at a low level. The majority of cabinets discharge at about 1 ft. 3 in. above FFL
High level (vertical) heater battery and fan cabinet	Occasionally for planning convenience		

Boiler type and capacity	*Heat load*	*Fuel type*	*Stoking method*	*Reason*
Two Beeston 9 BR cast iron sectional boilers	456,000 B.Th.Us.	Washing singles	Automatic worm-fed from hoppers	The hot water supplies from the three boilers are inter-connected. Any two can therefore, serve the heating and domestic systems if the third is out of action
One Beeston 6 MN	673,000 B.Th.Us.			

Hot water storage	*Location*	*Material*	*Capacity*
Two lagged calorifiers	Boiler-house	Galvanized mild steel	700 gal. total

Hot water storage (continued)	*Location*	*Material*	*Capacity*	*Comments*
4 lagged calorifiers	Lavatories	Galvanized mild steel	Three of 60 gals., one of 30 gals.	In order to keep the length of the domestic hot water runs to a minimum. Domestic size calorifiers, fed from the heating system in winter and by 4-kW immersion heaters in summer, are used in lavatories farthest from the boiler-house. Tepid water is supplied from these to basins for hand-washing

Cold water storage	*Location*	*Material*	*Capacity*	*Comments*
Tank 6 ft. × 4 ft. × 4 ft.	Boiler-house	Galvanized mild steel	600 gals.	The Local Authority required that cold water should be stored for all calorifiers and all fittings in which hot and cold water were mixed. Swivel mixing taps are of the type that maintain the hot and cold supplies separate until they are discharged at the nozzle, and domestic calorifiers are fitted with brake tanks. Thus it was only necessary to store water for the showers. This part of the system is pressured in order (i) to reduce pipe runs and diameters; (ii) to maintain an even head on both sides of the mixing valves; (iii) to avoid the expense of a tank room on the roof of the four-storey block
Tank 5 ft. × 3 ft. × 2 ft. 8 in.	Top floor of four-storey (in teaching store)	Galvanized mild steel	250 gals.	Storage for boiler circuit is mounted above head height and supported on precast plaster walls of the teaching store

SOIL WASTE

Type of system	*Materials*	*Upper floors*	*Comments*
Separate	First-quality stoneware (surrounded with concrete under and within 2 ft. 6 in. of building)	Preformed welded mild-steel stacks	Prefabricated copper wastes to basins

Drain types	*Location*	*Materials*	*Comments*
Acid	Science laboratories	Pipes to BS 1143 with fire-clay bench-mounted dilution sinks and dilution funnels	In principle, to dilute acid at source

Rainwater disposal types	*Location*	*Materials*	*Comments*
Aluminium tube 3-in. internal diameter	All external on column grid from sump in eaves unit to rodding shoe cast into column base, or to discharge over 12-in. square asbestos tile on adjoining roof. Most rainwater down-pipes have been kept to the south and east elevations of the building. Collection to stormwater sewer on road on north boundary	Tubes, spigots, and brackets of aluminium	In single-storey tubes in storey lengths from eaves to ground

FIRE

Structural precautions	*Columns*	*Floor structure*
At the time of building the fire resistance of neither the floor system nor the columns was known. Little information was available about the behaviour of similar prestressed structures under fire, and it was not possible at the time to embark upon official tests. Though the columns could be regarded optimistically, the behaviour of the floor system was very much an unknown. It was, therefore, decided to discount entirely the fire resistance of both elements and to apply protection	Most columns in multi-storey blocks were contained within partitions which gave them a cover of ⅝-in. gypsum plaster. Free-standing columns were encased in ¾-in. fibrous plaster. Internal faces of external wall columns at window jambs were encased in ¾-in. hardwood	For all ceilings below upper floors 1½-in. vermiculite panels suspended within the asbestos-wood grillage (see ceilings) were used

Grade of protection	*Comments*
Through these precautions the prescribed fire grading of half-hour fire resistance was assured	Recently, official tests have been carried out at the Fire Research Station at Boreham Wood, as a result of which both columns and floor structure unprotected have received a half-hour fire grading

Planning precautions

The requirements of MOE Building Bulletin No. 7, "Fire and the Design of Schools," have been complied with. The double staircase well, forming the spine of the four-storey block, gives a choice of two staircases to every room with direct escape into the open at ground floor level,

Apparatus, sprinklers, etc.

An electric alarm bell system has been installed, and sprinklers, blankets, and buckets provided

COLOUR

Paint types	*Where used*
Plastic emulsion paint, two coats	All internal plaster partitions, plasterboard, and exposed concrete, excluding steamy areas. Some external concrete
Plastic emulsion paint, one coat sprayed	Ceilings, excluding steamy areas
Semi-gloss oil paint, three coats	Kitchens, catering rooms, changing rooms, showers, etc.
Distemper, one coat sprayed	Ceilings to kitchens, catering rooms, changing rooms, etc.
Full-gloss, three coats on primer	All internal timber other than hardwood. All external timber, including hardwood. All internal steelwork (ungalvanized steel treated with rust-inhibiting solution prior to anti-corrosive priming coat

TIME SCHEDULE

Development of System	*Working Drawings*	*Bill of Quantities Part 1*	*Work commenced*
November 1951-October 1952	October 1952-April 1953	October 1952	10th July 1953
		Bill of Quantities Part 2	*Work completed*
		October 1953	10th May 1955

Type of contract
RIBA with Quantities

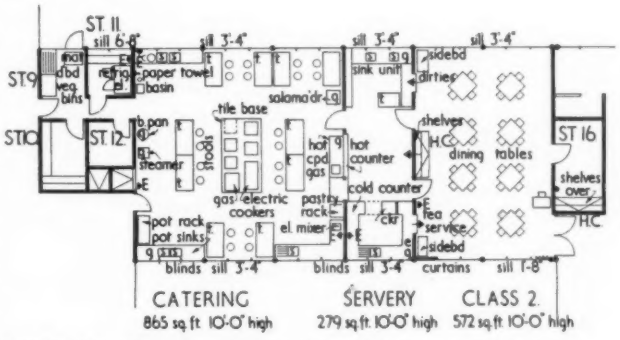
Comments
The contract was in two stages. The first stage included foundations, frame erection, roads and drainage Development work overlapped Working Drawing period. About 300 drawings were produced, excluding. development of system

DETAILED PLANNING OF SELECTED AREAS

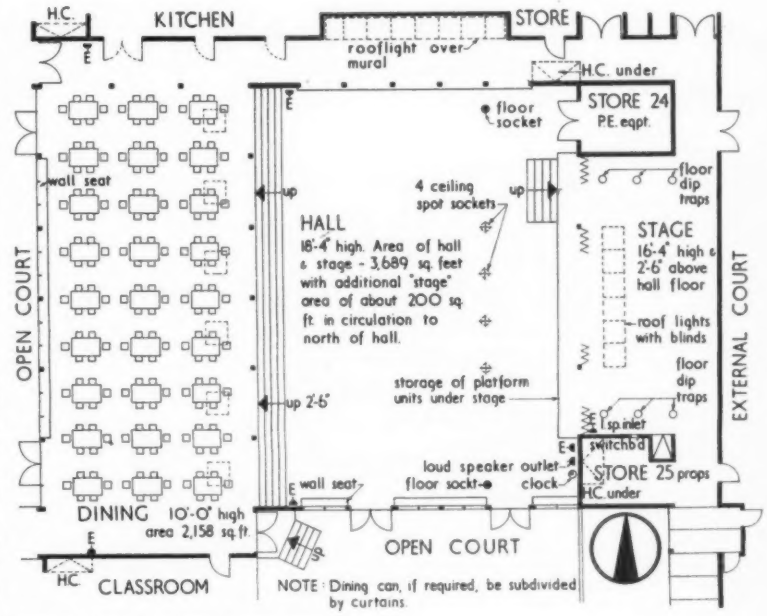
The problem in this school, where only one stream is expected to specialize in housecraft and catering, was that the accommodation would have to be usable not only for advanced work but for more general courses for the younger children. In spite of this, it was decided that, in addition to one housecraft room suitable for a normal secondary school housecraft course, space and equipment should be provided for a specialized catering course.

The accommodation for this includes: (*a*) A room of about 30 ft. by 30 ft. with a central island of cooking equipment a small area for vegetable preparation, another for pastry preparation, another for washing up and another for service of meals. (*b*) An adjacent servery of about 10 ft. by 30 ft. connected to the main kitchen with a door and service hatch, and to the "restaurant" by "in" and "out" doors. (*c*) A room of about 20 ft. by 30 ft which could be used sometimes as a restaurant served by the catering kitchen and at other times as a classroom. (*d*) Stores for dry goods.

As already mentioned, the hall and dining space have been regarded as the social centre of the school where everyone will come each day. They are also spaces which will be used for a very large number of different purposes, some with conflicting requirements. The dining space (planned to take about 162 at one sitting) forms, in fact, a 30-ft. wide continuation of the hall at a slightly raised floor level, being separated from it only by four wide steps and five columns. It could, therefore, be used for assembly, social functions, concerts, or plays, and the raised floor would enable a better view of the proceedings. To the south the hall is again extended out into a garden court sunk to the same floor level as the hall and sheltered from the west, north, and east. Along the north end of the hall there is a raised aisle. To the east there is a stage and a plain back wall. The dining area will, it is anticipated, be used mainly as part of the hall when not needed for meals. It could, however, be used for exhibitions or for individual work if the hall were not in use. It can be divided into three smaller spaces by curtain divisions if these were needed. It can also be used in conjunction with the classroom-restaurant adjacent to it to the north and also with the paved court in fine weather



Detailed plan of catering servery and class 2 [Scale : $\frac{1}{4}$" = 1' 0"]



Detailed plan of hall and dining rooms

SITE AND PLAN ACCOMMODATION

Site accommodation	*Area in acres*	*Per cent. of total*
Building	2	11·1
Playing fields	10	55·6
School garden	2	11·1
Planting near building, roads, paths, paving, caretaker, hard tennis courts	4	22·2
Total	18	100

Plan accommodation	*Area in sq. ft.*	*Per cent. of total*	*Area per place*
Hall, stage, gymnasium	7,354	13·6	10·81
Library, store	1,110	2·1	1·63
General and practical classrooms	25,928	48·1	38·12
Dining room	2,191	4·1	3·22
Pupils storage, sanitary accommodation	5,034	9·3	7·40
Staff rooms, service	4,896	9·1	7·19
Circulation	7,370	13·7	10·83
Total	53,883	100	79·20

COST ANALYSIS

Cost analysis (based on Tender figures)	
No. of form entries	4
No. of places	680
Floor area (sq. ft.)	53,883
No. of sq. ft. per place	79·2
Net cost	181,690
Net cost per place*	267
External works	21,212
Gross cost	202,902
Gross cost per place	298
Tender date	May, 1953

* The normal limit of net cost per place, calculated in accordance with Building Bulletin No. 2A Part 4, was 276.

Ratios

Area of enclosing walls / Total floor area	=	0·777
Area of solid wall / Total floor area	=	0·467
Area of windows (and ext. doors) / Total floor area	=	0·310
Total roof area / Total floor area	=	0·79

Stairs

No. of flights	=	9
Height floor to floor	=	11 ft. 8 in.
Width between handrails	=	3 ft. 8 in.

Element	*Cost per f.s.* s.	d.
Preliminaries and insurance	4	0·9
Contingencies	1	8·5
Work below ground floor level*	5	8·2
External walls and facings	4	9·0
Internal partitions	2	8·4
Frame	9	2·0
Upper floor construction and staircase	2	7·7
Roof	4	11·3
Roof lights	1	0·7
Floor finishes	3	6·9
Ceiling finishes	2	9·8
Windows and doors (external)	3	1·1
Doors (internal)	0	6·4
W.c. doors and partitions	0	1·3
Cloakroom fittings	0	1·2
Wall finishes	0	3·7
Fittings	3	7·3
Ironmongery	0	3·1
Plumbing (external)	0	1·0
Plumbing (internal)	0	9·8
Sanitary fittings	0	6·5
Gas installation	0	3·1
Electric installation	2	8·5
Heating installation	5	7·6
Ventilation	0	0·9
Drainage	1	3·4
Glazing	0	7·7
Decorations	1	8·1
Playgrounds and paved areas	1	7·6
Garden room and stores	0	11·4
Total	67	5·1

* Including sum of £3,250 or 1s. 2·5d. f.s. for piling required to transmit loads through poor sub-soil to firm chalk

COST ANALYSIS: comments

This is the third Cost Analysis of a secondary school to be published, previous schools being Barnet Lane, Barnet, on February 24, and Remington Road, Sheffield, on March 24, and it is useful to compare the three and consider what cost information they provide. A comparison of the main elements is set out below:

	Sheffield s.	d.	Barnet s.	d.	Worthing s.	d.
Preliminaries and contingencies	—	8·0	2	6·6	5	9·4
Structure	34	0·5	34	3·9	35	6·9
Finishes	8	2·5	10	10·9	8	4·5
Fittings	2	6·0	3	6·8	3	8·5
Services	15	2·0	14	2·0	11	4·8
Cost of building excluding external works items	60	7·0	65	6·2	64	10·1

A detailed inspection of the cost of various elements shows that the cost of the "Frames" at Barnet and Worthing (9s. 6·7d. and 9s. 2d.) is twice that at Sheffield (4s. 6·5d.) but this extra cost is recovered by the less expensive foundations (3s. 11·0d. and 5s. 8·2d. against 7s. 9·25d.), External Walls (4s. 0·7d. and 4s. 9d. against 5s. 10d.) and Roofs (4s. 10·4d. and 4s. 11·3d. against 6s. 0·5d.).

More information than is provided is needed to explain the difference between the structural elements in the two prefabricated schools Barnet and Worthing. For instance: Why did the element "External Walls" at Worthing exceed that at Barnet? Were the walls more expensive in construction or were they of greater area? These questions could be answered if the ratio of the solid wall area to floor area were given.

The element "Windows and External Doors" at Worthing was 3s. 1·1d. compared with 4s. 11·6d. at Barnet. The specification indicates that the lower cost was due to the use of wood windows, but how did the window areas in the two schools compare? These questions the quantity surveyor points out could be more accurately answered if these ratios and specification data were included with Cost Analyses.

A point of importance which is shown clearly from these analyses is that one element cannot always be considered in isolation, since a decision to use an expensive material or method of construction in one element may produce important savings in another. One example of this is as follows:

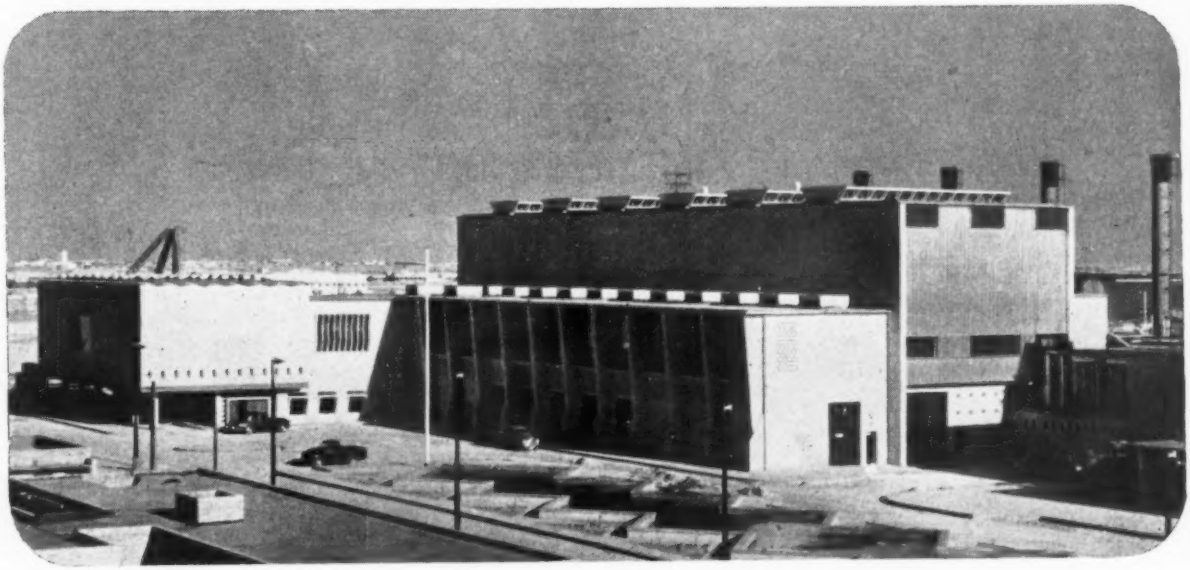
	Sheffield s.	d.	Barnet s.	d.	Worthing s.	d.
Internal partitions and walls	1	5·5	1	11·0	2	8·4
Wall finishings	1	10·25	2	2·0	0	3·7
Totals	3	3·75	4	1·0	3	0·1

At Worthing a self-faced partition block was used for partitions and linings and though more expensive in itself the saving is apparent in the wall finish element. And this is responsible for the structure apparently costing more than at Barnet and Sheffield.

The reasons for differences in the cost of the element Preliminaries can of course only be guessed but the wide variations *i.e.* 8d. at Sheffield; 1s. 0·02d. at Barnet; and 4s. 0·9d. at Worthing call for some explanation. These can be caused either by different methods of calculating site and office overheads, different methods of pricing or by contractors providing very different levels of supervision and site equipment. The opportunity of pricing site supervision and overheads is provided for in Bills of Quantities and it would be of the greatest advantage if architects and quantity surveyors could persuade contractors to price these items in a uniform manner. The efficiency of a contractor is an important factor in building costs and the construction time. The standard of supervision and site equipment allowed for in the preliminaries of a B.Q. may be an indication of the amount of care and attention a contractor will give to the job.

The Services at Worthing are substantially cheaper than at the Sheffield and Barnet schools. This reduction is accounted for in the main by the Plumbing, Drainage and the Electrical Installation elements. The Electrical Installation shows the greatest reduction and suggests that the use of a non-conduit installation makes a very useful contribution to economy.

Building for the Industries of the World



ELECTRICITY

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TECHNICAL SECTION

Whether or not architects feel sympathy for TDA's campaign to promote the wider use of timber for exterior wall cladding, nothing but good can come from the exposure tests which they are about to carry out on 280 samples cut from 20 different hardwood and softwood species. These tests are to be carried out in selected urban, rural and seaside surroundings. This testing in diverse atmospheres is very necessary, for it is being repeatedly brought home to us that building materials (and particularly woods) behave differently not only in atmospheres with different degrees and types of pollution—which we could have guessed—but in exclusively rural surroundings in different parts of the country. This was well brought out by the Forest Products Research Board's experiments on the life of timber preservatives, which proved that preservatives are more effective at Dolgelly in North Wales than on the other test sites at Princes Risborough in Bucks and Thetford in Norfolk. It may well be that we have a sounder basis for regionalism in architecture than we suspected.

This week's special article

7 PRACTICE
housebuilding in California

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

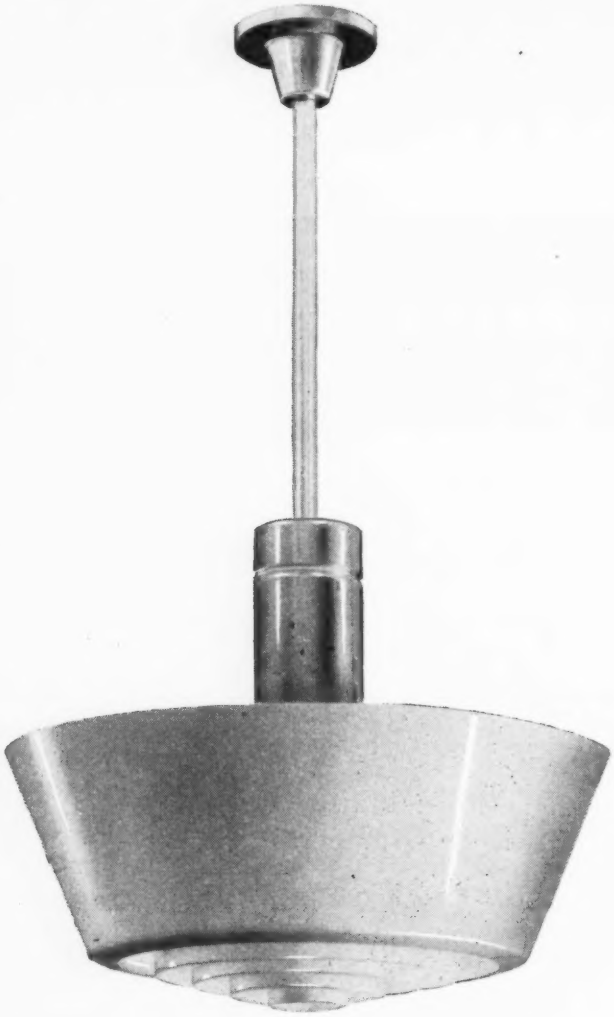
Poor design in speculative housebuilding is a defect which may be seen in all countries. Those who wish to correct it must first understand the economic circumstances in which the speculative housebuilder has to work. Unfortunately, lack of comprehensive records makes this difficult. This week, Professor Bowen (our Guest Editor of two years ago) summarizes an American book which gives a remarkably full picture of how the speculative builder has been operating in the San Francisco Bay area since the war. Though he is technically in advance of his counterpart in this country, the parallel is sufficiently close for useful comparison.*

Two years ago the University of California published a book entitled " Housebuilding in Transition," which was based on " Studies in the San Francisco Bay Area." This work is of much wider interest than the title would seem to imply, for it is, in fact, one of the most thorough assessments of the organization and achievements of the housebuilding industry, in any country, that has ever yet appeared in print. No one who wishes to assess, for example, the housebuilding industry in Britain should fail to read this book, whose author, Sherman J. Maisel, assisted by an adequate staff, thoroughly sifted and analysed a mass of original data on housebuilding costs and efficiency.

METHODS OF SURVEY

The study could not have been completed without the participation of the housebuild-

* *Housebuilding in Transition* by Sherman J. Maisel. Obtainable from Cambridge University Press. 37s. 6d.



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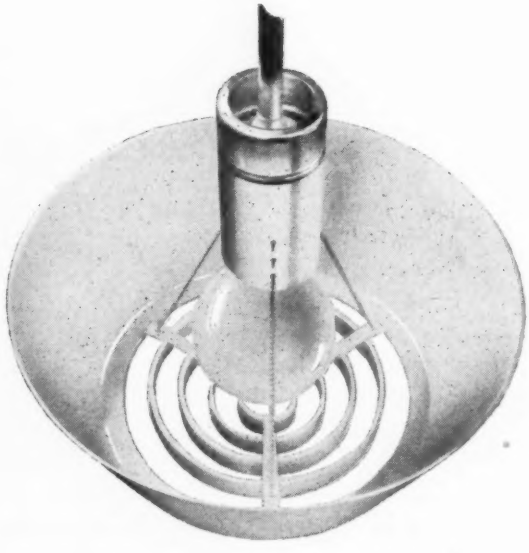

SPECIFICATION. The 12" diameter louvred diffuser is moulded in a white translucent non-static high temperature plastic, and its position is adjustable with a 200w. 150w. or 100w. lamp.

Direct downward lighting is obtained through the louvred aperture, the top is open giving shadowless ceiling illumination. Diffused general lighting with low brightness is obtained through the translucent sides.

Metalwork is in anodised aluminium, finished satin silver.

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ing industry itself; no university research department, however well staffed, can proceed far with an industrial study unless those in the industry concerned are willing to give unpublished information to the research team. The method of the survey was first, to obtain a few basic facts about *all* the housebuilders in the area, and secondly, to follow this up with sampling out of the complete list, many different samples being used for different purposes. Thirdly, direct inquiries on costs of materials, and on sub-contracted items, were made to materials' suppliers and to sub-contracting firms. Fourthly, mainly for comparative purposes, official statistics were analysed on housing and housebuilding in the United States as a whole, as well as in the local area, and labour statistics compiled by various agencies were analysed. Finally, data were obtained from banking, financial and credit organizations connected with housebuilding.

These methods of investigation could be equally successful in Great Britain, but only if the trade associations were willing to co-operate in their use.

The result, for the Bay area alone, is an astonishingly complete picture from which even those intimately connected with the industry can hardly have failed to learn a great deal, because never before has the interrelation of the various functions been described so fully, nor the economic forces that preserve intact (or threaten), the small and medium size firms been so thoroughly exposed.

THE BAY AREA

San Francisco Bay, once an oyster fishing paradise, is now, economically speaking, an overgrown Serpentine in the heart of one of the world's great metropolitan areas. As fast as finance and civil engineering skills allow, the Bay itself is being crossed by bridges; one bridge alone, the Oakland, carries about four or five thousand automobiles and nearly as many trucks on its spans *at any given moment* of a busy day (it is a two-decker affair, nearly twelve miles long). The Bay area in 1950 (to which this study relates) had 2·2 million inhabitants; it had grown by 56 per cent. in ten years, and is still growing fast. Several mountain ranges run through the area. The highways are tunnelled through them.

Thus one can live in Berkeley, a mile or two from the University, 1,100 feet, or 1,400 feet above the town, up a twisting mountain road entirely built up each side with Californian houses, mostly embodying the principle of huge expanses of glass with sundecks on the roof, and supported on the hill by stilts.

Rainfall in the area is slight in most places (higher in the mountains of course than by the Bay—which, incidentally, is being progressively filled in, but is still large and spectacular, especially at night when the lighthouse of beautiful Alcatraz sweeps around). In this rapidly growing area, housebuilding has been booming. First, and most important fact is the existence of a distinct housebuilding *industry*. Over 90 per cent. of the houses built by firms in the area (in 1949) were constructed by businesses which did only housebuilding. (About 11 per cent. of all houses built were owner-built, a figure much lower than the average for the United States, which was no less than 33 per cent. " Owner-built " means substantially by the owners' own labour, most often at week-ends and in their spare time, although most owners normally sub-contract out part of the work, like the plumbing and electrical contracting.)

Professional housebuilding firms are divided here into two principal types, the contractor, and the " merchant " or " operative " builder. The contractor is a builder who builds on a " lot " which the owner has bought, usually to a design selected by the owner, and as he is paid in instalments as different stages of the work are completed, he risks little capital. The " merchant " builder is analogous to our " speculative " builder; he acquires the site, decides upon the design (not always, alas, consulting an architect), and puts out his own money as the work progresses.

SIZE OF BUILDERS

Mr. Maisel found that it was possible to classify Californian builders into three fairly distinct size categories, small, medium, and large. Unlike most British statistics on this subject, his size-groups related to " work performed " rather than to " number of men employed."

" Small " firms, on his classification, were those which built between one and twenty-four houses in a single year. These " small " housebuilders in fact numbered no less than 93 per cent. of the total number of housebuilders in the area. They operate still in the " craft tradition," which means that, typically, the owner of such a firm is a craftsman himself (most often a carpenter), who had, on average worked about fourteen years or so in the industry before setting up in business on his own account. Most of the firms of this size in the industry in 1950 were of post-war origin, that is to say, less than five years old. As in the corresponding size groups in the British industry, there had been a tremendous influx of new enterprise, in the form of new small firms, into the industry after the war in response to expanding demand for houses. The turnover rate of such firms entering and leaving the industry was also higher than for other industries. Small firms tend to remain small as "a matter of choice" as Mr. Maisel puts it; he means by this that there are powerful economic, and organizational factors working against any expansion in the size of the typical small, craftsman-owned, firm. For, as a craftsman, the owner is interested mainly in planning on a small scale, in exercising his craft in such a way as to maintain his independence at a reasonable living wage, and in keeping his executive functions as simple and uncomplicated as possible. Often the owner of the firm, or his wife, does all the bookkeeping and secretarial work. In most of these firms the owner's home is his office. The low overheads of these firms are the source of their survival value in one sense, but are also a source of their weaknesses.

For, on the whole, although the small builder is still important, he is playing, in the Bay area, a diminishing role in house production; his percentage share in the total output of houses is declining. Even among the small firms themselves, there is some tendency towards concentration, and increase of size. This does not appear to be due to inadequate financing, or to backwardness in specialized work; the small builder can call in a sub-contractor, and the work that he does himself, with his own gang, is usually as efficiently done as that done by the medium or large builder. His disadvantages consist in the difficulty that the small builder has in specializing his labour, in obtaining quantity discounts, and in keeping records; with these disadvantages, he cannot compete in any kind of uniform housebuilding (large scale repetitive work), but has, typically, to confine himself more and more to single houses, or to very small groups of houses, and to build for a specialized market.

The medium sized firm, defined as one building between twenty-five and ninety-nine houses a year, is in perhaps the most vulnerable, and transitional, stage of development. The medium sized housebuilder built most of his houses " operatively," that is to say for sale on completion, and most of them in " tracts," on sites which might be called private housing estates. In both these respects he was unlike the small builder, who operated typically on single houses, and on contract to the owner. A few medium builders, of course, build houses on contract, and some build scattered individual houses as a speculation. But the trend is away from contract building, which has to be to the requirement of the individual owner, and hence to the particular set of blueprints approved by him; this " works out expensive," and is increasingly less popular with this class of builders. The medium sized builder is sometimes a " merchant " builder, that is a person acquainted primarily with the building materials' markets rather than with the crafts of building operations. He can get materials at lower prices by buying wholesale. He can strike better bargains sometimes with sub-contractors. But he is typically conservative in outlook, and either too large or too small to be able to risk innovations in design. He offers the customers a " satisfactory product " (*i.e.*, one that they are willing to buy) at a price lower than they would pay for a " custom-built " house.

SMALL AND MEDIUM BUILDERS, AND ARCHITECTS

It may be well to pause here, before considering the operations of the large housebuilders, to consider just where architects fit into the picture. The Bay area housing described by Mr. Maisel, is one hundred per cent. " modern " in style, in the sense that no one wants to buy a house, however small, that is not single storey, with an attempt at a " modern " kitchen, centrally heated (usually by hot air, circulated by a natural-gas-fired furnace), frame-built and with a minimum of plastering. But both the small and medium sized builder are loath to build to an architect's design, and rarely do so. Some of their work is bid for, and sometimes an owner will call an

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architect in to review the bids as well as to prepare the drawings on which the bids are based, but not necessarily to progress the work to its conclusion. In other cases, contractors work in collaboration with estate brokers. The owner approaches the broker, and they discuss various building lots and housing plans. They agree a price, and the builder is then called in to adjust his plans to the owner's price limit. This is called a "package deal." The financing is arranged by the broker.

If an owner deals directly with a small builder, the design is sometimes copied from builder's "stock plans," or clipped out of one of the numerous magazine articles on "design for living," and only occasionally is an architect called in.

Mr. Maisel sums up the position in regard to medium sized builders as follows: "Builders do not know what the consumer wants. They guess. Their guess is that he wants what he used to want." Thus, the medium builder is no innovator. This does not mean that his style of building changes as slowly as it does in Britain, for example, for custom-built houses are going up all the time, and these architect-designed houses, few as they are in number, have an immense effect upon the taste and knowledge of the average owner. The point is that there are immense economic obstacles in the way of the employment of architects, on any substantial scale, for the individual design of houses put up by small and medium firms.

Thus, the very groups of firms which might be regarded as, in some degree, most suited to satisfy the individual's demand for a special design, are those which can least easily co-operate with architects, on any appreciable scale. Small and medium firms just cannot afford "custom design"; their whole position in the market is only preserved by rigorous curtailment of all types of "overhead" costs, and architectural fees paid by the builder would fall under this heading. Such "custom-built" houses as these firms erect are therefore built to the order of clients who have had to meet the architect's fees themselves.

LARGE FIRMS

There are about thirty firms in the Bay area producing more than one hundred houses a year. This group, about 2% of all house-builders in the area, produced 35% of all units in 1949.

These firms, though not at all large in relation to the large firms in other American industries, are large, even colossal, in relation to the past history of the industry in this area. They have grown up very recently, in response to the huge post-war market for housing, and it must be noticed that they, too, like the small and medium firms, are still passing through a stage of rapid transition. Their main advantages over the smaller firms consists in their superior skill in purchasing materials and in financing, and Mr. Maisel believes that they may have over-specialized in these directions.

COSTS OF THE COMPOSITE HOUSE CLASSIFIED BY MAIN EXPENDITURES AND BY SIZE OF BUILDER

Expenditures	Size of builder			Size of builder		
	Small	Medium	Large	Small	Medium	Large
	(in dollars)			(per cent. of total)		
Direct labour	1,485	1,300	1,100	16	14	13
Direct materials	2,235	1,925	1,825	24	21	21
Sub-contracts						
Plumbing	889	765	640	9	8	7
Painting	626	587	537	7	6	6
Flooring	396	370	343	4	4	4
Cement and concrete	314	285	259	3	3	3
Masonry	235	205	180	2	2	2
Sheet metal and heating	225	212	175	2	2	2
Electric wiring and fixtures	220	207	180	2	2	2
Ceramic tile	180	141	130	2	2	1
Roofing	174	168	148	2	2	2
Grading	52	33	19	1	*	*
Linoleum	35	31	24	*	*	*
Shades and blinds	33	27	22	*	*	*
Subtotal sub-contracts	3,379	3,031	2,657	35	33	30
Incidentals	410	410	310	4	4	4
Land	1,250	1,250	1,250	13	14	14
Overhead and profit	741	1,334	1,608	8	14	18
Total cost	9,500	9,250	8,750	100	100	100

* Less than one-half of 1 per cent.

"The composite house" in each case is an imaginary house in which the figure for each item is an average figure for the total number of houses built by the class of builder in question. A "small builder" is one who builds up to 24 houses a year; a "medium builder" one who builds from 25 to 99 houses a year.

The large builders have built most of the less expensive houses since the war. In 1949 the lowest average (median) priced house *to the buyer* was that built by the largest firm of builders, and cost $9,250 (£3,300), while the average cost of those produced by the medium builder was $10,500 and by the small builders $12,400 (£3,750 and £4,430 respectively). The large builders, in fact, skimped the details, and cut the quality, to cater for a mass market. They concentrated on sub-urban, or even non-urban, sites rather than within existing metropolitan districts. Moreover, many of the large firms aimed at creating whole communities, with shops, hospitals, schools and community buildings, and at gaining from the enhanced values that such development may bring.

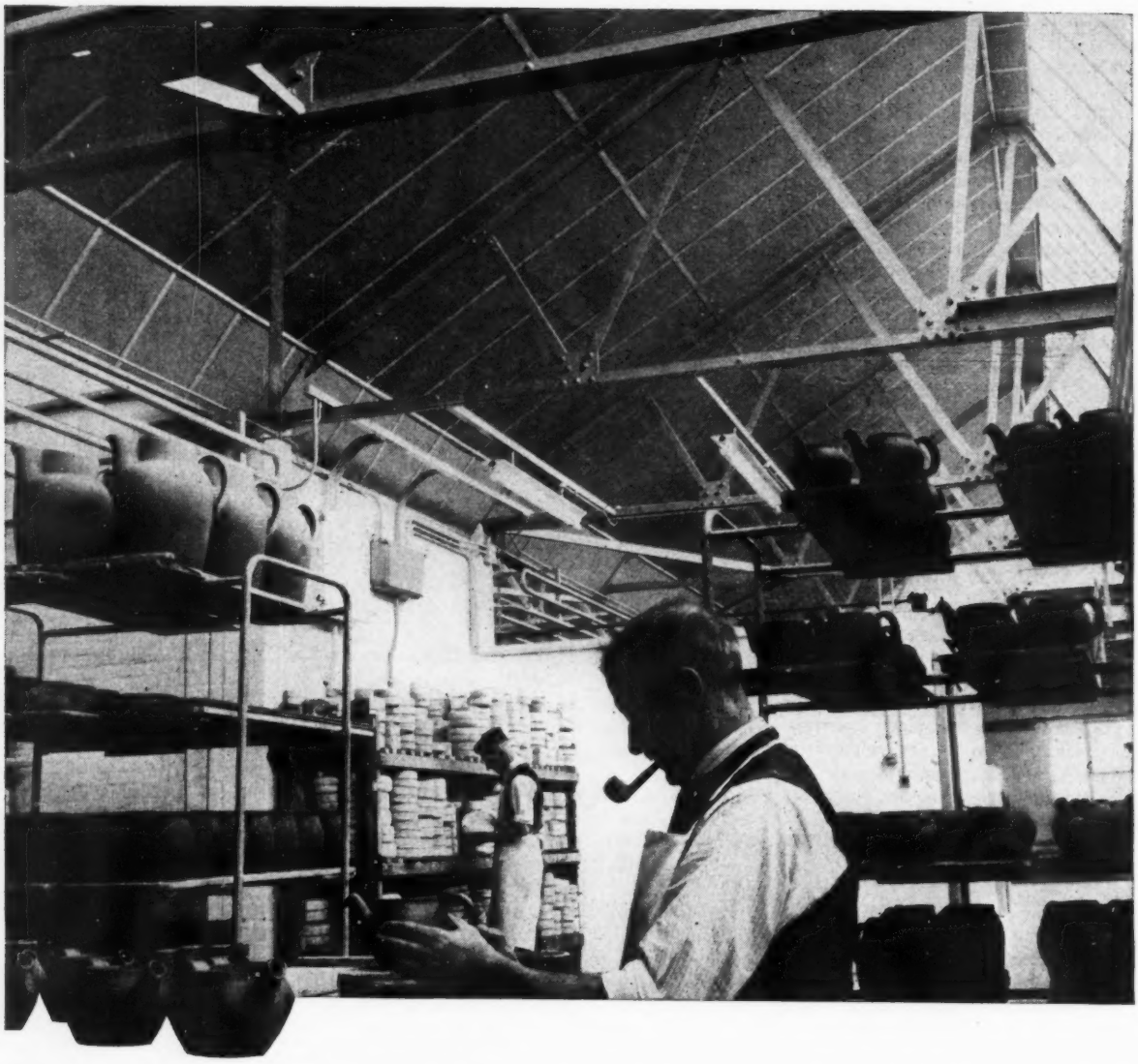
The large firms are all merchant builders in type, and usually they develop whole tracts of houses for sale to the public. They are "older" firms than the smaller house-builders—their average age being 15 years. Half the firms existed before World War II (which makes them "old" firms by some Californian standards); a few date back to the first decade of the century.

Average age of the owners of the large firms is 52, which is rather older than the average for the medium firms' owners; the extra group of years signifies experience. About 40 per cent. only of the large owners have worked as building workers. The structure of the large firms is relatively much more complex that that of the smaller firms. Usually about two to four of the principal members of the firms assume primary executive positions.

Mr. Maisel's statistics bring out the interesting fact that it is the big builder who uses the least amount of equipment per unit of all firms. The amount of equipment he uses per house completed is less in value than that used by the small or medium builder. This is not necessarily because the large builder is less equipment-minded than the smaller, but perhaps because his superior directing organization permits him to spread his overheads to better effect. Moreover, though in a better financial position to add to their heavy machinery, the large builders have usually tended not to do this, but to develop their use of small, relatively inexpensive power tools instead.

The "large" firm, in capital terms, was one with assets of $600,000 or more, not a very large sum relatively to the capital employed in other industries. (Three very large firms had assets of $5,000,000 or more.) Large firms turn over their capital on average five times a year. Since they also enjoy the highest rate of profit on sales of any group, they receive the greatest return in proportion to the "net worth" of the firms, about 30 per cent. per annum.

Since World War II the large builders have been working for a seller's market, they have, up till recently, been able to concentrate on operating structure, on land buying, and on problems such as taxation, materials supplies and labour. They have, with financial success, for the most part ignored problems of design. Whether more competitive conditions, and an increasing discrimination evinced by purchasers, will produce a change of heart on this matter has yet to be seen; it will hardly do so unless the advantages gained by design can be translated into



What does cold weather cost you – in good work?

When this photograph was taken at Denby Potteries, near Derby, it was freezing outside. Yet the men you see are working *in their shirt sleeves* unconcernedly and skilfully.

Look to the roof for the explanation. It is lined with ½ in. Lloyd Insulation Board. Before insulation the highest work-temperature that could be attained when it was really cold was 46°F. Now it is a comfortable 62°F—a direct increase of 16°F, achieved without incurring the heavy expense of either new heating plant, *or greater fuel consumption by the existing plant.*

There follow other advantages vital for such work. Lighting is better and more easily reflected; dust is excluded; in summer, solar radiation is reduced, and cool working conditions are ensured.

Insulation makes sense for most factories. Ask for a copy of "The Heat Barrier" booklet, which enables you to calculate, as nearly as possible, how soon the money saved on fuel bills will catch up the initial cost of insulating your own works.

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economic terms, either by saving in the cost of building, or by increasing the value of houses to owners.

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8.44 surveying: specification
QUANTITIES AND ESTIMATING

Quantities and Estimating for Building Technicians. J. F. L. D'Este. Vol. I, Brickwork and Drainage; Vol. II, Plastering and Paving. (E. & F. N. Spon Ltd. 9s. 6d. each.)

These books are intended for building trades students who wish to "fit themselves for future positions of an administrative or supervisory nature."

In Part I they introduce the reader to mensuration, illustrating taking-off, abstracting and billing, with examples of the trade being dealt with. Next the assessment of materials quantities is explained (how much aggregate and cement for a yard cube of concrete, etc.) and this is followed by "Quantity Measurements" (how you deal with pipe chases, squints, rebates, "narrow widths," etc.). Then come measurement examples demonstrated with drawings and facsimile dimension pages. Part II is, except for the examples, the same in each book. It briefly explains price build-up under materials, labour, overheads and profit.

These books, the first of a series on the traditional trades, are unlikely to be of direct use to the architect, but there are a number of things puzzling to the uninitiated. For example, there seems to be little mention of plant. If the estimator wished to dig his drain trenches mechanically, this book would not help him much to assess the price. The calculation of overheads (insurances, establishment charges, etc.) occupies several pages, but labour costs, which account for a much larger proportion of the contract sum, entail more variables, and surely would be more difficult and more important to assess accurately, are dismissed in two or three paragraphs. The illustrations, too, are rich in cornices, mansard roofs, brick arches and so forth, that are not used nowadays. Clearly the books belong to a past phase when prices were stable and there was no fuss about economy, work study or site cost recording.

9.52 design: general
VIBRATION IN BUILDINGS

Vibration in Buildings. BRS Digest No. 78. (HMSO, 3d.)

A good deal is heard from time to time about damage to buildings from vibration. In fact there has been very little real evidence about how serious normal vibration is. This Digest is useful in explaining the way in which vibration occurs and in putting the whole subject on a rather more logical basis. People are very sensitive to vibration of quite low intensity but the possibility of damage to structure seems to be slight except where very heavy machinery is in the building. The Digest gives results of some investigations which have been made and a table showing the type and intensity of vibrations caused by a number of sources including aircraft, bell ringing, road traffic, gunfire, electric trains and a number of factory machines.

Methods of reducing vibrations are discussed in a rather general way including the use of flexible mountings for machines. Also the isolation of special apparatus which itself needs to be kept free from interference and from vibration.

The isolation of complete buildings does not appear to be very feasible.

10.136 design: building types
BUNGALOWS

Fifty Modern Bungalows. Edited by Felix Walter, FRIBA. (The Architectural Press Ltd. 18s. 6d.)

This little book is intended more for the layman than for the architect, though it gives much information that the architect may not already have at his finger-tips. A subsidiary aim is, of course, to jolly the layman into choosing the sort of house AJ readers think he ought to have. As is right and proper the subject of cost is much to the fore: the lump sum and the cube is given for the majority of the bungalows illustrated and in the introduction there is a useful sliding scale showing the percentage which must be added to each year's figures in order to arrive at the equivalent for today. This is all to the good, but the wise architect will hurriedly point out that tenders do not run to form and that so much depends on the efficiency of the builder and on whether or not he really wants the job.

Another aspect which gets special attention is heating. At the back of the book is an appendix which describes four examples of floor panel heating: two by hot water, one by hot air and one by electricity. The author, like everyone else who writes on this subject, has had to depend on the *ipse dixit* of the architect who sponsored the installation in each case and for this reason he is becomingly reticent about giving an opinion. Nevertheless, he might with safety have said more about the characteristics of under floor heating and about the relation between these and the thermal capacity of the construction.

The 50 bungalows are well chosen, though your reviewer suspects that the editor had a job to find enough presentable examples. Their construction is adequately described and the photographs are excellent.

18.169 construction: theory
WELDED STRUCTURAL STEELWORK

Metal-Arc Welding of Weldable Structural Steel Tubes—BS 938. (BSI 1955, 4s.)

Revision of wartime British Standard based largely on BS 538 which applied to welding of mild steel for general building construction. BS 538 has since been superseded by BS 1856 and BS 449 so that BS 938 has required revision. The new standard bases its requirements for weldability in terms of mechanical properties, the chemical composition being unrestricted. The steel tubes comply with BS 1775 "Steel tubes for mechanical, structural and general engineering purnoses."

18.170 construction: theory
WIND LOADS

Wind Effects on Bridges and other Flexible Structures. (HMSO 1955, 1s. 6d.)

National Physical Laboratory booklet on wind tunnel research into wind effects on bridges.

The booklet is mainly concerned with the oscillatory effects but static wind loads are also mentioned. Oscillatory effects occur in two ways, by aerodynamic instability and buffeting. In the former the oscillations are set up due to interaction of the bridge itself with a steady airstream and can therefore be overcome by proper design. Buffeting oscillations are set up by the bridge lying within a disturbed airstream such as the wake of an adjacent structure. The experimental methods used to investigate the effects are discussed in some detail and are well illustrated. A set of recommendations is given for design for wind effects in suspension bridges generally.

20.222 construction: complete structures
DESIGN FOR SUBSIDENCE

How it was Done—Subsidence. (Architecture & Building. May 1955. pp. 198-201.)

Problems from the Jeremiah Ambler Factory at Peterlee where subsidence may occur.

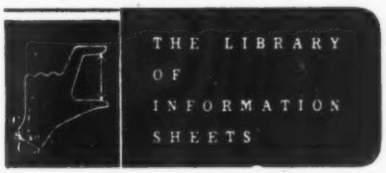
This is probably the first time in this country that a building has been designed to counter future subsidence with acceptance of responsibility by the mining authority after agreement on the method of design. The recommendations were that the siting of the building should be related to the direction of coal extraction, single storey factory bays up to 90 ft. by 50 ft. would be allowed, buildings should have steel frames with added bracing, provisions should be made for jacking stanchions, floors and walls to be freely supported, foundations of heavy machines to be independent of floor, no shafting for machines to be used, reasonable floor loading up to 1½ tons per sq. ft. allowed and strip footings to be reinforced, large areas of glass to be avoided, two storey office blocks to be built in units approx. 30 ft. by 20 ft. in plan, and where laid in ground pipes to have flexible joints and cables to be looped.

The methods by which these conditions are met are described in the article which is well illustrated to give points of detail.

25.116 water supply and sanitation
CHEMICAL DRAIN PIPES

Salt-glazed Ware Pipes with Chemically Resistant Properties. BS 1143 : 1955 (BSI, 4s.).

Covers quality and dimensions. Architects should be aware of this specially resistant type of pipe in addition to the normal pipes covered by BS 65.



CANCELLATION

Sheet 35.B1, *published* 9.9.48, *has been cancelled and should be removed from collections. It has been replaced by Sheet* 35.B1, *published in the issue of* 28.7.55.

Readers requiring up-to-date information on building products and services may complete and post this form to the Architects' Journal, 9, 11 and 13, Queen Anne's Gate, S.W.1

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4.8.55

Buildings Illustrated

Technical High School, The Boulevard, Durrington-on-Sea, West Worthing, Sussex, for the Worthing Borough Council and West Sussex County Council. (Pages 145-164.) Architects: Architects and Building Branch, MOE. Chief Architect: S. A. W. Johnson-Marshall, C.B.E., B.ARCH. (L'POOL), A.R.I.B.A.; Maurice Lee, A.R.I.B.A. (architect in charge); Mary Crowley, A.R.I.B.A.; John Kitchin, A.R.I.B.A. in consultation with F. R. Steele, F.R.I.B.A., F.R.I.C.S., M.T.P.I., County Architect, West Sussex, and G. H. Kempton, A.M.I.C.E., F.R.I.C.S., M.I.MUN.E., Borough Engineer, Worthing. Quantity Surveyors: J. Nisbet, A.R.I.C.S., and P. Bathurst, A.R.I.C.S. Decorative tile panel: Dorothy Annan. Wall painting: Ceri Richards. Consulting engineer: A. J. Harris (Pre-Stressed Concrete Co. Ltd.). General contractors: Gilbert Ash, Ltd. Sub-contractors: piling, Piling & Construction Co. Ltd.; asphalt, Wainright Paving & Contracting Co. Ltd.; precast concrete units, Mono Concrete Co. Ltd.; bricks, Cement Marketing Co. Ltd.; wood wool, Halcrete (Precision) Panels Ltd.; roofing felt, William Briggs & Sons Ltd.; Bellrock partitions, Orlit Ltd.; glass, Aygee Ltd.; ceilings, The Cape Asbestos Co. Ltd., Tentest Ltd., Meta Mica Ltd.; central heating, Weatherfoil Heating Systems Ltd.; gas fitting, South Eastern Gas Board; stage lighting equipment, Strand Electrical Engineering Co. Ltd.; electric wiring, South Eastern Electricity Board; electric light fixtures, Hartley Electromotives, Fulford Brown Ltd., Thorn Electrics Ltd., General Electric Co. Ltd.; socket outlets, M.K. Electric Ltd.; fire alarms, Gent & Co. Ltd.; timber windows and external doors, Samuel Elliott & Sons (Reading) Ltd.; window and door furniture, James Gibbons Ltd., Alfred G. Roberts Ltd.; ironmongery, Fixtabriken (suppliers, Tomo Trading Co. Ltd.); gates, Bayliss, Jones & Bayliss Ltd.; ventilation, Greenwood's & Airvac Ventilating Co. Ltd.; plumbing, J. S. Wright & Co. Ltd.; waste units, Econa Ltd.; sanitary fittings, Adamsez Ltd.; dilution pots, Doulton & Co. Ltd.; w.c. partitions, Compactom Ltd.; internal doors, Jayanbee Joinery Ltd.; floor coverings, Haskell Robertson & Co. Ltd.; balustrades, Light Structures & Casements Ltd.; taps, Barking Brassware Co. Ltd.; sunblinds, J. Avery & Co. Ltd.; kitchen and canteen equipment, Adams & Son (Engineers) Ltd., Allied Ironfounders (Raybourn), James Stott & Co. Ltd., Benham & Sons Ltd., R. & A. Main Ltd., Hobart Manufacturing Co. Ltd.; fibrous plaster, John Kent (London) Ltd.; metal work, Light Structures & Casements Ltd.; joinery, wall boards, etc., Troy Joinery & Cabinet Co. Ltd.; stage curtain, Gerald Holtom; furniture, Geo. M. Hammer & Co. Ltd.; cycle sheds, H. Newsum & Sons Ltd.; glass house, Duncan Tucker (Tottenham) Ltd.; tennis courts, W. H. Gage & Sons Ltd.; cold store, The Lightfoot Refrigeration Co. Ltd.; shrubs and trees, Goatchers; mobile chalkboards, Kingfisher Ltd.; shelving, Libraco Ltd.; gym. kit fittings, Jas. Sieber Equipment Co. Ltd.; gym. equipment, Spencer, Heath & George Ltd.; clocks, Baume & Co. Ltd.; expansion jointing, Expandite Ltd.; paint, John Hall & Sons Ltd.; internal planting, Neale Bros. (Nurseries) Ltd.

Announcements

Charles E. Bantin, A.R.I.B.A., DIP.T.P.(LOND.) has commenced practice at 16a, Kenton Park Parade, Kenton, Middlesex, where he will be pleased to receive trade catalogues, etc.

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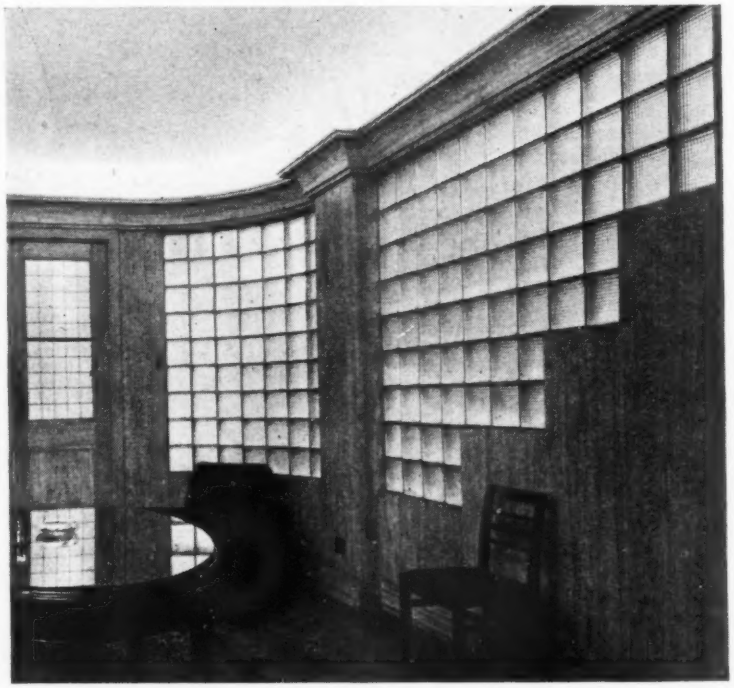

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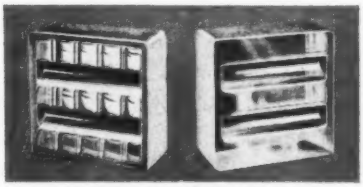

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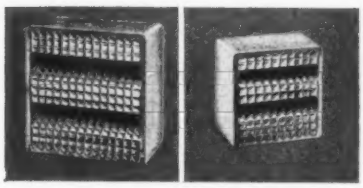

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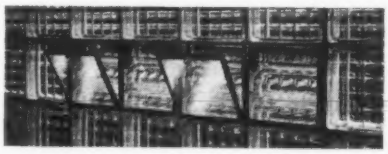

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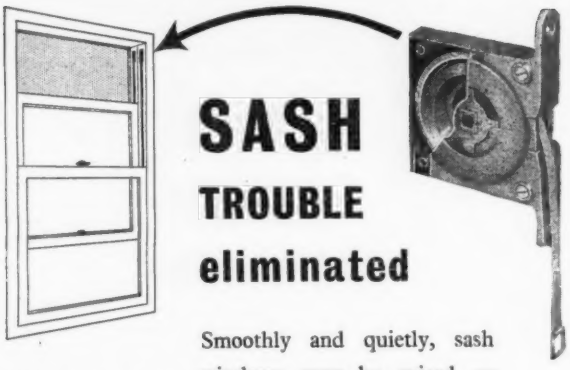

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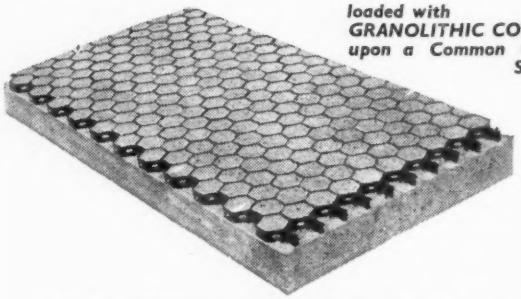

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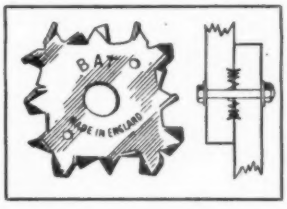

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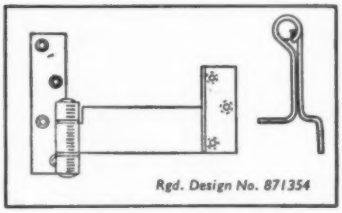

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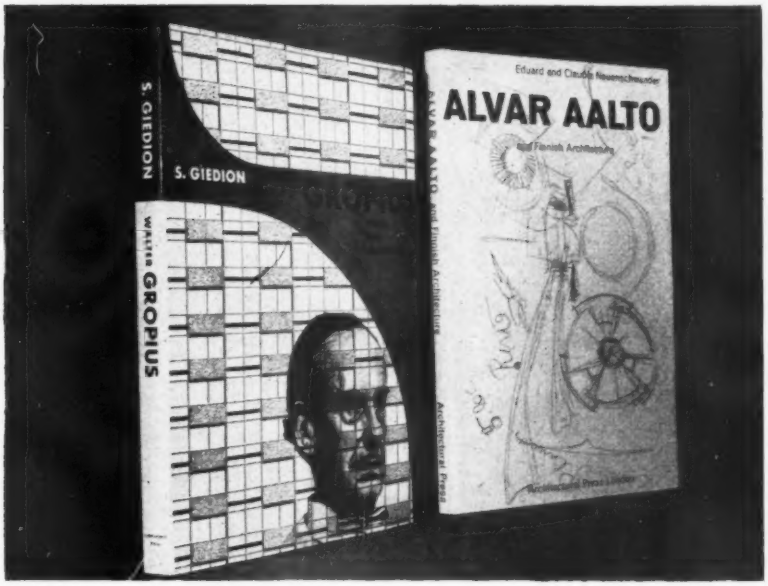

NEW BOOKS ABOUT TWO GREAT ARCHITECTS

THE MOST IMPORTANT BOOK yet written about one of the greatest living architects, by one of the most widely-read writers on architects and architecure. The author of *Space, Time and Architecture* pays tribute to the creative genius of a world-renowned pioneer of the modern movement, his friend Walter Gropius—who, in January, 1954, was awarded the first São Paulo Prize for Architecture in recognition of his work as an innovator and educator during the past half-century. Dr. S. Giedion, at the instigation of the Matarazzo Foundation of São Paulo (donor of the prize) writes a detailed, authoritative study of Gropius' development as designer, teacher and leader and illustrates his account with over 300 photographs and plans of buildings and projects for which Gropius has been responsible, either alone or—practising one of the principles he has so vigorously preached for many years—as a leading member of a creative team of designers.

Chapters on Gropius' background, heritage and personality are followed by appreciations from two of his greatest contemporaries, Mies van der Rohe and Le Corbusier. The 11 chapters on his life and work include Gropius and the Bauhaus, Buildings for Education, Buildings for Industry, the Modern Theatre, Prefabricated Houses, Development of the Slab Apartment Block, the Changing Structure of the City. Then follow over 140 pages of illustrations of Gropius' work, by far the most comprehensive collection ever published. The book ends with a complete list of Gropius' works, bibliographies of all his books and other writings, and of books and critical articles about him and his work: and an index. Size 10½ ins. by 7⅞ ins. 248 pages with over 300 line and halftone illustrations, and a full list of Gropius' works and projects, bibliographies of works by and about Gropius. Price 42s. net, postage 1s. 3d.

WALTER GROPIUS: WORK AND TEAM-WORK

by Dr. S. Giedion

THIS WORK by Eduard and Claudia Neuenschwander gives an insight into a frontier of Western civilization where some of the most interesting works of the modern movement have been created, and where today an entirely new architectural generation, inspired by Alvar Aalto, receives professional training and stimulation probably unequalled elsewhere. First place in Finnish society belongs not to the manager or the politician but to the intellectual and the creative genius. And the architect shaping the environment and many of the accessories of modern living is held in particularly high esteem. Without many words, through careful choice of photographs, sketches and detailed plans, the authors clearly show how Aalto's creative power impresses itself on the landscape and way of life of Finland, and how this creative power organically evolves from the country's peculiar regional characteristics.

Eduard Neuenschwander worked in Alvar Aalto's office for three decisive years, decisive because during these years Aalto became absorbed with the design of large-scale projects. Aalto had, of course, worked on large-scale projects before: but now realization immediately followed the drafting stage. Aalto almost deliberately destroyed his sketches and plans. Even photographs of his major works are extremely rare. This book—possible only because Neuenschwander, in daily working contact with Aalto, succeeded in collecting and preserving original material—shows the great works and projects completed from 1950 to 1952 as well as numerous earlier buildings, and is thus a unique document and a standard work for every architect. Text and captions are printed in English, French and German simultaneously. Size 10⅞ ins. by 7½ ins., 192 pages with approximately 300 photographs, plans and detailed layouts. Price 50s. net, postage 1s. 3d.

ALVAR AALTO AND FINNISH ARCHITECTURE

by E. and C. Neuenschwander

THE ARCHITECTURAL PRESS, 9-13, QUEEN ANNE'S GATE, LONDON, SWI

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.

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she or the employment is excepted from the provisions of the Notification of Vacancies Order, 1952.

OFFICE OF THE RECEIVER FOR THE METROPOLITAN POLICE DISTRICT.

Applications are invited for unestablished appointments as ARCHITECTURAL ASSISTANTS (New Works and Maintenance Branches) and also as SANITARY ENGINEERING ASSISTANTS in the Chief Architect and Surveyor's Department.

Rates of pay, £442 10s. (age 21) by annual increases to £695 (men) and £442 10s. by annual increases to £615 (women). Overtime of approximately £24 per annum is also payable while a 45½-hour week is worked.

Conditional hours, 44 per week. *Annual leave*, 24 days.

Application forms from the Chief Clerk, Architect and Surveyor's Department, New Scotland Yard, S.W.1, stating for which drawing office application is made. 9795

COUNTY OF LINCOLN—PARTS OF KESTEVEN.
COUNTY ARCHITECT'S DEPARTMENT.

Applications are invited for the following appointments:—

(*a*) ARCHITECTURAL ASSISTANTS. A.P.T., II and III.

(*b*) JUNIOR ARCHITECTURAL ASSISTANTS. General Division.

(*c*) QUANTITY SURVEYING ASSISTANTS. A.P.T., IV.

(*d*) ENGINEER'S ASSISTANT (HEATING). A.P.T., III.

Above the General Division scale; commencing salary will be according to experience.

Any further information can be obtained from the County Architect.

Applications, stating the post applied for and giving full particulars of age, training, experience, qualifications, previous and present appointments with dates and salaries, and accompanied by two testimonials, should reach the undersigned by the 12th August, 1955.

J. E. BLOW,
Clerk of the County Council.

County Offices, Sleaford, Lincs.
July, 1955. 2019

LINDSEY (LINCOLNSHIRE) COUNTY COUNCIL.
ARCHITECT'S DEPARTMENT.

Vacancies on the permanent staff for:—

(*a*) ASSISTANT ARCHITECTS, Grade IV (£675—£825).

(*b*) ASSISTANT ARCHITECT, Special Grade (£650—£775).

(*a*) and (*b*) to be A.R.I.B.A.

(*c*) ARCHITECTURAL ASSISTANT, with Inter.-R.I.B.A., Grade II (£560—£640).

(*d*) ASSISTANT QUANTITY SURVEYOR, A.R.I.C.S., Grade V (£750—£900).

(*e*) HEATING ASSISTANT, Grade III (£600—£725).

(*f*) ELECTRICAL ASSISTANT, Grade II (£560—£640).

(*g*) BUILDING INSPECTOR / SURVEYOR, Grade II (£560—£640).

Applicants for (*g*) should be capable of preparing drawings and specifications for small works of additions and alterations.

Starting salary not more than two steps up grade may be granted in special circumstances. N.J.C. Conditions of Service. Canvassing will disqualify.

Candidates must disclose in writing whether to their knowledge they are related to any member or senior officer of the Council.

Applications, giving age, qualifications, experience, present salary, copies of two recent testimonials, to be sent to the undersigned not later than Friday, 12th August, 1955.

A. RONALD CLARK, A.R.I.B.A., A.M.T.P.I.,
County Architect.

County Offices, Lincoln. 2034

MINISTRY OF WORKS require ARCHITECTURAL ASSISTANTS for drawing offices in London, Edinburgh and various provincial offices, with at least 3 years' training, some experience in an architect's office, and of Inter. R.I.B.A. standard. London salary, £442 to £695 per annum; rates elsewhere slightly less. Starting pay according to age and experience; prospects of promotion and permanency. State age and full details of training and experience to E. Bedford, Esq., C.V.O., A.R.I.B.A., Chief Architect, Ministry of Works, 20 (F), Abell House, John Islip Street, London, S.W.1. 1000

GOVERNMENT OF IRAQ, MINISTRY OF EDUCATION.
COLLEGE OF ENGINEERING, BAGHDAD.

Applications are invited for the post of PROFESSOR OF ARCHITECTURE. Candidates should possess qualifications, professional practice and teaching experience suitable for the post of Head of the Department of Architecture which it is hoped to establish in the near future.

Basic salary from 200 to 250 Iraqi Dinars a month, according to qualifications and experience (1 Iraqi Dinar = £1 sterling).

Contracts will be for one year and may be extended.

First-class fares (including wife and two children) at beginning and end of contract. High cost-of-living allowance from ID.12 to ID.14 a month. Rent allowance (subject to certain conditions) up to ID.12 p.m. Leave passage allowance ID.40 or ID.60 per annum (single and married respectively). Provident fund 5 per cent. of basic salary (deducted monthly), plus 10 per cent. added by Government. Accumulated amount payable on termination of contract. Income tax of the order of 10 per cent. of basic salary.

All appointments will date from 1st October, 1955, and applications (no forms) must be received by the Cultural Attaché, Iraqi Embassy, 22 Queen's Gate, London, S.W.7, not later than 10th August, 1955. Copies of two recent testimonials, and names and addresses of two referees, must accompany applications. 2014

MANCHESTER COLLEGE OF TECHNOLOGY.
(Faculty of Technology in the University of Manchester)
Appointment of
LECTURER IN STRUCTURAL ENGINEERING.

The Governing Body invites applications for a Lectureship in Structural Engineering in the College with the title and status of Lecturer in the University of Manchester.

Candidates should be graduates in Science or Technology and should possess a good knowledge of Theory of Structures. The person appointed will be required to undertake research work on Structures and to assist in lecturing and laboratory work in Structural Engineering.

Salary: £650 per annum, rising by annual increments of £50 to £1,350 per annum. Commencing salary according to qualifications. Superannuation under F.S.S.U. and family allowances.

Conditions of appointment and form of application may be obtained from The Registrar, College of Technology, Manchester, 1. The last day for the receipt of applications, is Monday, 19th September, 1955.

B. V. BOWDEN,
Principal of the College.
2116

BOROUGH OF MARGATE.
APPOINTMENT OF ARCHITECTURAL ASSISTANTS.

Applications are invited for the appointment of ARCHITECTURAL ASSISTANTS on the following grades:—

(*a*) A.P.T. I (£500—£580).
(*b*) A.P.T. II (£560—£640).
(*c*) Special Grade (£650—£775).

dependent upon qualifications.

Applications, giving details of age, present salary, qualifications, and experience, and enclosing two recent references are to be received by the undersigned not later than Saturday, 20th August, 1955, and should be enclosed in envelopes bearing no name or mark indicating the identity of the sender, and endorsed "Architectural Assistant."

Canvassing will disqualify and candidates should disclose any relationship existing between themselves and any member or Chief Officer of the Council.

T. F. SIDNELL,
Town Clerk.

Town Clerk's Office,
40, Grosvenor Place,
Margate.
25th July, 1955. 2114

POPLAR BOROUGH COUNCIL require:—

(*a*) Two ASSISTANT ARCHITECTS (TEMPORARY), salary £800 × £50 to £850. Applicants should have passed the Final R.I.B.A Examination.

(*b*) Three ARCHITECTURAL ASSISTANTS (TEMPORARY), salary £700 × £50 to £750. Applicants should have passed the Intermediate R.I.B.A. Examination.

(*c*) One SENIOR PLANNING ASSISTANT (PERMANENT), A.P.T. V (£750/£900). Applicants should have passed Final Examination of Town Planning Institute;
plus London "Weighting" in each case. Posts (*a*) and (*b*) offer about 3/4 years' employment. Forms obtainable from the Borough Engineer and Surveyor, Poplar Town Hall, Bow Road, E.3. Closing date 15th August, 1955. 1965

HACKNEY BOROUGH COUNCIL invite applications for vacancies of ARCHITECTURAL ASSISTANT (2) in the Borough Engineer and Surveyor's Department. Salary for each appointment within A.P.T. Division Grade II (£560—£640 p.a.). London weighting allowance also payable.

Candidates must have had a good architectural training and must have passed the R.I.B.A. Intermediate or equivalent examination. The commencing salary will be fixed according to the qualifications and experience of the successful candidate.

Application form from the Town Clerk, Town Hall, Hackney, E.8, returnable by 20th August, 1955. 2126

COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE.
COUNTY LAND AGENT'S DEPARTMENT.

ARCHITECTURAL ASSISTANT required on the permanent staff of the County Land Agent's Department. The commencing salary will be £750 per annum on Grade A.P.T. V, salary range £750 × £30 (5)—£900.

Applicants must be Registered Architects and Associate Members of the Royal Institute of British Architects, and have had good training and experience in the design and layout of Farmhouses, Cottages and Farm buildings, preparation of working drawings, specifications, bills of quantities, supervision and final settlement of accounts. A practical knowledge of agriculture will be an advantage.

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

Application Forms may be obtained from the undersigned, to whom they must be returned completed not later than the 31st August, 1955.

J. C. BOWER, F.L.A.S., A.R.I.C.S.,
County Land Agent.

County Hall,
Wakefield. 2105

PADDINGTON BOROUGH COUNCIL require ASSISTANT ARCHITECT (£705—£855 p.a.), preferably A.R.I.B.A., with experience in contemporary design, the construction and supervision of general municipal works, particularly multi-storey flats, or should have had similar experience with architects in private practice.

Commencing salary dependent upon qualifications and experience of successful candidate. N.J.C. conditions. One month's notice.

Applications (quoting A.225) should state age, qualifications, experience, past and present appointments (with salary), and names and addresses of two referees, and should reach the undersigned by 13th August, 1955.

W. H. BENTLEY,
Town Clerk.

Town Hall, Paddington Green, W.2. 2027

CUMBERLAND COUNTY COUNCIL.
APPOINTMENT OF SENIOR PLANNING ASSISTANT.

Applications are invited from suitably qualified and experienced candidates for the above superannuated appointment, at a salary within Grade A.P.T., VI, of the National Scales (£825—£1,000 per annum).

The duties of the post will be in connection with work on Town and Comprehensive Development Area Maps and on development control throughout the County.

Forms of application and further particulars as to duties, car and subsistence allowances, from the County Planning Officer, Citadel Chambers, Carlisle. Closing date for applications: 27th August, 1955.

G. N. C. SWIFT,
Clerk of the County Council.

The Courts, Carlisle. 2028

BOROUGH OF SOLIHULL.
APPOINTMENT OF ASSISTANT ARCHITECTS.

Applications are invited for the following posts in the Borough Engineer & Surveyor's Department:—

PRINCIPAL ASSISTANT ARCHITECT A.P.T. Grade VI £825—£1,000 (to be in charge of the education section).

ASSISTANT ARCHITECT A.P.T. Grade IV £675—£825.

ASSISTANT ARCHITECT, A.P.T. Grade III, £600—£725.

JUNIOR ASSISTANT ARCHITECT A.P.T. Grade I—£500—£580.

Solihull has a population of 75,000 which is to increase to 110,000 over the next few years, and the appointments are primarily in connection with the large programme of schools, etc., which is in hand as a result of the rapid expansion of the Borough.

No application forms are being issued, but the Borough Engineer will be pleased to answer specific questions regarding the positions.

The appointments are subject to the Local Government Superannuation Acts, the National Scheme of Conditions of Service and one month's notice.

Where applicable housing accommodation will be made available, as soon as possible.

Applications, giving the names of two referees should be sent to Mr. C. R. Hutchinson, B.Sc., A.M.I.C.E., Borough Engineer & Surveyor, 90, Station Road, Solihull, not later than 1st September, 1955.

W. MAURICE MELL,
Town Clerk.

26th July, 1955. 2144

BOROUGH OF GUILDFORD.
APPOINTMENT OF ARCHITECTURAL ASSISTANT.

Applications are invited for the above appointment at a salary in accordance with Grade A.P.T. II (£560—£640 per annum).

Applicants should have had a good training in design and construction in relation to housing schemes, and other factors being equal, preference will be given to those having passed the Intermediate Examination of the R.I.B.A.

Housing accommodation will be provided if required.

Applications, together with the names of two referees, must be sent to the Borough Engineer and Surveyor, Municipal Offices, Guildford, by the 19th August, 1955. 2155

SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.
ARCHITECTS' DEPARTMENT

Applications are invited for the following appointments on the permanent staff of the Board's Architect, generally in accordance with the Conditions of P.T.B. Circular Nos. 19 and 44.

LONDON HEADQUARTERS (LONDON WEIGHTING APPLICABLE).

PRINCIPAL ASSISTANT ARCHITECTS, Scale II. The commencing salary will be at the minimum of the scale, £1,050 × £40 (5) × £25 (1) —£1,275. Applicants must be Associate Members of the Royal Institute of British Architects, and have had sound practical experience of the planning and construction of hospitals and public buildings, and be capable of carrying through projects from commencement to completion. Applicants must also be able to undertake investigations of planning requirements and produce sketch schemes and attend Committees.

SENIOR ASSISTANT ARCHITECT. Commencing salary will be at the minimum of the scale, £920 × £30 (5) × £25 (1)—£1,095. Applicants must be Associate Members of the Royal Institute of British Architects and have had sound practical experience of the planning and construction of hospitals and public buildings, and be capable of carrying through projects from commencement to completion, working under the supervision of a Principal Assistant Architect.

ASSISTANT ARCHITECTS. Commencing salary will be within the scale £640 × £25 (4) × £30 (4) × £35 (2)—£930. Applicants must be Associate Members of the Royal Institute of British Architects, and be capable of preparing working and detailed drawings, specifications, and supervising work on individual projects. Experience of hospital planning and construction an advantage.

ASSISTANT QUANTITY SURVEYOR. Commencing salary will be within the scale £640 × £25 (4) × £30 (4) × £35 (2)—£930. Applicants must be Associate Members of the Royal Institute of Chartered Surveyors (Quantity Surveying Branch), and have sound pratical experience in estimating and analysis of prices, working up and taking off of quantities for small contracts, and also checking contractors' accounts.

WESTERN AREA OFFICE AT WINCHESTER (To reside in or near Winchester).

SENIOR ASSISTANT QUANTITY SURVEYOR. Commencing salary will be at the minimum of the scale, £920 × £30 (5) × £25 (1)—£1,095. Applicants must be Associate Members of the Royal Institute of Chartered Surveyors (Quantity Surveying Branch), and have sound practical experience in estimating and analysis of prices, working up and taking off of quantities for contracts, and also of checking contractors' accounts.

SENIOR ASSISTANT ARCHITECT. Commencing salary will be at the minimum of scale, £920 × £30 (5) × £25 (1)—£1,095. Applicants must be Associate Members of the Royal Institute of British Architects, and have had sound practical experience of the planning and construction of hospital and public buildings, and be capable of carrying through projects from commencement to completion, working under the supervision of a Principal Assistant Architect.

ASSISTANT ARCHITECTS. Commencing salary will be within the scale, £640 × £25 (4) × £30 (4) × £35 (2)—£930. Applicants must be Associate Members of the Royal Institute of British Architects, capable of preparing working and detailed drawings and specifications, and supervising work on individual projects. Experience of hospital planning and construction an advantage.

Applications, stating age, experience, qualifications, present appointment and salary, together with the names and addresses of three referees, should be sent to the undersigned, giving the appointment for which applying on the application and envelope, by not later than 12th August, 1955.

E. G. BRAITHWAITE
Secretary.

South West Metropolitan Regional Hospital Board,
11a, Portland Place,
London, W.1. 2125

NOTTINGHAMSHIRE COUNTY COUNCIL.
COUNTY ARCHITECT'S DEPARTMENT.
APPOINTMENT OF STAFF.

Applications are invited for the following appointments:—

(i) ARCHITECTURAL ASSISTANTS.

Grade A.P.T. V—salary £750 × £30 to £900 per annum; and Grade A.P.T. IV—salary £675 × £30 to £825 per annum.

Applicants must be fully qualified and registered architects.

A.P.T. Special Scale £650 × £25 to £775 per annum.

Applicants must have passed Parts I and II of the R.I.B.A. Final or special Final examination, or their equivalent, at one of the recognised Schools of Architecture, and should have had at least five years' experience (which may include the period spent on theoretical training).

(ii) STRUCTURAL ENGINEERS.

Grade A.P.T. V—salary £750 × £30 to £900 per annum.

Applicants should be Associate Members of the Institute of Structural Engineers and must be capable of undertaking the design and supervision of the erection of all types of structures.

Forms of application may be obtained from DONALD GIBSON, County Architect, County Hall, Trent Bridge, Nottingham, to whom they should be returned as soon as possible and in any event not later than the 26th August, 1955.

A. R. DAVIS,
Clerk of the County Council.

Shire Hall,
Nottingham. 2134

ROYAL BOROUGH OF KINGSTON-UPON-THAMES.
BOROUGH SURVEYOR'S DEPARTMENT.

Applications are invited for the following posts:—

(*a*) ARCHITECTURAL ASSISTANT—A.P.T. GRADE IV (£675—£825 p.a. plus London Weighting) commencing at £735 p.a. Applicants must be qualified and capable of supervising the work of three assistants under the direction of the Chief Architectural Assistant. Application forms and further details obtainable from the Borough Surveyor, Guildhall, Kingston-upon-Thames.

Housing accommodation will be provided for the successful applicant if necessary.

(*b*) TRAINEE ENGINEERING ASSISTANT —Gen. Division (*i.e.*, £210 at 17 years, £230 at 18 years, plus London Weighting). Applicants must be prepared to enter into an agreement to complete three years in the Engineering Section of the Department.

(*c*) TRAINEE PLANNING ASSISTANT—Gen. Division (*i.e.*, £210 at 17 years, £230 at 18 years, plus London Weighting). Applicants must be prepared to enter into an agreement to complete three years in the Planning Section of the Department.

(*d*) TEMPORARY BUILDING INSPECTOR for a period of approximately two years at a salary of £650 per annum. Applicants should have a thorough knowledge of building construction and be experienced in preparing reports on properties.

Candidates for posts (*b*) and (*c*) should first obtain further details from the Borough Surveyor, Guildhall, Kingston-upon-Thames.

Applicants for (*d*) must submit full details, stating age, qualifications and previous experience, together with the names and addresses of two persons to whom reference may be made. No special application form is provided for this post.

Canvassing will disqualify. Relationship to any member or senior officer must be disclosed.

Applications for all posts to be sent to the Borough Surveyor, Guildhall, Kingston-upon-Thames, by not later than the 29th August, 1955.

A. B. ROGERS,
Town Clerk.

Guildhall,
Kingston-upon-Thames,
25th July, 1955. 2142

CITY OF CARDIFF.
APPOINTMENT OF ARCHITECTURAL ASSISTANTS.

Applications are invited for the following appointments in the City Surveyor's Department.

(*a*) SENIOR ARCHITECTURAL ASSISTANT (EDUCATION), A.P.T. Grade VI (£825—£1,000 per annum).

(*b*) ARCHITECTURAL ASSISTANT (EDUCATION), A.P.T. Grade IV (£675—£825 per annum).

(*c*) ARCHITECTURAL ASSISTANT (EDUCATION), A.P.T. Grade 2 (£560—£640 per annum).

(*d*) ASSISTANT ARCHITECT (HOUSING), A.P.T. Grade 6 (£825—£1,000 per annum).

(*e*) ARCHITECTURAL ASSISTANT (HOUSING) A.P.T. Grade 3 (£600—£725 per annum).

(*f*) ARCHITECTURAL DRAUGHTSMAN (HOUSING), Misc. Grade VI (£575—£635 per annum).

(*g*) SENIOR ASSISTANT ARCHITECT (GENERAL), A.P.T. Grade VI (£825—£1,000 per annum).

Candidates should possess the minimum qualifications and experience prescribed by the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services for posts in the above mentioned Grades.

General Conditions of Appointment may be obtained from the undersigned.

The Council will assist in providing housing accommodation for a period, for the successful applicants, except in the case of Appointment (*f*).

Applications, accompanied by the names and addresses of three referees and endorsed with the description of the post applied for must be delivered to me not later than the 25th August, 1955.

S. TAPPER-JONES,
Town Clerk.

City Hall,
Cardiff.
July, 1955. 2164

MIDDLESBROUGH EDUCATION COMMITTEE.
APPOINTMENT OF ARCHITECTURAL STAFF.

Applications are invited from suitably qualified persons for the following vacancies in the Education Architect's office.

Appointments will be made within the grades as indicated, subject to qualifications and experience.

(*a*) ONE SENIOR ASSISTANT ARCHITECT, A.P.T. Grade V, £750—£900.

(*b*) THREE ASSISTANT ARCHITECTS, Special Scale, £650—£775.

(*c*) ONE ARCHITECTURAL ASSISTANT, A.P.T. Grade II, £560—£640.

(*d*) ONE DRAUGHTSMAN OR DRAUGHTSWOMAN, Miscellaneous Grade III, £420—£485.

HOUSING accommodation is available for the successful applicants for posts (*a*) and (*b*), if required.

An excellent opportunity is offered for participation in the extensive Educational Building Programme which includes contemporary Primary and Secondary Schools, Branch Colleges, Extensions to the College of Art, and Community Centres.

Application forms and particulars may be obtained from the Director of Education, Education Offices, Woodlands Road, Middlesbrough, to whom completed forms should be returned not later than 15th August, 1955. 2128

COUNTY BOROUGH OF SUNDERLAND.

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

(*a*) ASSISTANT ARCHITECTS—salary within Grade A.P.T. IV (£675—£825).

(*b*) SENIOR ARCHITECTURAL ASSISTANTS —salary within Special Scale (£650—£775).

(*c*) ASSISTANT QUANTITY SURVEYORS—salary within Grade A.P.T. IV (£675—£825).

(*d*) SENIOR QUANTITY SURVEYING ASSISTANTS—salary within Special Scale (£650—£775).

(*e*) QUANTITY SURVEYING ASSISTANTS—salary within Grade A.P.T. II (£560—£640).

Applicants for (*a*) must be members of the R.I.B.A., for (*b*) have passed Parts I and II of the R.I.B.A. Final or Special Final examination or their equivalent at a recognised School of Architecture, for (*c*) and (*d*) have passed the Final examination of the R.I.C.S., and for (*e*) have passed the Intermediate examination of the R.I.C.S. Commencing salaries will be fixed according to experience.

Application forms and further details from the Borough Architect, Grange House, Stockton Road, Sunderland (state for which appointment it is desired to apply).

Closing date for receipt of completed applications, 26th August, 1955.

Canvassing, either directly or indirectly, will disqualify.

G. S. McINTIRE,
Town Clerk.

Town Hall,
Sunderland.
22nd July, 1955. 2100

CHESHIRE COUNTY COUNCIL.
COUNTY PLANNING DEPARTMENT.

Applications are invited for the appointment of a PLANNING ASSISTANT (ARCHITECTURAL) in Headquarters Office at Chester on A.P.T. Grade I (£500 × £20—£580).

Duties will entail preparation of building sketch designs and work on housing and town centre layouts. Applicants should be good draughtsmen and have a keen interest in design and building construction.

Forms of application and details of the conditions and duties attaching to the appointment can be obtained from the undersigned to whom they should be returned by the 17th August, 1955.

KENNETH O. MALE,
County Planning Officer.

Bridgegate House,
Lower Bridge Street,
Chester. 2132

NORTHERN IRELAND HOUSING TRUST.
ASSISTANT ENGINEER, GRADE II.

The Trust invites applications for the post of ASSISTANT ENGINEER, Grade II, on a salary scale of £750 × £25—£825. Candidates must be Corporate Members of the Institution of Civil Engineers or of the Institution of Municipal Engineers.

Preference will be given to ex-service candidates.

The person appointed will be required to participate in a contributory superannuation scheme which allows for the reciprocal transfer of benefits in Local Government Schemes in suitable cases.

Assistance in obtaining housing accommodation may be given in suitable circumstances to the successful candidate.

Please apply not later than 29th August, 1955, giving full details of age, education, qualifications and experience, including present post and salary, to the General Manager, Northern Ireland Housing Trust, 12, Hope Street, Belfast, marking the envelope 34/28. 2137

STAFFORDSHIRE COUNTY COUNCIL.
EDUCATION ARCHITECT'S DEPARTMENT.
INSPECTOR OF BUILDINGS.

Applications are invited for the following appointments:—

(1) INSPECTOR OF BUILDINGS, South West Divisional Area, based at Dudley. A capable experienced Inspector of Buildings required to supervise the maintenance of Education properties in this area comprising approximately 140 properties. Grade A.P.T. III (£600—£725 per annum).

(2) INSPECTOR OF BUILDINGS, County Area, based at Stafford. A fully experienced Inspector of Buildings required to supervise the maintenance of Education properties in this area. Grade A.P.T. III (£600—£725 per annum).

Forms of application, which must be returned within 10 days from the date of this advertisement may be obtained from The Education Architect, Green Hall, Lichfield Road, Stafford.

T. H. EVANS,
Clerk of the County Council.
2124

HORNCHURCH URBAN DISTRICT COUNCIL.

Applications are invited for appointments of:—

ARCHITECTURAL ASSISTANT, Grade IV—£675/£825.

ARCHITECTURAL ASSISTANT, Grade II—£560/£640.

ENGINEERING ASSISTANT, Special Grade E —£650/£775.

TEMPORARY CLERK OF WORKS (ENGINEERING)—£600 p.a.

PLANNING ASSISTANT, Grade II—£560/£640.

Details of posts and forms of application are obtainable on application to the undersigned by whom completed applications (in envelopes appropriately endorsed) must be received not later than Saturday 13th August, 1955.

P. L. COX,
Clerk of the Council.

Council Offices,
Hornchurch.
21st July, 1955. 2122

CENTRAL ELECTRICITY AUTHORITY, Bankside House, S.E.1 require :—
BUILDING AND/OR CIVIL ENGINEERING DRAUGHTSMEN.
Salary N.J.B. Grade VI, £536—£662 p.a., inclusive, according to experience and ability.
Pension Scheme. One Saturday morning in four on duty. Application forms from D. Moffat, Director of Establishments, Winsley Street, W.1 Quote Ref. : AE/621. 2113

CITY AND COUNTY OF THE CITY OF LINCOLN.
CITY ARCHITECT'S DEPARTMENT.
Applications are invited for an ARCHITECTURAL ASSISTANT, Grade A.P.T. I (£500—£580), to work on a varied programme of new buildings.
The post is superannuable, and a medical examination will be necessary.
Applications, stating age, qualifications and experience, together with the names of two persons to whom reference may be made, should be delivered to R. R. Alexander, A.R.I.B.A., M.T.P.I., City Architect, Stamp End, Lincoln, not later than the 19th August, 1955.
J. HARPER SMITH,
Town Clerk.
Town Clerk's Office, Lincoln.
20th July, 1955. 2044

CARDIGAN COUNTY COUNCIL.
Applications are invited to fill the following vacancies in the County Architect's Department, County Hall, Aberayron :—
(*a*) ARCHITECTURAL ASSISTANT, Grade A.P.T. I—II (£500—£640).
(*b*) ARCHITECTURAL ASSISTANT, Grade A.P.T. II (£560—£640).
Applicants should have passed the R.I.B.A. Intermediate Examination and should have had a minimum of one year's experience in an Architectural Office. Commencing salary will be in accordance with qualifications and experience.
Application forms and conditions of appointment can be obtained from the County Architect and these must be returned to the undersigned by not later than 22nd August, 1955.
J. E. R. CARSON,
Clerk of the Cardiganshire County Council.
Swyddfa'r Sir,
Aberystwyth. 2101

BOROUGH OF CROSBY.
BOROUGH ENGINEER AND SURVEYOR'S DEPARTMENT.
ARCHITECTURAL ASSISTANT.
Applications are invited from persons holding an appropriate qualification for the above appointment. Salary in accordance with the National Scale of Salaries, viz., A.P.T. II (£560 to £640).
Applications, on forms obtainable from the undersigned, to be delivered not later than noon on Monday, the 22nd August, 1955.
HAROLD O. ROBERTS,
Town Clerk.
Town Hall,
Waterloo,
Liverpool, 22. 2139

CITY OF PETERBOROUGH.
CITY ENGINEER & SURVEYOR'S DEPARTMENT.
Applications are invited for the appointment of a SENIOR ARCHITECTURAL ASSISTANT on the staff of the City Engineer & Surveyor, at a salary within A.P.T. Grade IV (£675/£30/£825).
Applicants must be qualified architects, experienced in school building and capable of carrying out sketch designs, working and detail drawings and site control, with the minimum of supervision.
In a suitable case, the Council will, if desired, provide housing accommodation.
Forms of application may be obtained from the City Engineer, Town Hall, Peterborough. Closing date for applications is the 18th August, 1955.
C. PETER CLARKE.
Town Clerk.
Town Hall,
Peterborough.
July, 1955. 2143

SKIPTON URBAN DISTRICT COUNCIL.
ARCHITECTURAL ASSISTANT.
Salary within £675 × £30—£825 (Grade IV) according to qualifications and experience. N.J.C. Service Conditions.
Established post for Capital Works (houses, shops, flats, public baths, park development, etc.).
House available, if required.
Apply, giving age, qualifications, salary grading, experience and names of three referees, to the Surveyor and Water Engineer (Mr. K. B. Robinson, B.Sc. (Eng.), A.M.I.C.E.), Town Hall, Skipton, by 22nd August, 1955.
L. E. SMITH,
Clerk to the Council.
2150

BRECONSHIRE COUNTY COUNCIL.
PLANNING DEPARTMENT.
Applications are invited for the established appointment of CHIEF ASSISTANT in the County Planning Department at a salary in accordance with A.P.T. Grade IV (£675—£825 per annum). Further particulars and conditions of appointment will be sent on request. Applications must be received by the undersigned not later than 31st August, 1955.
C. M. S. WELLS,
Clerk of the County Council.
County Hall,
Brecon. 2158

LONDON COUNTY COUNCIL.
ARCHITECT'S DEPARTMENT.
Vacancies for ARCHITECTS Grade III (up to £945), and ARCHITECTURAL ASSISTANTS (up to £783), for widespread construction programme which includes houses, blocks of flats, schools of all types, and various public and industrial buildings. Application forms and particulars from Architect (AR/EK/A/2), The County Hall, S.E.1. (1189) 2136

AIR MINISTRY Works Designs Branch require in London and Provinces (with liability for overseas service) ARCHITECTURAL ASSISTANTS experienced in planning/preparation of working drawings and details for permanent and semi-permanent buildings. Salaries up to £810 p.a. (men) and £706 (women). Starting pay based on age, qualifications, and experience. Paid overtime. Posts non-pensionable with long term possibilities. Natural born British subjects only. Write stating age, qualifications, employment details, including type of work done, to any Employment Exchange, quoting Order No. BOROUGH 2303. 2163

BEDFORDSHIRE COUNTY COUNCIL.
ASSISTANT QUANTITY SURVEYORS.
APPLICATIONS are invited from suitably qualified persons for the following vacancies on the permanent establishment :—
(*a*) ASSISTANT QUANTITY SURVEYOR, A.P.T., Grade IV (£675—£825 per annum).
(*b*) QUANTITY SURVEYOR'S ASSISTANT, A.P.T., Grade II (£560—£640 per annum).
Application forms can be obtained from the County Architect, Shire Hall, Bedford, and should be returned to him as soon as possible. 2133

Architectural Appointments Vacant

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

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she or the employment is excepted from the provisions of the Notification of Vacancies Order, 1952.

ARCHITECT'S ASSISTANTS required (1 Senior and 2 Juniors) for West End Office. Write, stating full particulars and salary required, to Box 8736.

RAMSEY, MURRAY & WHITE have a vacancy for ARCHITECTURAL ASSISTANT, about Intermediate standard, preferably with office experience. Salary according to qualifications. Apply 32, Wigmore Street, London, W.1, or telephone WELbeck 1409. 9823

ARCHITECTURAL ASSISTANT (Intermediate standard) required at once for varied practice in City office. Write, stating age, experience, and salary required, to Henry C. Smart & Partners, L.R.I.B.A., 120, Moorgate, E.C.2. 1611

ASSISTANT ARCHITECT required for the London Head Office of a major oil company. The work is in connection with large-scale development of service stations, involving the design of new and the re-modelling of existing stations. Should preferably be an Associate Member of the R.I.B.A., capable of supervising staff and controlling work through all stages of development. Must hold current driving licence. Pension and Life Assurance Scheme. Generous sickness benefits; luncheon voucher scheme; social club. Write, giving full details, stating age, experience and salary required, to Box 1296, quoting Ref. RO/AA 713.

REQUIRED for progressive London office, ARCHITECTURAL ASSISTANT. Intermediate stage or above, some office experience. Please write for interview. Box 1019.

ARCHITECTURAL ASSISTANTS required urgently for London office. Intermediate stage or above, and with practical experience, particularly in traditional domestic and other work. Please write stating age, experience, and salary required to Box 9896.

ARCHITECTURAL ASSISTANTS, SENIOR and JUNIOR, required in busy London office with varied practice. Good salary and prospects for suitable applicants, five-day week. Write Box 715 c/o 7, Coptic Street, W.C.1. 1782

ARCHITECT'S ASSISTANT required for the London office of a firm of Architects with interests throughout the country, must be of Intermediate to Final R.I.B.A. standard. Superannuation scheme. Apply in writing to Messrs. Cotton, Ballard & Blow, 133a, Wembley Park Drive, Wembley, Middlesex. 1763.

CO-OPERATIVE WHOLESALE SOCIETY, LTD., ARCHITECT'S DEPARTMENT, LONDON.
ASSISTANT ARCHITECTS.
WORKER-UP.
APPLICATIONS are invited from suitably qualified persons. Salary on a scale £485—£945, inclusive of L.W., with placing according to age, qualifications and experience. The posts are superannuable, subject to medical examination. Five-day week in operation.
Applications, stating age, experience, qualifications and salary required, to: W. J. Reed, F.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 99, Leman Street, London, E.1. 1934

APPLICATIONS are invited for appointments in South-West England with Designers and Manufacturers of new traditional buildings.
(*a*) CHARTERED ARCHITECT as Deputy to Staff Architect. Applicants must have good practical experience, and be capable of taking charge of Drawing Office Staff.
(*b*) ARCHITECTURAL ASSISTANTS. Applicants should have good experience up to R.I.B.A. Inter.
Full particulars of qualifications, age, experience, and salary required, to Box 1948.

SECO, LTD., urgently require ARCHITECTURAL ASSISTANTS and DRAUGHTSMEN for the preparation of working drawings and details for a variety of buildings designed on the unit principle. Apply in writing to Chief Architect, Seco, Ltd., 11, Upper Brook Street, W.1. 1940

ASSISTANT required in busy practice in West End, in early twenties, about Intermediate R.I.B.A. standard. Excellent opportunities for gaining all round experience. Box 1942.

ADAMS, HOLDEN & PEARSON require SENIOR and JUNIOR ARCHITECTURAL ASSISTANTS immediately. Write, giving particulars of experience and salary required, to 38, Gordon Square, W.C.1. 1928

ARCHITECTURAL ASSISTANTS required immediately in busy London office with varied practice. Intermediate to Final standard or equivalent. Good salary and prospects for suitable applicants. 5-day week. Write, stating age, experience, to J. M. Sheppard & Partners, 38, Bedford Place, W.C.1. 1926

QUALIFYING or QUALIFIED ASSISTANTS wanted in London Architects office with wide and varied practice. Apply stating age, experience and salary required. Box 2092.

ARCHITECTURAL ASSISTANT required in North Wales Office, with good general experience, able to take charge of Contracts. Knowledge of Quantities an advantage. Write giving full particulars and salary required to Box 2049.

SENIOR ASSISTANT required for contemporary office, good prospects. Write, giving details of age, experience, salary required, to Box 2048.

REQUIRED—QUANTITY SURVEYOR, able to prepare Bills of Quantities on own responsibility, at busy South Midlands office, within 30 miles of London, living accommodation provided. State salary required. Box 2159.

IMPERIAL CHEMICAL INDUSTRIES LIMITED, Dyestuffs Division, requires an ARCHITECTURAL DRAUGHTSMAN of Intermediate R.I.B.A. Standard, possessing a sound knowledge of structural framework design and building construction, together with experience in the preparation of working drawings and details for industrial and commercial buildings. Applications with brief details of experience to Staff Department, Hexagon House, Blackley, Manchester, 9. 2008

JUNIOR ARCHITECTURAL ASSISTANT required, apply in writing to: Alfred H. Howard, L.R.I.B.A., West Way House, 19, St. Thomas' Street, Winchester. 2012

REQUIRED for a small busy West End office, ARCHITECTURAL ASSISTANT of Intermediate Standard with 3—4 years' office experience. General practice with wide variety of work in London and Home Counties; five-day week; bonus scheme. Apply in writing stating age, experience and salary required to Welch & Lander, 38, Gloucester Place, Portman Square, W.1. 2023

BUSY London Firm of Architects contemplating opening branch office in Kingston Area of S. London would be glad to hear from JUNIOR and SENIOR ARCHITECT'S ASSISTANTS living in that area who are interested in working in such an office. Box 1996.

ARCHITECTS ASSISTANTS required (one Senior and one Junior) for London Office. Some experience in industrial and hospital buildings desirable but not essential, 5-day week, good prospects and scope for suitable applicants. Apply stating age, experience and salary required to Box 2070.

MESSRS. GOTCH, SAUNDERS & SURRIDGE, Bank Chambers, Kettering, have vacancies for a Senior Architectural Assistant and a Quantity Surveyor capable of taking off Bills of Quantities. Pension Scheme available. Please apply in writing, with particulars of experience. 2066

LOUIS DE SOISSONS, PEACOCK, HODGES & ROBERTSON have vacancies for Senior and Junior Architectural Staff in their London, Welwyn Garden City and Plymouth Offices. The work is varied and covers Industrial, Ecclesiastical, Offices, Schools, Housing (Cottages and Flats). Accommodation within a reasonable time is available at Welwyn Garden City. Write stating age, salary and experience to 3 Park Square Mews, London, N.W.1. 2075

ARCHITECTURAL ASSISTANTS from Inter standard or above required for West End office engaged on Commercial work. Able to prepare working drawings from sketch schemes. Five day week, Luncheon Vouchers, etc. Reply stating age, experience and salary required to Box No. 2074.

ARCHITECT'S JUNIOR ASSISTANT required, neat draughtsman, good knowledge of construction, permanent and pensionable position. Write only Russells Brewery, Malton. 2011

YOUNG ASSISTANT required to Staff Architect of Progressive Combine with H.Q. in London and Branches throughout the country. Able to run small contracts and to work with minimum of supervision. Occasional travelling involved. Contributory Superannuation scheme. Write giving full details to Box 2073.

ARCHITECTURAL ASSISTANTS required in Progressive new Office. Interesting work at home and abroad. Opportunity for working on own initiative. Good salary and excellent prospects for advancement. Arthur Swift & Partners, 16 Manchester Square, W.1. Tel.: Hunter 0364. 2061

ARCHITECTURAL ASSISTANTS required, for contemporary office. Salary according to experience. C. H. Elsom, F.R.I.B.A., 44, Catherine Place, S.W.1. Victoria 4304. 1950

ARCHITECTURAL DRAUGHTSMEN of Intermediate R.I.B.A. standard urgently required for work at Head Office. Reply, giving details of experience, to Sir Alfred McAlpine & Son, Ltd., The Oaks, Hooton, Cheshire. 1963

YOUNG ARCHITECTURAL ASSISTANT (in 20's) required for North-East Midlands private office. Practice comparatively new and rapidly expanding. Recently qualified or Inter. standard required, with opportunity to control contracts. Good prospects. Pub, Industrial, Domestic work, etc. Apply, giving particulars and salary, to Box 1955.

WESTWOOD, SONS & HARRISON, F./F.R.I.B.A., urgently require a SENIOR ARCHITECTURAL ASSISTANT, A.R.I.B.A. standard, with office experience; also JUNIOR ASSISTANT. Apply in writing, giving qualifications, to 46, Baker Street, W.1. 1958

ASSISTANT, Intermediate R.I.B.A. standard, required, with previous experience in private Architect's office. Ability to prepare attractive sketches and perspectives an advantage. Apply to H. S. W. Stone & Partners, Chartered Architects, 20, The Crescent, Taunton, Somerset. 1953

ARCHITECTURAL ASSISTANT required for work in the City. State age, experience, and salary required, to Clifford Strange, 5, London Wall Buildings, E.C.2. 1910

CECIL Howitt & Partners, Architects, St. Andrew's House, Mansfield Road, Nottingham, require JUNIOR ARCHITECTURAL ASSISTANTS, preferably Inter. R.I.B.A. standard. Please apply in writing, giving full details and stating salary required. 4705

ASSISTANT (male) required; near Final standard. Previous office experience essential. Apply for appointment to: Walters & Kerr Bate, 14, Gray's Inn Square, London, W.C.1. Holborn 9850. 2060

IMPERIAL CHEMICAL INDUSTRIES, LTD., Billingham Division, require the services of additional ARCHITECTURAL ASSISTANTS, up to 30 years of age. Preference will be given to applicants who hold the Intermediate certificate of the A.R.I.B.A. Write, giving full details, to the Staff Manager, Imperial Chemical Industries, Ltd., Billingham Division, Billingham, Co. Durham, quoting advertisement reference W.1. 2059

COMPETENT ARCHITECTURAL ASSISTANT required, Inter. standard, to work on building of contemporary nature. 5-day week. Salary according to ability. Telephone CITy 4086. 2121

BRISTOL Architects require ASSISTANT, with at least 3 years' office experience, of Intermediate or near Final standard. Apply, giving details of experience and salary required, to Box 2098.

ARCHITECTURAL DRAUGHTSMAN required. About Inter. R.I.B.A. standard. Salary according to experience and qualifications. Permanent compulsorily pensioned post. Prospects of promotion are outstanding, managerial chair the prize. Write in the first instance, giving details of experience, etc., to Resident Surveyor and Clerk of Works, Charrington & Co., Ltd., Anchor Brewery, Mile End Road, London, E.1. 2097

WANTED.—SENIOR ASSISTANT, South Coast. Qualified, aged 35 upwards. Capable run jobs start to finish. State salary required and when free. Apply Box 2096.

ASSISTANT ARCHITECTURAL DRAUGHTSMAN, with a knowledge of building surveying, required for Estates Department of a multiple Company. Telephone PRImrose 1764 or 6553. 2095

ARCHITECTURAL ASSISTANT. — Birmingham Co-operative Society require the services of an experienced Assistant, with good knowledge of building construction, and preferably some experience of shop fitting. Permanent pensionable position. Salary £650—£750, according to experience. Apply to Personnel Officer, Birmingham Co-operative Society, Ltd., High Street, Birmingham, 4. 2093

RICHARD SHEPPARD & PARTNERS require interesting and varied ASSISTANTS for responsible work. Must be interested in Architecture; some knowledge of construction an asset. 2099

ARCHITECT required by a large building contractor to handle modern factory development schemes. Staff appointment. Box 2094.

ARCHITECTURAL ASSISTANTS required by Richard Costain, Ltd., for their London Headquarters. Applications are invited from Architects with Final R.I.B.A., commencing salary £700—£800 per annum; and from young Architects, with Intermediate R.I.B.A., commencing salary in region of £600 per annum. Apply to Chief Personnel Officer, Richard Costain, Ltd., 111, Westminster Bridge Road, London, S.E.1. 2104

ARCHITECTURAL ASSISTANT, of Intermediate standard, required immediately. Write, giving details of experience and salary required, to Leach, Rhodes & Walker, 90, Deansgate, Manchester, 3. 2106

ARCHITECTURAL ASSISTANTS required in West End Architect's offices. Those studying for Inter. to Final R.I.B.A. Examination or qualified. Varied practice, specialising somewhat in factories, City offices and stores. Write, giving full particulars, to Box P.514, Willing's, 362, Grays Inn Road, W.C.1. 2109

CAPABLE ARCHITECTURAL ASSISTANT required. Must be experienced and enthusiastic. Reply, with particulars and salary required, to: George Coles, F.R.I.B.A., 40, Craven Street, W.C.2. 2107

ASSISTANTS required in Architect's office (London, W.C.). Must be experienced and capable. General practice. Scope for advancement. Write Box N.513, Willing's, 362, Grays Inn Road, W.C.1. 2108

SENIOR ARCHITECTURAL ASSISTANTS required by busy West End Architects, with extensive and varied practice in all parts of the British Isles. Applicants must be Associates R.I.B.A. and able and willing to take full responsibility for management of contracts from sketch design stage to final accounts. Good contemporary design essential. Apply, stating full particulars, to Box 2111.

MESSRS. J. STANLEY BEARD, BENNETT & WILKINS require several fully qualified SENIOR ARCHITECTURAL ASSISTANTS, capable of taking full charge of large contracts and with ability in contemporary design. Apply in writing only, marking envelope "Confidential," to 101, Baker Street, London, W.1. 2112

GEORGE WIMPEY & CO., LTD.

THE Architects' Department seek ARCHITECTURAL STAFF enthusiastic to apply their knowledge to new construction techniques, covering Houses, Multi-Storey Flats, Offices, Schools and Industrial Buildings for contracts in the U.K. and overseas.

Appointments range from ARCHITECTS to DRAUGHTSMEN, with special interest to those of ability, recognising the value of the designer and technician as an integral part of the production team.

Appointments are on a permanent basis, 5 days a week at Head Office, Hammersmith.

Salaries will be according to qualifications and experience, and subject to satisfactory service; there is a Pension Scheme for those wishing to make a career with the firm.

Applicants should write, giving brief particulars, to E. V. Collins, A.R.I.B.A., Chief Architect, George Wimpey & Co., Ltd., 27, Hammersmith Grove, London, W.6. 2115

ASSISTANT for a busy small office, with variety of interesting work. No guarantee of permanency, but this could, by good work and suitability, become almost inevitable. About Final standard and some good office experience is what we are looking for; Associateship is by no means essential. We think salary between £600—£750, but proved ability in the right man (or woman) could soon raise this figure. Please give full details. Spence & Price, A./A.R.I.B.A., 26, St. Mary's Place, Newcastle upon Tyne, 1. 2117

ARCHITECTURAL ASSISTANTS required by the EAST AFRICAN POSTS AND TELECOMMUNICATIONS ADMINISTRATION on probation for two years for the permanent and pensionable establishment. Normal tour three years. Salary scale (including 10 per cent. temporary cost-of-living allowance) £1,003, rising to £1,280 a year. Commencing salary according to age and experience. Outfit allowance £30. Free passages. Liberal leave on full salary. Candidates, under 35 years, should be student members of R.I.B.A., or have reached an equivalent standard in their studies. They must be capable of preparing, under supervision, all working and detail drawings for large buildings, including Telephone Exchanges, Post Offices and Staff Houses. Possession of the building construction certificate of any recognised School or Board of Education will be an advantage. Write to the Crown Agents, 4, Millbank, London, S.W.1. State age, name in block letters, full qualifications and experience, and quote M2B/40782/AG. 2118

ARCHITECTURAL ASSISTANT, Final standard or near, for work on Commercial and Industrial projects of a contemporary character. Leonard J. Multon, F.R.I.B.A., 6, Greenfield Crescent, Birmingham, 15 2127

ARCHITECTURAL ASSISTANT required for Private Practice in Worcester. Capable preparing working drawings, specifications and supervising small contracts. 5-day week. Full particulars, including salary required, to Box 2129.

ARCHITECTURAL ASSISTANT required in London, with experience in alteration work. Knowledge of Hotel and Public House work would be an advantage. Applicants should be capable of dealing with smaller type jobs from survey to final accounts. Write, giving age, experience, and salary required, to Box 2120.

MESSRS. HARRODS, LTD., invite applications for the following posts:—

(1) ARCHITECTURAL ASSISTANT, experienced in departmental store work.

(2) SENIOR SHOPFITTING DRAUGHTSMAN. Successful applicants will be responsible to the House Architect for the design and supervision of work for new departments. A flair for interior design would be considered an advantage. The posts are permanent, progressive and pensionable, with restaurant and sports club facilities. Applications, giving full particulars, should be addressed to M. Kenfield, Esq., A.R.I.B.A., House Architect, Messrs. Harrods, Ltd., 44, Hans Crescent, S.W.1. 2119

ARCHITECTURAL ASSISTANT required, commencing September. Applications in writing, giving full particulars, to: Read & McDermott, F.R.I.B.A., A.M.I.Mech.E., Architects and Consulting Engineers, 18, High Street, Maidstone. 2130

ARCHITECTURAL ASSISTANT required (male or female) in the Architectural Dept. of an old-established firm of Chartered Surveyors. Reply, stating full particulars of experience and salary required, to G. Scott Baird, L.R.I.B.A., 20, Salisbury Street, Blandford Forum, Dorset. 2131

ARCHITECTURAL ASSISTANT required by Major Oil Company undergoing expansion, for its Sheffield office. Applicants should be of Intermediate standard, and must be capable of carrying out work on the design and re-modelling of service stations. Social Club, Pension and Life Assurance scheme, generous sickness benefits. Write, giving full details of experience, age and salary required, to Box 9862, quoting Ref. A.A. 588.

RONALD WARD & PARTNERS require several capable ARCHITECTURAL ASSISTANTS, with contemporary outlook and willing to use own initiative. Salary range £400 to £800. Interesting and varied work, home and abroad. Congenial working conditions. Apply 29, Chesham Place, Belgrave Square, S.W.1. Telephone: Belgravia 3361. 2135

ARCHITECTURAL ASSISTANTS wanted urgently for varied contemporary work. Salary according to experience. Apply John Dudding & Partners, F./A.R.I.B.A., A./A.I.L.A., 30, Clarendon Street, Nottingham. 2138

FLAT available for ASSISTANT seeking position in country office with pleasant surroundings. Write stating age, experience and salary required, to Burgess, Holden & Watson, Chartered Architects, Beaconsfield, Bucks. 2157

ARCHITECTURAL ASSISTANTS required for varied and interesting contemporary work in medium sized office, with scope for initiative and responsibility. THREE A.R.I.B.A. or Final standard, with some office experience, and TWO Architectural Draughtsmen. Salaries by arrangement, according to ability. Hadfield, Cawkwell & Davidson, 1, High Court, Sheffield, 1. 2156

BUCKINGHAMSHIRE firm of Architects within thirty miles of London, with a varied practice, require two qualified QUANTITY SURVEYORS. Five-day week, accommodation available. Salary according to age and experience. Please write giving fullest particulars to Box 2159.

ARCHITECT, practising N.W.3 district, requires efficient Intermediate standard ASSISTANT for work on Hospitals. Please state details of experience and salary required. Box 2140.

ARCHITECTURAL ASSISTANTS required for busy West End office. Intermediate or Final standard. Varied and interesting work. Please write stating experience and salary required to: F. G. Frizzell, A.R.I.B.A., 80, Portland Place, London, W.1. 2141

FARMER & DARK, Romney House, Tufton Street, S.W.1, require ARCHITECTURAL ASSISTANTS, within range £500—£750, for interesting industrial/commercial work. Some practical experience preferable. Five-day week. Pension and Life Assurance scheme. Write or telephone ABBey 6311. Ref. J.T.P. 2154

ARCHITECTURAL ASSISTANTS required. Varied work. Salaries £700 to £750. Write, stating age, training, experience, present salary. All interview expenses paid. G. de C. Fraser, Son & Gearey, Chartered Architects, 27, Dale Street, Liverpool. 2153

ARCHITECTURAL ASSISTANT required for busy office. Interesting commercial and industrial work. Apply, stating age, experience and salary, and enclosing copies of testimonials, to Mr. G. Yarwood, F.R.I.B.A., Architect's Dept., The Barnsley British Co-operative Society, Ltd., Dearne Works, Twibell Street, Barnsley. 2151

JUNIOR and SENIOR ARCHITECTURAL ASSISTANTS required in Exeter office. Box 2152.

THE LONDON HOSPITAL, Whitechapel, E.1, requires JUNIOR ARCHITECTURAL ASSISTANT. Salary £440 to £650 p.a., according to experience, plus London weighting. Post superannuable. Applications, stating age, present salary, and brief particulars of experience, to be sent to the House Governor. If successful applicant is a woman, accommodation is available at a hotel run by the hospital in Kensington. 2149

ARCHITECTURAL DRAUGHTSMAN, Inter.-R.I.B.A. standard, required for medium-sized practice, with considerable contemporary variety. Five-day week. Luncheon vouchers. Please write in first instance to Box 2147.

ARCHITECTURAL ASSISTANT required. Intermediate to Final standard, with office experience, for small busy practice. Shaw & Lloyd, F.R.I.B.A., 74, Gt. Russell Street, W.C.1. MUSeum 9693. 2145

SENIOR ARCHITECTURAL ASSISTANT required, Westminster office. Experience of commercial and industrial buildings in London essential. Write in first instance giving details of experience and salary required. Box 2148.

ARCHITECTURAL ASSISTANT required, Inter.-standard or recently qualified. Small contemporary practice. Opportunities for site experience and running jobs. Salary from £550, according to experience. Apply Challen & Floyd, 7, Cromwell Road, S.W.7. Tel. KENsington 0169. 2146

WATES LIMITED offer Permanent and progressive posts for ASSISTANTS in their Architect's Department. The company has an interesting programme of housing work of all kinds, and of commercial buildings and applicants should preferably have some experience in these fields. Five-day week, pension scheme, good salaries, according to ability. Write, stating age, education, qualifications and experience to the Architect, Wates Ltd., 1258-60, London Road, Norbury, S. W. 16. 2162

Architectural Appointments Wanted

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

THIRD year Student desires position in Manchester as part-time ASSISTANT. Wishing for practical experience offers services without remuneration. Box 2160.

Other Appointments Vacant

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

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18-64 inclusive or a woman aged 18-59 inclusive unless he or she or the employment is excepted from the provisions of the Notification of Vacancies Order, 1952.

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