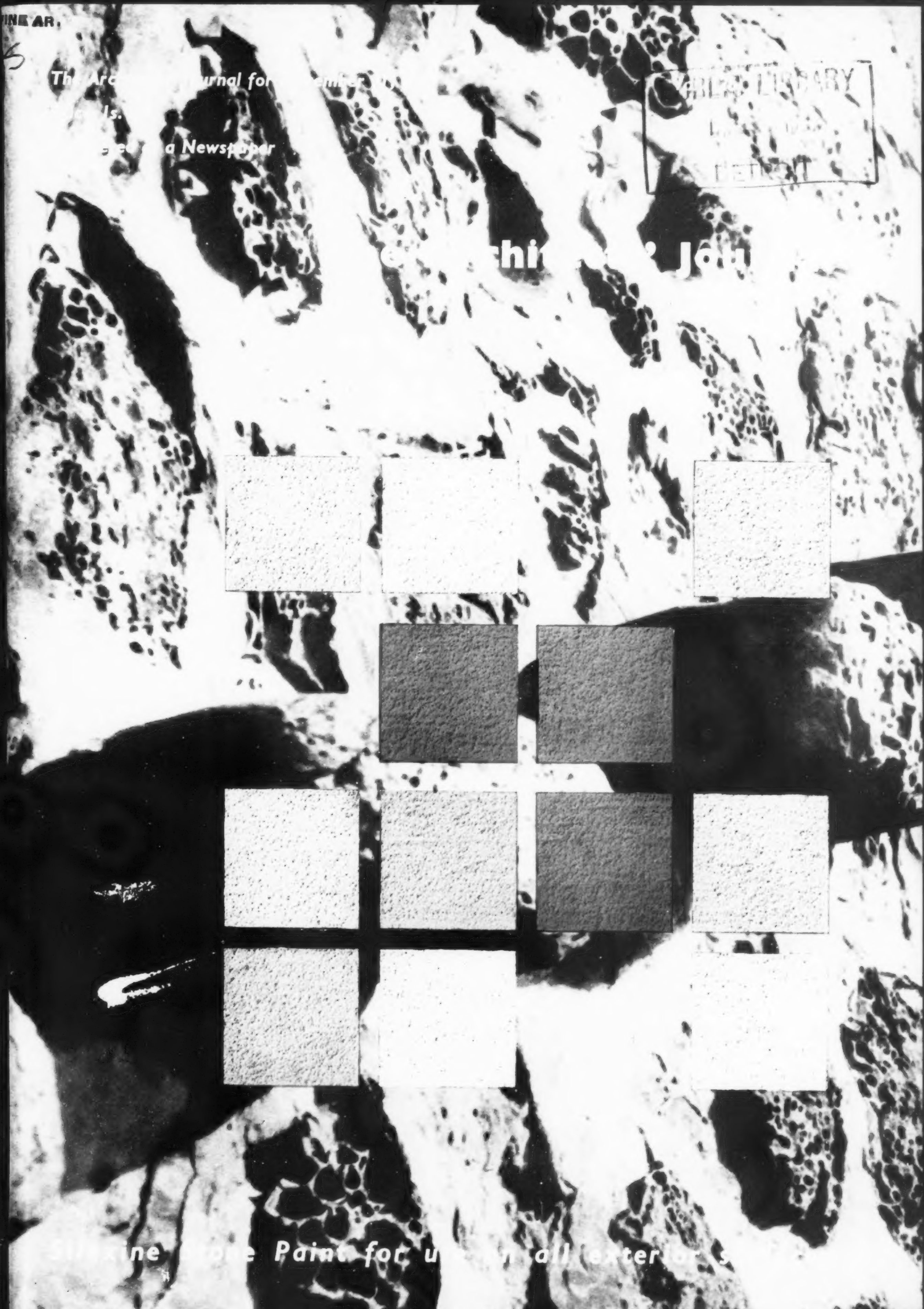

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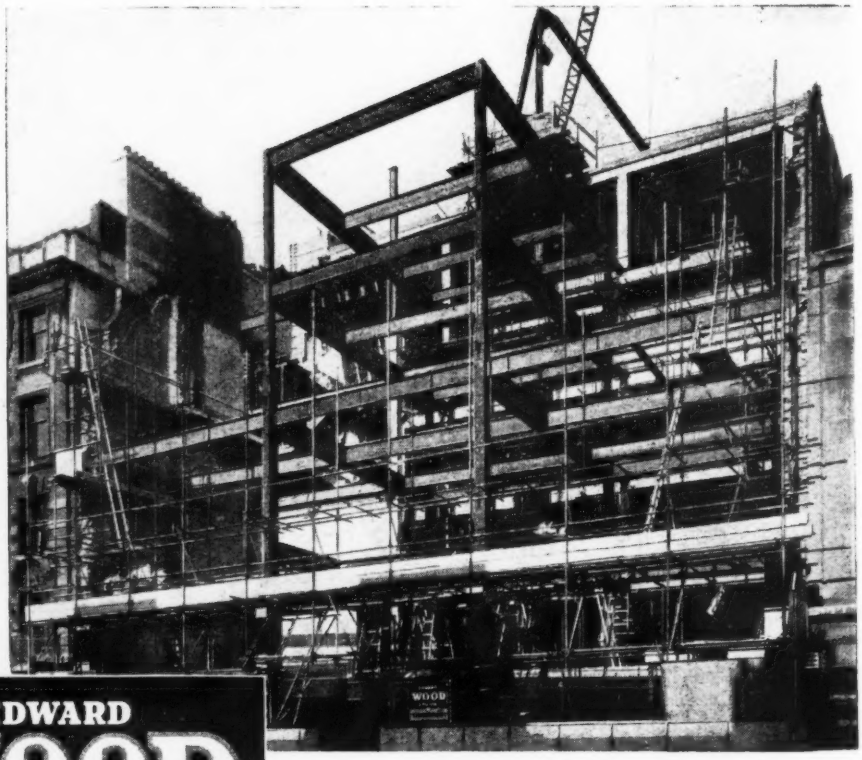

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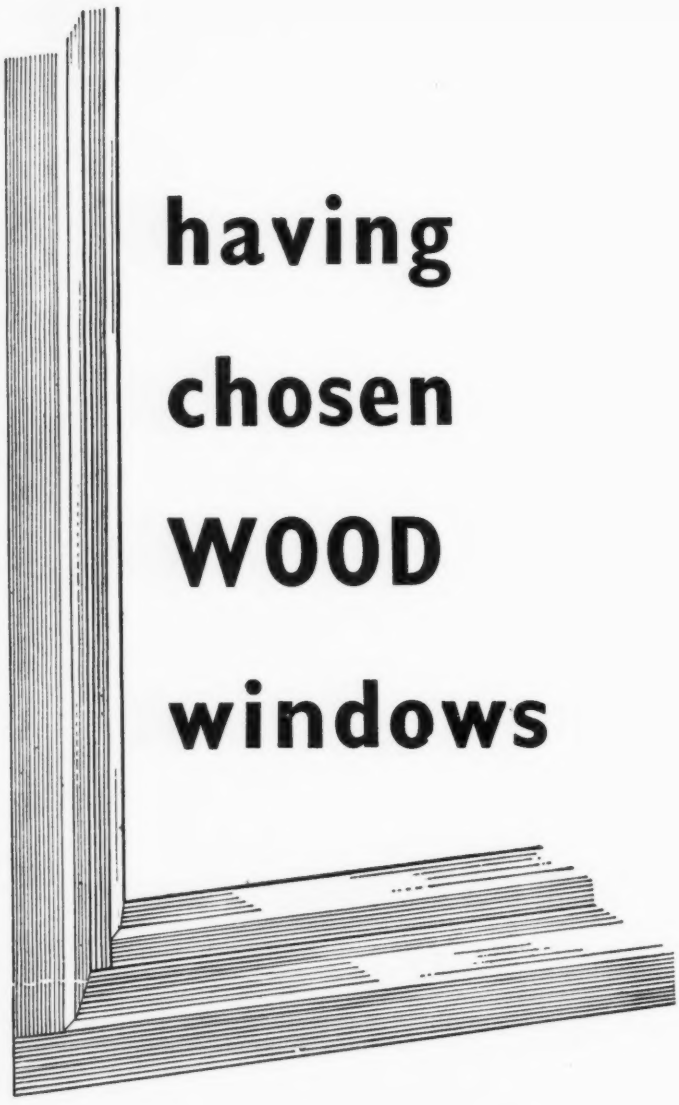

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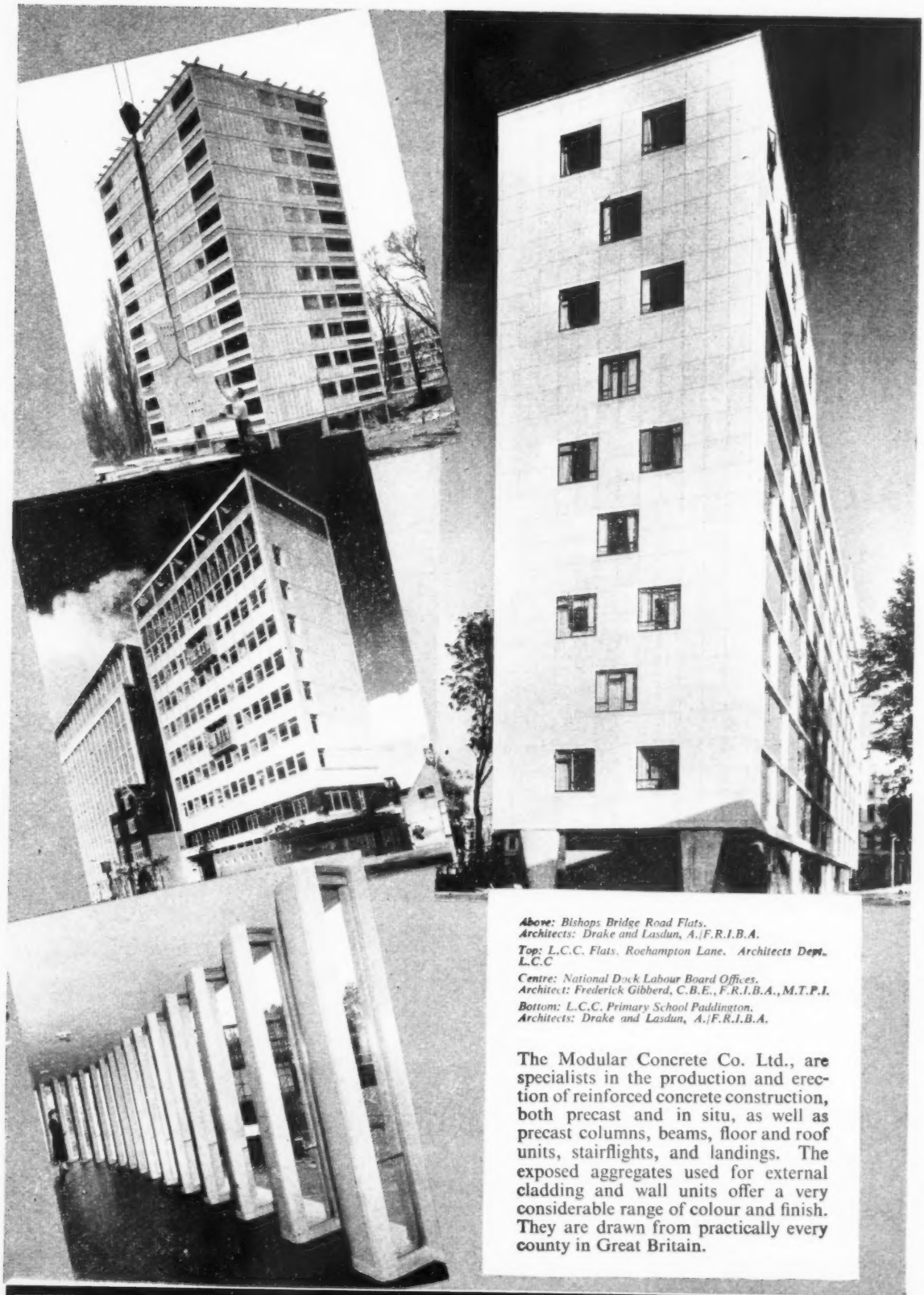

Above: Bishops Bridge Road Flats.
Architects: Drake and Lasdun, A./F.R.I.B.A.

Top: L.C.C. Flats, Roehampton Lane. Architects Dept., L.C.C

Centre: National Dock Labour Board Offices.
Architect: Frederick Gibberd, C.B.E., F.R.I.B.A., M.T.P.I.

Bottom: L.C.C. Primary School Paddington.
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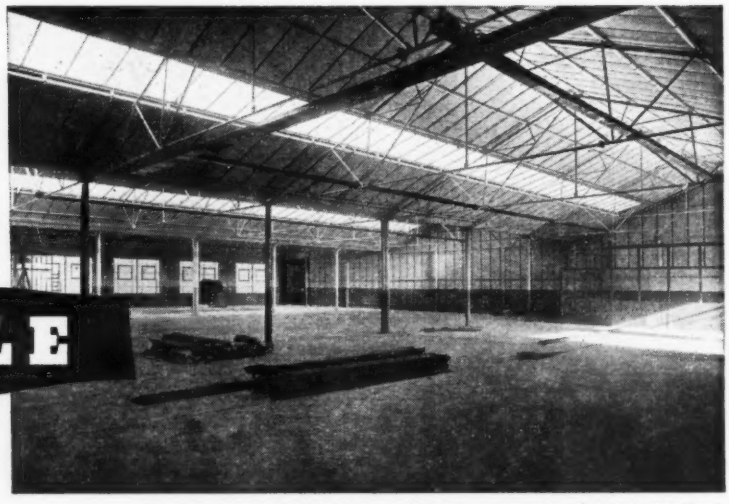

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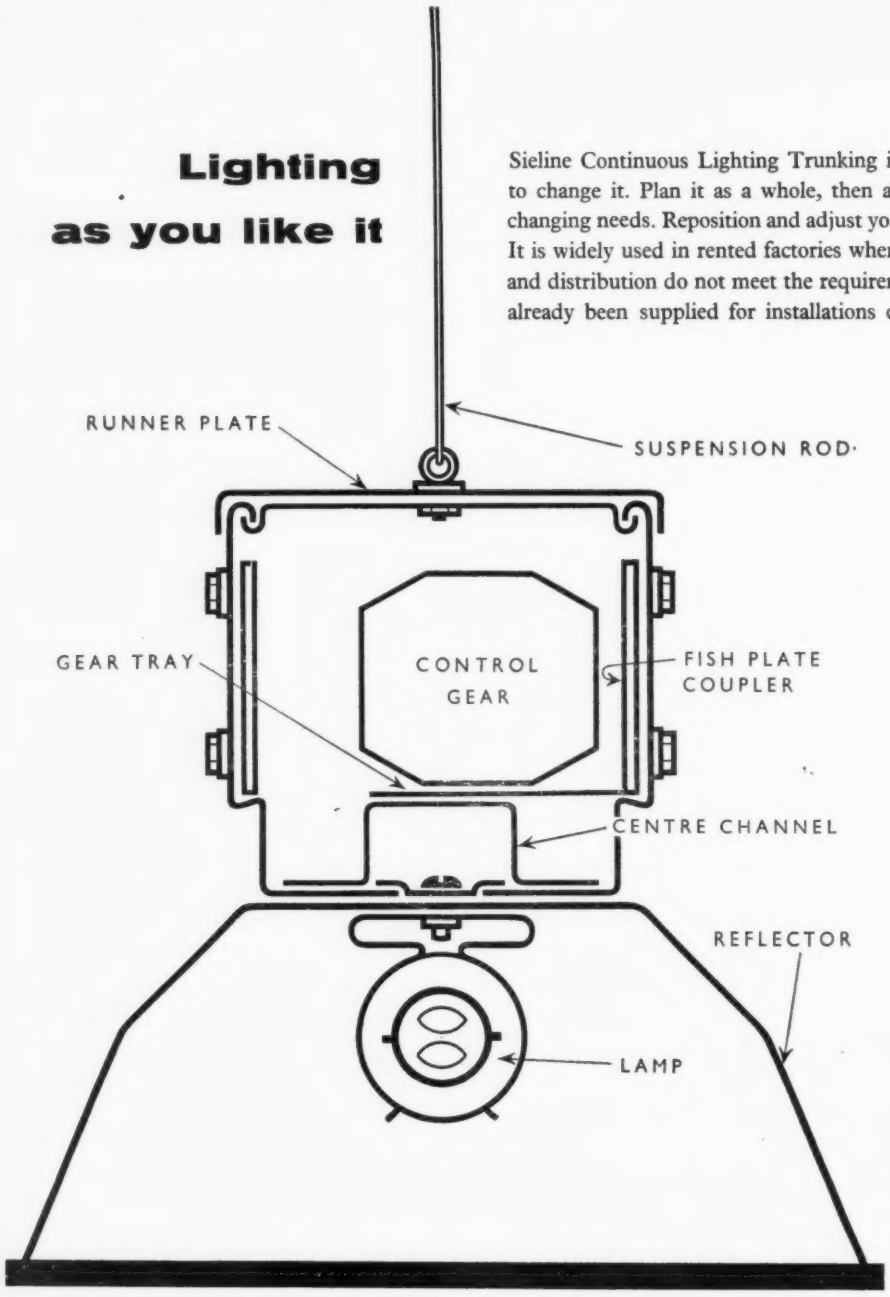

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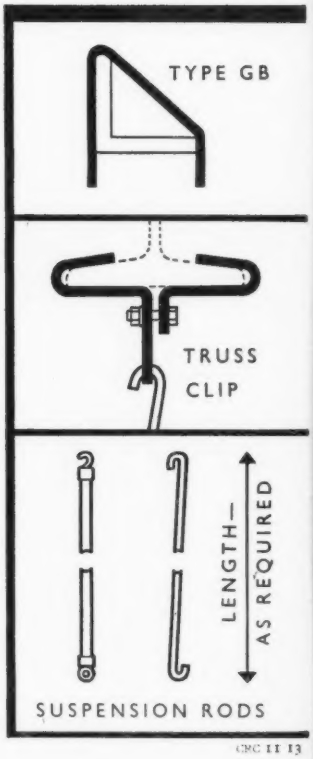

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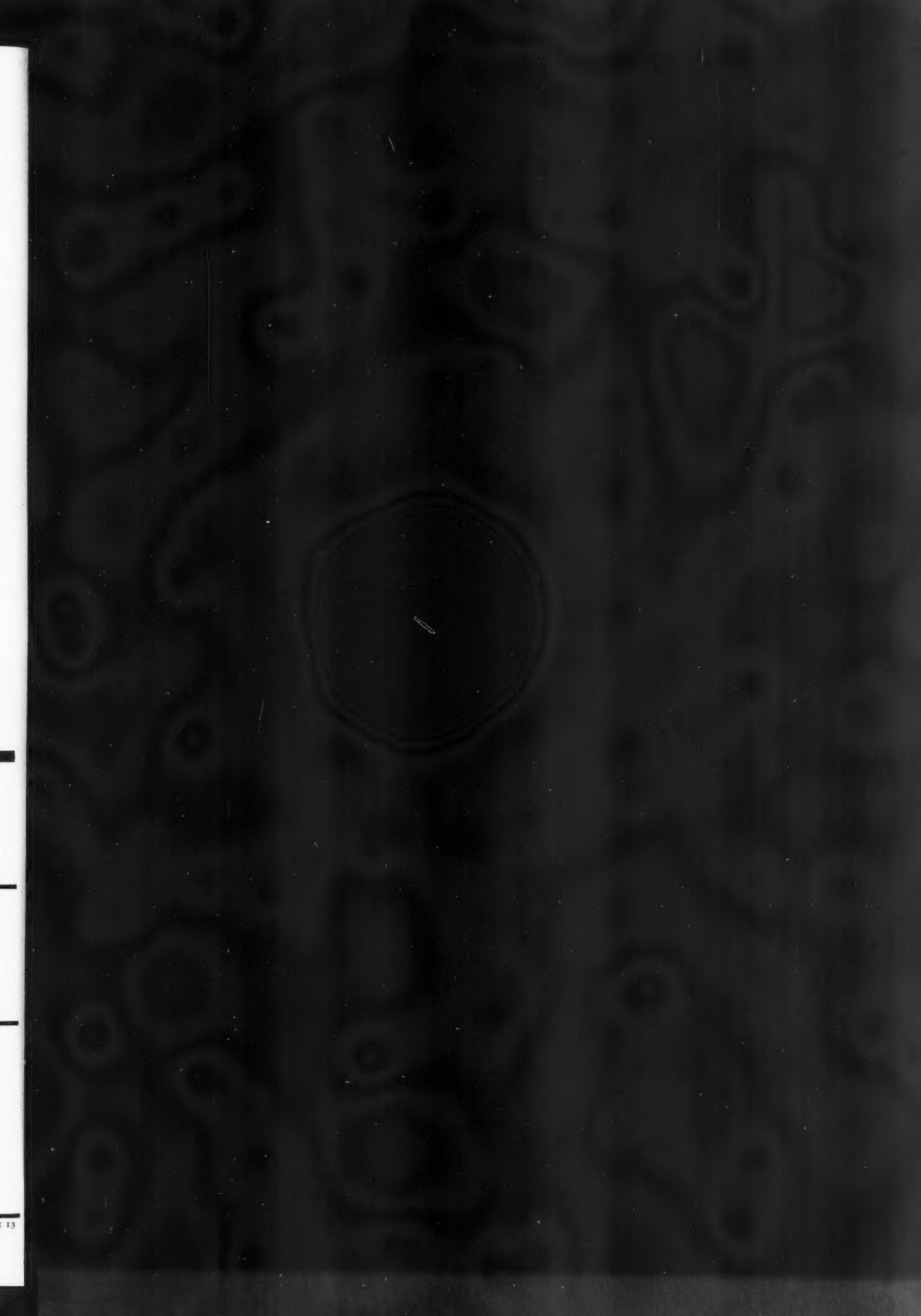

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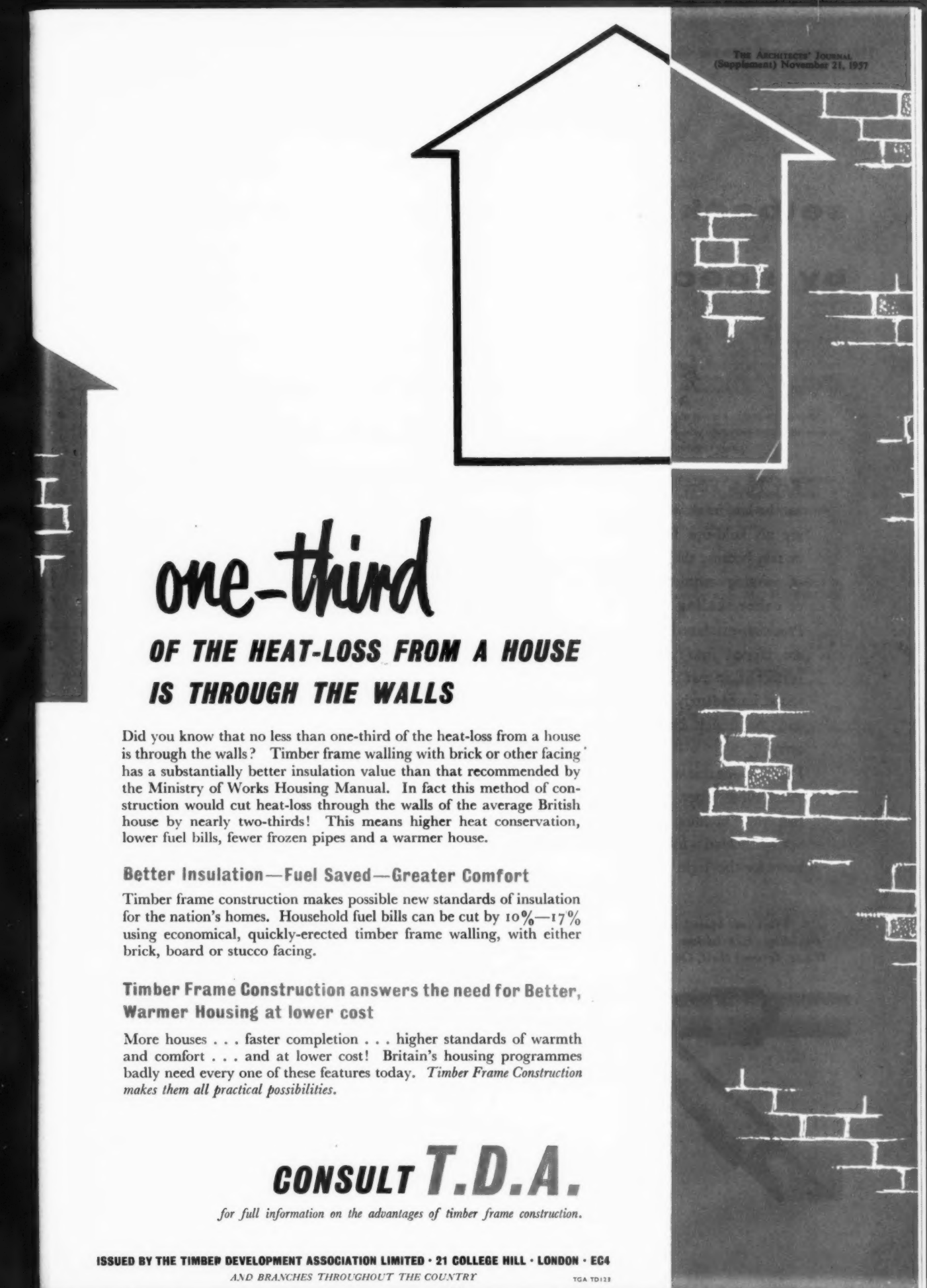

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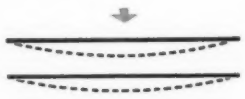

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Key pipes are vacuum-impregnated with pitch and are non-porous and resistant to normal effluent corrosives throughout their thickness.

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The 30-year loan period applies to all Key Drain pipes. Pitch fibre pipes have been used with notable success in the United States for over 50 years.

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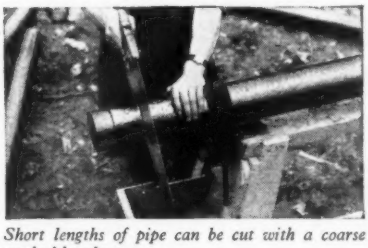
The precision-machined taper joints require no mortar or jointing compounds.



Short lengths of pipe can be cut with a coarse toothed handsaw.

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Building Research Station Report

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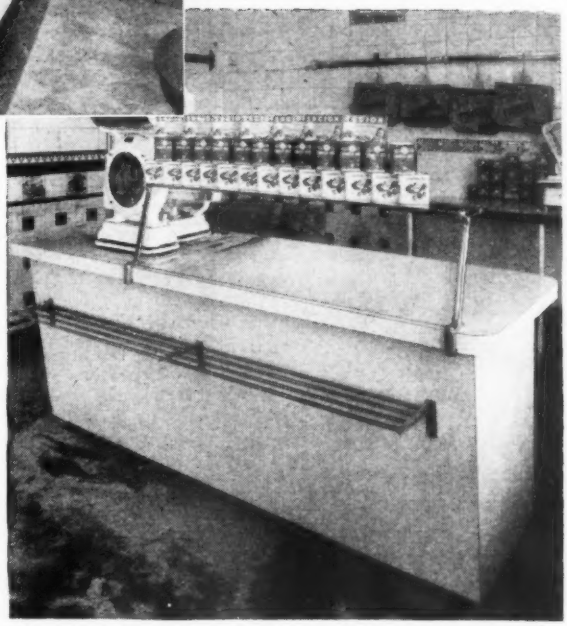

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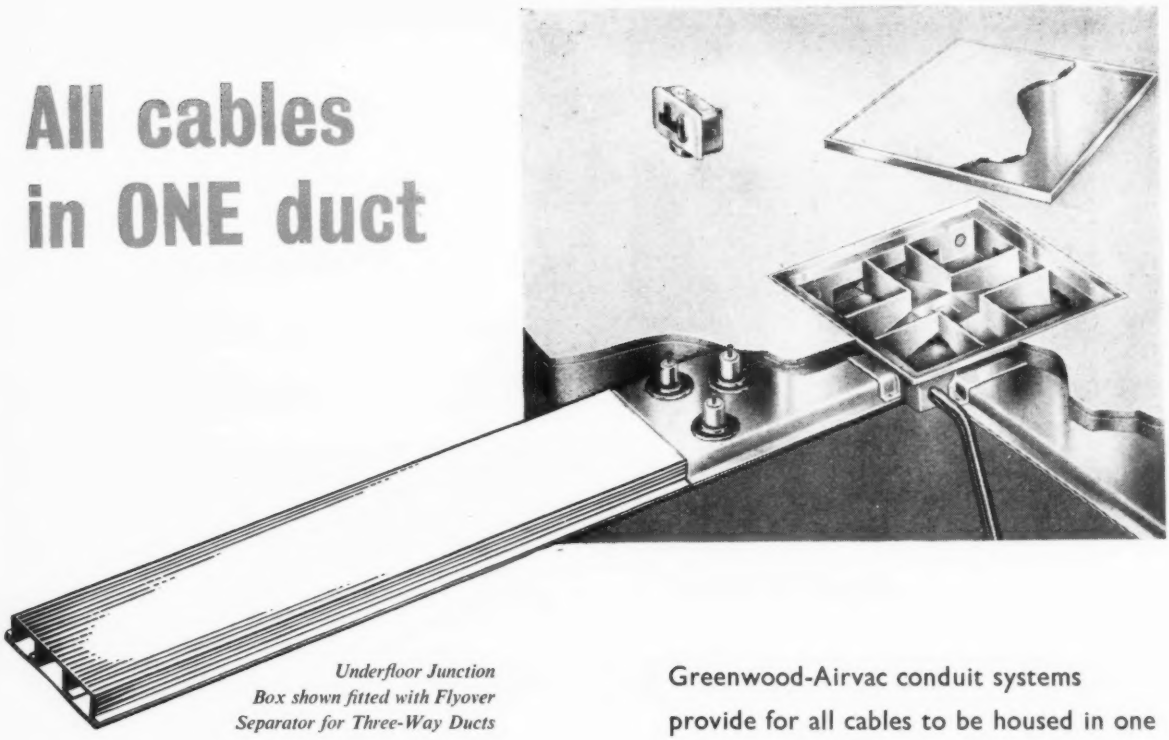

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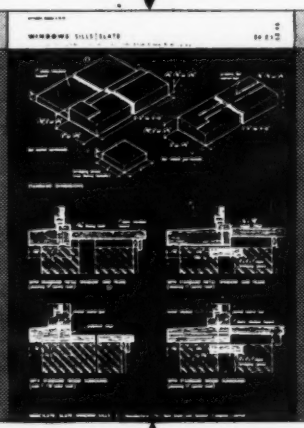

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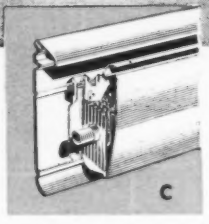

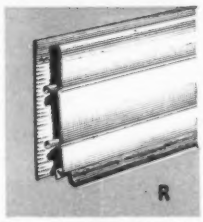

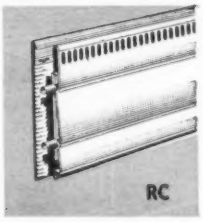

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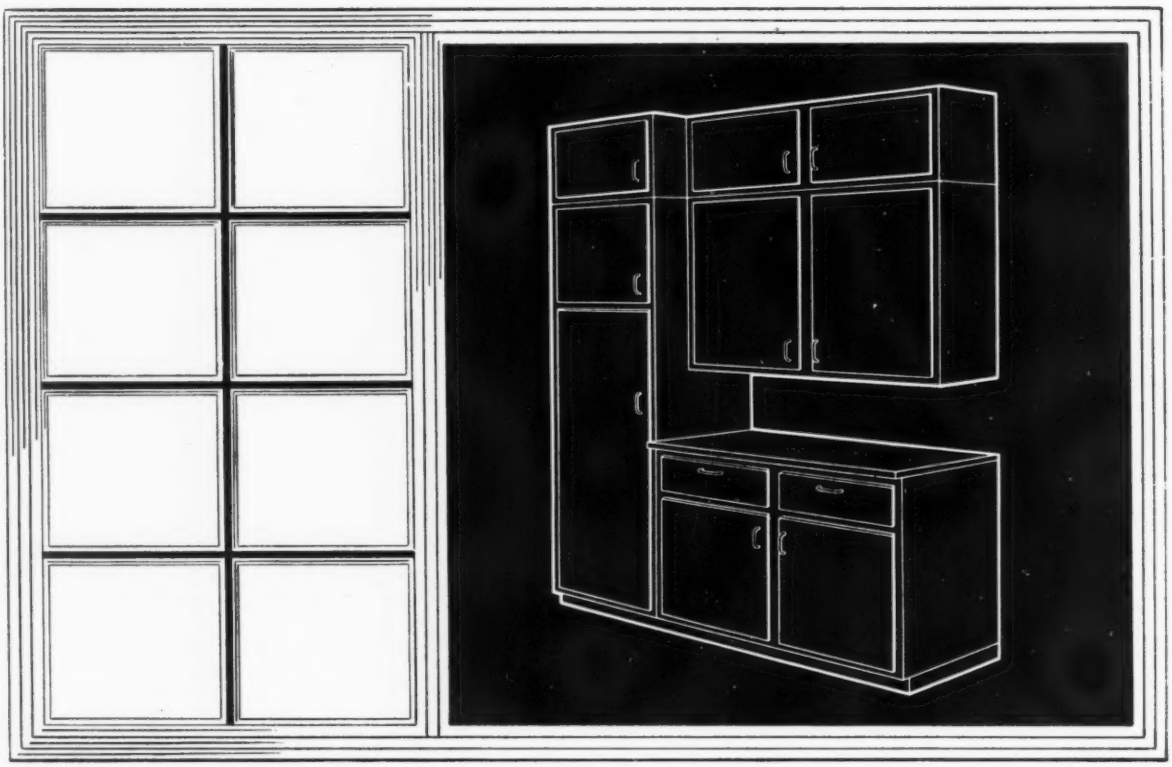

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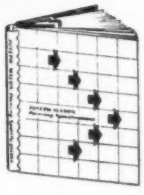

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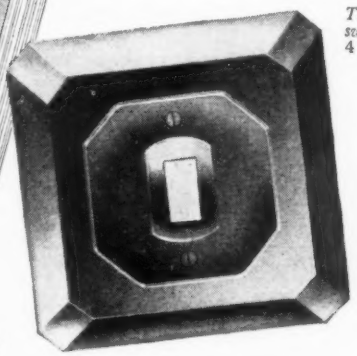

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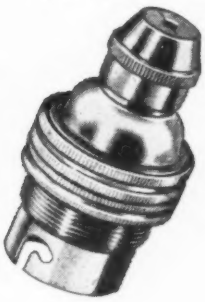

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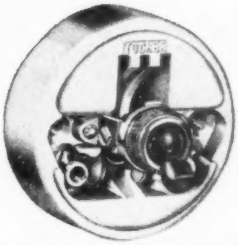

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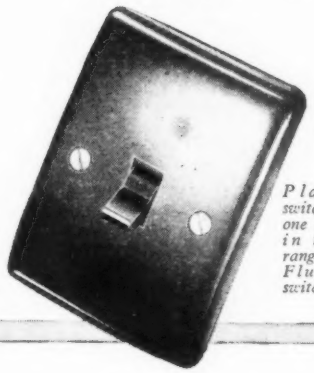

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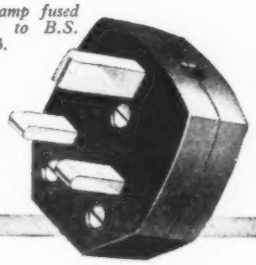

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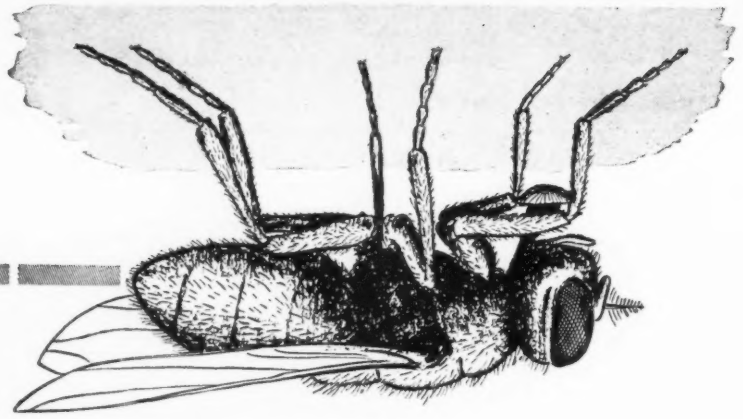

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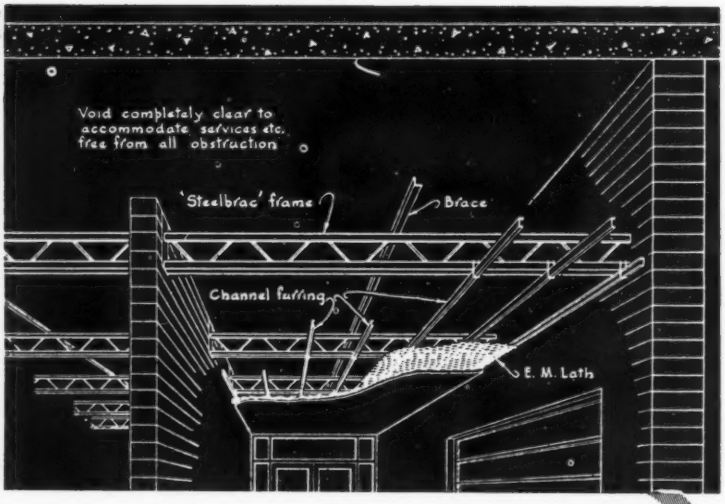

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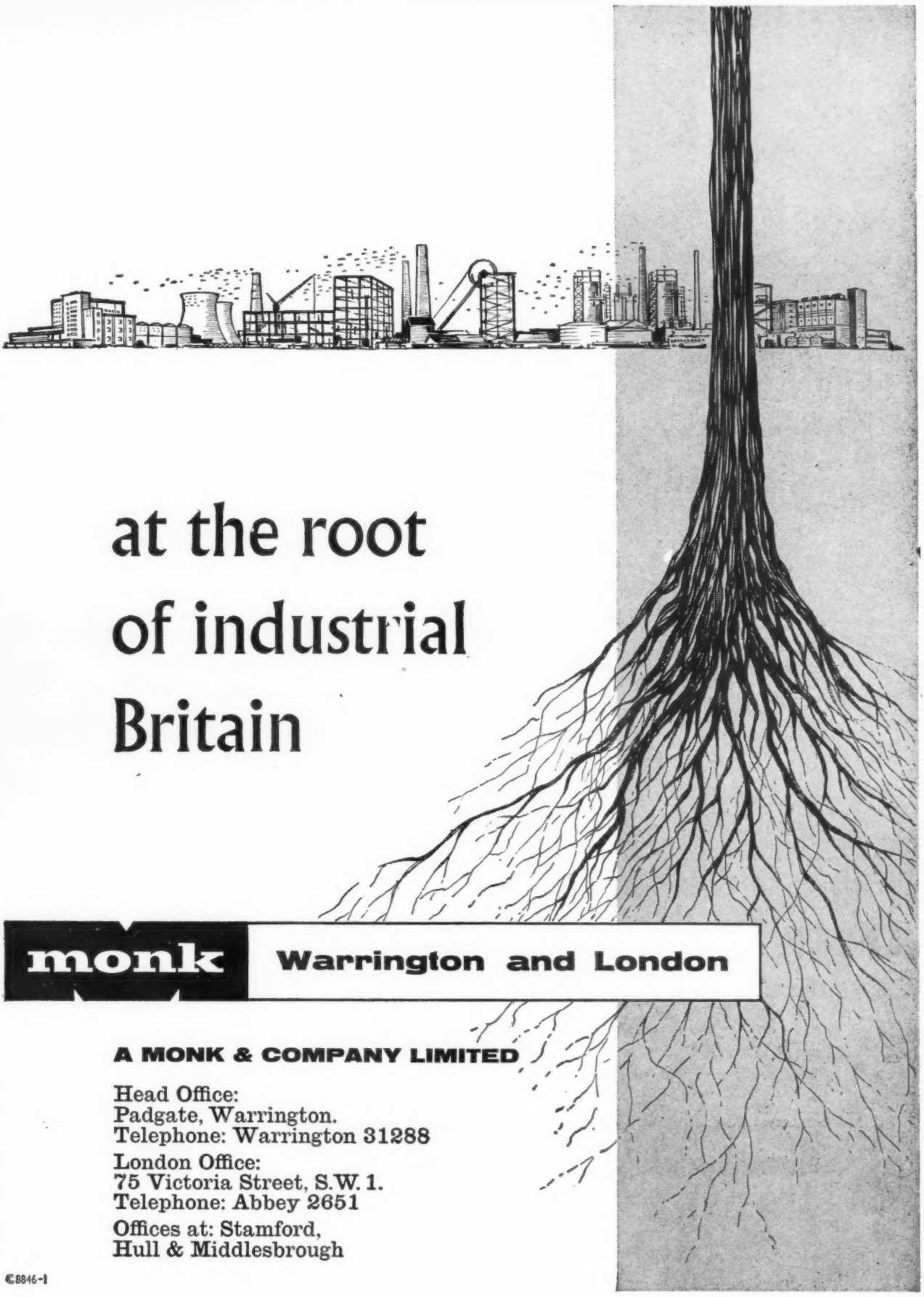

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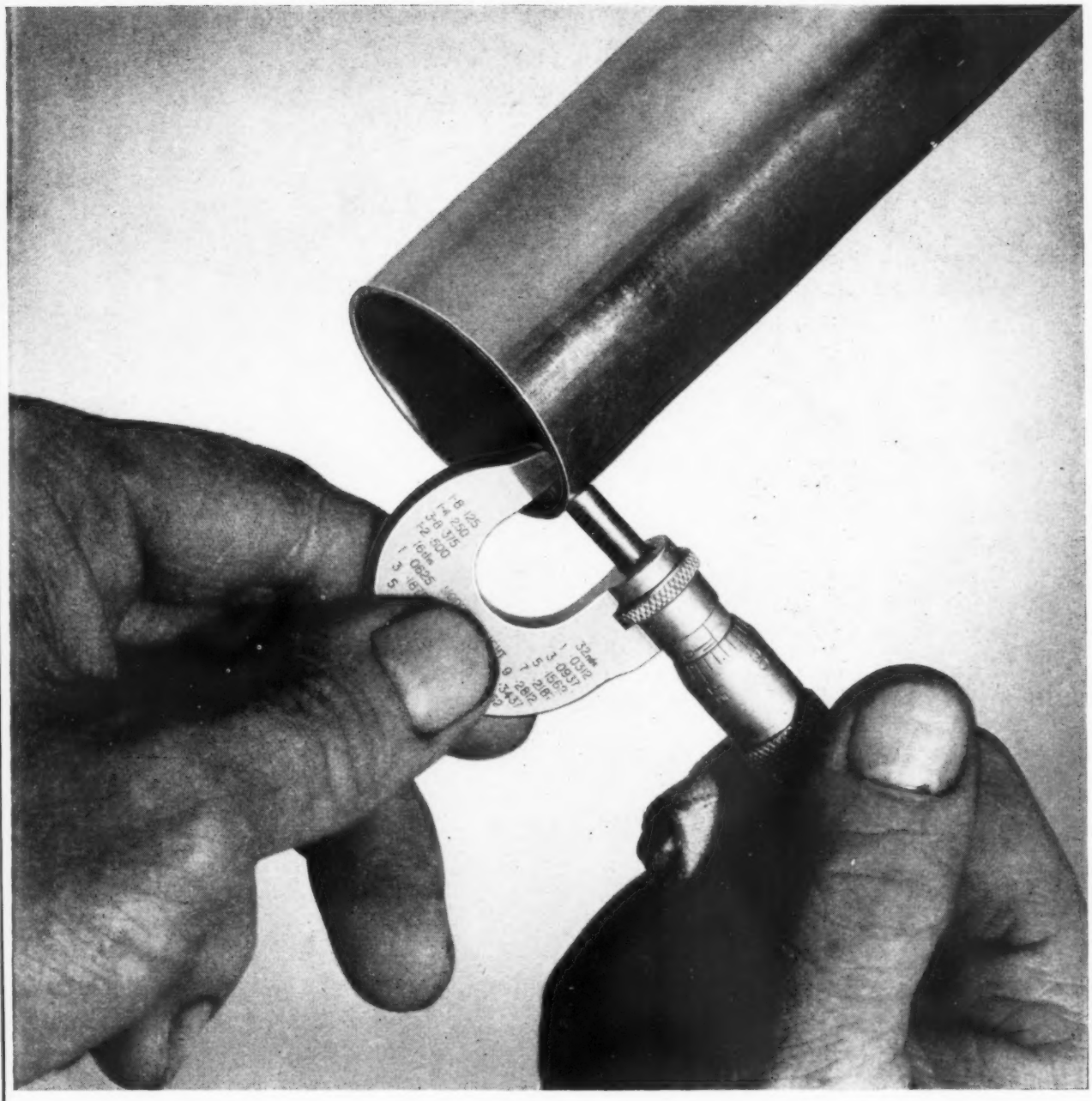

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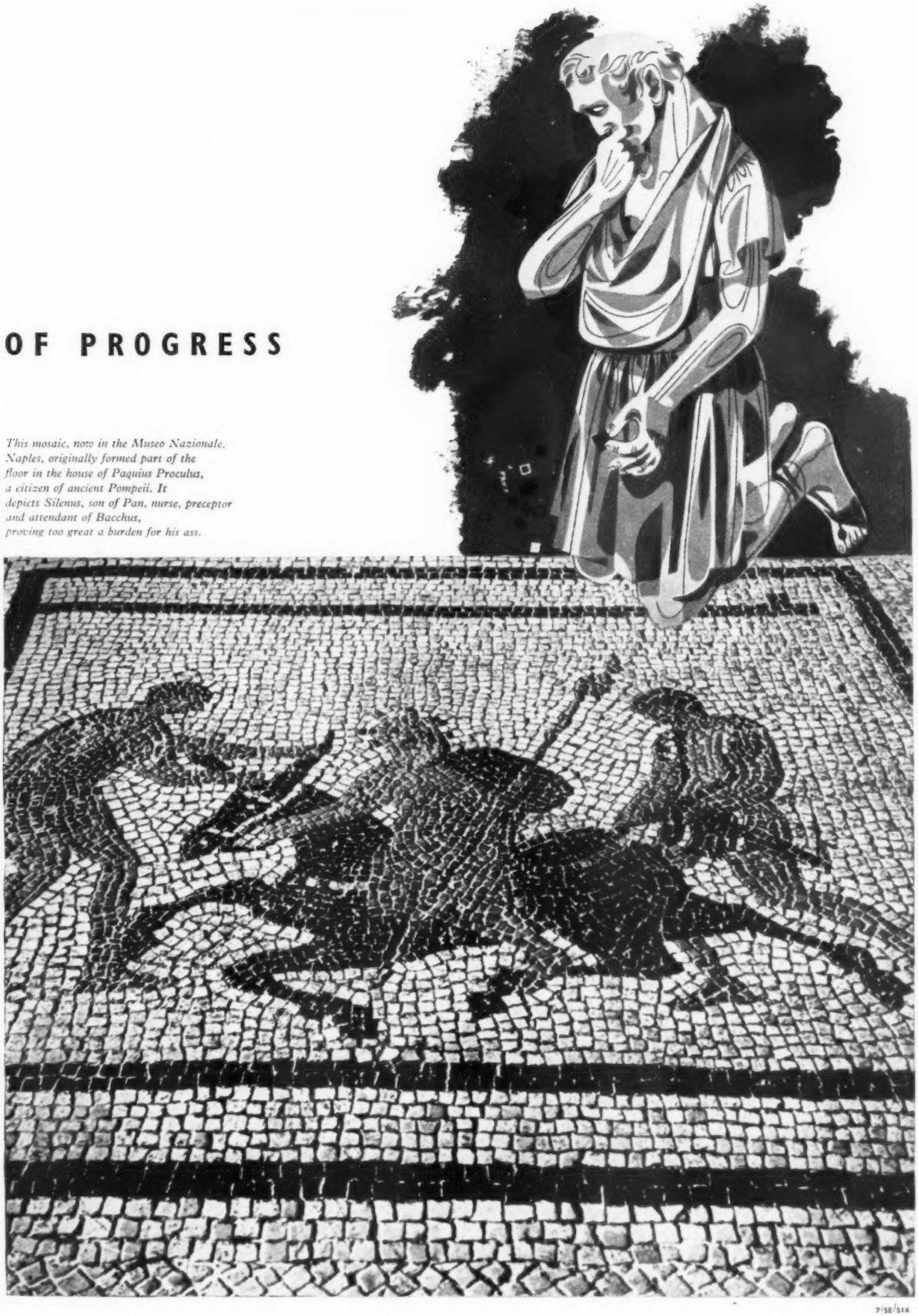

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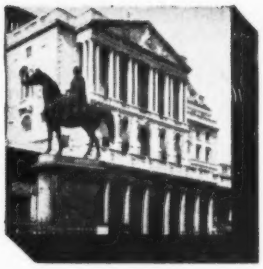

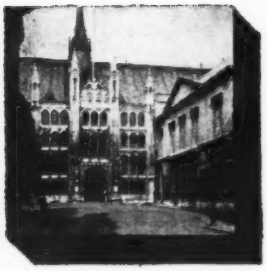

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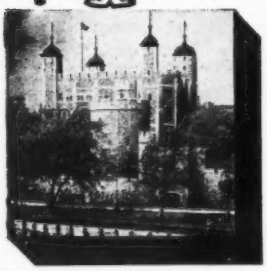

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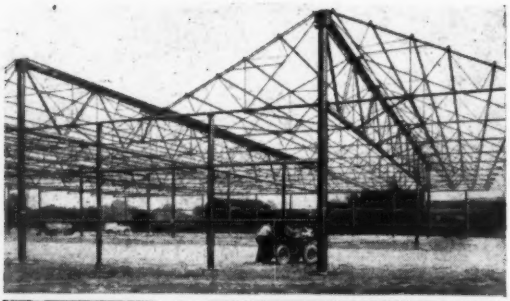

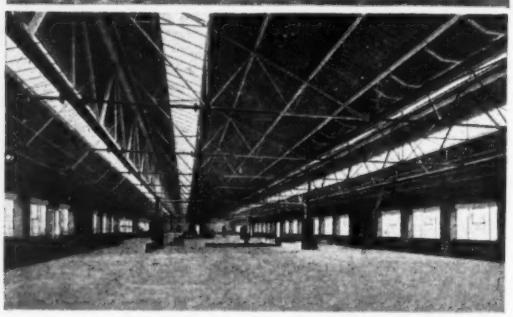

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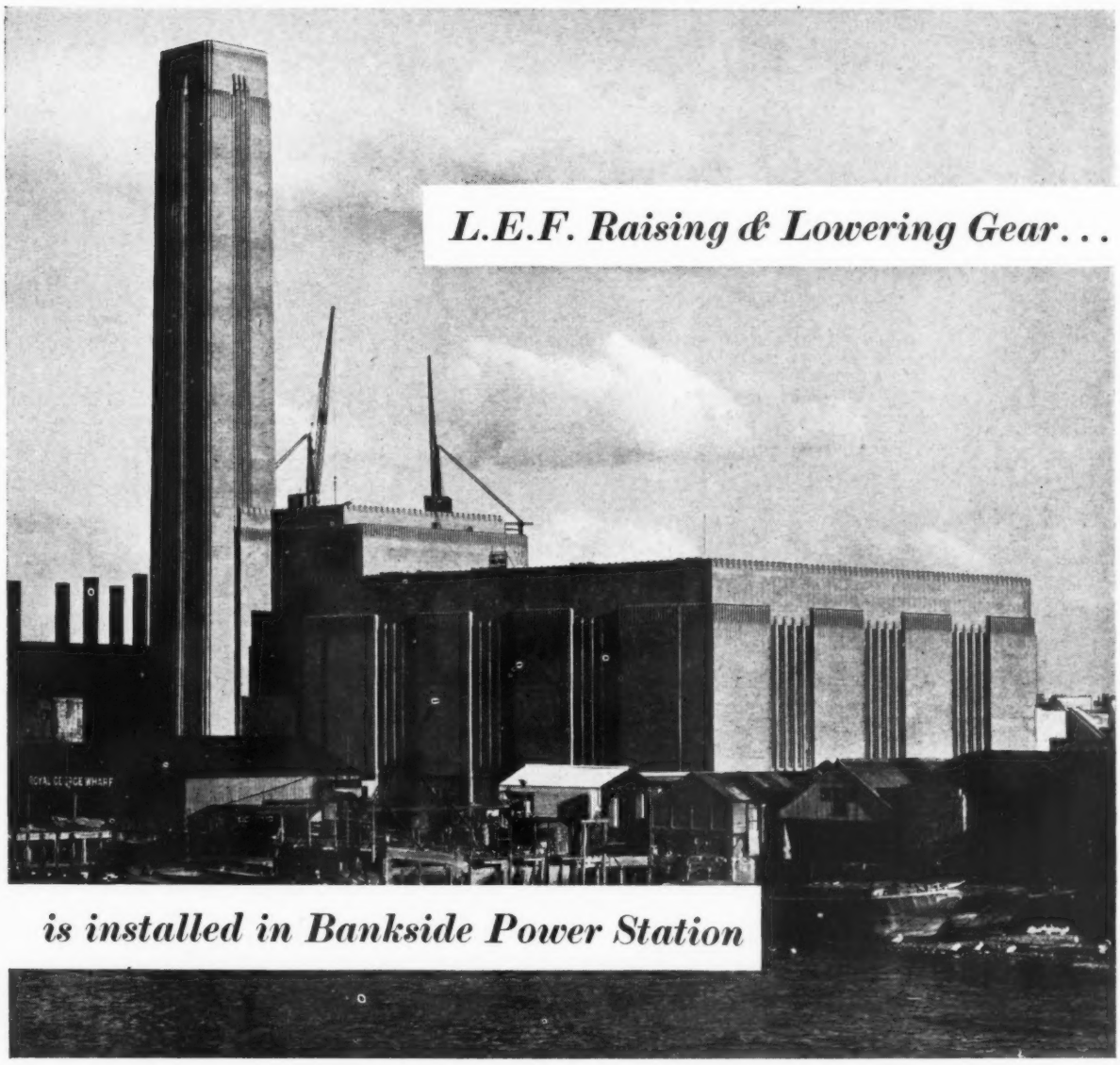

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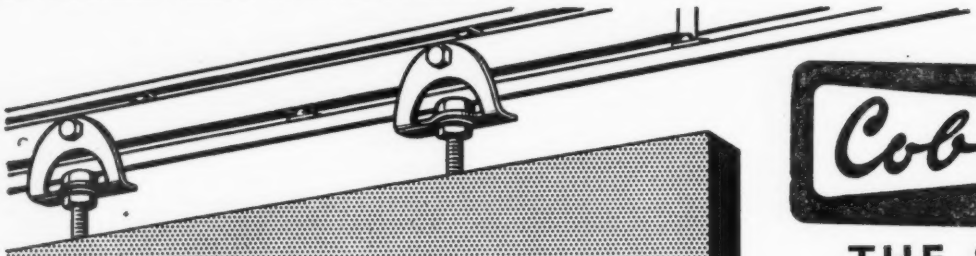

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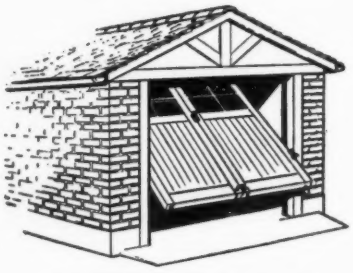

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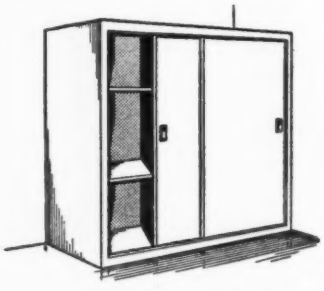

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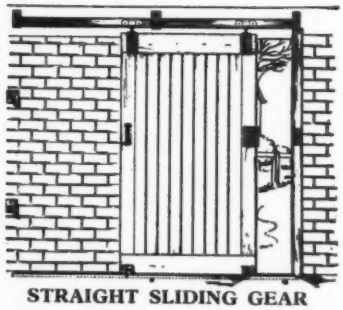

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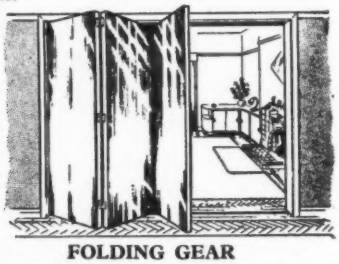

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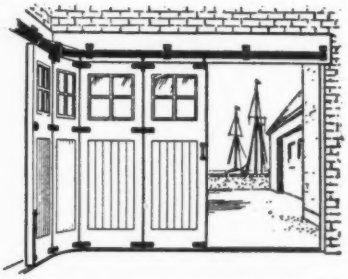

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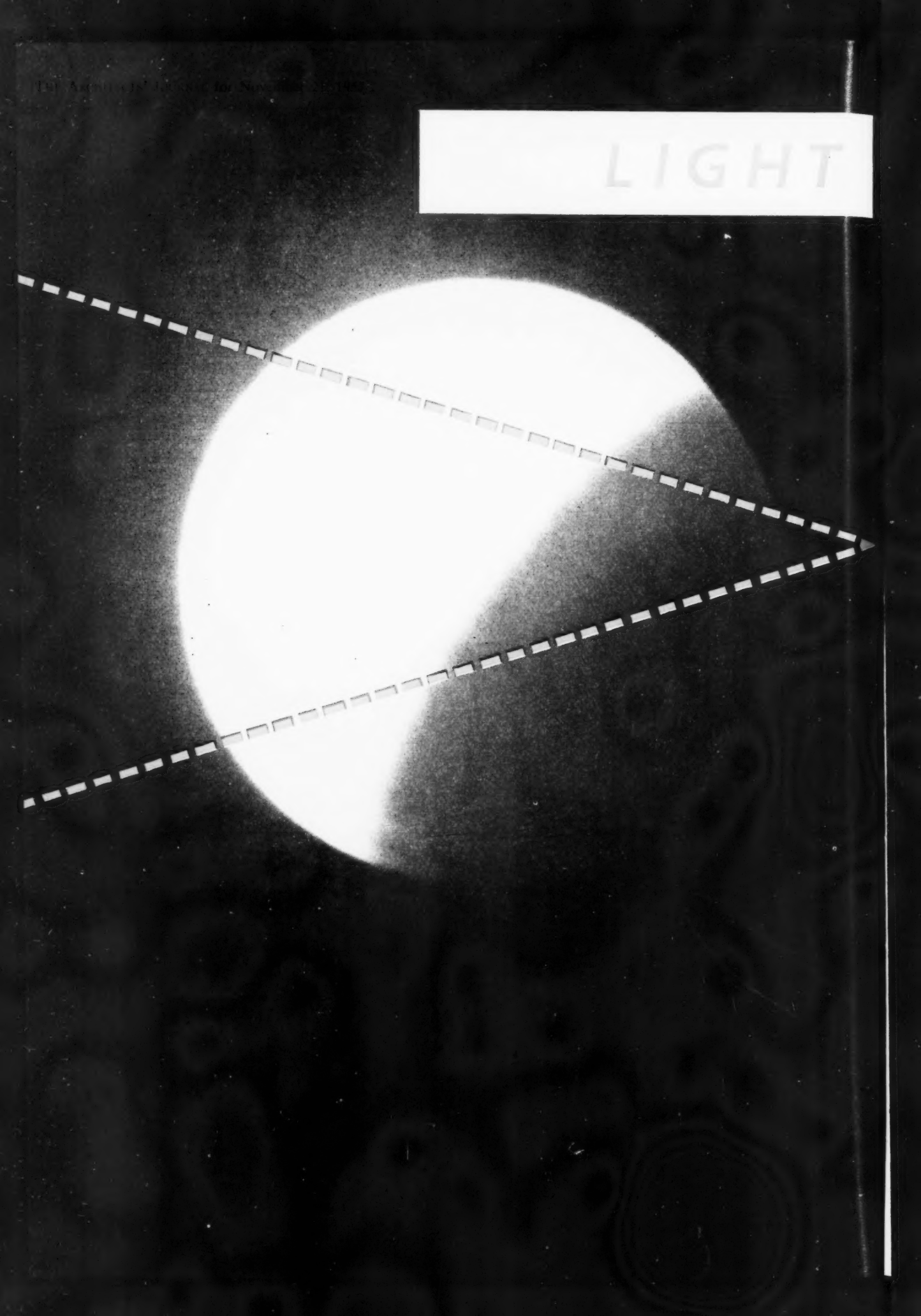

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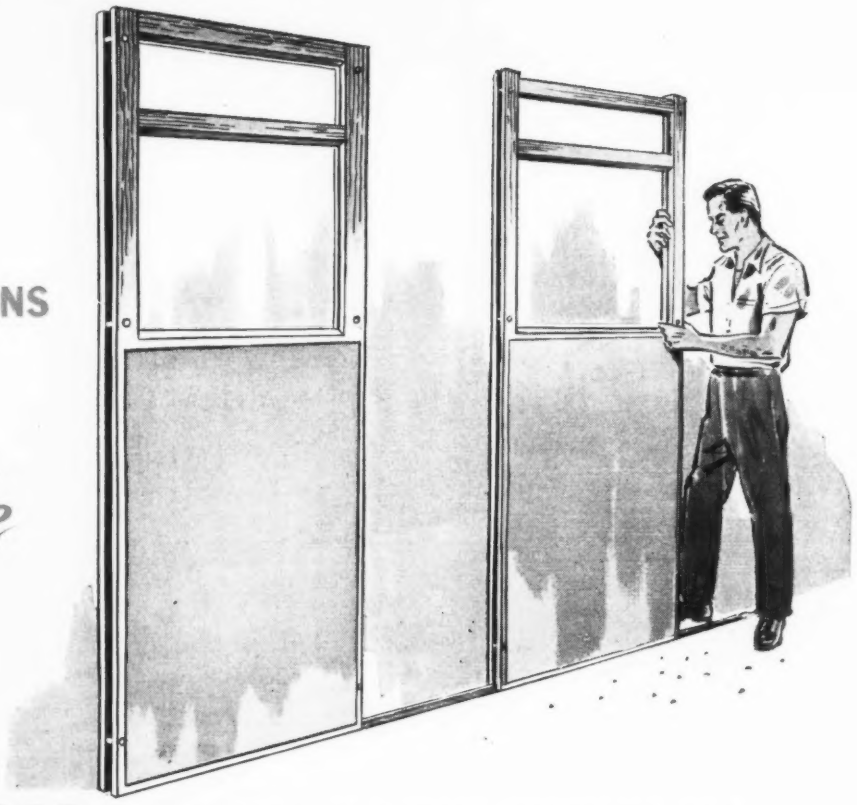

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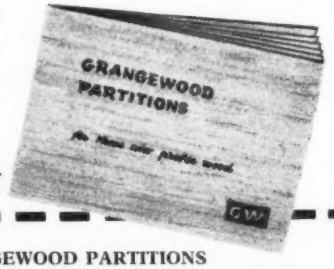

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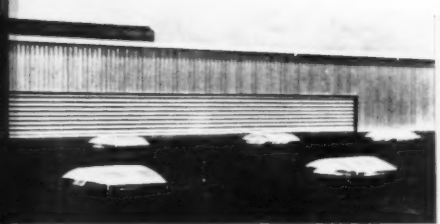

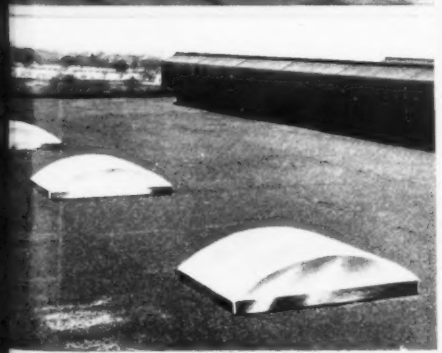

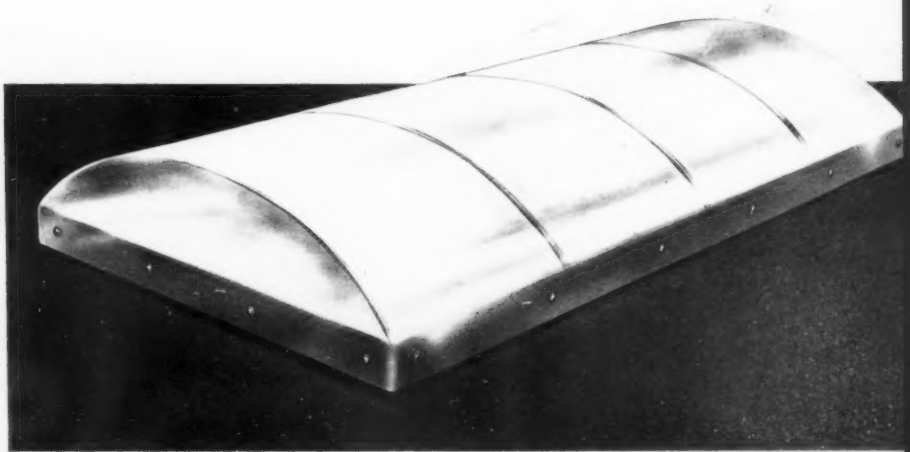

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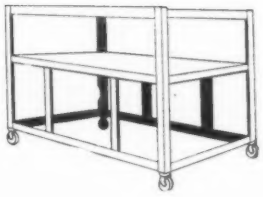

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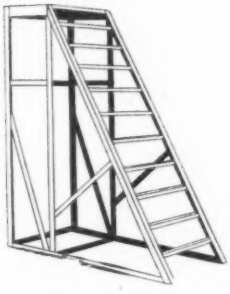

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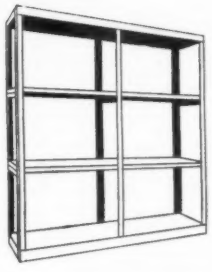

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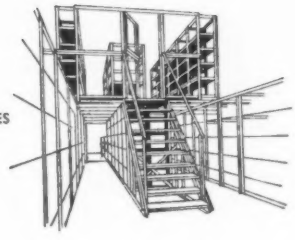

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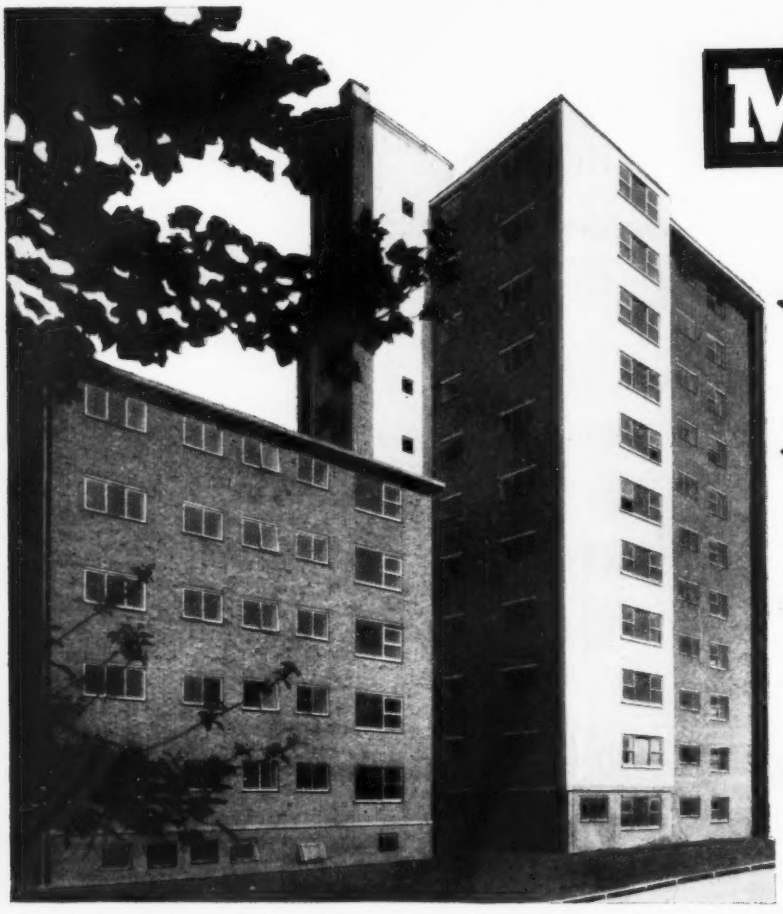

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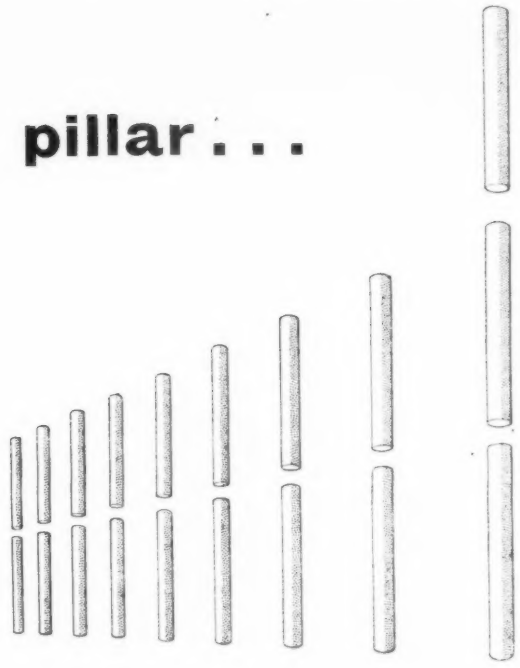

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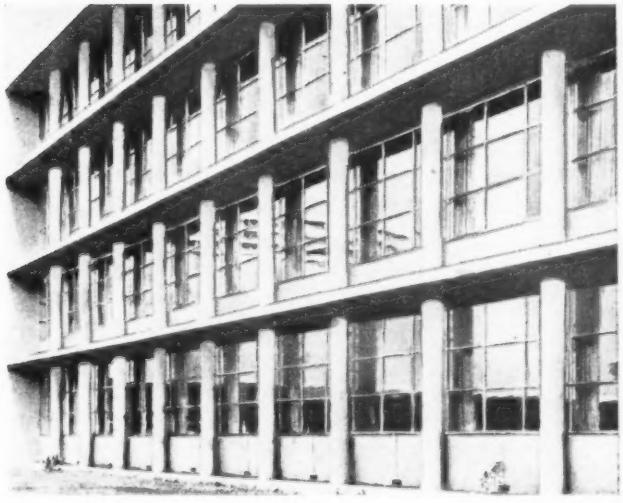

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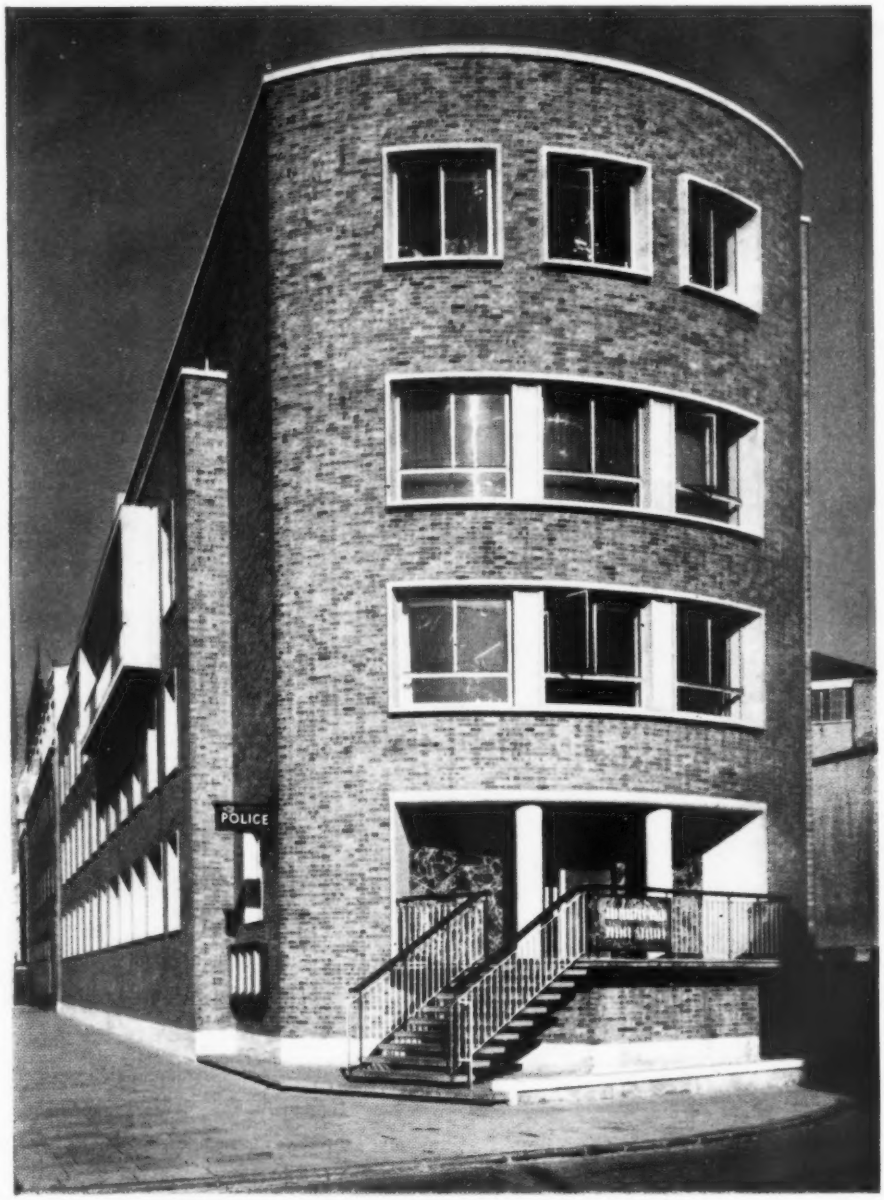

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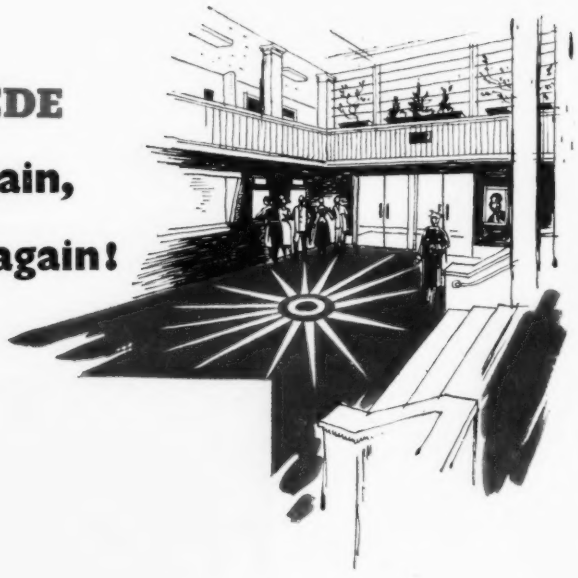

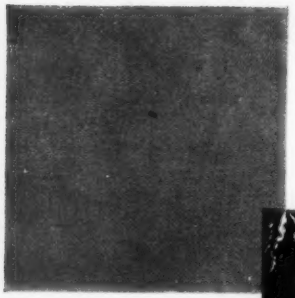

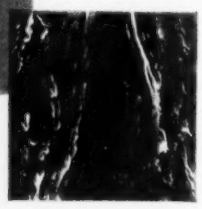

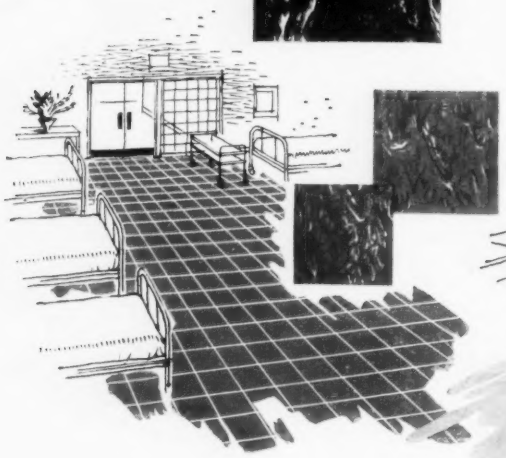

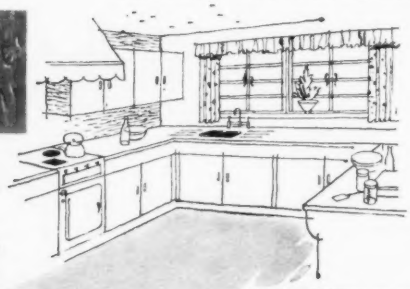

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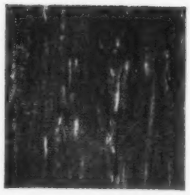

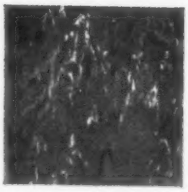

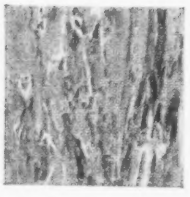

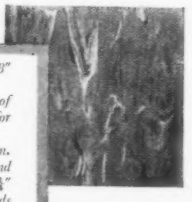

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NOT QUITE ARCHITECTURE

BUILDING FOR CLIMBERS

(*Mountain—not Social*)

The recently published schemes for University buildings make one wonder whether all the clients' (*i.e.*, students') requirements are being properly met. If architects have a vocational sport it would appear (from a casual reading of the gossip columns of the professional journals) to be sailing. If only it were rock climbing! What a rich architectural style would have emerged.

*

However, undergraduates do climb and this is a guide to the features they would welcome in their buildings.

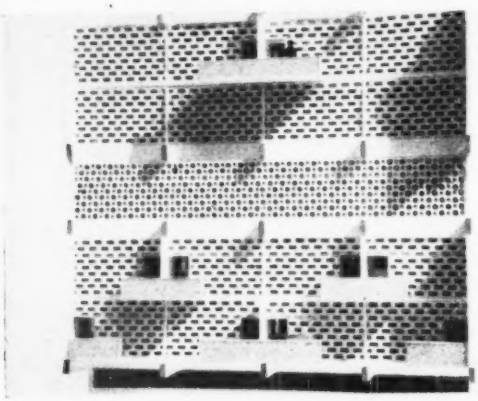
*

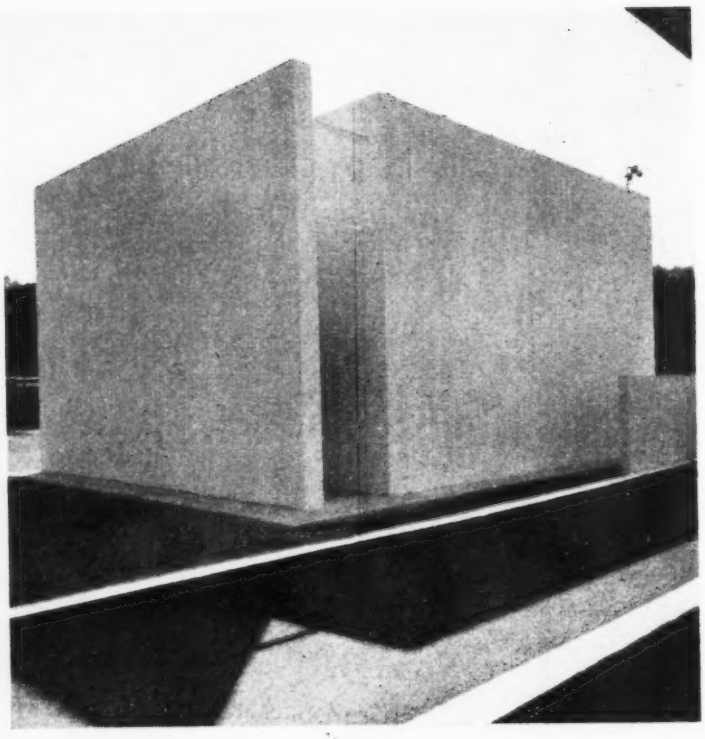
1. *Vertical Ascents:* Rainwater pipes must be at least half an inch from the wall, so that the climber can get his fingers round. The difficulty then depends on other features, such at the length and diameter of the pipe, its proximity to a corner, the surface of the wall, and the availability of resting places. The architect should provide several downpipes of varying standards of difficulty. If the pipe finishes below the top of the wall a large rainwater head should be provided. Pipes in or near a corner can often be climbed by layback* or, if the gap between the pipe and the corner is just right, by jamming hands and feet, and in these cases the pipe may be fixed tight against the wall.

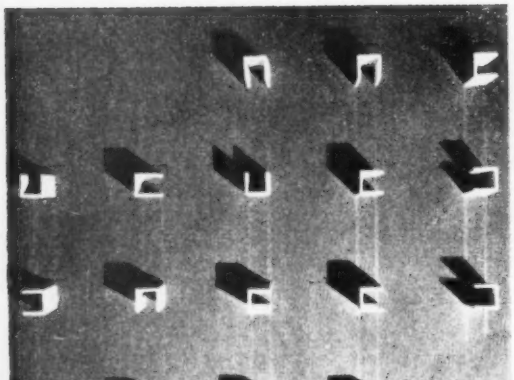
*

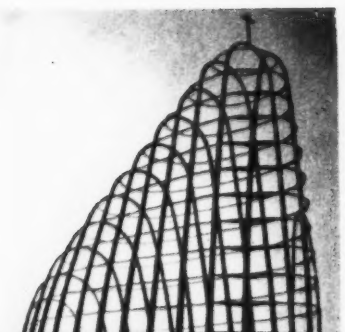
2. *Chimneys:* A "chimney," in climbing parlance, occurs when two parallel walls face each other. It should be between 1 ft. 6 in. and 4 ft. in width, and is climbed by wriggling up or straddling the gap and levering oneself upwards. Obviously the friction is of utmost importance; the smoother the walls the harder the climb. Pebble dash should not be used, as the pebbles tend to come out when any pressure is applied, and act as ball-bearings between the climber and the wall.

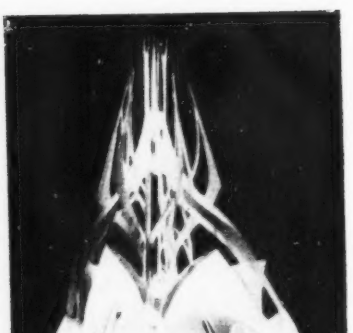
* Climbing a pipe by layback means that the climber stands with the pipe between himself and the corner, holds on to the pipe, and leans away from it. He then puts his feet on the opposite wall, below the level of his hands. By moving his feet and hands gradually upwards, he is able to "walk" up the opposite wall.











Top, left, projected office block by R. K. Chadirji (Irak); top, right, exhibition pavilion by Ahlgren, Olsson and Silow (Sweden); above, house structure by Hanford Yang (USA); below, warped slab by Gunther Gunshel (Germany); right, ovoid basilica by Andrault and Parat (France); far right, unplaced Syracuse competition entry by Alain Bourbonnais (France).

Blinkers In The Rue Bartholdi

The October issue of the influential Paris architectural magazine *Architecture d'Aujourd'hui* was devoted entirely to the work of younger architects all over the world, ranging from actual buildings by recently established masters like Paul Rudolph and Harry Seidler, to the excitable imaginings and uncompromising purities of the newly-qualified—but including nothing at all from Great Britain. There are a number of possible explanations for this startling omission: *Architecture d'Aujourd'hui* is closely linked to the aesthetic doctrines of *Groupe Espace*, with which many younger English architects have a quarrel that goes back some years now; it is also closely linked to the French CIAM group, and the same younger architects may be in bad odour for their part in wrecking the old CIAM organization. Perhaps our younger architects are just not good enough—but even if we have no-one in the Rudolph-Seidler class, any average fifth year exhibition at one of our progressive architecture schools could produce work of the quality of the projects and buildings reproduced above. Or perhaps *Architecture d'Aujourd'hui* no longer has a London correspondent? At all events, the drawing on the left, taken from the top of one of the editorial pages of the September issue, seems to give a fair picture of the outlook of the Rue Bartholdi, an outlook that does little credit to a magazine of international standing, and little service to that international interchange of ideas for which Paris is the traditional clearing house.

3. *Cracks:* Vertical cracks, of varying widths from 2 in. upwards and at least 4 in. deep, should be provided.* Thin cracks are deplorably absent from most buildings at present, and it is to be hoped that in future architects will see that they are provided or that they arise within a reasonable time after completion.

*

4. *Irregularities:* Sometimes on the corners of a building, alternate courses of brick or stone are made to project beyond the rest. These give an easy route up, or perhaps a pleasant way down. A judicious sprinkling of these bricks on a bare wall would undoubtedly give a very pleasant climb.

*

5. *Traverses.* A traverse is a horizontal climb across the wall of a building. If a narrow ledge is provided a hand traverse can be made. The climber hangs on with his fingers and works his way along the ledge; the difficulty depends mainly on the distance between resting places. The ledge may be walked, for variety, if handholds are available a few feet above—or walked without handholds if the ledge is more than 5 in. wide.

*

6. *Belays:* On exposed hard climbs many climbers prefer to be roped and a "belay" for fixing the rope at the top of the climb is desirable. Collars on downpipes, ornamental projections, lightning conductors, chimney stacks, balustrades or railings fulfil this purpose. A window is not sufficient since it may not be assumed that the climber is known to the inhabitants of the building, and to enter a building through its upper windows is to risk prosecution.

*

7. *Wall Climbs:* A wall is climbed using several or all of the above methods. The imaginative architect should be able to provide a large number of interesting routes, with many standards of difficulty. It is not, unfortunately, possible to give an accurate grading of the above types of climb, since they depend so much on individual conditions. Different people will give a different grading to the same climb. A climb that is easy on a calm, dry day may be very hard with wind or icy conditions to contend with. The hardest part of a chimney climb, for instance, may occur, not in the chimney itself but on entering or leaving it, and the architect should not be too lenient here. However, a word of caution: there is little fun to be gained in starting a climb which leads nowhere, and some sort of finish should be available. A fairly flat roof is useful, and large eaves should be avoided, unless good handholds are provided to assist the climber past them.

*

A final note. Make your aids to climbing as strong as possible. Rainwater pipes have a tendency to work loose with repeated use, and can be dangerous; and nothing makes a climber look sillier than to drop 50 ft., clutching in his hands a large pipe or gutter or a particularly malevolent gargoyle.

ANTHONY BAYES

* Cracks may be climbed in a similar way to pipes, and may also often be climbed by the "jamming" method.

REFERENCE: *The Night Climbers of Cambridge*, by "Whipplesnaith," published by Chatto and Windus.

The Editors

A NEW ROLE FOR THE BUILDING CENTRE

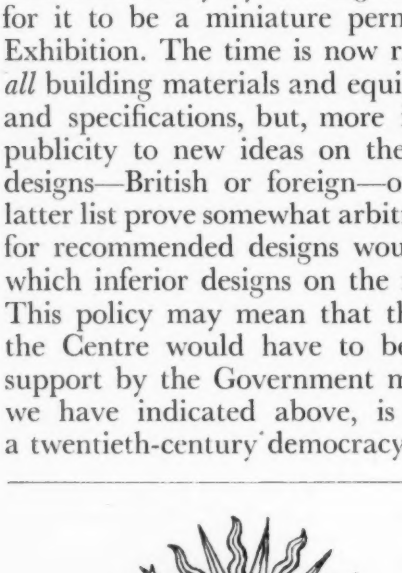
THE lesson we have all learnt from the Sputnik is that while competitive private enterprise, working in a partially free economy can give some nations a very high standard of living and scientific achievement, the rigidly controlled economy can, by totalitarian methods, rapidly overhaul the achievements of the free economy by undertaking selected, limited aims and concentrating all available brain-power and manpower to those purposes.

Western democracies may be repelled by the loss of personal liberty involved in such measures, but they are fast realizing that competitive economics can be very wasteful in labour and materials—that cut-throat competition can be just that. . . . There are, it would seem, two ways of improving standards in a free economy: by raising the quality of education and by speeding up the competitive marketing process. The first method is inevitably a very slow one, but the second can have more immediate results. We believe that there are simple steps which can be taken to improve the quality of products manufactured by private enterprise in addition to passing complicated legislation to deal with the evils of monopolies and so forth. One of the most important of such steps is the setting up of consumer advisory bodies. One of the first of such bodies, in a limited way, was the Council of Industrial Design. Recently two other bodies, one privately run, one a part of the British Standards Institute, have started giving advice on how to obtain value for money in household purchases.

We believe that this type of advisory service is entirely beneficial and should be greatly enlarged and developed. It is the simplest method by which good products can be publicized and therefore the effect of competition on the whole marketing system accelerated. But if it is important for the housewife, whose individual purchases are, in the main, small, relatively inexpensive items such as clothing, foodstuffs and household sundries, how much more important would be such a service to the building industry, where architects and builders are responsible for the purchase of vastly more expensive items. It is easy to say that professional training and experience soon equip a man to accept this responsibility. This may have been true once, but it is hardly true today. The reason is simple: the number of different buildings which a man designs in a lifetime has not changed significantly, but the number of materials, and the variety of equipment which can be put into each building has multiplied enormously. In other words, the choice put before the architect has increased greatly but the number of opportunities to experiment has remained constant. It is obviously, therefore, best to avoid having architects learning "the hard way" through "practical experience," which normally means at other peoples' expense. It was partly to meet this situation that the British Standards Institute and the Building Research Station evolved, but their influence on the manufacturers of building materials and

equipment, though fairly sure, is slow.

What is needed is an accelerator of professional experience. This could be achieved by a body composed of architects and engineers who would select material on the basis of performance, appearance and value for money (with equal emphasis on each attribute, not, as we suspect with the COID, putting appearance first) and who would publicize their choice. The body to undertake this would logically seem to be the Building Centre. The first in its field, and the pattern on which the world famous Boncentram in Holland has been modelled, the Centre should, we suggest, celebrate its twenty-fifth anniversary by revising its aims. It is no longer sufficient for it to be a miniature permanent version of the Building Exhibition. The time is now ripe for it to record and exhibit *all* building materials and equipment—showing samples, prices and specifications, but, more important still, to give special publicity to new ideas on the one hand, and proven sound designs—British or foreign—on the other. No matter if the latter list prove somewhat arbitrary. The effect of such publicity for recommended designs would be to accelerate the rate at which inferior designs on the market were replaced by good. This policy may mean that the present method of financing the Centre would have to be adapted, and some financial support by the Government might be necessary, but that, as we have indicated above, is probably an essential task of a twentieth-century democracy.



TERRACES REPRIEVED?

Mr. Butler's statement to the House that the Nash terraces are less likely to be destroyed than public opinion imagines, and his readiness to listen to M.P.s before any final decision is taken, are certainly reassuring as far as they go. ASTRAGAL has also heard, from what diplomatic correspondents would call "a high and reliable source," that the terraces are not going to be destroyed. It remains to be seen, however, what this really means. Mr. Butler did not say "all." The Gorell Committee in 1947 recommended that of the 24 groups of houses forming the "Nash terraces" at least seven should be preserved "at all costs"—Chester, Cornwall, Cumberland and Hanover Terraces, Park Crescent, York Gate and Sussex Place. But this was the committee's last ditch, the point beyond which it would not retreat: in fact, it wanted to preserve the lot. It looks as if we may be in, not for a controversy on the complete destruction of the terraces, but an argument about the merits of individual terraces, and the problem of their replacement. But why must these battles be fought afresh every ten years?

IMPACTED WISDOM

Fort Worth, the Texan city where "wheels and legs are kept separate," and the mechanized beings are to be driven underground, leaving the human ones to enjoy fresh air and exercise in safety above, is a place to give all planners a lift of unaccustomed optimism. And optimism was certainly the keynote of a talk about Fort Worth by its architect, Vienna-born Victor Gruen, at the Stationers' Hall in the City of London last week.

*

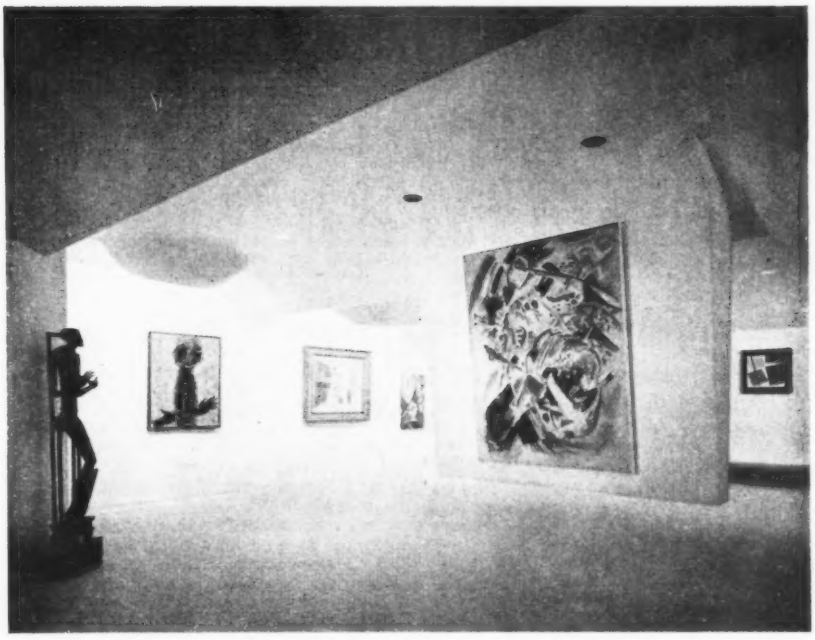
Apart from Mr. Gruen's hopeful disposition and witty tongue—he produced a new definition of Subtopia by saying the countryside is becoming "infested with Bacillus technologicus"—there is food for optimism in the fact that Fort Worth today has begun on a 15-year-plan for refashioning itself with all wheeled traffic going underground, and has found the ways to win local officialdom, population and business interests for the scheme, and the means to pay for it, despite the fact that, as Mr. Gruen remarked, "Five years ago 'Planning' was a dirty word in America—as dirty as "Communism'."

*

Mr. Gruen had been caught in transit, returning to Texas from his annual visit to Vienna, to talk about Fort Worth to an advisory group of consultants recently formed under the title of IMPACT (it stands for Industrial-Municipal Planning and Co-ordination of Technologies—or maybe the polysyllables came after the initials were thought of). They have worked together before, on the High Paddington proposal and the New Barbican plan, and the fact that Fort Worth *is* a fact as well as a plan evidently gave everybody new heart to continue the struggle for planned development, to end the decay of town centres and release the traffic jams. They peppered Mr. Gruen with questions, from "where does the money come from?" to "how does one carry home the shopping?" And Sir William Holford, speaking up as a distinguished visitor, expressed how much interested they all had been.

*

The City of London Plan, Sir William pointed out, had many of the same ideas as those for Fort Worth, though their appearance might be different, but he was pessimistic about "democracy" ever allowing them to become reality. Mr. Gruen had only one answer to that: "Optimism."



The newly-completed World House Gallery and some explanations in "Brutalist-type handwriting." See note below.

THIS WAS TOMORROW

Perhaps the Amiable Young Men who decided, against powerful advice, to call their exhibition at Whitechapel *This is Tomorrow* were right after all. Now that tomorrow is here, *Architectural Forum* has pictures of the newly-completed World House Gallery in New York, complete with non-upright walls, wavy ceilings, trick lighting, abstract paintings, and other Whitechapel gimmicks, including an explanatory text in the designer's own Brutalist-type handwriting. The main advance on Whitechapel is that it all appears to be well and expensively detailed, and the materials are very plushy.

*

What struck my Scholarly Spy as ironical—and more than ironical after he had looked up dates and facts in the good books—is that the designer is Frederick Kiesler, who says in his blurb that (among other things) "A new æsthetic unfolds its wings, freed from the Prison of the Grid." My SS writes: "It appears to be an historical fact that the man who shut up exhibition design in the prison of the grid in the first place was one Frederik Kiesler, member of *de Stijl*, whose 1924 theatre exhibition in Austria, later seen at the Paris exhibition of 1925, was the first exhibition structure based on those rectangular space grids that have later become so routine and tedious. So a wheel has come full circle with a vengeance, though one cannot help feeling that the *amende* might have been more *honorable* if Kiesler had admitted responsibility for the original incarceration."

WHAT TOP PEOPLE SIT UPON

More than one early visitor to the Arts and Crafts Exhibition Society's show at the Victoria and Albert must have been momentarily caught out, as ASTRAGAL was, by a set of five chairs, unlabelled and uncatalogued, plain, straightforward in design, but noticeably worn and battered. An historic set of Gimsons, perhaps? A recently discovered suite of . . . and then realisation dawned—standard MoW issue chairs, not exhibits, but for the Princess and the other top people to sit on at the opening ceremony.

*

The mistake has a moral, for these humble sitting machines were practically the only objects in the whole crowded, but well-arranged, room that were free from an insufferable artiness that varied in style from the pseudo-mediæval to the sub-Espresso; they showed just how low handicraft work has fallen in design and conception today. Nevertheless, those exhibits that were handicraft-made for sound economic reasons, like the keyboard instruments by Goble, Dolmetsch and Clark and the violin bows by Bultitude, were mostly impeccable and in some cases superlative, and showed up the rest of the objects on view.

*

It is clear that what the handicraft business in England needs today is not higher standards of workmanship, but higher standards of intellectual and economic realism. These highly sophisticated people really must stop playing at peasants, artificially imitating the accidents of incompetence. If they offered instead those qualities which it is uneconomic to build into mass-produced consumer goods—notably high finish and absolutely hairline precision—many people, including ASTRAGAL, would be prepared to take them much more seriously.

CAPITOL CONVERSION

It seems we are not the only country that has first-class, but half-muffled, architectural scandals. Quite apart from the continuing mutters from affronted Brazilian architects at Corb's attempt to muscle in on the design of their new dream-capital, Brasilia, there is an increasing undertone of rumblings from Washington about the long-proposed, long argued, long-opposed scheme to extend the Capitol there, by advancing its eastern façade just enough to spoil its relation to the dome above it.

*

As the committee, headed by the Capitol's architect, J. G. Stewart, finally put in an allegedly agreed report, advising that the refronting be done, sundry Congressmen were busy promoting bills to cut the ground from under the committee's feet by amending the law under which they were

operating, and the air was beginning to thicken with allegations, some of them more or less posthumous, that the agreed report was a fiction, that the views of some of its members are being grossly misrepresented, and that the proposed internal improvements, which were the justification of the rebuilding would be on the west side of the block anyhow.

POLY

Not every student publication presents its readers with a free paper doyley and bids them farewell with a genuine handcrafted kiss. For these uncommon courtesies ASTRAGAL would like to thank the editors of *Polygon 2* (though they might have been less determined to conceal the fact that it comes from the Regent Street Polytechnic). The kiss is printed on a sheet of ten-to-the-inch graph paper, and it can therefore be stated with some certainty that my copy contains just over one square inch of genuine old-style non-kissproof lipstick.

*

On the other hand, it is possible that this combination of indubitably-organic form with demonstrably-regular rectangular geometry may have some connection with the last article in *Polygon 2*, which—if I read it aright—is a plea for a sort of split-level architectural æsthetic, for modular grids controlling everything standardized, and roly-poly organic shapes (the New Bowellism, is the term suggested) for unique one-offs and public buildings. But since this is a student publication where everything is possible and no holds are barred, why stick at only a two-way split (which is what the US has already, anyhow). Why not have as many æsthetics as there are building types?

*

And what happens if the bulk of your standardized accommodation is in Fuller domes, or moulded fibreglass shells? The purely visual attractions of a neat two-form system are obvious enough, and have been exploited by Corb since goodness knows when, and by the Woods at Bath before him, but is it enough for our present needs and is it *good* enough for our future needs?

ASTRAGAL

LETTERS

R. V. Trigg, L.R.I.B.A.

John Voelcker, A.R.I.B.A.

Peter L. Clark, A.R.I.B.A.
Lecturer in Building, Nottingham and District Technical College

Thomas A. Markus, A.R.I.B.A.

J. M. Austin-Smith

Representation

SIR,—Having read the collective opinions of local government architects in your issues of October 24 and 31 respectively, I feel that these reactions to Richard Sheppard's open letter are no contributions to the spirit of his proposals, but are an illustration of an ill-informed appraisal based on a narrow outlook.

There is an obvious economic necessity for all LGO's to improve their status and monetary reward for the services they carry out for the community. Architects and members of other professions employed in this capacity are dependent at the moment on two sources of representation to achieve improvement: their professional body and their Trade Union. The former, for a variety of reasons, is unable to provide effective support—and thus the whole responsibility for the present salaries and conditions of service and all future improvements rests with the latter.

It is therefore interesting to read that "NALGO does not effectively represent the architectural profession in its negotiations with the National Joint Council and is indeed never likely to do so." Very true; NALGO is fully occupied in representing local government officers (of whom a small minority are architects) with the unselfish support of "a large preponderance of clerical and administrative officer members" whose "long and sustained effort" is acknowledged by Mr. Sheppard.

It is suggested that the financial aspirations and professional recognition of the local government architect would best be served by:

(*a*) The formation of a vigorous society to work wholeheartedly with and not against NALGO.

(*b*) The direct assistance given to NALGO by architects at local, district and national level.

The Association would benefit from their interest and active support, and perhaps in due course the closer contact with members at all levels from all departments would ensure that a statement such as "the status and respect rightly due to architects is to be maintained" would offend their sense of decency as strongly as it did mine.

R. V. TRIGG.

Northampton.

Rushbrooke Housing

SIR,—In reply to "Functionalist's" queries and criticisms, published on October 24.

(1) A door should certainly have been provided between the kitchen and the passage leading to bathroom and bedrooms.

(2) Orientation; the bedroom spine runs from north to south with a maximum variation of 15 degrees to east or west. This variation is useful in arranging the group of houses to suit the configurations of a particular site. I agree that the alternation between east and west is not entirely satisfactory—the difference should be reflected in the plans of east-side and west-side houses, but for simplicity I kept the same plan while making sure that the courts got plenty of sun.

(3) Overlooking; possibly it was not clear from the plan published, but the large bedroom always looks into the court of the same house and the other bedrooms (one or two) look on to public ground. Within the limits of one-, two-, and three-bedroom houses it is always possible to arrange the sequence of houses in such a way that they do not overlook each other's courts.

JOHN VOELCKER.

London.

Education For Builders

SIR,—Will you please clarify the following points which have arisen from the article by Alan Tate, "Education for Builders," published on September 19?

He states that the Higher National Diploma is equivalent to the Higher National Certificate and later quotes questions from an HND examination paper set in 1957 for part-time *day* students.

The student with Ordinary National Certificate may either proceed to an HNC course, which is usually three evenings or one day per week for two years, or to an HND course comprising three years' full time study, or a Sandwich type course of four years' duration (*ie.*, six months in industry, six months at college each year). A far greater variety of subjects are studied and a much higher standard attained on the HND courses, and perhaps this can best be illustrated by a comparison of hours.

HND — 3,000 hours plus.
HNC — 430 hours approx.

Hardly equivalent.

Concerning the second point: which educational establishments run an HND course for part-time students?

It would be in the best interests of students and prospective employers for a suitable distinction to be made between the two qualifications.

PETER L. CLARK.

Leicester.

Alan Tate, the author, is abroad, so we showed Mr. Clark's letter to a spokesman of the Institute of Builders, who makes the following comments.

1. The Higher National Diploma is considerably higher in standard than the Higher National Certificate. The latter, by virtue of the time factor—that is to say, the average student would have only three evenings per week for 2½ hours per evening in which to study the subjects—is to a very large extent narrowly vocational in outlook. The full-time course offered for the Diploma permits some study of background subjects; and a very much broader approach results. In addition, where the full-time course is of the sandwich type it cannot be argued that the full-time course has no element of practical experience which is very helpful in the part-time course. In short, the point made by Mr. Clark is a correct one. The point made by Mr. Tate cannot be said to be correct.

I should welcome an opportunity to show you typical syllabuses of these courses and I am sure it will become immediately evident to you.

2. I think there must be a misprint so far as the statement that an HND examination paper was set for part-time day students.

The Diploma implies full-time or full-time sandwich. It is the Certificate which is taken by part-time day or part-time evening students.

Cladding Skyscrapers

SIR,—Your leader of November 14 pinpoints issues which Sir Howard Robertson raises by implication in his letter. Whilst it is unfortunately true, as you say, that our knowledge of the functional performance of curtain walling is far from adequate for a dogmatic judgment, it is sufficient to show Sir Howard's argument for what it is—rationalisation of private taste. There is only space for the briefest replies to his 11 points; but first the initial confusion which he introduces must be pointed out. Arguing that "the all glass front" in American offices is on the way out, he qualifies this by saying that it is ". . . in reality only about 50 per cent. glass owing to fire regulations." Throughout his letter it is difficult to decide whether his points refer to windows, to spandrel panels, or to both. I will take each of Sir Howard's points in turn:

1. *The load on the air-conditioning for both heating and cooling is found to be excessive and uneconomic.*

This is only so when the balance between window orientations on various elevations has not been achieved. Thus, south facing walls can act as solar collecting surfaces for heating north-facing rooms. Implicit in the idea of the glass curtain is the use of such devices as special glasses, shades and blinds against heat build-up and double glazing against heat loss: these are not "remedies" but an integral part of the glass curtain.

2. *The heat resisting glass reduces summer heat, but correspondingly cuts down the benefits of solar warmth in winter.*

This is not necessarily so. It must be remembered that unwanted summer heat and wanted winter heat are coming from different directions. Thus the American Society of Heating and Air Conditioning Engineers' Guild shows that in New York latitudes the east and west elevations present the most serious summer problems as the sun is striking from low altitudes, screens are of little use, and there is little reflection loss from the glass. South elevations present less problems as the sun is striking from a greater height and can be screened by shallow overhangs. Thus, in these latitudes ordinary glass with overhangs on south elevations, and heat absorbing glass on east and west elevations, will make the most of both conditions.

3. *The next logical step, already in application on lower structures, is the use of sun louvres, of various degrees of complication, requiring maintenance and adding to initial cost.*

There must be few buildings in New York, even of "traditional" construction and with small windows, which do not need such devices somewhere and at some seasons, and the increased amount of them which larger windows demand is not in proportion to the extra area (*e.g.*, a remote control device for a blind 6 ft. high by 6 ft. wide does not cost twice as much as for a window 6 ft. high and 3 ft. wide). The savings made by a properly designed curtain wall more than pay for these devices.

4. *The "all-glass" fronts, having attractive possibilities in the country (views, etc.), seem in the cities to demand extensive use of venetian blinds, behind which electric light is burning, thus adding a fresh source of heat. Otherwise the glare, at certain phases of the year, is terrific.*

To reduce glare it is not, of course, necessary to cut out daylight, but only to diffuse it (by using special glasses or blinds), to redirect it upwards (by using prismatic glass or adjustable venetian blinds) or to reduce it (by using neutral, grey or obscuring glass). Such diffusing, redirecting or reducing as may be necessary should not of itself require the burning of electric light.

5. *The thin curtain walling is at least as expensive as masonry, and if the added cost of an excess loaded air-condition is added, is often more expensive.*

For reasons given above, there is no reason why a thin curtain wall with proper insulation should place a greater air conditioning load on the plant than a thick masonry one. The enormous saving in dead weight (reduced structure and foundation) and the speed of erection of curtain walls more than make up for their extra cost per sq. ft. on savings in floor area (see 10 below).

6. *The maintenance of glass and metal façades can be very high, the various mastics and jointings requiring frequent attention and sometimes replacement.*

Glass itself is unique among building materials in requiring no maintenance: it is the maintenance of the frame which is expensive. Developments are now on foot to reduce this (permanent aluminium finishes, vitreous enamelled aluminium, cladding panels incorporating their own framing which is concealed behind the front skin). The use of motor-car type glazing extrusions, as in Saarinen's General Motors buildings, or patent glazing techniques, or rubber-like mastics, should make for long-life joints with relatively easy replacement. A stone building also needs maintenance—usually rather more than it gets.

7. *Such façades only look well if constantly cleaned. I was informed at the all-glass Manufacturers Trust Bank building in Fifth Avenue that its façades are washed every day.*

Yes, but as you point out in your leader, properly designed overhead rails, platforms and cradles make this little more expensive than window cleaning on a traditional building. But the finished product, a clean curtain wall, is something immeasurably more appealing than a clean stone building: it is a new conception of pristine sophistication. The price you pay is accepted as the price of permanent freshness.

8. *Excess of glass often gives rise to unhappy and distorted reflections from neighbouring buildings* (e.g., *No.* 450, *Park Avenue*).

This need not happen; but in any event some people like it.

9. *A building such as the Fifth Avenue Bank only looks really interesting when the totally luminous ceiling is lit up. These lights are on all day and in the evening, and the effect is charming. But it is a form of advertising expense which is scarcely possible for us here, at any rate on a large scale.*

The success of other glass-fronted buildings which do not have the luminous ceiling of the Manufacturers Trust Bank suggests that this device, fine as it is, is not essential. On this point of advertising it is surely evident that signs incorporated in the curtain and designed as part of it will have a longer life and will look better than neon advertising "stuck on" store façades.

10. *The curtain wall buildings mostly have columns projecting internally, or free-standing internally back of the glazing. These columns encumber the floors and waste space. Where the column is placed externally (Inland Steel Building, etc.) the loads are eccentric, the construction more expensive, and if there is a building line, the lettable "envelope" is reduced by the sacrifice of external space.*

Sir Howard's solution to this problem is, apparently, to flush up the columns on both sides with a thick wall, and thus make certain of giving no increased unencumbered floor space or lettable area. No: thin walls, be they eccentric or not, reduce the load on the columns sufficiently to allow the column dimensions to be reduced too. Internally projecting columns do encumber floor space, but the space left between them is, nevertheless, valuable—especially if partitions are properly related to columns.

11. *The window problem of these buildings is still unsolved. We have better windows, incorporating blinds, available now on the English market, with others to follow.*

It is not easy to see what Sir Howard means. Certainly our windows leave much to be desired in detailing; but we must in any case *use* windows and we have no option but to insist on getting better ones.

It is not "functional and technical analysis" which has swayed Sir Howard, but emotional prejudice. Against this there is no argument. But one would have thought that the increasing adoption of glass curtain walling by the leading American office architects and by large industrial and commercial corporations at least speaks for its economics. The manager of the Manufacturers Trust Bank, at the Conference on glass held by the Washington Building Research Institute last November, showed clearly the effect of his building on his business; he was apparently sufficiently convincing for at least two other major banks to follow suit. One can only wish that those British commercial giants who try to put the architectural clock back could be convinced that their buildings are a definite debit item.

THOMAS A. MARKUS.

St. Helens.

CRITICISM: *On November 7 we published an article by J. M. Richards on the Ministry of Pensions building at Twickenham. Last week the MOW architect in charge of the job, E. H. Banks, replied. Below is a letter about the building from J. M. Austin-Smith, F.R.I.B.A.*

I have read with interest the criticism by J. M. Richards of the Office Building at Twickenham, designed by the Chief Architect's Department of the Ministry of Works. I am very largely in agreement with both his praise and his criticism of the building, though one aspect which I feel to be important does not appear to have been fully dealt with by Mr. Richards.

I refer to the manner in which the single-storey mass wraps itself around one corner of the tall block. Mr. Richards generously refers to this low part of the building as a "single-storey wing." That, unfortunately, is just what it is not, which is a great pity, since a clearly defined single-storey wing properly articulated to the main block would have been infinitely preferable to the wrap-around technique which has been employed.

The fundamental fault surely lies in the planning. It would be fallacious to criticize the plan in detail, since I am unaware of all the factors involved. Nevertheless, within any given set of conditions it is possible to produce a clean, tidy plan, or one that is scrappy and pieced together. I feel that the ground floor plan of the office building at Twickenham falls into the second category. Undoubtedly it fulfils all its requirements, but it gives the appearance of having been produced by tacking on one unit to the next.

This, surely, is a very early stage in the development of a plan, and very considerable refinement is required so that a precise statement can be made by the building and not the unfortunate conglomeration which the present plan brings about.

J. M. AUSTIN-SMITH

NEWS

OLYMPIA

Building Exhibition Opened

The building industry of Great Britain has magnificent achievements to be proud of, said Henry Brooke, the Minister of Housing and Local Government, when he opened the Building Exhibition at Olympia last week. This did credit to all, from designers down to craftsmen, he continued, and he was sure that knowledge existed in Britain to enable us to show the world that we could build better than anyone else. Nevertheless, he gave those three familiar reasons why the building time was faster in the United States than here: 1. There was more preplanning, which enabled the contractor to start the job with all the architect's drawings in his possession. 2. There was a correlation between the size and speed of a contract—on the bigger contracts—and there were more of them—progress was quicker. 3. There was greater standardization of building techniques and greater use of mechanical equipment. He also said that he had become more than ever conscious of the tensions that existed in every aspect of life between the forces of tradition and change—particularly in the fields of architecture, building and planning. He was sure new methods of building were coming in.

Kenneth M. B. Cross, P.R.I.B.A., who took the chair at the opening ceremony, announced that the Queen had agreed to act as Patron of the exhibition, which was the fiftieth to be held at Olympia and the largest ever. Referring to the exhibition, he said that the same *desiderata* on information and on presentation applied to exhibition stands as to technical literature. L. A. Walden, president of the NFBTE, and J. H. Mills, president of the NFBTO, who proposed and seconded the vote of thanks to the Minister, both expressed concern lest the current financial restrictions lead to unemployment.

The exhibition will be reviewed fully in next week's JOURNAL. A superficial inspection showed that there were no startlingly new features, but that the standard of exhibits and of exhibition stands was noticeably higher than in previous years, and the attempts to sectionalize the halls under types of subject shown were, if only very slightly, bearing fruit.

HOUSING DEBATE

A 20 Per Cent. Cut

The government aims to reduce the housing programme of local authorities and new towns in England and Wales to 100,000 a year by 1959-60, and to 20,000 a year in Scotland. These figures were given to the House of Commons in last week's debate on housing, and carry rather further the earlier announcement by the Chancellor of the Exchequer that the housing programme would be reduced by 20 per cent. The output of houses by local authorities and new towns is likely to be about 140,000 houses in the current year, so that the cut is likely to be rather more severe than 20 per cent.

G. R. Mitchison opened the debate with a sharp criticism of the government's twin policies, the elimination of the general needs subsidy and the increase in interest rates, which are now 6¼ per cent. on local loans. The slum clearance campaign, he said, was not going too fast. The MOHLG had anticipated that 60,000 houses a year would be clear, but clearances were only running at 40,000 a year. On the assumption that the local authority housing programme would be cut to 117,000 houses a year (17,000 more than the figure later announced by Mr. Brooke) in 1959-60 Mr. Mitchison calculated that after allowing for slum clearance, new towns and overspill there would be only 30,000 houses a year to relieve the general housing shortage. And this figure he contrasted with the waiting lists of 53,000 urgent cases in London, 100,000 in Glasgow and 35,000 in Liverpool. He also stressed the adverse effect of high interest charges in two ways: on the one hand the 2 per cent. rise in the bank rate would add £1 a week to the rent of each house; on the other, the need to replace low interest loans would cost Birmingham a 3d. rate, and Leeds a 5d. rate. James McInnes, who seconded the Labour motion regretting the lack of any positive proposals for dealing with the housing problem, drew similar contrasts between the housing programme in Scotland and his estimate of the number of slums at 200,000, the waiting lists at 300,000, and the overspill for Glasgow alone at 300,000.

Henry Brooke, the Minister of Housing and Local Government, opened by retorting that while the Labour Government had been satisfied with 200,000 houses a year, the government had surpassed its target of 300,000 every year since 1953. Housing had been given a special priority because of the grave situation when they took over, and had been absorbing from one fifth to one quarter of the total capital investment. Quite clearly this rate of housebuilding could not be needed forever. Although there was still a severe shortage in some places, over the country at large, local authorities had built enough houses to satisfy urgent needs, or were within sight of this. His aim was that in 1959-60 local authorities and new towns in England and Wales would complete 100,000 houses. He had no intention of limiting the freedom of local authorities to decide their own housing priorities in the light of local circumstances, although in some cases it might be necessary to set an overall limit on the number which a particular authority could put out to tender next year. To Mr. Mitchison's financial criticisms he replied that only one authority in seven was operating a differential rents scheme.

Private housing, he added, could not be exempt from the credit squeeze. He was not making any prophecy, but it might be that for the next few years building in England and Wales would be shared roughly half and half by private builders and public authorities. The government, he concluded, would not be content until everybody had a decent home of their own, and until all the slums were down. But when it was a question of putting a brake on new housing or letting inflation go unchecked the whole country would say that honest money must come first.

The opposition motion was rejected on a division.

ISE

New Beam Mill

A paper was presented to the Institution of Structural Engineers recently which described the new Dorman Long rolling mill at Lackenby and the range of sections with which it will deal.

The new mill is part of a £60 million expansion scheme and will be the most modern universal beam mill in the world. The beam sizes, ranging from 6 in. by 6 in. to 36 in. by 16½ in., have been chosen from the American range to be fully adequate but without too many sizes being included.

Experimental rolling will commence in 1958 and full production will be achieved as soon as the inevitable initial difficulties have been overcome. The advantages of the sections both as beams and columns are obvious and will be heartily welcomed by structural engineers. The price is not yet available, but the beams will be sold in competition with the existing BS Sections, there will be a saving in steel weight in the structure, and fabrication should be easier. It will not be possible for engineers to design on the basis of the new sections until full production is attained and there will undoubtedly be a short period during which substitutions may have to be made.

The Duke of Edinburgh leaving the Building Centre after making a thorough tour of the exhibits on the occasion of his first visit to the Centre. He is accompanied by Sir Giles Gilbert Scott, the president; Sir Alfred Hurst, the chairman (in the rear); and Frank Yerbury, the director of the Building Centre. This year is the twenty-fifth anniversary of the founding of the Centre.

RIBA

Dame Evelyn Sharp, Permanent Secretary to the MOHLG, has accepted the RIBA Council's nomination for election as an honorary associate.

Street Furniture Manual

The RIBA Council is to approach the Civic Trust—on the recommendation of its Town and Country Planning and Housing Committee—with a view to the production of an advisory manual on the design of street furniture.

Town Portrait

"Portrait of a Town" is the name of an exhibition to be shown at the RIBA's headquarters, 66, Portland Place, W.1, from December 12 to 23. It has been prepared by the Guildford School of Art.

DIARY

Architectural Aspirations. Talk by Michael Pattrick. At the AA, 34 Bedford Square, W.C.1. 8 p.m. NOVEMBER 27

Slum clearance. Talk by J. P. Macey. At the RICS, 12 Great George Street, S.W.1. 5.45 p.m. DECEMBER 2

Modular Furniture. Paper by John F. Hard (Managing Director of D. Meredew Ltd.). At the RSA, 6 John Adam Street, W.C.2 7.30 p.m. DECEMBER 5

Architectural and Building Requirements as Related to Atomic Energy. Talk by Sir John Cockcroft. At the RIBA, 66 Portland Place, W.1. 6 p.m. DECEMBER 10

MODULAR SOCIETY

The Practical Selection of Modular Sizes for Components

Speaking at a meeting of the Modular Society at the Royal Society of Arts on October 28, 1957, Anthony Williams, of the Modular Co-ordination Study Team at BSI, began by recapitulating the recent history of modular co-ordination in this country and by re-stating the five essentials of the subject. The first of these was the division of all building material into the categories of "materials," "components," and "functional elements" and the limiting of the scope of modular co-ordination to "components." The second was the selection of a basic module of 4 in. and acceptance of the fact that for the time being the brick size must remain much as it was. The third essential was the solution of the tolerance problem by the distinction between the "nominal" size of a component (which would be on the module) and the "actual" size, which would be the modular size less an allowance for the joint and for manufacturing tolerances. The fourth was the establishment of a modular reference system—in effect a module grid at 4 in. centres; and the fifth and last stage, which had only recently been reached, was that of determining a basic range of sizes from which the size of each standardized building component within the system would be selected.

Concerning this last stage, which formed the main subject of his talk, Anthony Williams referred to the original desire of the members of the EPA project on Modular Co-ordination to eliminate some of the thirty sizes which come in the range 0-120 in. and gave his view, (which was also that of the Scandinavian members) that all 4 in. multiples within this range should be retained.

He then considered the rules which should govern the selection of standard dimensions for "small components" (*i.e.* components up to about 32 in. wide). These should be selected on an empirical basis having regard first to the functional limits of a product's dimensions (Fig. 1). A room door could not be less than 24 in. or more than 36 in. wide. This would determine the limits of the range. Where, however, it was desired not to include all sizes within a range, and where components were customarily used in combination, a further criterion of selection could be applied. Namely, how many different modular spaces—see Fig. 2—could be filled by adding components together. If there was only a single modular width, the number of modular spaces filled up from 4 in. to 120 in. would depend upon the width. Thus, if a cabinet was 24 in. wide it would fill five spaces, if it was 20 in. wide it would fill six and if it was 16 in. wide it would fill seven. If, however, two sizes were included in the standard, the situation at once improved. If cabinets were 16 in. and 24 in. wide they would fill fourteen spaces, and if they were 20 in. and 24 in. they would fill twenty spaces. If a third size was added little was gained, however, and the speaker's conclusion was that components of this type should normally be made in two related sizes, that these would often be 4 in. apart, and that they should not have a Highest Common Factor of more than 4 in.

Components wider than about 32 in. were not susceptible to this treatment, said the speaker, and their sizes must be selected on the basis of the spaces required for each design. For this a modular grid might well be used, the most likely dimensions of which would be those multiples of 2, 3 and 5 which give sizes like 32 in., 40 in., 48 in., 64 in., 80 in., and 96 in. that have the maximum number of factors divisible by 4 in.

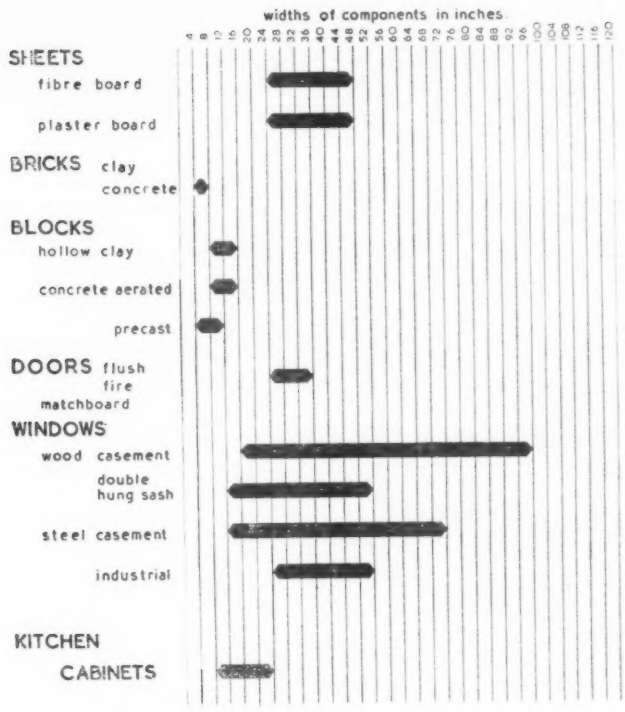


Fig. 1, chart showing the functional limits to the sizes of a selection of building components.

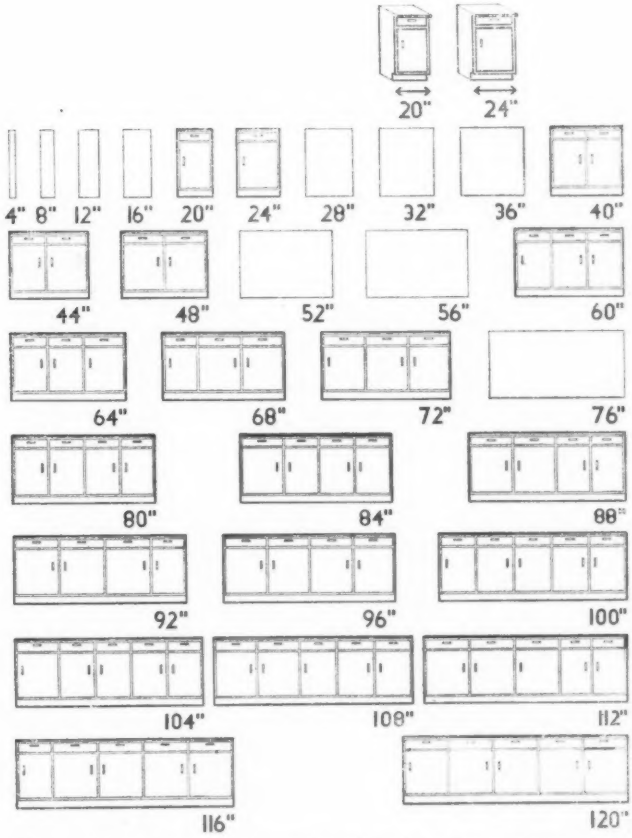


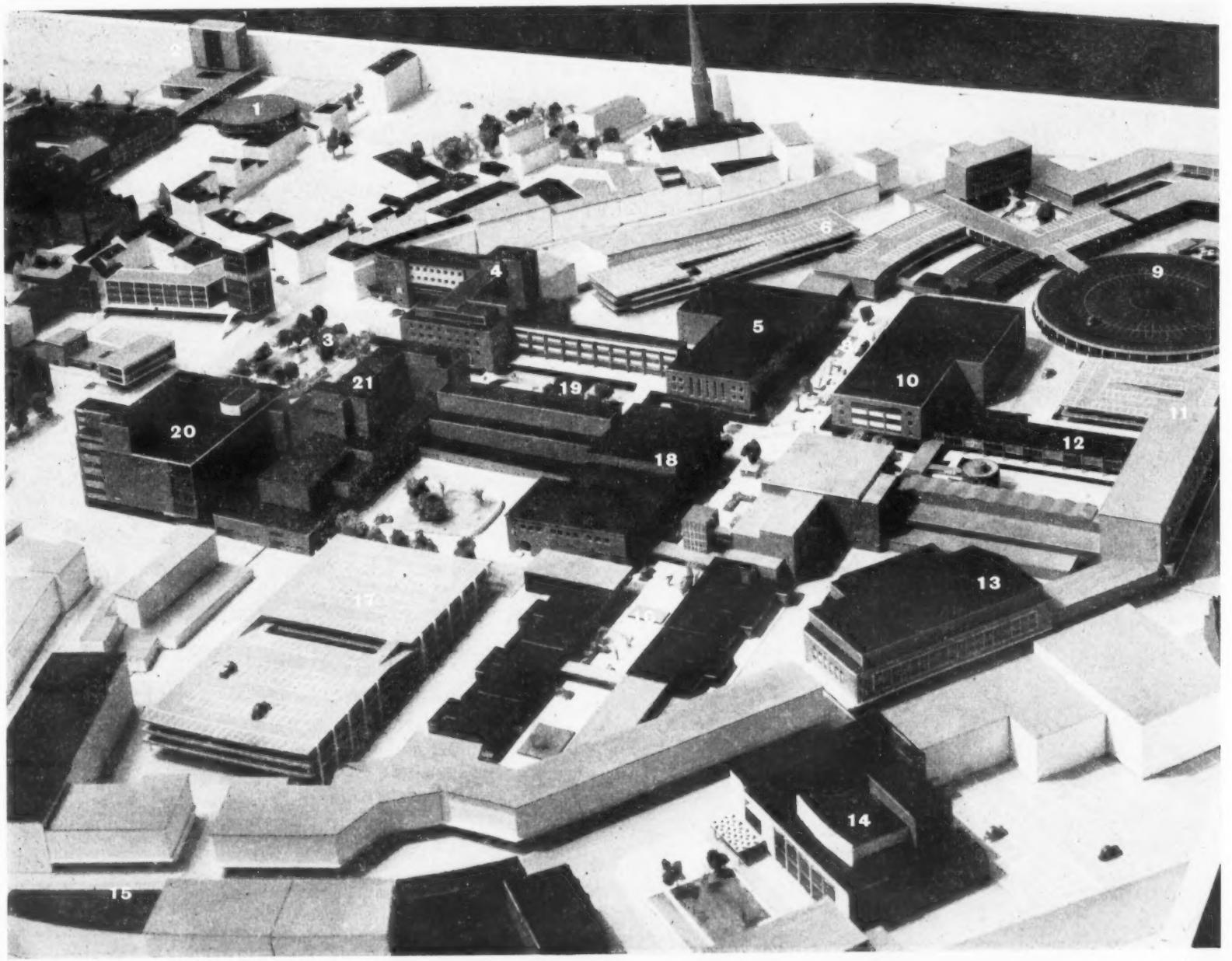
Fig. 2, diagram showing the number of modular spaces (20 out of a maximum of 30) between 4 in. and 120 in. which can be filled by two standard kitchen cabinet sizes 20 in. and 24 in. respectively.

THE LATEST PROPOSALS FOR COVENTRY'S CITY CENTRE

Further proposals which have been made for the central area of Coventry are incorporated in the model shown here. Some of the proposals have not yet been approved by the Corporation, but the general layout forms the basis for investigations and designs for specific projects. The picture below shows the civic area, seen from the north. The new cathedral can be seen in relation to the new college of art and technology—a group of buildings placed around a series of enclosed and partially enclosed areas. The picture opposite shows the commercial area, from the north. Note the pedestrian ways and also, at the rear of the shops, the multi-level car parks. The circular retail market, in the top right-hand corner, is now under construction. It will have a roof-top car park. Below this is a block of two-level shops which are due for completion early next year. The new civic theatre, in the foreground, is due to open early next year.

Points of interest about the scheme are as follows. A pedestrian way will link the cathedral with a small square east of Broadgate. The civic theatre will now face a newly-planned square, and this will provide a better setting, not only for the theatre but also for the new motor showrooms and the new offices of the local newspaper, "The Coventry Evening Telegraph," which are under construction. Opposite the existing Council House a processional way has been designed, incorporating an "above ground" civic hall. The recently-completed local government offices which face this processional way are to be extended to house the City Architect and Planning Department. (The planning staff, working under A. G. Ling, city architect and planning officer, include W. Burns, who is principal planning officer, and J. D. Spence, E. Wyn Thomas and J. F. N. Collins, planning officers.)

1. Local government offices
2. Law courts
3. Council house
4. Civic hall
5. Cathedral ruins
6. New cathedral
7. Multi-level car park
8. Swimming baths
9. College of art and technology
10. Library
11. Art gallery



Key

1. Civic hall
2. Law courts
3. Broadgate
4. Broadgate house
5. British Home Stores
6. Multi-level car park
7. Market square
8. Market way
9. Retail market with roof car park
10. Woolworth
11. Multi-level car park
12. Two-level shops
13. Co-op store
14. Civic theatre
15. Corporation street
16. Smithford way
17. Multi-level car park
18. Marks & Spencer
19. The precinct
20. Owen-Owen store
21. Hotel Leofric

Amersham High Street.

A HIGH STREET KEEPS IN KEEPING

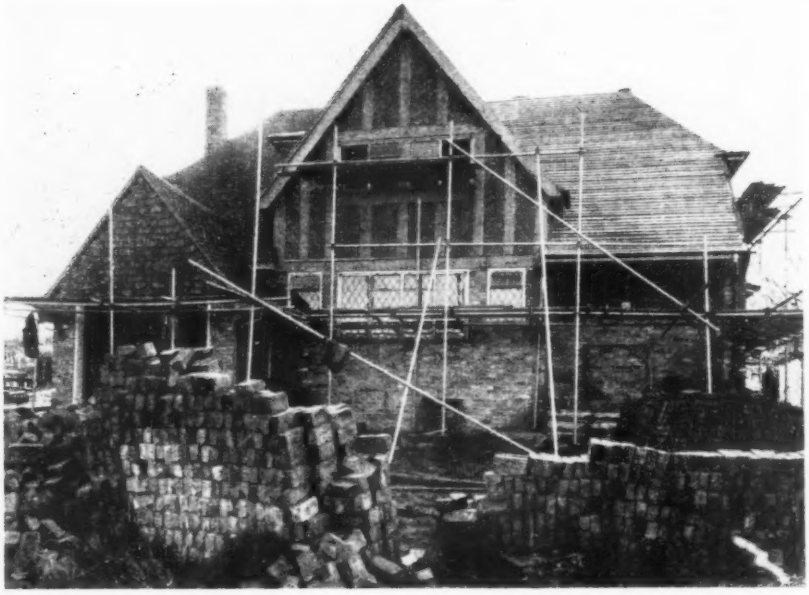
Amersham High Street is well-known as a visual delight. How natural it is, therefore, that the North Thames Gas Board chose to provide it with a noble foil. And who can be surprised that the Rural District Council objected to an "incongruous" single-storey house of good design, and approved a "Stockbroker's Tudor" dwelling? The guardians of our heritage are certainly remarkable men. Just how remarkable you will deduce from the following report by a JOURNAL *representative.*

The Minister of Housing and Local Government, in a recent planning appeal, said that "Amersham High Street is rightly famous as one of the most nearly complete main streets of its period." For that reason he decided that he could not permit a building that would be "a quite incongruous addition to the town." In taking this line he was supporting the Amersham Rural District Council which had taken a firm stand against "incongruous additions" to the town.

Anybody going to Amersham to-day would have no difficulty in finding two structures, one of them still under construction, and the other recently completed, that fully

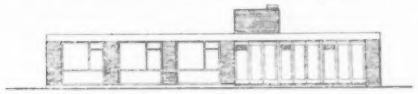
Two illustrations to show how the new gasometer, for which planning permission was not required, dominates the town. Left, looking east, with the old town hall on the left, and below, a closer view. The new gasometer was built between the old one and the street.

The one the Council passed . . .

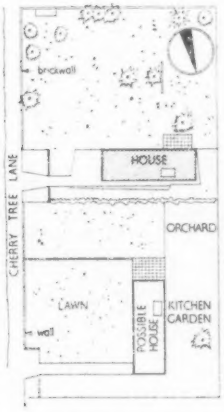


House at Cherry Lane, Amersham. Architects, Melville, Seth-Ward and Partners.

. . . and the one it refused



Elevation of house at Cherry Lane, refused planning permission by the RDC and the Ministry. Architect, Erno Goldfinger. Scale: $\frac{1}{32}$ in. = ft.



Site plan of the house above, showing its location in a secluded garden with high brick walls and matured trees. The house was designed to be the same height as the garden walls. Scale: $\frac{1}{128}$ in. = 1 ft.

comply with the Minister's description of "incongruous additions" to the town. One is the new gasholder, a monster 95 ft. high and nearly as broad, containing 500,000 cubic feet of gas, and standing within a few yards of the High Street, little more than 100 yards from the old Town Hall which is its centrepiece. The other is a new two-storey house described to me by the chairman of the Rural District Council, Maj. George Boyce, as "Stockbrokers' Tudor," complete with half-timbering on herringbone brickwork, diamond leaded lights and other cliches from the same vocabulary, that is being built for another member of the RDC on a vacant site to the south of the High Street.

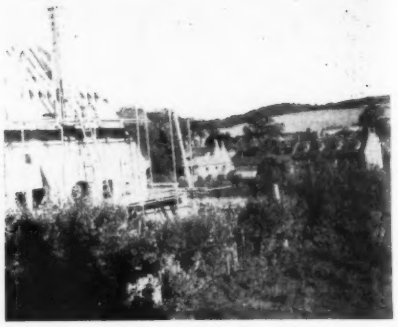
Yet neither of these structures incurred the Minister's displeasure. Indeed, neither was ever referred to him. The North Thames Gas Board, being a statutory undertaker, is not subject to development control, and did not require planning permission to erect its new gasholder, which overshadows the town and destroys the intimate domestic scale of its High Street. The "Stockbrokers' Tudor" design was passed without question by the RDC, with the approval of the County Planning Committee. The Minister used the word "incongruous" to describe an inconspicuous single-storey house designed by Ernö Goldfinger, whose crime was to give it a flat roof and to omit overhanging eaves.

It is worth looking a little bit more closely at the different treatment accorded to these two houses. The Goldfinger house was designed for a typographer who is keenly interested in good design. The owner thought it would be rather exciting to build a modern house that would be a fitting addition to the old town, just as the Georgian houses, in their day, were frankly modern additions to it. But because his site was on a rising piece of ground overlooking the High Street, in what was formerly the garden of "The Firs," a fine Queen Anne house in the High Street, he thought that a flat roof would be particularly appropriate, as it would keep the house low and inconspicuous among the trees. A flat roof would not have interfered at all with views either north towards the town, or south from it. He employed a well-known architect who, he thought, could build a house that would be right for his personal needs and for Amersham. And so a single-storey house was designed, with a flat roof, to be no higher than the garden wall, in the traditional red brick, that would soon have merged unobtrusively into the landscape. When the plans were rejected by the Amersham RDC the planning officer first suggested that he would not mind a "contemporary flavour" but did not wish to have a modern house in the old town. Subsequently the council modified its objections, and was prepared to accept either a pitched roof, or a flat roof with overhanging eaves, despite the fact that overhanging eaves would have been an artificial addition to the design both in appearance and construction. At the enquiry the RDC objected that the house would be "completely out of keeping" with "The Firs," and would spoil the view from the footpath that runs at right angles to Cherry Lane—although in fact it would scarcely have been visible. Evidence in support of the design was given by Sir Patrick Abercrombie and J. M. Richards, and letters in its support were read from Sir Hugh Casson and John Summerson. Nevertheless, the Minister rejected the design, mainly on the ground that it would be visible from this footpath. The

From the north: the line of the pitched roof shows that a flat roof would have been invisible from this point.

The above house as it was built, with a high-pitched roof. In this view, from the south, Amersham High Street would have been visible had a flat roof been allowed.

The view the Minister preserved



The Minister's main reason for refusing permission to the Goldfinger house was that it could be seen from a path skirting the fields. Both these pictures are taken from this path. The large picture shows, left bottom corner, the pitched roof of the Goldfinger house, which would have been almost invisible with a flat roof, and the mock Tudor edifice subsequently approved by the RDC. The smaller photograph, also taken from the path, shows the view towards old Amersham and the Chilterns that the Minister was so concerned about, with the mock Tudor house standing unscreened in a field.

house had to be redesigned with a double-pitched roof, making it far more conspicuous.

One would imagine after the Minister had given such a decision that the RDC would have refused all applications for houses that obstructed the view from the footpath. But not at all. The "stockbroker's Tudor" house, which is now being built, is sited right up against the footpath, completely obstructing the view of the town.

Town planning, as in this case, all too often swallows the camels and strains at the gnats. The gasholder and the bogus Tudor go up, while the modern architect runs into difficulties. It is easy to say that the problem can be solved by freeing architects from planning control: but one should say this, if at all, with one's eyes open; knowing, for example, that this "stockbroker's Tudor" house and many others like it are also designed by architects. A closer look at the planning machinery and the way it operates in Amersham may help to illustrate the problem.

Amersham Rural District is a large area covering 72 square miles in the Chiltern Hills, of outstanding natural beauty where it has escaped the ravages of the builders. Much of the undeveloped land is green belt, and had it not been for the strict use of the power to control development the green belt would long since have been engulfed by bricks and mortar. In this respect the RDC's planning control—unlike its "aesthetic" control—has been effective in the face of strenuous efforts by developers to build on the green belt. The centre of the rural district is Amersham town, which consists of two parts: old Amersham, around the High Street, which lies in the valley of the Misbourne, and Amersham-on-the-Hill, typical of any outer London suburb, which has grown up in the last fifty years round the railway station above the valley. The Amersham RDC takes pride, in its official guide, not only in the scenery, but in the area's literary, historical and architectural associations. Both the Government and the Local Authorities are fully aware of the rich architectural tradition of Amersham. With the object of preserving it, most of the buildings in the High Street have been listed for preservation on account of their architectural interest. The question that arises is whether preservationism is enough: for in fact most of those who build in the area, whether for the Council or privately, fail completely to learn from the tradition, which has been fossilized in Amersham High Street, and ignored elsewhere.

The Rural District Council, in exercising the powers of development control delegated to it, does not employ its own technical staff. It is advised by an officer of the Buckinghamshire County Council, who is qualified neither as an architect nor as a town planner. Above him there is an area planning officer for South East Buckinghamshire, who is an MTPI and a surveyor, but not an architect, and above him there is the County Planning Officer, who is also an MTPI and a civil engineer, but not an architect. There are, of course, architects on the staff of the County Planning Officer, but it will be seen that the chain of command in Amersham passes exclusively through the hands of those who are not trained as architects. When I discussed the problems of town planning control with Maj. George Boyce, the Chairman of the RDC (who was most co-operative, and answered frankly every question put to him) I asked him why, for such an area of rich architectural interest, the Council did not employ an architectural consultant whose advice could be taken on all development in any way affecting the old town. The Council Clerk explained that this was not allowed, as Buckinghamshire County Council had delegated its powers of planning control on condition that the RDC employed no technical staff of its own: the technical staff is employed by the County Council.

The procedure on applications, Maj. Boyce explained, is that the Buckinghamshire Planning Committee (in reality, one presumes, the County Planning Officer) submits observations on every application. If the RDC and the County Council agree, the application is determined accordingly. If they disagree, it is considered by a special committee of the County Council. This committee may consult an advisory panel of architects practising in Buckinghamshire, although this advice is not necessarily followed. This is not an RIBA-CPRE panel, and its members are anonymous. This panel did in fact turn down the Goldfinger house. Official CPRE-RIBA panels, which do not exist in Buckinghamshire, are not, of course, anonymous.

It is easy to test the views of the Amersham RDC on architecture by studying its current housing. If one turns off the High Street

and walks up Whielden Street towards High Wycombe, one passes abruptly from old Amersham to a new housing estate that exhibits all the worst faults of council housing. A very similar plan is being used for houses now being built at the junction of Church Street and Back Lane, where the layout is even less satisfactory. These flats were designed by a private architect.

When I asked Maj. Boyce why the Council was building housing estates of such poor aesthetic quality he blamed the Minister's restrictions on cost, and showed me a perspective of a proposed new terrace of rather more modern design. But cost is, in fact, no excuse. At Whielden Street the ground in front of the houses is not divided into gardens, but has been grassed over, instead of allowing the grass to flow freely between the road and the houses; dwarf walls have been built at considerable expense, following the line of the vision splays, cutting up the ground, wasting money and making a poor layout worse. Good landscaping and detailing will, of course, cost some money, and it is often right to blame the MOHLG for its parsimonious attitude: but an infinitely better result could have been obtained for the same amount of money.

I discussed the whole problem of architectural control at length with Maj. Boyce, and with Mr. Pocock, a member of the RDC, and of the Buckinghamshire County Planning Committee. Mr. Pocock was genuinely surprised to learn that there was a strong feeling among the younger, modern, architects at any rate against controls, for, he said, in Buckinghamshire there was no such control except in such areas as old Amersham where there was an "architectural whole" to preserve. Elsewhere, explained Maj. Boyce, they were governed by the Minister's decision in a 1956 planning appeal (where the external appearance of a house was said to be "startling") that the developer should be allowed to have the house of his choice. "We have tried on a number of occasions to control this speculative building of boxes," said Mr. Pocock, "but we don't get away with it."

Maj. Boyce explained the rejection of the Goldfinger house by saying that, because it was in the "architectural whole" of Amersham, the only thing to do was to refuse it and abide by the Minister's decision. But the council did not consider that the "stockbroker's Tudor" design was such a startling departure, and approved it because it considered that the Minister would not refuse permission on appeal. The "stockbroker's Tudor" was, he said, "spurious," but it reflected the age in which we lived. "It is an age," he said, "of artificial things, or artificial jewellery and that sort of thing. Here was a developer who wanted artificial decoration. We did not like it, but we felt we could not resist it."

But the Goldfinger house? It was not only the flat roof and the lack of eaves that were objectionable. "These Cubist buildings are bad in this climate. They soon get stained, and look unkempt." Mr. Pocock was much more sympathetic to modern architecture, going so far as to say he was not against it if it was well done, and Maj. Boyce, when the discussion roamed further afield, said that he liked the Gollins, Melvin and Ward buildings in New Cavendish Street. It was only in such places as old Amersham that he thought modernity unsuitable.

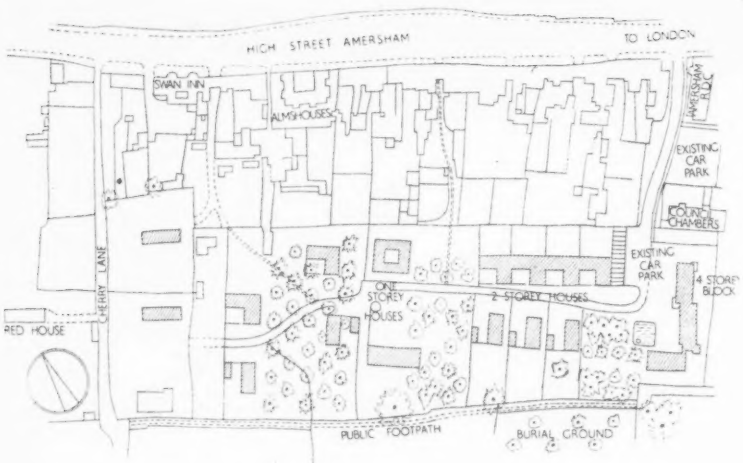
How many refusals are there? Not more than one in one hundred were referred to the architects' panel, and probably only one in a thousand was refused on architectural grounds. How many plans submitted were by architects? The majority of individual houses, but only a minority of speculatively built houses. The largest speculative builder in the area employs an assistant "with architectural experience" to do his designs. Others are still using pre-war designs. Another advertises in the local press: "Contemporary building, decorating and designing a speciality."

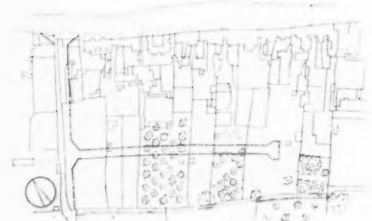
At the moment Amersham is rent by controversy about whether to develop, and if so, how to develop, the area of back gardens running south from the High Street, between Cherry Lane and the Town Hall. This controversy illuminates the whole problem of control. The Council considers that in a town where there is such a shortage of building land this area should be developed. But the Council not only neglected in the past to prepare a detailed plan for the development of this area, but built the housing estate already mentioned at Whielden Street, which blocked a possible access from the east. All the alternative access routes debouch into Amersham High Street—a busy main road with an average of 302 vehicles an hour—through narrow openings. Most of the householders do not want to build on their gardens, or orchards. But two of them do, and when they applied for permission this year, in one case to build two houses and in the other to build three, the Council refused permission on the grounds that these houses would block the access from Cherry Lane, and so prejudice the comprehensive development of the area. To show that it was possible to develop the area properly with access from Cherry Lane the Buckinghamshire County Council planning officer prepared a plan (in a week, and without making a survey, according to the clerk to Amersham RDC). This is a plan for a typical suburban development. Cherry Lane would be widened to 40 ft. overall, to conform to the Buckinghamshire County Council's revised schedule of road widths. A vision splay would be opened out where Cherry Lane joins the High Street, resulting in the bisection and ruination of the front garden of "The Firs" (the Queen Anne House that the RDC and the Ministry are so anxious to preserve) and the demolition of three Victorian cottages on the other side of the Lane. The cottages themselves are of no interest, but to punch a hole of this size in the street would be wrong. From Cherry Lane, its charm destroyed, a similar cul-de-sac road, 34 ft. wide overall, would be run straight, parallel to the High Street, with building lots on either side of it. The RDC has approved this plan in "principle," but wishes it to be understood that it is in no way committed to it in detail.

Two architects who practise in the area, Derek Matthews and H. Werner Rosenthal, have prepared an alternative plan by which access would be obtained from the High Street by the existing entrance at the side of the Town Hall, now used by cars to go to and from two Town Hall car parks. There would be a low block of flats to close the vista, and a lane would run through the gardens and orchards preserving

Amersham RDC housing

Whielden Close, flats recently built by the Amersham RDC in old Amersham. Another estate using very similar plans, is now being built north of the High Street. Note, right, the ground behind the flats cut up into tiny jig-saw plots with concrete posts and wire to give each flat a "garden," many of which are uncultivated.





Top: a plan (scale 1/3,000) showing the scheme proposed by Derek Matthews and H. Werner Rosenthal for the development of land to the south of old Amersham High Street. Planning permission was refused because it did not comply with the county council's schedule of road widths and vision splays. Left, the RDC's proposals, approved in principle only but not in detail, to widen Cherry Lane to 40 ft., knock down the three cottages illustrated below to provide vision splays, and drive a 34-ft. roadway with building lots on either side. (Scale 1/6,000).

so far as possible the existing trees and orchard which would, the architects say, be largely destroyed in the Council's plan. The houses, moreover, would be informally grouped to give a sense of privacy and enclosure. Sites would be individually developed, under strict architectural control. Permission for this plan has been refused because (*a*) it does not provide for a vision splay at the High Street (this would also involve knocking down two or three cottages) and (b) the lane is not 34 ft. in width, overall.

The rigid insistence on vision splays and minimum road widths by the road engineers is fatal to any scheme for the development of this area. Extending old Amersham is rather like converting an old house. It has to be adapted and extended to meet changed conditions, without destroying or subverting its character, and this is not to be done by rigidly applying suburban by-laws. It would be far easier to solve the problem if the Amersham by-pass, planned many years ago, were to be built. Here is a case where a skilled architect planner, after a thorough survey and analysis of the area, could work out a solution that would harmonize the new and the old, and provide a safe and architecturally acceptable road access. Such a plan could take into account the Council's intention to build a new civic centre at Amersham-on-the-Hill and to remove (one fine day) the temporary Council chamber at the rear of the Town Hall. What this problem does show is the unsuitability of piecemeal development, with wrangles over each application. The only possible solution is comprehensive development.

An article that studies town planning control in a single area is likely to raise more questions than it answers. But a number of useful points can be made.

Pending changes that would probably require legislation (freeing architects' designs from aesthetic control is one of these) much could be done within the existing machinery. Is there any good reason why the Buckinghamshire County Council should not entrust architects, rather than surveyors and engineers, with responsibility for architectural control?

Why should Buckinghamshire not set up CPRE-RIBA advisory panels with the specific aim of raising the standard of private building Where these panels are working effectively the proportion of architect-designed houses is rising; and if some architect-designed houses are not all they should be, nevertheless, the more houses that are designed by architects the better the standards are likely to be. It was obviously absurd to waste time and money debating whether the Goldfinger house in Amersham should or should not have a flat roof. If the Minister made it clear that he would never support the planning authorities in such absurdities this kind of thing could be stopped. But the Minister, by supporting the RDC in this case, positively encouraged it.

Would complete freedom for architects solve the problem? In many places it might, but is it really possible to allow any registered architect to build whatever he pleases in Amersham High Street? Anyone who thinks so should take a long, lingering look at the picture on page 773. Freedom for architects would let through one more house in a thousand: and that might be important for the progress of good design. But the major problem in the war against subtopia is the remaining 999 which at present pass safely through the net of æsthetic control.

Local councillors who say they dislike speculative building complain that the Minister will not support them if they use their planning powers in a serious attempt to raise standards. And the Minister passes the buck back to the Council. The present system offers unlimited scope for shifting of responsibility. But one of the root troubles is the failure of the Minister to support those who really do declare war on nasty speculative building. But even in a small town like Amersham the best solution would often seem to lie in positive planning, in comprehensive development under the control of a single architect, with a more elastic application of the bylaws that impose universal suburban standards. And statutory undertakers should be brought under planning control.

Cherry Lane lies between The Firs, on the right, and the Victorian cottages, on the south side of Amersham High Street.

technical section

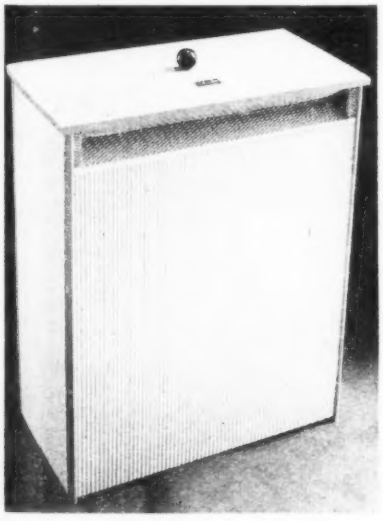
THE INDUSTRY

Brian Grant describes a storage heater and a radiator pipe return.

Thermal storage heating

The Dulrae Supa-Stor electric thermal storage heater has an internal thermostat arranged to vary the charging period at night (within the limits of the time switch setting) according to the amount of heat withdrawn during the preceding day. The heat output during the day can be controlled by the knob at the top of the cabinet. In the standard model the loading is 1,500 W. and the heat storage capacity 12 kWh., but in another model both figures are increased by about 30 per cent.

There are two self-contained but withdrawable heating elements, and the heat storage medium is in powder form. Weight is 56 lb., to which must be added a further 224 lb. for the heat storage medium. The outer casing is insulated and has a low surface temperature, the standard finish being a light grey, but this can be painted to any colour if necessary. Dimensions are 2 ft. by 1 ft. with a height, including the control knob, of 2 ft. 9½ in. Price is £16. (*Dulrae Ltd., Griffin Lane, Aylesbury.*)



The Dulrae Supa-Stor heater.

Tidier radiators

For central heating installations where long and unsightly runs of water return pipe are to be avoided, Gulf Radiators have evolved a simplified pipe run. The hot supply is taken to the bottom of the radiator, and the return is brought back from the far end by welding the pipe to the bottom manifold at the foot of the radiator on the wall side; so that both connections are side by side and installation is simplified. These out of sight return pipes can be supplied on panel radiators of any length. (*Gulf Radiators Ltd., 229, Regent Street, W.1.*)

19 CONSTRUCTION: DETAILS

the glass curtain wall 2, heat transmission

Continuing his review of the present stage of our knowledge of the glass curtain wall, the author, Thomas A. Markus, turns to the problem of heat transmission. This he considers under two aspects: insulation against heat loss from the building and the passage of solar radiation into the building. On heat loss he points out that we need, not the single U-value figure at present envisaged, but three or four values to take into account different orientations and whether a building is used day and night or during the day only. Pointing out that the U-value of opaque panels becomes more critical when double glazing is used in the translucent panels, he suggests 0·2 B.t.u./hr. sq. ft. deg. F. as a reasonable U-value for an opaque panel. He then considers solar radiation, first by pointing out the contribution of heat resisting glass in preventing excessive heat gain in hot weather; and second by discussing the problem of edge fixing created by the thermal expansion in the glass. On this last he demonstrates that cracking is caused not (as we have been led to believe) by insufficient tolerance, but by the unequal expansion in the glass caused by the shielding of the frame; and that therefore the depth of the frame is critical.

Thermal insulation

The problem of thermal insulation more than any other feature of the subject, drives home the absolute necessity of treating curtain walling comprehensively. The overall insulation value of the wall must be in accordance with recognized standards for fuel economy and for keeping capital costs for heating plant as low as possible—this standard will be defined by a "U" value. The wall must also have sufficient thermal capacity to act as a "fly-wheel"—*i.e.*, to cushion the heating plant from sudden large fluctuations caused

technical section

by changes in external conditions. In both respects the curtain wall presents serious problems.

Whereas the BRS Digest No. 98 outlines some general principles on the thermal insulation problems of the curtain wall it does not set out to give the architect or heating engineer a simple method for arriving at a practical " U " value for calculations. Short of measurements on complete curtain walls over a long period such as have been carried out at the BRS Wall Laboratory for some years, but which have been limited to a few selected types of construction, some approximate method of calculation which takes into account the " U " values of the separate components of the curtain wall is the only available method of prediction. The three main components are the window (glass and frame), the opaque panel and the curtain wall framing. The more accurate the figures for each of these three components are, the more realistic the answer will be.

(*a*) WINDOWS: Windows are likely to take up 50 per cent. or more of the area of a normal curtain wall. " U " values for them vary, as for any type of construction, according to exposure conditions—*i.e.*, orientations and wind conditions. But for glass, which is transparent, the calculation is even more complex. The surfaces within the room absorb and reflect the radiation transmitted by the glass in various proportions. The absorbed energy heats them and they in turn re-radiate long wave energy to which glass is opaque and this accounts for the well-known " greenhouse " effect of cumulative heat build-up behind glass.

The solar heat gain through a window alters its net " U " value to such an extent that at periods of high radiation intensity it may be negative—*i.e.*, the heat gained through the window by radiation is higher than that lost through it by convection-conductance. Even on a north wall in winter day-time radiation gains from the sky can be substantial and may give a minimum day " U " value 200 per cent. lower than the maximum night value 12 hours later.

More accurate knowledge of solar heat gain through various types of window, on various exposures and orientations, will in time necessitate a complete re-appraisal of " U " values in walls with large windows. The effect is more than " a welcome addition to comfort " (Digest 98)—it may well be a substantial reduction of heating costs. So whilst architects at the moment consider every square foot of window as a heating liability in the building, and large windows required for appearance or light are included with a guilty conscience, they may find that in certain circumstances windows will be a heating asset.

There will be an increasing need for three or four " U " values for a given wall:

(*a*) A mean day value for winter—this could be used for calculating fuel consumption for buildings heated only during the day (*e.g.*, offices).

(*b*) A mean night value during winter—to be used in combination with the day value for 24-hour heated buildings (*e.g.*, a hospital).

(*c*) A frequency curve showing the number of occasions on which the " U " value reaches certain maxima —this is required for assessing the total load the plant may be required to carry, and whether it is economical to maintain the design temperature (say 65 deg. F.) on all occasions, or whether one may allow a drop in temperature for X hours or Y days per annum.

(*d*) Variations of " U " values according to orientation.

In all calculations, of course, the thermal capacity of the building must be allowed for: where it is low, as in most curtain wall structures, a building heated during the day only may place considerable extra load on the plant in the morning, whilst the structure which has cooled during the night is absorbing heat.

It may be found, for instance, that large windows on a north and south wall of a slab building balance each other on clear days—*i.e.*, the heat lost on the north wall is about the same as that gained on the south.

For the time being there is not sufficient window " U " data to make this comprehensive approach possible. BRS is measuring " U " values on curtain walls on north walls. As this information is published the situation will become clearer. But it will be many years before there is sufficient data, especially such as takes into account other than north orientations. In the meantime architects and engineers can only carry on using conventional figures, as indicated below, but they should be aware that whilst these may give fairly accurate results for the calculation of heating plant, where there are large windows they may give an excessively high and inaccurate result for fuel consumption, particularly if:

(*a*) The building has large windows facing south.

(*b*) It is only in daytime use (*e.g.*, offices and schools).

(*c*) Curtaining is regularly used at night.

The Institution of Heating and Ventilating Engineers' tables give the following values for single and double glass in windows.

Table 1. U values for single and double glass (reproduced from IHVE tables)

Thermal transmittance, U.
B.t.u./hr. sq. ft. deg. F. difference of air temperature.

Orientation	*Exposure to wind*					
S	Sheltered	Normal	Severe			
W, SW, SE		Sheltered	Normal	Severe		
NW			Sheltered	Normal	Severe	
N, NE, E			Sheltered	Normal		Severe
Glass						
Single windows	0·70	0·79	0·88	1·00	1·14	1·30
Double windows	0·41	0·44	0·47	0·50	0·53	0·56

It must be assumed that the double glass values are for a sealed ¾-in. air space, the optimum condition. Larger cavities than this do not give the increase expected due to an extra mass of air since increased convection currents take place and heat transfer by conduction across this air is relatively insignificant; at ¾ in. these are inhibited by the nearness of the hot and cold air layers. At smaller spacing the conduction exchange will be higher and the convection interference between the hot and cold air layers will cause short circuiting currents across the cavity. At ½-in. spacing the thermal insulation value will be about 90 per cent. to 94 per cent. of the ¾-in. space, at ¼-in. spacing about 82 per cent. to 87 per cent. and at

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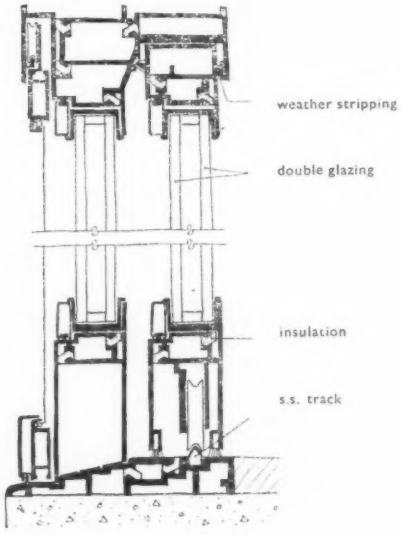


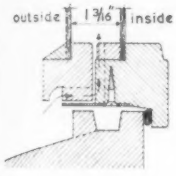


Fig. 1 (above), section through a pair of American double glazed doors designed to eliminate ¼" cold bridge." Fig. 2 (left), bottom ventilation into the cavity of a Swedish double window designed to ensure that "breathing" is to the outside.

¼-in. spacing about 50 per cent. Ventilation of the cavity will also increase the "U" value; by a small amount if the space merely "breathes" to the outside air, by a larger amount if there is top and bottom ventilation and a through current of air.

The overall window "U" value will be the glass value modified by the effect of the frame—this depends largely on the frame material. The American Society of Heating and Air Conditioning Engineers' (ASHAE) *Guide* gives the following factors by which the glass "U_c" values should be multiplied.

Several American manufacturers are producing discontinuous metal frames in which the "cold-bridge"

Table 2. Factors applicable to glass U values to account for frame materials (reproduced from ASHAE Guide)

Window description	*Single glass Percentage glass*	*Factor*	*Double glass Percentage glass*	*Factor*
Sheets	100	1·00	100	1·00
Wood sash	80	0·90	80	0·95
Wood sash	60	0·80	60	0·85
Steel sash	80	1·00	80	1·20
Aluminium	80	1·10	80	1·30

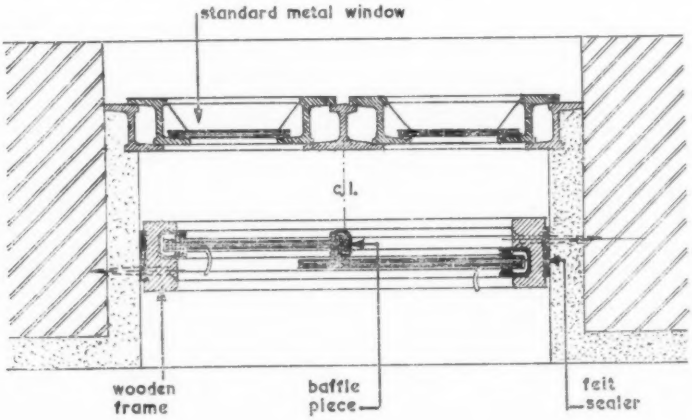
heat loss is eliminated. An example is illustrated (Fig. 1).

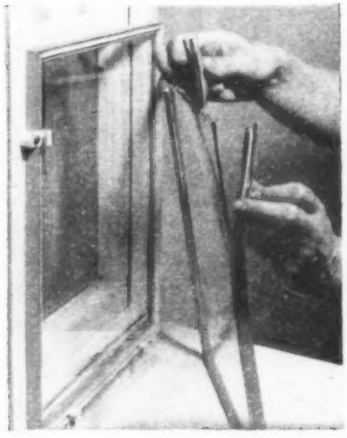
The use of curtaining at night will cause a substantial reduction in window "U" values; 15 per cent. is a reasonable estimate, but this will vary according to the weight of the curtain material and the closeness of its fit.

Four well-known hermetically sealed double glazing units are available in this country: "Hilsulate," "Insulight," "Holloseal" and "Cavity Plyglass." All are available in a variety of glass thicknesses and with varying air spaces. All rely on adhesives or mastics to retain the hermetic seal and careful glazing according to the manufacturers' instructions is necessary to prevent moisture causing a breakdown. The enclosed air is of low moisture content and therefore condensation is only likely in extreme conditions; even then the total water vapour being small and being distributed over a large surface the condensation may not be visible.

Various methods of double glazing with two separate pieces of glass in one frame, from simple double rebates to complex metal sections, have been used with greater or lesser success. The difficulty is that even where a hermetic seal can be obtained by mastics and sealing compounds, the enclosed air will have the moisture content of the atmosphere at the time of construction. Whenever the inside face of the outer pane drops to the dewpoint temperature of the enclosed air, condensation will form. If the member separating the panes is timber, it should be sealed and painted, otherwise moisture escaping from it during strong sunlight will cause condensation. If air penetration into the cavity is inevitable the design should ensure that breathing is to the outside rather than the inside (see Fig. 2). The provision of deliberate vent holes may solve this, but their blockage by dirt and

Fig. 3 (below), an English internal "storm sash" designed for fixing on the inside of an existing window to provide double glazing. Fig. 4 (below right), the fixing of a second English version of an internal "storm sash."





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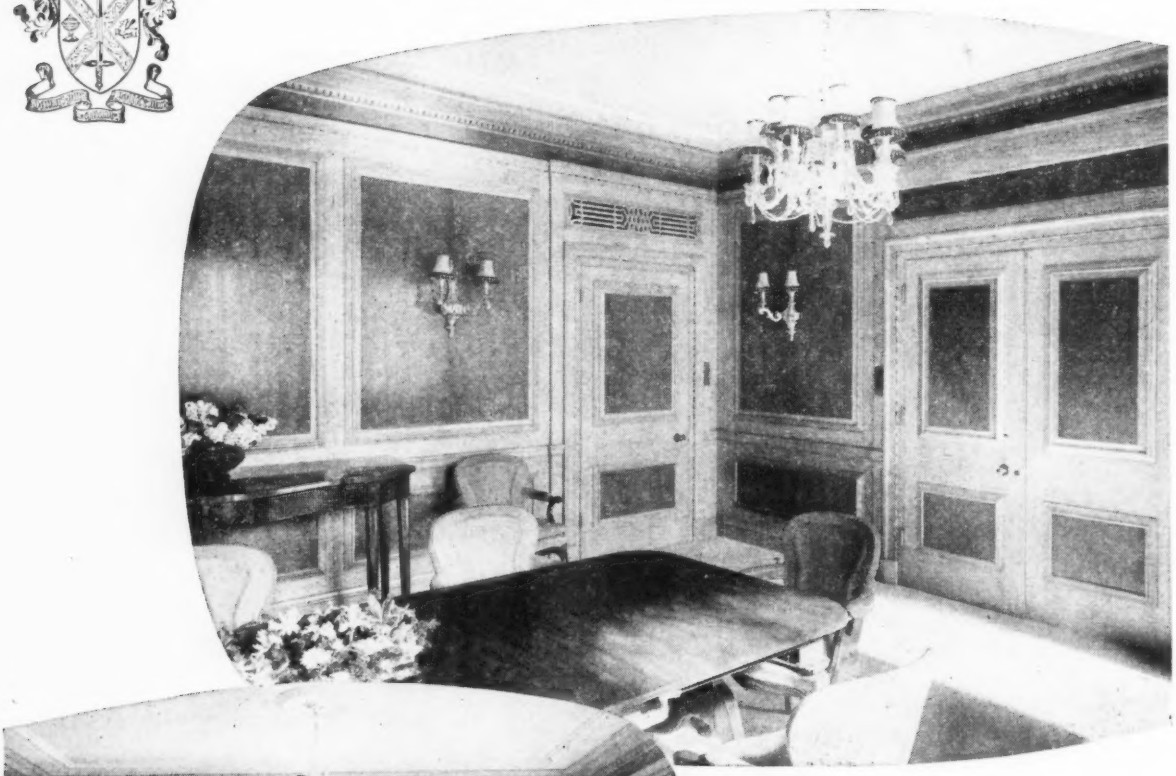
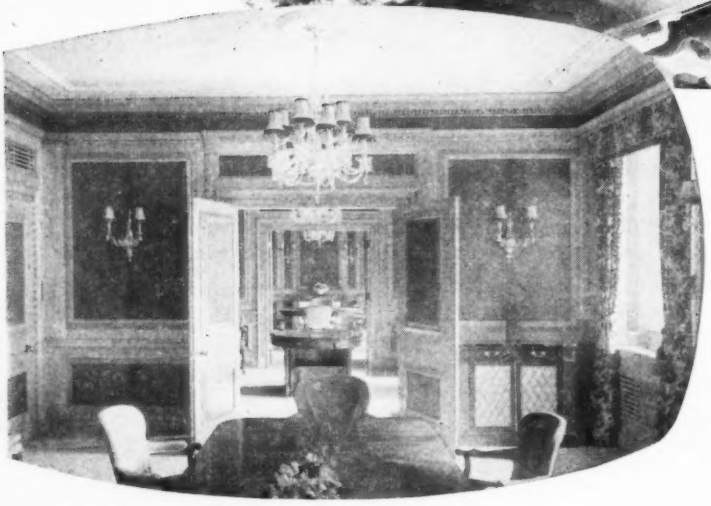


GUESTS' LUNCHEON ROOM



VIEW OF THE LUNCHEON ROOM SUITE FROM THE GUESTS' TO THE DIRECTORS' LUNCHEON ROOM

The Luncheon Rooms, shown above, are panelled in selected Plane tree Burr with solid Plane tree for all the joinery work. In other suites the panelling is of figured English Walnut with the joinery carried out in the same timber. All these materials were supplied from our extensive stocks of decorative veneers and home grown hardwoods, and the panels were manufactured in our Crayford factory to the Architect's specification.

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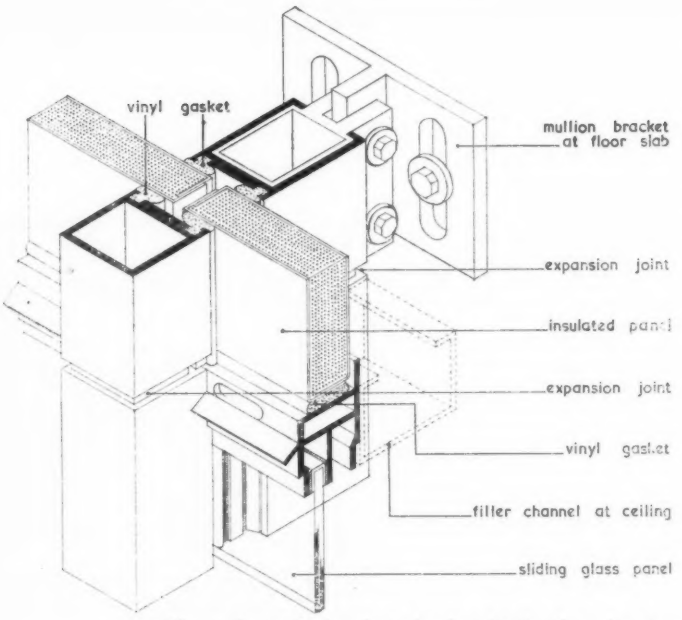
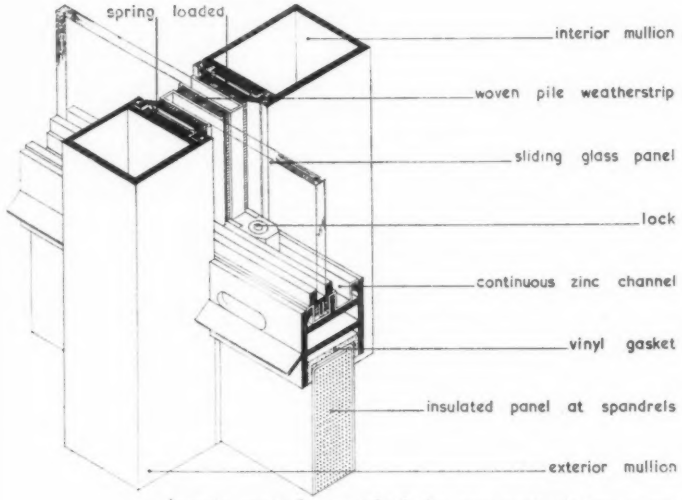


Fig. 5, isometric drawings showing details of an American "split mullion" curtain wall. Above, at head level; below, at sill level.



insects must be watched. In any such design provision must be made for easy removal of one pane, preferably the inner, for cleaning.

A number of systems similar to the American "storm sash," but applied inside the existing window, are available; they consist of a subsidiary frame and glass which are held by channels, toggle clips or other means against the window frame. Two are illustrated in figs. 3 and 4 on page 779.

The average cost of double glazing with factory-made units and with double windows is about the same, although in both there are large variations; in the first due to type of glass and the proportion of edge to area and in the second due to varying qualities of materials and fittings. With factory-made double glazing units the expensive item is the edge seal; the ratio of edge length in feet to area in square feet is 4:1 in a unit 12 in. × 12 in., but 1:1 for a unit 48 in. × 48 in.—the latter will therefore be cheaper per square foot than the former using the same glass thickness and cheaper also than an oblong unit of the same area, 96 in. × 24 in., in which the ratio is 5:4. Thicker glass costs more; this increase is particularly sudden when the size demands a change from sheet to polished plate, but in all cases the lowest possible edge to area ratios should be aimed for.

With double windows this area to frame ratio also has an effect, but more important are the quality of the material (*e.g.*, hardwood or softwood) and the quality of the fittings. The large single opening light window seems to be the most economical where ventilation is required.

The time taken for repayment of the capital cost of double glazing or double windows out of fuel savings and (amortized) saving on capital cost of heating plant has been variously estimated at 10 to 25 years. It depends on the amount of window in the wall and on the use of the building; it will be shorter in a 24-hour heated building where high internal temperatures are to be maintained (*e.g.*, a hospital) than a building heated during the day only and with lower permissible temperatures (*e.g.*, a canteen or shop). The freedom from condensation and down-draught may be the determining consideration in such situations as shop windows or a hospital ward.

(*b*) THE OPAQUE PANEL: The wide variety of factory or site assembled glass fronted panels makes it impossible to generalize about "U" values. The important point to remember, however, is that no matter how high the insulation value of this panel the effect of large window areas and heat-flow through the framing may substantially reduce the overall insulation, especially at night and times of low solar radiation intensities. Double glazing and carefully detailed framing is essential if the high insulation value of a panel is to be fully realized.

Several factory-made glass fronted cladding panels are available.

Panel	*Construction*	*Claimed "U" value in B.t.u./hr. sq. ft. °F.*
"Hilsulate" coloured panel	Coloured dished aluminium tray behind glass.	0·55
"Vitroslab"	Sealed double glazing unit, with coloured glass fibre interlayer, alone or with a variety of insulating materials fixed to it.	0·6 to 0·13
"Colourseal"	Sealed double glazing units with painted and fired surface on rear of front glass.	0·4
"Hollow Seal" composite wall cladding panel	As above with a variety of insulating materials fixed to the back.	Down to 0·25

Where a single opaque glass such as "Muroglass" or "Armourclad" is used in front of a back-up wall with a separate cavity the insulation value can be "tailor-made" to requirement. The inclusion of a reflective, metallic foil on one side of a cavity will greatly increase the insulation of the entire panel. A factory-made "Vitroslab" panel with such a foil is obtainable. In the USA a toughened opaque coloured glass, similar to "Armourclad," is available

technical section

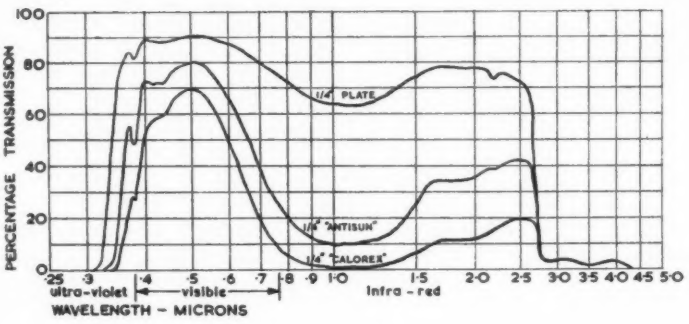


Fig. 6, energy transmission curves for normal plate glass and two heat absorbing glasses, "Antisun" and "Calorex."

with a sprayed fired-in aluminium surface on top of the ceramic.

Hollow glass blocks have been used in curtain walling both as "window" and as "panel"; the Code of Practice "Walls and Partitions of Blocks and Slabs" gives a measured "U" value of 0·44 B.t.u./hr. sq. ft/deg. F. for them on a north wall. The laboratory value, where incoming solar radiation is ignored, is given as 0·54.

The BRS Digest gives no guide as to the "U" value to be aimed for in the opaque panel. When manufacturers of expensive compound panels are putting sales pressure on architects based on an emphasis of low "U" values, it must always be remembered that due to large areas of single windows and the "cold bridge" framing effect, the overall insulation gain in the wall may be only marginal (perhaps only one or two decimals on the "U" value). However, where double glazing is used or smaller windows, such panels may be a more worthwhile investment. A reasonable maximum "U" value for the opaque portion of the curtain wall is 0·2 B.t.u./hr. sq. ft./deg. F.

(*c*) FRAMING: The prevention of "cold bridge" heat losses through the framing, needs careful location of the insulation or the use of materials of low conductivity such as timber. Several manufacturers are attempting to overcome this problem and two methods, using a "split mullion" system, one American and one English, are illustrated in Fig. 5 on page 780.

Where special precautions of this kind are not taken it is suggested that the "U" value for the wall should be increased by, say, 10 per cent. for metal framing to allow for this extra heat loss.

(*d*) CALCULATION: Having assessed the "U" value of the three separate components of the curtain wall as outlined above, the total "U" value can be approximately obtained.

Example

A wall with 40 per cent. single glass window (80 per cent. glass and 20 per cent. aluminium frame), 60 per cent. opaque panel and aluminium curtain wall framing.

Glass "U" value = 1·0 B.t.u/hr./sq. ft./°F.
Correction factor for aluminium frame according to Table 2 = 1·10
Total "U" value of window = 1·10 B.t.u./hr./sq. ft./ °F.
Opaque panel "U" value = 0·2 B.t.u./hr./sq. ft./ °F.

$$\text{Total wall "U" value} = \frac{40}{100} \times 1{\cdot}10 + \frac{60}{100} \times 0{\cdot}2 + \text{correction factor for curtain wall framing—say 10 per cent.}$$

$$= \frac{2{\cdot}2 + 0{\cdot}6}{5} + 10 \text{ per cent.}$$

= 0·616 B.t.u./hr./sq. ft./°F.

When this overall "U" value has been calculated the heat transfer through the wall can be calculated by:

$Q = U \times A (t_i - t_o)$, where
Q = total heat loss in B.t.u./hr.
U = overall coefficient of thermal transmittance in B.t.u./hr./sq. ft./ °F.
A = area in sq. ft.
t_i = indoor temperature in °F.
t_o = outdoor temperature in °F.

Solar radiation

Apart from its effect on lighting and "U" values solar radiation raises two distinct problems in the curtain wall: first, heat gains through the windows in excess of the heat losses which were considered under the "U" value concept and, second, heating of opaque panels and frames and resultant stresses on and deterioration of materials.

(*a*) EXCESSIVE HEAT GAIN: Uncomfortable summer heat gains, as BRS Digest No. 98 suggests, are not so serious in this country that they cannot normally be dealt with by ventilation and blinds. Probably this problem will be tackled together with that of glare and, as in that case, so here special glasses may have a useful function even in this country and certainly in more extreme climates. The so-called heat absorbing glasses may be particularly necessary where:

(i) There are large areas of fixed glazing (no ventilation).

(ii) Difficulty of access or type of usage (*e.g.*, an office corridor) makes operation of blinds impractical.

(iii) Capital and maintenance cost of blinds are prohibitive.

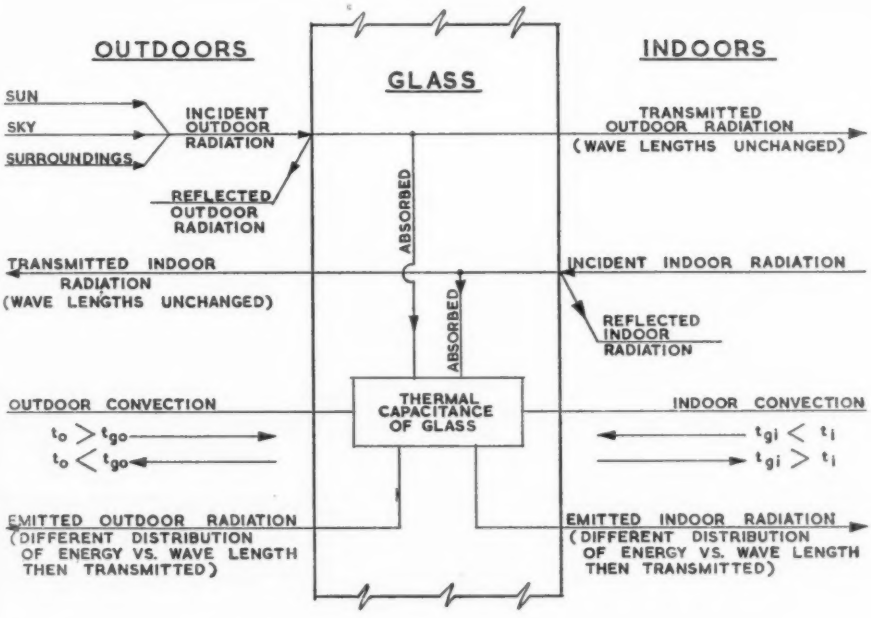
(iv) Clear vision must be retained, as in an airport control room.

The principle of these glasses is that by the incorporation of certain iron compounds they absorb part of the short wave infra-red energy. Of the solar energy reaching the earth through various air masses, roughly 50 per cent. is in the visible range and 50 per cent. in the short wave infra-red.

Fig. 6 shows the transmission curves for normal ¼-in. polished plate glass and the two British heat absorbing glasses "Calorex" and "Antisun"—which have a light transmission of about 60 per cent. and 70 per cent. and a solar heat transmission of about 20 per cent. and 42 per cent. respectively. In the USA and on the Continent glasses with solar heat transmission varying from 18 per cent. to 70 per cent. are obtainable. These glasses transmit less light at the red end of the visible spectrum than at the other and this gives them their characteristic blue-green colour.

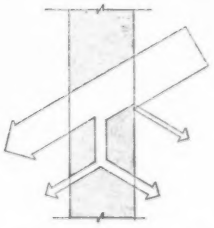
All energy falling on glass is reflected, absorbed and

technical section



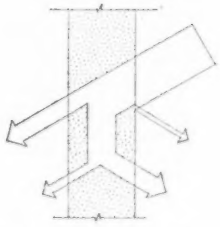
t_o = OUTDOOR AIR TEMPERATURE
t_{go} = OUTDOOR GLASS SURFACE TEMPERATURE
t_i = INDOOR AIR TEMPERATURE
t_{gi} = INDOOR GLASS SURFACE TEMPERATURE

Fig. 7 (left), diagram showing the pattern of thermal behaviour of heat absorbing glass. Fig. 8. (below), comparison of heat transmission through polished plate glass, heat absorbing polished plate glass, and a double glazed window incorporating both.



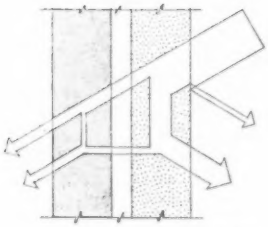
112 and 184 BTU/HR-SQ. FT.

1/4 in polished plate glass



78 and 117 BTU/HR-SQ. FT.

1/4 in heat absorbing polished plate glass



59 and 91 BTU/HR-SQ. FT.

1/4 in. heat absorbing polished plate outside
1/4 in polished plate glass inside

transmitted in various proportions. The reflection depends on the incident angle of the energy and on the surface texture of the glass. For transparent glasses it is less than 10 per cent. at normal or near-normal angles of incidence. The remaining energy is absorbed and transmitted in proportion to the transmission characteristics of the glass—the more the transmission the less the absorption (see Fig. 8).

All absorbed energy, visible or otherwise, heats the glass and the hot glass in turn re-radiates long wave energy to both sides. This raises two practical design problems. First, special glazing precautions must be taken and since these are similar to those for opaque cladding glasses they are considered under that heading. Second, heat gains from the hot glass must be minimized. The provision of ventilation above and below to assist in removing warm air is one method. Another, but more expensive method, is to use double glazing with the heat absorbing glass as the outer pane and ordinary glass for the inner pane. The inner pane both seals the layer of warm air from the room and also acts as a radiation shield against the long wave energy emitted by the hot outer glass, to which it is opaque. Ventilation of the space between the glasses to the outside air will increase the effectiveness of such a window even further.

Accurate calculation of the total heat balance is a complex matter.

The glass receives radiation from three external and one internal source; it reflects, absorbs and transmits this energy; the absorbed energy heats the glass; there is convection-conduction exchange from both sides which also heats the glass; the glass therefore acts as a " heat sink " and re-radiates to both sides. The most accurate work to date has been done by G. W. Parmalee and W. W. Aubele at the laboratory of the American Society of Heating and Air Conditioning Engineers. It has been published in detail* and an outline of it is given in ASHAE *Guide*. For anyone designing for tropical conditions and calculating air conditioning loads from solar radiation through various types of glazing this *Guide* is indispensable. The figures given in Table 3 (p. 783) have been calculated from the *Guide* and they are based on two selected tropical conditions, since it is assumed that it is only in fully air conditioned buildings in these

* In papers on different glass products in issues of the *ASHVE* (later *ASHAE*) JOURNAL's section on heating, piping and air conditioning.

technical section

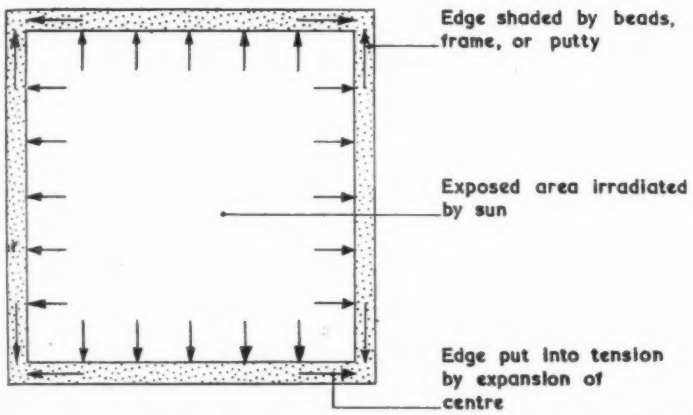


Fig. 9, illustrating the creation of tension round the edge of a glass sheet by the expansion of glass in the centre.

Table 3. Passage of heat through a variety of glasses for two selected tropical conditions

Aspect		*South*	*East*
Time		12 noon	9.0 a.m.
Total direct and diffuse radiation in B.t.u./hr./sq. ft.		138	214
Solar altitude		68°	45·5°
Outdoor dry bulb temperature		95° F.	80° F.
Indoor temperature		80° F.	80° F.
Glasses	*Total per cent. direct solar energy normal transmittance*	*Total B.t.u./hr./sq. ft. Passed Inwards*	
Single sheet	87	112	184
Single ¼-in. polished plate	77*	104	168
Single ¼-in. polished heat absorbing plate	41	78	117
Double, 2 sheets, ¼-in. space	76	94	158
Double, 2¼-in. polished plates, ¼-in. space	60*	84	138
Double, outside ¼-in. polished heat absorbing plate inside ¼-in. polished plate, ¼-in. space	35	59	91
Single, $\frac{7}{32}$-in. hammered (rough side out)	75	87	160
Single ¼-in. heat absorbing hammered (rough side out)	21	52	75
Glass blocks (smooth external faces, wide horizontal ribs on internal faces)	—	40	92

* These figures are lower than those accepted in this country and open to doubt.

regions that accurate calculation is necessary. The Table is useful for other regions as a method of comparison between the nine types of glazing.

(*b*) HIGH GLASS TEMPERATURES: A great deal has been written and said recently on the effects of solar radiation on opaque glasses and the resultant high temperatures reached. BRS Digest No. 99 gives 160 deg. F. as the maximum for an opaque insulated material in this country and draws attention to a number of important implications of such a temperature; but some of the recommendations concerning glass must be questioned. Both in the Digest and earlier discussions there is an emphasis on clearances round the glass to allow for thermal expansion at the expense of other practices which are not only equally important in themselves but are more often ignored. The special glazing techniques described below also apply to heat absorbing glasses such as "Calorex" but not to toughened glasses such as "Armourplate" or "Armourclad" which cannot be overstressed from solar radiation and which only require normal sound glazing practice. The toughened glasses cannot of course be cut or worked.

An opaque coloured glass becomes hot according to the degree of its absorption; a light or white panel will gain less heat than a black of dark one. A transparent or translucent glass used in front of an opaque panel absorbs a little of the sun's short wave energy and a lot of the long wave, emitted by the hot, absorbing panel behind it, to which it is opaque. If there is a separating cavity the air is heated from both warm surfaces and cumulative heat build-up takes place. If the glass is in contact with the absorbing panel it will be heated by conduction. Whichever condition causes heating of the glass, since the edges are normally covered by beads and frame rebates and embedded in mastic and since glass is a poor conductor of heat, there will be a considerable temperature differential between the centre and the edge. The centre will try to expand; the cold edges will try to restrain it and will thus be put into tension (see Fig. 9). Whilst glass is extremely strong in compression it is relatively weak in tension and it is tensile stresses which invariably cause failure. In this instance the tensile stresses are concentrated along the weakest part of the panel—the edge which always has minute flaws and fissures. These will determine the limiting stress which the glass can withstand, beyond which they will open up and start cracks across the pane. This hot centre cold edge differential may be higher at low ambient temperatures, as for instance on a clear frosty day when the sun emerges from behind an obstruction or cloud. A dark heat absorbing frame will reduce the differential in comparison to a white or reflective frame. The difference between a metal and wood frame in this respect has not yet been assessed.

Experiments and experience have shown that two factors are critical in determining resistance to this stress. The first is the amount of edge cover. Within practical limits the narrower this is the smaller will be the temperature differential and hence the stress on the glass. Above a certain width of cover, about $1\frac{1}{8}$ in. for ¼-in. glass, the stress again becomes less as there is an increasing width of strip to resist the tension. At about $1\frac{1}{8}$ in. the two opposing trends combine to give the lowest resistance. Fig. 10 shows edge stress plotted against the width of edge cover. If the maximum edge cover is limited to $\frac{3}{8}$ in. the glass has an ample margin of safety (see Fig. 11).

The second critical factor is the edge condition of the glass; any edge damage such as shelling, grazing, nipping or even arrising (particularly on the coloured surface of the glass) weakens the edge resistance to tension. Prevention of such damage involves good cutting, careful handling and packing and careful glazing. Wooden battens should always be used to cushion glass from hard floors or walls during storage.

In the cutting of wired glass small edge "vents" (fissures) are caused by the wires during cutting. It should not, therefore, have colour applied to it and wired "Muroglass" had to be withdrawn for this reason. Translucent or transparent wired glass may be used in front of opaque panels provided there is an

technical section

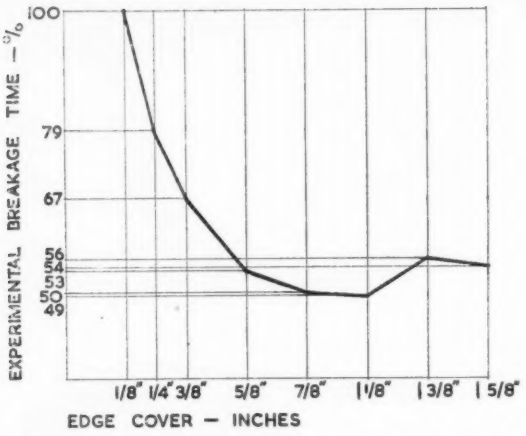
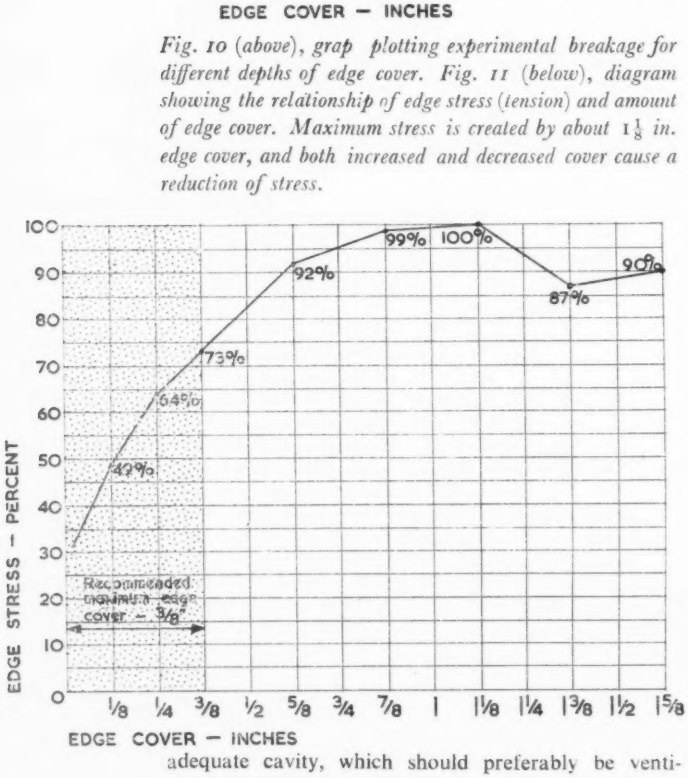


Fig. 10 (above), graph plotting experimental breakage for different depths of edge cover. Fig. 11 (below), diagram showing the relationship of edge stress (tension) and amount of edge cover. Maximum stress is created by about 1⅛ in. edge cover, and both increased and decreased cover cause a reduction of stress.



adequate cavity, which should preferably be ventilated to the outside. Cavity ventilation will not only reduce the centre glass temperature but is also desirable as a means of condensation control.

Tight glazing will, of course, cause breakage under thermal movement but few substantiated cases of it have occurred as precautions for its prevention are standard practice in the glazing trade. Special care must, however, be taken to prevent projecting screw-heads, welding fillets in corners and out-of-square frames from causing tight glazing. The clearances normally recommended are larger than required for differential thermal movement because they envisage these conditions and also dimensional tolerances in the glass and frame.

The determination of these clearances from theoretical data, such as coefficients of expansion, as is done in Digest No. 99, is difficult, because:

(*a*) The glass coefficient is lower than that of any framing material except timber (Table 2 in Digest No. 98 suggests that glass and steel have identical coefficients; this is not in accordance with standard reference works). This suggests that contraction during cold weather of the frame against the glass may be a more serious risk than expansion of the glass against the frame in hot weather.

(*b*) Even though the frame has a higher coefficient it may expand less because it has a high thermal capacity, *e.g.*, concrete; because it is reflecting, *e.g.*, aluminium; or because it projects in the nature of a cooling fin and is thus cooled more rapidly by the wind than the glass.

(*c*) In a row of windows or panels it is impossible to predict in which direction a particular frame will move in respect to the glass edge—in moving away from one pane it may move towards another.

(*d*) The frame material will generally move parallel to the glass edge and the space reduction between the frame and glass is more likely to be the result of buckling than straightforward thermal expansion.

Using the figures given in Table 2 of Digest No. 98 and assuming the biggest difference in materials (*i.e.*, glass in an aluminium frame) the total relative movement does still not justify the clearance recommended in Digest No. 99—*i.e.*, ¼ in. for every 4-ft. length. In an 8-ft. length this would mean ½-in. clearance at both ends which would necessitate a minimum rebate depth of ⅞ in., unlikely to be obtained in any of the standard framing systems. Apart from this, the difficulty and expense of adequately filling a ½-in. wide gap with mastic makes such clearances impracticable.

In practice, therefore, the customary tolerance of ⅛ in. all round, for panes up to 30 in. in their major dimensions and 3/16 in. all round for panes over this size, will be sufficient to cater for thermal movements and the other conditions described above. The two setting blocks placed under the bottom edge not only prevent mechanical stress caused by direct glass to frame contact but are also intended to centralize the glass in the opening. Sometimes they have to be of different thicknesses to do this. The suggestion in Digest No. 99 that setting blocks should be placed at "frequent intervals" along the bottom edge would largely defeat their purpose; the glass can only be raised fully on two blocks and the others would take no weight. The two that do so may be the wrong ones for even load distribution or centralization of the pane.

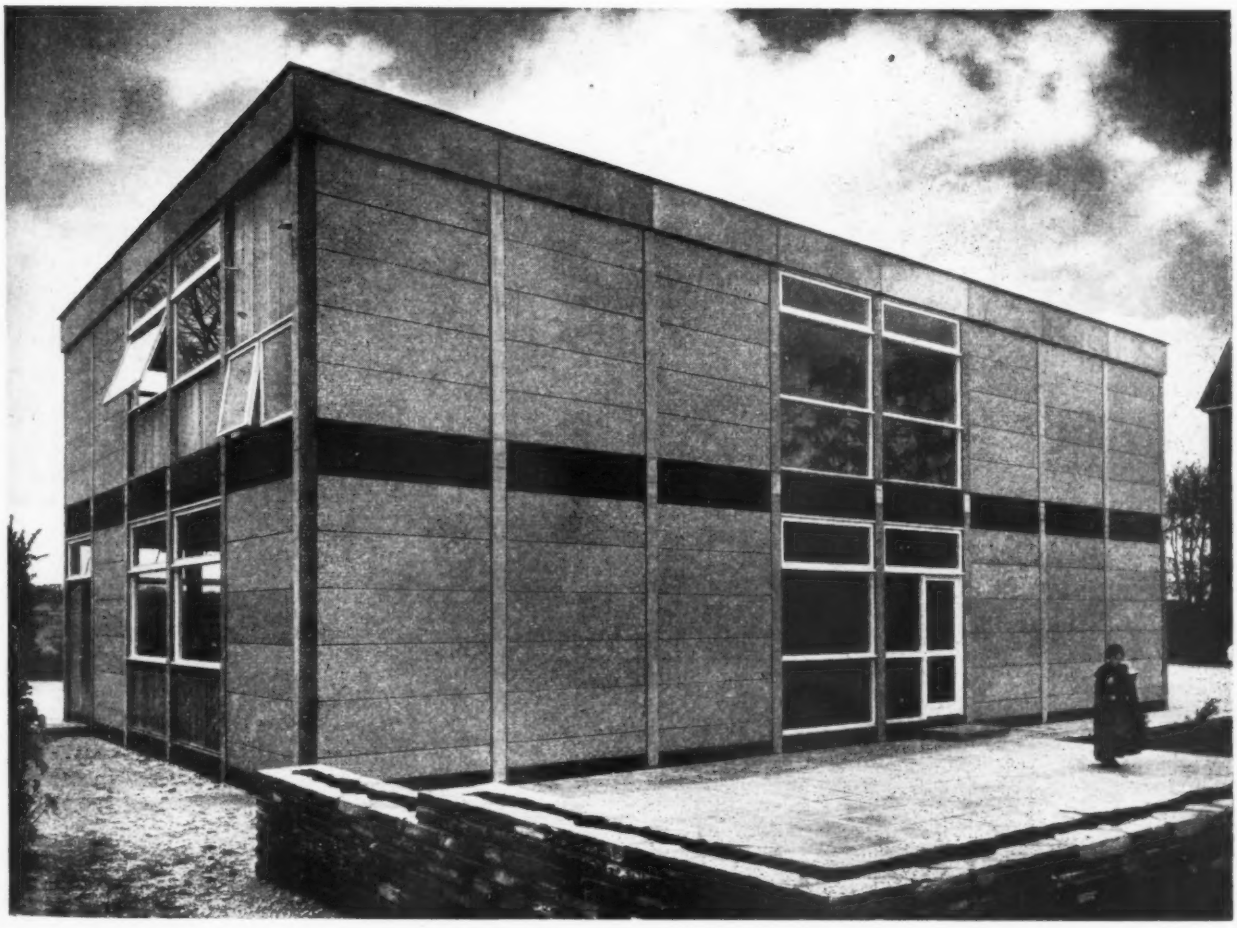
It is equally important to maintain clearances between the front and back of the glass and the frame and bead, to prevent local hot or cold spots and mechanical stress. Normally ⅛ in. is recommended as a maximum on each side. Under "wind" special precautions to prevent this mastic from being squeezed or "pumped" out in exposed situations are described. High glass temperatures also affect such materials as mastics, stoved or pigmented colours and insulation materials. The manufacturers of these products must be aware of the possible maximum temperatures and it is suggested that they should assume 160 deg. F. to 175 deg. F. for this country and 175 deg. F. to 190 deg. F. for tropical regions.

LABORATORIES

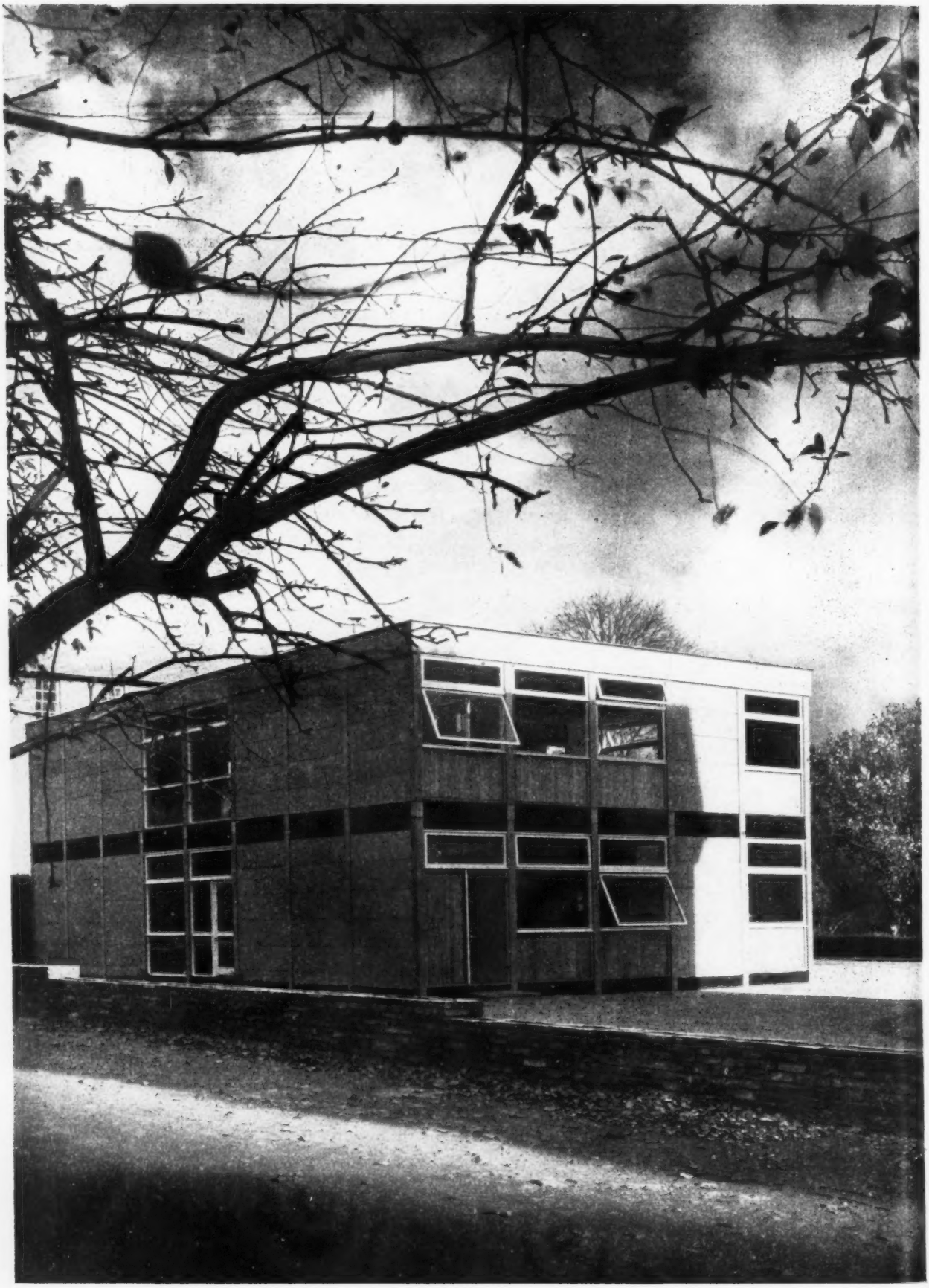
at SHERBORNE SCHOOL FOR GIRLS, SHERBORNE, DORSET; designed by the ARCHITECTS' CO-PARTNERSHIP
quantity surveyors DAVIS, BELFIELD and EVEREST

A new building was required at the Sherborne School for Girls, to accommodate the chemistry department and release existing laboratories for the physics and biology departments. As the school is short of space for new buildings, a two-storey block was designed and constructed to take a third floor if required later. The areas of rooms, amount of equipment installed, etc., were based on recommendations from the Industrial Fund for the Advancement of Science in Schools, from which the school received a grant. The laboratories are constructed in the precast concrete system first used at the Worthing Secondary School (AJ August 4, 1955).

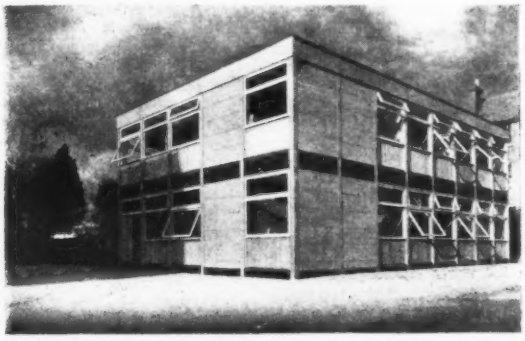
From the north, showing the entrance with landing windows above.



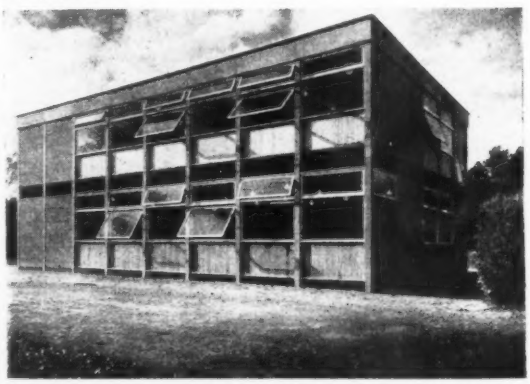
building illustrated



Opposite page: from the south-west. Below: from the north-west. The light-coloured precast concrete slabs have a sienna marble, exposed aggregate finish. The slabs which form a dark line round the middle have a black cement mix with a dark exposed aggregate. The junction between the ground and first floor columns with the exposed ends of bracket units have been exposed with "V" joints. In most cases where this structure has been used on other buildings these joints have been slurried over. The wall in the foreground of the picture on the left was already on the site.



Below: from the south. The fascia and columns are of precast concrete. The in-situ concrete plinth is painted black. The window units are of timber, painted white, and the panels below are of untreated Western Red Cedar with sub-sills of oiled hardwood. External solid doors are painted blue, BSS.2660 No. 7-080.



Below: elementary chemistry laboratory on the ground floor. The ceilings are white painted fibreboard. The floors are black and white marbled thermoplastic tiles. The exposed structural members are all painted white. The wall panels on the chalk board wall are light pink, BSS.2660 No. 1-020. The end wall panel next to the window is pale blue, No. 7-083.

analysis

CLIENT'S REQUIREMENTS

A new building to house the whole of the accommodation needed for chemistry so that the existing laboratories could be re-planned, to enlarge within them the physics and biology departments.
The school is very short of space for building. Therefore a two-storey block, with the possibility of adding a further storey for geography at a later date, was decided on.
The site selected by the school is on part of a disused tennis court. A minimum amount of site work and landscaping has been done, in order not to increase gardening and maintenance work.

PLANNING AIMS

The school received a grant from the Industrial Fund for the Advancement of Science in Schools. The areas of rooms, layout and quantity of equipment are generally in accordance with the Fund's recommendations. A simple, rectangular building with minimum circulation areas and large, well-lit rooms was aimed at.

element and price per sq. ft.	s	d
preliminaries and insurances	15	5½
contingencies	4	3¼

Figures based on estimated final account.

Work below ground floor level 3 9½
Columns housed in 2 ft. 9 in. square by 2 ft. 8 in. deep r.c. foundations. Between them runs a periphery beam, 6 in. wide by 1 ft. deep. No excavation under slab, maximum of 4-in. hardcore, 6-in. concrete slab.

STRUCTURAL ELEMENTS

Frame or load-bearing element 12 0½
Prestressed precast concrete frame. Columns at 6-ft. 8-in. centres, primary and secondary floor and roof beams and precast infilling slabs.

External walls 5 9
Standard eaves precast cladding slabs, fairfaced as columns. External precast concrete cladding slabs between columns; coloured black at first floor level; elsewhere faced with Siena marble to tone in colour with local Ham stone.

$$\text{ratio: } \frac{\text{solid wall}}{\text{floor area}} = \frac{0{\cdot}4597}{1}$$

Windows (cost includes external doors) 7 11¼
Softwood frames, hardwood sills. Projectors, hoppers and V-jointed cedar panels.

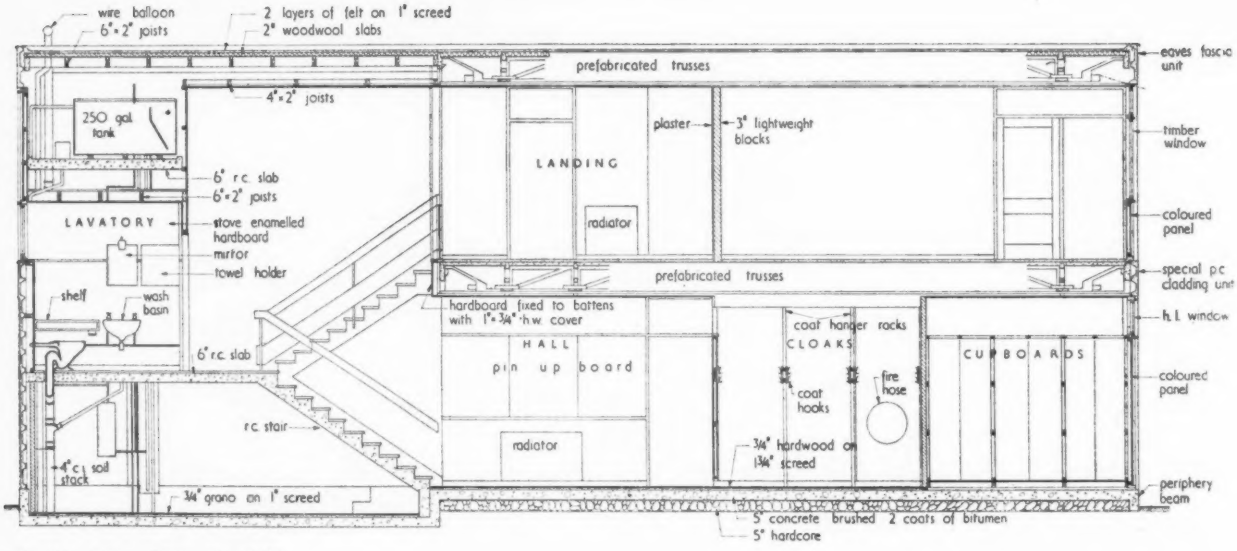
$$\text{Ratio: } \frac{\text{windows (including external doors)}}{\text{floor area}} = \frac{0{\cdot}5133}{1}$$

External doors (cost included above)
Front door in glazed panel. Side doors, painted external quality ply.

$$\text{Ratio: } \frac{\text{doors}}{\text{floor area}} = \frac{0{\cdot}015}{1}$$

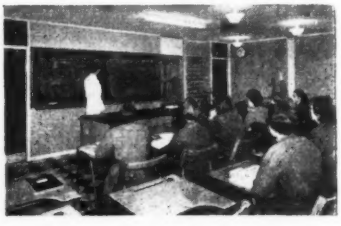
Upper floors 1 8½
Span, 26 ft. 8 in. Primary and secondary prestressed, precast 3 ft. 4 in. units; concrete infilling slabs, 2-in. structural screed.
Area, 1,718 sq. ft.
Super loads, 90 lb. per sq. ft. (60 lb. live load, 30 lb. partitions, finishes, etc.)

building illustrated

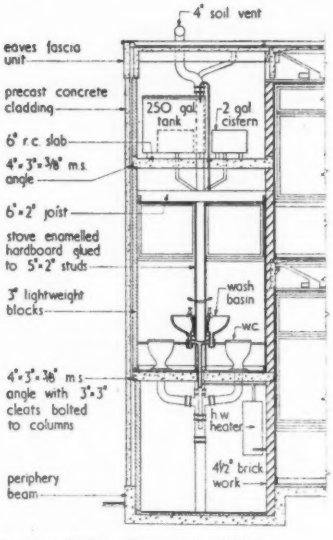


Section A-A [Scale: ⅛" = 1' 0"]

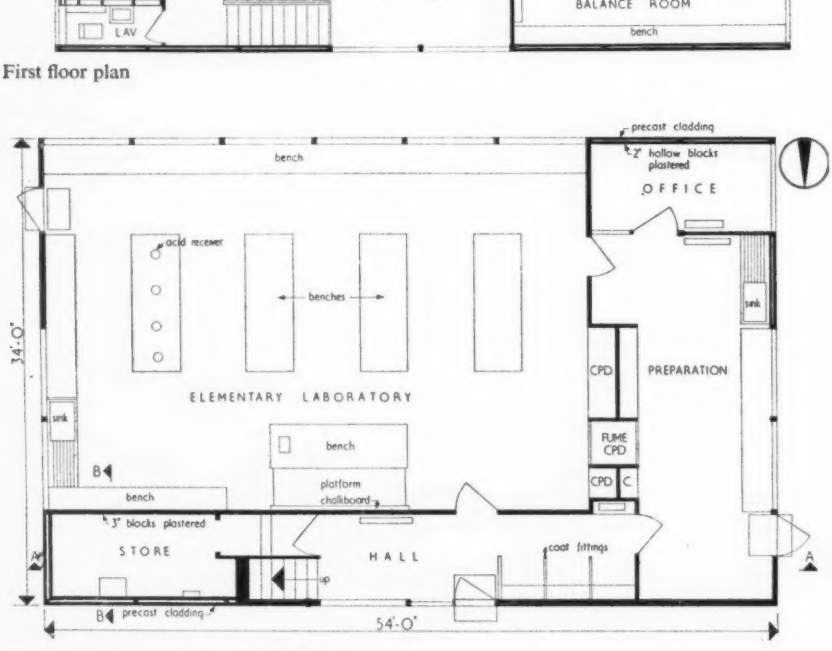
First floor plan



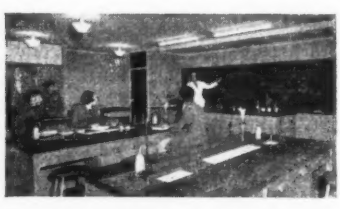
The advanced chemistry lecture room.



Section B-B [Scale: ⅛" = 1' 0"]



Ground floor plan [Scale: 1/32" = 1' 0"]



The advanced chemistry laboratory on the first floor.

analysis

	s	d
Staircases	1	0
1 r.c. staircase and landing. Not a part of the precast r.c. system. Width, 3 ft. Total rise, 10 ft. 9 in.		
Roof construction	2	10
Primary and secondary prestressed precast concrete unit; concrete infilling slabs, 3-in. insulating screed. Aluminium eaves drip. Area, 1,792 sq. ft.		
Roof lights		
Glazing	1	8½
Hopper windows, 32 oz. Projectors, ¼-in. plate. Wired Georgian in four below-sill glazed panels.		
total of structural elements	32	11½

PARTITIONS AND FITTINGS

Internal partitions	1	2¾
2-in. hollow blocks (1,166 sq. ft.) and 3-in. structural blocks (535 sq. ft.).		
Internal doors	1	0¼
13, hardboard painted, single.		
Ironmongery		6
Door furniture, anodized aluminium lever handles. Window furniture, cam stays and espagnolette bolts.		
Fittings	18	5¾
Laboratory Benches: hardwood tops, beech faced block-board doors and cupboards. Plastic catchpots and drainage (from sinks) above floor level.		
Others		7
total of partitions and fittings	21	9¾

FINISHES

Floor finishes	3	7½
¼-in. granolithic to store; area, 109 sq. ft. Price per sq. yd., 10s. 5d. 9-in. × 9-in. × ⅛-in. thermoplastic tiles to laboratories and classrooms. Area, 2,783 sq. ft. Price, 13s. 4¼d. per sq. yd. Wood block flooring, polished, to halls and landings. Area, 303 sq. ft. Price, 55s. 9d. per sq. yd.		
Wall finishes	1	5½
½-in. plaster, painted. 2-in. hollow clay pot inner skin to external walls.		
Ceiling finishes	2	11¼
Tentest fibreboard panels, fixed to timber framing and treated with fire-resistant paint.		
Roof finishes		8½
Two layers bituminous felt and chippings. Area, 1,718 sq. ft.		
Decorations	1	11
Walls: emulsion paint, prime and three coats. Woodwork: gloss paint—internal, prime and three coats; external, prime and four coats.		
Total of finishes	10	7¾

SERVICES

	s	d
External plumbing		3½
Cast iron pipe connections to water and gas mains.		
Hot and cold water installation	3	2½
Galvanized iron pipes.		
Sanitary fittings		4¾
Two low-level w.c.'s; two glazed stoneware lavatory basins.		
Heating and ventilation	3	9¼
Low pressure hot water accelerated system service, warm air cabinets and radiators. Internal temperature, 62°F. for classrooms. Air change, 3 per hour. "U" of walls, 0.3. 0.6 for panels below windows. "U" of roof, 0.3 (MOE standard for school premises) cost excludes connection to heating main in adjoining building.		
Gas installation		8¼
20 points to laboratory benches and 2 gas water heaters.		
Electrical installation	2	9¾
Fluorescent lights, 6; Tungsten, 61; 13-amp. power on ring main, 10; clocks, 3.		
total of services	11	2

Drainage	1	8¾
Cast iron pipes. One new manhole, connection into existing manhole. Rainwater also in cast iron to existing manhole.		
Other elements not shown above	6	11½
All external works, drainage beyond last connecting manhole, all external gas, electrical and water mains, share of new heating installation in adjoining building.		

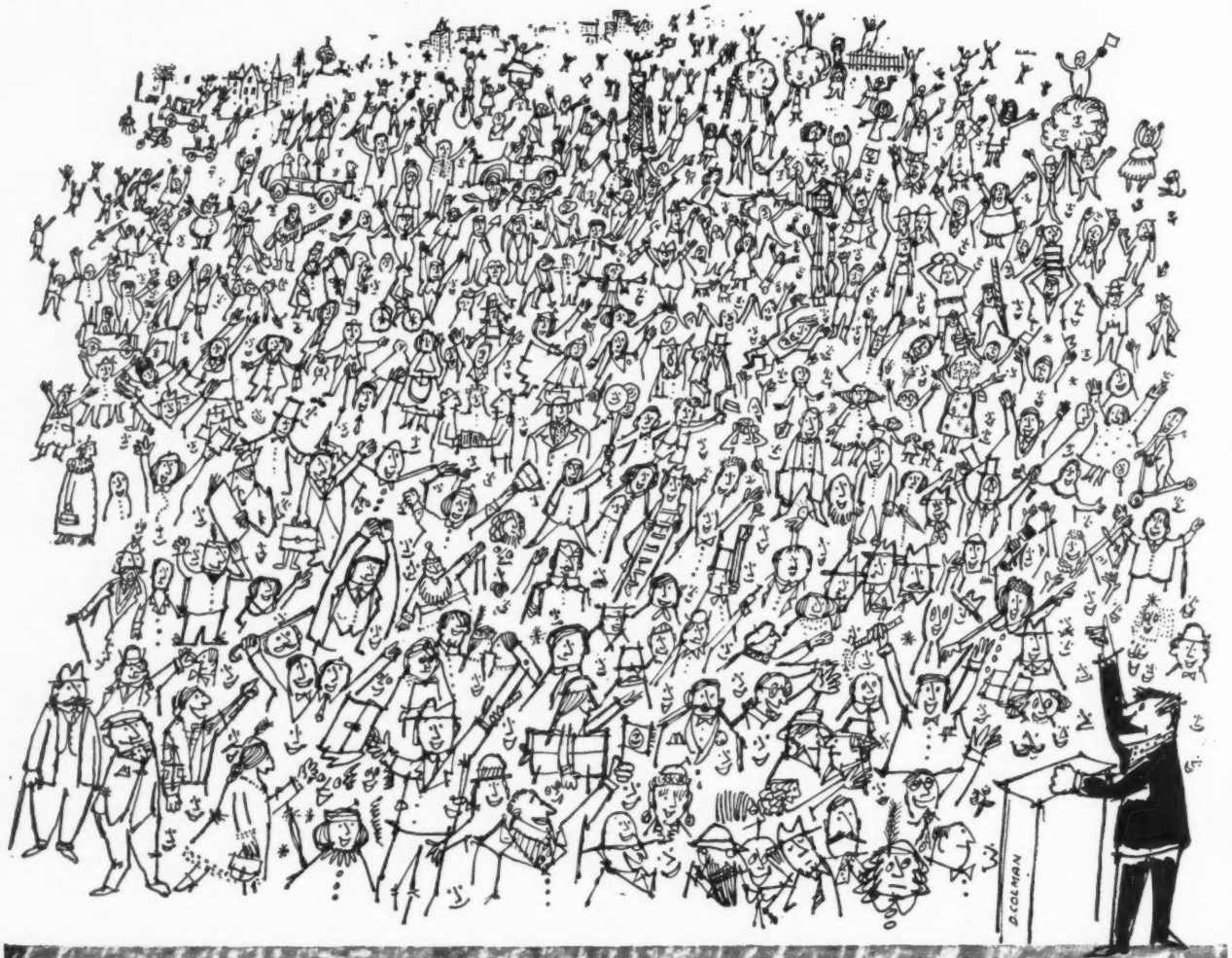
Shillings per sq. ft. of floor area (excluding "other elements".) = 101s. 10¼d. = £17,673 / 3,470 sq. ft.

COST SUMMARY

Ground floor area: 1,775 sq. ft. Total floor area: 3,470 sq. ft.
Type of contract: negotiated.
Work began: May 1, 1957.
Work finished: August 30, 1957.
Tender price: £18,780.
Final contract price: (estimated) £18,880 including "other elements" shown above).
Tender price external works and ancillary buildings: £220.
Final contract price: £240 (estimated).

CONTRACTORS

General contractor: Gilbert-Ash Ltd. *Sub-contractors—Electrical:* Norman H. Sheppard. *Flooring (Accotile):* The Southern Tiling Flooring Contractors Ltd. *Ceilings:* Tentest Fibre Board Co. Ltd. *Heating:* Weatherfoil Heating Systems Ltd. *Laboratory benches:* Spencer's Joinery Ltd. *Window and external door units:* East & Son Ltd. *Ironmongery and sanitary fittings:* William Dibben & Sons Ltd. *Cloakroom fitting:* The Finch Organisation. *Furniture:* Avant Galleries Ltd. *Blinds:* Deans Blinds (Putney) Ltd. *Fire fighting equipment:* The Pyrene Co. Ltd.



Five thousand years we've waited . . .

for CARLITE pre-mixed plaster

Aha! A revolution in plaster and about time too. Five thousand years is a lot of 44-hour weeks, but it is roughly the number of years that Man has been plastering with heavy sanded plasters. The first advance of basic importance in all this time is Carlite.

Carlite is a *pre-mixed* plaster, and in it sand is replaced by a lightweight aggregate of Perlite, which is premixed with gypsum in the factory.

The advantages of Carlite are many. Already it has won the calculating (but human) hearts of architects and builders, who are using it on scores of their biggest contracts. If you are still unaware of just what these advantages are, full technical information is available. Send us your name and address today.

The Gotham Company Limited, Gotham, Nottingham.
The Carlisle Plaster & Cement Co., Cocklakes, Nr. Carlisle.
Thomas McGhie & Sons Ltd., Kirkby Thore, Westmorland.

building illustrated

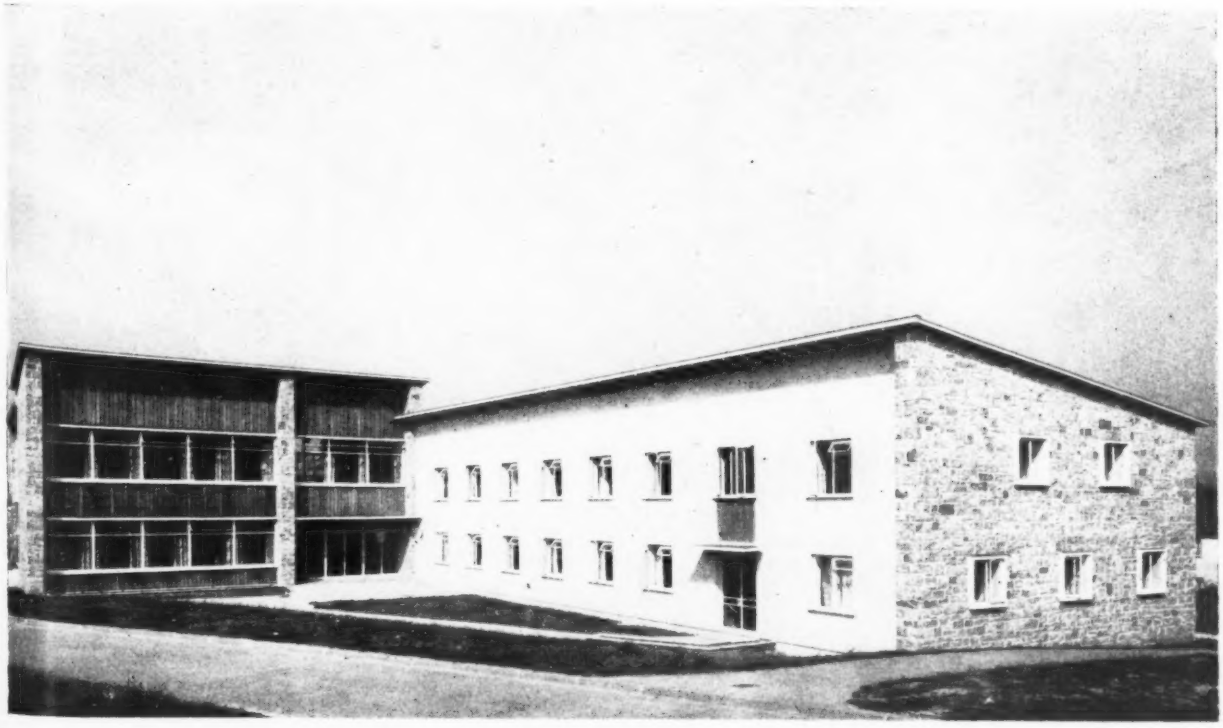
Old People's home at Ernesettle Green, Plymouth

OLD PEOPLE'S HOME

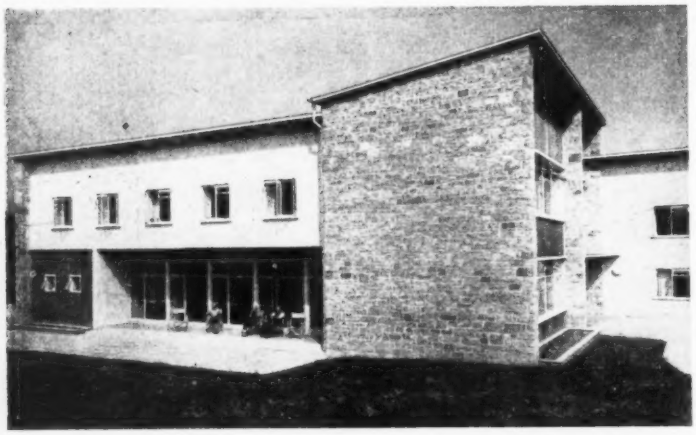
at ERNESETTLE GREEN, PLYMOUTH ; designed by H. J. W. STIRLING, city architect ; assistant architect D. HUNT assistant W. R. SOLOMON ; consultants (heating) HOARE, LEA and PARTNERS
quantity surveyors GASKELL, BROWN and PARTNERS

The Lakeside Residential Home for old people is located in the neighbourhood unit of Ernesettle on the perimeter of the city, and close to a shopping centre, church and green. The accommodation for 35 persons of both sexes includes a high proportion of single bed-sitting rooms, a feature not to be found in similar homes in the city. Each bed-sitting room is equipped with a built-in wardrobe, a lavatory basin, and a radiator under the window. This is the first old people's home to be cost analysed in the JOURNAL.

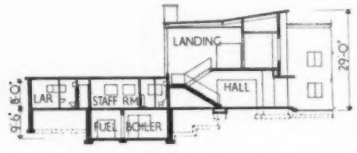
From the south-west. The communal and staff wing is on the left.



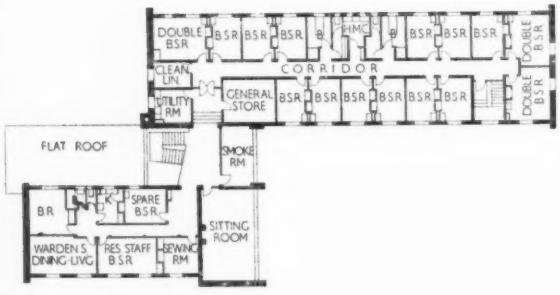
building illustrated



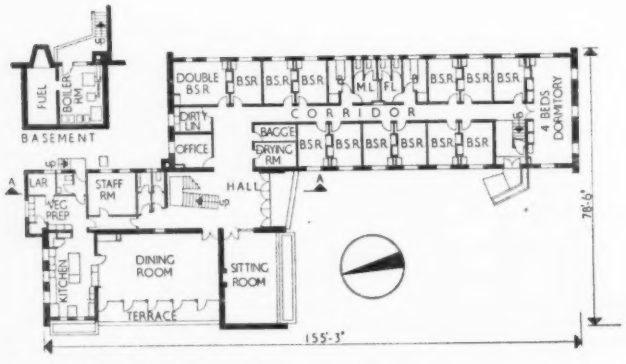
From the west. The wing on the left contains the dining room and kitchen on the ground floor and staff accommodation above. Gable walls are faced with random limestone rubble; elsewhere external finishes include white tyrolean rendering, facing bricks and vertical timber boarding.



Section A-A



First floor plan



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

analysis

CLIENT'S BRIEF

To provide a home for 35 able-bodied aged persons with a high proportion of single bed/sitting rooms, and a small number of double rooms for married couples Central heating to residents' rooms in addition to main communal rooms. Ground floor access for wheel-chairs to main communal rooms.

SITE: topography, access

The site is located on the perimeter of the city in the neighbourhood unit of Ernesettle and in close proximity to its shopping centre, church and green. The site faces on to the green and the road surrounding it and slopes evenly away from this road to the northernmost corner. Corporation terrace and semi-detached traditional type houses flank the site on either side and at its back.

PLAN: general appreciation

The accommodation is contained on two floors and in two main units The larger unit contains the residents' bed/sitting rooms, toilets and bathrooms, and the other unit, which caters for the communal life of the home, contains the large sitting rooms, smoke room, dining room and kitchen. The large entrance hall links them and at the same time isolates the separate functions of the two units, giving privacy and quiet to those residents wishing to retire to their rooms.

price per sq. ft.	s	d
preliminaries and insurances		10½
contingencies		11½

Note: figures based on final contract price. Contingencies excluded from total.

STRUCTURAL ELEMENTS

Work below ground floor level — 5 3½

Mass concrete foundation. Ground floor, 2-in. concrete cover, d.p.m. and 4-in. site concrete. Basement tanked with 1½-in. asphalt horizontally and ¾-in. vertically.

Load-bearing element, external walls — 5 3

Calculated engineering brick piers to support beams across wide spans.
11-in. cavity walls. White tyrolean finish externally. External walls to ground floor reinforced, to comply with byelaw. Gable walls, 14-in. random rubble limestone externally, 2-in. cavity and 4½-in. brick inner skin. Facing brick panels.

$$\text{ratio: } \frac{\text{solid wall}}{\text{floor area}} = \frac{0{\cdot}76}{1}$$

Windows — 1 9½

Purpose-made and standard type metal windows generally, painted white.

$$\text{ratio: } \frac{\text{windows}}{\text{floor area}} = \frac{0{\cdot}073}{1}$$

External doors — 6½

Main and secondary entrances, purpose-made metal casements. Kitchen entrance, flush door with Georgian wired glass.

$$\text{ratio: } \frac{\text{doors}}{\text{floor area}} = \frac{0{\cdot}026}{1}$$

Upper floors — 3 1

R.c. floor slab.
Span: 24 ft. 6 in. (average). Area: 640 sq. yd.

building illustrated

The dining room on the ground floor, looking towards the kitchen servery hatch.

The first floor landing with the smoke room on the left.

analysis

	s	d
Staircases	10	
R.c. with h.t . reinforcement. Main beam from which the 2-in tread and riser is cantilevered. 1-in. heavy density cork treads. Steel balustrade both sides. Two staircases: widths, 4 ft. and 3 ft. 6 in. Total rise, 10 ft. 10 in. and 8 ft.		
Roof construction	2	5
Type of roof:		
1. 8° monopitch: 7-in. × 2½-in. rafters supporting strawboard 2. 8° monopitch 5-in. × 2-in. rafters on steel bearers supporting strawboard. — 6,850 sq. ft.		
3. Flat: 9-in. × 2½-in. bearers supporting boarding for zinc. — 1,500 sq. ft.		
Glazing		8
total of structural elements	14	7

PARTITIONS AND FITTINGS

Internal partitions	1	1½
3-in. breeze concrete, 315 sq. yd. 4½-in. brick, 504 sq. yd.		
Screens		8½
Glazed and wax polished mahogany, to act as fire breaks.		
Internal doors	1	0¾
Flush, hardboard-faced. 115 single, 10 double.		
Ironmongery		3¼
Anodized aluminium door furniture, pull handles, kicking plates and latches.		
Fittings		6
Cupboards in kitchen, dining room, sewing room. Airing cupboard, and storage shelves to clean linen room and baggage room.		
total of partitions and fittings	3	8

FINISHES

Floor finishes	3	6¾
Bed/sitting rooms and communal rooms, cork tiles: 8,820 sq. ft., price 26s. per sq. yd. (laid). Bathrooms, toilets, etc., terrazzo: 648 sq. ft., price 30s. per sq. yd. Entrance and sun terrace, concrete tiles: 306 sq. ft., price 35s. per sq. yd. Kitchens and stores, coloured cement: 1,467 sq. ft., price 6s. 6d. per sq. yd.		
Wall finishes	3	1½
Hard wall plaster finished washable distemper.		
Ceiling finishes		8
Ground floor, plaster; first floor, ⅜-in. plasterboard and skim coat.		
Roof finishes	3	5½
Aluminium " clip-on " roofing on 2-in. strawboard (6,850 sq. ft.); zinc on felt and boarding (1,500 sq. ft.). Total roof area, 8,350 sq. ft.		

analysis

	s	d
Decorations	1	10½
Walls, oil-bound washable distemper. Wallpaper to panel in dining room. Gloss paint interior and exterior. Hardwood joinery wax polished. Cedar boarding externally, twice oiled. Medium colour cork tiles.		
total of finishes	12	8¼

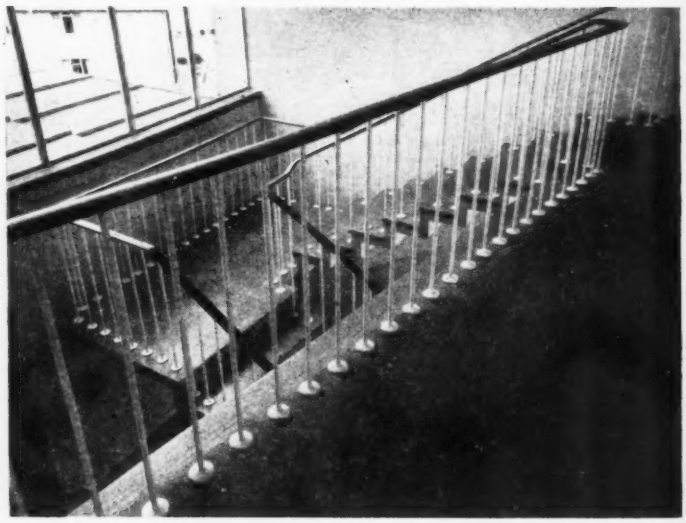
SERVICES

External plumbing		4¼
R.w.p.s and gutters in asbestos cement, painted white.		
Hot and cold water installation	3	4
H. and c. to each bed/sitting room basin. Roof space utilized as circulating duct. Hot water circulation assisted by pumps.		
Sanitary fittings	1	4¼
A lavatory basin to each bed/sitting room. Slop hopper to dirty linen room. 33 lavatory basins, 6 single sinks, 2 double sinks, 4 foot baths, 5 baths, 9 w.c. suites, 1 slop hopper, 3 urinals.		
Heating and ventilation	3	2¼
Accelerated l.p. hot water by radiators in all rooms except entrance hall, dining room and ground floor sitting room, where there is coiled floor heating. Open fireplaces in sitting rooms. Extract fans to kitchen and drying room. Natural ventilation to bed/sitting rooms.		
Gas installation		1
Gas points to cooker, hot cupboard to servery counter and eye level grill. Poker points to two sitting rooms.		
Electrical installation	1	11¼
Each bed/sitting room has light switch and bell push to call system by bedside, with socket outlet below, 18 in. from floor level. Call system of luminous type and once started will not stop until switched off at the source of the call. Type of point and number of each type: Lighting, 110; 13-amp outlets, 52; clock, 5; motors, 4; cooker, 1; fire alarms, 6; call system, 31.		
Fire-fighting equipment		¼
Four hosereels fixed into positions recommended by the Fire Officer, two on each floor. Additional equipment for boiler room and kitchen.		
total of services	10	3¼
Drainage	2	1
One-pipe plumbing.		
Other elements not shown above		3
Kitchen equipment, gas: cooker, hot cupboard to servery counter and eye-level grill. Electric refrigerator and cooker to matron's kitchenette.		

total cost per sq. ft. of floor area = £31,282 / 12,579 sq. ft = **49 8¼**

COST SUMMARY

The sketch design was completed July 1951, but working drawings were not prepared until 1953/54, due to national steel shortage at that time.
Ground floor area: 6,459 sq. ft.
Total floor area: 12,579 sq. ft.
Type of contract: RIBA (quantities)
Work began: February 17, 1954
Work finished: February, 1955
Tender price of foundations superstructure installations and finishes, £31,339
Final contract price: £31,282.
Tender price of external works and ancillary buildings: £1,931
Final contract price: £2,480
Total tender: £33,270
Final: £33,762



The main staircase, the 2-in. treads and risers are cantilevered from a central r.c. spine beam. Treads are finished with 1-in. heavy density cork.

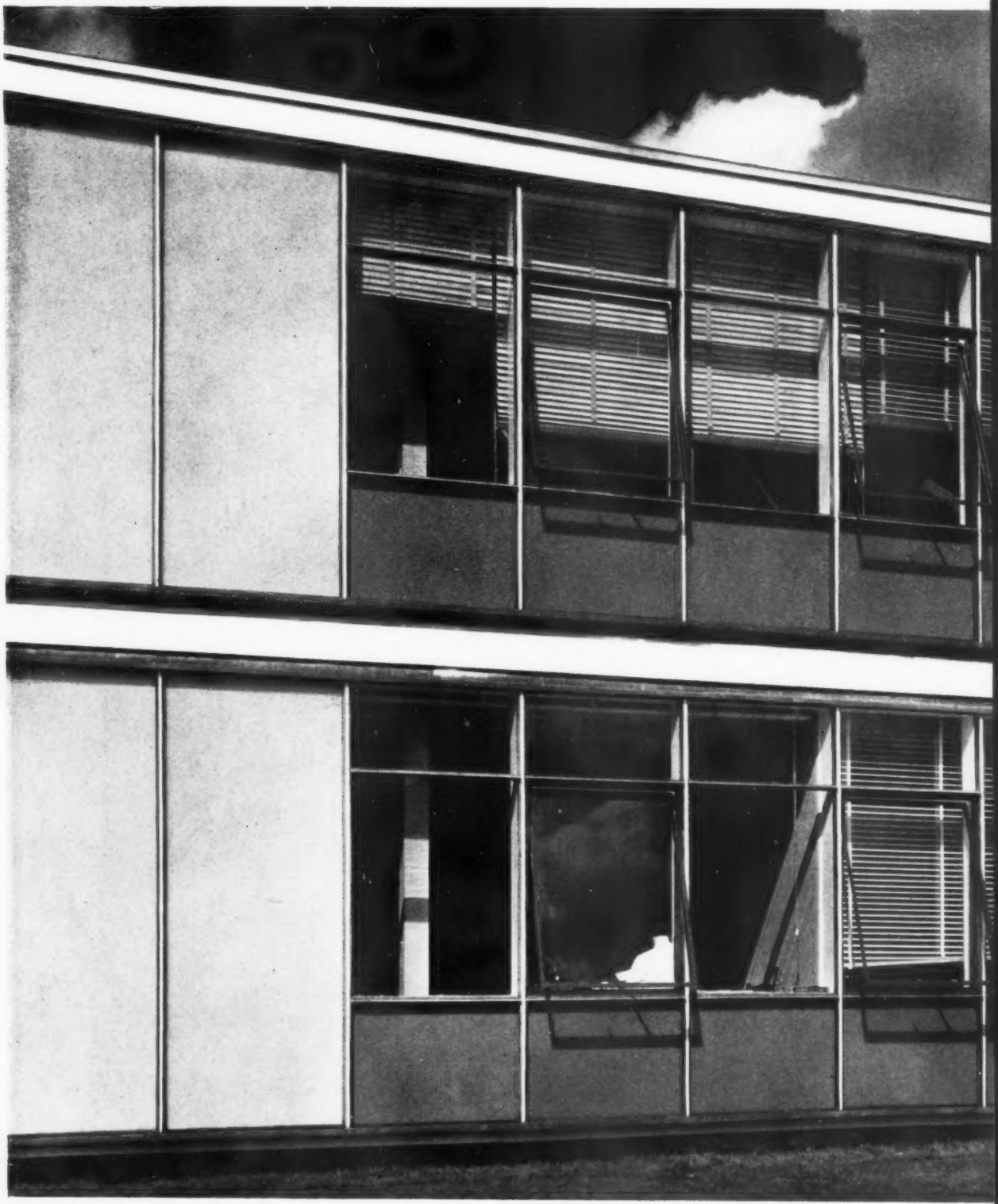
CONTRACTORS

General contractor: A. N. Coles Ltd. *Sub-contractors:—Gas and kitchen equipment:* South West Gas Board. *Special windows:* Henry Hope & Sons Ltd. *Electricity:* Yeldon & Gardiner. *Cork tile floors:* Cork Insulation & Asbestos Co. Ltd. *Terrazzo:* S.W. Flooring Co Ltd. *Balustrades:* Woodrow Metals Ltd. *Heating, hot and cold water supplies:* Johnson & Baxter Ltd. *Reinforcement:* Square Grip Reinforcement Co. Ltd. *Ironmongery:* William Dibben & Sons Ltd. *Sanitary fittings, curtain track:* Henry Lawry Ltd. *Roller shutter:* G. Brady & Co. Ltd. *Fire grates:* Plymouth Tile & Hardware Co. Ltd. *Fire-fighting equipment:* Pyrene Co. Ltd. *Tiled fire surrounds:* J. F. Hussell & Co. Ltd. *Paints:* Associated Lead Manufacturers Ltd. *Bricks:* Western Counties Brick Co. *Door furniture:* R. Cartwright & Co. Ltd.

working detail

CURTAIN WALL: FACTORY AT CAMBERLEY, SURREY

John Bickerdike, architect

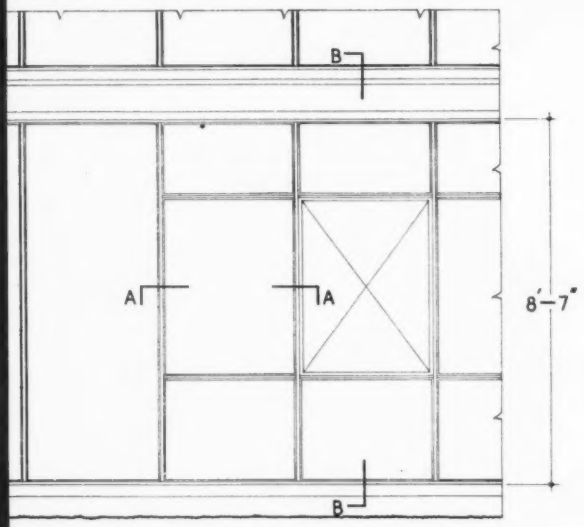


The frame of this curtain wall is of redwood, prefabricated on a **3** *ft.* **4** *in. module, in four and six module lengths. The frames are fixed with* $3\frac{1}{2}$*-in. m.s. screws (at quarter span between module lines) to head and sill plates bolted to the structure. Apart from the narrow forward edge of mullions and the plate beneath ground floor sill, the soft-wood frame does not read in the external face. Window sills and transoms have aluminium drips; framing sills and remaining plates are lead-covered. Opening lights are steel and fixed lights are beaded in iroko.*

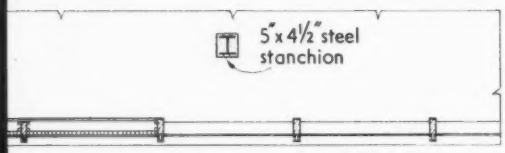
working detail

CURTAIN WALL: FACTORY AT CAMBERLEY, SURREY

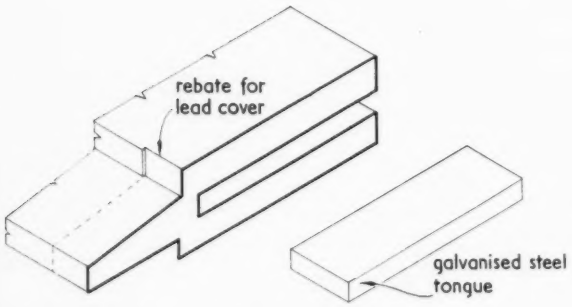
John Bickerdike, architect



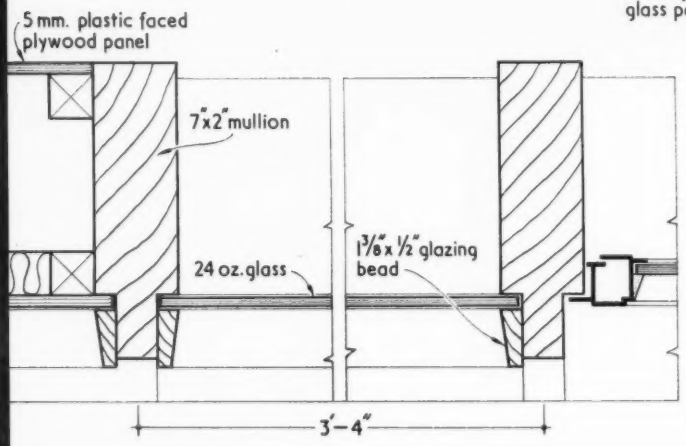
ELEVATION scale 1/4" = 1'-0"



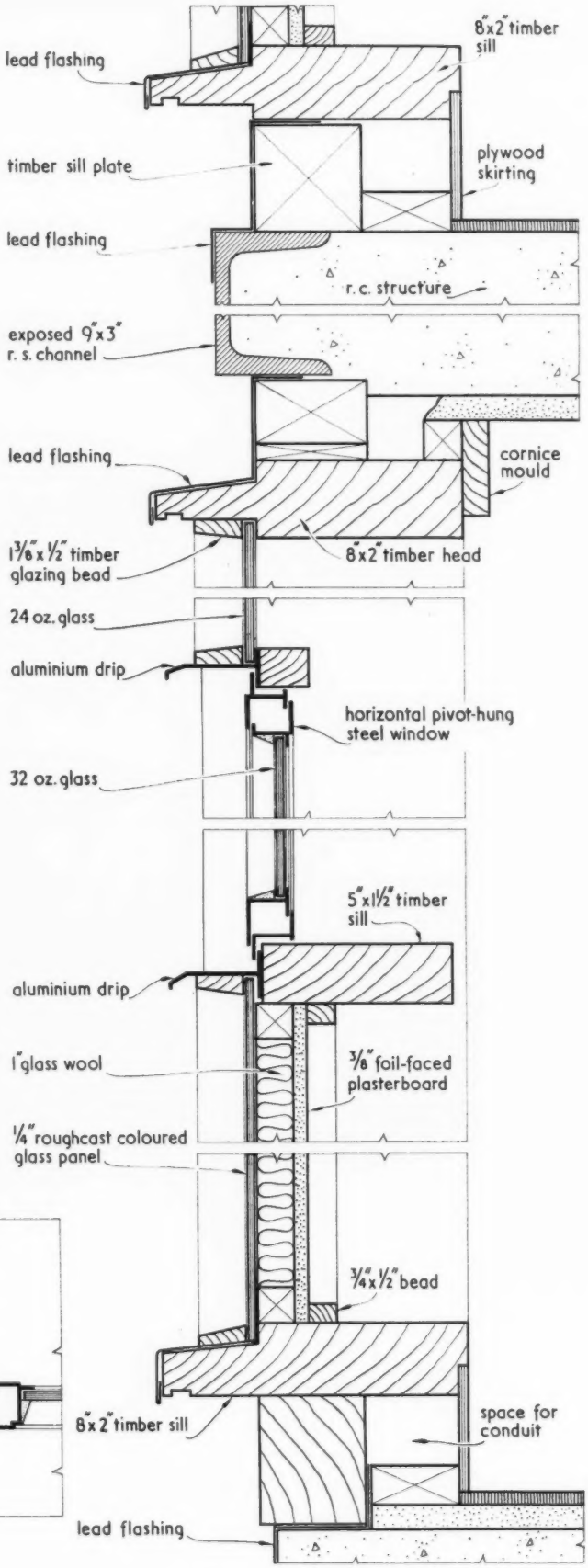
PLAN scale 1/4" = 1'-0"



METHOD OF JOINTING HEAD AND SILL UNITS.



PLAN AT A–A. scale ¼ full size



SECTION B–B. scale ¼ full size

working detail

ROOFLIGHT: FACTORY AT CAMBERLEY, SURREY

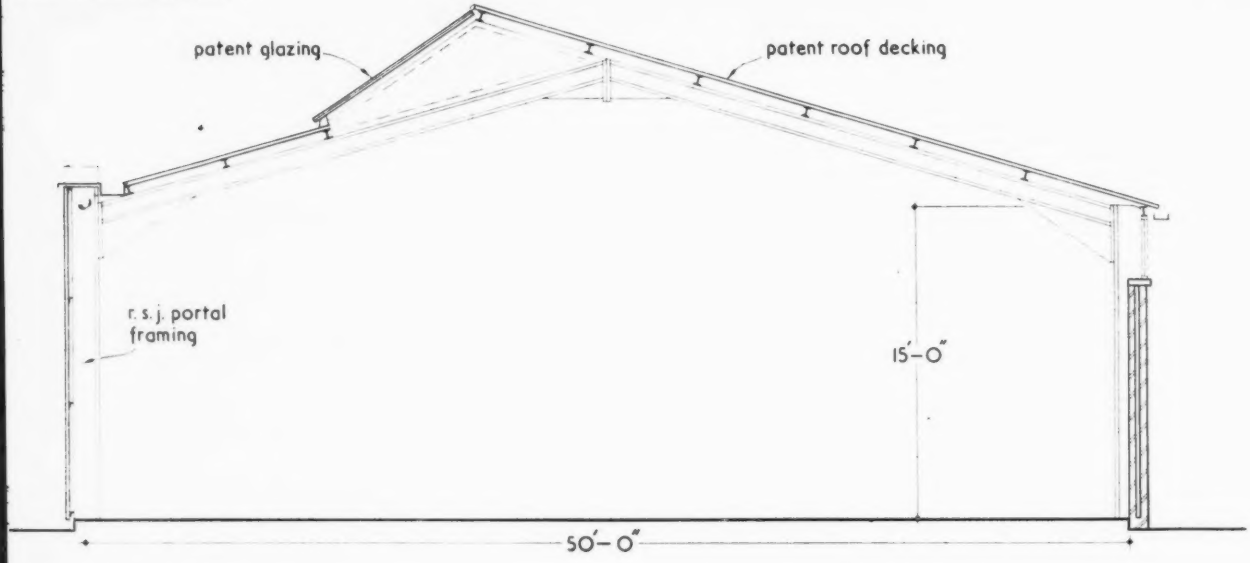
John Backerdike, architect

This unusually neat northlight is formed by the upward continuation of the southern slope of the roof. The light is supported on spandrel frames which rest on the main portal trusses. The spandrels are filled in (and, incidentally, painted magenta red) to provide some measure of glare protection.

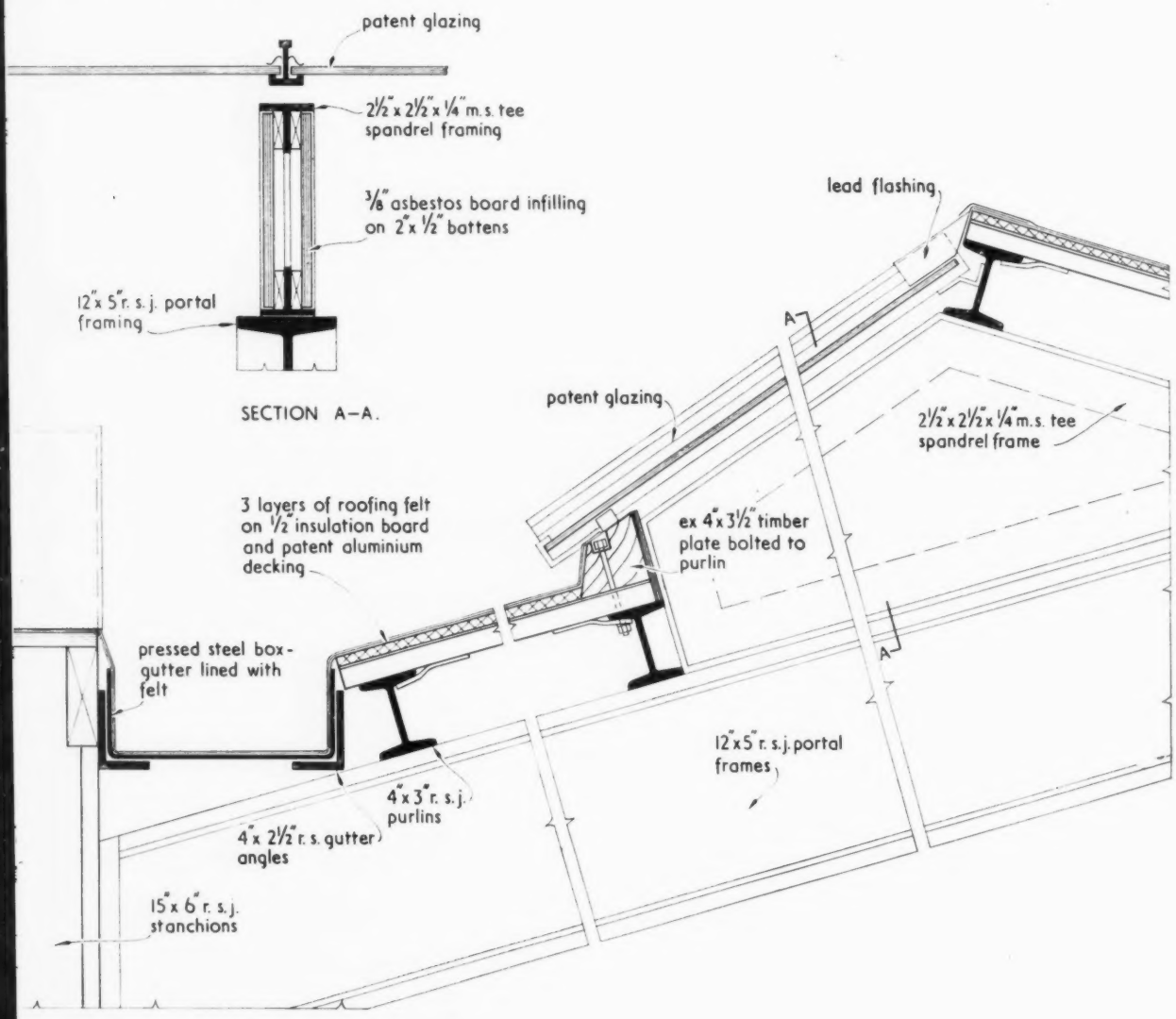
working detail

ROOFLIGHT: FACTORY AT CAMBERLEY, SURREY

John Bickerdike, architect



SECTION. scale 1/8" = 1'-0"



DETAIL SECTION OF ROOF. scale 1½" = 1'-0"

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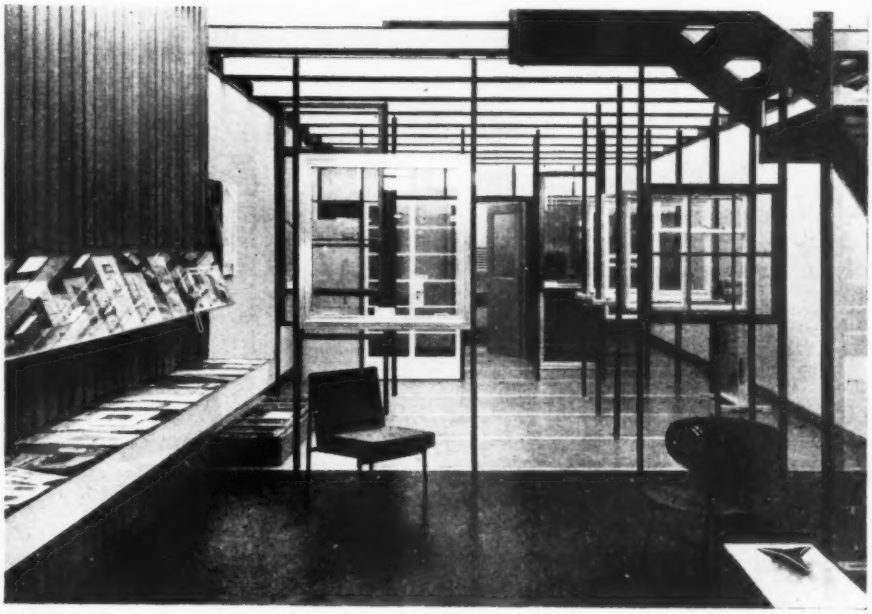
SHOWROOMS IN HIGH HOLBORN, LONDON, W.C.1

The newly-opened showrooms for Williams & Williams Ltd., at 36 High Holborn, were designed by Bronek Katz and Vaughan, architect-in-charge, Roger Balkwill. The problem of exhibiting a changing range of products has been solved by providing a grid to which windows, doors,



and curtain walling may be fixed. Exhibits can be bolted with friction grip fastenings to grooved pressed steel posts. These can be fixed in position between perforated floor strips and grooved overhead beams. Colours generally are subdued, with areas of natural wood, slate, black leather cloth and mirrors. Bright colour is introduced in small lighted ceiling recesses and in stained glass panels. The open staircase, left, avoids a visual restriction in the very narrow site.

News continued from page 768

BUILDING CENTRE

Managing Building Projects

A correspondent writes:

The third of the discussions on Managing Building Projects, organized by the Brixton School of Building, and held at the Building Centre, was more lively than the previous two ("Architect and Client," and "Architect and Quantity Surveyor") for it touched on an issue crucial to architectural quality and value—architect-builder collaboration.

The architect speaker, Robert Paine of Canterbury, and the engineer, Geoffrey Wood (of Ove Arup and Partners), spoke on early design collaboration between engineer and architect. They have worked together in practice and agree that collaboration should begin at the "back of an envelope stage" when many alternatives can be thrown up and thrown out. Robert Paine suggested there should be a period when the architect goes "into retreat" to assimilate the possibilities and the requirements until they become "part of him"—emerging with a solution in general terms which architect and engineer will work up together.

Neither speaker thought it necessary to have *all* drawings completed provided they kept well ahead of the builder's needs—not only for building, but for materials ordering. In running a contract, Mr. Paine mistrusted too much "open diplomacy" as he called it. Mr. Wood proposed site meetings once a month but agreed that one still had to "use the knuckle dusters behind the scenes." Robert Paine preferred control of the contract to be through the architect—who should not interfere in site management or deal with sub-contractors direct. Both speakers agreed that builders must take responsibility for sub-contractors—even if they had been nominated by the architect.

These topics led inevitably to design stage collaboration with the builder. Mr. Wood described his own experience of this as "the nearest to heaven that you can get," but warned the meeting that designers must not expect very fruitful design suggestions from a builder. His thinking is conditioned by competitive tendering and it is better for the designer to make use of his knowledge of site methods. Asked by Mr. Paine whether collaboration affected costs, Mr. Wood explained that the builder could give an idea of the costs of alternative solutions and could price unfamiliar methods with more confidence than if he were tendering competitively, because his risk was shared by the client. Pricing problems led Mr. Paine to question the practice of pricing only on the bill—"an abstract of the measurements of the building—rather than the building itself." Mr. Wood then quoted one of his own jobs—a bridge—where tenders had been supplied with photographs of a model, as well as drawings and a bill. He suggested that it was worth while to give contractors the opportunity to suggest modifications in a design and reminded the meeting that there was a strong tendency nowadays for an increasing use of negotiated contracts.

Discussion from the floor was mainly about the merits of employing a consultant rather than a sub-contractor as designer; the reduction of architects fees for specialist work; methods of selecting, by competition, a builder with whom one could collaborate in design; and the practice of employing a builder only as "job manager."

Announcements

F. R. S. Higgison, A.R.I.B.A., has commenced practice at 48, High Street, Burnham-on-Sea, Somerset (telephone: 3056), where he will be pleased to receive trade catalogues, etc.

Sir William Baird and Partners (London), chartered quantity surveyors, of 7, Catherine Place, London, S.W.1 (telephone: Victoria 8668) have taken W. D. Hyde, A.R.I.C.S., into partnership. The name of the firm remains the same. They also announce that on December 1 they are opening a branch office at 42, St. Mary's Gate, Derby, where P. D. Smart will be in charge.

T. A. Fitton & Son (E. Hamilton Thompson, A.R.I.B.A.), architects and surveyors, of 4, Chapel Walks, Manchester, 2 (telephone: Blackfriars 9930), announce that they have opened a branch office at Barclays Bank Chambers, 87, Haywood Street, Leek, Staffordshire, where they would be pleased to receive trade catalogues, etc.

Correction

In the issue of October 31 a review of an exhibition of oil-fired heating described Watts oil-fired boiler as costing £230 and having an efficiency of 60 per cent. The relevant paragraph should have read as follows:—"Watts" demonstrated a slim, pleasant unit of 70,000 B.Th.U. per hour rating, costing £200. This is a purpose-built, pressure-jet Oil-Fired Boiler, and the efficiency claimed is 75 per cent. They also offer a number of models of their well-known gravity feed boilers which can be readily adapted to oil firing.

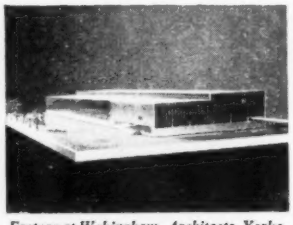
Preview

January Architectural Review

Each New Year, the Review devotes an entire special issue to a survey of what the leading architectural offices in Britain have in hand on the first day of the year.

Assembly Hall of a girls' comprehensive school at Southwark. Architects, Chamberlin, Powell and Bon.

The view presented by *Preview* is an extremely varied one; the buildings it covers range from a pub to a synagogue, by way of schools, universities, colleges, hostels, hospitals, factories, office blocks, churches, airports, planning schemes, housing layouts, a market and a seaside pavilion; and the offices and architects responsible for these projects-in-progress read like a directory of the country's top talent (as indeed they are)—the L.C.C., the Ministry of Works, ACP, T. P. Bennett and Sons, Bridgewater and Shepheard, James Cubitt and Partners, Llewelyn Davies, Easton and Robertson, Frederick Gibberd, Erno Goldfinger, Gollins Melvin and Ward, Sir William Holford, Arthur Ling, Sir Leslie Martin—and so on down the alphabet to Yorke Rosenberg and Mardall.



Factory at Wokingham. Architects, Yorke, Rosenberg and Mardall.

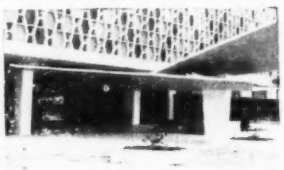
The reflection in *Preview's* mirror may prove flattering or alarming, but even where there appear to be grounds for satisfaction at the design of the buildings themselves, the environments into which they are being fitted still leave much to be desired, and though this is beyond the architects' control, it is not exempt from the watchful eye of the *Counter Attack Bureau*, whose month by month vigilance will be maintained even in this special issue.

Smithsons
Building Exhibition
ONNO

November Architectural Review

The controversial Smithsons will make their first appearance as contributors to the Review in November, with an illustrated study of the Shape of the Community, in which they set against the exhausted diagrams of CIAM planning their vision of a more humane type of city. For non-visionaries—and for visionaries too—*Skill* will provide a full coverage of the Building Exhibition from the technical point of view, as well as an *Interiors* treatment of G. A. Jellicoe's restaurant and shopping floors at Harvey's of Guildford.

Visionary qualities, spurred by hard practical necessities, illuminate Kenneth Browne's proposals for applying the ONNO traffic-directing technique to Park Lane and west Mayfair. The study of the functional tradition is advanced by Brian Spiller's article on Georgian Breweries. Buildings described in this issue will include the new Bowater Factories by Farmer and Dark, whose cladding provides a practical follow-up demonstration of patent-glazing techniques, and Rangoon University and Technical Institute, by Raglan Squire and Partners, extensively illustrated in colour. Professor



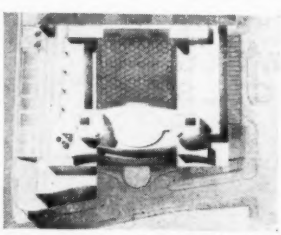
Entrance to the Library of the new Rangoon University. Architects, Raglan Squire and Partners.

Pevsner reviews Tschudi Madsen's important book on the Origins of Art Nouveau, whose character is summed up in the title *Beautiful and, if need be, useful*, and Dr. S. Lang will provide a note on Architectural Visitors to Padua, based upon a register kept by the university there, in which practically every English architect and amateur of note signed his name when passing through.

TUC
Brasilia
Street Lighting

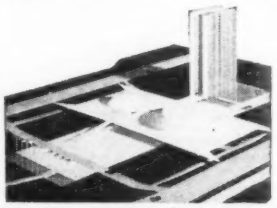
December Architectural Review

Design for public and administrative functions will form the subject of the two most important features in the Review for December. The *TUC Memorial Building*, designed by David Aberdeen, which is only the second public building of consequence to go up in London since the War, will be described and illustrated for the first time in completed form, and a supporting article in *Skill* will examine in detail the finishes



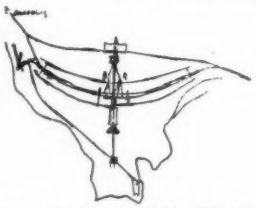
Airview drawing of David Aberdeen's TUC Memorial Building.

and mechanical equipment that make this one of the most lavish buildings—outside the commercial field—of recent years. The other major feature is concerned with *Brasilia*, the projected new capital city for Brazil, typically grandiose and Latin-American in conception, but more likely than most such schemes to achieve completion. Sir William Holford,



Oscar Niemeyer's design for the Congress Building at Brasilia.

who was one of the jury who assessed the competition for the new capital's plan, introduces the project and its site, discusses the competition, and adds a few words by way of introduction to the brilliant and unconventional winning scheme, by Lucio Costa, father of Brazil's modern movement, whose report is published in English for the first time.



One of Lucio Costa's sketches for Brasilia.

Another father of his art, *John Britton*, founder of English topographical studies, will be the subject of an historical article by Peter Ferriday, and the bicentenary of the birth of the great neo-Classical sculptor *Antonio Canova* is celebrated by one of England's leading neo-Classical scholars, F. J. B. Watson, with a chronicle of English visitors and admirers at the sculptor's studio in Rome. Gordon Cullen will tackle one of the most vexed and debated problems of outdoor detailing, *Street Lighting*, in terms of distribution and siting, as well as the design of equipment, and interiors to be described include the IBM offices and the Garden Centre, both in new office blocks in Wigmore Street. Foreign reports will cover the *Triennale di Milano*, and the *Berlin Interbau* exhibition, and regular features like the *Counter Attack* Bureau and Robert Melville's provocative art-criticism will continue.

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

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HENRY WOOD,
Town Clerk.

Municipal Offices,
Tamworth, Staffs.
6th November, 1957. 8029

BUCKS COUNTY COUNCIL

Applications are invited for the appointment of ASSISTANT ARCHITECTS in the County Architect's Department on Architects' Special Scale, £750—£1,030 p.a., and A.P.T. Grade IV, £1,025—£1,175 p.a.

The appointments are superannuable and subject to medical examination.

A weekly allowance of 25s. and return fare home once every two months may be paid for six months to newly appointed married officers of the Council unable to find accommodation.

Applications, on forms provided, must be returned by 30th November, 1957.

F. B. POOLEY,
County Architect.

Council Offices,
Aylesbury, Bucks. 8046

SOUTH-EAST METROPOLITAN REGIONAL HOSPITAL BOARD

Vacancy for ASSISTANT ARCHITECT—salary rising from at least £720. Applications by December 2nd, 1957. Details from Regional Architect, 10, Hallam Street, W.1. 8047

CITY AND ROYAL BURGH OF DUNFERMLINE
BURGH ARCHITECT'S DEPARTMENT

Applications are invited for the post of ASSISTANT ARCHITECT, on salary scale A.P. Va-VI (£765 to £890), with placing according to age, qualifications and experience. The post is superannuable and subject to medical examination.

Applicants should be Associate Members of the Royal Institute of British Architects, preferably with considerable experience in housing and local authority work.

Applications, stating age, experience, qualifications and present appointment, together with copies of two recent testimonials, should be addressed to Leonard Howarth, Burgh Architect, 6, Abbot Street, Dunfermline, not later than 30th November, 1957.

The post has been designated by the Town Council for priority housing.

Applicants must disclose, in writing, whether to their knowledge they are related to any member or senior officer of the Town Council, and canvassing, either directly or indirectly, will be a disqualification.

J. DOUGLAS,
Town Clerk.

City Chambers, Dunfermline.
12th November, 1957. 8094

BURGH OF KILMARNOCK
BURGH ARCHITECT'S DEPARTMENT

Wanted, JUNIOR ARCHITECTURAL ASSISTANT. Salary in accordance with the Clerical, Supervisory, etc. Division, Grade VI (at present £565 × £15—£610 per annum). Apply giving details of experience and enclosing copies of testimonials to the Burgh Architect, 64A Bank Street, Kilmarnock, within 10 days of the publication of this advertisement. 8057

COUNTY BOROUGH OF SOUTHEND-ON-SEA
BOROUGH ARCHITECT'S DEPARTMENT

Applications are invited for the following posts: ASSISTANT ARCHITECT, salary scale £750 by annual increments of £40 to £1,030.

Two Posts of ASSISTANT QUANTITY SURVEYORS, salary scale £750 by annual increments of £40 to £1,030.

QUANTITY SURVEYING ASSISTANT, salary scale of £575 by annual increments of £30 to £725.

Candidates must be suitably qualified and experienced. Housing accommodation may be provided for the senior appointments.

The appointments will be subject to the provisions of the Local Government Superannuation Acts and the National Joint Council's Scheme of Conditions of Service so far as adopted by the Council. Medical examination.

Applications, stating age, qualifications and experience, with the names of two referees, should be submitted to the Borough Architect, 30, Alexandra Street, Southend-on-Sea, forthwith.

Canvassing will disqualify. Any candidate who is related to any member or officer of the Council is required to disclose the fact.

ARCHIBALD GLEN,
Town Clerk.

8054

BOROUGH OF WALTHAMSTOW
BOROUGH ARCHITECT, ENGINEER AND SURVEYOR'S DEPARTMENT
CHIEF ASSISTANT ARCHITECT

Applications are invited from suitably qualified Architects for the above appointment on New Grade A.P.T. V (£1,205—£1,355, inclusive of London weighting), with the commencing salary according to experience.

Applications, stating age, qualifications, experience, present position and salary, together with the names and addresses of two referees, one of whom should be the present or former employer, are to be received by the undersigned not later than noon on Saturday, 30th November, 1957, endorsed "Chief Assistant Architect."

G. A. BLAKELEY,
Town Clerk.

Town Hall, Walthamstow, E.17.
14th November, 1957. 8105

CUMBERLAND COUNTY COUNCIL
PLANNING DEPARTMENT

Applications are invited for the following appointments:—

(a) TWO PLANNING ASSISTANTS, on Scale A.P.T. IV (£1,025—£1,175). A.M.T.P.I. essential, with additional qualifications and/or experience in engineering, architecture including landscape architecture, or surveying.

(b) ONE PLANNING ASSISTANT, on Scale A.P.T. II (£725—£845). Intermediate T.P.I. preferred.

(c) ONE DRAUGHTSMAN, on Scale A.P.T. II (£725—£845). Experienced in planning department.

Application forms and further information from County Planning Officer, 1, Alfred Street North, Carlisle. Closing date: 7th December, 1957.

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

The Courts, Carlisle. 8104

COUNTY BOROUGH OF WALSALL
PUBLIC WORKS DEPARTMENT
ASSISTANT ARCHITECT

Applications are invited for the appointment of Assistant Architect, Special Grade for Architectural Assistants (£750—£1,030), at a commencing salary of £990 per annum.

Applicants must be A.R.I.B.A. The post is superannuated and the person appointed will be required to pass a medical examination.

Applications, giving the names of two persons to whom reference may be made, and stating age, present position, salary, qualifications, and details of experience, should be submitted to the undersigned not later than Monday, 9th December, 1957.

M. E. HABERSHON,
Borough Engineer and Surveyor.

Borough Engineer and Surveyor's Office,
Council House, Walsall.
13th November, 1957. 8097

CITY OF BIRMINGHAM
CITY ARCHITECT'S DEPARTMENT

Applications are invited from fully qualified Architects for permanent and superannuable appointments as ASSISTANT ARCHITECTS, at commencing salaries according to capabilities, and experience within the Special Scale, £750×£40—£1,030 p.a.

Scope for progressive design of Schools and Educational Buildings of many kinds, a variety of Civic Buildings, and Housing Schemes, including tall blocks of flats, maisonettes and shopping centres.

Medical examination. 5-day week.

Applications, endorsed with the heading of the post and stating age, present position and salary, qualifications, experience and two referees, to the undersigned by 6th December, 1957.

A. G. SHEPPARD, FIDLER,
City Architect.

Civic Centre, Birmingham, 1. 8102

URBAN DISTRICT COUNCIL OF BASILDON
ASSISTANT ARCHITECT

Applications are invited from qualified and experienced Architects for the above established post.

The Special Grade—maximum £1,030 per annum—is applicable; the commencing salary to be £910 per annum, or above, according to experience. Housing accommodation will be considered.

The District is developing rapidly—present population 67,000, area 27,000 acres. Wide variety of interesting works.

Full particulars and application forms from and returnable to Mr. S. A. Wadsworth, A.M.I.C.E., A.M.I.Mun.E., Council Offices, High Street, Billericay, Essex; closing date: 2nd December, 1957. 8103

COUNTY BOROUGH OF GATESHEAD

Applications are invited from qualified and experienced persons for the following appointments, which are subject to N.J.C. conditions:—ASSISTANT ARCHITECTS, Special Scale (£750—£1,030). Applicants must have passed Part I and II of the Final Examination of the Royal Institute of British Architects or must be registered Architects. Previous experience with a Local Authority would be an advantage.

All above posts pensionable, subject to medical examination and one month's notice on either side.

IN SUITABLE CASES HOUSING ACCOMMODATION WILL BE MADE AVAILABLE ON A RENTAL BASIS, ON PLEASANT POST-WAR ESTATES.

STARTING SALARIES WOULD DEPEND ON THE QUALIFICATIONS AND EXPERIENCE OF THE APPLICANTS.

Applications, on forms obtainable from the Borough Surveyor, Swinburne Street, Gateshead, 8, must be returned to him within 10 days of this advertisement.

C. D. JACKSON,
Town Clerk.

Town Hall, Gateshead, 8.
November, 1957. 8096

METROPOLITAN BOROUGH OF LEWISHAM
TEMPORARY SURVEYING ASSISTANT

Applications are invited for the above appointment, primarily for the surveying of building sites. Salary between £760 and £1,060 per annum, according to qualifications and experience.

Further particulars and form of application from the Town Clerk, Lewisham Town Hall, Catford, S.E.6. Closing date: 2nd December, 1957. 8095

COUNTY BOROUGH OF CROYDON
ASSISTANT ARCHITECT

Applications are invited from members of the R.I.B.A. for an officer to lead a small team engaged on housing schemes and multi-storey flats. Salary scale A.P.T. IV, £1,055 to £1,205, including "London weighting," commencing according to qualifications and experience. 5-day week.

If necessary, the Corporation will endeavour to assist with living accommodation at a full economic rent.

Further particulars and application form from the Borough Engineer, Town Hall, Croydon, Surrey.

Closing date: 9th December, 1957. 8100

LONDON COUNTY COUNCIL
ARCHITECT'S DEPARTMENT
EXPANSION OF QUANTITIES DIVISION

Vacancies exist for ASSISTANTS, with sound practical building experience, for purpose of undertaking investigation of costs of various types of materials and forms of construction, and applying results to preparation of estimates of expenditure for building projects.

Previous Local Authority experience not necessary.

Salaries up to £1,090.

Application forms and particulars from Architect (AR/EK/55/57), County Hall, S.E.1, returnable by 30th November, 1957. (2125) 8099

LANCASHIRE COUNTY COUNCIL
COUNTY ARCHITECT'S DEPARTMENT

ARCHITECTS, who have recently passed their Final Examinations, are invited to apply for posts with starting salary of £750 a year in a scale which rises to £1,030.

Applicants with experience may be offered higher starting salaries.

Interesting programme of Schools, Technical Colleges and similar work.

Applications, obtainable from the County Architect, G. Noel Hill, F.R.I.B.A., M.T.P.I., P.O. Box 26, County Hall, Preston, to be returned not later than Monday, 9th December, quoting Ref. A/AJ. 8061

BOROUGH OF BRIDGWATER
APPOINTMENT OF ASSISTANT QUANTITY SURVEYOR

Applications are invited for the above appointment in the Borough Architect's Department, at a salary in accordance with A.P.T. Grade II (£725—£845 p.a.).

Applicants should be experienced in taking off and preparing Bills of Quantities, measuring works in progress, and preparing interim certificates and settlement of Final Accounts.

Applications, stating age, experience and qualifications, and accompanied by copies of three recent testimonials, to be delivered to the Borough Architect, Town Hall, Bridgwater, not later than Saturday, 30th November, 1957.

H. A. CLIDERO,
Town Clerk.

Town Hall, Bridgwater.
9th November, 1957. 8098

BERKSHIRE COUNTY COUNCIL
ASSISTANT ARCHITECT, Grade IV (£1,025—£1,175).

Man capable of taking charge of contracts under a Section Head from preliminary scheme stage to completion is required. Opportunity to obtain a varied experience will be given.

Application forms and further particulars can be obtained from J. T. Castle, A.R.I.B.A., A.M.T.P.I., County Architect, Wilton House, Parkside Road, Reading, to whom they should be returned not later than Thursday, 28th November, 1957. 8101

BOROUGH OF FINCHLEY
ARCHITECTURAL ASSISTANT
HOUSING AND TOWN PLANNING DEPARTMENT

Salary within the Special Scale, according to qualifications and experience (£750 × £40 to £1,030, requiring R.I.B.A. Final Examination or equivalent and 5 years' experience), plus London weighting. Experience in Local Authority Housing and design of multi-storey flats an advantage.

Subject to satisfactory service, anticipated duration of the appointment will be 2/3 years.

The National Scheme of Conditions of Service and the Local Government Superannuation Acts apply, and medical examination required.

Applications, stating age, full particulars of qualifications and experience, and accompanied by copies of two testimonials (or the names of two referees), to the Borough Housing and Town Planning Officer, The Avenue, Finchley, N.3, by not later than first post on Wednesday, the 4th December, 1957.

R. M. FRANKLIN,
Town Clerk.
Municipal Offices, N.3. 8073

DENBIGHSHIRE COUNTY COUNCIL
COUNTY ARCHITECT'S DEPARTMENT, WREXHAM

Applications are invited for the post of CHIEF QUANTITY SURVEYOR, A.P.T., Grade V (£1,175—£1,325), in the above Department. Candidates must be Corporate Members of the Royal Institution of Chartered Surveyors, Sub-Division III (Quantities Section); must have wide experience in the preparation of Bills of Quantities for all types of building works for a County Authority, measurement of works on site, preparation of interim certificates and final accounts, and must be capable of taking charge of a Quantity Surveying Section. Application forms may be obtained from me. Completed application forms to be returned to me by 30th November, 1957.

W. E. BUFTON,
Clerk of the County Council.
County Offices, Ruthin. 8060

STEVENAGE URBAN DISTRICT COUNCIL
ARCHITECTURAL ASSISTANT

Applications are invited for the above-mentioned post in accordance with the Special Grade of the National Scheme of Conditions of Service for Architectural Assistants, at a commencing salary of £910, rising to £1,030 per annum.

Applicants should be A.R.I.B.A. and should have a contemporary approach to design. The Council have a programme of work associated with the New Town Development. The present population of Stevenage is approximately 30,000 and the town is rapidly developing to a maximum population of 60,000. Full details of the appointment can be obtained on application to the Engineer and Surveyor, 19, Orchard Road, Stevenage, Herts.

Applications, together with the names of two referees, should reach the undersigned by not later than 30th November, 1957.

Housing accommodation will be available if required.

E. J. BOWERS,
Clerk of the Council.
Council Offices, Orchard Road, Stevenage, Herts.
12th November, 1957. 8110

COUNTY BOROUGH OF BOOTLE

Applications are invited for the following appointments:—

(*a*) ASSISTANT ARCHITECT, Grade A.P.T. III (£845—£1,025 per annum).

(*b*) ASSISTANT ARCHITECT, Grade A.P.T. II (£725—£845 per annum).

Preference will be given to those having experience in the design and planning of schools.

Application forms, obtainable from the Borough Surveyor, Town Hall, Bootle, 20, are returnable by Friday, the 13th December, 1957.

By Order,
HAROLD PARTINGTON,
Town Clerk.
8124

HAMPSHIRE COUNTY COUNCIL.—ARCHITECTURAL PLANNING ASSISTANT required, A.P.T., Grade II (£725—£845), in the County Planning Department Headquarters at Winchester. Candidates must have passed the Intermediate Examination of the Royal Institute of British Architects or of the Town Planning Institute, be experienced and capable designers and have some knowledge of Town Planning. The appointment is pensionable and subject to a satisfactory medical report. In approved cases the County Council assist with removal and other expenses.

Applications, stating age, education, qualifications and experience, together with a copy of one testimonial and the names of two referees, should reach the Clerk of the County Council, The Castle, Winchester, by 7th December. 8126

SOUTHERN ELECTRICITY BOARD
ENGINEERING DRAUGHTSMEN (TWO VACANCIES)

Engineer's Department, No. 4 (Bournemouth) Sub-Area. Salary N.J.B., Schedule D, Grade 6 (£595 × £20—£715 per annum). N.J.B. Conditions of Service.

Applicants should be fully qualified draughtsmen and be able to undertake under supervision the preparation and final layout of building and civil engineering drawings. A sound knowledge of building construction is essential.

The successful candidate will be required to contribute to the C.E.A. and Area Boards' (Staff) Superannuation Scheme, if eligible.

Applications, on forms obtainable from the Sub-Area Secretary, 1, Priory Road, Bournemouth, and returned to him, in envelopes suitably endorsed, not later than December 2, 1957. 8125

NORTHUMBERLAND COUNTY PLANNING DEPARTMENT

ASSISTANT to Area Planning Officer required on Special Scale of Salaries (£750—£1,030). A.M.T.P.I. or equivalent essential. Commencing salary according to qualifications and experience. Application forms from County Planning Officer, County Hall, Newcastle on Tyne, 1, to be submitted by 30th November, 1957. 8072

Architectural Appointments Vacant

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

BUCKINGHAMSHIRE firm of Architects, within 30 miles of London, with a varied practice, require TWO ARCHITECTURAL ASSISTANTS, approaching Final R.I.B.A. standard. 5-day week. Salary according to age and experience.—Please write, giving full particulars, to Box 7768.

CITY ARCHITECT requires ASSISTANT, experienced industrial and commercial field. Intermediate Standard. Salary £600—£700. Box 7969.

CO-OPERATIVE WHOLESALE SOCIETY, LTD. ARCHITECT'S DEPARTMENT, BIRMINGHAM

APPLICATIONS are invited for the following appointment in the above Branch Office undertaking interesting and varied commercial and industrial projects:—

ASSISTANT ARCHITECT, capable of preparing working drawings from preliminary details. There is a 5-day week in operation, and the appointment will offer prospects of upgrading.

Applications, stating age, experience, qualifications and salary required, to G. S. Hay, A.R.I.B.A., Chief Architect, Co-operative Wholesale Society, Ltd., 1, Balloon Street, Manchester. 7941

UNITED DAIRIES LTD., LONDON

APPLICATIONS are invited for the following appointments in the Architect's Department at the Company's Head Office :—

SENIOR ARCHITECTURAL ASSISTANT capable of making site surveys, preparing sketch plans and working drawings and supervising work in progress. Knowledge of shop fitting an advantage.

ARCHITECTURAL JUNIOR ASSISTANT. Experienced in tracing and colouring.

ACCOUNTS CLERK capable of checking and certifying Builders' accounts

Applications stating age, experience, qualifications and salary required to R. E. Akerman, F.R.I.B.A., Chief Architect, United Dairies Ltd., 31, St. Petersburgh Place, W.2. 7829

JUNIOR ARCHITECTURAL ASSISTANTS required. Five-day week. Factory and office buildings. Minimum 3 years' experience.—Write full particulars, R. H. Gallannaugh, L.R.I.B.A., 54, Queen Anne Street, London, W.1. 8037

PROGRESSIVE Architect, whose current work includes an important office building, urban housing, shops, high flats, and a Town Hall, needs two forward-looking ASSISTANTS, of about fourth year Evening School standard. Five-day week, pleasant surroundings, and a keen lot of chaps. Salary according to ability.—Box 8035.

ARCHITECTURAL ASSISTANT required, with imagination and experience, for contemporary commercial work in London.—C. H. Elsom & Partners, 10, Lower Grosvenor Place, S.W.1. VIC. 4304. 8034

KEEN Intermediate ASSISTANT required for London practice. Excellent prospects and salary for man with initiative.—Full details to Box 8025, or Tel. CAN. 3979.

ARCHITECTURAL ASSISTANT required in Engineer's Office of large Brewery Company in East Midlands area. Work comprises general maintenance, alterations, extensions, and additions of industrial buildings. State age, experience, qualifications and salary required.—Apply Box 7789.

LONDON Firm of Architects requires JUNIORS just leaving school, preferably with G.C.E.; also Post-Intermediate ASSISTANTS, preferably with London experience. Five-day week. Lewis Solomon, Son & Joseph, 21, Bloomsbury Way, London, W.C.1. Telephone HOL 5108. 7997

GOOD position offered to ARCHITECTURAL ASSISTANT of Intermediate standard in Sheffield. Applicants should be prepared to accept responsibility, be capable of individual working and have a good standard of presentation. They must also have a contemporary outlook. Good salary offered, five-day week, luncheon vouchers and social club. Write giving full particulars of age, experience, and salary required to Box 8107, quoting Ref. AA/257.

CITY Architect's Office require ASSISTANT of about Intermediate R.I.B.A. standard. Must be quick and reliable draughtsman and accustomed to good class work. Interesting varied work and secure future. Apply stating experience, age and salary. Box 8093.

EAST Midlands Brewery Company requires STAFF ARCHITECT and SURVEYOR with experience of maintenance and improvements in Licensed Houses. House available upon appointment. State full details of qualifications, experience and salary required. Box 8091.

JUNIOR ASSISTANT required for Architect and Surveyor's West London Office. Box 8090.

ARCHITECTURAL ASSISTANT. Intermediate standard, required in small, busy Office in S.E. Hampshire. State age, experience and salary required. Box 8064.

BUSY office in Kensington requires ARCHITECTURAL ASSISTANT approaching Intermediate, with 3/4 years' office experience, good draughtsman and sound knowledge of construction essential, for work on licensed premises. Apply: Mayell, Webb & Hart. Telephone: FRE 8596. 8065

SENIOR ASSISTANT who is above average ability in design and practical experience with a good personality, is required to eventually take responsible position in office. Apply in writing to John H. D. Madin, Dip. A.R.I.B.A., 83/85, Hagley Road, Birmingham, 16. 8067

PARTNERSHIP. An expanding practice in the Midlands requires an ARCHITECT who would be suitable for partnership. Only Architects with high qualifications and ability need apply. Write giving full details. Box 8068.

TWO ARCHITECTURAL ASSISTANTS required about Intermediate standard with office experience, capable working drawings busy practice. Apply Ardin & Brookes, A./A.R.I.B.A., 129, Mount Street, London, W.1. 8070

ARCHITECTURAL ASSISTANT, up to R.I.B.A. Intermediate standard, required at Guildford. Varied work, mainly factory. Five-day week. Salary by arrangement. Box 8074.

BIRMINGHAM. James A. Roberts, Chartered Architect, Chanelle House, 86, New Street, Birmingham, 2. Mid. 4315-6, requires Junior and Intermediate level ASSISTANTS to join teams on interesting large-scale projects. 8075

INTERMEDIATE and Final standard ASSISTANTS required. Minimum two years' office experience. Salary according to abilify. Box 8076.

ARCHITECTURAL ASSISTANT required by Theo. H. Birks, F.R.I.B.A. Salary range £750—£950 p.a. Ring LAN 7236 for appointment. 8077

ARCHITECTURAL ASSISTANTS required for work on Industrial and Commercial projects. Experience of this type of work desirable but not essential. Salary by arrangement. Write, stating age, experience and qualifications to Box 8078.

ASSISTANT of Intermediate standard, with office experience, good draughtsman, required for work on Flats and Houses. Please state experience, age and salary required to: R. Jelinek-Karl, F.R.I.B.A., 22, Chancery Lane, W.C.2. Hol. 5695. 8082

ASSISTANTS required in congenial office, Manchester area. Interesting work. Canteen and other amenities. Salary up to £900 p.a., dependent upon qualifications and experience. Apply Box 8117.

ASSISTANT ARCHITECT, Final standard, good office experience, for varied country practice with Local Authority work. Salary by arrangement. Car Allowance. Please send details A. C. Bishop, A.R.I.B.A., Market Square, Retford, Notts. 8113

ARCHITECTURAL ASSISTANT required for office with varied contemporary work. Commencing salary from £500 p.a. according to experience. Applications to F. Tomkinson & Son, 180, Edleston Road, Crewe. 8112

ARCHITECTURAL ASSISTANTS for University and Hospital work. Good salary, dependent on experience. Non-contributory Pension Scheme in being after probationary period. Three weeks' holiday a year, and five-day week. Reply, stating age, experience, etc., to: Thomas Worthington & Sons, 178, Oxford Road, Manchester, 13. 8061

ARCHITECTURAL ASSISTANT wanted, about Intermediate standard. Small private office in provinces. Full details to Box 8066.

ARCHITECT (Slough area) requires part-time assistance with preparation of working details for small alteration works in London. Box 8089.

CHARLES B. PEARSON & SON require qualified SENIOR ASSISTANTS in their Manchester and Lancaster Offices. Experience in hospital work would be an advantage. Write in the first instance, giving details of age, training and experience and salary required, to 18, Dalton Square, Lancaster. 8088

AT PURLEY, ambitious ASSISTANT to take charge of small contemporary office, fine prospects. Particulars to Box 8069.

STEEL, PEECH & TOZER, branch of the United Steel Co.'s Ltd., have vacancies for TWO ARCHITECTURAL DRAUGHTSMEN, with at least five years practical experience. Variable type of work including office blocks, amenity centres and service buildings. Industrial experience would be an advantage, but is not essential. Good pension scheme and canteen facilities, etc. Salary according to age and experience. Applications should be made in writing to the Labour Manager, Steel, Peech & Tozer, The Ickles, Sheffield, 1. 8119

ARCHITECT required by the National Coal Board for their Divisional Headquarters (Welfare Branch) in Edinburgh. Salary £700 × £30—£1,000 p.a. (at present under review); qualifications—A.R.I.B.A. The point of entry will depend on qualifications and experience. The work involved covers a wide and interesting field, including Pithead Baths, Medical Centres, Canteens and Social Centres. Applications, stating age, education, qualifications, experience, present post and salary, to the Divisional Chief Staff Officer, National Coal Board, 3, Eglinton Crescent, Edinburgh, 12. 8114

WANTED in London office of A.R.I.B.A. engaged on work for Housing Company, JUNIOR ARCHITECTURAL ASSISTANT, Intermediate R.I.B.A. standard. Experience in preparation of Sketch Designs, Working Drawings and Specifications essential. Salary according to experience and capabilities. Box 8120.

GEORGE WIMPEY & CO. LTD., require ASSISTANTS for interesting work in their Manchester Architect's Department. Canteen facilities. Pleasant office. Salary in accordance with experience and qualifications. Apply in writing to 629, Eccles New Road, Salford 5, Lancs. 8116

TIMBER Building Prefabricating Company requires for its Farnborough Office, an ARCHITECTURAL DRAUGHTSMAN. Applicants should be quick and accurate with a contemporary outlook. Five-day week, staff canteen. Write giving details of age and experience to H. & H. Blacknell, Ltd., Park Place, Pinehurst Avenue, Farnborough, Hants. 8115

NEW ZEALAND Architectural Practice mainly engaged Commercial, Bank, Industrial work requires: (*a*) ASSISTANT ARCHITECT with A.R.I.B.A. salary range £950 to £1,050; and (*b*) ARCHITECTURAL ASSISTANT with about seven years good experience, salary range £750 to £850. Ability, qualifications, influence rate applicable, such being commencing salary subject good increases, twice yearly, dependent progress. Single or married men considered, excellent opportunity enterprising men, two or three years assured engagement, applicants' passage paid subject few minor conditions. Apply airmail, with snapshot and personal and experience details, plus small recent eighth working drawing, to Mitchell & Mitchell and Partners, P.O. Box 187, Wellington, N.Z. 8092

SENIOR AND JUNIOR ARCHITECTURAL ASSISTANTS required for work in connection with the design of new building techniques. Apply A. M. Gear, F.R.I.B.A., 12, Manchester Square, W.1. HUNter 0331. 8118

Architectural Appointments Wanted

4 lines or under, 9s. 6d.; each individual line, 2s. 6d. Box Number, including forwarding replies, 2s. extra.

A.R.I.B.A., 32, five years' responsible and varied experience in same office, seeks progressive position. Car owner. Box 8086.

SEVEN per cent. prevents one of the Top Twelve confirming previous offer to disappointed young Architect. Are any of the remaining Eleven interested in his services? Box 8080.

A.R.I.B.A., fully experienced industrial and commercial work, seeks responsible post with prospects. Private practice or company in North East. Salary £1,400—£1,500. Box 8079.

Other Appointments Vacant

4 lines or under, 9s. 6d.; each individual line, 2s. 6d. Box Number, including forwarding replies, 2s. extra.

BUCKINGHAMSHIRE firm of Architects, with Quantity Surveying branch, require JUNIOR ASSISTANT, for taking off and working up. Salary according to age and experience.—Write Box 7769.

QUANTITY SURVEYOR required for construction department of prominent Retail Company on Merseyside. Must be fully experienced in abstracting and taking off quantities for large commercial buildings. Permanent appointment offering scope for advancement. Good commencing salary. Staff Life Assurance and Pension Scheme. Five-day week. Apply giving age and complete details of qualifications and experience to Box 8122.

CHARTERED QUANTITY SURVEYOR, minimum six years' experience, required for the quantity surveying section of a Midland firm of Architects. Assistance with housing can be given if desired. Box 8083.

QUANTITY Surveying section of a Midland firm of Architects require a QUANTITY SURVEYOR (not necessarily qualified) experienced in the settlement of final accounts. Assistance with housing can be given if desired. Box 8084.

THE NORTH EASTERN ELECTRICITY BOARD

APPLICATIONS are invited for the appointment of a SENIOR DRAUGHTSMAN, Chief Engineer's Department, Carliol House, Newcastle upon Tyne. Applicants should be experienced in site surveying and design and preparation of detailed drawings of buildings with reinforced concrete foundations for substation installations up to 66 kV.

Salary: Schedule D, Grade 4—£895/£995 and conditions of service in accordance with National Joint Board Agreement.

Applications stating age, qualifications and experience to be received by the Assistant Secretary (Establishments), The North Eastern Electricity Board, G.P.O. Box No. 117, Carliol House, Newcastle upon Tyne, within ten days of the appearance of this advertisement. 8106

QUANTITY SURVEYING ASSISTANTS required by Air Ministry Works Directorate in London and Provinces. Grade and commencing salary based on not less than 3 or 5 years' previous experience under Quantity Surveyor or Building Contractor. Approved full time study will count towards five years period. Normally technical qualifications in Builders quantities or Building, *e.g.* C. & G. Final or O.N.C. or proof to equivalent standard. Duties include abstracting and billing, site measurement and preparation of estimates. Salary range £545 at age 25 to £870 London rate starting pay dependent on age, qualifications and experience. Salaries somewhat lower in Provinces. Pensionable and promotion prospects. Five-day week, three weeks' leave a year. Appointments carry liability for service anywhere U.K. or overseas. Applicants normally should be natural born British subjects. Write stating age, qualifications and previous appointments including type of work done, to Manager, Professional and Executive Register, M.L.N.S., 1-6, Tavistock Square, W.C.1, quoting reference PE105/745. No original testimonials should be sent. Only applicants selected for interview will be advised. 7995

GOOD salary and prospects offered to keen man with drawing office experience for detail design and site supervision of prefabricated structures, U.K. and abroad. Write in first instance to Staff Architect, Mod-X Structures Ltd., 20, Lowndes Street, S.W.1. BELgravia 3266. 8121

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