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One of the many hospitals where the Ministry of Sound is needed, evidently! And, in spite of its apparent modernity, its magnificent surgical and radiological equipment, its enlightened methods, its almost terrible cleanliness — this hospital is really an anachronism! It lacks essential and irreplaceable healing factors ..... Quiet must be *planned* — along with light, heat and fresh air. The Ministry of Sound should preferably be consulted before the plans have left the architect's desk. But in existing hospitals they can still work remarkable cures. Acousti-Celotex tiles can be installed in busy wards with the minimum of inconvenience. They can be cleaned and painted repeatedly without affecting their power to hush noise and help convalescence. The Blue Book — a veritable treatise on practical Noise Quieting and Acoustical Control — will gladly be sent to all interested in the great cause of hospital improvement!

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The Editor will be glad to receive MS. articles and also illustrations of current architecture in this country and abroad with a view to publication. Though every care will be taken, the Editor cannot hold himself responsible for material sent him.

THURSDAY, SEPTEMBER 12, 1940. NUMBER 2382 : VOLUME 92

PRINCIPAL CONTENTS

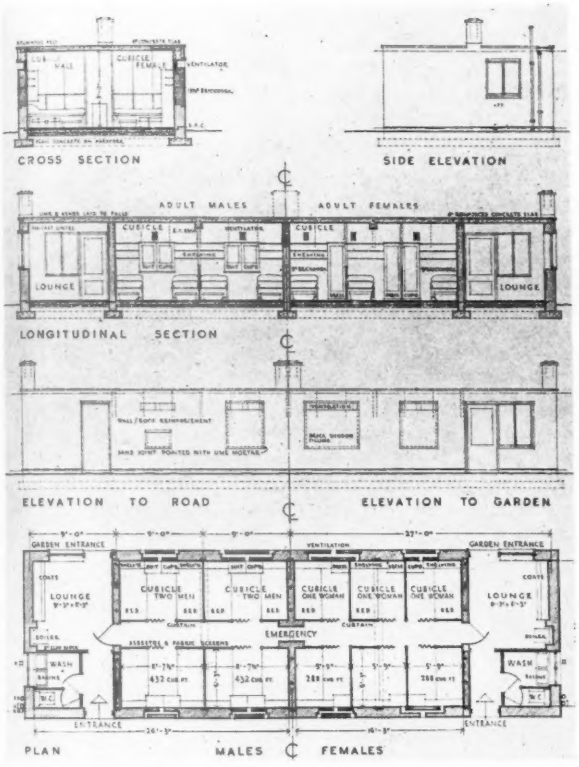
Owing to the paper shortage the JOURNAL, *in common with all other papers, is now only supplied to newsagents on a "firm order" basis. This means that newsagents are now unable to supply the* JOURNAL *except to a client's definite order.*

To obtain your copy of the JOURNAL *you must therefore either place a definite order with your newsagent or send a subscription order to the Publishers.*

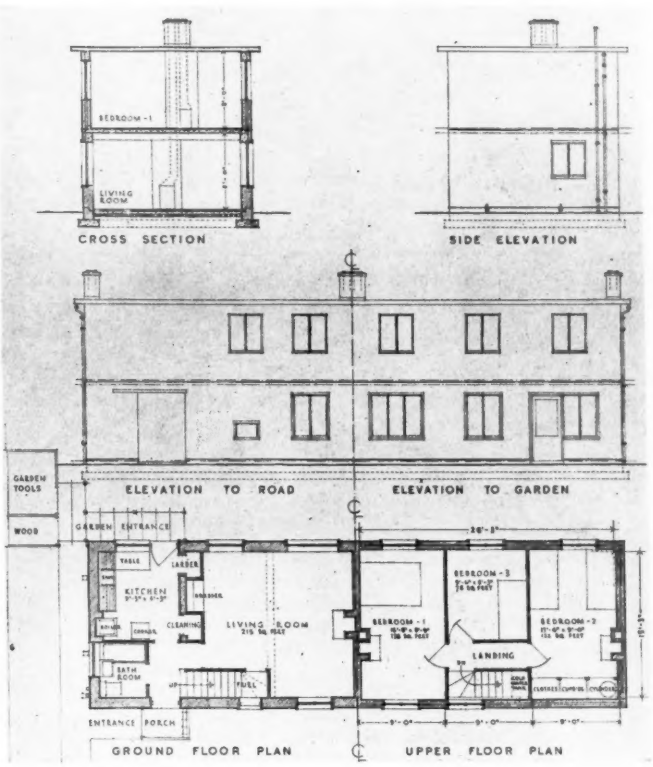
INDUSTRIAL HOUSING COMPETITION

HOUSE SECTION: DESIGN PLACED FIRST

BY J. G. LEDEBOER AND GEORGE FAIRWEATHER

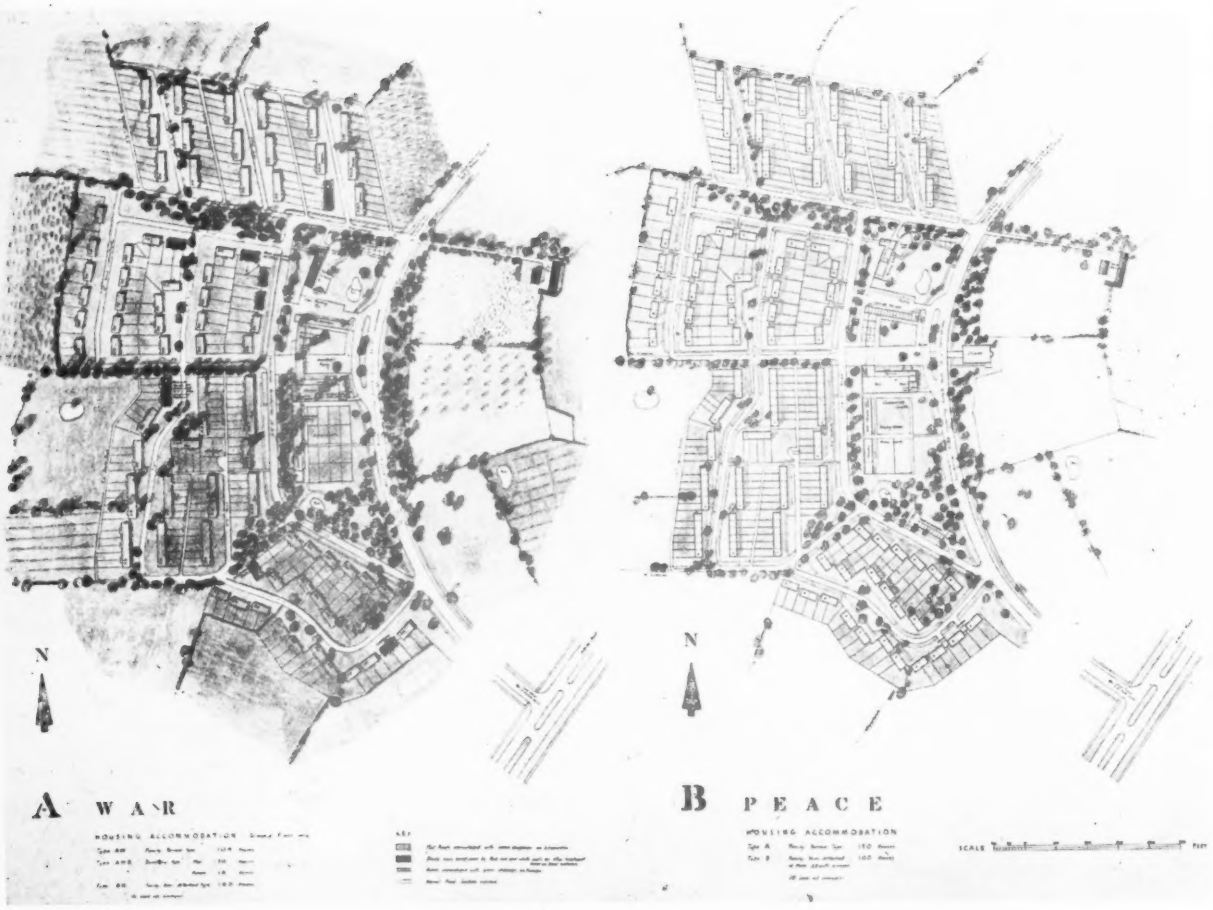


HOUSE IN WARTIME



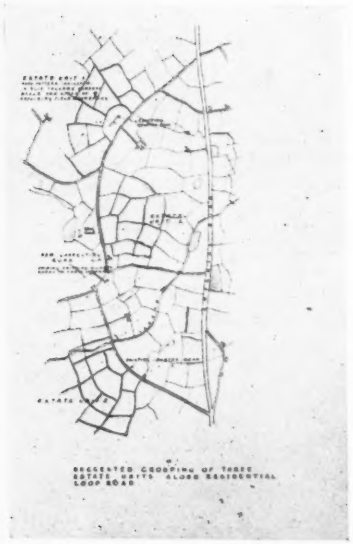
HOUSE IN PEACETIME

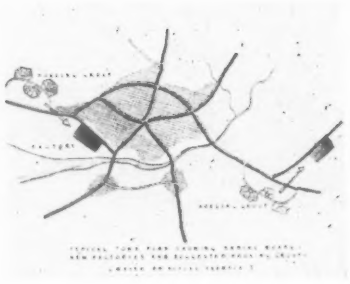
AS announced in last week's issue, the Assessors (Messrs. K. Cross, R. Fitzmaurice, J. H. Forshaw and G. A. Jellicoe) of the R.I.B.A. Industrial Housing Competition awarded the first premium (£250) in the House Section to Miss J. G. Ledeboer and George Fairweather, whose design is reproduced above. The winning scheme in the Estate Section is reproduced overleaf and the second premiated designs, assessors' report and a review of the designs submitted appear on pages 213-217.



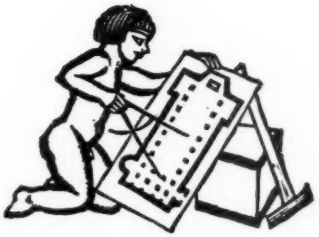
INDUSTRIAL HOUSING COMPETITION

ESTATE SECTION WINNING SCHEME





On this page we reproduce the scheme, by Messrs. G. Grenfell Baines, John A. Ashworth, Stanley E. Catterall and Tom Mellor, awarded the first premium (£100) in the estate section of the competition. Assessors in their report, state: "This is a well-planned scheme that would pass into the landscape by reason of the broken grouping of its buildings and is, in addition, temporarily camouflaged."



ESCAPISTS AND MISS AUSTEN

UP to a year and a week ago, escapism was a term which had suffered lifelong injustice. It was a word which had done hard service over a wonderfully wide range of meaning. It had marched with the time with unflagging sprightliness ; it was always sharp and always ready. In 1932 an escapist was one who denied the imminence of the Class War ; in 1937 he was anyone who advocated soft-pedalling with Hitler ; in 1938, he was anyone who was unable to open his newspaper till after breakfast—and any time from 1925 onwards he was, to architects, the client who pined after thatch and roses round the door.

Yet—despite all these wonderful powers—escapism was denied the smallest virtue. The term was an omnipresent sandbag ; the attitude of mind it represented had no champions. Ordinary people might indulge in escapism—and of course they all did—but they could never admit it ; and they went through agonies explaining away on improbable grounds such little bits of their escapism as came to public knowledge.

The war has made us all more sensible and more truthful. We now admit that undiluted reality will break the strongest back ; that, in short, a little escapism does us good.

The unfortunate thing is that we did not all become honest sooner. For our little bit of escapism is now hard to come by. Thatch and roses and the means to get to them have disappeared, country friends are crowded out, the 10 p.m. siren has given us a disinclination for cinemas and the shelter has no radio. We are left with books. And since it takes a strong stomach to appreciate *Death in the Basement* when we are in the basement and a bomber overhead, most of us are re-reading the Masters ; and the more we do this the more furious we are that machine-minded realists should ever have imposed on us that escapism is wicked.

Consider, for instance, Jane Austen. What are we shown of a strong-nerved and realist period in her five famous novels ? Only a tiny portion of contemporary society, and that idealized. Smaller landed gentry and naval and army officers are flanked on one side by one or two prosperous merchants (who are obviously not quite the thing) and, on the other, by a few young men of broader acres and £10,000 a year. The cast is small : a young woman of shrewdness and outward humility ; silly young and old women ; a grave elderly man ; clergymen who come off poorly ; and a young man or so—either with or without good principles. For plot we know that a young woman is going to be suitably married and others are going to come croppers.

These people move and these things happen in surroundings which, even for architects, are lightly sketched. But architects of 1940 notice joyfully that Miss Austen's characters kept romance and commonsense in separate compartments where living quarters were concerned. A modern house was better than an old house, and the hobby of wealthy young men was improvement—in house, park and prospect. The Romantic enthusiasm might be at its height and *The Mysteries of Udolpho* have a huge public, but our ancestors never humbugged themselves into a liking for ruins indoors. And when the naïve and very young Catherine (packed full of the creepy-crawlies of Mrs. Radcliffe) actually reached *Northanger Abbey*, Jane Austen dealt with her sharply :

> An abbey ! Yes, it was delightful to be really in an abbey ! But she doubted, as she looked round the room, whether anything within her observation would have given her the consciousness. The furniture was all in the profusion and elegance of modern taste. The fireplace, where she had expected the ample width and ponderous carving of former times, was contracted to a Rumford, with slabs of plain, though handsome marble. . . . The windows . . . to be sure the pointed arch was preserved—the form of them was Gothic—they might even be casements ; but every pane was so large, so clear, so light ! To an imagination which had hoped for the smallest divisions, and the heaviest stonework, for painted glass, dirt, and cobwebs, the difference was very distressing.

To a modern realist it must be horrifying that Miss Austen, so clear-eyed on one or two points, could be so escapist on all others ; and still more horrifying that her contemporary public could accept and enjoy such slightness, insipidity—unreality.

But he cannot explain this escapism on the grounds of contemporary custom, alone. Jane Austen's outlook was narrow, her world small and there is no doubt her range of subject and manner of treatment were closely confined—whether she knew it or not—by rigid standards of what was proper in a book. Her heroines may not have been able to wash their hands, much less their stockings, in print. But these things would not have prevented her mentioning the Napoleonic Wars if she had wanted to do—or the acute anxiety over revolutionaries and invasion through which she lived.

Jane Austen lived from 1775 to 1817, right through the siege of Britain. The French Revolution, incessant wars, Boney's encampment at Boulogne, the turning of Portsmouth (which she visited) and many other places into fortresses, preparations for evacuation and the raising of what can only be called a Home Guard, all took place before or during the writing of her novels. She never mentioned any of them and the danger was as real as it is now.

Was she an escapist to the point of lunacy as our realists of the 'thirties would have us think ? It is unlikely. She seems to have thought (and there is little doubt her strong-nerved contemporaries would have agreed with her if her novels had been published as they were written) that you can take war too seriously.

The Architects' Journal
45 The Avenue, Cheam, Surrey
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NOTES & TOPICS

THE INDUSTRIAL HOUSING COMPETITION

TO be surrounded by architects' drawings in the Henry Florence Hall. To be able to compare at leisure, on a sunny afternoon, one competitor's main idea with another's, were both so pleasant in wartime that disappointment at the results was only admitted very grudgingly.

*

Yet disappointment was my strongest feeling on leaving the exhibition of schemes entered for the R.I.B.A. Industrial Housing Competition. It was an annoying, generalized disappointment—a feeling that the competition had not quite come off, that the winners had provided only workmanlike embodiments of what was obvious at the start. It may be that there is no new solution to the problems of the competition of which the advantages are not far outweighed by drawbacks. This perhaps is what was disappointing.

*

The winners of the House Section (Miss Ledeboer and Mr. Fairweather) adhered to the one-floor in war, two floors in peace, solution. By adopting a long, thin oblong they accommodate eight men and six women on the ground floors of two houses—a higher number than in any other I saw. The sleepers are well protected from blast and splinters, to some extent from nightly noise, and the construction—as one would expect from Mr. Fairweather—is thoroughly worked out and eminently practicable.

*

But it was with what is doubtless purely sentimental aversion, that one found the sleepers were to have no daylight at all, not even a strip of wired glass, and that cross-ventilation was to be through baffled ventilators of modest size. And it was only later that one realized that factory workers are now on war service as much as soldiers, and that if they have feeding, washing and recreation and writing rooms outside their houses, safe, clean and reasonably quiet sleeping quarters are all they should expect inside them.

*

The estate plan section of the competition was the more difficult of the two. One hoped that the need for camouflage in wartime would bring forward solutions which would strike a lasting blow at the aridities of "Local Authority" housing layouts.

*

The problem was of great interest. The ideal layout for wartime industrial housing is one which will not be recognized for what it is by a bomber. Or, if that is impossible, it is one which is either really or apparently so dispersed that it is not worth attack with a limited number of bombs. Peacetime housing should combine good orientation, imaginative informality of grouping and careful subordination of roads within a moderate area.

*

The extent to which these two sets of requirements were opposed or complementary was the basic question in this part of the competition.

*

To an onlooker who cannot realize the difficulties to the same degree as competitors, it seems that the best course would be to build up from a standard "English Village" pattern of, say, a cross roads, a short wobbly street, fifty isolated buildings and two or three "farmyards." The many competitors who adopted an idea of this kind seemed either to take fright at an idea of informality in peacetime or at any close grouping in war. The winners, for instance (Messrs. Baines, Ashworth, Catterall and Mellor), broke up a "Local Authority" layout into four blobs but otherwise stuck fairly closely to precedent. And despite their ingenious camouflage suggestions it seems doubtful whether the picking out of a dozen buildings in red and white can make so many units conform to common rural ground pattern.

*

On the other hand, Messrs. Halliday and Agate have achieved a good semi-rural pattern for wartime; but its peacetime form is not so happy.

*

It seems sad if we have to end by admitting that the needs of war and peace are too opposed to allow of any dual-purpose buildings, or dual purpose layout of buildings, rising above the tolerable and the cheap.

INSURANCE SCHEME FOR WAR DAMAGE

Two basic constituents of public confidence, determination and calmness of mind in wartime are that there should be equality of sacrifice and that everyone should know where he stands.

*

Equality of sacrifice is, of course, impossible to attain in regard to matters of fundamental importance: which is all the more reason for vigorous attempts to come near it in secondary questions—such as money. That everyone should know where he stands, within reasonable limits, is an easier undertaking and one that the Government should spare no pains to achieve.

*

The Government's War Compensation Scheme for damage to property, which was explained at length in the JOURNAL last week, bears very hard on private owners of damaged property in regard to both these factors.

*

A man's house and furniture or business premises and

goods may vanish utterly and not only involve him in heavy and perhaps prolonged expense, but also leave him bewildered and uneasy about his future financial position. "After the war" the Government will pay for damage in whole or in part: but until then a man who has been earning much over £400 a year must exist on his own or friends' resources.

*

This bleak outlook for the unfortunate under the Government's scheme made Mr. Churchill's statement that the question of war damage insurance is to be reconsidered one of the most welcome parts of his speech last Thursday. He stated that the August figures of 800 houses damaged beyond repair was so far below the Weir Committee's estimates that a comprehensive insurance scheme was brought back into practical politics and would be examined at once.

*

A scheme of insurance, it should be pointed out, need not—and probably will not—affect the procedure for assessing damage laid down in the existing compensation scheme, which is both fair and simple. What it will do is to make possible immediate payment of compensation, and thus enable owners of damaged property to make a fresh start and know exactly where they are. What is more, it may prevent a considerable deterioration of national assets: for at present the owner of a building which is uninhabitable but capable of repair may not be able to finance such repair, and unless a building society or local authority comes to his aid quickly consequential damage will soon far exceed that caused by the bomb.

*

The London blitzkrieg may make necessary a slightly higher compulsory premium, but it does not affect the main principle of an insurance scheme—payment of compensation at the earliest possible moment after damage.

DISCOVERY

Few people can resist the thrill of intruding upon the privacy of famous people, alive or dead. The personal apartments of the great, when preserved as their owners left them, have a peculiar fascination which their more formal surroundings never possess. Intimate relics too—a pipe, a dancing slipper, or a toy—create an atmosphere far more poignant to the observer than such objects as a marshal's baton or a royal crown. That is why Osborne is more enthralling than Hampton Court, and the simple little bedroom on Elba more moving than the mirrored salons of Versailles.

*

London is rich in such places, from Kensington Palace and Apsley House to the Melbury Road residence of Lord Leighton. There is one, however, which I visited this week, which I am ashamed not to have visited before —the R.R.S. *Discovery*.

*

She lies black-hulled and yellow-sparred, just below Waterloo Bridge, looking with her old-fashioned funnel and schooner-bow rather *démodé*, and very unassuming for a ship whose life has been so full of events. But, despite her quaint look, she is no museum piece. She is only forty years old and ten years ago made a voyage to the Antarctic. After her first trip south, she went into service with the Hudson Bay Company. During the Great War she was used in the Channel. In 1920 she was expensively reconditioned and went south again. For eight years she lay in East India Dock, and in 1936 she became the property of the Boy Scouts Association. She has narrowly escaped destruction many times, and her adventures have made her a worthy successor to the first bearer of her name, which sailed in 1602 to Hudson Bay under the command of William Baffin himself.

Constructionally she is unique, being built almost entirely of wood. Her sides are in places over two feet thick, of solid timber to withstand ice. The bow was designed to ride up on to the ice and crush it, and a device in the stern enables the propeller and rudder to be lifted up for repair. Round the compass a circle 30 ft. in diameter was designed to be kept entirely free of magnetic materials. This was a difficult and expensive task, and was not completely successful, as Captain Scott himself remarked, for the contents of the provision rooms within the circle could not very well be preserved in brass.

*

The ship has not been much altered. The laboratory has been turned into a tiny museum, with personal relics and belongings of Captain Scott and his companions, including a facsimile of the last entry in his diary. The engine room still contains the old-fashioned vertical, brass-topped cylinders, and on the foredeck is a kennel with a husky's name over it.

*

The wardroom is the most interesting part of the ship, a low narrow room panelled in shining mahogany. Swivel chairs face the green baize-topped table, and ranked round are the cabins of the officers and scientists, Evans, Wilson and the rest. Scott's cabin is only slightly larger than the others, and is sparsely furnished. There are no portholes. Each cabin is lighted and ventilated from the deck above. In these tiny rooms the officers lived for two years, while the *Discovery* lay frozen and immobile in McMurdo Sound. The air below decks is still musty from the furs which used to fill the holds, but (banal as this may seem) it is somehow not as perceptible as the emotional atmosphere of association and memory, which hangs so heavily over these narrow bunks and brass handles, the worn baize table and its waiting circle of polished vacant chairs. Every ship has a romance of its own—on board the *Discovery* it is almost overwhelming.

A.R.P. FOR FIDO

London dog owners will be interested to hear that the plans of the first official canine air-raid shelter have been approved by the authorities. It is designed by the National Canine Defence League, and will be placed in Kensington Gardens. The sponsors hope that it will be only the first of many.

*

Should this be so, it will eliminate the need for the plan, recently suggested by a daily newspaper, by which a special evacuation ship was to be chartered to convey our doggy pals to the safety of Canada. The crew were to be chosen carefully for their dog-loving natures. They would have to be, I imagine.

ASTRAGAL

NEWS

A.R.P.

The A.R.P. Co-ordinating Committee has asked Sir John Anderson to receive a deputation on September 16 at which representatives from many parts of the country will urge points which the Committee believe to be extremely urgent if unnecessary loss of life from bombing attacks is to be avoided.

The main proposals which it is intended to put forward are as follows :

(1) The widespread and immediate construction of the "two-stage" type of shelter advocated by the Committee, popularly called "the Haldane shelter." The essential feature of this type of shelter is that it can be rapidly constructed to be blast and splinterproof and then strengthened to be completely bombproof. The Government, although approving it, has taken no steps whatever to press forward with the construction of the shelters.

(2) An immediate adjustment of the priority "system" and the taking of other necessary steps to ensure that supplies, especially of steel and cement, are made available for shelter construction.

EXHIBITIONS

An exhibition of modern paintings is now being held in the Art Gallery, Brighton. It will remain open until October 5.

An exhibition arranged by the Hull School of Architecture on the "Scalby Reception Centre, 1940" is to be held at the Architectural Association, 36 Bedford Square, W.C.1, from September 16 to 28.

HOUSING CENTRE

Following luncheon lectures have been arranged by the Housing Centre, 13 Suffolk Street, S.W.1. September 17 : "The Welfare of Women in War Industries." By Miss May Curwen. September 24 : "Octavia Hill." By Miss E. Moberly Bell. October 1 : "The Wartime Work of the C.P.R.E." By Mr. H. G. Griffin. Each lecture will commence at 1 p.m.

A collection of studies by Town Planning Institute candidates, entitled "If London Began Again," is now on view at the Centre until September 27.

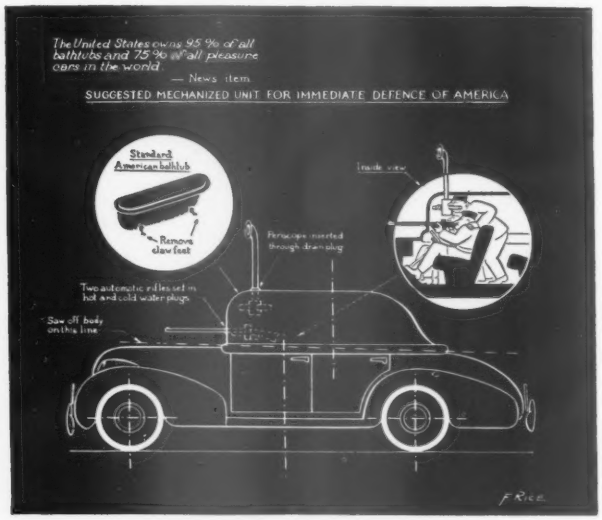
Each year it is customary for the Town Planning Institute to require candidates for examination to submit a "set piece" in the form of a solution of a planning problem in connection with some definite town. This year a new departure has been made, which is of particular interest to Londoners and all interested in the planning of cities. A contour plan of the cleared site was supplied but entrants had entirely free minds, there being no evidence, unless the "Tidal River" were recognized as the Thames, that the problem set was the replanning of London. The requirements were to plan a proposed "Federal Capital City" with an initial population of 10,000 persons and an eventual one of 1,000,000.

ANNOUNCEMENT

Mr. W. Sadler, F.R.I.B.A., is now in practice at 30 Ashcombe Avenue, Surbiton. Telephone, Elmbridge 1072.

NOISE ABATEMENT LEAGUE

The Noise Abatement League, in its annual report, states that the activities of the League are not only to continue during the war but are to be extended and intensified as far as possible. Report continues : "While the war lasts, the League proposes to concentrate on the technical and educational work necessary to further its progress and to maintain its Service Bureau for the use of old and new members. In order to do this it has already cut down its overhead charges to a minimum, raised an extra fund from the Members of its Council and has reorganised its secretariat on the basis of the lowest possible expenditure. Owing to the war, there will be no Annual Conference or Dinner this year."



The "New Yorker" recently made the ingenious suggestion (illustrated above) that America's many motor-cars and baths might, in combination, make a great contribution to speedy rearmament. The suggestion's chief interest to British architects is the statistical assumption about bath-tubs on which it is based.

LETTERS

Miners' Welfare

SIR,—The Miners' Welfare Commission architects' office is well known to your readers, and has earned high praise as a unique example of a team of official architects producing work of a high standard.

It will therefore come as a shock to you to know that Government restrictions having compelled the Commission to cease new work in the provision of pithead baths, it has been found impossible so far to persuade any department to utilize the services of this notable team. Twenty-one members of the staff whose ages range from 25 to 33 are being released for service elsewhere as individuals—if possible, in a professional capacity—but would it not have been better to use their experience of working together ?

Since the war began, many new units have had to be created, usually under the aegis of consulting engineers or contractors, in order to carry out extensive works for defence, munitions or A.R.P.

The Miners' Welfare office, with its architects, engineers and quantity surveyors, and its administration closely organized in wide areas of the country, is quite capable of tackling any kind of building problem, from a large factory to a couple of cottages or a washhouse for refugees from air raid damage. There is no doubt that still more factories will be required, and that welfare facilities should go with them : the necessity for *bomb*-proof shelters, moreover, is becoming clearer, as is the need for organizing air raid damage reparation.

The collapse of the export coal market does not diminish the needs of the miners of the many pits still unprovided with baths, nor those of the many mining areas for further recreational facilities. If, when the temporary shortage of building materials due to A.R.P. and defence works is over, it still appears that other building work has a prior claim over miners' welfare, will it not still appear to have been short-sighted to disperse a famous architectural team, rather than, by bold planning, to allot it its place in planning war-time building ?

D. E. PERCIVAL,
B.A., A.R.I.B.A.
Chairman of Council, A.A.S.T.A.

R.I.B.A. INDUSTRIAL HOUSING COMPETITION

On this and the following four pages we print the assessors' report, designs placed second and a review of the designs submitted. The JOURNAL *had hoped to publish in addition the winners' reports and sketches of a number of the other schemes submitted, but, owing to circumstances beyond its control, this has not been possible. Winning designs appear on pages 207-208.*

ASSESSORS' REPORT

One hundred and sixty sets of drawings were received, of which one was disqualified through late arrival.

We are gratified by the response, and by the high standard and variety of the entries. Without departing from requirements, the premiated designs are carried outstandingly further than the lead given in the Conditions.

The following are the general principles upon which awards have been made :—

(*a*) That the post-war estate population remains static or decreases ; but will *not* necessarily increase.
(*b*) That a different standard of comfort is permissible in war than in peace time.
(*c*) That the post-war proposals are capable of achievement simply and are of a high standard.

THE HOUSE

PLAN.—Broadly, there are four principal types of plan :

(*a*) Those containing A.R.P. shelter separated from sleeping rooms.
(*b*) The ground floor only built in wartime and wholly or in part protected.
(*c*) Complete house built and protected.
(*d*) Bungalow wholly or in part protected and temporarily used for denser occupation.

We consider that reasonable protection for sleepers in any new houses or living quarters is paramount, but at the same time we realize that a first floor storey—being highly vulnerable to blast—is incapable of economic protection. We are agreed that in the classification referred to above, type (*b*) holds the more practical solutions of the problem in view of the general requirements of most schemes; accordingly type (*b*) has received the primary awards.

Type (*d*), *the bungalow*, solves the difficulties of a decrease in population where the post-war standard of comfort may rise without additional building ; and this theme has been pursued by one competitor sufficiently to justify a special award.

In both these categories a number of plans encourage the hope that the houses of the future will not necessarily follow the old plan types but tend towards affording a more open planning, in which room convenience, furniture sizes and arrangements are better understood. The compressed accommodation of rigid compartments might give way to more adequate floor spaces served by convenient fitments and by enclosed service units of maximum efficiency.

Within the scope of type (*b*) are the following arrangements :

(1) A standard ground floor family plan, with temporary bedroom accommodation alone strengthened.

(2) A standard ground floor plan either wholly or in part strengthened, and flexible for use either as hostel or family dwelling (with or without collaboration with its neighbours).

(3) A war plan designed as a hostel only.

By itself the hostel is inadmissible, since the problem of family transference is part of the competition.

WINDOWS. — Total protection to sleepers depends upon special treatment of windows. There now appears to be sufficient justification for blocked-up windows, provided there is adequate ventilation. Apart from protection there is the advantage of a possible reduction in sound disturbance and infringement of black-out.

GENERAL CONSTRUCTION.—The position as regards materials supply fluctuates in wartime (one material may be in short supply for a time and then become available) so that adaptability for various methods of construction is better than reliance upon one material. It has been assumed that no carcassing timber, but a certain quantity of steel, will be available.

The official code for air raid shelters has been accepted as a guide to protection.

CAMOUFLAGE.—This has been regarded as a regional problem and is considered in the estate plan.

ARCHITECTURAL CHARACTER.—Many schemes, whether premiated or not, are of particular architectural distinction. One such design is No. 76, where the author has made a contribution to the art and standard of living beyond the scope of present possibility.

THE AWARDS

107 (*First Prize* £250) (J. G. Ledeboer and George Fairweather).—This is simple and shows clear thought. A semi-detached plan whose wartime use is flexible, economic, and has been considered in detail, structurally and otherwise. The postwar plan is sound but has not been given such careful thought. The elevations are wholly negative. Such a scheme could be universally adopted in principle and be subject to varied architectural expression. The sleeping room is protected against blast and splinters. The entrance to this room is well screened by the external walls, except for the chance of splinters entering the lounge window; this gives a narrow vulnerable area in the sleeping room, governed by the window sill and above sleeper height. Ventilation of the sleeping room is provided by an ingenious form of light trap. A feature of the construction is the anchorage of the roof slab into the walls, which provides reinforcement to the structure as a whole against blast.

40 (£125) (R. A. Horsman).—Also a simple proposal. A standard semi-detached house plan with living room only protected and converted to bedroom. This could be used as a self-contained family flat exclusive of reliance upon a communal restaurant. The architectural expression is very good and individualistic. It provides blast and splinter protection to the sleeping room, and the additional protection of the entrance to this by a transverse screening from adjacent houses has been well worked out. A slight disadvantage is that a change in disposition of houses on the site would involve reconsideration of this protection. No provision has been put forward for ventilation of the sleeping room, or escape, but neither would present an insuperable difficulty.

112 (£25) (Frederick Gibberd).—Final elevations may prove very distinguished. Plan somewhat oversize. Provides a system of ventilation by air inlets near floor level and extractor ventilators in the roof. Wartime elevations would require further consideration.

52 (£25) (L. A. Clarke, D. E. E. Gibson, J. T. Mallorie, P. J. Marshall, F. B. Rayner-Whitaker).—Well balanced and good character. Lacks provision for ventilation to sleeping room and the small opening light is a weakness.

24 (£25) (T. Forbes MacLennan and Partners).—Carefully considered and interesting. The sleeping room lacks provision for ventilation, though small windows are provided. The protection provided by the 4½ in. internal partition to the sleeping room is inadequate against blast coming through door and window openings to other rooms. The accompanying layout is original, but the houses are too closely associated.

74 (£10) (Rodney Thomas).—An interesting bungalow plan put to a dense use in wartime. It is doubtful if the postwar estate plan could be spacious and economic. The elevations are cumbersome. Through ventilation is provided to the sleeping room, but there is some uncertainty about the completeness of the blast and splinter protection.

79 (£10) (C. M. Bond, A. Lee and L. Enevoldson).—A good example of careful protection of rooms on two floors. Ventilation has not been considered.

98 (£10) (B. H. Dowland).—Interesting plans, poor elevations. The roof soil is unpractical on a small scale. Puts forward a special asbestos-cement opening light which might very well work in practice.

105 (£10) (Cyril Sjostrom).—Charming architectural expression. Is of special interest in that the postwar addition to the building is designed in terms of light framed construction which may prove a logical development. The protection to sleepers is incomplete.

111 (£10) (R. G. Brocklehurst).—Is an original solution with a strong and commodious shelter for the occupants of a pair of houses, temporarily converted into four flats.

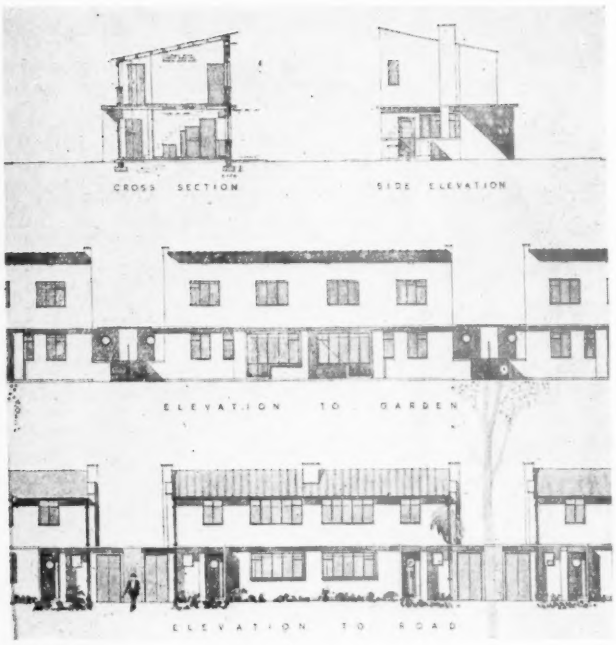
139 (£10) (A. Llewellyn Smith, A. B. Waters and L. C. Moulin).—Combined use for a block of four houses. Has small high windows at the back of the sleeping room and screen walls protecting some windows in front. The screen walls would afford incomplete protection as shown, and the competitor appears to have made an error in screening the sitting room rather than the dormitory.

151 (£10) (A. W. Sodden and P. Cornu).—Interesting plans and elevations. Puts forward a proposal for concrete sliding shutters to windows of the sleeping rooms, but their protection is inadequate against splinters. Supplies of pumice, the material specified for the shutters, have been mainly drawn from Germany and Italy.

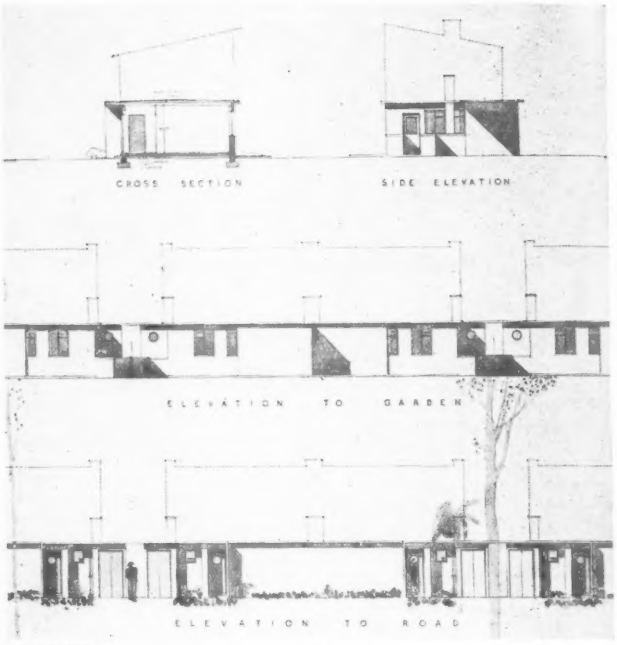
SPECIAL NOTES.—In No. 115 (J. E. Sterrett) the shelter is slightly sunk and the soil banked. This is thoughtful, but the expense of waterproofing, etc., would give a very limited practical application.

External baffle walls are costly and should be used to the minimum if at all. In many schemes they have not given adequate lateral protection to openings. Overhangs to roofs are vulnerable to uplift from blast.

A number of competitors provide for blocking window openings up to the 6 ft. level, providing various forms of shallow fixed or opening lights above that level. Glass blocks, with or without concrete frames, are used in several schemes for fixed lights and toughened glass is suggested in a few cases for the opening lights. Many of these schemes fail on account of the lack of

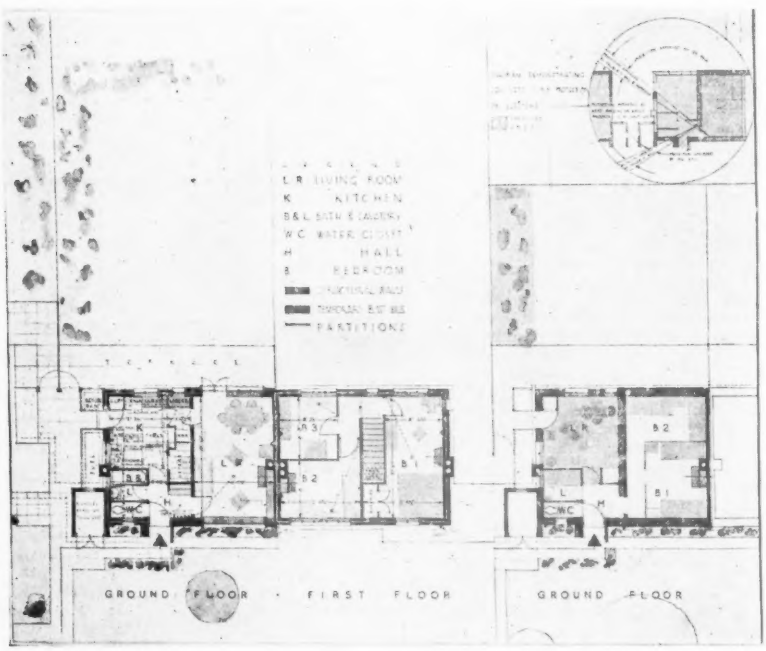


WARTIME



PEACETIME

HOUSE SECTION DESIGN PLACED SECOND: BY R. A. HORSMAN



PLANS OF BOTH HOUSES

provision for ventilation under black-out conditions.

No. 54 (Arthur Brooks)
makes use of self-centering brick vaults, a development that may be of value in view of the need to economize in steel. The thrusts from the vaults, however, have not been well balanced by massing of masonry.

No. 41 (A. H. Mottram and I. J. Pond)
shows an interesting system of fully recoverable shuttering for cellular concrete walling and a method of forming flooring with precast concrete filler units. The wall shuttering has been used with success in Scotland and the flooring is of a type which has been widely exploited on the Continent and is very applicable to wartime conditions.

No. 15 (*a*) (James J. Shannon)
gives a convenient method of building concrete walls in precast concrete units as shuttering. This is a simple method and should be economical.

No. 98 (B. H. Dowland)
One of the premiated designs, has an interesting hopper light window in asbestos cement with toughened glass.

THE ESTATE PLAN

Although many of the competitors followed too literally the observations in the conditions, the plans are for the most part varied and interesting. Landscape in relation to an open dis-

position of buildings, and planting integral with the houses themselves, have been more than usually well studied.

Many otherwise admirable plans fail because they are too conspicuous from the air, and would probably draw attention to an adjoining factory. The first prize is given to a well-planned scheme that would pass into the landscape by reason of the broken grouping of its buildings and is in addition temporarily camouflaged.

We feel that possibilities arise from the war plan of 133, which receives a special award. This follows the traditional disposition of an English village, the cost of services to outlying houses being set against access paths instead of roads. As a war measure this inconvenience is permissible.

Such a community could partly revert to rural industries and agriculture should there be partial industrial unemployment after the war. It obtains its rural character not through a false sentiment but through what may be described as an ordnance map inconspicuity and may contain as much considered planning as a more formal scheme. It achieves a large measure of concealment without resort to camouflage.

This total A.R.P. plan appears better than the individual treatment of houses. No. 16 house shows nets at so steep an angle that the shadow projection would be unchanged. No. 15 provides curved eaves which would be ineffectual and vulnerable to blast. Roof treatment with grass or other natural materials is unpractical on a small scale owing to drying up of soil.

THE AWARDS

135 (*First Prize* £100) (G. Grenfell Baines, John A. Ashworth, Stanley E. Catterall and Tom Mellor).—Excellently planned community both as to imposed wartime camouflage and peacetime requirements. The principle is capable of adaptation to different sites. It creates its own character and clearly aims for a cultured living for an industrial population. It is no criticism to say that were it to revert to rural development it might quickly become shabby. The well arranged blocks, open spaces, trees, etc., must be kept in good repair.

133 (£50) (Halliday and Agate).—An ingenious and practical war plan. The site has been artificially planned to create an illusion from the air, but not necessarily from the ground. Essentially ungeometric.

44 (£20) (Edward B. Redfern).—A design of peculiar charm, economy and good sense. The accompanying house plans are in keeping. The lines of shadows would make it somewhat conspicuous from above. Aspect good.

26 (£10) (Stella M. Scott).—A larger scale pattern that might prove satisfactory in certain districts. Good estate plan but individual plots require careful study.

79 (£10) (C. M. Bond).—The houses follow existing hedges in broken lines.

108 (£10) (Horace Farquharson and McMorran).—A delightful geometrical scheme, with house spacing similar to No. 26. This pattern requires wider spacing between the individual houses to obtain a rural character Aspect good.

JOINT AWARDS

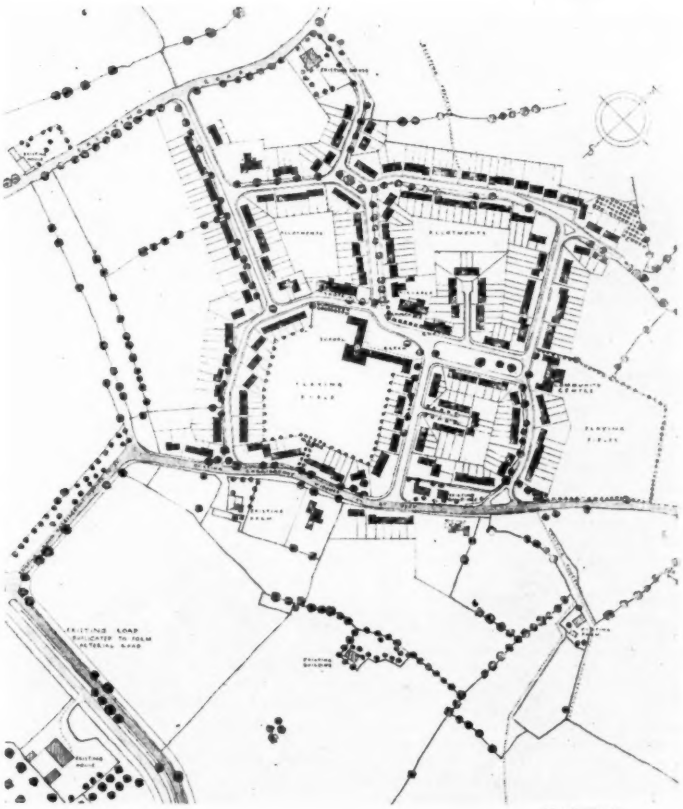
In addition, three awards have been made for complete sets of drawings.

13 (£10) (Frank T. Winter).—A well balanced sober scheme, with too pronounced a layout.

51 (£10) (Edward Banks).—A sensitive and gracious design, also with too distinguished a layout. The A.R.P. shelter is separate from the sleeping accommodation.

88 (£10) (H. F. Hoar and W. R. Pertwee).—Has an abundance of original and interesting ideas which are open to criticism in various respects. Walls consist of two skins of 4½ in. brickwork filled with rammed earth or alternatively with concrete. New 4½ in. brickwork

WARTIME



PEACETIME

ESTATE SECTION: DESIGN PLACED SECOND: BY HALLIDAY AND AGATE

could probably not withstand the high pressure likely to be set up by earth ramming, and the saving of the moderate amount of bricks is hardly sufficient to warrant the complication of introducing another trade to do the concreting. Among proposals for camouflage of the estate, the omission of estate roads in wartime is useful also for blast. The general layout is rational, but the planting is possibly over-studied.

THE JOURNAL'S REVIEW OF THE DESIGNS

NO NOTABLE CONTRIBUTION

THOUGH the exhibition of competitors' designs is teeming with good ideas which, as one of the assessors remarked at the opening ceremony, should be remembered and put to practical use instead of being stowed away as mementos in office files, yet it must be confessed that there is a flatness about the designs as a whole—a certain lack of any *big* idea, or of any really notable contribution to the art of housing.

This is particularly noticeable in the layout section of the competition, where some permanent contribution to the problem of siting small houses was most hoped for. Possibly the failure to produce any brilliant solution was partly due to the damping effect of compromise when trying to satisfy the contradictory conditions of peace and war. But this dual problem, one hoped, would give added zest to the contest.

THE HOUSE PROBLEM

Before enlarging on this failure, it is best to review the main points of the individual house problem.

The main difficulties were—

(1) to provide "camping out" accommodation for industrial workers during war, with sleeping accommodation well protected from blast and splinters.

(2) to design the wartime accommodation so that it could be built only with materials at present available, and with a minimum of skilled labour.

(3) to arrange the wartime accommodation so that it could be readily adapted or enlarged, after the war, to form satisfactory accommodation for family units.

(4) to make the houses, in their wartime stage, as inconspicuous as possible from the air.

THE WINNING SCHEME

The first and second prize schemes, and two which were awarded £25, are illustrated in this issue.

There is no question that the first prize was given to a scheme based on unadulterated common sense and practicability—which are, after all, the vital qualities for a scheme of this sort at this time. The solution had elementary directness, and could not have been more directly shown. (In fact it was an inspiration to see two imperial size black and white drawings featured as centrepiece of an important R.I.B.A. competition.)

Like all the prize-winning schemes and the greater number of the others, the winners followed the competition committee's advice and planned to build a single storey building for wartime use, with a concrete slab roof which in peacetime would become the bedroom floor.

The war and peace planning scheme is extremely simple and can be easily read in the reproductions of the drawings. Construction relies mainly on brick and concrete, and there is an interesting idea in projecting the steel reinforcing bars of the *in situ* slab roof and bending them down to reinforce the outer brick walls, giving additional wartime strength to resist caving-out tendencies from blast. The cross-hatched portions of the plan represent independent brick panels which can be removed to form door or window openings when normal life returns. The main brick walls are ingeniously arranged to give blast protection to the sleeping portion, and the method of plan adjustment is extremely clean.

In this scheme, as in many others, the window has been abandoned as incompatible with blast protection, and a baffle system has been devised, in brick, which practically defeats normal blast and is 100% effective for black-out conditions. In spite of cross-ventilation and additional vents in the upper walls, the sleeping conditions, specially with temporary reduction in space standards, would be inevitably airless and depressing. But perhaps the authors are justified in assuming that, in a vulnerable area, the extra danger of germ dissemination is more than offset by the high standard of protection from blast and splinters.

INGENIOUS SOLUTIONS

Several competitors have been more enterprising with the window problem. There is one scheme by a Coventry group of architects in which the comparative blastproofness of glass bricks has been exploited (the war elevation is almost preferable to the peace), and there is another where stout walls have been ingeniously contrived as screens which project beyond the rectangle of the house and give, in spite of reasonable sized window spacings, *fair* protection from blast without the loss of air and light and that "free-flowing space" feeling beloved of peace. (Rather as Frank Lloyd Wright might have handled it.)

The second prize-winner is a specially good example of walls ingeniously and sensibly contrived to give maximum blast protection.

STRUCTURAL CONTRIVANCES

In the structural details, the diagrams of the Concrete and Cement Association seem to be well featured, and the asbestos pressure-pipe system has been well used for temporary and permanent use. There is an example of a simply adjusted movable shuttering system which we are told on good authority has "really worked" in Scotland, and there is one highly ingenious system of interlocking bricks (not unlike the recently publicised wedge-and-socket self-centering concrete arch system in principle), which produces a two-storey section somewhat like a hammer-beam roof in brick, with first floors supported by segmental brick arches and roof by pointed Gothic arches, over which a New England gambrel roof can be made to fit very nicely.

PREFABRICATION

Many systems of prefabrication, mainly concrete panel, have been tried, and notable among these, though it uses a fair proportion of light steel shuttering for floors, is number 105, which is distinguished by a very thorough, well-illustrated report illustrating the structural system. This scheme is not alone in suggesting a peacetime upper storey of framed or solid plank timber, brought from Canada or Scandinavia, when the pent-up timber resources of the world are suddenly released.

IMMEDIATE ADOPTION?

So far as the house section is concerned, it can be said, with controlled enthusiasm, that this bold competition has justified itself. Not only the winning scheme, but many others, could be adopted immediately and profitably by sweating wartime industrial centres (like Coventry, from which one of the best solutions happily comes).

DISAPPOINTING LAYOUTS

But it is the layout section of the competition which one finds disappointing — in fact, disheartening.

The problem here was to produce a siting arrangement for 250 houses (whether separately or in short terraces) and for a community centre which in war was to be used for communal dining, laundry and bathing. The siting had to be so contrived that the community would be as invisible as possible from the air in wartime, and as attractively planned as possible for peacetime living. The committee hoped that through this competition some worthwhile contribution would be made to town and country planning.

Bluntly, it was difficult to find anything approaching a worthwhile contribution, even among the prize winners.

THE WINNING LAYOUT

The winning layout is an attempt to work the road system of the housing scheme into the wobbly rectangle pattern of the typical English countryside. Most competitors who were in the running realized the fundamental need of this for camouflage purposes, though there were plenty who worked on the quite false assumption that the more curly you make your roads and building lines, the less they will be seen.

The camouflage devices used by the winners, already well known, seem reasonably sound: the majority of houses in the wartime stage are of one storey, disguised in the accepted way, while a few two-storey houses, and one of the communal buildings, are deliberately emphasized. At the same time a few of the roads are finished in white concrete, the remainder in coloured tarmac—giving the impression, at great height, of straggling lanes and haphazard houses and farms.

PEACETIME PLANNING

This simple trickery can be applied with equal effect in almost any layout pattern of similar density, and it is therefore disappointing to find that the final peacetime development, though it could be a pleasant enough place to stroll about in, fails to establish any progressive principle, or improvement on what has been so often done before. There is the abandonment of the private front garden for the continuously planted communal strip, which has been successfully practised in the United States for generations and is one of the features of Welwyn Garden City; but otherwise the layout sticks to the corridor street system, with the occasional setting back of terraces and pairs of houses to give variety in "grouping"—a pleasant enough notion popularized by the late Sir Raymond Unwin. There are the familiar awkwardly-shaped gardens at corners, and houses of similar type-plans facing each other across the road with at least three different orientations.

SECOND PRIZE LAYOUT

The second prize design is based on the idea of a village which has "just growed." An actual section of an ordnance map has been taken, more or less at random (no site was specified in the conditions), and the access roads for the new development follow the existing lanes, cart tracks and footpaths. The competitors have to some extent "got away with it" by assuming that only a small proportion of the ultimate 250 houses will be built in wartime, and that convenient gaps can be left in the temporary layout, giving a temporary scattered village effect.

CAMOUFLAGE

Compared with the winning scheme, this could be described as an attempt at more "organic camouflage," that is to say, it does not depend so much on superficial disguise as a natural informality.

The assessors have obviously considered this camouflage question a very vital factor, and in the case of this second scheme they do not seem to have considered the peacetime plan sufficiently noteworthy of being hung with the wartime plan. (It is unfortunate that the complete sets of prize-winning schemes could not have been hung together instead of having some of the less important

but nevertheless relevant drawings being elsewhere on less conspicuous screens.)

This peacetime plan is certainly somewhat reactionary. It depends, for instance, on rather poor imitations of Welwyn grouping, permits itself awkward-shaped allotment areas at backs of gardens, places shops rather carelessly on traffic roads without any proper separation between domestic and commercial use, and makes no attempt at studying orientation of houses.

NEGLECTED PRINCIPLES

In other successful and unsuccessful schemes, there seem to be very few new *pointers* for post-war development. Even some of the commonly accepted pre-war desirable principles have been constantly neglected. For instance, substitution of the usual street corridor and back-to-back garden-strip system for some system giving gardens of more reasonable shape, varying in size and opening on to some form of useful and pleasant common garden: again, some attempt at more highly organized and economic road design, as an improvement on the wasteful ribbon system. (There were a few attempts at this, but mostly they suffered the fault of a too rigid pattern for camouflage purposes.) Greater use of gravel drives and footpaths in developments where private cars do not have to be catered for. And the long-accepted principle of orientation was also neglected by nearly all competitors.

Generally, even where schemes had been ingeniously zig-zagged, or sprinkled for camouflage purposes, there was an unhappy tendency to think in terms of paper patterns, and failure to study the layout from the point of view of the individual (including the baker's man) who has to move about in it. It was the *stereotyped* character of so many of the layouts which was so disappointing, and the fact that, even among the successful, Welwyn had been poorly digested and Radburn not even thought over.

MINISTRY OF HOME SECURITY

Following are extracts from Bulletin No. C.8, just issued by the Research and Experiments Department of the Ministry of Home Security, on structural damage caused by recent air raids to some single-storey buildings.

1. *Introduction*

It is generally imagined that in the case of a direct hit little can be done to save a building from more or less complete destruction. This view is not supported by the evidence of recent air raid damage. The extent of the damage naturally depends on the size of the bomb and the type of building hit. Details are given in paragraph 2 of cases where structural damage has been caused to a modern single-storey building. In addition to the cases described in paragraph 2, there have been a number of direct hits where the damage has been confined to the roof covering, the structure itself being undamaged.

2. *Recent Air Raid Experience*

A. *Direct hit on the building shown in Fig. 1.*—Bomb penetrated the roof and exploded on the floor in the position shown, the damage being as indicated in the figure. There appear to have been three major causes which all contributed their share towards this structural collapse.

(1) The presence of strong side walls (9 in. brickwork, steel framed) fixed at the eaves to the roof steelwork. This appears to have been the most important cause of the collapse. When the blast from the explosion hit these side walls it forced them apart, and tore the trusses away from their end connections, leaving them unsupported.

(2) Lack of continuity of the valley beam. Had adjoining lengths of the valley beam been spliced to develop the full strength of the section then, when the 4⅞ in. dia. rivets connecting the stanchion cap to the valley beams were sheared by the earth movement resulting from the explosion, the valley beam would still have been adequate to span between the adjacent undamaged stanchion and the gable wall.

(3) Lack of steel framing in the gable wall. In conjunction with (2) above the provision of steel stanchions instead of brick piers in the gable wall would, at any rate if the stanchions were not bonded into the wall, have ensured that the valley beam would hold up.

B. *Direct hit on roof of a similar building to Case A.*—In this case the bomb detonated on contact with a roof truss and did little damage apart from stripping the sheeting and glazing over a considerable area. None of the roof steelwork collapsed in spite of the truss struck being damaged as shown in Fig. 2. This case clearly shows how even the "continuity" afforded by the stiffness of the joint A of the truss is sufficient to prevent collapse. In this case it is probable that the continuity of the purlins did much to hold up the damaged truss which, in any case, was only called upon to support its own weight, since the sheeting and glazing were blown off by the explosion.

C. *Near miss on 500 ft. long by 50 ft. wide steel-framed shed building.*—The roof of this shed was of asbestos-cement sheeting carried on steel roof trusses spanning 50 ft. between 12 in. by 6 in. R.S.J. eaves beams. These eaves beams were carried on 10 in. by 6 in. rolled steel stanchions. The bomb exploded beside one of these stanchions, moving and tilting its concrete base to such an extent that the connection between the stanchion and the eaves beams was sheared, and the stanchion fell over on its side. As a result of this the two 20 ft. lengths of eaves beam on either side of this stanchion collapsed, together with the four roof trusses originally carried by them. It is of interest to note that the connections between these four trusses and the collapsed eaves beams were undamaged and also that the remote ends of these eaves beams remained attached to the adjoining stanchions. It is certain that had the eaves beams been connected together over the supporting stanchions, this collapse would have been avoided altogether. As in Cases A and B above the sheeting was completely stripped over a wide area, so that the load which the continuous eaves beam would have been called upon to carry over two bays would have been relatively small.

D. *Near miss on shed building having sides and gable ends sheeted with corrugated iron.*—Several large bombs exploded close to the gable end and the only damage done was to strip the sheeting and buckle the sheeting rails and gable stanchions. The latter, which were 7 in. by 3½ in. R.S.J.'s spaced at 12 ft. 6 in., were bowed in away from the explosion for a maximum distance of 14 in. They were held at eaves level (20 ft. from ground level) by a horizontal wind girder, and neither this wind girder nor any of the main steelwork suffered any damage. This case is of particular interest as showing the excellent behaviour of a fully-framed shed building under blast. Had the end gable wall been of brickwork it is almost certain that it would have been destroyed, bringing down any steelwork supported by it.

E. *Direct hit on single-storey building with filler joist and hollow tile roof.*—This building was part steel framed and part wall bearing. The main roof steel consisted of 14 in. by 5½ in. rolled steel joists spanning 18 ft. between 7 in. by 4 in. rolled steel stanchions at the front of the building and a 13½ in. brick wall at the back. The bomb penetrated the roof before exploding and completely demolished the back wall of the building, thus bringing down the back edge of the roof. At the front of the building the 7 in. by 4 in. stanchions were little damaged and continued to hold up the roof along its front edge.

3. *Design of New Buildings*

The examples of damage given in paragraph 2 show the importance of the three following points if the maximum resistance to collapse is to be obtained:

(1) Buildings should be fully framed. That is to say, *all* load should be carried by the steel framework and not part by the framework and part by the external walls.

(2) The steel framework should be as continuous as possible. That is to say, beams and girders should be joined together over supporting stanchions and beam to stanchion and other connections should be as rigid as possible.

(3) A "safety valve" type of construction should be adopted wherever possible, but particularly in small buildings. That is to say, if brick panel walls are required for the protection of plant and personnel, they should be of the minimum height necessary to give the required protection. Above this height the walls should be of light sheeting designed to blow out under internal blast without damaging the structural framework.

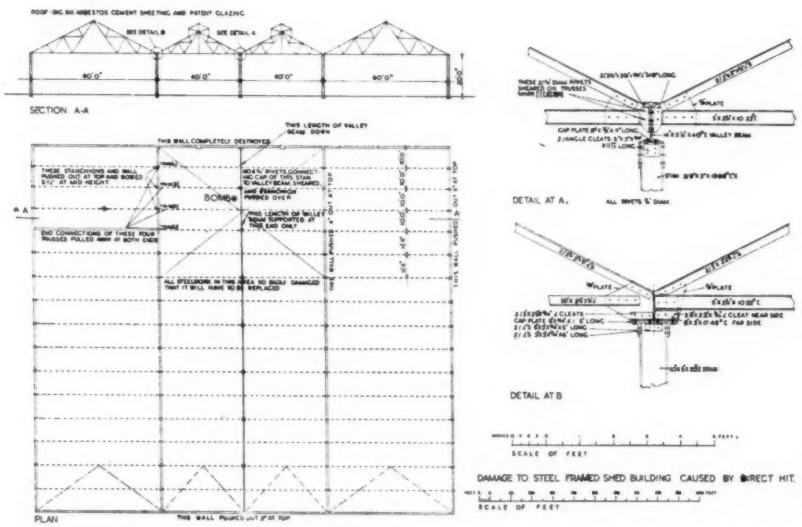


Figure 1

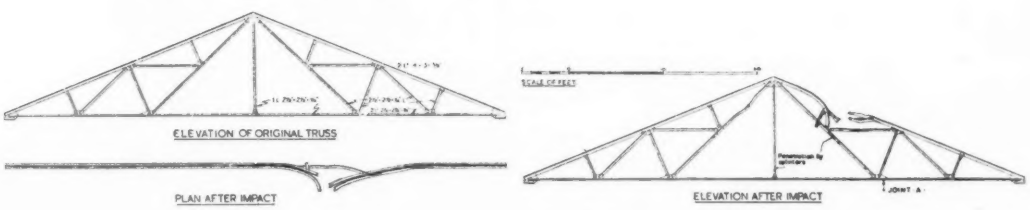
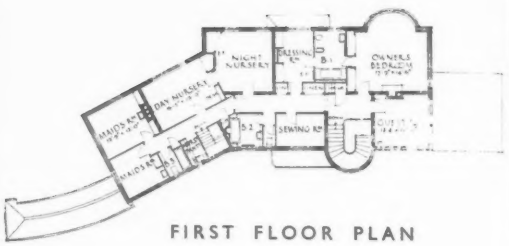


Figure 2

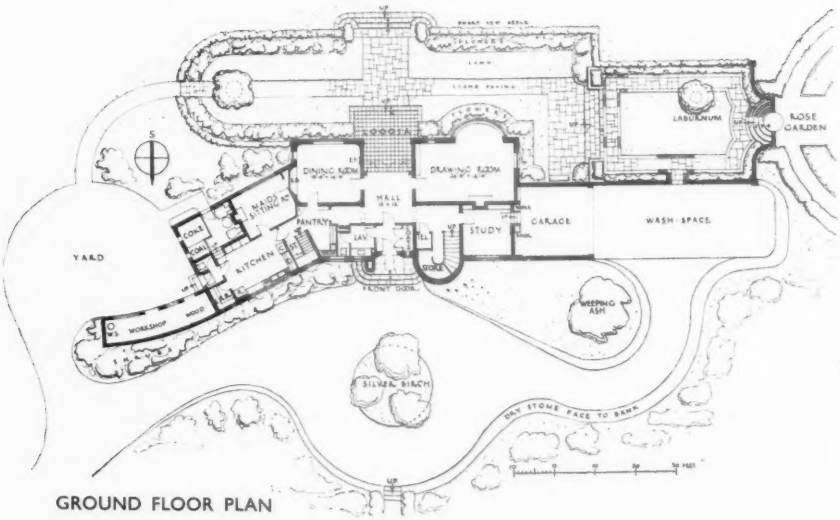
HOUSE AT W

BY MINOPRIO AND S

Entrance drive; below, south terrace; right, view from south-west.



FIRST FLOOR PLAN



GROUND FLOOR PLAN

GENERAL AND SITE—The house at Ware, Herts, was built in a meadow falling to the south-east; the garden and terraces were designed by the architects.

CONSTRUCTION AND EXTERNAL FINISHES—15½ in. and 11-in. cavity brick walls; solid concrete and timber joisted floors; pitched timber roof covered with dark red hand-made sand-faced tiles on battens, felt and boards. Partitions: 9 in. or 4½-in. brickwork or pumice block, plastered. External walls: red multi-coloured facings; sand limes in outbuildings and garage. Steps and terrace: random rectangular York stone. Windows: teak, untreated, and left to weather naturally. External doors: oak or teak.

INTERNAL FINISHES—Floors generally, deal boards on joists with lino in nurseries, pantries and kitchen; cork tiles in bathrooms, lavatories, hall and study; maple boards in drawing room; tiles in back entrance.

Above, main staircase balustrade ; black hand-rail ; white wrought iron balustrade ; royal blue carpet. Left, drawing room fireplace in polished Clipsham and Roman stone ; and bay window of owner's bedroom ; silver grey paint-work and dark red curtains ; grey carpet.

INTERNAL FINISHES (*cont.*)—Doors, panelled walnut to principal rooms ; painted deal elsewhere. Main staircase : painted deal with wrought iron balustrade, black hardwood handrail and blue carpet.

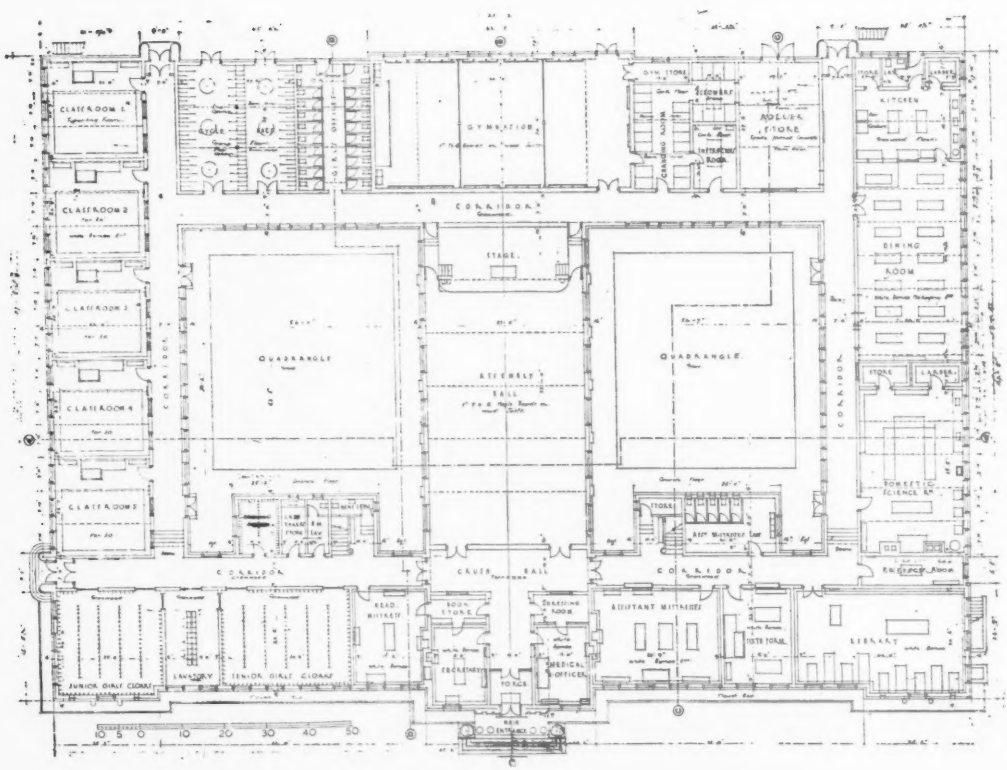
SERVICES—Water, own well with electric pump. Drainage : own septic tank. Light : mains electric.

General contractors were E. H. Burgess, Ltd. ; for list of sub-contractors see page xvi.

C

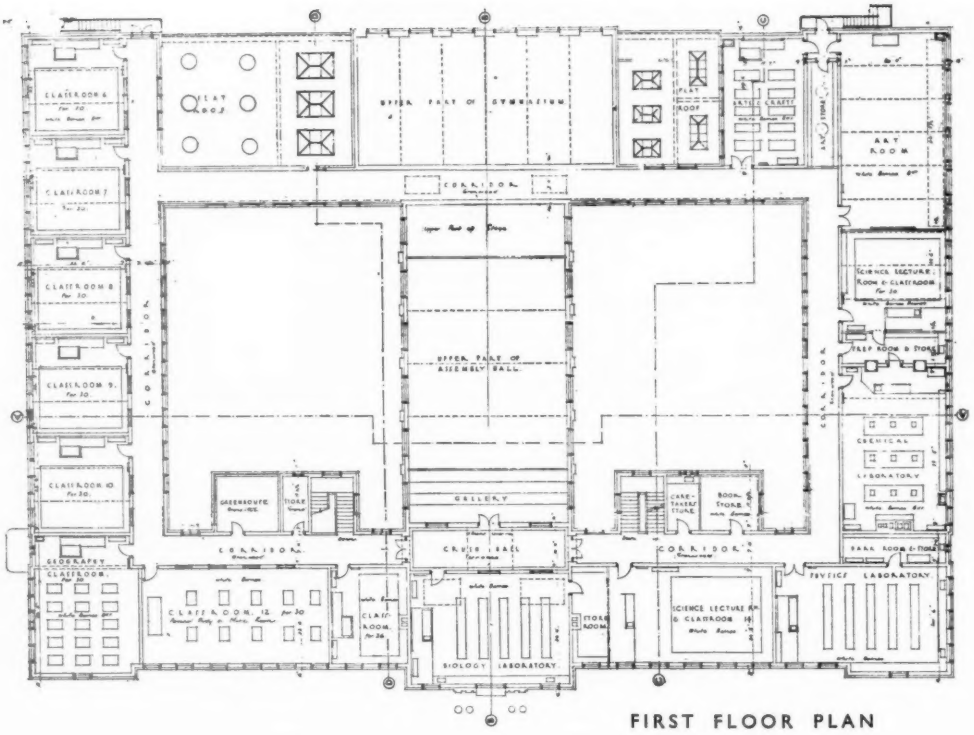
SCHOOL, ACCRINGTON

Main entrance



GENERAL — High school for 465 girls at the eastern end of a 19-acre site on the outskirts of Accrington. The western portion of the site will be used for a future boys' school.

GROUND FLOOR PLAN



FIRST FLOOR PLAN

DESIGNED BY STEPHEN WILKINSON

Main front

View from south-west

PLAN—The assembly hall is placed on the main axis of the plan and the various rooms are grouped around two quadrangles. Administration (headmistress, secretary, etc.) is placed around the main entrance, and the girls' entrance is on the south elevation with cloakrooms and lavatories adjacent. On the north front are the domestic science room, dining rooms and kitchen, and the west block is occupied by the gymnasium, changing rooms, showers, offices, etc. A library is also provided. Further classrooms are situated over their counterparts below, the whole of the north wing being occupied by science laboratories and art rooms.

CONSTRUCTION AND EXTERNAL FINISHES—Brick, with 16-in. cavity external walls with stone dressings and reinforced concrete floors and flats except for the assembly hall and gymnasium. Roof is finished with green slates.

INTERNAL FINISHES—Domestic science room, kitchen, all corridors and cloakrooms are floored with red composition blocks. Crush halls (ground and first floor), staircases and vestibules are in green terrazzo. Assembly hall and gymnasium are finished with 1-in. maple boards on joists ; the remainder of the accommodation generally is finished with $\frac{7}{8}$-in. British Borneo white flooring laid on coke breeze concrete. Most rooms have a 3 ft. 6 in. cement dado with plaster above. Library, dining room and assembly hall are panelled in hardwood to a height of 7 ft. 3 in. Domestic science room and kitchen have wall tiling 4 ft. high. Changing rooms, showers and offices are in white glazed brick ; the gymnasium and various small rooms are distempered. Crush hall and vestibules are in cream faience to full height ; corridors have faience 3 ft. 6 in. high.

SERVICES—Lighting, electricity with gas emergency lighting. Heating, low pressure hot water boilers situated in basement. Ventilation, generally, by natural means except for the assembly hall, the natural ventilation being reinforced by extracts in the ceiling connected to a fan under the copper turret.

General contractors were J. Whittaker and Sons, Ltd. ; for list of sub-contractors, see page xvi.

Assembly hall

Library

Gymnasium

SCHOOL AT ACCRINGTON • DESIGNED BY STEPHEN WILKINSON

SOME QUESTIONS ANSWERED THIS WEEK:

★ *WE require a camouflage paint for application over Clipsham stone, but which would be completely removable from the stonework at a future date* - - - - - - - - Q483

★ *WHAT mortar would you recommend for building 9-in. thick sand lime brick panel infilling of a one-storey factory?* - - - Q484

★ *WE are enclosing sample of floor surfacing from solid concrete ground floor of office building. Can you identify firm responsible for laying original floor?* - - - - - - Q489

★ *PATCHES of dark stain have appeared on panelling of English oak pews and choir stalls we completed five months ago in a church. Can you give information on cause and remedy?* - Q491

THE ARCHITECTS' JOURNAL INFORMATION CENTRE

THE Information Centre answers any question about architecture, building, or the professions and trades within the building industry. It does so free of charge, and its services are available to any member of the industry.

Questions may be sent in writing to THE ARCHITECTS' JOURNAL, 45 The Avenue, Cheam, Surrey, or telephoned direct to the Information Centre: Regent 6888.

Enquirers do not have to wait for an answer until their question is published in the JOURNAL. Answers are sent direct to enquirers by post or telephone as soon as they have been prepared.

The service is confidential; and in no case is the identity of an enquirer disclosed to a third party. Samples and descriptive literature sent to the Information Centre by manufacturers for the use of a particular enquirer are forwarded whenever the Director of the Centre considers them likely to be of use.

Finally, if an answer does not provide all the information needed, the Centre is always glad to amplify any point on which the enquirer wants fuller explanation.

Any questions about building or architecture may be sent to:

THE ARCHITECTS' JOURNAL
45 THE AVENUE, CHEAM, SURREY
Telephone: *VIGILANT 0087*

or ring the Architects' Journal Information Centre at

REGENT 6888

Q482 ARCHITECT, NORTHERN IRELAND.—*I would be glad to have advice on the following matter. In carrying out extensive reconstruction works to a church, I specified for the INTERNAL PLASTER rendering and floating of the walls to be Portland cement mortar finished in Keene's cement. The parish priest, after the cement backing has been finished, desires what is known here as a grey FINISH. This was a usual finish in former years and was obtained by mixing lime and sand and finishing with a hand float. I feel that to apply a similar finish to a cement backing would not give successful results. I would be pleased to know if any of the following mixes could be used on the cement and sand backing and finished with a hand float?* (a) *Keene's cement and sand;* (b) *Pioneer plaster and sand;* (c) *Snowcrete and sand.*

Any one of the mixes suggested would be quite suitable for the purpose. The cement and sand backing should be scored and wetted before application of the finishing coat. With a Keene's cement and sand float finish the coarser varieties of Keene's cement can be used and the sand should pass a No. 40 mesh sieve. Equal volumes of Keene's cement and sand would be preferable. Similarly,

with Pioneer plaster the sand should pass a No. 40 mesh sieve and equal volumes of plaster and sand should be used. With the Snowcrete and sand finish the best results would be obtained by using the Fine Snowcrete Mixture, which is a factory bagged composite mix of Snowcrete, white cement and suitably coloured and graded sand. If, however, a local sand is to be used with the Snowcrete white cement this sand should be as light in colour as possible and used in proportions around 1 volume of cement to 2½ volumes of sand.

Q483 PAINT FACTORS, LONDON.—*We have been asked to supply a CAMOUFLAGE PAINT for application over Clipsham stone, but it is stipulated that the paint must be easily and completely REMOVABLE FROM the STONEWORK at some future date. What type of paint would be best suited to this purpose?*

The normal camouflage paint is of the nature of an oil-bound distemper, but most recent specifications have called for bitumen-bound materials. Neither will fulfil the conditions laid down. Clipsham stone is one of the hard Bath stones and will provide a base of varying suction for any distemper coating. Where little suction is obtainable the coating will rest on the surface and ultimate flaking will result. Where a more porous part of the stone is treated the coating will be absorbed into the surface and will be difficult to remove without mechanically defacing the surface. Nor can we suggest any other form of paint suited to the purpose. The only means whereby complete removal of the camouflage film could be guaranteed would be to cover over the stonework with an underslating felt or hessian and to apply the camouflage over the fabric. This practice has been followed on a number of buildings by cutting out joints of the stonework and inserting wood laths on edge and nailing the fabric or felt to these laths.

Q484 ENGINEERS, LONDON.—*We have been told that in using SAND LIME BRICKS cement mortars should be avoided. Is this so? Also what MORTAR would you recommend for building 9 in. thick sand lime brick panel infilling of a one-storey factory?*

In building sand lime bricks the use of strong cement mortars should be avoided. The reason for this is that sand lime bricks have a greater shrinkage factor than normal clay bricks, particularly when used direct from the brickworks and without any period of storage for initial drying out after the steaming process. Hence, in building such bricks in strong cement mortar the shrinkage is cumulative and sometimes results in vertical cracks in the structure, either between window openings on successive floors or, in cases of panel infilling uninterrupted by lights, by a vertical crack near the pier or stanchion casing. By using a weaker mortar the shrinkage tendency is allowed to accommodate itself in the individual bricks. If a straight cement mortar is to be used, a 1 : 5 mix could be specified, but with this, unless the sand is exceptional, the mortar will be " short " and will not spread easily. Hence it is easier to specify a lime-cement-sand mix, say of the proportions of 1 : 1 : 6, and so have adequate strength and " butteriness," with which, of course, goes ease of spreading.

Q485 ARCHITECTS, WEST BROMWICH.—*A client of ours desires a basement to be used as an air raid shelter, but the brickwork is in a very damp condition. He quotes a PROCESS which he has seen advertised FOR DRYING OUT BUILDINGS CALLED " KNAPIN." We cannot find any reference to such a process in any of the trade journals or catalogues. We should be glad to know if you have any information or recommendations to make regarding this?*

The firm in question is no doubt Messrs. British Knapen, Ltd., Stone Grove Manor, Edgware. This firm has considerable knowledge of problems concerning dampness and carries out remedial measures under guarantee.

Q486 ARCHITECT, LONDON. — *My problem is this : Factory buildings once operated by one concern now house five self-contained firms. Two of these firms provided shelter accommodation for their personnel at the outbreak of war. Three firms did not and under threat of legal action have been given seven days' notice by the Council to provide such shelter. Jointly they have put the matter in my hands and with every haste plans were formulated and lodged with the Council and at the same time the necessary works put in hand. The Council's surveyor has returned the plans to me asking for secondary exits placed in a boundary wall. This wall is a PARTY WALL owned jointly with a domestic dwelling adjoining. This adjoining property is empty AND, from the enquiries I have made, has apparently changed ownership three times within recent years : the whereabouts of the present owner I have been unable to trace. Speed is necessary to avoid possible legal penalties for the non-provision of shelter accommodation, consequently I have no wish to enter upon party wall notices even if I could find the present adjoining owner. Am I empowered under the Civil Defence Act to proceed forthwith and provide these necessary SECONDARY EXITS in the party structure?*

No provision of the Civil Defence Act would appear to give such powers. The power of an owner or occupier to execute works is contained in Section 15 of the Act, wherein it is provided that an owner of any commercial building may execute works in the premises. It would therefore appear that a secondary exit from a shelter through a party structure could only be made in agreement with the adjoining owner.

Q487 ARCHITECTS' DEPARTMENT, MULTIPLE FIRM, LONDON, W.—*We should be glad if you would advise us of the proportion to mix LIME AND GRANITE WASTE FOR MASS CONCRETE? This concrete will act as foundations for brick partition walls. Also in what proportions would you use lime and sand for mortar in building partition walls? Needless to say, we are considering the use of lime because of the difficulty of obtaining cement. The work will be done in Cornwall.*

It must be made clear that the work should be executed under the control of someone with a knowledge of the traditional methods of handling lime, the lime to be used, and the period of time which must elapse between the laying of lime concrete and building on this foundation. It is scarcely possible to give the proportions of lime and aggregate for concrete without a more intimate knowledge of the source, size and grading of this aggregate. In the area in which building is intended, certain granite wastes are obtainable as spoil from tin-mining. These should on no account be used, or certainly they should not be used without the fullest investigation as to whether such waste will have no harmful effect on the setting of the lime. Given a crushed sound granite well graded from 1 in. downwards and free from dust and made so preferably by washing, this would form a suitable aggregate. As to the lime, only a ground stone lime or Blue Lias lime of the eminently hydraulic class should be considered. This material has a slight expansion on slaking and setting, so that for this reason alone the concrete mix should

Electric wiring installation by:—
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• • •

BRANCHES & AGENTS THROUGHOUT THE WORLD

There are over two hundred and sixty points for lighting, fans, plugs, bells, etc. in this fine new hospital building. Most of the wiring was installed on the surface on teak-wood strips, but in certain rooms, including the operating theatre, chases were cut in the walls, lined with cement and finally plastered over to conceal the wiring. Some 6,200 yards of HENLEY C.M.A. (Regd.) Tough Rubber Sheathed Cables were used for the installation.

HENLEY CABLES

W. T. HENLEY'S TELEGRAPH WORKS CO. LTD.

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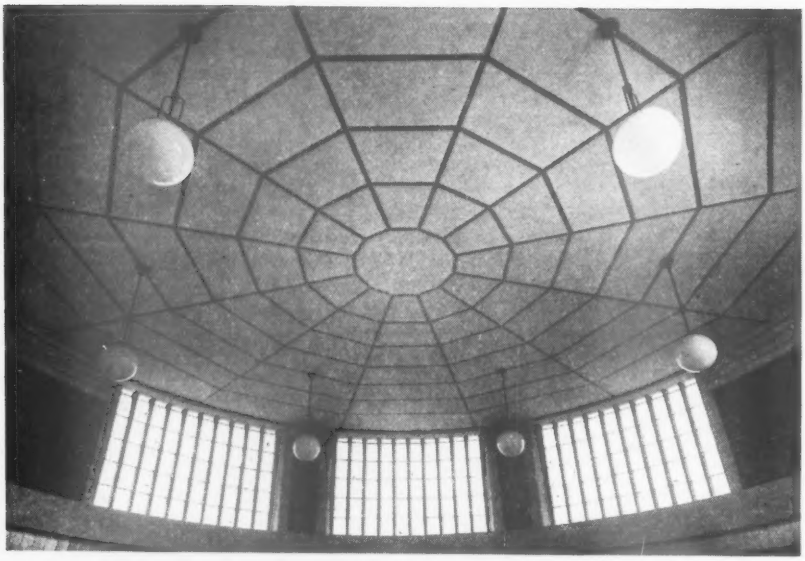
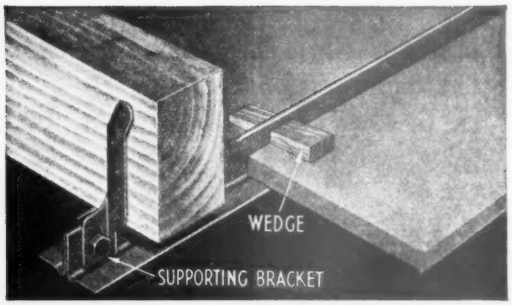
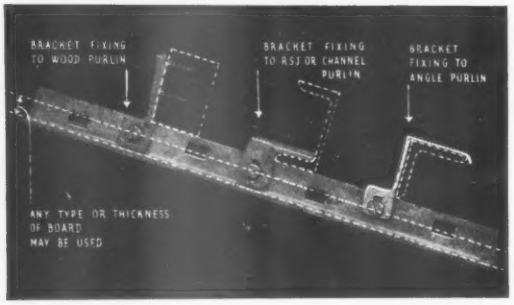
Telephone—Dorking 3241 (10 lines) Telegrams—Henletel Dorking

AnD WEDGE METHOD
PATENT No. 519406



Circular Ticket Hall at St. John's Wood Underground Station.
Architect: S. A. Heaps





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Wallboards

The originators of the application of wallboards by means of a staggered, slotted metal tee section to underside of steel or wood purlins.

Inventors and Patentees of the
AnD Wedge Method

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TAS/An 38

be in position for a period of time before the brickwork is built. After an eminently hydraulic lime is obtained and suitable aggregate, assuming that a 1 : 4 mix by volume is adopted, the work should be kept damp after placing and allowed to set for a period of, say, 14 days. For the mortar, similar precautions must be taken as to origin and cleanliness of the sand, and a 1 : 2½ or 1 : 3 mix by volume can be used. Care should be taken that the bricks are wetted before use and that not too great a height of work is erected in one day. With an eminently hydraulic lime of the Blue Lias type, 18 in. rise in building per day would be normal, and certainly 30 in. rise should not be exceeded.

Q488 BUILDING CONTRACTORS, LANCS. — *We have carried out a particular job, under the 1931 Form of Contract, the architect being also the quantity surveyor. The quantities form part of the contract and included in the accepted Bill of Quantities under the heading of PROVISIONAL SUMS are a series of items for Patent Glazing, Metal Windows, Asphalt, etc. The whole of these sums were taken out of the Contract and expended by the architect, who claims that by this action the whole transaction was taken out of the hands of the Contractors, since the persons executing the works or supplying material under these items become artists or tradesmen who are not nominated sub-contractors, but engaged by the employers, under Clause 24c, AND that the Contractor is therefore not entitled to these CASH DISCOUNTS provided in Clause 24a and b. In the final account rendered, the provisional sums were deducted and a claim put in for the Cash discounts, as we maintain that Clause 24c merely gives access to the employer. We should be pleased to have your opinion on the correctness of this method of procedure.*

The Information Centre cannot undertake to give a legal opinion on the particular facts of any particular case, but the general position concerning the subject of this enquiry is as follows:

It seems clear that the allowance of Cash Discounts in the 1931 Form of Contract is for payment of services rendered or for duties performed, i.e. for paying specific sums of money within a limited period, and the Contract does not state or imply that the Employer should recompense the Contractor if he is not called upon to perform such duties. The Architect is obviously entitled to omit certain provisional sums if he desires, and the Employer is also entitled to employ tradesmen, engaged by himself, and it seems immaterial whether the work done by such tradesmen was originally included in the Contract in the form of provisional sums or not. The only claim which seems justifiable, therefore, is for ATTENDANCE on the tradesmen concerned if this was necessary.

It is appreciated, however, that a great many contractors—especially when trying to keep their price low—have not added for attendance or profit against provisional sums and have relied on the Cash Discount to remunerate them for any supervision or attendance which they will have to provide. This is a regrettable practice, in that it obscures the clear-cut conception of a Cash Discount as a fee for prompt payment or payment in advance of reimbursement and for that alone. But there is no doubt it is common: and where it has happened, and provisional sums have been subsequently expended by the Architect, it is not uncommon for the Employer to make an *ex gratia* payment to the Contractor equivalent to the Cash Discounts. If, however, the Provisional Sums form a large proportion of the total Contract sum, the Contractors are at liberty to claim that their omission has seriously altered the nature of the Contract, and seek to have it set aside. But this is always a difficult claim to sustain in practice, and it would appear better to approach the architect on the question of attendance.

Q489 SURVEYORS, LONDON. — *We are enclosing a sample of a floor surfacing taken from the solid concrete ground floor of an office building. Close fitting linoleum has been laid on top of this flooring and the surface is at present damp and discoloured. Alterations are being carried out to the premises, and the work has involved breaking through the floor at various parts. We intend removing the linoleum and making good and RESURFACING the FLOORS. From the sample enclosed, can you identify the firm responsible for laying the original floor as we would like to make contact with them and have them carry out the work of restoration?*

From examination of the sample, the flooring material is almost certainly 1 ct. ⅜ in. thick red coloured magnesium oxychloride, the ordinary jointless or composition floor. It is impossible to identify the name of the layers; the material could have been laid by any of the magnesium oxychloride jointless flooring firms, and their names are legion. With these sawdust wood-flour filled floors, it is not possible to abrade the surface in the way generally adopted in resurfacing timber and terrazzo floors. No doubt, however, it will be possible for an experienced firm of layers to restore the appearance of the original floor by carefully rubbing with steel wool and applying oil or a hard wax surface coating.

Repairs to the damaged positions can be done quite easily, the material being laid in a plastic state and tamped and trowelled into position. Two firms experienced in such work are the Marbolith Flooring Co., Ltd., 29 Albert Embankment, London, S.E.11; and the Linolite Composition Flooring Co., 36 Mitcham Lane, Streatham, London, S.W.16.

Q490 ARCHITECT, SURREY.—*I am a qualified architect and lecturer on building construction and quite recently I registered for Military Service, but have not yet been asked to attend for the Medical Examination. Since registering I have been offered a post as an ASSISTANT QUANTITY SURVEYOR, an occupation which I understand is reserved at the age of 23. If I accept this post, will I be classified as a Quantity Surveyor and consequently in a RESERVED OCCUPATION?*

The Schedule is based on the occupation in which a man is engaged at the time of Registration, and it is on the particulars taken at the time of Registration that calling up is based. The enquirer should therefore consult an official of the Ministry of Labour concerning his position: and it would be best to do so after he has actually started his work as a quantity surveyor—since a completed change of occupation is a firmer basis on which to ask for changes to be made in Registration particulars than a hypothetical change.

Q491 ARCHITECTS, NOTTS. — *About five months ago we completed some panelling, pews and choir stalls in a church. These were constructed of ENGLISH OAK and were finished with wax polish only. No other treatment was given to the woodwork at all. PATCHES OF DARK STAIN with the appearance of a watered ink have now appeared in many places, and we should be glad if you could give us any information on the cause and remedy for these.*

This enquiry was passed to the Director of the Forests Products Research Laboratory, to whom we are indebted for the information given in the reply. The reply is:

"We have examined the discoloured

sample. Chemical tests reveal that the stain has been caused by interaction between the tannin of the wood and iron. There is no indication as to how the iron came to be applied to the wood, but this type of stain commonly occurs when moist oak wood is sawn or planed, and another possible cause can arise as follows. Oak which is to be finished with wax only is frequently treated with oxalic acid to remove finger marks, etc., before waxing. It is not generally known that if the acid is applied from an iron vessel—e.g. a painter's pot—black stains are liable to develop in the wood in the course of time.

"Superficial iron stains are readily removed from oak wood by washing first with a warm aqueous solution of oxalic acid and then with water, but wax or other finish must be removed before applying this treatment. If the iron stain has penetrated deeply into the surface of the wood, its removal by oxalic acid is difficult and sometimes impossible. We have known cases in which the stain has been apparently eradicated only to develop again after a few months' exposure to air and light.

"We should advise you to experiment as follows with a small area of wood in which the stain is at its worst. First remove the wax by rubbing down with turpentine or other suitable solvent. Allow surface to dry. Dissolve 1 oz. of oxalic acid crystals in 12 fluid oz. of hot water, using a glass or earthenware dish. Soak a clean rag or cotton wool pad in the acid and rub the stained area of wood until it assumes the normal colour of oak. Wash thoroughly with warm water and remove as much as possible of the water remaining on the wood by sponging or other means. Allow the wood to dry and leave exposed to light and air for as long as possible—say, two to three months. If the stain develops again during this time, we very much fear that no amount of oxalic acid treatment will remove it entirely, and the only course then open to you would be to plane or sand the wood to a clean surface.

"Oxalic acid is poisonous and it is desirable to wear rubber gloves when using it."

REFERENCE BACK

[This section deals with previous questions and answers.]

Q458 *August* 15, 1940

Glass Anti Blast Protection and Glass Substitutes.—A reader has forwarded a list of names of firms producing various forms of protection and substitutes, which is additional to the names given in the reply published in our August 15 issue. These additional names and the type of material manufactured are listed below.*

Q461 *August* 15, 1940

In the reply to this enquiry the address of the manufacturers of Ferrophane glass substitute was given as 38 Sneath Avenue, N.W.11. Since then a new company has been formed for marketing the material, with the name Ferrophane, Ltd., of West Ham Lane, London, E.15; Tel. No. Maryland 3677. The description given of the material was also incorrect. The material essentially is fine expanded metal galvanized after manufacture, then dipped in a plastic, and the continuous sheeting so formed can be cleaned with soap, water and a sponge.

* *TRANSPARENT LACQUERS:*
Joseph Freeman Sons & Co., Ltd., Cementone Works, 96 Garrett Lane, London, S.W.18; Goodlass Wall & Co., Ltd., Seel Street, Liverpool; Watco, Ltd., 56 Buckingham Gate, London, S.W.1; Safeglass Products Co., Ltd., 70 Finsbury Pavement, London, E.C.2; Pytram, Ltd., Dunbar Road, New Malden, Surrey; Westminster Decorating Co., 9 St. Martins Mews, London, W.C.2; Fleetwood Chemical Co., 12 Prince Street, Deptford, London, S.E.; Pinchin Johnson & Co., Ltd., 4 Carlton Gardens, London, S.W.1; Shatterproof Window Corporation, 22 Barrett Street, London, W.1; British Patent Utility Co., Ltd., 13 Victoria Street, London, S.W.1; Warren and Richardson, Ltd., St. Andrew's Hill, London, E.C.4; K. and W. Processes, St. Johns Works, Bookham Street, London, N.1; Auto-Glass, 6 Finsbury Square, London, E.C.2; Headquarters and General Supplies, Excel House, Whitcombe Street, London, W.C.1; Bewyse Products, Exchange House, Old Change, London, E.C.4; Latham, Browne & Co., Western Road, Merton, London, S.W.19; Scientific Health Aids, Ltd., 237 Gray's Inn Road, London, W.C.1; Peerless Safety Glass Co., 9a Queensway, Ponders End; Etherium, Ltd., 52 Grosvenor Gardens, London, S.W.1; Garinol, Ltd., 14–18 Weedington Road, London, N.W.5; Anglo International Trade Association, 3 Gordon Square, London, W.C.1.

TRANSPARENT TAPES:
Adhesive (Paper), Ltd., Brunel Road, Old Oak Common Lane, Acton, London, W.3; Herts Pharmaceutical, Ltd., Bessimer Road, Welwyn Garden City, Herts; Durex Abrasives, Ltd., Thames House, Millbank, London, S.W.1.

PRICES

BY DAVIS AND BELFIELD, CHARTERED QUANTITY SURVEYORS

GENERAL POSITION

The general position is much the same as last month, in fact neither Labour Rates nor the prices of the basic materials given below have altered. Labour Rates for the Central London Area remain at 1s. 10½d. for Craftsmen and 1s. 5¼d. for Labourers (an increase of 7·14 per cent. and 9·52 per cent. respectively over pre-war rates). Wages, however, come under review again this month and there is the possibility of an increase in October.

BASIC MATERIALS	Increase over pre-war prices at end of							
	January, 1940	February, 1940	March, 1940	April, 1940	May, 1940	June, 1940	July, 1940	August, 1940
	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.	per cent.
Portland cement	+ 9·8	+ 9·8	+ 9·8	+ 9·8	+18·3	+20·7	+20·7	+20·7
2-in. Unscreened ballast	+17½	+17½	+17½	+17½	+17½	+17½	+21¾	+21¾
Fletton bricks (at station)	—	—	—	—	—	+ 5·9	+ 5·9	+ 5·9
Stoneware drainpipes (British Standard) 2 tons and over	+ 9·4	+ 9·4	+ 9·4	+ 9·4	+ 9·4	+ 9·4	+ 9·4	+ 9·4
Roofing tiles	+ 7½	+ 7½	+ 7½	+ 7½	+12½	+12½	+12½	+12½
Steel joists (basic sections) ex mills	+19	+19	+19	+19	+19	+19	+30·8	+30·8
Lime greystone	+14·3	+14·3	+14·3	+14·3	+19	+19	+19	+19
Sheet lead	+50	+50	+50	+50	+50	+50	+50	+50
Iron rainwater goods	+ 3¾	+12½	+12½	+12½	+12½	+12½	+12½	+12½
Iron soil pipes	+ 3¾	+12½	+12½	+12½	+12½	+12½	+12½	+12½
Copper tubes	+23½	+25½	+25½	+25½	+25½	+25½	+25½	+25½
White lead paint	+21¼	+22¾	+22¾	+22¾	+22¾	+22¾	+22¾	+22¾

T. A. Davis.

F.S.I.

TRADE NOTES

The sixth issue of the Quarterly Review of the International Tin Research and Development Council contains an illustrated article, describing a special tinning machine designed to produce more uniform and less porous tin coatings on tinplate. This machine embodies certain new features which are not yet employed in industrial practice, one of which is a device for securing a smooth drive for the rollers.

Another article which is of particular interest at the present time explains the uses of fusible alloys for the mounting of dies and punches for press-tool work, for foundry work and for bending tubes and sections.

An article entitled " Fluxes for Soldering," gives important information regarding the types of flux available, and the uses to which each type is suited. Further details are given in this issue as to the best methods of ensuring adhesion of bearing metals to bearing shells of cast iron and alloy steel.

Other articles give examples of technical difficulties encountered by tin consumers and of the Council's suggestions for overcoming them ; this service of technical advice is available to any firm engaged on processes in which tin is involved.

Copies of *Tin and Its Uses* may be obtained free of charge from the International Tin Research and Development Council, Fraser Road, Greenford, Middlesex, England.

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The third number—and last for the duration—of *Ceramics in Art and Industry* has just been published by Doulton and Co., Lambeth, S.E.1, from whom copies are obtainable, free of charge. The publication is devoted to the firm's new headquarters at the southern end of Lambeth Bridge, and contains plans, excellent photographs and a full description of the building from its inception to the opening ceremony.

Messrs. Doulton point out that the paper for this issue was reserved before the present shortage arose. They have decided, however, that the publication of subsequent numbers should be suspended until after the war. Their organization at the new headquarters is, however, being fully maintained.

THE BUILDINGS ILLUSTRATED

HOUSE, WARE, HERTS (pages 218-219). Architects : Minoprio and Spencely. General contractors were E. H. Burgess, Ltd. Sub-contractors and suppliers included : Chas. J. Ell and Sons, artesian well ; Allied Brick and Tile Works, Ltd., bricks ; H. A. Oakeshott, brick cills ; Pryke and Palmer, Ltd., coal hoppers ; Cork Insulation Co., Ltd., cork flooring ; J. D. Beardmore & Co., Ltd., curtain railways ; Globe Wernicke, cupboard, steel ; Thomas Glenister, Ltd., dining chairs ; J. D. Beardmore & Co., Ltd., door furniture ; P. C. Henderson, Ltd., door track ; C. Kite & Co., Ltd., electric fan ; North Metropolitan Electric Supply Co., electrical work ; The Pyrene Co., Ltd., fire appliances ; John Bolding and Sons, Ltd., Well Fire and Foundry Co., Ltd., and J. Whitehead and Sons, Ltd., fireplaces ; Folding Beds, Ltd., folding bed ; Venesta, Ltd., grille (Plymax) ; T. Potterton, Ltd., heating ; Merchant Adventurers, Ltd., and Wallace Electricity Co., light fittings ; E. Hilburn & Co., Ltd., linoleum ; E. H. Burgess, Ltd., mantelpiece ; James Clark and Son, Ltd., mirror, decorative ; Art Pavements, Ltd., paving ; Frigidaire, refrigerator ; Roberts Adlard & Co., Ltd., roofing ; John Bolding and Sons, Ltd., and Carter & Co., Ltd., sanitary fittings ; T. and W. Ide, saucer domes ; Carter & Co., Ltd., tiling ; H. E. Taylor & Co., Ltd., and Williams and Williams, Ltd., windows ; Garton and Thorne, Ltd., and A. Bucknell, wrought iron.

ACCRINGTON GIRLS' HIGH SCHOOL (pages 220-222). General contractors were J. Whittaker and Sons, Ltd. Sub-contractors and suppliers included : Manchester Slate Co., Ltd., slater ; W. H. Crook, plumber and glazier ; E. Godley, Ltd., plasterer ; A. Sharrocks, painter ; J. Blake, Ltd., heating and hot water services ; Engineering Service Co., electrical installation ; Helliwell & Co., Ltd., steel windows and lantern lights ; Rigby and Mellor, Ltd., ventilating turret ; J. Lenegan, fibrous plaster ; E. Wood & Co., Ltd., steel roof principals ; E. Whittaker, Ltd., wood panelling ; Monk Patent Glazing Co., Ltd., patent glazing ; Homan and Rodgers, concrete floors ; Leeds Fireclay Co., Ltd., faience wall tiling ; Craven, Dunhill & Co., Ltd., wall tiling ; Granwood Flooring Co., Ltd., Granwood flooring ; Asbestos and Rubber Co., Ltd., cork terrazzo ; D. Anderson and Son, Ltd., and Highways Construction Co., Ltd., asphalt ; T. Blackburn and Sons, Ltd., fire escape staircases ; Brookes & Co., Ltd., boundary railings, ornamental bronzework, etc. ; T. Blackburn and Sons, Ltd., fireproof doors and shutters ; J. Lenegan, stone carving ; J. Faulkener and Sons, Ltd., lightning conductor ; Musgraves (Liverpool), Ltd., sanitary fittings ; Baxendale & Co., Ltd., grates and mantels ; N. F. Ramsay & Co., Ltd., ironmongery ; W. Norris & Co., Ltd., and F. Stork, floor polishing ; J. T. Hartley & Co., fittings ; Wake and Dean, Ltd., furniture.