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★

THE ARCHITECTS' JOURNAL

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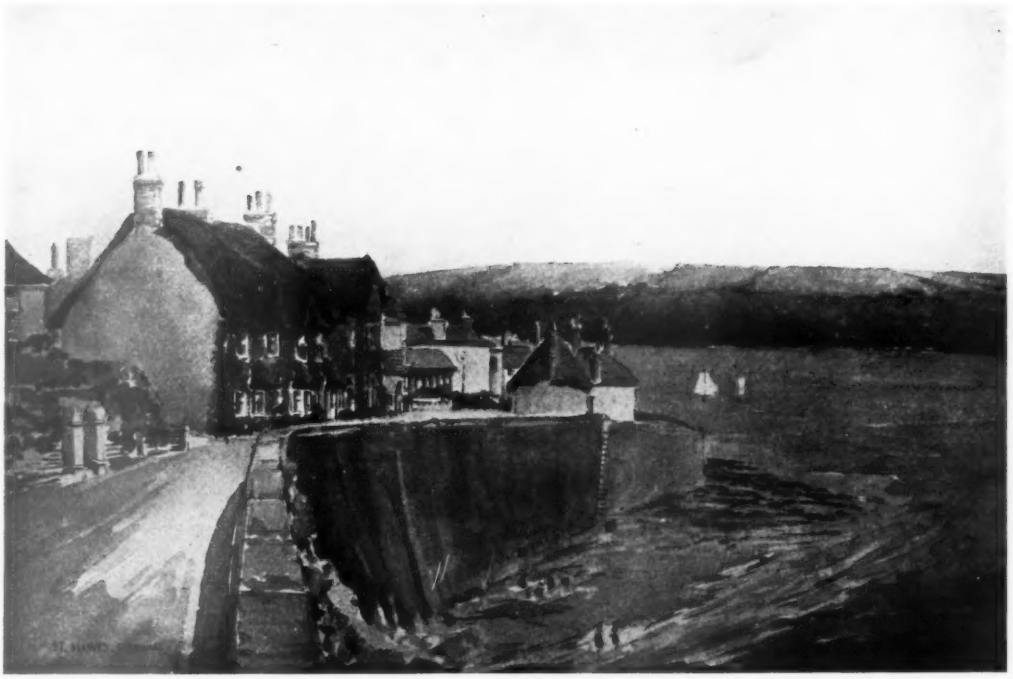
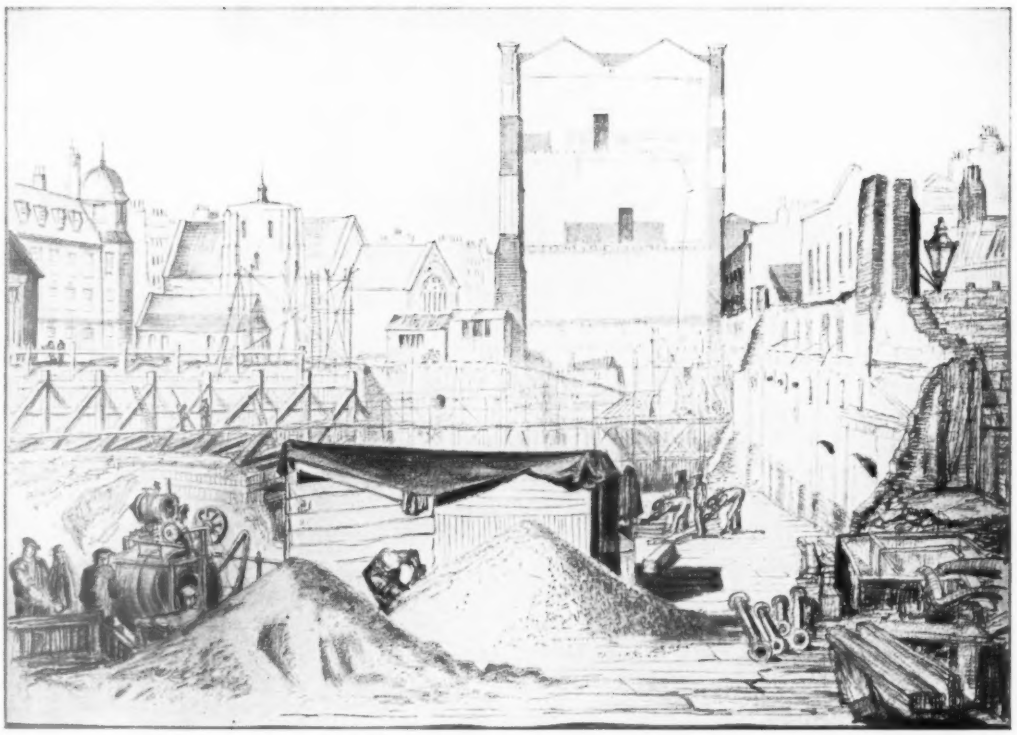
The Editor will be glad to receive MS. articles and also illustrations of current architecture in this country and abroad with a view to publication. Though every care will be taken, the Editor cannot hold himself responsible for material sent him.

THURSDAY, NOVEMBER 30, 1939. NUMBER 2341 : VOLUME 90

PRINCIPAL CONTENTS

EXHIBITION OF A.A. MEMBERS' HOLIDAY SKETCHES





Two of the exhibits on view at the annual exhibition of A.A. Members' Holiday Sketches now being held at 36 Bedford Square, W.C. Top, St. Mawes, Cornwall, by H. Bertha Robinson. Bottom, Excavation, Horseferry Road, S.W., by Ailwyn Best. It will run until December 22.

LUCERNE

An exhibition of photographs taken by members of the Architectural Association during the annual excursion to Switzerland last August was held at 36 Bedford Square, W.C., on Tuesday last. Above, one of the exhibits—Lucerne, by Stanley Shurmur.

RESERVED FOR WHAT?

STEPS TO AN ANSWER

THE circumstances in which the present war opened had some peculiar features. For once this country was ready to meet events that were certain to happen; and it had prepared at least a skeleton organization to deal with events that might happen.

Architects, in pre-war days, were a part—or seemed to be a part—of the skeleton organization. What part they did not know. They were listed, they were ready, and did not enquire very closely into what contingencies they were designed to meet and how they were to meet them.

The war has now been going on for nearly thirteen weeks. Peace-time building, as was inevitable, has almost stopped. The air raids, whose effects architects were presumably and mysteriously going to help to remedy, have not occurred—yet. Authority is too busy to think of architects. If anyone is going to plan their war service it must be themselves. Architects are—in public estimation—only important in war as part of the building industry. As they add to the efficiency of the building industry in war, so will the right war service for most of them emerge automatically. It is on the building industry that the JOURNAL *believes architects must concentrate their attention—on how war work is now being done, on what might be done, and on how it should be done.*

In this belief the JOURNAL *published last week a summary of the present position of architects and the industry. This week it repeats this summary and adds some indications of how the industry is likely to be disorganized by present methods of allocating war work if action is not taken, soon, by the industry.*

EVERY architect is worrying at present about the future. After thirteen weeks of war, ordinary work, as was to be expected, has largely ceased; emergency work is slackening; and the war service for which most architects have registered their names and qualifications appears no nearer and no clearer.

But this is not the whole story. It is not a question of building work having ceased and of waiting for it, coaxing it, to begin again. Building of certain types is going on at high speed, materials are being controlled, and there are hints of much more work to come.

Architects are part and parcel of the building industry, and their first war service is to show how the industry can best be used in war and convince Authority that they are right.

The JOURNAL, as well as many architects and other people in the industry, believe that if this is to be done at all it must be done *now:* before present hand-to-mouth methods become, *via* a few precedents, *What Is Always Done*—before the industry's present organization, which will be needed badly when the attack from the air develops, is severely disorganized.

The only way to learn how the building industry should be used in war is to understand what is happening now. Below, the JOURNAL tries to summarize the main facts of the present situation; and then to list the first actions which that situation seems to make necessary.

Here is our Summary:

THE ARCHITECTS:

There are about 13,000 Registered Architects. Architects are reserved at 30 and over. Besides those reserved, many younger men have no immediate prospect of another job, in the Services or out, and are therefore available for architectural work. The number of Registered Architects over 29 is unknown. So is the number of those not Registered who were engaged in architecture or its study on September 3. *Probably*, the grand total was not much under 20,000.

How many of these 20,000 want work now is difficult to assess.

The ordinary work, and nearly all the emergency work, of private firms and local authorities is coming to an end.

The official departments engaged on war work are not expected to increase their staffs more than 20 per cent. in the next year.

Not more than 500 architects or students are in the Services now; and not more than another 1,500 are likely to be allowed to join in the next year.

Fifty special appointments and 250 junior jobs will probably be the total obtained through the National Register in the next year—if not in the next two years.

It is therefore probable that about 10,000 architects and assistants want work now, and that about 15,000 will want it badly in six months' time.

The work which architects would do best in war is work which is as nearly as possible that which they were doing in peace-time. To achieve this for any number of architects it is necessary that the methods and organization of the building industry remain in war-time as nearly as possible the same as they were in peace-time. This is desirable on much more important grounds than that of the architects' need. So the next steps are—(1) *To recollect what the Building Industry is; and* (2) *To see how it can best be used in war-time.*

THE BUILDING INDUSTRY:

Here are a few facts:

★ *The gross value of all work carried out by the building industry in the year ending September 3 last was about*

RESERVED FOR WHAT?

(Continued from previous page)

£600,000,000. The value of work on buildings (including repair and maintenance) was about £400,000,000.

★ *The number of insured persons in the building industry (building, public works contracting and constructional engineering) in July, 1938, was 1,424,870*
Numbers in industries directly dependent ... 529,030
Numbers in industries partly dependent ... 264,540
Numbers in industries indirectly affected ... 992,400
If one takes one-third of the last two categories as deriving their employment indirectly from the building industry, the grand total is ... 2,372,280

★ *The figures just quoted do not include architects or other allied professions and their staffs; they do not include any person in building firms or materials manufacturing firms who earns more than £5 a week.*
How much the total is increased by these additional people is not known: certainly by 100,000—perhaps by 250,000.
Therefore TWO-AND-A-HALF MILLIONS may be taken as a fair estimate of the number employed in, or dependent on, the building industry.

★ *There are about 48,000 building and contracting firms which employ more than ten people. There are about 2,000 which employ more than a hundred.*

These statistics remind architects that they are bound up with, and dependent on, an enormous industry which is spread all over the country in small and large units—all linked up and interdependent in a complex organization of trades, materials, professions and executives.

With this we come to the main point of how the war building programme can best be carried out.

The programme will consist of: (1) Mostly light, quick, cheap buildings; and (2) an unknown programme of air raid reparation.

This work can be done in two ways:

1. By using the peace-time methods, organization, trades and materials of the industry as fairly and widely as is consistent with the nature of the works.

2. By monopolizing one or two materials only (and, consequently, trades) and inducing a small part only of the industry to change its methods by means of continued flow of work, first preference in chosen materials and a measure of standardization.

Let us consider these one at a time.

METHOD 1. *Advantages:*

1. It spreads the unavoidably smaller volume of war work fairly through all building firms of any size and most of the important building materials. It will make it more probable that the smallest builders will be able to carry on with essential work of maintenance and repair.

2. It helps to keep the industry throughout the country at a reasonable level of efficiency to meet unpredictable demands of air raids.

3. It preserves (by not draining away one material and one set of tradesmen) the existing structure of the industry.

4. If materials are properly allocated according to the relative urgency of works, it enormously increases the potential output of the industry.

5. It avoids a double dislocation of the industry: (*a*) when some trades and firms are monopolized for war work and the rest left to survive as best they can; (*b*) when the industry is changing back for peace-time again.

METHOD 2. *Advantages:*

1. It is capable *for the first contracts*, when the easiest materials are plentiful and controlled, of being very much faster than Method 1.

2. Providing the total volume of war work is certain to be small (say, one-tenth of peace-time volumes), the building types not too diverse and chosen materials plentiful, it is probable that it would still be *quicker* than 1—though not so good in quality or cheap in price.

More could be said for and against both methods. The central fact remains that the building industry as it now exists must be kept in tolerable working order to meet the demands of air raids—since it is too large and complex to replace. The use of Method 1 for war works would go some way to ensure this.

The use of Method 2 would do the exact opposite. As the volume of work grows, Method 2 must increasingly dislocate the internal organization of building firms and the proportions in which materials are produced—while doing nothing to keep going the major part of the industry.

The weight of evidence therefore appears clearly in favour of using Method 1 for all war-time building. But before considering how architects could try—hand-in-hand with the rest of the industry—to secure its use, it is essential to try to see what has happened so far.

THE METHOD USED SO FAR:

It appears beyond question that no Government Department is responsible for building as a whole.

The stoppage of work throughout the country has been considerable and is increasing.

The various fighting and armaments supply departments are competing against each other by means of various versions of Method 2, and there is no authority charged with arranging their demands in an order of urgency.

All departments are working from hand-to-mouth and no one appears charged with preparing an approximate programme of all works needed during the next year.

No Minister is responsible for the welfare of the building industry as a whole and of its two to two-and-a-half million employees.

Sir Connop Guthrie is advisor to the Cabinet on building problems, but it is doubtful whether he has power to procure from the various Departments sufficient evidence to stop inter-departmental competition.

If the foregoing review is correct, the *first* war work for all architects is to join with the rest of the industry in persuading the Government to use Method 1 for all building for war purposes.

The central organization of the building industry—Building Industries' National Council—is ready to be used.

When Method 1 has become the rule, *and not before*, the full volume and kind of work which ought to be

done in war-time can be discussed. Proposals for an extension of public works, evacuation camps and the rest can only be properly considered when the volume and nature of more vital works are known and provided for.

The whole building industry must decide, through B.I.N.C., what is the best way to see that Method 1 is used for war-time building. The JOURNAL makes the following suggestions of steps which seem, in principle, essential :

1. The establishment of a small Committee which shall possess complete authority to act on behalf of all the two-and-a-half millions of the building industry, allied professions, and dependent industries.

2. That it should be agreed that no partisan claims for work will be made independently by sections of the industry or its professions without the consent of this Committee.

3. That this Committee should approach the Government and speak to it (with irrefutable corroborative evidence), roughly like this :

"We are the biggest internal industry, and general unemployment among us will affect the whole economic structure of the nation.

"It is essential for the prosecution of the war to keep our organization in tolerable working order throughout the country—for the work which we may be required to do both in armaments and rebuilding when air attacks develop.

"It is therefore common sense to spread present war building contracts as fairly through building firms and important materials as is possible.

"The unavoidable fall in building volumes in war-time enables us to do all you can possibly want (bar bombing) with ease, and still reserve plenty of labour and plant.

RESERVED FOR WHAT?

"The present competition between departments for the easiest materials and quickest results will, if not checked, damage our organization badly—even ruinously.

"We therefore ask you to allow US to organize your whole building programme on these conditions :

1. That you tell us as nearly as possible what buildings and other works you will want for the next year (bar bombing)—including a description of each scheme and its component units.

2. That you establish an order of urgency for these schemes which will not be subject to change under pressure from various Departments.

3. That you give us a grant for a War Buildings Bureau which will prepare and standardize designs for all the commonest types of war building in all the building materials which can be used with tolerable speed and at low cost. These designs (and detail drawings) will be available free to all contractors ; and the material used will be decided according to the urgency of the contract.

4. That we are allowed to do our own controlling."

In this way the JOURNAL believes that architects —in close collaboration with the industry of which they are a part—can begin to answer the question—*Reserved for What?*

War must always upset an essentially constructive industry like building. In war the industry faces new problems and must solve them faster.

The public does not understand the complex organization of the industry, and, in war-time, sees little use for architects.

By doing all they can to help the industry solve war-time problems, by doing all they can to see that war building is arranged so that the industry can undertake it with minimum dislocation of usual methods, architects can go a good way towards solving their own problem of employment in war.

They can certainly do little or nothing towards solving it by appeals to Authority on their own account.

WHAT ARCHITECTS HAVE DONE SO FAR

THE JOURNAL has tried to state the case for architects preparing an answer to Reserved for What ? *in close collaboration with the rest of the building industry. But since the outbreak of war the profession has, of course, made attempts to find a partial answer for architects alone. Both individual architects and the R.I.B.A. have tried, as was right, to encourage the employment of architects direct ; and a review of R.I.B.A. action both before and after the outbreak of war is contained in the "R.I.B.A. Journal" for November 20.*

Below we list the best-known appeals and representations which have been made since September 3 :

★ A letter in *The Times* by Mr. Murray Easton calling attention to the A.A. groups of architects formed to carry out work of any kind.

★ A letter in *The Times* by Sir Herbert Baker asking for continued employment of architects on cultural grounds.

★ A letter in *The Times* by Professor C. H. Reilly urging the employment of architects on war works in order to save money and secure greater efficiency.

★ A letter in *The Manchester Guardian* and other papers by the President, R.I.B.A., pointing out the necessity of record plans of buildings in case of air raid damage.

★ A letter to the Press from the Birmingham Society of Architects urging the continuance of proper maintenance and repair work in war-time.

★ Representations by the R.I.B.A. in order to secure a proper share of air raid damage valuation work for architects.

★ Various actions by the R.I.B.A. to increase the use, by local authorities and others, of the architectural sections of Regional Advisory Committees.

★ Representations and letters by the R.I.B.A. to Government Departments and individuals.

★ A letter by the R.I.B.A. to Mr. Herbert Morrison offering collaboration in rescue and demolition services.

These actions have not produced any considerable result. Chiefly, in the JOURNAL'S *belief, because those in authority quite honestly do not see that architects can contribute anything to the efficient execution of building for war purposes.*

•

But the R.I.B.A. is also collaborating with Building Industries National Council in preparing to put the case of the whole industry before the Government. It will greatly strengthen the evidence for this case if all architects send in at once to B.I.N.C. the details of Stopped Work which are asked for on page 653.

The Architects' Journal
45 The Avenue, Cheam, Surrey
Telephone : Vigilant 0087-9

NOTES & TOPICS

£14,000 AND 12 GUINEAS

THAT architects can supply value for fees received has at least seemed, in the past few years, to be becoming more generally accepted. And even if there are many who remained unmoved, the upper ten have been thought to be converted almost to a man.

*

Consider, then, a case in the Westminster County Court last month.

*

A firm of quantity surveyors sued for £75 for surveying a castle, which had remained untouched since 1707, for purposes of renovation. The renovation cost £14,000 and a firm of decorators was paid £500 for supervising the alterations.

*

It was maintained by the defence that the charge for plans should have been £12 12s., as a competent assistant and junior could have prepared measured drawings in a week. The hot water engineers, it was stated, had made no charge for preparing the plans used in their work. Judgment for plaintiffs, £58 with costs.

*

The fascination of this case lies in the sense of values which peeps from it. A famous castle has not been touched since 1707, but no architect appears to have been thought necessary for the alterations. Twelve guineas is held a reasonable expenditure on a preliminary survey—though £14,000 is to be spent. A firm of decorators (who no doubt earned it) gets a fee of £500.

*

Until more general agreement is reached on what is substance and what is shadow, ours is likely to be a difficult trade.

HELP FOR OTHERS

A correspondent has sent me a paragraph from the *Daily Telegraph* which provides a sequel to the preceding note. It is by "Our Industrial Correspondent."

*

It states that a committee has been set up to inquire into the circumstances of nearly 20,000 people normally employed in painting, sculpture and designing ; and that it is to be suggested to this Committee that unemployed members of these callings should be employed on drawing, for record purposes, notable examples of British architecture.

*

It may be that architects are to be included in this work under the heading of "designers." But I would not recommend strenuous action to ensure it. If we cannot prove that we can do, and ought to be doing, much more valuable work at a time like this, no number of famous buildings would be big enough to help us.

THE GUINNESS TRUST

Last week the Guinness Trust reached its jubilee. On November 18, 1889, Sir Edward Cecil Guinness, afterwards first Lord Iveagh, gave £200,000 for housing for poor people in London and £50,000 for Dublin. Since then 3,682 flats have been built, housing about 10,500 people. The capital of the Trust is now a million and a quarter.

*

The latest Guinness buildings are, in my view, excellent examples of unhurried, thoroughly well-considered design. Externally there may not be much that is gleaming, dramatic or heady about them ; but one is certain that ten years of London's atmosphere will still find the flats comfortable, the exteriors seemly and the maintenance charges dead low. And that is the real test of good design in housing.

*

The older Guinness buildings seem to us now to be distressing. We forget too easily what general housing conditions were in the 1880's. Mrs. Beatrice Webb's *My Apprenticeship* leaves no doubt that the first Guinness dwellings were as much an advance on their surrounding slums as the Loughborough Park scheme is an advance on its tenants' previous accommodation.

BLACKHEATH CAVE-DWELLERS

There is a large collection of A.R.P. jokes based on the analogy of our cave-dwelling ancestors, but few of us picture ourselves as literally dwelling in caves before the war is over. Greenwich Borough Council, however, is now considering whether the caves recently re-discovered (with great difficulty) at Blackheath* can be adapted for use as air raid shelters.

*

The search for the caverns has been going on since the 1938 crisis, and it has been found that they are exactly as they were left by the original inhabitants.

*

There are three separate caverns, the largest of which is about 35 ft. in diameter. They vary in height from 6 ft. to 11 ft. 6 in., and are roughly 40 ft. below the ground. Greenwich may soon be one up on Finsbury—at smaller cost.

* The Blackheath chalk caves are a smaller edition of the Chislehurst caves, and are thought to have been first discovered about 1780. One newspaper report of the new explorations adds "One theory is that the caves were used for dancing "—whether by our remote ancestors or by the gay 1780's is not stated.

BLIND MAN'S BUFF

Compulsory—and purely voluntary—evacuees left London for better 'oles at the beginning of September, but the lack of concerted air attack that still prevails at the moment of going to press has created a false sense of security, and London is distinctly less empty than it was ten weeks ago. This is as noticeable at night as in the daytime.

*

In the event of an air raid during the day there are many shelters in shops and other premises for which bombees can speedily make, but the majority of these retreats close with the shops, and the remainder appear to have no illuminated signs to make them discoverable after dark. So what happens if the Heinkel should show up then remains to be seen. In some respects Britannia is very like the girl from Missouri : she's gotta be shown.

*

There would seem to be no reason why many more illuminated signs should not be employed. Looking for a needle in a haystack is child's play compared with searching for a street name in the black-out, and for sheer abandon there is nothing to equal an impromptu dive over a loathsome heap of rotting sandbags.

WAR KILLS CULTURE

A schoolmaster evacuee on the staff of one of London's most ancient grammar schools tells me that the war put a stop to their proud project for a brand new school in the medieval tradition.

*

The architect, one of that rare species, now almost extinct, who believes in giving his clients what they want, asked the headmaster whether he would like the new building to be modern or traditional. The headmaster thought that out for a few moments, and then replied that as the school (a *genuinely* old building) was traditional, he would like the new building to be exactly the same.

THE PROPERTY MARKET

The position with regard to the letting of houses is still rather an estate agent's nightmare. If, either directly or indirectly because of the war a tenant is unable to pay his rent, the landlord cannot evict him except by order of the court, and it is extremely doubtful whether this would be forthcoming. This appears to be a reasonable arrangement ; and, indeed, if the tenant's inability to pay is really due to the situation created by the declaration of hostilities, most landlords try to meet him.

*

At the same time, renegade tenants are making hay of landlords' reluctance to go to law. The owner of a block of flats in North London, who lost four or five tenants at the beginning of the war, saw the way things were going and wrote to his other tenants offering to reduce their rent by half if they would guarantee to stay on for the duration.

WEEKLY FEATURES

Trade Notes and Prices for Approximate Estimates are held over from this issue.

Concrete hollow blocks being erected to protect the Royal Artillery Memorial at Hyde Park Corner.

In this way he reckoned he could just break even. Tenants talk, however ; and occupiers of neighbouring blocks of flats have since written to their agents suggesting that their rents should also be reduced.

*

House owners, too, have been finding that prospective tenants are refusing to pay more than half the normal peace-time rents, and as mortgage interests, ground rents and general upkeep costs still have to be met, even half rents are preferable to empty property.

PROTECTION OF STATUES

Several statues in London have been protected against possible aerial bombardment. One of the most recent to be safeguarded is the late Sargeant Jagger's Royal Artillery Memorial at Hyde Park Corner.

*

Sandbags *have not* been used to protect this statue ; the method adopted consists of a revetment of hollow precast concrete blocks, as will be seen from the photograph on this page. I am told by the Cement and Concrete Association that the cost of a concrete block revetment is approximately half that of one of the sandbag type of equal protective value and, once erected, the concrete blocks require no further protection or maintenance over a long period of years.

INCREASED VISIBILITY

St. George's, Bloomsbury, is now splendidly visible from the east end of New Oxford Street. A triangular site has been cleared at the corner by Hart Street, and the façade of the church can now be seen properly related to the tall, stepped pyramidal tower. Did you realize that it is one of the most handsome of London's classic churches ?

ASTRAGAL

Civil Defence is with us from now on. The technician's work won't be finished when basement strutting is complete and trenches are dug. In future every client will demand of his architect technical guidance on fire-fighting appliances, escapes, the equipment and construction of shelters, and planning for A.R.P. Thus not only emergency legislation but defence measures in general have become the permanent concern of the architect who is faced today with the problem of digesting a whole new official literature and solving a whole new series of problems. The INFORMATION CENTRE exists to simplify this task by providing expert opinion for any reader who cares to use the Service. Any question connected with building will be dealt with by the Centre.

ARCHITECTS' JOURNAL

EMERGENCY

INFORMATION CENTRE

If you have a problem which demands an expert answer send it to:—

THE ARCHITECTS' JOURNAL,
45 THE AVENUE,
CHEAM, SURREY.
VIGILANT 0087

or ring:

THE A.J. INFORMATION CENTRE
FLAXMAN 5322

The Information Centre itself is working from London, but enquiries sent direct to the JOURNAL will be passed on without delay.

These are typical of the questions we have already answered:

What are the relative costs of sandbagging and brickwork?

How is a gas-lock formed?

How is a factory protected from incendiary bombs?

Are footings necessary to walls sub-dividing basement shelters?

How is wood protected against liquid gases?

How are ventilated black-out window screens formed?

How is sandbagging rotproofed?

How much safer is a 20-ft. deep shelter than a semi-surface type?

How is a light lock formed?

How should screen walls be arranged?

How is a basement shelter protected from bursting water mains?

What is the definition of a light-proof material?

What publications are there on farm buildings?

What would be the maximum spread of debris if an h.e. bomb hit a 330-ft. stack?

What publications are there on camouflage?

What protection is needed for light shafts?

What is adequate provision for a first aid and decontamination centre?

Is a 1938 contract binding?

Who is responsible for making good air-raid damage to unfixed materials?

What is the cost per head of gas filtration?

Under what obligation is a building owner to provide shelter for the occupants?

How is a leaking shelter waterproofed?

How will the grant be paid?

Are cinemas to be provided with shelters?

Can blast-proof doors be used for naturally ventilated shelters?

Q94 SUSSEX.— *We have recently constructed an air-raid shelter for a HOTEL for the use of staff and residents. Our clients have asked us to make a claim for a grant towards the cost of this. In our opinion the grant does not apply to hotels, and in any case it is too late to make application. Would you kindly advise if we are correct?*

Hotels are not required under the Act to provide air-raid shelters, and so far as we can ascertain no grant will be paid if they do provide them, although this is not definitely stated in the Act. Actually it is not too late to apply for a grant in respect of work completed, but this does not affect your particular case.

Q95 BROMSGROVE.—*What is the NEW ADDRESS of Messrs. Tentest?*

Tentest Fibre Board Co., Ltd., 75 Crescent West, Hadley Wood, Barnet, Herts. Telephone: Barnet 5501–5502.

Q96 HATFIELD.—*The question I wish to put forward is not really a structural one, but I have been asked similar questions by several of my clients, and I should like to be able to answer. What kind of SHELTER EQUIPMENT is reasonable for a private shelter for ten to twelve persons?*

The extent of the equipment depends on the period of time to be anticipated between the alarm and the all-clear. It seems, however, reasonable to assume a serious attack might force people to stay in their shelters for at least three hours, and possibly six. On the other hand, where raiders only pass over a district, the alarm would take not less than half an hour. Consequently there can be two types of equipment.

1. For shelters in districts likely to experience heavy attacks—big towns and industrial centres.
2. For shelters in districts which may be subject to chance attacks.

Shelters in the first group should have all amenities possible as it is important to sustain morale. The question of ventilation has been discussed repeatedly, and is in every technician's mind. Some form of heating is necessary, particularly in trench shelters. The best method would be portable electric fires, with plugs provided in the shelter. Running water will rarely be available, but a washstand with a basin is a convenience. Care must be taken to see that when the air in the shelter becomes warm, no uncovered water surface is left to contribute to the humidity. The provision of closets and urinals is essential in large shelters, but even for small shelters

Q97

it should not be overlooked. Where possible, the closets should be separated from the shelter itself by a small passage. Electric light is essential. People cannot be expected to sit in the dark. In fact, the light should be strong enough to enable people to read or play cards. It is generally known that seating is to be provided, but rarely remembered that it should be comfortable. Tables are useful too. For large shelters, a collection of books (with shelves) and table games might be of advantage, but nothing which involves movement should be provided, unless the ventilation is extremely efficient. Wireless should be installed in every shelter or at least connections provided so that occupants can take their own portables. Telephone communication would be of great importance for the safety of the occupants in the event of exits becoming sealed by debris. The problem of how the all-clear signal is to be conveyed to persons in shelters has not yet been properly considered. When air raids occur, people will try to seal all openings to shut out the noise of the attack and defence, and thus a telephone would be the only means of receiving information of the end of a raid. Everyone using a shelter should realise that all mechanism is subject to failure, and alternative provisions should always be made. A certain amount of warm clothing, electric torches and batteries should be kept in the shelter. A pick, shovel and hammer are also necessary. In addition, there should be first-aid outfit, drinking water, etc., and emergency rations. Remember in treating the internal walls that colour has great psychological effect.

Q97 LONDON.—*I have to provide shelter for 300 employees of a printing shop. A disused basement is available, but the cost of strutting would probably be very expensive owing to the HEAVY MACHINERY OVERHEAD. Alternatively, trenches could be constructed on a site belonging to my client about 250 yds. from the shop. The building is quite substantial, with walls and two rows of cast-iron columns in the centre. The printing machines occupy the whole of the floors. Which of the sites would you consider most suitable?*

Neither arrangement would be ideal. 250 yards, however, represent a time-loss of not more than 2½ minutes, and it should be possible for all the workpeople to be inside the shelter in less than seven minutes after leaving the shop. Shelters under heavy machinery should always be avoided. It is not only expensive, but scarcely possible, to strut effectively against the collapse of a building containing such machinery. If a part of the building can be found without machinery overhead it would be different, but we take it from your question that this is not the case.

Q98 STEPNEY GREEN.—*Can you tell us where we can obtain small STEEL EMERGENCY EXIT COVERS for brick air-raid shelters?*

There is a tremendous demand for these covers. Delivery time varies from three days to three weeks, so should be ascertained before ordering. The following are among the firms who supply them: Messrs. Burn Bros., 6-8 Stamford Street, Blackfriars, S.E.1; Telephone Waterloo 5261. Messrs. Haywards, Ltd., Union Street, Borough, S.E.1; Telephone Waterloo 6035–6039. Messrs. J. Gardner & Co., Ltd., Kent House Lane, Beckenham, Kent; Telephone Sydenham 6080. Messrs. Robert Jenkins & Co., Ltd., Ivanhoe Works, Rotherham.

Q99 BERMONDSEY.—*I hope you will excuse my putting forward a question less specific than such questions should be, but my problem is troublesome as it re-occurs frequently. I understand that in order to obtain the necessary OVERHEAD PROTECTION FOR A SHELTER either:*

1. *An entirely new floor which complies with the requirements in the Air Raid Shelter Code can be built over the shelter; or*
2. *The existing floor can be used.*

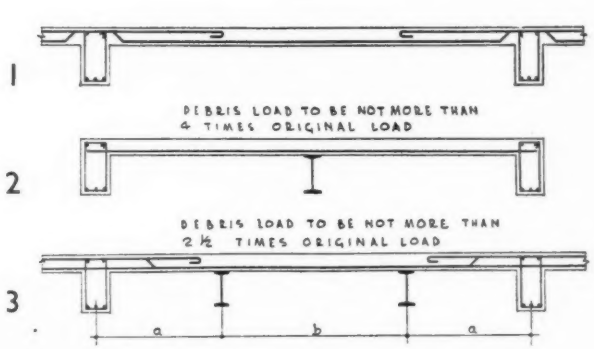
There seem few problems involved if the first method is adopted, but the second appears more economical and I understand will be permitted where the existing structure fulfils the condition for overhead protection. This will often be the case, particularly where solid reinforced concrete slabs are concerned, but the difficulties are:

(a) *How can the nature of the reinforcement be ascertained?*

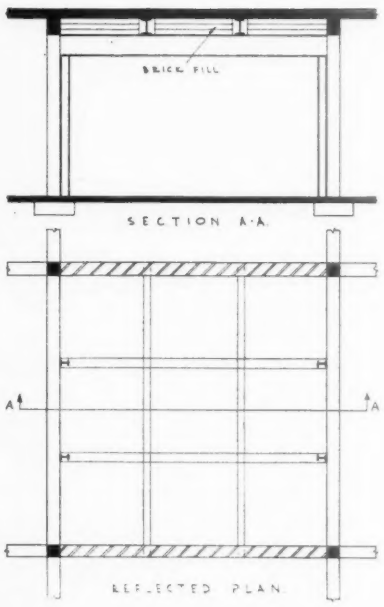
(b) *How can the existing reinforcement be made of use to withstand debris load?*

(c) *What are the dangers of changing the stresses by the introduction of strutting and of the slab cracking over the additional supports?*

For many reinforced concrete buildings it should be possible to find the engineers' original drawings which would show the reinforcement. Where this is not possible, the cover to the reinforcement should be removed at several points to discover the size, distance apart and length of bars. Generally it will be sufficient to hack away the concrete on the soffit, as the top reinforcement will not be of importance in a strutted slab. Practice has shown that slabs reinforced in accordance with the regulations, i.e. where bars are extended on the underside to a point near the supports (Figs. 2 and 3), can be strutted to take debris load. Where, however, the reinforcement is as shown in Fig. 1, an arrangement which has never been permitted, but has sometimes occurred in practice, there seems no suitable way of dealing with it. Any strutting of a concrete slab will consist of joists, precast beams or walls placed across the direction of the span, so that the new span is less than the existing one. It is important to realize that as there will be no top reinforcement over the new supports, the new spans must be considered as non-continuous slabs, i.e. their bending moments should be



INFORMATION CENTRE



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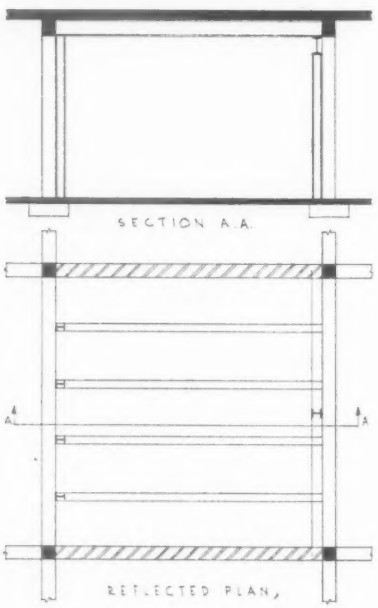

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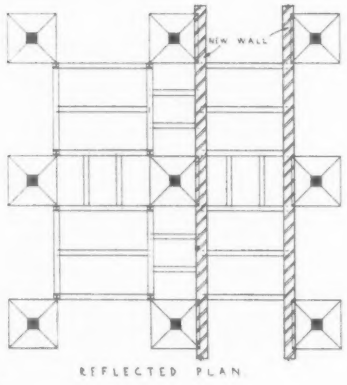
calculated in accordance with the formula

$$M=\frac{wl^2}{8}$$

where 'l' is the particular span measured between the centres of any two adjacent supports whether existing or new. One longitudinal seam or strut in the centre will be sufficient, as a rule, for an existing non-continuous slab (Fig. 2) that is to carry a total load, including debris load, of not more than four times the load for which it was calculated, or for a continuous slab that is to carry, including debris load, a load of not more than 2½ times the load for which it was calculated. If two supports are needed, in a span, making three new spans, owing to the fact that there is generally more reinforcement in the centre span (*b*) than in the outer ones (*a*) (Fig. 3), it will be found reasonable to make the centre span larger than the outer ones. Each is to be calculated separately as a non-continuous slab (*see* above). No doubt, in rare cases, three supports will be needed, and when this is so, the two middle spans should be longer than the two side ones. Slabs spanning in two directions present a problem, as it is difficult to reduce both spans. This could be done, however, by means of secondary and main beams (Fig. 4). Where this is not possible, a series of parallel joists might be introduced at relatively close centres (Fig. 5), thus neglecting the effect of the existing reinforcement in the direction parallel to the new joists, and only taking into consideration, for the bending moment, the bars that are at right angles to the joists. Flat slabs are a special problem, and the only satisfactory arrangement is to provide a square of beams (Fig. 6), and then to sub-divide the centre panel by parallel beams, and each of the column strips



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by beams running normal to the strip. This arrangement is rather complicated and tends to make flat slabs unsuitable for strutting.

Any joists or other beams introduced to support existing slabs must be properly wedged up for the whole of their length. Cement grout on top of such joists is the only means of preventing these connections from falling apart, but it is not sufficient means in itself. The beams, together with the struts or piers supporting them, should be wedged up until any original deflection in the slab is made up. This wedging should be carefully carried out, but should not be exaggerated. If the beams press upwards too much, cracks will appear in the surface of the slabs, but the significance of such cracks is much smaller than has sometimes been maintained. Such cracks will undoubtedly close again when the strutting is removed and the structure will not be materially weakened. If dust or dirt get into the cracks before they close, strange noises will be heard for a short time.

INFORMATION CENTRE

Q100 HIGHFIELD.—*What is the NEW ADDRESS of "Engineering"?*

18-20 Compton Road, Hayes, Middlesex.

Q101 CASTLEFORD. — *We are constructing tunnel shelters to accommodate 1,200 persons under the floor of a large factory. These have to be ADEQUATELY VENTILATED, and we shall be glad to know what is the best method. We want to avoid if possible a forest of ventilating pipes passing through the factory above, and wonder if some form of ventilation by means of fans is possible. Access to the open air is on one side only, where three emergency exits are being provided.*

It is difficult to detail any scheme for these shelters without a knowledge of their size, number and disposition. The need for mechanical ventilation will depend on the actual circumstances, and in particular on the number of cubic feet of air space allowed per person. From the description given it would seem that natural ventilation would not be practical. For mechanical ventilation the Home Office recommend an air supply of 2½ cub. ft. per minute per person, and ventilation and filtration units are made with capacities up to 800 persons, i.e. 2,000 cub. ft. per minute. The number of units required in your particular case will depend on the number of individual tunnels or compartments, with a minimum of two units. The ideal form of ventilation is one which incorporates a gas filtration unit and has an auxiliary drive for use in the event of failure of the electric supply. This auxiliary drive may be by manual operation for units up to a capacity suitable for 150 persons, and by diesel engine for larger units. This, however, involves considerable expenditure, something like £1,000 for a unit for 600 persons, excluding auxiliary diesel drive, ducting, etc. Gas filtration is not required by Home Office Regulations, and ventilating fans without gas filtration are, of course, less expensive. They should, however, be provided with an

auxiliary drive whenever possible. As the particular problem arising out of your case may require individual consideration, it may be necessary to consult a ventilating engineer, but any of the heating and ventilating contractors* would be able to estimate for a suitable scheme.

Q102 BRISTOL.—*We have designed an air-raid shelter for a COMMERCIAL BUILDING comprising eight shops and a suite of offices over. The offices and seven of the shops are let. The owners do not occupy any part of the building. Can you tell us how the cost of the shelter should be proportioned under the Civil Defence Act? For example, should the value of the vacant shop be taken into consideration and the owners of the building pay a proportion of the cost of the shelter in respect of that value, even though owing to the war the shop may not be let for a long time? Are we right in assuming that the cost of the shelter must be apportioned strictly according to the value of the portion of the premises occupied by a particular tenant, even though, for example, the number of employees requiring shelter per unit rental value is far more for the offices than for the shops? If so, it doesn't seem a very fair arrangement.*

Under Section 19 of the Civil Defence Act, 1939, the total increase in rent which is permitted is one-tenth of the expenses of the owner, which can be apportioned between the owner and the lessee of the building and is payable over a period of ten years. The amount by which rents can be increased is calculated as follows:

(*a*) Ascertain one-tenth of expenses of providing the shelter.

(*b*) To this result add the amount of any diminution of the annual value of the premises, if they are impaired as a result of the provision of the shelter.

$a + b$ = Permissible increase per annum.

(*c*) Ascertain the annual value of each portion let as at the date of the completion of the works.

(*d*) Ascertain the annual value of the whole premises as at this date.

(*e*) The proportion which (*c*) bears to (*d*) is the proportion of the permissible increase per annum payable by the lessee of that portion.

For example:

Expenses of providing shelter, £900.

(*a*) = One-tenth of expenses	£90
(*b*) = Diminution of annual value was ..	£50
$(a + b)$ = Permissible increase per annum ..	£140
(*c*) = Annual value of portion let at date of completion of the works, say ..	£35
(*d*) = Annual value of whole premises at date of completion of the works, say ..	£350

$\frac{c}{d} \times (a + b)$ = permissible increase

i.e. $\frac{£35 \times 140}{350} = £14$

The "annual value" is defined in detail in Section 90 of the Act. In general words the "annual value" can be said to be the estimated value at which premises might be let from year to year, the tenant paying rates and taxes and the landlord being responsible for outside repairs. It has been assumed in this reply that the work has been carried out in accordance with the provisions of Section 19 of the Act. It is immaterial whether the other shops or offices are let. The lessee can only be responsible for his share as calculated above. From Section 19, subsection 7, of the Act, it may be taken that the period of ten years over which the increase in rent operates can commence at any time after completion of the shelter. In your case, when the last shop is let, the ten years for that shop will commence from the date of letting. You are quite correct in assuming that the cost must be apportioned strictly according to the value of the portion of the premises occupied by a particular tenant.

Q103 HOLBORN.—*What is meant by Section 7 (b) in Part I of the Revised Code, where it states that TO DIVIDE COMPARTMENTS holding more than 50 persons, the walls must consist of "two walls, each consisting of reinforced concrete not less than 12 in. thick or of sound brickwork or stout stonework not less than 13½ in. thick, with a space between them not used as an air raid shelter"?*

This space is not defined in the Code, but it may be considered that two walls of the thickness required with a space of not less than 10 ft. between them will withstand the explosive effect of most types of bomb. The space might reasonably be used as lavatory accommodation. It should be realized that this sub-section is in the nature of a compromise, and that the 24 in. reinforced concrete wall required in section 7 (*a*) is to be preferred, as there is always the possibility of a bomb dropping in the space.

Q104 CHANCERY.—*Can you tell me what would be a reasonable percentage for an architect to charge as FEES on air-raid shelter work for private clients, with particular reference to the strutting and strengthening of basements?*

It seems reasonable to base fees upon the R.I.B.A. scale of charges for alteration work. Work for local authorities is of course governed by a special scale, but this has been based on the assumption that schemes for a number of similar shelters will be required at one time. We understand the Treasury accepts the R.I.B.A. scale in cases where architects' fees are added to the cost of the shelter when application is made for the grant.

REFERENCE BACK

[*This section deals with previous questions and answers.*]

Q76 *CONTROL OF MATERIALS*

BIRKENHEAD. — Although there is a Ministry of Supply Cement Control Department, there are in fact not any restrictions on the buying and selling of cement, sand or shingle.

Q82 *VENTILATION OF TRENCH SHELTERS*

Since sending my original question I have had the opportunity of reading a report on the atmospheric and other conditions in air raid shelters published in the September bulletin of the Industrial Welfare Society. This report gives the result of tests carried out on personnel occupying standard trenches accommodating 50 people.

A test was also carried out during the past few days on one of our local trench shelters similar to the one described in my previous letter.

The escape grating at one end of the shelter was adjusted to give ventilation of 12 square inches, and readings were taken on the anemometer when 45 people were in the trench. The weather was bad, and rain fell continuously during the experiment, and after one hour no-one in the shelter complained of feeling unwell although the air was noticeably tainted.

Ventilation occurred downwards through the grating at one end, the air at the centre of the shaft being static. The air at the door end was static, except for approximately one foot depth, where the maximum speed registered was 35 ft. per minute. At this velocity it was estimated that there would be a change of approximately 5,400 cubic

* *Among these are: Richard Crittall & Co., Ltd., Bush House, W.C.2; Sturtevant Engineering Co., Ltd., Exchange Buildings, Stephenson Place, Birmingham; Sutcliffe, Speakman & Co., Ltd., Leigh, Lancs; Mellor-Bromley & Co., Ltd., Minotaur Works, Leicester.*

feet per hour, with a trench volume of 1,274 cubic feet.

Full readings of temperature and humidity changes are given below :—

	Temp.°F.	Humidity	External Temp.°F.
9.0 a.m.	49	87	45
9.15 a.m.	54.5	84	42
9.30 a.m.	61	76	42
9.45 a.m.	64	78	42
10.0 a.m.	62	78	42

From these results it would appear that drying effect took place due to the rise in temperature and cooling on the wall surface. With low humidity and high temperature outside, it is expected that humid temperature conditions inside would be bad.

Again, on referring to "Kempe's Year Book" for 1938, reference is made to movement of air other than by fans, and a formula is given to determine the velocity of the air in feet per minute :—

$$V = 180\sqrt{\frac{h\,(T-t)}{t+460}}$$

where,

V=velocity of air in feet per minute.

T=temperature of heated air °F.

h=height of flue in feet.

t=outside temperature °F.

When applying this formula to our particular shelter and assuming as a basis of calculation with 30°F. rise is taken as maximum permissible, and a 10 ft. column of air under escape grating, and 150 cubic feet of air per person as a minimum, the velocity of the rising air (allowing for restriction) equals 0.7 square feet.

My problem, therefore, is to make a steel manhole for the escape grating, and to ascertain the minimum amount of ventilation which would be required to meet the regulations so that this grating cover could be lifted from its seating by, say, $\frac{1}{8}$ or $\frac{1}{4}$ in. The cover measures 2 ft. by 1 ft. 6 in. inside.

It seems to me that your suggestion of limiting the opening at the door end in order to keep it as near the floor as possible is a good one, and I hope to have an experiment carried out on this condition.

I am interested, however, in arriving at some reasonable practical formula which could be adopted, by assuming a 3 ft. 0 in. square opening at the entrance end of the shelter and, say, 12 in. or less opening at the escape grating end of the shelter.

One proposal is to have a certain number of holes drilled in the escape grating to give permanent ventilation when the shelter is unoccupied, but the problem is to determine if this ventilation would be sufficient when the shelter is occupied.

I hope I have managed to make my problem a little clearer.

I feel that this question is quite an important one, and may require to be further considered in the event of gas being used later in this war.

I am interested to note from your letter that where a space of $3\frac{3}{4}$ square feet per person has been allowed that ventilation is required to give 450 cubic feet per person per hour, whereas I had previously assumed that 150 cubic feet under the same conditions would have been accepted.

This is the fourth of a series of wartime articles which will deal with the problems that most closely concern architects at the time of publication.

RESEARCH

SHELTERS: 4

[BY FELIX J. SAMUELY]

(2) SHELTERS FOR EMPLOYEES—*(continued)*

PROVIDED that local conditions offer a choice of rooms, the following structural considerations are important :—

(*a*) A room in the lowest floor is preferable to a room in an upper floor. In fact the Code generally refers to rooms in the lowest floors only, and to others as permitted, only if designed and carried out under expert supervision.

Rooms in upper floors are difficult to strut as all the struts would have to be carried through to the foundations and it must be ascertained that the blast from a 500 lb. bomb bursting at a distance of 50 feet would not demolish the building as a whole. In fact, the blast action of a bomb, exploding near the surface of the ground, can be assumed as being reduced in upper storeys. If, however, the blast hits the building under the shelter, there is always the danger that while the compartment itself would remain safe against blast and debris, the supporting structure in collapsing would bring about the collapse of the upper storeys. An example of a shelter in an upper storey is given in Fig. 31, which shows a concrete frame warehouse with six storeys, with a shelter in an upper floor. In this particular case there was no basement available and the ground floor had to be kept open to allow lorries to drive in, particularly to the loading docks. The remaining space which could have been used for a shelter would have been threatened by the fall of particularly heavy stored goods overhead. On the other hand, a part near the centre of the building was found which could be stiffened in such a way that its collapse, except due to a direct hit, was very unlikely, especially as the building had been constructed with a heavy reinforced concrete frame. The final position of the shelter has the advantage of being free from heavy debris loads, the load of the floor immediately over the shelter being more of a protection than a danger.

Such a case, however, must be considered as an exception.

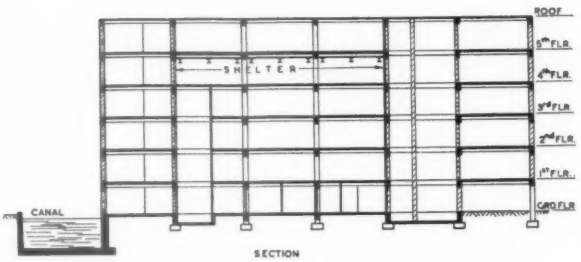
(*b*) Where part of a building has a basement, i.e. where the lowest floor consists partly of the basement and partly of the ground floor, it is better to provide the shelter in the basement unless the considerations set out in (*d*) and (*e*) conflict with this decision. Basements, especially those situated wholly underground, are in less danger of collapsing sideways, and provided that the ordinary debris load can be sustained, the position of the shelter is a reasonably safe one. (Fig. 32.)

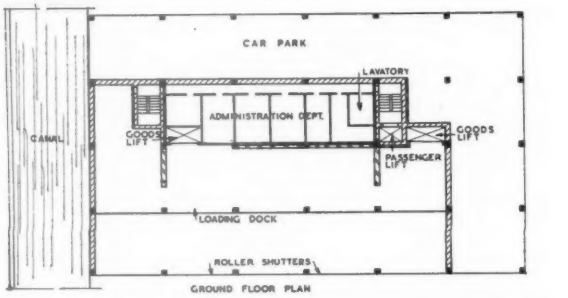
Where floors above ground are used as shelters, special provisions would have to be made to ensure that walls extend sufficiently in both directions to prevent such a collapse. (Fig. 33.)

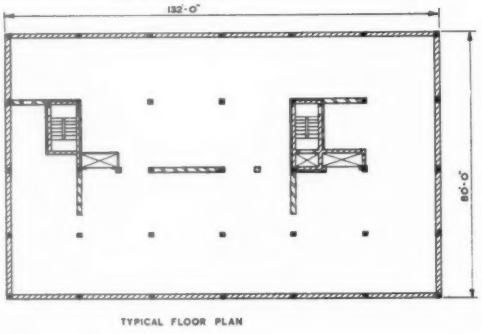
One advantage with basements is that they rarely require natural light, and where a ground floor is adapted for shelter purposes, natural light would have to be excluded by blocking up the windows. Light shafts in basements might be adapted in such a way that a certain amount of light can still enter.

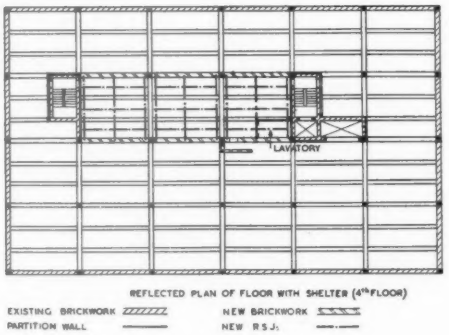
Services, however, generally converge in basements—*see* point (*c*)—and basements are often liable to flooding, *see* point (*d*).

(*c*) Boiler houses are to be avoided, and if the only basement in the building is a boiler house, it should not be

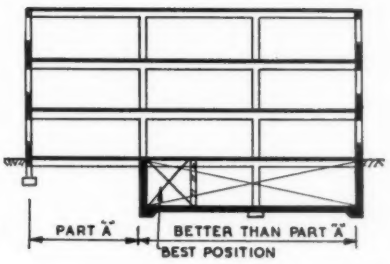




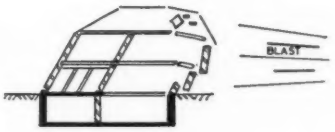




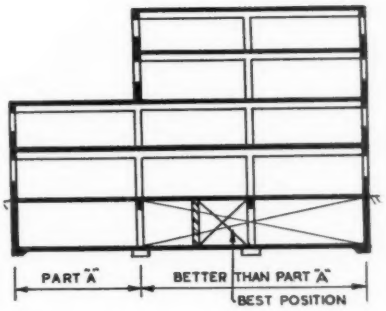
31 *Example of shelter in 4th floor of a warehouse.*



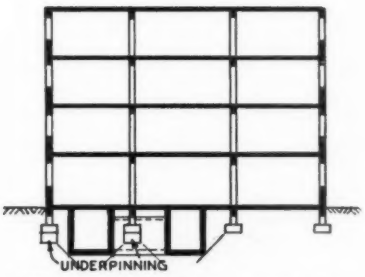
32 *Position of shelter in basement.*



33 *Basement unaffected by side blast, even when strutted ground floor is affected.*



34 *Part of a building protected by several storeys.*



35 *Trenches under the ground floor.*

considered as possible shelter. Pipes should be avoided as much as possible. Very few basements are entirely free of pipes, and these form obstacles to strutting, and may have to be removed.

(*d*) Rooms subject to sudden inundation must also be avoided. Such sudden flooding might occur for several reasons;

(i) A water main may be located in the immediate neighbourhood and, if damaged, the water might flood the shelters in a very short time.

(ii) A shelter may be below the level of the ground water, actually tanked, but a crack in the outside wall and the tanking would allow the ground water to rush in.

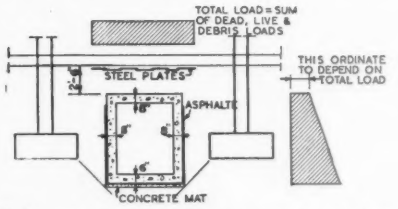
Neither of these dangers is so imminent that it need make such a room absolutely unsuitable for shelter purposes, but if a choice is offered, they will be weighed in the balance against it.

(*e*) The more overhead protection a room has the better, provided that any possible debris load can be carried. The fact that some bombs may penetrate a number of floors before bursting does not alter the fact that others may not, and that thus floors overhead offer some, if not a reliable, protection against direct hits (Fig. 34).

While even several slabs of reinforced concrete will not be proof against a direct hit of most delayed-action bombs, a multi-storey building, although having only timber floors, may give protection against the hit of an instantaneous-action bomb. For this reason, if a part of the building considered for shelter has only one or two storeys overhead, and another part six, the latter should be selected.

(*f*) Where rooms would otherwise be suitable for shelter, but must be constantly used, the possibility of trenching under such rooms should always be considered. Trenches under a building are the safest method of economical protection. They will be particularly useful where foundations are deep, and they can be used under ground floors or under basements, provided, of course, that there is no danger from ground water. Where local conditions permit of such trenches being constructed with 2 ft. 6 in. of earth above, extremely heavy debris loads can be withstood —loads which would cause other types of shelter to collapse. The arrangement of thin steel plates near the surface of the

earth is recommended where extraordinarily heavy debris can be expected (printing machines, etc.) (*see* Fig. 36). Such trench shelters would have to be designed to carry the possible debris load (although the impact is diminished by



36 *Detail and loading of trench shelter under the lowest storey of a building.*

the earth over), and to withstand considerable side pressure. For such trenches, *in situ* construction is to be preferred (Fig. 36).

Details of Construction

(*See also* pages 964-966, ARCHITECTS' JOURNAL of June 8, 1939.)

Two different types of strutting have to be considered in regard to shelters in buildings :—

(1) Strutting of such floors or buildings which, in themselves, provide sufficient overhead protection.

(2) Strutting of such buildings, where overhead protection has to be provided, as well as strutting.

(1) In an existing building, the required overhead protection may be given in the following ways :—

(*a*) By means of a reinforced concrete slab.

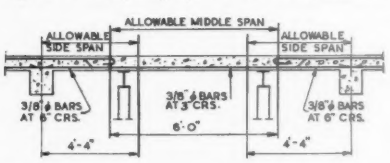
(*b*) By means of brick arches.

(*c*) By means of the building mass above ("substantial building").

Reinforced concrete slabs, if solid, should be not less than 4 in. thick. If they are constructed by means of hollow tiles, they should conform with Fig. 6, page 574 of THE ARCHITECTS' JOURNAL of November 9. With either solid or hollow tile construction, it is always possible to ascertain the maximum span for which the existing reinforcement is sufficient to carry the expected debris load.

Example

An existing slab 5 in. thick, with $\frac{3}{8}$ in. bars at 3 in. centres, may span 12 ft. in accordance



37 *Example for strutting for existing reinforced concrete floor, 5 in. thick.*

with Fig. 37. Some of the bars are bent up so that towards the end of the span the existing bars are at centres of 6 in. This slab will have to carry a total load of 550 lb. per sq. ft., including debris load. The concrete is of such quality that 750 lb. per sq. in. can be permitted. Steel stress 18,000 lb. per sq. in.

It can be found from tables that the centre of the slab can withstand a bending moment of M = 2,460 lb. per ft., while near the supports a bending moment of 1,310 lb. per ft. can be taken. If new supports are provided under the slab the spans must be considered as single spans as there is no reinforcement over these supports.

For a bending moment

$$M = \frac{550 \times L_1^2}{8} = 2460$$

in the middle of the span, we find

$$L_1 = \sqrt{\frac{2460 \times 8}{550}} = 6 \text{ feet.}$$

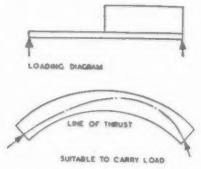
and for the outer part of the span

$$\frac{550 \times L_2^2}{8} = 1310, \text{ we find}$$

$$L_2 = \sqrt{\frac{1310 \times 8}{550}} = 4 \text{ ft. } 4 \text{ in.}$$

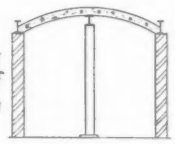
This allows a certain margin for the position of the supporting beam, namely between 3 ft. and 4 ft. 4 in. from the supports as shown in Fig. 37.

Where brick or concrete arches are used $8\frac{1}{2}$ in. or more thick, they would be in accordance with the requirements for overhead protection, but they are not always sufficient to carry the load. It must be ascertained, therefore, whether the arch can carry the debris load, and in this connection it should be borne in mind that the ability of an arch to carry loads is considerably reduced if the loads occur eccentrically. With falling debris the loads may be very eccentric, and the arch should only be considered adequate if the calculations show that one-sided debris and superload cannot overstress it (*see* Fig. 38). Where an



38 *Lines of thrust in arches due to unsymmetrical load.*

arch is overstressed, continuous sheeting must be provided underneath to carry the load, but this sheeting need not conform with the regulations for over-



39 *Ineffective strutting of arches by means of joist under the crown to be avoided.*

head protection which is supplied by the arch (Fig. 40). Unlike slabs, arches cannot be strengthened by the introduction of intermediate supports (Fig. 39).

A substantial building overhead (*see* below) is not clearly defined in the Act. As a general rule, except that it should

Table IV

Span of Timber Boarding

Total load

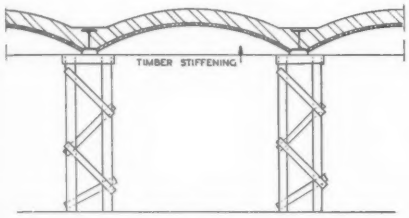
Thickness	250	300	350	400	450	500	550	600
In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.	Ft. In.
2	4 2	3 9	3 6	3 3	3 1	2 11	2 9	2 7½
2½	5 2½	4 8	4 4½	4 1	3 10	3 8	3 5	3 3½
3	6 3	5 7½	5 3	4 10½	4 7½	4 4½	4 1½	3 11½
3½	7 3½	6 5½	6 1½	5 8½	5 6	5 1	4 10	4 7
4	8 4	7 6	7 0	6 6	6 2	5 10	5 6	5 3
4½	9 4½	8 5	7 10½	7 4	6 11	6 7	6 2	5 11
5	10 5	9 4½	8 9	8 1½	7 8½	7 3½	6 10½	6 7

Table V

Capacity to carry load for a number of timber joist sections

Section	Section modulus in³	Load per ft. to be carried on a span of							
		5 ft.	6 ft.	7 ft.	8 ft.	9 ft.	10 ft.	12 ft.	14 ft.
8×3	32	680	470	350	265	—	—	—	—
8×6	64	1,360	940	700	530	—	—	—	—
9×3	40.5	860	595	440	335	265	—	—	—
9×6	81	1,720	1,190	880	670	530	—	—	—
10×4	66.7	1,420	980	730	550	435	350	—	—
11×4	80.7	1,710	1,180	880	665	525	420	290	—
12×6	144	3,060	2,120	1,570	1,190	940	765	530	390

have at least two storeys and a roof, it might be considered that a building which conforms either with the Ministry of Health's Byelaws or the London Byelaws, 1938, is "substantial," but it should not be overlooked that many buildings constructed in the past do not conform with these byelaws. *It is important that all timber floors should be properly anchored to the walls.* Where overhead protection is supplied by a substantial building, strutting is to be introduced in a similar manner as described for arches which are insufficient to withstand falling debris.



40 *Timber strutting for arched floors.*

Except in the case of reinforced concrete or hollow tile floors, a continuous new floor is thus to be provided, even where the existing building gives the required overhead protection, and this new floor has to withstand debris load, but need not conform with the regulations for overhead protection. It may consist of steel sheeting or timber boarding. This floor is needed to transfer the load from the falling debris, which may land anywhere, to beams or other supports. Actually, timber is the cheaper for this purpose. Where steel is used, sections which are uneconomical, although often recommended, should be avoided. Corrugated iron is one such section. Pressed sheeting, of the same weight, can carry a much higher load with the same span or the same load for a larger span. For instance, a 16-gauge pressed sheet 2½ in. in depth can carry a load of 350 lb. per sq. ft. on a span of 4 ft. 9 in.; 16-gauge corrugated sheeting can only carry this load on a span of 2 ft. 8 in. Table IV shows the length of timber boards which can be used efficiently for different loads.* Timber boards should be protected against fire on the top where the existing construction is not fireproof, perhaps by asbestos sheets. This is not necessary in the case of brick arches, where they may be used in accordance with Fig. 39, where the arch is unable to carry the debris load itself.

All sheeting, whether from timber or steel, must rest on beams or walls. This also refers to existing reinforced concrete slabs. It is economical to arrange division walls and external walls of shelters so that, as far as possible, they serve immediately to carry the sheeting or floor slab over. Where this is not

* The load is to comprise: Dead load, normal superload, debris load.

WAR AND THE PROFESSION

NOTICE ISSUED BY THE R.I.B.A.

• The Building Industries National Council, which represents all sections of the building industry, is preparing to bring the strongest possible pressure to bear on the Government to enable building to be resumed on a substantial scale, and it is preparing a case based on statistics of building actually stopped by the war, combined with statistics of materials and labour available for the resumption of building.

• In the meantime, it is of the utmost importance that the architectural profession should be in a position to show the actual facts of the situation as they affect the architect in private practice.

• It is essential when approaching the Government to give precise information as to how the practice of the majority of architects has actually stopped.

• It is proposed to remind the Treasury and other Government Departments that the work of architects and quantity surveyors preparatory to the resumption of building work takes many months.

• It is, therefore, important to know of all cases where working drawings as well as building operations have been stopped, so that Treasury sanction may be obtained to the preparation of drawings in advance of the resumption of work. In this connection the President of the R.I.B.A. has addressed a letter to the Presidents of the Allied Societies asking whether they would at once undertake the task of getting information in their provinces and sending it on to the R.I.B.A.

• It would also be helpful to have the experience of London members, and it is hoped, therefore, that London members will assist by sending in, as soon as possible, particulars as set forth in the following questionnaire.

1. *To what extent has your practice been reduced as a result of the war? (An approximate percentage should be given.)* ... ...

2. *To what extent have you been compelled to reduce your staff?* ... ...

3. *For how long do you anticipate that you will be able to keep your present staff employed?* ... .

4. *If the position does not improve—*
   (a) *In the next six months,*
   (b) *In the next year,*
   will you be compelled to contemplate closing your office? ... ...

5. *Will you insert on a separate sheet short particulars as* pro forma *under?—*

Nature of job	Whether public or private	Estimated cost	Amount spent	Whether working drawings made	Cause of stoppage	Remarks

possible, joists are to be used, and they might be carried by struts, walls or other joists. Joists may be from timber or steel. Timber will generally be cheaper, but where large spans are concerned it will not be suitable. Table V shows the carrying capacity per ft. run of timber joists. Whether long or short span beams are used will depend on local conditions. Short spans are usually cheaper, and often local conditions prevent long lengths of joists being delivered; but where a room is to have any alternative uses, long spans are preferable, and it should also be remembered that a large number of struts hinders movement, although the question of stretchers being moved about is not so important as in public shelters. Doubtless the headroom will be reduced where long-span beams are used, and, in fact, pipes may often define the position of struts. *See also* Figs. 10 and 11, page 574, THE ARCHITECTS' JOURNAL, November 9.

Architectural Front

R.I.B.A.

Present conditions governing candidature for the Associateship require that Students R.I.B.A. who pass or receive exemption from the Final Examination must submit a certificate that they have had at least one year's experience in an architect's office. It has been decided by the War Executive Committee, on the recommendation of the Officers of the Board of Architectural Education, that this regulation shall be waived for the period of the war. It will, therefore, be possible for students who have passed or received exemption from the Final Examination to apply immediately for election as Associates.

PROPOSED WAR TIME ATELIER

Two general meetings have been held of interested people. After general discussion unanimous vote was given at the second meeting favouring the formation of an atelier at the Building Centre, where free accommodation is to be provided. Apart from expressions of approval, and promises of support, given at the last meeting, letters have been received from many interested people who in many cases have offered to give their expert services. Scheme, as decided upon, is to provide means and accommodation for anyone old or young to work with others on a mutual assistance basis on problems which will be of constructive value to those attending the Atelier, and later to the profession and its allied interests. A number of groups were formed at the last meeting and these have, and are, selecting their own subjects of study. Each group has a convener who will be responsible for the general direction. It is open to anyone interested to form other groups or join the existing ones.

The Atelier will open on Monday, December 11, and on that day and the two days following, at least one of the directorate will be in attendance, between the hours of 12 noon and 6 p.m., to discuss programmes and enrol names. On Thursday, December 14, a general meeting of members will be held at 158 New Bond Street, W.1, at 5.30 p.m., to confirm the appointment of the executive committee, which was elected at the first meeting, and to approve certain minimum regulations.

The executive committee was as follows: Messrs. R. F. Jordan, Basil Ward, E. A. A. Rowse, Colin Penn, S. M. Desyllas, Anthony Cox. Members will be called upon to pay a very nominal subscription which will be adjusted to meet individual means. This will be used to meet necessary administrative costs.

Amongst many others the following have already agreed to act on the directorate or in an advisory capacity: Messrs. John Carter (Solicitor), O. E. Davis, R. Fitzmaurice, Eastlake Fortey, Dr. Martin, E. A. A. Rowse, Dr. A. R. Snowden, A. B. Waters, Sir Owen Williams, and F. R. S. Yorke.

Any communications to be sent to Miss M. Morrison, Hon. Sec., at 158 New Bond Street.

As a result of the necessity of economising paper in war-time, newsagents will shortly be unable to keep a stock of journals and periodicals for casual sale. If you wish to make sure of receiving your copy of this JOURNAL *in future, you should either place a definite order with your newsagent or subscribe direct to*

THE PUBLISHER, 45 THE AVENUE, CHEAM.

Annual subscription rates £1 3s. 10d. inland; £1 8s. abroad.

Building Front

Colonel J. J. Llewellin, M.P., Parliamentary Secretary, Ministry of Supply, speaking at the Ministry on "CONTROLS AND PRIORITIES," said:

There were five sub-committees dealing respectively with materials, productive capacity, labour, transport, and works and buildings. He was concerned in the first two. At the first joint meeting (held on September 3), there arose at once the question of whether priority certificates should be issued wholesale for all work for the defence services, or whether the Ministry should issue these certificates only where a "clash" occurred over some particular product or some particular kind of productive capacity. The Department's decision was only to issue certificates when a "clash" of this kind occurred, and none had, in fact, been issued yet. He also stated that in the allocation of commodities the demands of both the Services and of home and export trade had to be considered with due regard to emergencies. Some shortage, as in the case of timber, for instance, was felt because of the need to divert supplies to national necessities. Except for houses already in an advanced stage of construction, timber had been refused for house building, and for many purposes, including hutments, the Government were encouraging the use of substitute materials.

The Secretary of State for Scotland has issued new Regulations prescribing forms of notice necessary to meet the requirements of RENT and Mortgage Interest Restrictions Act, 1939. These regulations take the place of the Rent Restrictions (Scotland) Regulations, 1938.

Forms of notice included in the new Regulations are:—

Forms of notice of increase of rent with respect to dwelling houses controlled by the Rent Restriction Acts before the passing of the new Act.

Forms of notice of increase of rent with respect to dwelling houses now brought under control by the new Act.

Form of notice to be inserted in rent books or similar documents with respect to dwelling houses controlled by the Rent Restrictions Acts before the passing of the new Act.

Form of notice to be inserted in rent books and similar documents on and after December 1, 1939, with respect to dwelling houses now brought under control by the new Act.

A copy of the Regulations which are entitled "The Rent Restrictions (Scotland) Regulations, 1939," has been sent to all local authorities for their information. Copies, price 3d., can be purchased by private individuals through any bookseller or directly from H.M. Stationery Office, 120 George Street, Edinburgh, 2.

BELLING & CO.—Six-page leaflet just issued devoted to electrical appliances for A.R.P. and emergency purposes. Firm have already supplied a great many fires, air warmers, small cookers, boiling rings, etc., to local authorities throughout the country for control centres, wardens' posts, A.F.S. posts, etc.

CEMENT AND CONCRETE ASSOCIATION.—Government Departments and local authorities throughout the country, faced with problem of rotting sandbags and consequent danger of collapse, have been investigating different methods of providing a permanent substitute for this type of revetment. One method consists of providing a revetment of hollow precast concrete blocks and revetments of this type are being erected to protect the Royal Artillery Memorial, Hyde Park Corner (*see* photograph on page 645).

LETTERS

SIR,—One of Maurice Webb's many activities for the good of others was in connection with the Architects' Benevolent Society, of which he was Hon. Treasurer. He worked very hard for this Society, and was personally responsible for many actions to raise funds for it.

We feel sure that many friends of his would like to do something in his memory which would have pleased him. Our suggestion is the raising of a fund to be handed over to the Architects' Benevolent Society as a "Maurice Webb Memorial" Donation.

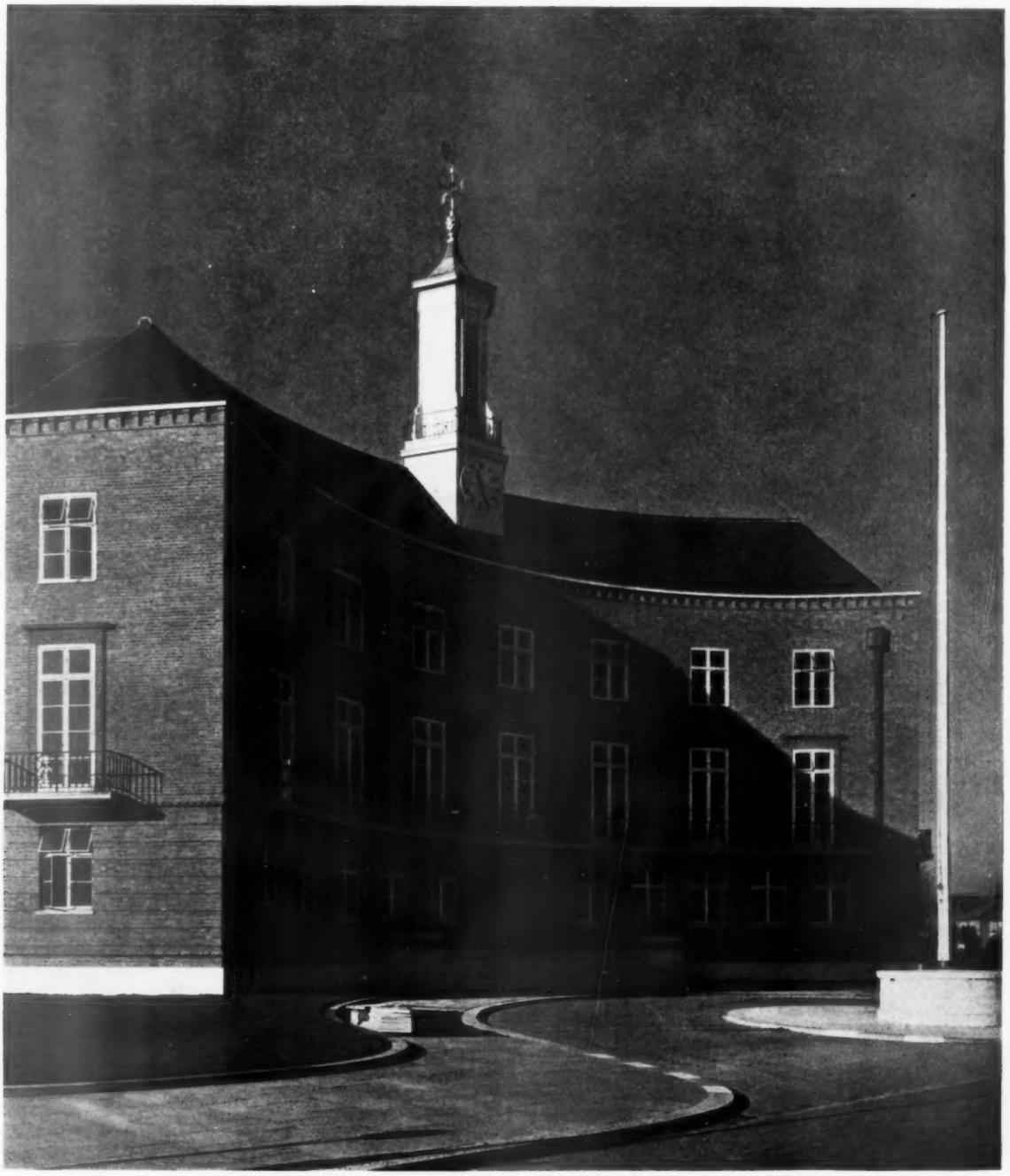
Maurice Webb in recent weeks was very concerned about the Architects' Benevolent Society and the appeals likely to be made to it in the immediate future by members of the profession so badly affected by the war. What better could we do, therefore, to show our appreciation of him than to make an effort in his name to help this Society's work.

Donations, however small, from those who agree with our proposal, together with any correspondence, should be sent to The Hon. Secretary, Maurice Webb Memorial Donation, c/o The Architects' Benevolent Society, 66 Portland Place, London, W.1.

E. STANLEY HALL,
President R.I.B.A. & President A.B.S.
E. W. WIMPERIS,
Chairman, Arts Club.
R. ATKINSON,
Vice-Chairman, Building Centre.
F. R. YERBURY,
Hon. Secretary to Maurice Webb's Donation Fund.

MUNICIPAL BUILDINGS, WATFORD

BY C. COWLES-VOYSEY; ASSISTANTS: R. ASHTON AND J. BRANDON-JONES

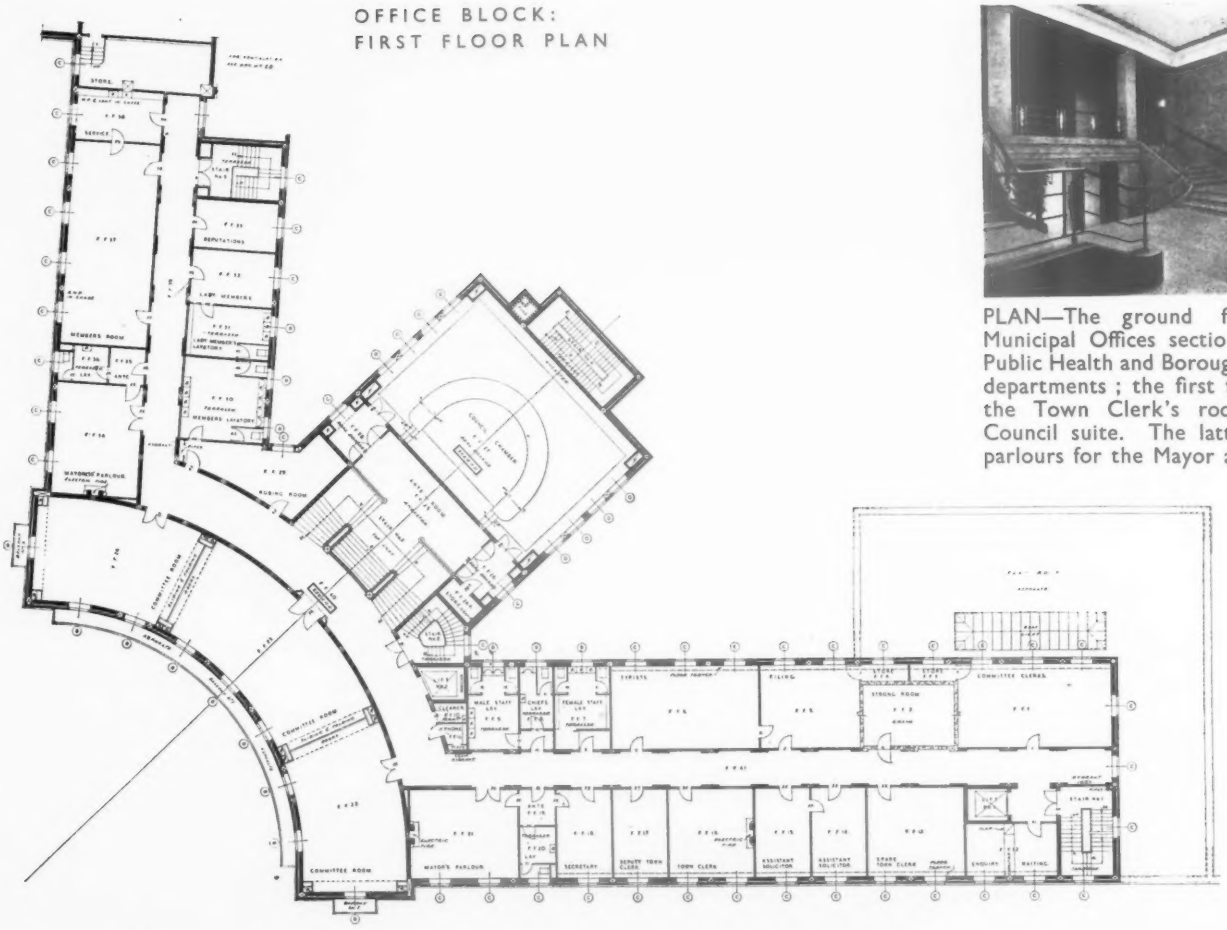


Main entrance to office block

GENERAL AND SITE—Buildings occupy the site originally known as The Elms, at the junction of the Rickmansworth and Hemel Hempstead Roads. A block of offices faces each road, and the angle formed at their junction is cut by a semi-circular façade overlooking the roundabout. Main entrance is in the centre of this semi-circle, with the principal staircase, ante-room and Council Chamber placed upon the centre line. The Assembly Hall, having an entrance in Rickmansworth Road, is placed with its major axis parallel with the boundary of the Memorial Hospital grounds. A secondary office entrance provides access to the Rates Department on the Rickmansworth Road frontage.

CONSTRUCTION AND FINISHES—Reinforced-concrete frame and curtain walls faced with a mellow sand-faced hand-made brick. Roofs are covered with tiles.

OFFICE BLOCK:
FIRST FLOOR PLAN



PLAN—The ground floor of the Municipal Offices section houses the Public Health and Borough Treasurer's departments ; the first floor contains the Town Clerk's rooms and the Council suite. The latter comprises parlours for the Mayor and Mayoress,

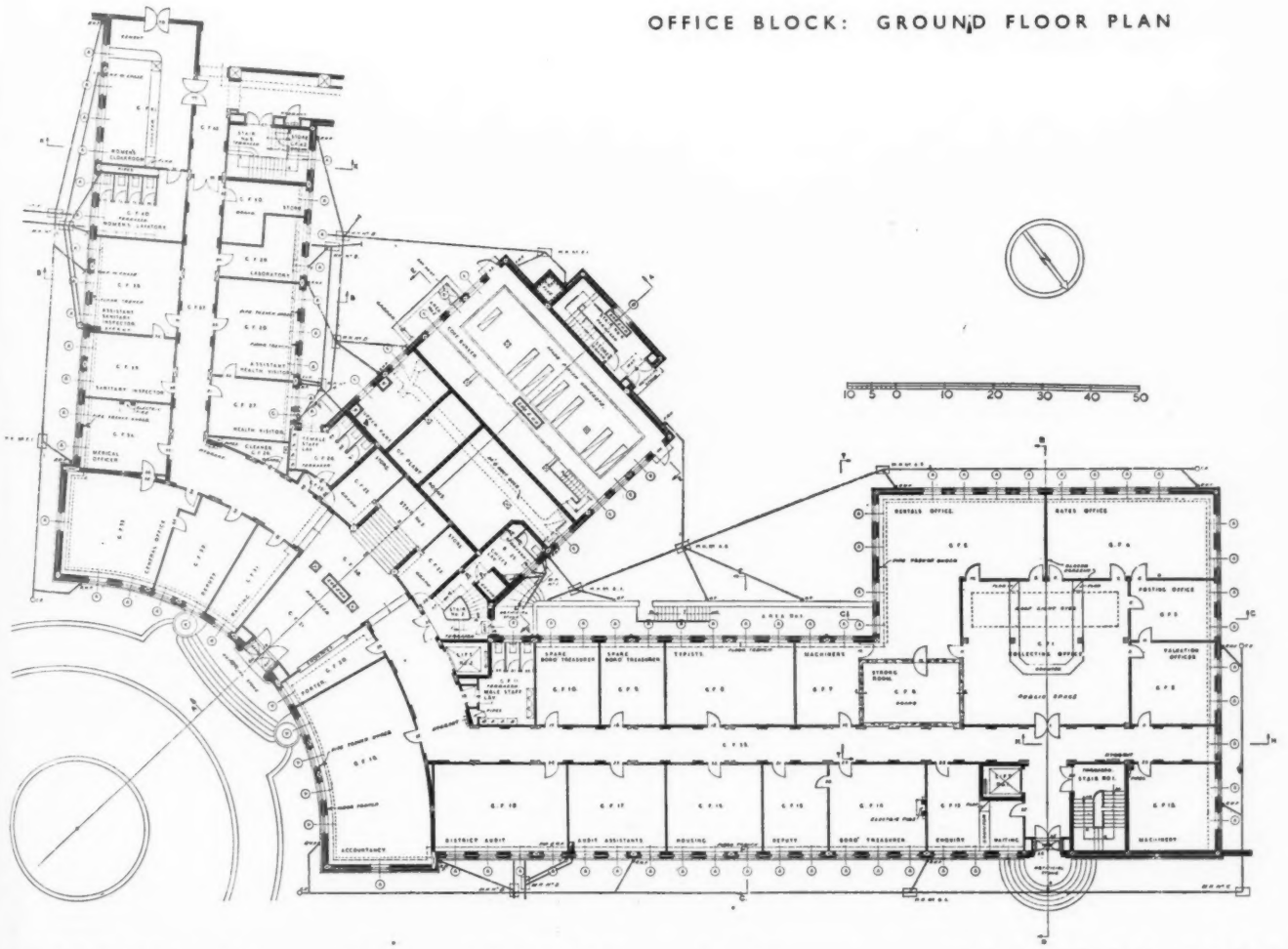
View from Rickmansworth Road showing entrances to office block and (extreme left) the assembly hall block.

MUNICIPAL BUILDINGS, WATFORD • BY C. COWLES-VOYSEY;

committee rooms and members' rooms. Above this, on a second floor, are offices for the Borough Engineer. Assembly Hall provides seating accommodation on the ground floor for about 1,300 people, and a further 300 in a gallery. This hall, which has been designed primarily for music, meetings and general assembly purposes, can also be used for dancing. A refreshment room, with kitchen and service, has been planned for use in conjunction with the Assembly Hall.

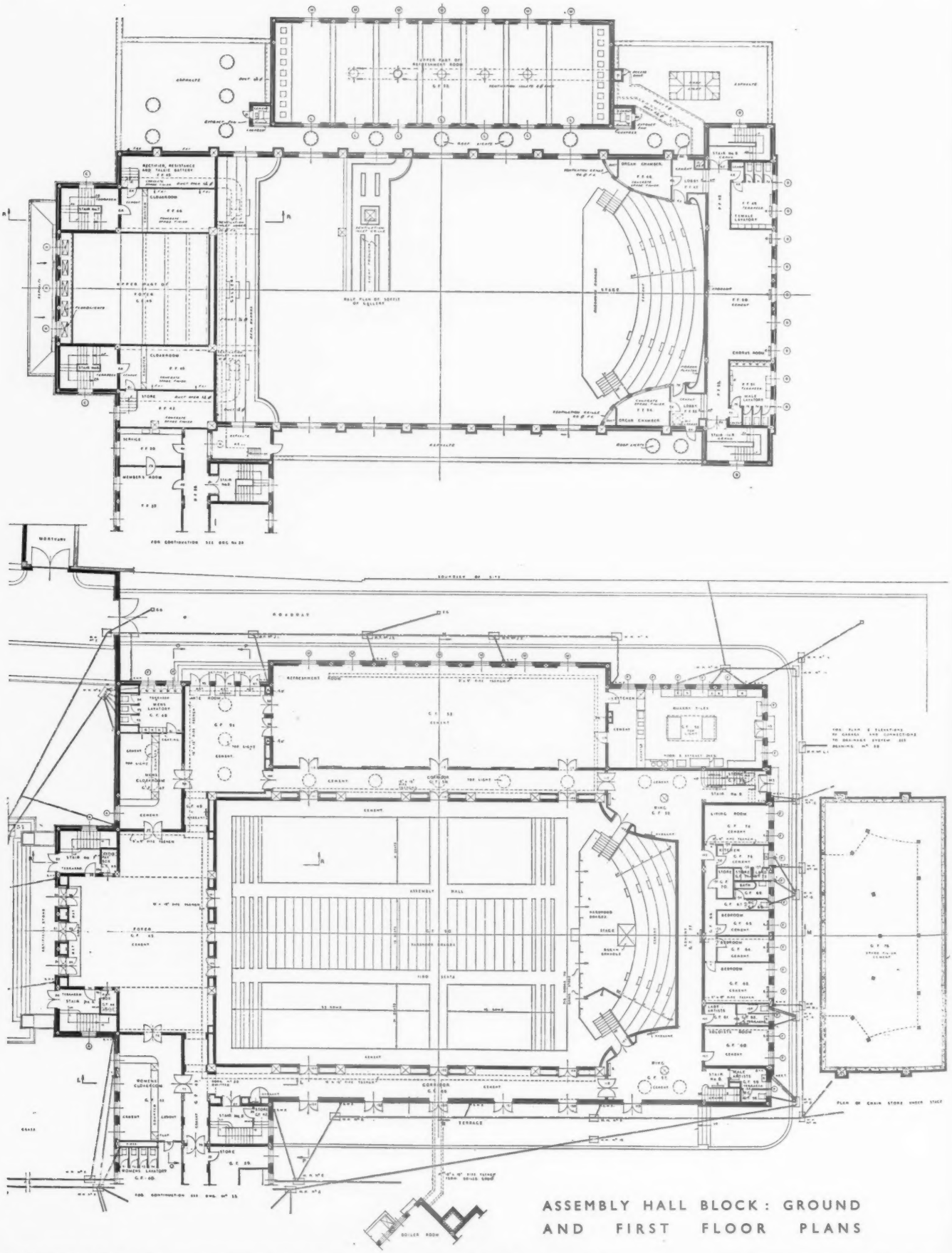
Facing page: main staircase from first floor landing; above: committee room and council chamber.

OFFICE BLOCK: GROUND FLOOR PLAN



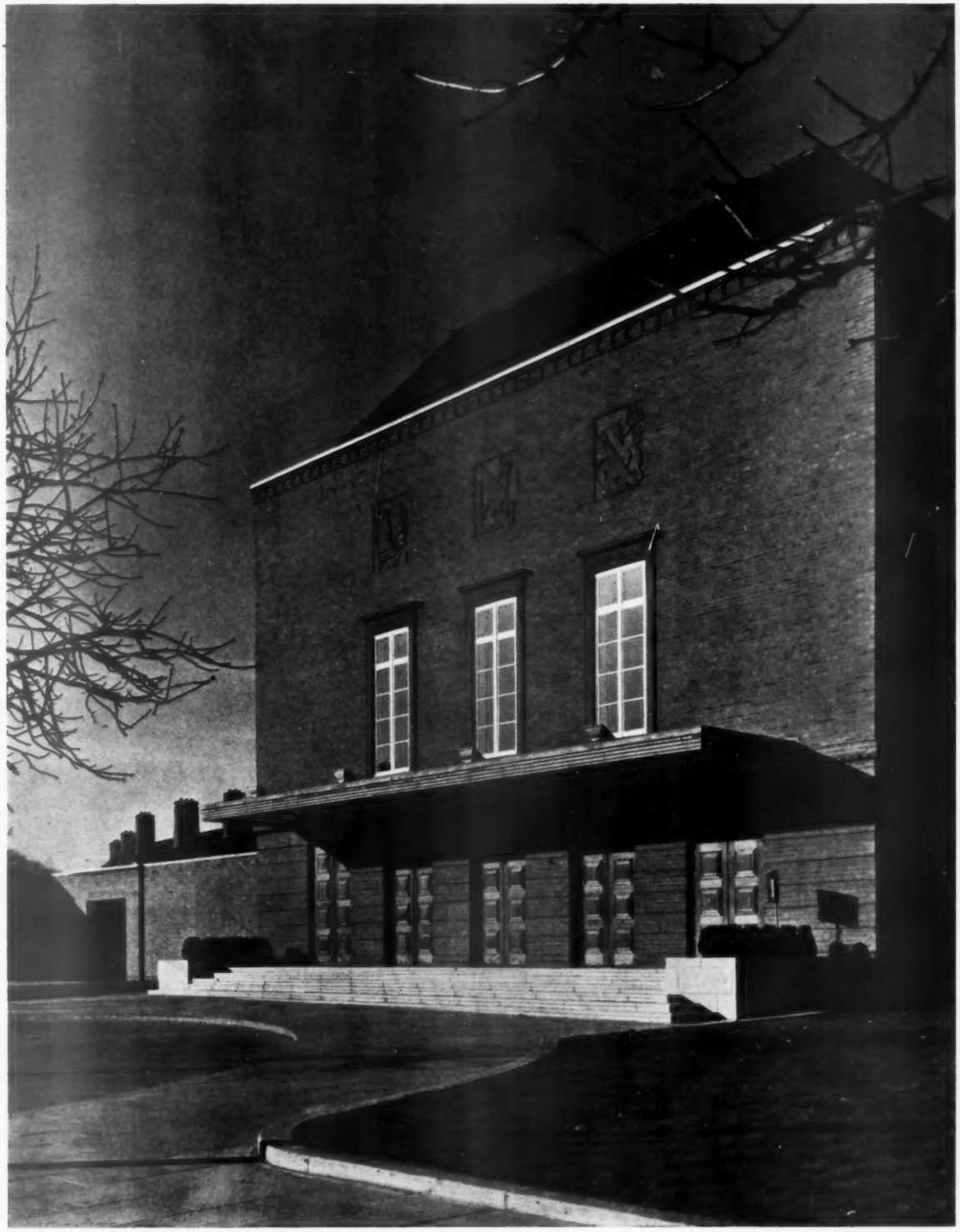
ASSISTANTS: R. ASHTON AND J. BRANDON-JONES

C



ASSEMBLY HALL BLOCK: GROUND AND FIRST FLOOR PLANS

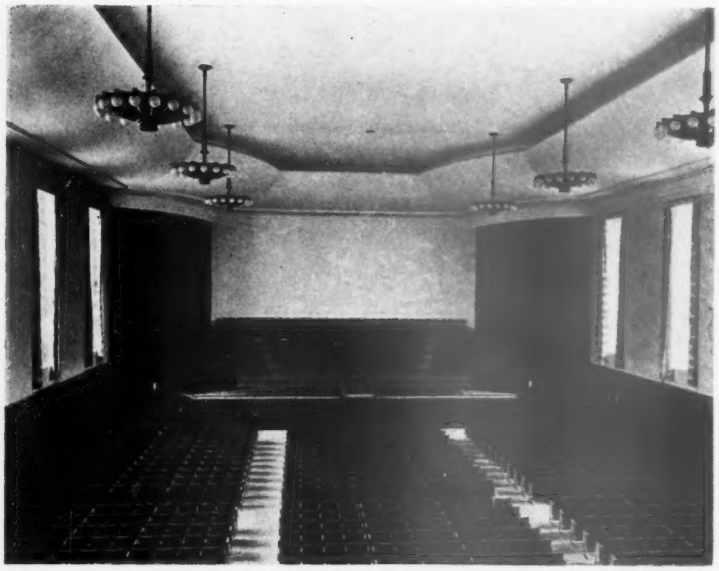
MUNICIPAL BUILDINGS, WATFORD • BY C. COWLES-VOYSEY; ASS

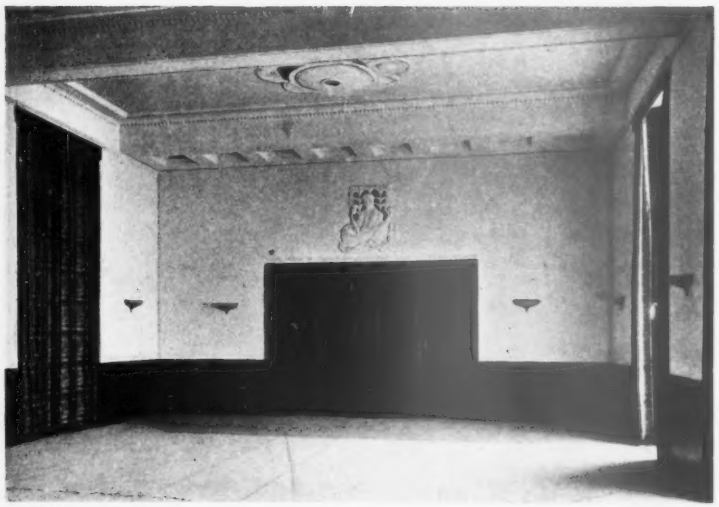


Entrance to Assembly Hall

SERVICES—Low-pressure hot-water heating through ceiling panels with gravity-fed coke-fired boilers. Air-conditioning is installed for the Assembly Hall, Council Chamber and the other larger units. The general contractors were Richard Costain, Ltd.; for list of sub-contractors and suppliers see page 663.

ASSISTANTS : R. ASHTON AND J. BRANDON-JONES





MUNICIPAL BUILDINGS, WATFORD

BY C. COWLES-VOYSEY; ASSISTANTS: R. ASHTON AND J. BRANDON-JONES

Above, Assembly Hall looking towards the stage. Left, the refreshment room.

LITERATURE

WEEK-END WISDOM

Week-end Houses, Cottages and Bungalows. Edited by Alan Hastings, with an introduction by Hugh Casson. London: Architectural Press. Price 7s. 6d. net.

THE publication of a book on small houses is usually no epoch-making event in the architectural world. It has been done many times before and will happen many times again. To introduce a new touch to such an old subject, therefore, is something of an achievement. In general appearance this book on week-end retreats keeps to the standard already set by other books on contemporary architecture from the same publishing house, and constant readers of the JOURNAL and *Review* will no doubt recognize many of the buildings.

The new note occurs in the list of architects whose work is illustrated, and the inclusion of their addresses as well as their names, which is such a simple and sensible thing to do that one wonders why it is not a recognized practice in all books of this kind. Architects in the main are modest creatures and somewhat apt to hide their light under a too-professional bushel, and one cannot help feeling that more publicity would make for more confidence and consequently more work all round, even if this is a book-review and not a leader.

The illustrations, plans and descriptions are of week-end retreats of every type, and are arranged approximately in order of cost, from a full-sized £2,500 house to a bungalow at £510, though it should be pointed out to client-readers that the latter forms but one of a group.

Mr. Hugh Casson is a free-thinker. He judges everything on its merits and is not swayed by fashions. His excellent introduction deals with such varied problems as choice of site; forms of heating; intermittent occupation, and

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THE USE OF STEEL SECTIONS AS COLUMS AND STRUTS:

Columns & struts can be carried out in a great variety of sections. Examples of the groupings are shown on Sheet 11 of this series.

GROUP (2): columns consisting of composed sections for any load.

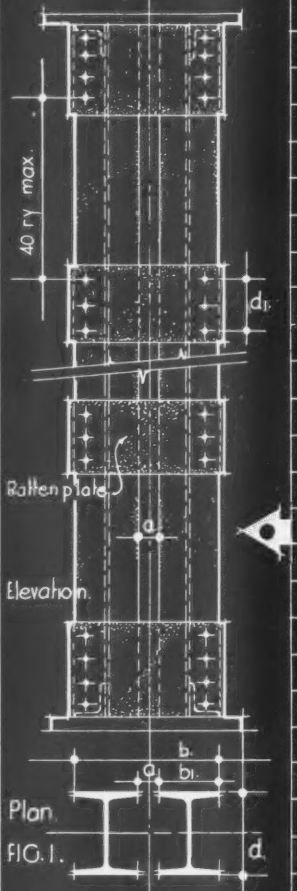

FIG. 1.

DIMENSION 'a': The two joists forming one section may touch each other, but if they do not, they should be not less than 3/4" apart so that grout can be filled in.

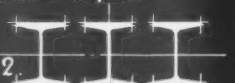

FIG. 2.

Three or more joist sections. This information Sheet refers to cols. of joist sections only.

FIG. 3. See back of Sheet.

Joist combined with 2 channels.

TABLE GIVING EFFICIENCY FACTORS (e) FOR TWO EQUAL B.S.S. SPACED JOIST SECTIONS, AS CENTRALLY LOADED COLUMNS (STRUTS).*

Approx. overall size of col. d x b ins.	Size of each joist d x b1 ins.	Min. distance clbd 'a' ins.	LENGTH OF COLUMN OR STRUT IN FEET. 6.	6·5.	7.	7·5.	8.	8·5.	9.	10.	11.	12.	13.	14.	16.	18.	20.	22.	24.
3 x 4.	3 x 1½.	2·30.	0·57	0·65	0·53	0·51	0·48	0·44	0·42	0·37	0·32	0·28	0·25	0·22	0·18	0·15	0·12	•	•
3 x 6.	3 x 3.	3·00.	0·58	0·55	0·53	0·51	0·48	0·45	0·43	0·38	0·33	0·29	0·26	0·23	0·18	0·15	0·13	•	•
4 x 5¼.	4 x 1¾.	3·06.	0·63	0·62	0·60	0·58	0·57	0·55	0·52	0·51	0·46	0·42	0·37	0·34	0·27	0·22	0·19	0·16	0·14
4 x 6.	4 x 3.	3·00.	0·63	0·62	0·60	0·58	0·57	0·55	0·53	0·51	0·46	0·43	0·38	0·35	0·28	0·22	0·20	0·17	0·15
4¾ x 5¾.	4¾ x 1¾.	3·68.	0·65	0·64	0·62	0·62	0·61	0·60	0·58	0·55	0·53	0·51	0·46	0·42	0·36	0·30	0·26	0·22	0·19
5 x 7.	5 x 3.	3·86.	0·66	0·65	0·64	0·63	0·62	0·61	0·60	0·57	0·55	0·53	0·50	0·46	0·39	0·34	0·29	0·25	0·24
5 x 9.	5 x 4½.	4·50.	0·66	0·65	0·64	0·63	0·63	0·61	0·60	0·57	0·55	0·52	0·50	0·46	0·39	0·34	0·29	0·25	0·24
6 x 8.	6 x 3.	4·70.	0·67	0·66	0·66	0·65	0·64	0·64	0·63	0·62	0·60	0·57	0·55	0·52	0·48	0·43	0·37	0·33	0·31
6 x 9.	6 x 4½.	4·50.	0·67	0·66	0·66	0·65	0·64	0·64	0·63	0·62	0·60	0·57	0·55	0·52	0·48	0·43	0·37	0·33	0·31
6 x 10.	6 x 5.	5·00.	0·67	0·66	0·66	0·65	0·64	0·64	0·63	0·62	0·60	0·57	0·55	0·52	0·48	0·43	0·37	0·33	0·31
7 x 10.	7 x 4.	5·52.	0·68	0·67	0·67	0·67	0·66	0·66	0·65	0·64	0·63	0·62	0·60	0·58	0·55	0·52	0·50	0·47	0·45
8 x 10½.	8 x 4.	6·26.	0·69	0·68	0·67	0·67	0·67	0·67	0·66	0·65	0·64	0·63	0·61	0·60	0·58	0·55	0·52	0·48	0·43
8 x 11½.	8 x 5.	6·25.	0·69	0·68	0·67	0·67	0·67	0·67	0·66	0·65	0·64	0·63	0·61	0·60	0·58	0·55	0·52	0·48	0·43
8 x 13.	8 x 6.	6·75.	0·69	0·68	0·67	0·67	0·67	0·67	0·66	0·65	0·64	0·63	0·61	0·60	0·58	0·55	0·52	0·48	0·43
9 x 11½.	9 x 4.	7·04.	0·70	0·70	0·69	0·69	0·68	0·67	0·66	0·66	0·64	0·63	0·62	0·62	0·60	0·57	0·54	0·51	0·48
9 x 14.	9 x 7.	7·00.	0·70	0·70	0·69	0·69	0·69	0·68	0·67	0·67	0·66	0·65	0·64	0·63	0·61	0·58	0·56	0·52	0·50
10 x 12½.	10 x 4½.	7·92.	0·70	0·70	0·70	0·69	0·69	0·69	0·68	0·67	0·66	0·66	0·65	0·64	0·62	0·60	0·58	0·55	0·52
10 x 13.	10 x 5.	7·84.	0·70	0·70	0·70	0·69	0·69	0·69	0·68	0·67	0·66	0·66	0·65	0·64	0·62	0·60	0·58	0·55	0·52
10 x 14.	10 x 6.	7·88.	0·70	0·70	0·70	0·69	0·69	0·69	0·68	0·68	0·67	0·66	0·65	0·64	0·62	0·60	0·58	0·55	0·52
10 x 16.	10 x 8.	8·00.	0·70	0·70	0·70	0·70	0·69	0·69	0·69	0·68	0·67	0·66	0·65	0·64	0·62	0·60	0·58	0·55	0·52
12 x 14½.	12 x 5.	9·46.	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·67	0·66	0·66	0·64	0·63	0·62	0·59	0·57
12 x 16.	12 x 6L.	9·52.	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·67	0·66	0·66	0·64	0·63	0·62	0·59	0·57
12 x 16.	12 x 6H.	9·54.	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·67	0·66	0·66	0·64	0·63	0·62	0·59	0·57
12 x 17½.	12 x 8.	9·40.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·67	0·67	0·65	0·64	0·62	0·60	0·57
13 x 15½.	13 x 5.	10·30.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·67	0·66	0·64	0·63	0·61	0·59
14 x 17½.	14 x 6L.	11·12.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·66	0·65	0·64	0·62	0·59
14 x 17.	14 x 6H.	10·98.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·66	0·65	0·64	0·62	0·61
14 x 19½.	14 x 8.	11·12.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·66	0·65	0·64	0·62	0·61
15 x 17.	15 x 5.	11·64.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·67	0·65	0·64	0·62	0·61
15 x 18.	15 x 6.	11·94.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·62	0·61
16 x 19.	16 x 6L.	12·72.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·62	0·62
16 x 18½.	16 x 6H.	12·36.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·62	0·62
16 x 21.	16 x 8.	12·86.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·62	0·63
18 x 20½.	18 x 6.	14·18.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·63	0·63
18 x 21½.	18 x 7.	14·14.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·63	0·63
18 x 22½.	18 x 8.	14·44.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·67	0·65	0·64	0·63	0·64
20 x 22½.	20 x 6½.	15·80.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·66	0·65	0·65	0·65
20 x 23½.	20 x 7½.	15·66.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·66	0·65	0·65	0·65
22 x 24½.	22 x 7.	17·24.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·68	0·67	0·67
24 x 26½.	24 x 7½.	18·80.	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·70	0·69	0·69	0·68	0·68

* The values given to the right of or above the zig-zag line may be applied to secondary compressive members. They should not be applied to main structural columns, or struts, for which the values lie to the left of the zig-zag line. The criterion is a slenderness ratio of 150.

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THE ARCHITECTS' JOURNAL
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INFORMATION SHEET

• 770 •

STRUCTURAL STEELWORK

Subject : Economical Column Sections, 3.

General :

This series of Sheets on steel construction is not intended to cover the whole field of engineering design in steel, but to deal with those general principles governing economical design which affect or are affected by the general planning of the building. It also deals with a number of details of steel construction which have an important effect upon the design of steelwork.

Both principles and details are considered in relation to the adjoining masonry or concrete construction, and are intended to serve in the preliminary design of a building, so that a maximum economy may be obtained in the design of the steel framing.

This Sheet is the thirteenth of the series, and sets out in tabular form the comparative economic efficiencies of columns or struts composed of two equal joist sections, spaced at a minimum distance " a " centre to centre, and connected at intervals in the length by batten plates as shown to the left of the Sheet.

Column Groupings :

Where centrally loaded columns consisting of one section only are not desirable (see Group (1) on Sheet No. 11 of this series), composite sections (as shown in Group (2)) may be used. The advantages of composite sections are set out on Sheet No. 12.

Composite columns consisting of two joists as shown on this Sheet are especially useful, owing to variety of the joist sections available. They can be used for a particularly wide range of loads and buckling lengths.

Efficiency Coefficient :

For general clauses, see back of Sheet No. 11 of this series. The factors for the columns shown on the present Sheet can never be greater than 0.70, but may be as low as 0.14. Struts with an efficiency factor of less than 0.20 are not permitted for columns or for chords of trusses, and of less than 0.14 are not permitted at all.

When calculating the efficiency factor, an allowance has been made for the materials used for the batten plates where required, and for additional labour compared with ordinary joist or channel sections.

Three or more joists can be combined, as shown in Fig. 2, and the efficiency coefficients are the same as for two joists of the same type. The distance from centre to centre of the joists can be limited to the minimum required by constructional considerations.

A joist may be combined with two channels as indicated in Fig. 3. In this case the efficiency coefficient may be taken as half the sum of the efficiency coefficient for the joists and those for the channels (the latter being given on Sheet No. 12 of this series). There are no specific requirements for the distance between joists and channels.

Batten Plates :

The two joists are to be connected by batten plates in a similar way to that prescribed in Sheet 12 for channels. It is sufficient to fasten the batten plates to the outer flanges of the joists (see Fig. 1). The clear distance between the outer rivet holes of adjacent batten plates should not be greater than 40ry, where ry is the smaller radius of gyration of the single section. The width " d_1 " of the batten plates is usually taken equal to the depth of the joists " d."

Loading :

See formula quoted on the back of Sheet No. 11 of this series.

Buckling :

See clauses on the back of Sheet No. 11 of this series.

Previous Sheets :

Previous Sheets of this series dealing with structural steelwork are :—

No. 729 : Basic Steel Sections.
No. 733 : Mechanics of Sections, 1.
No. 736 : Mechanics of Sections, 2.
No. 737 : Economical Framing, 1.
No. 741 : Economical Framing, 2.
No. 745 : Economical Beam Sections, 1.
No. 751 : Economical Beam Sections, 2.
No. 755 : Economical Beam Sections, 3.
No. 759 : Riveted Plate Girders.
No. 763 : Fire Resisting Cover to Steel Beams.
No. 765 : Economical Column Sections, 1.
No. 769 : Economical Column Sections, 2.

Erratum

Steel Frame Construction No. 12. Information Sheet 769, reverse side. Under 'Efficiency Coefficient' third line : for "can never be greater than 0·70" read "can never be greater than unity."

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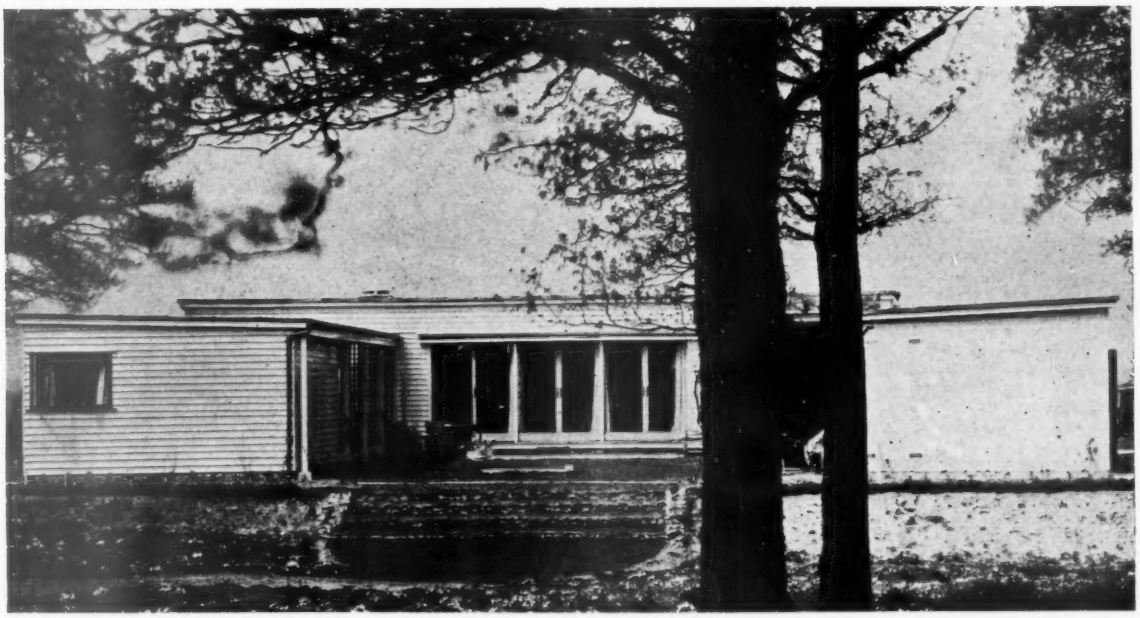

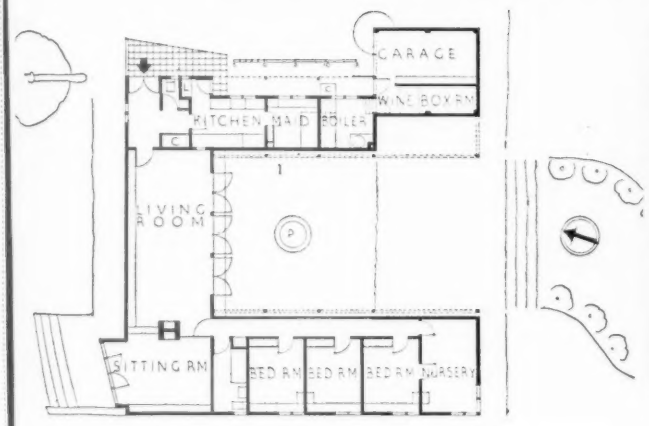

All-timber bungalow at Churt, Surrey, designed by Anthony M. Chitty. From "Week-end Houses, Cottages and Bungalows." Top, view from the south; right, view from the east showing the bedroom wing.

disposal of empties ; and such is the power of the printed word that the architect who gives this book to his client should find his spadework made extraordinarily easy. G. B. H.

The Buildings Illustrated

MUNICIPAL BUILDINGS, WATFORD (pages 655–660). Architect, C. Cowles-Voysey, F.R.I.B.A. ; Assistants, Robert Ashton and John Brandon-Jones. Consulting engineer, Dr. Oscar Faber, O.B.E. Quantity surveyor, H. J. Venning, F.S.I. Furnishing consultant, Mrs. Elsa Booth. Clerk of works, W. G. Cook. General contractors, Richard Costain, Ltd. Foreman, F. Baddeley. Sub-contractors and suppliers included : Grierson, Ltd., electrical installation ; G. N. Haden and Sons, Ltd., heating, hot water installation and ventilating ; Dorman, Long & Co., Ltd., structural steelwork ; C. E. Welstead and Sons, Ltd., metal windows ; Haywards, Ltd., roof light and lay lights ; Hammond and Champness, Ltd., passenger lifts ; Empire Stone Co., Ltd., Empire stone ; Anselm, Odling and Sons, Ltd., Ancaster stone ; Diespeker & Co., Ltd., terrazzo ; Alfred Pratt & Co. (1928), Ltd. (Proctor and Lavender), facing bricks and roofing tiles ; Haywards, Ltd., saucer domes ; Stoner and Saunders, Ltd., lead rainwater pipes and heads ; Hobbs, Hart & Co., Ltd., strong-room doors ; Clark, Hunt & Co., strong-room divisions ; J. and E. Hall, Ltd., ash hoist ; Pontifex and Emanuel, sanitary fittings ; Rippers, Ltd., flush doors ; S. W. Francis & Co., Ltd., garage shutters ; De Jong & Co., Ltd., fibrous plaster ; May Acoustics, Ltd., acoustic plaster ; Horace W. Cullum & Co., Ltd., acoustic felt ; Garton and Thorne, Ltd., staircase balustrades ; W. Bainbridge Reynolds, Ltd., balcony railings and weather vane ; Garton and Thorne, Ltd., bronze guard rails ; W. Larkins, lightning conductors ; J. W. Gray and Sons, Ltd., flagstaff ; Standard Range and Foundry Co., Ltd., ironmongery ; James Gibbons, Ltd., floor springs and cycle racks ; Loft Ladders, Ltd., loft ladders ; London Spray and Brush Painting Co., Ltd., spray painting ; G. H. Turner, light fittings and amber glass ; R. M. Radio, Ltd., loudspeaker and public address installation ; Dictograph Telephones, Ltd., internal telephones ; Gillett and Johnston, Ltd., electric clocks and turret clock ; S. Dixon and Son, Ltd., internal fire service ; Cellulin Flooring Co., Ltd., linoleum floor covering ; Stevens and Adams, Ltd., deal block flooring ; J. P. White and Sons, Ltd., special joinery ; Maple & Co., Ltd., furnishings; Mrs. Anne Brandon-Jones, heraldic hanging ; Cox & Co., seating ; Eric Munday, carving in stone ; Laurence Bradshaw, decorative panels ; William Cutbush and Son, Ltd., garden work.

Illuminating Engineering Society

The first war-time meeting of the Illuminating Engineering Society was held at the E.L.M.A. Lighting Service Bureau on November 14, when the new President, Mr. F. C. Smith, was inducted by the retiring President, Mr. Percy Good.

In an informal opening address (the Presidential Address will be delivered at a later date), the new President referred to Mr. Good's services to the Society during his presidential term which, he said, was divided into three portions, the first when he was in Australia and New Zealand and established close contact with the Australian and New Zealand Illuminating Engineering Societies ; secondly, the hard work on behalf of the Society which Mr. Good carried out on his return ; and finally his work during the very difficult period at the beginning of the

war, when the Society had placed its services at the disposal of the authorities.

The services of the Society had been accepted with alacrity, and a variety of specific problems had been placed before them for consideration. A great deal of work had been accomplished, some of which was already published in the form of British Standard Specifications such as those relating to lighting fittings for providing even illumination at very low intensities, to light locks for shops, and to lighting equipment for public air raid shelters. Other specifications were nearing completion and would deal with fluorescent paints and with gauges for checking low illumination. Eighty members of the Society were working on 23 committees, the members of which had jointly contributed some 2,000 " man hours." In co-operation with the Society's work the laboratories attached to the electrical and gas organizations had closely united in their efforts to accomplish the necessary experimental work.

Mr. C. E. V. Lambert demonstrated an experimental gauge for checking illumination of low value, the gauge being based on the use of luminescent radioactive paint.

The President announced that it was the intention of the Council to maintain the activities of the Society as fully as possible during the war period. Publication of the Transactions and " Light and Lighting " would be continued, and although it would not be possible for the usual full session of meetings to be held, members were asked to submit papers for publication or to be read eventually before the Society. A meeting would be held in December to consider a scheme for the establishment of a new class of membership, namely Fellowship, and for the recognition of a class of fully qualified members.

Manufacturers' Item

In order to meet the demand for the Aylesford hollow blocks and Gault engineering bricks the Aylesford Pottery Co., Ltd., during the shortage of transport on rail and road, have called into use their wharf which is situated on the River Medway, Kent. This firm have their own railway track running direct from their works to the wharf, where the bricks are loaded into trucks and run down to the barges (*see* illustration). The Gault wire-cut engineering bricks, we are informed, are being widely used for public works contracts, schools, hospitals, asylums and, recently, for R.A.F. stations, military barracks, militia camps, etc.

•

Contracts Placed

Extensions, comprising a new male block, at the Ransome Sanatorium, Southwold Road, Mansfield, Notts, for the Nottinghamshire C.C. : H. James (Mansfield), Ltd., Central Buildings, Station Road, Mansfield. (Architect, W. H. Holmes.)

Extensions to factory premises at Merrow Street, Merrow, Guildford, Surrey, for P.A.M., Ltd. : F. Milton and Sons, Ltd., of Witley, Surrey. (Architect, E. McKie.)

The Government has authorized H.M.O.W. to proceed with first of the schemes for the erection of hutment buildings for the accommodation of civil servants evacuated from Whitehall. These are to be built at Cheltenham by Pitchers, Ltd., 57 Ashburton Grove, London, N.7. (Architect, Sir J. G. West, Chief Architect, H.M.O.W.)

Structural alterations, White Hart Hotel, Roe Street, Macclesfield, Cheshire, for Lonsdale and Adshead, Ltd. : L. Brown and Sons, Wilmslow, Cheshire. (Architects, Alfred Price and Sons.)

Continued on page xxii

PRICES

***IMPORTANT NOTE.**—Prices given below are for works executed complete and are for average job in the London area; all prices include overheads and profit for the general contractor. The prices given in italics are for materials only and represent the cost of the materials included in the measured rates. They are based on the prices given in current market prices of material with the addition of ten per cent. for overhead charges and profit, though owing to present conditions many of these prices may no longer hold good.*

The cost of labour (including its proportion of overhead charges and profit) can be ascertained by subtracting the prices in italics from the prices in heavier type.

***NOTE:**—Prices for Approximate Estimates are held over from this issue.*

PART 4: CURRENT PRICES FOR MEASURED WORK—II

BY DAVIS AND BELFIELD

JOINER

The prices given below are based on the controlled prices for orders of not less than £15 in value for any one size and quality. 20% must be added for smaller orders and owing to restrictions it is seldom practicable to place large orders except under licence.

Deal Flooring

		1"	1½"
Plain edge flooring in batten widths	per square	42/–	51/2
		32/–	*40/2*
Ditto tongued and grooved ditto ..	per square	46/7	56/8
		35/6	*44/8*
T. & G. B.C. Pine rift flooring in narrow widths	per square	53/9	—
		40/5	

Secret Nailed Tongued and Grooved Strip Flooring, fully Desiccated, including Polishing

		1" nominal			1½" nominal		
		£	s.	d.	£	s.	d.
Austrian Wainscot Oak ..	per square	11	3	2	13	5	9
Plain Japanese Oak ..	per square	9	8	4	11	7	8
Plain American Oak ..	per square	9	3	9	11	9	8
Pitch Pine	per square	8	15	8	10	19	6

JOINER—(*continued*)

		1" nominal			1½" nominal		
		£	s.	d.	£	s.	d.
British Columbian Pine ..	per square	5	18	2	6	14	6
Canadian Maple	per square	8	13	10	10	13	3
Burma Teak	per square	11	3	2	13	11	8
English Oak	per square	12	15	11	15	19	11
Gurjun	per square	8	13	10	10	13	3
Jarrah	per square	8	7	4	10	8	0

Wall Linings

⅛" B.C. Pine tongued and grooved V-jointed Matching in narrow widths	per square	34/2	*23/1*
¼" (6 mm.) Birch (A) Plywood and fixing to walls	per square	52/5	*42/6*
3/16" Asbestos cement sheets butt jointed	per foot super	–/4	*–/2¼*
• ½" Fibre board and fixing to walls	per yard super	3/6	*2/11*
Deal battens as grounds plugged to brickwork	per foot super	–/1½	*–/0½*
2" × ¾" wrot and chamfered fillets	.. per foot run	–/1¾	*–/0¾*
2" × ½" wrot and moulded ditto	.. per foot run	–/1¾	*–/0¾*

• Items marked thus have risen since October 26.

CURRENT PRICES

BY DAVIS AND BELFIELD

JOINER

Skirtings

	Deal	Austrian Oak
1″ stock chamfered or moulded 4″ high, fixed to and including grounds and backings planted on per foot run	-/3½	-/10¼
	-/2	-/7¼
Add for plugging to brickwork .. per foot run	-/0½	-/0¾

Fitted ends on hardwood price as 4″ of skirtings, mitres as 6″.
Fitted ends, etc., on deal skirting included in price per foot run.

Casements and Fanlights

	1½″		2″	
Deal stock moulded sashes divided into squares with glazing bars per foot super	1/4½	-/4¼	1/5½	-/5
Add for hanging casements (butts measured separately) .. .. each	1/9		2/-	

Cased Frames and Sashes

Deal cased sashed frame, including 2″ double hung stock sashes, with 6″×3″ Oak cill and brass axle pulleys, sash line and weights, average 15 feet super per foot super	3/9 *1/7*

Doors in Deal

	¾″	1″	
Matchboarded, ledged and braced door per foot super	1/-	1/2	
	-/4¾	-/5¾	
	1½″	1¾″	2″
Framed, ledged and braced door, filled in with matchboarding .. per foot super	1/7½	1/10	2/1
	-/6	-/6½	-/8½
Ditto garage doors in pairs per foot super			1/10
			-/5½
Labour rebated and beaded meeting styles, per foot run			-/1

	4-panel
1½″ square framed, both sides per foot super	1/8 -/7¾
2″ ditto .. .. .. per foot super	2/- -/9¾
1½″ bead butt panels one side, but square the other .. .. .. per foot super	1/9 -/7¾
2″ ditto .. .. .. per foot super	2/2 -/10½
1½″ moulded both sides .. per foot super	2/- -/9¼
2″ ditto .. .. .. per foot super	2/4 -/11¼
For fixing only, stock or p.c. doors, allow per foot super	-/2½

Doors in Hardwood

Austrian quartered oak:
Labour, 2 × as much as deal.
Materials, 3¼ × ditto.
Labour and materials, 2½ × ditto.
Cuban mahogany:
Labour, 3 × as much as deal.
Materials, 4¼ × ditto.
Labour and materials, 3½ × ditto.
Teak:
Labour, 3 × as much as deal.
Material, 3½ × ditto.
Labour and material, 3¼ × ditto.

Deal stock glazing beads, mitred and bradded per foot run	-/1½ -/0½
Ditto and fixed with brass cups and screws per foot run	-/3 -/1

Window and Door Linings

	1″	1¼″	1½″
Deal linings, 6″ wide, tongued at angles and planted on including backings per foot run	-/6½	-/7¼	-/8¼
	-/2¾	-/3¼	-/4
Add for plugging to wall .. per foot run	-/0½	-/0½	-/0½
Add for rebating .. .. .. per foot run	-/0½	-/0½	-/0½
Add for ¾″×1½″ stock Deal stop planted on per foot run	-/1¾	-/1¾	-/1¾
	-/0¾	-/0¾	-/0¾
Deal window board 9″ wide, with rounded nosing, tongued at back and on and including bearers plugged to brickwork per foot run	-/9½	-/10¾	1/0½
	-/4¼	-/5¼	-/6¼
1″ Deal scotia mould .. .. per foot run		-/1¾	
		-/0¾	
Austrian quartered oak linings 6″ wide tongued at angles and planted on including backings per foot run	1/2½	1/5½	1/8¾
	-/8¼	-/10¼	1/0½
Add for plugging to brickwork .. per foot run	-/1	-/1	-/1
Add for rebating .. .. .. per foot run	-/1	-/1	-/1

JOINER—(*continued*)

	1″	1¼″	1½″
Add for ½″×2″ Austrian quartered oak stop planted on .. .. .. per foot run	-/3½	-/3½	-/3½
	-/1¼	-/1¼	-/1¼
Austrian quartered oak window board 9″ wide, with rounded nosing tongued at back and on and including bearers plugged to brickwork per foot run	1/9	1/11½	
	1/0¾	1/3¾	
1″ Austrian quartered oak scotia mould per foot run		-/3¼	
		-/1¼	

Window and Door Frames

	Deal	Austrian Quartered Oak
4″×3″ door frames .. .. .. per foot run	-/9½	2/2
	-/4½	1/4¼
4″×3″ window frames .. .. per foot run	-/11½	2/6
	-/4½	1/4¼
4″×3″ transomes and mullions .. per foot run	1/3½	3/2
	-/4½	1/4¼
6″×3″ door cill, sunk weathered twice throated and grooved for water bar (measured separately) per foot run	—	3/5½
		2/0½
6″×3″ window ditto .. .. per foot run	—	2/9½
		2/0½
Add or deduct for variation in sectional area per square inch .. .. .. per foot run	-/0⅜	-/1⅜
Add for each labour, for chamfer, bead or rebate, etc. .. .. per foot run	-/0½	-/1
Add for each moulding .. .. per foot run	-/0¾	-/1¼

Architraves

	Deal	Japanese Oak
1″×3″ stock chamfered or moulded architraves, including mitres on softwood, planted on per foot run	-/3	-/7½
	-/1¼	-/4¼
Mitred angles on oak price as 6″ of architrave.		
Add for plugging to brickwork .. per foot run	-/0½	-/0¾
Add for narrow splayed grounds .. per foot run	-/1½	-/1¼
	-/0¼	-/0¼

Shelving

	Deal	Austrian Quartered Oak
Slat shelving of 1″ × 2″ spaced ¾″ apart per foot super	-/9	—
	-/3¾	
1″ shelving .. .. .. per foot super	-/10	2/2½
	-/5	1/4¼
1½″ ditto .. .. .. per foot super	1/0½	2/8¼
	-/6½	1/8¼
1″ cross-tongued shelving .. per foot super	1/-	2/6½
	-/5½	1/5¼
1¼″ ditto .. .. .. per foot super	1/2½	3/0¼
	-/6¼	1/9¼
1″×2″ chamfered bearers planted on per foot run	-/2½	-/5¾
	-/0¾	-/2¾
Add if bearers plugged to brickwork per foot run	-/0½	-/0¾

Teak Draining Boards and Twice Oiling

1½″ Moulmein cross-tongued fluted draining board fixed to slight falls .. per foot super	3/9 *1/11¼*
½″×2″ rounded rim bedded in white lead and screwed to edge of draining board per foot run	-/6½ -/2¼
½″×4″ rounded skirting fillet ditto per foot run	-/8½ -/3¼

Staircases

	Deal	Austrian quartered Oak
1¼″ treads and 1″ risers .. per foot super	2/-	4/6
	-/9	2/-
2″ strings, fixed .. .. per foot run	1/9½	4/6½
	-/7½	2/8½
Housing treads and risers to strings .. each	-/9	1/6
3″×2¼″ Moulded handrail .. per foot run	—	1/6½
		-/10¼
1¼″×1¼″ square balusters 2′ 6″ long .. each	-/10	1/9
	-/2	-/5½
4″×4″ Newels with chamfered edges and fixing per foot run	1/4½	3/2
	-/8½	*1/11*

CURRENT PRICES

BY DAVIS AND BELFIELD

Ironmonger, Steel and Ironworker, Plasterer and External Plumber

IRONMONGER

Fixing only

4″ Butt hinges to softwood	per pair	1/–
4″ ditto to hardwood	per pair	1/4
16″ T. hinges to softwood	per pair	1/6
48″ Collinges patent gate hinges to softwood	per pair	7/6

		Softwood	Hardwood
6″ Cabin hooks	each	–/7½	–/10
Hat and coat hooks	each	–/3	–/4
Cupboard knobs	each	–/3	–/4
Night latches	each	1/6	2/–
Thumb latches	each	1/6	2/–
Letter plate and knocker, including perforation in door	each	2/6	3/4
Barrel or tower bolts	each	–/10	1/1
Flush bolts	each	1/6	2/–
Rim locks and furniture	each	2/–	2/8
Mortice ditto	each	3/–	4/–
Rebated ditto	each	3/6	4/8
Grip handles	each	–/6	–/8
Cupboard locks	each	1/–	1/4
Spring catches	each	–/10½	1/1½
Casement fastener	each	1/–	1/4
Ditto stays	each	–/10	1/1
Sash fastener	each	–/8	–/11

STEEL AND IRONWORKER

(For Rainwater Goods—*see* "Plumber.")

Steelwork

		£	s.	d.
Basis for plain rolled steel joists	per ton	16	3	0
		13	*8*	*0*

Fabricated Steelwork

		£	s.	d.
Joists cut and fitted	per ton	20	0	6
Stanchions, ordinary sections with riveted caps and bases	per ton	23	10	6
Stanchions, compound	per ton	25	11	6
Plate girders	per ton	27	19	6
Framed roof trusses, 25′ 0″ span	per ton	30	4	6
Ditto ditto 60′ 0″ span	per ton	28	5	0

Wrot Iron Work

Simple balusters and handrail fixed (excluding mortices, etc.)	per cwt.	56/–
Bolts and nuts fitted	per cwt.	45/– *38/6*

Galvanized Corrugated Sheeting

		20 B.G.	22 B.G.
Sheeting in 3″ corrugations and fixing on wood framing with screws and galvanized embossed curved washers including laps	per square	52/3 *42/3*	46/1 *36/8*
Ditto fixed to steel framing	per square	60/1 *47/7*	54/7 *42/1*

PLASTERER

Lime and Sirapite Plastering

	Per yard super	In narrow widths per foot super
Expanded metal lathing	1/8 *1/1½*	–/3
1″ × ⅜″ sawn laths	–/9½ *–/5*	–/1½
Render and set in lime and hair	1/8 *–/6½*	–/3¼
Render, float and set in lime and hair	2/– *–/8¾*	–/3¾
Plaster, float and set ditto on lathing (measured separately)	2/1½ *–/9¼*	–/4
Render and set with Sirapite	1/9½ *–/8*	–/3½
Plaster, float and set ditto on lathing (measured separately)	2/3 *–/10¾*	–/4
Skimming coat Sirapite	1/5½ *–/4½*	
½″ thick plaster board fixed including covering joints with scrim cloth	2/– *1/2½*	

PLASTERER—(*continued*)

Keenes

	Per yard super	In narrow widths per foot super
Cement plain face on and including a backing of Portland cement and sand	2/6 *–/8½*	–/5 —

Mouldings and Labours

		Lime and Sirapite	Keenes
Plain cornices and mouldings 6″ girth	per foot run	–/9½ *–/1½*	–/11 *–/2*
Labour arris, quirk or throat	per foot run	–/1½	–/1½
Ditto rounded angle	per foot run	–/2	–/2
Ditto staff bead	per foot run	—	–/7½

Mitres price as 12″ of moulding, stopped ends as 6″, and rounded angles as 18″.

Portland Cement and Sand (1 : 3)

		½″	¾″
Screeds to floors for wood or tiles	per yard super	1/2½ *–/4¼*	1/4 *–/6½*
Screeds for tiling, etc., on walls	per yard super	1/4 *–/4½*	1/6 *–/6¾*
Renderings to walls—one coat float finish	per yard super	1/6 *–/4½*	1/8 *–/6¾*
Plainface	per yard super		2/– *–/6¾*

Coloured Cement Plainface

Cullamix No. 2 or 3 cream, on and including water repellent cement and sand backing	per yard super	3/10 *1/9*
Snowcrete mixture on and including ditto	per yard super	3/10 *1/8½*
Snowcrete and white silica sand on and including ditto	per yard super	3/4½ *1/3½*

For keyed bricks or hacking face of concrete, to form key for plastering, *see* "Bricklayer."

Wall Tiles, Commercial Quality

6″ × 6″ × ⅜″ ivory or white	per yard super	17/8 *12/11*
Extra for rounded edge tiles	per yard run	1/2½ *1/1½*
6″ × 6″ × ⅜″ coloured enamel bright glazed	per yard super	22/11 *18/2*
Extra for rounded edge tiles	per yard run	–/4½ *–/3¼*
6″ × 6″ × ⅜″ eggshell gloss enamelled	per yard super	23/10 *19/1*
Extra for rounded edge tiles	per yard run	–/4½ *–/3½*

EXTERNAL PLUMBER

Lead

	Flats	Gutters, Flashings, etc.	Stepped Flashings	Soakers cut to size
*Milled sheet lead and labour per cwt.	43/11 *30/5*	45/– *30/5*	46/2 *30/5*	38/9 *30/5*

Bedding edges in white lead	per foot run –/2
Lead wedgings to flashings	per foot run –/1½
Ditto to stepped flashings	per foot run –/2
Dressing 6-lb. lead over glass and glazing bars	per foot run –/3½
Copper nailing	per foot run –/1½
Close ditto	per foot run –/2
Bossed ends to rolls	each –/7½
Extra labour dressing through shoots and into rainwater heads	each 3/–
Ditto to cesspools, including extra solder	each 5/3

*** Items marked thus have fallen since October 26.**

CURRENT PRICES

BY DAVIS AND BELFIELD

EXTERNAL AND INTERNAL PLUMBER

EXTERNAL PLUMBER—(*continued*)

Cast Iron Rainwater Goods

Rainwater Pipes fixed to brickwork.

		3″	4″
Round pipes	per foot run	1/6½	3/4
		1/1¾	*1/5½*
Extra for bends	each	2/4	2/11
		1/6	*2/1*
Ditto 6″ offset	each	2/4	2/11
		1/4	*1/11*
Ditto single branches	each	2/10	3/8
		1/10	*2/8*
Ditto shoes	each	2/4	3/–
		1/7	*2/–*
		3½″ × 3½″	4″ × 3″
Square and rectangular pipes ..	per foot run	3/1	2/10
		2/6½	*2/3*
Extra for elbows (fitted)	each	6/6	5/11
		5/3	*4/8*
Ditto single branches	each	6/7	6/3
		5/1	*4/9*
Ditto shoes	each	7/2	6/6
		6/1	*5/5*

Gutters fixed to fascia.

		4″	5″	6″
Half-round gutters ..	per foot run	1/1	1/2½	1/7½
		–/9	*–/10*	*1/2½*
Extra for angles	each	1/9	2/–	2/6
		1/–	*1/2½*	*1/8*
Ditto nozzles	each	1/7	1/10½	2/3
		1/–	*1/3*	*1/7*
Ditto stop ends	each	1/0½	1/3	1/4½
		–/8¼	*1/–*	*–/10¾*
Ogee gutters	per foot run	1/2	1/4	1/8½
		–/10	*–/11½*	*1/3¼*
Extra for angles	each	1/9	2/1½	2/3
		1/–	*1/4*	*1/5*
Ditto nozzles	each	1/8½	2/2½	2/5
		1/1½	*1/7*	*1/9*
Ditto stop ends	each	1/1½	1/4½	1/7½
		–/9½	*1/–*	*1/2½*

INTERNAL PLUMBER

Lead Pipes

Service.

		½″	¾″	1″	1¼″
*Pipes laid in trenches ..	per foot run	1/0½	1/4½	1/11¾	2/8½
		–/7¾	*1/–*	*1/5¾*	*1/11¼*
Add if fixed on walls ..	per foot run	–/1½	–/2	–/2½	–/3¾
Ditto if in short lengths ..	per foot run	–/1	–/1	–/1½	–/2
		1½″	2″	2½″	3″
*Pipes laid in trenches ..	per foot run	3/4½	4/7	—	—
		2/5½	*3/6*	—	—
Add if fixed on walls ..	per foot run	–/5	–/6	—	—
Ditto if in short lengths ..	per foot run	–/3	–/4	—	—

Distributing.

		½″	¾″	1″	1¼″
*Cold water pipes fixed to walls	per foot run	–/11¾	1/4	1/10	2/5½
		–/5½	*–/8¾*	*1/–*	*1/3½*
Add if in short lengths ..	per foot run	–/1	–/1	–/1½	–/2
		1½″	2″	2½″	3″
*Cold water pipes fixed to walls	per foot run	3/0¾	3/11¾	—	—
		1/7¾	*2/2¾*	—	—
Add if in short lengths ..	per foot run	–/3	–/4	—	—

Waste and Warning.

		½″	¾″	1″	1¼″
*Waste and overflow pipes fixed to walls	per foot run	–/9½	1/–	1/3½	1/6½
		–/3½	*–/5½*	*–/7¾*	*–/10*
*Waste and overflow pipes fixed in short lengths	per foot run	1½″ 2/0	2″ 2/8½	2½″ —	3″ —
		1/1	*1/5¾*	—	—

Soil and Ventilating

		3½″	4″	4½″
*Pipes fixed, including lead tacks	per foot run	4/7½	5/9¼	6/11¼
		2/11¾	*3/10¼*	*4/9¼*

		1½″	2″	2½″	3″	3½″	4″	4½″
Bends ..	each	1/6	2/–	2/9	3/9	4/3	4/6	5/6
Soldered joints to fittings		½″	¾″	1″	1¼″	1½″	2″	
	each	1/9	2/–	2/3½	2/7	2/10½	3/5	
		–/6	*–/9*	*1/–*	*1/3*	*1/6*	*2/–*	
Soldered branch joints (price as largest branch) ..	each	½″ 1/11	¾″ 2/2	1″ 2/5½	1¼″ 2/9	1½″ 3/0½		
		–/6	*–/9*	*1/–*	*1/3*	*1/6*		
Soldered branch joints (price as largest branch) ..	each	2″ 3/7	2½″ 4/–	3″ 4/7	4″ 5/7	4½″ 6/1		
		1/6	*2/4*	*2/10*	*3/9*	*4/2*		

Wrap small pipes with hair felt .. per foot run –/6 –/3½

INTERNAL PLUMBER—(*continued*)

Drawn Lead Traps

	1¼″	1¼″ 3″ deep seal	1½″	1½″ 3″ deep seal	2″	2″ 3″ deep seal
P. Traps 6 lb. with cleaning eye and two soldered joints .. .. each	7/5	7/11½	8/7	9/2	10/8	11/3
	4/2	*4/8½*	*5/1*	*5/8*	*6/11*	*7/6*
S. ditto .. .. each	7/9	8/4	9/1	9/7	11/5	12/–
	4/6	*5/1*	*5/7*	*6/1*	*7/8*	*8/3*

Brasswork (Best Quality)

	½″	¾″	1″
Brass screwdown stop cocks including two soldered joints .. .. each	7/10½	10/5½	14/5½
	5/4½	*7/11¼*	*11/10½*
Ditto, including two red lead joints for iron each	5/–	7/–	10/4
	3/6	*5/4*	*8/6*
Ditto, including one soldered and red lead joint .. .. each	6/8	7/10½	12/7½
	4/8	*5/9½*	*10/4¾*
High pressure Portsmouth pattern ball valve with flynut and union and one soldered joint each	9/6	12/3	21/5
	6/9	*9/6*	*18/6*
Ditto, including red lead joint for iron each	7/9	10/1½	18/3
	5/8	*7/10½*	*15/10*
Brass thimble and soldered and cement joints each	2″ 5/1		4″ 9/–
	2/11		*6/–*
Ditto, with solder and caulked lead joints each	5/8		10/1
	3/5		*6/4*

Fixing Only (Connections to Pipes measured separately)

24″ × 18″ × 6″ sinks including taps, etc., and pair of brackets cut and pinned to brickwork .. .. .. each	6/-
24″ × 18″ lavatory basins ditto .. .. .. each	6/6
W.C. suite comprising pan and trap, seat, W.W.P. and brackets.. .. .. each	10/6
Baths, including taps, etc., and setting in position .. each	10/6

Screwed and Socketed Galvanized Steam Quality Steel Tubes and Fittings

Pipes up to and including 1½″ include short running lengths, sockets, connectors, elbows, bends, fire bends; Tees and Diminishing Pieces enumerated.

Distributing.

	½″	¾″	1″	1¼″	1½″	2″
Pipes fixed to walls per foot run	–/10½	–/11½	1/3½	1/10½	2/4½	3/–
	–/5	*–/6*	*–/8*	*–/11*	*1/2¼*	*1/6¾*
Ditto in short lengths, fittings, etc., measured separately per foot run	–/10¾	–/11½	1/4	1/10½	2/5½	3/1½
	–/4¼	*–/5*	*–/6¾*	*–/9¼*	*1/0¼*	*1/3¼*

Extra for

		½″	¾″	1″	1¼″	1½″	2″
Firebends	each	–/4	–/6	–/9	1/3	1/6	2/–
Bends	each	1/2	1/5	1/9	2/6	3/1	4/9
		–/7½	*–/10*	*1/1½*	*1/10*	*2/3*	*3/7*
Round elbows ..	each	1/4½	1/7	1/9½	2/3½	2/9½	4/5
		–/10	*1/–*	*1/2*	*1/7½*	*1/11½*	*3/3*
Square ditto ..	each	1/3½	1/5½	1/8	2/2	2/7½	4/1½
		–/9	*–/10½*	*1/0½*	*1/6*	*1/9½*	*2/11½*
Tees	each	1/6	1/9½	2/–	2/6	3/0½	4/9
		–/10½	*1/1½*	*1/3½*	*1/9*	*2/1½*	*3/6*
Crosses	each	2/9	3/2	3/10	5/–	6/–	9/1
		1/11	*2/3*	*2/10*	*3/9½*	*4/6½*	*7/3*
Diminishing pieces	each	–/10	–/11	1/2	1/6	1/11	2/8
		–/4½	*–/5*	*–/6½*	*–/8½*	*–/11*	*1/4½*
Caps	each	–/7	–/8½	–/10	1/1½	1/5	2/1
		–/3½	*–/4½*	*–/5½*	*–/8½*	*–/10½*	*1/4½*
Plugs	each	–/6	–/7	–/8½	–/10	1/1	1/6½
		–/3	*–/3½*	*–/4½*	*–/5½*	*–/7*	*–/10½*

Cast Iron Waste, Soil and Vent Pipes

		2″	3″	4″	5″	6″
L.C.C. pipes in 6′ 0″ lengths fixed to brickwork ..	per foot run	1/9	2/0½	2/6½	4/5	5/4
		1/3	*1/5*	*1/10½*	*3/8*	*4/4*
Extra for bends	each	3/11	4/10	6/7	9/4	12/8
		2/3	*2/10*	*4/2*	*6/5*	*9/–*
Ditto single branches ..	each	5/9	6/7	7/9	8/7	10/7
		2/11	*3/2*	*3/7*	*3/6*	*4/3*
Ditto swannecks 6″ projection	each	4/5	6/5	8/5	12/5	16/11
		2/3	*3/10*	*5/4*	*8/9*	*12/3*
Extra for access door or any fitting	each	6/9	6/9	7/3	8/6	8/6

*** Items marked thus have fallen since October 26.**

CURRENT PRICES

BY DAVIS AND BELFIELD

INTERNAL PLUMBER, GLAZIER AND PAINTER

INTERNAL PLUMBER—(*continued*)

Zincworker

	13 G.	14 G.	15 G.	16 G.
Rolled sheet zinc on flats per foot super	-/8¾	-/9	-/10	-/10½
Ditto in gutters, cover flashings, etc. per foot super	-/9	-/9½	-/10½	-/11
Ditto in stepped flashings per foot super	-/11	-/11½	1/0½	1/1½
Labour and risk dressing over glass per foot run	-/4½	-/4½	-/4½	-/4½
Capped ends to rolls .. .. each	-/2½	-/2½	-/2½	-/2½
Extra labour to cesspools .. each	2/7½	2/7½	3/2	3/2

Copperworker

Distributing.

	½″	¾″	1″	1¼″	1½″	2″
• Solid drawn copper tube fixed to walls per foot run	-/9	-/11¼	1/4¾	1/9½	2/4½	3/1¾
	-/5¼	*-/7¼*	*-/11*	*1/1¼*	*1/3¾*	*1/11¾*
Add if in short lengths per foot run	-/0¾	-/0¾	-/1	-/1½	-/2	-/2½

Fittings for copper tubes

Compression type						
• Straight couplings each	1/11	2/3½	3/2	3/11½	5/4½	7/7¼
	1/4	*1/7½*	*2/5*	*3/1½*	*4/5½*	*6/7¼*
• Obtuse elbows .. each	2/10¼	3/4	4/8	5/9	9/4	13/4
	2/2¼	*2/7*	*3/10*	*4/10*	*8/4*	*12/3*
• Tees .. .. each	3/3	3/8½	5/7	7/9½	11/10½	16/6
	2/6	*2/10½*	*4/8*	*6/9½*	*10/9½*	*15/4*
• Crosses .. .. each	4/4	4/11	7/1	8/6	13/11	19/1
	3/6	*4/-*	*6/1*	*7/5*	*12/9*	*17/10*
• Reducing couplings each	—	2/3½	3/2	3/11½	5/4½	7/7
	—	*1/7½*	*2/5*	*3/1½*	*4/5½*	*6/7*
• Bends .. .. each	2/6½	3/1	4/3	5/3½	8/8½	12/8
	1/10½	*2/3*	*3/5*	*4/4½*	*7/8½*	*11/7*
• Brass stopcocks each	5/7½	8/-	11/1	19/8	26/9	44/2
	4/5½	*6/8*	*9/7*	*18/-*	*24/11*	*42/2*
Capillary type						
Straight couplings each	1/7	2/-	2/9½	3/5	4/4	5/9½
	-/9	*1/-*	*1/7½*	*2/1*	*2/10*	*4/1½*
45° Elbows .. each	2/6½	3/2¼	4/2	5/3½	7/4½	10/5½
	1/7½	*2/1¼*	*2/11*	*3/10½*	*5/9¾*	*8/8½*
Tees .. .. each	2/9¼	3/2	4/7½	6/4	8/6	12/-
	1/9¼	*2/-*	*3/3½*	*4/10*	*6/10*	*10/2*
Crosses .. .. each	3/4	3/9	5/6½	7/7	10/6½	14/9
	2/3	*2/6*	*4/1½*	*6/-*	*8/9½*	*12/10*
Reducing couplings each	—	1/7¾	2/0½	2/7½	3/5½	5/0½
	—	*-/7¾*	*-/10½*	*1/3½*	*1/11½*	*3/4½*
Bends .. .. each	2/10½	3/5	4/7½	6/-	8/10	11/11
	1/11¼	*2/4*	*3/4½*	*4/7*	*7/3*	*10/2*
Pillar tap connections each	2/0½	2/9¼				
	1/2½	*1/9¼*				

	24 G.	23 G.
Rolled sheet copper on flats .. per foot super	1/6	1/8
Ditto in gutters, cover flashings, etc. per foot super	1/7	1/9
Ditto in stepped flashings .. per foot super	2/1½	2/4½
Labour and risk dressing over glass .. per foot run	-/4½	-/4½
Capped ends to rolls .. .. each	-/3½	-/3½
Extra labour to cesspools .. .. .. each	3/8	3/8

GLAZIER

Sheet Glass (Ordinary Glazing Quality)

18 oz. clear sheet and glazing to wood, sprigged and with back and front putties, to all normal sizes not exceeding 60″ in length or 40″ wide .. .. per foot super	-/6½
24 oz. ditto .. .. per foot super	-/7¾
32 oz. ditto .. .. per foot super	-/11½
Obscured ground sheet glass, net extra to above prices per foot super	-/1¾
¼″ figured rolled white glass and glazing to wood with beads (measured separately) .. .. per foot super	-/10½
Ditto, normal tints, ditto .. .. per foot super	1/2¾
Hammered double rolled cathedral white ditto per foot super	-/10
Ditto, normal tints, ditto .. .. per foot super	1/1¾
Add for glazing into metal frames (ordinary rebates) per foot super	-/1¾
Ditto, metal sashes with ferroput .. per foot super	-/2¼
Ditto, solid metal casements and screw beads per foot super	-/2¼
Wash leather strip or similar material and bedding edge of glass .. .. per foot run	-/3¼

Glazing only, thick drawn sheet glass, polished plate or wire **polished** plate for all normal sizes. (For prices of glass *see* materials **section** and add profit, say 10 per cent.) per foot super -/6½

Under certain conditions the above prices are subject to 5 per cent. increase.

PAINTER

Whitening, Distempering and Painting (on new Plastered Walls)

Twice distempering white .. per yard super	-/4½	*-/1*
Ditto, in common colours .. per yard super	-/7	*-/3½*
Add for stippling .. .. per yard super	-/2	—
Preparing and painting two coats of undercoating and one coat of enamel .. per yard super	1/9	*-/8*

Preparing and Painting Two Coats of Oil Colour on Ironwork after fixing

General surfaces .. .. .. per yard super	1/-	*-/4*
Perforated landings and staircases both sides (one side measured) .. .. .. per yard super	2/6	*-/8*
Pipes, bars, balusters, etc., not exceeding 3″ girth per yard run		-/1½
Metal window frames .. .. .. per yard run		-/2¼
Eaves gutters .. .. per yard run		-/7½
2″ Rainwater pipes .. .. .. per yard run		-/3
4″ ditto .. .. per yard run		-/6
Squares one side .. .. per dozen		1/9
Large ditto .. .. per dozen		2/3
Extra large ditto .. .. per dozen		3/-
Edges of casements .. .. each		-/3

Painting on New Woodwork

		Knot, prime, stop and paint three coats oil colour		Add or deduct for each coat more or less	
General surfaces ..	per yard super	2/-	*-/8*	-/6	*-/2*
Fascias and soffites	per yard super	2/6	*-/8*	-/7½	*-/2*
Fillets, skirtings, etc., not exceeding 3″ girth	per yard run	-/3	—	-/0¾	—
Ditto, not exceeding 6″ ..	per yard run	-/5½	—	-/1¼	—
Ditto, not exceeding 9″ ..	per yard run	-/7	—	-/1¾	—
Ditto, not exceeding 12″..	per yard run	-/9	—	-/2	—
Squares one side	per dozen	3/6	—	-/9	—
Large ditto	per dozen	4/6	—	1/-	—
Extra large ditto ..	per dozen	6/-	—	1/4	—
Edges of casements	each	-/6	—	-/1½	—

Sundries

Twice creosoting woodwork ..	per yard super	-/6	*-/2*
Twice limewhiting brickwork ..	per yard super	-/4½	*-/0¼*

		Sizing	Staining	Once Varnish
General surfaces ..	per yard super	-/2	-/4½	-/6
		-/3	*-/1½*	*-/2¼*
Wax polishing	per foot super		-/4½	
Body in and French polish on hardwood surfaces	per foot super		1/-	

Writing

Plain letters or figures, two coats, 2″ to 12″ letters per dozen inches in height	1/10½
Ditto, shaded .. per dozen inches in height	2/6
Plain gold, 2″ to 12″ letters per dozen inches in height	2/6
Ditto, 12″ to 24″ .. per dozen inches in height	3/9

Gilding

	Single Gold	Double Gold
Preparing and gilding in best oil gold per foot super	5/3	8/4
Ditto in matt or burnished gold per foot super	7/4	11/6

Paperhanging

	On walls		On ceilings	
Preparing new plastered walls for papering per piece (60 feet super)	1/4	*-/5¼*	1/5½	*-/5¼*
Pasting and hanging only.				
Plain lining paper per piece (60 feet super)	1/4	*-/1½*	1/8	*-/1½*
Common printed papers per piece (60 feet super)	2/-	*-/1½*	2/6	*-/1½*

• Items marked thus have risen since October 26.

Continued from page 664

The "Portland Arms" Hotel, Mill Lane, Newcastle-upon-Tyne, Northumberland, for Calders, Ltd.: Tait and Holmes, Ltd., of Benwell Village, Newcastle-upon-Tyne. (Architect, E. M. Lawson.)

New office and works for Beck, Knoller & Co. (England), Ltd., in Edwards Lane, Liverpool: D. W. Hall and Son, Ltd., of 60 Christian Street, Liverpool.

GENERAL POSITION OF BUILDING INDUSTRY

"The disruptive effects on the building industries of the outbreak of war appear to be much more extensive and serious than formerly seemed likely or, indeed, than is necessary," states the current issue of the *Building Industries Survey*, published by the Building Industries National Council.

It is well known that a large volume of Government work is in progress and that the programme for the immediate future is likely to be even greater in view of the necessity of increasing available accommodation in advance of an expansion of productive effort and the consequent need for greater storage. As with the rearmament programme, so with war-time preparation, the building industry is the first to be affected.

It was probably with such considerations in mind that the Government on the outbreak of war made sweeping decisions which have quickly led to the virtual cessation of new civil building work.

The effect of these measures is clearly shown by the fact that the number of building operatives unemployed in October at 129,948 was more than one-third greater than in the previous month, in spite of the increase in the Government programme and the acceleration of existing works, the large volume of civil defence activity, and the depletion of the available labour force by the calling up of men for military service.

The restriction of civil building activity shown by these figures has led to the expression by all sides of the industry of grave concern at the harm being done to the industry and its associated interests.

It is essential in time of war for the Government to have first claim on the resources of all industries for the prosecution of hostilities, but it is equally essential to build up the national income to a maximum by permitting, and indeed encouraging, as much civil activity as possible in order to increase the yield of taxation, and thus provide what are literally the sinews of war.

The experience of the country during the general depression and the subsequent recovery amply demonstrated the importance of the stimulating effect of a well-employed building industry.

It is hardly too much to say that had all sections of the industry been brought into close consultation with the Government during the re-armament programme, or even at the outbreak of war, a disruption of the industry so grave as to threaten it with disintegration could have been avoided. Adequate organization of Government programmes and of materials supply, coupled with the balanced use of the industry's resources through the working out of alternative methods would, by enhancing efficiency, have left available a greater margin of resources for utilization in civil work. In building it is especially true that the output to be obtained from given industrial resources depends not only on their magnitude but also on their organization and co-ordination. An organized programme with a steady flow of work and a balanced employment of resources gives greater output than unco-ordinated or even competing programmes proceeding without regard to the balance of the industry.

The Council will make every effort to achieve on these wider considerations that fruitful and constructive consultation which it has already effectively established on the technical aspects of civil defence. The united efforts of the industry, comprising the professions and materials interests as well as contractors and operatives, can alone provide a satisfactory solution to the problems with which the industry is confronted.

A.A.S.T.A. DIARY

The Architects' and Surveyors' Pocket Diary for 1940 is now obtainable from the Secretary of the A.A.S.T.A., 57 New End, London, N.W.3 (price 2s. 6d.—post free 2s. 8d.). This is a most useful pocket compendium for architects, surveyors, engineers, clerks of works, builders and students. In addition to the diary portion it contains 63 pages of concise reference notes, architects' planning information, surveyors' tables, steel tables and memoranda of all trades, a legal section, lists of professional and trade organizations and of the district surveyors of London. The diary is only ⅜ in. thick, with reinforced covers of grained leather. The A.R.P. Supplement consists of eight pages of statistical information relating to bomb-resisting shelters, blast-proof protection, capacity and ventilation of shelters, entrances and exits, closets, sandbag walling, shoring, etc. The figures given are in accordance with the latest Government requirements and are applicable to all types of blast-proof shelters.

THE INSTITUTION OF STRUCTURAL ENGINEERS

There will be a meeting of the Yorkshire branch on Saturday, December 2, 1939, at 2.30 p.m., in the Hotel Metropole, Leeds, when a paper entitled "Coastal Erosion and Defence Works," will be read by G. McLean Gibson, O.B.E., M.I.STRUCT.E., ASSOC.M.INST.C.E.