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THE ARCHITECTS' JOURNAL

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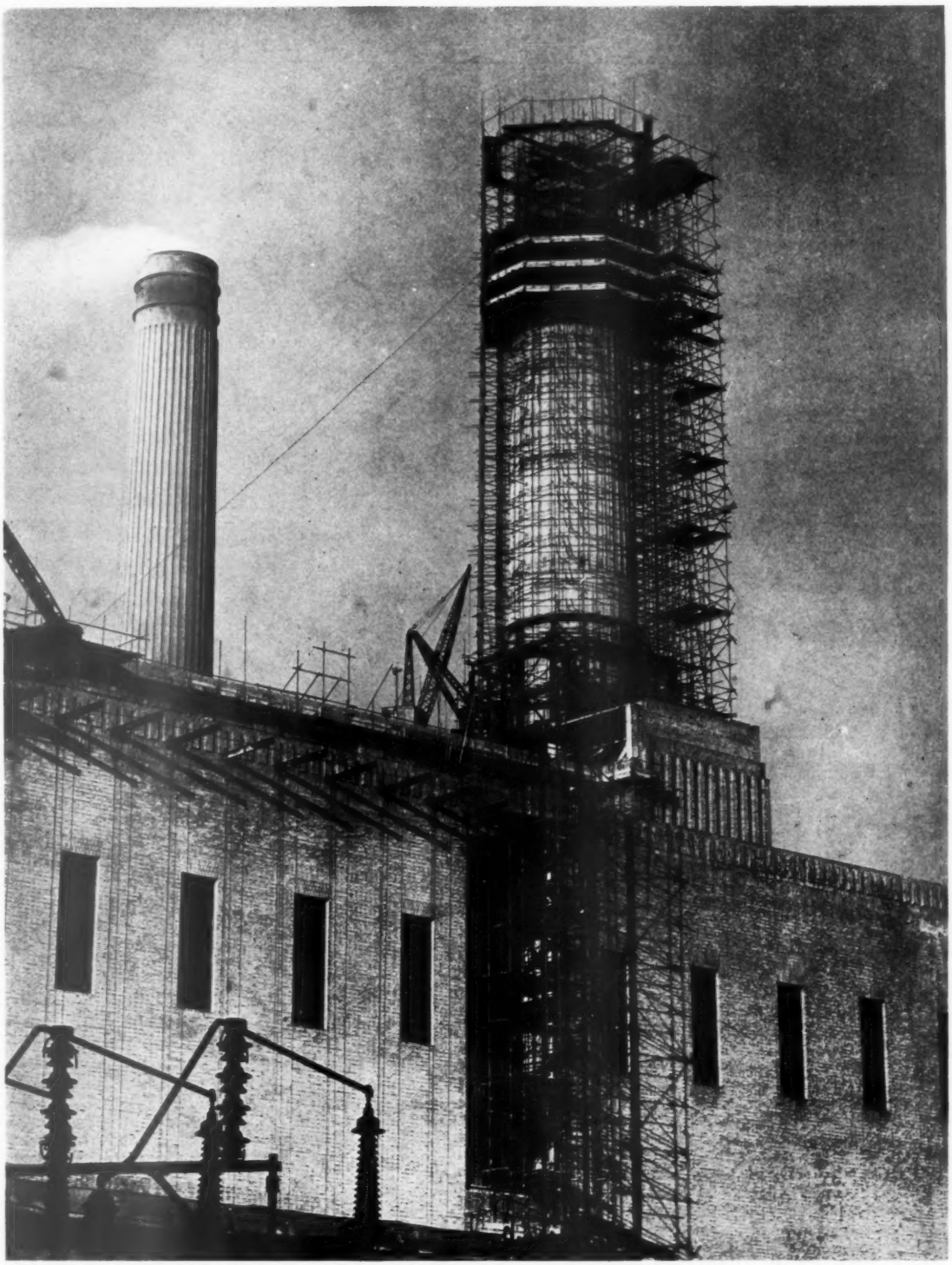
The Editor will be glad to receive MS. articles and also illustrations of current architecture in this country and abroad with a view to publication. Though every care will be taken, the Editor cannot hold himself responsible for material sent him.

THURSDAY, JANUARY 11, 1940. NUMBER 2347 : VOLUME 91

PRINCIPAL CONTENTS

BATTERSEA POWER STATION EXTENSION

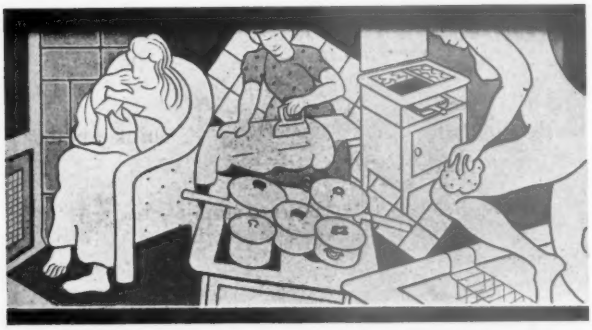


The scheme for the extension of Battersea Power Station is progressing steadily despite the difficulties caused by the outbreak of war. The two reinforced concrete chimneys are now being joined by a third, and eventually when the scheme is complete a fourth chimney will be erected.

The chimney now in course of construction is being built to cope with the additional boilers and generating plant which form part of the extension scheme. The internal diameter of the chimney is 28 ft. 2 in. at its base, and 22 ft. 1 in. at the top, whilst the length of the shaft is 171 ft. and the height to the top is 352 ft. 6 in. O.D.

The thickness of the shell at the base is 10 in., tapering to 9 in. at the bottom of the reeds or fluting. Upwards from this point the shell is 6 in. thick, with the reeds projecting 3 in., and at the top of the chimney above the concrete band the thickness of the shell is 4 in.

The work is being carried out under the direction of Sir Leonard Pearce, C.B.E. (Engineer-in-Chief).

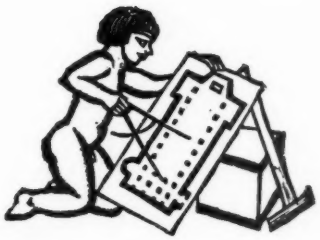


DECORATIVE HOARDING

Two views of the oil paintings by Miss Marjorie Morrison on the Building Centre hoarding, 158 New Bond Street. An exhibition of designs for the decoration of emergency shop-fronts and hoardings was opened by Sir Kenneth Clark, at the Centre on Monday last. He said: "This exhibition represents an exceedingly important idea. It is one of the boring bromides which one talks about modern art that the artist is quite out of touch with the public. Another equally boring bromide is that modern art provides practically no opportunity for large-scale mural decorations. It has hitherto been impossible to make a cocktail out of these two bromides that did not mix.

"The fact was that large-scale mural decorations in anything like the sense that was practised in the past were a thing that the ordinary man did not need. It was no doubt very desirable that he should learn to need it, and that is one of the functions of the Society of Mural Painters. Now the existing circumstances have played into our hands and given us the opportunity of realizing the necessity for large-scale decorations because nobody can fail to be depressed by these terrible hoardings which have sprung up on every street in London.

"Those hoardings are almost all that the artist wants as an incentive. We have direct contact with the public. We have a particular problem, a particular subject, which is very valuable. That is to say, we have the greengrocer, the scent shop, represented in symbol—and the artist is given an opportunity of using his ingenuity to make shutters open upon a certain display, and has starting points for ingenuous solutions: in fact, he has what all artists have been looking for for a long time."



MINISTRY OF BUILDING

IN a letter to *The Times*, published on December 29, the President of the R.I.B.A. asked for a Ministry of Building.

The JOURNAL believes that he could not have taken a wiser step. Circumstances fully justify it. But even more important when quick action is needed, the President's move will arrest attention, direct it to the facts and figures involved, and bring thinking people far more quickly to a realization of what the building industry now faces.

Since the outbreak of war it has been plain that the public, including many M.P.s and some Ministers, have thought of the building industry as only one among many industries which, regrettably, must almost be shut down in war. It needed the jolt of Mr. Stanley Hall's request and the facts set out in his and other letters to destroy such a conception. The building industry is not one of many industries : internally, it is *the* industry.

With jealous care to convince his readers before overwhelming them, Mr. Hall gave only three statistical illustrations. The building industry is responsible for the employment of nearly one quarter of the total insured industrial population ; the estimated £200,000,000 of work stopped by the Government ban on public works caused a total loss to the Exchequer of £10,000,000 ; and the annual cost of maintaining the 359,000 operatives now unemployed will be £18,000,000.

These illustrations show that the industry—wholly internal in labour and products, four-fifths internal in raw materials—cannot be turned off like a tap without a huge loss in revenue, a huge unemployment bill and chaos at the end of the war—if not before.

Perhaps wisely, Mr. Hall did not mention the possible consequences of severe bombing raids if the building industry is not kept ready to deal with them. He emphasized the magnitude of present distress, recalled that two Cabinet Ministers had said there was a shortage of key materials when in fact there is no shortage save in timber—and that because of wasteful use—and asked for a Ministry of Building.

To the President's arguments, Sir Alfred Hurst (President of the London Builders' Conference) added three more in a letter published on January 2, also in *The Times*.

In Sir Alfred's view, the building industry since 1919 has become more and more the main vehicle of economic expansion, in place of the export trade which held that position in the nineteenth century. The intense competition of the last decade has left the industry with no reserves to meet a prolonged depression. Government departments have retained uncoordinated their independence and their executive powers in building matters ; and have placed their war contracts with an extremely small group of firms " selected on no clear principles."

These and subsequent letters in *The Times* make clear the importance of obtaining public recognition of two facts about building.

First, the building industry has become so large and so much the vehicle of prosperity in other industries, that the maintenance of war-time revenue may be said without exaggeration to depend on an adequate level of employment in the building industry.

Second, the work which has become available for the industry since war broke out has not been distributed in a way which ensured the greatest nourishment for the industry. Far from it. The various departments placed their contracts independently, secretly and sometimes, one suspects, in competition. It was certainly the affair of no Department to think about the industry as a whole.

To stop this irresponsible allocation of what work there is, is the first necessity. And to stop it is the reason for Mr. Hall's Ministry of Building and for Sir Alfred Hurst's view that :

> The immediate need is for the centralization under one strong authority—Minister or Controller—of all Government dealings with the industry, making full use of the expert knowledge which every section of it is anxious to place at the disposal of the Government.

When this Controller knows what contracts have already been placed and what will need to be placed in the next year, when their order of urgency has been decided and their geographical position examined, it will be possible to use basic building materials in the proportions in which they are now produced. It will also be possible to decide accurately what additional works will be needed to preserve the best balance between an unwisely high level of employment (for war-time) on the one hand, and on the other a level so low that it reduces national revenue dangerously.

But until we get a Controller who can do these things, no one (not even the Government) can know what is happening or ought to happen in the industry which controls the employment or unemployment of more than two millions.

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

NOTES & TOPICS

MINISTER OF BUILDING

THE correspondence in *The Times* during the last fortnight on the subject of War and the Building Industry has included letters from the President of the R.I.B.A., the President of the London Master Builders' Association and the Chairman of the London Builders' Conference. All three asked for a Minister or Controller of Building.

*

The duties of this person would be (1) to watch and regulate the industry's level of employment on behalf of the Government and the economic strength of the country; and (2) to estimate, and arrange in order of urgency, place and type, the Government's war building programme on behalf of the industry.

*

The case for such an appointment could not be stronger. The building industry may have become, as Sir Alfred Hurst believes, too big. What matters today is that it *is* big, and has been for ten years the prime mover in the expansion of home-market industries: transport, services, multiple shops—all the way to chintz curtains, wireless sets and hedge clippers. It now controls the employment of one in four of all insured industrial workers.

*

No one can expect pre-war building volumes to be maintained. Everyone can expect, most rightly, a most well-informed and careful supervision of the industry by a Controller with full powers. We have the right to expect that building contracts for war purposes should be allocated to produce the greatest possible nourishment for the industry; and that before all "non-war" building is vetoed the national effect of consequent unemployment in the industry and dependent trades should be considered.

*

None of this is possible at present. No one is responsible. It is almost certain that no single Government department or adviser has even got a list of all war building contracts so far placed: it is quite certain that no Government department is responsible for how those contracts affect or will affect the building industry in general.

*

Until someone is given full powers as Controller, the present and future position of an elaborate organization of about two million people will remain—for all practical purposes—anybody's guess.

STILL SECRET WEAPON

A message from New York in one of our more sober dailies last week gave quite a long description of the incendiary egg—a specially small type of incendiary bomb which Herr Hitler is supposed to be going to use in myriads.

*

It has long been obvious that incendiary bombs, intelligently used, are potentially the most dangerous feature of air warfare. But I still don't believe in the incendiary egg.

*

I first heard of it last October as a most secret secret. (And one suspects the story is now passing us for the second time.) The bomb is supposed to weigh under half a pound, and therefore a bomber can carry about four times more than of the normal 1-kilo bomb.

*

My flesh refuses to creep: for what this bomb gains on the swings it seems to lose on the roundabouts. The destructiveness of an incendiary bomb must on the average be proportional to the time it burns. And to have any penetrative power at all, the new egg bombs will have to be very small, and their burning period, in consequence, almost too short to ignite anything besides petrol.

THE LATE PRINCESS LOUISE

Few people who visit the fifteenth-century Wool Hall at Lavenham are aware of the fact that some twenty-five years ago the building was demolished and completely removed in sections for re-erection.

*

The romantic story of its abduction and subsequent rescue (by the late Rev. Henry Taylor) was told last week in the correspondence columns of *The Times*. Mr. Taylor, evidently a man of great resource and initiative, hired a posse of fast cyclists to follow the lorries which were carrying away the numbered timbers to an unknown destination. The trail led to Ascot, to a cottage being reconstructed for the use of Princess Louise. Her Royal Highness was immediately approached by the S.P.A.B., and she at once abandoned the project, and generously arranged for the complete restoration of the building on its original site.

WAR-TIME SHOP FRONTS

Last Monday, Sir Kenneth Clark opened, at the Building Centre, a joint exhibition by the National Register of Art Designers and the Society of Mural Painters. The aim of the exhibition is to encourage the idea of decorative treatment of the A.R.P. protections which most shops have erected.

*

There are designs for varying degrees of protection and

illustrations of schemes already completed. The idea is excellent, and everyone who knows a shopowner should take him to the Building Centre before January 27.

*

I reproduce a hoarding design for a "fully-protected" tailor's shop, by Kenneth Rowntree.

ADAM IN OXFORD STREET

So far, the only notable war-time innovation in Oxford Street is the exhibition of Epstein's Adam, in company with some of his early busts, in an amusement arcade opposite the Marble Arch Pavilion.

*

The custodian, in shirt sleeves, had been sweeping orange peelings and the torn halves of admission tickets from the floor. Then, using the broomstick as a pointer, he re-created for his fish-eyed audience the bulges of taut muscles, demonstrating, in a curious cockneyed Chelsea jargon, the "marvellous portrayal of strength."

*

"Wot I say, you've got to be broad-minded-like" (working slowly around from the rear) "before you can appreciate this 'ere work of hart. Now take these 'ere stomach muscles. . . ."

SNOW WHITE AND THE ENGLISH HOME

Snow in many residential suburbs has palliated the crimes of the speculative builder. Under this white disguise rough-cast Tudored elevations are softened, their texture is improved, and their powers of offence shrink.

*

Which brings me back to an idea one or two people have advocated for the general improvement of the English scene: whitewash the lot! Splash on distemper, and, with this bold healing ointment, cure the outbreak on the face of England.

*

Incidentally, an engineer of eminence suggested to me recently that if every building in every town and village and industrial area in the country was painted a careful shade of pale green, England would be virtually invisible from the air. When I capped this idea by saying that water-colour manufacture should become an industry of national importance, so that all rivers and streams could be coloured at their source, to make it still more difficult for enemy airmen, he became huffily quiet; his suggestion was serious.

THIS WEEK'S PROBLEM

Who introduced the term "Double Elephant"; and when?

*

Last week, after the usual remark of a layman that the phrase was odd, a committee of three architects declared themselves baffled.

*

It is easy to see that any mid-Victorian manufacturer of drawing instruments might have described two sizes of his particular boards as his "Imperial" and "Antiquarian" models; and, by possessing the continued patronage of all the best architects, have introduced the words into common usage—first as indicating a brand, then a size.

*

But my committee declined to believe that any manufacturer would have had the robust imagination and remarkable strength of mind to commend to his public Castor and Pollux's Highly Finished, *Double Elephant* Model, Draughting Board.

*

I agree, and await with complacency an expert explanation.

ASTRAGAL

The Information Centre owed its inception to the difficulties that arose when architects were faced with the problems of A.R.P. and other emergency work that followed the outbreak of war. The specialized questioning goes on, but it is clear that an information centre is needed for general building problems too. This Centre exists primarily to simplify the task of the architect in these days when emergency legislation and defence measures have become his immediate concern, but it does not confine itself to this work alone. The Centre will provide an expert opinion on any question connected with building.

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?

Q138 SPEEDWELL.—*To what department of the Admiralty should one write in connection with INVENTIONS?*

To the Director, Department of Scientific Research, the Admiralty, Whitehall, S.W.1.

Q139 MANCHESTER.—*In a commercial building for which a shelter is being provided, a large yard at the rear without any buildings thereon is let to a car park company. Would the latter company be considered "a tenant of the building" under the Act, and therefore liable to an increase in rent according to the COST OF THE SHELTER. I should imagine not, but would be glad to have your views. One attendant only is employed in the car park.*

The Act relates to "Buildings" and a commercial building is defined as "a building in which more than 50 persons work." Consequently, if there are two contiguous buildings and in one there are 60 people working and in the other 20 people, shelter need be provided only for the building in which 60 people work. A car park attendant does not work in a building, so shelter need not be provided and thus the tenant is not liable to an increase in rent. This question gives rise to another problem and indicates a case in which misfortune may be the result of strict adherence to the Act. If the car park were to form part of the building, if for instance it were in the basement, the tenant in possession of the car park is then to be charged with a part of the total expenses, in proportion to the annual value of the car park. This proportion might be very high even if only a few people are employed to work there. For instance, in a building consisting of a car park and two upper floors, there may be three people working in the car park and 120 in the upper floors. The car park, however, may represent 40 per cent. of the total annual value of the building and thus the occupier would have to pay 40 per cent. of the cost of the shelter, in equal instalments, spread over a period of ten years, although less than 3 per cent. of the shelter would be required for employees of the car park.

Q140 N.W.11.—(1) *How is a basement shelter protected from BURSTING WATER MAINS?* (2) *How is a LEAKING SHELTER waterproofed?* (3) *How are GRANTS to be paid?*

(1) Under the existing procedure adopted for the conversion of basements for use as air raid shelters structural precautions are not taken to give protection against the effects of bursting water mains. Official consideration has been given to the question of bursting water mains in

the Home Office publication "Provision of Air Raid Shelters in Basements." Under the heading "Hazardous Features to be Avoided" the matter is considered from this point of view: That if a basement is situated so near to large water mains or sewers that a breach in them would allow a discharge direct into the basement premises, the basement should not be selected for use as an air raid shelter. Otherwise the danger from rapid flooding will only be from the flooding of the street, which is unlikely to be very deep. In the latter case it is suggested that it is desirable to ensure that there are well-constructed walls to areas at least 12 ins. above pavement level, and that any openings to the basement can be closed up to the probable height of a flood in the street. To provide against flooding where water from a fractured water main could find direct access to basement premises, would, of course, be a costly procedure. The main points to be considered would be tanking of the shelter up to a height of 12 ins. or more above pavement level, in such a way that the water pressure would not affect the waterproofing. Provision of water-tight doors sufficiently strong to resist water pressure (the average gas and splinter proof door would, no doubt, be suitable), and the provision of an emergency exit, access through which would not be affected by flooding.

(2) With regard to a leaking basement care should be taken to ascertain that the presence of water on the walls is actually due to water infiltration and not to condensation. Often a close observation of the surface on which the damp is appearing will show which is actually the cause of the trouble. Condensation forms on a surface first as minute globules of water which build up to form a continuous film, while water which is filtering through the wall shows itself in larger, spaced globules which eventually drip off the wall surface. More severe cases of infiltration of subsoil water are, of course, readily apparent. Dampness in building is a complex subject and each case must be treated on its merits. With a basement it should be remembered that the infiltration of subsoil water can take place not only through the walls but also through the floor. The required waterproofing treatment to be applied to these surfaces must depend upon the severity of the infiltration at the worst instance. The waterproof membrane must be such that it will not be affected by the accumulative effects of the water infiltration. It is well known, for instance, that with ground floor concrete a mild water infiltration may not be readily apparent until it is sealed with a sheet flooring when, the evaporation area being destroyed, the water builds up beneath, exerting a pressure sufficient to lift the flooring. There are, of course, innumerable methods of waterproofing walls short of the actual tanking in the form of a flexible waterproof membrane held securely in position by means of an inner wall. One that is often satisfactory consists in nailing sheets of dovetail section bituminous sheet lathing to the walls and floors and then rendering with a dense mortar. Hot bitumen or bitumen emulsion applied to the surface and then rendering is an alternative. The success of any treatment short of proper tanking must depend upon the severity of the water infiltration. With condensation, treatment is essentially a matter of ventilation, which is, of course, generally difficult in basements. Condensation can, however, often be alleviated by applying an absorbent membrane with some heat insulating qualities to the wall surface and introducing some heating. The most simple method commonly adopted is to coat the walls with cork dust paint, which is available in a proprietary form.*

(3) Reference should be made to the Civil Defence Bill, Part 2, Section 21, which deals with Exchequer grants in respect of provision of air raid shelters in factory premises, mines, commercial buildings, etc., and Section 18 which deals with special provisions as to commercial buildings when the owner does not occupy the whole building. If the building comes under the heading of a dwelling house loans are available from the local authority (*see* Section 28 of the above Bill). Full details of the basement shelter in question would be necessary in order to deal with this last question in detail.

Q141 CARDIFF.—*In the current week's issue of an architectural publication I saw mention of a special corps in the Royal Engineers for ARCHITECTURAL DRAUGHTSMEN. I am at present a sapper in the Royal Engineers, and as I am on a transfer list I wish to make application, as a second-year student at the Welsh School of Architecture, for a commission. I have had nine months' experience in the army in an officer-producing unit. I wish for further information on the subject and the address of the headquarters of this company.*

The special corps to which you refer is part of the Royal Engineers and your company office will have full particulars of it. Appointment as an architectural draughtsman does not carry commissioned rank. The qualifications required and rates of pay are set out in circulars No. D.2401/9 and D.2396/9, which can be obtained from the R.I.B.A., 66 Portland Place, W.1, if your company office have no copies.

Q142 W.C.1.—*Can you recommend any good CORRESPONDENCE SCHOOL for R.I.B.A. examination?*

C. W. Box, Esq., F.R.I.B.A., 115 Gower Street, W.C.1, or L. S. Stanley, Esq., F.R.I.B.A., St. Catherine's College, Cambridge.

Q143 NEWCASTLE.—*Can you tell me whether FIRE LOOKOUT POSTS, CONTROL ROOMS, FIRST AID ROOMS, etc., are only necessary upon receipt of legislative instructions? Can I also presume that the training of fire parties and first-aid parties is also only required when under similar conditions, or is it always required?*

Section 23 of the Civil Defence Act refers to the training of employees and applies to every commercial building, mine or factory where more than 30 persons are employed. The amount of training which the employer is supposed to give to the employees is not exactly specified, but is defined as follows: "To secure that all persons employed by him in the premises in or about the mine or in the building are trained as respects the routine to be followed in the event of an air raid and that a suitable proportion of these persons are trained and equipped to give first-aid treatment, to deal with the effects of gas and to fight fires." The procedure, in accordance with the Act, is as follows: Within a month of the coming into force of the Act, i.e. by August 13, 1939, every occupier of a factory as well as every owner of a commercial building and mine had to make a report setting out what measures he had taken, or was going to take, to comply with this section. The Factory Inspector (or in other cases the Mines Inspector or the Local Authority) is entitled to serve a notice on the employer in which he can ask for any measures he deems necessary independent of what measures have been described in the original report. The requirements of the Factory Inspector are to be complied with unless a special appeal

* Obtainable from Messrs. Thomas Parsons and Sons, Ltd., 315 Oxford Street, W.1. Mayfair 0742.

is made to the Minister within 14 days, in which case the final decision lies with the Minister. If an employer does not comply with the decision of the Factory Inspector or the Minister, he is liable to a fine of up to £100, and in the case of continued non-compliance, to a further fine of up to £50 per day. This answers the last paragraph of the letter. As far as fire lookout posts, control rooms, first-aid rooms, etc., are concerned, which can hardly be termed "equipment" in accordance with the letter of the law, their installation need not be started except upon receipt of legislative instructions, although from a purely logical point of view first-aid equipment is not much use without a first-aid room.

Q144 MUSEUM.—*What is the NEW ADDRESS of Messrs. Hessolite, Ltd.?*

82 Victoria Street, S.W.1. Victoria 8973.

CURRENT PROBLEMS: *9th Article*

TEMPORARY & SEMI-PERMANENT BUILDINGS

BY EUGENIO FALUDI AND GODFREY SAMUEL

2: ALL DRY CONSTRUCTION

PART I.

IN the first article of this series we discussed the different kinds of demand for temporary and semi-permanent building at the present time, and the factors determining our choice of means to satisfy them. We shall now consider the various techniques in greater detail, always bearing in mind speed of erection and economy of method—the two most important factors in time of war.

These light structural techniques may be divided into two main classes:—

1. *Dry Construction*, with timber, steel or various sheet materials, in which the parts are fixed together on the site with nails, bolts or screws.

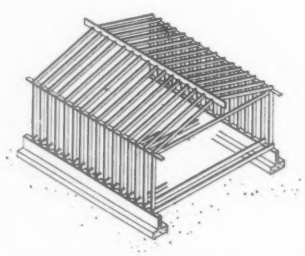
2. *Wet Construction*, with block materials, in which the use of mortar is required for joining the parts on the site.

For temporary buildings the former is preferable. Where disassembly and re-use are called for, it is essential.

For semi-permanent buildings the latter may be preferred, especially at the present time, when many of the materials required for dry construction are available only in such limited quantities, and there is a superabundance of cement (on account of the reduction in road and other public works programmes).

The various types of dry construction may be classed according to the structural principles used:—

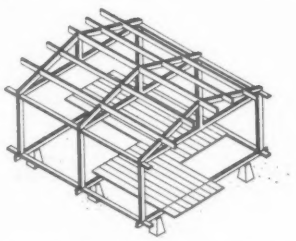
(i) Continuous support to roof, e.g. rafters and studs (Fig. 1).



1

Frame with continuous support. Foundations: Sleeper walls.

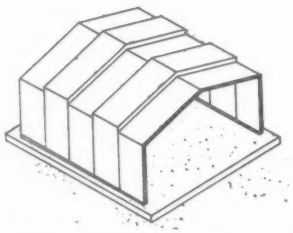
(ii) Point supports to roof, e.g. purlins, trusses, and posts, with panel infilling (Fig. 2).



2

Frame with point supports. Foundations: Concrete piers.

(iii) Panel supports to roof, e.g. portable sectional types (Fig. 3).



3

Supporting panels. Foundations: Surface concrete.

(i) The first requires so much site work that it is only economical with timber and in very small and temporary individual buildings or in very large and more or less permanent ones. Where a two-storey timber building is required, it is almost essential. In such cases, various methods of framing can be used:—

(*a*) In this country the usual form is the braced frame, with all except corner studs cut to the storey, and a common plate for joists and studs.

(*b*) In America it is usual to run the studs through both storeys (balloon frame), or

(*c*) To build the upper storey off the first floor (platform construction).

The first allows greater standardization, the second less material, and the third easier erection; but as we are here concerned with one-storey buildings, the details are outside the scope of this article, except in so far as they are shared with other systems.

(ii) We shall therefore pass on to the second main type, that with point supports. We shall consider the various elements of the structure in the order in which they are designed, the architect's order, rather than that in which they are erected, the builder's order.

A. THE FRAME:
   (1) Beams and Trusses.
   (2) Columns.
B. THE ROOF AND CEILING.
C. THE WALLS.
D. THE PARTITION.
E. THE FLOOR.
F. THE FOUNDATIONS.

TABLE I.—COMMON BUILDING SOFTWOODS

Trade Name	Bot. Name	Source	Weight lb. per cub. ft. 12% moist	Working Stresses (av. qual.) lbs. per sq. in.			Shear with grain	Shrinkage % tan 12% moist	Order of Preference				
				Bending	Compression across grain	Compression with grain (L/D=25)			Resistance to Decay	Ease of Working	Nailing	Gluing	Painting
1. Northern Pine Yellow Deal..	Pinus Sylvestris	Baltic .. C. Europe	36	1,170	280	600	70	3.9	3	2	2	2	3
2. Norway Pine Can. Red Pine	Pinus Resinosa	U.S.A...	34	990	300	513	76	3.6	3	2	2	2	4
3. Northern White Pine	Pinus Strobus	U.S.A. Canada	28	810	250	436	76	3.0	3	1	1	1	2
4. Pitch Pine (Longleaf)	Pinus Palustris	U.S.A...	41	1,400	360	685	106	3.8	2	3	3	2	4
5. Spruce ..	Picea ..	Europe U.S.A...	28	970	250	513	73	3.8	4	2	1	1	3
6. Fir (True Firs)	Abies ..	Europe U.S.A...	27	990	300	465	63	3.6	5	2	1	1	3
7. Larch ..	Larix ..	Baltic .. C.Europe U.S.A...	36	1,080	325	570	90	4.0	3	3	4	2	4
8. Douglas Fir.. B.C. Pine ..	Pseudotsuga Taxifolia ..	U.S.A. .. Canada ..	34	1,500	350	702	98	3.9	2	3	3	2	4
9. Western Hemlock	Tsuga .. Heterophylla	U.S.A... Canada	29	1,170	300	595	67	4.0	4	2	2	1	3
10. Western Red Cedar	Thuja Plicata	U.S.A... Canada	23	810	200	436	72	2.5	1	1	2	1	1

A. THE FRAME

Materials

The best frame combines maximum strength with minimum weight or size. Materials available are :—

(*a*) Concrete.
(*b*) Steel.
(*c*) Timber.

(*a*) Prefabricated concrete frames have usually been considered too heavy for the kind of structures we are concerned with, but the fact that steel is now required first and foremost for armaments, and that timber imports are likely to be curtailed, calls for a greater use to be made of concrete. It is more suitable, however, in conjunction with block walls, and will therefore be discussed under Wet Construction.

(*b*) Steel frames will also be more conveniently considered under Wet Construction, although they are very suitable also for dry construction with sheet materials.

(*c*) The advantages of timber are :—

(i) its being a natural product, whose methods of working are therefore well established ;

(ii) its fibrous structure, and consequent easy working by machine or hand, and easy joining by nails, screws or bolts, or glue.

(iii) its lightness (in proportion to strength) and consequent easy transport and assembly.

We are not here concerned with hardwoods. Although stronger than softwoods, their slow growth and their weight make them too expensive for light construction.

In considering the use of timber, the most important question is that of economy of material. This calls for a closer study of strength and quality than has generally been given. The grading of qualities is at present in urgent need of standardization. Each exporting country generally has a different system, and in some cases where new sources have been tapped the old grading is not always a reliable guide. It may be useful at this point, however, to sum up briefly the principal softwood timbers available and their qualities (Table I).

It is clear from this Table that some timbers are more suitable for structural frames when strength is required, e.g. Northern Pine, British Columbia Pine ; others for internal work, where easy working is more important, e.g. True Firs and Spruces ; others again for external covering, where light weight and good weather resistance are important, e.g. Western Red Cedar.

Fire Protection

One disadvantage of the extensive use of timber is its inflammability. In large structures, fire checks can be inserted in air spaces, but for temporary buildings this is seldom justified.

Timber can be made more fire-resistant by two methods :

(*a*) Impregnation of fibres. Various proprietary materials are available, generally containing phosphate of ammonia.

(*b*) Coating of surface. Ordinary whitewash has some value. Effective alternatives are sodium silicate and certain casein products.

Dimensions

The frame consists essentially of a series of beams or trusses supporting the roof and carried on posts to the foundations, lateral stiffening being incorporated in roof, wall and floor panels.

The basic dimensions of the frame, span, height and bay, are determined by :

(*a*) Internal arrangements required by the use of the building.
(*b*) Standard sizes of roof coverings.
(*c*) Standard sizes of wall coverings.
(*d*) Ease of handling in transport and erection.

Broadly speaking, it will generally be found that internal arrangements are the most important factors in determining span and height, and sizes of materials in determining bays.

Standard army hut dimensions for different purposes are :

Purpose	Span	Height	Bay
Living accommodation ..	19′ 0″ or 24′ 4″	8′ 6″	12′ 0″
Dining room, hospitals, etc. ..	24′ 4″ or 28′ 6″	10′ 6″	12′ 0″
Sanitary blocks, etc.	19′ 0″ or 24′ 4″	9′ 6″	12′ 0″
Garages, etc. ..	24′ 4″ or 28′ 6″	12′ 9″	12′ 0″
Garages, etc. ..	36′ 6″	14′ 0″	12′ 0″
Portable buildings	12′ 0″ or 16′ 0″	7′ 6″	5′ 0″

In prefabricated systems it is an advantage to have a modular relation between span and bay, to provide greater interchangeability between the different types of wall unit.

Beams and Trusses

For narrow spans up to about 12 ft. beams are economical, and they have an advantage in not requiring a rigidly square or oblong plan.

For wider spans trusses use less material, fundamentally because they are shallower towards the ends, where the load is less. This form also provides a natural fall for the roof coverings.

Segmental trusses have an advantage for such materials as asbestos cement or felt by allowing continuity of covering in the width of the building, by avoiding the necessity of a ridge covering, and by reducing stress in the principal rafter.

Beams

Types of beams are :

(i) Solid, preferable where there is an ample supply of timber. (Fig. 4.)

(ii) Laminated, often more economical through the use of smaller sections, the strength varying from 70–80% of that of the equivalent solid section. (Fig. 5.)

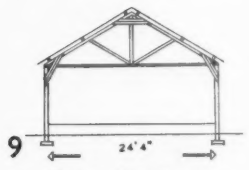
(iii) Box beams and I-sections, giving little appreciable increase in strength for the equivalent amount of material in solid or laminated beams, but perhaps sometimes valuable against buckling on account of the greater width. (Figs. 6 and 7.)

(iv) Lattice, seldom economical in timber except as principal roof members. (Fig. 8.)

Trusses

Types of trusses are :

(i) Solid triangulated members, economical for normal spans where there is an ample supply of timber, provided they are not mortised, but only spiked or bolted with the joints strengthened by cross boards or plywood gussets. (Fig. 9.)



9 *Triangulated truss.*

(ii) Laminated triangulated members, more economical for wider spans, especially in the present circumstances, with similar alternative strengthening to the corners.

(iii) Laminated arches, economical for very large spans. They may consist of vertical members bolted, or horizontal, bent and glued. The latter system is obviously more economical in material and has an efficiency compared with the former, ranging according to the radius from 75 per cent. to 90 per cent. (where the radius is 150 times the thickness of the member).

(iv) Lattice, or Belfast truss, economical, where supplies of small timber are ample, for fairly large spans, provided appearance does not demand exceptional workmanship.

In many cases lateral joints can be strengthened considerably further by the use of modern connectors let into each of the members to increase the bearing surface of bolt-heads. Increases in strength for a selection of types are approximately :

1. Wood dowel : $3\frac{3}{4}$ times that of an ordinary $\frac{3}{4}$-in. bolt. (Fig. 10.)

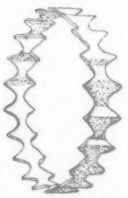
10 *Wood dowel connector.*

11 *Bulldog connector.*

2. Bulldog : $5\frac{1}{2}$ times that of an ordinary $\frac{3}{4}$-in. bolt. (Fig. 11.)

3. Alligator : 7 times that of an ordinary $\frac{3}{4}$-in. bolt. (Fig. 12.)

4. Split ring : 12 times that of an ordinary $\frac{3}{4}$-in. bolt. (Fig. 13.)



12 *Alligator connector.*

13 *Split ring connector*

Columns

Types of columns are :

(*a*) Solid, preferable where there is an ample supply of timber.

(*b*) Composite, often more economical, especially for very low or very high slenderness ratios. (Strength compared with the equivalent solid section is approximately 82 per cent. for a ratio of 6 or 26, but only 65 per cent. for a ratio of 18. U.S. Forest Products Laboratory.) (Fig. 14.)

(*c*) Trussed, useful for very light or

14 *Composite column.*

lofty structures such as covered ways or Dutch barns.

In no case should the slenderness ratio, or proportion of unsupported height to least width, exceed 30.

It is seldom economical to erect the columns independently with temporary strutting. They should be either :

(i) Assembled with the truss in a horizontal plane and raised together to the vertical ; or

(ii) Assembled with the wall panels and raised in the same way.

The former is better for larger and more permanent buildings, the latter for smaller ones with prefabricated panels.

Where any part of the frame is to be exposed to the weather, it must be treated with preservative. This applies to all parts if they are likely to be stored for some time before or between use. Preservatives are further discussed below.

B. The Roof and Ceiling

1. *The Roof Covering*

Determining factors in the choice of roofing materials are :

Weight.

Weather resistance, especially in relation to pitch.

Ease of transport and erection.

Ease of maintenance.

Alternative materials (with minimum pitches) are :

(a) *Slate or tile*, virtually excluded on account of weight and erection costs—Pitch 30–60°.

(b) *Metal*, either (i) as thin covering to boards—Pitch $\frac{1}{2}$° ; or (ii) as corrugated sheets—Pitch $22\frac{1}{2}$°.

The former is in practice excluded by cost and by war conditions.

If used, alternatives for temporary structures are :

1. 24 S.W.G. copper (1 lb. per sq. ft.).

2. 4 lb. lead (3 lb. for flashings) 15 ft.–40 ft. by 2 ft. 6 in. sheets.

3. 14-gauge zinc (11 gauge for flashings) 8 ft. by 2 ft. 6 in. (1.13 lb. per sq. ft.).

The latter also is not so readily available in war-time, but for semi-permanent work 24-gauge corrugated steel sheeting can be used. An easy width for handling is 2 ft.

(c) *Asbestos cement*, either (i) as slates, rectangular or diamond—Pitch $22\frac{1}{2}$° ; or (ii) as corrugated sheets—Pitch $22\frac{1}{2}$°. The former is liable to breakage, and erection costs are little less than ordinary slates or tiles.

The latter has advantages in maintenance and ease of transport and erection, and can be used with segmental roofs. There may be some disadvantages in the weight. Standard sizes are 2 ft. 6 in., 3 ft. 6 in., and 4 ft. by 4 ft.–10 ft. depending on

corrugation, weight 3·0–3·5 lb. per sq. ft.

(d) *Timber* in the form of shingles, the best being Western Red Cedar—Pitch 30–60°.

The advantage is the comparatively light weight and easy maintenance, the disadvantage in erection costs and in the steeper pitch required, involving more material for the trusses.

(e) *Felt*, two-ply or three-ply bituminous, probably the most satisfactory except for more or less permanent work —Pitch ½–5°.

Two-ply should only be used on very temporary structures. Advantages are light weight, possibility of prefabrication, and use on curved surfaces. It is generally laid on wood boarding, and is therefore better with purlins than rafters, as the board joints are then parallel with the fall. It should be stuck down and not nailed. Battens are sometimes used as a precaution against buckling in the sun; but they are liable to form water pockets and should not be required with proper fixing.

It can also be laid on plywood panels. This system has been subjected to an interesting series of experiments by the United States Forest Products Laboratory. Its merits will be considered in conjunction with wall panels in Part II.

(2) *Purlins*

Alternative materials are steel and wood.

The former is useful where minimum obstruction of roof lighting is required, and where steel frames are used. It will be considered in connection with steel frames.

Timber purlins are more flexible in use. In long buildings they can be jointed in various ways:

(*a*) Butted over the trusses with cleats, preferable for quick erection with prefabricated trusses in temporary buildings.

(*b*) Halved over the trusses, generally the most economical. Cleats are necessary with the heavier or steeper types of roof-covering.

(*c*) Halved not over the trusses, with plates and cleats as with (*b*). Purlins are laid in long and short lengths, the longer cantilevered over alternate bays, the shorter bridging between. By the greater degree of continuity reductions of from 17.5 per cent. in the section (where the cantilever is a fifth of the bay) to 29 per cent. (where it is a seventh) are possible in a typical case. An economy is possible if the purlin can be reduced to the next standard size.

(3) *Ceilings*

Roofs can be unlined in buildings not designed for human habitation, where heat losses are unimportant. If lined, alternative arrangements are possible:

(i) Lining at purlin level: Advantages are greater air space and economy in structural framing; disadvantages, the necessity for wrought roof timbers and difficulty with internal partitions.

(ii) Lining at tie level: Advantages are better insulation, the hiding of roof timbers, and easier handling of internal partitions; disadvantages, less air space and more framing.

Determining factors in the choice of materials are:

1. Weight.
2. Insulating value.

Alternative materials are as for wall linings, discussed in Part II, with the addition of such textiles as cotton, useful where appearance and light weight are of primary importance, and no insulation is required. Generally, soft boards will be found most satisfactory.

(*The third article in this series:* ALL-DRY CONSTRUCTION.—Part 2, *will appear on January 25.*)

Building Front

1. The Minister of Supply has made the CONTROL OF TIMBER (No. 7) ORDER, 1939, which, as from January 1, 1940:—

(*a*) Amends the provisions of the Control of Timber (No. 4) Order, 1939, by giving power to the Minister to issue special or general directions in regard to the purchase of timber or boxboards situate outside the United Kingdom; and

(*b*) brings in a new licensing system to control the use by consumers of stocks of timber owned by them.

Under the new consumers' licensing system, no person having any stocks of timber acquired at any time by him otherwise than under the provisions of the Control of Timber Orders (e.g. by "acquisition" licences granted under the No. 5 Order) may consume such stocks except under the authority of a "consumer's" licence or in accordance with a special or general direction issued by the Minister.

There are certain exceptions to this licensing system. Holders of stock may consume up to 50 standards of softwood, 2,000 cubic ft. of hardwood and 20 cubic metres of plywood without licence.

Government Departments and certain undertakings may consume stocks without licence under specified conditions until further notice. Details of these exceptions are given in the Control of Timber (No. 7) Order, 1939, Direction No. 1.

Subject always to the control of the Headquarters Department of the Timber Control, the "consumer's" licensing system introduced by the No. 7 Order will be operated by the Timber Control Area Officers. Copies of forms of application for licences should, therefore, be obtained from and returned when completed to the appropriate officers at the addresses shown below.†

Copies of the Control of Timber (No. 7) Order and of the Direction issued under the Order may be obtained directly, or through any bookseller, from H.M. Stationery Office at the published sale prices.

LANGLEY LONDON LTD.—This firm are opening two new departments. One department will handle asbestos cement products, i.e. corrugated sheets and all fittings, flat sheets and slates and fittings. The other new department will specialize in Langley's reinforced building paper. This material has several uses, including the insulation of buildings—temporary or permanent—by lining roofs, walls, floors and ceilings to prevent penetration by damp, draughts and dirt; the curing and protection of concrete; and A.R.P. purposes —light obscuration, the temporary covering of sandbags, etc.

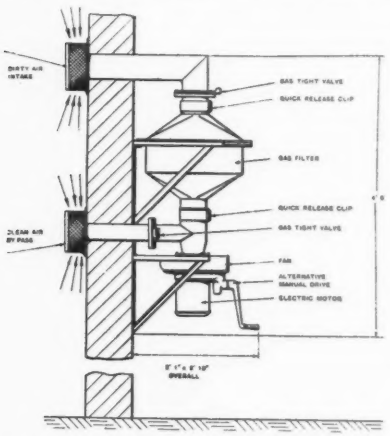
MELLOR BROMLEY & CO.—Specializing in gas filtration and ventilation equipment. Booklet A.R.P./3 recently issued by firm entitled *Ventilation and its Application in Civil Defence*, in which the firm's products are fully illustrated and described, features the Mellor-Bromley gas filtration units. Extracts from the brochure are given below:

Where numbers of people are concentrated together,

† TIMBER CONTROL AREAS

No.	Covering	Headquarters' Address
1	Northumberland, Durham, North Riding of Yorkshire	2 Devonshire Terrace, Jesmond, Newcastle-on-Tyne, 2.
2	Yorkshire (West Riding and East Riding)	Craven Street Senior School, Holderness Road, Hull.
3	Lincolnshire, Nottinghamshire, Derbyshire (less portion in No. 9 Area), Leicestershire, Rutlandshire, Northamptonshire.	3rd Floor, Vernon House, 24 Friar Lane, Nottingham.
4	Norfolk, Suffolk, Cambridgeshire, Huntingdonshire, Bedfordshire	35 Goodwins Road, King's Lynn.
5	London, Essex, Hertfordshire, Kent, Surrey, Middlesex, Buckinghamshire, Oxfordshire.	25 Savile Row, London, W.1.
6	Sussex, Hampshire, Dorsetshire, Berkshire, Isle of Wight, Wiltshire (South of G.W.R. main line excluding towns on that line).	Deepdene, Midanbury Lane, Pitterne Park, Southampton.
7	Devon, Cornwall	Sutton Road, Plymouth.
8	Somersetshire, Wiltshire (north of G.W.R. main line and including towns on that line), Gloucestershire.	Runnington Lodge, 29 Durdham Park, Bristol, 6.
9	Cheshire, Lancashire, Cumberland, Westmorland, Montgomeryshire, Merionethshire, Caernarvonshire, Denbighshire, Flintshire, Anglesea, and in Derbyshire—Buxton Borough, Glossop Borough, New Mills Urban District, Whaley Bridge Urban District, Chapel-en-le-Frith Rural District.	8th Floor, India Building, Water Street, Liverpool, 2.
10	Warwickshire, Worcestershire, Staffordshire, Shropshire, Herefordshire	24 St. James' Road, Edgbaston, Birmingham, 15.
11	Northern Ireland	77/79 Corporation Street, Belfast.
12	Lanarkshire, Ayrshire, Renfrewshire, Wigtonshire, Dumbartonshire, Argyllshire, Clackmannan, Kirkcudbrightshire, Dumfriesshire, Stirlingshire, Bute.	29 Park Circus, Glasgow, C.3.
13	West Lothian, East Lothian, Midlothian, Berwickshire, Peeblesshire, Selkirkshire, Roxburghshire	45 Queen Street, Edinburgh, 2.
14	Angus, Fifeshire, Perthshire, Kinross-shire	56 Reform Street, Dundee.
15	Aberdeenshire, Morayshire, Banffshire, Kincardineshire, Orkney and Shetland.	Amicable House, 3rd Floor, 252 Union Street, Aberdeen.
16	Inverness-shire, Nairn, Ross and Cromarty, Sutherlandshire, Caithness	53 Shore Street, Inverness.
17	Monmouthshire, Glamorganshire, Carmarthenshire, Pembrokeshire, Cardiganshire, Breconshire, Radnorshire.	27 Newport Road, Cardiff.

as is the case in air-raid shelters, a constant supply of fresh air is essential both for the above reason and to keep temperature and humidity conditions within reasonable bounds. It will be noted that Home Office regulations permit very much smaller room volumes for



Mellor, Bromley & Co.'s gas filtration plant (size B).

given numbers of people in shelters where ventilation plant is installed; in addition, it is not so necessary to take precautions against gas by proofing or making the room airtight. In installing ventilating equipment where fresh air is transferred from outside, it is obviously wise to incorporate filters that will be capable of dealing with all the poison gases most likely to be used by foreign aircraft. The unit illustrated has been designed with these principles in mind and conforms fully to the Home Office specification. The abridged details given below deal with the three most popular sizes.

Size of Unit	Cubic feet air/min.	H.P. absorbed	H.P. motor	Diam. of dirty inlet pipe	Diam. of clean air by-pass
A—suitable for 10/15 persons	38	.06	¼	4"	3"
B—suitable for 25 persons	63	.08	¼	5"	3"
C—suitable for 50 persons	125	.15	½	5"	3"

TIMBER DEVELOPMENT ASSOCIATION. "The Story of Timber" is the title of a film made for the Timber Development Association by Dartington Hall which was shown privately for the first time at Film House, Wardour Street, W.1, on January 1. It is intended chiefly for exhibition in schools and colleges as part of the educational campaign which the Association is continuing as a long-term policy in spite of the temporary difficulties of supply. The film tells the story of the production of timber and includes shots of the forests in Finland, Sweden and the Dominions; it runs for 35 minutes.

Hutments

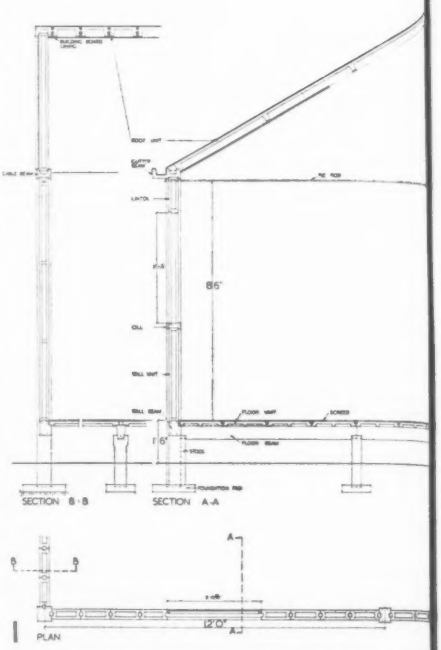
The latest announcement from the Timber Control allows purchases at the rate of only £5 a month instead of the £20 which has been allowed since the war began. From this it is not outrageous to assume that there is still an excessive demand for timber (presumably for Government purposes), and some designs for concrete hutments recently put forward by the Cement and Concrete Association seem a more or less sensible answer. That officialdom would like to have a standard reply to all problems is merely a continuation of previous policies, but there is, at the moment, a definite excess of cement on the market, and it would be much better to make use of available materials rather than insist on a standardized design all over the country. And it is not unfair to add that concrete has certain very definite virtues from the point of view of splinter protection, notably lacking with timber construction, though, of course, no form of light construction can provide more than partial protection against bomb splinters.

Sample editions of most of the huts illustrated on this and the following page have already been erected by the Cement and Concrete Association on a site adjoining the Coombe Hill Golf Course at Kingston. Full constructional details can be obtained from the Association at 15 Turl Street, Oxford.

MOPIN TYPE (Figs. 1 and 1A) (E. Mopin, Ltd.)

Foundations to the floors and to wall columns are provided by precast concrete stools set on *in-situ* concrete.

Thin ribbed concrete slabs about 6 ft. long by 18 in. wide make up the floor. These slabs are supported by precast beams 6 ft. apart which rest on the stools, the surface being finished off with a half-inch rendering of cement mortar.



1A *Figs. 1 and 1A, Mopin Type.*

The wall is divided into 12-ft. bays by precast concrete columns and formed of vertical hollow units keyed and grouted together. These vertical units can be trough-shaped with wood fillets between them for the attachment of a wall-board lining if desired.

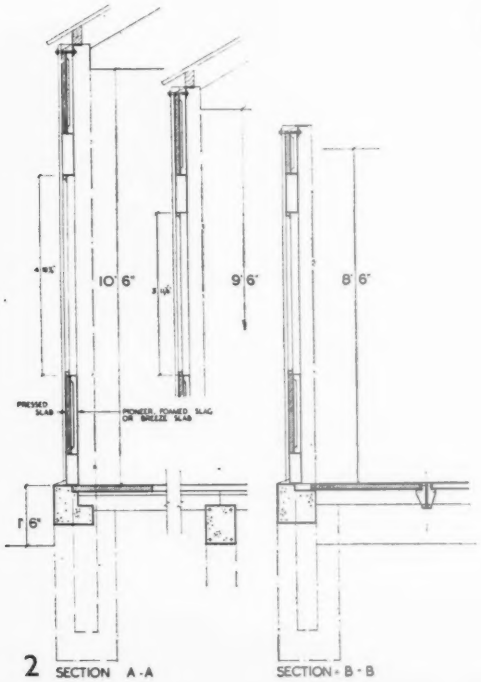
Similar hollow or trough-shaped units which thrust against a precast gutter beam with steel ties at the columns are used for the construction of the roof. For larger spans the number of units in the cross-section of the roof is increased, giving it an arched form. Spaces between the units and at ridge and gutter are grouted up and the whole given a bituminous covering.

Among the advantages of such a system is the fact that the amount of steel required is a minimum, no external finish to the walls is needed and adequate insulation is provided. Should it be considered advisable to adopt a steel truss or flat roof supported on steel stanchions, the arrangements of the wall units may be modified slightly. The special gutter beam is no longer necessary, as a standard gutter can be incorporated. A slight change in the width of joint between the vertical units makes it possible to comply with almost any spacing of doors and standard windows.

PRECAST PAVING SLAB TYPE (Figs. 2 and 2A). (British Concrete Federation)

Large quantities of paving slabs are available in stock and have appreciable residual value. They may be used as filling within a framework similar to that employed by Messrs. Cowdell and Stewart, as shown in Fig. 2. The surface may be rendered weatherproof by the insertion

Figs. 2 and 2A, Precast paving slab type.



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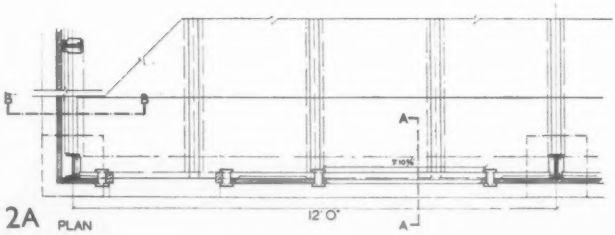
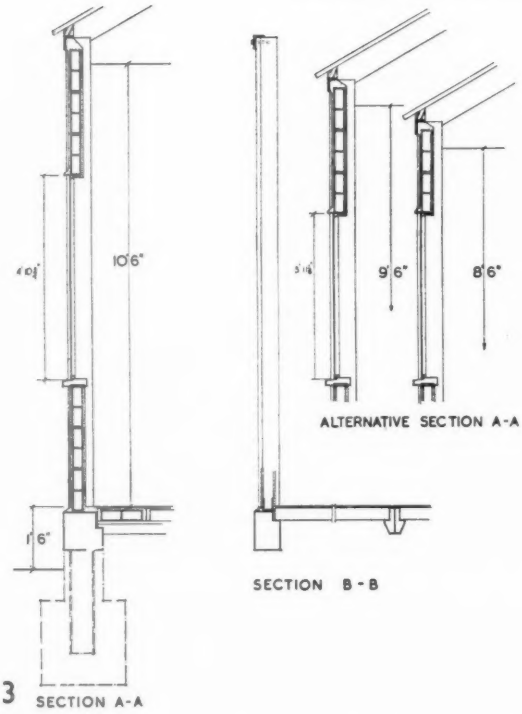


2A



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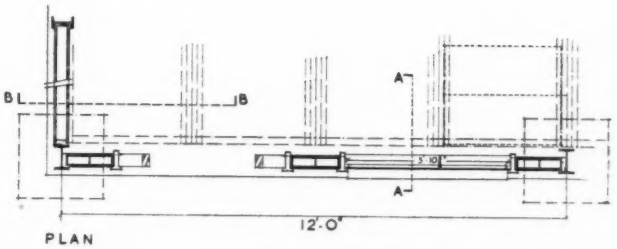


3A

Figs. 3, 3A & 3B, plycrete type.

3B

of pre-moulded bitumen strips between adjacent slabs. A cavity wall is provided by an inner leaf of light-weight concrete blocks in order to minimize any possibility of condensation and enable a fibre board lining to be fixed, should this be thought desirable.

PRECAST BLOCK SCHEME (not proprietary)

In some types of hutment a wall formed of normal partition blocks suitably weatherproofed may provide sufficient insulation. The blocks should afford some protection to the steel stanchions and at the same time be tied to them. An inner block lining can, of course, be added if considered necessary.

With such walls a variety of precast unit floors may be used of either Siegwart, Bison, Hollocast, Rapid and other types.

PLYCRETE TYPE (Figs. 3, 3 A and 3 B) (Cowdell and Stewart)

Low pitch roofing in this system has been applied to the hut of this type at Coombe Hill. Its application to walls and floor is shown on the drawings.

The basis of the system is the use of a very light hollow concrete block, formed by wrapping a special paper which has previously been covered with ¾-in. of cement mortar round a removable core. These blocks are laid between vertical precast wall units and rendered both inside and outside. For the floor, the blocks can, if desired, be given additional strength by being reinforced within a further covering of cement.

Construction of this type employs manual labour to a large extent, and great care has been taken that each unit shall be as light as possible in order that it may be easily placed. The degree of insulation provided is high, as the wall virtually consists of a number of sealed cells.

RENDERED FABRIC TYPE (Nofrango, Ltd.)

For these walls a very light 24-gauge steel framework of channel form with continuous holing (to allow easy adjustment to any particular spacing of windows and doors) is fixed between the stanchions, fabric is hung on both sides and wired to this framework. Standard steel windows are bolted to the framework and the fabric cut away and folded back at intervals. Both inside and outside fabrics are then rendered, forming a cavity wall.

The floor beams are cast in light metal formwork, fabric is stretched across them with a certain amount of reinforcement and the surface rendered in cement mortar.

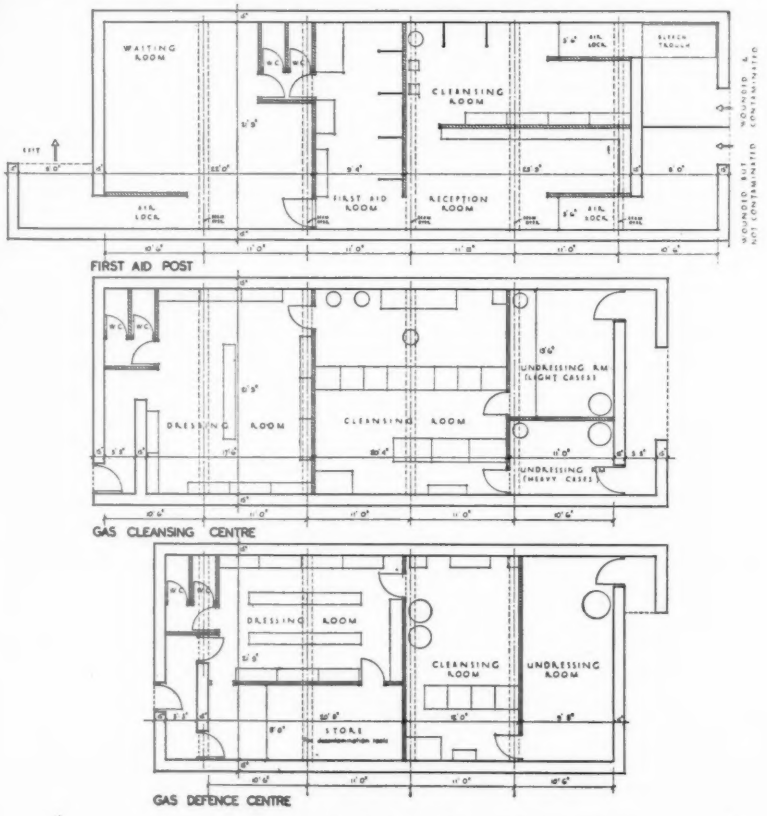
Apart from the rendering, the weight of material to be transported is a minimum.

FLAT ROOF

Precast floor units of any of the several types available can be used to provide a flat roof. They may run either longitudinally or transversely and be of either hollow or trough type dependent on whether or not a fibre board soffit is considered advisable.

FIRST AID, GAS CLEANSING AND GAS DEFENCE CENTRES (Fig. 4.)

Whatever degree of protection may be decided upon for the majority of the buildings of a camp, it may be thought desirable to give splinter-proof protection to those which are more important. This can be achieved by the use of 15-in. plain ordinary concrete walls and masking the entrances by suitable baffle walls. In view of the danger from blast and gas, it seems advisable to provide a flat roof and to rely on artificial light and ventilation.



4 *First aid post, gas cleansing and gas defence centres.*

CORRECTION.

Hollow concrete blocks were used for the screen walls at the Houses of Parliament, and not (as stated in our December 21 issue) stone.

LETTERS

Reserved for What?

SIR,—The question you ask in your recent issues is at once pertinent and urgent. Pertinent to each and every section of the building industry and urgent for rational war economy as a whole.

The conception of keeping any section of the building industry "in reserve"

in the sense of inactive is utterly meaningless; as well endeavour to conserve the physical strength and acquired skill of one's right arm by means of a permanent sling! Our problem is twofold:

First, we must provide the Government with conclusive evidence that a healthy and, therefore, balanced building industry is essential in the present emergency; secondly, the industry itself must produce the blue prints of the structure best designed to preserve this balance in conditions of reduced civil output and heavy, but only partly determinable, Government requirements.

The main outlines of the solution to the second problem are already becoming clearer, and with Government definition of economic policy, the problem as a whole is well within the competence of the industry's central organization, the Building Industries National Council. There exists, however, widespread uncertainty regarding the main economic principles which govern the position of the building industry in our developing war economy.

It is well known that Government quarters have in recent times increasingly recognized the immense scope offered by the building and public works industries in the maintenance in peace-time of balanced national economic activity. *No other industry possesses a like potential for the creation and distribution of income or for the generation of public revenue and new private savings.* For that reason alone there is an immediate case for decisive Government action to prevent in our present tribulation such disintegration of the industry as would seriously weaken a national economic weapon of this importance.

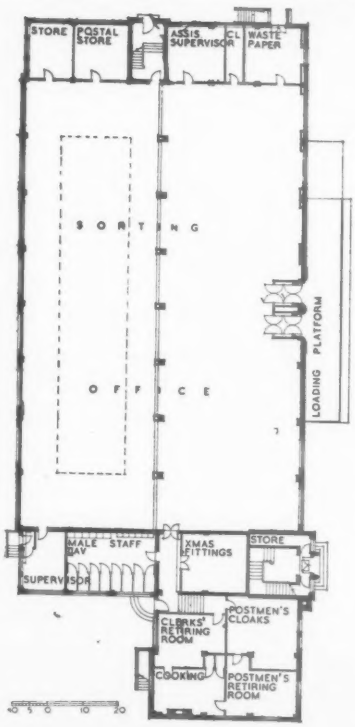
But in present circumstances there are grave difficulties which must be recognized and met. The fact that total Central Government disbursements are of the order of seven million pounds per day, and may shortly have to reach eight million pounds, means that, after providing for all necessary recruitment to the services, we shall have to meet an enormous draft on the residual productive energy of our past and present man-power, i.e. our accumulated capital resources at home and abroad, as well as our current productive powers. It is of the essence of the situation that, in making use of these resources, due regard should be had to our probable post-war potential in conditions of demobilization and disarmament. In present circumstances, and apart from the execution of Government requirements, the building industry will be called upon to provide large numbers of men for the services and possibly also for urgent labour shortages elsewhere. It is, however, of the utmost importance to obtain practical recognition of the fact that nothing whatever can be saved for the war budget *via* the

SLOUGH SORTING

DESIGNED BY F. A.

GENERAL AND SITE—On a spacious site on land adjacent to the High Street, Slough. Scheme comprises two steel-framed buildings on the north and south sides of a large paved yard. The northern block is a single-storey building, containing the garage for the combined postal and engineering fleet, together with a large workshop and engineering accommodation and welfare quarters for the staff of the Post Office Engineering Department. The southern block is a three-storey building with Sorting Office and postal requirements on the ground floor. A loading bank has been provided to facilitate the handling of the mail bags between the Sorting Office and the postal vans, and the paved yard affords ample space for manœuvring. The first floor is occupied by the apparatus room, power rooms and offices in connection with the Telephone Exchange and the second floor by the switch room and staff welfare accommodation. A further wing at the north-west angle of the main block provides accommodation for batteries, amplifier equipment and ventilating plant.

FINISHES—Sand lime bricks have been used throughout with dark brindles for the plinths and main doorway surrounds and artificial stone dressings and copings. The whole building is treated internally in a colour scheme of cream and green. General contractors were W. A. James & Son; for list of sub-contractors, see page 50.

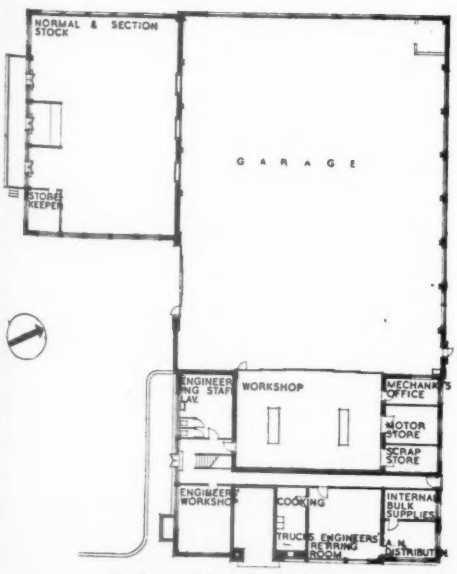


Above, general view of the Sorting Office, showing main entrance and loading platform.

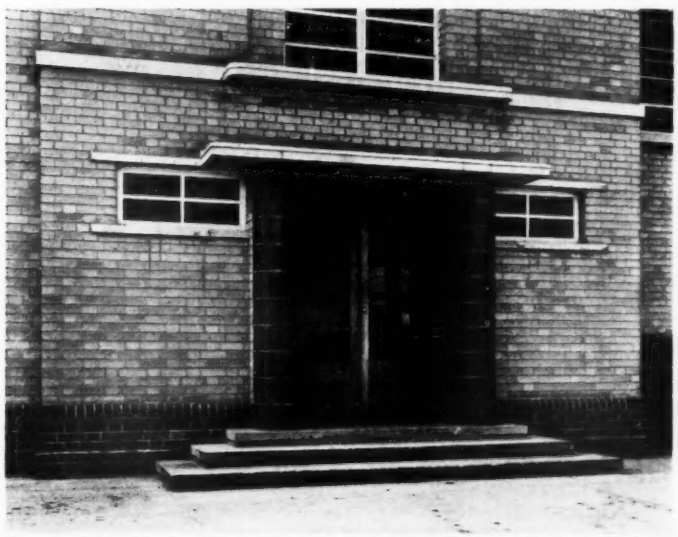
SORTING OFFICE: GROUND FLOOR PLAN

OFFICE : TELEPHONE EXCHANGE AND GARAGE

LLEWELLYN (H.M. OFFICE OF WORKS)



PLAN OF GARAGE



Sorting Office block : Above, the main entrance. Top the loading platform

disemployment of men and resources in the building industry unless these resources are of such a nature that they can be—and in fact are—immediately re-employed in the national service elsewhere.

Suggestions have been made that upwards of £100 millions might be "saved" annually by postponement of maintenance work on existing capital assets. Even if the resources of the building industry concerned with this maintenance could forthwith be re-employed elsewhere (a very big question indeed), there would still remain a strong case for rejecting this proposal except in the very last resort. Every year there accrues a mass of maintenance work of urgent character. To "save" on this now would be tantamount to needless destruction and an ultimate expenditure which will be a multiple of present real cost.

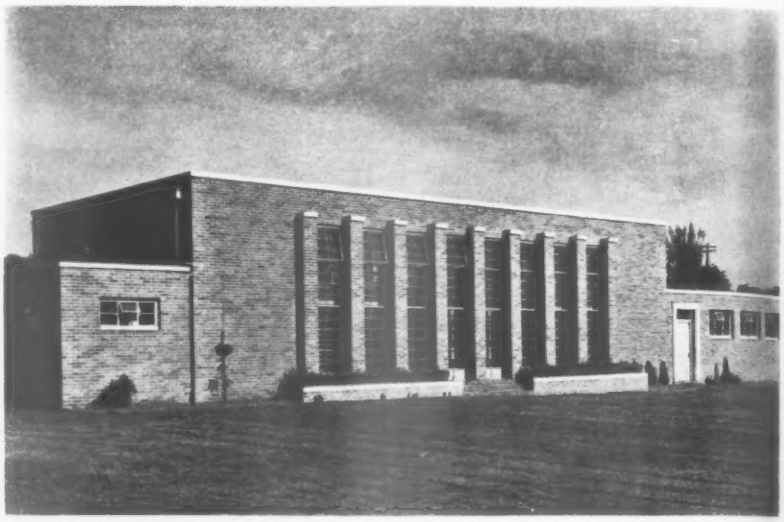
Economy, i.e. optimum utilization of resources, eagerly sought in peace-time, is today essential. The need for building design to fulfil a maximum purpose at the smallest cost called the architectural profession into being, and it is surely a reflection on present methods that just when true building economy for war purposes is most necessary the services of the architect are being so seriously neglected.

Although there is a general and well-founded aversion to undue use of our external resources to help in financing the war, the feeling is growing that the quickest way to win is to put forward our maximum economic effort in the shortest possible time. Success in this respect would itself do more than anything else to maintain intact the capital value of the main mass of our foreign assets, which are not in any case readily saleable outside this country, i.e. for foreign exchange. Thus, whilst our war effort necessarily demands far-reaching, albeit orderly and progressive, re-direction of our home activities, it is bad policy to precipitate or tolerate such upheaval as must postpone the attainment of our maximum war potential, leave useful resources disemployed, and undermine completely the national asset of a balanced building industry.

These considerations point to the desirability of careful discrimination in making a choice of home *versus* external resources for specific war purposes. Determinable Government building requirements should be co-ordinated with a sufficient release or encouragement of civil building to preserve the essential health of the industry throughout the country, not only for future peace-time use, but also to cater for any unforseeable or emergency war-time requirements. Only in this sense can any part of the building industry be held "in reserve," and it is surely only in this sense that the industry itself can offer a really valid contribution to the prosecution of the war.

J. L. GIBSON
Lead Industries Development Council

ADDITIONS AT ST. BA

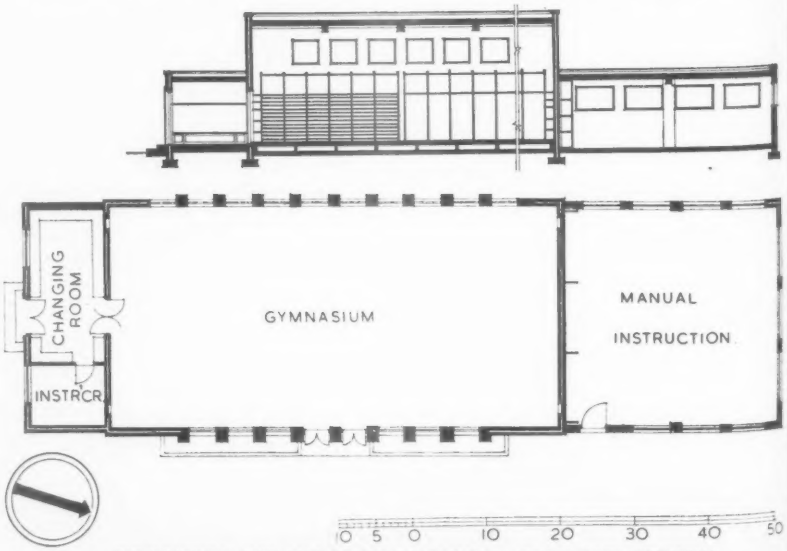


GYMNASIUM AND WOODWORK BLOCK

CONSTRUCTION AND FINISHES—11-in. cavity brick walls with strongly marked external piers carrying the roof beams of steel. The spacing is such that every alternate pier carries a R.S.J. roof beam, and the spaces between the piers are just sufficient to take a standard steel casement in wood frame. The Portland stone padstones at the head of the piers are carried right through to form a terminal feature externally and a beam seating internally. The roof is of wood joists, boarded and covered with built-up bitumen roofing. The walls are faced with hand-made local multi-colour bricks with light mortar and slightly recessed joint, formed with the rounded end of a tool handle. Monks Park stone was used for coping and doorways. Standard steel casements in wood surrounds are fitted.
COST—£1,500. 6½d. per foot cube.

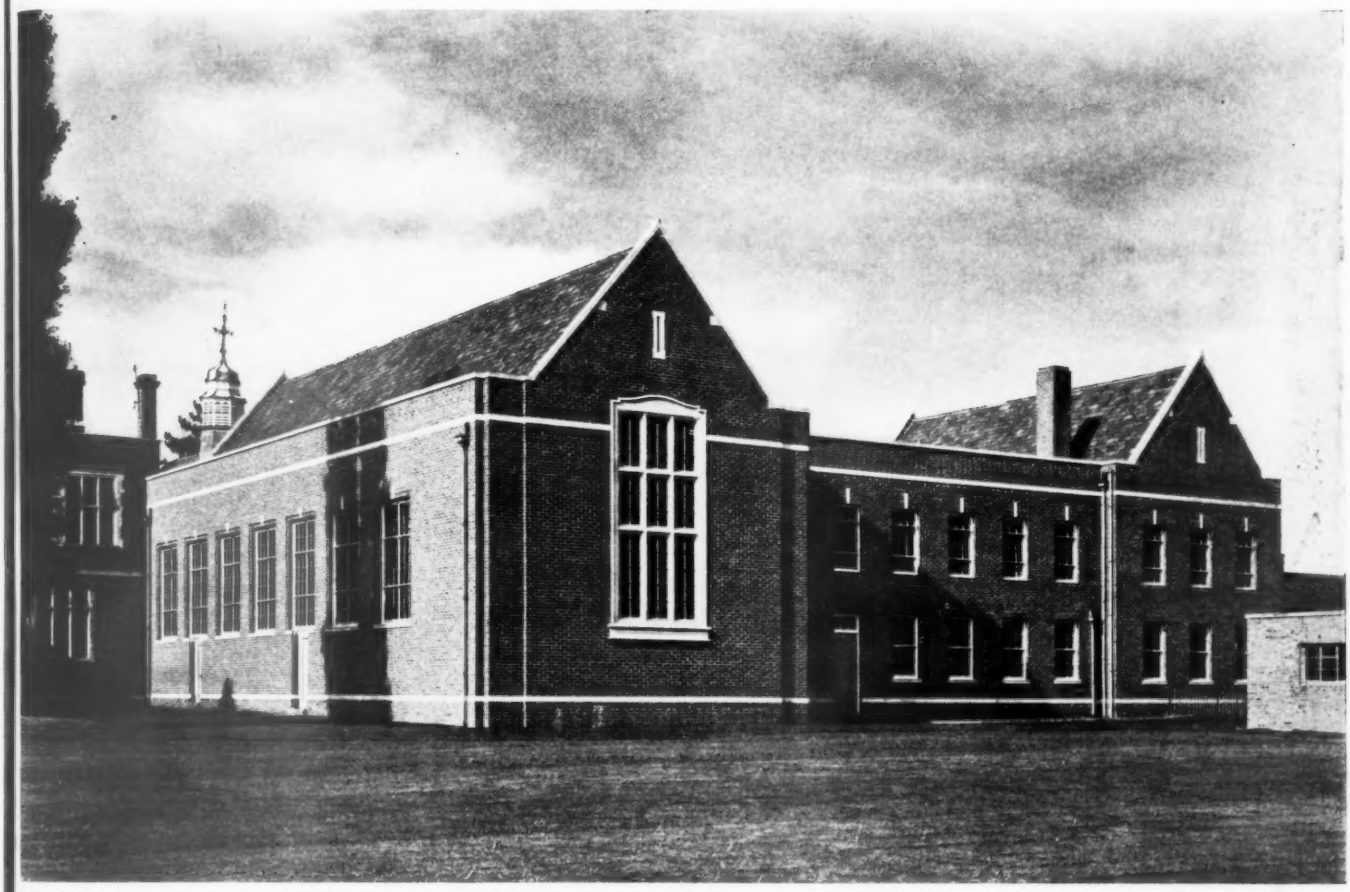
ASSEMBLY HALL AND LABORATORY BLOCK

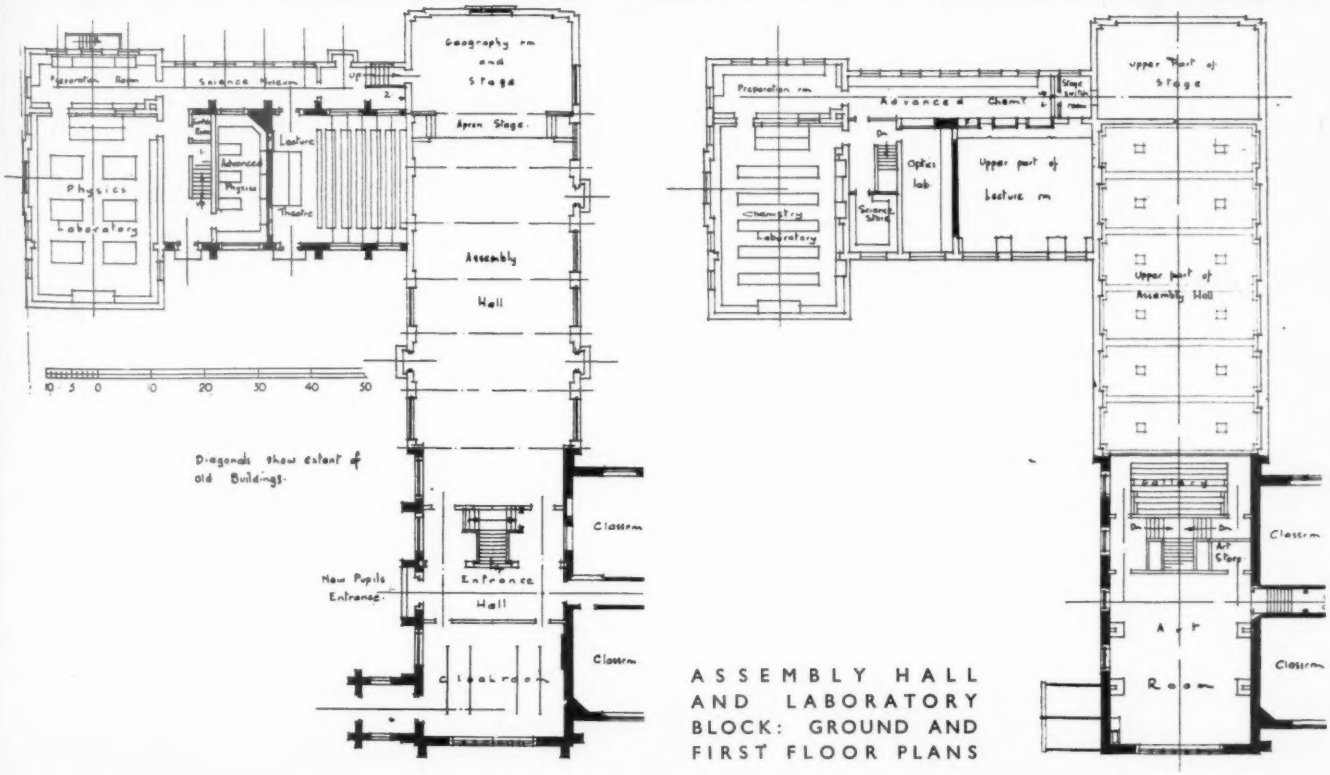
GENERAL—Purpose of the scheme was to extend the hall and laboratory wings of the school, retaining as much of the old buildings as possible.
CONSTRUCTION AND FINISHES—Weight-carrying brick walls. Steel first-floor beams carry fir joist floors with batten width maple boarding. All internal walls are 9 in. and 4½ in. brickwork. Whole of the new buildings is constructed in cavity work, the inner wall being weight-carrying, and strengthened by piers where loads are to be carried. Walls are finished with local hand-made multi-colour bricks, the stone dressings being in Monks Park stone. The work is set in gauged lime mortar, the pointing being carried out as the work proceeded. Windows are all-steel casements in wood surrounds.
COST—The final price, including all furniture, etc., was about £10,150.



GYMNASIUM AND WOODWORK BLOCK: PLAN AND SECTION

BARTHOLOMEW'S SCHOOL, NEWBURY, BERKS



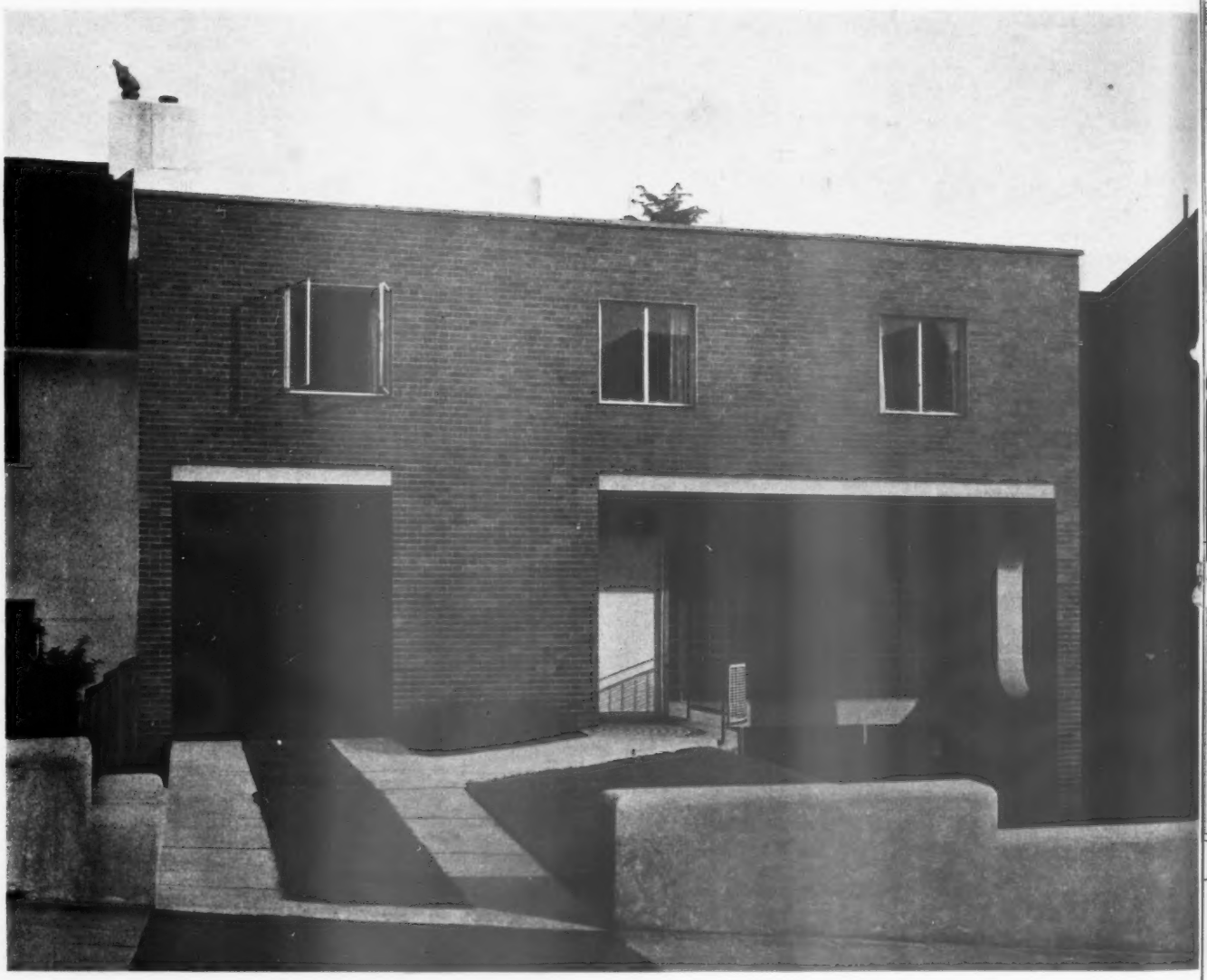


ASSEMBLY HALL AND LABORATORY BLOCK: GROUND AND FIRST FLOOR PLANS

DESIGNED BY ERIC A. ROBERTS

D

HOUSE, ARKWRIGHT ROAD, H

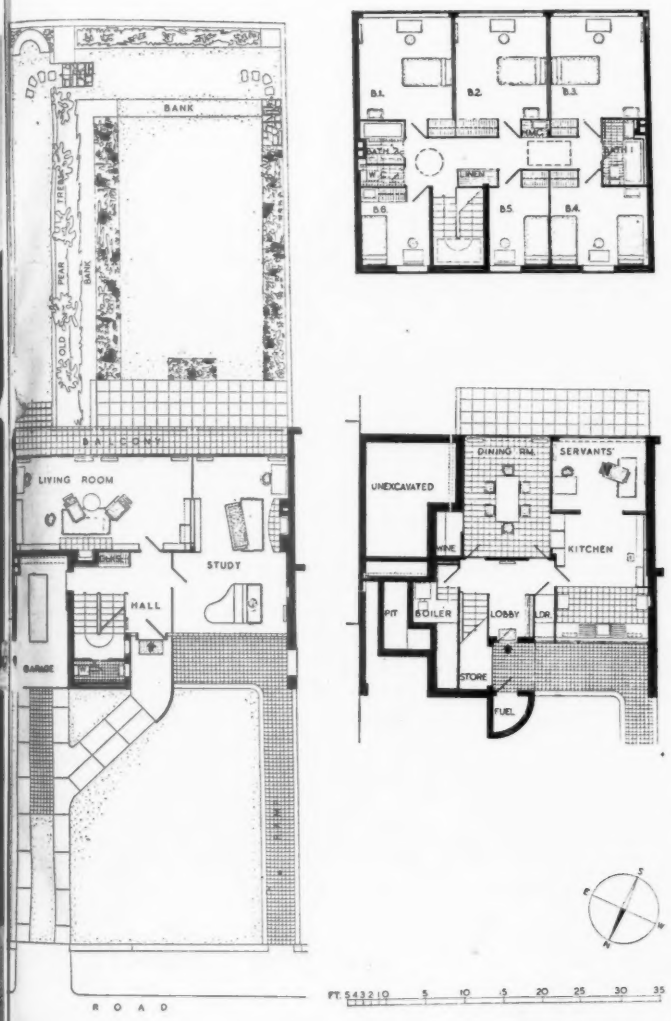


North front from the road level.

SITE—In Arkwright Road, Hampstead. The adjoining houses are of radically different design. The site slopes steeply from the road level.

PLAN—The client's main requirement was to have the maximum number of bedrooms possible in a house on such a narrow site. The longer side of the L-shaped living-room and most of the bedrooms face approximately south over the garden; dining-room also faces south. End of living-room has a glass brick wall.

D, HAMPSTEAD



LOWER GROUND, GROUND AND FIRST FLOOR PLANS

Top, a detail of the lower ground floor level, which is reached by a ramp from the road; right, south elevation from the garden.

CONSTRUCTION AND FINISHES—Building is of R.C. frame construction with hollow tile slabs and 11-in. cavity and 9-in. brick walls. Staircase is also of R.C. Steel windows are used throughout.

DESIGNED BY
SAMUEL AND HARDING

HOUSE AT HAMPSTEAD

BY SAMUEL AND HARDING

Top, looking out over the balcony and garden from the living-room; centre, the study at the north end of the living-room with a glass brick wall towards the road; left, the living-room.
The general contractors were F. J. Moreton and Son, Ltd.; for list of sub-contractors, see page 50.

News Items

A. A. EXHIBITION

The annual exhibition of photographs by members of the Architectural Association is to be held at 36 Bedford Square, W.C., from February 6 to 23. All members are invited to send exhibits for the exhibition. Photographs should be mounted on white cards 16 in. high and should bear the name, title, particulars of camera, etc. Exhibits should be delivered to No. 36 Bedford Square, not later than Tuesday, January 30.

HOUSING CENTRE

Forthcoming Tuesday lunches include :— January 16. "The War and the Building Trades Operative." By Mr. R. Coppock. January 23. "The War and the Building Trades Employer." By Sir Alfred Hurst, K.B.E., C.B. January 30. "Rural Survey : Further Results." By L. Desyllas. February 6. "Problems Arising from Evacuation." By Miss M. L. Harford, Secretary, Women's Group, N.C.S.S.

Film Show, Thursday, January 18, 4.30 p.m. (Charge for tea : 6d. members, 1s. non-members.) The programme will include part of Mr. Matthew Nathan's new colour film of the work of housing associations made for the National Federation of Housing Societies and a series of colour slides of housing and town-planning in U.S.A. and Mexico taken by Mr. Gordon Stephenson.

THE SOANE MEDALLION

65 candidates took part in the Preliminary Competition for the Soane Medallion, and 21 were admitted to the Final Competition.

The Soane Medallion and, subject to the specified conditions being fulfilled, £150 has been awarded to Mr. Eric G. Broughton, A.R.I.B.A., of the Royal College of Art and The Polytechnic, Regent Street, London.

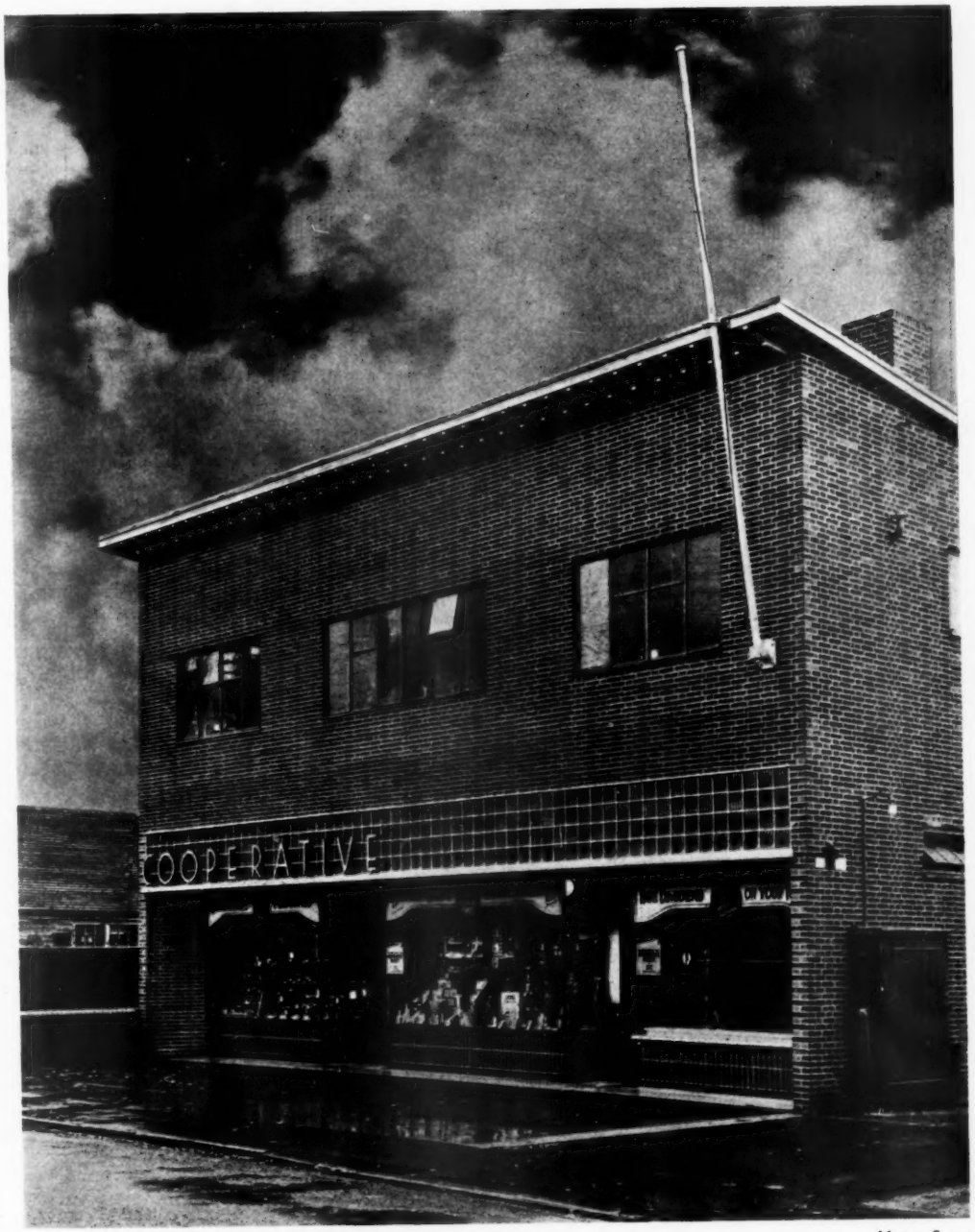
Literature

The addition to the series of Geological Survey *Special Reports on the Mineral Resources of Great Britain*, by J. G. C. Anderson, with a contribution by M. Macgregor, deals with the granites of Scotland. It brings together in a compact form the information available on this subject, and the main purpose is to provide, for the use of those engaged in the granite industry, an account of the distribution, mode of occurrence and character of the principal Scottish granites. The first three chapters are of an introductory nature, dealing in succession with the development of the industry, with the mineralogical, chemical and physical properties of granite, and with the distribution and age-relationships of the Scottish occurrences. Later chapters deal in turn with the granites of North-East Scotland, of the Galloway district in the south-west, and of the Western Highlands. These include the most important centres of the industry. Special attention is given to granites at present being exploited and an account is provided of the methods of working in use. Other occurrences of granite throughout Scotland are also briefly described. A list of the quarries in operation during 1938 is appended.

The memoir is illustrated by nine text-figures, a folding map showing the distribution of the principal granites, and three plates of photographs. It can be obtained (price 2s. 6d. net) from H.M. Stationery Office, 120 George Street, Edinburgh, 2, or from any agent for the sale of Ordnance Survey maps.

SHOP AT CRANLEIGH, SURREY

DESIGNED BY L. G. EKINS



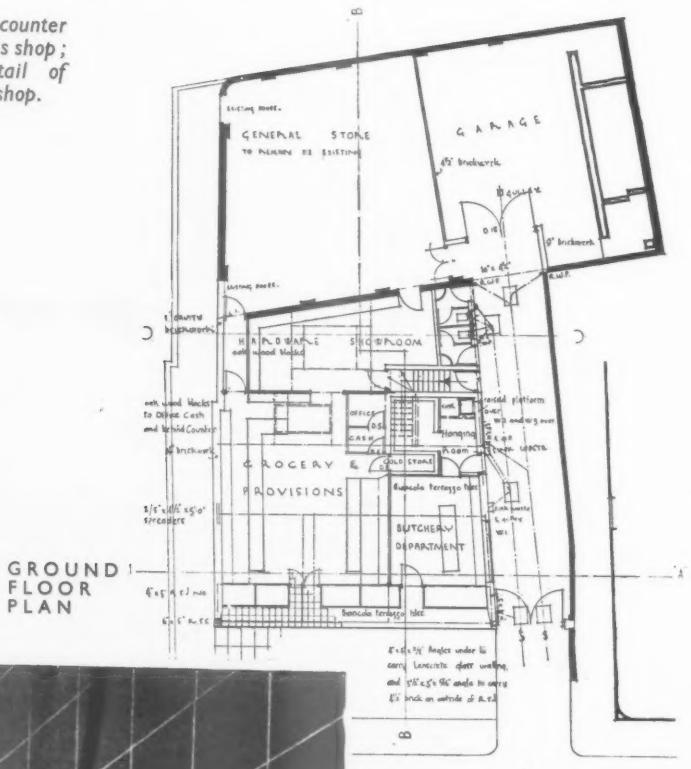
Main front

SITE—The shop is situated in the main street of the village, to which it has a frontage of 43 ft.

PLAN—The ground floor accommodation includes a grocery and provision shop with a small hardware department at the rear, and a butcher's shop with hanging room and cold store adjoining. On the first floor is a flat which does not entirely cover the shops, thus permitting lantern lights to be introduced giving adequate natural lighting to the shops. The shop fronts are recessed to provide a covered space where customers can be protected from the weather.

CONSTRUCTION AND EXTERNAL FINISHES—11-in. hollow brick construction with 9-in. and 4½-in. internal brick walls faced with 2-in. brown sand-faced bricks pointed in cream mortar. The roof is timber framed covered with boarding and finished with asphalt and tar macadam. The fascia running the whole length of the façade is of prismatic glass bricks.

Left, pay counter in butcher's shop; below, detail of butcher's shop.



SHOP AT CRANLEIGH

DESIGNED BY L. G. EKINS

INTERNAL FINISHES — The soffit of the roof is painted a bright blue with joists in cream. Interior fittings are in oak with marble shelves and counter tops. The walls and counter fronts are faced with black and white opalite glass. In the butcher's shop glazed wall tiles in two shades of green are used with a thin red line at dado level. Hanging and show rails are stainless steel.

The general contractors were the Co-operative Wholesale Society, Ltd.; for list of sub-contractors see page 50.

SOCIETIES AND INSTITUTIONS

AIR RAID PROTECTION INSTITUTE

Following are some extracts from a paper entitled "Public Basement Shelters: Practical Experience in a Metropolitan Borough," read by C. F. de Steiger at a meeting of the Air Raid Protection Institute on Tuesday last.

The Metropolitan Borough of Wandsworth as we know it today was established under the London Government Act, 1899, an Act which replaced the District Boards of Works in London by 28 Metropolitan boroughs. Of these boroughs, Wandsworth is now the largest, with an area of 9,199 acres, or about 14½ square miles, and with a population, according to the 1931 Census, of 353,110 persons. The Borough is subdivided into nine wards, starting west: Putney, Southfields, Fairfield, Springfield, Clapham North, Clapham South, Balham, Tooting and Streatham.

In December, 1937, the Council appointed an Air Raid Precautions Committee as a Standing Committee of the Council to deal with the formulation and administration of an air raid precaution scheme for the Borough. One of the duties of this Committee was to decide upon the type of air raid protection to be provided for the population. The various types finally adopted may be summarized under the following headings: Anderson Shelters, Domestic Surface Shelters, Trench Shelters, Basement Shelters, Partly Sunk Fifty-Person Unit Shelters, Surface Fifty-Person Unit Shelters.

I will confine my observations tonight to public air raid shelters provided in existing basements. To ascertain the number and condition of all available basements, the Borough Council organized a survey of over 5,000 cellars and basements throughout the shopping centres of the Borough, while the Metropolitan Police carried out a concurrent survey to establish the number of people in the main shopping centres at various times during the day. From the data obtained from these surveys, a scheme of public basement shelter accommodation for those members of the public caught in the streets during an air raid has been worked out. Out of the total number of 5,000 basements inspected, some 2,000 were retained for further examination. For each of these basements, all relevant details were noted on individual survey sheets, and a certain number of approximate surveys were made on that occasion, mainly with a view to determining the capacity of these basements. Out of these 2,000 basements a large proportion had to be eliminated as not available on account of their being in use by the occupiers or on account of their being unsuitable for various reasons. A balance of some 800 basements was left as "possibles" for conversion into public air raid shelters. At this point we were called in as Consultants by the Borough Council to undertake a final survey and to give recommendations as to the work involved in carrying out the adaptation. The 800 basements were again visited, particular attention being paid to the checking of information already obtained in the preliminary survey, with the addition of such notes and particulars as to enable them to be considered in the light of the Civil Defence Act and other recent Government recommendations on the subject. All notes were recorded on survey sheets. On that occasion a note was also made of the presence or absence of electric lighting, drinking-water supply, electric light or power conduits, gas supplies, water pipes, drains, manholes and any other features considered to be of importance. Eventually 558 basements were retained for final consideration. The balance was rejected for the following typical reasons: Impossibility of providing a second exit; inadequate area; inadequate height (generally basements with a clear height of less than 6 ft. 6 in. have been rejected); heavy machinery above; presence of undesirable plant and obnoxious materials, such as chemicals; inadequate structural conditions.

The capacity of the future basement shelters was determined in accordance with the floor and surface area and air cube conditions for naturally ventilated shelters as stipulated by the Home Office. An endeavour was made to limit the number of persons in one basement shelter to 50. In some cases this figure has been exceeded where prevailing conditions seemed to indicate that no additional risk was being taken by putting more people in one basement. The total number of persons for whom accommodation could be found in these basements amounted to 29,730, of whom 3,740 would be resident on the premises, leaving accommodation for 25,990 of the floating population.

The buildings over the basements were studied and graded according to the type of construction. The grades into which the buildings fell were as follows: (A) Steel or reinforced concrete frame buildings with concrete floors; (B) sound brick buildings with concrete floors; (C) brick buildings with wood joist floors. The basements themselves were in turn graded into types (A) (B) and (C) according to the grading of the building over, a type (A) basement, for instance, implying that the building above consists of a steel or reinforced concrete frame structure with concrete floors. Type (B) basements were subdivided into type (B_1) and (B_2), the former consisting of a small single cellar entered by stairs at the back of the shop with pavement lights along the street frontage, the latter consisting of a large single cellar with similar features. Type (C) basements were subdivided into grades (C_1), consisting of a single small cellar entered by a trap in the shop on the ground floor or by stairs. Type (C_2) as a double-room cellar with stairs in rear room and pavement lights along the street frontage. Type (C_3) as a basement used as living quarters with stairs to a ground floor corridor and coal vaults under the pavement, and access from the garden or backyard, generally reached from an alleyway parallel to the main street behind the house, and Type (C_4) as large, single-room basements with large pavement lights along the street frontage and stairs at the back leading to a back area entrance. The comparative result of this grading showed that only 0.35 per cent., that is, two basements, of all surveyed basements were of grade (A), 7 per cent., or 39 basements, of grade (B), and 91 per cent., or 506 basements, of grade (C). Nine basements could not be fitted into any of these grades.

In the following I propose to give a short description of the structural principles according to which this conversion work has been carried out. All basements were strutted in accordance with the Government requirements for a superimposed debris load depending on the number of storeys over. In the first instance the strutting was carried out in timber, as in the early days of the war no steel could be supplied from stock and timber supplies were plentiful. The ceilings were sheeted with 9 in. by 3 in. timbers placed 3 in. apart, the sheeting in turn being supported by timber beams and timber props, the whole strutting being wedged against the ceiling. This timber strutting decreases the clear height of the future shelter by approximately 1 ft. under the beams. In some cases, therefore, it has been necessary to lower the existing floor of the basement so as to have a resulting clear height of at least 6 ft. When timber supplies became more difficult, steel strutting took its place. At the present moment, as no timber is being released for basement strutting work, steel is being used exclusively. In certain cases timber sheeting and timber beams were supported on tubular steel props. In most cases special mass concrete footings had to be provided to support the props, as the existing basement floors were not strong enough to take such concentrated loads. In other cases sole plates were introduced to spread the load over an existing mass concrete floor. Special attention was paid to the cross bracing of the strutting so as to make it more resistant against lateral thrusts. All timber work inside the basement shelters was treated with fire-resisting paint.

The walls in these basements had, without exception, at least the requisite thickness of 13½ in. to ensure splinter-proofness, and were left untouched. Baffle walls in 9-in. brickwork were built in front of the entrance and exit openings. Otherwise, all existing windows and chimneys were bricked in with 13½-in. or 9-in. brickwork, the latter where the openings were situated well below ground level and where, therefore, no splinters are to be expected. Baffle walls were carried right up to the ceiling of the basements if placed inside, and were, if suitably placed, used to support the ends of beams supporting the sheeting. Existing walls were not used for that purpose, props being placed close to these walls to support the ends of the new beams. All existing and new walls inside the shelters were distempered, as it was felt that a clean-looking shelter would have a good effect on the morale of the occupants.

The use of sandbags for baffle walls and for the purpose of closing in windows was in principle abandoned right from the start, as a careful investigation into the relative cost of splinter-proof sandbag and brick walls showed that a 13½-in. brick wall built in Fletton bricks in cement mortar, resting on existing concrete with no footings and finished on each side with a fair face, would cost between 20s. and 25s. per yard super. as against a cost of 35s. to 45s. for an equivalent sandbag wall 2 ft. 6 in. thick, including the cost of the sandbags, sand, labour in filling, tying and placing in position and treating the exposed surfaces after erection with some preservative. This comparison of the cost of brickwork and sandbag walls does not take into account the fact that the sandbag wall will in all probability have to be repaired, if not replaced, even when treated, after a period of one to two years approximately. On the other hand, the cost does in neither case provide for removing the walls when the emergency is over. It was anticipated that in such an event there would be very little difference in the cost of removing the two types of wall.

In some cases it was desirable not to destroy specially well-built window surrounds by bonding in new brickwork. A sandbag wall would have overcome this difficulty, but even in such cases we decided to use brick walls built in front of the window opening and bonding this new brickwork only around the existing window surround to the existing wall.

Very serious difficulties were encountered in providing entrances to these basement shelters, which had to be arranged in such a manner that they are accessible to the public at all times of the day or night. As already pointed out, no front areas with existing steps leading down to the basements were available. It was therefore decided to construct an entrance into the basement direct from the pavement level, closed by a flush trap-door. In many cases use was made of existing pavement lights, which had generally to be enlarged to allow for an easy staircase to be provided. Difficulties were experienced with these entrances insofar as existing service mains under the pavement had in many cases to be moved when they happened to be close to the building line. Wherever

practicable, these entrances were located in side streets so as to keep the main street pavement as clear as possible of obstruction in case of an alarm. Some of the entrances were hooded over so as to be available also as emergency exits even if debris should have fallen on to them from the buildings above. The hoods have a further advantage in rainy weather of keeping the staircases dry. They also enable a light to be provided which can be safely switched on during black-out hours. Wherever possible, existing entrances into the basement from the backyard were utilized. Unfortunately, as already pointed out, only a small number of such entrances was to be found in the Borough.

Every basement shelter was designed to have at least one entrance and one emergency exit as remote as possible from each other. The main feature of the emergency exit is that it has to be in a serviceable condition after debris from the building has covered it up. They are, therefore, all built with a hood over the manhole exit. The concrete roof slab raised on 9-in. brick walls is designed to carry a superimposed load of 400 lbs. per square foot, which was considered to be sufficient for the purpose. A small trap-door fitted on the side away from the building opens inwards so as to ensure its workability even in a case when the debris should have piled up in front of it. In many cases it was not possible to provide both an entrance and an emergency exit to one basement. In these instances two or more neighbouring basements were connected to each other with passage openings through the party walls, while an entrance was provided at one of them and an exit at the other. Wherever local conditions allowed it, the emergency exit was carried some distance away from the face of the building by means of an underground passage or crawlway through precast concrete tubes. All entrances to the shelters were equipped with a special lock working to one pass key. A large number of pass keys is available to be distributed to the people in charge of the shelters, the police and the air raid warden organization.

THE ARCHITECTURE CLUB

A meeting of the Architecture Club will be held at 12.30 on Thursday, January 18, at Commonwealth House, High Holborn, W.C.1, for a tour of inspection of the above building which has recently been designed by Mr. H. P. Cart de Lafontaine, F.R.I.B.A., for the directors of the Hollowburn Investment Trust, Ltd.

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ANNOUNCEMENT

Mr. W. H. Ansell, F.R.I.B.A., has taken into partnership Mr. Arthur Bailey, A.R.I.B.A. The firm will be known as Messrs. W. H. Ansell and Arthur Bailey, 12 Gray's Inn Square, W.C.1.

BANK NEWS

The net profits of the Westminster Bank for the past year, after providing for rebate and taxation, and after appropriations to the credit of contingency accounts, out of which accounts full provision for bad and doubtful debts has been made, amount to £1,475,745. This sum, added to £526,584 brought forward from 1938 leaves available the sum of £2,002,329.

The dividend of 9 per cent. paid in August last on the £4 shares and 6¼ per cent. on the £1 shares, absorbs £563,298. A further dividend of 9 per cent. is now declared in respect of the £4 shares, making 18 per cent. for the year; and a further dividend of 6¼ per cent. on the £1 shares will be paid, making the maximum of 12½ per cent. for the year.

The dividends will be payable (less income tax) on February 1.

£100,000 has been transferred to bank premises account and £300,000 to officers' pension fund, leaving a balance of £534,006 to be carried forward.

PITHEAD BATHS

The Miners' Welfare Commission announces that during the month of December new pithead bath installations were completed or commenced at the following collieries :—

Buildings completed :

Gresford (North Wales) for 2,016 men.
Markham (South Wales) for 1,536 men.

Buildings commenced :

	£
Comrie (Fife) by Messrs. W. and J. R. Watson, Ltd., 48 Iona Street, Edinburgh, 6	27,005
Markham Extension (Derby) by Messrs. Thomas Beighton, Ltd., Brimington, Chesterfield ..	5,254
Glencraig (Fife) by Mr. J. Cullen, Edinburgh Road, Musselburgh..	19,042
Princess Royal (Forest of Dean) by Messrs. E. A. Bond & Co., Ltd., 49 Beda Road, Cardiff	18,877
Ayr 9 and 10 (Ayrshire) by Messrs. D. J. Milligan, 46 Kyle Street, Ayr	14,326
Total ..	£85,304

Building tenders about to be invited :

Valleyfield (Fife) for 1,100 men.
Hapton Valley (Lancashire) for 310 men.
Shireoaks (South Yorkshire) for 1,080 men.
Elliot (South Wales) for 1,632 men.

THE BUILDINGS ILLUSTRATED

SLOUGH SORTING OFFICE (pages 40-41). Architect, F. A. Llewellyn, O.B.E., H.M. Office of Works. Heating installation for each block was arranged and supervised by Mr. M. P. McLaren, H.M. Office of Works. General contractors, W. A. James and Sons. Dorman Long & Co., Ltd., of Nine Elms Lane, S.W.8, supplied and erected the steelwork. Sub-contractors and suppliers included : Grovebury Brick Co., facing bricks ; Stent Concrete Co., artificial stone for window dressings, copings, etc. ; J. A. King & Co., Ltd., supplied and erected the Glascrete canopies over the loading banks to the Sorting Office and normal Stock Room ; Messrs. W. G. Kaleyards, Ltd., Chester, steel casements and doors.

NEW GYMNASIUM AND WOODWORK SHOP, ST. BARTHOLOMEW'S GRAMMAR SCHOOL, NEWBURY (pages 42-43). Architect: Eric A. Roberts, A.R.I.B.A. General contractor, E. B. Hitchman, who was also responsible for the demolition, excavation, foundations, plumbing and joinery. Sub-contractors and suppliers included : Curridge Brick and Tile Co., bricks, Curridge hand-made sand-faced multi-colours ; H. Young & Co., terra-cotta ; National Bituminous Products, Ltd., built-up bitumen flat roof ; Horsley Smith & Co. (London), Ltd., maple strip flooring ; Kerner-Greenwood & Co., " Pudlo " waterproofing materials ; Newbury Gas Co., gas radiator heating ; May and Hutt, electric wiring ; K. S. Neale, door furniture ; Mellowes & Co., casements and window furniture ; T. Thorn and Son, stonework.

NEW ASSEMBLY HALL AND LABORATORY BLOCK, ST. BARTHOLOMEW'S GRAMMAR SCHOOL, NEWBURY (pages 42-43). Architect : Eric A. Roberts, A.R.I.B.A. General contractors, Cooke Bros., Ltd., who were also responsible for the demolition, excavation, foundations, joinery and school fittings. Sub-contractors and suppliers included : Limmer and Trinidad Lake Asphalte Co., Ltd., " Ledtrinda" lead-lined dampcourses ; Permanite, Ltd., asphalt ; Cowley Concrete Co., precast steps ; H. Young & Co., Ltd., structural steel ; W. T. Lamb and Sons, old Delabole grey-greens slates ; Horsley Smith & Co., Ltd., woodblock flooring ; Kerner-Greenwood & Co., " Pudlo " waterproofing materials ; The Bath and Portland Stone Firms, Ltd., polished stone dado in hall ; T. Thorn and Son, polished stone dado in hall (set by) and Monks Park stone and stonework ; A. R. Turner, R.P., central heating " Ideal " equipment : Newbury Municipal Gas, gas fixtures ; F. E. Becker & Co., laboratory fittings ; Newbury Gas Co., gasfitting ; Urban Electric Supply Co., electric wiring ; Troughton and Young, Ultralux electric light fittings ; Osler and Faraday, electric light fixtures ; Doulton & Co., Ltd., sanitary fittings ; K. S. Neale, door furniture, cloakroom fittings ; Crittall Manufacturing Co., Ltd., casements, window furniture ; Camp Hopson & Co., Ltd., laboratory dark blinds ; A. E. Rawlings, plaster ; J. Bullock, metalwork.

HOUSE AT HAMPSTEAD (pages 44-46) Architects : Samuel and Harding. General contractors were : F. J. Moreton and Son, Ltd. Sub-contractors : Helical Bar and Engineering Co., Ltd., reinforced concrete ; Accrington Brick and Tile Co., Ltd., bricks ; Industrial and Domestic Heaters, Ltd., central heating ; Bratt, Colbran, Ltd., grates ; Duncan Watson, Ltd., electric wiring, bells ; Merchant Adventurers of London, Ltd., Oswald Hollmann, Ltd., and Troughton and Young, Ltd., electric light fixtures ; George Jennings, Ltd., sanitary fittings ; J. D. Beardmore & Co., Ltd., and Dryad Metal Works, Ltd., door furniture, window furniture ; Rowe Bros., Ltd., casements ; D. W. Price & Co., glass bricks ; Shutter Contractors, Ltd., rolling shutters ; Veneers (Anglo-European), Ltd., Donovan flush doors ; Austin Compton Roberts, and G. A. Harvey & Co., Ltd., metalwork ; Cork Insulation Co., Ltd., cork floors ; Cellulin Flooring Co., Ltd., lino.

GUILDFORD AND DISTRICT CO-OPERATIVE SOCIETY, LTD., CRANLEIGH BRANCH (pages 47-48.) Architect, L. G. Ekins, F.R.I.B.A. Assistant, W. J. Reed. General contractors, Co-operative Wholesale Society, Ltd. Sub-contractors and suppliers included : Dorking Brick Co., Ltd., bricks ; Dawnays, Ltd., structural steel ; Standard Flat Roofing Co., Ltd., special roofings ; Lenscrete, Ltd., shop front frieze ; Walter W. Jenkins & Co., Ltd., terrazzo flooring ; R. A. Champion, Ltd., electric wiring ; Adamsez, Ltd., sanitary fittings ; Crittall Mnfg. Co., Ltd., casements ; Tile Decorations, Ltd., tiling ; Bratt Colbran, Ltd., mantels ; Co-operative Wholesale Society (Shopfitting Dept.), shop fittings ; Stanley Jones, Ltd., shop fronts.

Manufacturers' Items

A complimentary dinner was given recently at the Dorchester Hotel in honour of Mr. E. R. Clarke, the senior director of the

well-known firm of G. A. Harvey & Co. (London), Ltd. During the evening Mr. Clarke was presented with a canteen of

silver to commemorate his recently completed fifty years of service with the Company—he joined the firm as a boy in 1889 and became a director when it was formed into a limited liability company in 1914.

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The English Joinery Manufacturers Association, established in Nottingham in 1904, has recently moved its headquarters to London. It has taken offices at 31 Marsham Street, Westminster, S.W.1 (Telephone : Abbey 4297), and Mr. R. G. Harvey Greenham, B.A., LL.B., has accepted the post of Secretary.

Mr. Greenham is a barrister and has had many years' previous experience in acting for various trade Associations and was for two years Private Secretary to the Financial Secretary to the War Office. In 1933 he tied for the Office of City Remembrancer for the City of London.

Mr. John T. Sharp of Messrs. Sharp Bros. and Knight, Ltd., of Burton-on-Trent, who has acted as President of the Association for the last 20 years, has now been appointed Past President and has been succeeded in the office of President by Mr. Henry N. Newsum, M.C., J.P., Managing Director of Messrs. H. Newsum Sons & Co., Ltd., of Lincoln. Mr. Henry Newsum became Vice-President of the Association in 1936. The Vice-Presidents of the Association are Mr. R. W. Mugford, of Messrs. Duncan Tucker and Sons (Tottenham), Ltd., who has been Vice-President since 1936, and Mr. James B. Austin, of Messrs. Austins of East Ham, who first became Vice-President in 1937.

Mr. H. N. Newsum.

Mr. R. G. H. Greenham.

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The Bristol branch of the Coal Utilisation Joint Council has been transferred from its present office in Baldwin Street, Bristol, to 18 Glen Drive, Stoke Bishop, Bristol, 9. Telephone No. : Bristol 81022. Telegrams : Promocoal, Bristol. The services of Mr. G. H. Barnard, Area Combustion Engineer for that Branch, will be available as usual from the new address, to which all communications dealing with South-Western Branch matters should be sent.

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To receive the staff of Thos. W. Ward, Ltd., and celebrate the coming of age of their son, Lieut. Phillip T. Ward, the Master and Mistress Cutler, Mr. and Mrs. Ashley S. Ward, gave a party and dance at the Cutlers Hall, Sheffield, on December 29. The guests were received by the Master and Mistress Cutler, Lieut. Ward, and his sister, Miss Mary Ward.

The directors of Thos. W. Ward, Ltd., presented Lieut. Ward with a gold cigarette case suitably inscribed. On his actual birthday early last month, the local directors presented him with a silver cigarette box, and the staff at Albion Works with a travelling case.

When war broke out Lieut. Ward was at the Paris office of Thos. W. Ward, Ltd., and returned to England to join his unit in the Royal Artillery.