THE ARCHITECTS' JOURNAL

THE ARCHITECTS' JOURNAL
WITH WHICH IS INCORPORATED THE BUILDERS' JOURNAL AND THE ARCHITECTURAL ENGINEER IS PUBLISHED EVERY THURSDAY BY THE ARCHITECTURAL PRESS (PUBLISHERS OF THE ARCHITECTS' JOURNAL, THE ARCHITECTURAL REVIEW, SPECIFICATION, AND WHO'S WHO IN ARCHITECTURE) FROM 45 THE AVENUE, CHEAM, SURREY

THE ANNUAL SUBSCRIPTION RATES ARE AS FOLLOWS :
BY POST IN THE UNITED KINGDOM..... £1 3 10
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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.

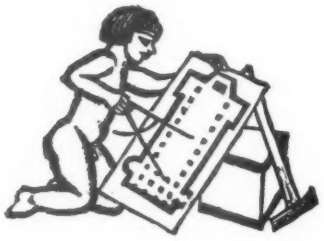
THURSDAY, MARCH 19, 1942. NUMBER 2460: VOLUME 95

PRINCIPAL CONTENTS

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this JOURNAL *should not be taken as an indication that they are necessarily available for export.*

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

In common with every other periodical and newspaper in the country, this JOURNAL *is rationed to a small proportion of its peace-time requirements of paper. This means that it is no longer a free agent printing as many pages as it thinks fit and selling to as many readers as wish to buy it. Instead a balance has to be struck between circulation and number of pages. A batch of new readers may mean that a page has to be struck off, and conversely a page added may mean that a number of readers have to go short of their copy. Thus in everyone's interest, including the reader's, it is important that the utmost economy of paper should be practised, and unless a reader is a subscriber he cannot be sure of getting a copy of the* JOURNAL. *We are sorry for this but it is a necessity imposed by the war on all newspapers. The subscription is £1 3s. 10d. per annum.*



from AN ARCHITECT'S *Commonplace Book*

"I speak from experience: I know what it is to live in a cottage with a deal floor and roof, and a hearth of stone, and I know it to be in many respects healthier and happier than living between a Turkey carpet and gilded ceiling, beside a steel grate and polished fender. I do not say that such things have not their place and propriety; but I say this, emphatically, that the tenth part of the expense which is sacrificed in domestic vanities, if not absolutely and meaninglessly lost in domestic discomforts and incumbrances, would, if collectively offered and wisely employed, build a marble church for every town in England."—*John Ruskin.*

NEWS

★ *Reasons why the R.I.B.A. Elections should be held this year* *page 220*

★ *Lord Portal's first two appointments to MOWP* *page 221*

★ *Chart showing structure of the New Directorate of Post War Building* *page 222*

EDUCATION

The Interim Report of the R.I.B.A. Special Committee on Architectural Education has just been issued. It is printed below :—

The Committee was set up by the Council in 1939 with the following terms of reference :—

"To consider the state of Architectural Education and to make recommendations to the Council."

The Committee is constituted as follows: Messrs. T. A. Darcy Braddell (Chairman), W. H. Ansell, Joseph Addison, Martin S. Briggs, Professor L. B. Budden, Professor W. G. Holford, Messrs. G. A. Jellicoe, Hubert Lidbetter, Anthony Minoprio, F. S. Orme, Stanley C. Ramsey, Thos. E. Scott, Charles G. Soutar, Basil M. Sullivan, L. Sylvester Sullivan, C. S. White.

The first meeting was held on July 24, 1939, and altogether eleven meetings have been held to date. In view of the wide field of investigation which lay before the Committee, the first two meetings were spent in discussing the method of approach. The Committee felt that before they could usefully discuss the present system of Architectural Education it was desirable that they should, as a Committee, be fundamentally in agreement about the aims and principles of architectural education. It appeared, therefore, that their work should be dealt with in three stages :—

1. Consideration of the aims and principles of Architectural Education. 2. Examination of the existing machinery of Architectural Education. 3. Preparation of a report to the Council with recommendations.

Following this programme members of the Committee submitted their views on the aims and principles of architectural education, and the qualifications of the ideal architect. These memoranda were discussed by the Committee at successive meetings, summarised and finally approved as representing correctly the views of the Committee on the Aims of Architectural Education.

At the same time members of the Council, the Board of Architectural Education, Heads of Schools and other members of the profession were circularised and invited to express their views on Architectural Education. The letters and memoranda received in reply have been indexed, and form a valuable body of evidence and opinion from representative architects.

It was then decided to consider the Machinery of Architectural Education, beginning with Entry into the Profession. This subject has been discussed with particular reference to the enrolment as Probationers of candidates who have been admitted without having passed recognised examinations. Such candidates have been accepted on the strength of letters from Headmasters of the schools at which they received their general education, and the submission of drawings. The Committee were agreed that this system was a totally inadequate means of testing a candidate's suitability for enrolment as a Probationer. The desirability of reviving the Preliminary Examination for candidates who have not passed the recognised examinations was discussed, but a majority of the Committee were agreed that the R.I.B.A. should not burden itself with another examination when there were already in existence perfectly satisfactory tests such as the Senior Certificate Examination of the College of Preceptors and the various Matriculation examinations, all of which (unlike the School Certificate) could be taken after leaving School.

Several members thought that the R.I.B.A. could reasonably insist on candidates for the Probationership passing the School Certificate or an equivalent examination; but it was agreed that provision should be made for boys who had already left school without taking the School Certificate owing to ignorance of the R.I.B.A. regulations for the Probationership.

The view was also expressed that a personal interview with candidates making special applications would be most desirable as an additional safeguard.

After further discussion it was unanimously agreed that the matter was urgent, and immediate steps should be taken to remedy the existing Probationership system. It was therefore agreed to prepare an interim report to the Council, and to submit the following recommendations :—

(1) That after July 1, 1943, candidates for the Probationership who have not started their architectural careers should be required to have passed one of the recognised examinations, but that for a period of four years from the publication of this report those who have already started their architectural training should be permitted to make special applications.

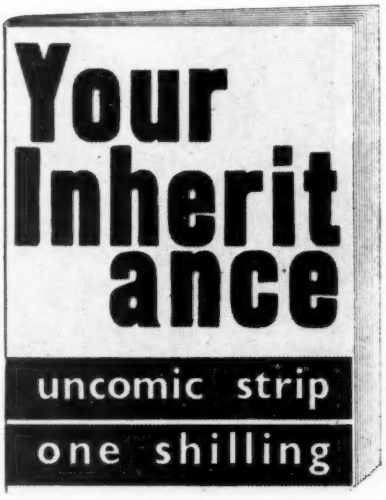
(2) That at the end of the period of four years, all candidates for the Probationership should be required to submit a certificate of having passed one of the recognised examinations.

(3) That from the date of the publication of this report, all candidates making special applications for the Probationership should be interviewed.

Note: The Headmasters of the Recognised Schools of Architecture are being asked if they will undertake the work of interviewing candidates making special applications.

R.A. EXHIBITION

The Royal Academy has issued the following notice concerning the Exhibition



The cover of Your Inheritance *(reprinted from the Christmas number of the* JOURNAL.) *This uncomic strip telling the life story of a piece of land has just been published by The Architectural Press.*

paymaster-general to planners

The Paymaster-General's office was formed just over a hundred years ago; its function is that of paying agent for the different Government Departments, other than the Revenue Department. Now, for the first time, the P.G. has a dual task—responsibility for the country's money-bags and the organization and the co-ordination of the whole field of planning for post-war reconstruction. The new P.G., Sir William Jowitt, appointed a week or so ago, is 56 years of age; he was educated at Marlborough and New College, Oxford, and was called to the Bar (Inner Temple), in 1909. He entered Parliament in 1922 and became a K.C. in the same year. He was a member of the Royal Commission on Lunacy in 1924; Attorney-General, 1929-32; and Solicitor-General at the time of his appointment as Paymaster General.

which opens on May 4 and closes on August 8.

Time for, and mode of, sending in Works.—All works intended for the Annual Exhibition of the Royal Academy, must be punctually sent there on one of the days fixed for their reception. These days this year will be: Water-colours, pastels, miniatures, painting in tempera, black and white drawings, colour prints, engravings and architectural drawings, Friday, March 27; oil paintings, Saturday, March 28, and Monday, March 30; sculpture, Tuesday, March 31.

Tempera: Paintings in tempera in which oil has been used should be sent as oil paintings, unglazed, on the days for receiving oils. All other works in tempera must be sent under glass on the first day, and must be plainly labelled "Tempera" on the glass.

Colour woodcuts must be plainly labelled as such and sent in as engravings.

Hours for the reception of works, 8 *a.m. to* 7 *p.m.*, except Saturday, March 28, 8 *a.m. to* 3 *p.m.*

No work will under any circumstances be received before or after these specified dates and hours.

All works must be delivered at the Burlington Gardens entrance. None will be received at Piccadilly entrance.

All works sent from the country or from abroad must be consigned to an agent in London for delivery at the Academy, *unpacked*, on one of the appointed days. Works may not be sent by post to the Academy. No works in cases will be received; nor will the expenses of carriage be defrayed by the Academy. The attention of foreign artists and of English artists residing in the country and abroad is especially called to this regulation.

Artists are expected to assure themselves that their agents, if any, are fully acquainted with the current regulations.

Mode of describing Works.—All the works sent by each artist must be entered on a printed form duly filled in with the name (Christian and surname in full, *signed by the artist*) and address of the artist, the titles and descriptions of the works as they are to be inserted in the catalogue, and the price if it is desired to place them on sale. These forms must be sent under cover addressed to "The Secretary."

At the back of each frame must be written the name and address of the artist, with the title or description of the picture, and the number to which it refers on his or her form. This information must also be repeated with *great distinctness and accuracy* on a label, securely attached by a string to the top of each frame, and made to hang over in front, as also to each piece of sculpture.

It is necessary that these Regulations, more especially the last, should be strictly complied with, in order to avoid delay and inconvenience, as well as inaccuracy in the catalogue.

The forms and labels can be procured (*during the month of March only*) from the Academy. Applications for them made by letter must be accompanied by a *stamped and addressed* envelope for their enclosure, and should state the number of works it is proposed to send.

Number of Works allowed.—No artist is allowed to send or exhibit more than three different works.

Size of frames, margins, etc.—Each picture or drawing must be in a separate frame, or if a series of drawings from one story be at any time admitted in the same frame, they must be enumerated as distinct pieces. *Passe partout* is not admissible. A case of sculptured gems will be considered as one work, provided the size of the case does not exceed six inches by five inches; and a case of medals or plaques, each of which is not more than seven inches in its widest dimension, will be considered as one work, provided the size of the case does not exceed three feet by four feet. Miniatures must be in separate frames, uncased, and enumerated as distinct pieces. Miniatures in frames set with jewels are inadmissible.

Oil pictures must not be sent in under glass, but any oil picture not more than 30 square feet superficial measurement, obtaining a place on the line, may have a glass put over it if so desired on an appointed day before the opening of the exhibition, of which due notice will be given. Frames should be of natural wood or gilt for oil paintings; the painted surface of oil paintings should be not less than 14 inches by 10 inches. *Excessive size of pictures and drawings* or excessive breadth in frames or margins, may prevent pictures, drawings and engravings obtaining the situation they otherwise merit. For works in black and white the following sizes of mounts are recommended: 24 inches by 19 inches; 22 inches by 16 inches; 19 inches by 16 inches. Reliefs should be framed. Frames must have no rings or other projections on the back. *Frames of extravagant design or colour or unusual material should be avoided as likely to cause difficulty in arrangement, or even exclusion.*

During the war architects may send framed photographs of completed buildings instead of drawings. The frames of architectural drawings and photographs must be of natural wood or gilt, not exceeding 2 inches in breadth. Preference will be given to geometrical drawings not exceeding half-inch scale. Architectural drawings which are the work of an artist other than the designer must have the names clearly inscribed on the mount, as follows: "Designed by . . ., architect; drawn by . . .," but the draughtsman's name will not be included in the catalogue. A piece of decorative or monumental sculpture may be accompanied by an explanatory *drawing* of not more than 10 inches by 8 inches, which must be framed and glazed.

Works inadmissible.—No works which have been already publicly exhibited in London at exhibitions held by societies or institutions (excepting engravings or etchings published within the previous twelve months); no copies of any kind (excepting paintings in enamel, and impressions from unpublished medals, in which case the name of the original designer must be specified); no mere transcripts of the objects of natural history; no realistic models of ships or of other inanimate objects, except architectural models of buildings; no vignette portraits in oil; and no engravings and etchings that have been published more than twelve months can be received. Miniature paintings over a photographic basis should not be sent. Works by deceased artists are admissible only within twelve months from the date of decease.

THE NOT-SO-BIG-MEN

THE bulk of this issue of the JOURNAL is taken up by an account of how local contractors and professional men in North Staffordshire organized themselves into a unit capable of executing two large government contracts—and to variations on that theme. Some of the issues raised may appear to be dead because the war time building programme is past its peak; but they are not entirely dead for three reasons.

(i) A revival of war building may at any time become necessary. Not for armament factories and hostels perhaps, but quite possibly for other things—the manufacture of synthetic materials for instance or A.R.P. It is unwise in war time to conclude that an activity as essential as building will not be needed again for the duration.

(ii) Quite apart from new building work it is impossible to denude the country of building labour. Garrisons must be maintained capable of keeping existing buildings in working order and also of repairing blitzed cities. The Ministry say that in 1941 500,000 men were employed in civil building and repair work (excluding whole time maintenance workers). In other words, balancing a decrease likely to be brought about by the licensing of repair work against a slight surplus to meet emergencies. A force greater than that which dealt with the War building programe (36 million pounds a year) is likely to be wrapped up in these garrisons.

What are they going to do? The bulk of them will obviously do maintenance work, but what about the emergency reserve? Are they to be kept busy doing maintenance and repair work that is not strictly necessary in many cases on buildings likely to come down after the war?

So far the official attitude has been to classify the smallest firms (about 40,000) as handymen, to employ the largest (about 1,000) and to ignore the rest as much as possible. Two points strike one about this policy. The first is that the number of people engaged in repair work of one kind and another is fantastic, and there must be at least as much scope for organization

in this field as in any other. Anyone who has had the misfortune to hand out repair work to a handyman knows that most of his time is spent chasing small pieces of materials and borrowing other people's tools. But that is by the way. The second is that there is a lot to be said for working out and putting into practice now a system which would make it possible to employ the larger local firms on government work in case of need. This might mean keeping a certain amount of building work going in order to absorb in turn firms not strictly necessary for maintenance work under licence, keep them in training, and keep a skeleton organization running. The chief objection is that such a policy would involve using materials needed for other purposes, but on the other hand methods of construction are known which involve using very few critical materials. And in some cases new building work might still be necessary as part of the war building programme.

(iii) Other things being equal it's worth devoting a good deal of thought to possible methods of keeping the industry ticking over and capable of making a rapid start after the war. This means keeping as many firms as possible alive—by rationing work if necessary; it also means teaching at anyrate the majority of them to undertake the kind of contract—large housing estates for instance—that is likely to be offered.

The North Staffordshire Building Industries Council have shown that this problem though difficult is not insoluble. The two housing schemes undertaken by them, costing approximately £400,000 each, are not yet complete, but it looks as if (making allowance for hold-ups caused by bad weather conditions) they would be completed on time and what's more remarkable within the estimate. Another interesting point is that it was found possible to prepare complete sets of drawings including surveys of both sites in *three* and *five days* respectively.

If half the necessary war-time garrison could be brought up to this pitch of efficiency the switch over to reconstruction would be easier than it seems likely to be at present. Suggestions for making this kind of co-contracting easier than it has been are contained in an article on page 216.

REFRESHER. *Questions discussed in this issue are not new. Soon after war began it became obvious that a crisis was confronting the building industry: the development of that crisis can be traced in back numbers of the* JOURNAL. *Starting point of the effort to tackle problems confronting smaller builders is a letter signed by G. L. Greaves, published on May 2, 1940, the opening paragraph of which reads:*

Sir,—I am writing to outline steps which I feel would help to avoid that complete dislocation and even annihilation of our industry which is inevitable if the present conditions continue. Although I am writing personally the views I am expressing are largely the same as those held by the representatives of the building industry in the North Staffordshire area, who met together to discuss this matter on March 4, 1940.

This letter was followed by another, published on August 8, 1940, suggesting that a ministry of building should be set up to deal with the situation, and the building experiment described on pages 211-216 is the result of the North Staffordshire discussions.

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

NOTES & TOPICS

The fatheadedness of a railway enquiry clerk had compelled me to remain stationary for 24 hours very much against my will, but fortune had softened the blow with a hotel handsomely equipped with everything except books. After dinner a craving for literature came upon me and grew.

*

But there was nothing but a *List of Schools* for 1941.

*

I turned first to the Public Schools and began to calculate the narrowness of the pre-war gateway to four-out-of-five good jobs.

*

I found there were about 225 schools listed, of which 150 would be called Public Schools by somebody or other. The average cost of keeping a boy at one of these 150 schools is about £200 a year and the total annual entry to them (assuming a school life of 4 years) is, or was, about 11,000. I don't know how many males reach the age of 13 each year in Great Britain and N. Ireland but it is, I suppose, in the neighbourhood of 350,000. Certainly the gateway does seem a little on the small side.

*

From these calculations my thoughts wandered to the question, how many architects would be able

in future to pay £200 a year to educate a son. And just at this moment the *List of Schools* fell open at *The Profession of an Architect.*

*

The Profession of an Architect (I read) . . . offers considerable scope to the man of artistic taste and constructive ability. . . . Whilst the study of Architecture is interesting, and the practice remunerative, it demands hard and patient work. . . . Success comes from various sources. The winner of a Public Competition is brought into notice as a capable designer of Municipal Buildings. . . . Another man may devote himself to Domestic Buildings and win fame as the Architect of country houses. Town Planning commands the attention of municipal authorities. . . . The man without capital may find it wise to remain in an Architect's office as a valued and trusted assistant rather than run the risks of private practice. . . . Commercial Architecture attracts the constructive designer and Ecclesiastical Bodies need the services of the student of Gothic Architecture. . . .

*

Well, there it is. The division of the profession into architects and assistants, the latent emphasis on money to be made, the assumption that the private architect is the only architect, seem to us to-day a little distasteful. That doesn't mean that this outline of the profession (probably written by an F.R.I.B.A. in 1910) was not, up to 1939, substantially true. It was. But seeing it like that, set to hold its own with outlines of other professions, one feels it needs revision.

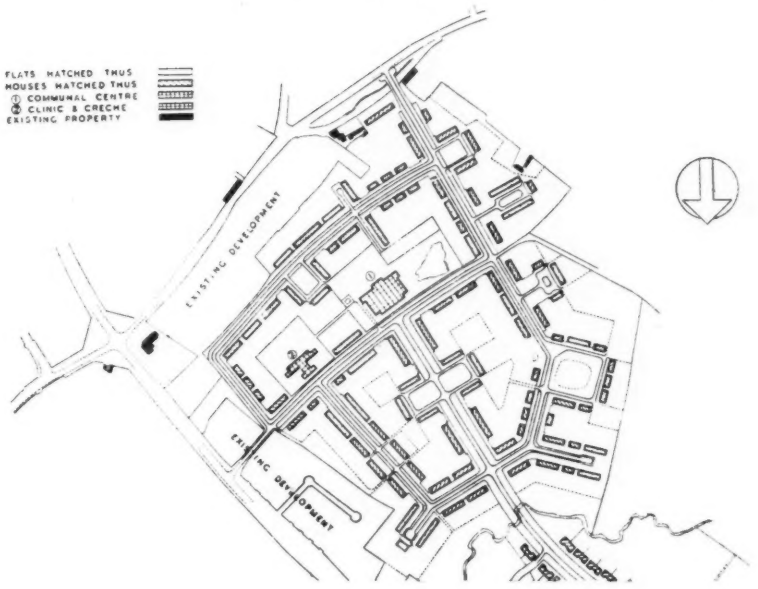
*

And why, when one is about it, limit revision to architecture? If all the values, distinctions and educational methods and aims which are summarized in this most truthful book are not revised at the end of this war, the 11,000 of the chosen may begin to have real difficulties with the 350,000.

MOWP

Lord Portal's first two appointments to MOWP are announced on page 221. One is a Chartered Accountant and the other is Chairman of the Coal Tribunal.

ASTRAGAL

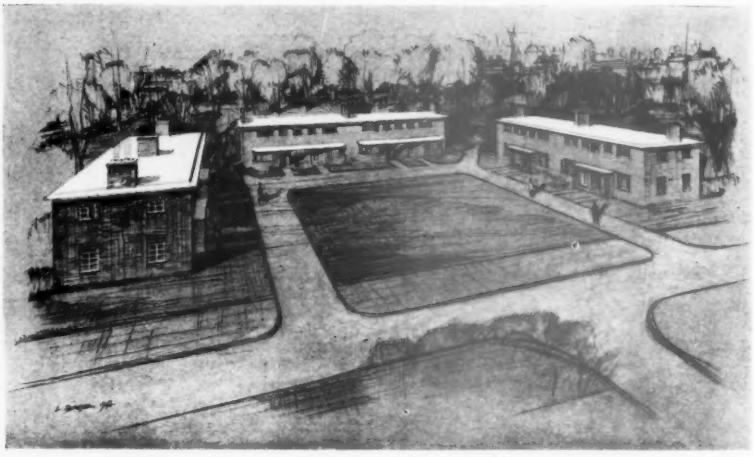


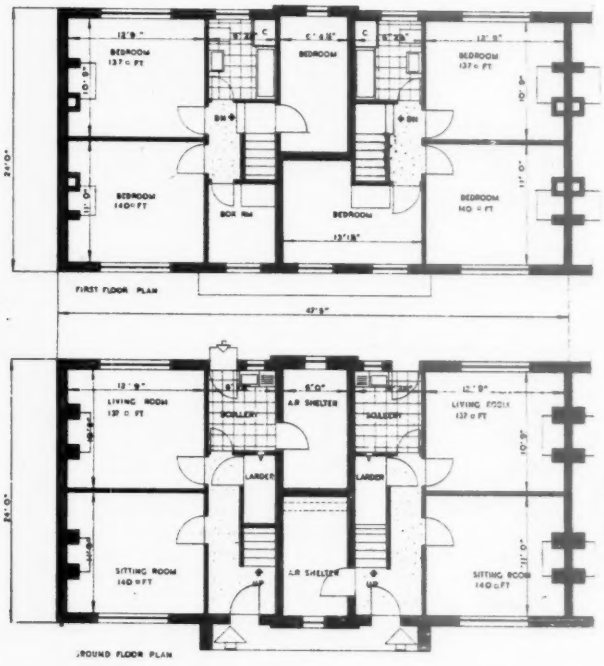
EXPERIMENT

The two housing schemes illustrated this week have a very special interest. They are not merely new and interesting examples of war-time housing though they are that. There is a story behind them, which is given below in full. That story tells how the North Staffordshire Building Industries Council was formed to do in their area what the building industry as a whole has been challenged so often to do—organize itself. The prime movers were the North Staffordshire Architectural Association inspired by Mr. W. L. Greaves, but the resulting developments were only made possible by the close co-operation of many different people.

The difficulties of the undertaking were stupendous. In the first place it was necessary to elect a chief contractor with whom the Ministry could deal and who would undertake the responsibility of bulk purchase of materials without any financial inducement beyond a small allowance to cover out-of-pocket expenses. In the second place it was necessary for the architects concerned to handle what might be called the paper organization of the job as a whole: time scheduling, labour transferences, allocation of materials between one contractor and another when supplies ran short, because none of the contractors concerned had a staff capable of undertaking this type of work. Thirdly there was difficulty about finding work to do. Timely help from the senior M.P. for the area solved this difficulty. Lastly there were financial difficulties—the banks were at first unwilling to grant credit, though they eased up a bit later, and first instalments of materials had to be bought on tick. Nobody connected with the scheme pretends that there were not difficulties. The interesting point is that these difficulties were overcome with a minimum of outside assistance by the intense desire of all concerned to make the scheme work.

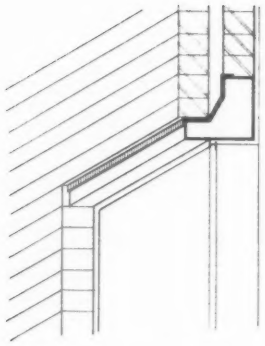
An article by a correspondent is also printed (page 216) because it raises some issues connected with the organization of the building industry which are very interesting in relation to this North Staffordshire experiment. It begins by tracing how changes brought about by two years of war-time control have been largely responsible for creating the crisis which the North Staffordshire Council for the Building industry was created to meet. It goes on to suggest how the potential usefulness of the industry as a whole might be greatly increased if that control were used to help—instead of to crush—small and medium sized firms by smoothing away some of the difficulties which at present beset attempts to organize the industry on a co-operative basis.





PLANS OF 3-BEDROOM PARLOUR-TYPES HOUSES

Every attention has been given to obtaining variety and interest in the grouping of the houses, e.g., cul-de-sacs, quadrangles and variations in the building line to obtain set-backs. All the roads are of concrete, chiefly because concrete was found to be the cheapest form of construction, having regard to first costs and maintenance costs. The main ring roads were constructed slightly ahead of the houses and were used to bring building materials to the various house sites ; the necessity for rough building roads was thus dispensed with. Top, perspective by L. Bedger ; left, three-bedroom parlour type houses ; right, general view.



Typical precast lintol.

GENERAL.—Early in 1940 it was evident that the Building Industry generally (the medium sized and smaller sized contractors in particular) would be facing increasingly difficult conditions, and these matters were discussed by the Council of a Staffordshire Architectural Association with a view to discovering whether any action could be taken to mitigate the difficulties. As a result the Council convened a Meeting of the various sections of the industry in Staffordshire to consider the whole position. This Meeting thereupon inaugurated a Council of the Building Industry with the dual purpose of uniting local building interests and of bringing influence to bear upon Government policy to place Government work in the area with those sections of the industry normally carrying on business therein. To this end a memorandum was drawn up and submitted to the Local Members of Parliament, and steps were taken, through the R.I.B.A. and B.I.N.C., to persuade other areas to take like action. It will thus be seen that the framework of an organization capable of carrying out large Government contracts existed in Staffordshire in the early part of the War.

THE BIRTH OF THE SCHEMES.—Certain difficulties had arisen in connection with transport which were impeding the estimated full production of the factories through lack of accessible labour, and to overcome these difficulties it was clear that two courses would have to be adopted, namely, the improvement of transport facilities as far as possible, and as this could only be done to a limited degree, the provision of new living accommodation within easy reach of the factories themselves.

The Authorities were thus faced with a serious situation for production in the completed factories was limited by the amount of available labour which could be brought to the factories ; they therefore proposed to erect hostels as a partial solution of the difficulty.

The Senior M.P. for this area had been deeply concerned with these

problems for some time, and was convinced from his experience in the last war that hostels were not a satisfactory solution, particularly so having regard to the intention to employ married labour, both male and female. About this time he was invited by the Minister of Supply, Sir Andrew Duncan, to act as his representative in the area in relation to all matters concerning factories. He undertook this heavy responsibility and thus became directly concerned in, and responsible for, the clearing away of all obstructions to production. After careful consideration he came to the conclusion that some more permanent type of accommodation was necessary, and at his instigation two schemes were prepared on a purely speculative basis.

The former scheme took the form of permanent flats and was prepared, including surveys, in a little under a week; whilst the latter also took the form of flats, but planned for ultimate conversion into houses, and was prepared between mid-day on Friday, January 17, and the evening of Sunday, January 19, 1941. The two schemes were then taken to London and put before Sir Andrew Duncan on Monday morning, January 20.

It must be realized that at this time there was a Cabinet Minute against the building of houses during the war, but Sir Andrew Duncan, being convinced of the soundness of the arguments adduced in favour of this more permanent type of development, gave his unqualified approval, and it is undoubtedly owing to his enthusiasm and unstinted efforts that all difficulties were overcome and the way made clear for actual building works to proceed.

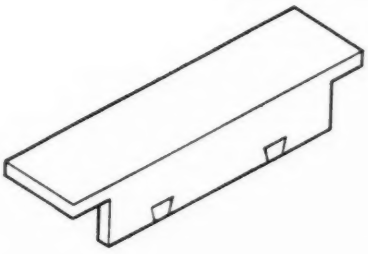
The first consideration by the Ministry's technical advisers was given to the Site "A" development as, at the time, this was considered as being the more urgent, and the scheme, as prepared for Site "A," was tentatively approved—subject to minor amendments.

At a later date when the position at Site "B" came under review, the Ministry took the view that they preferred to proceed there with a duplicate of the Site "A" scheme rather than to undertake a completely new form of development.

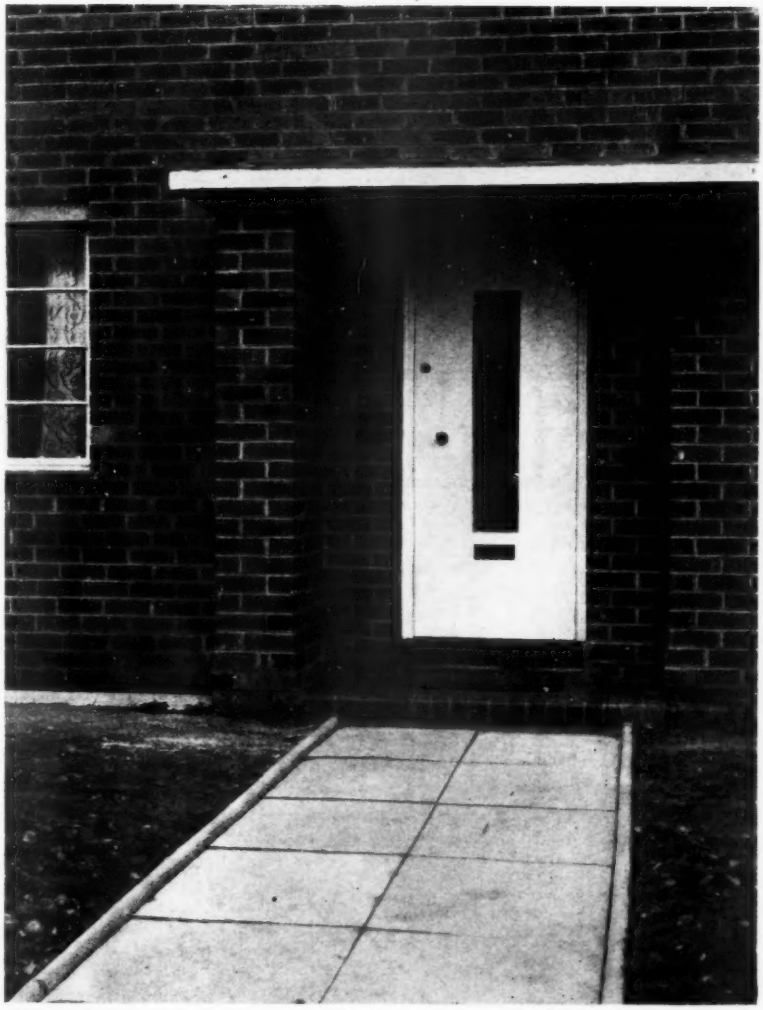
The negotiations which were necessary to secure the sanction of both the Cabinet and the Treasury occupied some little time; thus the works at Site "A" did not commence until March 25, and those at Site "B" approximately one month later. The estimated time for the completion of these two schemes was nine months each.

ORGANIZATION. — *Architects.* — In order to get the work done expeditiously the co-operation of local architects was obtained.

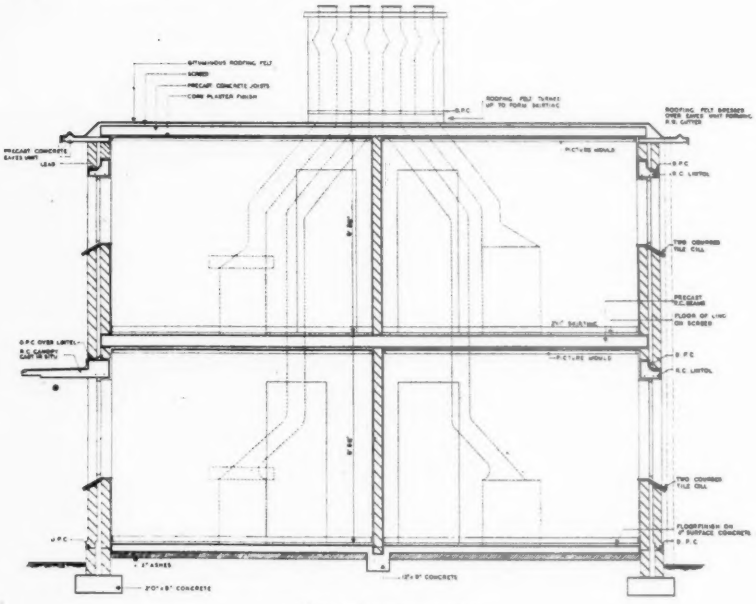
CONTRACTORS. — *Building Contrac-*



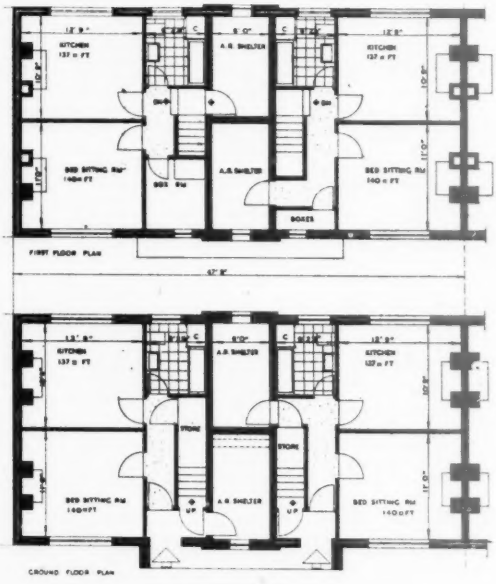
Detail of typical precast stair unit; right, standard units in position in staircase. Below, typical entrance to block of flatted houses.



A point of particular interest in both house and flat plans is the method adopted to provide air-raid shelters. In the house this is done by increasing the width of the normal through passage between pairs of houses and forming two separate air-raid shelters in the space so provided. In the flatted houses a similar method is adopted to provide air-raid shelters on both ground and first floors but after the war, when the flatted house is converted to a normal house, it is only the shelter walls on the ground floor which will be removed, since the first-floor shelters will be absorbed into the first-floor plan. Finishes are: Flats: Floors.—Hall, tiles; kitchen, wood blocks; bed-sitting room, wood blocks; bath room, terrazzo; air-raid shelter, concrete. Houses: Hall, tiles; sitting room, wood blocks; living room, terrazzo; scullery, quarry; bath room, terrazzo; first floor, concrete with provision for lino on felt.



Typical cross section.



Flatted type houses.

With the exception of the staff houses, plans of all the houses are similar, i.e., three-bedroom parlour types. Some of the houses are, however, designed so that for war-time use a separate flat is provided on each floor. After the war, with very slight alterations, these flatted houses can be converted back to the standard three-bedroom parlour type house. Plans of the normal type houses are reproduced on left; plans [of 3-bedroom houses are reproduced on page 212. Below general view of flatted type houses.

tors.—The purchasing of all materials was carried through by the main contractor, who invoiced them at cost to his co-contractors, charging a small percentage only for his extra secretarial expenses. The main contractors on each site signed the contracts with the Department.

Merchants.—To obviate any overlapping, to ensure a fair distribution of commissions and also in order to obtain the best service and, as it has since proved, the best prices from the local merchants, they agreed, at our suggestion, to the formation of a company to deal with our requirements on both sites. They appointed site agents and all enquiries were passed through them and distributed anongst their fellow merchants. As a measure of the success of this method we may mention that the merchants are very proud of their record that during the progress of these works, in spite of rises of price, they have not once asked for an increase over their estimates, but have been able by buying in bulk and ahead of advancing prices to cover for the Ministry. We think this in itself is a complete justification of the method adopted and an excellent testimonial to the service rendered by the merchants. So far as possible, materials were specified from local sources to avoid unnecessary transport.

Electricians.—In view of the heavy calls on electricians generally for Government work, it was decided to apply the co-operative principle to the local electrical contractors and in this they willingly concurred; thus the schemes had the benefit of the maximum tradesmen available in the area, and all electrical firms recognized by the E.C.A. in the area, however small, were given an opportunity of carrying out work if they wished for it.

Plastering.—This work was entrusted to the largest plastering contractor in the district although, of his own accord, following a conversation with us, he brought in his fellow contractors. During the course of the works delays made the introduction of one outside plastering contractor necessary on Site "A."

Bricks.—The brickmakers of this district were nearly all members of an Association, whose assistance was immediately sought, together with that of three firms outside the Association. In this way adequate stocks of bricks, made locally, were secured for the works.

With regard to facing bricks, two works were put into production entirely for these jobs and, except for transport difficulties, this arrangement worked satisfactorily.

THE WORK ON THE SITES.—Experience of the working of these schemes on the sites has been both interesting and instructive.

The original conception of the organization on the sites was to have three architects, each in charge of about one hundred houses—the whole to be worked collaterally. In practice this was found cumbersome owing largely to difficulties arising from the simultaneous construction of roads and houses, and also to the expressed desire of the Ministry to complete one section before commencing further work.

The site organization ultimately set up consisted—in addition to the two site architects already mentioned—of a clerk of works to superintend in detail the road contractors, and to examine and test all drains and sewers; occasional architectural assistant draughtsmen as required, and a full-time clerk. At Site "A" it was found necessary for a short while to employ a materials' clerk to assist with the checking and distribution of building materials to the contractors.

The Quantity Surveyors have had—in addition to the above—an office with measuring staffs on the sites.

It will be realized that in any such scheme there is an opportunity for the chief contractors to divert to their own use the best of the labour drafted to the sites by the Ministry of Labour, but any such tendency is checked if provision is made for such distribution to be arranged in collaboration with the site architect, and in this way an equitable distribution is assured.

The various contractors were at first diffident in regard to the transfer of labour from one to another as occasion demanded, but it must be recorded that at no time was this diffidence carried to the point of obstruction, and such transfers from time to time, as became necessary, at the direction of the site architects.

Conflicting claims from co-contractors for materials delivered to the site were dealt with strictly in accordance with the progress schedule laid down by the site architect, and priority given to those units having precedence of completion on the schedule.

These matters were discussed each Monday at a meeting between the main contractor and his co-contractors, followed by a meeting on the same morning with the site architects, and as occasion demanded, the lay-out architects and chief architect.

Each Monday afternoon, also, a joint meeting of the executives on both sites, consisting of the site architects, the main contractors and lay-out architects, was held with the chief architect, the architect in charge of the detailed drawings, the materials co-ordinating architect and the quantity surveyors, when all matters concerned with each site individually, and with the sites collectively, were considered. At these meetings questions of conflicting supplies of materials to the two sites were under review and transfers of labour from one site to another were effected from time to time.

It will be realized that, by these means, the conflicting interests of any section were subordinated to the general well-being and progress of both sites, to the ultimate benefit of the Ministry.

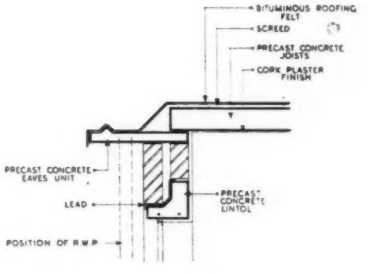
All matters appertaining to controlled supplies, including steel, petrol, timber, bitumen, etc., were dealt with from the offices of the chief architect, and applications made to the Departments concerned after close checking by the resident architects and the quantity surveyors.

Similarly, reservation of men and deferment of calling-up were also dealt with through the same office.

A general cover was obtained in the early stages by means of a personal letter from Mr. Ernest Bevin, whereby all men working on the sites were reserved *en bloc* until July 31, 1941.

Owing to the abnormal requirements of the Ministry in the area, two unexpected difficulties were encountered: one was a restricted supply of gravel and the other a shortage of local labour. In regard to the former, a survey of the gravel supplies in the district was made by the chief architect together with Mr. F. R. S. Yorke, A.R.I.B.A., of Sir Alexander Gibb & Partners, and an allocation agreed upon by the Ministry was the result. As far as labour was concerned, priority was given to the work on the housing sites and a transfer of labour was effected to Sites "A" and "B" amounting in all to two hundred men, although the transfer of the final allocation, as agreed, was never completed.

Quantities were taken-off on the original scheme, but before work commenced this was so materially altered that the quantities did not apply in detail and they were therefore used as a priced schedule. Before the Site "B" job commenced, new bills of quantities were taken-off and priced-in at the original price to arrive at the final estimated cost. The work is measured on completion at the scheduled rates, which are, of course, subject to fluctuation in the price of materials and labour rates, including payments under the Essential Works Order and the Uniformity Agreement. Payment is made to the general contractor who pays his co-contractors, but the quantity surveyors submit to him, with each certificate, a statement of the amounts due to his co-contractors. In view of the advantage to the Ministry of buying well ahead and stocking on the site, the normal percentage reservation on the value



SECTION THROUGH EAVES

The method adopted for detailing the eaves is shown in the drawing; two views of the eaves construction are also reproduced above. The centre photograph shows how the precast slabs are tailed down below the roof construction and also illustrates the method adopted to shutter the screed. Above, a general view; a perspective from same viewpoint appears on page 211.

of materials on the site is considerably reduced.

Appended are some detailed figures giving an indication of the scope of the works, and it should, perhaps, be mentioned in connection with the labour figures that, at the time these works commenced, a very large proportion of this labour was not engaged upon work which could, by any stretch of imagination, be termed "Of National Importance." It may thus be seen that by the adoption of this scheme considerable labour was soon made available for the use of the Ministry which could not, in our opinion, have been secured by any other means then possible.

In addition, we are confident from our experience on these sites that the local contractor can get a greater return per man hour from his employees by his own closer touch with the work and the long-standing loyalty between master and man, than can the larger impersonal contractor lacking these special qualities.

It is of prime importance that an integral part of any such scheme should be supervision by persons not only properly qualified, and therefore thoroughly capable of making decisions on the site, but also known and respected by the contractors. Only in this way can unnecessary friction be avoided and the many minor contentions arising from day to day be satisfactorily resolved.

DETAILS

NUMBER OF UNITS :—

Site "A"—
370 divided into 220 Houses
220 Flats
40 Staff Houses
480 Lettings

Site "B"—
328 divided into 250 Houses
156 Flats
406 Lettings

ESTIMATED COSTS :—

As Sanctioned :

Site "A" ...	£410,000	0	0
Site "B" ...	£410,000	0	0

From Original Bills of Quantities :

Site "A"—			
Houses	321,787	7	6
Roads & Sewers	74,424	18	0
	396,212	5	6
Community Buildings* ...	31,500	0	0
Total ...	£427,712	5	6
Site "B"—			
Houses	283,285	15	11
Roads & Sewers	106,550	0	0
Community Buildings* ...	31,500	0	0
Total ...	£421,335	15	11
	389,835	15	11

(Above figures do not include payments under E.W.O. or U.A.)

By Estimates to date :

Site "A" (17/12/41)—			
Houses	330,000	0	0
Roads & Sewers	55,500	0	0
Total ...	£385,500	0	0
Site "B" (24/12/41)—			
Houses	300,000	0	0
Roads & Sewers	65,000	0	0
Outfall Sewer & Sewage Works	13,513	0	0
Total ...	£378,513	0	0

(Above figures inclusive of payments under E.W.O. and U.A. *Not proceeding).

LABOUR :—

Site "A"—Rising from approximately 100 men in first fortnight to a peak of 695 in 25 weeks and averaging 561 to date.

Site "B"—Rising from approximately 100 men in first fortnight to a peak of 829 in 21 weeks and averaging 635 to date.

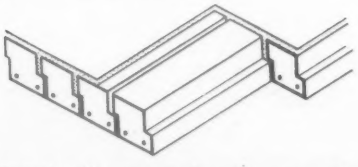
MATERIALS :—

	Commons	*Facings*
Bricks		
At Site "A"...	6,150,500	2,194,500
At Site "B"...	4,959,250	1,778,500
	11,109,750	3,973,000

DATE OF COMMENCEMENT :—

At Site "A"—
General ... March 25, 1941.
Staff Houses October 7, 1941.
At Site "B" April 28, 1941.

It must be realized that these are very approximate details taken out at the end of last year, and must not be taken as accurate.



Detail of pre-cast beams over air-raid shelter.

WANTED

A NEW DEAL IN THE BUILDING INDUSTRY

[*BY A SPECIAL CORRESPONDENT*]

This article should be read bearing in mind the experiment in housing just described, since it is a plea for the Government's co-operation with the smaller builder. The footnotes are editorial ones, added by way of commentary.

So far during this war there has been a difference of opinion on the best method of securing efficiency, which has never been properly thrashed out, and which has resulted in a kind of dual control that has had unsatisfactory consequences. The opposing principles might be described as State control v. private enterprise. The value of private enterprise has never been doubted in this country. It might, in fact, be described as one of the things we are fighting to preserve. On the other hand, a large measure of State control is obviously necessary in war time and the Government has by general consent been given such wide powers that it is scarcely possible to increase them.

So far, unfortunately, the exercise of these powers has had a tendency to stultify private enterprise instead of helping it along, and there is a general and very widespread impression that the output of industry in this country is not nearly so great as it ought to be. This doubt is expressed by criticism directed against the honesty and integrity of those responsible for organizing production, both in Government departments and in industry, which is, to say the least of it, unconstructive. The attention of politicians could perhaps be more usefully directed to studying the way in which the building industry has been affected by war-time controls.

The powers that have been conferred on the Government, in this field at any rate, could scarcely be more complete. It is the only client worth mentioning and controls apparently unlimited financial resources, which it can direct to whatever purpose it sees fit. It also

controls building labour and materials, and directs the use of plant and equipment. Such private building work as is undertaken must be licensed, and the licensing system is being extended to control even building work necessary for maintenance. In spite of the fact that these powers are there and are being exercised every day, the view is continually being expressed that the Government has not formulated a policy, and that the industry is in a state of disorganization.

This view is, to say the least of it, superficial. The Government cannot in the nature of things exercise these powers without organizing the industry for better or for worse. The question is not "Is the industry being organized?" but "Is it being organized to the best advantage, and if not why not?" The best way to approach this question is to start by analysing the system as it operates at present.

The process is as follows. Only approved contractors are allowed to tender for Government contracts. That is to say, only contractors whose financial resources are sufficiently large to enable them to undertake the risk of tendering for a large contract, i.e. £100,000. There are perhaps 1,000 to 1,500 firms who possess sufficient capital to do so. The firms which get the tender naturally get the labour and also the necessary materials and plant. It is the Ministry's job to see to this, and it appears to be coping with the problem with resolution and efficiency. Incidentally, however, there are 86,580 firms of builders in this country, and 85,580 mustering between them about 50 per cent. of the skilled labour in the country are sentenced to death by this procedure, except in so far as they are taken on as sub-contractors. According to the official estimate perhaps 40,000 out of the total number of firms registered are only capable of undertaking jobbing work, but what of the rest? Argument is that the smaller firm must die because only really large-scale organization is efficient. Comments on the efficiency of the particular type of large-scale organization, viz., monopoly, fostered by this policy, are to be found in the Report of the Select Committee on National Expenditure. There is little doubt about it that it is not efficient.

In theory, competition for future work and a desire for profit should secure that these giant firms do their utmost to execute the greatest possible amount of work in the shortest possible time, provided they are left free to organize their work without interference. The utmost possible therefore has been done to free them from control by professional men. This is right in principle. An organizer must be left free to organize in his own way. There can be no doubt that at present contractors enjoy that freedom.[1] Why then do we not get results?

The answer appears to be that in practice there is no competition. The essentials of the competitive system are (i) a higher rate of profit on work well done, i.e. done more economically than might be expected without corresponding reduction in quality; (ii) threat of future loss of work if work is badly done, i.e. unexpectedly slow or poor in quality; (iii) a really competitive tender, called by those who adopt the contractors' point of view, price cutting. Excessive price cutting undoubtedly results in bankrutpcy and other unpleasantnesses, but some measure of price cutting is essential to the proper working of the competitive system. It is in fact the only method by which reductions on cost are ever passed on to the public.

Excess profits duty automatically rules out (1): any profits above a certain rate, arbitrarily fixed, are confiscated. The war situation resulting as it has done in a tremendous pressure or work, *combined* with the very small number of contractors at present in a position to undertake the kind of work that is wanted, i.e. large contracts, rules out (ii), during the last two years no big firm could remain unemployed for long. The Ministry of Works and Buildings is doing its best to rule out (iii) by launching out a standard schedule of prices.

It is argued that this schedule of prices will not undermine the principles of free competition because the basis on which prices have been fixed, i.e. current rates for labour and materials are clearly stated, and can be revised from time to time as the normal workings of the competitive system bring about a progressive decrease in costs. This argument presupposes the competitive system is still operating and that there is still some incentive to reduce costs whereas quite clearly there is not. With (i) and (ii) out of operation, the contractor who completes his work quickly gains nothing.[2] He is not allowed a higher rate of profit, nor is he guaranteed favourable consideration when future contracts are granted. It may in some cases be to his advantage to spread his profits over a longer period. It is certainly in his interest to do so until he is absolutely ready to start his next job. He is not allowed to accumulate reserves to meet periods of unemployment, therefore in order to keep his organization together he must make sure that they are continually employed.[3] Under these conditions a schedule of prices is bound to have the effect of stabilising prices at the existing rate. What this means can best be seen by comparing the rate of output of a Russian Stakhánovite with the rate of output of an English bricklayer, as described by Sir Ernest Simon himself.[4]

No amount of appeals addressed to workmen is going to alter this. Because at present economies resulting from increased labour output may be swallowed up by inefficient organization in the sense described above, and the workman knows it. I do not mean to suggest that managements which act in this way are deliberately unpatriotic. It is their duty to do the best they can to keep their firms going. It is, however, an unfortunate fact which it is unwise to ignore, that the best method of doing this, under the existing system, does not necessarily involve getting on with the job as quickly as possible. With a tender based on the schedule of prices, there is a limit to amount of time a firm can spend on a job without actually losing money.[5] On the cost plus profit system there is absolutely no limit. In this sense the schedule of prices is a big step forward, but it is by no means a solution of the whole problem.

The only way of making certain that contractors on either system had no motive for delay would be for the Government to guarantee to pay them whether they are working or not for some considerable period. This would remove the last traces of free competition and turn the firms so treated into Government departments. Even if this were done it would not provide a motive for hurrying. It would merely make certain that there was no motive for not hurrying. England has always believed in a system of free competition as a stimulus to efficiency. Is it wise to deprive the contractors of this stimulus in the middle of a war? That is in effect what has been done, and as one might expect it has resulted in what can only be described as immeasurable drift.

Let us go back again for a moment to consider the matter from the point of view of the labourer to whom your "First on the job" posters are so often addressed. He is in exactly the same position as the contractor; he cannot be sacked—his wages are fixed at so much an hour. The only risk facing him is unemployment if he completes the job too quickly. An attempt has been made to encourage output by instituting piece rates, but there are grave objections to piece rates based on individual output.[6] In the first place the calculations involved are elaborate

[1] Is it true to say that the utmost possible has been done to free contractors from control from professional men? The appointment of agents and civil servants inside the departments is a step in the reverse direction.

[2] Excess profits take off the cream, but there is still a varying margin of profit underneath this level—profit between, say, 1 and 4 per cent.

[3] The continual employment, not so much of general labour, but of contractor's senior staff, is one of the most important reasons now operating.

[4] Moscow in the making.

[5] Though quite a number of firms are prepared to run at a loss in this sense and appear to consider themselves entitled to praise for doing so.

[6] Piece work and bonus system are not one and the same thing. Bonuses are paid by gangs, so there is a small measure of co-operation required.

(and the Ministry has set its face against complicated systems of accounting) and, secondly, because the average output per man, though it partly depends on the efforts of individuals acting independently of each other, depends to a much greater extent on how their work on the site is organized as a whole. The importance of co-operation in the actual work of construction is continually being emphasized by demands for works committees and site committees. Organization of workmen on the site is a problem that can be summed up in the one word—team work. Piece rates based on individual output do not encourage team work. On the contrary, they prevent it.

So much for the existing system. Is it surprising that results are poor? To suggest how these impediments to efficiency might be removed is more difficult, but it's time some attempt was made.

Let's go back to the beginning. The story started with the statement that only about 1,000 firms in the country are allowed to tender for Government jobs. There is a reason for this. Other firms have not the resources necessary to finance a large job. But can this reason not be removed? The Government is at present controlling finance, unskilled labour and materials, plant and equipment. Often the plant, labour and some of the materials arrive on the job first, the contractor next and professional men, if any, last of all. Under the circumstances is there any object to be gained by keeping up the fiction that it is necessary for the contractor to finance the job? Would it not be possible for the Government, working through a suitable agent, to advance money for the purchase of all materials, hire of plant and unskilled labour, without obliging the contractor to do so at all.[7] In relation to almost all of these things, there are controlled rates or fixed prices any way, so there is little or no scope for displays of business ability and ingenuity in this field.

Procedure of this kind would of course imply reversing the order in which the participants to a building operation usually appear. It would mean first of all sending a building administrator or agent, plus a staff of designers on to the site to design the whole layout from A—Z. Architect for site plans and layout, consulting engineer working under him for structural design of roads and drainage, heating and lighting engineers also, if necessary, for design of specialist installations and, finally, a staff of draughtsmen to prepare full sets of drawings and quantity surveyors to take out quantities, so that ultimately the *right* amount of materials could be ordered and delivered. Always bearing in mind of course that when bricks are asked for in war-time concrete may come instead. This, however, makes it all the more desirable not to get a contractor on the site at all, until plans and material suitable for each other are ready for work to proceed without a hitch on some unit of a reasonable size.

An outfit of this kind would secure all the advantages of large scale organization in building. It would make possible (i) large scale planning and all that that involves in the way of prefabrication and repetition; (ii) bulk purchase of materials, centralized hire of plant and other heavy equipment, scaffolding, etc., and finally a centralized pool of unskilled labour.[8]

At the same time it would completely cut out the risk of the industry as a whole being stifled by monopoly which is at present very great.

Any builder under a system of this kind would be in a position to undertake work at a fair price worked out by the quantity surveyor on the basis of a bill of quantities, known wages rates, and costs of materials; this could be a firm price (none of your quoting on or off) because all the unknowns except the skill and organizing ability of the builder and his team of workmen would have been cut out. Drawings would have been prepared to suit the site, materials bought, unskilled labour would be the same for everybody. Incentive to get the job done well and quickly could be provided by making efficiency (and there would be plenty of opportunity for comparison with several little builders working side by side) the basis for awarding future work[9] (possibly work on the same site not yet allocated to anybody), the competitive tender with the accompanying risks being cut out altogether. By cutting out the uncertainties of a competitive tender and making efficiency the sole criterion for the placing of future contracts an obvious motive *would* be provided for increasing output, and the quantity surveyor *would* be in a position from time to time to revise his methods of estimating in the light of reductions in cost, though it might be unwise to reduce rates by the full extent of earnings. A system of this kind would involve an accurate system of costing though not perhaps quite in the sense suggested by P.E.P. The quantity surveyor would have the responsibility of checking amounts of materials used by each contractor, also the length of time during which each retained the use of plant and equipment. On the basis of these calculations deductions or reimbursements would be made to each according to whether he was more or less economical than had been estimated. There would be inspection of work in process in the ordinary way to see that quality was maintained. This would also be in the hands of the quantity surveyor and the architect.

It would be the building administrator's job to draw up a time schedule for the whole site; to be responsible for all deliveries of materials at the right time, and also for having supplies of unskilled labour available as and when necessary. Before work started this time schedule would have to be either accepted or modified by each contractor in so far as the organization of the job as a whole made it necessary for him to work in with other people.

Any team getting their work done in half-time could take on extra work under another contract. Any team whose work was held up by a breakdown on the administrative side, i.e. late delivery of materials, would be paid at a fair average rate agreed beforehand so that they would run no risk from circumstances outside their own control. On the other hand, any contractor failing to keep up to the agreed schedule might be obliged to bear the cost of compensating others kept waiting through his delay. He would certainly not be able to shuffle off the cost of his own inefficiency on to the client. On this basis it should be possible to distinguish very clearly at the end of a big job who had and who had not been efficient.

The building administrator, together with all the other professional men employed, should probably be engaged in an annual contract and paid a salary in order to remove all possible incentive to be careless about costs. With a system of this kind their spheres of responsibility would be so clearly defined that it should be relatively easy to judge who was and who was not getting good results.[10]

I have said that this method of financing and organizing building would allow teams of craftsmen of any size to apply and get work on Government jobs. Naturally, I do not mean to imply that in no cases would it be necessary to stipulate that work should be undertaken by large firms. Big engineering jobs could certainly only be undertaken by firms of large size.

[7] Your alternative to the contractor running the job, is to transfer his main functions to a professional organization. The question arises whether some contractors might not be able to provide professional organizations, which would be an incentive in place of competition. In other cases professional organization might be able to take over the contractors' main responsibility.

[8] These advantages are not necessarily secured by appointing a chief contractor. They seldom employ competent consultants, and are often prevented from purchasing materials in bulk by the fact that sub-contractors prefer for one reason and another to purchase their materials themselves in small quantities.

[9] This is the crux of the matter. How can one measure the cost efficiency of a job? We have man-hours, man-hour costs, man-hour times, but we have no man-hour-cost-time efficiency ratio. Each job differs, and some means of measuring efficiency and incorporating this in a joint report by Q.S. and architect or organizer is essential.

[10] An engineering contractor on steel cannot be cleared off the site in time for a smaller building contractor to take over. (Many details, e.g. guttering, carcassing, machinery founds, may involve alterations in steel work.) This would be possible if all particulars were prepared beforehand, but since processes change with the fortunes of war, alterations become inevitable.

It would be part of the building administrator's job to decide in the light of type of plant to be handled and so forth, what were the smallest units in which work could be sub-contracted. On a housing estate the units could clearly be quite small, though one bigger organization might be necessary to take charge of road making, drain laying and excavating throughout. On the other hand, if a dry dock were being built, there would not be much room for small teams. In between, in the case of an office or factory requiring a framed skeleton of some type, a large engineering contractor would be needed to take complete charge of the framework; once this was completed the work might be broken up into units each contracted out to a single firm *completely* responsible for everything in that unit from wall panels to light fittings. Provided drawings were accurate, this arrangement need not result in difficulties. With increasing prefabrication the number of special tools needed for an all-in job of this kind should decrease rapidly, and in the same measure there should be increasingly less reason for having specialists sub-contractors responsible for all fittings of one type throughout a building. Instead it would be necessary only to have specialist designers working as part of the building administrator's team, responsible for designing everything of each type throughout in order to make certain that parts built separately fitted together. Developments of this kind would make the organization of building work very much easier by cutting out the need for everybody to stand around waiting for everybody else. They, however, presuppose that everything except the actual execution of the work is planned and organized, from start to finish, as a whole, by specialists.

The argument most generally advanced against a system of this kind is that there is a shortage of building administrators. This argument would be more convincing if attempts to find them had been made and failed. So far the only suggestion put forward by the Director-General for Works and Buildings is that the building industry should organize itself. He cannot expect this to happen, for he must know very well that the necessary finance cannot be acquired by whistling for it. Quite apart from this, however, the building industry does not want to organize itself in the sense in which organization is understood by large scale engineering contractors. They value what they are pleased to call their craftsman's independence. This is a somewhat unfortunate phrase because it suggests out-of-date methods. What they really value, however, is freedom to organize their own work in their own way and to take the consequences of their own efficiency or inefficiency. They value this freedom because their work requires skill.

Owing to the way in which building is at present organized, it is impossible to preserve this kind of independence and yet work on a large building scheme—the reasons for this are as a rule not technical but financial. The small firms cannot finance the purchase of materials; they cannot maintain the necessary administrators and officials to deal with the organization of the job as a whole on paper. On the other hand, their organization on the site is in many ways better than that of larger firms. They know their men and are in a position to say whether they are pulling their weight or not. The individual responsibility and personal contact they value so highly is something worth preserving. Absenteeism and a good many other troubles can be traced to the lack of it. It is not so much the little builders who are wrong as the present method of placing contracts and financing building operations. That needs altering, and fortunately it should be much easier to alter it than to alter the whole structure of the industry.

The necessary parts are all there from the Government agent down to the organization of the navvy ganger. The Government holds the cards in its hand; all that is needed is a slight reshuffle and a new deal.

[11] To sum up: two things are wanted (1) an understandable system of measuring cost efficiency and (2) an incentive to the contractor which bears the same relation to his work as that of the bonus to the men. The article hints at a possibility of the first, and we think is very interesting on that ground.—[ED. A.J.]

R.I.B.A.

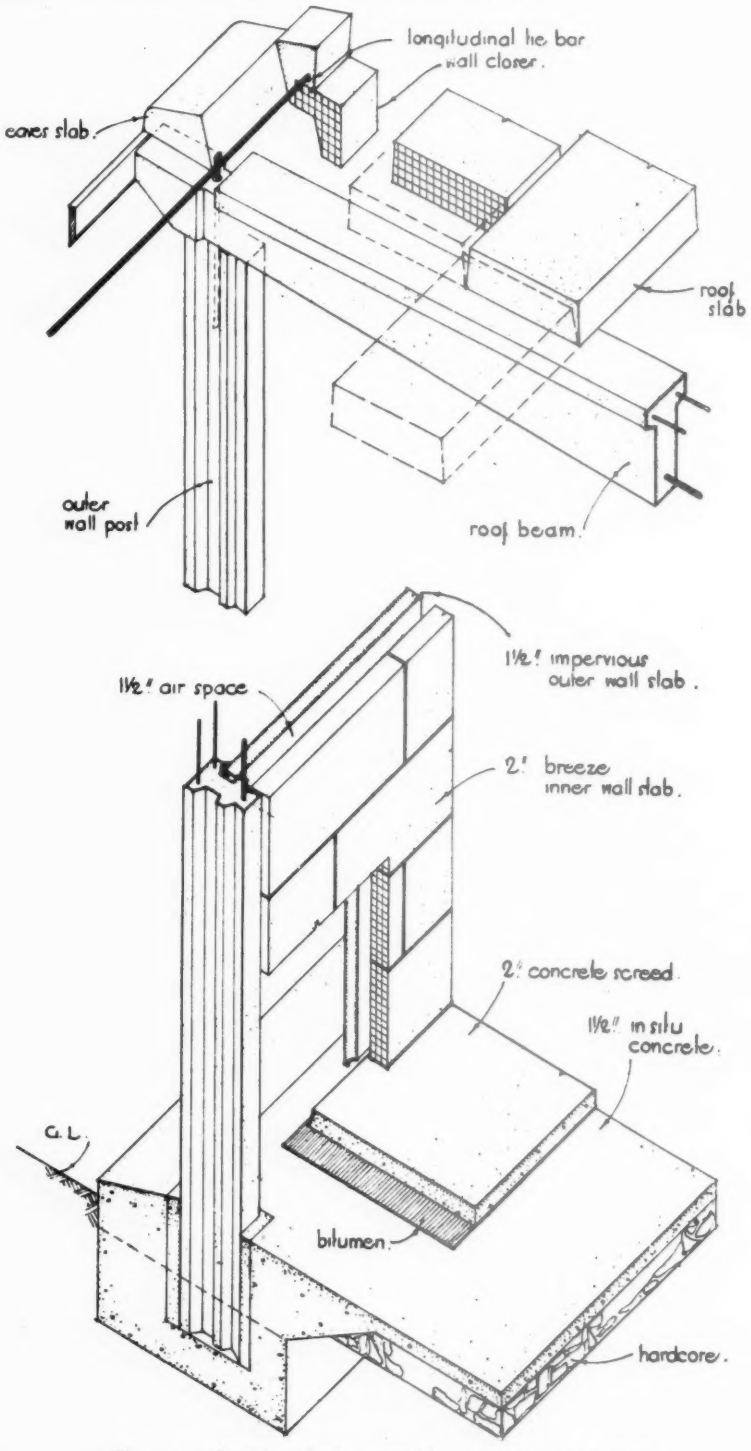
On Tuesday, March 10, 1942, the following members were elected:—

As Hon. Associate (*1*).—Denby, Miss Elizabeth Marian (London).

As Fellows (*9*).—Aldridge, Capt. Rowland de Winton (London); Elgar, Sidney (Salisbury); Howitt, Leonard Cecil, B.ARCH.L'POOL., DIP.T.P.MANCR., D.P.A. L'POOL., A.M.T.P.I. (Manchester); Roberts, Evan Wendell (Nottingham); Stern, Samuel (London); Wiseman, Arthur Eric (Chelmsford); Brooks, John McMullen (London); McAdam, Bernard Joseph (London). (*Overseas*).—Hill, Patrick Joseph (Johannesburg).

As Associates (*5*).—Hinchliff, John (Architectural Association) (Hoarwithy, Herefordshire); Manahan, John Gerard, B.ARCH. (University College, Dublin) (Dublin); Stutfield, Miss Elizabeth (The Polytechnic, Regent Street, London) (Harrow, Middlesex). (*Overseas*).—Hussey, Geoffrey Mark (Cape Town, South Africa); Morgan, Reginald Dewar (University College, Auckland, New Zealand) (Auckland, New Zealand).

As Licentiates (*11*).—Anderson, Arthur George (Knowle, Warwickshire); Cook, Geoffrey Walter (London); Dootson, Will (Kilmarnock, Ayrshire); Lloyd, Eric Thomas (London); Mutimer, Albert John (London); Offen, Stanley Ernest (Stanmore); Pye, James Frederick (Grimsby); Sharp, Thomas Wilfrid, M.A., M.T.P.I. (London); Smith, Peter Timmis (Somerford, near Congleton, Cheshire); Weller, Oliver Mandeville (Birmingham); Wright, Arthur George Beaumont (Trowbridge).



Clear span hostels. Basic assembly of structural elements.

In spite of the fact that the system has been evolved primarily to meet emergency building requirements, the structures are permanent in every respect and should not be considered parallel with lightweight, purely temporary systems, intended to last only a few years.

Both the Hall (clear span) and partitioned types have been developed by the British Concrete Federation to the instructions of the Directorate of Constructional Design of the Ministry of Works and Planning to meet the requirements of such varied applications as: Emergency schools, offices, emergency shops for bombed areas, canteens and recreation buildings, food stores, emergency housing, and housing for agricultural workers, and emergency laundry and welfare centres.

LETTERS

F. R. S. YORKE, A.R.I.B.A.
GORDON STEPHENSON, A.R.I.B.A.
H. E. DAVIES
J. CURTIS
W. H. ANSELL,
(President, Architects' Benevolent Society)
LAUNCELOT H. ROSS, F.R.I.B.A.

R.I.B.A. Elections

Sir,—The activity of the R.I.B.A. has increased in recent months and excellent interim reports have been prepared by the Reconstruction Committee.

In order to allow the membership to show their approval of this work and to strengthen the Council, which must be finally responsible for the policy of the Institute, we suggest that it is very necessary for the Council election to be held this year.

The last elections were held in 1939 at a time of great uncertainty. At that time the role of the R.I.B.A. was far from clear. The same is not true to-day, when the R.I.B.A. is in a position to give valuable advice to those responsible for post-war building and planning.

GORDON STEPHENSON
F. R. S. YORKE

Ideal Housing

SIR,—The general tendency to-day of architects and, I think, many members of the public concerning post-war housing is to favour what are termed "Ideal Housing Estates."

These estates are to be run on communal lines incorporating many schemes such as communal restaurants, etc., which have been forced upon us by the war.

Mrs. Brittan, in her letter in the February 5 issue, puts forward her ideas on the subject and I think these are an excellent example of what is favoured as our post-war housing. This consists of a fairly small estate with a key building centrally situated to house a restaurant and domestic staff.

Surely if these schemes are adopted we will be losing our individuality and independence for which we are so well known in the world and for which we

are also fighting. The British man has always wanted and always will want his own home and I don't think communal schemes form part of that home. Let us not forget, "An Englishman's home is his castle."

Also, far from abolishing that elusive "class distinction" we would merely be encouraging it, as we would find that the residents of all such estates would be of a similar standard of living and of a similar wage as the other people on the same estate. Would a man earning £10 per week live on an estate that was catering for men earning, say, £3 per week. And so the distinction between these estates would grow until it entirely dominated our mode of living.

Communal restaurants, etc., meet our needs of to-day satisfactorily but they will never cater for the individual which is so important to a peace-time nation. Germany has lost its individuality and in doing so the German people have also lost their freedom.

Make sure we keep *our* individuality which is the essence of our freedom.

J. CURTIS

Ashington

A.B.S. Christmas Fund

SIR,—Now that the Architects' Benevolent Society's Christmas Fund is closing, may I beg the courtesy of your columns that I may thank all those who have helped to make it a success. Although the total received, £697 15s. 0d., fell short by £49 15s. 8d. of that of 1939, it is in many ways more encouraging. 1,053 separate contributions have been received as against 864 in 1939, and whereas the previous appeal was made to many building and other industrial firms, this year's was to architects only. One gift in 1939 was for £100; this year our highest single amount was £25. There has thus been an awakening and spreading of interest and sympathy, for which the Council of the Society is grateful.

W. H. ANSELL

(President, Architects' Benevolent Society.)

The Year's Work

Sir,—Like many others, and for some years, I have enjoyed reading Professor Reilly's criticism of some of the year's work. His review in the New Year issue contains comment, however, which offends. Everyone agrees that the work of Messrs. Tait and Lorne is of the highest order, but Professor Reilly's disparaging remarks on the work of the late Sir John Burnet are both churlish and unnecessary.

It is unfortunate that an article of taste should show such a lapse.

LAUNCELOT H. ROSS

Glasgow

Architectural Blimpery

SIR,—At the age of fifty I have to prepare for the R.I.B.A. Special Final Examination, when my time could be far better spent on war work.

Despite my four years articles, my membership of the Architectural Association, and the fact that I have been paid as an architectural assistant for the past twenty-eight years, I have been refused Architectural Registration on the grounds that I have not seven years experience.

My professional sin may be that I spent seventeen of those twenty-eight years as an Architectural Draughtsman in the ranks of the Regular R.E.

H. E. DAVIES.

TRADE NOTES

Ceiling Type Electric Fans (B.S. No. 367-1941).—The British Standard for ceiling type electric fans has recently been revised. The previous edition published in 1932 has been carefully reviewed and has been brought into line with present-day requirements. Some Amendments have been made to the method of test. Additional definitions of rated voltage, regulator, types of enclosure and requirements dealing with the design of construction of fans, motors, speed regulators and suspension systems have been inserted.

Standard sizes of blade sweeps, speeds and standard voltages, frequencies and phases are now specified, but the performance of fans for non-standard voltages, frequencies and phases may be determined by the specification provided the appropriate clauses are complied with.

The question of specifying radio interference suppression methods was considered (see Clause 16, page 12, of the specification), but owing to the whole question being fully dealt with by another committee of the Institution, it is only touched on in this specification.

Noise from fans due to both electrical and mechanical causes (see Clause 17—silent operation) is also being considered by another committee of the Institution which has not yet completed its work.

Copies of the new specification and the revision (B.S.367-1941) may be obtained from the British Standards Institution, 28, Victoria Street, Westminster, S.W.1, both price 2s. 3d. post free.

At a meeting of Westminster Bank, Ltd., on January 28, the directors submitted the balance sheet as on December 31 last. This showed that the profit for the 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, amounted to £1,189,695 19s. 10d.; to this has to be added the sum brought forward from the previous year, £551,129 9s. 1d.; making a total available of £1,740,825 8s. 11d.

MOWP

The Minister of Works and Planning announces that, in consequence of improvements in the supply position, that it has been possible to discontinue the procedure whereby supplies of aluminous cement could only be obtained by an application supported by a certificate from the appropriate Government Department or other authority.

Supplies of the cement may accordingly now be ordered in the normal way through ordinary trade channels whenever its use is essential to expedite work of national importance.

At the same time the need for economy in the use of aluminous cement continues, and its use should be restricted to the type of case referred to in the preceding paragraph.

If difficulty should be experienced in obtaining supplies in such cases, particulars of the orders, and a statement of the justification for the use of the cement, should be furnished to the Director of Cement, Ministry of Works and Planning, Lambeth Bridge House, London, S.E.1, who will give every assistance possible.

Lord Portal, Minister of Works and Planning, has made the following appointments:—*Building Materials Board.*—Chairman of the Building Materials Board: Sir Harold Howitt, D.R.O., M.C., F.C.A., partner of Messrs. Peat, Marwick Mitchell & Co., Chartered Accountants. *Director of Cement.*—Director of Cement (in succession to Lord Wolmer): Mr. J. Norman Daynes, K.C., Chairman of the Coal Tribunal.

CENTRAL COUNCIL

Following is a list of members of the Central Council for Works and Planning and its Committees. Names of members of the Committees have just been announced.

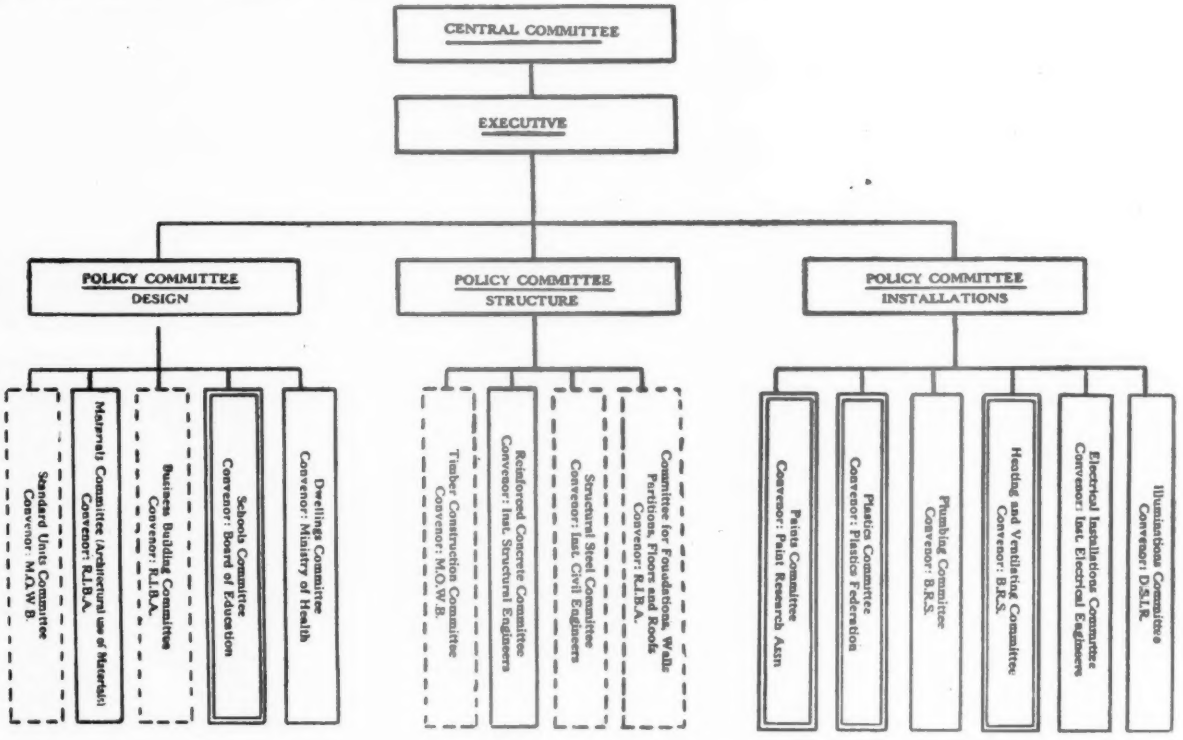
CENTRAL COUNCIL.—*Chairman*: Hugh Beaver. *Deputy-Chairman*: Sir Ernest Simon. *Members*: Sir Harry Brand, Sir George Burt, Richard Coppock, Luke Fawcett, Oswald Healing, Sir Clement D. H. Hindley, John Laing, F.I.O.B., Alderman Pitt, J.P., Tom Pugh, J. W. Stephenson, Percy Thomas. Scotland John I. Loudon, A. McTaggart. *Official Members (Ministry of Works)*: W. Leitch, C.B., Deputy Secretary; H. H. Montgomerie, O.B.E., Principal Assistant Secretary; T. P. Bennett, Director of Works; Major-General K. C. Appleyard, C.B.E., D.L., M.I.Mech.E., Director of Emergency Works. *Ministry of Labour*: G. H. Ince, Director of Man Power. *Secretary to the Council*: E. J. Rimmer, B.Sc., M.Eng., A.M.Inst.C.E., Barrister-at-Law.

Following is a list of members of the Committees of the Central Council for Works and Buildings:—

EDUCATION COMMITTEE.—*Chairman*: Sir Ernest Simon. *Deputy-Chairman*: Mr. Thomas. *Council Members*: Mr. Bennett, Sir George Burt, Mr. Coppock, Mr. Fawcett, Mr. Healing, Sir Clement Hindley, Mr. Laing, Mr. Loudon, Mr. McTaggart, Mr. Pitt, Mr. Stephenson. *Co-opted Members*: Mr. G. D. H. Cole, Director of Nuffield College Social Reconstruction Survey; Mr. F. E. Drury, Principal L.C.C. School of Building, Brixton; Mr. T. Howarth, O.B.E., F.I.O.B., President of National Federation of Building Trade Employers, Past-President, Institute of Builders, and Director, R. and T. Howarth, Ltd.; Dr. A. E. Morgan, Ministry of Labour and National Service; Mr. G. H. Parker, Vice-President, Building Industries National Council; Mr. J. W. Parker, Scottish Education Department; Mr. E. G. Savage, C.B., Director of Education, L.C.C. (late Senior Chief Inspector of Technical Schools and Colleges); Mr. A. Scott, M.B.E., F.R.I.B.A., M.I.Struct.E., Ministry of Health; Mr. H. B. Wallis, Board of Education; Mr. J. Wilson, O.B.E., F.R.I.B.A., Department of Health for Scotland

SPECIAL TRAINING.—*Chairman*: Mr. Cole. *Deputy-Chairman*: Mr. Stephenson. *Members*: Messrs. Coppock, McTaggart, J. L. Manson (Staff Inspector of Building, Board of Education), Parker, Pitt, J. Ferguson (H.M.I., Scottish Education Dept.). *Ex officio*: Sir Ernest Simon and Mr. Thomas.

EDUCATIONAL COURSES.—*Chairman*: Mr. Savage. *Members*: Messrs. L. H. Bucknell (F.R.I.B.A., Ministry of Works and Buildings), Drury, Ferguson (H.M.I., Scottish Education Dept.), J. B. M. Hay (H.M.I., Board of Education), Sir Clement Hindley; Messrs. Laing, J. H. Macdonald (Education Department, L.C.C.), R. L. Roberts (Past-President



First report of the Directorate of Post-War Building was issued a fortnight ago. It will approach the task not through research or experiment of its own, but by collating existing information and co-ordinating all activities pursued elsewhere. The work will be done through groups and committees, mostly actually or potentially in existence. A Director and three Assistant Directors have been appointed, Sir James West, O.B.E., F.R.I.B.A. (Chief Architect of M.O.W.P.), is Director in general charge of the Directorate, and, as such, Chairman of the Executive. Mr. John H. Markham, F.R.I.B.A., Assistant Director (Technical), generally superintends the necessary technical studies on both the architectural and engineering sides. Mr. Christian Barman, F.R.I.B.A., Assistant Director (Administrative), is responsible for the appointment of committees, for programmes and terms of reference, and for inter-committee publicity and reports, and for the preparation of all technical matter to be issued. Above chart shows structure of the Directorate. Committees formed or in process of formation are enclosed with single lines. Committees that have held one or several meetings are enclosed in double lines.

of Institute of Builders), B. Sandercock (Amalgamated Society of Woodworkers), Dr. R. E. Stradling (Ministry of Home Security, Research and Experiments Department). *Ex officio*: Sir Ernest Simon and Mr. Thomas.

APPRENTICESHIP.—*Chairman*: Mr. L. Fawcett. *Deputy-Chairman*: Sir George Burt. *Members*: Messrs. J. Ferguson (H.M.I., Scottish Education Dept.), J. B. M. Hay (H.M.I., Board of Education), Howarth, Loudon, Dr. Morgan, Messrs. Scott, Wilson. *Ex officio*: Sir Ernest Simon and Mr. Thomas. *Drafting Secretary*: Mrs. B. Wootton (Director of Extra-Mural Studies, London University).

CONTRACTS CONDITIONS COMMITTEE.—*Chairman*: Sir Ernest Simon. *Deputy-Chairman*: Mr. Healing. *Council Members*: Sir Harry Brand, Sir George Burt, Sir Clement Hindley, Mr. Loudon, Mr. Stephenson, Mr. Thomas. *Co-opted Members*: Mr. C. C. W. Goodale (Head of Contracts Branch, Ministry of Works and Buildings); Mr. W. T. Halcrow, M.Inst.C.E., M.I.Mech.E. (Partner, W. T. Halcrow and Partners, Consulting Engineers).

LABOUR CONDITIONS AND WELFARE COMMITTEE.—*Chairman*: Sir Ernest Simon. *Deputy-Chairman*: Mr. Coppock. *Council Members*: Messrs. McTaggart, Montgomerie, Pitt, Pugh, Thomas. *Co-opted Member*: Mr. A. W. Garrett (H.M. Chief Inspector of Factories).

REGIONALISATION COMMITTEE.—*Chairman*: Sir Ernest Simon. *Deputy-Chairman*: Sir George Burt. *Council Members*: Major-General Appleyard, Messrs. Coppock, Loudon, Pitt. *Co-opted Member*: Mr. C. T. Every (Assistant Director of Emergency Works, Ministry of Works and Buildings).

WORKS COMMITTEE.—*Chairman*: Sir Ernest Simon. *Deputy-Chairman*: Sir Clement Hindley *Council Members*: Mr. Bennett, Sir George Burt, Messrs. Coppock, Fawcett, Healing, Ince, Laing, Montgomerie, Stephenson. *Co-opted Members*: Mr. I. Bowen (Chief Statistical Officer, Ministry of Works and Buildings), Mr. P. Gilbert, O.B.E. (Director of Bovis Ltd.)

LAW REPORT

High Court Judge and Duty of Architects.

In the King's Bench Division, High Court of Justice, on February 23, Mr. Justice Hallett concluded the hearing of an action by Miss Amelia Gliksten, of Hill Street, Mayfair, London, against Messrs. S. Clifford, Tee and Gale, architects and surveyors of Moorgate Hall, Moorgate, London, to recover damages for injury plaintiff had sustained by the alleged negligence of the defendants and on breach of duty on the part of the defendants as architects and surveyors and agents for the plaintiff in connection with the building of an air-raid shelter at 30, New Bond Street, London, of which the plaintiff was the leaseholder.

Mr. Cartwright Sharp, K.C., and Mr. Astill Burt appeared for the plaintiff, and the defendants were represented by Mr. A. F. Salter, K.C. and Mr. Suffert.

The case for the plaintiff was that she constructed under her obligations under the Civil Defence Act an air-raid shelter at New Bond Street in August, 1939. She now claimed damages by reason of the fact that the defendants, who acted for her in the construction of the shelter, neglected to serve the two lessors in the building with the usual notices before the work was actually begun, thus preventing her from recovering part of the costs of the shelter amounting to £258. She further alleged that through the defendants' negligence she had brought an abortive action in the Westminster County Court.

Defendants denied plaintiff's allegations and pleaded that they used all reasonable skill in the exercise of their duties.

His lordship, in giving judgment, said in this case the plaintiff had said that Mr. Tee had promised to look after her if an air-raid shelter were needed. In his lordship's judgment that did not put upon the defendants any duty towards the plaintiff. It was the sort of thing any professional man would say if a known client came to him and mentioned a matter they were interested in. It was quite impossible to suggest from a phrase of that

FACTS ABOUT GLASS FOR ARCHITECTURAL STUDENTS

No. 10—"Armourplate"

and other toughened glasses

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Protection: "ARMOURPLATE" if broken disintegrates into innumerable small pieces, not sharp enough to cause serious injury.

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QUALITY:

"ARMOURPLATE" retains the qualities of ordinary polished plate glass, namely, transparency, brilliant lustre and flatness of surface. It does not discolour under any conditions. Its expansion when heated is the same as that of ordinary plate glass.

Each piece of "ARMOURPLATE" is indelibly branded "ARMOURPLATE" as a guarantee that it has been subjected to the special toughening process and has passed the standard tests at our Works.

SIZES AND THICKNESSES:

Thickness	Length	Width	
3/16" *i.e.* 4.8/5.5 mm.	51"	25"	Sizes over 3 ft. should be as near 5.5 mm. as possible.
¼"	70"	52"	Sizes over 9 ft. super to be in 17-20/64 ins.
5/16" ⅜"	82"	70"	Also strips 9 ins. to 18 ins. wide × 110 ins. long.
½"	82"	70"	
⅝"	70"	52"	
¾" ⅞" 1" 1¼"	Can be supplied in sizes up to 8 sq. ft. Larger sizes in these thicknesses should be submitted for consideration.		

"ARMOURPLATE" can be supplied in most shapes if not too irregular. Any unusual shapes should be submitted for our consideration.

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The toughening process can be applied to certain other forms of glass, but the extent to which the strength of the glass and its resistance to temperature changes can be increased depends upon the type of glass used.

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TYPES
- Toughened Black Glass
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- Toughened Stippolite and Selenium Glass
- Toughened Tinted Polished Plate

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Holes should not be near the edge of "ARMOURPLATE," and when bevelled glass is required, not more than ¼" of glass must be removed, so that ¼" glass must be left ½" thick on the edges; thus ⅜" glass must be left ¼" thick on the edges, and so on. Care is necessary in handling and fixing "ARMOURPLATE" Glass so as not to damage the edge of the sheets by chipping. The edge of "ARMOURPLATE" and Toughened Glass is not stronger than the edge of ordinary glass, and wherever possible the edge should be protected.

SOME USES: "ARMOURPLATE" for Automatic Cigarette or Ticket Machines; Battery Assembling Tables; Gas and Electrical Cooker Doors (single and double glazed); Drying Tables in Chemical Plants; Display signs suitable for hanging outside Hotels, etc.; Glasses for Meters; Electric or Gas Floodlighting; for Hospital, Locker, Trolley and Table Tops; Screens; Shelves; Windows for Mental Hospitals; Miners' Cap Lamps; Rough-usage Mirrors (silvered); Machinery Guards; Porthole Glasses; Drawing Office flat Printing Frames; Road Signs; Vacuum Pan Sight Glasses; Furnace Flue Inspection Doors; Fire Screens; Fire Blowers; Frameless Entrance Doors.

OTHER TOUGHENED GLASSES for Electric Fires (Tinted Cathedral); Fish and Chip Range Backs; Motor Pit Lights; Underwater Lighting; Trawler Floodlights; Gas Radiators; Hospital Equipment; Windows in Mental Hospitals; Police Cell Windows; Road Signs; Shop Fronts; Canteen Hot Closet Tops, etc.

This is published by Pilkington Brothers, Limited, of St. Helens, Lancashire, whose Technical Department is always available for consultation regarding the properties and uses of glass in architecture.

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kind that there was any duty or obligation of any kind on the part of the professional man. The plaintiff had put her case too high in that respect. He thought defendants also put their case too high when they said they were in no sort or kind of duty towards the plaintiff until they received her letter. The professional duty of the defendants started from the time they offered the plaintiff professional advice. He came to the conclusion that there had been no negligence here on the part of the defendants and he entered judgment for the defendants with costs.

HOUSING CENTRE

At a recent meeting of the Housing Centre, Mr. W. A. Robson spoke on Regionalism, with special reference to regional planning. He juxtaposed the two types of regionalism : regional local authorities, which have been on the carpet for 20 or 30 years, and the Central Government Regions introduced [as emergency measures] in the present war. The former is a scheme based, first, on the need for widening the present local government areas, in view of the services which require large areas for their proper administration [such as roads, main drainage, police, hospitals, town and country planning] ; it is further based on the need to reconcile the large city council and the county councils, where the town population is spilling over the city boundaries, creating divided allegiance of the inhabitants and various other difficulties.

The other form of regionalism is entirely different : the twelve Regional Commissioners set up during the war are not local government raised on a higher level, but superimposed on local government to act as the eyes and ears of, and in case of invasion to act for, the Central Government.

The question is whether after the war the superimposed regional machinery should be regarded as non-existent, or whether one should use it for the development of democratic regionalism. In spite of counter arguments, Mr. Robson favours the second alternative : the existing foundation is something to start with ; the number of regions might in time be increased to 30 or 40 ; and the organization can be brought into line with the regional council to be elected after the war as the organ of democracy in the region.

There should be a " two-deck " structure of local government, not more : the regional council and one lower deck only, viz., a single town council or county council. These councils would be too far removed to work down to the people, so there should also be local committees in wards and streets (a difficulty is how to invest these committees with responsibility). What must be avoided is separately elected autonomous authorities covering the same area ; the number of independent local authorities has to be reduced.

The most important single task of the regional organization is planning on a regional scale. But there must be real collaboration between the regional and the central planning departments. Instead of the present practice of local or regional councils submitting their plans to the Ministry for trifling comments, Mr. Robson suggests that the Central Government have a say in the process of regional planning. For this purpose, the regional council should have along side it a regional planning commission which includes a representative, perhaps as chairman, of the Central Government as such and representatives of the pertinent central departments. It would certainly be an innovation to have Central Government officials sitting at the same table with elected regional councillors, but such a new kind of co-operation between central and local government would only be to the good by creating a joint responsibility for achieving a common end.

MASTIC ROOFING

Mastic Asphalt for Roofing is the title of a booklet recently issued by the British Standards Institution (B.S. 988 : 1941). In the foreword it is stated that " The immediate issue of this specification for mastic asphalt for roofing, the work for which was started some years ago, was undertaken as a result of representations that there was a need for specifications for this class of materials. In issuing this publication the committee desires to emphasise the fact that these specifications are not in themselves war-time formulæ. The committee are advised that mastic asphalt as defined herein has been widely used for many years past under guarantees of performance. Users are therefore reminded that the specifications purport only to contain technical provisions, but do not purport to include all the necessary provisions of a contract. The committee also desire to emphasise that the types and grades of mastic asphalt defined herein are based on the experience and technical practice of certain branches of the industry. They have been drawn up to employ ingredients normally used in peace-time and these are still available. The specification does not at present include types of mastic asphalt which embody those ingredients which are not available at this time, such as natural asphalt rock, flux oil, etc., the importation of which into this country is at present impossible. A final complete Specification for Mastic Asphalt Roofing will be issued in due course and will cover and embody all the appropriate types and grades, including those referred to above."

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