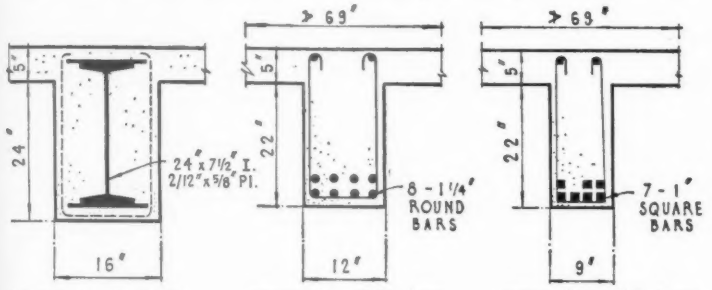
Conserving Steel in FLOOR AND FLATROOF CONSTRUCTION

Article Number Four in a new series on the principles and practice of reinforced concrete construction. It is suggested that each article should be cut out and kept in a personal file for the series, and for other information relating to reinforced concrete construction.



DESIGN A. *Structural steel beam at 8.5 tons per sq. in.*

DESIGN B. *R.C. beam reinforced with normal mild steel plain round rods at 18,000 lb. per sq. in.*

DESIGN C. *R.C. beam reinforced with works-hardened square twisted bars at 27,000 lb. per sq. in.*

To-day, and for a long time to come, the conservation of our steel resources must be the vital consideration of those who plan—bearing in mind, of course, that the use of the least amount of steel must be compatible with maintenance of the accepted safety factor.

Now in modern fireproof construction there is no alternative to reinforced concrete for floors and roofs whether for light-weight hollow or ribbed construction, or for a heavy-duty solid slab. It falls to the architect, therefore, to select the most suitable type of slab and, other things being equal, he will naturally choose the most economical.

Architects are fully aware that the weight of steel reinforcement is reduced to a minimum if high strength steel is employed. Savings are considerable when such material is used in the form of works-hardened reinforcement.

For example, by simple calculations it can be shown that in an office floor of hollow tile slab construction there is a saving of 30 per cent. in the weight of steel required if the concrete ribs are reinforced with square twisted bars instead of plain mild steel round rods.

A similar saving is effected in, say, a warehouse floor requiring a solid reinforced concrete slab. The alternative employment of fabricated meshes of twisted square bars of works-hardened steel leads to immense savings in labour as well as a saving of 25 per cent. in the weight of the steel.

The introduction of reinforced concrete beams to support reinforced concrete slabs is also worthy of the architect's close consideration. The three alternative sections illustrated are designed to carry identical floors. Designs B and C in reinforced concrete require smaller overall sections than does A. Thus the architect is immediately presented with more headroom (or reduced storey-height and consequently savings in walls), less concrete (and consequently less dead-load). Comparison of the two reinforced concrete sections shows that by adopting the design B with normal mild steel rods, the architect can save 55 per cent. of the steel required in the steel beam, design A. Adoption of design C reinforced with high strength steel results in a saving of 65 per cent. compared with design A and 30 per cent. compared with design B.

From even a cursory examination of these figures the architect will realize that worthwhile monetary savings accrue from the use of concrete reinforced with modern works-hardened steel.

THE ARCHITECTS' JOURNAL

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

THURSDAY, MAY 21, 1942. NUMBER 2469: 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*

"They made a front just like St. Paul's
Or like Westminster Abbey,
And then as if to cheat the Lord
They made the back part shabby."

Rev. C. H. Spurgeon.

NEWS

★ *Formation of a committee for the Industrial and Scientific Provision of Housing* *page* 353

★ "*Within a few months everyone who has anything to do with the administration, design or superintendence of war-building schemes will be a direct employee of a Government Department*" *page* 354

APPOINTMENTS

Mr. T. S. Tait, F.R.I.B.A., has resigned from the Ministry of Works and Planning. His post as Assistant Director of Post-War Building (Standardization) is to be taken by Mr. Francis Lorne, F.R.I.B.A. The work of the Committee on Building Materials Standardization is to continue, under the chairmanship of Mr. H. Ryle, A.R.I.B.A., with Mr. Frederick MacManus, A.R.I.B.A., as Secretary. Mr. F. R. S. Yorke, A.R.I.B.A., has been appointed Assistant to Mr. Christian Barman, F.R.I.B.A. (Assistant Director, Administrative).

Sir Giles Gilbert Scott, R.A., has been appointed architect for the rebuilding of Coventry Cathedral, which was blasted in the blitz of 1940. We understand that the outer walls which remain will be repaired and that the spire will be undisturbed.

ARCHITECTS' BENEVOLENT SOCIETY

The President, Mr. W. H. Ansell, M.C., P.R.I.B.A., in moving the adoption of the annual report of the Architects' Benevolent Society at the Society's annual meeting, said that the Council were constantly considering new ways of raising funds, and their aim was to arouse in all architects a sympathetic interest in the work of the Society. Over a thousand donations had been received in response to the Half-Crown Appeal, a considerable increase over the number received for the previous appeal, and the majority were from new contributors, which was very encouraging to the Society. The report was adopted.

The Council and officers were elected for the year of office 1942-1943 as follows:

President, Mr. W. H. Ansell, M.C., President, R.I.B.A. Vice-Presidents, Sir Harry Vanderpant, Hon. A.R.I.B.A.; Sir Banister (Flight) Fletcher, P-P.R.I.B.A.; Sir Charles A. Nicholson, Bart., F.R.I.B.A.; Mr. H. Greville Montgomery, Hon. A.R.I.B.A.; Captain H. S. Goodhart-Rendel, P-P.R.I.B.A.

Ordinary members: Messrs. S. Phillips Dales (F.), G. E. Soulsby (S.), L. Sylvester Sullivan (F.), Charles Woodward (A.), F. R. Yerbury (Hon. A.), W. Curtis Green (F.), H. Austen Hall (F.), F. R. Hiorns (F.), J. A. Slater (F.), Anthony Minoprio (A.), S. H. Hamp (F.), C. H. Holden (F.), A. H. Moberly (F.), F. Winton Newman (F.), S. Tatchell (F.), Francis Jones (F.) (representing the Manchester Society), C. M. Hadfield (F.) (representing the Sheffield, South Yorkshire and District Society), Ernest Bird (F.) (representing the Hampshire Society), Arthur C. Russell (L.) (representing the Essex, Cambridge and Hertfordshire Society), T. Taliesin Rees, F.S.I. (F.) (representing the Liverpool Architectural Society), Cecil Burns (F.) (representing the South-Eastern Society), J. R. Leathart (F.) (representing the Architectural Association), P. W. Lovell, B.A.CANTAB., F.S.A. (A.) (representing the London Society), Vincent Burr (L.) (representing the Institute of Registered Architects), E. Hadden Parkes (F.) (representing the Mount Pleasant Artists' Rest Home), Miss B. Priestley (representing architectural students).

ROOFING SLATES

The Director of Roofing, Ministry of Works, is able to release supplies of roofing slates to merchants whose stocks have been reduced below a certain figure. When the enemy started raiding this country on a large scale, it became necessary to ensure that all slates produced by the quarries were used for essential repairs. This was not an easy task, particularly as the output decreased when, at the outbreak of the war, many skilled quarry workers found other occupations. Merchants' stocks were depleted rapidly to meet the emergency. These could not be fully replenished, as this would have "frozen" large quantities of slates in areas where they were not needed, at the expense of districts where the demand was urgent.

The present release of stocks will result in a general dispersal of roofing slates throughout the country, a step which is desirable in the national interest. An adequate reserve is being maintained at the quarries for dispatch to any district in case of emergency.

Considerable economies in transport have been achieved by the distribution scheme which has, since its inception, operated on a voluntary basis with close co-operation between the Director of Roofing, the slate quarries, the slate merchants and the roofing contractors.

In accordance with this scheme, Welsh slates may not be delivered to the south-west of England, while the Cornish quarries may not send their slates to the north, which is served by the Westmorland and Welsh quarries.

The new release of slates will be delivered in full truckloads only.

WASTE PAPER

The country's need of waste paper is as urgent and pressing as ever. It is wanted for making nearly every kind of munitions, and on these the safety of every one of us depends. Have *you* done everything you possibly can to hunt out all *your* waste paper and made sure that it is handed over for repulping? Have *you* gone through your plan chest, your file, your cupboards, your drawers, your collection of old drawings, specifications, bills of quantities, correspondence, etc.? If not, *do it now*. And if you *have* religiously gone through the accumulation of years, are you going steadily on day after day, and week after week saving every available scrap? That is what the country wants from each one of us.

architect's trip to augsburg

In one of the Lancasters which recently paid a daylight visit to the M.A.N. works which make diesel engines for U-boats at Augsburg, the ancient Bavarian capital which lies 30 miles to the south of Munich, was an architect, Pilot Officer Desmond Ossiter Sands, A.R.I.B.A., a twenty-three year old Australian. He didn't have much time to study the architecture. Only five of the twelve planes came back, but Pilot Officer Sands was in one of them, and for his " courage, fortitude and skill of the highest order " he was awarded the D.F.C. The photograph above was taken after his investiture by the King.

A.A.S.T.A. EXHIBITION

An exhibition of paintings on behalf of the " Aid to Russia " Fund of the National Council of Labour is to be opened on June 4 at 3 p.m. by Madame Maisky at the house of Mr. and Mrs. Ernö Goldfinger, 2, Willow Road, Hampstead. N.W.3. Exhibition will remain open until June 21 between the hours of 3 to 9 p.m. weekdays and 11 a.m. to 9 p.m. Sundays. Exhibits will include paintings by Eileen Agar, Rita Kernn-Larsen, Henry Moore, John Piper, Graham Sutherland, Derain, Picasso. Admission 1/-. Lectures and discussions on various aspects of Soviet life will be announced later.

WAR DAMAGE

Following notice has been issued by the Board of Trade :

The Board of Trade, acting through the Insurance and Companies Department, is responsible for three War Damage Insurance Schemes.

(*a*) The Commodities Scheme, covering traders' stocks.

(*b*) The Business Scheme, covering plant and machinery and business equipment generally, as well as a special scheme for farmers to cover the farmer's equipment, livestock, crops and goods on the farm.

(*c*) The Private Chattels Scheme, i.e. furniture, clothing and other effects belonging to private persons.

The Board of Trade is not responsible for insurance against damage to buildings, houses or other fixed property, or for Marine Insurance, which fall under the War Damage Commission and the Ministry of War Transport respectively.

Insurance under the Commodities and Business Scheme is compulsory where stocks or business equipments, as the case may be, exceed £1,000 in value (£200 in the case of foodstuffs). Insurance under the Chattels Scheme is voluntary. In the case of farmers, special arrangements apply.

It is to be noted that if a person does not insure he is not entitled to any compensation, apart from the free cover provided under the Private Chattels Scheme, but there is no free cover under the Commodities or the Business Schemes.

In view of the resumption of bombing, it may be of interest to explain the claims organization of the Board of Trade and the way in which it is functioning under existing conditions.

In order to deal efficiently and rapidly with all claims, the Board of Trade in June, 1941, decentralized the claims administration by dividing the United Kingdom into 35 insurance districts, 4 of which embrace the London Area. With the co-operation of the Insurance Companies and Lloyd's, they have appointed in each district outside London, a Committee consisting of the Managers of the Branches of certain of the leading Insurance Companies in the respective districts, who are responsible for dealing with claims under the Commodities and Business Schemes arising in the districts. Much time has been devoted by Members of the Committees, particularly in the heavily bombed areas, to this work and their work has been of the utmost value, not only to the Board of Trade, but to the country as a whole. In the London Area, the arrangement is slightly different. Insurance officials have been seconded by leading Companies to each of the four districts and the work of co-ordination is carried out by a Committee of Management of which the Chairman is Mr. Walter Carter and Sir Stanley Aubrey is Deputy Chairman. The work of the Committees is carried on under the general direction of the Insurance and Companies Department of the Board of Trade.

During recent raids, Members of the Committees at Bristol immediately visited Bath in order to supervise the claims work arising in the town and to assist claimants. Additional assistance was also provided immediately from headquarters by the Insurance and Companies Department. In the case of Exeter, the District Committee at Plymouth immediately appointed a Sub-Committee to deal with the situation at Exeter. Action on similar lines was taken in the cases of Norwich and York.

While the Private Chattels claims fall under the general jurisdiction of the Insurance and Companies Department,

claims are dealt with by the District Valuers of the Inland Revenue on behalf of the Board of Trade and not by the District Insurance Committees. In all the cases mentioned, the Inland Revenue took special steps to assist claimants in the towns that have suffered.

To assist small traders, particularly in the salvaging of their stocks, the Board of Trade is encouraging the establishment of Mutual Aid Associations to act in close co-operation with the District Insurance Committees.

It is most important that traders should familiarise themselves with the Government Insurance schemes which exist for their protection. They can do so by consulting the insurance company, broker or agent through whom they effect their ordinary fire insurance.

PREFABRICATION

A lecture on "Prefabrication in War-time" was given by Miss Justin Blanco-White to a meeting of the A.A.S.T.A.

The lecturer said she would speak about prefabrication of the structure of a building, although rationalization of the site work, services and internal partitions and services was equally necessary. Five factors were influencing the design of wartime huts: materials, ease of erection, performance and strength, output and use value.

Despite the knowledge on the subject available from other countries the work started from scratch at the beginning of the war. At first timber and steel were extensively used. The early Ministry of Supply timber hut, in which walls and roof were boarded on the site, was discontinued because it was uneconomical, inaccurate and clumsy to handle. It was superseded by an officially sponsored plaster-board hut, which reduced the timber to a quarter or one-sixth, the wall and roof units being of felt-covered plaster-board on a very light frame. The structural use of plaster-board was an innovation for outside walls, and the accurate calculation of the trusses saved material and greatly increased the strength. "The resin-bonded plywood hut, where the material again is a new one, is perhaps the high-water mark in hutting design; the hut is strong, simple, completely prefabricated, including partitions, and is put up in a few hours. It is not a serious solution to the hutting problem because output cannot be developed far enough during the war. The Nissen hut is very popular with the authorities because it is cheap, strong and easy to put up. But it is less popular with the troops, and shortage of steel is now ruling it out."

Shortage of other materials made the design of a concrete hut essential. By comparison with a plywood hut a concrete one was made up of very small pieces and therefore slower to build, but compared with other heavy constructions it achieved a good deal. It provided a rationalized masonry technique and a high standard of permanency and finish without the use of skilled site labour. The most important concrete design—because it had the backing of most concrete product firms—was the B.C.F. hut, designed on the principle of beams and posts spaced so as to take unreinforced wall and roof panels. It was desirable, of course, that the many firms making concrete huts should concentrate on a few types, rather than all sinking their money in different moulds of irreconcilable dimensions.

Other types than the B.C.F. had a wider spacing of posts with reinforced panels; some had light roofs, and one, using wood-wool slabs, had full-height wall sections.

In concluding, Miss Blanco-White suggested that a universal type of hut might be worked out to use each material in its most appropriate place—light materials for roofs, heavy for walls, impervious materials for weather proofing, and porous ones for lining. This would make the best use of what light materials were available, although some heavy roofs might still be needed. This was feasible now that standards were officially fixed and designs co-ordinated by a central committee.

During the discussion, Mr. Fisher, of the B.C.F., gave fuller details of the hut, including the fact that 180 different works are now collaborating to produce the standard huts throughout the country. He also stated that the B.C.F. were redesigning the hut so that other materials in good supply, such as asbestos and plaster-board, could be used to advantage.

Committee for Industrial and Scientific Provision of HOUSING

IT is very important for us to make sure that a large rehousing programme can be rapidly executed after the war. Available statistics suggest that the building industry cannot, without drastic reorganisation, hope to complete such a programme at the necessary speed, even with excessive dilution of labour and capital. A committee for the scientific and industrial provision of housing has recently been formed to investigate the possibility of manufacturing parts of houses by modern production methods and delivering them to the site ready for erection by assembly line methods such as are employed in other industries. The need for development along these lines has been discussed for years but until this committee was formed there was still no organisation either for the planning of research or the co-ordination of industrial effort, although experience in other countries suggests that prefabricated houses—if they are to be real homes and not commercial freaks—must be the product of many industries. Some dozens of industries already have a part to play in the erection of an ordinary house; every move in the direction of "assembly line methods" is likely to multiply the number of specialist producers who each have a finger in the pie. In the motor industry it is possible for one firm to make itself responsible for the manufacture of every part, because there is a large market for a standardized finished product. But in the building industry there is not the same demand for a standardized finished product: nor is it satisfactory to construct a house from such a limited range of materials. These and other considerations connected with the revision of building laws suggest that a change of method in the building industry can only be brought about through industrial and professional co-ordination, because the problems raised are too complex to be handled by trading interests operating independently. So say the Committee for the Industrial and Scientific Provision of Housing, and the argument seems convincing.

This Committee, then, intends to bring about a marriage between commercial enterprise and scientific research. "So far," they say, "it has been laid down and unquestioned that the professional societies, trade associations and research bodies are divorced from commercial activity, save in a purely advisory capacity. The time, however, is past when ethical and professional opinion can wash its hands of responsibility for the activities of commercialism. This applies with particular force to the question of prefabrication, since it bears upon the social life of the people and the

development of the individual." This marriage, like other respectable marriages founded on mutual distrust, is to be the occasion of a legal settlement. The present Committee recommends that as soon as possible a council be established consisting of two separate sections, one for Commerce the other for Research: "the constitution of the Research Council could be so framed as to remove it from any charge of vested interest" and "insulate the control of pure research from practical proposals having direct commercial application," while "the Building Council's operations would be directed on purely commercial lines save that the Council itself would not be a profit making organization, profit making being limited to the activities of each constituent firm. The Building Council would be the focus of a co-operative effort or series of efforts of the commercial interests concerned, and would, by agreement, have access to the work of the Research Council, but would primarily concern itself with the practical application of such research." The experiment is interesting, and one hopes that it will succeed.

All the relevant trade associations, professional bodies and commercial firms are being invited, in the meantime, to

(*a*) Co-operate with the proposed research and co-ordination body on the production of designs upon which commercial activity can be based.

and/or

(*b*) Group themselves commercially to implement the designs so produced.

They are also being asked to subscribe to the Committee's funds and to "provide it with data upon which it can, with expert legal and accountancy opinion formulate a definite constitution and a programme of work for the proposed Research Council." Membership of the Committee is to be strengthened as the result of contacts obtained in this way. Funds raised will, in the meantime, be spent on clerical, organizational, and research work in connection with

(1) the establishment of adequate representation on the Committee of industrial and other interests involved and the raising of further funds.

(2) Enquiry into the extent and result of existing research, including potentially useful inventions.

(3) Applicability of proposals to various trades and industries.

(4) Economic aspects of the marketing of prefabricated houses and potential fields of utility.

(5) Guiding principles and a hypothetical constitution.

Representation on the proposed Research Council (also in abeyance pending the formulation of a definite constitution) will depend upon the nature of the research work discovered to have been done already (2) and its distribution among the various interests involved.

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

WAR BUILDING'S NEW ORDER

It appears that after stoutly fought engagements during many months a glorious victory has been won about which the public has been told very little; and when victories are few this seems a pity. I have been told by several men who ought to know that within a few months everyone who has anything to do with the administration, design or superintendence of war building schemes will be a direct full-time employee of a Government department, answerable only to his departmental chief through the usual departmental channels.

★

All the bad old ways of employing a local private architect to do a small job, of hiring for a period a whole firm of architects, engineers or quantity surveyors to do a big job, are to stop. In short, Civil servants, established and temporary, will soon have swept the building board absolutely bare of opposition. And this we are encouraged to believe from the very little we are told will be a very good thing.

★

Architects are on the whole progressive people and know there are advantages in being direct employees of the State. But architects can be employed by the State in more than one way, and it remains to be discovered whether

the new method of inserting architects, and all other consultants, into a huge departmental machine one at a time like currants in a pudding will in fact prove the best way of using their services.

★

Some time before this war, the JOURNAL made a survey of conditions of work in several big official architects' departments, and the only department which emerged with credit from that unbiased examination was the Miners' Welfare Department. This office differed from all the rest in that in it an architect and 6 to 12 assistants were given entire charge of one or more building schemes first to last—subject only to the observance of certain general rules, and the ultimate satisfaction of the principal architect. In all the other offices the staff was divided into three distinct groups which existed almost in separate worlds. These were : a vast drawing office which turned out drawings for buildings which its members never saw ; a large number of senior architects and inspectors who acted as somewhat unreliable middlemen between drawing office and sites and between drawing office and clients' committees ; and the small staff on the sites who had to do what they could with the drawings and the middlemen.

★

The point about this survey's results which is particularly applicable to these times of urgency is that conditions in the official department which worked best were precisely those which obtained in the best private architects' offices. And those conditions of employment —in which groups of architects (or any other consultants) are given entire charge of a building scheme subject to observing certain guiding rules and giving good results—are those which are now apparently to disappear entirely from war building.

★

If one tries to find out why this is to happen, all answers boil down to two : (1) the fixed belief of Civil servants that war building can only be controlled by creating an elaborate Civil service machine of pre-war type ; and (2) the various uproars in the House of Commons about fees paid to firms of consultants.

★

Architects in these days will not be disposed to worry much about the fee question—there are few people or firms now who are not prepared to work for a reasonable salary and that alone. But they are entitled to ask why the system which worked best both in official departments and outside should now be abandoned. It would be a nice change if M.P.s concentrated their questions on this point for a few weeks.

THE WAR STYLE

Streamlining—of a kind—has been fashionable for years. Since Sir Malcolm Campbell first took his Blue Bird out on the sands, ships, cars, trains and aeroplanes have been designed to offer the least possible resistance to air flow, and architects, acknowledging the force of fashion, have set about designing buildings with sweeping lines and trailing balconies intended to give the impression that they, too, were in the swim. Fortunately, the results were never tested in a wind tunnel.

★

Today, when everything is whittled down to essentials there's no room for stunts. Even features many people regarded as essential are missing from buildings just completed—parapet walls are a thing of the past and only vestigial copings remain to tell stories of architrave frieze and cornice. A more austere and scientific form of streamlining has emerged. The swirl and the flourish have gone. Buildings are no longer made to look as if they ought to be moving. But in all parts of the country an effort has been made to design them so that air passing rapidly by takes as little as possible with it.

★

The most surprising thing about this new style, perhaps, is that it's indistinguishable from the modern movement.

Cantilevers, for instance, have always been a favourite motif—some people might say obsession—of the modern group. Few other people took them seriously. Now we have Building Research Bulletins advising factory owners to use cantilevers for external walls because they are so strong. It appears that when a bomb bursts near or inside a building blast invariably blows out the nearest wall. If columns are part of the wall they keep it company, but if they are free standing they remain undamaged as a rule.

★

Flat roofs are another case in point. There has been a lot of prejudice against them justified as a rule by the argument " this type of construction is unsound." H.E.'s have blown off so many tiles and slates and exposed the weakness of so many hips and valleys, that the boot is now on the other roof.

★

Welded steel monolithic concrete and framed concrete construction are further examples. They have all in their turn been regarded as tiresome tricks ; but they turn out now to be stronger than the clumsy piers with awkward joints, that use up so much more material. It's no surprise, of course, that concrete is strong, but the superior strength of welded steelwork which has turned out to be equally robust may surprise a good many people.

★

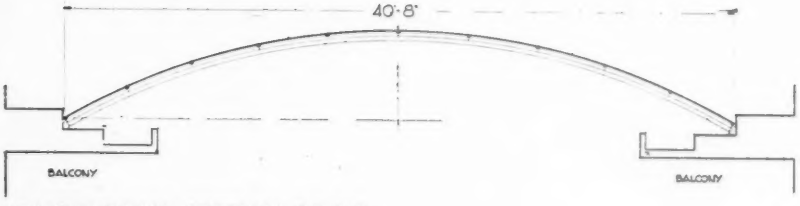
One innovation the war hasn't helped to popularize, you may say, and that is open planning. " Je design avec la lumière " is certainly not a slogan for to-day. Still, leaving glass on one side, it has been suggested on good authority that the best form of A.R.P. would be to design buildings like hives, with large openings in the outer walls equal to at least half the wall surface, fitted with shutters capable of pivoting open at the slightest pressure (the rest of the wall being made blast-proof to give protection), and that interiors should be free and open, so far as possible without doors instead of being designed as a series of separate compartments. The wheel has gone full circle.

ASTRAGAL

INTRODUCTION. *In our issue for April 9, we illustrated the B.C.F. system of hutting. Previously, March 12, we illustrated an all-ply hut which uses less wood than is normally needed for a hut of non-timber construction. These systems were worked out at the instigation of, and in collaboration with, MOWP. In the meantime other systems of prefabrication have been worked out by private enterprise and launched on the market. They have all been evolved to meet the same set of conditions—acute shortage of skilled labour, steel and timber. The solutions arrived at, however, vary greatly. The Tarran system of construction illustrated below, results in buildings which are frankly temporary and can easily be moved. Quite a number of different materials can be used for blocking out spaces between ribs (timber plywood, wood, concrete, foam slag concrete, etc) The framework, however, must be made of wood. Neither timber nor plywood are now available in large quantities, but for some time past the directorate for economy of design has been worried to find a suitable use for sawdust which is, of course, one of the principal components of wood concrete. So far this material has not been extensively used because of certain properties which are difficult to allow for in building. Foam slag concrete is also available. The Tarran system of construction has been worked out in relation to four different types of building :* (1) *a 40-ft span hall ;* (2) *a parabolic hut ;* (3) *a two-storey house ; and* (4) *a straight-sided hut with a curved roof—all of which are illustrated.*

PREFABRICATION : THE TARRAN SYSTEM

TYPE 1. FORTY-FOOT SPAN HALL



LONGITUDINAL SECTION OF RIB

CROSS SECTION

Perspective and sections of a structure with a 40 ft. roof span. Photograph on the left shows the span of a typical building erected at an exhibition held recently in London.

OFFICIAL REPORT

Tarran construction is the collective name for the system which comprises the use of prefabricated panels of easily handled sizes (less than 1 cwt.)—each panel has timber ribs infilled with either : (*a*) Lignocrete ; (*b*) Plywood ; (*c*) Matchboards ; (*d*) Roughboarding, or any suitable material (depending on proposed use) such as sheet steel, insulation board, hardboard, etc. (not in war-time).

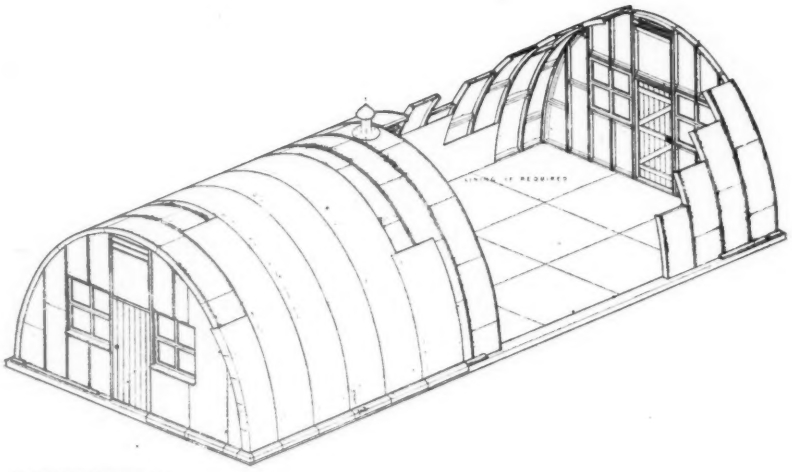
Lignocrete is recommended at this time as, apart from its important insulating, heat resisting and anti-condensating properties, it contains no specially imported materials : it is composed of cement, sand, chalk and mineralised wood flour.

Two types of construction are available : (*a*) "Curved" construction, standardised into 16 ft. 0 in. span by 38 ft. 0 in. long, or 19 ft. 0 in. span by 62 ft. 0 in. long, each of which can be decreased or increased indefinitely in 2 ft. multiples of length only.

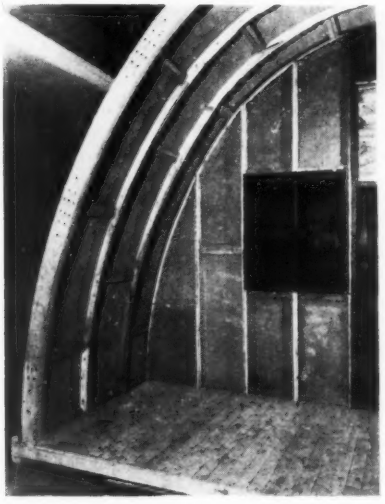
Clear spans up to and including 80 ft. have been erected, using a laminated timber rib at suitable centres (6 ft. or 8 ft.) with unit infilling. The principle aim of the system is to form continuous construction from individual units by bonding—it will be seen that in standard huts each adjacent ring is half-bonded.

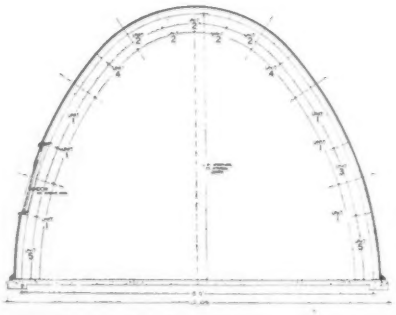
(*b*) "Straightsided"—the later development—not particularly because it is any better but because the straight walls are preferred by some users (storage, bunking, etc.).

TYPE 2. PARABOLIC HUT

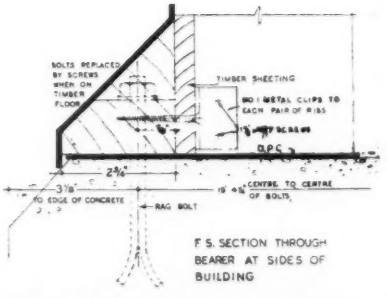


AXONOMETRIC





CROSS SECTION



SECTION THROUGH BEARERS

The parabolic huts are made in two sizes, with spans 16 ft. and 19 ft. respectively. They can be built up to any length in units of 2 ft. and the lengths of the buildings erected vary from 16 ft. to 140 ft. The above illustrations are of the 19 ft. span type.

ANALYSIS OF THE SYSTEM

[BY A SPECIAL CORRESPONDENT]

THE structural unit of the Tarran System is composed of two light timber ribs and a panel of lightweight concrete, usually Lignocrete, cast between or attached to the ribs. Lignocrete is made of a mixture of mineralised sawdust, chalk, sand and cement ; it is a fireproof, nail holding and well insulating material. The moisture content, however, is higher than that of ordinary concrete and the material contracts and expands in a way that is liable to cause cracks unless the size of slab employed is relatively small. Wood concrete is also apt to warp while drying out though this can be prevented if proper precautions are taken and the standard of workmanship is high. The units are either curved or plane, forming elements of arches or plane vertical walls respectively, with a strengthening rib at each end. The segments of an arch are placed end to end, with butt joints, and the joints in adjacent ribs are staggered. The joint of one rib is placed approximately in the centre of the adjoining ribs, the two being screwed together thus maintaining the continuity of the section. The window frames are cast in vibrated concrete and a window unit is erected in place of a standard unit.

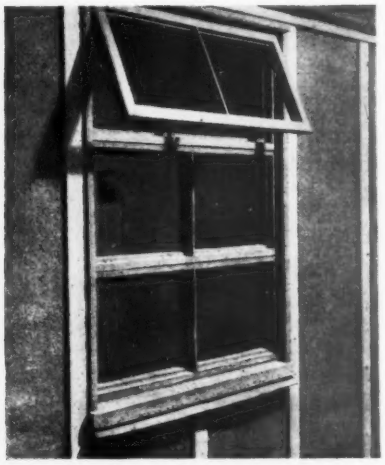
The system can be considered from the same points of view as the B.C.F. hut, described in the ARCHITECTS' JOURNAL for April 9, 1942.

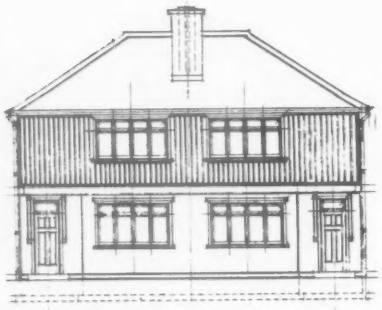
(1) *Manufacture.*

The shape of the units is very simple and the number of different types is small. In the case of the Lignocrete panels, nails are driven through the timber ribs before casting and a series of wires are stretched across the mould and spot-welded to opposite nails, forming ties. Wire ties are also laid longitudinally and spot-welded to the transverse wires.

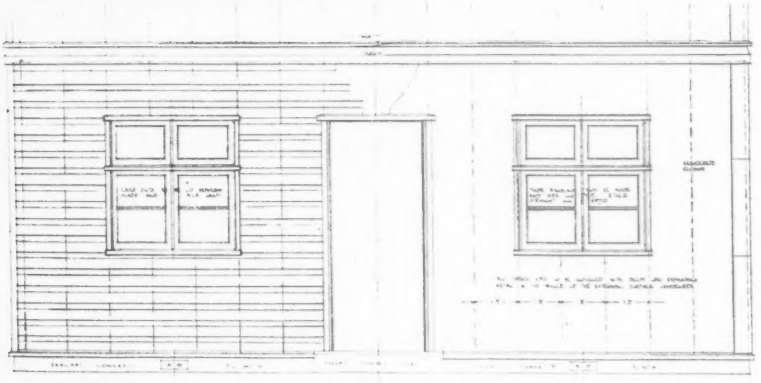
The simplicity of the moulds and the small number of different types of units makes the system very suitable for mass production.

TYPE 3. TWO-STOREY HOUSE



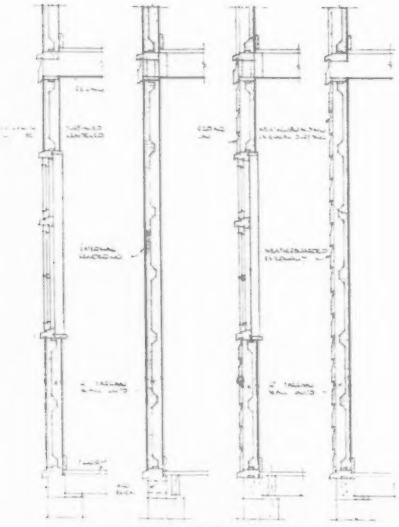


2-BEDROOM HOUSE



ELEVATION OF 3-BEDROOM HOUSE

SECTION SHOWING INTERNAL AND EXTERNAL USE OF PREFABRICATED PANELS.



TYPICAL SECTIONS

Above drawings show how the Tarran system can be adapted for housing purposes. Top, detail of a window unit; bottom, part of a house erected at a recent exhibition.

(2) *Erection.*

The units are so light that they can be lifted by one man. They are easily assembled and screwed together. The springings of the arched units are set in a channel in the concrete floor and the whole subsequent procedure is almost automatic. The continuous surface of the parabolic cross section renders the arrangement of gutters and down pipes unnecessary, and the whole surface is covered with waterproof felt. A standard hut can be erected in one working day by a few men.

(3) *Stability.*

The system is a timber construction. The Lignocrete panels merely stiffen the timber ribs and prevent buckling. Tests on straight wall units have proved that the ultimate load in bending is the same whether the Lignocrete panel is on the tension or on the compression side. Naturally, no great strength and resistance to blast can be expected from such a structure, but it should be noted that the timber units are very flexible and capable of big deformation before failure.

Straight wall units of 10 ft. 6in. length, when loaded as a beam of 9 ft. 9 in. span, have had a maximum deflection of $2\frac{7}{8}$in. to $3\frac{3}{8}$in., i.e. $\frac{1}{40}$th to $\frac{1}{35}$th of the span.

This quality may be helpful in case of a momentary action such as blast or earth shock. On the other hand, the walls of the parabolic hut, although anchored, may be lifted by suction since the connection at the base is weak (Type 2). The whole hut may be tipped over by blast. Even less favourable is the construction of the straight-sided hut (Type 3) owing to its very small lateral stiffness. In the case of the two-storey house the structural weakness is even more marked.

The resistance to blast of the parabolic hut may be improved by sinking the structure two feet below ground level, which is possible without altering the system.

(4) *Habitability.*

If the inside is lined with wallboards, the heat insulation of the walls and roof is sufficient. The sound insulation is also as good as may be expected in a temporary building. Since the whole area of the hut is unaffected by structural members, partitions may be arranged to suit any requirements.

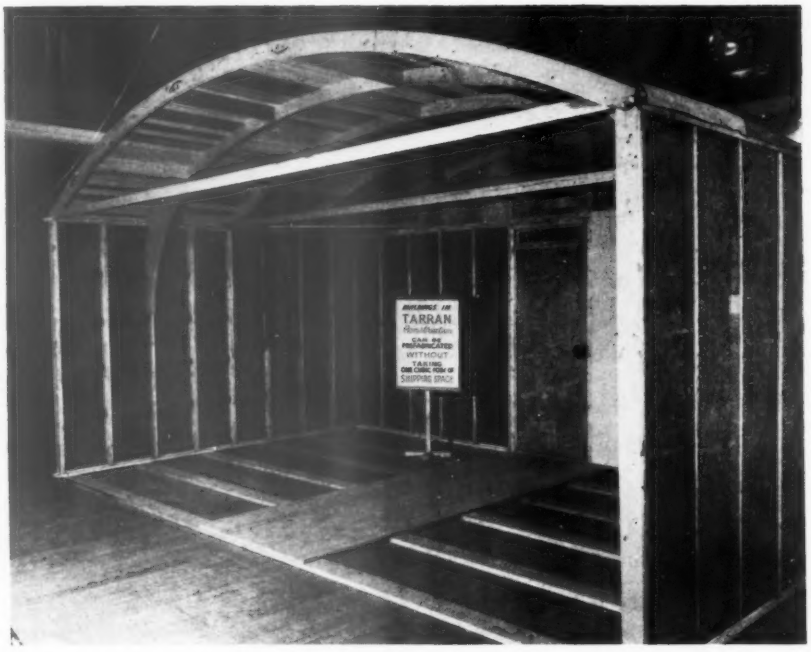
Experience will show whether people like to live in a room of parabolic shape.

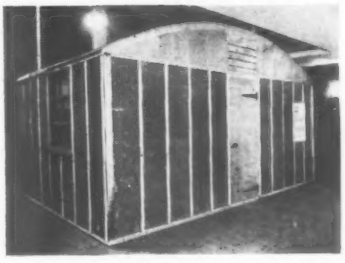
(5) *Adaptability and utilization after the war.*

The system allows a great variation in span without increasing the size or weight of the single units (Type 1). No mortar or concrete is used on the site apart from the floor cast on the ground. The position of the partitions may be changed at any time.

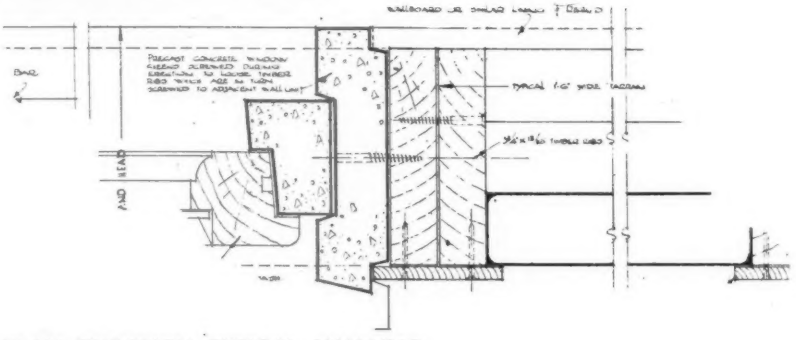
The huts can be dismantled and re-erected on another site without loss of

TYPE 4. STRAIGHT-SIDED HUT

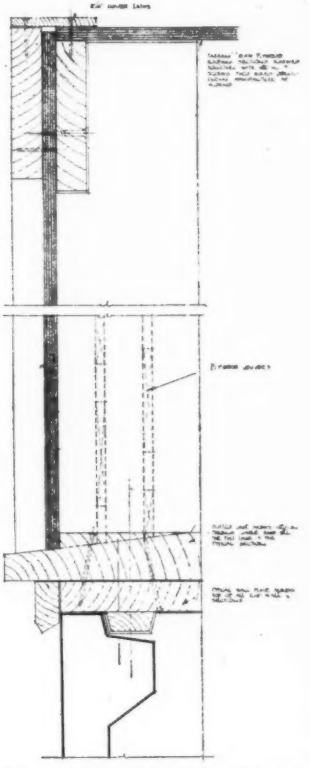




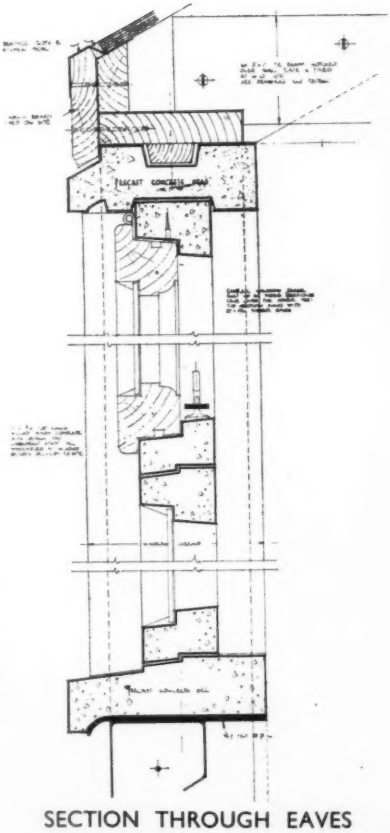
The straight-sided hut, the latest type, is erected with Lignocrete panels, 7 ft. 3 in. in height at 18 in. centres, with a timber roof. Standard size of the hut is 38 ft. by 17 ft. 8 in. Above and left are two views of this hut.



PLAN THROUGH TYPICAL WALLING



SECTION THROUGH GABLE



SECTION THROUGH EAVES

material. A saving of 30 per cent. in structure weight is achieved as compared with the standard prefabricated timber hut of the W.D.—which makes the transport very much easier. Such huts may be used after the war as holiday camps, youth hostels or bungalows, etc., far away from their present site. They are much more of a temporary character than the B.C.F. hut or other systems in reinforced concrete. By rendering the external face of the walls or by adding a boarding on the outside (Type 4) the huts can be given the appearance of a permanent building, but the surface treatment does not affect the structural weakness which is below the usual standard of a permanent building for dwelling purposes.

To sum up, it can be said that the Tarran System solves the problem of the portable hut with great economy in labour and materials. Its disadvantage in war time is the use of timber although the amount of timber required is comparatively small. Most of the labour is used in the factory; the weight to be transported to the site is small, only a minimum of labour is wanted on the site and a great number of huts can be quickly erected and used immediately after completion.

LETTERS

F. J. OSBORN
(Hon. Secretary, Town and Country Planning Association)

ASTRAGAL

Garden Cities and Industries

Sir,—Your editorial for April 23 and your report of the Cambridge Conference* do not do justice to the views of the Town and Country Planning Association as expressed in the booklet "Planning and the Countryside," or to mine, as stated at the conference. On the location of industry the Association does not speak without practical experience. Many of its members are industrialists and others have taken part in developing Letchworth, Welwyn and the Government Trading Estates. I happen to have discussed location, as an immediate practical issue, with thousands of industrial firms, and as a director of a fairly large manufacturing company I mix very much in these circles; and the same is true of many of my associates in the planning movement. Your editorial skims very superficially over the important issues of town structure in relation to domestic living conditions, industrial necessities and community requirements, all of which we have tried, in a series of considered statements, to integrate fully. Our policy of industrial decentralization is a result of that balanced consideration, and can neither be advanced nor destroyed by picking out and stressing one or two of the factors.

Your editorial seems to overlook that the Barlow Royal Commission sat for two years on this subject, heard a mass of immensely weighty evidence from Government Departments, local authorities and industry, and reported unanimously that decentralization to smaller towns is the right policy.

It is really amazing to find in your editorial such an argument as this: "The solution arrived at by natural processes is conurbation. Why not try to make it work?" The solution arrived at by "natural processes" includes also slums, overcrowding, ugly buildings and unutterable civic confusion. It is surely because "natural processes" do not give us good cities that we have to plan. Even the term "natural processes" begs an important question. The standards of density and open space enforced by public authority condition the processes of urban development. They have been too weak in the past, and if they had been strong enough to protect human (and industrial) interests adequately the pattern of our cities would have been completely different. Industry and business could not have coagulated into a few excessively large centres.

It is quite true that the 9½ million people now living in the L.P.T.B. area *might* have been accommodated in garden cities (though with too small rural belts between them) within the same area. But that is not the way they are arranged at all. Nearly 9 millions live within a twelve-miles radius, and a vast number of these are in dormitory suburbs and waste two hours a day in travel. In the central (L.C.C.) area 4 million people, plus a lot of industry and business, are huddled together at an average of over 55 persons per acre, as compared with a tolerable overall density of 25. How quickly we can reduce the frightful density of 55 may be an open question. But unless we do reduce it we cannot give decent houses and gardens to those who continue to live in that area; and to pursue the pre-war practice of running them out to more and more distant suburbs is not a policy anybody defends to-day. The only alternative is thus the moving-out (or restriction on the return after the war) of *some* of the central workplaces so as to give sufficient space to the rest and their workers.

In your Cambridge report you quote Mr. Sharp as accusing me of "jibing at beauty in town planning." Mr. Sharp said so much that was valuable in his paper that I didn't then reply to this *obiter dictum*. But he and you must know well that it is untrue. I spent sixteen years of my life (with others) fighting the battle of the architect against the Philistines, and Welwyn is the result—the best example in this country of good building design on the scale of a whole town. As a result of that experience I know what the architects are up against, and I have warned them that they cannot hope in this country to condition the life of the people to any *a priori* ideas of visual design—whether it is the terrace-street or the soaring tower. This "externalist" approach plays right into the hands of the despised and rejected speculative builder, to whom I must pay the tribute that at least he understands and respects the idealism of his clients. We need not lose the battle of design if we start with a study of what the client wants. We shall certainly lose it if we seek to condition our masters to our own love of façades or of such abstractions as "urbanity"—which I sympathize with but the vast majority won't. I think the demand of ordinary people for the individual family house can (by the exercise of great skill and hard work) be reconciled with architectural design. It cannot in a democratic country be over-ridden.

Lastly, I ask for your support and not your sneers in my efforts to get for British architects something they have not had in centuries—a chance to design on the civic scale, to build worthily for a new age in new towns. It is in the new towns that imagination and technique will find their most unrestricted scope. And the relief of pressure given by the building of a moderate number of new towns will give you far better opportunities for humanizing and modernizing the conditions of life in the overcrowded cities. That is, and always was, the main purpose of the garden city movement which, so far from being "out of date," is only just beginning to be understood.

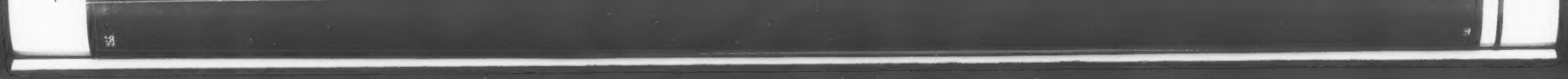
F. J. OSBORN

[Despite all that Mr. Osborn says it is not clear that there is anything to be gained by decentralizing industry. The term, of course, is an unfortunate one and has no clearly defined meaning. Some people might call moving a factory from the centre of London to the Great West Road decentralization, but the majority of people who use the term mean more than this—they mean encouraging the growth of small industrial towns in parts of the country where there has previously been no industry.

Decentralization in the first sense is obviously necessary and would be easy to bring about. In fact, before the war industry was moving out of London at a surprising rate; though unfortunately the movement was not planned. More extreme forms of decentralization are difficult and would probably have to be encouraged by some form of subsidy. No real case has yet been made for fighting against the tendency of industry to concentrate in certain clearly defined areas. The argument that the yield of agricultural land laid down as grass can be increased by developing it at twelve houses to the acre, and new life brought to rural areas by the development of new towns, is merely a reflection on the present state of British agriculture.

As for the allegation that we take an external view and desire to plan chiefly for architectural effect, the argument in the leading article referred to was based on the assumption that the type of development advocated by the Town and Country Planning Association is satisfactory: *i.e.*, an overall urban density of six houses to the acre, with agricultural belts in addition to this. We consider a more compact type of development desirable, but that does not affect the argument. However, as Mr. Osborn has raised the point, let us add that our reasons for preferring a more compact type of development are strictly practical. A happy family life in the kind of self-contained house Mr. Osborn advocates so enthusiastically is in fact not common. It is unreasonable to expect women to work sixteen hours a day and like it when

*A.J. April 23



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SIZE of BEAM SECTION, & TYPICAL DIAGRAMS.

◉ TABLE GIVING COMPARATIVE PROPERTIES & EFFICIENCY COEFFICIENTS (e) OF ORDINARY & PLATED JOISTS (WELDED).

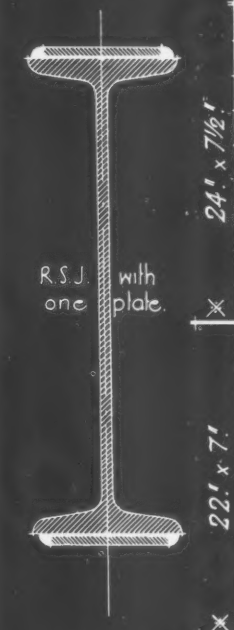

	PLATE (ins)	I.	Z.	W.	Z/W	e.
24" x 7½"	none	2533	211·1	95·0	2·22	2·22
	2 x ½	2833	226·6	101·8	2·23	2·12
	6 x ½	3433	274·6	115·4	2·38	2·26
	12 x ½	4333	346·6	135·8	2·56	2·43
	8 x ¾	4373	343·0	135·8	2·53	2·40
	12 x ¾	5293	415·2	156·2	2·76	2·62
	8 x 1	5037	387·5	149·4	2·60	2·47
	12 x 1	6289	483·8	176·6	2·74	2·60
※	+ 12 x 1 / 10 x 1	9939	709·9	244·6	2·90	2·65
22" x 7"	none	1677	152·4	75·0	2·03	2·03
	2 x ½	1931	167·9	81·8	2·05	1·95
	6 x ½	2439	212·1	95·4	2·23	2·12
	12 x ½	3201	278·4	115·8	2·40	2·28
	8 x ¾	3229	274·8	115·8	2·38	2·26
	12 x ¾	4005	340·9	136·2	2·50	2·38
	8 x 1	3797	316·4	129·4	2·45	2·33
	12 x 1	4857	404·8	156·6	2·59	2·46
※	+ 12 x 1 / 10 x 1	7987	614·4	224·6	2·74	2·60

※ R.S.J. with two plates.

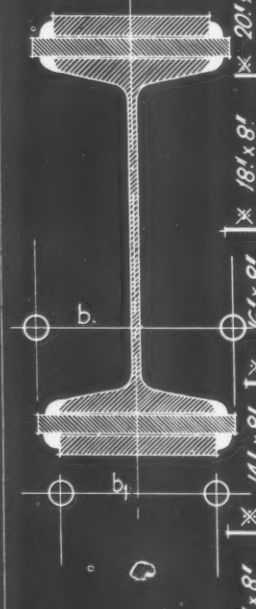

	PLATE (ins)	I.	Z.	W.	Z/W	e.
20½" x 7½"	b x ½	1673 + 105 b	159·3 + 10·00 b	89 + 5·4 b	·95 Z/W	
	b x ¾	1673 + 162 b	135·6 + 15·07 b	89 + 5·1 b	"	
	b x 1	1673 + 221 b	152·1 + 20·09 b	89 + 6·8 b	"	
※	+ b1 x 1	1673 + 221 b + 215 b1	139·4 + 18·42 b + 22·08 b1	89 + 6·8 b + 6·8 b1	"	
18½" x 8"	b x ½	1292 + 85 b	136·0 + 9·01 b	80 + 5·4 b	·95 Z/W	
	b x ¾	1292 + 132 b	132·5 + 13·45 b	80 + 5·1 b	"	
	b x 1	1292 + 181 b	129·2 + 18·10 b	80 + 6·8 b	"	
※	+ b1 x 1	1292 + 181 b + 221 b1	117·5 + 16·45 b + 20·09 b1	80 + 6·8 b + 6·8 b1	"	
16½" x 8"	b x ½	974 + 68 b	114·6 + 8·01 b	75 + 5·4 b	·95 Z/W	
	b x ¾	974 + 105 b	111·3 + 12·00 b	75 + 5·1 b	"	
	b x 1	974 + 145 b	108·2 + 16·11 b	75 + 6·8 b	"	
※	+ b1 x 1	974 + 145 b + 181 b1	97·4 + 14·50 b + 18·10 b1	75 + 6·8 b + 6·8 b1	"	
14½" x 8"	b x ½	706 + 52·6 b	94·1 + 7·01 b	70 + 5·4 b	·95 Z/W	
	b x ¾	706 + 81·7 b	91·1 + 10·54 b	70 + 5·1 b	"	
	b x 1	706 + 113 b	88·2 + 14·12 b	70 + 6·8 b	"	
※	+ b1 x 1	706 + 113 b + 145 b1	88·2 + 14·12 b + 16·11 b1	70 + 6·8 b + 6·8 b1	"	
12½" x 8"	b x ½	488 + 39·1 b	75·1 + 6·01 b	65 + 5·4 b	·95 Z/W	
	b x ¾	488 + 61·0 b	72·3 + 9·04 b	65 + 5·1 b	"	
	b x 1	488 + 84·7 b	69·7 + 12·10 b	65 + 6·8 b	"	
※	+ b1 x 1	488 + 84·7 b + 113 b1	61·0 + 10·59 b + 14·12 b1	65 + 6·8 b + 6·8 b1	"	

◉ for explanation of notations, see reverse side of this Sheet.

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INFORMATION SHEET : STEEL FRAME CONSTRUCTION : WELDING No 31.
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INFORMATION SHEET
• 863 •
STRUCTURAL STEELWORK

Subject : Welding 31 : Comparative Properties and Efficiency Coefficients of Ordinary and Plated Joists (Welded) (*b*).

General :

This series of Sheets on welded steel construction is a continuation of a preceding group dealing with riveted and bolted construction, and is intended to serve a similar purpose, namely, to indicate the way in which economical design as affected by general planning considerations may be obtained.

Both the principles of design and the general and detailed application of welded steelwork are analysed in relation to the normal structural requirements of buildings. The economies in cover and dead weight resulting from the use of lighter and smaller steel members and connections are taken into consideration in the preliminary arrangement of the building components, in order to obtain maximum economy in the design of the steel framing.

This Sheet is the fourth of the section on detailed considerations of design in welded steel, and gives comparative Moments of Inertia, Section Moduli and Efficiency Coefficients for ordinary and plated R.S.J. beams.

Notation :

I = Moment of Inertia of plated joist.
Z = Section Modulus of plated joist.
w = Weight of section in lbs. per ft. run.
$\frac{z}{w}$ = Efficiency of section, by weight only.
e = Reduced efficiency of section, allowing for labour costs.
b = Width of first plate, inches.
b*l* = Width of second plate, inches.

Ordinary Joists :

For beams up to a length of 30 ft., where the required Section Modulus does not exceed 150 in.^{3}, R.S.J. sections are suitable in welded construction just as in riveted. The tables and formulae given in Sheet 6 of the the series of Information Sheets on Structural Steelwork, also hold good when applied to welded beam sections.

In welded construction, however, the ends of beams are frequently restrained or partially restrained, and therefore the deflection is reduced. A beam held rigidly at both ends has a deflection of 1/5th of that of a beam freely supported at the ends, while the Bending Moment in the centre is only 1/3rd. The required Section Modulus for spans greater than 24 times the depth should, therefore, be $\frac{3Ml}{80d}$ instead of $\frac{Ml}{16d}$ as given in the above mentioned Sheet 6, for simply supported beams (see table below).

Table for beams 100 per cent. restrained at both ends.

Bending Moment 'M.'	Required Section Modulus for Spans. Not greater than 24 times the depth.	Greater than 24 times the depth.
Tons, ft.	1.5M	$\frac{3Ml}{80d}$
Tons, in.	.125M	$\frac{Ml}{320d}$
Lb., in.	$\frac{M}{18{,}000}$	$\frac{Ml}{716{,}800d}$.

where M is the Bending Moment at the centre, measured in tons/ft.

If a beam is partly restrained at the supports, values are to be taken which are intermediate between those given in this table and those in the table given in Sheet 6 of the riveted series.

Plated Joists :

On the front of this Sheet a table of Efficiency Coefficients is given for common examples of plated joists. These values vary from those given for corresponding sections in Sheet No. 8 of the series on Structural Steelwork, because no allowance for rivet holes has to be deducted. The choice of plates is considerably greater in welded construction because there is no minimum width for them.

In all other respects the remarks on Sheet No. 8 mentioned above, also apply to welded plated joists, particularly the notes on the length of flange plates and asymmetrical plating.

The most commonly used plated joists are 24 in. by 7½ in. and 22 in. by 7 in., as these give the largest efficiency values. The properties of these joists, combined with a variety of plates, are shown on the front of this Sheet. Smaller plated joists are advisable only where the construction depth is limited.

The widest available R.S.J. of a given depth should be used in such cases.

From the above-mentioned table the properties of plated joists with single plates of width "b" and with double plates of width "b" can be quickly evaluated.

For a plated joist not mentioned in the table the Section Modulus Z can be determined from the following formula, which corresponds to that given in Sheet 8, as mentioned above.

$$Z = \left(\frac{Zj}{h} + A\right) hj.$$

where Z*j* = The Section Modulus of the joist.
h*j* = The depth of the joist.
h = The total depth.
A = Area of plates on one flange, top or bottom.
Z = The Section Modulus of the compound section.

The Efficiency Coefficient will be $0.95\frac{z}{w}$ (to allow for increased labour costs when compared with ordinary R.S.J.s.).

w = the weight per ft. run = 3.4 × total cross sectional area in sq. ins.

Previous Sheets :

Previous Sheets of this series on structural steelwork are Nos. 729, 733, 736, 737, 741, 745, 751, 759, 763, 765, 769, 770, 772, 773, 774, 775, 776, 777, 780, 783, 785, 789, 790, 793, 796, 798, 799, 800, 801, 802, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 819, 821, 822, 823, 824, 826, 827, 829, 830, 832, 836, 837, 838, 839, 840, 842, 843, 845, 847, 848, 849, 850, 851, 852, 853, 855, 856, 857, 859, 860 and 862.

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London Office (*Temporary Address*) : King's House, London, S.W.1.
Telephone : Whitehall 3993.

a forty-hour week for factory workers is already in sight. Our grandmothers were able to manage well in such conditions but their granddaughters' standards are more exacting. It is only possible to live up to them either by planning for a less individualistic way of living or by accepting a big decline in the birth rate.—ED. A.J.]

Mr. Gloag and the Bricklayers

Sir,—Mr. Gloag's indignation* about a note of mine is spontaneous, warm-hearted and right-minded to a point just short of Rotary. So strong have been his feelings that he has clean forgotten to present arguments to refute my contention or even to deny that it is true.

I outraged Mr. Gloag by writing :

In peacetime the bricklayer and his unions —both true creatures of capitalist price economy—are out to do as little as possible for as much as possible for as long as possible. So are building contractors, quantity surveyors and architects and all *their* unions.

Mr. Gloag calls this vapid, cynical, libellous, silly clever, unworthy ; but not, more pungently, untrue.

And I contend, Sir, that when allowance has been made for the conciseness obligatory for your wartime contributors it *is* true. That bricklayers are interested in fine bricklaying and architects in fine architecture is also true, but is no denial that the primary interest of bricklayers and bricklayers' unions, and architects and architects' unions, is to raise wages, shorten hours and eliminate blacklegs.

ASTRAGAL

B.S. 1020 CONCRETE ROAD SLABS

The B.S.I. has just issued the above war emergency specification for concrete road slabs. The Foreword to the standard explains that the specification is intended to give the minimum requirements for the construction of " in situ " concrete paving for war-time roads, approaches, parking places and similar work. It is not intended to apply to public roads and thoroughfares administered by a highway authority.

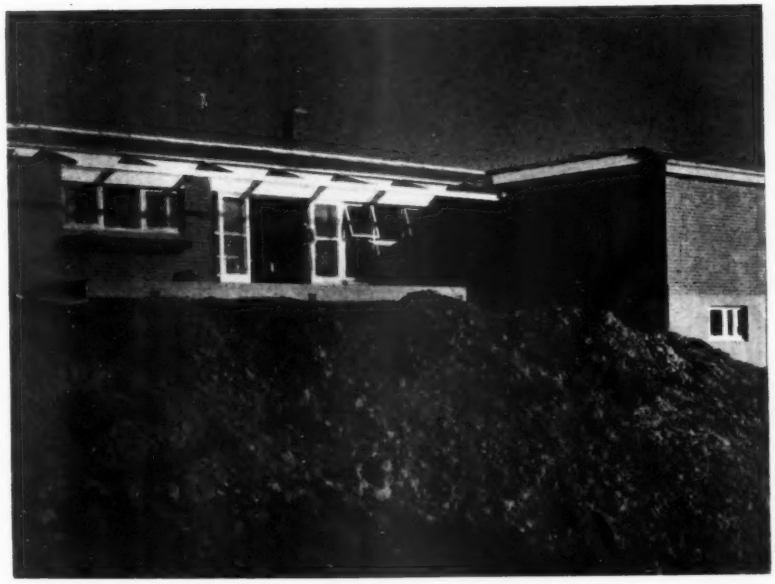
The specification is in four parts. The first part deals with the preliminary foundation work to be carried out before the concrete road is laid ; the second part specifies the quality of the materials used in the concrete ; the third part deals with the mixing and the placing of the cement, that is, the proportions of the concrete mix, the method of mixing, the period of curing to be allowed before traffic is admitted to the road, etc.

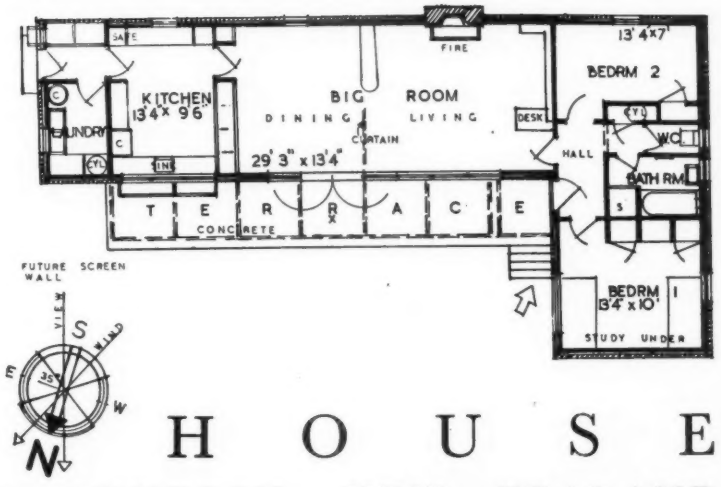
The fourth part relates to the dimensions of the slabs, the methods of making joints between slabs and the precautions to be observed when the concrete is laid down in cold weather.

The specification should be particularly useful to those engaged at the present time in the layout and building of camps, hostels, factories, and other war buildings which necessitate the construction of temporary roads.

Copies of this specification may be obtained from the British Standards Institution, 28, Victoria Street, Westminster, S.W.1, price 2/3, post free.

*Letter on page 347, A.J. for May 14.





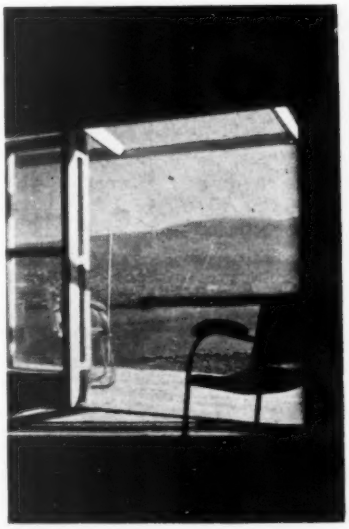
HOUSE AT DUNEDIN, NEW ZEALAND

DESIGNED BY PAUL PASCOE

GENERAL AND SITE—On the slopes of Waverley, overlooking Dunedin harbour and town. The building was commenced in February, 1941 and completed in September of the same year.

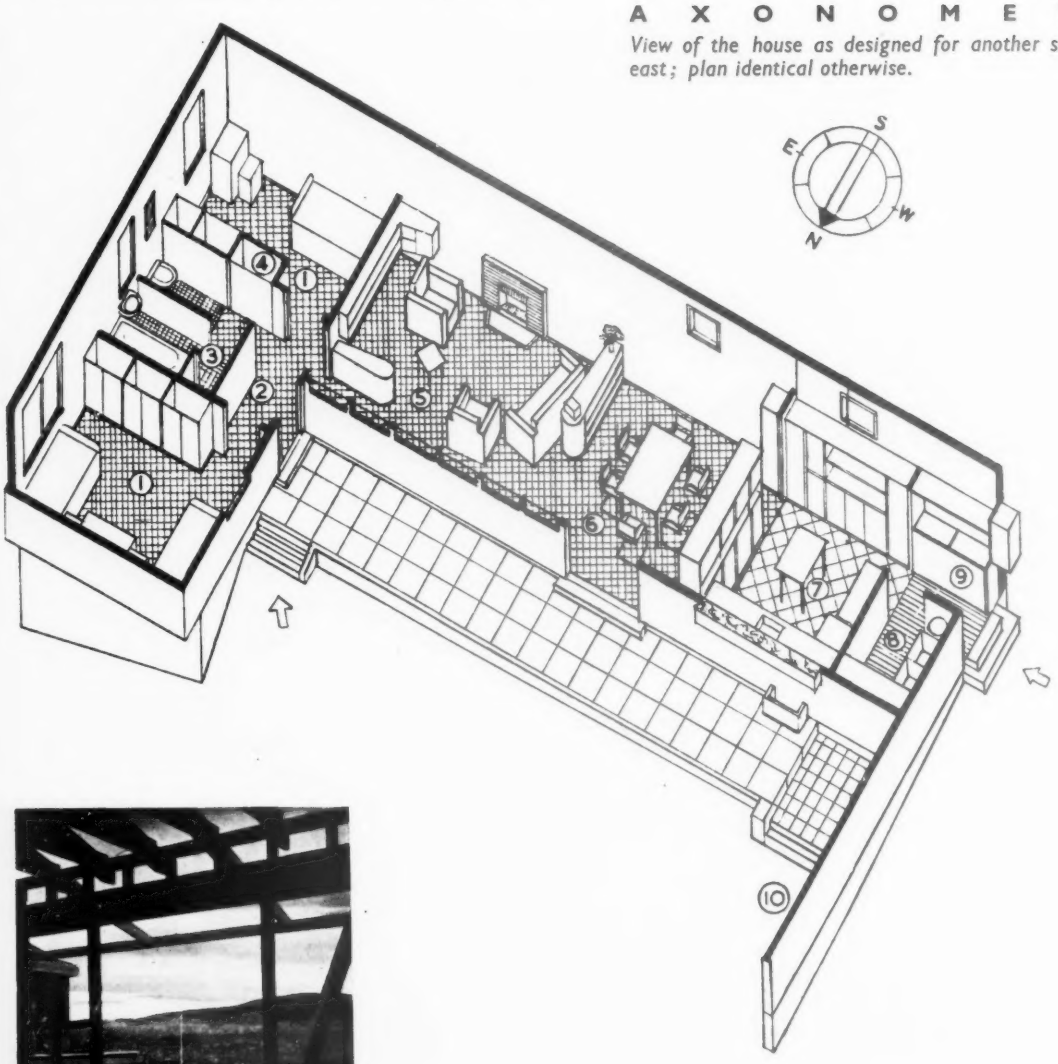
PLAN—The prevailing wind is in the south-west. The house would, ideally, have been turned round the other way, so that the bedroom wing lay to the east ; it was impossible to do this owing to the adjacent road and adjoining house. The plan is essentially simple, being clearly formed of three almost separate blocks : living, working and sleeping. If a curtain of full height is used the division of the large room is simple.

Top, exterior view showing windows to kitchen, large room and bedroom. Right, view from the main room, looking towards the harbour.



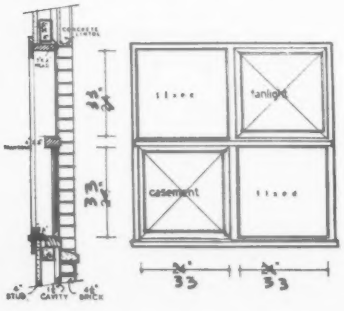
AXONOMETRIC

View of the house as designed for another site; bedroom wing east; plan identical otherwise.



CONSTRUCTION AND FINISHES —The inside walls are stud, the outside skin 4½ in. brick veneer, the two being separated by a 1½ in. cavity. This helps the insulation quality of the house and reduces periodical painting. The roof is in corrugated asbestos sheeting and the interior wall is in fibrous plaster. The external walls are of red brick, with grey white joints. The windows are in wood, the square unit (2 ft. 9 in.) construction to the large room being a particular feature. The alternation of fixed sheets in frames (i.e., no sashes), and the opening sashes, make for a light effect; this is enhanced by the opening sashes being painted a different colour from the frames, transomes and mullions. The terrace, which runs nearly the whole length of the north front, is of pre-cast concrete paving slabs and the steps leading up to the front door are of concrete.

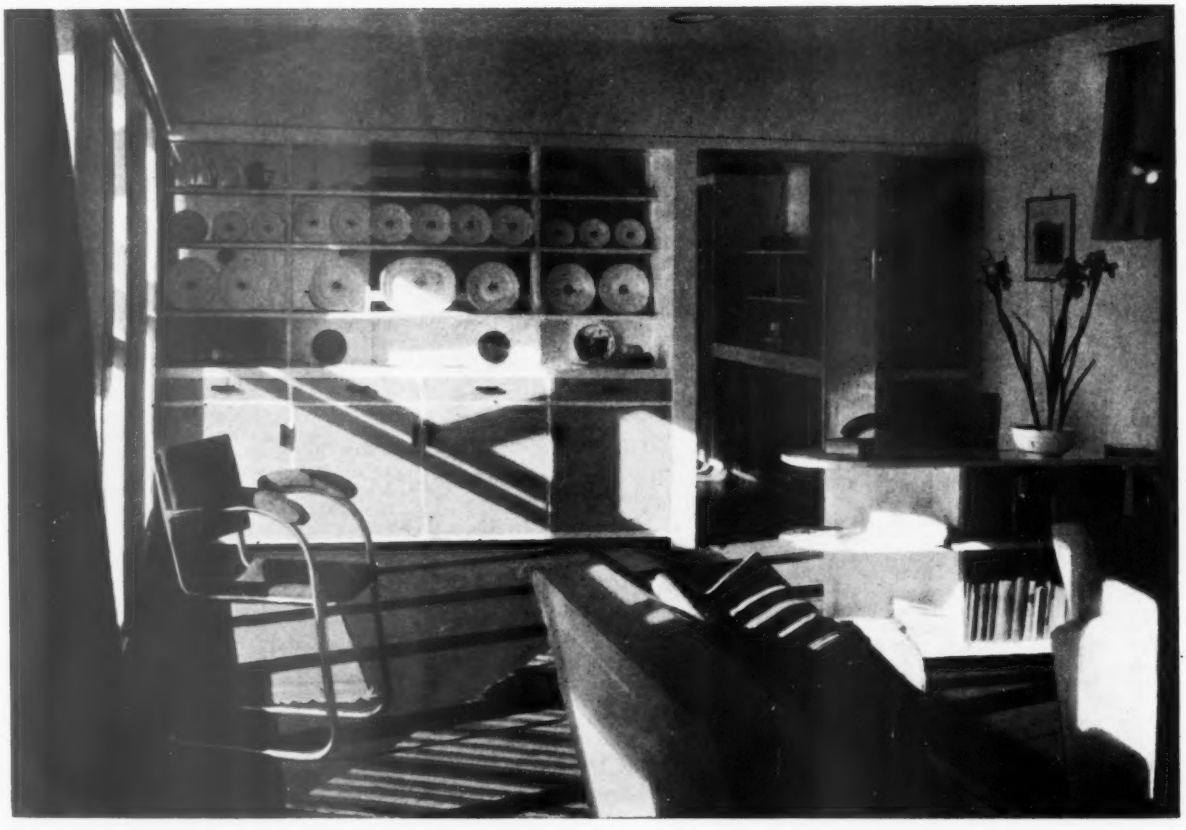
Left, cantilevered rafters at 5 ft. 6 in. centres for awnings in summer. Below, typical window unit detail.



KEY

1. Bedrooms.
2. Hall.
3. Bathrooms.
4. Linen.
5. Living Room.
6. Dining Room.
7. Kitchen.
8. Wash House.
9. Fuel.
10. Shelter Wall.

Facing page: top, interior view showing the 2 ft. 9 in. square unit windows and outside terrace at the dining end of the main room. Bottom, another view of the dining end of the main room. Clear glass has been inserted between the upper shelves of the dresser to expose the kitchen to view in order to give a more spacious effect.



INTERNAL TREATMENT — The colour scheme of the main room is : ivory white walls and shelf edges ; light grey doors ; blue felt carpet ; coloured rugs ; white chair coverings. The fireplace has a red brick surround.

HEATING—It was found that the hot water cylinder would have been too far from the bathroom if it had been located near the kitchen and wash house. Two hot water cylinders (electric), were installed : in the bathroom and kitchen.

Above, living end of main room. Below, the main front.

HOUSE AT DUNEDIN

DESIGNED BY PAUL PASCOE

SERVICES

The tenth of the Royal Society of Arts series of twelve lectures on "The Post-War Home—Its Interior and Equipment" was given recently by Mr. R. FITZ-MAURICE, *A.R.I.B.A., Principal Scientific Officer, B.R.S. The title of the lecture, points from which are printed below, was*

Lighting, Heating and Ventilation

Taking all things into account, it is quite evident that post-war housing has to be thought of in terms of maximum economy in first cost, in running cost and in labour, and that every penny counts. With this in mind it is appropriate to examine individually the subjects of lighting, heating and ventilation, and to note the state of the art in each.

Lighting

Lighting falls naturally into two categories—day lighting and artificial lighting ; they are usually dealt with separately, and in some ways it is convenient to do so ; the illuminating engineer deals with artificial lighting and the architect with daylighting when he fixes the size and shape of the windows. Before separating daylight and artificial light, however, it is necessary to think of their interrelation. It is open to question whether sufficient importance has been attached to daylighting in the past, and it is necessary to realize that inadequacy of daylighting in the home means that artificial light has to be switched on an hour or so earlier than would be necessary if the daylighting were more efficiently contrived. On a gloomy winter's day it may, in a bad case, be necessary even to keep artificial lighting going all day. This means an unnecessary encroachment on the weekly budget. To take an example of a badly lit working kitchen—let it be supposed that, due to inadequacy of daylighting, artificial light has to be used for 300 hours longer than would be necessary with a better arrangement of windows over the whole winter. Using a 60-watt lamp this would mean the use of 18 units of electricity—9s. at a 6d. rate—enough to buy a child a pair of boots. Consequently, although the illuminating engineer is perfectly competent to make good any deficiency in daylighting, an appreciable financial burden may be laid on the householder.

To look at the state of the art of illumination we find that artificial lighting is on a much more well-defined and exact scientific basis than daylighting. The physiological requirements are codified, and there is a strong body of professional skill to provide the illumination to meet those requirements. The industry is progressive, and there is a wealth of scientific research in progress all the time, so that developments in artificial illumination have been rapid and the progressive improvement is likely to continue. Daylighting, on the other

CREMATORIA

The prevention of waste of valuable land in towns ; avoidance of unsightly cemeteries and burial grounds ; and the safeguarding of land for the living will cause town planners to include crematoria in their post-war schemes, said Lord Horder, President of the Cremation Society, at its annual general meeting in London. "Planning must take into consideration the needs of the district," he continued, "and future schemes should cater for the establishment of a crematorium in every town and city. No person who seeks cremation should be deterred or prevented by reason of distance or expense.

"Linking up with these crematoria, every village should have its Garden of Rest or Remembrance where the ashes of the deceased villagers, cremated in the nearby town crematorium, may be scattered or preserved, as desired. In such a plan, the Churches could play an important part by the conversion of the old churchyards into Gardens of Rest and the church crypts into columbaria for the retention of ashes. By these simple acts, the churches would not only considerably assist the growth of the cremation movement, but they would thereby also provide a means whereby the family contact, so frequently severed by death, might be maintained. Similarly, enterprise on the part of Municipalities, by the establishment and encouragement of crematoria in every town, would help to preserve the land for the living and at the same time, as we have abundant evidence to prove, would make a substantial contribution towards the reduction of the rates. The more crematoria are established, the greater will be the demand for cremation, and thus the less the demand upon cemeteries which are wasteful of ground and public money."

BRITISH STANDARDS INSTITUTION

The Institution has received a communication from the Minister of Production to the effect that His Majesty's Government recognise the British Standards Institution as the sole organization for the issue, in consultation with any Government, professional or industrial bodies concerned, of standards having a national application.

In regard to the preparation and issue of codes of practice for building and civil engineering work, the Minister of Works and Planning is making special arrangements by the appointment of a representative committee with which the B.S.I. is fully co-operating.

ARCHITECT'S WILL

Mr. Frederick Cowell, Architect and Surveyor, of Tunbridge Wells, has left £62,995.

hand, has not developed in the same way. Nobody sells it, and there has not been the commercial incentive towards betterment of the art. Valuable work has, however, been done in the direction of reducing daylighting of buildings to an exact science, and in particular the pioneer work of P. J. Waldram has to be acknowledged. Unfortunately, the computation of daylighting in a building until recently has called for a somewhat laborious exercise in geometry which few architects and builders have attempted to master. As a by-product of war-time conditions a simple and rapid method of predicting daylight efficiency of any arrangement of windows has been devised which should encourage more general attention to the subject. This is the range of "daylight factor protractors," due to A. F. Dufton, of the Building Research Station. The incentive arose out of a study of economical structures for war-time factories. In war-time roof glazing is a source of weakness under air bombardment, and it was important to reduce the area of glass to the bare minimum compatible with efficient lighting. The protractor makes it possible to analyse the lighting condition of any window very rapidly, and many architects and engineers have already found it a very convenient instrument for their everyday problems. In effect this means that a rapid analysis of daylighting efficiency is now a practical possibility for any room in any building, and we may hope that the ill-lighted room may soon be a thing of the past.

It has already been noted that standards of artificial illumination have been codified for various occupations, but the position is not so satisfactory with daylighting. It is necessary to lay down standards of daylighting adequate for various kinds of occupation, including the home, and it is worth note that many everyday domestic tasks call for a high standard of lighting. The kitchen sink, the cooker, the sewing table, all need generous illumination. Finally, in the field of lighting there is a new development to record in the fluorescent discharge tube. This device is already widely used in war factories, though it is not yet available on the domestic market. It has at least two important advantages—its current consumption is less than the incandescent bulb for equal light output (though there may be increased initial capital cost) and its light is a much nearer approximation to daylight than any artificial illumination hitherto available. Consequently it should be possible to use it to augment failing daylight and to merge from daylight into full artificial illumination without any perceptible inconvenience to the eye.

To summarize, there are possibilities of notable improvements in the lighting of buildings after the war both by daylight and by artificial light, and, at the request of the Ministry of Works and Planning, the Department of Scientific and Industrial Research has set up a committee, of which Dr. C. C. Paterson, F.R.S., is chairman, to give practical effect to the advances in scientific knowledge of the principles of illumination.

Heating and Ventilation of Buildings

It is convenient to discuss heating and ventilation under one heading, for they are very intimately related. A system of heating devised without regard for ventilation might very well fail to give comfortable conditions, and vice versa. Despite the importance of the subject, there has not been any very outstanding development to record in the heating of low-cost houses in the inter-war period and, compared with many other countries, the English home is not well heated.

Looking at the problem of the heating of the home in the broadest possible way, there are two important aspects to consider—economy in the use of fuel from the point of view of the conservation and proper use of one of the most vital national assets—and economy in the use of fuel from the point of view of providing the individual with the maximum warmth in his home at a price which he can afford to pay.

So far as this country is concerned, the main source of heat is coal; there is no indication at present that water-power will be able to share to an important extent in the production of heat. All the indications point to the conclusion that more economical methods of heating of buildings can and should be developed as a major contribution to national economy. And from the standpoint of the conservation of our fuel resources, economical methods of heating must go hand in hand with more scientific use of coal. For instance, by the pre-treatment of coal valuable by-products are obtained and fuels produced which have the advantage of being smokeless.

Smoke abatement is again an important national problem. It is difficult to assess in monetary terms the harm done to the community by smoke pollution. There is some injury to health, due to loss of sunshine, etc., a vast amount of unnecessary labour in cleaning and upkeep of buildings, and deterioration of vegetation in and around the polluted regions. Ways and means of obtaining smokeless combustion are developing rapidly, and it is possible to look forward confidently to the ideal of completely smokeless heating of the home, even if the open fire is to be retained.

When we come to look at the problem from the point of view of the householder, where every penny counts, the first question that arises is the cost of fuel. The increases in cost are such as to suggest that a change in the whole approach to the problem of the heating of the home is not only overdue but is, in fact, inevitable. It is possible to burn coal inefficiently at 25s. per ton without suffering too badly in pocket, but at 60s. per ton the situation is very different. Another factor indicating that a change of outlook is overdue is the question of labour-saving in the home. It is almost fantastic to suppose that any housewife should exist without an adequate, constant hot water supply in the year 1942. Dirty and dirt-making heating appliances, requiring constant attention, are also anachronisms and should be swept away.

The question of what is to be done about it is at the moment under active investigation by the Department by a group under the chairmanship of Professor Egerton, F.R.S., and the final conclusions are not yet available. It is clear, however, that the following are the directions in which improvements are to be looked for:

1. The betterment of building construction to ensure that heat wasted by conduction through the building fabric is reduced to the minimum. It is necessary to strike a careful balance between the possible saving in fuel and the additional cost, if any, of the building due to the introduction of better insulation.
2. The development of more efficient heating appliances and the education of the public to interest themselves in the efficiency of the appliances provided for them.

At the present time it is almost impossible to persuade a householder to interest himself in the efficiency of a fireplace. The factor which governs the sale of an appliance is more often than not the peculiarly lurid tile surround which accompanies a very inefficient grate. It is understood that the coal-producing and coal appliance manufacturing industries are actively engaged on researches into the improvement of appliances, and it is perhaps not Utopian to look forward to a day in the near future when every appliance put into a house will be supplied to a rigid specification for combustion efficiency and that the same standards of supervision will be applied to its installation as to the drains of a house.

It is necessary before leaving the question of efficient heating of buildings to examine the open domestic grate. There is in Great Britain a violent prejudice in favour of this form of appliance, though it has been discarded in almost every other country in the world except in the homes of the very rich. The open grate can and be doubt will be improved; it may in the near future be made smokeless, and the torrent of air sucked up the chimney may be reduced so that draughts in the room will not be so objectionable. Even with these improvements, however, it is likely to remain a relatively inefficient heating device unless a way can be found to make use of the heat which passes up the chimney, and the question arises whether the British people can be persuaded to give a fair trial to some alternative device. Alternatives are available; indeed, it is astonishing if one considers only efficiency how the open fire has survived for so long. Note, for instance, how it compares with the closed stove. The open fire gets about one-quarter of the heat of the coal into room; the stove gets about three-quarters—a striking contrast. But prejudice dies hard. Something can be done to overcome it possibly by attention to the design of the stove to make it more attractive in appearance. But in the meantime it is best to assume that the open fire will survive for some time to come, and investigations to increase its efficiency and to reduce its smoke emission must go on. There are indications of real progress in these directions. One question which is much exercising the mind of every planner is the possibility of centralized heating for a whole district from a single boiler house. This form of heating has been practised in America, Germany, and U.S.S.R., but its applicability to British conditions is at present uncertain and the subject of investigation. The idea is in many ways most attractive, as it should make smoke elimination possible and lead to much saving of labour in the home. The main difficulty arises from the very variable nature of the British climate. An installation capable of handling the heating load during the relatively limited cold weather experienced in this country will not be running nearly to its capacity over the greater part of the heating season, and it is well known that large plants need to work as nearly as possible to their capacity to obtain a high order of running efficiency. Even with this disadvantage, however, there are interesting proposals on foot which may lead to the development of the method on a practical scale.

Ventilation is linked with heating to the extent that all heating devices with flues act to a greater or less extent as ventilators of the rooms in which they are installed. At the extreme end of the scale the ordinary open fire may draw so much air into the flue above the fire that draughts are difficult to avoid, and the room is chilled by the excessive volume of air drawn in from out of doors. Ventilation of the home is not in a very satisfactory state at the present time; perhaps the reason is to be found in the fact that people have been encouraged to open their windows to a greater extent than they used to do, especially in bedrooms. The fact is that to open a window in the depth of winter does mean a loss of heat from the room or from the house, which people of limited means can ill afford; what is wanted is a system of ventilation which will change the air sufficiently for health at all times, even when the windows are shut tightly, without introducing an amount of cold air so excessive as to chill the room and its occupants. Ventilation of the home with the windows shut depends at the present time either on the existence of a flue from the room which serves as an outlet or on a wall ventilator which serves as an inlet.

Logically a proper system of ventilation comprises an inlet and an outlet, and with both of the systems mentioned only the one half is provided, cracks and chinks providing the other half of the circuit. The worse the workmanship of the building the better the ventilation, and vice versa. A difficulty with a proper system of ventilation with correctly designed inlets and outlets is that the rate of ventilation will be completely at the mercy of the wind. A system which gave adequate ventilation when the wind was light might well admit a gross excess of air in moderate and strong winds. This difficulty, however, should not be insuperable, and the subject is being actively studied at the moment.

★ *Would you please supply me with sunblind details as used in countries where there is strong sunshine?* - Q 906

★ *Last year our works were badly damaged through enemy action; designs and drawings were destroyed. The Board of Trade inform us that no compensation is admissible. Is any action being taken to obtain an amendment to this rule?* - - - - - - Q 908

THE ARCHITECTS' JOURNAL

INFORMATION CENTRE

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

Enquirers do not have to wait for an answer until their question is published in the JOURNAL. Answers are sent direct to enquirers as soon as they have been prepared. The service is confidential; and in no case is the identity of an enquirer disclosed to a third party.

Questions should be sent to—
THE ARCHITECTS' JOURNAL
45 THE AVENUE,
CHEAM, SURREY.
Telephone: VIGILANT 0087

Q 905

ARCHITECT, FIFE.—*What steps, if any, can a PROBATIONER (who will register on the 18th of this month) take to get into the Royal Engineers—Surveying Section, if such exists—and would there be any advantage in voluntary enlistment before receiving calling-up notice.*

You can approach your local Recruiting Centre with a view to voluntary enlistment in the Royal Engineers' Surveying Section, and your application will probably be sent to the War Office for approval. The question of your being posted to the Surveying Section, however, depends upon the vacancies and also upon the nature of your work in civil life. No guarantee can be given that you will be accepted for the Surveying Section.

We would draw your attention to a letter from the War Office, published in THE ARCHITECTS' JOURNAL for January 29, which states that "it is desired to obtain particulars of members and students of Professional Institutions who are not already serving and are desirous of consideration for commission in the Royal Engineers, either through the Army Officers Emergency Reserve or after training in the ranks." Members and students who wish their names to be considered should write to the Secretary of the R.I.B.A. giving :—

1. Date of birth.
2. Private address.
3. Occupational classification number (not industry letter).
4. Registration number under National Service (Armed Forces) Act (if registered) and date and place of registration.
5. Particulars of former military or O.T.C. service, if any, including details of any certificates obtained.

Q 906

ENQUIRER, LIVERPOOL.—*I would be very much obliged if you could supply me with SUNBLIND DETAILS as used in countries where there is strong sunshine like Egypt. I enclose herewith photographs of buildings which show the type of sunblinds of which I want details.*

Details of sunblinds vary according to the source of manufacture and, unfortunately, the brochures normally supplied by manufacturers are largely out of print.

We are sending you a comprehensive series of sketches of blinds manufactured by Messrs. G. A. Williams & Son, Ltd., of 42, Queens Road, London, W.2, and no doubt they will give you further particulars of any type in which you are most interested.

Q 907

ENQUIRER, LANCS.—*I am interested in modern methods of CONSTRUCTION as applied to HOUSING, where steelwork and reinforced concrete are used as a skeleton framework, and external walls become purely screens to enclose the required space and to keep out the weather and sound. Can you suggest any book which will enable me to make a close study of this form of construction?*

It is not easy for us to help you, as few books have been written specifically on the subject of your enquiry, although there are a very considerable number of books and articles which have some bearing on the subject. Unfortunately many of the articles are in foreign and more particularly, in American publications, of which you will be unable to obtain copies except through a library.

As the question is still largely one of research you would do best to carry out your studies at a library, and there is no point in us supplying you with a list of foreign publications which may not be available at the library concerned.

The Library of the R.I.B.A. probably contains the best selection of books and articles, and with their permission we have extracted from their catalogues the British publications of recent date which might be helpful. These are given below.

In addition we would draw your attention to the large number of articles by R. Cotterell Butler, A.R.I.B.A., on Wartime Building Practice in *The Builder*, an index to which is given in *The Builder* for April 25, 1941.

ARTICLES IN PERIODICALS.

Gibberd, F., and Mopin, E., Designers. *Prefabrication in Unit Tenements.* Arcl. Design and Constrn., 1938, Apl., p. 161.

Faludi, F., and Samuel, G. *Temporary and Semi-permanent Buildings (Including Prefabrication).* Archts. Jnl., 1940, Jan. 4 and subsequent issues.

Clarke Hall, D. *The Case for Prefabrication.* A.A. Jnl., 1940, May, p. 155; Br., May 3, p. 538.

Livett, R. A. H. *Designing and Building in Prefabricated Concrete.* W. Yorks, Soc. of Archts. Jnl., 1938, Feb.-Nov. *The Architect and Housing by the Speculative Builder. lx. Steel-framed Houses.* (Scheme by Denis Poulton). R.I.B.A. Jnl., xiv., 1938, p. 496.

Bacher, G., with MacDonald, Alister. Inventers. (*System of Pressed Steel Interlocking Units*). Archts. Jnl., 1940, May 2, p. 446. *Timber Houses—Prefabricated Construction.* Builder, 1938, Feb. 18, p. 360.

Corkhill, T. *Standardised Construction for Timber Houses.* Wood, 1938, Sept., p. 447. (Not in Library). (*Prefabricated Timber Units in Houses*) *in Recent Swedish Architecture, Pt. ii—Municipal Small Houses in Sweden.* R.I.B.A. Jnl., 1939, Jan. 9, p. 223.

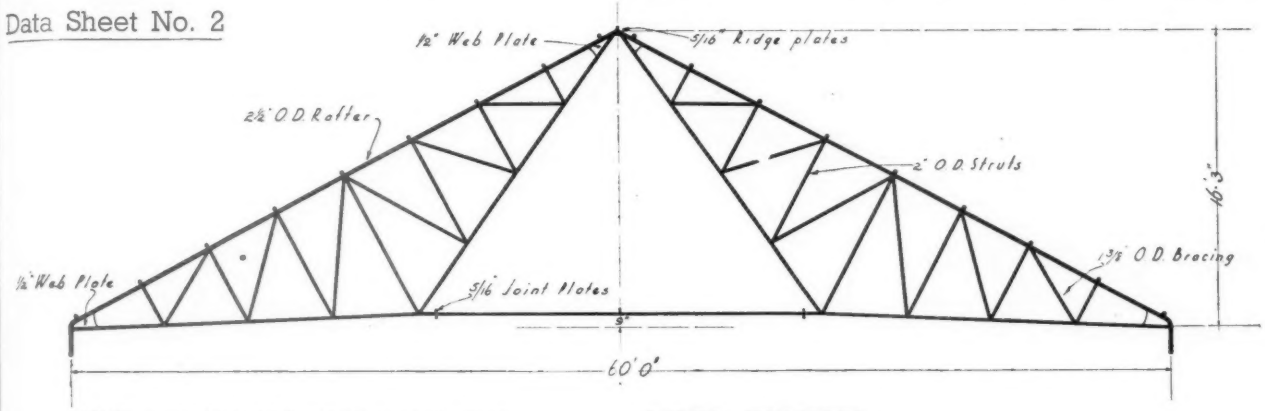
Warland, E. G., *The Fabric of Modern Buildings. (Including Pre-cast Plaster Slabs, Internal Faces of Walls),* p. 47. 1a, 80. Lond., 1937.

Butler, R. Cotterell. *Construction: Economic Efficiency and Prefabrication. (War-time Building Practice Series, N.* 47). Builder, 1941, 28 Mar., p. 320.

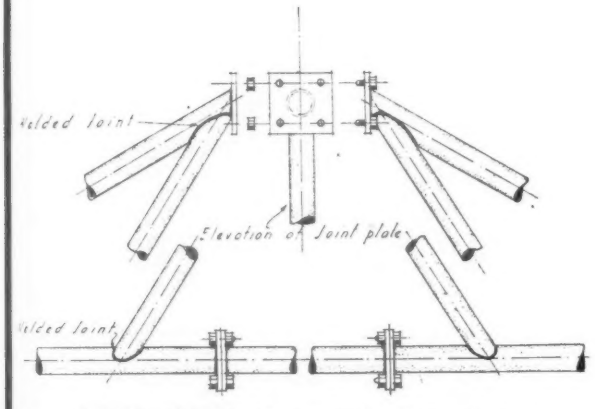
Butler, R. Cotterell. *Provisional Building: Comparative Study of Emergency Structural Systems. (War-time Building Practice Series No.* 48-49.) Builder, 1941, 11 Apl., p. 359, 18 Apl., p. 380. *Unit Construction in Asbestos-cement Sheeting Turnall "Granitous." (Asbestos-Cement).* Building, 1940, March, p. 69.

PATENT WELDED TUBULAR CONSTRUCTION

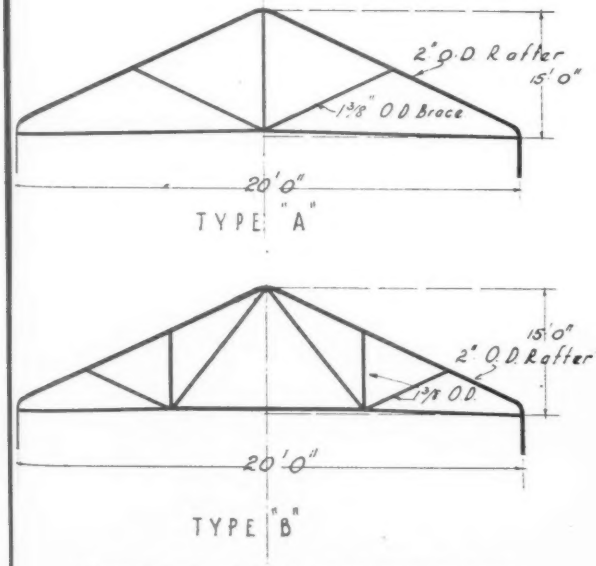
Data Sheet No. 2



60 ft. span welded tubular roof truss



Detail of joint plates and ridge plates.



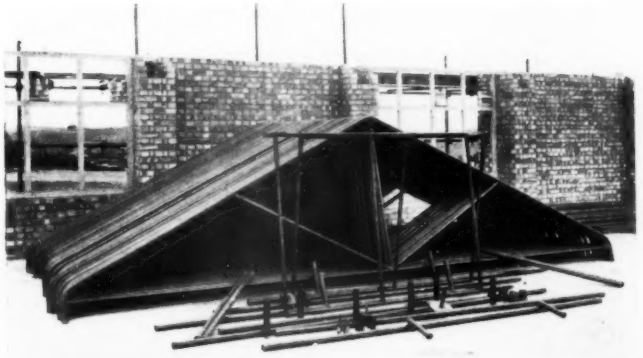
Two types of 20 ft. span roof trusses. The photograph on the right shows a number of these trusses ready on the site for assembly.

ROOF TRUSSES

The standard series of welded tubular roof trusses available range from 15 ft. span, rising by multiples of 5 ft. to 60 ft. span. They can be fully fabricated and welded at the factory and delivered to the site ready for assembly, or, as is often advantageous where the larger trusses are to be used and where long distances in transport are involved, sections of the trusses can be factory fabricated and welded together after delivery to the site. A special mobile welding plant and a mobile unit of skilled welders is available for this purpose. The truss sections, or complete trusses, are easily stacked for transport and are exceptionally light.

The hollow circle is recognised by structural engineers to be a most economical section and in construction it uses the least material for the greatest resistance to stress. The roof trusses are singularly neat and light in appearance, and with the circular section there is a marked absence of dirt-retaining angles and corners ; where protection against chemical attack or corrosion is specially necessary anti-corrosive paints are most simply applied. The trusses have great strength and it is a feature in this form of construction that the joints, usually the weakest parts in a structure, are the strongest parts.

This is the second of a series of informative data sheets outlining the principles of welded tubular construction and planned to give (1) *An analysis of the various sections that comprise the system—roof trusses, sectional wall frames and door frames, etc.* ; (2) *Typical details of war-time construction* ; (3) *Factory fabrication and/or site welding* ; (4) *Permanent and post-war construction—details showing how the system is used with brick construction and with concrete construction. As the completion of this series will be spread over a period of approximately twelve months, it is believed that some readers of* THE ARCHITECTS' JOURNAL *might like to have the information in advance of publication, in which case would they send to us, on their business notepaper, requests to this effect.* Scaffolding (Great Britain) Ltd., 77, Easton Street, High Wycombe, Bucks.



Canteen for Forces in Hyde Park: Light Steel and Thermolux. Architects Jnl., 1940, 14 Mar., p. 271. Architect and Building News, 15 Mar., p. 260, Builder, 22 Mar., p. 367.

Forest Products Research Lab. of America. *Prefabrication: Its Application to the All-Wood House.* Wood, 1937. Vol. 2, No. 4, p. 161-4.

Proskauer, A. E. *Mass Produced Swedish Houses.* Wood, 1939, Mar.,-Vol. 4, No. 3, p. 138-41.

BOOKS.

Dept. of Scientific and Industrial Research. *Principles of Modern Building, i. (Fitzmaurice). (Including: Drying-out of Pre-cast Units Before Incorporation in Structure, p. 62.)* 80, Lond., H.M.S.O., 1938.

Q 908

MANUFACTURERS, WARWICK. — *Last year our Works were badly damaged during the Birmingham blitz and the whole of our DESIGNS and DRAWINGS were DESTROYED. These papers included, in addition to sketch designs, all our detailed working drawings, together with the draft of a practically completed catalogue intended for the use of architects. The Board of Trade inform us that no compensation is admissible. We should be very interested to hear if architects who have suffered similarly have been given the same ruling by the Board of Trade, and in that case whether any common action is being taken with a view to obtaining an amendment to the Board of Trade's ruling.*

It is specifically stated in clause 95 of the War Damage Act that the "goods" which can be insured do not include "money, negotiable instruments, securities for money, evidences of Title to any property or right, or of the discharge of any obligation or *any documents owned for the purpose of a business.*

It has been submitted that documents that represent work in progress (as architects' plans, bills of quantities, etc.) are not documents owned for the purpose of a business, but constitute the business itself, but we understand that representations have been made to the Board of Trade, and that their ruling applies to all such documents.

Although we cannot speak for the various Architectural, Engineering, Surveying and similar Institutes, we have no doubt that they are watching their members' interests, and would have taken the matter further if there was a reasonable chance of obtaining a different ruling.

In our opinion the ruling of the Board of Trade in this matter cannot be set aside except by the amendment of the War Damage Act.

Q 909

MANUFACTURERS, WARWICK.—*Can you tell us the makers please of "Luxoid" waterproof GLAZING MATERIAL which we understand can be fitted into metal frames and puttied?*

"Luxoid" was made by the Thermalux Glass Co., Ltd., and sold by Messrs. James Clarke & Eaton, Ltd., Scoresby House, Glasshill Street, Blackfriars, London. We understand that manufacture has now ceased, but that Messrs. James Clarke & Eaton still have stocks.

Q 910

ENQUIRER, LONDON.—*Can you recommend BOOKS dealing, not necessarily in great detail, with the VALUATION FOR ASSESSMENT of Rating on Properties and Valuation of Property of Fire Insurance.*

There are a very large number of books dealing with valuations, but we suggest the following which should assist you both as regards rating and fire insurance.

Complete Valuation Practice, by J. E. Tory and N. E. Mustoe. Published by Estates Gazette.

Curtis's *Valuation of Land and Houses.* Published by Estates Gazette.