# CENTERLESS ARCH CONSTRUCTION

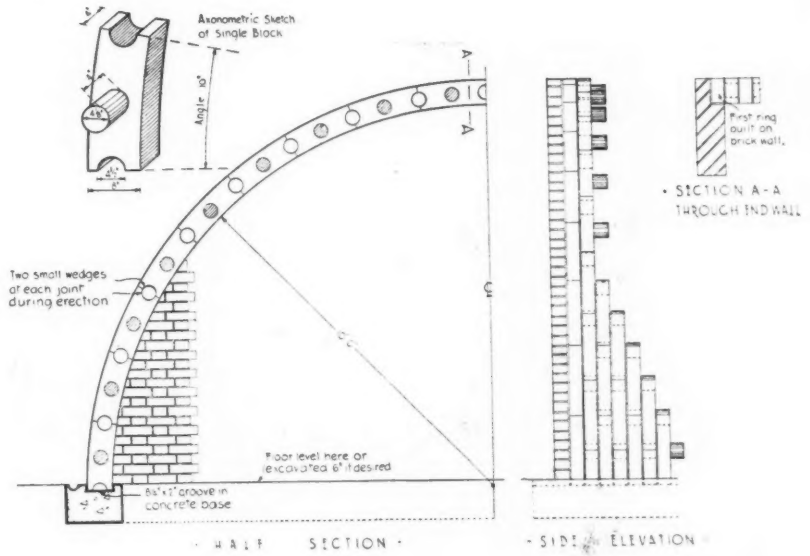


*Figure 1. Diagram of 20 ft. span structure.*

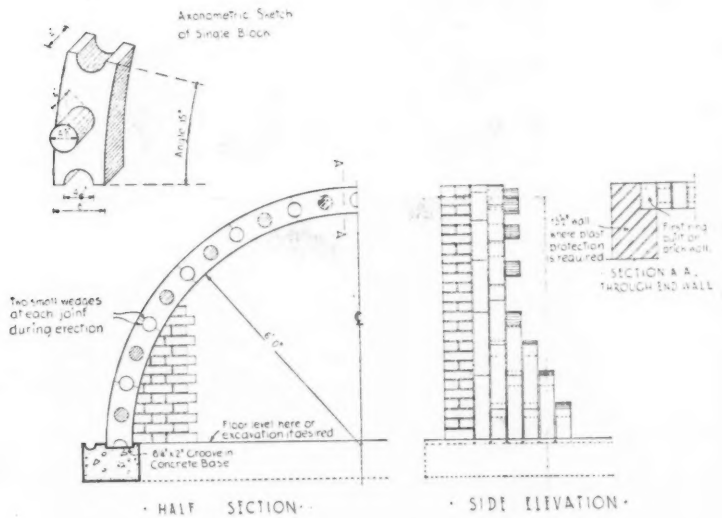


*Figure 2. Diagram of 12 ft. span structure.*

*WARTIME Building Bulletin, No. 6,* just issued by the Department of Scientific and Industrial Research, is in two parts. The first part illustrates a centerless arch type of construction. An experimental structure of 20 ft. span has been erected at the Building Research Station and a 12 ft. span structure is at present on view at the Building Centre, 158 New Bond Street. The Bulletin states :—*

*By the use of specially shaped blocks of the type illustrated in Fig. 1, it has been found possible to erect a segmental arched vault† without the use of centering. The system may be applied to various types of structure up to 20 ft. span and lengths of the order of 60 ft. Details of construction and examples of such buildings are illustrated in Figs. 1 and 2.*

*The blocks are made accurately to shape and, if concrete is used, they should preferably be cast in steel moulds to ensure this accuracy. By resorting to vibratory methods of placing and by the use of suitable mixes, the blocks can be instantly demoulded and produced at a rapid rate. They require no reinforcement. The units are simple to make, the moulds are not complicated and it should be within the capacity of any concrete products manufacturer or building contractor to turn out units. They have been made at the Building Research Station for the 20 ft. arch in a dry mix, and tamped by vibration, instantly demoulded and erected when one day old.*

*A mix consisting of 1 cwt. Portland cement to 2 cu. ft. clean sand and 4 cu. ft. of shingle up to ½ in. diameter, has been found very suitable and it is recommended that concrete mixes of similar quality should be used. It is possible that lighter weight concrete blocks could be used, but no tests have yet been made on this point. In order to increase the ease of handling, blocks of smaller dimensions than those illustrated might be used.*

*The method of construction can best be explained by reference to Fig. 1, which shows an arched structure of 20 ft. span.*

*The end wall of the structure is built with a ledge upon which the first arch ring is bedded. This ring, with its protruding lugs, provides a template for the next arch ring. The lowest blocks in each ring are bedded into a shallow channel formed in the foundation concrete. The back of each block is buttered with cement mortar before pressing back into position. The dowels are made ⅜ in. smaller in diameter than the recesses at the ends of each block, and this enables the blocks to be supported centrally on wood wedges or strips of lath inserted in the manner shown in the illustration. This procedure allows the blocks at the crown to be easily placed in position. The blocks are close jointed or may be given a fine mortar joint, and on completion of the ring the wood wedges are withdrawn and the arch action is developed. Clearance spaces between the lugs and the recesses are then pointed up.*

*As a rough indication of the speed of erection it should be possible for four men to work simultaneously on a 20 ft. diameter arch and they may be expected to erect 12 ft. run of arch per eight-hour day.*

*Part II of the Bulletin is really a supplement to Building Research Wartime Building Bulletin No. 3 on huts and gives details of two designs which were only briefly referred to in the earlier Bulletin. The application of three type designs to multiple-span hut schemes is also shown.*

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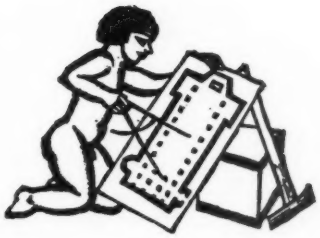
* H.M. Stationery Office. Price 1s. Crown Copyright Reserved. Bulletin No. 5, recently issued, is reviewed on page 36.

† Provisional patent protection (British Patent Application No. 10611/40) has been applied for in the general interest, but so far as the Department is concerned, any British firm who notifies the Secretary, Department of Scientific and Industrial Research, Teddington, Middlesex, is free to use the method without royalty.

*The Victorian Government Tourist Bureau, recently completed, occupies the whole of the ground floor of the Hotel Australia Extension in Collins Street, Melbourne, and was designed by Messrs. Leslie M. Perrott and Partners and the Architects' Branch of the Victorian Railways. Above, the booking hall as seen from the main entrance : on the left are the offices of the manager and the travel hostess, and the booking counters, above which is an 8 ft. wide gallery which accommodates the clerical staff ; on the right is shown a part of the information counter.*

*The photograph reproduced on the left, booking hall looking towards the main entrance. An 80 ft. long photo-mural, by G. Sellheim, depicting the development of transport, is shown on the left of the illustration. The panelled dado and information counter are of Queensland walnut. The flooring is of coloured rubber inlaid with motifs of early aboriginal art.*

# TOURIST BUREAU, MELBOURNE



# FIRST AND SECOND PIONEERS

ARCHITECTS heard of the death of Sir Raymond Unwin with great regret. To all of them he was known as the foremost of the pioneers of town planning in Britain. By most he was thought of with gratitude as a President R.I.B.A. who devoted his whole energies to helping the profession during its worst slump.

But the events and anxieties of war should not prevent architects' thoughts of Sir Raymond and his work going beyond these things. The war is indeed the greatest reason why it should not be so : for the war has ended the second phase of town planning in this country, and the end of the war will begin a third phase which may entirely change the relationship of architects and town planning.

Sir Raymond Unwin lived and worked through both the phases which are now ended. He was the foremost of the architect pioneers ; he originated or helped to originate the first British solutions for the problems which town planning sets out to solve, and much of the legal mechanism needed for those solutions.

From Unwin's life it can be seen that the first practical experiments in town planning were a triumph of idealism. For many years isolated reformers had advocated the " planned town " which would provide healthy, convenient and beautiful surroundings for all its inhabitants. By the 1890's, the fearful mess of Victorian expansion, the uneasy conscience of politicians, the obvious ineffectiveness of by-laws about light and air, and the ardour of social reformers, led to the first attempts to achieve these surroundings in practice.

The experiments—of which the most important were " garden cities "—were few, but architects of imagination realized their possibilities : they saw that planning an area of land for the efficient exercise of all human activities was architecture in the grandest manner. They saw that such planning could offer more to, and ask more from, architects than had ever been dreamed of before.

These architect-town-planners of the first phase —which ended in 1914—did not underestimate difficulties. They saw that good town-planning would demand both co-operation between an architect of special abilities and at least a dozen other specialists, and the goodwill and help of politicians and the public. They, and Sir Raymond with them, saw that Letchworth, Hampstead and the first Town Planning Act were only laboratory experiments before the real work. They hoped to evolve from them a framework which, given the will to use it, could stop the aimless muddle of urban expansion.

The second phase of town planning—the 1918–1939 phase—opened with a dazzling opportunity. Hundreds of thousands of houses were needed, millions were eventually built, and the framework of town planning and the planners were there to be used.

In the small patches of land which local authorities bought and developed themselves the lessons of the early experiments were applied : in most badly, in a few well. In the vast areas eventually covered by speculative housing there was no attempt to use those lessons : individual buildings were placed a little further apart, but otherwise the land was used as badly as in any Victorian expansion.

This misuse of land had three main causes. In 1918 the demand for houses was immediate and enormous and town-planning mechanism small and feeble. The local authorities, even in later years, did not understand the aims of town planning and carried out duties connected with it only under compulsion. And throughout this second phase, the individual who was determined to extract the last penny from his piece of land has possessed energy, resource, cash, first-rate lawyers and the ear of many M.P.s.

The struggle over town planning in practice continued, but it became, in fact if not in theory, a struggle about unimportant details. Optional powers were conferred on local authorities and were ignored. Compulsory duties were imposed on them, and speculators' lawyers sat happily down to find a way round every clause of every Act. The mass of legislation grew in size and architects grew weary.

This is what matters to architects about that second phase of town planning. Architects were the pioneers in town planning, but between 1918 and 1939 they supplied few new recruits to replace the pioneers. Local authorities required of their Town Planning officers no power to plan : they required only an adviser on town planning legislation and an expert in avoiding compensation. Architect-town-planners who believed in planning did not want such jobs, and did not take them.

But the legal manœuvres of town planning in practice were, fortunately, not the whole of town planning between 1918 and 1939. Research went on. A mass of knowledge was accumulated about land utilization, the location of industry and of what may be called Regionalism. In this research architects took part. And as the evils of aimless expansion and pin-prick remedies became more obvious, so it became plainer and plainer that SOMETIME *positive* planning would have to be begun—and on a huge scale.

Until this war that SOMETIME was remote. It is now remote no longer. Whether this war is won or lost, positive town planning—or, to use a better phrase, Regional Planning—will be one of the primary means of reconstruction. In this third phase of planning, and first real phase, architect-town-planners possessing all the enthusiasm and energy that Sir Raymond Unwin and his collaborators brought to the first town planning more than forty years ago will be needed once more.

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

# NOTES & TOPICS

### THE NEW PRESIDENT

MR. W. H. Ansell, who succeeds the late Mr. Stanley Hall as President of the R.I.B.A., enters a post from which war has taken away the more graceful functions and added many new difficulties.

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During ten months of war, architects and the building industry have had little success in their attempt to persuade the Government that the greatest efficiency in the execution of the war building programme would be obtained by using the industry's peace-time organization, in collaboration with the industry's leaders, with the fewest possible changes.

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From the time war broke out, Service Departments each seized upon pieces of the industry and, in happy rivalry, set about fitting them into systems of building organization which had been invented almost overnight.

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Architects suffered worst from this departmental short cut. Not that architects could be done without—as those in authority first happily supposed. By now each Service building organization incorporates many architects—known by different names, working in odd ways, but still architects.

*

Thus Mr. Ansell confronts an industry of which one part has been turned upside down and is working at high speed, while another and larger part still retains its peacetime organization and is little employed. To see that this larger part is used for war work—if it is needed—without being first twisted to fit into some new-fangled system of organization, is the biggest job awaiting the new President. All architects will wish him success in its accomplishment.

### THE CENTERLESS ARCH

The B.R.S. has been experimenting for some time on methods of building which avoid the use of wood and steel. Much information on the subject has already been published, and the latest product of B.R.S. ingenuity is now to be seen at the Building Centre. An inaugural demonstration took place last week, compèred by Mr. Yerbury, and attended, judging by the hardness of their hats and the relentless glitter of their horn-rimmed glasses, by a body of strictly practical men.

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After an introductory harangue by that bulwark of the industry, Mr. Alfred Bossom, M.P., the invention was explained by a member of the B.R.S. staff.

*

It revealed itself as a new form of concrete block, which makes possible the construction of arched roofs without centering or reinforcement. The roof is made up of arched rings keyed together, each ring being composed of curved and notched blocks with studs projecting laterally to make contact with the adjoining ring. To erect such a roof you start by building a curved end or gable wall, and lay on this your first ring. The rest follow as easily as the last three pieces of a jig-saw puzzle, as a competent demonstrator, in black suède shoes and a tiepin, showed us. Windows can be built in where desired, and spans up to 20 ft. have been built and tested. The whole system has that deceptive simplicity which is the quality of all the greatest inventions. It's so obvious now you come to think of it—as I expect somebody said when they saw the first wheel. I am told some explanatory drawings appear elsewhere in this issue.*

*

Although the method is patented, free manufacturing licences will be granted to approved applicants. Meanwhile anyone who is faced with war-time building problems will find here a valuable solution to at least one of them.

### WAR PICTURES

Under conditions bordering on the deepest secrecy, the Ministry of Information has opened at the National Gallery the first exhibition of works by official war artists.

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It is an uneven but highly stimulating show, in which the old guard, with their hackneyed subjects and theatrical colours, make a pleasantly insignificant appearance. (One of these, which closely resembled a B.O.P. coloured supplement, was surrounded by those arbiters of public taste, the press photographers.)

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Of the salaried artists, Ardizzone and Bawden, both with the Army, are the most successful. The small-scale drawings by the former of army life in pre-*Blitzkrieg* France are packed tight with terse, witty observation—they are graphic reporting at its very best. I particularly liked "The Chaplain having his boots removed," and "Priest begging for a lift in Louvain." Bawden's drawings of Dunkirk are vivid records of that triumph of the amateur, and it is encouraging to hear that he has left to continue his vigorous comments in the Near East.

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The rest are a queer mixture in which Ravilious, Anthony Gross and Pitchforth make a fine and imaginative showing in their various fields of activity. John Piper has enjoyed himself with stencils and primary colours in his interiors of a control room, and Eric Kennington's larger-than-life portraits are as relentlessly powerful as if his subjects were men of granite instead of flesh. Keith Henderson, Nevinson and Nash are disappointing. So, too, are the drawings of aircraft construction by Raymond McGrath. Despite

* Page 21.

their attractively precise draughtsmanship and delicate colours, they come too near the lifelessness of an Academy rendering. We can hope for better things to come.

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Perhaps the greatest personal success is scored by Midshipman J. Worsley, who is not an official war artist. His sketches of life on winter patrol, which have been bought by the nation, are magnificent reporting, economical, lively and confident.

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The exhibition is only the first, it is hoped, of a series, and makes a very promising start. It is almost unadvertised, and will last for an unknown period, but do not let the modesty of its organizers prevent you from seeing it.

THE NEW FINLAND

The first plans for Finnish reconstruction have been made public in America. They are plans by Alvar Aalto.

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Direct news from Finland has been difficult to obtain in this country. When I last mentioned Aalto on this page, it was to say he had joined the Finnish army in its fight against Russia, and all architects will rejoice to learn that Finland's foremost architect has not only survived the war and been put in charge of reconstruction, but that his plans for rehousing half a million people are nearly complete : after four months of peace.

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Aalto, the American report states, had two alternatives in preparing his scheme for the rehousing of 500,000 refugees. He could build temporary communal dwellings first and thereafter draft families to finished houses as these were built. Or he could leave the families in their existing makeshift quarters, plan and mark out the final homes with the utmost speed, and transfer families into these homes directly carcassing was completed.

*

It is characteristic of Finland and of Aalto that the more courageous course was chosen. Town planning and building have been nationalized. Before winter comes it is intended that the new towns should have been planned and houses carcassed, glazed and provided with stoves. Thereafter, electric lighting, plumbing, the ubiquitous Finnish telephone and better surface finishings will be installed, each by a separate mobile labour force. Public buildings and all the other appurtenances of a highly civilized democracy will follow as money and labour become available.

*

In the way this huge problem is being tackled, Finland sets one more example to all other democracies.

WHERE WERE YOU ?

An inevitable result of the London air-raid warning a fortnight ago was the exchange of reminiscence : Where were you ? What did you do ? The novelty and reminiscence soon wore off and died away : people had almost invariably stayed in bed or gone to their shelter. But one of my friends had done something different. He casually admitted to having spent the warning period pacing round the dome of St. Paul's Cathedral.

*

He is a member of that recondite body the St. Paul's Night Watch, who spend the night hours conspiratorially lurking in the crypt and, during air-raids, patrolling a conveniently situated gallery within the thickness of the stone base of the drum, from the apertures of which they watch out for any incendiary bombs that may fall on to the lead and timber roofs of the cathedral.

*

This occupation should provide a grandstand view in future air-raids, and plenty of excitement—whether in dealing with actual bombs or in intercepting any parachutists that may descend from the roof dressed as clergymen (the latter can presumably be distinguished from real ones, if the stories from Holland are correct, by their folding bicycles).

*

But my friend tells me that he has been anything but bored while waiting for these excitements to begin. He has been richly rewarded for his trouble both by the spectacle of the darkened cathedral at midnight (which he says is startlingly beautiful on moonlight nights) and by the pleasures of exploring the tortuous passages and roof spaces which make a building of apparently simple plan one of the most complicated imaginable behind the scenes.

REGISTRATION

This month is likely to be exciting—so exciting that things may be forgotten which would never be forgotten otherwise. One of these is Registration under the Architects Registration Act.

*

Time now runs short. Anyone who has not registered by August 1 will not be allowed to call himself an architect thereafter. Nor will he be able to use the letters F., A., or L. R.I.B.A.

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Those who are still unregistered should therefore do something about it very quickly.

ASTRAGAL

## BRICKS IN WARTIME

*IN the last few months the increasing shortage of timber and steel has compelled the building industry to devise methods of avoiding their use in all war building works of secondary importance—and thus to find alternatives for many of the commonest forms of building construction.*

*The manufacturers of the principal building materials have carried out much research into methods by which their products can be adapted to meet the new conditions, and next week the* JOURNAL *will survey the effects of those conditions on one of these basic materials—*BRICKS. *The survey will be called* BRICKS IN WARTIME, *and will outline the brickmaking industry's resources, and illustrate the ways in which brick products have been adapted and developed by the industry to take the place of structural forms which can no longer be generally used.*

# NEWS

## NEW P.R.I.B.A.

Mr. W. H. Ansell has been elected President of the R.I.B.A. Names of members of the Council for the session 1940–41 are printed on page 36.

## IRON AND STEEL CONTROL

Minister of Supply has made the Control of Iron and Steel (No. 11) Order, prohibiting, with certain exceptions, the use of iron and steel for buildings except under licence.

The intention of the new Order, which came into force on July 8, is to prohibit the consumption of iron and steel already in the hands of contractors or consumers and the sale of iron and steel by stockholding merchants for non-essential buildings. No licence will be required for the use of steel for building, where the purchase of that steel has been authorized by a Department for that purpose under the Steel Distribution Scheme, or has been licensed by the Ministry of Supply (Iron and Steel Control) on or since April 1, 1940. In order to cover urgent requirements for repairs and maintenance, the use, or the purchase from a stockholder, of less than one ton in one month for any particular building is exempt from the licensing scheme.

In present circumstances the Minister considers it necessary to prevent any use of iron and steel for non-essential buildings, and licences will only be granted for its consumption for buildings not already authorized, when it can be shown that the building will serve a useful purpose in connection with the war effort. Any application for a licence to use iron or steel under this Order should be made to the Department to which application would be made for authority to purchase steel under the Steel Distribution Scheme.

## APPOINTMENT

Mr. Frank Chippindale, A.R.I.B.A., head of the School of Architecture at the Manchester Municipal School of Art, has been appointed head of the School of Architecture and Building at the Leicester College of Arts and Crafts, and, subject to the approval of the Education Committees of the two cities, will take up his duties there as from September 1.

Mr. Chippindale was a student at the Ilkley Grammar School from 1916 to 1921, and at the Leeds College of Art from 1921 to 1926. In 1928 he took advantage of a West Riding Council scholarship in architecture to visit the United States of America, where he won the certificate in construction of the New York City Building School. He was senior lecturer and design master at the Leeds College of Art from 1929 to 1932, when he began his work in Manchester.

## BUILDING TRADE SCHOLARSHIP

In connection with the degree course in building in the Faculty of Technology of the University of Manchester, the North-Western Federation of Building Trade Employers has again decided to award a scholarship which will be tenable in the Manchester College of Technology. Scholarship will be of the value of £60 a year for three years, beginning with the new session in September.

Details may be obtained from the secretary, North-Western Federation of Building Trade Employers, National Buildings, St. Mary's Parsonage, Manchester, or from the registrar, College of Technology, Manchester, 1.

## MANCHESTER MUNICIPAL SCHOOL OF ART

Applications are invited for appointment as Head of the Department of the School of Architecture. Applicants must possess suitable academic qualifications and satisfactory teaching experience.

Salary, dependent on qualifications and experience, will rise to a maximum of £500 per annum. The appointment is pensionable, in accordance with the rules of the Board of Education.

Forms of application, together with particulars of the duties and conditions of the appointment, may be obtained from Mr. W. O. Lester Smith, Director of Education, Education Offices, Deansgate, Manchester, on receipt of a stamped and addressed foolscap envelope (2½d. stamp).

Last date for receiving applications is July 19, 1940.

## OBITUARY

### S. DAVIES

The death occurred last week of Mr. Sidney Davies, of Stourbridge. He was forty-five years of age.

Mr. Davies was educated at the King Edward VI School, Stourbridge, and was articled to Mr. Hugh E. Folkes of the same town. In 1914 he was rejected for military service and secured an appointment with Mr. A. Hackett, Birmingham, and supervised the erection of large munition works in Birmingham and district. At the conclusion of the war he commenced practice on his own account. Lately he was assisting in the Stourbridge Borough Surveyor's department.

### B. T. KITCHIN

Death has occurred of Mr. Brook Taylor Kitchin, F.R.I.B.A., at Arne, Wareham, Dorset.

Mr. Kitchin was chief architect to the Ministry of Health and the Welsh Board of Health, retiring in 1925 after thirty-two years' service. He was consulting architect to the Queen Mary Maternity Hospital and Walton-on-Thames Hospital. His works included: West Herts Hospital; Eton College Sanatorium; and various buildings for the Leeds and Dudley Boards of Guardians.

### P. H. ELLIS

Mr. P. Herbert Ellis, of Leicester, has died at the age of sixty-two.

Mr. Ellis was chief architectural assistant in the Architects' Department of Leicestershire Education Committee, a position he had held since the last war. He had been in the department since 1907.

## DIARY

*Thursday, July* 11.—BUILDING CENTRE, 158 New Bond Street, W.1. Exhibition of Centerless Arch Construction. Until July 26. 10 a.m. to 5 p.m. (Saturdays, 1 p.m.).

*Tuesday, July* 16.—HOUSING CENTRE, 13 Suffolk Street, S.W.1. Luncheon: "The Women's Plan." By Miss D. S. Crewe. 1 p.m.

*Thursday, July* 18.—ARCHITECTURE CLUB. At the Charing Cross Hotel, W.C. Supper—Discussion: "How Shall we Plan our Buildings for Life after the War: In the Country?" 7.45 p.m.

# INDUSTRIAL HOUSING COMPETITION

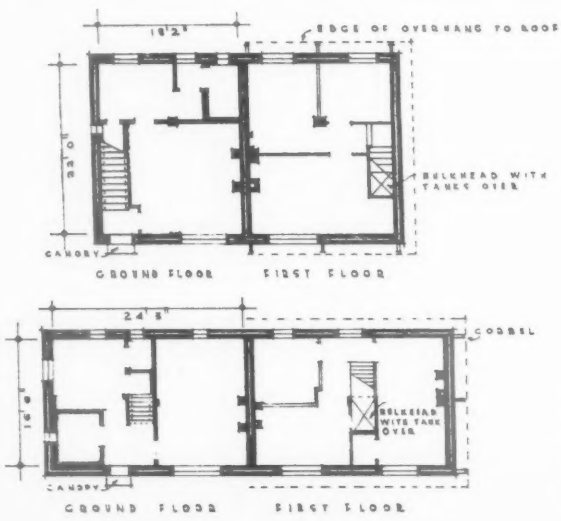
Mr. Bertram Baden has placed at the disposal of the R.I.B.A. the sum of £750 for use as premiums in a competition associated with the prosecution of the war. The committee appointed by the Council of the R.I.B.A. to examine and prepare conditions of this competition, and to act as assessors, are: Messrs. Kenneth Cross, F.R.I.B.A., Chairman, R.I.B.A. Competitions Committee, R. Fitzmaurice, B.SC. (Building Research Station), J. H. Forshaw, F.R.I.B.A., and G. A. Jellicoe, F.R.I.B.A., who have considered that the architectural profession can make a contribution towards the problems of *industrial housing*, which are causing the gravest concern to public and private authorities. Following prizes will be awarded for suitable designs: (1) For the house, first prize, £250; (2) For the estate plan, first prize, £100. £400 in additional prizes will be awarded at the discretion of the committee.

Details of the competition, which is open to students and members of the R.I.B.A. and members of allied societies, are as follows:

It is the view of the committee that permanent housing round the basic industries may wisely be undertaken at this time, provided:—

(*a*) The building programme is economical, swift and does not interfere with pressing war activity.

(*b*) The houses are designed for peace, but are able to be




*Plans for a pair of semi-detached cottages referred to in the conditions of the R.I.B.A. housing competition printed on this and the facing page.*

temporarily utilized for a denser number of occupants per house.

(c) The houses, without undue cost, give adequate A.R.P. protection to sleepers.

*The House.*

The house may be a detached dwelling or one of a block up to eight. Illustrations (on the facing page) of Ministry of Health plans for a pair of semi-detached cottages are taken from the Bulletin on War Time Housing of the Building Research Station, and will serve as a guide in size and accommodation. The committee wish to draw the attention of competitors to the form of living which has come to make such a plan universal in England, and to stress that no fundamental departure in principle should be made without the most serious justification.

The structure itself should make use of home-produced materials as much as possible, and reduce to the minimum the use of timber and steel. Simplicity of erection, with the present shortage of skilled labour, is essential. In view of changing conditions, competitors may refer to alternative methods of construction in their reports.

*The Estate Plan.*

It is suggested that, during wartime, meals, baths and laundry would be communal, and the layout plan should show a building placed both for this purpose and for ultimate use as a recreation hall.

The estate is to be assumed to be of 250 house units, and the site flat and featureless. It adjoins the town or works, but is sufficiently detached to be unaffected in design by this proximity. The surrounding landscape is a pattern of fields with hedgerow trees. The site lies off an arterial road, to which access is obtainable and from which services may be taken. The design for post-war must be based on statutory requirements.

The peacetime design will have from 8 to 12 houses to the acre. The layout must be flexible in size, and should not be a landmark from the air. Tree planting, with assumed soil and local conditions, must be considered and competitors are advised to consult with a landscape architect or horticulturist. The immediate use of gardens as allotments should be considered.

Economy of layout and upkeep is essential, and so also is the retention of human scale and amenity.

*Drawings Required.*

(1) House: Plans, sections and elevations to a scale of ¼ in. to one foot, as required to show the construction of—

(*a*) The post-war house.

(*b*) The wartime utilization, showing position of beds, etc.

(2) Estate plan: Plan to a scale of 1/1250, indicating tree planting, but no services. Drawings should not be elaborate or highly finished, but presented in such a manner as to be readily understood. Pencil drawings or prints will be accepted. All drawings must be delivered flat, unmounted.

*Report.*

Each scheme must be accompanied by a brief report and outline specification of the house.

*Closing Date.*

All designs must be delivered to the Secretary, R.I.B.A., marked "Industrial Housing Competition," not later than 12 noon, Tuesday, August 27, 1940. Drawings must be unsigned and accompanied by the report, also unsigned, and a sealed envelope containing the name and address of the competitor. An addressed envelope is included with each copy of the conditions. No questions will be answered. The committee is prepared to consider any variation from the stated requirements, provided it complies with the spirit and objects of the competition.

*Copyright of Designs.*

The copyright of all designs remains the property of the competitor, but the committee reserve the right to exhibit any or all of the designs in a public exhibition. No member of the committee, nor any partner, associate or employee of a member of the committee, shall compete or assist a competitor. Copies of these conditions may be obtained from the Secretary, R.I.B.A., 66 Portland Place, London, W.1, at 6d. post free.

*Some Observations by the Committee.*

(1) The House: There appear to be many possibilities of designing a building that complies with the foregoing conditions. An example may be as follows. Build the ground floor only, omitting stairs, bath and kitchen equipment. The kitchen becomes a small sitting room, the bathroom a bedroom for one, and the remaining space partitioned if necessary for beds, bunks or hammocks. The structure would be of 13½-in. external brick walls, with slab roof, suitable to act as first floor, and give resistance to light incendiary bombs. Windows to be provided with shutters, or other blastproof protection. Subsequently the first floor may be completed with normal tiled or flat roof.

(2) *The Estate Plan.*

By this competition the committee anticipates the renewal of wartime estate development and intends to encourage beforehand the adoption of sound principles which may well prove a contribution in the art of good house design and town and country planning.

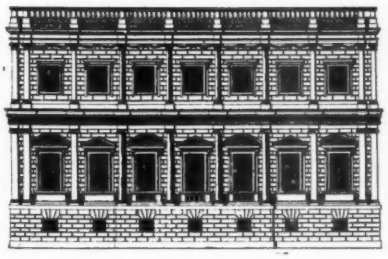
The pre-war estate development was governed by the factor of the economic continuous road, and the layout amenities, grass verges, trees, etc., emphasized these lines. The roads were often curved to decrease monotony, leaving the gardens to fill in the spaces behind the houses as well as they were able. This pronounced and curving road development does not easily merge into the countryside. Equally, a formal Renaissance plan is self-centred and outstanding, and accordingly inappropriate.

The aim would appear to be an all-over pattern sympathetic to the English pattern of fields, and capable of indefinite extension. The house units should not be in continuous shadow-throwing lines, and should be interspersed with trees.

The most interesting historic example of the geometric approach to planning for a different reason, is Winchelsea in Sussex, laid out at the end of the thirteenth century, and consisting of a plain grid as a basis for varied mediæval buildings. An example of integral planting is the house and chestnut plan of Milton Abbas in Dorset.

*References.*

Building Research Station War Time Building Bulletins Nos. 1 to 6 (inclusive). Building Research Station on War Time Housing (at present in the press). Ministry of Health Rural Housing Manual, 1938.



# THE LILY PAINTERS

[*By DUDLEY HARBRON*]

Ah! happy he who thus in magic themes
O'er worlds bewitched to early rapture dreams,
Where wild enchantment waves her potent wand,
And Fancy's beauties fill her fairy land.
CRABBE

LAST summer I spent some time in a lonely part of the country. It is marked on the map as waste. It lies between two roads, one of which is said to have been a Roman construction, and the other, of more recent date, follows what was once a prehistoric track. From the side of each of these roads the moorland stretches almost level for a few miles and then the ground descends steeply into a narrow gorge at the bottom of which a stream tumbles swiftly toward the ocean. From its elevation above the sea level, its steep gradients and stony subsoil, the district has never supported more than a few widely scattered inhabitants. For the most part these are now housed in isolated farms, the owners of which pay less than a sovereign a year to the court leet for their large areas of land. The rest live in little cottages appended to these farms.

The real native denizens appear to be descendants of the prehistoric inhabitants of the district, crossed with the few outlaws or outcasts from the walled towns of the north who have taken refuge among them over the centuries. They have a primitive shape of skull and frame. Their gait is lolloping. Their speech is difficult. Their hair shaggy. They are reserved and shy of strangers. Within their fastness they want to be left alone.

They have done very little to humanize the neighbourhood since their remote ancestors set up the tall stones on the most desolate stretch of the moor. These remain the first evident attempt to dramatize the scene, to provide a meeting place for superstitious man and the fearful gods that whisper and love, quarrel and slumber about this place.

In such a setting a stranger appears strange indeed. Anything he has done is conspicuous.

It was not until the last years of the seventeenth century that the first of these adventurers from the outside world arrived upon the scene and made a mark. Whether he was a native returning to his native heath after world-wandering, or whether he sought quietude, I cannot say; but what he did is plain to see. He built himself a substantial pre-Palladian mansion on a level portion of the land. He then took possession of that which no one else had wanted—the steeper part of the cleft in the country. For his neighbours had already appropriated the open land capable of feeding sheep and had pushed their claims outward and upward to the limits of endurance of their neighbours and their flocks.

Across the bottom of the gorge he threw a bridge, highly civilized and suitably substantial. Along the sides of his torrent he planted a variety of trees that now form more than wood and less than a forest. How he managed to get other than fish, rabbits and potatoes to eat is an unsolved problem. He had a soul above salt. Out of a great piece of rock he had a hermitage hewn. Such an action seems to have been a redundant mortification of the flesh. He may have sat within to receive alms, or more probably have hired some old man to perform the part of recluse. The entrance to this cave is roughly reminiscent of a Tudor doorway. It gives the exterior that ecclesiastical appearance supposed to be necessary to the abode of a hermit. The interior is dark and damp. The cave is circular, with a stone bench round the circumference formed of the material unremoved for the walls—obviously designed to serve as a summer-house should the hermit prove intractable. Within, supper could be served to the shuddering occupants seated on this stone bench round a circular table decorated by candles which provided light and heat.

There was an interval of a hundred and fifty years ere another improver lighted upon the scene. Like his predecessor he was a romantic. He planned to build himself a castle on the hillside further toward the east. His scheme never got any nearer completion than the building of the outhouses. These assumed the shape of quasi-Gothic stables, which were fitted with the best Victorian appliances for the comfort of the horses. Although the castle never materialized, the would-be baron left behind some evidence of his imagination. There are stone water troughs for the horses by the wayside. A spring is trained to supply refreshment for man, horse and dog. The water issues from the mouth of a lion carved in marble into a large stone trough: the overflow is contrived to quench the thirst of dogs. A cup is provided for the wayfarer. On the upper part of this work are three inscribed lead tablets. The earlier of these reads:—

Man made the trough,
The water God bestows;
Then praise His name
From whom the blessing flows.

The latest, by some disputatious passer-by, proclaims :—

The water is pure as if from Heaven it ran,
And while I praise the Lord, I'll thank the man.

The initiator of these amenities was a benevolent shipowner. I guessed as much when I discovered some other of his handiwork. He had the collecting habit of a sailor.

In Mary Linskill's novel, *The Haven under the Hill*, the character Nathaniel Rountree is a retired seaman. Describing his garden, the authoress says : "The old man was repainting his figureheads ; there were three of them in the tiny garden plot. One of them was only a torso, nameless and sexless, and with no history save that 'Than' had found it lying among the rough stones of the beach after a storm." The other two were "a lively Galatea, while Lord Nelson stood opposite, bound with an iron band to an apple tree."

In spirit the shipowner and the sailor were one. The former had festooned the gable ends of the permanent structures with the skulls of a large type of deer, hung by chains from the chimneys; and on the ends of all his temporary buildings he had nailed huge crests and coats-of-arms, heraldically tinctured—all different. On a chicken coop a lion's head. On a summer-house a crest of a spotted dog and a coat of arms in which the same dog figured.

In his grounds, on the top of a hill among the bracken, he has devised a quarterdeck of a ship. In the centre stands a capstan converted into a sundial. In the front of this are ranged six muzzle-loading cannon and, behind, the stern of a wooden ship serves as a seat. Whilst above all this is a tower of stones in circular imitation of a fighting top from which a pennant could wave in the breeze. His garden is parted from the road by a conventional stone wall, but is separated from the country by some cast-iron railings appropriate to the town of 1850.

The most recent comer is maintaining the tradition of his kind. Out of the woodland he has cleared a space for a swimming-pool into which the waterfall tumbles. Several swings hang from the branches of the trees.

As I struggled knee-high through the gorse and heather on the flatter part of the moors—named appropriately SOULSGRAVE—the thought came to me that someone in the not too distant future would construct an aeroplane in this place.

# EMERGENCY BUILDINGS

## A.A.S.T.A. Memorandum

The A.A.S.T.A. has just issued a Memorandum on Emergency Buildings, prepared by the Association's Evacuation Committee. It is printed below :—

Experience of air attack on Britain, and uncertain possibilities of invasion, have raised acutely the question of providing temporary accommodation for those whose homes are damaged by bombs, or otherwise rendered untenable. Local authorities have already made provision for the storage of food, blankets and other necessities. The provision of shelter is equally important.

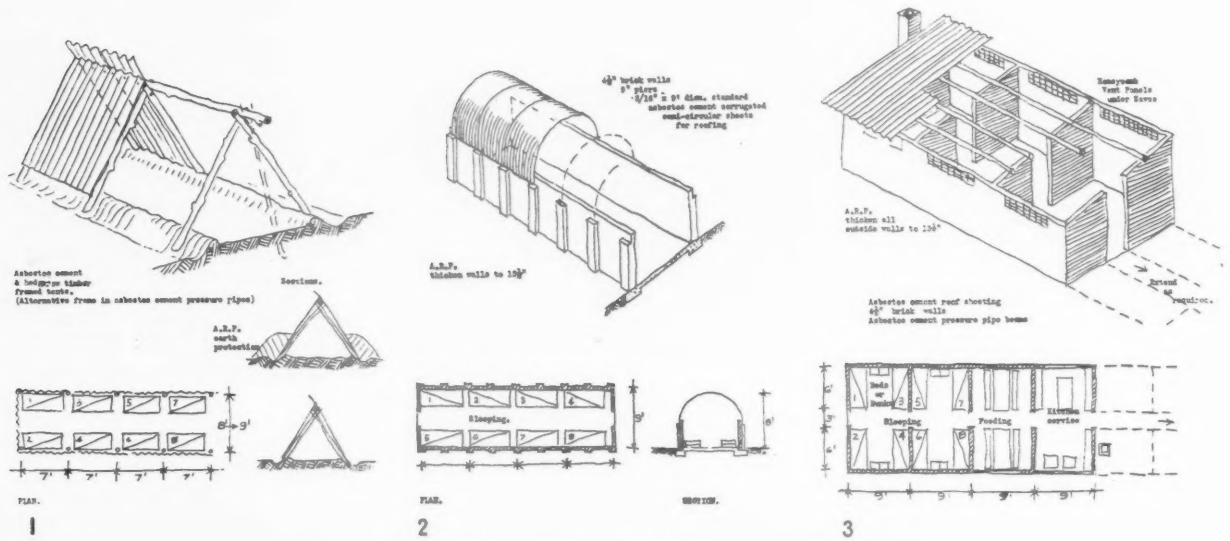
This report of the A.A.S.T.A. Evacuation Committee outlines emergency building types of a very simple character which would be suitable for providing temporary accommodation for eating, sleeping and first aid, and which could be speedily built by unskilled labour from materials which are at present still available. The necessity for controlled evacuation (to which the above proposals are supplementary) is now more obvious than at any time since the outbreak of war. The A.A.S.T.A. has attempted to show in the reports which it has submitted to the Government from time to time that such a controlled evacuation is possible and could be effected even now on the basis of an immediate requisitioning of large country houses in safe areas, and the use of individual billets, augmented by the building of new communal feeding centres, hostels and camp schools.

*Materials and Construction.*—The difficulties of building in wartime are acute. They are due mainly to lack of tensile materials. Bricks, concrete, glass and plaster are amply available. Steel and all important metals, as well as timber, are scarce and under strict control. Asbestos-cement is one of the few materials which is capable of sustaining considerable tensile stresses and is available in large stocks. Production capacity is limited for certain types of asbestos-cement products such as pressure pipes. It is likely, however, that corrugated sheets are amply available for our purpose and that pressure pipes may, if limited mainly to purely temporary structures that can be dissembled, be re-used at once by the authorities after use. We therefore suggest, on the lines of the accompanying sketches, the simplest possible types of construction, using mainly brick, concrete and asbestos-cement for the less temporary buildings in the reception areas (see types 2 and 3) and local hedgerow timber tents covered with asbestos-cement sheets (type 1). The framework of the tents could also be constructed of asbestos-cement pressure pipes, subject to available supplies.

*Labour and Material Stocks.*—The problem of labour is important. The simplicity of the suggested methods of construction would make it possible to erect these building types mainly with unskilled labour. In order that they may be erected speedily as and when required, it is essential that adequate stocks of the necessary building material should be accumulated and allocated now throughout the country. The allocation of these stocks would have to be based on the advice of expert military and civil authorities, taking into account the re-zoning of the reception areas in the light of the possibilities of invasion.

*A.R.P.*—The asbestos tent buildings (type 1) could be banked with earth at the sides as protection against splinters and blast and the exposed areas of corrugated sheet could be paint camouflaged. The second and third emergency building types recommended are built in the first instance mainly of 4½-in. brickwork or thin concrete blocks. Either of these could be easily thickened to 13½-in. brick or its equivalent to provide splinter and blast protection. Alternatively, open trench accommodation away from the actual buildings could be provided.

*Re-use.*—The materials of these buildings could be dismantled and re-used for more permanent and higher-standard evacuation buildings to be erected as the exigencies of the military situation permit.




1 2 3

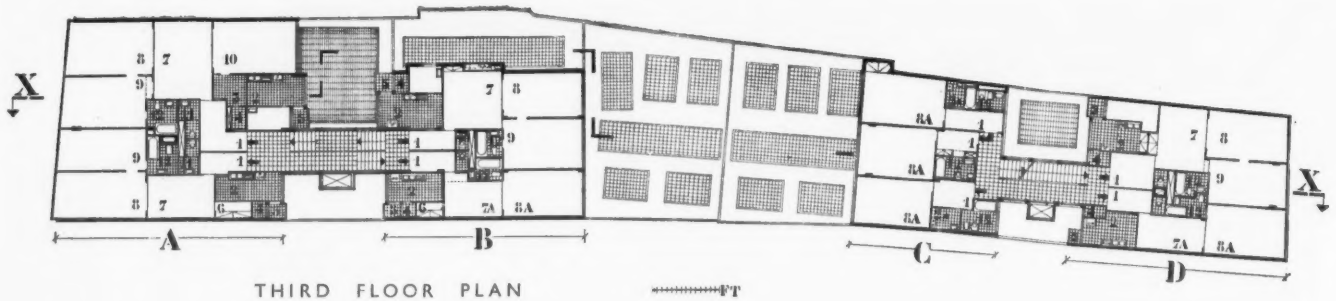
*Sketches of suggested temporary buildings for wartime. See note above.*


*The main front to Stepanská Street*

# ARCADES, OFFICES AND FLATS, PRAGUE

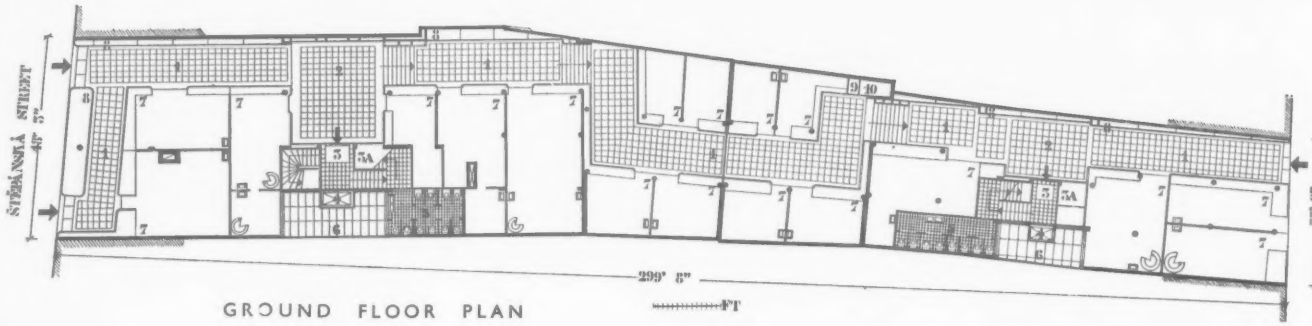
*DESIGNED BY EUGENE ROSENBERG*

*Block B seen from block C*




THIRD FLOOR PLAN

FT

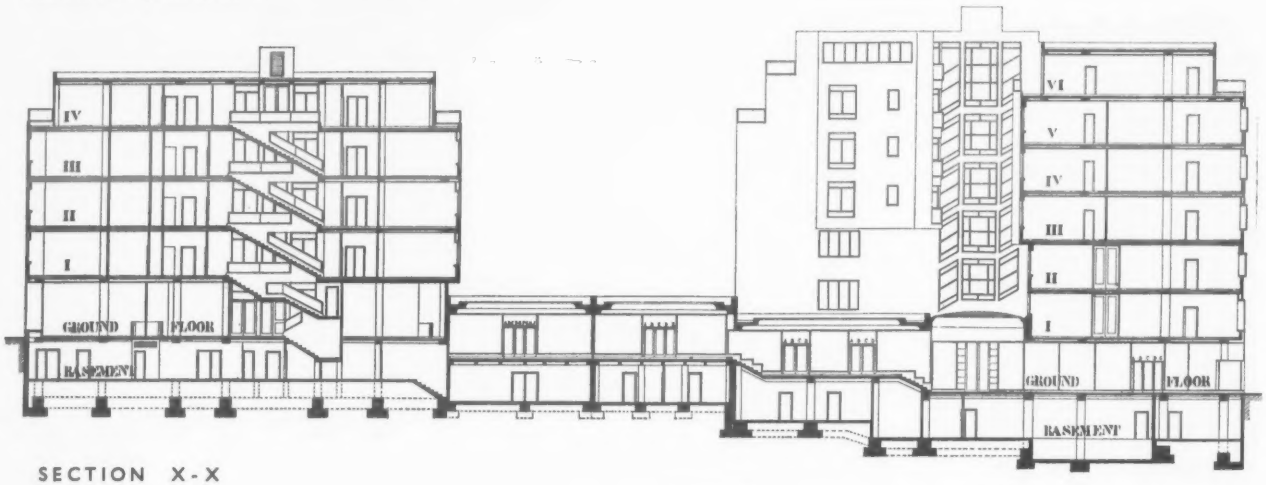



GROUND FLOOR PLAN

FT

## KEY TO PLANS

Ground floor : 1 : Arcades. 2 : Foyer. 3 and 3a : Porter. 4 : Passenger lift. 5 : Lavatories. 6 : Area. 7 : Shops. 8 : Showcases. 9 : Telephone box. 10 : Cleaners' storage.
Third floor : 1 : Entrance vestibule. 2 : Kitchen. 2a : Kitchenette. 3 : Pantry. 4 : Larder. 5 : Balcony. 6 : Wardrobe. 7-8 : Living-room. 7a : Hall. 8a : Bed-sitting-room. 9 : Bedroom. 10 : Dining-room. 11 : Lavatory and w.c. 12 : Bathroom.




SECTION X-X

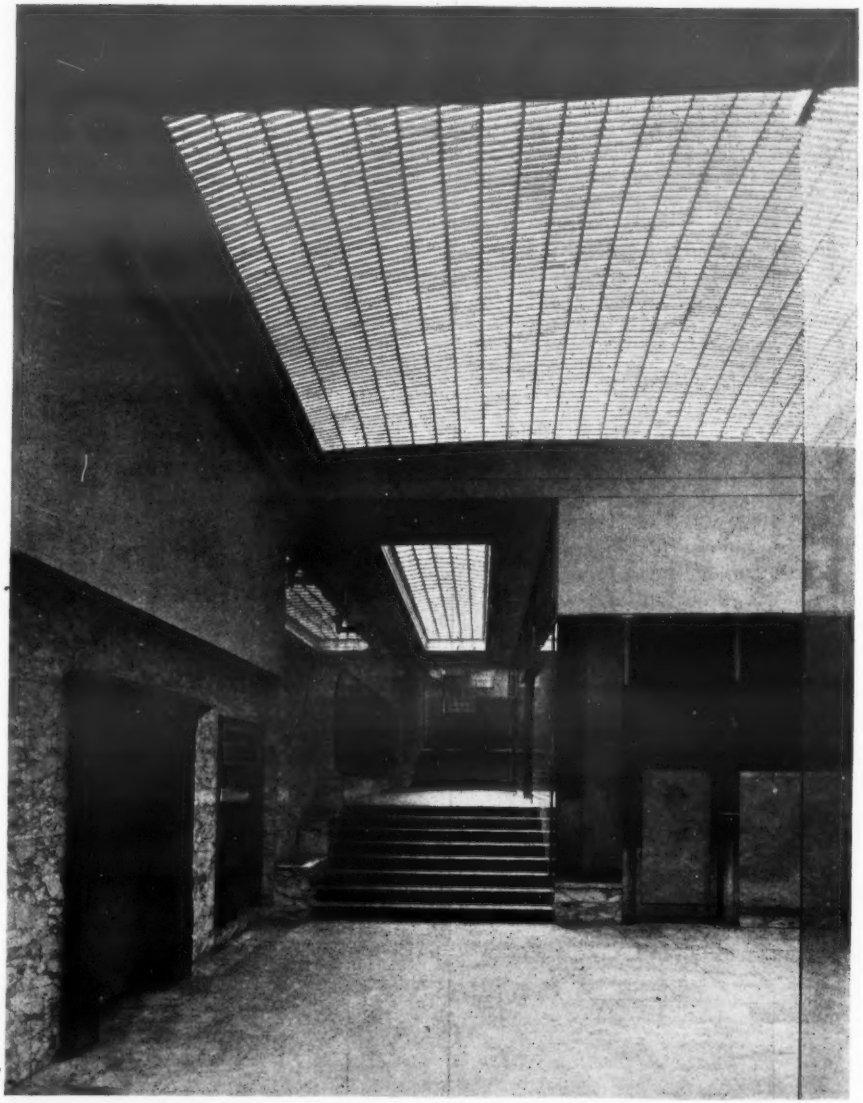
FT

GENERAL AND SITE—Buildings with narrow frontages, considerable depths, and numerous arcades are extremely common in the centre of Prague. These arcades, in addition to their obvious purpose, also serve as streets. The site of this scheme was originally a thoroughfare connecting two main streets ; it has a depth of 300 ft. with frontages of 36 ft. to Smecky Street and 49 ft. to Stepanská Street. Because of the great depth of the site it was thought undesirable to provide a straight-through corridor and for this reason the arcades were broken into three parts. Originally it was desired to overcome the 13-ft. difference in the level of the two streets by a ramp treatment. This was found impossible and the problem was solved by three flights of steps.

PLAN—The whole of the basement is used for storage ; access from the shops is by spiral staircases and goods lifts at each end of the building. Above the ground floor, which is entirely built upon, there are four blocks (marked *A*, *B*, *C* and *D* on the ground plan) placed in pairs at each end of the site. Each pair is linked by a common staircase and passenger lift. Offices, with cloakrooms and lavatory accommodation, occupy the whole of the first and second floors ; the other floors are devoted to flats. Bathrooms and w.c.'s of the flats are placed over the cloakrooms below and have common vent shafts. In block *A* there are two flats on each floor. One comprises a living-room, dining-room, bedroom, service quarters and balcony. Living-room and dining-room can be thrown into one. The second, smaller, flat has a large living-room, bedroom and service quarters. Blocks *B* and *D* are similar in layout to block *A*. Block *C* has three bachelor flats on each floor, two of these having kitchenettes.

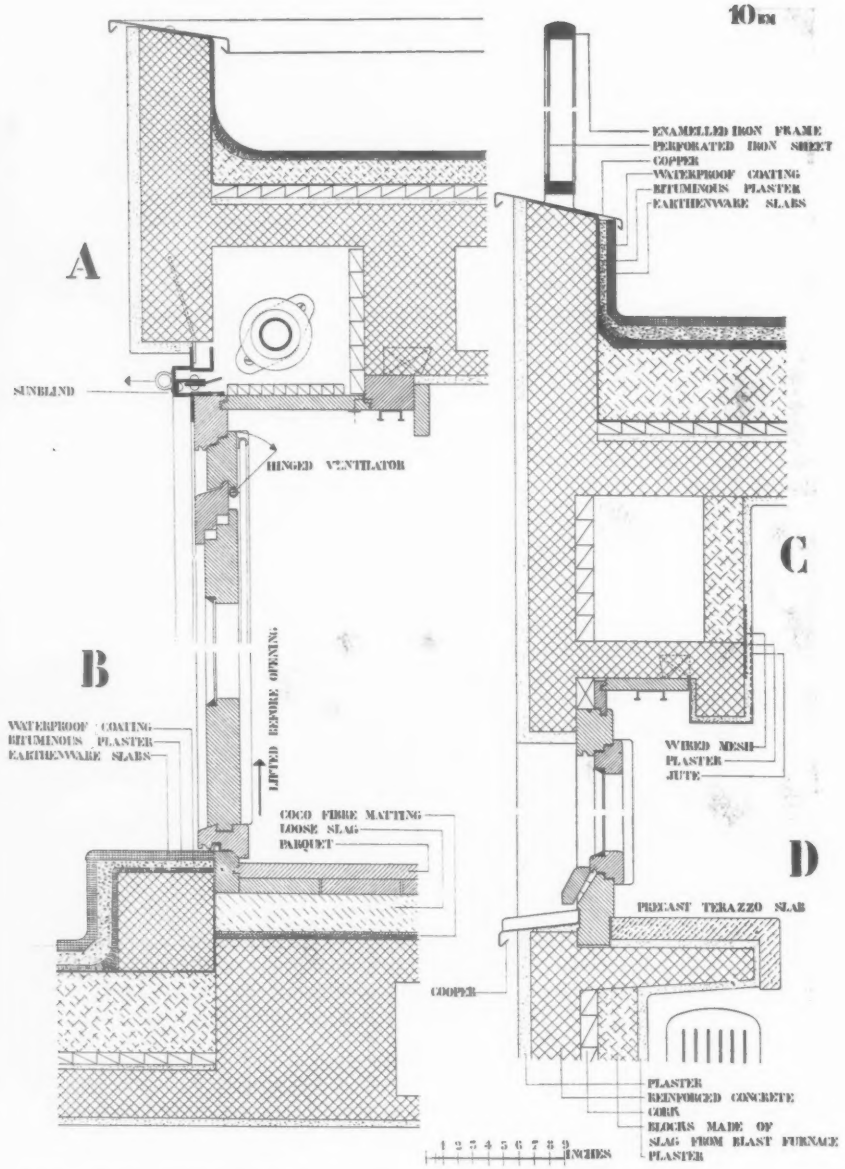
CONSTRUCTION AND FINISHES—R.C. Building is divided into four separate sections by expansion joints. Internal walls lined with cork slabs and breeze blocks. Ceilings are flush throughout unobstructed by the beams which occur in the double thickness of the concrete floor. In the lower thickness are the panel heating pipes. Partitions are of light-weight blocks about 3 ft. by 1 ft. 6 in. and 3 in. thick, made of slag ; they stand on cork strips. Between individual flats and between service quarters and habitable rooms the walls are of double thickness divided by coco fibre matting for sound insulation. This matting is also laid directly on thin screed on the concrete floors.

*The area between blocks A and B, looking upwards*



*Foyer between blocks A and B*

*Two views of the Arcade between blocks B and C.*

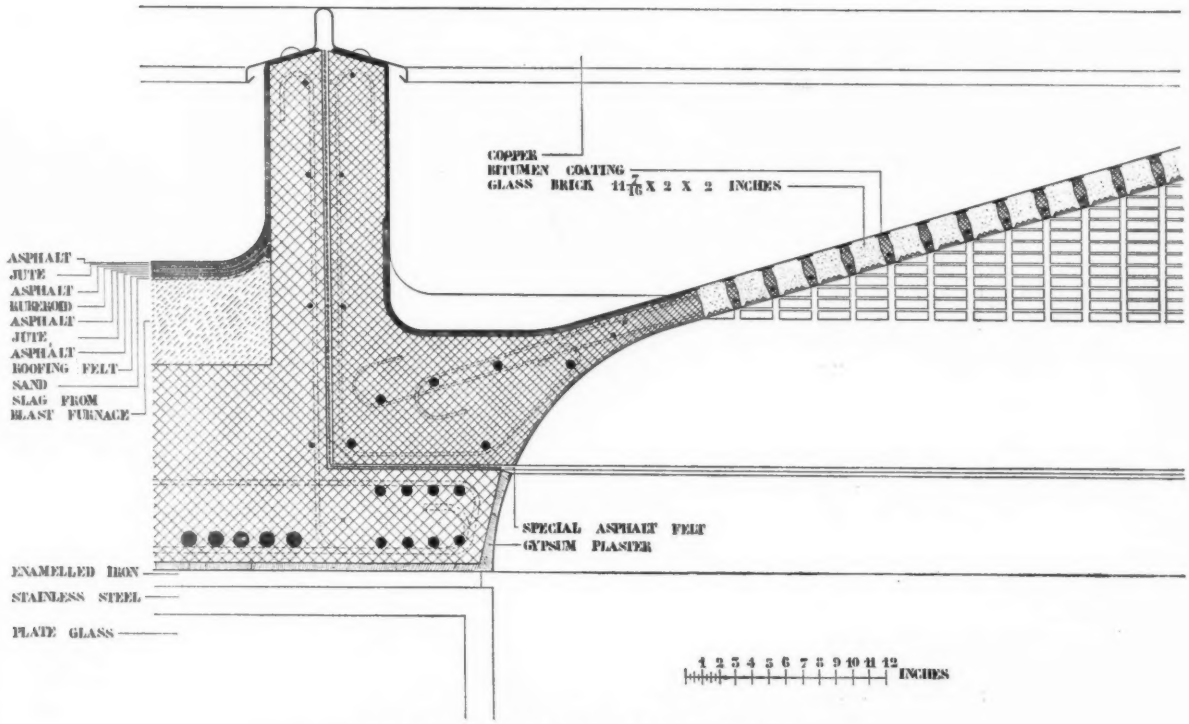



SECTIONS THROUGH SINGLE GLAZED DOORS AND WINDOWS

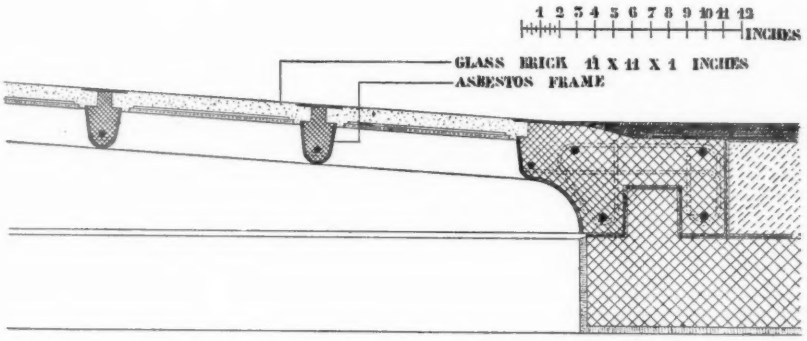
FINISHES (*contd.*)—Wood bearers about 3 in. by 2 in. are then laid on the floor, spaces between being filled in with loose slag; on top of this is laid the wood-strip floor. Floors of the service quarters have precast terrazzo tiles. Floor of the arcade is Czech syenite slabs, the walls in marble. Frames to the showcases are in stainless steel.

The façade to the main street (Stepanská) is faced with slabs of Czech polished syenite. Other outside walls, including areas, are finished in tiles or plaster. Windows to the flat and office accommodation are double glazed. The projecting windows in the main street are constructed of oak and their frames are faced with stainless

## ARCADES, OFFICES AND FLATS, PRAGUE,




DETAIL OF GLASS BRICK ROOF




ANOTHER DETAIL OF GLASS BRICK ROOF

*Staircase between blocks A and B*

steel ; other windows are in soft wood and enamelled. Staircases and landings are constructed as continuous R.C. slabs with precast terrazzo steps.

The balustrade is of wired cast glass in steel framing. The balustrades of the balconies and terraces are of perforated iron sheet.

SERVICES—Central heating by panels and radiators, the latter occurring in the flat accommodation. Firing to boiler is automatic and thermostatically controlled.

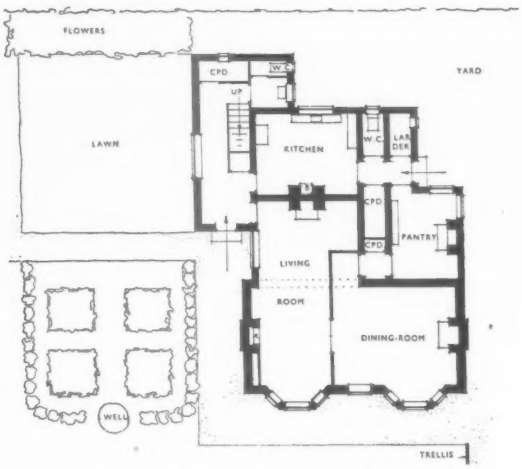
COST—£43,000. Price per ft. cube : just under 1s.

DESIGNED BY EUGENE ROSENBERG

# ALTERATIONS

*Cottage before alteration*

*DESIGNED BY TATTON BROWN AND LIONEL BRETT*




PLAN BEFORE ALTERATION

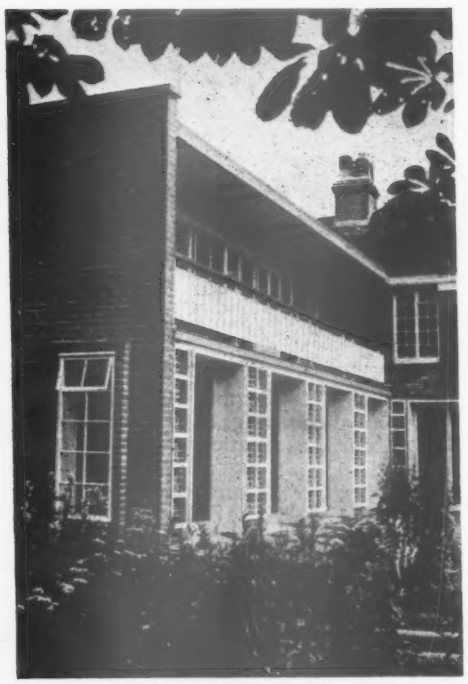
**PROBLEM**—The problem was to add a new wing containing a living-room, owner's bedroom and bathroom to an existing small Queen Anne cottage. Arising from this it was decided to restore the cottage approximately to its original condition, as previous unintelligent alterations had been made to it. These included the removal of the central entrance door to the side of the house and the destruction of the axial approach up the front garden. The cottage is seen in this condition reproduced above.

**PLAN**—The first step was the restoration of the dignity of the original elevation by replacing the door in its central position and adding a gate in the hedge and a straight path. A trellis fence was built on the left of the entrance to correspond with that existing on the right. The ground-floor plan of the cottage was restored approximately to its original form. The dimensions of the new wing were determined by an old well which formed a natural axis and by the existing stepped back wall.

**CONSTRUCTION AND EXTERNAL FINISHES**—The addition is in brick. The brick piers are cased in light painted woodwork with a trellis on the garden side. The glass doors of the living-room, when opened, lie flat against the boarded jambs of the piers. On the first floor, windows run the full length. The balcony is vertically boarded with slats at intervals and a teak rail. The cantilevered roof has light V-jointed soffit boarding, whose long lines are relieved by tapered sham rafters, the undersides of which are painted grey-blue.

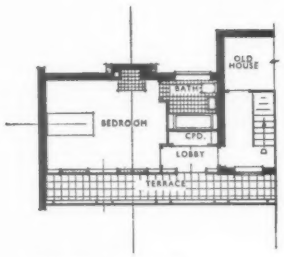
**INTERNAL FINISHES AND EQUIPMENT**—The living-room is linked to the garden by a paved terrace which is carried through the glass doors into the living-room, ending in an 8-in. step down to the pile carpet with which the rest of the floor is covered. The riser of the step between the terrace paving stones and the carpet consists of a white-painted perforated metal grille behind which runs a heating pipe. This arrangement, besides heating the room, provides permanent ventilation in combination with air inlets under the floor in the north wall and, by means of rising convection currents, acts as a barrier against cold air from the glass doors and warms the stones of the raised step, which might seem chilly in winter. In the living-room the curtain tracks are recessed into the ceiling, and during the daytime the curtains cover the brick piers so that only the glass windows are visible. The bedroom has recessed radiators under the opening parts of the room-length window.

General contractors were E. Brown, Ltd.; for list of sub-contractors see page xiv.

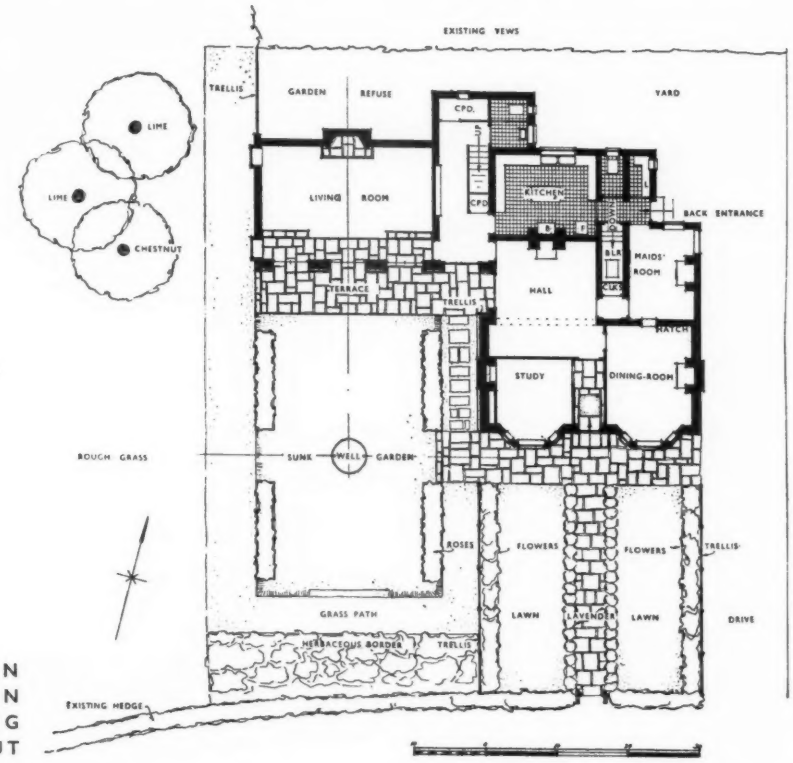


*Looking along the garden front with the terminating brick wall on the left. By running the trellis and balcony parapet right up to the far wall a vertical break between the cottage and the new wing has been avoided.*

# AND ADDITIONS, HOUSE NEAR ASCOT




[[NEW WING:
FIRST FLOOR PLAN




GROUND FLOOR PLAN
AFTER ALTERATION
SHOWING NEW WING
AND GARDEN LAYOUT

*Another view of the garden (south) front*

C

# R.I.B.A.

ELECTION

**At a meeting of the Council of the Institute held last week, Mr. William Henry Ansell was elected President, in succession to Mr. E. Stanley Hall, whose death occurred last month.**

Mr. Ansell was born in Nottingham in 1872 and educated in Derby. He received his architectural education at the Architectural Association and the Royal College of Art, and was articled to Messrs. Naylor and Sale, of Derby. He commenced practice in London in 1900. Mr. Ansell was President of the Architectural Association 1928–29; Chairman of the R.I.B.A. Board of Architectural Education 1931–33; Vice-president R.I.B.A. 1933–35; and Hon. Secretary 1938–40. His principal works include: Church of Humanity, Liverpool; Butchers' Charitable Institution, Hounslow; Head Office of the National Deposit Friendly Society, Queen Square; Memorial Convalescent Home, Skegness; Hospitals at Westbury, Wilts; Sevenoaks, Kent; Frome, Somerset; The Gresham's School Sanatorium, Holt, Norfolk; The Zachary Merton Convalescent Home for the London Hospital; Almshouses, West Ham; and a large number of medium-sized houses up and down the country.

Council for Session 1940—41 is as follows:

*President:* Mr. W. H. Ansell, M.C.
*Past Presidents:* Messrs. H. S. Goodhart-Rendel and Percy E. Thomas, O.B.E., HON. LL.D. (Cardiff). *Vice-Presidents:* Messrs. A. C. Bunch (Warwick); Edward Maufe, A.R.A., M.A. (OXON), and C. G. Soutar (Dundee).
*Hon. Secretary:* Mr. Michael Waterhouse, M.C., B.A. (OXON). *Hon. Treasurer:* Mr. L. Sylvester Sullivan.
*Members of Council:* Professor Patrick Abercrombie, M.A. (LIVERPOOL); Messrs. Victor Bain (Leeds); Percy J. Bartlett (Nottingham); A. C. Bunch (Warwick); C. Cowles-Voysey; C. Lovett Gill; Stanley Hamp; G. Noel Hill (Manchester); Charles H. Holden, HON. LITT.D. (MANCHESTER); T. Cecil Howitt, D.S.O. (Nottingham); L. H. Keay, O.B.E. (Liverpool); Edward Maufe, A.R.A., M.A. (OXON); J. Nelson Meredith (Bristol); Howard M. Robertson, M.C., S.A.D.G.; C. G. Stillman (Chichester); John Swarbrick (Manchester and London); E. P. Wheeler (Epsom); and G. Grey Wornum. *Associate Members of Council:* Messrs. Wesley Dougill, M.A., B.ARCH. (LIVERPOOL) (Liverpool); R. A. Duncan; Professor W. G. Holford, B.ARCH. (LIVERPOOL) (Liverpool); Messrs. R. D. Manning (Thetford); Anthony Minoprio, M.A., B.ARCH. (LIVERPOOL); Norval R. Paxton, M.C. (Leeds); and E. Berry Webber. *Licentiate Members of Council:* Messrs. Stanley A. Heaps; C. Bertram Parkes (Birmingham); and S. Lunn Whitehouse (Birmingham).

*Representatives of Allied Societies in the United Kingdom or Eire*

*Six Representatives from the Northern Province of England:* Major S. W. Milburn, M.C. (Northern Architectural Association); Messrs. C. Gustave Agate (Manchester Society of Architects); Harold A. Dod, M.A. (LIVERPOOL) (Liverpool Architectural Society); Cecil Leckenby (York and East Yorkshire Architectural Society); J. E. Stocks (West Yorkshire Society of Architects); and W. G. Davies (Sheffield, South Yorkshire and District Society of Architects and Surveyors).
*Five Representatives from the Midland Province of England:* Lieut.-Col. H. G. Wicks, M.C., T.D. (Birmingham and Five Counties Architectural Association); Messrs. A. F. Bryan (Leicester and Leicestershire Society of Architects); H. F. Traylen, F.S.A. (Northamptonshire, Bedfordshire and Huntingdonshire Association of Architects); A. E. Eberlin, M.C. (Nottingham, Derby and Lincoln Architectural Society); and T. G. Scott, M.C. (East Anglian Society of Architects).
*Six Representatives from the Southern Province of England:* Messrs. John Challice (Devon and Cornwall Architectural Society); C. W. Pike (Wessex Society of Architects); E. A. L. Martyn (Berks, Bucks and Oxon Architectural Association); A. E. Geens (Hampshire and Isle of Wight Architectural Association); a Representative to be appointed by the Essex, Cambridge and Hertfordshire Society of Architects; and Mr. John L. Denman (South-Eastern Society of Architects).
*Four Representatives of Allied Societies in Scotland,* nominated by the Council of the Royal Incorporation of Architects in Scotland: Messrs. J. R. McKay (Edinburgh); T. Forbes Maclennan (Edinburgh); R. M. Mitchell (Perth); and one representative to be appointed.
*One Representative of Allied Societies in Wales,* nominated by the Council of the South Wales Institute of Architects: Mr. C. F. Bates (Newport, Mon.).
*Two Representatives of Allied Societies in Ireland:* Messrs. W. H. Howard Cooke (Royal Institute of the Architects of Ireland); and J. H. Stevenson (Royal Society of Ulster Architects).
*Representatives of Allied Societies in the British Dominions Overseas,* nominated by the Council of each of the following: Royal Architectural Institute of Canada: Mr. H. L. Fetherstonhaugh; Representative in the United Kingdom to be nominated. Royal Australian Institute of Architects: Representative to be nominated; Representative in the United Kingdom to be nominated. New Zealand Institute of Architects: Representative to be nominated; Representative in the United Kingdom to be nominated. Institute of South African Architects: Mr. D. S. Haddon; Representative in the United Kingdom, Mr. E. Berry Webber. Indian Institute of Architects: Representative to be nominated; Representative in the United Kingdom to be nominated.
*Representative of the Architectural Association (London):* Captain Joseph Hill.
*Representative of the Association of Architects, Surveyors and Technical Assistants:* Mr. V. L. Nash.
*Chairman of the Board of Architectural Education:* Mr. Hubert Lidbetter.
*Chairman of the R.I.B.A. Registration Committee:* Mr. T. A. Darcy Braddell.
*Chairman of the R.I.B.A. Official Architects' Committee:* Mr. A. C. Bunch (Warwick).
*Representative of the R.I.B.A. Salaried Members' Committee:* Mr. W. E. Brooks.
*Chairman of the Allied Societies' Conference, Vice-President:* Mr. C. G. Soutar (Dundee).

## CIVIL DEFENCE ACT

The Ministry of Home Security has issued an Order confirming revisions to the Revised Code made under Section 13 of the Civil Defence Act. The revisions are as follows:—

1: Where 12 in. thickness of reinforced concrete was specified for lateral protection, it is now possible to use 12 in. of structural concrete as well. Structural concrete is a mix of 112 lb. of cement to 2½ cubic feet of fine aggregate and 5 cubic feet of coarse aggregate. Tests and experience have shown that 12 in. of this concrete is proof against splinters from a 500-lb. bomb at 50 ft. and even less. This change allows of a saving in the use of steel.
2: Where 15 in. thickness of ordinary or structural concrete unreinforced were specified, 15 in. thickness of ordinary concrete are now specified. This is merely a change arising out of (1) above.
3: The approval of the use of hollow concrete blocks for lateral protection is now incorporated in the Revised Code. This results in a saving of skilled labour, and the hollow concrete blocks are more durable than sandbags. The result of special trials indicates that this form of construction provides adequate safety, although under the provision of paragraph 2 (*a*) VII it would not have been approved.
4: The appendix to Part I of the Code now becomes the appendix to Part I (2). It has been expressed in more general terms to include other forms of flooring which would be suitable for providing overhead protection. The appendix to Part I (1) is now a description of hollow block construction authorized in the new Section II (*a*) VIII referred to in (3) above.

## WARTIME BUILDING BULLETIN NO. 5

In an earlier bulletin of this series (No. 2) the broad principles for the use of reinforced concrete in wartime building were outlined, and in Wartime Building Bulletin No. 5, just published by the Building Research Station of the Department of Scientific and Industrial Research (H.M. Stationery Office, price 1s.), type designs are given which illustrate the application of these principles to the problem of the single-storey factory. The roofs consist of reinforced concrete slabs with a raised section providing a continuous lantern with vertical lights, and drawings are provided for spans of 30 ft. and 40 ft. and for column spacings of 15 ft. and 27 ft. A table shows the weights of steel demanded by these proportions, but if maximum economy is to be achieved, it is of the utmost importance that spans and column spacings should not be wider than is absolutely necessary.

The loads and stresses for which these designs have been prepared are given, and a suitable concrete mix suggested, while roof drainage, foundations and day-lighting are also discussed. Two appendices deal fully with the shuttering required for these designs and for the roof slabs of Type A described in Bulletin No. 1 of the series.

## BUILDING INDUSTRY

"In the grave situation now confronting the nation nothing less than the utilization of all resources in a gigantic common effort will suffice. The building industries are anxious to take their place with the other war industries in the struggle," states the current issue of the *Building Industries Survey*. The *Survey* continues:

Since the commencement of the rearmament programme the Building Industries National Council has repeatedly urged the full utilization, in the national interest, of its resources. These pleas have not been without effect. Close and continuous consultation with the A.R.P. Department of the Ministry of Home Security commenced a year ago. The advice and assistance of individual organizations have been offered and accepted. Great improvements have been made in the organization of works and the balanced use of resources.

But, although the Minister of Labour has promised the establishment of a Ministry of Building after the war to assist in the tasks of reconstruction, full recognition of the part to be played by building as a war industry has not been forthcoming. This recognition should no longer be withheld.

The building industries will be required to provide new buildings and to make good damage to property and essential services during hostilities. The probability of intensive bombing attack increases the responsibility of the industry and the part it can play, particularly in view of the need to duplicate as much as possible of our industrial plant.

Moreover, in the new situation before us the call has gone forth from the Prime Minister himself to be prepared to defend our island and, if necessary, to fight on the beaches, on the hills or in the streets. The legacy of the last threat of invasion is the curious buildings along the south coast. But the part to be played by the building industry in modern warfare goes much further than the erection of look-out towers. Gun emplacements, strong points, fortifications of all kinds must be provided and much other work done.

This work, which is essentially building work, can, as with A.R.P., be carried out by civil industry. The task of the military is to provide the strategical conception, the arms and the fighting men. The task of carrying out that strategical conception can be done by the building industries using all their resources and professional services.

The building industries are ready.

## ARCHITECTS' REGISTRATION COUNCIL

At a recent meeting of the Architects' Registration Council of the United Kingdom, it was announced that Mr. Basil M. Sullivan had been appointed as R.I.B.A. representative on the Council and a member of the Finance and General Purposes and Professional Purposes Committees. The positions were previously occupied by the late Major Maule. Other appointments announced were: Mr. J. E. Swindlehurst, General Purposes and Professional Purposes Committees (in succession to Major Athoe, resigned); Mr. Reginald Browne, representative of the I.A.A.S., on the Board of Architectural Education (in succession to Mr. R. S. Bowers, resigned); Mr. Percy V. Burnett, R.I.B.A. representative on the Admission Committee (in succession to Mr. J. D. Hossack, resigned). Messrs. H. Lidbetter and S. C. Ramsey were appointed for the session 1940–41 Chairman and Vice-chairman, respectively, of the Board of Architectural Education.

## MINISTRY OF HEALTH

Loans sanctioned during the quarter ended June 30, 1940, to local authorities in England and Wales included: Housing, £962,750; municipal services (including clinics, sanatoria, mental hospitals, fire, police, gas, hospitals, lighting, maternity and child welfare), £663,474; swimming pools (playing fields, recreation grounds, open spaces, baths, etc.), £65,546; water supply, £511,174; education services, (libraries and museums), £1,328,233; roads and bridges (including private street works), £576,289; other services, £2,261,490.

973.

# THE ARCHITECTS' JOURNAL LIBRARY OF PLANNED INFORMATION

## COLUMNS FORMED FROM ONE JOIST TO WITHSTAND BENDING MOMENTS AS WELL AS DIRECT LOAD.

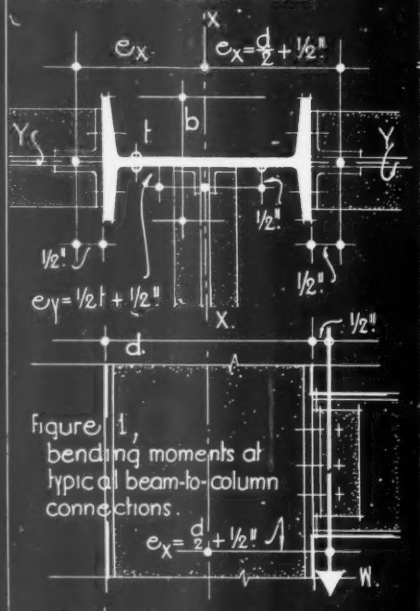
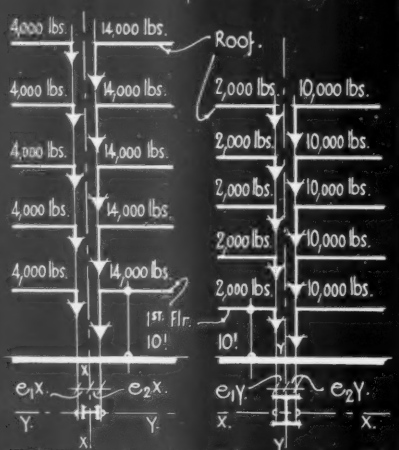
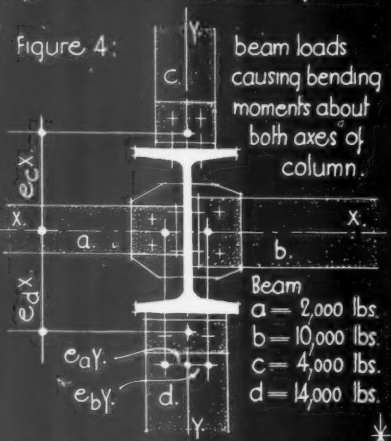



Figure 1, bending moments at typical beam-to-column connections.




Column loading (a) Column loading (b)
Figures 2 & 3 : see notes on back of Sheet.

Figure 4:




beam loads causing bending moments about both axes of column.

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*Compiled by C.W. Hamann, Consulting Engineer.*

## ✳ TABLE GIVING REDUCTION COEFFICIENTS (β) FOR B.S.S. JOIST SECTIONS AS ECCENTRICALLY LOADED COLUMNS (STRUTS).

| Size d x b, inches | ECCENTRICITY $e_x$ Ins. | ECCENTRICITY $e_y$ Ins. | LENGTH OF COLUMN OR STRUT IN FEET. 6. | 7. | 8. | 9. | 10. | 11. | 12. | 13. | 14. | 16. | 18. | 20. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 x 1½. | 2·0 | 0·30 | • | • | • | • | • | • | • | • | • | • | • | • |
| 3 x 3. | 2·0 | 0·66 | 0·89 | 0·79 | 0·70 | 0·55 | 0·48 | 0·42 | • | • | • | • | • | • |
| 4 x 1¾. | 2·5 | 0·28 | 0·40 | • | • | • | • | • | • | • | • | • | • | • |
| 4 x 3. | 2·5 | 0·57 | 0·86 | 0·76 | 0·67 | 0·54 | 0·47 | 0·40 | • | • | • | • | • | • |
| 4¾ x 1¾. | 2·8 | 0·29 | 0·40 | • | • | • | • | • | • | • | • | • | • | • |
| 5 x 3. | 3·0 | 0·53 | 0·86 | 0·76 | 0·67 | 0·54 | 0·47 | 0·40 | • | • | • | • | • | • |
| 5 x 4½. | 3·0 | 0·87 | 1·27 | 1·17 | 1·36 | 0·92 | 0·82 | 0·75 | 0·67 | 0·59 | 0·54 | 0·47 | • | • |
| 6 x 3. | 3·5 | 0·48 | 0·85 | 0·78 | 0·66 | 0·54 | 0·47 | 0·40 | • | • | • | • | • | • |
| 6 x 4½. | 3·5 | 0·72 | 1·20 | 1·06 | 0·95 | 0·83 | 0·73 | 0·66 | 0·57 | 0·54 | 0·47 | 0·40 | • | • |
| 6 x 5. | 3·5 | 0·87 | 1·29 | 1·20 | 1·08 | 0·96 | 0·86 | 0·76 | 0·70 | 0·64 | 0·56 | 0·48 | 0·40 | • |
| 7 x 4. | 4·0 | 0·60 | 1·11 | 0·95 | 0·81 | 0·72 | 0·62 | 0·55 | 0·48 | 0·44 | 0·40 | • | • | • |
| 8 x 4. | 4·5 | 0·57 | 1·06 | 0·91 | 0·78 | 0·67 | 0·57 | 0·54 | 0·47 | 0·42 | • | • | • | • |
| 8 x 5. | 4·5 | 0·82 | 1·29 | 1·20 | 1·08 | 0·96 | 0·86 | 0·76 | 0·70 | 0·64 | 0·56 | 0·48 | 0·40 | • |
| 8 x 6. | 4·5 | 1·62 | 1·39 | 1·33 | 1·26 | 1·19 | 1·08 | 0·99 | 0·89 | 0·82 | 0·75 | 0·64 | 0·55 | 0·47 |
| 9 x 4. | 5·0 | 0·57 | 1·06 | 0·91 | 0·78 | 0·67 | 0·57 | 0·54 | 0·47 | 0·42 | • | • | • | • |
| 9 x 7. | 5·0 | 1·24 | 1·42 | 1·40 | 1·35 | 1·29 | 1·23 | 1·16 | 1·08 | 1·01 | 0·92 | 0·80 | 0·70 | 0·61 |
| 10 x 4½. | 5·5 | 0·65 | 1·19 | 1·05 | 0·92 | 0·80 | 0·72 | 0·64 | 0·56 | 0·50 | 0·47 | • | • | • |
| 10 x 5. | 5·5 | 0·73 | 1·27 | 1·17 | 1·04 | 0·92 | 0·82 | 0·75 | 0·67 | 0·59 | 0·54 | 0·47 | • | • |
| 10 x 6. | 5·5 | 0·97 | 1·38 | 1·33 | 1·24 | 1·16 | 1·06 | 0·98 | 0·89 | 0·80 | 0·73 | 0·64 | 0·54 | 0·47 |
| 10 x 8. | 5·5 | 1·32 | 1·43 | 1·41 | 1·39 | 1·34 | 1·31 | 1·27 | 1·19 | 1·11 | 1·02 | 0·89 | 0·78 | 0·70 |
| 12 x 5. | 6·5 | 0·69 | 1·23 | 1·12 | 0·99 | 0·88 | 0·78 | 0·70 | 0·62 | 0·56 | 0·50 | 0·44 | • | • |
| 12 x 6. L. | 6·5 | 0·91 | 1·38 | 1·29 | 1·22 | 1·12 | 1·02 | 0·92 | 0·85 | 0·76 | 0·70 | 0·59 | 0·52 | 0·44 |
| 12 x 6. H. | 6·5 | 0·98 | 1·38 | 1·31 | 1·23 | 1·13 | 1·04 | 0·95 | 0·86 | 0·78 | 0·72 | 0·61 | 0·52 | 0·45 |
| 12 x 8. | 6·5 | 1·32 | 1·43 | 1·41 | 1·38 | 1·34 | 1·31 | 1·27 | 1·19 | 1·11 | 1·02 | 0·89 | 0·86 | 0·70 |
| 13 x 5. | 7·0 | 0·70 | 1·24 | 1·15 | 1·01 | 0·89 | 0·79 | 0·72 | 0·64 | 0·57 | 0·52 | 0·45 | • | • |
| 14 x 6. L. | 7·5 | 0·85 | 1·35 | 1·28 | 1·20 | 1·09 | 0·96 | 0·89 | 0·80 | 0·73 | 0·65 | 0·56 | 0·48 | 0·42 |
| 14 x 6. H. | 7·5 | 1·10 | 1·38 | 1·29 | 1·22 | 1·12 | 1·02 | 0·92 | 0·85 | 0·76 | 0·70 | 0·59 | 0·52 | 0·44 |
| 14 x 8. | 7·5 | 1·24 | 1·43 | 1·41 | 1·39 | 1·34 | 1·31 | 1·27 | 1·19 | 1·11 | 1·02 | 0·89 | 0·76 | 0·69 |
| 15 x 5. | 8·0 | 0·66 | 1·22 | 1·09 | 0·96 | 0·85 | 0·75 | 0·67 | 0·59 | 0·55 | 0·50 | 0·42 | • | • |
| 15 x 6. | 8·0 | 0·81 | 1·35 | 1·28 | 1·20 | 1·08 | 0·96 | 0·88 | 0·79 | 0·72 | 0·67 | 0·55 | 0·45 | 0·40 |
| 16 x 6. L. | 8·5 | 0·82 | 1·35 | 1·28 | 1·20 | 1·08 | 0·96 | 0·88 | 0·79 | 0·72 | 0·67 | 0·55 | 0·45 | 0·40 |
| 16 x 6. H. | 8·5 | 0·85 | 1·35 | 1·28 | 1·20 | 1·08 | 0·96 | 0·88 | 0·79 | 0·72 | 0·67 | 0·55 | 0·45 | 0·40 |
| 16 x 8. | 8·5 | 1·19 | 1·43 | 1·41 | 1·38 | 1·33 | 1·27 | 1·20 | 1·13 | 1·05 | 0·99 | 0·86 | 0·75 | 0·67 |
| 18 x 6. | 9·5 | 0·79 | 1·35 | 1·28 | 1·20 | 1·08 | 0·96 | 0·88 | 0·79 | 0·72 | 0·67 | 0·55 | 0·45 | 0·40 |
| 18 x 7. | 9·5 | 0·99 | 1·40 | 1·35 | 1·29 | 1·20 | 1·13 | 1·02 | 0·95 | 0·86 | 0·80 | 0·72 | 0·57 | 0·50 |
| 18 x 8. | 9·5 | 1·14 | 1·43 | 1·41 | 1·38 | 1·32 | 1·26 | 1·19 | 1·12 | 1·04 | 0·96 | 0·83 | 0·73 | 0·64 |
| 20 x 6½. | 10·5 | 0·86 | 1·38 | 1·29 | 1·22 | 1·12 | 1·02 | 0·92 | 0·85 | 0·76 | 0·70 | 0·59 | 0·52 | 0·44 |
| 20 x 7½. | 10·5 | 1·04 | 1·42 | 1·38 | 1·33 | 1·26 | 1·15 | 1·11 | 1·02 | 0·95 | 0·89 | 0·73 | 0·64 | 0·55 |
| 22 x 7. | 11·5 | 0·88 | 1·38 | 1·33 | 1·24 | 1·16 | 1·06 | 0·98 | 0·89 | 0·80 | 0·73 | 0·64 | 0·54 | 0·47 |
| 24 x 7½. | 12·5 | 0·98 | 1·41 | 1·37 | 1·31 | 1·23 | 1·16 | 1·06 | 0·98 | 0·91 | 0·83 | 0·72 | 0·61 | 0·54 |

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

THE ARCHITECTS' JOURNAL
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# INFORMATION SHEET
# • 799 •
# STRUCTURAL STEELWORK

**Subject :** Economical Column Sections (Eccentrically Loaded) : I, Single Joists

**General :**

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

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

This Sheet is the twenty-eighth of the series, and sets out in tabular form the reduction factors necessary for the calculation of the comparative efficiency coefficients of plain, single joist sections used as eccentrically loaded columns or struts.

The formula for the determination of the efficiency of any standard joist section is given below, and it should be noted that in order to make the calculation for a column having bending moments, the efficiency coefficient of a similar section centrally loaded must be known : these coefficients are given on Sheet No. 11 of this series.

**Bending Moments :**

Bending moments (M) whatever their origin, existing in combination with direct loads (W), can be considered as direct loads acting eccentrically, the eccentricity being $e = \frac{M}{W}$. Another useful way in which such bending moments may be defined, is to consider a part of the load as acting at a pre-determined eccentricity. This will be the case for most skeleton frame buildings. If e is the eccentricity which a proportion $\alpha$ of the load would have, then $M = We\alpha$, where $\alpha$ is always smaller than unity. Bending moments may occur about the x-axis or y-axis or there may be combined bending moments (see Figure 1).

**Efficiency Coefficients :**

The possible combinations of bending moments and loads are so varied that it is not possible to give an efficiency coefficient for every combination and length of column, particularly as the permitted stress varies considerably with the bending moment, but in the table on the front of this Sheet, reduction coefficients $\beta$ are given with the help of which the efficiency coefficient (c) can immediately be found from the following formula.

$$C = \frac{C_1}{1 + \alpha\beta}$$

Where $\alpha$ signifies that part of the load which acts eccentrically at the point required by standard beam to column connections and which is defined by $e_x$ in the table on the front of this Sheet, for bending moments about the x-axis only. $C_1$ would be the efficiency coefficient for a direct load taken from Information Sheet No. 11 (designated e on that Sheet).

**Example A, Eccentricity About X-Axis :**

If a column is to withstand a load originating from two beams in every floor, transmitting 14,000 and 4,000 lbs. as shown in Figure 2, the total load in the first floor would be $5 \times 18{,}000 = 90{,}000$ lbs. $= 40{\cdot}2$ tons, and the bending moment under the first floor would be occasioned by the difference of loads in that floor only, namely $14{,}000 - 4{,}000 = 10{,}000$ lbs. $= 4{\cdot}4$ tons, so that

$$\alpha = \frac{10{,}000}{90{,}000} = 0{\cdot}11$$

For instance, for a 14 in. by 6 in. joist 10 ft. long, it is found from the table on the front of this Sheet that

$$\beta = 0{\cdot}96$$

Now $C_1$ (i.e., e) from sheet No. 11 $= 0{\cdot}54$ for this section,

$$\text{so that } C = \frac{0{\cdot}54}{1 + 0{\cdot}11 \times 0{\cdot}96} = 0{\cdot}48.$$

Under these circumstances, the load which this joist can carry is $W = 7{\cdot}2CA$, where A = the area.

$\therefore W = 7{\cdot}2 \times 0.48 \times 13{\cdot}59 = 46$ tons. (Therefore this column section is suitable for the given load.)

**Example B, Eccentricity About Y-Axis :**

The bending moments considered so far have all been about the x-axis of the columns, and these occur most frequently. There may, however, be bending moments about the y-axis as eccentricity $e_y$, see Figure 1. In the table on the front of this Sheet the eccentricity $e_y$ is shown which would have the same effect as $e_x$ shown in the same table. If the actual $e_y$ eccentricity is larger or smaller, the proportion of the eccentrically acting load $\alpha$ is to be increased or decreased accordingly. For instance, if a column has loads, as shown in Figure 3, of say 10,000 and 2,000 in each floor, that is $5 \times 12{,}000 = 60{,}000$ lbs. $= 27$ tons in the first floor, its proportion producing a bending moment would be : 8,000 lbs. $= 3{\cdot}6$ tons in the ground storey,

$$\alpha = \frac{8{,}000}{60{,}000} = 0{\cdot}13.$$

A section 12 in. by 5 in. is to be checked to see if it is sufficient.

The actual eccentricity would be 0·85 ins., instead of 0·69 ins. as given in the table, so that the efficiency coefficient for a 12 in. × 5 in. R.S.J. would be

$$C = \frac{C_1}{1 + \alpha\beta \times \frac{0{\cdot}85}{0{\cdot}69}} = \frac{0{\cdot}41}{1 + 0{\cdot}13 \times 0{\cdot}78 \times \frac{0{\cdot}85}{0{\cdot}69}} = 0{\cdot}36$$

The permitted load $W = 0{\cdot}36 \times 7{\cdot}2 \times 9{\cdot}45 = 24{\cdot}4$ tons. (This section is therefore insufficient, and the next larger should be calculated.)

**Example C, Eccentricities about Both Axes :**

For the purpose of determining the efficiency coefficient where bending moments occur about x-axis as well as the y-axis, the proportions of eccentric loads have to be added, but if either the actual eccentricity $e_x$ or $e_y$ are not identical with those given in the table, the loads have to be reduced proportionally. For instance, if a column were loaded as shown in Figure 4 by the combined four loads in every floor (total load = 67.2 tons), which were shown before in Figures 2 and 3, and if it is to be checked whether a column 10 in. by 8 in. would be correct, it is found that $e_x$ given in this table is the actual eccentricity, while the actual eccentricity $e_y$ is only 0.9 in. instead of 1.32 in. and therefore,

$$\alpha = \frac{10{,}000 + 8{,}000 \times \frac{0{\cdot}9}{1{\cdot}32}}{90{,}000 + 60{,}000} = 0{\cdot}102$$

Now for 10 ft. length $C_1 = 0{\cdot}79$

$$\beta = 1{\cdot}31$$

$$C = \frac{0{\cdot}79}{1 + 0{\cdot}102 \times 1{\cdot}31} = 0{\cdot}70$$

$W = 7{\cdot}2CA$, where A = the area of the joist

$= 7{\cdot}2 \times 0{\cdot}70 \times 16{\cdot}18 = 81$ tons

($\therefore$ this section is suitable).

**Previous Sheets :**

Previous Sheets dealing with structural steelwork are Nos. 729, 733, 736, 737, 741, 745, 751, 755, 759, 763, 765, 769, 770, 772, 773, 774, 775, 776, 777, 780, 783, 785, 789, 790, 793, 796, and 798.

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**Telephone :** Victoria 8571

*SOME QUESTIONS ANSWERED THIS WEEK:*

★ *WHAT is the thermal conductivity value of Western red cedar?* - - - - Q412

★ *WE have to instal suitable plant for the keeping and preservation of fruit. Can you give us the names of any firms who manufacture the gas treatment plant which is commonly used for this purpose?* - - - - - Q414

★ *WHICH firms supply cycle parks for works staff?* - - - - - - Q418

★ *IN connection with some furniture we are to make up for the Admiralty we require supplies of fireproofed timber. Where are these procurable?* Q422

THE ARCHITECTS' JOURNAL

# INFORMATION CENTRE

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

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

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

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

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45 THE AVENUE, CHEAM, SURREY
*Telephone:* *VIGILANT 0087*

*or ring the Architects' Journal Information Centre at*

REGENT 6888

Q410 ARCHITECT, BUCKS.—*I am about to build a TIMBER DRYING KILN, 45 ft. long and 15 ft. wide, at one of the factories in High Wycombe. It has brick walls and concrete ceiling and floor. The maximum humid temperature would be 130 degrees Fahrenheit. The walls are to be constructed with 9-in. inside skin, 2-in. cavity and 4½-in. outside skin. I am specifying cement mortar, one part cement to three parts sand, and should be obliged if you would let me know whether any other form of MORTAR would be more suitable for building the walls than that which I have specified.*

As the inner skin of the wall is at times likely to be saturated by condensation, a cement mortar would be best, as there is more likelihood of trouble from the use of lime mortars, owing to expansion of partly hydrated lime under the action of the condensation. Assuming, therefore, that cement mortar is best, the question of proportions of cement and sand must arise. Nothing stronger than the 1 : 3 would be necessary, but whether or not a leaner mix could be used, particularly for the 9-in. work, is worthy of consideration. We can see no technical advantages in the leaner mix in so far as the kiln temperatures are

concerned. In the ordinary way leaner mixes have less movement with varying moisture content. But the leanest mix which could be used for the 4½-in. outer skin would be 1 : 4, and it would be impracticable to use two mortars in the two leaves, so that the only practicable alternative to the 1 : 3 already suggested would be a 1 : 4 mix and this change could be made. We would mention that the authority on kiln design and construction is the Forest Products Research Laboratory, Princes Risborough, Bucks, and as the Laboratory is close to the inquirer's address it might be worth while to consult them in the matter.

Q411 LOCAL AUTHORITY, ARCHITECTS' DEPARTMENT.—*I believe there is a TRANSPARENT PAPER FOR the SPLINTERPROOFING of GLASS which only requires wetting and will then adhere to the glass. Can you tell me who makes this?*

Despite careful inquiry we have been unable to locate a paper of this type or at least a paper of this type made up for this specific purpose. There are available, however, good quality resin-impregnated net fabrics which are believed to adhere firmly to the glass after wetting. The marketing firms are given below.*

Q412 HEATING ENGINEERS, LONDON.—*What is the THERMAL CONDUCTIVITY value OF WESTERN RED CEDAR?*

From a publication of the Department of the Interior, Canada, entitled *Canadian Woods : Their Properties and Uses*, the following formula is given for the calculation of the thermal conductivity of a timber :

$$K = \frac{W \text{ plus } 5}{43}$$

where $W$ is the weight in lb. per cubic foot of the wood at 12 per cent. moisture content. An allowance of approximately .007 B.T.U. is required for each 1 per cent. difference from the 12 per cent. moisture content. The weight per cubic foot of western red cedar is 23 lb. at 12 per cent. moisture content.

Q413 ARCHITECT, SOUTH COAST.—*Rooms and a landing forming a flat on a TOP FLOOR contain a large quantity of books and papers and it is desired to protect the whole from possible damage by incendiary bombs. The roof space is being floored with tongued-and-grooved boarding screwed to the ceiling joists. Consistent with a not too heavy cost, what is the best form of PROTECTION for the surface of this flooring, and the undersides of the rafters over, FROM being set fire to by INCENDIARY BOMBS? It is presumed that the roof and floored ceiling joists would, together, prevent the bomb from piercing the ceiling. Where can I get cellulose film to apply to windows to prevent splinters flying from shattered glass?*

Since boarding has been provided the fire protection of the platform could be achieved in various ways, such as : (1) The use of ⅜-in. Durasteel sheet ; (2) ½-in. asbestos wood ; (3) ½-in. Kimoloboard ; (4) 1 in. thickness of gypsum plaster and sand or of the Thistle or Pioneer A.R.P. finish ; (5) by the Government recommendation of 2 in. of sand spread over the boards. In this latter instance, however, we would suggest laying the sand as a very lightly bound mortar, say of the proportions of about 1 : 20, the cementitious agent being Portland cement or hard wall plaster. It will also be necessary to coat all exposed roof timber within a 3 ft. vertical distance of this platform. Fireproofing paints or the Thistle or Pioneer A.R.P. finish are suitable for this purpose. Manufacturers are given below.* Among the many colourless products available for application to window glass are Arpex, Cerrux and Protec, made by the firms given below.†

Q414 ARCHITECTS, STAFFORDSHIRE. — *A client of ours is anxious to instal suitable PLANT FOR the keeping and PRESERVATION OF FRUIT. We shall be glad if you can give us the names of any firms who manufacture the gas treatment plant which is commonly in use for this purpose.*

Messrs. J. and E. Hall, Ltd., Dartford, Kent, supply and erect gas storage plants for fruit. The erection of these plants involves the use of steel and timber and both materials are rigidly controlled. Steel and timber for use in this work would have to be released from the allocation of t Ministry of Agriculture and Fisher and before this is done the installa intended and details of the pro will require to be lodged with J. Wright, Esq., Room 646, Ministry Food, Great Westminster Ho Horseferry Road, London, S.W.1.

Q415 ARCHITECTS, WEST COUNTRY.— *connection with floors for an office bl being erected in conjunction with fac premises, the clients particularly w us to use compressed CORK T FLOORING, which has pro satisfactory as far as their exis offices are concerned. We have made inquiry for this material AND that it is necessary to get an IMPO LICENCE. Do you know if procedure exists throughout the w of the cork suppliers? If you suggest any material which is availa which has the particular quality being quiet, rather like cork, we s be very pleased to hear. It is to be on a screeded concrete floor, maximum thickness of which is to 1½ in. including the screeding.*

From inquiries made it would se that supplies of compressed c floor tiles vary appreciably betwe different firms. With certain fir the country of manufacture of t products has changed hands a supplies are no longer obtainable. the case of other importing fir a licence to import will have to obtained from the Board of Tr when their present stocks are exhausted. The Cork Insulation Ltd., Beefex House, 14 West Smi field, E.C.1, have stocks in t country and would be willing tender for the supply and fixing the material. On acceptance of t tender, supplies of the tiles will reserved in their present stocks delivered as and when required.

As to alternatives, ¼ in. thick cork carpet could be considered. T material is similar to cork tile as fa comfort and quietness are concer It is laid like linoleum and probably be found to be less than thirds the cost. Another possib is rubber flooring, and this mat in 3/16 in. thickness will be a comparable in cost to an ordi ⅜-in. cork tile.

Q41

Q416 ARCHITECT, NOTTS.—*I have been sulted as to how to overcome a d culty that has arisen in connection the blacking out of roof glass. clients had the underside of a l stretch of ROOF GLAZING (m in lantern lights) PAINTED W*

* *The Keystone Paint and Varnish Co., Ltd., 15 Adeline Place, London, W.C.1 ; Dobsons and M. Browne & Co., Ltd., Queens Road, Nottingham ; A. and F. H. Parkes (Nottingham), Ltd., Beeston, Notts.*

* *ASBESTOS WOOD.—Turners Asbestos Cement Co., Erith.*
*KIMOLOBOARD.—Cellactite and British Uralite, Ltd., 296 High Holborn, W.C.1.*
*PIONEER A.R.P. FINISH.—Casebourne (I.C.I.), Ltd., Imperial Chemical House, S.W.1.*
*THISTLE A.R.P. FINISH.—British Plaster Board Co., Ltd., Erith, Kent.*

† *ARPEX.—Watco Co., Ltd., 56 Buckingham Gate, S.W.1.*
*CERRUX.—Cellon, Ltd., Richmond Road, Kingston.*
*PROTEC.—Stic B. Paint Sales, Ltd., 14 Palmer Street, London, S.W.1.*

*BLACK PAINT. During the recent heat-wave many of the sheets of glass have cracked, and this is thought to be due to the black paint absorbing the heat. Can you tell me what steps would be necessary to overcome the trouble? It occurs to me that a coat of green distemper on the upper side might deflect the heat, but this is merely conjecture and I should be glad of advice.*

The cracking of the glass panes is undoubtedly caused by the use of the black paint for obscuration. A report by Pilkington Bros., Ltd., on this subject was embodied in the reply to Question No. 376, published in the JOURNAL on June 20 last. The surface coating of the glass with green distemper or other form of light coloured summer shading paint would certainly alleviate and possibly cure the present trouble. Unfortunately, to use a light coloured surface would be in contradiction to the recommendations of the Ministry of Home Security. In Home Office A.R.P. Pamphlet entitled "War Time Lighting Restrictions for Industrial and Commercial Premises" (price 2d., obtainable from His Majesty's Stationery Office, York House, Kingsway, W.C.2), on page 8, there appears the following:

> White or green "stippling" to roof lights is unsatisfactory. If sufficiently dense to prevent the emission of artificial light it is also opaque to daylight. Furthermore, light colours have very considerable reflecting power, and would render the building more easily distinguishable from the air on moonlight nights.

It would seem, therefore, that there is no alternative but to remove the black obscuration paint and fit either inside blinds, fixed or in part moveable, or, better still, fixed shutters with opening parts at intervals so as to provide daylight for at least part of the working hours.

**Q417** OFFICER IN CHARGE, A.R.P. TRAINING, R.D.C. — *Have you any information available with regard to a PLASTER TYPE BOARD CALLED DURASTILL—it has been recommended to me as being excellent for protection of roofs, attics, etc., against burning from Incendiary Bombs, but I am unable to find out who manufactures it. Any particulars regarding this board, or other similar boards which could be recommended for the purpose above mentioned, would be greatly appreciated.*

We have no record of a board of this name. Probably DURASTEEL is the material intended. It is produced by Durasteel Roofs, Ltd., Oldfield Lane, Greenford, Middlesex. This material has perforated metal surfaces and a core of compressed asbestos, and has been used widely for the purpose described. Other boards used for the protection of roof space against incendiary bombs are Asbestos Wood and Kimoloboard, made by Turners Asbestos Cement Co., Asbestos House, Southwark Street, S.E.1, and Messrs. Cellactite and British Uralite, Ltd., Lincoln House, 296–302 High Holborn, W.C.1, respectively. Plaster boards of ½ in. thickness have also been used, usually with a superimposed surface ¾ in. layer of special fire-resistant finish now manufactured by plaster board companies such as those given below.*

**Q418** PROPERTY DEPARTMENT, MULTIPLE STORE, LONDON.—*Which firms supply CYCLE PARKS FOR WORKS STAFF?*

Ranges of cycle racks in steel and concrete are available from firms given below.†

**Q419** BUILDERS, PUTNEY. — *What MATERIAL is USED TO PETRIFY WOOD SHAVINGS prior to mixing these with cement to make building boards and slabs?*

Most processes of this nature are the subjects of patents, but general information on methods of manufacture and the processing or "mineralizing" of the wood fibre would be obtainable on application to the Director, Building Research Station, Bucknalls Lane, Garston, near Watford, Herts.

**Q420** CONTRACTORS, LONDON.—*What is the ADDRESS of the TIMBER CONTROL for Cardiff?*

The address is: The Timber Control, 27 Newport Road, Cardiff.

**Q421** ARCHITECTS, LONDON.—*Is there any information as to the angle of fall of a FACTORY CHIMNEY STACK UNDER the action of BLAST? Or is there any regulation in force as to the distance from a stack of known height where air-raid shelters for works personnel may be placed? Our problem is one of providing shelter accommodation on a fairly restricted factory site where there is a 200 ft. high chimney stack. Any regulation or information which would assist would be appreciated.*

The Structural Defence Handbook and the Civil Defence Act give no information on the subject except that, in so far as possible, placing shelter accommodation near chimney stacks should be avoided. This position has been confirmed by the engineering staff of the Ministry of Home Security. It appears that the matter is one for reference to the Regional Technical Officer of the Ministry of Home Security, who will gladly assist in determining suitable positions. A reference made to two consultant engineers yielded opinions which may be useful:

*1st opinion:* Under such conditions, it should be fairly safe to construct underground shelters outside the area lying within an angle of 60° from ground level to top of chimney.

*2nd opinion:* In falling under the action of blast a chimney stack would break, and outside a radius equal to half the chimney height normal underground shelter work could be considered ordinarily safe.

**Q422** FURNITURE FIRM, LONDON.—*In connection with some furniture we are to make up for the Admiralty we require supplies of FIREPROOFED TIMBER. Where is this procurable?*

Most of the fireproofed timber for the Admiralty comes from the Timber Fireproofing Co., Ltd., Market Bosworth, near Nuneaton. Alternative suppliers are the Crayford Fireproofing Co., Ltd., Creek Mill, Crayford, Kent.

**Q423** BUILDING CONTRACTORS, LONDON.—*We have been asked what is the most economical method of PROTECTION AGAINST INCENDIARY BOMBS FOR a FLAT timber ROOF of joists, boarding and bitumen sheet covering. What do you advise?*

A layer of sand 2 in. in thickness should give considerable protection, but there may be difficulties in keeping the sand in position. No doubt falls are provided to the roof surface, and these will further complicate matters. If the sand is lightly bound with Portland cement, it should stay put. A mix, say, of 1–20 cement to sand is suggested, spread fairly dry 2 in.

* *Messrs. Honeywill and Stein, Ltd., 21 St. James's Square, S.W.1; Messrs. British Plaster Board, Ltd., Brettenham House, Lancaster Place, W.C.2; Messrs. Casebourne & Co. (1926), Ltd., Imperial Chemical House, Millbank, S.W.1.*

† *STEEL.—James Gibbons, Ltd., 15 Fisher Street, Southampton Row, London, W.C.1; Constructors, Ltd., Nickel Works, Tyburn Road, Erdington, Birmingham.*
*CONCRETE.—Stelcon Industrial Floors, Ltd., Clifford's Inn, London, E.C.4.*

in thickness over the whole area. It will be necessary to fence around all gutter outlets. These measures will impose considerable extra dead load on the roof and strength of the structural timbers may have to be considered.

**Q424 BUILDERS, HANTS.**—*We should be very glad if you could advise us as to the name of a firm of SURVEYORS AND VALUERS who might have a young man on their staff who would act for us in the case of a disputed account and for whom the case would provide interest and experience.*

The Information Centre cannot make personal recommendations of this kind. It can only refer enquirers to the Institution best qualified to help. In this instance, The Secretary, The Chartered Surveyors' Institution, 12 Great George Street, London, S.W.1, should be able to give advice.

# TRADE ITEMS

The campaign for recovering scrap iron and steel and the general knowledge that aluminium, copper, lead and other metals are much used in armament work, has led to the belief that all metals, ferrous and otherwise, are equally scarce.

As far as lead is concerned, this is not true. Licences are being freely granted for pig lead for the manufacture of white and red leads and sheet and pipe, and it is therefore safe to assume that there are ample supplies of lead. What is more, merchants' stocks of lead products can be sold without licence.

●

Impact tests on toughened tiles and Armourlight lenses, carried out by firing a revolver at the glass at close range, are reported upon by the Research Department of Pilkington Bros., Ltd., St. Helens.

The lenses were mounted in concrete slabs 5 in. thick. In general, single lenses were broken by impact from a Colt .45 bullet at 10 yards. In double-glazed units the front lens was pierced (and diced), but the rear lens was undamaged even at 5 yards range.

The general conclusion is that single-glazed tiles offer some protection, and double-glazed tiles are extremely resistant, even after the front tile has already been shattered.

The full results were as follows :

A. *Single Glazed*

1. *4 in. square tile, 10 yards range.*—Bullet struck close to edge of tile. ½ in. diameter hole pierced, cone and large part of rim knocked out (rim found 1 yard behind block). Much powder. Tile diced.

2. *4 in. square tile, 10 yards range.*—⅛ in. diameter hole pierced, cone knocked out of back. Much powder. Tile diced. Bullet found at front of block.

3. *7 in. circular tile, 10 yards range.*—Scored surface, but did not penetrate. No fracture. No dicing.

B. *Double Glazed*

4. *4 in. square tiles, 10 yards range.*—Bullet struck close to edge of tile. (a) *Front tile :* Diced, some dice fell in, but no hole in front tile. (b) *Rear tile :* Undamaged.

5. *7 in. circular tiles, 10 yards range.*—(a) *Front tile :* 1 in. diameter hole pierced, cone knocked out of back. Much powder. Tile diced. Bullet observed between two tiles. (b) *Back tile :* Slight mark where bullet had touched. Undamaged.

6. *7 in. circular tiles, 7 yards range.*—Exactly as 5.

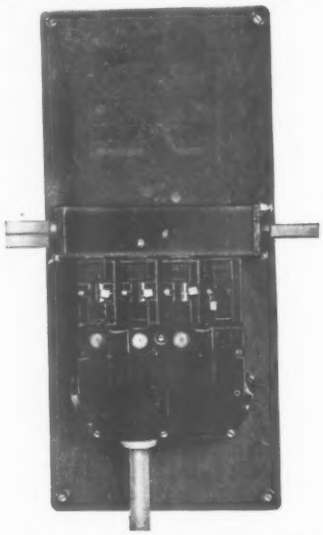
7. *4 in. square tiles, 5 yards range.*—Exactly as 5.

8. Same pair as in 6, with the front tile already diced by that shot. *7 yards range :* Bullet hit edge of tile. Bullet made a new hole in the front tile, but the back tile was still quite unharmed.

9. *Same pair as in 5 with the front tiles already diced by that shot, 5 yards range.*—Bullet hit rim of previous hole. Although the bullet struck the first tile where it was very thin, owing to powdering and conical break from the first shot, this tile must have offered some resistance, as the second tile was undamaged. A mark of splashed lead was visible on the rear tile.

●

Henley's have introduced a new feature of interest to electricity supply undertakings who experience trouble owing to the illicit consumption of current. It is the Isco meter lead shield, incorporated in the Isco (series 3)



insulated fuse set illustrated, which is mounted with the meter on a Henley plyboard.

This new feature fits between the meter and the Isco, completely protects the meter leads from accidental damage, and provides a reliable safeguard against illicit methods of obtaining current.

The Isco meter lead shield consists of a moisture-proofed fibre body held by moulded bakelite end pieces fitted with fibre diaphragms, is fitted to the plyboard by four rust-proofed wood screws, and is sealed by two tinned brass tabs.

●

The report of the directors of Callender's Cable and Construction Co., Ltd., for the year ended December 31, 1939, was submitted to a meeting held in London on June 28. Details of the report are given below :—

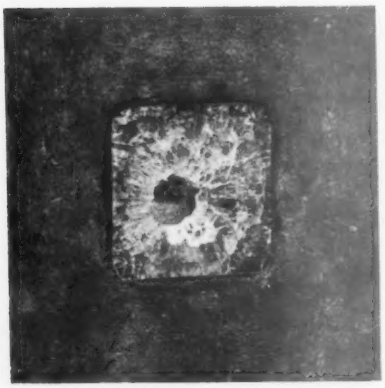
| | £ | £ |
|---|---|---|
| Audited accounts for the year ended December 31, 1939, show a balance to the credit of profit and loss account of ... ... ... ... ... | | 670,908 |
| From this there is to be deducted : | | |
| Appropriation for depreciation of buildings, plant and machinery, etc. | 70,000 | |
| Provision for income tax ... ... | 200,000 | |
| Provision for National Defence Contribution and Excess Profits Tax ... | 30,000 | |
| Interest on Debenture stock ... ... | 13,500 | |
| Dividend on 6½ per cent. Preference stock for year ... ... ... ... | 26,000 | |
| Dividend on 7½ per cent. Preference stock for year ... ... ... ... | 30,000 | |
| | | 369,500 |
| leaving | | 301,408 |
| To which has to be added the balance from 1938 ... ... ... ... | | 390,548 |
| There remains | | £691,956 |

It is proposed to deal with this in the following manner :

| | |
|---|---|
| 1. By the payment of a dividend on the issued Ordinary stock at the rate of 15 per cent. per annum, less Income Tax, of which an interim dividend at the rate of 5 per cent. per annum, less Income Tax, was paid on November 2, 1939; the balance of 10 per cent., less tax, to be paid forthwith. This, with tax, will absorb | 168,587 |
| 2. By transferring to a reserve for equalization of dividends, or for war contingencies ... ... | 125,000 |
| 3. By carrying forward to next year's account ... | 398,369 |
| | £691,956 |

●

Mr. R. Borlase Matthews, M.I.E.E., has resigned the chairmanship of Associated Smaller Manufacturers. Nine of the Council (seven area chairmen, the hon. treasurer, and the chairman of the Finance Committee) have also just resigned. "It is obvious," states Mr. Matthews, "that



*Front (left) and rear views of Armourlight toughened lenses, 4½ × 4½ × 2½, set in 5 in. concrete frame, after a bullet had been fired at a range of 5 yards. Front lens was punctured, rear lens held but smoked—bullet and powdered glass inside cavity. See note above.*

*Owing to the paper shortage caused by the German invasion of Scandinavia, the* JOURNAL, *in common with all other papers, is now only supplied to newsagents on a "firm order" basis. This means that newsagents are now unable to supply the* JOURNAL *except to a client's definite order.*
*To obtain your copy of the* JOURNAL *you must therefore either place a definite order with your newsagent or send a subscription order to the Publishers.*

under the present direction and management the Association cannot attain the objects for which it was formed, excellent and needful as they are (for there are nearly 190,000 smaller manufacturers without war work and some effective organization is therefore badly wanted)."

•

We have received from Turners Asbestos Cement Co. a four-page leaflet devoted to Turnall insulating building blocks. The firm point out that the majority of Moler building blocks now on the market are made from foreign silicious earths whose sources are now in enemy hands. The Turnall blocks, however, are made from British Moler earth in which the proportions of diatomite and clay are fully controlled in the mixing, whereas in foreign earths, being natural mixtures, the proportions vary. Advantages of these blocks are given by the firm as follows :—

"The blocks contain nothing which will react harmfully on nails, screws, pipes and constructional metals, in contact with them.

"They are strong, light, easily handled, fire-resisting ; possess low thermal conductivity ; form an excellent plaster base ; and will not shrink or expand after erection.

"The blocks are particularly suitable for inside walls and partitions, the underlining of flat roofs, mansard roofs and floors in cinemas, hospitals, hotels, schools, churches, flats and all public buildings."

•

Two new lighting fittings have just been marketed by the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2. The first consists of an all-metal pendant which, being free from glass, is safe and comparatively immune from damage by shock due to air raids. The fitting is primarily intended for installation in offices and other situations where a utility type is desirable. There are six concentric spun louvres suspended in a three-way decorative bracket. A maximum intensity is obtained immediately underneath by specially shaping the louvres to utilize the light normally wasted in a horizontal direction. Owing to this distribution and to the fact that no glass whatever is used in its construction, specular reflection from glossy papers lying on desks or other horizontal surfaces is minimized.

This unit is finished in sprayed silver cellulose and is equipped with an E.S. porcelain holder to take one 150/200 watt Pearl Osram lamp. By the omission of the swing ceiling plate and downrod, it can be converted from a pendant into a ceiling fitting.

The other unit is a simple and inexpensive inverted fitting. It has been primarily designed for quickly attaching to any existing flexible cord pendant in small rooms when it is desired to replace an ordinary shade by a more decorative unit. It is also suitable for overseas trade, as both glass and metalwork are designed to pack in the smallest possible space. Consisting of a chromium-plated carrier with a glass bowl 11 in. in diameter it is available in white, pink, or champagne colour with silver line decoration. It is suitable for use with one 60, 75, or 100-watt Osram lamp.

## THE BUILDINGS ILLUSTRATED

**ADDITIONS AND ALTERATIONS, HOUSE NEAR ASCOT, BERKS** (pages 34-35). Architects : Tatton Brown and Lionel Brett. General contractors were E. Brown, Ltd. Sub-contractors and suppliers included : Thomas Lawrence and Sons, Ltd., bricks ; London Brick Co., Ltd., Phorpres bricks ; G. R. Speaker & Co. Eonit pumice blocks ; G. M. Callender & Co., Ltd., Ledkore dampcourses ; Huntley and Sparks, Ltd., 3-ply cabots quilt (roofing insulation) ; Permanite, Ltd., 3-layer Permanite (roofing covering) ; Shanks & Co., Ltd., sanitary fittings, baths, basins, etc. ; Crane, Ltd., radiators and Carlton boilers ; Honeywill and Stein, Ltd., Gyproc plaster board ; Bachtold, Ltd., pine casements, doors and fittings with Alpine windows ; G. A. Harvey & Co., Ltd., perforated metal grille ; Ace Laminated Products, Ltd., flush doors.