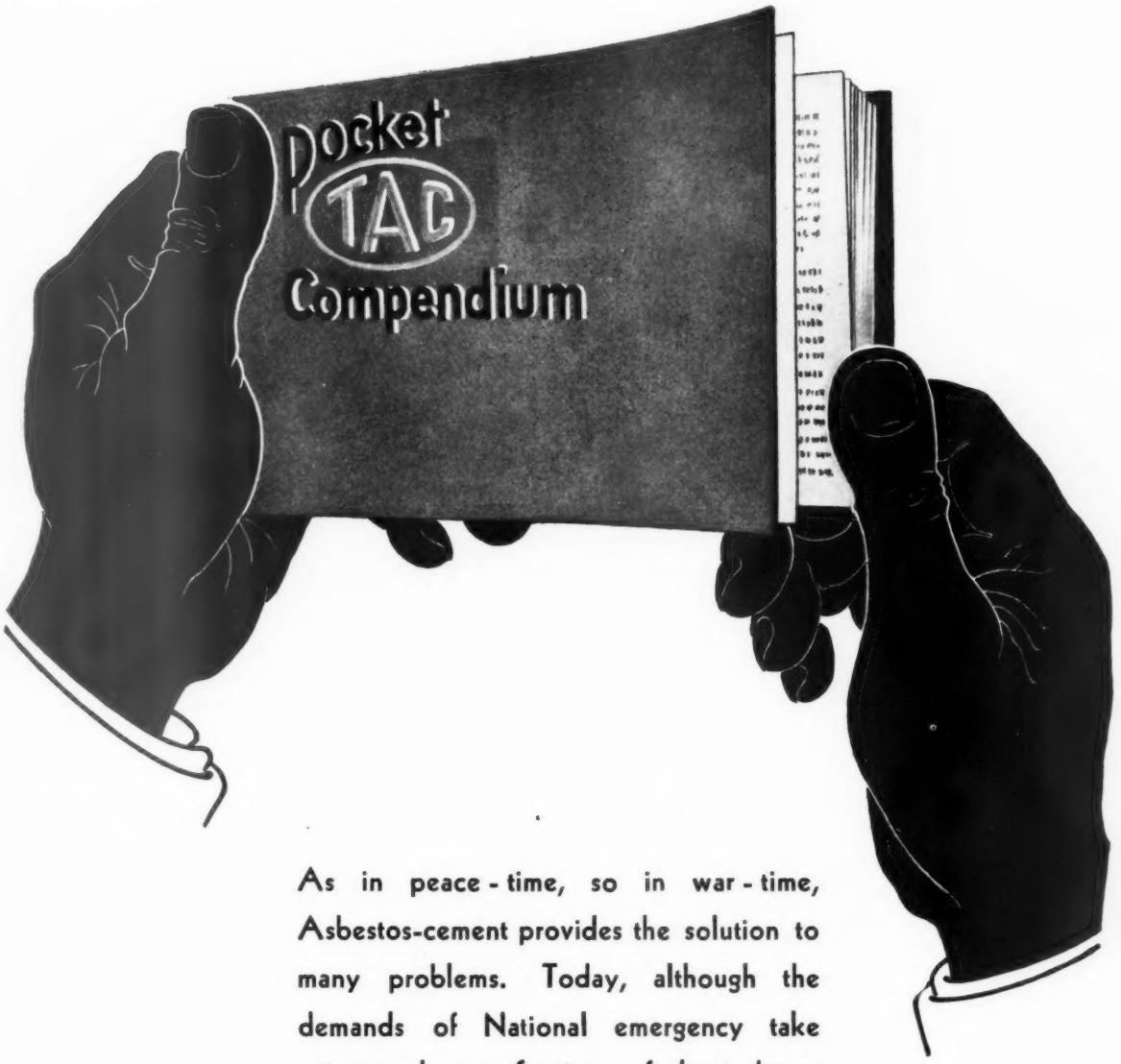

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THE ARCHITECTS' JOURNAL

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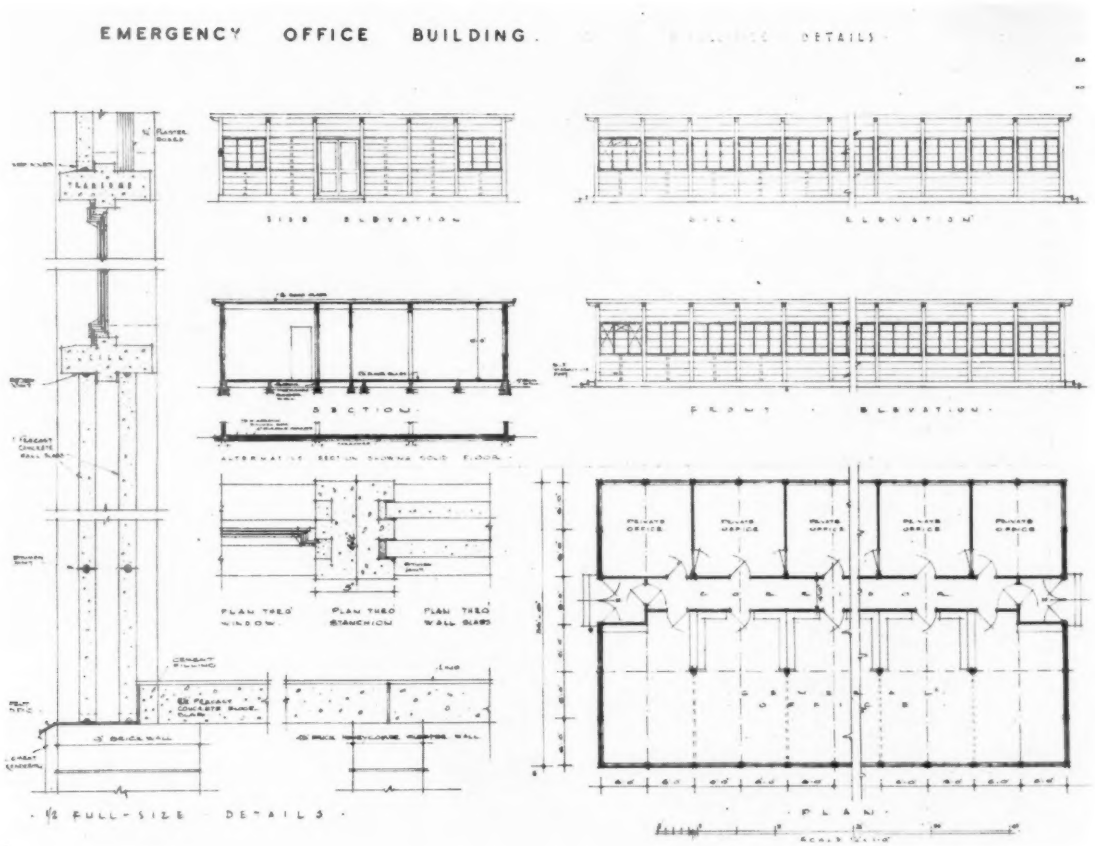
The Editor will be glad to receive MS. articles and also illustrations of current architecture in this country and abroad with a view to publication. Though every care will be taken, the Editor cannot hold himself responsible for material sent him.

THURSDAY, MAY 9, 1940. NUMBER 2364 : VOLUME 91

PRINCIPAL CONTENTS

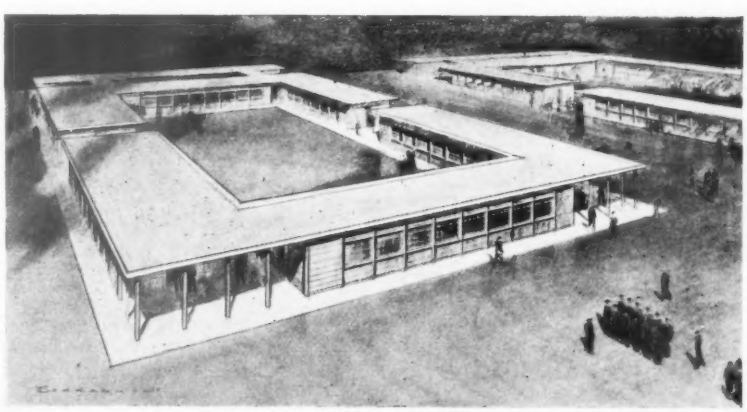
NEW CONCRETE CONSTRUCTION

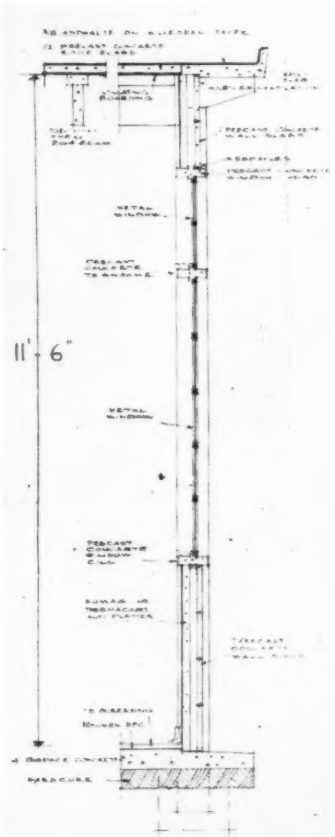


THE need for speed in the construction of buildings for war purposes, together with the shortage of timber and steel, has led to the development of several new systems of construction since war began.

The system illustrated on this page has been designed by Mr. Stanley Hamp, of Messrs. Colcutt and Hamp, with the assistance of Messrs. L. G. Mouchel and Partners, and has already been approved by the War Office. The construction consists of a post and beam framing of prefabricated R.C. units filled in with R.C. panels in which the volume has been reduced by prestressing the reinforcement. The system has been designed to suit several types of wartime building—huts, emergency offices and hospitals—and also to be capable of removal and re-erection for post-war purposes.

Below, a perspective of dining room and canteen for 600 men. Top, plans of emergency office and detail section up to window. Right, typical wall and roof section.

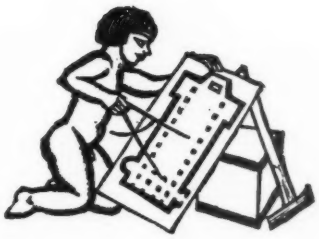




WARTIME ACADEMY

The Royal Academy Exhibition opened to the public on Monday last. Next week we will publish a review of the architecture section by Professor C. H. Reilly. "In the Architecture Room, things are," writes Professor Reilly, "as they were and have been almost since the last war. There is no sign of deep calling to deep, or of any great stirring anywhere. . . The gentle quarrel of the styles—the only war known here—goes on with the usual English compromises, or perhaps I ought to say the usual Academy ones."

Above, a model of the proposed new Wellington Barracks (No. 1521). By A. W. Kenyon. Bottom, entrance courtyard in the proposed new Regent's Park Barracks (No. 1458). By Louis de Soissons.



THE NECESSITY OF DISINTERESTEDNESS

THERE have been signs during the past month that the first phase of the war has ended, and that it may be followed very soon by that use of all national resources under hazardous conditions which is called total war. If this is so, the methods by which the building industry has tried during the past eight months to bring about a better wartime use of its powers must be changed if they are to have any hope of success.

Those eight months of the first phase of the war were, nationally, a period of watchfulness and vigorous preparation for total war. Changes took place in all occupations and industries, and particularly in the building industry. In it, the cessation of private building, a short-term rush of A.R.P. works and a large, high-speed and mysteriously organized Service building programme, have caused increasing unemployment.

To remedy this situation the leaders of the building industry adopted what may be called peacetime measures : and there is no doubt that at the time they were the right measures. The War Committee of B.I.N.C. and the industry's other representatives called attention to the size and great economic importance of the industry, to lack of foresight and serious faults in the Government's use of the industry for war purposes, to the large number of unemployed.

But it is important to notice what they did not do. Though their ultimate aim was the maintenance of a reasonable volume of work in the industry throughout the war—for which careful distribution of contracts and close liaison between Government and industry were essential—they did not put forward this primary aim in anything but general terms. Above all, they did not attempt to state precisely what volume of building work *should* be maintained in wartime as a national necessity.

Now, no one can doubt the great difficulty of making such an estimate. And, during the first months of war, M.P.s would have certainly disliked being asked to consider, still more to support, the totalitarian conception of fixing the wartime turnover of the country's second industry at such and such a figure : though they are always very ready to pay great attention to an industry's complaint that its technique or organization is not being properly used. Therefore, B.I.N.C. gave M.P.s what they were accustomed to—complaints of bad distribution and lack of foresight and a general appeal for more work.

But this stating of the industry's case in peacetime ways has been a failure during the months when those methods were desirable : and in particular the general appeal for more work has failed. It is therefore doubly certain that if we are to enter a phase of total war, all general, partisan, peacetime claims by the building industry—or any claims which can be so construed—are doomed in advance. During such a phase of war it will remain the duty of the building industry to try to ensure the best possible distribution and organization of the work given to it by the Government.

But claims for work additional to that in the Government's programme must be backed by convincing arguments of its national necessity. They must plainly be *disinterested* claims—based upon the most authoritative estimate which can be obtained of the degree of building activity which it is essential to maintain in war. And by disinterested we do not mean that they should *appear* disinterested. They must *be* disinterested. It is high time the building industry, *as an industry*, began to think seriously about its place in the national effort, rather than its loss of jobs.

There is no doubt that the whole industry would welcome such an estimate of what is, in short, *the rôle of building in total war*. There is no doubt that many members of the industry have been troubled in the last eight months by doubts whether building—other than military building—was essential in wartime, and by doubts whether appeals for more work were not unpatriotic.

The JOURNAL therefore believes that it is vital for the industry to obtain this authoritative estimate of the volume of building which should continue in wartime ; and, in doing so, does not underrate the difficulty of preparing such an estimate. But it believes it is not an insuperable difficulty. The proportion of the industry required for the execution of the Government's present war building programme, and as a reserve for a future expansion of that programme and for A.R.P. purposes, should be calculable. But beyond these the maintenance of the industry in wartime is an economic question. It involves calculation of the degree to which the stimulus which the building industry gives to other industries in peacetime should be encouraged, or discouraged, in wartime. And it is in the solution of this central question that the JOURNAL has suggested that the help of Mr. J. M. Keynes should be asked for.

On this question hang all others—whether building has a function of its own in war or is merely an ancillary military service, how contracts should be distributed and how each section of the industry can best contribute to the prosecution of the war.

By preparing the best obtainable answer to this question, the industry would put itself in a strong position—whereas now it is in a weak one.

It would, in short, be in a position to make recommendations of the precise, pointed, and forceful kind which alone will have any hope of being heeded during conditions of total war. And if these recommendations are not favourable to the building industry, they should still be put forward.

The Architects' Journal
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NOTES & TOPICS

OVER TWO HUNDRED MILLIONS ON BUILDING

WHEN war broke out all members of the building industry knew that peacetime volumes of building could not be maintained—or anything like maintained. If any one of those members had been asked in September what, in his considered opinion, was the proportion of peacetime volumes which could be maintained in war—taking into consideration the need of a building reserve to cope with unforeseen results of air raids—he would probably have said one-quarter or one-third.

*

Since then unemployment has steadily increased in nearly all sections of the industry. And it is therefore astonishing that the first semi-official estimate of the Government's building expenditure for this year should have revealed that it amounts to more than half the total building expenditure during the last year of peace.

*

Why is it that a building volume which exceeds the industry's hopes is accompanied by little or no benefit to the industry in general? The answer can only be found in the distribution of the work.

*

A small section of the 1940 programme—the A.R.P. section—has been spread throughout the country and executed by the industry's usual peacetime organization. But the vast bulk of it has been, and is being, executed by a very few firms in comparatively small areas of the country.

*

There are obvious strategic reasons for geographical placing, and in certain cases speed or convenience may have made it desirable to employ a few large firms.

*

But the magnitude of the hardship which is accompanying so great an expenditure will justify B.I.N.C. in using all the influence of the industry to overcome the Government's persistent refusal to consider how strategic and military needs can be reconciled with a much wider distribution of work.

MOTHER OF PARLIAMENTS ONE HUNDRED YEARS OLD

One hundred years ago last week Mrs. Barry (wife of Charles Barry, architect) laid the foundation stone of the Houses of Parliament. It was an obscure ceremony, for there is no record left of the other persons attending it, and the stone itself has never been found. This rather sinister beginning fits in well enough with the troubled history of the building.

*

Six years before, Mr. Barry, returning to London on the Brighton coach, saw in the sky a red glare. It was the burning of the old Palace of Westminster, and was to be his great chance. It was decided to rebuild in "the Gothic or Elizabethan manner," and the designs were to be selected by competition. Mr. Barry won, and retired under a deluge of Greek-*v.*-Goth pamphlets to prepare the working drawings with the help of Mr. Pugin, who had provided the elevations of the winning scheme (and, incidentally, the plans for another competitor; such a subdivision of our Art would, of course, horrify us today).

*

For two years they worked together, Barry sending the dimensions for Pugin "to work up. . . . I send some tracings . . . most wretchedly made by a youngster who is as dull and destitute of feeling as the board upon which he draws . . . do not be shackled as to height," etc., etc. A quarrel broke out, and it lasted seven years before Barry swallowed his pride and wrote again for help. ". . . I am in a regular fix respecting the working drawings for the fittings and decoration of the House of Lords. . . ." Pugin consented to carry on again, and worked feverishly to cope with the pressure of work thrust upon him. Almost the last requests of Barry were for "eighteen umbrella stands of quaint design" and some inkholders "cut on the exterior in a knowing way." It is not surprising that Pugin shortly after turned the corner and became insane from overwork—particularly as he did a good many of the details alone in a small boat.

*

The Barry-Pugin collaboration resulted later in a rancorous pamphlet war between their two sons, which developed at one time into a first-class melodrama involving "missing letters."

*

But Barry had other troubles, too. Dr. Reid, the plausible ventilating expert, proved to be inefficient, and his tubes took up enormous areas of space and involved the frequent alteration of plans. When the clock hands were fixed to Big Ben they were found to be too heavy. The big bell itself was found to be cracked after two months of service. Even after Barry's death a wrangle over his fees continued.

*

It is a pity that *The Times*, recalling last week in a leading article "the triumph of Sir Charles Barry" over many obstacles, did not mention the name of his overworked and responsible collaborator, Augustus Welby Pugin.

RAILINGS

For some months a "Collect Your Scrap Metal" Campaign has been in full swing under the encouragement of the Ministry of Supply. And, inevitably, it was at length suggested that the country should draw on the reservoir of metal contained in its iron railings.

*

It would have been so much easier for the Ministry of

Supply to encourage local and private authorities to turn in all railings, that the exhibition which the Minister of Supply will open at the Building Centre tomorrow deserves a special mention.

*

This exhibition does encourage the removal of railings, but it is also an illustrated guide to railings which should be taken and those which should be left : thus showing a power of distinction which must be very rare in a war ministry.

*

The Cautionary Guide and Survey on which it has been based are the work of Mr. James Melvin, of the Ministry of Supply (who was also one of the winners of the recent Margate Competition), and of Messrs. Bryan and Norman Westwood, who took the photographs and arranged the exhibition.

*

It is perhaps as well for Mr. Melvin that the Ministry does not intend to ask for suggestions of those railings which could most easily be spared to serve the nation's need. But that the Ministry is already well informed on this point is proved by the article called " Railings for Scrap " which appears in this month's *Architectural Review*. The authors of the article are James Melvin and Bryan and Norman Westwood.

PHILADELPHIA'S GARAGE

Perched on a rock, and closing the outward vista of Philadelphia's Fairmont Parkway (the majestic triple boulevard which slashes a ruthless diagonal across the city's standard chequerboard) stands the Philadelphia Museum of Art, rivalled only in fame and bulk by New York's Metropolitan Museum.

Meticulously Moderno-Greek, even to the archæologically coloured statuary of the tympanum, the Philadelphia Museum (*above*), when complete, will have seven acres of floor area. It is affectionately known to Philadelphians as the Greek Garage. In part of one wing there is parking space for the Parthenon itself.

*

The famous feature of the Museum, dating almost from its birth in 1919, is a series of period rooms called " The Main Street of the Ages." Showpiece is an English Tudor room transplanted from a hunting lodge of Henry VIII. The director of the Museum has been heard to whisper to awed visitors in this room : " This may be the very room in which Queen Elizabeth was conceived."

BLACKPOOL STAMPEDE

Soon Blackpool will be famed no longer for its curious sideshows. There will be no more errant clergymen in lions' dens, no more Epstein sculptures, no more strip-tease on roller skates, no more " armless wonders." Probably for the last time your handkerchief has been perfumed with Gipsy Love Drops.

*

This happy area is to be swept away, for the Blackpool Corporation and the L.M.S. have produced together a scheme of reconstruction which is to cost nearly four million pounds.

*

The Central Station and the surrounding district are to be demolished and rebuilt on a huge scale to incorporate a new terminus, a bus station, a park, a shopping arcade, an indoor stadium large enough for football, and (possibly) a block of flats.

*

" The station," said a Blackpool official, " will be entirely different from anything yet seen in this country or in Europe, and is the idea of Lord Stamp."

*

Work is to begin the moment Government restrictions on civil building are removed.

NIGHTMARE BECOMES REALITY

No architect who has ever submitted a design in open competition has entirely avoided the awful thought that, somehow or other, his design would be lost or forgotten by the promoters and would never be seen by the assessor.

*

In quite a number of otherwise sane architects, this idea —especially during the last week before Sending In—has been known to become an obsession. And, to my knowledge, three architects have gone to infinite trouble to deliver their designs by hand and have heavily tipped an astonished porter to ensure his good offices in a matter over which he had certainly no control.

*

The joke is now on the rest of us. The incredible has happened. It has been announced that Mr. A. F. B. Anderson, the assessor in the Margate competition, of which the result was published last December, has recently compared seven schemes, which he had not previously seen, with the three premiated designs and has awarded Equal-Third-Place to one of the forgotten and has highly commended another.

*

It is clear that Margate Council has spared neither trouble nor cash in remedying the awful slip of some unfortunate official, and Mr. A. Koener (the lucky-equal-third) has got £200 out of the blue. But I fear that when competitions start again in the golden time of after-the-war, a common obsession will be found to have increased rather than diminished.

DISGUISE AND DESIGN

" Disguise," said one of the characters in Robert Louis Stevenson's story " The Wrong Box," " is the spice of life." *The New Yorker* recently came across with a story about a salesman selling a new piece of furniture to a customer and saying : " It's a somewhat different idea—a set of books disguised as a radio."

ASTRAGAL

NEWS

BUILDING INDUSTRY AND M.P.s

In the House of Commons on Thursday last certain proposals which aim at alleviating the critical condition now prevailing in the building industry were put before an all-party meeting of M.P.'s, and presided over by Mr. A. C. Bossom, M.P., F.R.I.B.A. (photograph below). It was agreed that the proposals should be placed before

meetings of the three parties—Conservative, Labour and Liberal—by Mr. Bossom, Mr. G. Hicks and a leading Liberal M.P. respectively. One of the chief proposals is to form a deputation consisting of members of all parties together with leading members of the building industry to ask for the Government's consideration of ways in which the industry's resources could be used more fully.

CEMENT PRICE INCREASE

Price of Portland cement delivered to site in the London area was increased on May 2 by 3s. 6d. per ton, thus making the present price: Portland cement, delivered, in minimum 4-ton lots, 48s. 6d. per ton; rapid-hardening Portland cement, delivered, in minimum 4-ton lots, 54s. 6d. per ton; white Portland cement in minimum 1-ton lots is on and from the 3rd instant increased by 10s. per ton, thus making the price on that date 185s. per ton.

NEW SPECIFICATIONS

Two new standard specifications have been issued by the British Standards Institution. They are:

B.S.S. NO. 890-1940, BUILDING LIMES. (PRICE 3s. 6d.)

One of the outstanding needs in the building industry has been for a standard for building limes. A standard for cement was amongst the earliest standard specifications issued, but although lime is a very much older building material it has only just been possible to issue a standard for it. The preparation of the standard was commenced by the British Standards Institution some years ago, but many difficulties and problems arose which could only be solved by extensive research which has occupied a considerable period of time. The one which was most difficult was the devising of a suitable method for the determination of the hydraulic strength of hydrated lime. A note to the test that has been included emphasizes that it is to be regarded as tentative only and its suitability as a standard test is to be reviewed when experience of its use has been obtained by industry. The standard provides for quicklimes and hydrated limes under the following categories:—

Quicklime for plastering finishing coat, coarse stuff and building mortar.
Non-hydraulic and semi-hydraulic.
Quicklime for coarse stuff and building mortar only.
Non-hydraulic and semi-hydraulic.
Hydrated lime for plastering finishing coat coarse stuff and building mortar.
Non-hydraulic and semi-hydraulic.
Hydrated lime for coarse stuff and building mortar only.
Non-hydraulic and semi-hydraulic.

For each type of lime the requirements specified include the description, chemical composition, residue on slaking (or for the hydrated limes, fineness), volume yield, workability, hydraulic strength, soundness, etc., as appropriate to the particular type.

Details are given in an appendix for the procedure to be adopted in slaking quicklimes and the methods of carrying out the various tests are also outlined in full in other appendices.

B.S.S. NO. 892-1940, GLOSSARY OF HIGHWAY ENGINEERING TERMS. (PRICE 5s.)

This glossary, which is the result of careful work by a representative technical committee extending over several years, is an addition to the series of glossaries of technical terms issued by the British Standards Institution.

It is confidently hoped that its publication will lead to a more exact usage of technical terms, and will also enable the student or layman to understand the terminology peculiar to road engineering.

MINISTRY OF SUPPLY

Following notices have been issued by the Ministry of Supply.

Minister of Supply has made the Control of Iron and Steel (No. 7) (Scrap) Order, 1940, Direction (No. 3), increasing the maximum prices for scrap iron and steel as from May 6, 1940, to meet the recent increase in railway charges. In the case of scrap iron and steel for the manufacture of steel ingots, otherwise than in electric arc furnaces, the maximum prices have been increased by 1s. 6d. per ton for consumers in South Wales (West); by 1s. per ton for consumers on the North-west Coast and in Cheshire (including Shotton), Brymbo and South Wales (East); by 6d. per ton for consumers in the Midlands (except for two grades of cast iron which are increased by 1s. per ton); and by 9d. per ton for consumers in all other districts. All other grades of scrap are also increased by 9d. per ton.

Timber Control announce that it has been decided to cancel Home Grown Stock Form "H.G.1—Round Timber" This form should not, therefore, be included in Stock Returns.

TECHNICAL BULLETINS

Department of Scientific and Industrial Research has issued the first of a series of wartime bulletins, which will deal with current building problems and describe work carried out under the guidance of a committee of the Building Research Board formed at the instance of the Works and Buildings Priority Sub-Committee of the Ministerial Committee on Priority.

Owing to the great demands on the steel industry for munitions of war of every kind, it is of paramount importance that steel should be conserved to the utmost and the present bulletin shows how considerable economies of steel may be effected in the factory part of the Government building programme. The work has been in a very full sense a co-operative effort on the part of industry, leading engineers, Government Departments and the Building Research Station. The Design Committee of the British Steelwork Association brought together a large number of type designs and the less economical were rejected. Those which have been adopted and included in the present bulletin have been closely studied with the object of obtaining every economy in weight of steel, consistent with safety in use.

The designs given in the Bulletin cover a range of bay dimensions from 27 by 30 ft. up to 40 by 110 ft. and two main types are given, the one for a concrete roof slab affording protection against the small incendiary bomb and anti-aircraft fragments, the other for a light roof covering suitable for factories where these agencies would not be seriously destructive. All designs have been worked for two ranges of height. The main object of preparing the designs was to provide a yardstick against which any proposals for the use of structural steelwork could be compared since, so far as is known, there is no generally recognized economic standard for such buildings. The designs have been fully detailed, but it would be incorrect to assume that buildings in which they are incorporated should be put in hand without competent engineering supervision, since modifications may be desirable to fit the designs for particular purposes and, in any case, their assembly into a complete building requires full appreciation of the basis of their method of design which is stated in the Bulletin.

A.R.P. considerations are of the utmost importance in wartime building, since all factories erected at the present time will be engaged on the manufacture of products vital to the prosecution of the war. There are two main factors here to be considered: First, to minimize the damage likely to be caused by a direct hit, and, secondly, to find a satisfactory solution of the problem of daylight illumination and of black-out, together with means for minimizing the damage likely to be caused to glazing from the blast of a bomb exploding in the vicinity. These problems have been investigated at the Building Research Station in collaboration with the A.R.P. Department, Ministry of Home Security, and it was found necessary to develop a rapid method of computation of daylighting efficiency, so that glazing can be reduced to a manageable quantity considered in terms of A.R.P. requirements, whilst still admitting sufficient daylight to enable the output to be maintained in the factory. This method of computation of daylight is given as an Appendix to the Bulletin.

In certain cases there is a possible saving of steel by the substitution of reinforced concrete or reinforced brickwork for steel stanchions. Recommendations for the design of reinforced brickwork columns suitable for use in these designs are given in an Appendix. The design of precast reinforced concrete columns presents no special difficulty, and it is assumed that where convenient these would be regarded as a suitable alternative.

The Bulletin* will be followed by others dealing with other problems of wartime building, to be issued at fairly short intervals through H.M. Stationery Office. While these designs have been prompted by the requirements of wartime building and are given in terms of wartime building, it may be expected that they will point the way to a permanent advance in building technique in this country.

*Wartime Building Bulletin No. 1. Economical Type Designs in Structural Steelwork for Single Storey Factories. Published by H.M. Stationery Office, 1s. net.

ANNOUNCEMENTS

Mr. J. N. Fatkin, L.R.I.B.A., has moved his office to 128 Grainger Street, Newcastle-upon-Tyne, 1.

Owing to renaming of streets, the correct address of Mr. Andrew Reid is now: 14 John Adam Street, Adelphi, W.C.2.

R.I.B.A.

GENERAL MEETING

General meeting will be held at the Institute on Tuesday, June 4, at 8 p.m., when Sir Charles Bressey, C.B., Past President of the Chartered Surveyors' Institution, will read a paper on the Report which he and Sir Edwin Lutyens, K.C.I.E., R.A., prepared, entitled, "Highway Development Survey, 1937 (Greater London)."

ELECTION OF MEMBERS

As Fellows (10)

T. M. Ashford (Birmingham); R. Edmonds (Birmingham); H. O. Hamilton (Eastleigh, Hants); D. J. Howells (Swansea); H. Jackson (Birmingham); C. E. Monro (Glasgow); J. V. Nisbet, M.A. (Portsmouth); and I. Schultz (London). *Overseas.*—J. T. Mair (Wellington, New Zealand); and R. Synnot (Sydney, Australia).

As Associates (22)

K. L. Barry (Dublin); T. R. Bateman (Cambridge); (Miss) M. I. Boyd (Chobham, Surrey); A. R. Dannatt (Chelmsford); (Miss) M. M. Davidge (Worth, Sussex); P. Ginnell (Dublin); E. R. Goodall (New Malden, Surrey); S. G. Kadleigh (London); (Miss) R. F. Levy (Marlow, Bucks); E. W. Lovett (London); E. M. McIntyre (Aberdeen); K. D. Mistry (Liverpool); (Miss) G. D. Mitchell (Glasgow); W. K. Shuttlewood (London); (Miss) I. Sim (Gt. Milton, Oxon); F. G. Smith (Ormskirk, Lancashire); R. A. R. Smith (Manchester); A. H. Taylor (Aberdeen); O. S. Weiss (Leamington); and S. Wilkinson (Liverpool). *Overseas.*—H. H. M. Griffin (New Delhi); and A. J. Murray (Cape Town).

As Licentiates (6)

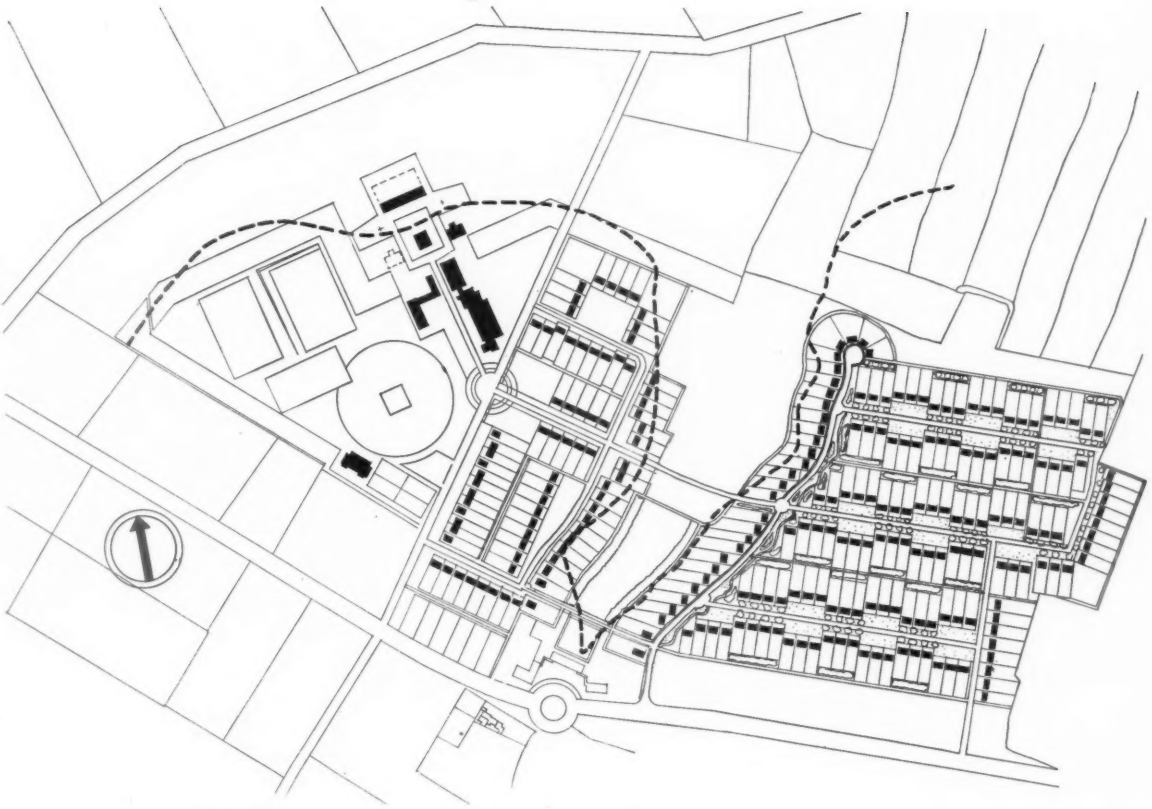
F. W. Andrews (Faringdon, Berks); H. F. B. Close (Walsall, Staffs); A. T. England (Lytham St. Annes); R. E. Hiscock (London); G. Leresche (Llandudno); C. G. Vaughan (Swansea).

DIARY

Thursday, May 9.—A.A.S.T.A. At St. Mary's Hall, Coventry. "What Can Architects Do Now?" By R. T. S. Skinner. 7.30 p.m. INSTITUTION OF ELECTRICAL ENGINEERS, Savoy Place, W.C.2. Annual general meeting. 6 p.m. CITY OF BIRMINGHAM COLLEGE AND SCHOOLS OF ARTS AND CRAFTS. Retrospective Exhibition of Students' Work. Until May 29. 10 a.m. to 6 p.m. SOCIETY OF ANTIQUARIES, Burlington House, W.1. "Excavation of a Megalithic Tomb near Waterford." By Mrs. Christopher Hawkes. "The Discovery of a Figurine of the 'Earth Mother,' and other cult objects, associated with evidence of Ritual Worship, in the excavation of Pit 15, Grime's Graves, 1939." By A. Leslie Armstrong. 4.30 p.m.

Saturday, May 11.—ARCHITECTURAL ASSOCIATION. All-day visit to Cambridge and neighbourhood. Buildings to be seen will include recent work by Sir Giles Gilbert Scott, Messrs. Stanley Hall and Easton and Robertson, and Walter Gropius and E. Maxwell Fry (village college at Impington). Coach leaves Bedford Square at 9.15 a.m., returning from Cambridge at 6 p.m. Return coach fare, 6s. 6d.

Thursday, May 16.—ARCHITECTURAL ASSOCIATION, 36 Bedford Square, W.C.2. Annual Reception. 8.30 p.m.



CALVERTON COLLIERY AND VILLAGE, NEAR NOTTINGHAM

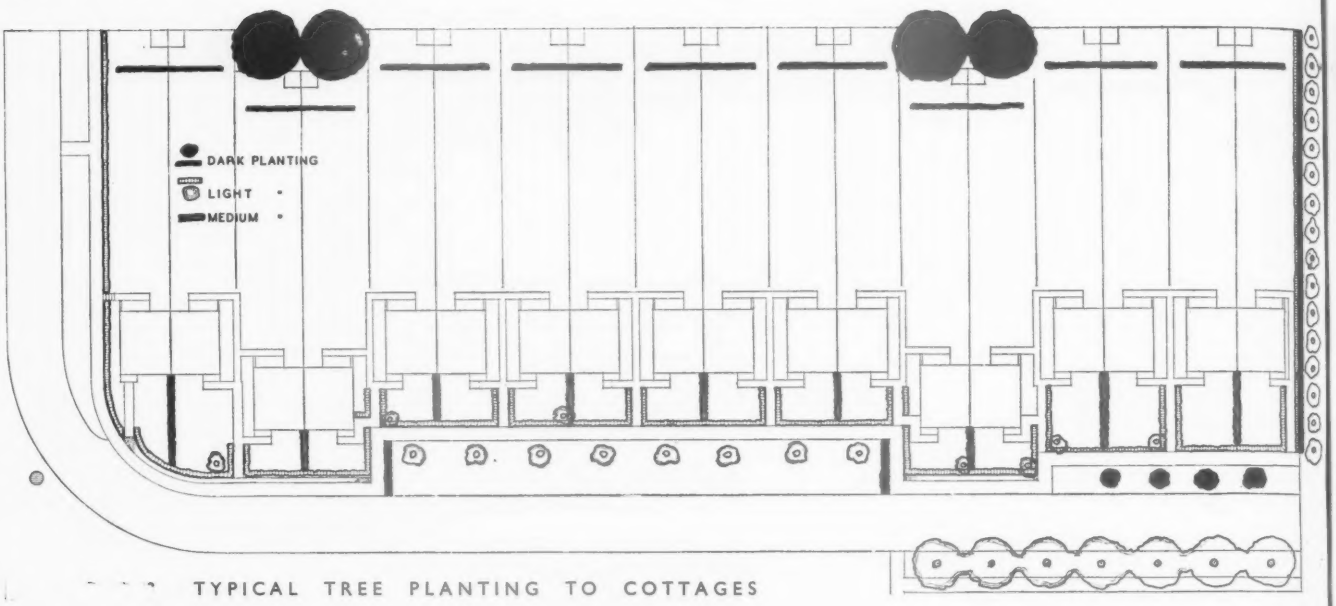
COAL MINE

ARCHITECT: G. A. JELLICOE (JELLICOE, PAGE AND WILSON)

GENERAL—*The partnership between Jellicoe, Page and Wilson was dissolved in December, 1939. The colliery buildings were designed by, and were under the supervision of, Richard Wilson. Pre-war assistants were Messrs. R. W. Cole, Rutherford, Peter Joseph and R. Collins. The architect wishes to recognize the part played in this design by the Chairman of the Company, Col. C. G. Lancaster, M.P., and the company's engineer, Capt. R. C. Wilson. Close association with the architects of the Miners' Welfare Commission, who were responsible for the design of the Pithead Baths, also made possible a comprehensive scheme.*

The present shaft is sunk three and a-half miles from the main shaft at Bestwood. It is for men only, and the second shaft, for coal, will not be sunk for some years.

The lower portion of the site between the two sections of the housing scheme was unsuitable for building owing to drainage difficulties and is to be used for recreation. The 230 contour is shown by the heavy chain line.



TYPICAL TREE PLANTING TO COTTAGES

LANDSCAPE—Colliery buildings are about three-quarters of a mile from the old village of Calverton. The most suitable site for the new village was in the area between the two. The contours are such that the works are very nearly out of sight from most parts of the new village. The open area in the village is caused by problems of drainage, and advantage has been taken to use this space as a park and playing area. The colliery buildings are modelled into the falling ground in such a way as to become closely associated with the landscape. Thus the office block is pressed against

Three of the cottages

COLLIERY BUILDINGS AND VILLAGE, CALVERTON, NOTTS:

View of village from south-west

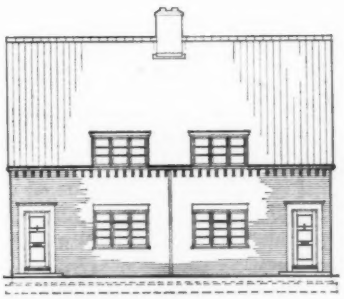
the playing fields, and this leads by way of the garages to the lamp room and the large blocks of winder house, stores, etc.

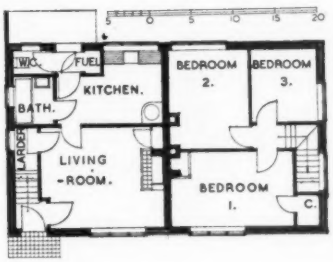
The planting is being considered according to the various scales required. Thus, the main protective belt, about 80 ft. wide, is planted chiefly with conifer to act as a wind screen : this is interplanted with hardwood and small-scale may-trees on the edge. There are formal clipped yew and box within the colliery lay-out, and the long flower boxes adjoining the baths are planted with gorse which will be left rough. A small box of massed polyanthus roses lies outside the canteen windows. The offices will be left unplanted during the war.

Planting in the village will be dominated by blocks of tall trees at the backs of the cottages. Those already planted are sycamore, and it is probable that the entire scheme will consist of the same tough tree. The road-side planting is being varied.

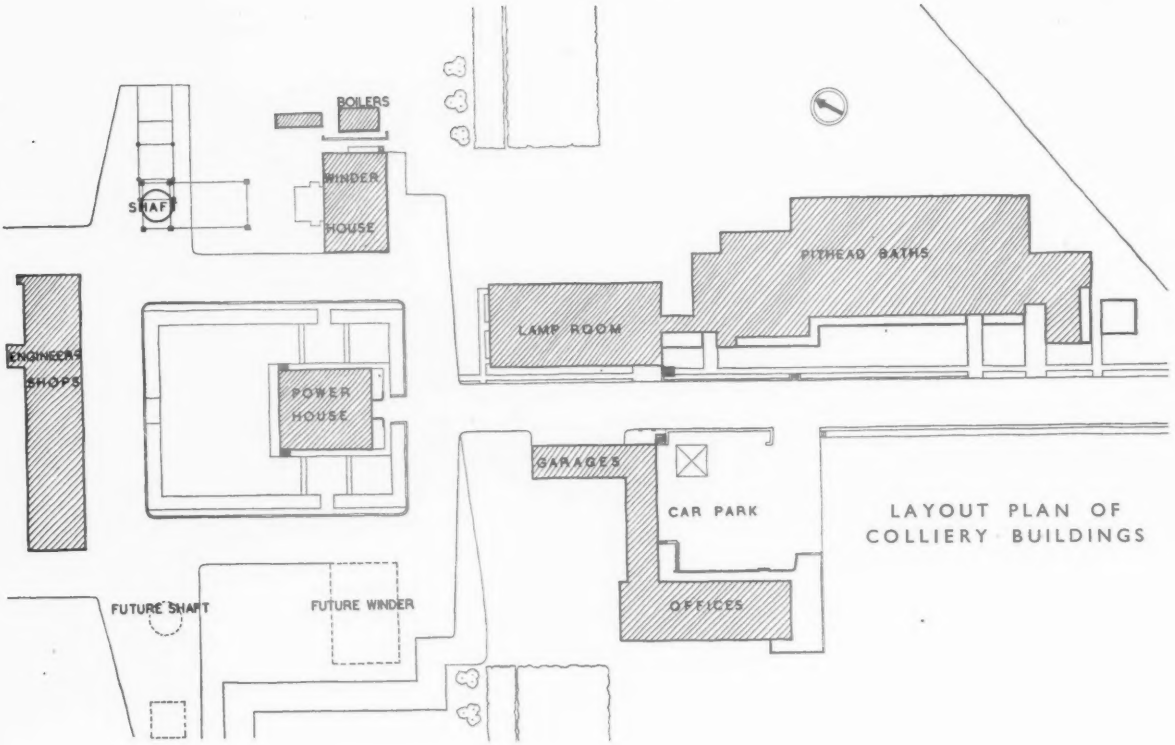
VILLAGE—The village has been planned to eliminate the idea of the continuous street. The perspective in time should give the impression of groups of buildings settled in a landscape of trees. The layout of the smaller part of the village is governed by existing trees and contours. The further area is, however, more or less level, and has lent itself to a geometric pattern that is economical. Where this pattern clashes with the landscape contour, there will be a parkway, possibly of rhododendrons, which will absorb the change. Service lanes between the cottages are intended for coal delivery, and a small shed is provided for each miner to receive coal direct from the cart. The usual procedure is for such coal to be dumped on the pavement outside each cottage. The spaces left for tree planting will, it is hoped, also provide space for children to play, since one of the great difficulties in the upkeep of grass greens and verges is wear and tear from this source.

Materials of the cottages are pantiled roofs, to match existing roofs at Calverton village, and white-washed walls.



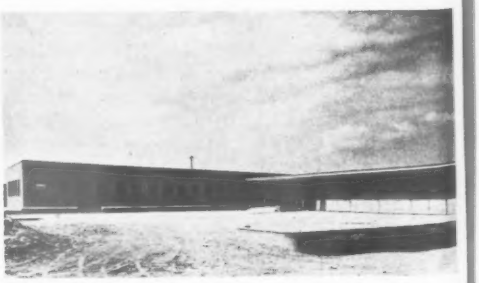


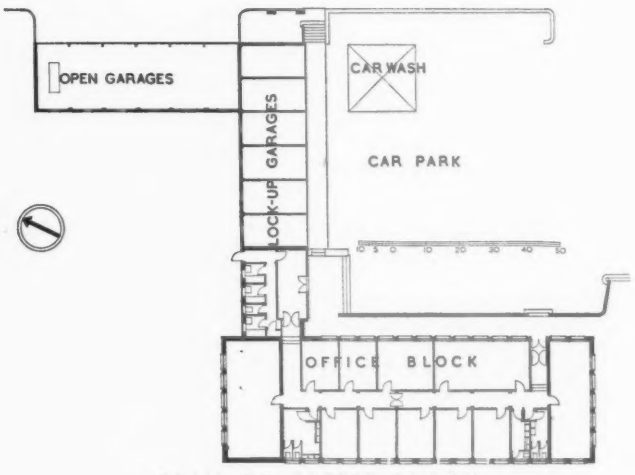
ARCHITECT, G. A. JELLICOE (JELLICOE, PAGE AND WILSON)



LAYOUT PLAN OF COLLIERY BUILDINGS

Right, main entrance to office block; below, general view of office block and lock-up garages.





PLAN OF OFFICE BLOCK

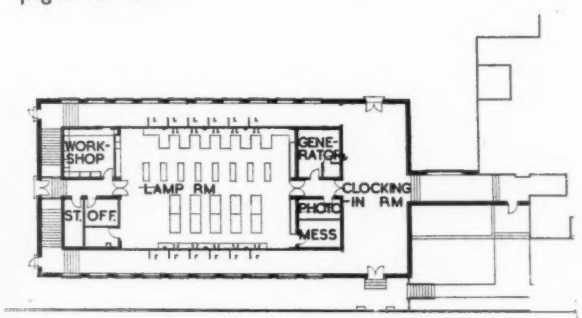
COLLIERY BUILDINGS AND VILLAGE, CALVERTON, NOTTS:

View from south of the power house and winder house (right)

COLLIERY—The present shaft is sunk 3½ miles from the main shaft at Bestwood. It is for men only, and the second shaft, for coal, will not be sunk for some years. The area to be used for additional buildings, sidings, dumps, etc., has been scheduled. The present number of miners is six hundred, and in a year or so will rise to fourteen hundred. The men enter by the canteen, remove their clothes in the first locker room, and pass into the second locker room for their miners' kit. From there they pass through the clocking room into the lamp room, where there is one-way traffic. Owing to the war, the tunnel connections to the pithead have not yet been made; miners will eventually use these, and not reappear upon the surface. The shaft is about six hundred yards deep.

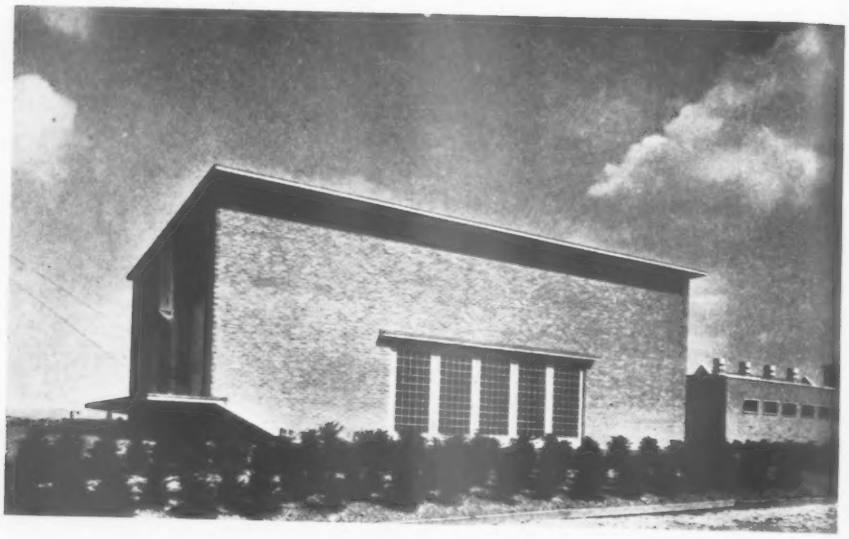
The Pithead Baths are illustrated and described on pages 483-485.

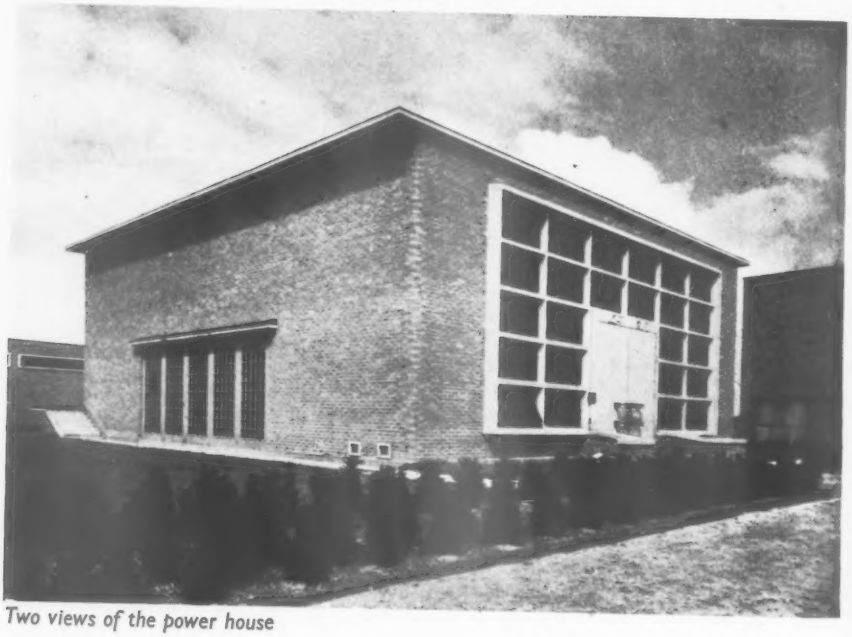
The power house



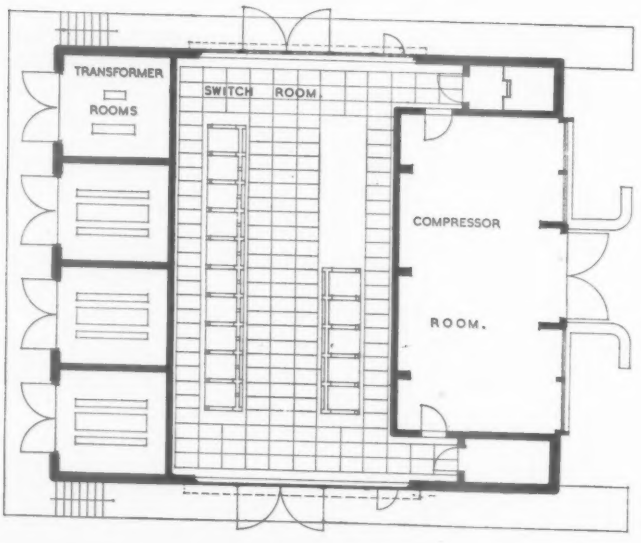
PLAN OF LAMP ROOM

ARCHITECT, G. A. JELLICOE (JELLICOE, PAGE AND WILSON)



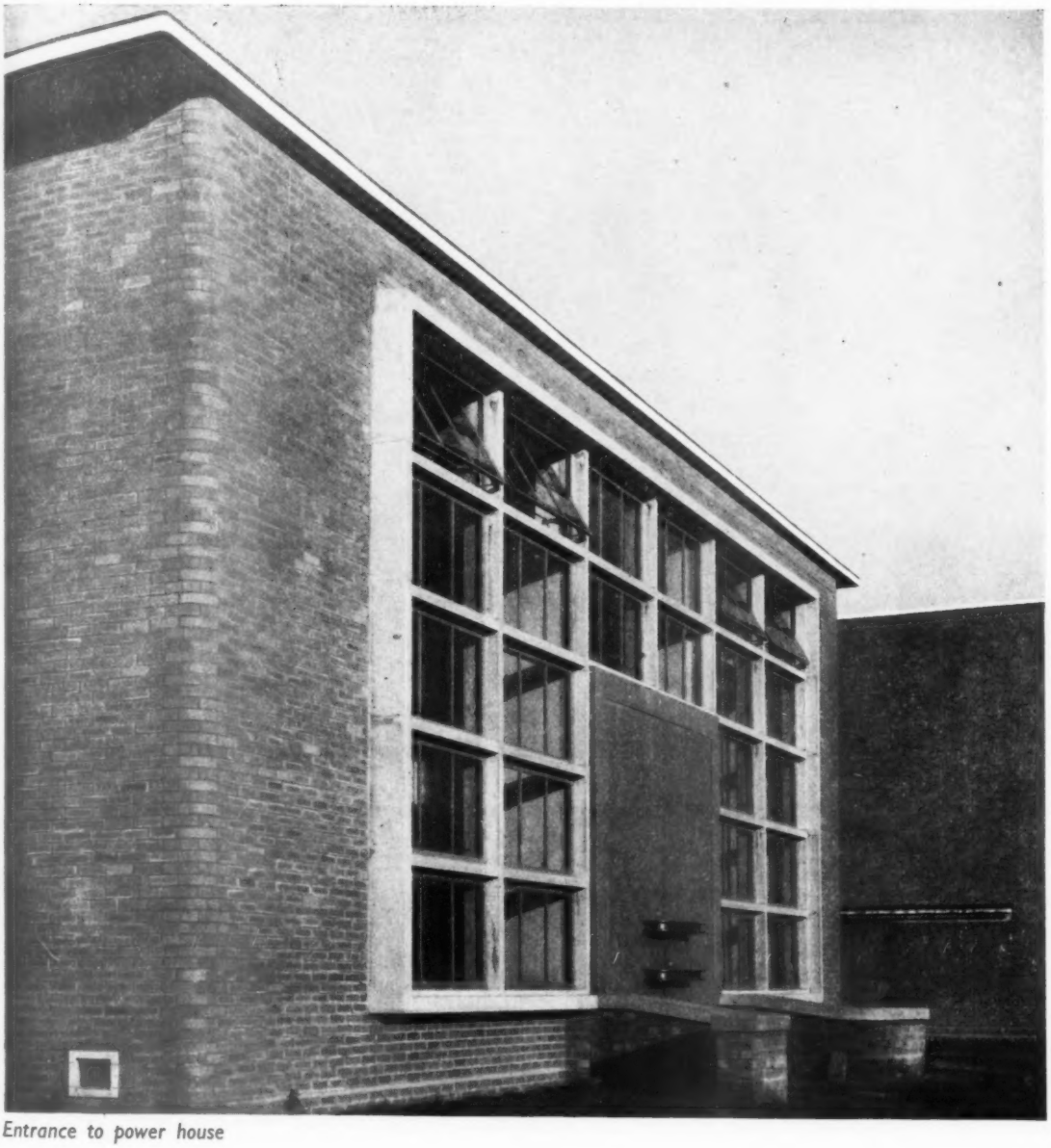


Two views of the power house

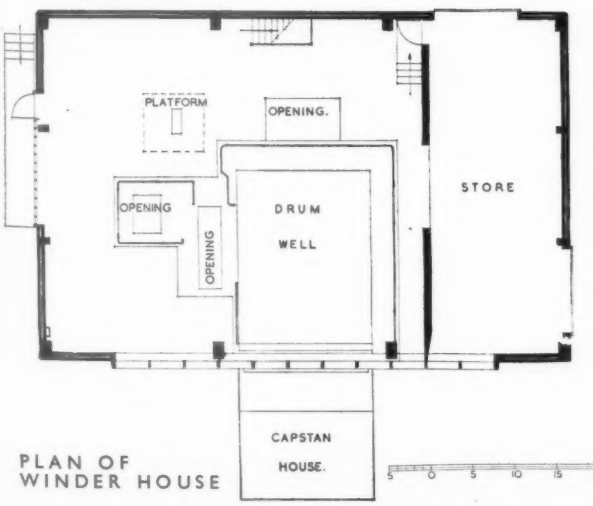


PLAN OF POWER HOUSE

COLLIERY BUILDINGS AND VILLAGE, CALVERTON,



Entrance to power house

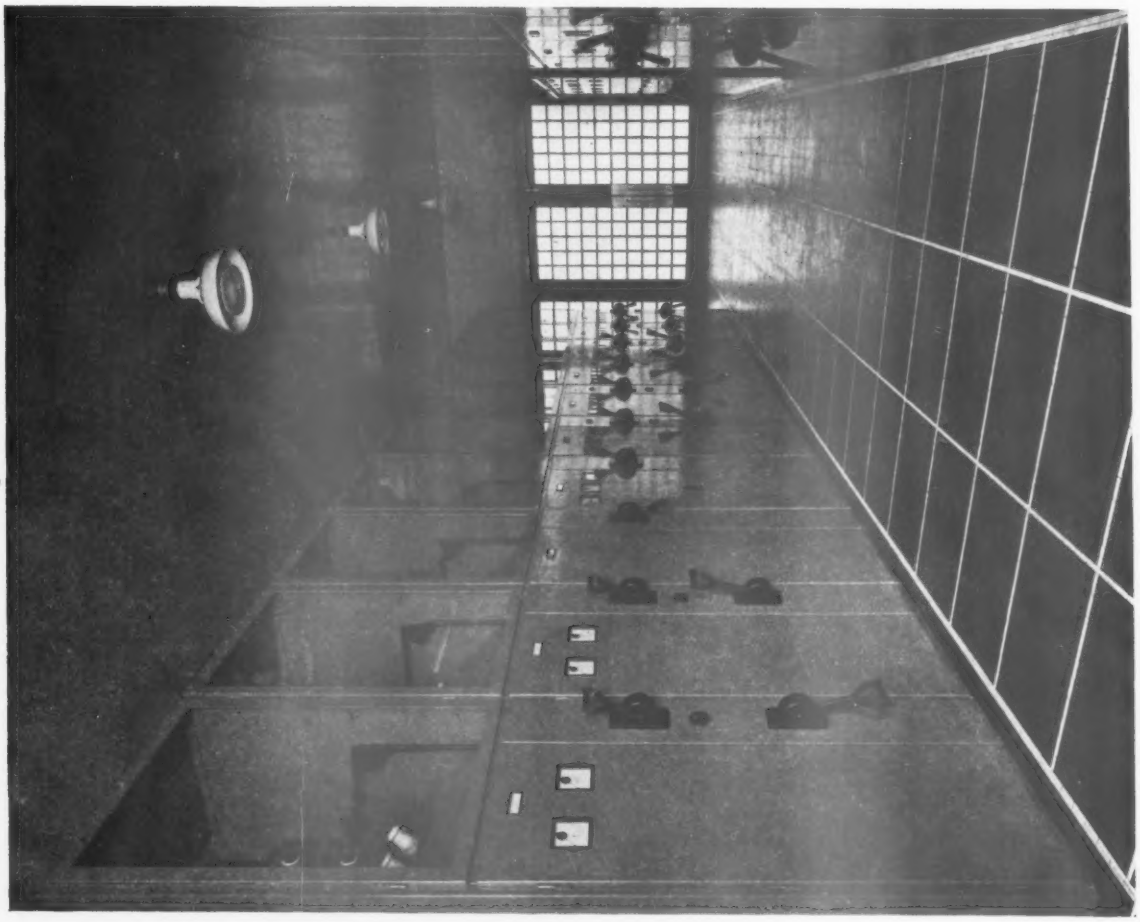


PLAN OF WINDER HOUSE

CONSTRUCTION AND FINISHES—Stores : steel frame, rustic fletton brick walls, pre-cast concrete slab roof, reinforced concrete foundations ; basement in reinforced concrete, metal windows, whole length operated by one gear at the end ; roof finish felt, sliding steel doors. Power house : reinforced concrete foundations and reinforced concrete frame, rustic fletton brick walls, inside walls plastered and painted, black tiles with white lines on floor of compressor and switch room, 6 in. by 3 in. metal-faced plywood skirtings, windows to switch room, teak ; windows to compressor room, metal, opening lights, friction pivot ; metal-faced plywood doors generally, front window precast concrete straight sections, jointed at corners. Winder house : steel frames, reinforced concrete foundations, large steel frame windows, using 9 in. by 9 in. channel as rib to windows, rustic fletton brick walls, and black tile floor. Lamp room : reinforced concrete roof, solid brick walls, with rustic flettons externally.

NOTTS • ARCHITECT, G. A. JELLICOE (JELLICOE, PAGE AND WILSON)

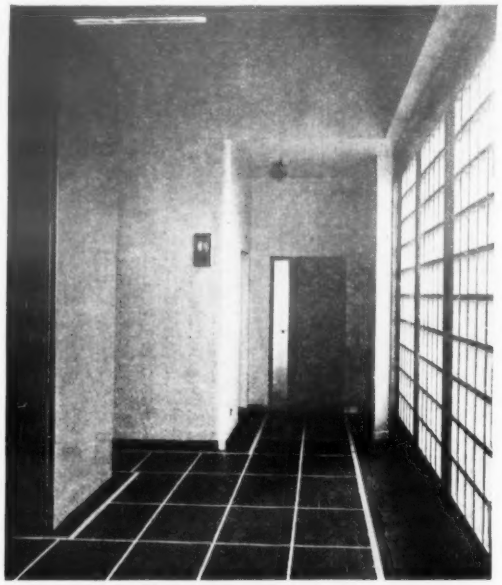
The winder house



Switch room in power house

Switch room in power house

The winder house



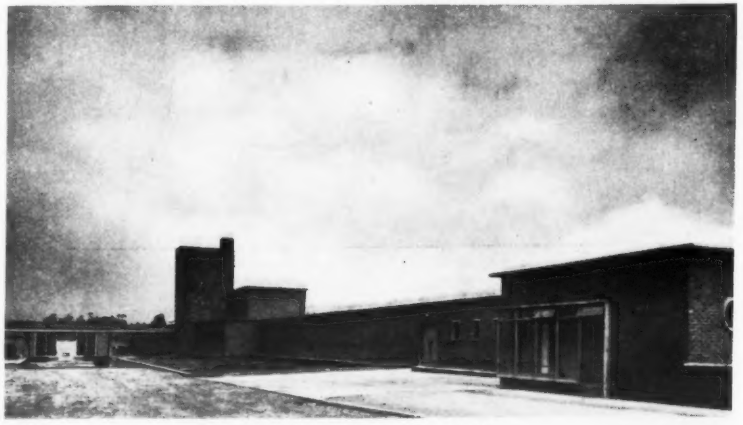
Entrance to power house

COLLIERY BUILDINGS AND VILLAGE, CALVERTON, NOTTS

ARCHITECT, G. A. JELLICOE (JELLICOE, PAGE AND WILSON)

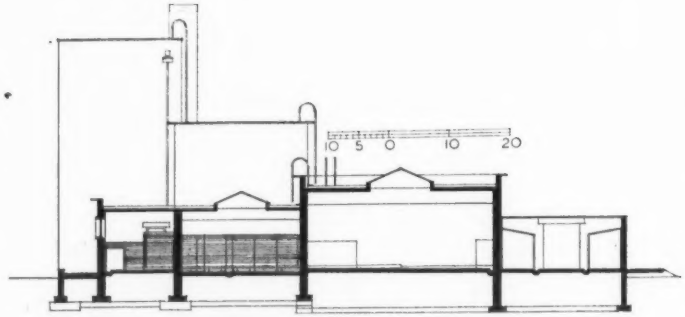
THE NEW PITHEAD BATHS AT CALVERTON COLLIERY, NOTTS

ARCHITECT, J. W. M. DUDDING
(ARCHITECTS' BRANCH, MINERS' WELFARE COMMISSION, UNDER THE DIRECTION OF J. H. FORSHAW AND C. G. KEMP)

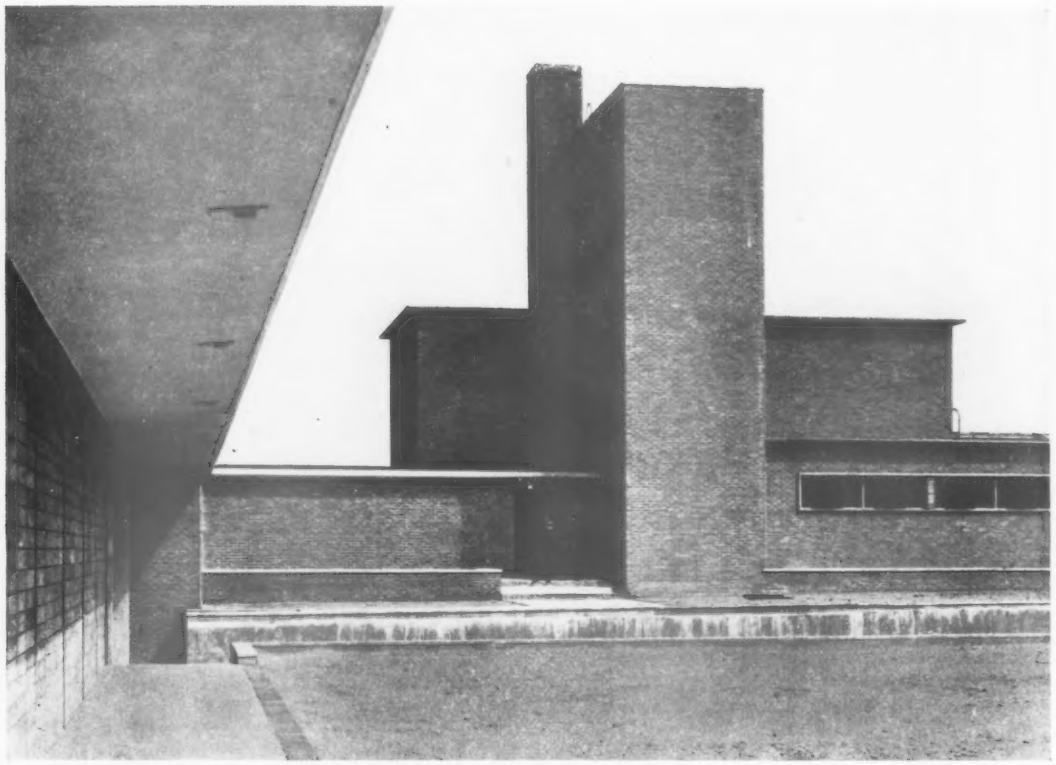


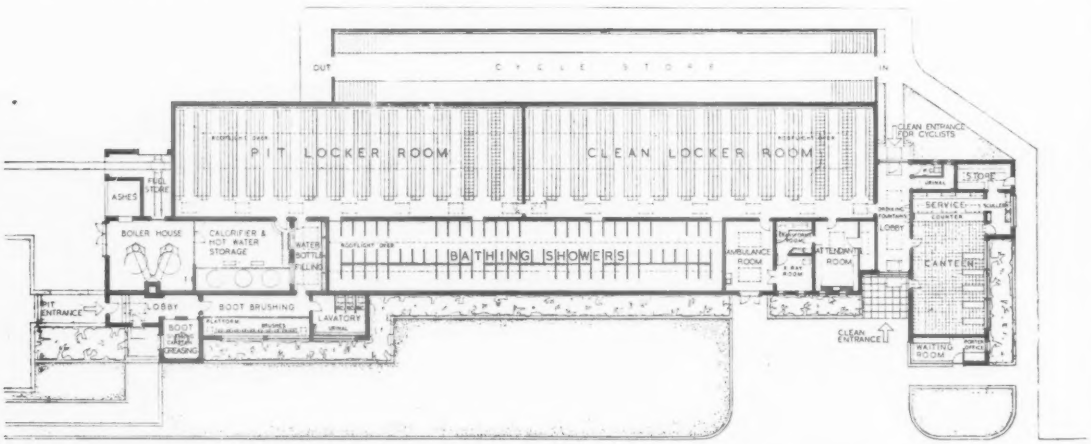
Two views from the south

GENERAL—The Architects' Branch of the Miners' Welfare Commission have at the invitation of the colliery owners collaborated with their architects in the planned development of the surface layouts, of which the pithead baths form an important part.

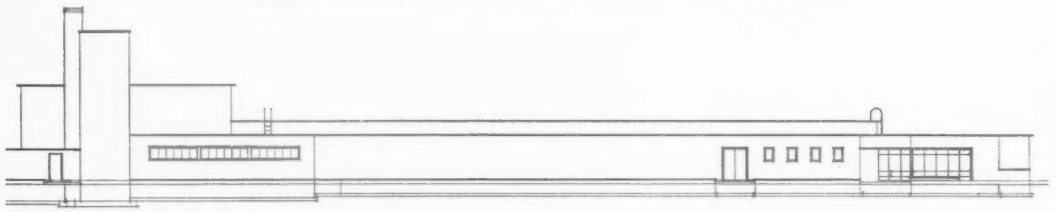


SECTION





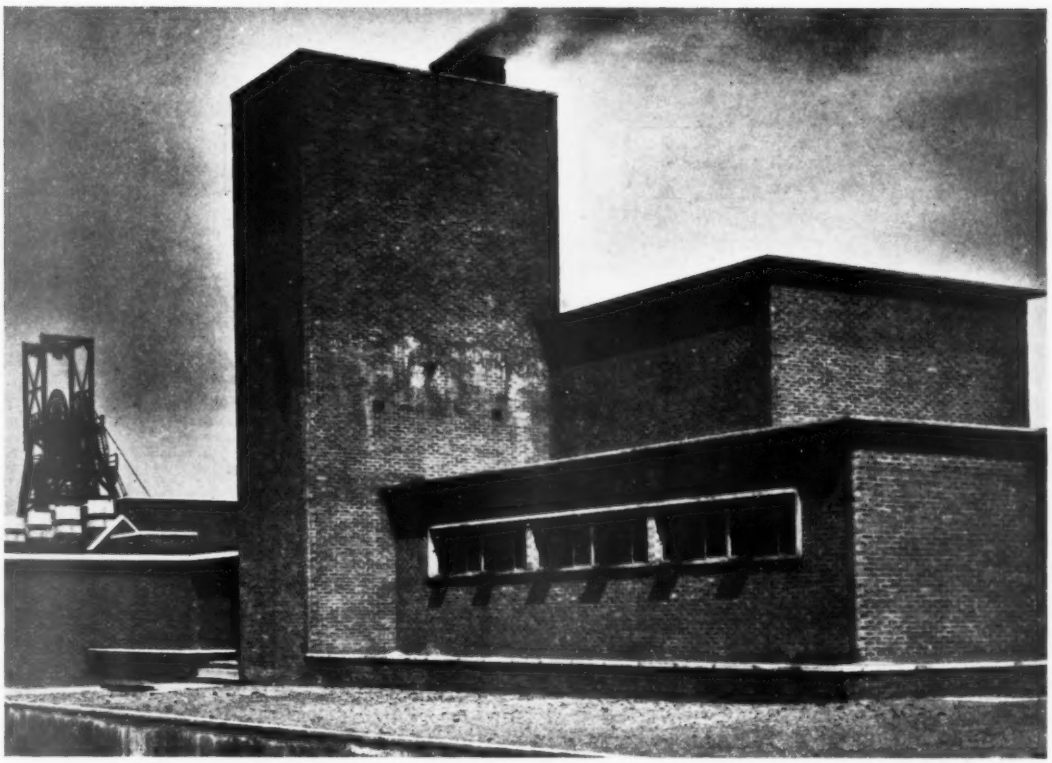
WEST ELEVATION AND GROUND FLOOR PLAN



PLAN—In addition to the normal accommodation, which includes 1,248 pairs of lockers and 87 showers, a canteen, a cycle park (paid for out of the District Welfare Fund), a Statutory First Aid Room, an X-ray Room and a Porter's Lodge and Waiting Room (paid for by the colliery owners), are incorporated in the scheme.

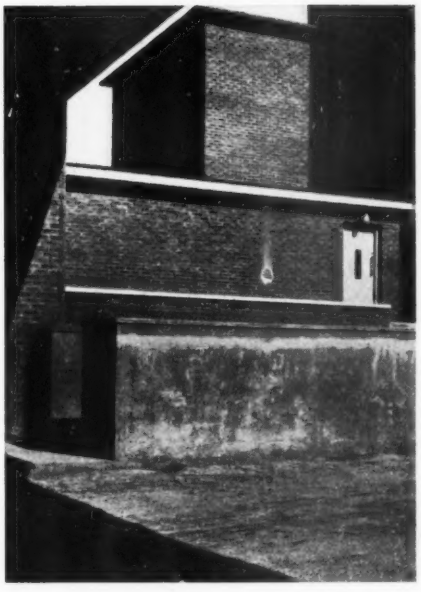
CONSTRUCTION AND FINISHES—Walls and partitions, brick. Floors: R.C. with hardened asphalte, grano or tiled finishes. Roofs: reinforced concrete with asphalte finish. Lamp rooms, boot greasing and attendants' room: cement glaze dadoes, walls and ceilings in oil-bound water paint. Bath house: tiled dadoes, walls and ceilings in anti-humidity

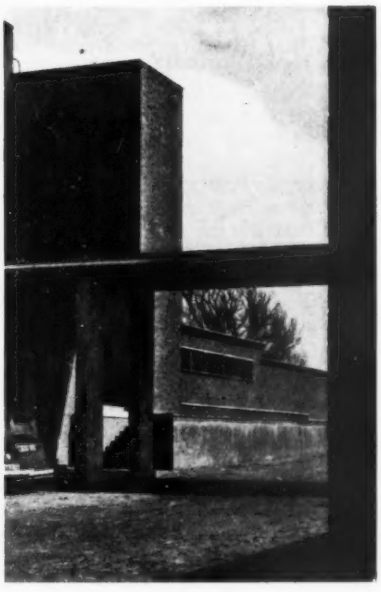
NEW PITHEAD BATHS AT CALVERTON,



Facing page : top, north end of the baths and boiler house from the car park. Above, another view of the boiler house. Below, two details of the covered way between clocking-in room and garage, and office block.

ARCHITECT : J. W. M. DUDDING (MINERS' WELFARE COMMISSION) UNDER THE DIRECTION OF J. H. FORSHAW AND C. G. KEMP





oil paint. Canteen and first aid room : coloured tiled dadoes, walls and ceilings in oil paint. Boot cleaning, water bottle filling, clean and pit lobbies, lavatories : tiled dadoes, walls and ceilings in oil-bound water paint. Floors : bath house, locker rooms, entrances and attendants' room in hardened asphalte ; canteen, ambulance, etc., in tiles ; boiler house, fuel store, calorifier room and plenum room in granolithic. Joinery : doors of armoured plywood on wood frames ; canteen and attendants' room fitments in deal, with teak draining boards and tops, all joinery painted in oil paint.

COST—Baths and canteen, £19,310 ; first aid room, £138; X-ray room, waiting room and porter's office, £362 ; cycle store, £950 ; total, £20,760.

General contractors were : Colliery Buildings, Simms, Sons and Cooke, Ltd. Housing : Bodill and Sons. Pithead Baths : A. Mason (Contractors) Ltd. For sub-contractors see page xxiv.

NOTTINGHAMSHIRE

THE NEXT YEARS

By

Howard Robertson

M. C., S. A. D. G.

[*VICE-PRESIDENT of the ROYAL INSTITUTE OF BRITISH ARCHITECTS*]

SYNOPSIS

THE present war is a fight for civilization. Civilization has been well defined as a state of well-being. A preliminary to well-being is order—now in danger throughout the world. Against increasing disorder certain groups within the community are bound to fight.

One of the national groups most closely bound up with good order is the building industry. When building achievement is at its highest so is the well-being of the community. But if building is to make its own contribution to order, the organizations which produce building must themselves be in order.

The first great problem affects the function of the architect, whose job has in the past years become more and more inclusive, and thus more and more nebulous. He is forced today to supply in building many of the functions which ought in fact to be carried out by other specialists—to the detriment of his own particular contribution.

That particular contribution is design. Our realization of this is obscured by differences over how that power to design should be used. New constructional possibilities, allied with influences from abroad, have led to a school of design in which simplicity of form may be succeeded by sterility. The reduction in range of materials and design forms may also reduce range and elasticity in power to design.

To preserve his power to design, the architect must be relieved of supervision, and this needs a closer collaboration between builder and architect. Bad workmanship should no more exist in building than in a new motor-car model. To achieve such collaboration and understanding the young architect and the young builder should receive some of their training in common. And it is equally important for architectural students to have contact with painters and sculptors, so that through architecture these arts will have a place, as a matter of course, in all buildings.

There is still too great a tendency to group architectural forms narrowly within various styles: whereas in fact a few basic influences have permeated all schools of design—the traditionalism of today is not that of yesterday.

A broader and truer standard of architectural criticism is what may be called THEME—the new direction from which a designer approaches his work.

There is a hierarchy in architectural design. After the originator of a theme come all conscientious architects who examine, use or reject.

Those middlemen are still working on contemporary architecture, both traditional and modern. And it may be that progress could be quickened not only by standardization of good equipment, but also by the preparation of a Black Book of faults in design, which would never be repeated.

It is certain that future design will be influenced by the results of air raids during the present war. These results will influence both the layout of cities and the form of the individual building. It may be that the cellar will reappear in houses as combined shelter, playroom, boiler-room and fuel store.

A probable development in flat blocks is the completion in new buildings only of "service" rooms—leaving living space to be subdivided according to the needs of individual tenants.

At present there are only two certainties about the future: that building must be the main vehicle of post-war recovery, and that stylistic tenets will no longer hamper any development in design which has good reason behind it.

9

THE education of the architect is something of capital importance. It cannot be disassociated from that of the education of members of other sections of the building industry.

Since architects, quantity surveyors, builders and engineers are working in the same field, though in different sections of it, it is important that the initial stages of their technical education should provide a common meeting ground. All students in these careers require a certain preparatory grounding along lines so nearly identical that it is feasible to consider merging this grounding into an educational scheme applicable to all sections. At a given stage specialization will arise. But the recollections of early studies pursued in common will ensure a mutual sympathy and understanding capable of forging a permanent link invaluable to collaboration in the later years of practice.

The architectural student has to acquire technique and a professional culture which assist him in developing his powers of design. He has also to be versed in the business and economic side of his profession. Whereas the quantity surveyor, the builder, the engineer, require an understanding of the architectural problem which they are to assist in solving, and a special technique of their own.

The detailed formulation of a curriculum which would satisfy the educational requirements for these four sections of the industry is beyond the scope of any brief survey; it is a task to which long and careful study should be devoted. But certain principles can perhaps be laid down as a basis for a more considered programme.

In the first place, it would be desirable

that the architect should share with the quantity surveyor, the engineer, and the builder, a preliminary training covering the technique of draughtsmanship in all its branches, and conventions for the expression of design in the form of drawings, thus establishing a common medium understood by all sections. There should be, for the guidance of all, courses in planning, construction, elementary engineering (structural, services, etc.), and courses explanatory of the value of design in the practical and economic spheres. There should be courses, rather fully developed, in office management, costing, valuations, and building finance. These courses would occupy, say, 18 months or 2 years, and would be common to all. After that period the training for each branch would become specialized, with certain more advanced lecture courses perhaps maintained in common.

The architect has, in the accepted school curriculum, been taught to study tradition, to gain a knowledge of historical elements, and proceed from that to the present. This method is almost certainly wrong, for the following reasons :

(1) The untrained student has imagination and feeling, which are too valuable to lose.

(2) Historical design at its best is too fine a thing to be appreciated by a beginner.

(3) The proper approach to architecture is through the instinctive desire of a man to build something in the best, simplest, and most logical manner, for the purposes of providing shelter. The refinements of design are something developed upon reflection, after practical knowledge has been gained. The development of this finer appreciation should follow, and not precede, the instinct to design and construct.

Therefore, the usually accepted procedure should be reversed. The architectural student should begin by acquiring the rudimentary technique of expression. He should then proceed, via a study of requirements, to design ; and he should be made acquainted in general terms with the current practice by which design is expressed both structurally and economically. In this way the natural and unfettered imagination which the student with proclivities brings to his studies remains unfettered ; it is in fact fed by the sort of logical development which the enthusiast enjoys and the learner appreciates as forward progress. The young understand current problems, and are eager to solve them. Logic and facts appeal to them. The more subtle things of the spirit cannot so soon be tasted and must be reserved for a later date. And so, to put the matter as a paradox, with wilful exaggeration, we have this situation : Instead of beginning with the Greek orders, and ending with glass bricks and reinforced concrete, we would reverse the process. Let us take, if you will, functionalism first, using the simplicity rendered possible by the use of reinforced concrete—if one likes—or any other current method of construction, in order better to leave the student free to plan, to study form, and to realize that form is structure which costs money. Let the student range for say three years through the current problems of the building art, acquiring a knowledge of the means to solve them through the application of growing powers of design which are developed from both aspects, the æsthetic and the practical. And let the student at this stage be made acquainted with the structure of the Building Industry, the inter-relation of its component parts, and the rôle of each. During, say, the fourth year, let this experience be broadened out to include town planning. And it is at this stage that the study of history and tradition might well enter upon the scene. Town planning is a modern science, based upon an old experience. Let this be realized, and also all the sociological implications of town planning. Realizing that building is something which takes place within the framework of a plan, the student will realize that there is nothing new under the sun, and that the town-planning problem of today is but the problem of yesterday brought up to date. Finally, having studied the modern technique, and the business of building, the architectural student is ready to appreciate the past. All architects come to realize that tradition is an inspiration which cannot be scorned, for the simple reason that it is the embodiment of experience. Tradition was once modernism. What has survived in it is successful experiment. And so, one comes to respect it ; and its lessons are a help and a guidance to all who have a trained appreciation. But this appreciation is not necessarily instructive; it is the result of the acquirement of—that awful word—culture. The instinct of the beginner is to scorn ; that of the experienced man to doff his hat in front of the achievements of those who have gone before.

So, the last item in the architectural curriculum might be the study of the Orders. And the student would leave his school with an experience, perforce abbreviated, of what life teaches, namely, the necessity for fresh thought, courage, imagination, to be shaped by that study and understanding without which the artist never gets beyond a certain point. Because, in neglecting it, he puts himself out of touch with a humanity which in every age combines love of the past with zest for the future.

Certain it is, to take a single item of architectural teaching, that lectures in history should proceed from the present back to the past. The child starts with the world as it is revealed to his seeing eye. The architectural student, who is an older child, does the same thing. The past is too subtle to serve up as an hors d'œuvre ; it is the finish of the meal, leaving the finer flavour and the zeal to proceed to works of creation for which a good digestion so well prepares.

One of the important elements of an architectural course, to be introduced at a very early stage, should be a study of the art of living as applied to the home, the office, conditions of work in industry, in the Services, etc. The field is enormously broad, and much of it would have to be covered in a very condensed form ; but, as in all matters of education, it is possible to indicate the theme and the approach to it, leaving the student to develop his own research in later life.

Students of architecture at the outset of their technical education have not had the opportunity to learn how people live, in the sense of understanding the working routine over which so much time is spent. Nor, lacking this knowledge, can they properly solve the problem of suggesting, through their powers of design, aid and comfort to the processes of living. It is not sufficient to impose an aesthetic environment, nor to plan ingenious contrivances for labour-saving which, while economizing a certain amount of activity and movement, may do so in a way which is ultimately stultifying. A very trite example of excess in this direction is the domestic kitchen so planned for economical working that it becomes uninhabitable as a room in which some person or persons are going to spend large portions of their existence. Perhaps, in broader terms, one might say that there is — strangely enough — an ultimate danger to well-being in an over-mechanization of facilities for living, because by the provision of too many "aids," a sense of true values can be destroyed, and the amount of human effort required to extract value out of the humbler activities of life is so lessened as finally to risk atrophy. The extremes met in living are between the complete townsman and the complete countryman, who end by being out of contact and sympathy, and whose conception of living is based on different values and ideas of what is worth while in life. Saving of useless labour, something for which we all strive, is of value when the saving has an object. Carried to excess, it can put the beneficiary out of touch with real values, and can eliminate the pleasure and pride acquired through the ability of people to do things well for themselves. This question, like so many in the field of building, touches sociology, philosophy, and finally politics, but the school days are too early for the acquisition of theories embodying an overhauling of the universe, since the necessary human experience is at that stage lacking.

There can be, and should be, however,

an early contact with the humbler realities for the understanding of which the student already has a background. This should be fostered and developed by wise instruction ; and if the practical facilities of architectural schools allowed it, a certain amount of practical building, craftsmanship, and domestic housework would be invaluable accompaniments to theoretical training. This sort of study would provide something which at present is not covered either in home life or in the average school. It is healthy for an architect to know what it means to receive goods at the door, put them away in cupboards and refrigerators, stoke the boilers, rod the sink wastes, renew the washers, clean the windows, and black the boots. Such things come the way of all people who live modest lives, as so many of us do and will continue to do. What better introduction for planning for living can be offered than first-hand knowledge of the physical and mental processes involved? Before telling others how to do it, we should first feel the impact of humble things which provide the basis for sanity in the handling of larger issues.

Perhaps the acquisition of country properties by evacuated schools of architecture can remain a permanency, and in the summer-time courses be arranged where ancillary aspects of the architect's training can be developed. The knowledge gained on the domestic side would certainly open up awareness to the problem of routine in other fields, so that the needs of the manual worker, the telephonist, the clerk, the director, could be catered for with an understanding of the fact that the art of living should not be set aside merely because a man is at his daily toil.

One thing is certain, namely, that existing systems of training for the Building Art will have to be recast. The necessity for closer contact between its elements is alone sufficient to bring about a change. The position of the professional elements, architects, engineers, surveyors, *vis-à-vis* each other, in relation to the Building Industry must be studied as a preliminary ; and our controlling boards and committees for education will have to be composed of elements most representative of the conditions which unification will bring about. The task is very big, but also very thrilling and constructive. It starts, too, from a promising situation. The foundations of the Building Industry are sound, and do not need to be recast.

[*To be continued*]

EXHIBITION

Annual exhibition of work of students of the Leeds School of Architecture is being held in the Leeds Art Gallery. Exhibition was opened by Lord Harlech on May 7 and will close on May 21.

LETTERS

The "New Statesman" and Mr. Byron

SIR,—Like all leftists, when somebody disagrees with you, you unearth a plot. It does not occur to you that any one can sit down alone and think about architecture. Oh no! To do that, one has to drive to the Royal Academy in a false beard and ask the Old Guard how to stop the rot. Together, behind locked doors, we concert an assault on the citadel of light ; we furbish up our matchlocks against your bastions of steel and concrete—and then the *New Statesman* turns Quisling on you, and the matchlocks carry the gate. It is too bad.

This is your explanation. Now let me give mine—if you can credit me with enough honesty to print it. What I am interested in (when I am not closeted with the White saboteurs), is whether modern architecture produces works of art. You are not interested in this, however much you may say you are. What you are interested in is whether modern architects *want* to produce works of art. The two are not the same. When you and I look at buildings of past ages, we do not ask what the architect wanted to do. We ask what he did. We do not make allowances for circumstances and motives. We praise, dismiss or condemn by the light of an æsthetic standard. This is the attitude I try to bring, as far as I am able, to the appreciation of modern architecture.

You may despise this attitude. You may argue that it impedes the activities of a movement which, as I fully agree, has performed a most valuable work of clearance and invention and which has still a major contribution to make. I cannot help that. In my view, the importance to architecture of maintaining a purely æsthetic standard of criticism, especially at this moment, transcends all other considerations. What do you and your fellow apostles do, what have you ever done, to maintain such a standard? In the whole of Mr. Richards's book there was not so much as a hint of it. What issue of THE ARCHITECTS' JOURNAL or the *Architectural Review* can you show me which contains any estimate of a modern building in terms of pure art? You keep on shouting that the modern architect is really an artist. You do not pay his buildings the compliment of assessing them as art. I do. Yet, because I do not find every one of them an impeccable masterpiece, because I recognize that contemporary urban conditions make it difficult and often impossible to practice building as an art at all, you rend me for a traitor.

I return the charge. It is you who have betrayed modern architecture, when you insist that it should be judged ethically instead of artistically. You reproach the *New Statesman* on the grounds that a progressive journal ought not to allow itself any criticism of progressive architecture. What has progressiveness to do with the goodness or badness of a building? I am by temperament a defender of the modern movement in architecture. I recognise its achievements and I believe its exponents should receive every possible encouragement. But I do not call it encouragement to conceal from them the standard by which their buildings must eventually stand or fall in the esteem of rational persons, and I do not call it recognition of achievement to cast a halo of false righteousness over their smallest experiments. It is not modern architecture, but its apostles' pretention of pious infallibility, that I wish to attack. The visual artist needs no moral crutches ; nor in this case will he ever spread his wings until these are cut away.

ROBERT BYRON

London, S.W.3.

[*Mr. Robert Byron's badinage seems to us to cloak a confession of error. Our quarrel with him was that he persisted in maintaining, despite correction, that modern architects believed that functional building must—just because of its functionalism—inevitably be fine architecture.*

He now yields the point that modern architects do not believe this—which he has never before admitted and which we hope he will make clear in the columns of the New Statesman. *But he adds in effect : but even if the production of fine architecture* is *the chief aim of these men, they never succeed in creating it.*

This is a very different contention, on which the views of Mr. Byron and of all other critics are of interest.

We have never reproached the New Statesman *for criticizing modern architecture either in a visual or any other way : the more the better. What we have got tired of is the constant misrepresentation of the aims of modern architecture on what have been for long hackneyed lines in the one paper which ought to know better.*—ED., A.J.]

The Competitive Tender

SIR,—Mr. Robertson's views on the collaboration of the architect and builder and the possible abolition of competitive tendering have reflections in many extremely successful contracts which I have carried out with carefully selected builders, but the universal abolition of competitive tendering carries with it a serious disadvantage to the community as a whole.

To grasp the full effect of the competitive tender and fully to understand the reasons which have caused tendering to persist in the building industry, it is necessary to summarize certain basic

STANDARD CAPS AND BASES OF COLUMNS :

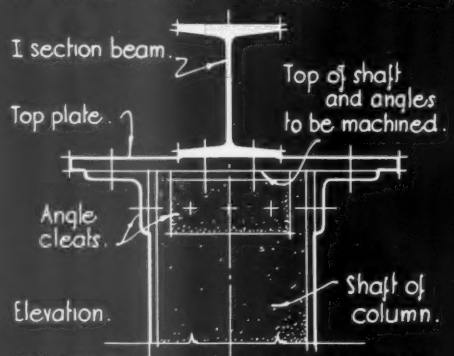


FIGURE 1 : SINGLE BEAM CONNECTED AT HEAD BY DIRECT COMPRESSION.

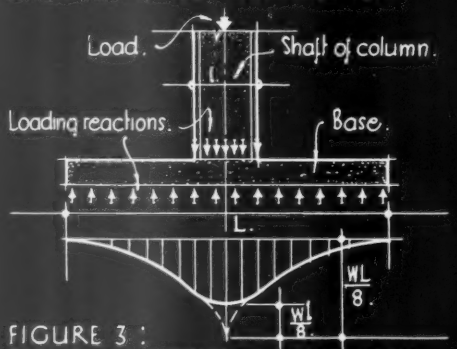
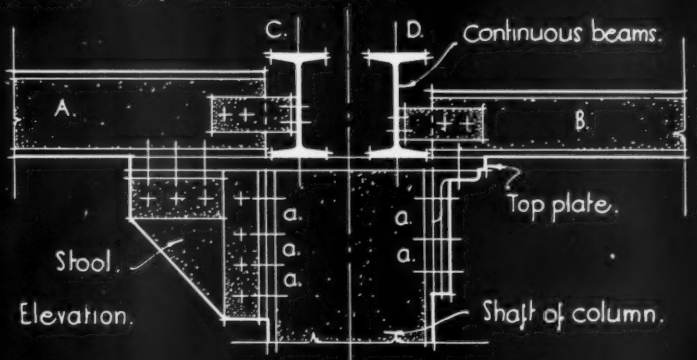
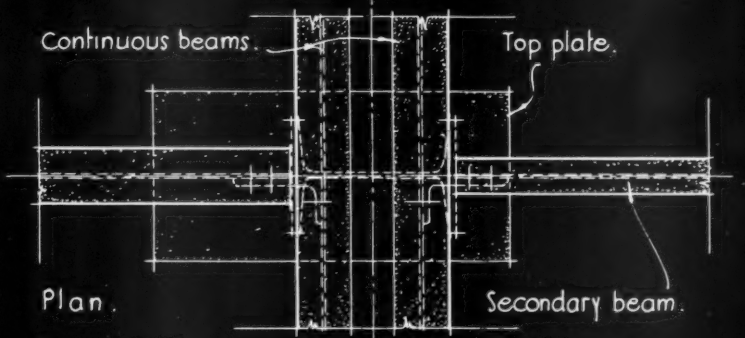


FIGURE 3 : BASE LOAD DISTRIBUTION DIAGRAMS.





Beams A & B are carried by shear in rivets 'a' ;
Beams C & D are carried by direct compression.

FIGURE 2 : HEAD CONNECTIONS FOR SEVERAL BEAMS BY DIRECT COMPRESSION & SHEAR.

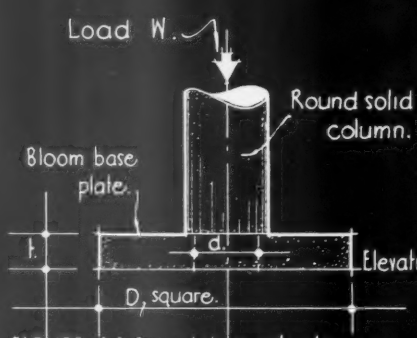


FIGURE 4 : for solid round columns.

DETERMINATION OF THICKNESS OF BLOOM BASES.

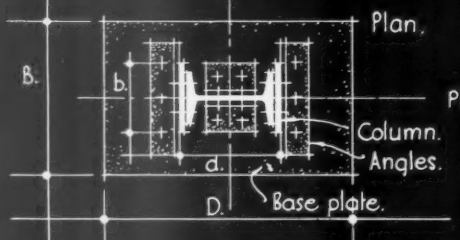
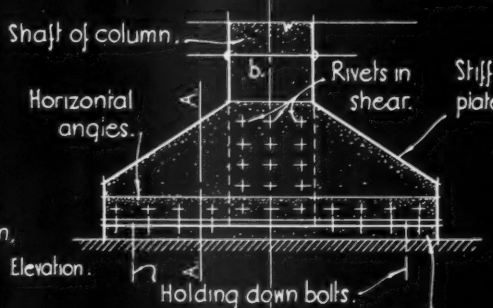
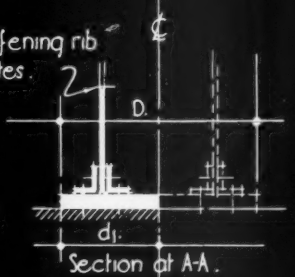


FIGURE 5 : for any other column.





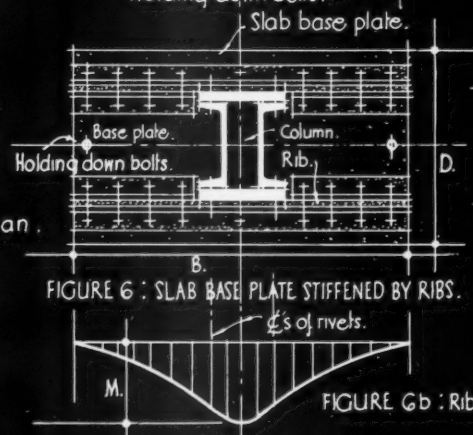


FIGURE 6 : SLAB BASE PLATE STIFFENED BY RIBS.

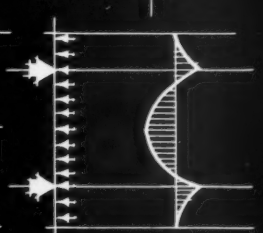


FIGURE 6a : Slab bending moment diagram.

FIGURE 6b : Rib bending moment diagram.

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INFORMATION SHEET

• 789 •

STRUCTURAL STEELWORK

Subject : Standard Connections, Splices and Bases : 5, Caps and Bases of Columns

General :

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

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

This Sheet is the twenty-third of the series, and deals with standard heads and bases of columns. Splices in columns will be dealt with in Sheet No. 24.

Caps :

A column has to have a cap if beams rest on top of it, but no cap is required where beams are connected to the column in the manner shown in Figure 4 on Sheet 21 of this series. Where caps are provided, it is advisable to use method 1, mentioned on Sheet 19, i.e. direct compression. Such a cap is shown in Figure 1 on this Sheet, where the angles serve merely to fasten the top plate, and the shaft end is machined after the angles have been riveted to the column.

Where several joists rest on a column, such arrangements may not be possible owing to lack of space and, in this case, the second method mentioned on Sheet 19 is applied, and the forces are transmitted by shear from the angles to the shaft of the column (Figure 2).

Bases :

A column might be standing on a grillage or on a concrete base. (For details of grillages, see Information Sheet No. 26 of this series.) Where a column stands on a concrete base, its base plate must be large enough to reduce the pressure on the footing to an extent that it can be borne by the concrete. The base plate, in distributing the load, acts as an inverted cantilever beam (see Figure 3).

There are two kinds of base plates :—

(1) Thick bloom plates, which are strong enough to take the bending moments.

(2) Thin plates which would be stiffened by ribs, and which must distribute the load to these ribs only.

Bloom Bases :

This method requires less labour but sometimes more material, particularly where large bases are concerned. It is always used for round, solid columns (Figure 4), and in this case the thickness is to be not less than

$$*t = \sqrt{\frac{WD}{12\,(D-d)}}$$

where w = the load
D = the width of the plate
d = the reduced diameter of the column on to which the base is shrunk
and t = the thickness of the base.

* This formula is identical in its numerical result with that given by the L.C.C. Regulations, which is more complicated in application as it does not refer to square plates only. In fact, the formula given by the L.C.C. is :

$$\sqrt{\frac{3W}{4f} \cdot \frac{D}{(B-d)}}$$

where B and D are the lengths of the shorter and longer sides of the base and

f = 9 tons/sq. in., the permitted stress in the steel.

For all other columns the thickness t of the plate should not be less than t_1 or t_2, whichever is the greater,
where

$$**t_1 = \sqrt{\frac{W\,(B-b)}{12D}}$$

and

$$t_2 = \sqrt{\frac{W\,(D-d)}{12B}}$$

where d and b are the overall dimensions of the column, D and B are the breadth and width of the base slab, t the required thickness and W the load (see Figure 5). As the shaft is to be machined after all angles are riveted to it, all loads are transmitted to the base plate by direct compression and the rivets fixing the angles serve merely for constructional purposes.

** These formulae give the same results as the formulae given by the L.C.C. Regulations, which are :

$$\sqrt{\frac{3W}{4f}\,\frac{(B-b)}{D}} \text{ or } \sqrt{\frac{3W}{4f}\,\frac{(D-d)}{B}}$$

whichever is the greater,

with the proviso that f = 9 tons/sq. in.

Plate Bases :

Figure 6 shows an example of a column of especially reduced overall dimensions, which would require too thick a bloom plate and is, therefore, provided with the other type of base, viz. a slab stiffened by ribs. The slab must be strong enough to take the bending moment caused by the bearing pressure, as indicated in Figure 6a, and the ribs together with the base plate (after the rivet holes have been deducted) must have a section modulus sufficient to take the bending moment

$$M = \frac{W\,(B-b)\,d_1}{8D} \text{ (Figure 6b).}$$

The permitted stress is 8 tons/sq. in., while 9 tons/sq. in. are permitted in bloom bases.

The rivets which connect the shaft to the stiffening web plates have to be strong enough to transfer the whole of the column load, but the rivets connecting these ribs to the horizontal angles, and the horizontal angles to the base plates, are of a constructional nature only. After all stiffening plates, including horizontal angles, are riveted to the shaft, the whole of the bottom face is to be machined before being riveted to the base plate.

Previous Sheets :

Previous Sheets of this series 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 and 785.

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details and their place in the community.

1. The production of articles subject to foreign competition provides severe competitive element in the factories dealing with these products and unavoidably helps to maintain a high standard of efficiency and low cost to the public.

2. The production of articles for internal consumption which are readily comparable—for example, cigarettes, motor cars, shaving soap—create similar competition and similarly maintain a high standard of efficiency.

3. The building industry, if left without any competitive element, would probably deteriorate very rapidly so far as efficiency and organization are concerned and the cost of building would rise abnormally against the public.

This view has, unfortunately, been emphasized upon every occasion upon which the element of competition has been eliminated on large scale works, and the recent attempts of the War Office to disregard competition and fixed price have resulted in disastrous costs of army camps.

4. A small number of firms in building have established intensively efficient organizations, taking very keen personal interest in the work they execute and maintaining a high standard of efficiency—

(*a*) Because of the interest they take in building as such.

(*b*) Because their efficiency enables them to secure an extensive volume of work without competition.

(*c*) They probably receive a higher rate of remuneration than the average builder, which is fully justified by the advantages which the client otherwise received.

These firms have risen to the front rank only after defeating or eliminating competition of less able organizers or less enthusiastic in principle.

5. The competitive system has enabled the young efficient firm to secure work and prove its capacity to carry out such work at a profit in spite of low cost, and eventually such capable firms reach the position in which they have established substantial business apart from their competitive work.

6. The buildings of the community demand a variety of standards of construction, and, broadly speaking, the standard of construction established by the reputation of a particular firm is reasonably constant; thus some firms are more suitably equipped for carrying out contracts where low cost is vital and others where high finish is essential.

This variety of standards makes open competition totally unfair and puts a premium upon a low standard of work.

Competition in building, to be fair, must always be selective, and only firms with a similar standard of work should be asked to compete.

Accurate knowledge should preclude any possibility of the builder "buying a pig in a poke," as Mr. Robertson suggests, because the architect, by knowing and fully specifying the work, supervising the work and selecting a similar standard of firm, will indicate his requirements with sufficient accuracy to eliminate unfair risk.

7. The reason for the existence of "organizations set up properly to maintain a reasonable margin of profit" are, in my view, due almost entirely to the poor organization of architects' offices and the lack of proper control of buildings.

8. To summarize:

(*a*) The builders' organization can collaborate with architect and owner with complete success, and in these instances the results are superior to those often obtained as a result of competitive tendering.

(*b*) Firms of the standard dealt with in the above paragraph all confine their work to a volume which is within the capacity of their principals, and therefore the amount which can be carried out by these methods is limited.

(*c*) No one has yet devised a system which by eliminating all competition will leave unimpaired the standard of efficiency of human beings.

In normal trading this is provided by firms inside or outside the country manufacturing similar commodities. In building competitive tendering is the only method so far discovered which maintains a reasonable standard of cost and efficiency amongst average building firms and appears to place collusion beyond dispute.

Notwithstanding this fact, exceptions exist amongst the most capable building contractors in the country, and in these cases the result of collaboration is often outstandingly successful.

T. P. BENNETT

Highgate, N.6.

Politics and Architecture

SIR,—May I be permitted to congratulate Mr. Birkin Haward upon his contribution under the above heading.

The President has said: "Behind Mr. Chamberlain's leadership we architects are willing and anxious to play our part in this gigantic struggle."

Mr. Haward questions implicitly the unconditioned inclusiveness of the President's expression "we architects." Is it not just possible that there might be somebody whose opinion did not coincide *exactly* with that of the President? Me, for instance.

A rhymed alphabet of my own recent composition (I do these things just for fun) under the letter "N" affords the following couplet:

> N stands for my Nose—a prehensile projection:
> You may pull it, dear Neville, in *any* direction.

It is evident, therefore, that while I am in accord with the President's principal contention, I still have room left for Mr. Haward. *One* nose only is involved.

MALCOLM MACTAGGART

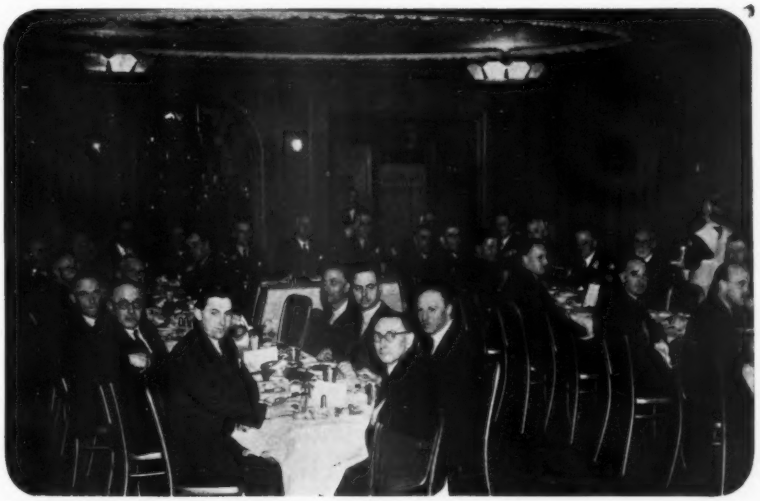
Welwyn.

HOUSING IN MANCHESTER

Manchester City Council has decided to ask permission of the Ministry of Health and of the Treasury to spend £157,912 on the completion of three housing schemes by building 125 flats for rehousing at Miles Platting, 65 similar flats at West Gorton, and 100 cottages on the Parkwood Housing Scheme at Wythenshawe.

APPOINTMENT

Mr. G. L. Greaves, A.R.I.B.A., of Messrs. Edward Forshaw and Greaves, chartered architects, Hanley, has been appointed by the R.I.B.A. as one of its ten representatives on the Building Industries National Council.



Photograph taken at the annual luncheon of the Notts, Derby and Lincoln Architectural Society.

SOME QUESTIONS ANSWERED THIS WEEK:

★ *CAN you tell us the increase in cost of a building due to the rise in cost of building materials?* - - - - - - Q295

★ *WHAT is the limit of height to which sandbagging should be built? Was there ever an official recommendation about the use of cement slurry as a preservative coating for sandbagging?* - - - - - Q297

★ *ARE there any contractors specializing in aerodrome landing grounds?* - - - Q298

★ *IN a hotel lounge the windows at both ends are screened with curtains. What method would you suggest for ventilation of these blackouts?* - - - - - - Q302

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.

The service is confidential; and in no case is the identity of an enquirer disclosed to a third party. Samples and descriptive literature sent to the Information Centre by manufacturers for the use of a particular enquirer are forwarded whenever the Director of the Centre considers them likely to be of use.

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

Q294 ARCHITECTS, SOUTHAMPTON.—*We are in the process of settling the final accounts in a building contract, the completion of which was long overdue. Our clients insist upon the so-called "PENALTY" CLAUSE BEING ENFORCED. The R.I.B.A. Form of Contract was used and the total "penalty," after making all reasonable allowances for delay, amounts to over 10 per cent. of the contract sum. We, therefore, anticipate dispute and recourse to arbitration as provided in the contract. The point upon which we are not clear, after closely scrutinizing the appropriate clauses, is whether in issuing our final certificate we should deduct the "penalty" amount, or issue it for the full amount of the value of the work executed and notify our clients at the time of issue that in making payment they may deduct the amount of the "penalty" as assessed by us—thus leaving it to their discretion whether or no they exercise their right to do so under the provisions of the contract.*

As the contract entered into between the parties will embrace the general conditions, and these include provisions for "penalties" for delay in completion of the works, the final certificate will be for the net sum

due to the contractor under the terms of the contract. In other words, penalties for delay must be debited against credits for work done, and the final certificate made out for the net sum due to the contractor. But in such a case it would be advisable to attach to the final certificate a full detail as to how the amount is arrived at, and also to draw attention to these details on the final certificate. If, of course, the award in a future arbitration varied the amount of penalty, an amended final certificate would be necessary.

The form of the question suggests that the architects do not agree with the enforcement of the penalty clause, while admitting that unjustifiable delay has occurred. In this matter, however, the architect's position is both that of agent of the client and arbitrator between client and contractor: and it is his duty to advise his clients what penalty has been incurred after all reasonable allowances have been made for exceptional difficulties encountered by the builder. He may also advise the client on whether it is "good policy" to enforce the penalties—in view of cost of litigation, the financial standing of builder and so on. But if the client decides to enforce his full rights, the architect must support him.

Q295 BUILDERS, LONDON.—*Can you give us the INCREASE IN COST OF A BUILDING due to the rise in cost of building materials?*

While it is possible to give the increases in cost of various building materials, it is not possible to give, with any degree of exactitude, a percentage increase in cost which will apply to all buildings. The only way to obtain any accuracy in this work would be to proportion the original cost of the building over the various trades and further subdivide the value of each trade into labour and materials. For any particular class of material the increase in cost is known (*see* Prices Note published in THE ARCHITECTS' JOURNAL for May 2 last). These additional costs can then be totalled and expressed as a percentage of total original cost. It can be expected that this percentage increase in cost will vary appreciably between different classes of buildings.

Q296 ARCHITECTS' DEPT., LOCAL COUNCIL.—*In a number of surface shelters erected of brickwork with flat concrete roofs laid to a slight fall, considerable DAMPNESS shows ON the UNDERSIDE OF the CONCRETE ROOFS. No cracks in the concrete are apparent, nor does it seem that the dampness is due to condensation, it being most persistent after rain. My chief alleges that these roofs, which are of 8 in. thickness, should be watertight, but the contractor disclaims liability. Should this thickness of concrete be watertight?*

Failing the presence of cracks, concrete of 8 in. thickness and laid to a fall, could be watertight, particularly if sufficient attention was paid to the choice and grading of the aggregate, the proportion of mixing water used, and the placing of the concrete. But it would be difficult to prove that ordinary concrete of the usual proportions and aggregates, placed without too much attention, would form a watertight roof. Normal construction of this type would be provided with an asphalt or similar weatherproof finish taken over the edge and provided with drips. It might well be that with the shelters where trouble is being experienced, the surface fall of the concrete is not continuous, and this could be proved or disproved after heavy rain or by flooding with water from a hose. Failing some such condition to explain the penetration, remedial measures might be attempted by screeding over the concrete outer surfaces with some form of waterproofed cement screeding laid by a specialist firm, since it is assumed that forms of bitumen cannot be used for this purpose because of difficulties of decontamination after gas. There is, of course, the Antigasphalt* form of gas-resisting asphalt which could be used for the remedial work.

Q297 ARCHITECT, BRENTFORD.—*I have been asked to appear as expert witness in a court case where a builder, on a client's direct instructions, erected SAND-BAGGING around a summer house so as to form an A.R.P. shelter. Certain DIFFICULTIES and deficiencies have now arisen and some particulars on the following points would be of enormous help to me. (1) What is the limit of height to which sand-bagging should be built? (2) Was there ever an official recommendation as to the use of cement slurry as a preservative coating for sand-bagging?*

In the publication of the Home Office Air Raid Precautions Department, entitled *Notes on the Construction, Maintenance and Replacement of Sand-bag Revetments*, obtainable from H.M. Stationery Office, price 2d., it is stated that sandbag revetments should never exceed ten feet in height. In Circular No. 175, issued by the Air Raid Precautions Department on August 21, 1939, there was included a recommendation of liquid cement as a means of protecting and prolonging the life of sandbagging already in position. A further note, issued by the same Department on November 6, 1939, withdrew this recommendation and advocated the use of creosote and other forms of sandbag preservatives.

Q298 ARCHITECT, READING.—*Can you give me the names of contractors specializing in AERODROME LANDING GROUNDS?*

The firms mentioned below* are all experienced in this work.

Q299 ARCHITECT, LONDON.—*I am interested in the various possible substitutes for timber in the laying of floors; among others, I have come across an idea which specifies "SAWDUST AND CEMENT." Is this the same as the patent jointless flooring marketed under various trade names as "Marbolith," "Athena," etc., or is it something both new and really suitable for FLOORS? If the cement and sawdust method is really new and suitable, is there anywhere that I can find the correct specification for the manufacture of this type of floors?*

Sawdust and cement is a wide term from which to identify a form of floor or flooring. The ordinary jointless or composition flooring could fall within such a description, the magnesium oxychloride used being the cement, and in the cheaper grades and undercoats of this type of floor sawdust is used as a filler. There are also proprietary forms of precast flooring tiles such as Granwood, by the Granwood Flooring Co., Ltd., 21 Bedford Row, London, W.C.1, which might well contain small proportions of sawdust and cement. But it may be that the sawdust and cement mix is a reference to a product which was available about 1928, of which one form was marketed under the name of "Novocrete." But the present whereabouts of the firm responsible for this have not been traced. Such mixes consisted of so-called "mineralized" sawdust and Portland cement, and the only form in which they seem to be commercially available at the moment is

* *Antigasphclt.—Limmer and Trinidad Lake Asphalt Co., Ltd., Berry Hill House, Taplow, Bucks.*

* *Landing Grounds Corporation, Ltd., 376 Jersey Road, Osterley, Middlesex. Messrs. En-Tout-Cas, Ltd., Syston, Leicester. Messrs. Maxwell M. Hart, Ltd., 39 Victoria Street, S.W.1. Messrs. Clark & Co., 13 Victoria Street, London, S.W.1. Messrs. Bradshaw Bros., Ltd., Aerodrome Contractors, Leicester.*

The Information Centre must make clear that, while it gives general opinions on problems involving legal matters, such advice must in no case be taken as a legal opinion on the facts of a particular case. It must also be made clear that the Centre, in helping to solve inquirers' problems, can accept no responsibility for any action taken as a result of its advice.

as fixing bricks and strips from the firm mentioned below*. No doubt with the shortage of timber and timber products there will be attempts to reintroduce sawdust cement mixes in both plain and reinforced forms. Most known previous mixes have been in the form of patented compositions, but it might be that general particulars of such a mix would be available from the Building Research Station, Bucknalls Lane, Garston, nr. Watford, Herts.

Q300 ARCHITECTS, LONDON.—*Due to steel supply restriction we have to consider the use of CONCRETE for the construction of underground PETROL storage TANKS. Is there any information available on suitable surface finishes for the inside of these tanks?*

This question is being given special attention at the moment. Various finishes have been suggested such as sheet metal linings and metallization, i.e. the spraying of molten metal on to the face of the concrete. The method most favoured is that of lining an outer concrete tank with hollow concrete sections—the hollows being permanently filled with water to prevent absorption of the petrol by the concrete. Provision, of course, would have to be made for maintaining the water level in the hollow beams, and also for a water sump and pump arrangement to remove any water finding its way into the tank. Such water apparently would automatically form a layer at the base of the tank. The firm mentioned below† specializes in hollow concrete rectangular beams, and further inquiries can be made of it.

Q301 ARCHITECTS, DUBLIN.—*Can you refer us to any graph showing the rise and fall of building costs in England or Ireland during any number of consecutive years from say 1920 to 1940. We should, of course, prefer to get a graph covering the whole of this period, but the information on the subject over as few as five years would be useful.*

Graphical representations of the course of building costs, cost of living and building wages from 1914 onwards, compiled by H. J. Venning, F.S.I., were given in the special supplement in the double number of the *Architect and Building News*, January 19, 1940, and copies are available, price 1s., from the firm mentioned below.* These costs, of course, must be taken as referring to England ; no equivalent for variation of costs in Ireland would seem to be available.

* *F. Dejong & Co., Ltd., 84 Albert Street, London, N.W.1.*
† *Concrete, Ltd., 632 Grand Buildings, Trafalgar Square, London, W.C.2.*

Q302 HOTEL, EASTBOURNE.—*In the hotel lounge there are windows at both ends and these are screened over with curtains. What method would you suggest for VENTILATION OF these BLACKOUTS?*

There are many devices now being put upon the market for ventilating window blackouts. These devices, however, operate largely by natural ventilation, whereas for a room of this size forced ventilation would seem more likely to give satisfaction. Something on the following lines would seem the best possible to obtain a measure of satisfaction : use curtains only from the window transom level downwards, and above this level blackout the glass by boarding or painting over, and into the blackout glass introduce two or more electrically operated extract fans of the Vent-Axia or Wyndo fan type.*

* *VENT-AXIA FAN. Vent-Axia, Ltd., 9 Victoria Street, London, S.W.1.*
WYNDO FAN. Richard Crittall & Co., Ltd., Bush House, London, W.C.2.

* *Gilbert Wood & Co., Ltd., 2 Bream's Buildings, London, E.C.4.*

INFORMATION CENTRE

REFERENCE BACK

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

Q247. *April 4, 1940.*

Messrs. Christie & Co. inform us that they are still in a position to supply the Pinoleum material, imports from France still being available. The address of the firm is now 44 Bow Lane, London, E.C.4.

MANUFACTURERS' ITEMS

Henry Hope and Sons have just issued a leaflet illustrating and describing their A.R.P. shelter escape cover, which has been designed on advice from one of H.M. Inspectors of Factories. Firm state :

The lid is balanced and can be pushed open with one hand from a cat ladder. It is weather-tight and cannot be frozen up in winter. It can be made gas-tight with sponge rubber strip. The lever handle locks the lid from inside and can be positioned to give slight ventilation. The frame and lid are of welded construction. Size gives a 2 ft. square clear opening with lid lifted. A steel angle support is provided to prevent the lid from falling right back. Price : Painted, £4 0s. 6d.; hot galvanized, £4 14s. 3d.; extra for gas-proofing, 12s.; carriage paid on ten or more.

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Despite the unsettled conditions that afflict all Continental countries, the Netherlands Fair at Utrecht is reported to have resulted in good business for those British manufacturers who took part in it. The exhibits seen in the photograph on this page are very similar to those which have demonstrated the efficiency of Pudlo brand cement waterproofer at so many of the Building Trades' Exhibitions held at Olympia, and they have evidently proved as

Kerner-Greenwood's stand at the Netherlands Fair. See note on this page.

Before and after. Shortly after the outbreak of war the Nederland Line's shopfront in the Haymarket, S.W., was boarded up (left); the boards have now been removed and the plate glass windows have been fitted with Bateman's security window-brace (right).

convincing to Dutch architects and builders as to their British counterparts.

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Concrete, Ltd., announce that they have now reopened their London offices at Grand Buildings, Trafalgar Square, W.C.2. Telephone numbers are as before, namely: Whitehall 9251–3.

Buildings Illustrated

COLLIERY BUILDINGS, CALVERTON, NOTTS (pages 475-483). Architect: G. A. Jellicoe (Jellicoe, Page and Wilson). General contractors, Simms, Sons and Cooke, Ltd. Sub-contractors and suppliers included:

1st Contract.—Trussed Concrete Steel Co., Ltd., reinforced concrete; London Brick Co., Ltd., bricks; John Ellis and Sons, Ltd., artificial stone; London and Wales Steel Construction Co., Ltd., structural steel and patent glazing; D. Anderson and Sons, Ltd., special roofings and roofing felt, and waterproofing materials; Benham and Sons, Ltd., central heating; Mortimer Gall & Co., Ltd., electric wiring; Benjamin Electric, Ltd., and Wigan Bulkhead Fittings, electric light fixtures; Leeds Fireclay Co., sanitary fittings; Dryad Metal Works, door furniture; C. E. Welstead, Ltd., casements; Bolton Gate Co., Ltd., folding gates and fireproof doors; Shutter Contractors, Ltd., rolling shutters; Carter & Co., Ltd., tiling; Minto and Bloomer, shrubs and trees; Herbert Morris, Ltd., cranes; Venesta, Ltd., metal skirtings; John Booth and Sons, Ltd., ventilators; Fraser and Chalmers, Ltd., winding gear; Siemens-Schuckert (Gt. Britain), Ltd., switch gears and transformers; Belliss and Morecom, Ltd., compressors; Comyn Ching & Co. (London), Ltd., silver bronze work.

2nd Contract.—Gledhill-Brook Time Recorders, Ltd., time clocking apparatus; Concordia Electric Safety Lamp Co., Ltd., miners' lamp apparatus; Gent & Co., electric clocks; Harcourts, Ltd., decorative and office light fittings; Union Electric Cable Co., Ltd., cable; J. A. King & Co., Ltd., windows and roof lights; Powers and Deane Ransomes, Ltd., steelwork; B. and B. Plastering, Ltd., plastering; William Pickford, Ltd., metalwork; John Bolding and Sons, Ltd., and Adamsez, Ltd., sanitary fittings; Cellulin Flooring Co., flooring; Kleine Co., Ltd., Duromit flooring; Adams & Co., doors; P. C. Henderson, Ltd., door gear; Supervents, Ltd., vents.

VILLAGE.—General contractors, Bodill and Sons. Sub-contractors and suppliers included: George Wright (London), Ltd., sanitary fittings; William E. Farrer, Ltd., sewage disposal; Yannedis & Co., Ltd., door furniture.

PITHEAD BATHS, CALVERTON, NOTTS (pages 483-485). Architect, J. W. M. Dudding (Miners' Welfare Commission), under the direction of J. H. Forshaw and C. G. Kemp. General contractors, A. Mason (Contractors), Ltd. Sub-contractors and suppliers included: Matthews and Mumby, Ltd., steel reinforcement; London Brick Co., Ltd., bricks (Phorpres rustic Flettons and Phorpres Flettons); Haywards, Ltd., concrete roof lights, and folding gates; James Woodward, Ltd., shower cubicles; Puttyless Glazing Co., Ltd., patent glazing; Young, Austen and Young, Ltd., plenum heating; Sankey-Sheldon, metal clothes lockers; Cochran & Co., Annan, Ltd., boilers; W. J. Furse & Co., Ltd., electric wiring; Ascog, Ltd., electric light fixtures; Bell and Smart, boot brushing machines and boot-greasing stands; Constructors, Ltd., steel cycle racks; General Light Castings, Ltd., sanitary fittings; Dryad Metal Works, door furniture; Hoskins and Sewell, Ltd., casements; Haskins, rolling shutters; Tucker Armoured Plywood Co., Ltd., metal-faced doors; Lion Foundry Co., Ltd., iron staircases; Frederick Harrington, black-out curtains; Hoyle, Robson and Barnet, cement glaze; S. G. B. (Dudley), Ltd., wall tiling; R. Gay & Co., and Robert Ingham, paint; Cox & Co., Ltd., canteen furniture; James Farquharson and Sons, furniture, first-aid-room and canteen equipment and clocks; H. Merryweather and Sons, shrubs and trees; Eric Munday, signs; Highways Construction, Ltd., asphalt floor and flat.