THE ARCHITECTS' JOURNAL

THE ARCHITECTS' JOURNAL
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Next week the Editor will publish his report on the result of the questionnaire on architectural criticism, together with a summary of the replies received from a large number of architects throughout the country. It will be necessary owing to unforeseen circumstances to postpone the article by Mr. Oswald P. Milne on *The £2,000 House* until a later issue.

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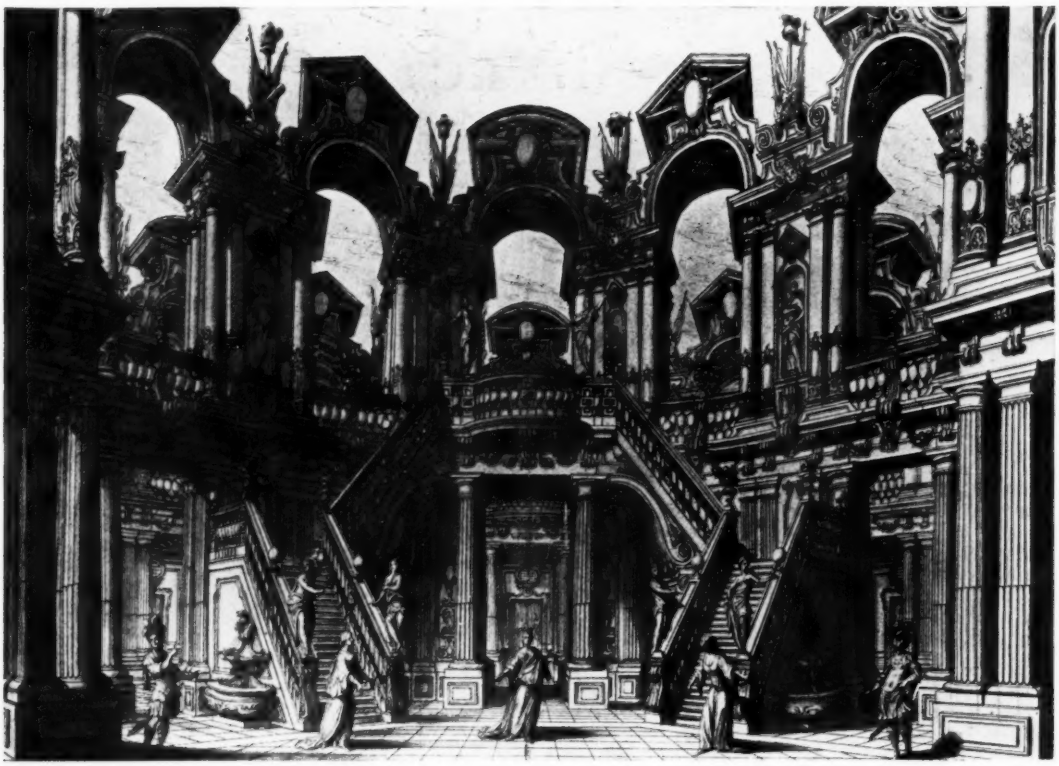
PRINCIPAL CONTENTS

The Index to Advertisers will be found on page iv.

CHRISTIAN BARMAN, *Editor*

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.



RENDERINGS OF ARCHITECTURE

Selected and annotated by Dr. Tancred Borenius.

XV. Giuseppe Bibbiena (1696-1756).
Design for Theatrical Scenery.

This design forms part of the same series of drawings by Giuseppe Bibbiena as the one previously illustrated and commented upon (see No. VI). *As regards their invention, these two semicircular porticoes, in two stories, the upper one consisting of arcades supporting triangular and curvilinear gables may be said to mark a degree of absurdity never surpassed, even by the Bibbienas. Borromini, no doubt, would have smiled benevolently at this gigantic extravaganza, which is quite in his manner and spirit. But Giuseppe Bibbiena undoubtedly knew every secret of the theatrical designer's craft; and his influence has to this day remained a vital force. Those who remember the ballet, "The Sleeping Princess," produced by M. Diaghileff at the Alhambra some years ago, and the magnificent palatial halls which formed such a conspicuous feature of its scenery, will be interested to learn that the designer, the late M. Bakst, mentioned, in conversation with the writer of these notes, that he had modelled himself upon the Bibbienas.*—[British Museum.]

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Wednesday, April 14, 1926

BRICKS AND TILES

TRULY the ramifications of economics are intricate and manifold, and almost, one is tempted to say, beyond the comprehension of man. Here, on the one hand, is Major Barnes telling all whom it may concern (and whom, indeed, does it *not* concern ?) that to make good the shortage of houses arising from the war, together with the number necessary to provide a dwelling for each separate family, and to replace unfit and insanitary houses, would have required, during the years 1919–1925, 2,339,376 houses (we presume he means dwellings), and that the actual number built during that period was 504,027; on the other hand we have the Builders' Merchants' Association giving vent to symptoms of acute alarm and uneasiness on account of the growing importation of foreign bricks and tiles, and the declining demand for those of British manufacture. At any rate, one economic line of thought would seem to be shaken by these statements : supply and demand do not always adjust themselves, but perhaps the argument might be advanced that conditions are still far from normal, and that it is the restoration of the gold standard in this country (a banker's device, and one never welcomed by the manufacturers) contrasted with the inflation in other countries, which is upsetting the normal flow of affairs.

Be that as it may, it is, to say the least of it, ironical that the country should be suffering from such an acute shortage of dwellings, a country, moreover, so rich in good brick-making earths, while at the same time brickyards cannot sell their products. Are there causes for this which can be in any way altered ? The Builders' Merchants' Federation have three suggestions to make, none of which is, in our opinion, to be commended. One proposal is for the imposition of a special tariff under the Safeguarding of Industries Act; another is that the Government subsidy should be given only to houses which have been constructed with materials of which 75 per cent. is British; the third suggestion is that the Fair Wages Clause should no longer be compulsory. The first two suggestions would assuredly have the effect of increasing the prices of houses, and they must, therefore, be dismissed. The third suggestion is, we feel, a retrograde step that would, were it possible to take it, be very much resented, and do more harm than good. For our own part we cannot but think that a partial remedy lies with the Federation itself. For certain commodities, small sales at high prices and restricted output may be desirable, desirable that is both as regards profits to the manufacturer and service to the community, but bricks and tiles are not such commodities; nevertheless, the manufacturers adopted that policy in the years immediately following the war, and it was one of the contributory causes of the collapse of the Addison scheme. We are not at all convinced that there has been any change of policy in the intervening years; if this be so, it is surely a contributory cause to-day of these unpleasant conditions. The success of the foreign competitor is due not a little to the fact that he can give prompt delivery of large quantities of goods. Another contributory cause and one which we hesitate to mention, for fear it shall be said that we have an axe to grind in so doing, is the difference in the quantity of advertising between the distributors of the foreign goods and the manufacturers of the British goods. Yet another contributory cause is, perhaps, to be found in the use of obsolete plant. Manufacturers in the past have not been over-eager to avail themselves of the most modern apparatus, and it will be remembered that England was one of the last countries to adopt the Hofmann kiln. These causes, taken collectively, may in partwise account for the unpleasant predicament in which British brick and tile makers find themselves, and if the foreign competition will bring about improvements in these matters, it will not have been the unmitigated evil that it is at the moment thought to be.

There is, however, something more fundamental than any of these matters which is giving the foreigner an advantage, and that is the attitude to-day towards work. It is possible to suggest many causes for the alarming growth of hostility towards work, but the fact remains that so long as it exists the happiness and prosperity of the nation, both individually and collectively, is lessened. Work evasion is not the road to happiness, and those who practise it are rarely contented. So long as this attitude persists, however, so long as work is evaded or grudgingly performed in England, the nation is competing at a disadvantage with those countries which have different ideals, and meanwhile the housing deficiency will pile itself up, and British manufacturers will suffer.

This influx of foreign goods, too, must increase unemployment, and every additional unemployed person is a burden to the community, and his keep is a tax on every commodity, a tax from which the competing countries, with their comparative freedom from unemployment, are immune. Thus, slackness leads to unemployment, which gathers mass to itself like an impelled snowball, or to change our metaphor, gathers velocity like a wheel descending a hill; we would that the Church, the State, or the Press could put a spoke in it, and then, perhaps, Major Barnes would be able to collect a less depressing set of figures, and British brick and tile manufacturers would be able to hold their own against foreign competition.

NEWS AND TOPICS

It is pleasant to record that the long-drawn-out dispute between the Oxford City Council and Christ Church is wellnigh ended. At a meeting of the City Council last week Alderman Gray stated that an agreement had been arrived at between Christ Church and the Property and Estates Committee regarding the St. Aldate's improvement scheme. It was decided that the city should agree not to build within 20 ft. of its boundary, and that Christ Church would also undertake not to build within 20 ft. of its boundary on the north. This would afford an opportunity of an architectural elevation which would be more pleasing than a dead wall, and would give access to more open space than if Christ Church and the city built up to their boundaries. The purpose to which the remainder of the site will be devoted will be a matter for future decision. Although this agreement has to be confirmed by the City Council it is now practically assured that a *modus vivendi* has been found. Although there is much to be said for the project of opening up a new view of Christ Church, the continuity of street lines also has a certain charm, and there can be no doubt that Tom Tower looked extraordinarily fine with a line of street frontages on either side of it. After all, the main function of architecture is to enclose spaces, and though here and there Oxford may stand to gain by the opening up of new views of ancient buildings, its chief distinction lies in the continuity of the long walls which join the colleges and their gardens, not only to each other but to whatever street buildings happen to be adjacent to them. Pull down the garden walls, isolate the colleges from each other and from the common thoroughfares, make Oxford conform to the ideal of architectural detachment which finds expression in our garden suburbs, and much of its charm and distinction will be gone.

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enclosed snapshot is of the dome of the mausoleum of Sûdûn Amir Maglis, one of the so-called 'Tombs of the Mamelukes,' on the outskirts of Cairo) on a building which, whilst modern in some respects, is yet essentially classic in conception."

* * *

"Architecture could not give dignity to a refuse destructor, a sewage farm, or a gas works. It could disguise the purpose of these structures, but such disguise was an abomination," was the summing-up by Mr. H. B. Creswell at the end of his "Inquiry into the ugliness of engineering structures," which was the title of a paper read by him before the Society of Engineers on Monday afternoon. If man's highest effort in beautiful building could not, therefore, reclaim a structure whose purpose was ignoble or trivial, engineering science, which had no such aim, certainly would not do so. But certain principles did he lay down, the recognition of which, he thought, would lead to many features of engineering construction, which now were ungainly, being given a pleasing form. These principles were indeed those which we should wish to meet with in all walks of life—Integrity, Efficiency, Economy, Out of these qualities new worlds could be made!

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I had looked forward so much to Mr. H. G. Wells's addressing the Structural Engineers at dinner on Monday night that when we were told he had not come I fell a-musing—over the wine—upon what he really would have said. I fixed my eyes meditatively upon a gentleman who rather resembled the great author, and with this inspiration I listened to what Mr. Wells *might have said.* . . . Mr. Wells dwelt first upon the word "structure," sketching, with rapid words, the first dwellings of the world. He went on to the daring ingenuity that was Man's when first he left the caves that Nature had provided, and built for himself. There were one or two reflective, impressive sentences. I caught such words as "the class-consciousness which largely led him to house himself from the beasts" and "his lessons in building learned from the birds." Mr. Wells then embarked upon the feats of structural engineering accomplished by the feathered folk: the intricate lattice-girder work of some of the twig-built nests, and the wonderful methods of suspension, and he thought that members of the Institute might still find something to study in the matter of reinforced concrete by regarding the way in which the birds filled in the interstices of the structures with clay and mud.

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From the shocks of storm which these castles-in-the-air were capable of withstanding, Mr. Wells went on to the alarming subject of Earthquakes—and here everyone sat upright. From earthquakes Mr. Wells predicted this country of ours was not yet free. "The buildings of the future," said Mr. Wells (and the hands of all went attentively to their ears) "will be modelled more and more closely upon the webs of the spiders and the nests of the birds. They will be stressed and strained to stretch like elastic, to bounce like rubber. They will be reinforced with some new metal—something like aluminium, perhaps, but having the spring of Toledo steel—and the concrete will be gaily-coloured stuff, which, though hard and impervious as glass, will have those properties of 'stretch' and 'bounce.'"

* * *

I really did not know what to say to some of the questions on architectural criticism set forth in the editor's *questionnaire.* I have always held opinions to be something of a nuisance. Rarely have we any means of discovering the truth of what we read, and the opposite opinion is always to be read elsewhere. We may put our trust in "experts," but often we have only their word for it that they are experts, and I know the mental limitations of the expert too well. An artist, too, is rarely a sound judge of the work of another artist—consider, for example, Tolstoy on Shakespeare, Mr. George Moore on Mr. Hardy, Ruskin on Whistler, Mark Twain on Sir Walter Scott, Hugo Wolf on Brahms, and Mr. John Collier on Mr. Epstein. Yet catholicity of taste is not an unimpeachable ideal for criticism to cherish; it is only the auctioneer, as Wilde said, who should admire all schools of art.

* * *

For non-committal yet forceful criticism I take a certain Californian for my guide. I was at the Lyceum in a crowded house. Standing in the passage beside me was a great Californian, with a face which flamed like the Californian sun and with a beard of Californian gold. He kept his eyes glued to the stage. In the first act the heroine is married to the man she doesn't love. Her friends arrange it and the law allows. "Waal, I'm hanged!" says the giant Californian as the curtain falls. In the second act the girl is missing from the honeymoon boat, and a torn cloak is found flying from the davits. "Waal, I'm danged!" ejaculates my friend. In the third act the missing woman is discovered alive and in London with the man she loves. The curtain falls amid the plaudits of all. I turn inquiringly to my Californian to learn his final impression of the piece. "Ef that ain't a corker!" he says, and turns to go.

ASTRAGAL.

ARRANGEMENTS

WEDNESDAY, APRIL 14

At the Royal Society of Arts. 8.0 p.m. R. A. Dawson, A.R.C.A., on Art Training and the Society's Competitions. Sir Frank Warner will preside.

MONDAY, APRIL 19

At the Royal Institute of British Architects. 8.0 p.m. Gilbert Bayes and Laurence A. Turner (Hon. A.R.I.B.A.) on The Co-operation of the Architect and the Craftsman.

At the Royal Society of Arts. 8.0 p.m. Charles Reed Peers, C.B.E., M.A., on Ornament in Britain. (Lecture I.)

FRIDAY, APRIL 23

At the Town Planning Institute. 6.0 p.m. Harold Swann on Differences in the Problem of Planning Built-upon and Unbuilt-upon Land.

MONDAY, APRIL 26

At the Institute of Structural Engineers. 6.0 p.m. Ewart S. Andrews on Theory versus Practice.

At the Royal Society of Arts. 8.0 p.m. Charles Reed Peers, C.B.E., M.A., on Ornament in Britain. (Lecture II.)

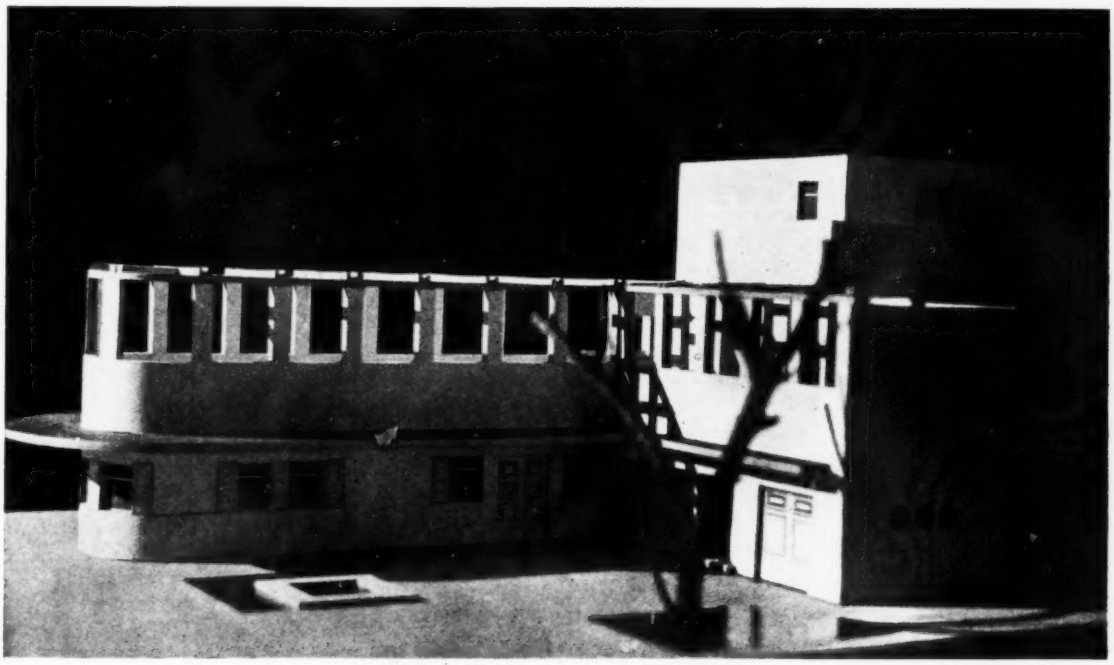
At the Architectural Association. 7.30 p.m. W. R. Davidge, F.R.I.B.A., F.S.I., on London Development. (Nomination of Officers and Council for Session 1926–1927.)

MEDITERRANEAN ARCHITECTURE

BY A. TRYSTAN EDWARDS

AT the Spanish School at Rome there is a flourishing architectural section which contains among its members some highly-talented artists. The designs which we here illustrate are by Mr. G. Mercador, who before proceeding to the school had enjoyed a considerable architectural practice in Madrid, where he has erected some very large blocks of flats and offices. He will tell you, however, that his greatest interest does not lie in these particular achievements, for he has no less ambition than to found what we call a Mediterranean style. The idea is, indeed, a fascinating one, and it has behind it so much logic that it is surprising that nobody has attempted to exploit it before.

Mr. Mercador has acquired his conception of the Mediterranean style through prolonged study, in which observation and analysis have been supplemented by the sketching of innumerable examples. As a draughtsman he shows an extraordinary facility, and has to his credit a prolific output of pencil studies of such distinction that these alone would establish his claim to consideration. Mr. Mercador won the Prix de Rome in 1923, and has subsequently travelled in France, Austria, Greece, and Turkey, and so has had a good opportunity of studying the Mediterranean at different points. His object is to evolve a style peculiarly adapted to a seaside existence in a brilliant climate, while

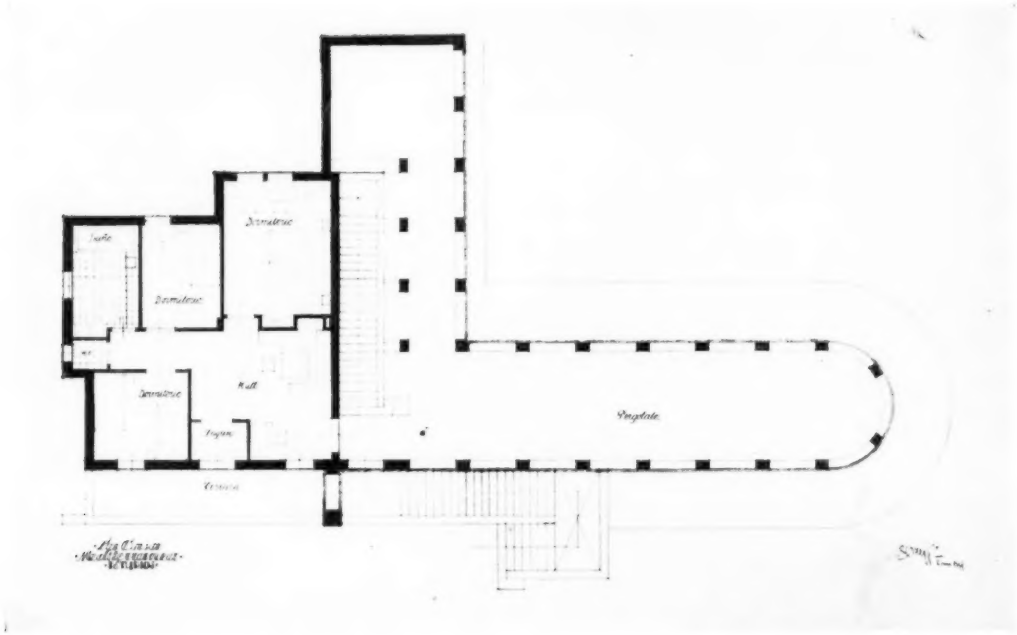


A Mediterranean House. By G. Mercador.

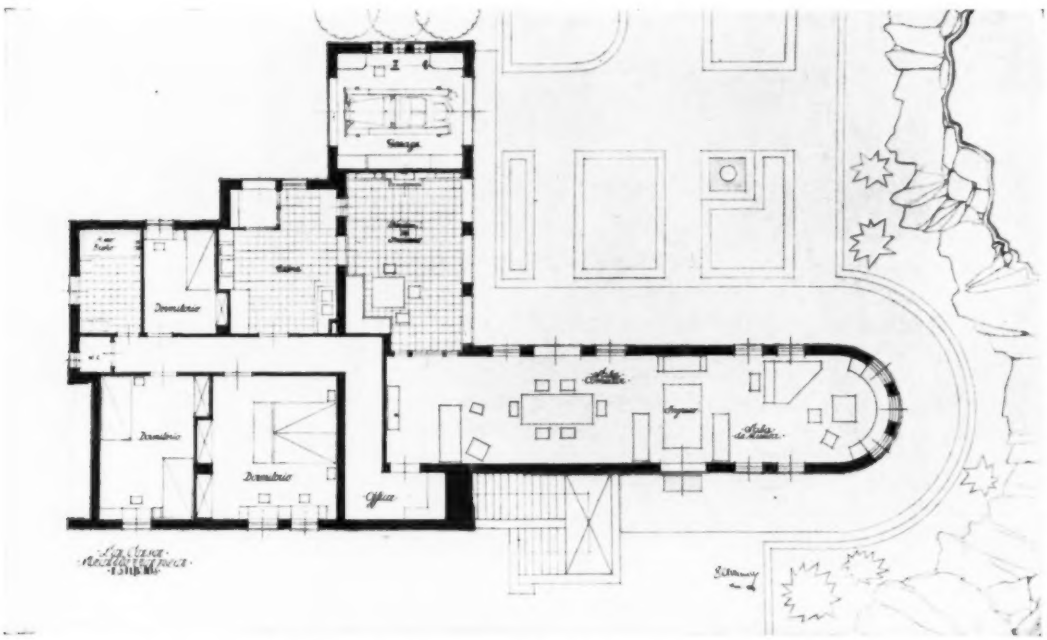
There can be no doubt that the Mediterranean, which for centuries has been the means of communication between races who have not only engaged in commerce with one another, but have also to a large extent partaken of a common civilization, is far more than a geographical unit, for it has a certain character and influence of its own which has actually set its stamp upon the architecture of the towns which border it. Exactly what this character is it is not easy to define, but recollections of Malta, Algiers, Sicily, and the Italian coast, Albania, and Greece, whether these places have actually been visited or are merely envisaged by means of pictures are sufficient to suggest that there has grown up around the Mediterranean an architecture of white walls, flat roofs, and compositions of buildings in which rectangular forms and outlines predominate.

at the same time he studies practicality to the extent of devising a system of construction which will be truly economical. It will be observed that the two examples here shown are entirely devoid of ornament, and owe their qualities to the manner in which their parts are disposed.

One special characteristic is here present which is especially commendable, namely, the extreme sociability of his houses, which can be set in fairly close formation without a discord arising between them. This is due to the fact that flat-topped buildings expressing variations of rectangular forms are, as it were, agglutinative, that is to say, they cohere and tend to combine into compositions which have a marked degree of homogeneity which is quite impossible among the gabled edifices which mar our modern English



seaside fronts. Mr. Mercador finds delight in providing deep shadows in which the occupants of his buildings may take refuge from the violence of the sun. The two plans here shown are of interest in that they show a departure from the types accepted in this country. These illustrations represent only a tiny fraction of the models and sketches for Mediterranean houses which Mr. Mercador has made, but they are sufficient to show that he unites technical ability with a highly-developed imagination which will enable him to produce designs of very great interest to architects, not only in his own country, but elsewhere. In fact, his contribution to domestic architecture is not altogether confined to the problem of determining a Mediterranean style, for it is quite probable that his designs will provide motifs which may be exploited in the composition of urban houses in general.



A Mediterranean House. Above, the first-floor plan. Below, the ground floor. A general view is given on the preceding page.

A Mediterranean House. By G. Mercador.

SPOLIATION OF THE COUNTRYSIDE

BY J. F. WATKINS

THE interest recently aroused on this question serves to indicate how opinion, particularly in the architectural profession, is showing concern at the results, now becoming obvious to all, of the very large developments taking place not only in outer London, but in proximity to all our large industrial centres, chiefly in districts where the transport facilities are such as to make it possible for people to live "in the country." Many interesting letters have appeared in the Press from time to time deploring the haphazard methods now being followed, and calling for official action in an effort to devise some ordered control of building development. As representing the profession as a whole, it is natural that the Royal Institute of British Architects should be asked to take definite steps in the direction above indicated, and it is to be hoped that the Council may find it possible to give a lead in the desired sense. The Town-Planning Institute, whose pioneer work in development is praised by all, is also giving the subject close consideration, and may be expected to offer valuable advice to the profession. What appears essential at this stage is the presentation of a considered statement of the position, so that those interested in any way may know of the things to which we, as a profession, take exception, and, on the other hand, be informed as to what suggestions we have to offer in order to avoid a repetition of the present unfortunate results. In trying to state these objections it is impossible to avoid reiterating to some extent points with which all architects are familiar, but as we hope to attract the interest of others concerned, who may not be of our profession, it is necessary to cover the whole ground as briefly as possible. What are the developments now taking place in our countryside which are, in our opinion, tending to destroy its beauty and character? These may be summarized as follows :

1. The design of new arterial roads. While it is admitted that the growth of road transport renders these arteries necessary, we criticize the lack of imagination in carrying out the work. There are few things more depressing in appearance than these new roads, due almost entirely to the absence of planting both of trees and hedgerows. It appears that the Ministry of Transport has already taken steps to remedy this, and that local authorities are now permitted expenditure on this head.

2. The method of widening existing country roads. This, in the opinion of many, is being carried out to an unnecessary extent. Fine old timber and matured hedgerows are being destroyed, and in many instances replaced with wooden fences and posts with wire.

3. The restricted range of methods both of road and building construction allowed under most by-laws. In the case of roads the result is usually hard and ugly, and in building any efforts to construct in traditional style are often rendered impossible on ground of expense.

4. The absence in most instances of any effective control over lay-out of estates for building purposes and the design of the individual houses erected thereon. Zoning of districts only carries the problem to a certain stage, and does not protect against the vulgar individual efforts at design which so often follow.

5. The lack of control in design of new premises where they are surrounded by old buildings of traditional character. Instances of this can be seen in any of our country towns and villages where such erections have utterly ruined the whole beauty of a street.

The points above mentioned are the main grounds of complaint, for all of which we claim immediate attention, and, if possible, remedy. Having reached this conclusion, we should now consider what suggestions we can offer which, if acted upon, may lead to improvement. Dealing with the points from this new aspect and in the order already given we suggest the following :

1. That it should be obligatory on the Ministry of Transport to at once put in hand the planting of trees and hedgerows to all new arterial roads where they pass through our country districts, and that the possibility of perpetuating the traditional form of country road with the grass verge be considered. That the same obligation be laid on county and local authorities in this respect.

2. That in widening existing roads the authorities concerned should make a point of preserving existing timber, and where hedgerows are demolished that they be replaced by similar or other planting. That where roads are scheduled for widening, the future frontage line should be settled, and wherever possible the planting of timber and hedgerows put in hand forthwith, so as to permit of a degree of maturity when the widening is actually carried out.

3. That the Ministries of Transport and Health should insist on the scope of all local by-laws being widened and rendered more elastic. That in doing this, encouragement should be given to a type of road which will carry on the tradition of our country lanes, and to buildings in character with the style and materials of the district.

4 and 5. That steps should be taken to educate local opinion on the necessity of careful study when developing new districts or erecting new buildings, to ensure a result that will add to and not destroy the amenities of the district.

These are our aspirations, and the question will be asked, How are they to be made in any way effective? In considering the possibilities it is first of all necessary for us to realize that the problem is not one concerning merely the architect and builder. We believe this view, so widely held, is wrong, and that we must admit that if we are to approach a solution then all those in any way concerned with land and its development must be enlisted in the campaign. We need the law, the house and estate agent, the local council official, the builder, the architect, and last but not least, the private owner.

In the last decade the owner of private estates rendered invaluable service in maintaining on his property, often covering a considerable area, the character and tradition of the local town or village. This centralized authority rendered control comparatively easy, but now the private owner is disappearing we must seek to find some other means of carrying on his good work. The Royal Institute of British Architects might invite the co-operation of properly constituted bodies representing the interests named. It might be decided to ask provincial and allied societies to form local committees in all districts to study the development of their towns and villages with a view to assisting in the desired direction. These local committees might prepare plans showing the best method of development. Having done this they might invite local property owners to meet them and explain to the latter the obvious advantages—economic, social, and æsthetic—of the schemes they have prepared.

CURRENT
ARCHITECTURE
SECTION

An ink factory in Middlesex.

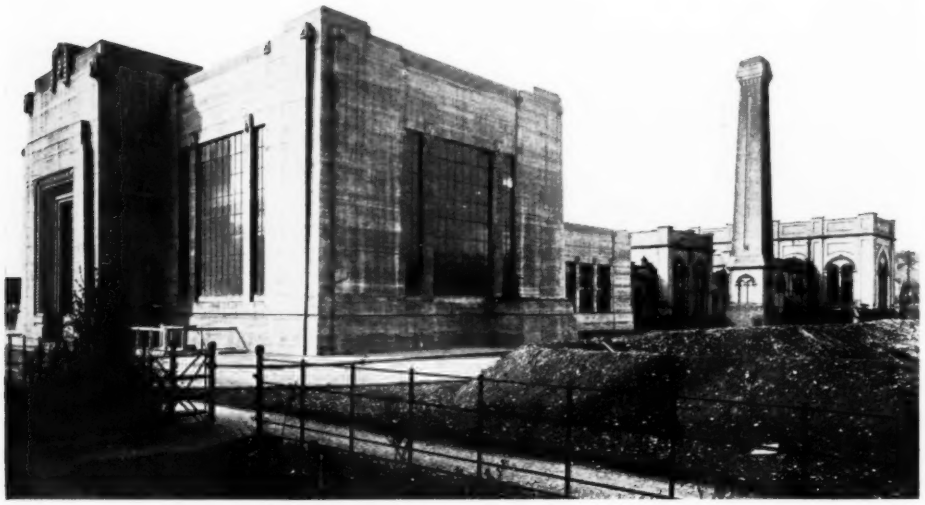
THE INDUSTRIAL WORK OF WALLIS, GILBERT, AND PARTNERS

BY ERIC L. BIRD

It does not seem to be the general custom in this country to regard factories and similar commercial buildings as deserving of æsthetic consideration. The large majority of them are entrusted to engineers, who seem usually to adopt one of two courses. The first is to regard the building from a purely scientific, efficient, and coldly logical point of view—the wiser course for an engineer—and while the result is convincing, it is usually bald and frequently ugly. Occasionally this pure efficiency has resulted in a certain fortuitous functional beauty, such as is possessed by the steamship and locomotive. The second course is to add irrelevant architectural trimmings when, for reasons of advertisement, the client has wanted "a fine building." This is done sometimes by a hired architect and sometimes by the engineer himself, and the result is almost always unsatisfactory. For this custom of the employment of engineers for commercial buildings architects themselves have been largely to blame. Frequently they have subordinated efficiency to æsthetics, or they have been too intent on some pet style, usually an expensive one. St. Pancras Station must have been an "awful warning" to directors of commercial concerns.

The erection of a so-called commercial building calls for the fulfilling of a programme of which the conditions are rather more exacting and stringent than those for the sorts of buildings, such as public and domestic, for which architects are usually employed. Of these conditions the economic factor is the greatest. A commercial concern will survive only so long as it can pay dividends, and any new buildings it considers erecting must have the maximum of efficiency with the minimum of outlay; there should also be an eye to the advertisement value of appearance and display. This is the client's point of view, and it is an entirely reasonable one. The architect, if he desires to go beyond this in order to satisfy his architectural conscience, has little more than pure form with which to play. Efficiency is therefore the keynote. This involves a general understanding by the architect of the usual manufacturing and business processes, and a close study of the manufacture for which the particular building in hand is intended. He should be able from his detached viewpoint not only thoroughly to grasp all the processes involved, but to suggest improvements to the client, who quite often is wrapped up in routine and "cannot see the wood for the trees." There are a few other conditions demanded by almost all buildings of this nature. They must be fireproof, well lit, capable of easy extension, and saleable, so that they may rank as an asset in the event of the firm winding up or moving.

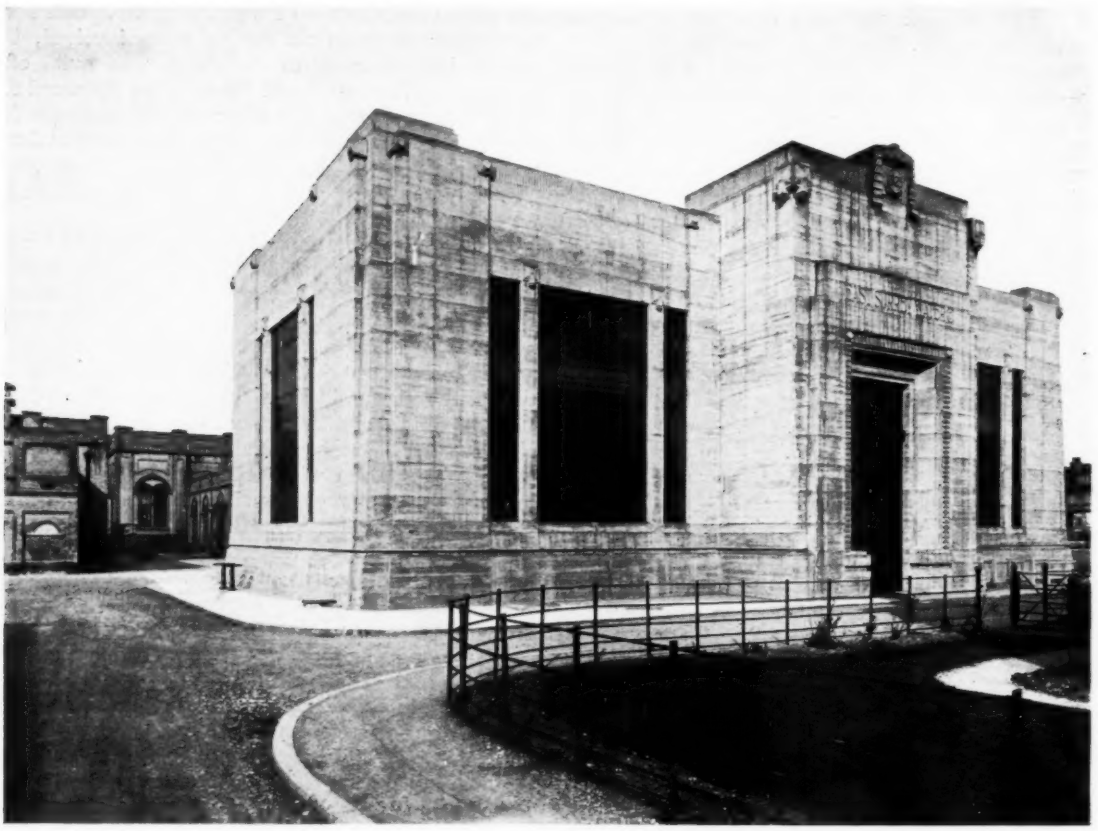
In the light of the foregoing the success will be appreciated of Mr. Thomas Wallis's work here illustrated. Bearing in mind the fact that the majority of commercial clients desire some display in their offices and headquarter buildings, and none at all in their factories, one cannot but admire their success as works of architecture. But examination of the plans will show that these buildings fulfil the essential condition of efficiency to the utmost, and that the elevations are little more than honest and logical expressions of the plan. Even without a knowledge of the special requirements one may appreciate the good points of such a plan as the General Electric Company's offices at Birmingham. Here are a multitude of small offices for numerous departments grouped so as to obtain the simplest intercommunication and easy supervision. Thus, one wing contains offices for ledger sales, wages, cashier, auditor, insurance and buying office; another, engineering, power, electrical and estimating departments; a third, typists, postal, contract and publication departments, while over this last, and communicating with it by a chute, are the order, contract, and export departments. In the centre of the building are the offices of the directors and secretary, while there is an exhibition-room placed conveniently to the main entrance. Even the lavatories are conveniently and economically grouped. It will be noticed, too, that



the offices are all placed so as to get the maximum of light, either outwardly or across the greatest width of the internal court.

Mr. Wallis is a great believer in planning on a system of units. Economically this is an immense advantage, as apart from the saving of cost through repetition work, the question of future extension is made easier. This is particularly noticeable in the plan of the factory for Messrs. Stannard, at Leek.

Not only are these units in plan, but in cube; most architects employ the former, but not many the latter. Æsthetically the result is that these buildings have a fundamental



The East Surrey Waterworks, Purley. Above, a general view. Below, the entrance.

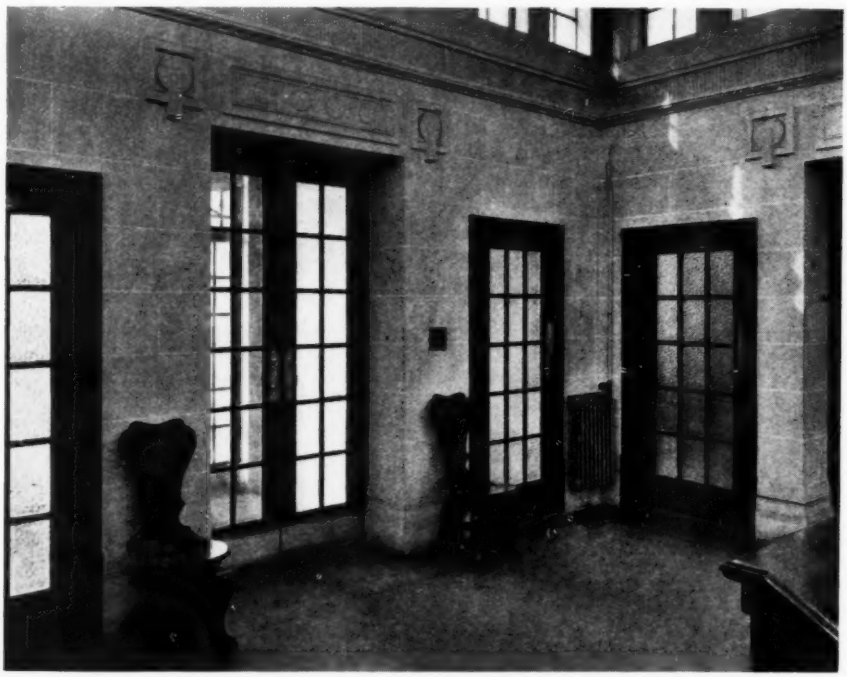
rhythm; there is an absence of uncertainty about such matters as window sizes and spacing, as is frequently met with in work not planned in this way.

The most striking feature in these buildings is the immense amount of window space. It has been realized recently that light has a commercial value, not merely to the health and eyesight of the employees, but in the actual saving of artificial light. To a firm whose annual electric lighting bill may run into four figures, the saving of even a quarter of an hour's light a day cannot be neglected. Hence we get elevations that present to the eye more void than solid, a state of affairs on which tradition affords us no more guidance than can be obtained from late perpendicular Gothic. Indeed, it is not unreasonable to claim for these buildings a certain kinship to Gothic architecture. The problems are similar: the medieval builders strove always for a fireproof structure that had a maximum of window with a minimum of support. We obtain our results more easily than they did by the use of steel and reinforced concrete with occasional use of other materials as coverings. Of late there has been much ink spilt on the question of the most proper mode of expression of reinforced concrete, and a little time spent on discussion of this most modern and debatable of problems will not be out of place. Without a clear comprehension of the material, its nature, and the technique of its use, it will be impossible to obtain a truthful expression of its functions. On one hand concrete is held to be essentially monolithic, though expansion joints are found to be necessary; on the other hand its plasticity is emphasized, though formwork other than the simple and rectangular is so uneconomical as to be usually prohibitive. Again, reinforced concrete is regarded as skeleton-like, an improved steel frame, without regard to the fact that it provides its own covering, and

Above, The East Surrey Waterworks. Below, The East Surrey Traction Company's works at Reigate.

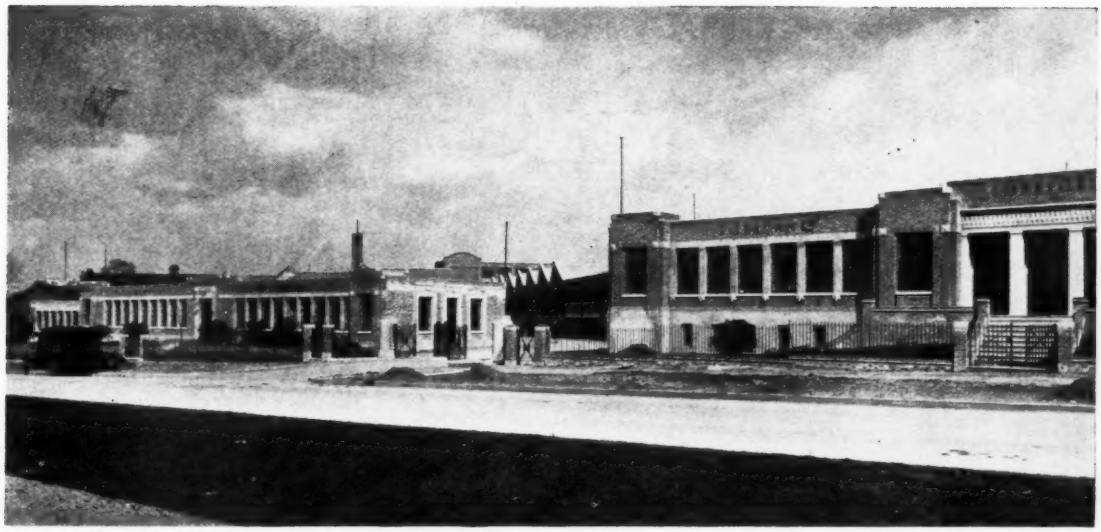
may serve equally well for walling as framework. It has been recently stated that concrete is a timber expression, since timber is the usual material for formwork. This is only true in so far as any material must be used according to the suitable and available tools, but beyond that it is a fallacy. Would one claim that blancmange is an expression of earthenware or enamelled iron, because it happens to be cast in a mould made of one of these materials? Probably there is no one word or phrase even that will convey an adequate idea of its complex nature and functions; there is certainly a fundamental difference between plain and reinforced concrete. The closest analogy to the former that can be obtained is probably the mud walling of the Egyptians (or even the blancmange). Both materials have weakness in tension, and are merely suitable for dead weight or compressive structures. On the other hand, while a reinforced concrete building is akin to the familiar steel frame, it is much more than a skeleton. The concrete forms both the bones and flesh of the structure, the reinforcement comprising the tendons that maintain the building in a state of equilibrium. There is a distinct analogy between the deltoid muscles of an extended human arm and the reinforcement hidden under the upper surface of a reinforced concrete cantilever. Further, we cannot fail to notice the salient fact that the material of the walls may be anything so long as it will keep out the weather. Apart from the glass it is often brick or stone, sometimes metal (bronze), and usually concrete itself. Herein lies the great fundamental error of the majority of experiments hitherto made in frame buildings—for in this matter the steel frame also enters—many architects persisting in regarding their façades as walls pierced with openings that are spanned by lintols. Whereas these buildings are in truth a frame —usually a symmetrical arrangement of units—of which the resultant panels have to be filled in. This muddled thinking, this clinging to old structural ideas, has led many architects into the error of treating the covering material as if it were the medium of support, rusticating piers, emphasizing horizontals, and even deliberately giving themselves the Orders as a handicap. We are faced with the problem of the frame and panel instead of the pierced wall.

The designer of a reinforced concrete building must face the fact that the skin of his building serves structurally no more than does the human skin; it is a protection, and nothing more. It is not even necessary to have the bony framework on the façade as is usual. This has been fully realized by Mr. Wallis in the Wrigley factory. A study of the plan reveals the fact that the whole building consists of a series of mushroom-headed posts supporting rectangular floor slabs, and, except for their own weight, the walls carry nothing whatever. This realization has been emphasized in the elevations with the happiest results.



A factory for Messrs. S. G. Brown at Acton. An interior detail of the offices.

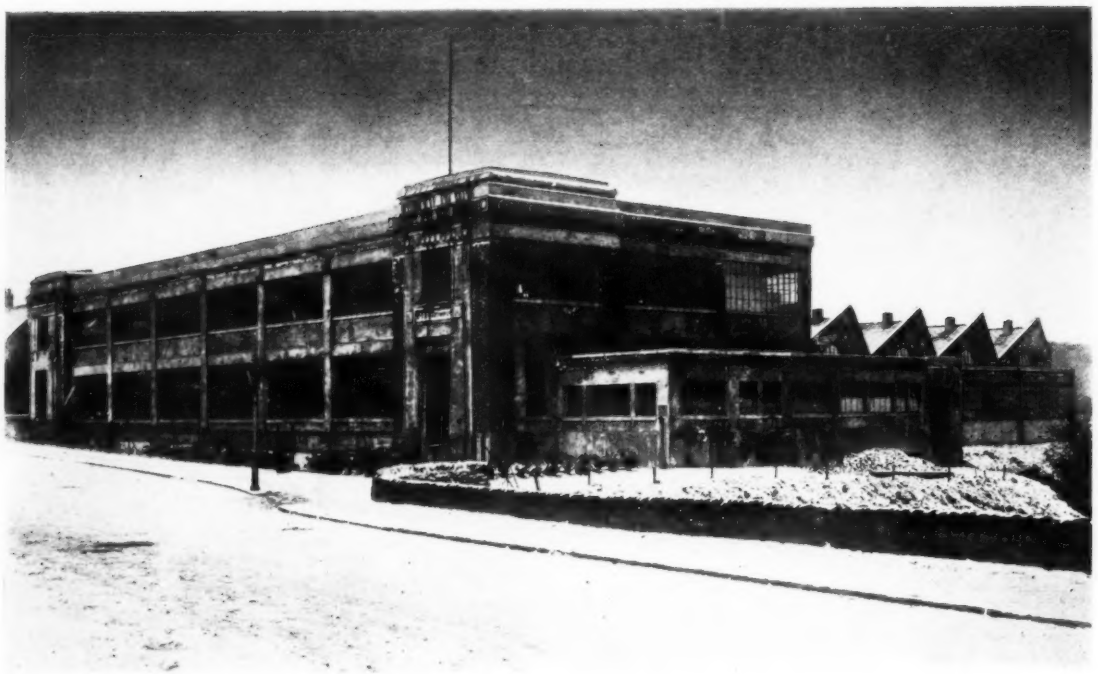
The habit of thinking in terms of masonry and the Orders is so ingrained in so many of us that we find difficulty in approving these thin-framed structures. One authority recently stated that he made his piers thick enough to satisfy the mind (which is thinking in terms of stone), regardless of an overplus of strength. Another produced an idea for a system of hollow construction to serve the same ends. After all we are accustomed to purely steel erections, such as gantries and cranes, and in some of them we discern æsthetic, as well as functional, beauty, and we do not experience any uncomfortable sensations of instability. We have subconsciously grasped the fact that these apparently gossamer erections are in reality more than sufficiently strong for their purpose. Yet we do not seem generally to have acquired the habit of thinking in terms

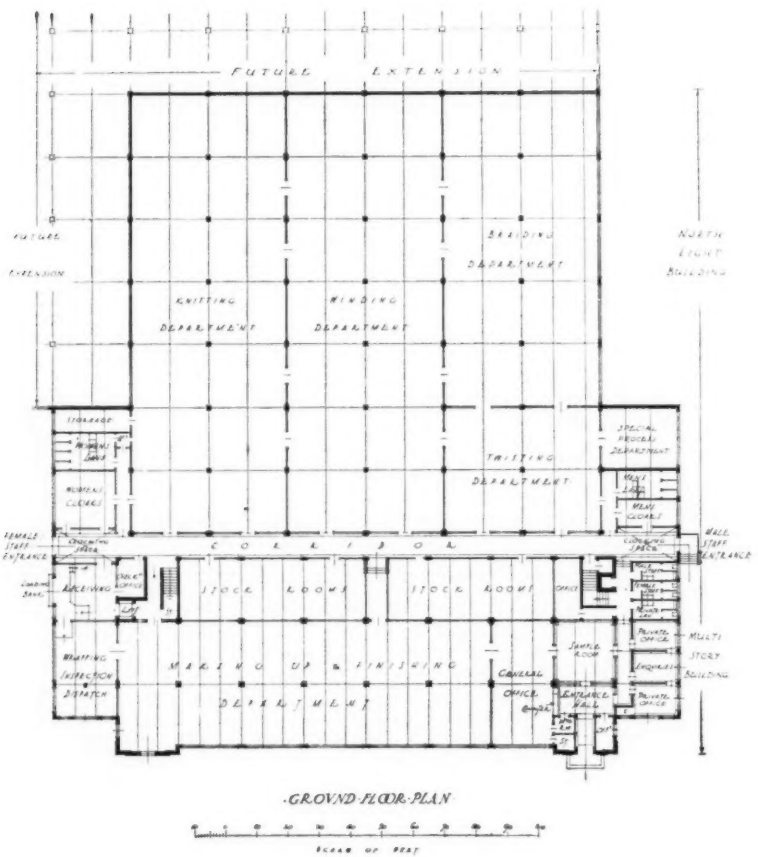


of covered steel and einforced concrete. The customary æsthetic failure of the modern office, shop, or factory building is largely due to the designer's attempt to wed classic architecture and proportions to an essentially frame and panel construction. Appreciation of these strange materials is largely a matter of intelligence allied to custom. But this way of thinking is being gradually forced upon us partly by the growing use of large areas of metal, usually bronze, in shop and office construction. The illustration of the East Surrey Traction Company's works at Reigate is an interesting example of this. It is not in the least incredible that within a few years some chemist may invent a cheap rustless alloy of steel, when the demands of maximum floor-space will drive us into facing buildings entirely in metal.

A few only of our architects have grasped these prin-

A factory for Messrs. S. G. Brown at Acton. Above, a general view. Below, a detail of the entrance.

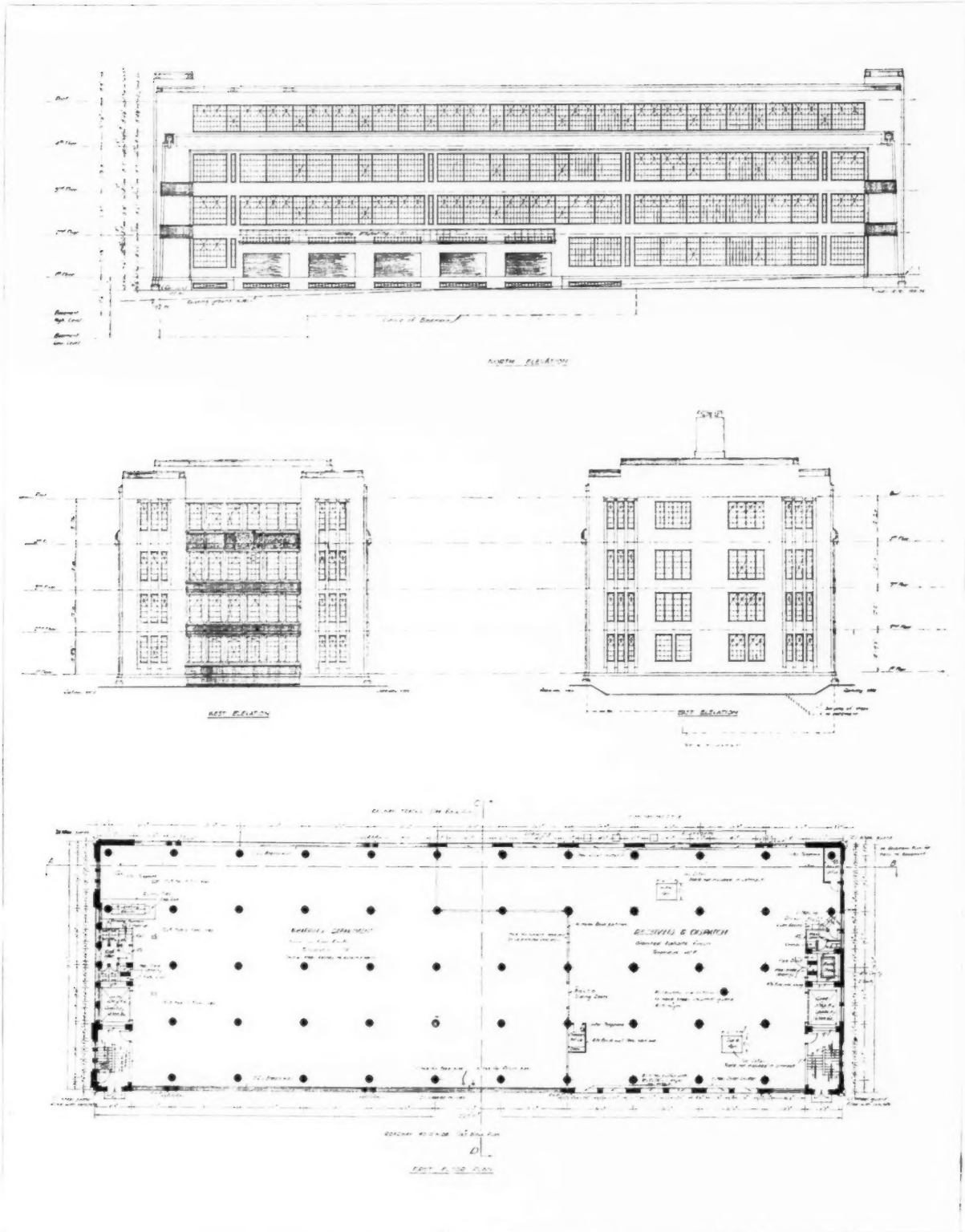




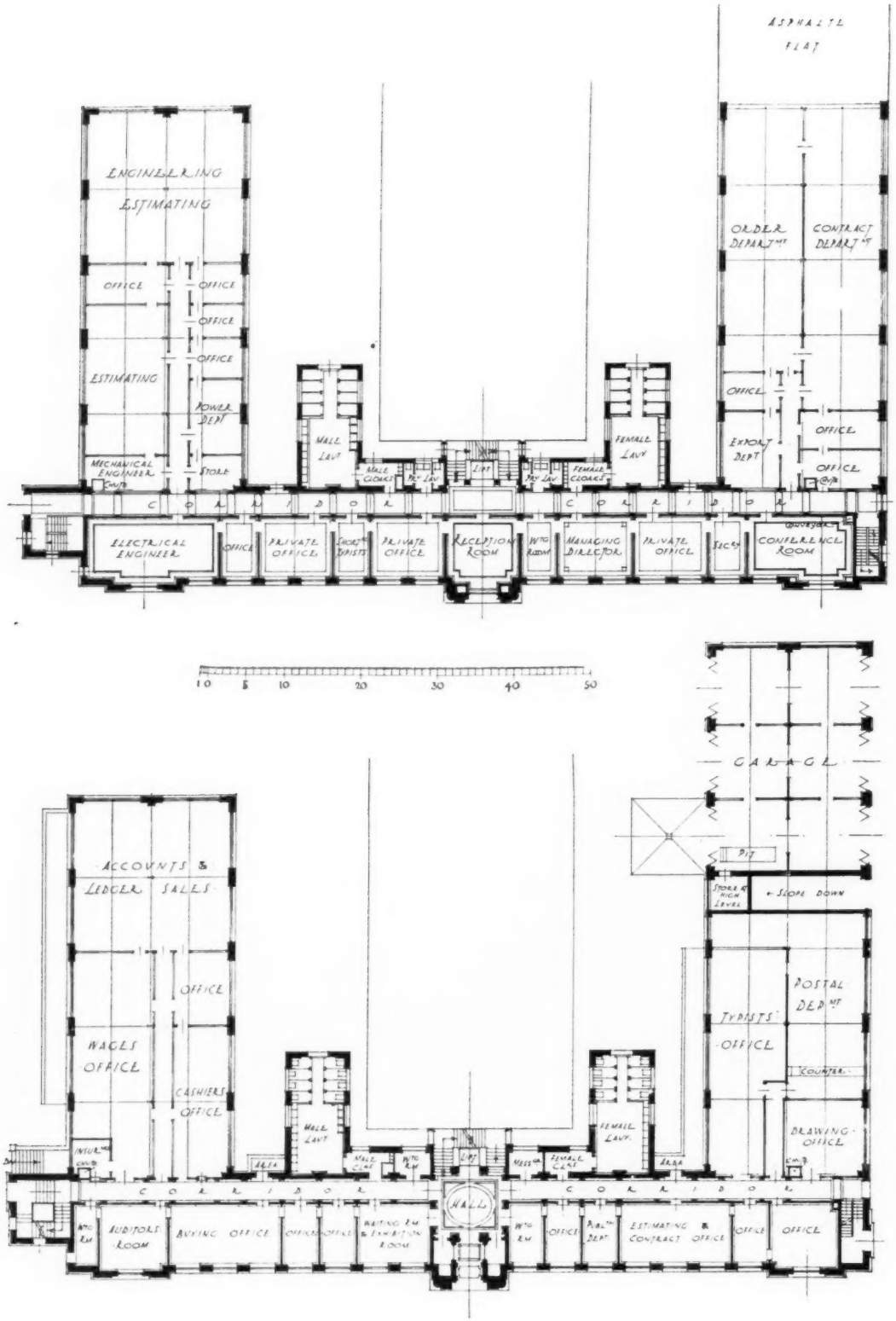
GROUND FLOOR PLAN

SCALE OF FEET

A silk factory for Messrs. W. Stannard and Company at Leek, Staffs.



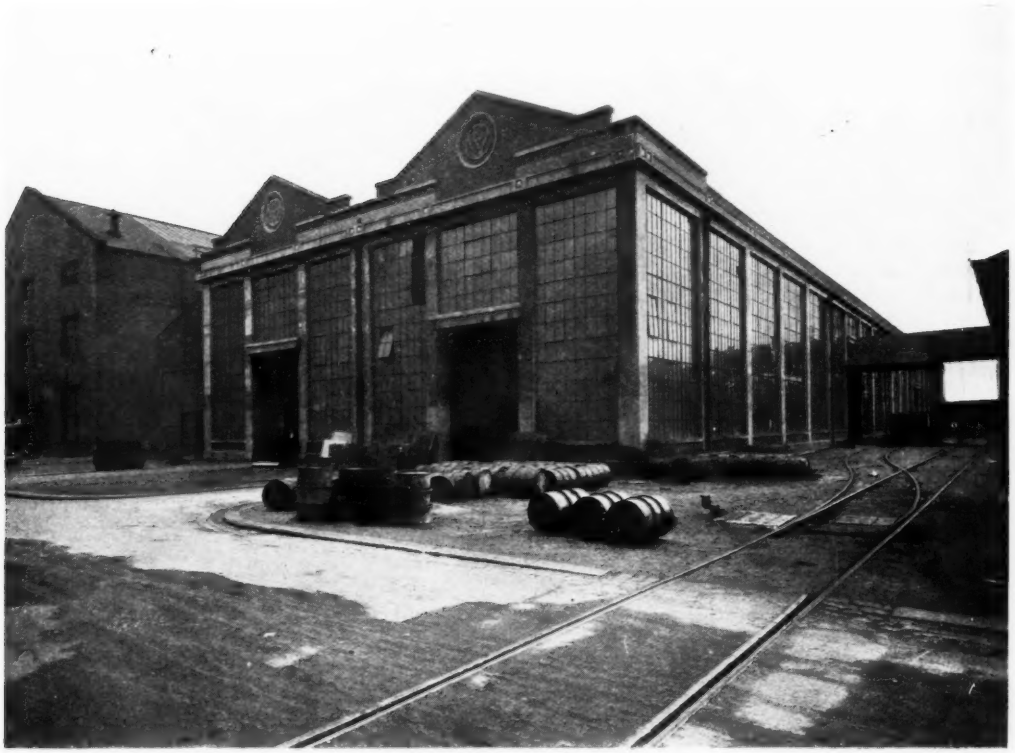
A proposed new factory at North Wembley for Wrigley Products, Ltd.



Administration offices for the General Electric Company, Ltd., Witton, near Birmingham.

Chocolate factory for Messrs. Barker and Dobson; at Everton, Liverpool.

Above, the General Electric Company's switch works. The receiving department. Below, works for Messrs. D. Napier and Sons, Ltd., at Acton.



The Metro-Vick tank shop. Above, a general view. Below, an interior view.

ciples in their entirety, and Mr. Wallis is one of them. Indeed, in his own class of work he plays almost a lone hand in this country. He is undoubtedly ahead of the majority in exploring and understanding the uses of these new materials; it is chiefly to be regretted that these commercial buildings are æsthetically limited by stringent financial conditions. In addition they gain enormously in being frank expressions of their purposeful and efficient plans, as many Continental ones are not. Here also we find no traces of any half-remembered or pet style unwillingly and unsuitably dragged in; there are no jam factories lurking behind bastard Romanesque fronts. Though these essentially modern buildings do not arrest the attention as do many of the newer Swedish and German commercial buildings, they are better for their definitely English restraint and their avoidance of the Kolossal.

Following are the names of the contractors and sub-contractors for the buildings illustrated on the preceding pages :

Administrative Offices, Witton Works, Birmingham, for the General Electric Co., Ltd. General contractor, Sir Robert MacAlpine and Sons.

Switch Works, Witton Works, Birmingham, for the General Electric Co., Ltd. General contractor, J. G. Gray, Ltd., Coventry. Sub-contractors : Trussed Concrete Steel Co., Ltd., reinforced concrete; Henry Hope & Sons, Ltd., patent glazing; Marbello, Ltd., patent flooring; Ashwell and Nesbitt, central heating and ventilation; Dent and Hellyer, plumbing and sanitary fittings; Williams and Williams, casements; Carter & Co., Ltd., tiling.

Chocolate Factory, Everton, Liverpool, for Messrs. Barker and Dobson, Ltd. General contractor, W. H. Davey.

Motor Works, Reigate, Surrey, for the East Surrey Traction Co., Ltd. General contractor, Walter Lawrence and Sons. Sub-contractors : A. D. Dawnay & Sons, structural steel; Mellowes & Co., Ltd., casements.

Silk Factory, Leek, Staffordshire, for Messrs. Wm. Stannard & Co., Ltd. General contractor, Henry Willcocks, Ltd., Wolverhampton.

Chocolate Factory, Hayes, Middlesex. General contractor, Holland and Hannen and Cubitts. Sub-contractors : Ragusa Asphalte Co., asphalt; Trussed Concrete Steel Co., Ltd., reinforced concrete; Mellowes & Co., Ltd., patent glazing; Norris and Dutton, Ltd., central heating; John Richards and Co., Ltd., electric wiring; Williams and Williams, Ltd., casements; Haywards, Ltd., iron staircases.

Machine shop extension at Witton, near Birmingham, for the General Electric Company, Ltd. The west elevation.

THE ACOUSTICS OF LARGE HALLS

BY A. H. DAVIS

Physics Department, The National Physical Laboratory

THE sounds uttered by a speaker in an auditorium proceed outwards in spherical waves until they strike the boundaries of the room. Here, enfeebled slightly or markedly, according to the nature of the surfaces, they are reflected in directions determined by the shape of the boundaries concerned.

The chief conditions for good hearing in an auditorium are : (*a*) that there should be no perceptible echoes; (*b*) that the loudness should be adequate and uniform throughout the building (i.e. not focused to some regions to the detriment of others); and (*c*) that there should be no undue reverberation, i.e. each speech sound should die away quickly enough to be inappreciable by the time the next is uttered.

To these conditions, if the hearing of music were concerned, it would probably be necessary to add a further stipulation, that the hall should be as uniformly reverberant as possible for musical sounds of all pitches, in order to ensure the preservation of the proper relative proportions of the components of a complex sound.

With regard to echoes, experience agrees that they are not noticeable when the time-interval between the direct and reflected sounds is less than about one-fifteenth of a second, or, in other words, when the path difference is less than 75 ft. In fact, it may be considered that reflected sounds arriving within this interval contribute usefully in raising the level of loudness, whereas those arriving later are undesirable, and should be enfeebled as far as possible by absorption or scattering.

In studying the acoustic properties of a proposed building, it is necessary, therefore, to consider the plans from the above point of view. If the hall is large, one must study the shape of the building and determine whether any undesirable echoes or reflections will occur, and ensure that sounds reaching remote seats shall be strengthened when necessary by reflections from suitable situations. Further, if, as is usually the case, calculation shows that considerable areas of absorbent materials must be introduced into the room to prevent excessive reverberation, their disposition and shape can be so chosen that they will not only reduce general reverberation, but will also suppress undesirable reflections.

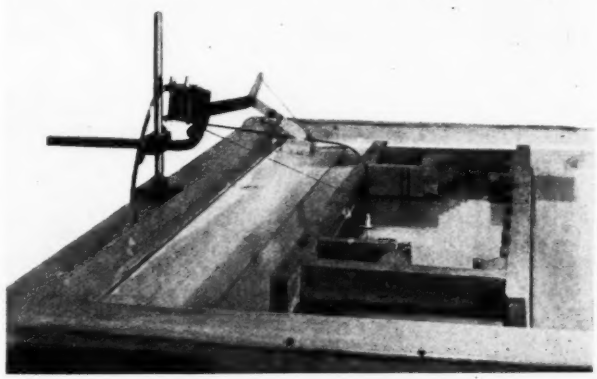


Figure one. General view of "ripple tank" apparatus, showing model section of building in position.

THE STUDY OF THE SHAPE OF THE BUILDING

While the complete determination in three dimensions of the acoustic properties of a chamber would be a complicated matter, in most cases it is possible to obtain very useful information from a study of sections. As a first approximation, the general direction of likely echoes may be obtained from simple geometry based upon the usual optical laws of reflection. However, it must be noted that since the wave-length of the sound concerned is usually comparable with the linear dimensions of reflecting surfaces, sound may spread somewhat outside the limits indicated by these optical laws, which are confined to phenomena of very short wave-length. Some interesting acoustic diagrams of this type, as presented by Mr. Hope Bagenal to the Royal Institute of British Architects, were published on November 26, 1924, in THE ARCHITECTS' JOURNAL.

The late Professor W. C. Sabine was the first to undertake a comprehensive study of the acoustics of theatres and other auditoriums by photographing the behaviour of actual impulsive sounds in model sections having open sides. He pointed out cases where the spreading of sound outside the limits of optical reflection, as revealed by his photographs, was a matter of some importance. For this photography of sound waves he adopted the general technique which had been developed previously by various physicists. As the sound spread in the model he illuminated it instantaneously by light from a distant electric spark. This light, after passing through the model, fell upon a photographic plate. Light is refracted by the sound waves—as it is by convection currents above hot radiators—and the position of the wave in the model was consequently clearly recorded on the photograph. A modified form of Sabine's apparatus has now been set up in the Physics Department of the National Physical Laboratory. An early photograph obtained by Mr. N. Fleming, B.A., is given later.

A further method, however, is available, which is very simple, and which gives visual demonstration of the actual progress of longer waves in a section having the shape concerned. The method uses the analogy between water waves and sound waves. The adaptability of the "ripple tank" method and the ease and rapidity with which the effect of modifications can be observed are of special value. The general arrangement adopted at the National Physical Laboratory is shown in figure 1. A model outline of a longitudinal section of a typical conference hall, made in wood on a scale of ¼ in. to 1 ft., is shown lying flat on the glass bottom of a shallow tank of water. The floor of the hall is seen on the left, the ceiling on the right, and the galleries in between. The reflecting characteristics of the outline of the section are observed from its behaviour towards ripples produced by means of a plunger, shown dipping into the water at a point corresponding to a position of a speaker standing near the centre of the floor of the hall. The plunger is not operated continuously, but is merely withdrawn from the water by means of an electromagnetic device, and it thus originates a short train of waves, which proceed outwards in circles and are reflected at the wooden boundaries. To facilitate study of the progress of the waves, light from an arc lamp passes upwards through the glass bottom of the ripple tank and casts a shadow of the waves upon a screen suitably mounted above. On this screen it is readily possible to observe the nature of the reflections. By means of a kinematograph camera, the full progress of a wave may be recorded in detail, or by taking snapshots at suitable times, photographs of selected features may be obtained.

As will be seen from figure 2a, the photographs show not merely one pulse, but a short train of waves. The distance from crest to crest between successive ripples corresponds to sound waves of length from 1½ ft. to 4½ ft. in the actual building, i.e. of sounds

having a frequency of from 250–700 per second, an important region in the speech range. The photographs are most easily interpreted if attention is directed to the progress of only one of the waves of the train. To isolate such a wave, if necessary, note may be made on each photograph of all the several parts of the disturbance which have traversed the same total distance from the source. As an illustration figure 2c has been treated in this manner. The selected parts have been inked in, and lettered behind the wave-front to correspond to the surfaces from which they have been reflected.

ILLUSTRATIVE RESULT

The set of illustrations in figure 2 relates to the longitudinal section of a model of a typical auditorium, the floor being totally absorbent. The first of the series shows the outgoing wave spreading equally in all directions from a certain position of a speaker on the floor of the hall. The second shows the conditions after reflections have taken place from the ceiling and from the walls below the galleries. The third photograph shows the further progress of the waves.

For comparison purposes figure 3 shows a sound-pulse photograph for a case closely similar to that illustrated in the ripple photograph of figure 2b. The position of the speaker—indicated by the large black circle — differs but slightly, and the distances travelled by the waves correspond almost exactly. The sound-pulse photograph is much clearer, because it deals with only a single pulse instead of a short train of waves, but when this is recognized the correspondence between the two photographs is most striking, not only as regards the main ceiling reflection, but as regards the extent and direction of reflections from subsidiary surfaces.

The photographs of figure 2 show that this section of the building is generally satisfactory. As regards echo effects, we may note that nearly all the once-reflected sounds reach hearers satisfactorily within one-fifteenth of a second of the original sound. It will be seen, however, that reflections from the backs C and G of the galleries are directed towards the upper parts of the chamber, from whence they may be returned later after reflection from the ceiling. Since such late reflections should be suppressed, it is clear that the backs of the galleries are suitable situations for absorbent materials or curtains.

Possibly the outstanding feature of this series is the excellence of the type of ceiling dealt with. It is low enough to supply hearers with a good reflected beam within one-fifteenth of a second of the original sound, and so usefully to enhance its loudness. The slight splay of the ceiling is sufficient to send to hearers sound which otherwise would be reflected to graze the walls, but it is not so pronounced as to focus sound unduly to the centre at the expense of the outer parts. Greater splay, however, would be inadvisable, for the focusing effect of surfaces with pronounced curvature or splay is nearly always detrimental to good acoustics.

Especially must we notice that the galleries are under the main ceiling, and that they thus derive benefit from the ceiling reflection. The excellence of the arrangment may be better realized if the characteristics of an alternative treatment are considered. To this end figure 4 compares the previous section with a modification in which the roof has been altered so that the gallery KH is under a separate ceiling. Waves have been photographed at corresponding moments for the two cases, and, whereas in the original section part of the pronounced ceiling reflection is directed towards the gallery KH, in the modified section this useful extremity is cut off. It will be noticed that the sound lost by the gallery is reflected by the splay F back to the main body of the hall.

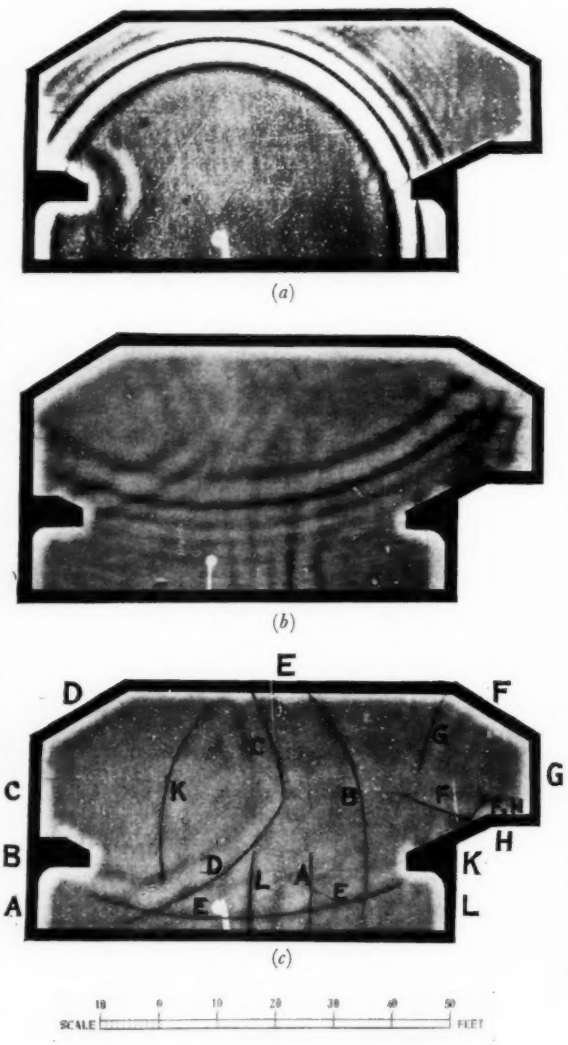


Figure two. Showing successive stages in the progress of ripples within a model section of a typical auditorium. Top, corresponds to $\frac{1}{34}$ second after emission; middle, $\frac{1}{18}$ second; bottom, $\frac{1}{15}$ second.

THE NATURE OF THE SURFACES OF THE CHAMBER

A large room of satisfactory shape, and from which separate echoes are absent, may still be very defective acoustically through the non-absorptive character of its surfaces. Indeed, the difficulty most frequently encountered in auditoriums is excessive reverberation, sounds being reflected to and fro without sufficient weakening.

The work of the late Professor Sabine elucidated the factors concerned in reverberation, and a convenient survey of his work was included in Mr. G. A. Sutherland's recent article in this JOURNAL on "Acoustical Demands in Auditorium Design." From Sabine's work the period of reverberation of a proposed hall may be calculated, this period being technically defined as the time which elapses after the finish of a sustained note before the general intensity in the room falls to the limit of audibility at one-millionth of its initial value. This period is given in seconds by the formula :

$$t = \frac{1}{20} \times \frac{\text{Volume of room in cubic feet.}}{\text{Total absorbing power of the surfaces of the room.}}$$

Data for the absorbing power contributed towards the total by each square foot of exposed wood, glass, plaster, etc., and certain other materials have been given by Sabine. They vary from 1·0 per square foot for open window or for floor-space covered by audience as ordinarily seated; 0·5 per square foot for hair-felt 1 in. thick; 0·2 per square foot for certain curtains, to 0·01–0·03 for glass or hard plaster. For most materials the absorbing power varies considerably with the pitch of the sound concerned, and only average values have been given here. We may note with regret that figures for but few English materials are available, and the behaviour of special absorbents and of panellings urgently needs to be studied, so that close calculations may be made. At

present absorptive powers must usually be estimated from figures published for similar materials.

Experiments have shown that reverberation has a preferred value for good acoustics. If reverberation is too pronounced the ear is confused by hearing at any time a number of sounds which have been emitted successively during the few seconds preceding. On the other hand, if the hall is large and very absorbent, lack of reinforcement from the surfaces causes the sounds heard to be correspondingly feeble and "dead."

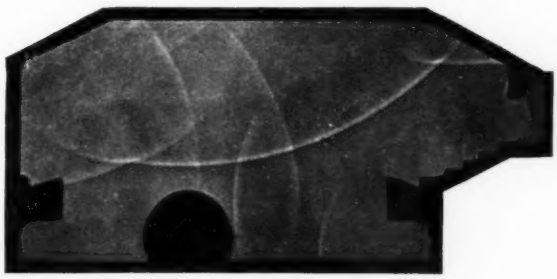


Figure three. Sound-pulse photograph.

While it is not possible to lay down any hard and fast rule on a question which is largely a matter of taste, nevertheless, it is generally agreed that for halls of moderate size, say up to 30,000 cubic feet, a standard period of just over one second represents the optimum conditions for both speech and music. Excessive reverberation is the more serious for speech, but insufficient reverberation is serious for music. Indications of the accuracy of taste is given by some experiments carried out by W. C. Sabine with the assistance of musical experts in five different rooms (2,100–6,000 cubic feet). The mean value of the preferred reverberation as obtained from the results of all the rooms was about 1·08 seconds, and the average departure from the mean was about 0·05 seconds.

For very large rooms the preferred period is apparently greater; for halls having a volume of, say, 100,000 to 1,000,000 cubic feet, the reverberant condition is usually regarded as satisfactory if the period is about two seconds. Presumably in very large halls the persistence of sound is tolerated for the sake of increased loudness, and speakers are expected to enunciate more slowly to accommodate themselves to the conditions.

A question arises as to the extent to which deviations from the optimum can be tolerated, and, naturally, this is even more difficult to assess than the optimum condition. In view of the high degree of accuracy of taste indicated above, it is probable that appreciable deviations are all objectionable, and put a strain upon the patience of the hearer. However, the following selection from published remarks made by W. C. Sabine is instructive. Speaking of the large lecture-room of the Jefferson Physical Laboratory, having a volume of 50,000 cubic feet, he regarded its condition empty, with a period of four seconds, as entirely impracticable for speaking purposes, but when it was full of people the period was 1·8 seconds, and he considered this to be fairly satisfactory. He did not, however, regard even such a condition with complete approval. For instance, a first design of the Little Theatre in New York, having a volume somewhat greater than 60,000 cubic feet, was rejected, although, over the range c^{I} (256) to c^{V} (4,096), it yielded a period of reverberation of 2·2 seconds—a state comparable with that of many theatres of which the acoustics are not specially questioned. Exceptional quality was sought in this case, and passing over as inadequate a modification yielding 1·8 seconds, a design was finally approved in which for musical notes over the range c^{I} (256) to c^{IV} (2,048), the period for a full audience lay between 1·1 and 1·5 seconds.

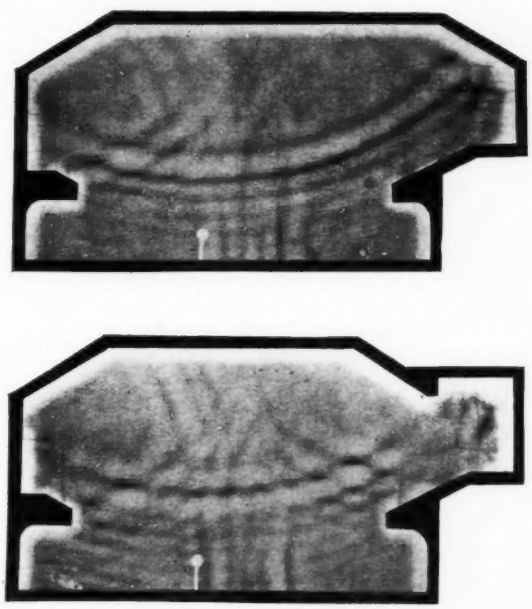


Figure four. Ripple photographs, contrasting two treatments of gallery ceiling. Above, gallery under main ceiling. Below, gallery under separate ceiling.

THE POSSIBILITIES OF ELECTRICAL SPEECH AMPLIFIERS

We have seen that for speakers in very large halls the question of adequate loudness becomes important, and that probably some excess of reverberation is tolerated for the sake of increased loudness. If this is so, then possibly the best solution would be to use electrical speech amplifiers to raise the volume of speech tothe necessary level, and to reduce the reverberation period of the hall to about one second, so that normally rapid speeches could be heard.

Unfortunately, there appear to be no published data for the optimum acoustical condition of an auditorium used in this manner for amplified speech. It appears desirable, however, to consider the question of amplified speech more closely, so that the possibilities of this new development may be judged.

In the first place, for natural effect the intensity at the ears of the listener must have approximately the same loudness as the original sounds at the microphone. This arises since increased loudness can introduce apparent distortion at the ears, low-pitched constituents of complex sounds tending to mask the higher. It is found necessary, therefore, to limit amplification so that the most remote listeners can just hear with comfort, and to place the projectors so high above the speaker's head, that the sound is not too great for the nearest auditors. When this is done the majority of the audience is conscious of only one source of sound, and that appears to be the speaker himself.

It has been found that to reproduce speech satisfactorily for public address purposes it is necessary for the system to amplify uniformly over the frequency range g to c^{V}, i.e. from about 200 to 4,000 vibrations per second. From scientific data published one would expect a range of c (64) to e^{V} (5,120) to be almost completely satisfactory. While there are speech frequencies outside these limits the loss in naturalness and intelligibility occasioned by their absence is said to be slight. Further, within these limits it is possible to amplify the energy of any one frequency nearly ten times as much as that of others before the ear—which has a range of ten billionfold—can detect any departure from the natural effect. These figures are interesting, apart from their application in public address equipment, for they indicate the range of pitch over which the absorbing power of a hall should be studied, and the extent to which it may vary within the range without affecting the naturalness of speech, provided always that the loudness is adequate for distinctness. For music a wider range of 35–7,000 is stipulated.

Speaking broadly, the main energy of the voice is of low pitch, but the characteristics essential to intelligibility are carried by the high-frequency sounds. For instance, if speech is passed through a filter which removes all sounds

lower in pitch than c^{ii} (512), 60 per cent. of the sound energy is removed, but while the result is somewhat unnatural, its distinctness is practically unimpaired. For distinctness of speech it is, therefore, vital to maintain adequate loudness of high-pitched sounds.

Further, the intelligibility of consonants—some of which have components of very high pitch, even above c^{v}—is somewhat seriously affected by reduction of speech intensity, and in ordinary conversation 50 per cent. of mistakes can be traced to three consonants alone. It is interesting that some degree of consonantal emphasis can be obtained by designing the electrical circuits of a public address equipment to emphasize components of high pitch. Indeed, the articulation of a poor speaker is sometimes relatively improved for broadcast purposes by this device.

The acoustics of the space in which speech amplifiers are used is a matter of considerable importance. The nature of the problem is somewhat varied by their use, but the requirements remain fundamentally the same.

Electrical amplifying equipment is not a remedy for excessive reverberation in a hall. It can promote loudness, but it cannot hasten the decay of sounds which, already emitted, persist sufficiently to cause confusion.

Separate echoes of the sound from the loud-speaker must be suppressed. In one respect amplified speech has, perhaps, an advantage over normal speech, in that there is freedom to place the projectors emitting the sound in a position where echo effects are minimized, whereas an ordinary speaker must stand at a fixed point on the platform. We have seen that the projectors should be placed high above the speaker's head so that the sound shall not be unduly great for the nearest auditor. In a hall with a very high ceiling there is further advantage in this, for with the projectors sufficiently near the ceiling, late disturbing echoes from this surface are eliminated, and the sound proceeds downwards towards the floor where, with an audience present, it is most likely to be absorbed.

It sometimes happens, particularly where some of the walls or ceiling are large curved surfaces, that echoes of the speaker's unamplified voice or reflections of extraneous sounds are focused to certain regions. It is important that the microphone shall not be located at one of these spots.

Resonance effects seldom occur in connection with the reproduced sound, for the spaces dealt with are usually so large that their natural frequencies are too low to be troublesome. However, they are important in connection with the mounting of the microphone. They generally result from attempting to conceal the microphone in some form of small enclosure. The best housing is a screen cover, which protects the microphone without affecting the sound reaching it.

A special difficulty which arises with electrical speech amplifiers is the tendency of the equipment to "sing" when the sounds already emitted from the projectors reach the microphone with sufficient intensity and suitable phase to aid the original sound. The system may then even emit a continuous note, or if it does not do this it will cause considerable distortion when sounds involving certain pitches are concerned. Usually the difficulty is sufficiently overcome by properly placing the microphone with respect to the projectors, but it forms one of the most troublesome problems met in actual operation. Fortunately, it is less pronounced in the presence of an audience owing to the increased acoustical damping of the room.

Summing up, it appears that in addition to solving the problem of inadequate loudness, electrical speech amplifiers may assist at times in dealing with echoes, and, where speech from a definite rostrum is concerned, they reduce the disadvantage of a very high ceiling. They are not a remedy for excessive reverberation. They have characteristics of their own, and in the design of any very large hall where a public address system is likely to be installed consideration might well be given to their particular requirements.

CORRESPONDENCE

ARCHITECT, BUILDER, CRAFTSMAN

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—Mr. Aumonier's letter deserves close consideration. The relations between building-owner (whom for convenience we will call the client), builder, and sub-contractor have been for some time a cause of anxiety to architects and surveyors. The matter is obscure; or perhaps it would be more correct to say that it has been obscured. My object in writing is to try and shed a little light upon it by showing exactly how we stand under the R.I.B.A. conditions of contract dated 1909.

There are two classes of sub-contractors. One is chosen by the builder himself for such things as plastering, excavating, slating, etc., while the other is chosen by the architect, without the knowledge of the builder, for such things as carving, ornamental plastering, heating, lighting, etc., and these we may call specialists. The first-named class need not detain us; they are free agents, and the terms of their sub-contracts with the builder are voluntary arrangements. Sub-contractors of the second class are named in the contract documents, the builder is instructed to accept them as his sub-contractors in accordance with clause 20 of the Conditions of Contract, and they have to accept the builder as their direct employer. The specialist may decline to become a sub-contractor, in which case he risks losing the job altogether. We will suppose that he agrees. The builder then presents him with a form of sub-contract to sign and, if its terms are inconsistent with those of the main contract or with the specialist's own stipulations attached to his estimate, the specialist would be within his rights in refusing to sign it, and the architect should support him.

Clause 28 of the Conditions of Contract lays down that the ". . . work to be performed by special artists or tradesmen shall be paid and expended at such times and in such amounts, and to and in favour of such persons as the architect shall direct, and sums so expended shall be payable by the contractor without discount or deduction or . . . . by the employer to the said artists or tradesmen. . . ." The effect of the whole clause is to make the specialist a real sub-contractor, except that the builder is relieved from responsibility in respect of the amount of payments, the architect taking it upon himself. Although the word "certificate" is not found in the clause, yet payment must be made as "directed," and the direction would be equivalent to, if not actually, a certificate. The clause certainly does one thing: it makes it incumbent on the builder to pay the specialist the full amount certified or directed without discount or deduction, and without waiting, in Mr. Aumonier's words, "until he has actually received the money from the building-owner." The brick, cement, and timber merchants do not wait for their money; why should the specialist?

The R.I.B.A. Conditions leave the question of the position of the builder rather in the air, a good deal has to be inferred. In his estimate the builder includes the provisions for specialists' work, and is told to add his profit. This profit is not a free gift from the client, it has to be earned by rendering some service. This service consists in giving facilities and making proper arrangements for the conduct of the works, in providing money for payment when directed, *and in seeing that the specialist's work is carried out satisfactorily*. This last item will astonish and, perhaps, even alarm some builders, but there is no escape. The builder must also make good any damage done by specialists' bad work and recover the cost, not from the client, but from the specialist. Similarly, loss and damage caused to the client by undue delay on the part of the specialist is recoverable by the client from the builder who, in his turn, has a claim against the specialist.

The duties of the architect in directing payments, the position in case of bankruptcy of either client or builder, give rise to many puzzling questions. It is pretty obvious that when clause 28 was drafted its full effect was not considered. It looks what it was,

a compromise, and one that satisfies nobody. It needs careful study with an open mind if the mutual positions of client, architect, builder, and specialist are to be properly defined.

J. E. DROWER

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—It was with great interest that I read Mr. Aumonier's letter. There is no doubt that the position of the specialist and craftsman in regard to building contracts is a thoroughly unsatisfactory one. The whole of his negotiations culminating in a sub-contract are carried on with the architect representing the building proprietor; and his instructions are, in fact, received from the architect to whose satisfaction his work has to be performed, yet he receives in most cases his actual order (of a kind) from the main contractor. This order is, however, of little real value, as the main contractor safeguards his own interests by making it clear on his order form that he will only be responsible for payment as and when he receives the actual cash from the building proprietor, and then in many cases only after fourteen days from the receipt by him of this payment, and subject to a discount varying from 2½ per cent. to 5 per cent. Obviously, therefore, the sub-contractor is most unfairly called upon to submit to two business risks, i.e. :

1. The solvency of the main contractor.
2. The solvency of the building proprietor.

If the main contractor fails to pay him, the sub-contractor, only under certain circumstances, has recourse to the building proprietor. If the building proprietor fails to pay the main contractor, he, the main contractor, is absolved under the safeguarding clause in his order on the sub-contractor from paying him. Thus the main contractor runs one business risk, the sub-contractor two.

To increase his difficulties still further the unfortunate sub-contractor negotiates with and receives his real instructions neither from the builder nor the building proprietor (whose very name he often does not know), but from the architect.

Such is the present state of confusion that under certain conditions it has been held that the contractor, in fact, acts as agent for the proprietor, and in the event of his, the contractor's, insolvency, the sub-contractor has a legal claim against the proprietor.

Under the R.I.B.A. contract the architect has power to certify the payment of p.c. items direct by the proprietor. This is the general practice in the U.S.A., and, in my opinion, it would be infinitely more satisfactory to all concerned if it were adopted by the architects in this country.

R. HUGH ROBERTS
Managing Director, The Birmingham Guild, Ltd.

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—Mr. Aumonier's letter raises questions in the solution of which the architect feels somewhat at a loss. We think we are right in saying that the average architect is not fully aware of the difficulties which may arise between the builder and the sub-contractor, particularly as regards forms of indemnity and methods of payment. Indeed, the practice of builders seems to vary, and several builders have given us as their opinion that in the case of a craftsman who supplies, as it were, labour as opposed to goods the 2½ per cent. for cash payment would not be deducted. Perhaps the difficulty lies in the fact that the craftsman as such is not recognized in the language of contracts, and can appear only as a sub-contractor.

There must be many like ourselves who would like to see a committee of the Institute discuss and clarify the general question of the relationship between the builder and sub-contractors, and between the architect and specialists. In the same way as the architect's method of work is being modified to-day, owing to the increasing complexity of his problem, and the growing necessity of specialist consultation, so it would seem that the fairly simple forms of contract hitherto adopted require revision and further consideration. There are probably others who will follow Mr. Aumonier's example and bring forward for discussion their own practical difficulties and problems. Amongst these may be mentioned the question of discounts for the supply of items such as sanitary fittings. In the north of England, for example, we have found that it is customary for merchants to reserve a further 10 per cent. discount for the builder, and while this may cover certain services paid for separately in the south, it clearly goes behind the R.I.B.A. form of contract. A discussion on these very practical points by architects and builders of wide experience would, we feel sure, be followed with the greatest interest by all in the profession and building trades.

EASTON AND ROBERTSON

HOLLOW FLOORS AND HOLLOW ROOFS

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—I have to inform you that the London County Council have passed the following resolution :

That the Council, in pursuance of the powers vested in it by the First Schedule (Part iii) to the London Building Acts (Amendment) Act, 1905, do approve as fire-resisting hollow floors and hollow roofs constructed of steel filler joists in combination with hollow bricks and concrete, subject to the following conditions :

(i) That all materials shall be to the satisfaction of the district surveyor, and the whole of the work shall be executed to his satisfaction.

(ii) That if any blocks are of clay they shall be thoroughly burnt, and be free from lime, cracks, and other defects.

(iii) That the concrete used for filling in, either between, around, or above the hollow bricks, shall be mixed in the proportions of at least one volume of Portland cement, two volumes of various sizes of clean siliceous sand, and four volumes of hard broken brick, flint or stone of all the various sizes which will pass through a mesh of ¾ in. square measured in the clear.

(iv) That there shall be at least 1 in. of fire-resisting material (inclusive of plaster) below the lower flange of the steel filler joist, and that all joints between hollow bricks shall be pointed in cement mortar.

(v) That there shall be at least 1 in. thickness of concrete or other fire-resisting material covering the upper flange of the steel filler joists.

(vi) That the steel joists shall receive one coat of rust-resisting paint.

(vii) That the sides and undersides of steel beams and girders (other than filler joists embedded in the thickness of the floor) shall be protected from the action of fire by fine tamped concrete at least 2 in. thick, or burnt clay tiles and cement plaster of an aggregate thickness of 2 in., or fine concrete 1½ in. thick, trowelled round suitable mesh reinforcement, and that in all cases the concrete shall be bedded solidly against the steel and there shall be no intervening cavity.

(viii) That fillets, strips, and blocks of wood or other combustible materials shall not be embedded in the thickness of the fine concrete necessary to comply with any of these conditions.

(ix) That the thickness of the material above the void added to the thickness of the soffit (exclusive of any plaster) shall be not less than 3 in.

(x) That the dimensions specified in the foregoing conditions shall refer only to questions of fire-resistance and resistance to impact during fires apart from any requirements in respect of imposed loads and working stresses under normal conditions of use.

Provided that this approval shall not in any way derogate from any of the powers of the Council, and shall not in any way affect the requirements of (1) the London County Council (General Powers) Act, 1908, with respect to cubical extent of buildings; (2) the London County Council (General Powers) Act, 1909, with respect to the enclosure or encasing of pillars or girders with brickwork, terra-cotta, stone, tiles or other incombustible materials; and (3) the regulations made under the provisions of section 23 of the London County Council (General Powers) Act, 1909, with respect to the construction of buildings wholly or partly of reinforced concrete.

E. TOPHAM FORREST,
Superintending Architect, London County Council.

LITERATURE

"THE WORK OF ERNEST NEWTON, R.A."

How difficult it is to realize that a whole quarter of the twentieth century has slipped away. To many of us it seems little enough time ago that the world was entering upon this new century with its uncharted years ahead, while the nineteenth, with all its familiar landmarks was drawing to an uneasy close in the midst of the Boer War.

Much water has run under the bridges since then. In the architectural world we have been painfully reminded of the passage of time, in the thinning of the ranks by the deaths of such men as Ernest Newton, Paul Waterhouse, and Leonard Stokes; men who were in the hey-day of their fame at the turn of the century, whose names inspired the young man who was starting his career twenty-five years ago.

Ernest Newton was a link between the old and the new centuries, his working years were pretty equally divided between them. His early influences were amid the battle that surrounded the defeat of the Gothic manner, but his work had the breadth of to-day's outlook. He links the days when Norman Shaw, with his profusion of invention and high enthusiasm, was giving new birth and life to domestic architecture and the after-war world of to-day, where simplicity in architectural form is of necessity the dominant note. Ernest Newton was a worthy bearer of the torch, and through his work we can see indisputably how our architectural predilections of to-day are but a development on the foundations set by Devey, Shaw, and Philip Webb.

It is, therefore, of more than passing interest that illustrations of Ernest Newton's work have been gathered together in a book.

One feels in turning the pages that he, perhaps more than most architects, revealed himself through his work, and so it is right that the book should consist mainly of illustrations. Sir Reginald Blomfield writes a short introduction, and speaks feelingly and charmingly of the man he knew, while W. G. Newton contributes a critical essay, sketching in an outline of his father's architectural career from the days when he entered Norman Shaw's office. He touches upon the tendencies in art and architecture that influenced him, and gives us some idea of the serenity and steady purpose that are amply reflected in his buildings.

Here one sees that, as Sir Reginald Blomfield says, he was "a man of fastidious taste," always working seriously and lavishing much care on every detail. Very sound he was, but with little of daring or adventure about him, preferring well-worn paths to excursions into the experimental.

Newton did other work than domestic it is true, but it is in his houses that one finds him in the happiest vein. Here we see what steadfast ideas he had about English architecture, and what the English house should be, and we find a continuous advance along a road that he well understood. He had made up his mind that the modern house should be a straightforward affair, the outcome of modern needs and of to-day's way of life, without affectation or any sham effects. He progressed towards direct plan and balanced elevation. With this conviction in his mind he was singularly unaffected by fashion or caprice in design. The "Art Nouveau" vogue of the 'nineties persuaded him to introduce a few inlaid diamonds on a staircase, or an occasional heart into minor decorative features, but the sound, sensible aspect of the houses remained. Later, the craze for "old English," with its half-timber, its beaminess and sham picturesqueness did not deflect him from the love of gracious simplicity of line. This is not to say that, if occasion demanded, he could not work in a picturesque manner. "Oldcastle" is a good example of how happily he could harmonize new work with old, but there is no pretence about it. However, the balanced plan and regularly spaced window had the greatest attraction for him, and in this he seems to have been in front of his time, pointing the way that others were later to follow.

There are sketches and drawings in the book that give us some idea of how Newton worked. One feels that invention did not come very easily to him, ideas did not flow from his pencil, design was rather a matter of painful labour, and once he had found a type of plan or a way of elevation that appealed to him he would play upon the same theme time and aga adapting it and perfecting it to fit the new problem. The placing of the house on the site, the getting the best out of the surroundings, harmony with the landscape, and the arrangement of the garden all were part of his art of house building, and so, though the theme might be the same, the houses each have their own individuality and very definite character.

As with all artists, his work does not always reach the same level of achievement. He would seem to have been happier in the smaller or medium-sized houses. These, sometimes, besides having all the refinement of design that we see running through all his work, capture that exceedingly elusive quality of charm which touches the good into the lovable. "Luckley," "Fouracre," and "Logmore" are notable examples. "Brand Lodge" and "Scotsmanfield," essays in roughcast houses, are somewhat bald, and his way of putting bay windows under gable ends is not always happy. Occasionally, and more particularly in the larger houses, he could be dull, and in the grand manner things did not quite come off.

However, all who practise the art of architecture know how exceedingly difficult it is to achieve even a moderate level of artistic success, and how many factors have to be manipulated with skill to avoid complete failure. To look over a man's life-work and find so little to criticize, as there is with Newton's, must be rare indeed. There is a soundness, common sense, and true artistic feeling bearing on all he did, and his houses are pleasant, gracious houses, and must be eminently satisfactory and satisfying to live in. His work will date less than that of almost any of his contemporaries.

The illustrations in the book are mostly from well-chosen photographs, and being arranged in chronological order, give a comprehensive idea of his work and its development. The complete list of his works is also of interest.

The short letterpress explanations of the illustrations are sufficient as the work tells its own story, but they are not always quite fitting to a serious work. To be told that a house is "a gentleman, but a country gentleman," reminds one of the chatty titles familiar in the illustrated papers or on the screen of the cinema. This is, however, criticism of a trivial matter, and hardly detracts from the excellence of the book as a whole, a book which should be possessed by all lovers of what is best in English domestic architecture.

OSWALD P. MILNE

The Work of Ernest Newton, R.A. London: The Architectural Press. £3 3s.

NEW SPECIFICATIONS FOR PAINT MATERIALS

The British Engineering Standards Association has issued British Standard Specifications for genuine dry white lead and genuine white lead oil paste for use in paint manufacture. They contain clauses regulating the composition together with standard reception tests for the purchase of genuine white lead in dry and paste form respectively, and appendices giving methods of carrying out the tests. These specifications have been prepared at the request of the paint manufacturers by a committee representative of both the buying and manufacturing interests and are the first to be published of a series of specifications for paints, varnishes and paint materials. As in the case of all British Standard Specifications, they will be reviewed as experience of their working or progress in the industry renders it necessary, and revised issues will be published from time to time.

"THE NEWER VIEW OF HISTORY"

With reference to the review under this heading in our issue of March 24, the authors write to state that "not a single subject in our books has been *redrawn*, all being reproduced direct from contemporary illustrations, so that the century can be viewed through the eyes of the people who lived in it and recorded it." Our reviewer, in expressing regret for assuming that the illustrations had been cleverly redrawn, explains that this inference seemed very natural from the brilliant clearness of the reproductions, which are delightful in every respect.

Fouracre: From the lawn. From
The Work of Ernest Newton, R.A.

THE COMPETITORS' CLUB

WHY A JURY?

THE oft-discussed question of the relative merits of adjudication by a jury as against the decision being in the hands of a single assessor has never reached a final conclusion. On the Continent the jury is almost universal, with us it is usually reserved for cases of more than ordinary importance, and being a comparative rarity, has not evolved for itself methods of procedure enabling full value to be obtained from such a combination. The main advantage of the jury is in securing different types of outlook in its members: one experienced in competition practice, one recognized as expert in the type of building demanded, one recognized as a leader in expressive design, and such others as may be regarded as likely to contribute to a well-balanced decision. With us the selection is sometimes quite haphazard: some qualifications are duplicated, and other ones omitted, so that very little of the possible advantages of a jury is secured, and we are apt to conclude that one assessor can do the work just as well.

The report on a recent competition in Amsterdam indicates how combined qualifications can be advantageously employed. At the first meeting the members of the jury satisfied themselves as to the compliance of the schemes with the conditions, at the second these were looked at solely from the town-planning point of view, the third and fourth were devoted to the internal planning in detail, the fifth and sixth to the actual selection and placing of the premiated designs, and the seventh to the preparation of the report. It is easy to see how various types of mentality would all find their *métier* in such consultations. The competition expert would take the lead in the first and last; the architect of broad general conceptions in the second; those with specialized experience in the third and fourth; while all would be brought in co-operation in the fifth and sixth. Of course there is no special virtue in the number of conferences; these might be more or less, but the general programme for reaching a decision looks very sound, and illustrates a failure in some of our own adjudications, in which the town-planning aspects, covering the relation of the building to its surroundings, have been ignored.

The first necessity, on the formation of a jury, is to agree on a systematic and logical mode of procedure. We are not strong in this, and rather like to arrive at our decisions by "intuition," a somewhat dangerous course, and liable to result in grave injustice at times. We are not likely to adopt quite the same standards of merit in design as those of the Continent, but competitions would be much less of a gamble than they are if our own standards were more definitely formulated and more closely adhered to when deciding on comparative merits. Juries can only work efficiently when the members recognize some general principles; if they do not, but fall back on their intuitive faculties, the confusion and uncertainty which are then inevitable will probably result in a decision worse than that of a single assessor.

As indicating the smoothness with which it is possible to conduct and adjudicate when the basic principles for it are generally understood, it is only necessary to quote the case of the Grand Palais and Petit Palais in 1896. The jury numbered no less than forty-seven members, and about two hundred designs were submitted. Two months were allowed for the preparation of the designs, and the adjudication occupied a fortnight. Only a clear appreciation of the right method could have enabled so large a jury to have arrived at so good a decision as this one in such a short time.

Over sixty years ago M. Cæsar Daly, writing on competitions, regarded the nomination of the jury (the jury system was not questioned) as the greatest technical difficulty in a competition on account of the demand that all schools of thought should be represented and the difficulty of finding a common ground on which a logical decision could be based. Fortunately since that time the general trend of architectural opinion has reached a more definite formula—if not an international one, at least for each country separately—and the conflict as to styles and the divergencies they connoted are practically extinct. Nevertheless, there remain a number of attitudes that men of ability still take towards the problems of design, and inasmuch as these are not antagonistic to each other, but merely tend to lay stress on the various aspects in different proportions, we may well continue to accept M. Cæsar Daly's views, and take careful note of the need that a jury should be representative of these differences, and not just a haphazard selection of architects, regardless of their special faculties. A mere increase in numbers is valueless—indeed, worse than valueless—if it does not offer the merit of a greater breadth of outlook.

In view of the careful consideration that has from time to time been given to competition procedure both at home and abroad, it certainly looks as if we are not treating the question seriously. There is an excuse for promoters, in that they cannot be expected to visualize the difficulties; but there is none for ourselves, as represented by our professional societies, if, knowing where the weak spots are to be found, we do not take proper steps to put matters right. Failures in adjudication, where there is a single assessor, are usually due to inexperience in competition practice, or too narrow an outlook as to the principles involved in architectural design. Exactly the same failures may occur with a jury if it is not selected with the intention that each member shall bring into its deliberations some qualifications not to be found in the others, and to secure by this means a broader general view than the single judge is likely to be able to take. The cry for a jury is a mere shibboleth, but the demand for adjudication by a body of men selected with careful deliberation to supplement each other's qualities is a rational one, and may be logically put forward by those desiring to see our competitions placed on a sounder footing.

SENESCHAL

COMPETITION CALENDAR

The following competitions are announced with the full approval of the R.I.B.A.

Friday, April 30. New interior design for Wagon-Lits. Premiums, 100,000 francs, 25,000 francs, 10,000 francs, and 5,000 francs. Particulars from La Compagnie des Wagons-Lits, 49 Rue de l'Arcade, Paris.

Monday, May 10. Isolation Hospital for Infectious Diseases, Doncaster. Assessor, Mr. T. R. Milburn, F.R.I.B.A. Particulars from Mr. W. Bagshaw, Town Clerk. Deposit £1 1s.

Friday, May 21. Elementary school, Bristnall Hall Lane, Warley, Worcestershire, for the Oldbury U.D.C. Assessor, Mr. W. S. Skinner, F.R.I.B.A. Premiums, £200, £100, and £50. Particulars from Mr. Arthur Culwick, Clerk to the Council, Council Offices, Oldbury, Worcs. Deposit £2 2s.

Monday, June 14. Dance Hall, Restaurant, Pavilion, and Shops at the Sea Beach, Aberdeen, for the Town Council. Assessor, the President of the Incorporation of Architects in Scotland. Particulars from Mr. A. B. Gardner, Town House, Aberdeen.

Saturday, July 31. Australian National War Memorial, Villers Bretonneux, France. Open to Australians. Particulars from High Commissioner's Office, Australia House, Strand. Deposit £2 2s.

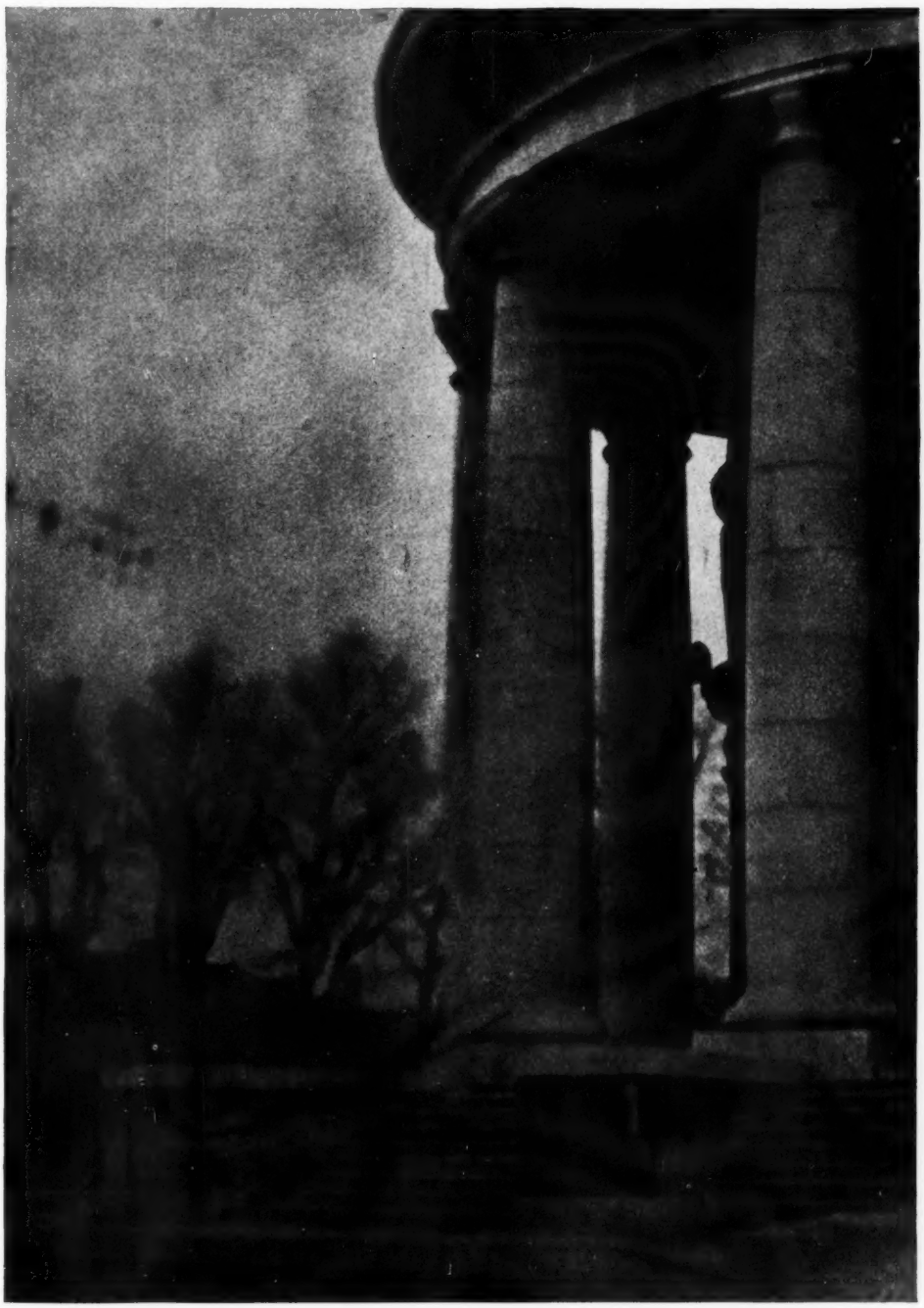
The conditions of the following competition have been received by the R.I.B.A.

June 21-23. Royal Society of Arts: Competition for Industrial Designs. Particulars from the Secretary of the Society, Adelphi, W.C.2.

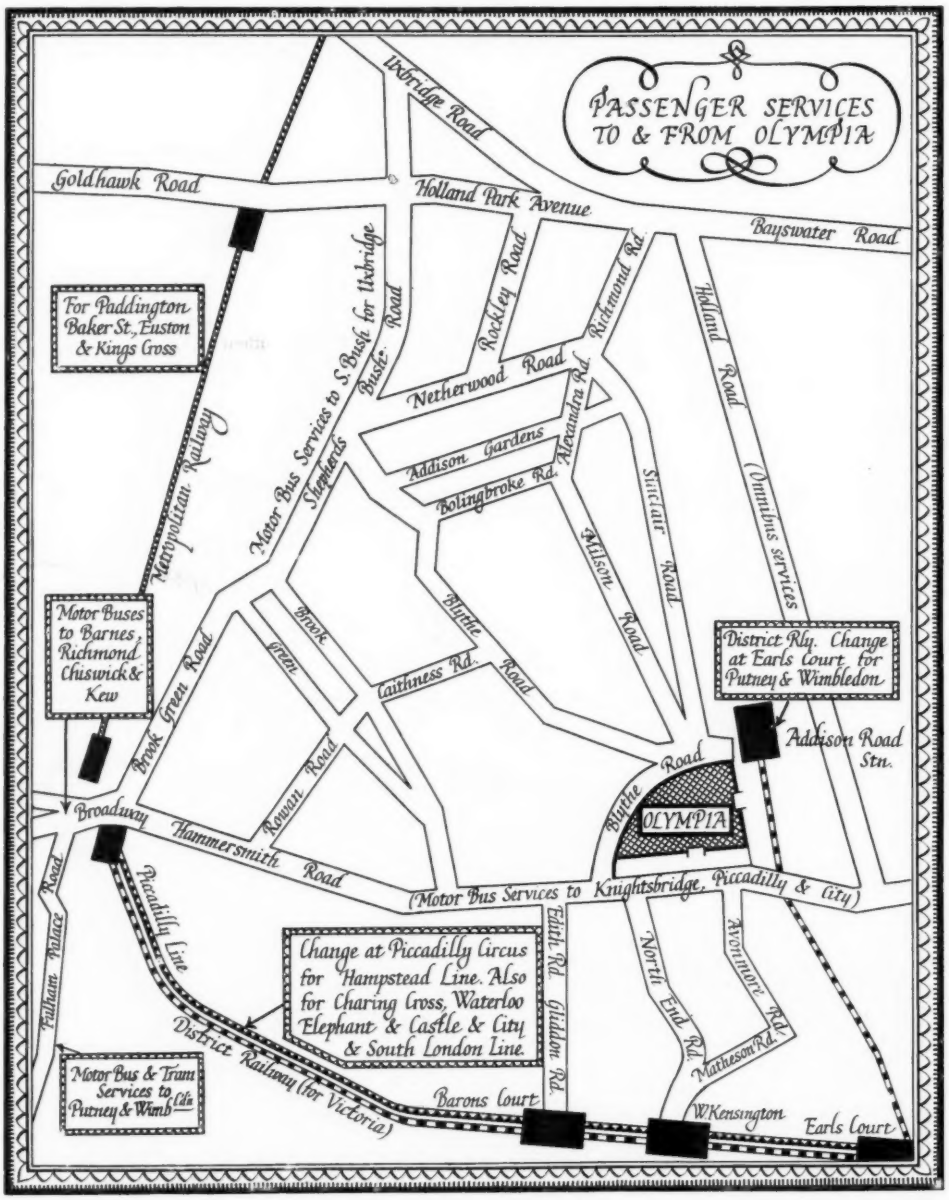
Monday, July 12. Royal National Eisteddfod of Wales, Swansea, Competitions: (1) National Parliament House of Wales (Prize, £100; (2) Street Façade to a Large Stores (Prize, £25); (3) Set of Measured Drawings of Architecture (Prize, £25). Assessor, Mr. Arthur Keen, F.R.I.B.A. Particulars from the publishers, Messrs. Morgan and Higgs, Heathfield Street, Swansea (1s. 2d. post paid).

Monday, July 12. Lay-out for new cemetery for Leicester City Council. Assessor, Mr. H. V. Lanchester, F.R.I.B.A. Premiums, £100, £50, and £25. Particulars from the City Surveyor. Deposit £1.

THE BUILDING EXHIBITION



SUPPLEMENT THE FIRST



How to Get to Olympia.

The Building Exhibition will be opened at Olympia at 12 noon to-day by the Rt. Hon. the Lord Mayor of London, Sir William Pryke, who will be accompanied by the Sheriffs. Mr. E. Guy Dawber, President of the R.I.B.A., will preside at the opening ceremony, and a vote of thanks to the Lord Mayor will be proposed by Sir Kingsley Wood, M.P., Parliamentary Secretary to the Ministry of Health.

Following is a list of the principal conferences and visits in connection with the exhibition: Thursday, April 15: Clayworkers' Day. Saturday, April 17: Visit of Institution of Sanitary Engineers. Tuesday, April 20: Visit of Institution of Structural Engineers. Wednesday, April 21: Visit of Estate Clerks of Works. 3 p.m. Lecture: "Substance, Form and Colour in Concrete," by Mr. Frederic Coleman. Chairman: Mr. Ralph Knott, F.R.I.B.A. Thursday, April 22: Visit of London Master Builders' Association. Friday, April 23: Visit of the London Society. Saturday, April 24: "At Home" to Members of the R.I.B.A., and A.A. Meetings of Association of Architects' Surveyors and Technical Assistants. Monday, April 26: Lecture: "Old London Bridge: Peter Morris and his Water Wheel," by Mr. Herbert A. Cox. 6.30 p.m., Chairman, Sir William Bull, M.P. Tuesday, April 27: A.A.S.T.A. Lectures: "Concrete Construction and Design," "Central Heating of Large Buildings." Chairman, Mr. E. Fiander Etchells, A.M.Inst.C.E. The exhibition closes on April 28.

THE EXHIBITION ERA

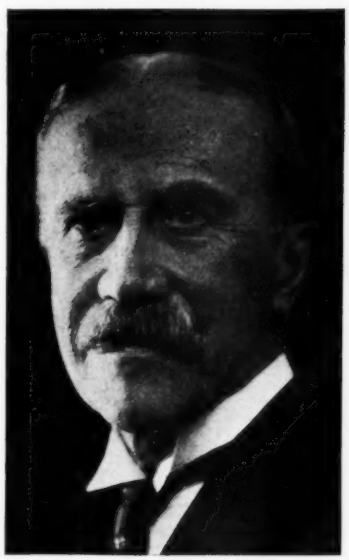
BY CLENNELL WILKINSON

It is easy to sneer at exhibitions—to draw attention to the rapid decay of an artist's conscience before the necessity of catching the eye of the prospective client as he enters the exhibition hall; to point out that an insincere straining after "originality" has thus become a feature of this era of exhibitions; to question whether works of art can ever show to advantage—can ever teach anyone anything worth knowing—when drawn up in ranks for inspection by people who, for the most part, could never learn; to urge that the silliest mistake of all is to drag masterpieces of painting or sculpture from their contexts and display them all in a bunch under conditions of lighting and from angles of vision for which they were never intended; and, finally, to argue that the sum total of "culture" imparted to the crowds who file before objects thus displayed is less than the total amount acquired by the much smaller number of privileged travellers who are able to go and see them in their proper surroundings.

But it will be found upon reflection that all, or nearly all, of these familiar arguments are points against museums or permanent picture galleries rather than against exhibitions. An exhibition is not permanent, except in the sense that you may repeat it under the same name, but with different exhibits, every year. There would have been no harm in removing the Elgin marbles, if the intention had been to exhibit them in the British Museum for a month or two, and then restore them to their proper places on the Parthenon. An Exhibition is essentially a *temporary* display, intended primarily to afford to the visitor an easy opportunity of *comparison*—without which it is impossible to cultivate a taste in art or, indeed, to acquire any knowledge worth having of anything. And, having served this useful purpose, the details of an exhibition are re-distributed amongst their owners, and the world goes on as before—but a slightly better and wiser world, and a world in which no one has suffered any permanent loss anywhere through the holding of the exhibition.

An exhibition, therefore, is before anything, convenient. It saves trouble, and it is from this point of view that a Building Exhibition is, perhaps, the most useful of all. For to acquire anything that could be called a good standard of comparison in regard to architecture and building necessitates more trouble—more travelling about the world—than in the case of any other art. The typical modern man—which is to say, the "business man"—has no time for travel. If he does it at all, he rushes it. There is pathos and irony in this, because travelling has never been so easy before. As Mr. Chesterton observed the other day, just when we have really nothing to say, we invent the loud speaker. In the same way, just when we have no time—and, except in America, no money—for travelling, we have invented all sorts of ways of moving about the world more easily and farther afield than our ancestors ever dreamed of. The eighteenth century traveller came home with a store of memories; the modern motorist may go farther, but he certainly sees less. The old joke about the man who asked his chauffeur when they were going to get out of this interminable cemetery, and was informed that what he took for gravestones were really milestones, is a crude, but rather a penetrating, comment upon the kind of knowledge of local architectural features that modern travellers bring home. That is why we say that a Building Exhibition is probably the most useful of all exhibitions. It meets a real human need, which the ordinary man simply has not the time to satisfy.

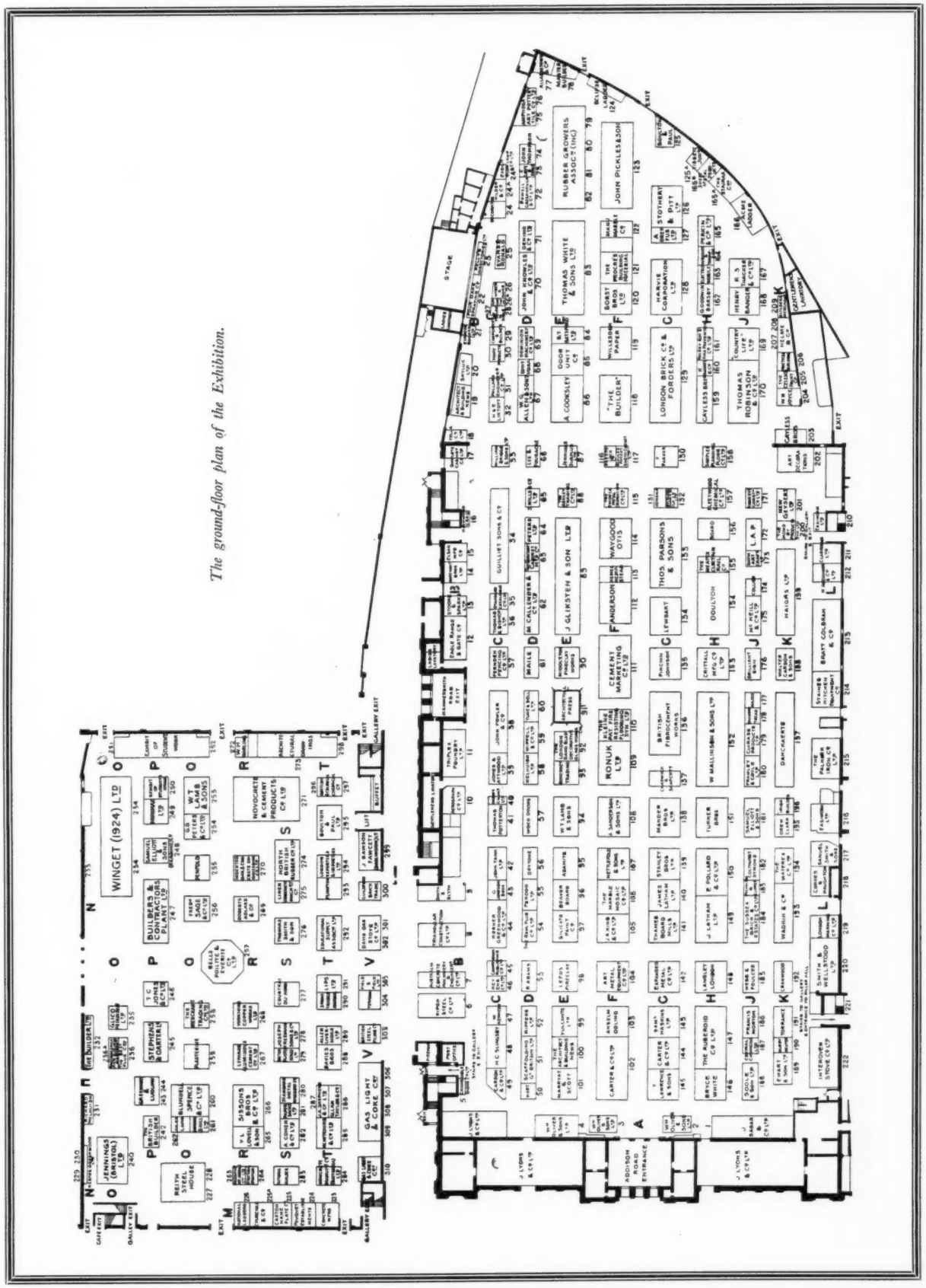
And, anyhow, this is an age of exhibitions. Anything that we are at all proud of we hasten to exhibit. Building must not be allowed to fall behind in the race, for it is one of the few indisputable facts about the war-weary "nineteen twenties" that they have witnessed a genuine and widespread revival of interest in architecture. We are approaching the time when the man in the street may pause on his way to lunch to look at some conspicuous building, when people in the train may be heard discussing the architectural merits of rival banks or shops. That is a tendency that should be encouraged. All that the man in the train asks for is a little simple instruction. At present his conversational style is badly cramped by his ignorance of architecture, and, notably, of its phraseology. At an exhibition he can see at a glance what are the main problems confronting a builder, and he can see how they have been overcome. A Building Exhibition is of enormous practical value to a professional architect, but to a layman it may be an intellectual revelation. And it is a revelation that can be obtained in a single afternoon.



Left: The Right Honourable The Lord Mayor of London, Sir William Pryke. Centre: Mr. E. Guy Dawber, President of the R.I.B.A. Right: Sir Kingsley Wood, M.P., Parliamentary Secretary to the Ministry of Health.

THE EXHIBITORS

	Row.	Number.
Acme Patent Ladder Co., Summerley Street, Earlsfield	J	166
Adamite Co., Ltd., Regent House, S.W.1	E	99
Adams, Robert, 5 Emerald Street, Holborn	D	53
Aerograph Co., Ltd., 43 Holborn Viaduct, E.C.	B	10
Aeronautical & Panel Plywood Co., Ltd., 218 Kingsland Road, E.C.2	H	152
Alexander, Herbert & Co., Ltd., Charmers Street, Leeds	L	212
Allardstown & Co., 51 Western Road, Upper Norwood, S.E.19	D	57
Allen, W. G., & Sons (Tipton), Ltd., Princes End, Tipton, Staffs.	D	67
Allen-Liversidge, Ltd., Victoria House, S.W.1	T	289
Anderson & Son, Ltd., D., Park Road Works, Stratford	F	112
Architect & Building News, The, 10 Lancaster Place, Strand, W.C.2	B	19
	E	100
Architectural Press, The, 9 Queen Anne's Gate, S.W.1	E	91
Art Decorations, Ltd., 72 Victoria Street, S.W.1	K	202
Art Metal Equipment Co., Ltd., 186 Shaftesbury Avenue, W.C.	F	104
Ashley Trading Co., Ltd., 11 Victoria Street, S.W.1	E	88
Athena Composition Flooring Co., Athena House, Waterloo Street, Hammersmith	G	131
Australia Concrete Machinery & Engineering Co., Ltd., Pordon Road, Brixton	B	7
Barnett, H., & Co., 19 Little Alie Street, E.1	H	160
Bath Art Craft, Ltd., Lower Bristol Road, Bath	J	173
Batsford, B. T., Ltd., 94 High Holborn, W.C.	E	84
Beaver Board Co., Ltd., 133 High Holborn, W.C.	B	96
Bell's Poilite & Everite Co., Ltd., Southwark Street, S.E.	Q	257
Bestpling Co., 56 Warren Street, Tottenham Court Road	O	236
Blundell Spence & Co., Ltd., 8 and 9 Upper Thames Street, E.C.	Q	260
Board, John & Co., Ltd., Dunball, Bridgwater	H	156
Borst Bros., Ltd., 74 Rivington Street, Shoreditch	F	120
Boulton & Paul, Ltd., Norwich	T	295
Bratt Colbran & Co., 10 Mortimer Street, W.	L	213
Briggs, Wm. & Sons, Ltd., Dundee	C	33
Brilliant Sign Co., 131 Uxbridge Road, Shepherds Bush	J	176
British & Colonial Chemical Co., Ltd., 91 Victoria Street, S.W.1	T	296
British Fibro-cement Works, Ltd., Central House, Kingsway	G	136
British Plaster Board, Ltd., 605 Tower Buildings, Liverpool	S	279
British Steel Piling Co., Ltd., 54a Parliament Street, S.W.1	V	305
Bryce, White & Co., Ltd., 28 Wharf Road, City Road, N.1	H	146
Buckland Sand & Silica Co., Ltd., Buckland Court, Betchworth, Surrey	G	132
Builders & Contractors Plant, Ltd., 51 Tothill Street, S.W.1	P	247
"Builders' Merchants' Journal," 104 High Holborn, W.C.	K	209
"The Builder," Ltd., 4 Catherine Street, W.C.2	F	118
	N	232
Callender, George M. & Co., Ltd., 25 Victoria Street, S.W.1	D	62
Carden & Co., Ltd., 61 Chancery Lane, W.C.	C	49
Carson, Walter & Sons, Grove Works, Battersea, S.W.	K	198
Carter & Co., Ltd., Poole	F	102
	G	144
Caxton Name Plate Co., 11, 13,15 Rochester Row, S.W.1	M	225
Cayless Bros., Battersea Park Road, S.W.8	R	159
	K	203
Cement Marketing Co., Ltd., Portland House, Tothill Street, S.W.1	F	111
Central Chemicals, Ltd., 71 Central Buildings, London Bridge, S.E.	J	187
Chadwick & Shapcott, Ltd., Acorn Works, Henry Street, Gray's Inn Road	G	137
Changeable Sign Co., 182 Shirland Road, W.9	B	5
Churchill, Charles, & Co., Ltd., 9 Leonard Street, City Road, E.C.2	N	225a
Clarkhills, Ltd., 13 Albemarle Street, W.1	S	282
Cohen, A., & Co., Ltd., 148 Dover Street, S.E.1		
Collier, Arthur, 453 Brixton Road, S.W.	J	174
Colthurst, Symons & Co., Ltd., Bridgwater	J	182
Compendium Publishing Co., 93 Chancery Lane, W.C.2	C	45
Concrete Manufacturing Co. (Battersea), Ltd., 317 High Holborn, W.C.	M	223
	T	284
Cooksley, A., & Co., 21 Tabernacle Street, E.C.	E	86
Cornes & Haighton, Ltd., 240 High Holborn, W.C.	L	318
"Country Life," Ltd., 20 Tavistock Street, W.C.2	J	169
Courtrai-du Nord Tile Co., 161 Borough High Street, S.E.1	S	277
Crittall Manufacturing Co., Ltd., 246 High Holborn, W.C.	H	153
Cuirass Products, Ltd., Abbey House, Victoria Street, S.W.1	J	179
Danckaerts Woodworking Machinery, Ltd., 77a Queen Victoria Street, E.C.	K	197
Davis Bros., 225 Lea Bridge Road, Leyton, E.10	T	288
Davis Gas Stove Co., Ltd., 60 Oxford Street, W.	V	301
Dawson, Fawcett J. (Darlington), Ltd., Darlington	V	299
"Decorator" The, 301 Bank Chambers, W.C.1	B	24
Denning & Co., Ltd., Crimchard Works, Richmond	D	71
Diamond Tread Co., Ltd., 28 Victoria Street, S.W.1	J	178
Dominion Machinery Co., Ltd., Union Street S., Halifax	D	69
Door Unit Co., Ltd., Park Royal, N.W.10	E	85
Doulton Co., Ltd., Lambeth, S.W.	H	150
Drew, Clark & Co., Ltd., Diamond Ladder Works, Leyton, E.10	K	195
Dreyfus, A., Ltd., Pepler Works, Pepler Street, Loftin Road, N.W.1	H	165
Dry Rot & Fire Prevention Co., Ltd., 33 Furnival Street, E.C.4	H	161
Drytone, Ltd., 73 Gower Street, W.C.1	D	56
Eagle Range & Grate Co., 127 Regent Street, W.	B	12
Easiwork, Ltd., 403 Oxford Street, W.1	L	210
Eclipse Rail-Track Ladder Co., Ltd., 40 Newfoundland Street, Bristol	F	124
Educational Supply Assn., Ltd., Esavian House, 171 High Holborn, W.C.	T	292
Electromobile, Ltd., Prospect Works, Otley, Yorks	H	163
Elliott, Saml., & Sons (Reading), Ltd., Reading	J	181
	P	248
Elsan Manufacturing Co., 34 High Holborn, W.C.	B	15
Emdeca Metal Decoration, Ltd., 94 Queen Victoria Street, E.C.	G	142
Express Boilers, Ltd., 64 Great Portland Street, W.1	B	21
Ewart & Son, Ltd., 346 Euston Road, N.W.	K	189
Expanded Metal Co., Ltd., York Mansions, S.W.1	G	142
Falkirk Iron Co., Ltd., Craven House, Kingsway, W.C.2	L	215
Fawcett Construction Co., 65 Victoria Street, S.W.1	J	171
Fenlon & Sons, 8 Tudor Street, E.C.4	C	27
Fernden Fencing Co., Ltd., Bridge Street, Guildford	C	37
Ferodo, Ltd., Sovereign Mills, Chapel-en-le-Frith	D	55
Field & Field, Ltd., 93 Bishopsgate, E.C.3	V	303
Fleetwood Chemical Co., Ltd., 9–13 Prince Street, Deptford	H	157
Four Oaks Spraying Machine Co., Four Oaks Works, Sutton Coldfield	B	22
Fowler, John, & Co. (Leeds), Ltd., Leeds	C	38
Frawley & Coyle Ltd., 5 Bloomsbury Street, W.C.1	J	180
Freeman, Joseph, Sons & Co., Ltd., Wandsworth	S	278
Gas Light & Coke Co., Horseferry Road, Westminster, S.W.1	V	306
		307
Gelesco Paint Co., Brent Wharf, Brentford	K	205
Glico Petroleum, Ltd., Alexandra House, Queen's Square, W.C.1	O	235
Gliksten, J., & Son, Ltd., Carpenter's Road, Stratford, E.	E	89
Goodwin, Barsby & Co., Ltd., St. Margaret's Ironworks, Leicester	H	162
Granwood Flooring Co., Ltd., 44 Bedford Row, W.C.1	K	192
Greenway & Ludlow, 3 Iddesleigh House, S.W.1	P	243
Guillet, Sons, & Co., 13a Finsbury Square, E.C.2	C	34
Haighs (Oldham), Ltd., Globe Ironworks, Reading	K	199
Harling, W. H., 117 Moorgate, E.C.2	R	272
Hart, H., 29 Little Street, Commercial Road, E.	D	50
Harvie Corporation, Ltd., The Broadway Buildings, S.W.1	G	128
Haskins, Samuel, & Bros., Walthamstow, E.17	G	143
Helme, P. E., & Co., 49 Northumberland Park, N.17	K	207
Hemel Hempstead Patent Brick Co., Ltd., 326 Gray's Inn Road, W.C.1	F	113
Heydon, Harold & Co., Ltd., 158 Hammersmith Road, W.6	G	125a
Hilder & Co., 10 Essex Street, W.C.2	B	24a
Hope Products, 104 High Holborn, W.C.1	C	30
Howard & Hill, Ltd., 31 Clarence Road, N.W.1	Q	261
"Hurry" Water Heater Co., 39 Broad Street, Birmingham	K	190
Hyder & Sons, Crouch, Borough Green, Kent	C	26
"Illustrated Carpenter & Builder," 8 Temple Avenue, E.C.4	C	29
Indented Bar & Concrete Engineering Co., Ltd., Queen Anne's Chambers, S.W.1	R	270
Interoven Stove Co., Ltd., The, 156 Charing Cross Road, W.C.2	L	222
"Irish Builder & Engineer," The, 54 Avenue Chas., Southampton Row, W.C.	K	196



The ground-floor plan of the Exhibition.

SECTION THE FIRST

MATERIALS

WALLING AND ROOFING MATERIALS

A special exhibit of MESSRS. ANSELM ODLING AND SONS, LTD. (Row F, Stand 103), is a pair of antique jasper columns with two richly-carved antique caps of statuary marble. A large variety of white and coloured marbles, suitable for many uses, from steps and paving to high-class carving and church work, is shown. Other interesting exhibits are carved and modelled

Balustrading in marble.

animals, such as polar bears and crocodiles, arranged in their natural surroundings. These are of marble of various colours, and make very effective decorations for winter, Italian, or rock gardens. They can be combined very attractively with growing plants. There is also a shop fascia of onyx cut thin, with bronze letters, and electric light behind. This forms an effective sign by day and by night. There are also a fine entrance doorway in Hopton-Wood stone, part of the contract for the National Provincial Bank in Piccadilly; and a glass case containing samples of rare marbles and interesting formations, such as crystals, stalactites, and so on, found in the marble quarries. Samples of garden ornaments, such as lions, sphinxes, vases, etc., are also shown.

* * *

Pieces of stone, which have been restored with Tabard's patent metallic stone, are shown by A. DREYFUS, LTD. A stonemason is in attendance to demonstrate the manner in which the restoration and preservation work is carried out. The material is a stone of Trachyte origin reduced to powder. It is mixed with an acid, which is claimed to soften without decomposing it and to reunite the molecules, thus reconstituting the original stone. The patent stone is claimed to resist a pressure of 2,232 lb. per sq. in. Among the many buildings restored by the firm is the church of St. Barnabas, Homerton. This church was partially restored by the firm in 1897, and twenty-five years later, as time and weather had made no appreciable impression on the work, the remainder of the fabric was entrusted to them for restoration. Other examples of a similar nature may be found in the list of some of the principal contracts the firm have carried out. (Row H, Stand 165.)

The exhibit of MESSRS. THOMAS LAWRENCE AND SONS (Row G, Stand 145) takes the form of a garden pavilion. Three sides face the gangways, thus it is possible to view in comfort the manner in which the different colours of the firm's bricks, tiles, T.L.B. rubbers, semi-Roman tiles, and kerbs are blended. At the rear of the exhibit an arch of T.L.B. rubbers is shown on the back wall of a well head springing from piers of No. 2 light $2\frac{5}{8}$ in. bricks. The wall to the well is constructed of "S 6" $2\frac{5}{8}$ in. bricks with a coping of double bull-nose bricks and semi-Roman tiles. In the corners are two examples of brick fireplaces. The surrounding walls and piers exhibit the firm's different bricks and tiles. The elevation facing the Addison Road entrance has "S 6" and "Z" 2 in. bricks in the rusticated piers mixed with semi-Roman tiles. The cross roofs are covered with tiles, No. 3 dark mixed on the left, No. 6 mixed in the centre, and No. 3 medium stained on the right.

* * *

In the Butt and Ben cottage (Row E, Stand 94) MESSRS. LAMB AND SONS display their multi-coloured bricks, brown hard Godstone bricks for hearths and door sills, nut-brown, hand-made Godstone roofing tiles, sand and lime bricks for scullery walls, small multi-coloured fireplace briquettes, and hard red quarry paving tiles. The Butt and Ben cottage is claimed to be specially suitable for a bachelor or spinster, or for two people. It has been designed by Mr. Lionel Littlewood, of Ashstead, Surrey, architect.

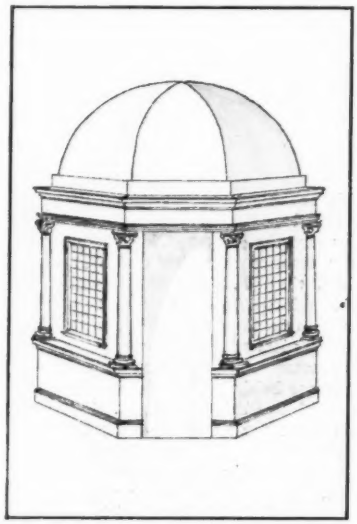
* * *

The exhibit of the LONDON BRICK CO. AND FORDERS LTD. (Row G, Stand 129) is built entirely of fletton bricks. Here are also shown samples of all descriptions of flettons, rustic white, and other facings. Such well-known brands as "Phorpres" and "Forders" need little introduction, but those who wish to do so can obtain at the stand information as to their strength and durability and as to the many large contracts for which they have been specified. Once more the company are making a feature of their multi-coloured rustic bricks. These bricks have a pleasing range of colour, and provide the broken line so much in vogue at the present time. The bricks are produced by an entirely new machine, invented for the purpose, and are made from specially selected clay. They are put forward as an example of artistic merit, while the strength and durability of the "Phorpres" flettons are claimed to be unimpaired.

* * *

Hempstead fire and sound-proof partition blocks are among the chief exhibits of the HEMEL HEMPSTEAD PATENT BRICK CO., LTD. These blocks are claimed to be fire-proof, and fire-resisting to the melting point of steel 2·786° Fahr., and to be sound-proof. Nails and screws can be driven into them These blocks are specified by many leading architects in London and the Provinces, particularly where hospital contracts are concerned, and they are largely used by His Majesty's Office of Works in connection with Government buildings, post offices, and telephone exchanges. The blocks have been and are being used in large quantities in connection with the rebuilding of Regent Street, and in the construction of many of the large hotels and restaurants in London. (Row F, Stand 113.)

The central feature of the exhibit of the MIDDLETON FIRE-CLAY WORKS (Row E, Stand 90), is a building 12 ft. high, octagonal on plan, and surmounted by a dome in white "Ceramo"

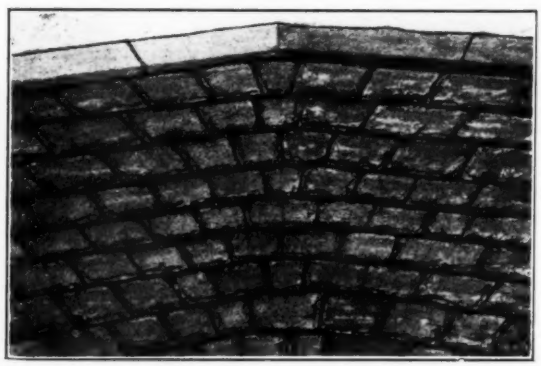


A feature in terra-cotta at the exhibition.

terra-cotta. The plinth is carried out in mottled stone vitreous terra-cotta, the columns and windows are in white "Ceramo" terra-cotta, and the cornice is in deep chocolate matt "Ceramo" terra-cotta. The remainder on the entablature is in mottled stone terra-cotta. Seven sides have windows with coloured leaded lights, and the eighth side forms the entrance. Round the central feature are various kinds of glazed sinks, pots, and pedestals. On the outside of the stand are wood showcases containing glazed bricks and tiles in various colours.

* * *

MESSRS. ROBERTS, ADLARD AND CO. exhibit Eureka slates, Dawson's patent italic tiles, hand-made rustic tiles, and Dutch hand-made bricks. Eureka slates are made in grey, grey-green, green, silver-grey, and rustic colours, and most of them are specially quarried in various parts of England and Wales for Roberts, Adlard & Co. Dawson's patent italic tiles are hand-made, sand-faced, and give the effect of a pantile and Italian tile combined when laid on the roof. The hand-made rustic tiles are of varying colours, and are specially made to give the effect of old tiles without having the tiles stained. In addition the firm are exhibiting various other types of hand-made and machine-made tiling. (Row R, Stand 269.)



A roof valley in Eureka slates.

The LONDON EXPORTERS AND IMPORTERS, LTD., show, among other exhibits, Leforest roofing tiles, which were awarded gold medals at the following exhibitions: Amsterdam 1883, Paris 1878, 1889 and 1900. The firm have recently taken off, for exhibition purposes, tiles which have been on a roof seventy years, and are still in good condition. The firm supply a manufacturers' guarantee that these tiles are perfectly weather-resisting, quite free from distortion, and retain their colour indefinitely. Four different types of interlocking tiles are supplied as follows: Leforest (Type No. 1): an ordinary straight-joint interlocking tile. Leforest (Type No. 2): a cross-joint tile, i.e. an interlocking tile that breaks the joint. Provision has been made for fixing this tile to the lower batten as well as to the top, and if this is done with every fourth row it is claimed that a very strong, rigid roof is the result. Le Marine—This is a tile of similar design to No. 2, but of a larger covering capacity. Burgundy—A large tile of different design, also for breaking joint. (Row T, Stand 294.)

* * *

Burmantofts terra-cottas are displayed as a feature in four piers on the stand of the LEEDS FIRECLAY CO., LTD. (Row E, Stand 98). These piers are carried out in several types and

The Regent Palace Hotel, London.

finishes. Among the more important buildings upon which this material has been used are the Regent Palace Hotel, the Strand Corner House, and the Park Lane Hotel, Piccadilly. A faience arch supported on piers is shown to exhibit the variety of glazed bricks now available. A display is also made of the Burmantofts "Lefco" terra-cotta fireplaces. Glazed bricks, tiles, Claridge's asphalte (of which the company are now the proprietors) are also shown.

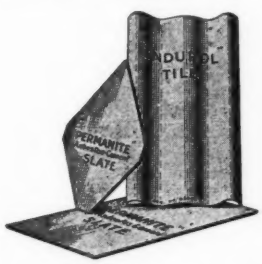
* * *

The "Progres" weatherproof interlocking roofing tiles are an outstanding exhibit by the "PROGRES" BUILDING MATERIAL SUPPLY LTD., who are the sole distributing agents for Great Britain, Ireland, and Dominions. These tiles are manufactured

from the finest non-ferrous tile earth by "SOC. AN. TUILERIES DU PROGRES," Hennuyeres, Belgium. The layer of clay used for the manufacturing of the tiles extends over the whole surface of the 250 acres of freehold property of the company, so it is claimed that supplies are guaranteed for at least another 200 years. The "Progres" tiles are made on the full plastic process, and are burned in ovens of the firm's own patent system, at a uniform temperature of about 2,000° Fahrenheit. They are claimed to be absolutely free from iron pyrites, to be unaffected by frost and climatic conditions, and neither to laminate nor disintegrate with age. The shape of the "Progres" tile is such that rain-water is thrown towards the centre of the tiles, thus leaving the joints perfectly clean from deposits. They have a deep, double interlocking system by which it is claimed "they can be securely fixed without the use of cement, mortar, wiring or nailing, and once they are fixed they withstand the most violent wind pressure." The upper end of the "Progres" tile is made with a high recess and deep water channel, which are covered by the over-lying tile, the effect being that when the rain-water is driven upwards by the wind, between the tiles, the water is intercepted and finally prevented from reaching the upper edge of the lower tile. The result claimed is that leakage through the roof is impossible. The firm state that these tiles were submitted to the following tests in the Government laboratory: "Twenty 'Progres' tiles were taken haphazard from a stock of 2,000,000 tiles, and were immersed for a considerable time, afterwards exposed for ten hours to a temperature of 27 degrees frost, then left to thaw. These operations, after being repeated fifteen times, failed to produce any disintegration either on the shape or texture of the 'Progres' tiles. Several tiles, taken haphazard from a big stock, were placed on two supports at either end, in the same manner as when laid on the roof, and tested by placing weight in the centre and increasing same until the tile broke. The average weight supported in this manner by each tile was approximately 5 cwt." The firm guarantee the above tests were not carried out with samples specially selected and prepared for the purpose, but with tiles taken from ordinary stock as supplied in bulk to the customers. (Row F, Stand 121.)

* * *

A small pavilion has been built by TURNER BROTHERS ASBESTOS CO., LTD. (Row H, Stand 151), with their "Permanite" asbestos-cement building specialities. On the roof are shown the 4 ft. × 3 ft. 8 in. Turner's Trafford tile for large areas and industrial buildings, the "Endurol" tile in three colours which gives a pantile effect suitable for houses, the 15¾ in. and



"Permanite" slates and an "Endurol" tile.

11¾ in. diagonal asbestos-cement slates in grey, red, blue, and russet-brown, suitable for any class of building, and the "Permanite" and "Serval" straight cover slates. The latter are specially prepared for domestic buildings, and are shown in several colours. The walls of the pavilion are lined with "Permanite" asbestos-cement sheets and roofing tiles and slates to permit close inspection. Examples of the new waterproofed asbestos sarking felt which is claimed to be suitable for application under slates, and to be vermin- and rot-proof, is also exhibited.

* * *

The central octagonal space in the new annexe (Row Q, Stand 257), used by BELL'S POILITE AND EVERITE CO., LTD., at the last Building Exhibition, for the erection of a tower, which was the highest exhibit ever constructed at Olympia, has been made a prominent feature by means of a lofty structure supporting Bell's Bigsix super-corrugated sheeting. On this sheeting water is continuously falling to demonstrate

Poilite straight cover slates.

its imperviousness. The boundaries are defined by racks covered on both sides with the firm's roofing materials, such as Bigsix, Everite standard corrugated sheeting, Poilite straight cover slating, the blue and russet-brown colours of which are of particular interest, and Poilite slates in small sizes, and the ordinary standard diagonal pattern. Poilite pantiles of Bell's original russet-brown colour are also featured. The various forms of roofing are so shown on the stand that the visitor can not only actually handle the material, but can also see for himself at close quarters the correct method of fixing each particular type to the requisite substructure. An item of particular interest is a new form of floor tiling which is shown for the first time at this exhibition.

* * *

MESSRS. VULCANITE, LTD. (Row E, Stand 99), are showing models illustrating the application of their patent vulcanite roofing to flat roofs, samples of roofing felts and dampcourses, Kamfer felt for carpets, and ordinary carpet Feltine.

* * *

Prominently displayed (Row H, Stand 147) by RUBEROID CO., LTD., is Ruberoid roofing, which has been employed for over thirty years on buildings of all types. It is claimed to be equally efficient on flat, pitched, or curved roofs, and it can be laid on wood or concrete. It is made in three permanent colours—grey, red, and green. In addition to the standard, or smooth finish, Ruberoid is also made with a slate finish, formed by rolling crushed natural slate into the surface during manufacture. Slate surfaced roofing is made in two permanent colours—red and green. The texture of the surface and the soft colourings are claimed to make it particularly suitable for bungalows, garages, pavilions, and all pleasure buildings. A new form of Ruberoid is the Ruberoid strip slate. This supplies the same broken surface and appearance as an ordinary slate or tile, and is unbreakable. Four slates in one, they can be fixed quickly. Models show the method of application to roofs of various types. There are, however, Ruberoid roofs on important buildings in practically every town in the country, and actual examples can be easily inspected by arrangement. Other exhibits include dampcourses, sarking, and roofing felts, P and B insulating papers, and preservative paints.

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A comprehensive display of "Lion" brand roofings and under-lining and sound-deadening felts are shown by MESSRS. F. MCNEILL AND CO., LTD. (Row J, Stand 175). "Lion" roofing is exhibited on large-sized models showing the construction of roofs of various kinds, and the formation of the outlets and flashings. This roofing is claimed to give efficient service under any climatic conditions. Models are also exhibited to show the gradual formation of "Combinite"

bitumen roofing as applied to flat or sloping roofs. "Combinite" roofing 3-ply consists of three layers. Each successive layer is cemented to the other by pure bitumen, and the joints are "broken" so that they do not come directly upon one another. The surface of the roofing is finished with bitumen varnish, into which carefully chosen grit is embedded. The firm also show their special process of felting for old and new corrugated iron roofs. This process, besides possessing numerous other advantages, is claimed greatly to equalize the temperatures in a corrugated iron building. "Lionite," another speciality for under-lining slates, tiled, or copper roofs, is claimed to be inodorous, resilient, and durable, and to make an excellent sound-deadening medium between wood-blocks and sub-floors in ball-rooms and lounges.

* * *

The stand of the BRITISH FIBROCEMENT WORKS, LTD., comprises a series of roofs showing the many "Fibrent" asbestos-cement manufactures. The centre span shows on one slope "Fibro Five" corrugated sheeting with corrugations 5 in. pitch. This material is claimed to be of exceptional strength, and has been designed to allow a full corrugation side-lap, and to be laid without mitreing at the laps. On the other slopes are shown "Fibrotiles," of which the company are the sole manufacturers. In addition to the enormous strength claimed for them, they have the advantage of being laid straight joint without mitreing of the corners. The eight slopes of the lower spans show alternatively "Fibrent" corrugated sheeting with corrugations 3 in. pitch, "Fibrent" duchess and ladies' straight pattern slating, and "Fibrent" diagonal pattern slating. The latter are obtainable in many varied colours. The ceiling of the centre span shows "Fibrent" flat sheeting, and panels of especially embossed sheeting. The dwarf walls and gable ends of the lower spans shows the use of flat sheeting for internal and external work, and a special process of rough-casting in situ. "Fibrent" flat sheets ⅛ in. thick are used on the floor. They are fixed direct to joists. (Row G, Stand 136.)

* * *

The pavilion of the NOVOCRETE AND CEMENT PRODUCTS CO., LTD., is built entirely of Novocrete building products. In the front is a loggia paved in the Italian manner in an attractive coloured design with the firm's special wear-resisting paving slabs. Access is gained to this by arched doorways, the arches of which are formed of Novocrete building blocks, sawn to shape on the site with a common saw. The loggia leads into a central hall, which is one of the largest rooms in the exhibition. The flooring illustrates the various types, colourings, and finishes of Novocrete in situ flooring, as laid by the firm's specially trained staff of floor-layers. In the centre is a design executed with Novocrete flooring tiles. In this central hall are also shown a number of practical test exhibits. There is, for instance, a Novocrete tiled roof subjected to the action of water. Another interesting feature is a section of Novocrete flooring of "dished" shape on which water will be allowed to stand throughout the exhibition. In one corner of the pavilion is a telephone-box with a telephone installed, from which visitors may judge how the non-conducting and sound-proof qualities of Novocrete render conversation within inaudible even to a person placing the ear close to the walls. In this hall MESSRS. TIBBENHAM CONSTRUCTION COMPANY, whose Tudor House incorporates Novocrete walls, have a stand with models of the various types of houses they construct. The pavilion has been erected to the plans of Mr. A. L. Abbott, L.R.I.B.A. (Row R., Stand 271.)

Lounge hall showing Novocrete walls and tiling.

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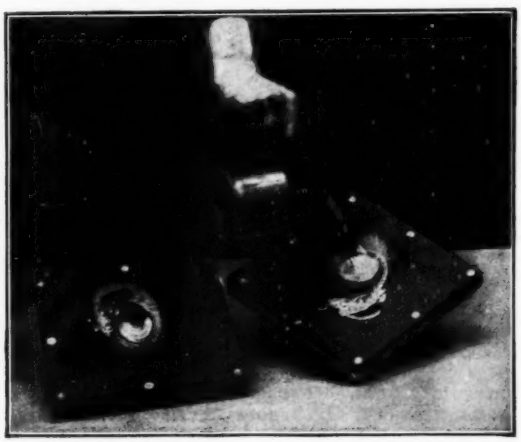
The back wall of the stand of the KEY ENGINEERING CO., LTD. (Row C, Stand 46) is covered with the firm's slate-surfaced felt, grey-green in colour, and fixed by means of wooden panel strips to represent a wall of a bungalow. Upon a larger counter are exhibits of the raw materials used in manufacture, emphasizing the mineral construction of the felt, and test pieces which have been subject to blow-lamp flame tests for fire resistance, as carried out by city building surveyors and other local authorities, and acid fire resistance tests taken on behalf of chemical works. This counter is roofed. The front roof is of standard weight grey bitumenized surface roofing, which is usually supplied for industrial works; and this is fastened down by means of the firm's special strip zinc roofing clamps. The side roofs are of red slate surfaced asbestos felt, as usually supplied for garages and bungalows, etc. The sign is formed of heavyweight felt roofing. It has a white unimpregnated surface, ready dressed for exposure to the weather, and the lettering is formed of black lining felt. Standard weight roofing felt is also laid as floor covering.



A blow-lamp flame test on asbestos roofing felt.

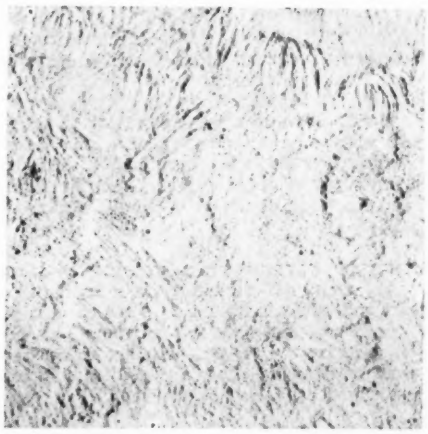
* * *

The exhibit of the LAFARGE ALUMINOUS CEMENT CO., LTD. (Row E, Stand 267), consists of photographs and plans of important constructional work carried out with Ciment Fondu. In addition, information with regard to tests carried out under practically every condition of use are available. The firm also show different examples of pre-cast work, and some cubes broken by prominent testing engineers showing the high compressive strength of this cement at early periods. Government durability tests over ten years are also available.

* * *

The "Atlas White" exhibit, arranged by Mr. Frederic Coleman on the stand (Row E, Stand 95) of the ADAMITE CO., LTD., is a display of substance, form, and colour in concrete. Not only can "Atlas White" be used to produce white concrete, but combinations of interesting shades and colours, permanent in character, can be procured by the addition of

coloured sands or other aggregates to the white Portland cement mortar. The outstanding feature consists of four panels of "Atlas White" stucco (white Portland cement renderings), in

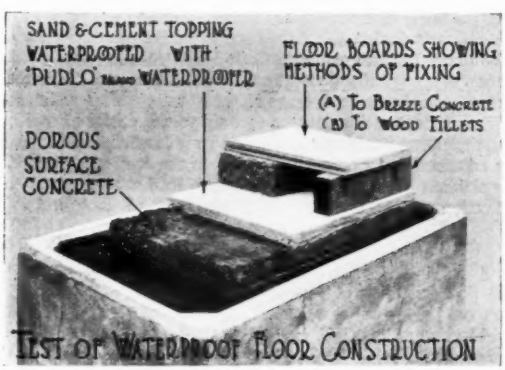


An example of "Atlas White" Stucco.

which four sands of different character have been introduced as varied aggregates. Thus not only are four shades of concrete stucco exhibited, but each panel is finished with a different form of textural finish. The variety of surface effects obtainable with so plastic a material are legion, the four types selected by The Adamite Co. for exhibition being typical finishes that have been applied widely in practice. A photographic display shows many other useful and architecturally artistic avenues for the use of white concrete, such as white cast concrete stone installations, examples of non-cracking terrazzo (with brass and lead liners), and white Portland cement mortar used for the pointing, setting, and backing of stone, marble, brick, and tile. "Colemanoid," the concrete waterproofer and hardener, is also exhibited.

WATERPROOFING MATERIALS

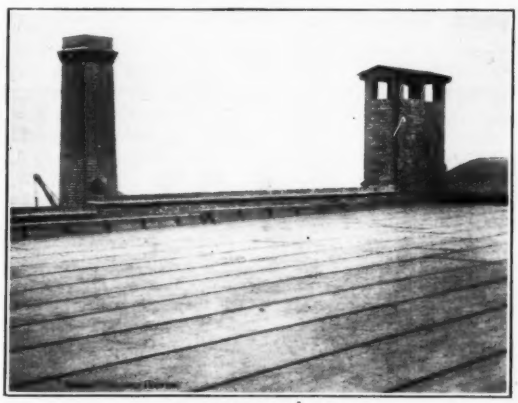
Many models of a practical nature are exhibited by MESSRS. KERNER-GREENWOOD AND CO., LTD. (Row C, Stand 44), to demonstrate their "Pudlo" brand cement waterproofer. The exhibits include a lily pool lined with waterproofed cement bordered on one side by grass-turfed banks. These grass banks are not merely decorative but, being kept wet, provide a test of the vertical dampcourses of waterproofed cement applied to the porous walls against which they are placed. A wall stuccoed on one side with sand and cement waterproofed with "Pudlo" brand powder has a stream of water running continuously down the waterproofed cement



surface. There is a model of a horizontal dampproof course of waterproofed cement with its base standing in a tank of water. The tank is formed by cementing together five porous coke-breeze concrete slabs, waterproofed on their inside surfaces with a ¼ in. facing of sand and cement, treated with "Pudlo" brand waterproofer. This waterproof finish is applied during the manufacture of the blocks, which ordinarily are used for external wall facings. Another model represents a corner of a cellar, and the various stages of waterproofing with "Pudlo" brand powder and cement are shown. In connection with this model is also demonstrated the method of keeping down the water pressure by means of a sealed sump. An examination of this model should be of very great help to all those who have to deal with the waterproofing of underground structures, such as cellars, tanks and manholes. On the stand is a collection of drawings by well-known artists—in themselves of considerable interest, but more so because they are the originals of illustrations to advertisements that have been, or are to be, issued by the manufacturers of "Pudlo" brand cement waterproofer.

* * *

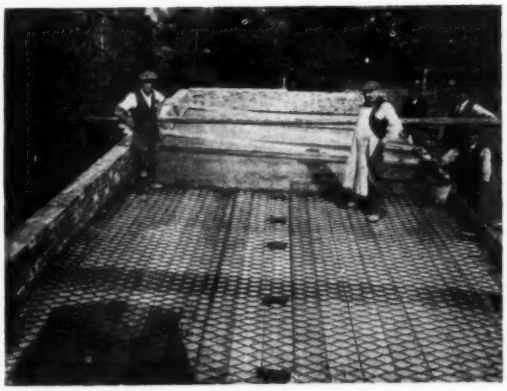
Among the chief exhibits of GEORGE M. CALLENDER AND CO., LTD. (Row D, Stand 62), is a model reservoir constructed of wood with sloping sides and lined throughout with "Callendrite" sheeting. This is under a practical water-test for the duration of the exhibition. In the centre of the reservoir is a column of loose, porous bricks under the top course of which, just above water-level, is inserted a piece of "Callendrite" dampcourse. Visitors should note the dry bricks above the dampcourse. Another exhibit is a wall showing the application of "Protex." One portion is treated with "Protex" applied directly on to the brick, and afterwards rendered with plaster, and another portion shows the "Protex" applied to plaster and papered over. Water jets saturate the wall from the back, and demonstrate the effectiveness of "Protex" as a damp-resister. Among other exhibits are the firm's "Veribest" ready roofing, "Bitufelt" roofing, "Rooferite" felts, and "Bitubond" building composition. A model is exhibited to show the application of "Bitubond" to a cavity wall. It is poured hot into cavities formed by two brick or stone walls, and fills every interstice in the inner wall faces. Thus, it is claimed to render the wall impervious, non-conducting, sound and temperature-proof.



A multi-bitumen roof.

FLOORING

The exhibit of the EXPANDED METAL CO., LTD. (Row G, Stand 142), consists of samples of the company's products, examples of their uses, and photographs of various works carried out on its systems. "Expamet" expanded steel has been in use all over the world for more than thirty years as reinforcement for concrete in foundations, walls, floors, roofs, bridges, culverts, etc. Other exhibits include "RR" 6 in. mesh, and

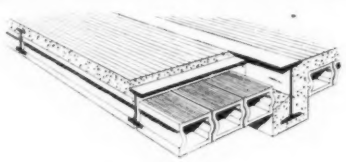


"Expamet" reinforcement.

treble-layer "Expamet" reinforcement for concrete roadways, pavings, etc. "BB" and "Expamet" lathings for interior and exterior plasterwork; "Ribmet" for concrete and plaster work; "Exmet" reinforcement for brickwork, concrete-block work, partition slabs, asphalt, etc, and mild steel wall-ties for cavity walls. A machine manufacturing "Exmet" reinforcement is on view.

* * *

MESSRS. J. A. KING AND CO., LTD., are exhibiting many of their specialities. "King" concrete building, wall, and partition blocks are for the erection of external and partition walls and internal partitions, in thicknesses from 1½ in. to 9 in. These blocks have enough surface for plastering on or rough casting when used for external work. The blocks are also made with a cement face for external work and internal partitions; the latter are being used considerably at the present time to avoid internal plastering. "King" plaster slabs for partitions, pugging and ceilings, have the surface finished either keyed for plastering or smooth face, dispensing with plastering and suitable for where walls require papering. Both the concrete blocks and plaster slabs are claimed to reduce enormously the amount of wet plastering in buildings. Pugging slabs and blocks are made to any thickness or size required. "King" reinforced plaster roofing slabs are claimed to form a light, fire-resisting roof, particularly adaptable for factories and warehouses. They give a smooth finish on the underside equal to a plastered ceiling. It is claimed that a building with a roof of this description is able to be kept at an even temperature on account of its fine insulating qualities, and prevents condensation. "King" hollow tile flooring dispenses entirely with the use of centering. The work can be carried out by the general contractor as the tiles are made in lengths of about 3 ft., which are carried by light filler joists. A very small amount of concrete is required. "King" hollow tile partition blocks are also exhibited. "Ferro Glass" pavement, floor, roof and stallboard light construction is composed of glass prisms about 2 in. deep and 4 in. square, so shaped that small reinforced concrete beams are made between each prism. The



A "King" hollow tile floor.

lips of these prisms are so shaped that they form practically one entire glass surface on the underside. There is no exposed ironwork. "King" concrete pavement lights are similar to "Ferro Glass" lights with the exception that there is no glass covering the concrete frame. In short, the construction is of light ferro-concrete framing on which c.i. frames are embedded, into which the lenses are inserted. In roof-light construction the iron frames are omitted as a special lens is used. (Row F, Stand 105.)

* * *

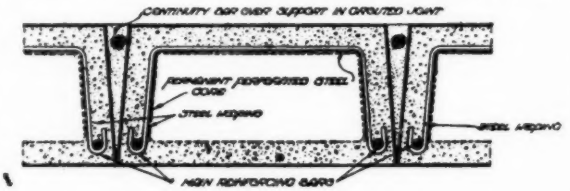
Mon'lithcrete rolled steel joists are exhibited by the FAWCETT CONSTRUCTION CO., LTD. These joists are specially designed for constructing fire-resisting floors, roofs, bridges, and lintels, and for making a foundation by spreading the load over a large area of ground. The construction consists of rolled steel joists, from which the compression web has been sheared, and concrete which takes the vertical compression. Twisted steels are passed through the web opening and buried in the concrete as bond in the opposite direction. (Row J, Stand 171.)

* * *

The KLEINE PATENT FIRE-RESISTING FLOORING SYNDICATE, LTD., are exhibiting their reinforced hollow brick floor and roof construction. They are the pioneers of this form of construction in this country. This year they are showing an exceptionally thin and light hollow brick roof, the advantages of which both for private and industrial buildings are obvious. (Row F, Stand 110.)

* * *

"Hollocast" concrete floors form the exhibit of the INDENTED BAR AND CONCRETE ENGINEERING CO., LTD. in conjunction with PRECAST CONCRETE LTD. The "Hollocast" concrete floor, as designed by the Indented Bar and Concrete Engineering Co., Ltd., and manufactured and erected by Precast Concrete Ltd., consists of a series of precast



A "Hollocast" concrete floor.

units in the form of hollow beams which are made of a length necessary to span between the supports. The standard beams are 12 in. wide, and for ordinary spans and loading the depth varies from 5 in. to 7 in., although in special cases beams can be made of almost any span called for in building construction. "Hollocast" beams are made of reinforced concrete with a permanent metal core, and after they have been placed in position the narrow channels formed between the beams are grouted up and the final floor surface, if any, is applied. The units can be made on the site of the building for which they are intended, or at the nearest vacant space, thus practically eliminating transport charges and the possibility of damage during transit. Even in the case of buildings on restricted sites it is often quite possible to cast the beams for each succeeding floor on the floor immediately below. No support of any kind is necessary during the construction of the floor. This not only tends towards economy but helps in the speedy completion of the interior decoration. Tests made on "Hollocast" beams have shown an average factor of safety of approximately 6·6. It is interesting to note that up to the designed working load deflection has been too small to be measured, and the beam has returned to its original form when the load was removed. Even when four times the designed load was applied the deflection was less than ·006 of the span. (Row R, Stand 270.)

TIMBER

A fine collection of French walnut (*Juglans Regia*) is to be seen on the stand of MESSRS. JAMES LATHAM, LTD., in solid butts and logs of grand proportions, and sawn to boards and planks. The timber is seasoned ready for every description

of joinery. Here are also finely figured veneers, matched and made up into magnificently figured panels for ships' saloons and kindred work. What may be called by-products of the walnut-tree are shown in highly figured sporting gun-stocks from the roots, and homely sabots and boot heels from the branches, not forgetting the edible walnuts. A stack of Austrian wainscot, including solid trees of noble proportions, are among an exhibit of hardwoods. The facias of Nigerian walnut are a feature, and introduce a comparative new-comer in colonial hardwoods. Mahogany, teak, and many other hardwoods make up a very interesting and attractive exhibit. Special exhibits are a French walnut, Austrian wainscot, Nigerian walnut for facias, counters and general joinery work, "Mahtal" laminated mahogany plywood and mahogany wall board. (Row G, Stand 140.)

* * *

MESSRS. WM. OLIVER AND SONS, LTD., also have a fine exhibit of timber. There are Austrian wainscot oak, of which the firm hold an enormous stock in dry boards and planks, both in square-edged wood and billets; Honduras mahogany in boards and planks with both edges squared specially suitable for shop-fitting and bank work, and also in log-cut stocks; French walnut in selected logs, seasoned and ready for use; Cuba mahogany of beautiful grain and colour. There are also English oak, dry and very specially selected, cross-cut off from strictly prime butt lengths only and of very fine size; and English wainscot for panel work and joinery. The firm claim that they can cut to size in English oak from some of the finest and biggest wood to be found in the country, and have a stock of planks up to 6 in. and over thick, already seasoning. At the present time the stock of English walnut with its beautiful dark grain is the largest the firm have ever held. Teak, American oak, American black walnut, whitewood, etc., are also stocked in large quantities. (Row A, Stand 2.)

PAINTING, DECORATING, AND WOOD PRESERVING MATERIALS

This year the propaganda department of the RUBBER GROWERS' ASSOCIATION are participating in the exhibition for the first time. They introduce the actual and potential uses of rubber to the building trades, and thus afford an opportunity to those engaged in them of obtaining a closer acquaintance of the properties and qualities of rubber, and the various performances it will give under specified conditions. In order to achieve this purpose a comprehensive exhibit has been assembled at which visitors to the exhibition are able to study rubber at first hand, and ascertain how it can be utilized in the various branches of the trade. Actual samples are on exhibit to demonstrate the insulating and damp-resisting qualities of this product, and its possibilities as a medium of artistic decoration. The exhibit is divided into two main sections, one devoted wholly to rubber flooring, tiling, and panelling, and the other subdivided under the following classifications: rubber articles and implements used in constructional work; rubber applied to electrical, gas, water, and heating engineering; rubber accessories, fixtures, and fittings, wholly or partially composed of rubber. The section demonstrating rubber flooring and tiling has been apportioned to those manufacturers who specialize in this material. (Row E, Stand 79.)

* * *

The pavilion of MESSRS. PLASTERING, LTD., is designed to show examples of all kinds of plaster work. There is plain and decorative plastering, compo and carton pierre work, and the company's special "Petrosand"—which is a material used internally to imitate stone. The latter can be executed to imitate any natural stone, and the colour and texture is even throughout. No pigments are used in its composition, the colour is permanent. (Row Q, Stand 259.)

The stand of the THAMES BOARD MILLS, LTD., manufacturers of "SX" board, is of unusual design. The base is 20 ft. square, and the height 12 ft. The stand is constructed

An "SX" board interior.

throughout of "SX" board, and is designed to show the various advantages of this material for interior lining purposes. A special exhibit shows a board in various stages of fixing. To pass from these various stages to the board actually fixed in accordance with the instructions issued by the firm should prove very instructive to the visitor. The decoration scheme emphasizes the artistic possibilities of the board. (Row G, Stand 141.)

* * *

The Melanoid bituminous paints exhibited by the MOND TAR BY-PRODUCTS SYNDICATE, LTD. (Row K, Stand 200), are manufactured by a new process which is the result of research and tests at one of the firm's laboratories. The various grades of Melanoid are claimed to afford a lasting protection to all forms of metal and woodwork. In addition to the air-drying blacks and colours the firm have recently introduced a number of lighter shades of colour, having a substantial proportion of bitumen content, which is the chief feature of all grades of Melanoid. Various exhibits of metal and woodwork painted with Melanoid are on view, including rain-water goods, iron window casements, skirting, iron railing and other parts of building and decorative work. Zulite, a new wood preservative and stain, is also on view.

* * *

The exhibit of MESSRS. SISSONS BROTHERS & CO., LTD. (Row R, Stand 266) shows various rooms decorated with the firm's well-known specialities. Hall's distemper is an oil-bound, sanitary, washable water paint, and complies with the Home Office, Factory and Workshop "Special Exception" Act. Sissons' oil flat is a super wall finish which is claimed to be washable to the extent of scrubbing with soap and water. It is made in white and thirty-one standard colours, and can be used on plastered walls, lining paper, and paint. Olac enamel in white and colours is recommended by the firm for the finest interior and exterior work, and Gen a Pur varnish for inside and outside work, and Sissons' bright gloss paint for use on plaster and woodwork.

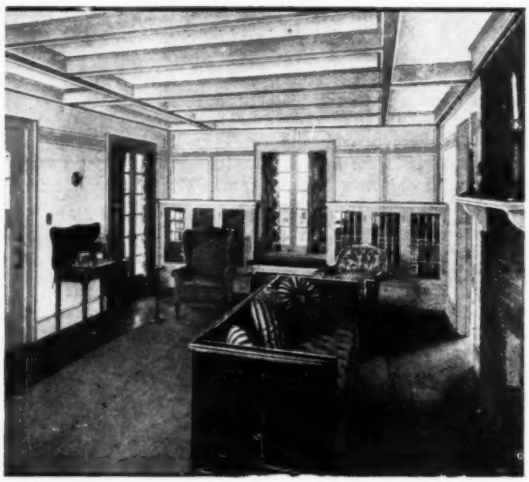
* * *

The exhibit of MESSRS. BLUNDELL, SPENCE & CO., LTD. (Row Q, Stand 260) shows the effects produced with the firm's various products. There is also an interesting collection of gums and raw materials used in the process of making these specialities. The following of the firm's decorative materials are given special prominence on the stand: Pammel,

Blundell's petrifying liquid enamel, a bright-drying finish for walls, wood and metalwork. It is claimed to dry with an intensely hard surface resembling glazed tiles. Transparent petrifying liquid is recommended for the prevention of damp walls, the treatment of new plaster, and the preservation of stone, brick, etc., from decay, and St. Paul's liquid paint for outside use; glossy Japonette, an enamel for high-class decorative work; flat Japonette, a washable flat oil paint for walls, ceilings and woodwork; hard gloss paint, a finishing paint; aluminium galvanizing paint, suitable for all kinds of metal work, and varnishes.

* * *

The specialities of the BEAVER BOARD CO., LTD., are shown in Row E, Stand 96. Beaver wall board (standard thickness $\frac{3}{16}$ in. 4-ply) is wholly a British manufacture from the raw material to the finished product. It is made from spruce timber of Canada reduced to fibrous form and pressed into uniform panels 36 in. and 48 in. wide, in lengths of 8 ft., 9 ft., 10 ft., 12 ft., 14 ft., 16 ft. In new work the panels can be nailed direct to the studding and ceiling joists or fixed over brick or concrete walls by the use of battens. It can also be applied over old plaster walls and ceilings for remodelling purposes. The surfaces of Beaver wall board can be finished



A "Beaver" board interior.

with oil or water paint, distemper or enamel, when the joins are covered with moulding strips to secure the complete and artistic panel effect. The Beaver wall board is claimed to ensure permanent, durable, sanitary and artistic walls and ceilings, to be an excellent non-conductor of heat and cold, to be unaffected by shocks or vibration, and to be moisture-proofed by a patented "Sealtite" process. Every panel of Beaver wall board is identified by the red edge border on the back of every panel linked with the firm's trade mark. Jumbo-weight Beaver wall board (5-ply ¼ in. thick) possesses all the assets of the standard board, but being thicker has added strength and is particularly adaptable where a thicker board would prove an advantage. This board bears the identification of the red edge border. Beaver tile board is similar to the standard Beaver wall board but is scored to give a tile effect. It can be enamelled easily and economically. The finished surface can be washed easily. Like Beaver wall board it is claimed that it cannot crack, chip or deteriorate in any way. Beaver tile board is also identified by the red edge border linked with the firm's trade mark. Beaver green board and Beaver black board are 5-ply boards prepared specially for use in nurseries, schools, colleges, etc. The writing surface is carefully hand-plated and hand-rubbed with a series of liquid slating coats. Carborundum and silex, two hard abrasives, are used to develop a durable finish, specially fitted for rapid legible writing.

The following specialities are among those exhibited by MESSRS. WALTER CARSON AND SONS (Row K, Stand 198): "Coverine" white undercoating, which is claimed to transform black into white in one coat; "Muraline," washable water paint, which is made in a dry powder and requires only the addition of cold water to make it ready for use—made in forty artistic shades; "La Belle" enamel, which is specially suitable for doors, dados, halls, wainscotings, Lincrusta-Walton, bathrooms; an anti-corrosion paint, in powder to be mixed with the firm's special oil mixture, suitable for all exposed work, and specially adapted to stand the corrosive effects of sea air; and a hard gloss paint supplied ready mixed for use. The latter is recommended where a quick drying paint is required. It gives a hard glossy surface, and is suitable for both interior and exterior work. Other specialities include metallic paint for radiators and all interior metal work; graphite paint for the preservation of iron and steel; pure liquid paint in fifty-four shades, for all interior and exterior work; "Vitrolite," greenhouse and general decorative white paint; "Muraprime," priming for "Muraline" and all distempers; "Matamure," wall paint with a perfect matt finish; and Maurice's porcelaine enamel, tap enamel, and bath enamel.

* * *

The centrepiece of the display of MESSRS. ARTHUR SANDERSON AND SONS, LTD., is one of a set of twenty Chinese hand-painted wallpaper panels executed *circa* 1780. This work possesses all the interest of age. It is in an excellent state of preservation, and is a valuable example to those who would decorate in the Chinese manner. In addition to this set, which is painted on a pink ground, there is another set of twenty-three lengths on a green ground. Both are offered for sale. Around this *chef-d'œuvre* are grouped modern wallpapers of Chinese inspiration, hand-painted decorations on grass cloth, of which an extensive range is stocked, and an example of the new sur-base decorations. The paint display is chiefly devoted to the exhibition of Durolave, a washable water paint. Sanstonia, the brush-applied stone finish, is also shown, together with an example of work executed in the firm's special front-door varnish, while other panels display Dersonite enamel and Dersonol flat enamel. On the furniture of this part of the stand is demonstrated the qualities of nitro-cellulose lacquers. (Row F, Stand 108.)

* * *

MESSRS. RONUK, LTD., exhibit an attractive stand constructed of oak, which has been polished by the "Ronuk" improved sanitary methods and by the workmen of the company's own polishing contract department. This branch of the firm is prepared to estimate for work in all parts of the country, and some idea of the result they are able to obtain can be gleaned from an examination of the floor of the stand; this is composed only of deal boards. (Row F, Stand 109.)

* * *

Klenostrip and Klenoex, two preparations for the removal of old paint, and for the cleaning of old stone and brickwork, are among the outstanding exhibits on the stand of the BRITISH AND COLONIAL CHEMICAL CO., LTD., the distributing organization of the Kleno products. The manufacturers of the products are the Kleno Manufacturing Co., Ltd. Klenostrip is a paste preparation to be applied to vertical surfaces to which it will adhere and so operate on the paint. Its chemical action, it is claimed, so destroys the paint that it can be simply washed off with water and a brush or sponge, leaving the wood as fresh and clean as when it left the carpenter's shop. After washing with water it will leave no harmful effects behind, so that fresh paint can be applied without risk. Klenoex is a liquid preparation suitable for horizontal surfaces, to strip paint, varnishes, polishes, etc. It possesses similar properties to Klenostrip and it is claimed to strip paint to the original wood without any risk or injury to the wood and without leaving any harmful effects behind. These preparations can be used in conjunction so that accelerated action is obtained. In the course of the year 1925, in the early part of which these two preparations were put on the market, Klenostrip and Klenoex have been very widely used by the largest firms in the country. (Row T, Stand 296.)

THE WEEK'S BUILDING NEWS

The Rebuilding of the Basingstoke Exchange

The Basingstoke Corn Exchange is to be rebuilt.

Housing at Dartford

The Dartford Council has decided to build 300 houses.

A Lewes Crematorium

A proposal has been made to build a crematorium at Lewes.

A School at Shooters Hill

The L.C.C. propose to build a secondary school at Shooters Hill, S.E.

A New School at Blyth

The Blyth Town Council has decided to erect a new central school at a cost of £30,000.

Housing at Colne

A scheme has been approved for the erection by the Colne Corporation of sixty-six houses.

City Hospital Extensions

The cancer wards of St. Mark's Hospital, City Road, E.C., are to be extended at a cost of £15,000.

Housing at Wetherby

The Wetherby Rural Council has had plans and specifications prepared for the erection of forty houses.

Flats at Hampstead

The Hampstead Council is to build sixteen four-roomed flats in Sheriff Road, West Hampstead, at a cost of £14,884.

Housing Loan for Rotherham

The Rotherham Rural District Council has decided to accept the loan of £50,032 at 5¼ per cent. for housing purposes.

Housing at Rochdale

A scheme has been approved by the Rochdale Housing Committee for the erection of 138 houses on the Milnrow Road site.

Housing at Ballycastle

The Ballycastle Rural District Council proposes to build sixty cottages at a cost of £598 per double cottage, or £315 per single.

Additions to the City of London School

The City of London School is adding to its accommodation a building containing nine additional classrooms, at a cost of £14,500.

Housing at Wilmslow

The Wilmslow Urban District Council has decided to prepare a scheme for the erection of fifty houses on land off Chapel Lane and Simpton Street.

The Edinburgh Industrial Hall

The Edinburgh Town Council has decided to purchase the Industrial Hall for conversion into a garage, at a price not exceeding £30,000.

A Buckhaven Housing Scheme

The Buckhaven Town Council has decided to borrow £120,000 to cover the cost of erecting 300 houses. Plans have also been passed for forty-four houses at Methil, and fifty-six houses at Buckhaven.

Housing at Waddon

The Croydon Borough Council has recommended that application be made to the Ministry of Health for sanction to borrow about £150,000 for the erection of 266 houses on the Waddon estate.

Improvements at Cuckfield

The Sussex County Council has notified its approval of the Cuckfield-Haywards Heath improvement scheme, which is estimated at a cost of £20,265.

Improvements to a Haverfordwest Road

The Haverfordwest Rural Council has approved of an improvement scheme for the Haverfordwest-Broad Haven Road, the estimated cost of which is £10,884.

A New Sanatorium for Surrey

A sanatorium for the treatment of tuberculosis is being built at Milford, near Godalming, by the Surrey County Council, involving an expenditure of £211,000.

Housing at Burntisland

The Burntisland Town Council has decided to proceed with another development of the West Haugh housing scheme by the erection of a further twenty houses.

A New Yorkshire Road

The Wortley Rural Council has decided to proceed with the making of a new road from High Green to Hagmanstone Bar, at Birdwell. The estimated cost is £128,500.

Accommodation for a Nairn School

The Nairnshire Education Authority has sanctioned the purchase of Ivybank House and grounds for the purpose of erecting new buildings for the accommodation of the secondary school.

A Bromley Housing Scheme

Ninety acres of the park surrounding Bromley Palace are to be developed for a housing scheme comprising 850 to 900 houses. A company has been formed with a capital of £30,000.

School Improvements in Dumbartonshire

At a recent meeting of the Dumbartonshire Education Authority it was decided that work should proceed at once with large extensions and reconstructions to school buildings in the Kirkintilloch and Vale of Leven areas.

Houses for Colliery Workers

The report of the Coal Commission states that at some of the large new mines in the South Yorkshire and Nottinghamshire coalfields, from one-third to nearly one-half of the total capital provided is being spent on houses for the workers.

Timber Houses at Aberdeen

The Aberdeen Housing Committee has recommended that, subject to the approval of the Scottish Board of Health, forty timber houses of the bungalow type of construction are to be erected on a site at Back Hilton Road at a cost of £20,918 8s. 7d.

The R.I.B.A. Intermediate Examination

The centres for this examination will be London and Manchester. At both centres the examination will be held from May 28 to June 1, inclusive. At the London centre the oral examination will be held on Thursday, June 3, and at the Manchester centre on Wednesday, June 2.

The Royal Gold Medal for Architecture

His Majesty the King has approved the award of the Royal Gold Medal to Professor Ragnar Ostberg (honorary corresponding member of the R.I.B.A.), of Stockholm, in recognition of the merit of his executed work. The medal will be presented to Professor Ragnar Ostberg at the banquet of the R.I.B.A. on June 17.

An Amalgamation

For a number of years the Art Metal Equipment Company, Limited, have manufactured and sold special steel equipment for banks, libraries, and business offices, and fire-resisting fittings, including doors, partitions, shutters, and adjustable shelving, in fact, any type of work previously made in wood, and Messrs. Roneo, Ltd., have confined themselves to the manufacture and supply of steel filing cabinets, cupboards, card index drawers, steel desks, and other standardized stock fittings of a similar character. Arrangements have now been completed to link these two branches of the industry, by Roneo, Limited acquiring the goodwill of the Art Metal Equipment Co., Ltd. Additional premises have been obtained in Holborn so as to give greater showroom facilities. Contract work will be undertaken, and standard fittings will be sold throughout the world by the Roneo organization, which consists of seventeen branches in England and branches or agents throughout the world. Mr. James C. Sellers, who has been identified with the steel furniture and equipment business for over twenty years will continue to direct this work as previously. He will be found at the Roneo Building, 5-11 Holborn.

RATES OF WAGES

			I	II
			s. d.	s. d.
A	ABERDARE	S. Wales & M.	1 8	1 3½
A₁	Abergavenny	Do.	1 7½	1 2⅝
B	Abingdon ..	S. Counties	1 6	1 1½
A	Accrington	N.W.Counties	1 8	1 3½
A₃	Addlestone	S. Counties	1 6½	1 2
A	Adlington ..	N.W.Counties	1 8	1 3½
A	Airdrie ..	Scotland	*1 8	1 3½
C₁	Aldeburgh	E. Counties	1 4	1 0½
A	Altrincham	N.W.Counties	1 8	1 3½
B₃	Appleby ..	N.W. Counties	1 4½	1 0½
A	Ashton-under-Lyne	N.W.Counties	1 8	1 3½
A₃	Atherstone	Mid. Counties	1 6½	1 2
B₃	Aylesbury ..	S. Counties	1 4½	1 0½
B	BATH ..	S.W.Counties	1 6	1 1½
B₃	Banbury ..	S. Counties	1 4½	1 0½
B₂	Bangor ..	N.W. Counties	1 5	1 1
A	BarnardCastle	N.E. Coast	1 8	1 3½
A	Barnsley ..	Yorkshire	1 8	1 3½
B₁	Barnstaple	S.W. Counties	1 5½	1 1½
A	Barrow ..	N.W.Counties	1 8	1 3½
A	Barry ..	S. Wales & M.	1 8	1 3½
B₃	Basingstoke	S.W. Counties	1 4½	1 0½
A	Batley ..	Yorkshire	1 8	1 3½
B	Bedford ..	E. Counties	1 6	1 1½
A₂	Berwick-on-Tweed	N.E. Coast	1 7	1 2½
A₃	Bewdley ..	Mid.Counties	1 6½	1 2
B₃	Bicester ..	Mid. Counties	1 4½	1 0½
A	Birkenhead	N.W.Counties	†1 9	1 3½
A	Birmingham	Mid. Counties	1 8	1 3½
A	Bishop Auckland	N.E. Coast	1 8	1 3½
A	Blackburn	N.W.Counties	1 8	1 3½
A	Blackpool	N.W.Counties	1 8	1 3½
A	Blyth ..	N.E. Coast	1 8	1 3½
B₃	Bognor ..	S. Counties	1 4½	1 0½
A	Bolton ..	N.W.Counties	1 8	1 3½
A₃	Boston ..	Mid. Counties	1 6½	1 2
B₁	Bournemouth	S. Counties	1 6	1 1½
A	Bradford ..	Yorkshire	1 8	1 3½
A₃	Brentwood	E. Counties	1 6½	1 2
A	Bridgend ..	S. Wales & M.	1 8	1 3½
B₃	Bridgwater	S.W. Counties	1 5	1 1
A₁	Bridlington	Yorkshire	1 7½	1 2½
A	Brighouse ..	Yorkshire	1 8	1 3½
B₁	Brighton ..	S. Counties	1 6	1 1½
A	Bristol ..	S.W. Counties	1 8	1 3½
B₃	Brixham ..	S.W. Counties	1 4½	1 0½
A₃	Bromsgrove	Mid. Counties	1 6½	1 2
C	Bromyard ..	Mid. Counties	1 4	1 0½
A	Burnley ..	N.W.Counties	1 8	1 3½
A	Burslem ..	Mid. Counties	1 8	1 3½
A₂	Burton on-Trent	Mid. Counties	1 7	1 2½
A	Bury ..	N.W.Counties	1 8	1 3½
A₃	Buxton ..	N.W.Counties	1 6½	1 2
B	CAMBRIDGE	E. Counties	1 6	1 1½
B₃	Canterbury	S. Counties	1 4½	1 0½
A	Cardiff ..	S. Wales & M.	1 8	1 3½
A	Carlisle ..	N.W.Counties	1 8	1 3½
B	Carmarthen	S. Wales & M.	1 6	1 1½
B₂	Carnarvon ..	N.W.Counties	1 5	1 1
A₁	Carnforth ..	N.W. Counties	1 7½	1 2⅝
A	Castleford ..	Yorkshire	1 8	1 3½
B₁	Chatham ..	S. Counties	1 5½	1 1½
B₁	Chelmsford	E. Counties	1 5½	1 1½
B	Cheltenham	S.W. Counties	1 6	1 1½
A	Chester ..	N.W.Counties	1 8	1 3½
A	Chesterfield	Mid Counties	‡1 8	1 3½
B₃	Chichester ..	S. Counties	1 4½	1 0½
A	Chorley ..	N.W.Counties	1 8	1 3½
B₂	Cirencester	S. Counties	1 5	1 1
A	Clitheroe ..	N.W.Counties	1 8	1 3½
A	Clydebank	Scotland	1 8	1 3½
A	Coalville ..	Mid. Counties	1 8	1 3½
B₁	Colchester ..	E. Counties	1 5½	1 1½
A	Colne ..	N.W.Counties	1 8	1 3½
B₁	Colwyn Bay	N.W.Counties	1 5½	1 1½
A	Consett ..	N.E. Coast	1 8	1 3½
B₁	Conway ..	N.W. Counties	1 5½	1 1½
A	Coventry ..	Mid. Counties	1 8	1 3½
A₃	Crewe ..	N.W.Counties	1 6½	1 2
A₃	Cumberland	.....	1 6½	1 2
A	DARLINGTON	N.E. Coast	1 8	1 3½
A	Darwen ..	N.W.Counties	1 8	1 3½
B₃	Deal ..	S. Counties	1 4½	1 0½
B₁	Denbigh ..	N.W.Counties	1 5½	1 1½
A	Derby ..	Mid. Counties	1 8	1 3½
A	Dewsbury ..	Yorkshire	1 8	1 3½
B	Didcot ..	S. Counties	1 6	1 1½
A	Doncaster ..	Yorkshire	1 8	1 3½
C₁	Dorchester	S.W.Counties	1 4	1 0½
A₃	Driffield ..	Yorks	1 6½	1 2
A₃	Droitwich ..	Mid. Counties	1 6½	1 2
A₂	Dudley ..	Mid. Counties	1 7	1 2½
A	Dundee ..	Scotland	1 8	1 3½
A	Durham ..	N.E. Coast	1 8	1 3½
B₁	EASTBOURNE	S. Counties	1 6	1 1½
A	Ebbw Vale	S. Wales & M.	1 8	1 3½
A	Edinburgh	Scotland	1 8	1 3½
A	E. Glamorganshire & Monmouthshire	S. Wales & M.	1 8	1 3½
B	Exeter ..	S.W. Counties	§1 7	1 2½
B₂	Exmouth ..	S.W. Counties	1 5	1 1
B	FELIXSTOWE	E. Counties	1 6	1 1½
A₃	Filey ..	Yorks	1 6½	1 2
A	Fleetwood ..	N.W.Counties	1 8	1 3½
B₃	Folkestone	S. Counties	1 4½	1 0½
A	Frodsham ..	N.W.Counties	1 8	1 3½
B₃	Frome ..	S.W.Counties	1 4½	1 0½
A	GATESHEAD	N.E. Coast	1 8	1 3½
B₁	Gillingham	S. Counties	1 5½	1 1½
B	Gloucester ..	S.W.Counties	1 6	1 1½
A₂	Goole ..	Yorkshire	1 7	1 2½
B₁	Gosport ..	S. Counties	1 5½	1 1½
A₃	Grantham ..	Mid. Counties	1 6½	1 2
A₂	Gravesend ..	S. Counties	1 7	1 2½
A	Greenock ..	Scotland	*1 8	1 3½
A	Grimsby ..	Yorkshire	1 8	1 3½
B₁	Guildford ..	S. Counties	1 5½	1 1½
A	HALIFAX ..	Yorkshire	1 8	1 3½
A₁	Hanley ..	Mid. Counties	1 7½	1 2⅝
A	Harrogate ..	Yorkshire	1 8	1 3½
A	Hartlepools	N.E. Coast	1 8	1 3½
B₂	Harwich ..	E. Counties	1 5	1 1
B₃	Hastings ..	S. Counties	1 4½	1 0½
B₁	Hatfield ..	S. Counties	1 5½	1 1½
B	Hereford ..	S.W.Counties	1 6	1 1½
B	Hertford ..	E. Counties	1 5½	1 1½
A₁	Heysham ..	N.W.Counties	1 7½	1 2⅝
A	Howden ..	N.E. Coast	1 8	1 3½
A	Huddersfield	Yorkshire	1 8	1 3½
A	Hull ..	Yorkshire	1 8	1 3½

The initial letter opposite each entry indicates the grade under the Ministry of Labour schedule. The district is that to which the borough is assigned in the same schedule. Column I gives the rates for craftsmen; column II for labourers; the rate for craftsmen working at trades in which a separate rate maintains, is given in a footnote. The table is a selection only. Particulars for lesser localities not included may be obtained upon application in writing.

			I	II
			s. d.	s. d.
A	ILKLEY ..	Yorkshire	1 8	1 3½
A	Immingham	Mid. Counties	1 8	1 3½
B	Ipswich ..	E. Counties	1 6	1 1½
C₁	Isle of Wight	S. Counties	1 4	1 0½
A	JARROW ..	N.E. Coast	1 8	1 3½
A	KEIGHLEY	Yorkshire	1 8	1 3½
B₂	Kendal ..	N.W. Counties	1 5	1 1
B₂	Keswick ..	N.W.Counties	1 5	1 1
B	Kettering ..	Mid. Counties	1 6	1 1½
A₃	Kidderminster	Mid. Counties	1 6½	1 2
B₂	King's Lynn	E. Counties	1 5	1 1
A₁	LANCASTER	N.W.Counties	1 7½	1 2
A₃	Leamington	Mid. Counties	1 6½	1 2⅝
A	Leeds ..	Yorkshire	1 8	1 3½
A	Leek ..	Mid. Counties	1 8	1 3½
A	Leicester ..	Mid. Counties	1 8	1 3½
A	Leigh ..	N.W. Counties	1 8	1 3½
B₃	Lewes ..	S. Counties	1 4½	1 0½
A₃	Lichfield ..	Mid. Counties	1 6½	1 2
A	Lincoln ..	Mid. Counties	1 8	1 3½
A	Liverpool ..	N.W.Counties	†1 9	1 3½
B	Llandudno	N.W.Counties	1 6	1 1½
A	Llanelly ..	S. Wales & M.	1 8	1 3½
	London (12 miles radius)		1 9½	1 4½
	Do. (12–15 miles radius)		1 9	1 4
A	Long Eaton	Mid. Counties	1 8	1 3½
A	Loughborough	Mid. Counties	1 8	1 3½
B	Luton ..	E. Counties	1 6	1 1½
A	Lytham ..	N.W. Counties	1 8	1 3½
A₁	MACCLESFIELD	N.W.Counties	1 7½	1 2½
B	Maidstone ..	S. Counties	1 5½	1 1½
A₃	Malvern ..	Mid. Counties	1 6½	1 2
A	Manchester	N.W.Counties	1 8	1 3½
A	Mansfield ..	Mid. Counties	1 8	1 3½
B₃	Margate ..	S. Counties	1 4½	1 0½
A₃	Matlock ..	Mid. Counties	1 6½	1 2
A	Merthyr ..	S. Wales & M.	1 8	1 3½
A	Middlesbrough	N.E. Coast	1 8	1 3½
A₃	Middlewich	N.W. Counties	1 6½	1 2
A	Monmouth	S. Wales & M.	1 8	1 3½
	S. and E. Glamorganshire			
A₁	Morecambe	N.W. Counties	1 7½	1 2⅝
A₃	NANTWICH	N.W.Counties	1 6½	1 2
A	Neath ..	S. Wales & M.	1 8	1 3½
A	Nelson ..	N.W. Counties	1 8	1 3½
A	Newcastle ..	N.E.Coast	1 8	1 3½
A	Newport ..	S. Wales & M.	1 8	1 3½
A	Normanton	Yorkshire	1 8	1 3½
A₂	Northampton	Mid. Counties	1 7	1 2½
A	North Staffs.	Mid. Counties	1 8	1 3½
A	North Shields	N.E. Coast	1 8	1 3½
B	Norwich ..	E. Counties	1 6	1 1½
A	Nottingham	Mid. Counties	1 8	1 3½
A	Nuneaton ..	Mid. Counties	1 8	1 3½
B	OAKHAM ..	Mid. Counties	1 5½	1 1½
A	Oldham ..	N.W.Counties	1 8	1 3½
A₃	Oswestry ..	Mid. Counties	1 6½	1 2
B	Oxford ..	S. Counties	1 6	1 1½
A	PAISLEY ..	Scotland	*1 8	1 3½
C	Pembroke ..	S. Wales & M.	1 4½	1 0½
A	Perth ..	Scotland	*‡ 8	1 3
A₃	Peterborough	Mid. Counties	1 6½	1 2
A	Plymouth	S.W. Counties	¶1 8	1 3½
A	Pontefract ..	Yorkshire	1 8	1 3½
A	Pontypridd	S. Wales & M.	1 8	1 3½
B	Portsmouth	S. Counties	1 6	1 1½
A	Preston ..	N.W.Counties	1 8	1 3½
A	QUEENSFERRY	N.W.Counties	1 8	1 3½
B	READING ..	S. Counties	1 6	1 1½
B	Reigate ..	S. Counties	1 5½	1 1½
A₃	Retford ..	Mid. Counties	1 6½	1 2
A	Rhondda Valley	S. Wales & M.	1 8	1 3½
A₃	Ripon ..	Yorkshire	1 6½	1 2
A	Rochdale ..	N.W.Counties	1 8	1 3½
B	Rochester ..	S. Counties	1 5½	1 1½
A₁	Ruabon ..	N.W.Counties	1 7½	1 2⅝
A₂	Rugby ..	Mid. Counties	1 8	1 3½
A₃	Rugeley ..	Mid. Counties	1 6½	1 2
A	Runcorn ..	N.W. Counties	1 8	1 3½
A₃	ST. ALBANS	E. Counties	1 6½	1 2
A	St. Helens ..	N.W.Counties	1 8	1 3½
A₁	Scarborough	Yorkshire	1 7½	1 2⅝
A	Scunthorpe	Mid. Counties	1 8	1 3½
A	Sheffield ..	Yorkshire	1 8	1 3½
A	Shipley ..	Yorkshire	1 8	1 3½
A₃	Shrewsbury	Mid. Counties	1 6½	1 2
A₂	Skipton ..	Yorkshire	1 7	1 2½
B	Slough ..	S. Counties	1 5½	1 1½
A₂	Solihull ..	Mid. Counties	1 7	1 2½
B	South'pton	S. Counties	1 6	1 1½
B₁	Southend-on-Sea	E. Counties	1 5½	1 1½
A	Southport ..	N.W.Counties	1 8	1 3½
A	S. Shields ..	N.E. Coast	1 8	1 3½
A₂	Stafford ..	Mid. Counties	1 7	1 2½
A	Stockport	N.W.Counties	1 8	1 3½
A	Stockton-on Tees	N.E. Coast	1 8	1 3½
A	Stoke-on-Trent	Mid. Counties	1 8	1 3½
B	Stroud ..	S.W.Counties	1 5½	1 1½
A	Sunderland	N.E. Coast	1 8	1 3½
A	Swansea ..	S. Wales & M.	1 8	1 3½
B	Swindon ..	S.W. Counties	1 6	1 1½
A₁	TAMWORTH	N.W.Counties	1 7½	1 2⅝
B₁	Taunton ..	S.W. Counties	1 5½	1 1½
A	Teeside Dist.	N.E. Counties	1 8	1 3½
A	Todmorden	Yorkshire	1 8	1 3½
A₂	Torquay ..	S.W.Counties	1 7	1 2½
B₁	Tunbridge Wells	S. Counties	1 5½	1 1½
A	Tunstall ..	Mid. Counties	1 8	1 3½
A	Tyne District	N.E. Coast	1 8	1 3½
A	WAKEFIELD	Yorkshire	1 8	1 3½
A₂	Walsall ..	Mid. Counties	1 7	1 2½
A	Warrington	N.W.Counties	1 8	1 3½
A₃	Warwick ..	Mid. Counties	1 6½	1 2
B	Wellingborough	Mid. Counties	1 6	1 1½
A	West Bromwich	Mid. Counties	1 8	1 3½
B	Weston-S-Mare	S.W. Counties	1 6	1 1½
A₃	Whitby ..	Yorkshire	1 6½	1 2
A	Widnes ..	N.W.Counties	1 8	1 3½
A	Wigan ..	N.W.Counties	1 8	1 3½
B₂	Winchester	S. Counties	1 5	1 1
B	Windsor ..	S. Counties	1 6	1 1½
A	Wolverhampton	Mid. Counties	1 8	1 3½
A₃	Worcester ..	Mid. Counties	1 6½	1 2
A	Worksop ..	Yorkshire	1 8	1 3½
A₁	Wrexham ..	N.W. Counties	1 7½	1 2⅝
B	Wycombe ..	S. Counties	1 6	1 1½
B₁	YARMOUTH	E. Counties	1 5½	1 1½
B₂	Yeovil ..	S.W. Counties	1 5	1 1
A	York ..	Yorkshire	1 8	1 3½

* Plasterers, 1*s.* 9*d.*

† Carpenters and Painters, 1*s.* 8½*d.*

‡ Plumbers, 1*s.* 9*d.*

§ Painters, 1*s.* 6*d.*

‖ Carpenters and Plasterers, 1*s.* 8½*d.*

¶ Painters, 1*s.* 7*d.*

PRICES CURRENT

EXCAVATOR AND CONCRETOR

EXCAVATOR, 1s. 4½d. *per hour*; LABOURER, 1s. 4½d. *per hour*; NAVVY, 1s. 4½d. *per hour*; TIMBERMAN, 1s. 6d. *per hour*; SCAFFOLDER, 1s. 5½d. *per hour*; WATCHMAN, 7s. 6d. *per shift.*

Broken brick or stone, 2 in., per yd.	£0	10	0
Thames ballast, per yd.	0	13	0
Pit gravel, per yd.	0	18	0
Pit sand, per yd.	0	14	6
Washed sand	0	16	6

Screened ballast or gravel, add 10 per cent. per yd.
Clinker, breeze, etc., prices according to locality.

Portland cement, per ton	£2	19	0
Lias lime, per ton	2	5	0

Sacks charged extra at 1s. 9d. each and credited when returned at 1s. 6d.
Transport hire per day:

Cart and horse	£1	3	0	*Trailer*	£0	15	0
3-ton motor lorry	3	15	0	*Steam roller*	4	5	0
Steam lorry, 5-ton	4	0	0	*Water cart*	1	5	0

EXCAVATING and throwing out in ordinary earth not exceeding 6 ft. deep, basis price, per yd. cube . 0 3 0

Exceeding 6 ft., but under 12 ft., add 30 per cent.
In stiff clay, add 30 per cent.
In underpinning, add 100 per cent.
In rock, including blasting, add 225 per cent.
If basketed out, add 80 per cent. to 150 per cent.
Headings, including timbering, add 400 per cent.

RETURN, fill, and ram, ordinary earth, per yd.	£0	2	4
SPREAD and level, including wheeling, per yd.	0	2	4
PLANKING, per ft. sup.	0	0	5

DO. over 10 ft. deep, add for each 5 ft. depth 30 per cent.

HARDCORE, 2 in. ring, filled and rammed, 4 in. thick, per yd. sup.	£0	2	1
DO. 6 in. thick, per yd. sup.	0	2	10
PUDDLING, per yd. cube	1	10	0
CEMENT CONCRETE, 4-2-1, per yd. cube	2	3	0
DO. 6-2-1, per yd. cube	1	18	0

DO. in upper floors, add 15 per cent.
DO. in reinforced-concrete work, add 20 per cent.
DO. in underpinning, add 60 per cent.

LIAS LIME CONCRETE, per yd. cube	£1	16	0
BREEZE CONCRETE, per yd. cube	1	7	0
DO. in lintols, etc., per ft. cube	0	1	6

DRAINER

LABOURER, 1s. 4½d. *per hour*; TIMBERMAN, 1s. 6d. *per hour*; BRICKLAYER, 1s. 9½d. *per hour*; PLUMBER, 1s. 9½d. *per hour*; WATCHMAN, 7s. 6d. *per shift.*

Stoneware pipes, tested quality, 4 in., per yd.	£0	1	3
DO. 6 in., *per yd.*	0	2	8
DO. 9 in., *per yd.*	0	3	6
Cast-iron pipes, coated, 9 ft. lengths, 4 in., per yd.	0	6	9
DO. 6 in., *per yd.*	0	9	2
Portland cement and sand, see "Excavator" above.			
Lead for caulking, per cwt.	£2	5	6
Gaskin, per lb.	0	0	5½

STONEWARE DRAINS, jointed in cement, tested pipes, 4 in., per ft. . 0 4 3
DO. 6 in., per ft. . 0 5 0
DO. 9 in., per ft. . 0 7 9

CAST-IRON DRAINS, jointed in lead, 4 in., per ft. . 0 9 0
DO. 6 in., per ft. . 0 11 0

Note.—These prices include digging and filling for normal depths, and are average prices.
Fittings in Stoneware and Iron according to type. *See* Trade Lists.

BRICKLAYER

BRICKLAYER, 1s. 9½d. *per hour*; LABOURER, 1s. 4½d. *per hour*; SCAFFOLDER, 1s. 5½d. *per hour.*

London stocks, per M.	£4	7	0
Flettons, per M.	3	0	0
Staffordshire blue, per M.	9	12	0
Firebricks, 2½ in., per M.	11	3	0
Glazed salt, white, and ivory stretchers, per M.	22	0	0
DO. *headers, per M.*	21	10	0
Colours, extra, per M.	£5	10	0
Seconds, less, per M.	1	0	0
Cement and sand, see "Excavator" above.			
Lime, grey stone, per ton	£2	12	0
Mixed lime mortar, per yd.	1	6	0
Damp course, in rolls of 4½ in., per roll	0	2	6
DO. *9 in. per roll*	0	4	9
DO. *14 in. per roll*	0	7	6
DO. *18 in. per roll*	0	9	6

BRICKWORK in stone lime mortar, Flettons or equal, per rod . 33 0 0
DO. in cement do., per rod . 36 0 0
DO. in stocks, add 25 per cent. per rod.
DO. in blues, add 100 per cent. per rod.
DO. circular on plan, add 12½ per cent. per rod.

FACINGS, FAIR, per ft. sup. extra	£0	0	2
DO. Red Rubbers, gauged and set in putty, per ft. extra	0	4	6
DO. salt, white or ivory glazed, per ft. sup. extra	0	5	6
TUCK POINTING, per ft. sup. extra	0	0	10
WEATHER POINTING, per ft. sup. extra	0	0	3
GRANOLITHIC PAVING, 1 in., per yd. sup.	0	5	0
DO. 1½ in., per yd. sup.	0	6	0
DO. 2 in., per yd. sup.	0	7	0
BITUMINOUS DAMP COURSE, ex rolls, per ft. sup.	0	0	7
ASPHALT (MASTIC) DAMP COURSE, ½ in., per yd. sup.	0	8	0
DO. vertical, per yd. sup.	0	11	0
SLATE DAMP COURSE, per ft. sup.	0	0	10
ASPHALT ROOFING (MASTIC) in two thicknesses, ¾ in., per yd	0	8	6
DO. SKIRTING, 6 in.	0	0	11
BREEZE PARTITION BLOCKS, set in Cement, 1½ in. per yd. sup.	0	5	3
DO. DO. 3 in.	0	6	6

THE wages are the Union rates current in London at the time of publication. The prices are for good quality material, and are intended to cover delivery at works, wharf, station, or yard as customary, but will vary according to quality and quantity. The measured prices are based upon the foregoing, and include usual builders' profits. Though every care has been taken in its compilation it is impossible to guarantee the accuracy of the list, and readers are advised to have the figures confirmed by trade inquiry.

MASON

MASON, 1s. 9½d. *per hour*; DO. *fixer*, 1s. 10½d. *per hour*; LABOURER, 1s. 4½d. *per hour*; SCAFFOLDER, 1s. 5½d. *per hour.*

Portland Stone:			
Whitbed, per ft. cube	£0	4	4
Basebed, per ft. cube	0	4	7
Bath stone, per ft. cube	0	2	9½

Usual trade extras for large blocks.

York paving, av. 2½ in., per yd. super.	0	6	6
York templates sawn, per ft. cube	0	6	9
Slate shelves, rubbed, 1 in., per ft. sup.	0	2	6

Cement and sand, see "Excavator," etc., above.

HOISTING and setting stone, per ft. cube	£0	2	2
DO. for every 10 ft. above 30 ft., add 15 per cent.			
PLAIN face Portland basis, per ft. sup.	£0	2	8
DO. circular, per ft. sup.	0	4	0
SUNK FACE, per ft. sup.	0	3	9
DO. circular, per ft. sup.	0	4	10
JOINTS, arch, per ft. sup.	0	2	6
DO. sunk, per ft. sup.	0	2	7
DO. DO. circular, per ft. sup.	0	4	6
CIRCULAR-CIRCULAR work, per ft. sup.	1	2	0
PLAIN MOULDING, straight, per inch of girth, per ft. run	0	1	1
DO. circular, do. per ft. run	0	1	4
HALF SAWING, per ft. sup.	£0	1	0

Add to the foregoing prices if in York stone 35 per cent.

DO. Mansfield, 12½ per cent.
Deduct for Bath, 33⅓ per cent.
DO. for Chilmark, 5 per cent.

SETTING 1 in. slate shelving in cement, per ft. sup.	£0	0	6
RUBBED round nosing to do., per ft. lin.	0	0	6
YORK STEPS, rubbed T. & R., ft. cub. fixed	1	9	0
YORK SILLS, W. & T., ft. cub. fixed	1	13	0

SLATER AND TILER

SLATER, 1s. 9½d. *per hour*; TILER, 1s. 9½d. *per hour*; SCAFFOLDER, 1s. 5½d. *per hour*; LABOURER, 1s. 4½d. *per hour.*

N.B.—Tiling is often executed as piecework.

Slates, 1st quality, per M:			
Portmadoc Ladies	£14	0	0
Countess	27	0	0
Duchess	32	0	0
Clips, lead, per lb.	0	0	4
Clips, copper, per lb.	0	2	0
Nails, compo, per cwt.	1	6	0
Nails, copper, per lb.	0	1	10
Cement and sand, see EXCAVATOR, *etc., above.*			
Hand-made tiles, per M.	£5	18	0
Machine-made tiles, per M.	5	8	0
Westmorland slates, large, per ton	9	0	0
DO. *Peggies, per ton*	7	5	0

SLATING, 3 in. gauge, compo nails, Portmadoc or equal:

Ladies, per square	£4	0	0
Countess, per square	4	5	0
Duchess, per square	4	10	0
WESTMORLAND, in diminishing courses, per square	6	5	0
CORNISH DO., per square	6	3	0
Add, if vertical, per square approx.	0	13	0
Add, if with copper nails, per square approx.	0	2	6
Double course at eaves, per ft. approx.	0	1	0
TILING, 4 in. gauge, every 4th course nailed, in hand-made tiles, average per square	5	6	0
DO., machine-made DO., per square	4	17	0

Vertical Tiling, including pointing, add 18*s.* 0*d.* per square.

FIXING lead soakers, per dozen	£0	0	10
STRIPPING old slates and stacking for re-use, and clearing away surplus and rubbish, per square	0	10	0
LABOUR only in laying slates, but including nails, per square	1	0	0

See "Sundries for Asbestos Tiling."

CARPENTER AND JOINER

CARPENTER, 1s. 9½d. *per hour*; JOINER, 1s. 9½d. *per hour*; LABOURER, 1s. 4½d. *per hour.*

Timber, average prices at Docks, London Standard. Scandinavian, etc. (equal to 2nds):

7×3, per std.	£23	0	0
11×4, per std.	33	0	0
Memel or Equal. Slightly less than foregoing.			
Flooring, P.E., 1-in., per sq.	£1	5	0
DO. *T. and G., 1 in., per sq.*	1	5	0
Planed Boards, 1 in.×11 in., per std.	33	0	0
Wainscot oak, per ft. sup. of 1 in.	0	2	0
Mahogany, per ft. sup. of 1 in.	0	2	0
DO. *Cuba, per ft. sup. of 1 in.*	0	3	0
Teak, per ft. sup. of 1 in.	0	3	0
DO., *ft. cube*	0	15	0
FIR fixed in wall plates, lintels, sleepers, etc., per ft. cube	0	5	9
DO. framed in floors, roofs, etc., per ft. cube	0	6	3
DO., framed in trusses, etc., including ironwork, per ft. cube	0	7	3

PITCH PINE, add 33⅓ per cent.

FIXING only boarding in floors, roofs, etc., per sq.	0	13	6
SARKING FELT laid, 1-ply, per yd.	0	1	6
DO., 3-ply, per yd.	0	1	9
CENTERING for concrete, etc., including horsing and striking, per sq.	3	10	0
SLATE BATTENING, per sq.	0	18	6

PRICES CURRENT; *continued.*

CARPENTER AND JOINER; *continued.*

DEAL GUTTER BOARD, 1 in., on firring, per sq.	£3	5	0
MOULDED CASEMENTS, 1¼ in., in 4 sqs., glazing beads and hung, per ft. sup.	0	3	0
DO., DO., 2 in., per ft. sup.	0	3	3
DEAL cased frames, oak sills, 2 in. d.h. sashes, brass-faced pulleys, etc., per ft. sup.	0	4	0
DOORS, 4 pan. sq. b.s., 2 in., per ft. sup.	0	3	6
DO., DO., DO., 1¼ in., per ft. sup.	0	3	0
DO., DO., moulded b.s., 2 in., per ft. sup.	0	3	9
DO., DO., DO., 1¼ in., per ft. sup.	0	3	3
If in oak multiply 3 times.			
If in mahogany multiply 3 times.			
If in teak multiply 3 times.			
WOOD BLOCK FLOORING, standard blocks, laid in mastic herringbone:			
Deal, 1 in., per yd. sup., average	0	10	6
DO., 1¼ in., per yd., sup., average	0	12	0
DO., DO., 1¼ in. maple blocks	0	15	0
STAIRCASE WORK, DEAL:			
1 in. riser, 1¼ in. tread, fixed, per ft. sup.	0	3	6
2 in. deal strings, fixed, per ft. sup.	0	3	9

PLUMBER

PLUMBER, 1*s.* 9½*d. per hour;* MATE OR LABOURER 1*s.* 4½*d. per hour.*

Lead, milled sheet, per cwt.	£2	4	6
DO. *drawn pipes, per cwt.*	2	6	0
DO. *soil pipe, per cwt.*	2	8	0
DO. *scrap, per cwt.*	1	9	6
Copper, sheet, per lb.	0	1	1
Solder, plumber's, per lb.	0	1	2
DO. *fine, per lb.*	0	1	5
Cast-iron pipes, etc.:			
L.C.C. soil, 3 in., per yd.	0	4	1
DO. *4 in. per yd.*	0	5	0
R.W.P., 2½ in., per yd.	0	2	0
DO. *3 in., per yd.*	0	2	5
DO. *4 in., per yd.*	0	3	3
Gutter, 4 in. H.R., per yd.	0	1	5
DO. *4 in. O.G., per yd.*	0	1	9
MILLED LEAD and labour in gutters, flashings, etc.	3	10	6
LEAD PIPE, fixed, including running joints, bends, and tacks, ½ in., per ft.	0	2	1
DO. ¾ in., per ft.	0	2	5
DO. 1 in., per ft.	0	3	3
DO. 1¼ in., per ft.	0	4	6
LEAD WASTE OR SOIL, fixed as above, complete, 2½ in., per ft.	0	6	0
DO. 3 in., per ft.	0	7	0
DO. 4 in., per ft.	0	9	9
CAST-IRON R.W. PIPE, at 24 lb. per length, jointed in red lead, 2½ in., per ft.	0	2	5
DO. 3 in., per ft.	0	2	10
DO. 4 in., per ft.	0	3	3
CAST-IRON H.R. GUTTER, fixed, with all clips, etc., 4 in., per ft.	0	2	7
DO. O.G. 4 in., per ft.	0	2	10
CAST-IRON SOIL PIPE, fixed with caulked joints and all ears, etc., 4 in., per ft.	0	7	0
DO. 3 in., per ft.	0	6	0
Fixing only:			
W.C. PANS and all joints, P. or S., and including joints to water waste preventers, each	2	5	0
BATHS only, with all joints	1	18	0
LAVATORY BASINS only, with all joints, on brackets, each	1	10	0

PLASTERER

PLASTERER, 1*s.* 9½*d. per hour (plus allowances in London only);* LABOURER, 1*s.* 4½*d. per hour.*

Chalk lime, per ton	£2	12	6
Hair, per cwt.	0	18	0
Sand and cement see EXCAVATOR, *etc., above.*			
Lime putty, per cwt.	£0	2	8
Hair mortar, per yd.	1	7	0
Fine stuff, per yd.	1	14	0
Sawn laths, per bdl.	0	2	4
Keene's cement, per ton	5	15	0
Sirapite, per ton	3	10	0
DO. *fine, per ton*	3	18	0
Plaster, per ton	3	0	0
DO. *per ton*	3	12	6
DO. *fine, per ton*	5	12	0
Thistle plaster, per ton	£3	9	0
Lath nails per lb.	0	0	4
LATHING with sawn laths, per yd.	0	1	7
METAL LATHING, per yd.	0	2	3
FLOATING in Cement and Sand, 1 to 3, for tiling or woodblock, ¾ in., per yd.	0	2	4
DO. vertical, per yd.	0	2	7
RENDER, on brickwork, 1 to 3, per yd.	0	2	7
RENDER in Portland and set in fine stuff, per yd.	0	3	3
RENDER, float, and set, trowelled, per yd.	0	2	9
RENDER and set in Sirapite, per yd.	0	2	5
DO. in Thistle plaster, per yd.	0	2	5
EXTRA, if on but not including lathing, any of foregoing, per yd.	0	0	5
EXTRA, if on ceilings, per yd.	0	0	5
ANGLES, rounded Keene's on Portland, per ft. lin.	0	0	6
PLAIN CORNICES, in plaster, per inch girth, including dubbing out, etc., per ft. lin.	0	0	5
WHITE glazed tiling set in Portland and jointed in Parian, per yd., from	1	11	6
FIBROUS PLASTER SLABS, per yd.	0	1	10

GLAZIER

GLAZIER, 1*s.* 8½*d. per hour.*

Glass: 4ths in crates:			
Clear, 21 oz.	£0	0	5
DO. 26 oz.	0	0	6
Cathedral white, per ft.	0	0	5½
Polished plate, British ¼ in., up to 2 ft. sup.	0	2	5
DO. *3ft. sup.*	0	3	2
DO. *7 ft. sup.*	0	3	9
DO. *25 ft. sup.*	0	4	3
DO. *100 ft. sup.*	0	5	1
Rough plate, ⅛ in.	0	0	5¼
DO. *¼ in., per ft.*	0	0	6
Linseed oil putty, per cwt.	0	16	0
GLAZING in putty, clear sheet, 21 oz.	0	0	10
DO. 26 oz.	0	0	11
GLAZING in beads, 21 oz., per ft.	0	1	0
DO. 26 oz., per ft.	0	1	3
Small sizes slightly less (under 3 ft. sup.).			
Patent glazing in rough plate, normal span. 1*s.* 5*d.* to 2*s.* per ft.			
LEAD LIGHTS, plain, med. sqs. 21 oz., usual domestic sizes, fixed, and up, per ft. sup.	£0	3	6
Glazing only, polished plate, 6½*d.* to 8*d.* per ft., according to size.			

DECORATOR

PAINTER, 1*s.* 8½*d. per hour;* LABOURER, 1*s.* 4½*d. per hour;* FRENCH POLISHER, 1*s.* 9*d. per hour;* PAPERHANGER, 1*s.* 8½*d. per hour.*

Genuine white lead, per cwt.	£3	5	0
Linseed oil, raw, per gall.	0	4	0
DO., *boiled, per gall.*	0	4	3
Turpentine, per gall.	0	6	6
Liquid driers, per gall.	0	9	6
Knotting, per gall.	1	5	0
Distemper, washable, in ordinary colours, per cwt., and up	2	0	0
Double size, per firkin	0	3	6
Pumice stone, per lb.	0	0	4
Single gold leaf (transferable), per book	0	1	10
Varnish copal, per gall. and up	0	18	0
DO., *flat, per gall.*	1	2	0
DO., *paper, per gall.*	1	0	0
French polish, per gall.	0	19	0
Ready mixed paints, per gall. and up	0	10	6
LIME WHITING, per yd. sup.	0	0	3
WASH, stop, and whiten, per yd. sup.	0	0	6
DO., and 2 coats distemper with proprietary distemper, per yd. sup.	0	0	9
KNOT, stop, and prime, per yd. sup.	0	0	7
PLAIN PAINTING, including mouldings, and on plaster or joinery, 1st coat, per yd. sup.	0	0	10
DO., subsequent coats, per yd. sup.	0	0	9
DO., enamel coat, per yd. sup.	0	1	2½
BRUSH-GRAIN, and 2 coats varnish, per yd. sup.	0	3	8
FIGURED DO., DO., per yd. sup.	£0	5	6
FRENCH POLISHING, per ft. sup.	0	1	2
STRIPPING old paper and preparing, per piece	0	1	7
HANGING PAPER, ordinary, per piece	0	1	10
DO., fine, per piece, and upwards	4	0	2
VARNISHING PAPER, 1 coat, per piece	0	9	0
CANVAS, strained and fixed, per yd. sup.	0	3	0
VARNISHING, hard oak, 1st coat, yd. sup.	0	1	2
DO., each subsequent coat, per yd. sup.	0	0	11

SMITH

SMITH *weekly rate equals* 1*s.* 9½*d. per hour;* MATE, *do.* 1*s.* 4*d. per hour;* ERECTOR, 1*s.* 9½*d. per hour;* FITTER, 1*s.* 9½*d. per hour;* LABOURER, 1*s.* 4*d. per hour.*

Mild steel in British standard sections, per ton	£12	10	0
Sheet steel:			
Flat sheets, black, per ton	19	0	0
Do., Galvd., per ton	23	0	0
Corrugated sheets, galvd., per ton	23	0	0
Driving screws, galvd., per grs.	0	1	10
Washers, galvd., per grs.	0	1	1
Bolts and nuts, per cwt. and up	1	18	0
MILD STEEL in trusses, etc., erected, per ton	25	10	0
DO., in small sections as reinforcement, per ton	16	10	0
DO., in compounds, per ton	17	0	0
DO., in bar or rod reinforcement, per ton	20	0	0
WROT. IRON in chimney bars, etc., including building in, per cwt.	2	0	0
DO., in light railings and balusters, per cwt.	2	5	0
FIXING only corrugated sheeting, including washers and driving screws, per yd.	0	2	0

SUNDRIES

Fibre or wood pulp boardings, according to quality and quantity. *The measured work price is on the same basis . . . per ft. sup.*	£0	0	2½
FIBRE BOARDINGS, fixed on, but not including studs or grounds, per ft. sup.	0	0	6
Plaster board, per yd. sup. . from	0	1	7
PLASTER BOARD, fixed as last, per yd. sup. . from	0	2	8
Asbestos sheeting, 3/32 in., grey flat, per yd. sup.	0	2	3
DO., *corrugated, per yd. sup.*	0	3	2
ASBESTOS SHEETING, fixed as last, flat, per yd. sup.	0	4	0
DO., corrugated, per yd. sup.	0	5	0
ASBESTOS slating or tiling on, but not including battens, or boards, plain "diamond" per square, grey	2	15	0
DO., red	3	0	0
Asbestos cement slates or tiles, 3/32 in. punched per M. grey	17	0	0
DO., *red*	19	0	0
ASBESTOS COMPOSITION FLOORING: Laid in two coats, average ¾ in. thick, in plain colour, per yd. sup.	0	7	0
DO., ¾ in. thick, suitable for domestic work, unpolished, per yd.	0	6	6
Metal casements for wood frames, domestic sizes, per ft. sup.	0	1	6
DO., *in metal frames, per ft. sup.*	0	1	9
HANGING only metal casement in, but not including wood frames, each	0	2	10
BUILDING in metal casement frames, per ft. sup.	0	0	7
Waterproofing compounds for cement. Add about 75 per cent. to 100 per cent. to the cost of cement used.			
Plywood			
3 m/m alder, per ft. sup.	0	0	2
4½ m/m amer. white, per ft. sup.	0	0	3¾
⅜ m/m figured ash, per ft. sup.	0	0	5
4½ m/m 3rd quality, composite birch, per ft. sup.	0	0	1½