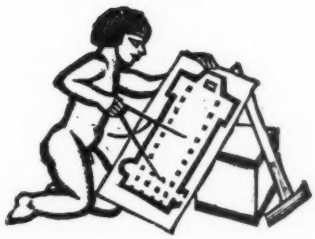
THE LAUSANNE FAIR

SWISS FEDERAL RAILWAY STAND

A METAL tourist map of Switzerland, 60 square metres in area, forms the background of the stand. Different coloured lights contrast the electric railway system with the few remaining steam-operated lines and the steamer routes on the lakes. A low counter, 11 metres in length, is in the foreground, on which a model train runs around a circular track controlled by automatic signalling. The stand was designed by Alberto Sartoris.

A PROVINCIAL CHURCH IN PORTUGAL

The church of Sao Miguel de Réfoios is typical of the fully developed baroque churches in the Portuguese province of Minho. The building is executed in granite, a material used universally even for the most complicated rococo carving. The façade of the church was rebuilt about the middle of the eighteenth century, but the entrance doorway is sixteenth-century Portuguese renaissance.



THE COMPETITION PROBLEM

IN this week's issue seven different building projects are advertised for open architectural competition. This number is a large one, and it is perhaps natural that such a wealth of choice for habitual competitors should have resulted in a reopening of general discussion concerning the whole competition system.

The problem is an old one, and with its reappearance there have appeared also many bogeys equally old, some slightly disguised, many still splendidly themselves. The efficacy of the whole system has been denied ; the waste of time of all but one of the competitors has been deplored ; and the cases for one assessor or several and for competitions in one stage or two have again been put forward. Indeed, the competitor possessed of a good memory might well be tempted to retire from contemporary discussion in quiet certitude that when all had been said the present system would still be found unaltered as being the only one both bearable and practicable. But it is very doubtful whether that competitor would be right in his opinion.

Most architects have always believed, and most architects believe today, that an open architectural competition system *of some kind* will have three good results. It will ensure that the building projects concerned will have the maximum concentration and thought of many types of architect expended upon them ; that general architectural standards will be raised by the merit of the resultant winning schemes ; and that it will offer to the young or unknown architect an equal chance with the most famous and prosperous.

To the desire that it may secure these three things the competitive system owes its general favour. It is, however, now widely considered that the system as it exists today achieves none of them save the last, and that not completely. Let us see what these present methods are.

The assessor of an open competition may be nominated directly by the President of the R.I.B.A. or he may, in fact if not in form, be chosen by the promoters. In either case his identity is known from the start to all whom it may concern. In the usual phrasing, this gentleman then advises the promoters as to the conduct of the competition, draws up the conditions, and acts as their assessor. Finally, he makes his award.

The general complaint against this procedure by many architects is that under it the successful competition winner may not be, and sometimes is not, the most thoughtful, far-sighted, imaginative and able planner. He may be something very different ; he may be an all-round architectural man of the world and, essentially, an astute psychologist. If he has convictions he lays them aside. He does not try to secure the best possible solution to the problem set him ; he tries to design what that curious entity the assessor-under-the-influence-of-the-promoters'-views-and-his-own-preconceived-ideas will consider the most suitable and workable scheme. A very different thing.

By the astuteness with which they assess the relative value of all the human problems of this odd portmanteau—and not, we emphasize, by the skill with which they value and fulfil the various needs of the building problem before them—do such competitors determine their chances of success.

In our view—for we feel that this is a time for plain speaking—this perversion of the whole finer meaning and intention of the competitive system should be ended. Such a statement concerning a problem of admitted complexity is easy to make. The solution is more difficult. But because of our conviction that that solution must be reached, and that its accomplishment is by no means impossible, we do not hesitate to put forward a suggestion for reform.

In our view the functions of adviser to the promoters and that of assessor should be kept separate. Promoters may choose their adviser, in fact should be encouraged to do so, but not the assessor. The adviser should draw up the conditions and in doing so should do all that lies in his power to keep these as free as possible of such promoters' views as "desire a dignified two-floored building in keeping with local building traditions." He should also answer competitors' questions, and then, his rôle fulfilled, retire from all connection with the competition. Previous to such procedure we hold that the President of the R.I.B.A. should establish and publish a roll of assessors, mainly composed of men of competition experience and representing as fully as possible the various groups of opinion in the profession in regard to the question of architectural design. From this roll all assessors of open competitions should be selected.

When the schemes submitted for any particular competition have all been submitted, and not before, an assessor should be selected by lot from the roll, judge the schemes according to the conditions drawn up, and make his award.

We do not pretend that reforms so sweeping lack very valid objections. Promoters will have to be persuaded, the personnel of the roll of assessors cannot please everyone, some competitors may feel tempted to play for safety ; and a competitor in a particular competition may suddenly and disconcertingly find himself its assessor unless steps are taken to prevent this occurrence. But we unhesitatingly state that by a revision of the system in some very similar manner the competitor who designs according to his best ability and deepest conviction, will be at least as likely to win as anyone else. This cannot always be said to be the state of affairs today.

The Architects' Journal
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NOTES & TOPICS

MAJOR HARRY BARNES

IT is with the deepest possible regret that I hear of the death of Major Harry Barnes, for whom I had the greatest respect.

*

Major Barnes worked unremittingly in the service of architecture and architects and was the strongest link we had with local government and parliamentary life. He was for many years the Member for East Newcastle, as well as a member of the L.C.C. His work for town planning ideals and for the reform of building regulations was only equalled by the energy with which he tackled the problem of registration.

*

It is no exaggeration to say that it is largely to Major Harry Barnes that we owe the fact of having a Registration Bill at all. As chairman of the Registration Council of the United Kingdom he had a difficult task, and in making a success of it earned the respect of every member of the Council and of every thinking member of the profession.

*

In the sphere of town planning, Major Barnes did much earnest spade work. As chairman of the L.C.C. Town Planning Committee it was to him that we were looking for the reasoned extension of the Waterloo Bridge scheme to embrace the whole of the Surrey Embankment.

ARCHITECTS AND GOVERNMENT

But perhaps the greatest lesson Major Harry Barnes has given us is the importance of an architect's participation in local and parliamentary government.

*

Architects have on innumerable occasions severely criticized Bills before Parliament, the Housing Bill, Ribbon Development Act, the Town Planning Bill, and so forth, as well as all suggestions of reform in bye-laws and building regulations. The most effective way to help to achieve well-reasoned legislation is, as Major Barnes, by personal example, has shown us, to serve on local councils and in the House of Commons.

*

Who is prepared to do duty in this important manner, to give up idle theory and to take up personal action? Soon the municipal elections will be in full swing and will be closely followed by the more important parliamentary campaign. How many architects will present themselves as candidates? There is surely no better way to ensure the proper relation of architecture to our major social fabric.

THUNDER OVER COCKERMOUTH

With world interest centred in Northern Africa there is some danger that momentous events that have been taking place in Cumberland may pass unnoticed.

*

A certain gentleman in that neighbourhood suffered the humiliation of the design of the roof of his house being criticized by the local authority on the grounds that it would damage the amenities of that attractive neighbourhood. In fact, they went so far as to ask him to alter it.

*

With the righteous indignation of an Englishman whose liberty has been threatened he disclaimed any intention of conforming with so dictatorial a demand.

*

On the contrary, he announced his intention, to show his defiance of interfering officialdom, of ordering his chimneys to be painted in stripes of red, white and blue.

*

That would show them what a free born Englishman thought of their "amenities"—and there, I understand, the matter rests.

*

Surely there is material here for a *cause celèbre*. What is the R.I.B.A. doing about it? What are the Public Relations Committee and the Inspectors of the Minister of Health doing—and, for that matter, Lady Houston and the D.I.A.?

*

The Cockermouth Case is a national question of the most urgent kind (red, white *and* blue). I for one shall not rest till it is decided.

UNIT FURNITURE

Yesterday I called again to see the D.I.A. Exhibition at Bowmans, which I mentioned last week. I thought it excellent and quite remarkable that so fine a show could be compiled out of the everyday stock of a London shop.

*

I went particularly to see the unit furniture, for I had an idea that it would be difficult to avoid monotony by the use of standard units. This view I found to be quite mistaken. Indeed, so well is the furniture arranged that it was some time before I realized that, with the exception of one room, all the furniture exhibited is of standard units.

GENEVAN QUARREL

Joint architects with a single client are likely enough to spend their time in fruitless bickerings: how much time, therefore, will be wasted by seven or eight architects doing a job for the fifty odd nations which make up the League?

*

The answer is approximately two years, if I am

Mr. Arthur H. Ley, A.R.I.B.A, with his bride, Miss E. C. Riches, leaving the Church at Lamorbey, Sidcup, after their marriage on Monday last.

to believe a recent newspaper cutting. Roads have been laid out, flowers planted, a railway has been moved nearly two miles to reduce noise, and still the building consists only of four walls and a tangle of service pipes, with nowhere to go.

*

And the Secretary-General of the League maintains that Council proceedings have twice been held up while the architects are persuaded to fight quietly while deciding what the new furniture is to be like and where it is to go.

GLIDING

During my recent holiday tour I made a detour—deliberately made a detour—to avoid some of the abbeys and ruins of Yorkshire and to have instead a few hours with the British Gliding Association's competitions held above the rock spurs to the north-east of Thirsk.

*

Many architects spend melodramatic week-ends yachting in the Thames Estuary, but this muddy spot does not compare with the delight of sailing in the clouds, noiselessly, swiftly, and serenely.

*

After several hours with these pioneer competitors I witnessed the perfect descent of an elegant Rhönbussard, from which emerged, to my intense amazement, none other than a fellow architect—Christopher Nicholson.

*

And then I perceived a direct relationship between the building of gliders or sailplanes and the building of modern structures—both unfold an adventure which some inner feeling compels us to undertake; both introduce little-known elements which challenge our sense of mastery.

*

We must organize an architects' Gliding Club—or does one already exist in some part of the country not yet visited by Astragal?

MUSIC

On Tuesday night this week I took my seat at the first Courtauld-Sargent concert of the season. And once again I found myself registering pleasure, not only at the work of the London Philharmonic Orchestra but at the number of fellow architects who support this concert series.

*

In the dim light I perceived close to me several friends from Bedford Square—Murray Easton, Thornton White, Henry Braddock, Eric Jarrett, to mention a few—and casting my eyes around the Queen's Hall I counted almost a hundred architects. And someone very like Hope Bagenal was chasing reverberations down the side gangways and engaged in writhing hand-to-hand encounter with echoes in the remoter corners—but perhaps it was not he.

MEET THE CHOWS

First prize this week: article in the *Daily Express* ("Women Worth Knowing, No. 1") from which the following are some random extracts.

*

The woman who stays at home is not always the woman who loves home life best. She may stay at home from lack of initiative, while the real home-lover is following a career outside it. Mrs. W. G. Robson, of Sheffield, is a real home-lover.

*

Fifteen years ago, when her husband's health began to fail, Mrs. Robson set to work to learn how to run his building business . . . . "I do not always go to work in quite the same way as my husband did," she said to me when I had a talk with her recently. "For example, I often rely on intuition where he would have had to sift evidence. I believe strongly in a woman's intuition, and that she should have the courage to use it."

*

She sat on the arm of a settee as she talked, and blew cigarette smoke meditatively into the air. Dressed in a brown suède costume which toned pleasantly with her Titian hair, she looked a figure at once charming and resolute. . . . "I never build houses if I can help it," said Mrs. Robson. "One has to build so many all alike. I prefer large buildings with individuality. Time for recreation? Why, of course!"

*

"Embroidery, for preference. How's this? And she led me to a landscape worked in embroidery, while the eldest of her four daughters brought in an embroidered centre-piece for a firescreen.

*

"At the moment I am knitting a blanket—fascinating work. I used to go to race meetings years ago, but I am too busy for that now. Still I find time for the company of animals. Meet the Chows and my Persian puss. Pity I haven't time for riding nowadays. I love horses. But one can't have everything. Come and see the house."

*

And for a brief quarter of an hour or so the business chief slipped into the background, and in her place was a house-proud woman, delighting in carved oaken chests, in old English glass, in carpets and cushions, and all those little touches that make a house into a home.

REUTERS

Reuters Press Agency, which occupies much the same position in relation to Fleet Street as the Building Centre does to architecture, is, I see, to have new premises.

*

Sir Edwin Lutyens is to be their architect and is to clothe the edifice externally with Portland stone—a material no one else seems able to work with equal liveliness.

*

Most architects who have dined at one time or another with Sir Edwin will know him as a master of anecdote—now we must adjust our views and think of him more in relation to real news.

ASTRAGAL

NEWS

POINTS FROM THIS ISSUE

MAINTENANCE SCHOLARSHIPS AWARDED BY THE ARCHITECTS' REGISTRATION COUNCIL

The Architects' Registration Council of the United Kingdom announces that maintenance scholarships have been awarded under certain conditions to the following for the year 1935–1936 :—

J. E. Lloyd (Birmingham) to attend the Birmingham School of Architecture.

A. Daykin (Mansfield, Notts) to attend the Department of Architecture, Sheffield University.

K. L. Rodham (Newcastle) to attend the Armstrong College School of Architecture (University of Durham), Newcastle-on-Tyne.

M. W. Smith (London) to attend the Architectural Association School of Architecture, London.

S. C. Halbritter (London) to attend the Architectural Association School of Architecture, London.

MANCHESTER SOCIETY OF ARCHITECTS

Lt.-Col. George Westcott, F.R.I.B.A., in his presidential address to the above Society last week, referred to the Restriction of Ribbon Development Act, 1935. "It appears to me," he said, "that it is far too easy for local authorities and those developing to evade the original intention of this piece of legislation. No doubt before long the Act will have to be amended to make it strong enough to stop the erection of these ugly bungalows and the despoiling of our countryside."

Discussing the Town and Country Planning Act, 1932, the President said : "Now that local authorities have been given the opportunity to replan built-up areas by the passing of the Act, I think the general public should show more than a passing interest in this very important work." He referred to the necessity of foresight.

"An example of this lack of foresight in replanning the central parts of the city," he said, "is shown by the Town Hall extension and Reference Library in Manchester, which would never have been carried out as they are had such a pre-arranged, systematic plan been adopted. Traffic congestion is often due to the lack of a bold scheme of town-planning. No city can have civic dignity unless it has some symmetrical binding together of parts, therefore the important buildings should bear some relation to one another."

THE ARCHITECTS' DIARY

Thursday, October 17

LONDON MUSEUM, *St. James's, S.W.1. Exhibition of photographs, "New London from the Air." Open until further notice. 10 a.m. to 6 p.m.*

NORTH LONDON HOME LIFE EXHIBITION. *At the Alexandra Palace, N. Until October 26.*

BUILDING TRADES EXHIBITION. *Birmingham. Until October 26.*

HOUSING AND HEALTH EXHIBITION. *At Glasgow. Until October 26.*

HOUSING EXHIBITION. *At Christ Church Parish Hall, London Road, St. Leonards. Until October 19.*

ROYAL ACADEMY OF ARTS, *Burlington House, Piccadilly, W.1. "The Decoration in Colour of Interior Walls coated with Plaster and External Walls coated with White Cement." By Professor A. P. Laurie. 4 p.m.*

SOCIETY OF ANTIQUARIES, *Burlington House, Piccadilly, W.1. "Neolithic and Bronze Age Jericho." By Professor John Garstang. 8.30 p.m.*

SOUTH WALES INSTITUTE OF ARCHITECTS. *Cardiff Branch. At the Technical College, Cardiff. "Commodity, Firmness and Delight." By E. R. Jarrett, A.R.I.B.A.*

Friday, October 18

ARCHITECTURAL ASSOCIATION, 36 *Bedford Square, W.C.1. Second of a series of public lectures on Building London. "The Industrial Age." By W. R. Davidge, F.R.I.B.A. 8 p.m.*

HAMPSHIRE AND ISLE OF WIGHT ARCHITECTURAL ASSOCIATION. *At Winchester. General Meeting and Presidential Address. 6.15 p.m.*

ROYAL ACADEMY OF ARTS, *Burlington House, Piccadilly, W.1. "Modern Pigments: Their Proper Selection and Use." By Professor A. P. Laurie. 4 p.m.*

LONDON SOCIETY. *At the Royal Society of Arts, John Street, Adelphi, W.C.2. "Heraldry and its London Home." By Archibald G. B. Russell, M.V.O. 5 p.m.*

ROYAL SANITARY INSTITUTE. *At the Town Hall, Bangor. "Housing and Town-Planning." By B. Price Davies. 3 p.m.*

Saturday, October 19

ST. PAUL'S ECCLESCOLOGICAL SOCIETY. *Visit to Enfield Parish Church, Vicarage and Old Houses. 2.30 p.m.*

ROYAL SANITARY INSTITUTE. *At Bangor. Visits to housing schemes.*

Monday, October 21

INSTITUTION OF STRUCTURAL ENGINEERS. *Midland Counties Branch. At the James Watt Memorial Institute, Birmingham. Address by the Chairman (G. W. Costain). 6.30 p.m.*

INCORPORATED INSTITUTE OF BRITISH DECORATORS. *At Glasgow. "Colour—its Application and Appeal to the Senses." By W. G. Morton.*

Wednesday, October 23

INCORPORATED ASSOCIATION OF ARCHITECTS AND SURVEYORS, *London and Home Counties Branch. At 43 Grosvenor Place, S.W.1. "The Function of Sculpture Today." By Gilbert Bayes. 7 p.m.*

ROYAL ACADEMY OF ARTS. *Burlington House, Piccadilly, W.1. Distribution of Prizes to Students. 9 p.m.*

NORTHANTS, BEDS AND HUNTS ASSOCIATION OF ARCHITECTS. *At the Swan Hotel, Bedford. Annual Dinner. 7 p.m.*

A.T.O.

At a meeting of the Architects' and Technicians' Organization, held at Conway Hall, Red Lion Square, W.C., last week the following resolution was proposed :

"That this meeting of London architects and technicians, held under the auspices of the Architects' and Technicians' Organization, demands that the National Government and the League of Nations immediately operate effective sanctions against Italy as empowered to do under the Covenant of the League, to end the brutal attack of Italian Fascism on the people of Abbyssinia."

We are informed that copies of the resolution were sent to the Secretary of the League of Nations, Craven House, W.C.2. and the Foreign Secretary, Foreign Office, Downing Street, S.W.

D.I.A.

On Tuesday last Lady Mount Temple opened, at Bowman Bros., Ltd., High Street, Camden Town, N.W., an exhibition of "well-designed furniture and household equipment" selected by the Design and Industries Association. This is the first exhibition in the series to be organized in retail stores by the Association.

HOW MUSSOLINI LOOKS

The following note was printed, under the above heading, in a recent issue of the *Glasgow Bulletin :*

"Mussolini looks as if he has not a care in the world," said Major G. B. J. Athoe, secretary of the Incorporated Association of Architects and Surveyors, who returned to London on Saturday after a tour in Italy with a party of architects.

"We had an interview with Mussolini," he said. "I thought he looked as if he did not have a care in the world. He spoke to us in French."

Major Athoe said that while he was in Rome he was assured by a high British official that the King of Italy is very far from being a cypher, as he is generally represented.

"As a matter of fact, I was told he is in daily touch with Mussolini," said the major.

SMIRKE MEMORIAL

Plans are being prepared for a memorial shortly to be erected in London to Robert Smirke, R.A. (1752-1845), a famous Academician of his time, and his two sons, Sir Robert Smirke, R.A., F.R.I.B.A. (1780-1867), and Sydney Smirke, R.A., F.R.I.B.A. (1798-1877).

The memorial is to be set up on the site of the house at Osnaburgh Terrace, Regent's Park, where Robert Smirke, Sen., lived and died, and which was demolished this year to make way for the building of a nine-storey residential structure designed by Mr. Robert Atkinson, F.R.I.B.A. The project to commemorate this family has the support of Sir William Llewellyn, P.R.A., Mr. Percy Thomas, P.R.I.B.A., and Mr. Robert Atkinson, F.R.I.B.A.

The form of the memorial has not been finally decided by the organizing committee, but the plan at present under consideration takes the form of a triptych of illuminated vellum, recording the achievement of the three men.

NORTHERN ARCHITECTURAL ASSOCIATION

"The disfigurement of our main streets with horrible signs still goes on apparently unchecked," said Mr. Harold Oswald, L.R.I.B.A., in his presidential address to the Northern Architectural Association at Newcastle on Thursday last. "Architects," he continued, "may have been

somewhat to blame for this in the past, as often no place was available for a sign, but this can be remedied and should be so by providing such spaces. Unless the architect is consulted as to how these spaces are to be utilized the results are often nearly as wicked as the nondescript signs which meander over the whole of some well-designed elevation.

ON THE AIR

On Saturday next, October 19, in the National Programme at 7.45 p.m., there will be a broadcast debate on the subject "That Flats Can Solve the Housing Problem." The proposer is Mr. Geoffrey Boumphrey and the opposer Sir Ernest Simon.

BIRMINGHAM AND FIVE COUNTIES ARCHITECTURAL ASSOCIATION

At a meeting of the above Association, held recently at Birmingham, it was reported that the Association now numbered 175 members—118 associates and 72 students.

R. I. B. A.

EXHIBITIONS

The designs of students of Schools of Architecture recognized for exemption from the R.I.B.A. Final Examination will be exhibited at the R.I.B.A., 66 Portland Place, London, W.1, from today, October 17 to October 22, between the hours of 10 a.m. and 8 p.m. (Saturday, October 19, 10 a.m. and 5 p.m.). The R.I.B.A. Silver Medal for Recognized Schools of Architecture and £5 in books is awarded for the best set of drawings submitted.

The designs of students of Schools of Architecture recognized for exemption from the R.I.B.A. Intermediate Examination will be exhibited at the R.I.B.A. from October 29 to November 1 inclusive, between the hours of 10 a.m. and 8 p.m. The R.I.B.A. Bronze Medal for Recognized Schools of Architecture and £5 in books is awarded for the best set of drawings submitted.

R.I.B.A. DANCE CLUB

The following dates have been arranged for dances at the R.I.B.A. premises for the Session 1935-36.

November 8, December 13, January 31, April 3, May 15 and July 3.

The dances will start at 9 p.m. and finish at 1 a.m. Gerhardi's Band has been engaged for the first dance.

The price of tickets will be as follows :—Double ticket for series of six dances, £2 ; single ticket for series of six dances, £1 10s. ; Individual tickets for each dance, 6s. each.

Applications for serial tickets or for individual tickets for each dance must be received at least three days before the first dance, or before the dance for which the tickets are required.

All applications must be accompanied by cheques for the appropriate amount.

All applications for tickets must be sent to Mrs. Alan Slater, 8 Wellgarth Road, London, N.W.11.

SCIENCE AND THE NEW BUILDING MATERIALS

Following are some extracts from a paper entitled "Science and the New Building Materials," read by Dr. R. E. Stradling, C.B., Director of the Building Research Station, at a conference held at the College of Technology, Manchester, on October 12.

IN starting any discussion on science and the building industry it always seems worth while to make quite certain that a clear picture exists as to what a traditional industry means. Such an industry involved craftsmanship, for it is only in craft skill that the traditional knowledge is passed from generation to generation. Such books as attempt to describe the materials and processes always have great difficulty when an attempt is being made to express in words the craft skill ; more often than not this is impossible. The traditional knowledge of the building industry is craftsmanship designed to meet the human needs of protection, chiefly from the weather. The knowledge is built up upon trial and error over long periods of time and depends upon :—

1. The human demands which were to be met at the time of the development.
2. The materials available.
3. The social and economic conditions during the period of the development. The traditional knowledge is thus only strictly applicable when these factors remain the same as they were during the development of the technique, and it does not require much serious thought to realise that, as a matter of fact, all three of these are changed.

Let us examine them in a little more detail.

1. *The Demands.*—The fundamental demand of protection from the weather still remains the same, but the standard of protection required is much higher. We usually consider this under the heading of a higher standard of living, and these higher standards are brought to mind immediately if we compare the requirements as to accommodation, sanitation, internal finishes, noise insulation and, not least, vermin eradication and prevention, which are now accepted as essential in new housing schemes. The first three of these are obvious, but perhaps a few notes on the last two may be of interest.

All will realize that the tendency in present-day construction is to cut down the thicknesses of walls and floors in order to cheapen the first cost of building. It is quite justly pointed out that the old traditional thicknesses are much stronger than are required from a load-bearing point of view, but it is not realized how much this reduction in massiveness of construction has helped to intensify the modern problem of noise. Not only have street noises become unbearable in cities and on main roads, but the advent of gramophones and loud speakers has brought about a condition in some of our homes which makes rest an impossibility. This problem of noise and its prevention has to be faced very seriously, and especially so if it is proposed to house people in flats. Whereas it does not seem to matter so much about noise created by one family in their own house—for this is obviously to some extent under the control of the householder—it does cause very serious trouble if the noise of children's play, loud speakers and the like are transmitted almost without reduction from one household to another.

The problem of the bed bug in some of our poorer dwellings is a more intense difficulty than is generally realized. The following is an extract from the report issued by the Ministry of Health on the bed bug :—

> "As a result of a questionnaire addressed to the London County Council, the Councils of the City of London and of the Metropolitan and County Boroughs it has been possible to form some opinion as to the extent of the problem. Estimates of the amount of infestation of houses provided under the various Housing Acts since that of 1919 vary greatly, some estimates being in the neighbourhood of 50 per cent.
>
> "Virtually every urban authority is troubled with this problem. It is estimated that in many areas practically all the houses are to a greater or less degree infested with bed bugs."

Over the last few months it has been the duty of the Building Research Station to inspect various housing schemes, especially flat construction, and the experience obtained certainly bears out the implication of the extract given above. The problem is much more difficult and widespread than has been generally realized. An encouraging point is that this trouble has been brought into the open and every effort is being made to reduce this nuisance as far as it can be by proper building construction.

2. *Materials.*—Turning now to our next division, that of materials, it will be realized that the traditional materials were either natural products or simple derivatives of them. Of the first group stones, slates and timber immediately spring to mind, and of the derivatives materials such as lime and bricks. A very short investigation brings the realization that such materials are really very local in their character, and, with a few outstanding exceptions, building materials were, where possible, such as could be obtained in the neighbourhood of the building.

3. *Social and Economic Conditions.*—In addition to the changes in social and economic conditions which have affected the demands made upon building, changes have occurred which have also affected the method of carrying out the processes of building. Three major ones are worth noting ; labour, transport and the demand for economy. Many of the traditional building processes were developed when, compared with the present day, labour was nearly slave labour. Some of the craft methods cannot now be carried out in their original form because of the labour costs involved. Transport has affected this fundamentally, for it is turning local

industries into potential national ones. Both men and materials can be transported easily from one part of England to another, and thus local traditions, both in materials and craftsmanship, have been spread and confused throughout the country. The demand for economy is interpreted in the majority of cases to mean cheapness in first costs. Very many of our present-day troubles in building are due to the interaction of these three factors of the present economic conditions.

As an example of this it is worth while spending a short time considering the case of lime and its use in plastering. Lime is a traditional material, but the original technique of its handling was very local as far as England is concerned. In this country there is a great variety of lime stones, nearly all of which require quite different technique if the best results are to be obtained. There seems every reason to suppose that the old-time craftsman who worked with his local lime was concerned with the traditional method of using that type of lime. At the present time, when both men and materials are sent from one end of England to another, it is easy to realize how lime can be misused. With the best will possible the craftsman may mishandle a lime through using a local technique not applicable to the imported lime, or a local lime may be misused by an imported craftsman. What is possibly nearer the truth at the present time is that there is no proper traditional technique for lime, but a muddle of the various traditional techniques of very local origin.

Now consider the act of plastering a wall. Even if, up to this point, the plasterer is handling his material correctly by suitable slaking and the like, he is now faced with placing it upon a constructional background. The traditional technique probably suggests three-coat work, and it may be even that such work is specified, but will the plasterer be given sufficient time to do his work as tradition demands? It is very doubtful indeed, for the principle of three-coat work is that of allowing long periods between the application of the various coats so that shrinkage and cracking of the two undercoats can take place, allowing the application of a finishing coat which shall be relatively free from cracking. The periods between the application of the coats should often be two or three months if full advantage is to be taken of the traditional knowledge. There is scarcely any need to point out that the chance of the man being allowed to wait these periods is very small at the present time. The client probably requires the house complete inside two or three months. Under these modern conditions it is not possible to carry out traditional processes.

METHODS OF JUDGING BUILDING MATERIALS

The basis of craftsmanship is the development of an instinctive knowledge of materials and how to handle them. Thus, the traditional way of judging a building material was to obtain an expression of opinion on its qualities by a practical craftsman. Assuming scrupulous honesty on the part of the particular individual, this method at its best can scarcely ever result in a judgment which is anything but very approximate and probably of local value only, for a man's personal experience is so affected by particular local conditions and unrealised and uncontrolled factors.

The advent of new materials to replace old or to meet new demands thus presents an almost insoluble problem to a traditional industry. There is no method of judging them, for no instinctive knowledge of new materials *can* exist and no experience is available. It may be suggested that the difficulty may be met by using the old method of trial and error on a job, but this virtually leads nowhere, for long before the information is available on one material a hundred new ones will be awaiting consideration. Thus, some new method of judging our materials is required, and this can be provided by scientific knowledge. New methods are based on scientific research, which consists essentially of isolating in a laboratory the various factors involved in a process and measuring their individual effects. How powerful a tool scientific research can be will be realised when we think of the gigantic new industries which have been built up by its use, e.g., electrical engineering, the chemical industry etc.

To apply scientific research to a traditional industry is not a straightforward or easy job, and not the least of the difficulties is the human one, for it is naturally extremely difficult for those already trained in the traditional work to realize what the new tool is and how slow the first stages of development must be. In changing over from a traditional industry to one based on scientific research involves an almost complete change in language; to some extent this is literally the case, but it is even more so in the fundamental method of approach. The traditional knowledge is the expression of a result "hammered out" by practical experience, but without any knowledge of why such a result has been found or why it has been a satisfactory solution in the past.

Thus, one of the first things which has to be done in building up a scientific basis for the industry is to find out and express in scientific terms why the traditional knowledge was in any way satisfactory. Or, to express it in another way, the present traditional knowledge has to be translated into scientific terms. This is more often than not extremely difficult, for the craftsmen themselves carry out so many of their processes instinctively without being conscious of exactly what they are doing. Until we know in the new language what the traditional knowledge means it is almost impossible to judge new materials.

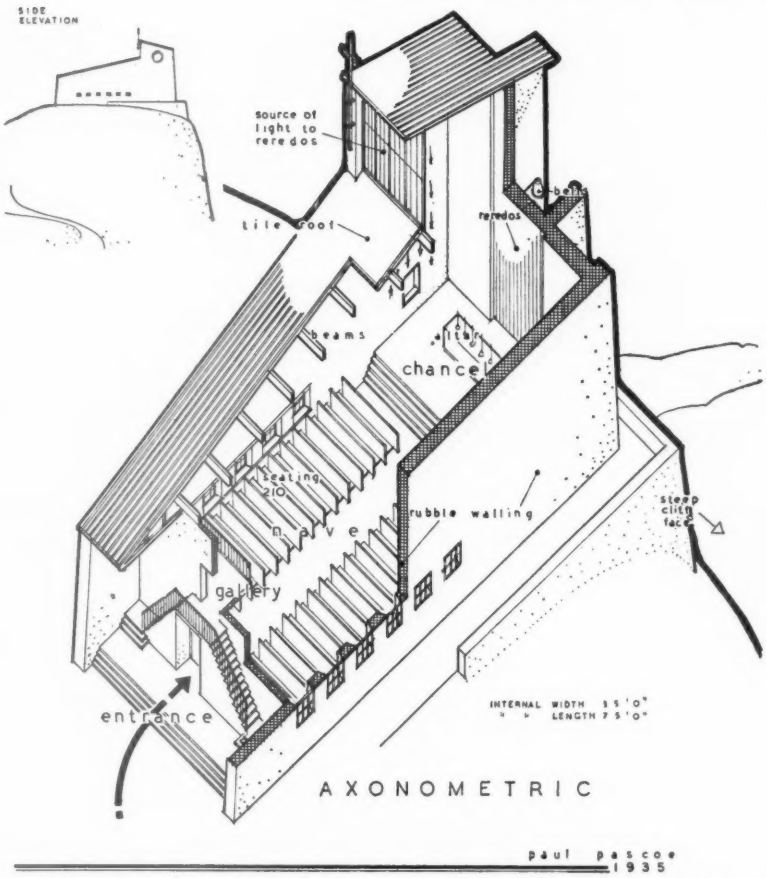
An industry in such a state of development as this is obviously a very happy hunting ground for the purveyor of "patent medicines." As in life generally, so in the building industry in particular, when we are in trouble and have not sufficient knowledge to get out of it by a logical process we have to recourse to faith, and this provides an income for wizards, whether they be religious, medical, or building "dope" merchants. Even materials which generations ago won favour in the industry and were known by certain trade designations, cannot now be obtained, although materials are supplied under the old name. The speed at which building is carried out, and the far greater extent of it, make the supply of materials a very serious problem. In the case of certain building stones, for instance, although it may be possible to get sufficiently good stone for a small job or for a big job carried out very slowly, it is often quite an impossibility to obtain the quantities of natural stone of a certain character at the speed required for modern construction. Hence inferior material is used, bringing about the troubles with which we are all so conversant.

When substitute materials are placed on the market it is practically impossible to tell in the absence of scientific knowledge whether these preparations are good or bad. The introduction of a substitute material into an industry depending upon craftsmanship introduces very serious difficulties. As already indicated, the technique of craftsmanship has been developed with the underlying assumption that the traditional material will not change. The substitute material, whilst it may be perfectly good for certain purposes which have been preconceived as those it is required to fulfil, yet may be so upsetting to the technique of the craftsman that failure has resulted. It is worth while considering a few further examples in order to make these ideas rather clearer.

PLASTERING

There is no one section of the industry which is so fruitful of enquiries at the Building Research Station as that of plastering. Whilst admitting that we have somewhat the outlook of a casualty ward of a hospital the impression is certainly left with us that it is more rare to find a success in plastering work than the reverse. One group of cases has already been referred to when discussing lime, and another is offered when we consider the introduction of the newer plastering materials supplied by calcium sulphate as a base. Time will not allow of a detailed consideration of the many fascinating points thrown up by these plasters, but one experience may be of interest for it illustrates the difficulty involved in translating to a practical craftsman the implication of the simple phrases of scientific terminology.

The advice of the Building Research Station was sought as to a suitable mixture of plaster and lime to use for the plastering of a new house. A certain type of plaster was recommended together with a suitable lime. The plaster was of the type known as a retarded hemi-hydrate—it is virtually a plaster of paris, the setting time of which has been prolonged by suitable additions of materials like glue. The effect of adding lime to such a plaster is to speed up the set again, and it was realized that only small batches of the mixture could safely be mixed at one time. This was pointed out to the enquirer, and instructions were also issued that the mixing board was to be non-absorbent and cleaned between each batch. The suggestions were received with grateful thanks, but a short time afterwards we received violent messages from the site of the building that the material was failing hopelessly. Of course, we went into the matter very carefully. We found it difficult to understand the failure because similar processes carried out at the Building Research Station had worked perfectly well. The failure was ultimately traced out to the difference in meaning attached to the word "clean." When we stated that the mixing board should be cleaned between batches we meant thorough cleaning. The plasterer, on the other hand, interpreted it to mean getting rid of major traces of the previous batch. This interpretation is not unreasonable, and would have worked perfectly well with his normal materials, but the effect of the small traces of the previous batch—which, of course, by this time had set hard—was to cause a further shortening of the setting time of the lime-plaster mix. It is a well-known fact that a few crystals of



War Memorial Church near Berlin. Designer: Erich Ernst Pfannschmidt.

a substance placed in a solution which is about to crystallize will increase the rate of crystallization. The practical result had been that before the plasterer could get the mixture on to the walls the setting process had already taken place and every motion of the plasterer simply disintegrated the mass. It will be realized from this how very difficult it is to introduce new materials and new processes into traditional craftsmanship unless a common basis of language exists.

The ever-present problem of painting on plaster presents another difficulty, due largely to the present-day conditions. Paint on plaster can be destroyed in two ways, by physical attack due to moisture left in the plaster and backing and chemical attack due to the action of lime and alkalis upon the linseed oil of the paint. The traditional methods whereby months were allowed for the drying out produced a final plaster which could be quite safely painted. With the modern rush it is more often the case that painting is attempted long before the plaster is dry on the walls, and failure often occurs under these conditions. The cause of chemical failure is a little more difficult. Lime by itself will not produce a paint failure, but if lime and alkalis are present a failure is usually brought about if moisture is also present. The alkalis may be supplied from the backing material of bricks, Portland cement, etc., or may be present in certain of the gypsum plasters which are not of the hemihydrate type but of the higher burnt variety whose setting times have to be accelerated by the addition of salts. Such salts in the presence of lime will often produce failure.

It is curious how little it seems to be realised that the traditional terminology, such as Keene's cement, Parian cement and the like, has really no meaning at the present time. The original materials which were sold under these names many years ago scarcely exist now, and cases have been brought to the notice of the Station where the same material has been sold under the names Keene's cement and also as ordinary Hardwall plaster, the only difference between them being about £2–£3 per ton difference in price!

BRICKWORK AND MASONRY

Two points in connection with brickwork and masonry provide interesting examples of present-day troubles and how difficult it is to find scientific expression for the phenomena involved.

First consider the use of mortars. The traditional ones were, of course, mixed with lime as the cementing material. As improvements occurred in the manufacture of Portland cement it became more and more the practice to use mortars with this as the cement. Especially was this the case in repointing old buildings, and, as you will have realized, disaster followed, for instead of the pointing decaying and falling out, a far worse condition resulted in that the bricks or stones now failed. In other words, the traditional mortar had been acting as a kind of safety valve for the release of salts contained in the walls, and when these valves were "screwed down" by replacing the lime mortar with one of Portland cement, then the salts escaped through the brick or stone, causing decay.

Such actions are associated with the capillary properties of the materials. It is obviously necessary to design mortar mixes to suit the material with which it is proposed to use them. A similar action can take place when two different stones are used in juxtaposition. One of these may be preserved at the expense of the other, though both may possess a long life if used apart. A detailed study is being made of these phenomena, but the work is not yet complete.

The second case under this heading is the choice of suitable building stone. The one here discussed is Portland, as it has been studied in more detail than almost any other. As will be well known, this is a limestone and used extensively for buildings of a monumental character, especially in and around London. Some of such work, particularly that carried out since the war, has shown quite serious decay and an extensive investigation has been carried out to discover the reason for this. To make a long story short, it may be said that it has been found that the decay of Portland stone is definitely connected with the ratio between the pore spaces below a certain size (termed micro-pores) and the pore spaces above a certain size (termed macro-pores). The arbitrary division between these groups is at a pore size of 5 μ (1/5,000 in.). As the ratio $\frac{\text{micro-pore space}}{\text{macro-pore space}}$ increases, so the resistance of the stone to weathering becomes less.

We obtained the services of a very experienced stone mason, and asked him to place certain specimens in order as he would choose them for his work. An interesting point then arose, for he placed them in *two* orders, depending on the purpose for which they were to be used. The first was for durability, and the second for ease of working for carving and the like. The first grouping coincided with the scientific results and obviously then the second did not. Again this is borne out by experience, for many a fine carving has been carried out in stone, which, whilst working well, has not proved durable.

In this case of Portland stone it has been possible to express in scientific terms the difference between good and bad stone and it is now a practical proposition to estimate, before it is incorporated in a building, whether a sample of stone is likely to be durable or not. The means to be adopted are not simple and could not be carried out as routine tests on a job, but it is hoped that they will lead to the correct grading of stone as placed on the market.

INTERNAL FINISHES—THE BED BUG

Mention has already been made of the problem presented by the prevalence of the bed bug. It is not suggested that such vermin have suddenly become more prevalent, for it is not known whether this is or is not the case, but certainly the problem is now being faced as one which should not exist and strenuous efforts are being made to do all that can be done on the building side to make life impossible for these bugs.

The life history is known in a general way though more research is probably required. The bed bug feeds entirely on blood, prefers darkness to light, can exist for considerable periods without food (it is stated for six months or so) and multiplies at a very great

rate. They live in dark cracks and crevices and come out at night to feed. The living places are provided by furniture and cracks in walls, especially where joinery originally came in contact with plaster. Floors have been found swarming with them. They are difficult to kill and the most effective agents are usually considered to be highly dangerous chemicals such as prussic acid, cyanogen and the like.

The builder's problem in connection with slum clearance, rehousing, etc., is so to finish the inside of the houses that cracks are reduced to a minimum. Shrinking joinery must be avoided, ordinary picture rails, skirting boards, cover slips and the like must be done away with and the floor covered with as jointless a material as possible. When all such matters have received attention, it is still necessary to realize, at any rate in the early life of the building when families are moved in from the appalling conditions of slum dwellings, that bed bug troubles are nearly certain to arise. Then the buildings have to be fumigated with highly poisonous gases and if the structure is not sound, not only are the dangers considerably increased for the surrounding families, but the effectiveness of the treatment depends upon a sufficiently high concentration of the gas reaching the bugs. Though scarcely the problem of this paper, yet attention should perhaps be drawn to the wastefulness of special building precautions if they are not associated with such facilities as disinfection of furniture, clothing, etc., during transit from the dirty to the clean conditions and intelligent social supervision to help the people concerned to adapt themselves to the higher state of existence.

ACOUSTICS

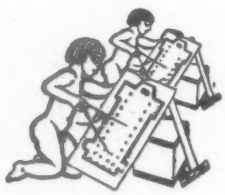
Attention has already been attracted to the increasingly unbearable conditions presented by noise. With a detached house for each family, the problem is largely one of keeping out traffic noises and the like for families seem to be able to " consume their own noise " or have little sympathy if they can't ! With attached dwellings, and especially with flats, the problem is very difficult. Loud speakers, gramophones and the like are sources of great annoyance, but with modern forms of construction the most serious disturbance is possibly due to those noises which get directly into the structure itself and are conveyed from point to point in a building, sometimes manifesting themselves in a form more objectionable than that of the original source. Children running to and fro on the floors above, boots dropping, furniture being moved—all noises which are caused by impacts on the structure itself are the most difficult to retain within the living space of the single household. The only hope seems to be in finding a suitable covering, especially for floors, which will not allow the impact noise to enter the structure. This is not easy. A heavy pile carpet would be extremely useful, but is, of course, quite out of the question for obvious reasons. Experiments are in progress now, trying to find solutions to this very urgent problem, but success has not yet been reached.

In the first two of these examples it has been shown how modern conditions have affected traditional technique. In the last two, new problems peculiar to modern conditions at any rate in intensity and emphasis, have been noted. The solution to the difficulties presented will only be found by scientific work. The older traditional methods of development are too slow even if in the end they could be effective, which is extremely doubtful.

At no time has there been such an urgent need for building science and the duty devolving upon building teachers is a heavy one. Teaching the traditional technique is not sufficient—it may even do more harm than good. It is absolutely essential that the teachers themselves should keep abreast of what research work is bringing to light and act as interpreters, not only to their students, but to the industry in their areas. The present age is one of transition.

If only our technical colleges could become real centres for the dissemination of the new knowledge, to their regular students certainly, but in addition the present generation of the industry ; if they could reach the position where the staff were so in touch with modern developments that they were instinctively appealed to immediately difficulties arose in the industry ; then a step forward would have been taken in national development which at present can be reached only in dreams. Yet this matter is very urgent if we are to overcome our present difficulties as a nation. The very highest state of efficiency must be attained, and there is little doubt such associations of teachers as your own can do much to bring this about.

COMPETITIONS



OPEN

October 28.—Sending-in Day. Competition for timber houses organized by the Timber Development Association. Assessors : Robert Atkinson, F.R.I.B.A., G. Grey Wornum, F.R.I.B.A. and E. Maxwell Fry, A.R.I.B.A. The competition is divided into two sections and competitors may enter for one or both. In each section there will be the following awards : first premium, £100 ; second premium, £30 ; third premium, £25.

SECTION 1 :—Designs to be submitted for a timber house suitable for a small family, the total cost to be £800. SECTION 2 :—Designs to be submitted for a week-end timber cottage, the total cost to be £350. Conditions, etc., are obtainable from the Manager, Timber Development Association, 69-73 Cannon Street, London, E.C.4. The latest date for submission of designs is Monday, October 28.

October 31.—Sending-in Day. New technical college, Manchester Road, Bolton, for the Bolton Corporation. (Open to architects of British nationality.) Assessors : John Bradshaw Gass, F.R.I.B.A., and Arthur J. Hope, F.R.I.B.A. Premiums : £500, £250 and £100. Conditions, etc., are obtainable from Mr. John A. Cox, M.A., Director of Education, Education Offices, Bolton. (Deposit £2 2s.) The designs must be submitted to the Director of Education before October 31.

November 1.—Sending-in Day. New municipal offices, clinics, etc., proposed to be erected in the grounds of York Castle for the Corporation of York. (Open to architects of British nationality domiciled in the United Kingdom.) Assessor : Henry V. Ashley, F.R.I.B.A. Premiums : £250, £150, £100 and £50. The last day for questions was July 29. Designs must be submitted to the Town Clerk, Guildhall, York, not later than November 1.

November 16.—Sending-in Day. Lay-out competition for Lumps Fort site, for Portsmouth T.C. Assessor : E. Prentice Mawson, F.R.I.B.A. Premiums : £350 and further £200 divisible. Conditions are obtainable from the Town Clerk, Guildhall, Portsmouth. (Deposit £1 1s.)

November 30.—Sending-in Day. Public baths and public health offices for the Coatbridge Town Council. (Open to architects resident and practising in Scotland for a period of at least two years.) Assessor : Wm. B. White, F.R.I.B.A. Premiums : £250, £150 and £75. Conditions, etc., are obtainable from the Burgh Surveyor, Coatbridge. (Deposit £2 2s.) Last day for submission of designs : November 30.

November 30.—Sending-in Day. Public library for the Colchester Corporation. (Open to members of the Essex, Cambridgeshire and Hertfordshire Society of Architects.) Assessor : Professor A. E. Richardson, F.S.A., F.R.I.B.A. Premiums : £150, £125 and £75. Conditions, etc., are obtainable from R. L. Hiscott, Town Clerk, Town Hall, Colchester. (Deposit £1.) Latest date for submission of designs : November 30.

December 31.—Sending-in Day. Proposed town hall, Bury, for the Corporation of Bury. Assessor : J. Hubert Worthington, O.B.E., M.A., F.R.I.B.A. Premiums: £500, £300 and £150. Conditions, etc., are obtainable from Richard Moore, Town Clerk, Municipal Offices, Bank Street, Bury. (Deposit £2.)

January 24.—Sending-in Day. Proposed offices for the Harrow U.D.C. (Open to architects of British nationality.) Assessors : C. H. James, F.R.I.B.A., and S. Rowland Pierce, A.R.I.B.A. Premiums : £350, £250 and £150.

The conditions and instructions to competitors, together with site plans, may be obtained on application to Mr. Vernon Younger, Clerk of the Council, Council Offices, Stanmore, Middlesex. (Deposit £2 2s.) The latest date for submission of designs is January 24.

January 31.—Sending-in Day. Proposed Parliament House, Salisbury, Southern Rhodesia, for the Government of Southern Rhodesia. (Open to architects of British citizenship.) Assessor : James R. Adamson, F.R.I.B.A. Premiums : £500, £300, £200 and £100. Conditions, etc., obtainable from the High Commissioner for Southern Rhodesia, Crown House, Aldwych, W.C.2. (Deposit £2 2s.) Last day for questions was August 26. The designs must be sent to the Assessor at 19 Silverwell Street, Bolton, not later than January 31.

SHOP AT EALING, MIDDLESEX

DESIGNED BY

CLIVE ENTWISTLE

GENERAL PROBLEM.—*The requirements of the shop were considerable show space, an ample area, unmarred by shelves of stock, where customers could sit while choosing and trying on shoes, and readily accessible storage space. In addition, economy in current consumption for artificial lighting was an important consideration.*

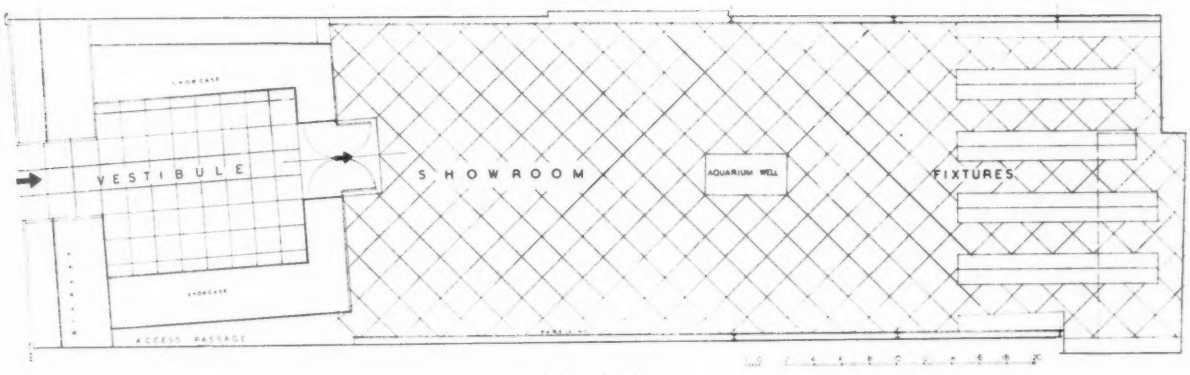
SITE AND PLAN.—*The site has a narrow frontage to the street and considerable depth. The shop is single-floored save for the stackroom portion which is two-floored, the first floor being used for additional storage. Lavatory accommodation is provided at the rear of the building.*

CONSTRUCTION.—*Steel girders and wood joisting were inserted to carry the laylights and roofing, the remaining constructional work being only the provision of fixing for fittings and decorative treatment.*

ELEVATION.—*The form and construction of the shop front was governed by consideration of lighting. The showcases fronting on the street are lit during daytime both directly and also by light which, entering the continuous window above the fascia, is reflected downwards from its curved and polished inner surface. Displays are thus amply lighted during daylight without artificial aid. At night the showcases are illuminated from behind the fascia immediately above them, and this light, filtering upwards, also illuminates the surface behind the upper window; thus the whole front is efficiently lighted from the showcases alone.*

The shop front plinth is of black granite and the stallboards and fascia of bronze-veneered plywood, butt-jointed and sealed behind with bituminous strip, and secured with aluminium rivets. The showcase windows are of the non-reflecting type. The blind-lath and glazing frames are of bronze, the cornice of stainless steel satin-finished, and the curved reflecting surface of anodized aluminium. A battened catwalk behind the fascia allows the upper window and the reflector to be easily cleaned.

Right, a detail of the shop front.



PLAN

SHOE SHOP, BROADWAY,

DESIGNED BY

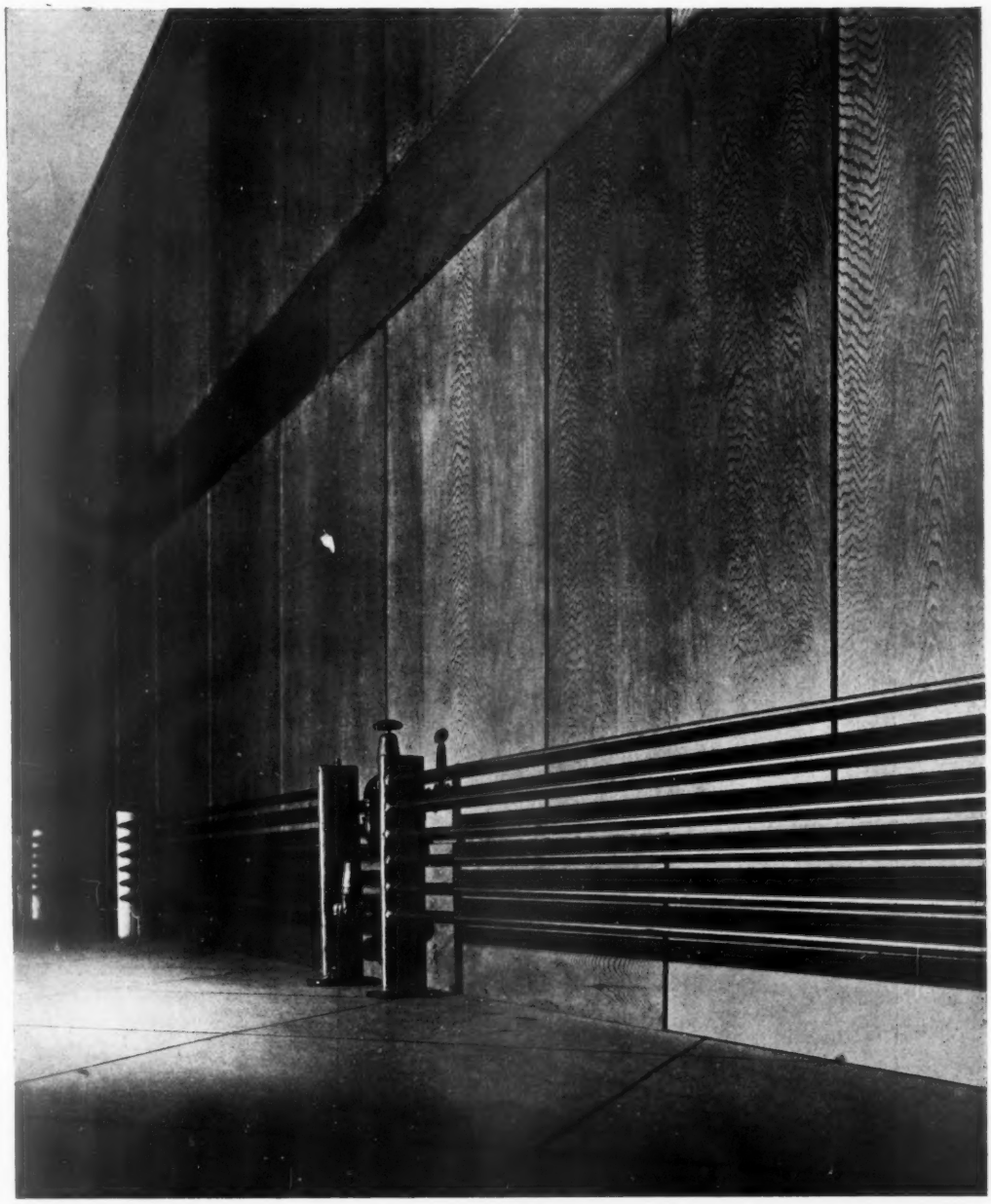
CLIVE ENTWISTLE

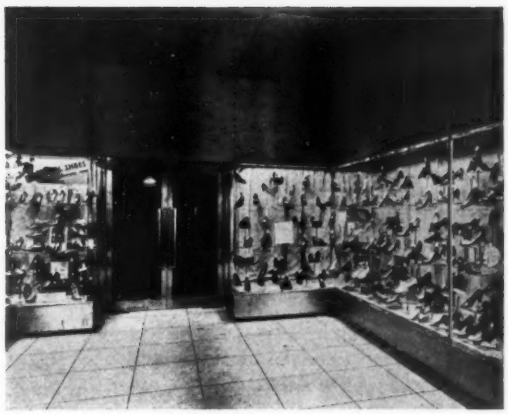
VESTIBULE.—*The vestibule showcases are bronze-framed and stallboards and walls are bronze veneered. The ceiling is of satin-finished aluminium sheet with stainless steel division strips. The doors are of stainless steel, glazed with special "one-way" wired glass. The floor is of cream terrazzo with black non-slip jointing.*

The wall surface above the cases is flush with their front face, the cases being lighted from lantern lights behind.

SHOWROOM.—*The showroom finishes are of cream terrazzo, western red cedar plywood panelling, and dead white plaster. Lighting is by four lantern lights, and at night from four cream-painted sheet-steel troughs, with stainless steel hangers and corrugated aluminium soffites. The screen between vestibule and showroom is of sand-blasted black glass with stainless steel framing. The chairs and fitting stools are of birch, and other fittings of deal, cream painted. The rugs are hand-tufted in neutral grey, Indian red, prussian blue and cream. The sunk aquarium has sides of sea-green roughcast glass, and a black glass bottom; the ends are of white obscured glass and are lighted from behind.*

EALING, MIDDLESEX



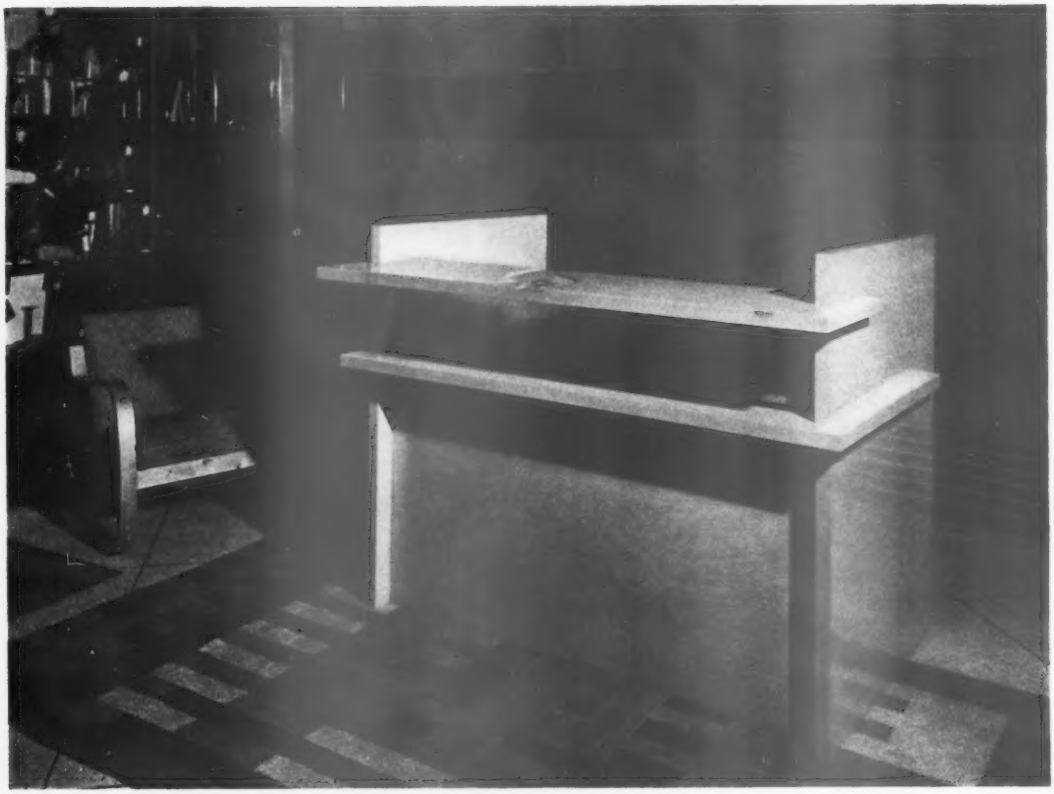


The hot water radiators are spray-painted copper colour, and were specially designed to avoid pattern staining; the air flow against the panelling being uniform over the whole surface, and any resulting change of colour uniform also.

The photographs show: above, a detail of the radiators and of the western red cedar panelling square sunk between sheets; right, the showcase vestibule.

The photographs on the facing page show: above, the showroom looking towards the entrance; left, the showroom from the entrance, showing the stock shelving and wrapping stools.

SHOP AT EALING, MIDDLESEX



DESIGNED BY CLIVE ENTWISTLE

Above, a cash desk in cream-painted deal; left, one of the wrapping stools and an entrance to the storage racks. All of the fittings were designed by the architect.

For list of general and sub-contractors, see page 572.

ARCHITECTS AND RIBBON DEVELOPMENT

BUILDING PROCEDURE UNDER THE NEW ACT

[*By a Barrister-at-Law*]

ALTHOUGH the Restriction of Ribbon Development Act 1935 may have been severely criticized, and although the view is prevalent in some quarters, that the Act will prove in the long run to be nothing else but a dead letter, no reasonable person can shut his eyes to the fact that statutory restrictions of an important character, in relation to building among other matters, must now be considered in addition to the other restrictions previously in force.

It is not my intention here to go into any detailed examination of the Act itself, but merely to elucidate as far as possible the matters to which attention should be directed in cases where building operations are contemplated.

It behoves every owner and occupier of property situated within what may be described as the danger zone, i.e., within 220 ft. of any road to which the provisions of Sec. 2 may be applied, or within a distance of half the standard width of any road in respect of which Sec. 1 of the Act may be brought into operation, to take steps to have their names and addresses and other particulars entered in the new Register to be kept under the Act.

Further, in cases of doubt, inquiries should always be made from the highway authority as to the existence of any restriction in relation to the land. The plans which are to be deposited by authorities under the Act should also be carefully inspected.

In cases where the land is subject to restrictions, and the proposed development is such that the consent of the highway authority thereto will be necessary, formal application for consent should be made. There is a particular form for this purpose, which must be filled in, a copy of which is here appended for the benefit of the reader.

Form A.

APPLICATION FOR CONSENT TO BUILDING

To the Clerk to the ———Council.

I apply for the consent of the Highway Authority to the erection of a building as below :—

(i) Classification letter and number of the road.

(ii) Sufficient particulars of exact position of proposed building. (If you can attach a map put on it a X or other clear mark to show the position, and say here " As on map attached.")

(iii) Nature of building (such as house, shop, garage, shed).

(iv) Material of building (such as stone, brick, wood).

(v) Proposed height and size. (If you can attach a plan, say here " As on plan(s) attached.")

(vi) Name and address (in *Block Capitals*) of person applying.

(vii) Date of application.

In certain circumstances the authority may neither refuse consent nor attach any conditions thereto.

This would be so, for example, except in the cases falling within the exceptions in the Third Schedule, where it was proposed to re-erect, alter or extend any building which was erected or made prior to the date when the restrictions were first " published." This date will not necessarily be August 2, 1935, the date on which the Act came into operation, but may be some subsequent date thereto, as would be the case, for example, where a standard width was adopted in relation to any road.

In the case of the 220 ft. lines restrictions under Sec. 2, on the other hand, the authority may neither unreasonably withhold nor attach unreasonable conditions to their consent.

It may be, of course, that the land is subject to planning restrictions as well, but in that case, unless the highway authority is also the planning authority, the applicant will have to obtain the consent of the latter authority to the development.

The fact that the highway authority is in such a case required to send particulars of the development to the planning authority will not be a sufficient reason why the consent of the planning authority as well should not be obtained to the proposed development.

The highway authority will be allowed a time limit of two months from the date of the application to make up its mind on the matter.

If it does nothing its consent will be deemed to have been granted. The authority, however, will by no means have the last say in the matter. The applicant, if he is aggrieved by the decision of the authority, will have a right of appeal to the Minister.

The appeal must be addressed to " The Assistant Secretary, Road Department, Ministry of Transport,' and it must be accompanied with the copy of the application in question made to the highway authority.

The grounds of appeal further must be set out in the notice.

A local inquiry into the matter will be ordered to be held at the request of either party to the dispute, but the Minister's decision will apparently be final. The Minister, however, is required by the Act to furnish a summary of the reasons for his decision.

Another important provision of the Act to be noted with regard to building development, is Sec. 17.

That section, however, is restricted in its application to *inter alia* buildings exceeding 250,000 cubic feet. When plans for the erection of any new buildings of this kind have been submitted the local authority may require as a condition of their approval the provision and maintenance of such means of entrance and egress as the authority may consider necessary for the purpose of limiting interference with traffic along adjacent roads.

The condition will become operative as from the date on which notice thereof is served on the applicant, though it may, of course, be subsequently modified or even withdrawn.

The condition, moreover, will be binding on every occupier.

An appeal will lie, however, against the authority's determination, but such appeal must be brought within twenty-eight days after the service of the notice. The appeal will lie to the Petty Sessions, from which Court a further appeal will lie to Quarter Sessions.

The above appear to be the most important provisions of the Restriction of Ribbon Development Act 1935, to which the careful attention of all persons contemplating building operations, and of their advisers, should be directed.

•

HOUSING CENTRE

In a lecture last week at the Housing Centre on " The Fabric of a New Community," Miss Elizabeth Denby started by taking two north country examples of what a community was *not*. Here the lecturer referred to the usual lack of open space, back-to-back cottages, monotony, and all the other manifold disadvantages from which the typical small industrial town suffered. In both these towns a certain amount of rehousing had been done, but most of it was not different in spirit to the old houses—stone slums replaced by brick cottages spaced a little further apart. After drawing attention to the different needs of a community and the artificial barriers of class imposed by birth and incomes, Miss Denby went on to the needs of the typical community and said that no society could survive which did not satisfy the needs of all these different

types. "But where should the emphasis be placed? What is the relative importance of generations or occupations or tastes? Like good speeches, I consider that a good town should have a beginning, a middle and an end. But, first, it is imperative that that area should contain all classes of society. The texture is infinitely stronger and richer. Municipal government is simplified. It is possible to create greater diversity and interest in the form and plan of the buildings, in the provision of playing fields, of concert halls, of health centres. A few timid experiments are being made here and there in the shape of a nursery school, or a meeting hall. And they are made apologetically, as though the expenditure were wasteful, and on luxuries. They are not. Mr. Lansbury is one of the few Ministers who have tried to give fun and health to the people. Just think what a furore that Lido caused! And how fully it is now accepted, used, enjoyed.

"What are the essentials for a full life? Air, light and sun. Space, privacy, quiet. Easy access to companionship, recreation, education. Easy access to work, but not to live beneath its shadow. Municipal direction, competence, economy and imagination. You may think it rather odd that I should mention this here, but the present watertight administrative compartments are very wasteful and react harmfully on the citizens of the town. Think of the present chaos in road making, street cleansing, refuse collection, lighting and heating, and the lack of public gardens, or public places for recreation and amusement. Municipal initiative would add not only to the enjoyment but to the income of their area.

"I can best end with a quotation from the late Professor Lethaby—'To forget the past would be as foolish as to ignore the future. Behind is custom, as in front is adventure. We have to awaken the civic ideal and to aim first at the obvious commonplaces of cleanliness, order and efficiency. Much has to be done: it is a time of beginning as well as of making an end.'"

●

R.I.B.A. EXHIBITION AT LEICESTER

The R.I.B.A. exhibition of international architecture is now on view at the College of Art, Leicester. Councillor C. R. Keene, who presided at the opening ceremony on October 8, said the public generally had a poor idea of what the architect was and what he really did. Some people thought that all he had to do was to satisfy the requirements of the authorities with regard to light and air.

"We shall agree," he said, "that if the architect had charge of our civilization we should live in a more orderly, sane and beautiful world."

●

Announcements

Mr. H. W. Weedon, A.R.I.B.A., has opened an additional office at Transport House, Broad Street, Birmingham, where he will be pleased to receive catalogues and trade literature.

Mr. Philip Evans Palmer, A.R.I.B.A., M.INST.R.A., has removed his offices to 4 Smith Street, Chelsea, S.W.3. Telephone No.: Sloane 6610.

OBITUARY

MAJOR HARRY BARNES

AN APPRECIATION

[*By Sir Raymond Unwin*]

BY the death of Major Harry Barnes, at the age of 64, the public and the architectural profession have alike suffered a great loss. The value of his work in protecting the public from incompetent architects will be increasingly recognized and appreciated, as the results of that work become more evident by the passing of time; and, in like manner, the profession will owe to him a growing standard of competence and the increasing opportunities for service to the community which will follow. The architectural profession would be in a bad way if it had to depend entirely on the services of those most brilliantly endowed with the artistic gifts of the designer. Major Barnes was the outstanding statesman of the profession. He became an Associate of the Royal Institute after examination in 1894. He practised extensively in the Newcastle district. In 1918 he entered Parliament as a Coalition Liberal Member; but the youthful character of his mind and his zeal for progress carried him leftwards in politics. He became associated with the Labour Party, and having been elected a Labour Member to the L.C.C. in 1934, he was appointed Chairman of the Town Planning Committee, to undertake one of the greatest and most difficult planning schemes that has ever had to be tackled. The London County Council and its Planning Committee have suffered a great loss in this connection.

For the architectural profession, and for the protection of the public, Major Barnes worked with indefatigable diligence and persistence against great difficulties, to carry through the necessary legislation for securing the registration of architects, and a minimum standard of proficiency for those who should practise; and as Chairman of the Registration Committee of the Royal Institute of British Architects, and subsequently, of the Statutory Council established under the Registration Act of 1931, he showed a capacity for the wise and tactful guiding of difficult committees, which established his reputation as an ideal chairman. It will be by no means easy to find his equal for that important work, the carrying out of which won him the respect and gratitude of all who understand what he accomplished.

The late Major Harry Barnes.

Major Barnes was for many years greatly interested in the solution of the housing problem. He was a close student of the conditions and facts. He wrote two of the standard works on the subject—*Housing: The Facts and the Future* and *Slum: Its Story and Solution*—and took a large part in promoting a better understanding and a more enlightened view of the whole subject, and of its connection with the larger problems of town and country planning.

He served on the Moir Committee set up by the Government to consider alternative methods of housing construction, and he collaborated with the writer and a few others in preparing evidence for Lord Moyne's committee, giving very valuable help.

He was a man of wide interests; was vice-president of the R.I.B.A., a Fellow of the Royal Statistical Society, a Member of the Town Planning Institute, and of the Royal Sanitary Institute; one of those most willing to give diligent service to his fellows, and slow to claim either publicity or reward.

It is good to know that he leaves a son who has already shown himself keen to follow in his father's footsteps, and as Secretary of Committees of the R.I.B.A. dealing with various aspects of housing and planning, he has won the respect and friendship of many of his fellows. To him, and to the other members of his family, the architectural profession will wish to convey their sympathy and encouragement.

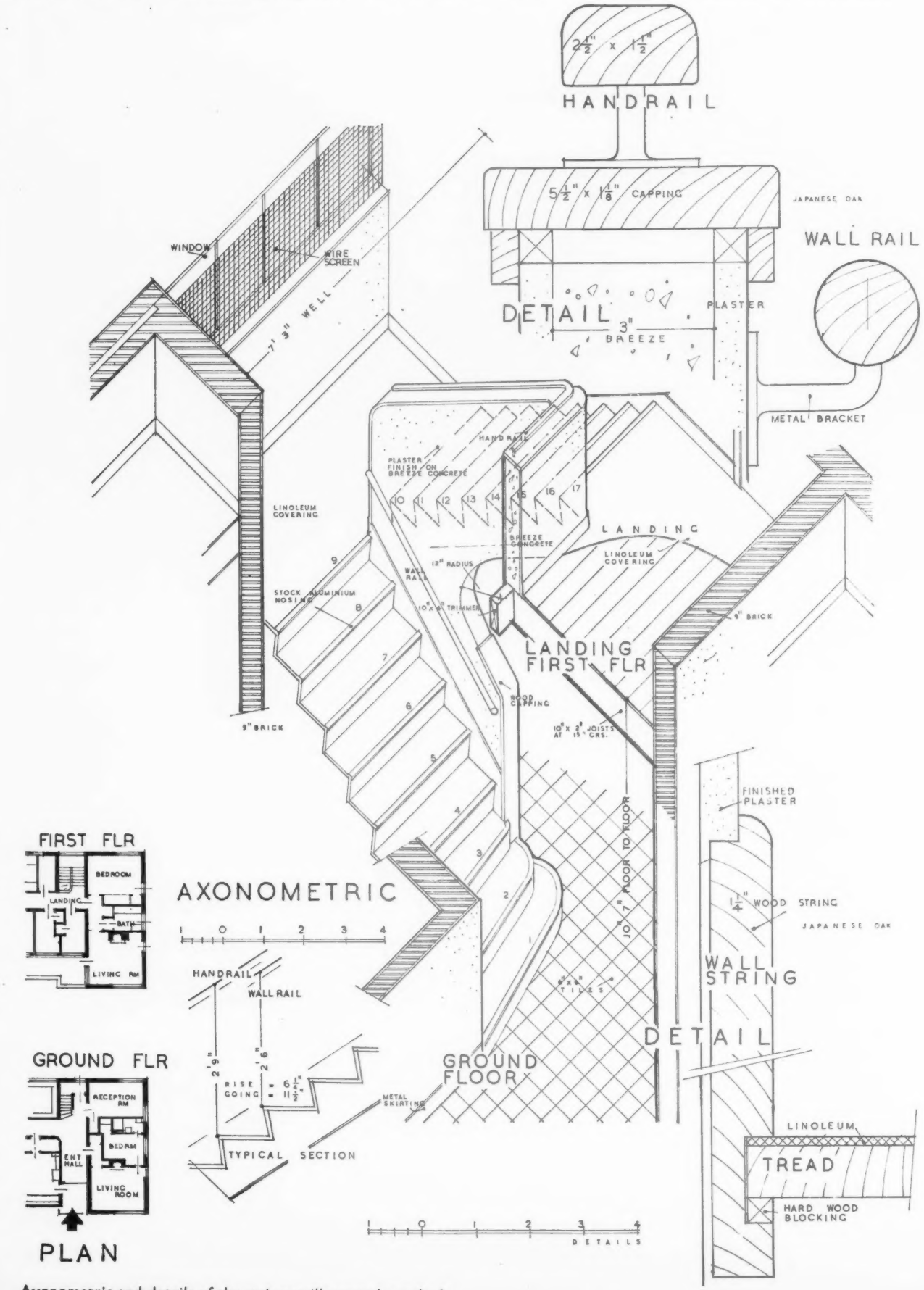
WORKING DETAILS : 343

STAIRCASE • BOARDING HOUSE, DARTINGTON HALL, TOTNES • WILLIAM LESCAZE

The staircase illustrated above has a solid balustrade of breeze concrete which is carried at landing level by a 10 in. by 4 in. trimmer joist. Treads and risers are finished in linoleum with a nosing of aluminium angle. An axonometric and details are shown overleaf.

WORKING DETAILS : 344

STAIRCASE • BOARDING HOUSE, DARTINGTON HALL, TOTNES • WILLIAM LESCAZE



Axonometric and details of the staircase illustrated overleaf.

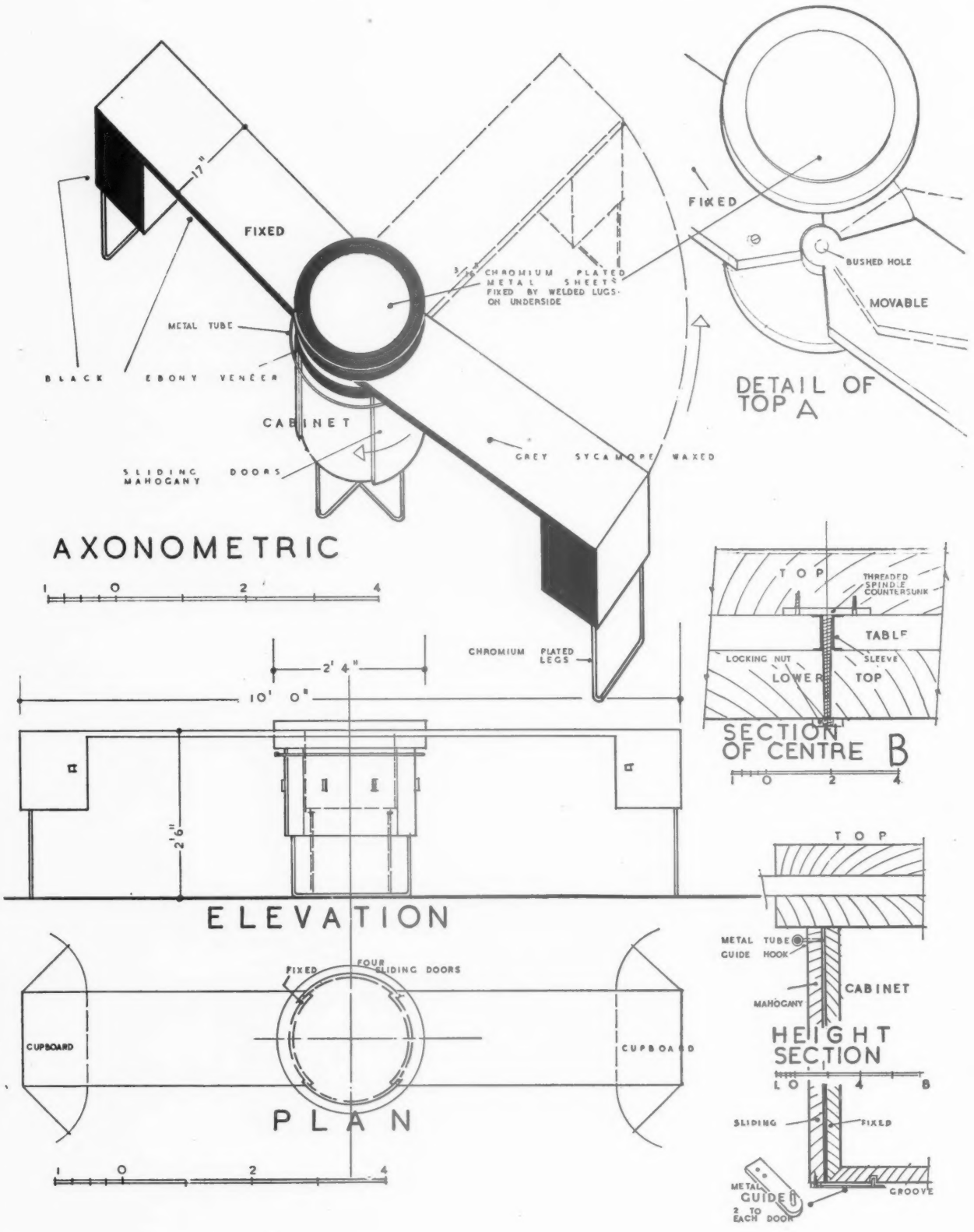
WORKING DETAILS : 345

ADJUSTABLE DESK • OFFICE IN ST. JAMES'S STREET, LONDON • A. V. PILICHOWSKI

The above illustration shows a combined cocktail cabinet and desk, one arm of which is free to move through a right angle. The fixed leaf is screwed to the top of the circular cabinet and the movable leaf has a bushed hole through which passes the fixing screw of the top disc of the cabinet. The four sliding doors to the cocktail cabinet are fitted at the top with rings which slide on a chromium-plated tube : metal guides, with a pin sliding in a sinking, restrain movement at the bottom of the doors.

WORKING DETAILS : 346

ADJUSTABLE DESK • OFFICE IN ST. JAMES'S STREET, LONDON • A. V. PILICHOWSKI



Axonometric and details of the desk illustrated overleaf.

LITERATURE

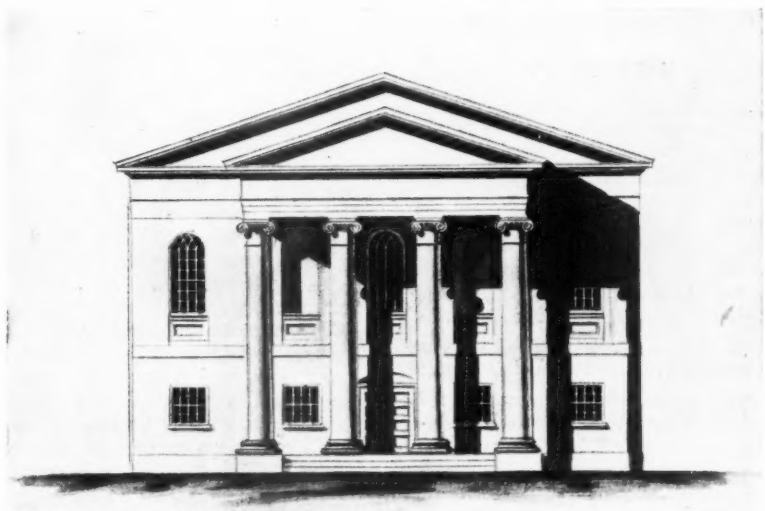
ROBERT MILLS

[*BY A. H. J. SPARROW*]

Robert Mills, Architect of the Washington Monument, 1781-1885. By H. M. Pierce Gallagher. London: Oxford University Press. Price 22s. 6d. net.

MRS. PIERCE GALLAGHER, in her preface to this life of Mills, asks pardon for overstepping in one or two instances, what she calls "strict biographical canon." One is tempted after reading the book to ask if there is such a thing, especially with reference to architects. Mills said somewhere in his unpublished writings, "There is scarcely a science but is enhanced in greater or less degree in this profession; Mathematics, Natural Philosophy, Chemistry, Botany, Geology, Natural History, Jurisprudence; Theology even." It is amusing now to see Botany included in such a list, but most people will agree with Mills that architecture is a study of unusual complexity. The architect has to correlate all the new ideas of the century, scientific and political, technical and social, and interpret them in terms of building. Any information, therefore, which throws light on the conditions of the society in which and for which he worked, is not irrelevant in the biography of an architect. If there is a fault to be found with this book it is that whenever Mrs. Gallagher appears to be on the point of an interesting and fruitful digression she stops short, as if in obedience to some tyrannical law. One wishes that she had taken more liberties with biographical canon.

It is a pity, for instance, that she has not published more of the correspondence between Mills and those "gentlemen of the committee" who supervised on behalf of the Federal Government the erection of Post Office and Treasury Buildings in Washington. The three passages which have been quoted are so amusing and give such a clear picture of the architect and his time that one would like to have more. They are part of an angry protest by Mills against the report of a certain Mr. Walter, who had been called in by the Government when the two jobs were already nearing completion, "to deliver an opinion not only upon the suitableness of the site, but also upon the character of both the design and construction of the buildings." There is no lack of material here. Mrs. Pierce Gallagher admits that "the reports which he returned to his harriers during 19 years of building are worthy of preservation as masterpieces of penetrating analysis. There is the same tantalising silence, possibly with greater excuse, in connection with Mills as town planner. Starting with the problems of a single town he is said to have worked out on paper a scheme covering the whole area of the United States. But the nature of the scheme, and its relationship to his other plans for linking together all the states of the Union by a vast network of communications, remains a matter for conjecture only. Another time, speaking of the State Insane Asylum which Mills designed for Columbia, South Carolina, the author says: "Most such institutions up to that time were crudely, many of them cruelly, planned with the idea of incarceration rather than cure. Only three had been built in America, few in Europe. That the deep reflection lavished by Mills on these designs bore fruit both original and valuable was evidenced by the number of enquiries which they evoked from the Northern States and from Europe." Here thinking apparently that this is all rather besides the point, she stops. Turning to the plan of the institution for further information, one finds that the patients appear to have been permanently immured in cells which measured 5 ft. by 10 ft. Without further information how can one assess the value of Mills's contribution to asylum design? Robert Mills's biography suffers particularly from this treatment because as an architect he is not remarkably interesting. His importance to America is great because he was the first native-born American to be trained in the profession (that is to say, in the principles of the Greek revival) and owing to this, and to the public character and great volume of his work as architect to the Federal Government, he had a very great influence; indeed he may be said to have determined the direction of American taste for some time to come. His influence can still be seen in those exquisite little classical houses illustrated in the *Forum* from time to time. But he made no great contribution to architectural design. Judging from his own words, written in his report to the Monument Commission of Boston, Mass., he did not aim to do so. "As long," he says, "as attention is paid to the rules laid down by them (the Greeks) we shall never offend the eye of genuine and unsophisticated taste." A negative aspiration. To say this is not to belittle Robert Mills, who, if not a great artist, was an extraordinarily gifted man, with a breadth of vision far in advance of his time. He was in touch with and personally concerned in all the developments going on around him which were rapidly revolutionizing society, and architecture seems to have been for him merely the most important among the many ways in which he tried to bring order into chaos. He recognized at an early stage the possibilities of mechanisation, particularly in relation to transport, and an organized system of communication comprising rail, road and water, was a favourite project on which he was continually circularizing Congress. His enthusiasm on the subject soon led him to undertake, at great personal inconvenience, a survey of the American coast, published under the title of *American Pharos*, or *Lighthouse Guide*. Moved by the same spirit he compiled his famous *Statistics of South Carolina*. being a complete geographical and



A drawing by Robert Mills of the elevation of the courthouse, Camden, South Carolina. From "Robert Mills."

D

The first Baptist Church, Baltimore, Maryland, from a contemporary print. From "Robert Mills."

topographical survey of the province. The value of such information was not generally recognized till a much later date. These were the most important of his activities but he undertook many other things besides, including among the most improbable, the design of a reaping machine. Mrs. Gallagher has summed him up very neatly. "That goal, the improving of man's condition on this planet, accounts for the catholicity of his taste and the unbounded scope of his endeavours; in architecture which was his vocation; in engineering which was surely more than an avocation, and in those scientific experiments which were at all events something above child's play."

THE COUNTRY HOUSE IN AMERICA

[*BY H. A. SNOW*]

American Country Houses of Today. Edited by Lewis A. Coffin. Architectural Book Publishing Co., Inc., New York. Price $8.

THERE is in the quiet grace and charm of the well-designed traditional country house a singularly refreshing quality but rarely discovered in the more forceful and sophisticated architecture of the city—a quality which, as le Blé describes it

"... lends the unyielding stone a kindliness most undefinable, and yet most clear defined."

It is pleasant to be reminded that in a country where multi-storeys tend (literally as well as figuratively) to overshadow architectural developments of a less spectacular nature, there yet remains a vast number of modern buildings which rely chiefly upon simplicity and good proportion for their appeal; though that appeal is undisguisedly one of associative values.

In *American Country Houses of Today* Mr. Coffin has brought together examples of contemporary domestic work from various parts of the United States "designed" (so it stated on the extremely informative dust-cover) "in all styles by 70 leading architects." The excellent photographs are accompanied and amplified by well-reproduced plans. In addition, a special section of the book is devoted to illustrations of the prize-winning houses in certain recent small house competitions, with an introduction by James Ford.

The renaissance in American architecture which commenced about 1912 brought with it a revival of interest in the old Colonial style of construction, i.e., timber framework weatherboarded or shingle-hung externally. Some delightful examples of this type occur in the book, notably the house and associated gate lodge at Stamford, Conn., designed by Holden, McLaughlin and Associates, and Charles Over Cornelius, associate architect. The influence of Southern tradition is discernible where the Georgian style has been adopted, often with the most satisfactory results, as, for instance, in the two admirable houses at Greenwich, Conn., by Phelps Barnum.

As is almost inevitable where two distinct yet not utterly dissimilar styles exist in juxtaposition, attempts are occasionally made to combine them in the same building. Such experiments require careful handling, however, and the union is rarely a happy one.

It is interesting to note the intelligent and effective use of wrought-iron work, and when, as is often the case, this is employed in conjunction with the curved zinc porch-roofs so typical of the period, an effect strongly reminiscent of our own Regency style is produced.

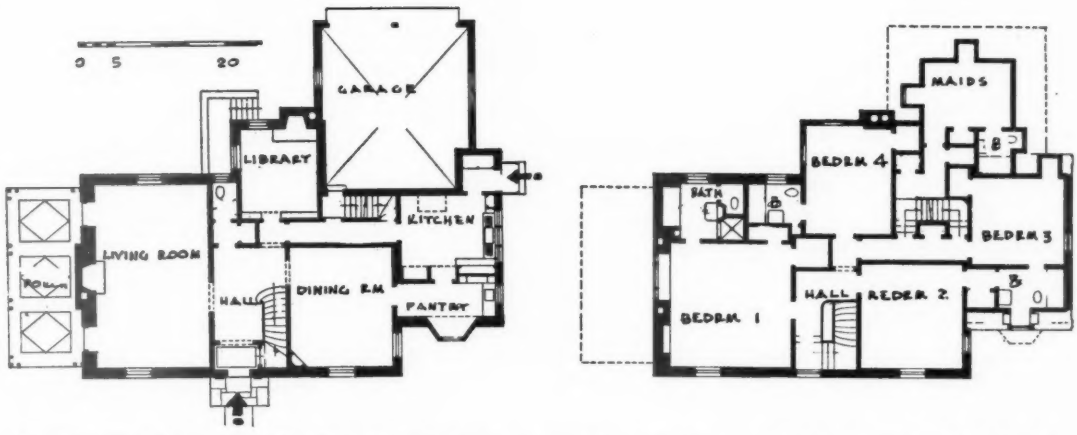
Turning to a consideration of planning principles, it is noticeable that, whilst they do not materially depart from accepted practice in this country, there emerge several minor points of difference which are not without interest. The country house plan is not apparently governed by any "gentlemen's agreement" which decrees that it shall have as far as possible a rectangular or otherwise symmetrical form; rather does it appear to grow—albeit naturally and logically—without other limitation than that imposed by the site boundaries. This principle of free planning (usually associated with flat roofs and "functionalism") is frequently adopted in these American houses—none of which is "modern" in the modern sense of the word—and the consequent elevational asymmetry is frankly acknowledged; in many instances, indeed, it contributes in no small measure to the attractiveness of the building.

In examining the plans it is observable that whenever possible a bathroom is attached to each bedroom, and even in quite small houses at least two bathrooms are incorporated. A further point of interest is the almost luxurious accommodation for the domestic staff, as compared with that provided in houses of corresponding size in this country.

On the other hand (if one may assume that the examples illustrated are typical), the comparative unimportance which attaches to the staircase in many otherwise spaciously planned residences is somewhat surprising. For the British architect the staircase has always had a special attraction—this, above all else, is his own personal province; upon it he may (and does) lavish all the skill and care of which he is capable, until into the subtly moulded rails and shapely newel-posts there passes something of the designer himself. To the American architect it remains a means of getting upstairs.

In the foreword to his book Mr. Coffin makes it clear that he views "functionalism"—at least in so far as it affects domestic architecture—with some distaste, and makes a strong plea for steady, gradual development along traditional lines—a development wherein new materials and structural possibilities may find a place, while still conforming to the acknowledged fundamentals of good design. "It is," he says, "our great opportunity to adopt and evolve, but not to forget the basic principles of simplicity, of proportion, of balance, and of well-designed detail."

Whether we agree with his views or



General view and ground and first floor plans of a house at Scarsdale, New York. Architect: Verna Cook Salamonsky. From "American Country Houses of Today."

not, there can be no doubt that Mr. Coffin has succeeded in producing a most informative book.

RATES

Rates and Rating. By Albert Crew. Eighth Edition. London: Pitman. Price 12s. 6d. net.

THIS book, which was first published twelve years ago, is devoted to the law and practice of rating, and contains efficient tables of statutes and cases as well as an index.

In this latest edition the text has been revised by including recent leading rating and derating cases and Statutory Rules and Orders, the relevant sections of the Local Government Act, 1933, and the resolutions passed at the London Assessment Conference held last year.

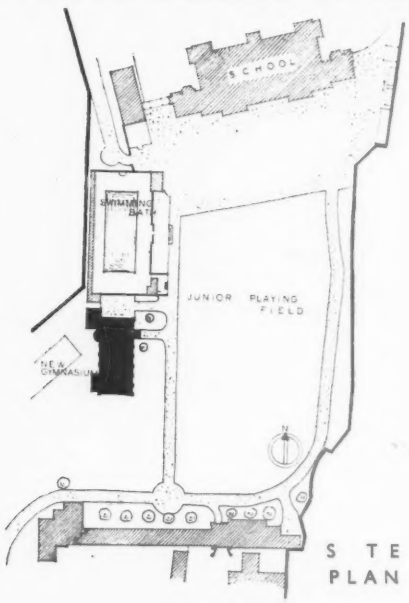
Rates and Rating is the only complete wieldy account of rating law, and the author's habit of continually bringing the text up to date (not merely adding appendices relating to recent events) is to be commended.

The subject of rates has recently come into some prominence owing to the realization that in poor areas the system creates a vicious circle of poverty; an area containing a large proportion of poor people must spend more money on services, must therefore charge high rates; but high rates discourage business firms from settling in the area, therefore the poverty is likely to continue as well as being accentuated by the burden of the rates themselves.

The author is not concerned with questions such as these, but the book may be commended to those who want to understand the rating system with a view to examining the various reforms that have been suggested, as well as to rating officials and ratepayers, and those concerned with rates in connection with their housing interests. P.H.M.

NEW GYMNASIUM AT

THE NORTH ELEVATION



SITE PLAN

PROBLEM AND SITE.—*The new gymnasium block is placed on the west side of the junior playing field as part of a general scheme of placing new buildings around the field to form an eventual quadrangle.*

The accommodation provided includes a spectators' gallery over the changing and instructor's rooms, and a heating chamber in the basement.

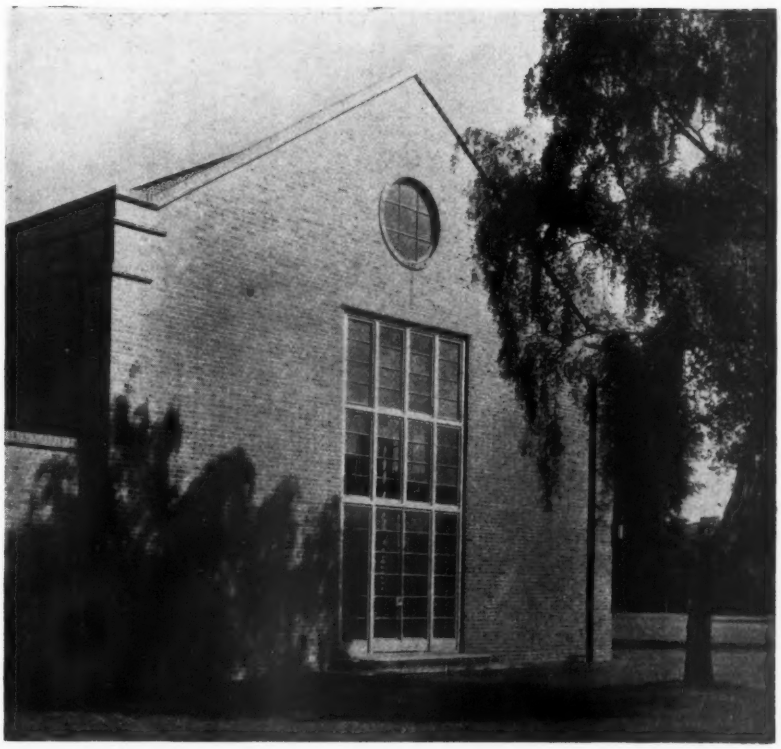
CONSTRUCTION.—*13½ in. brick walls with 1 ft. 6 in. piers at 11 ft. 6 in. centres to take light steel roof trusses. Walls are of red sand-faced brick outside, and lime whites inside. The roof is of hand-made sand-faced pantiles on felted boarding on composite purlins, with asphalted guttering. Flats are of concrete, asphalt finished. Windows are steel casements in wood frames with plain tile coursing above and below. Principal flooring is bajak strip on joists and sleeper walls; floor finish in lavatories of quarry tiles, and in store of grano. Joinery generally of deal, light emerald green stained. Stair deal framed with bajak treads and risers. Door glazing is in Georgian wired muffled plate. Ceiling in gymnasium of plasterboard, and elsewhere painted. Radiator recesses are rendered in cement.*

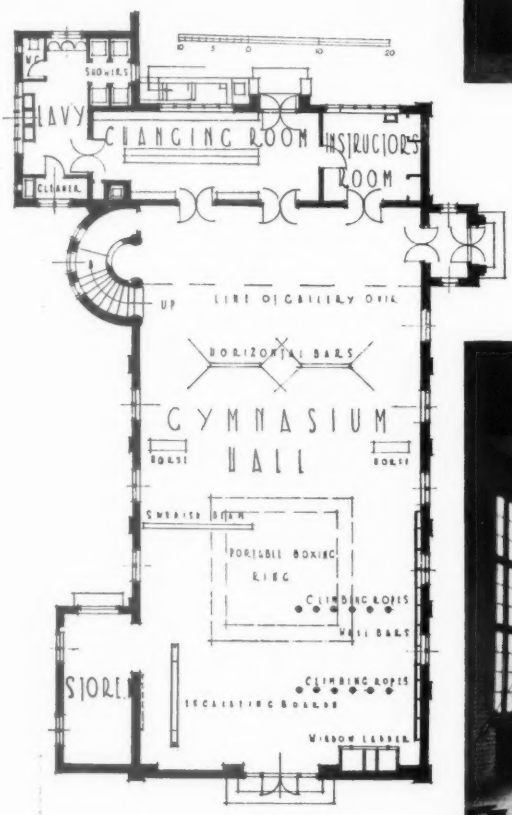
HEATING.—*By hot water radiators from low-pressure accelerated system served by a coke-fired boiler in the basement.*

Above is a general view from the south-east.

BEDFORD SCHOOL

DESIGNED BY OSWALD P. MILNE



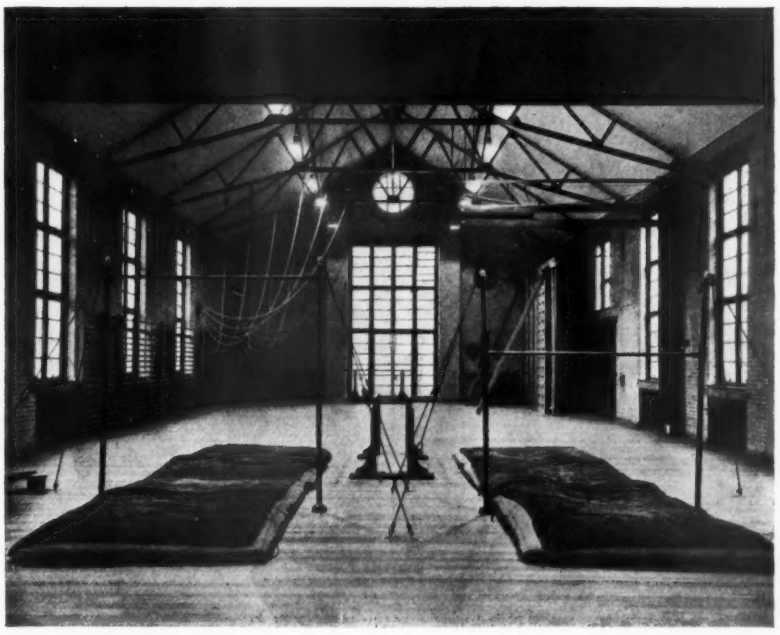


GROUND FLOOR PLAN

COST.—*The contract price for the building was £5,746; the price per foot cube being 1s. 1½d.*

Above, a detail of the south elevation; below, general internal view showing the gymnasium equipment.

For list of general and sub-contractors see page 572.



HOUSE AT WOLVERHAMPTON

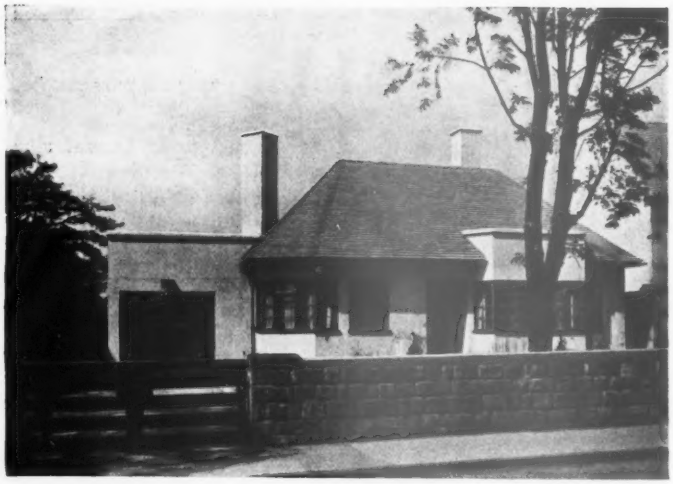
SITE.—*The building stands on the slope of a hill and the living-room windows overlook a wide view to the west.*

CONSTRUCTION.—*9 in. brick walls, white cement rendered. The main roof is of plain tiles, and the garage flat roof of patent bitumen-impregnated asbestos sheeting finished in macadam, laid on joists and boarding. The living room balcony and loggia below are of reinforced concrete.*

The rainwater guttering and down-comers are green vitreous enamelled both inside and out. The windows are steel casements throughout.

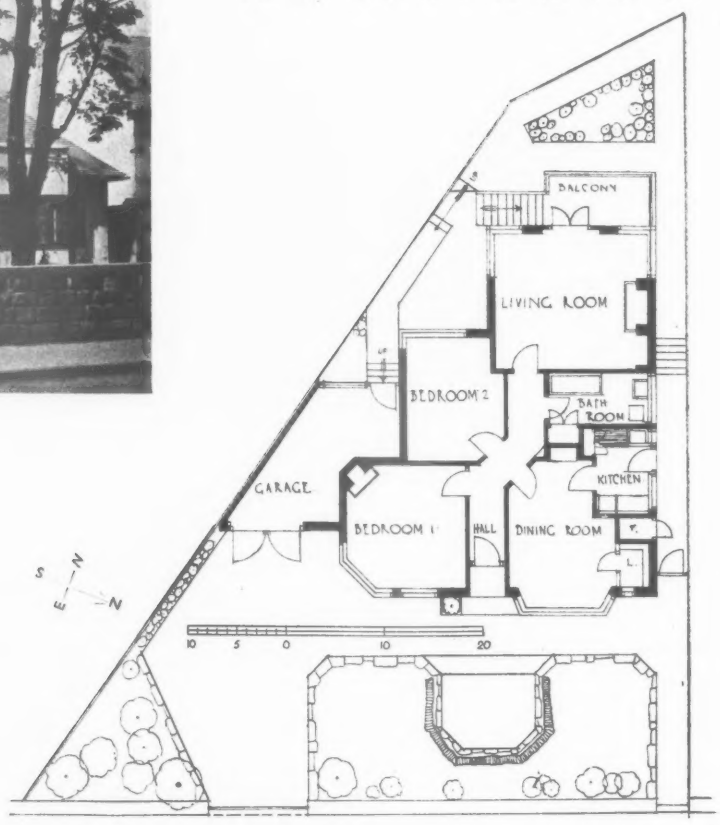
INTERNAL FINISH—*Generally of plaster with boarded floors. Kitchen and bathroom tiled to a height of 4 ft. 6 in., with semi-gloss paint finish over. Doors are flush and generally sliding, with furniture in coloured composition.*

Hot water supply is from a gas boiler in the garage.



DESIGNED BY

S. D. W. TIMMINS



CONTRACT.—*The contract price for the building was £860.*

The photographs show: a detail of the reinforced concrete balcony to the living room with loggia beneath; and a general view of the entrance elevation. On the right is the ground floor plan. The first floor contains a bedroom and store room.

TECHNICAL SECTION: 35

HEATING, AIR CONDITIONING AND MECHANICAL EQUIPMENT

BY OSCAR FABER

O.B.E., D.C.L., D.Sc., M.Inst.C.E. Hon.A.R.I.B.A., A.M.I.E.E., F.C.G.I., M.I.H.V.E., M.Am.S.H.V.E.

AND J. R. KELL, M.I.H.V.E.

RUNNING COSTS OF HEATING SYSTEMS

1. FUEL COST (*Continued*)

COMING under the heading of fuel cost is the electric current consumed by motors driving blowers, etc., for automatically fired boilers. This applies to oil firing, automatic coal stokers and to some types of gas boilers. It does not occur in the case of natural draught boilers.

Motors for this purpose vary, but ¼ h.p. to ½ h.p. generally serves boilers up to about 500,000 B.T.U.'s per hour, ½ to 1 h.p. boilers up to 1,000,000 B.T.U.'s per hour and so on pro rata. Taking 1 kilowatt as roughly equal to 1 h.p. (including electrical losses), for a full heating period of 5,040 hours the consumption for a motor of 1 h.p.= 5,040 units per annum, at 1d. a unit for power=£21. With thermostatic control the motor may run perhaps no more than half the time, so that an expenditure of roughly £10 per annum for 1,000,000 B.T.U.'s per hour may be assumed.

A further item of expense is the current consumption of the circulating pump, if any. For this about ½ to ¾ h.p. would usually be required for 500,000 B.T.U.'s per hour and 1 to 1½ h.p. for 1,000,000 B.T.U.'s per hour and so on. This is about 50 per cent. more than the above, and for whole time running a cost of about £30 per annum for 1,000,000 B.T.U.'s per hour at 1d. per unit might be considered a maximum. Where the pump is stopped at night or at week-ends this would be proportionately reduced. Thus for 12 hours a day an expenditure of £15 per annum per 1,000,000 B.T.U.'s per hour could be assumed.

It should be remembered that the heat equivalent of the power input to circulating pumps is not entirely wasted but comes out in the form of heat throughout the system. Of the power supplied as much as 60 per cent. may be delivered by the pump to the water as "water horse power." This is dissipated as heat in the friction of the pipes and thus is liberated for useful warming. Its proportion to the whole is, of course, so slight as to be unnoticeable, and in any case the cost of circulating pumps is common to all cases and need not therefore appear in a comparative table.

Fuel Cost of Hot Water Supply Systems.

It is possible to calculate the fuel consumption for a hot water supply system if the quantity of hot water to be heated per day or per week is known. The snag is that this is not known in advance, and different buildings appear to vary so vastly in this respect that any data collected on the point is of little use without interpretation. Typical figures were given in Table XLVI and may serve as a rough guide.

The fuel consumption is also dependent on the radiation from mains, towel airers, linen cupboard coils and other apparatus, and this continues 24 hours a day, all the year round, unless means are taken to shut off at night.

The problem is not so difficult where the demand is fairly steady, as in a large institution or hospital. In the case of an office building or block of flats, however, there is nothing definite to go on.

Taking a figure from Table XLVI for an office building we get 5 gallons per day per head for all purposes, maximum, or about 3 gallons average over the week. An example well known to the authors contains 300 occupants. This gives :—

300×3=900 gallons per day.

5½ days per week×52 weeks=257,000 gallons per annum.

Raised 70 deg. F×10 lb. per gallon= 1,800 therms per annum.

Mains radiation=50,000 B.T.U.'s per hour maintained 12 hours a day and allowed to drop to about 50 per cent at night.

Thus daily radiation=50,000 B.T.U.'s per hour×18 hours average =900,000 B.T.U.'s per day.

5½ days a week×52 weeks=2,600 therms per annum.

Then annual therms=1,800+2,600= 4,400 therms.

The fuel consumption with furnace coke hand-fired=

$$\left.\frac{\text{4,400 therms}}{\text{157 therms per ton (Table LIX)}}\right\} = 28 \text{ tons per annum.}$$

The actual consumption over several years has been 24 tons per annum, costing £38 10s. The building has a gross cube of 960,000 cubic feet, giving a cost of ·01d. per foot cube. In this case the figures agree well, and the above example serves to show the method of calculation.

Comparative figures with other fuels could be estimated by using the appropriate heat value per ton from Table LIX.

2. LABOUR

The labour attendant on the firing and attention of heating systems is often greatly exaggerated by those advocating fuels which require no labour.

Experience of a wide variety of systems appears to indicate the following requirements :—

(*a*) *Hand firing.*—(i) Small boilers, heating and hot water supply—short periods three or four times a day : caretaker or odd labour only. Not chargeable to heating as required for other purposes.

(ii) Up to three large boilers about 2,000,000 B.T.U.'s per hour each with daytime heating and night banking—one engineer who is required for general maintenance in any event. Part labour might be charged to heating but the engineer cannot be dispensed with even with "no labour" fuels, so the point is doubtful. If part time is debited to heating this would be about one third of his salary—say £50 to £80 per annum.

(iii) The same boilers as (ii) but in a block of flats or similar building where full heating to midnight is required, followed by night banking.

Daytime—part time of engineer's services only (say £50).

Second shift—one extra man full time (say £150).

Total £200.

(iv) The same as (ii) but full time heating as in hospitals, etc., one part time engineer, two whole time men extra.

(v) Large boiler plants—one full time man for each of three shifts. It has been shown that one man can stoke 1,000 tons per annum, which is more than any but the very largest systems require. Three stokers' wages might amount to about £450 per annum.

(*b*) *Magazine fed coke or coal boilers.*—Time taken is about ¼ to ½ hour per

day per boiler. This means that for any normal sized plant (no matter whether heat is required all night or not) the duty is only a small part of the engineer's work. Again he cannot be dispensed with for other reasons, and £30 or £40 per annum should cover the proportion of his time devoted to heating.

Alternatively, if the boilers are kept filled and cleaned by the gas company (as is now done in many cases) a service charge is made. In one case of four boilers of 2,000,000 B.T.U. each this amounts to about £100 per annum, including all ash removal, cleaning and adjustment and servicing of controls.

(*c*) *Automatic coal stokers.*—Except where hopper or direct feed is applied, approximately the same quantity of coal has to be actually shovelled as with hand firing. It is, however, done at about six-hour intervals instead of every three or four. Clinker and ash removal are the same.

The remarks applying to hand firing apply, therefore, to this system, except that the work is more of a part-time job.

Where hopper feed is used to fill the stoker bins the case becomes similar to that of magazine boilers. Here again certain of the coal companies will service the stokers and remove ash and clinker for a fixed annual sum.

(*d*) *Oil Firing.*—(i) Small automatic plants are safely left unattended all day and night and labour is only required for cleaning the boiler flues once a week, cleaning the burner and general supervision. This is so slight as to be negligible.

(ii) Larger plants, other than power boilers—part time cleaning and supervision by the normal engineer, for which very little is chargeable. Night running can often be supervised by the night watchman if one is available. If not, an extra man is required for night-time, costing, say, £150 per annum.

(iii) Large plants consisting of several steam boilers—one man per shift must be in attendance in any event, and probably could not be dispensed with no matter what the fuel.

(*e*) *Gas Firing.*—It has already been stated that no labour is involved with this fuel, and no cleaning.

Supervision costs may be ignored, as they represent but a small fraction of caretaker's or engineer's time.

(*f*) *Electric Thermal Storage.*—The same remarks apply as with gas.

3. MAINTENANCE AND REPAIRS

For comparative purposes, this item need only be taken as referring to the boiler plant. The ordinary pipes and radiators call for no maintenance and no repairs, except occasional packing of valves or on account of trouble due to frost. In fact, as a system, low-pressure hot water has least upkeep of all.

The maintenance and repairs necessary for the boiler plant are difficult to give in figures, but might be summarised as follows :—

Hand Firing.—Replacement of grate bars once every three years. If the bars are water-cooled, this does not arise. Cost might be £5 per annum for a large boiler. Servicing of automatic controls, £5 per annum.

Magazine Boilers.—These are the same as for hand-firing in this respect.

Automatic Stokers.—The fire-pot probably requires annual replacement in part or whole. The worm may call for renewal every three or four years. The gearing will require periodical overhaul. Automatic controls should be serviced once or twice a year.

Probably £10-£20 per stoker per annum should be allowed, depending on the make, quality of coal and method of running.

Oil Firing.—Overhaul two or three times a year is desirable with self-contained units, and periodical renewal of electrodes, burner nozzles, brushes, etc., is necessary. All-in cost, say, £5 per burner per annum.

Larger plants are generally attended to by the engineer, and the cost would be, if anything, less than above.

Gas Firing.—Practically no maintenance is called for here, and its cost is negligible.

Electric Thermal Storage Systems.—Renewal of electrodes once every three or four years may be necessary in the case of electrode boilers, and renewal of elements in the case of immersion heaters may be required at the same intervals.

As the electric controls are complicated, their annual overhaul is essential.

Average cost with any type, say, £20 per annum per boiler.

It will be seen that none of the above represents a high proportion of total running cost. A figure sometimes taken is 5 per cent. of the installation cost, though this would appear generally to be too high. Repair or replacement of the actual boiler is not included, as this is really common to all systems in some form or another.

TABLE LXI

FIRST COST OF HEATING SYSTEMS

Type of Building	Gross Cube (cu. ft.)	Cost of System using Coal or Coke, hand-fired, in Cast Iron Boilers, with: Hot-water Radiators	Ray-rads	Concealed Panels, Iron Pipes*	Concealed Panels, Copper Pipes*	Extra Cost (over C.I. Boilers, handfired) for: Gravity Feed (Coke) Magazine-boilers, including Steel Hoppers	Automatic Coal Stokers, hand-fired	Oil-firing, including Storage Tanks	Gas Boiler, High efficiency Type	Electrical Thermal Storage
		£	£	£	£	£	£	£	£	£
Small Hotel	165,000	560	740	700	840	275	190	340	160	500
Secondary School ..	500,000	1,900	2,600	2,580	3,280	380	420	500	200	900
Municipal Offices ..	1,270,000	2,800	4,000	3,700	4,200	550	470	650	250	1,800
Hospital ..	2,000,000	6,500 (W.I. Boiler)	8,700	8,500	9,900	750	660	1,100	400	2,300

* Does not include extra cost of special plastering.

4. INTEREST AND DEPRECIATION

This, again, when comparing fuel costs, should not apply to the heating system proper, but only to the additional cost of the equipment necessary for the particular fuel or method of handling.

If any difference is made in builders' costs by the adoption of an alternative fuel, interest on this also should be included.

These charges may generally be based on interest 5 per cent., depreciation 5 per cent. Items such as coal stokers, which may require almost complete renewal in ten years or so, should be debited with 10 per cent. depreciation.

Various costs of magazine boilers, stokers, oil-firing plants, etc., have been given in these articles from time to time, but in order to link them up with some concrete cases, the costs of four actual jobs have been taken out in Table LXI.

The first price column relates to the cost of the heating system, including plain hand-fired boilers, pipes and radiators. Alternative prices are then given for the same building heated by Ray-rads, and panels with iron or copper pipes. For comparison of fuel costs, no interest or depreciation is taken on these figures but on the ones following—i.e., on the extra sums due to magazine boilers, coal stokers, oil-firing, gas or electric boilers. No attempt has been made to estimate differences in cost of builders' work with the alternative schemes, as it varies so much according to conditions. For present purposes the builders' work for each is assumed the same.

TABLE LXII

Running Costs of Four typical buildings heated in various ways.

i. *Fuel Costs.*

Building and Type of Heat Requirement (cf. Table LX)	Gross Cube (cu. ft.)	Heat required in B.T.U. per hour	Hours p. annum, Constant Firing (Table LX)	∴Therms p. annum, Constant Firing (Systems *a* and *b*)	Hours p. annum, Intermittent Firing (Table LX)	∴Therms p. annum, Intermittent Firing (Systems *c*, *d*, *e* and *f*)	Annual Fuel Consumption at Rates given in Table LIX, also Cost* (see footnote) for various types of heating.					
							(*a*) Coke, hand-fired at 157 Therms/ton	(*b*) Coke in magazine-boiler at 182 Therms/ton	(*c*) Coal with automatic Stoker at 184 Therms/ton	(*d*) Oil at 302 Therms/ton	(*e*) Gas Boiler at 0·85 Therms/therm	(*f*) Electrical Thermal Storage at 0·0335 Therms/unit
Small Hotel : Type 2, Continuous except night-time	165,000	393,000	2,080	8,200	2,017	7,920	52 tons £86	45 tons £75	43 tons £54	26 tons £84	9,300 therms £155	226,000 units £236
Secondary School : Type 4, Part daytime	500,000	967,000	1,284	12,400	1,054	10,200	80 tons £132	69 tons £114	56 tons £70	34 tons £136	12,000 therms £200	305,000 units £320
Municipal Offices : Type 3, Daytime, excluding week-ends	1,270,000	1,740,000	1,440	25,000	1,238	21,600	160 tons £264	138 tons £230	118 tons £147	72 tons £288	25,400 therms £423	645,000 units £670
Hospital : Type 1, Continuous	2,000,000	3,000,000	3,024	90,720	3,024	90,720	580 tons £955	500 tons £825	493 tons £618	300 tons £1,200	107,000 therms £1,780	2,700,000 units £2,800

* Based on following fuel costs: coke 33/– per ton, coal (for automatic stoker) 25/– per ton, oil 80/– per ton, gas 4d. per therm, electricity ½d. per unit.

5. INSURANCE

Insurance of hot water or low-pressure steam heating boilers is not compulsory, as it is for high-pressure steam boilers.

Insurance of heating and hot-water supply boilers does, however, mean that any act on the part of the attendant due to ignorance or neglect, such as the overloading of a safety valve, is not allowed to go unchecked. A sense of security to the owner is given by the annual inspection of the insurance company's engineer, and he knows that if anything is wrong, or if the boiler wants cleaning out, he will be told so.

A further point is that, should he be unlucky enough to be the one man in a million who does have an explosion, due, perhaps, to a stoker's folly, and the man is fatally injured, no reflection can come on him in any subsequent enquiry if the boiler has been regularly inspected.

One company quotes 50s. p.a. for a cover of £5,000 against explosion, third-party risk and damage to surrounding property, in respect of a single boiler of mild-steel construction. The rates for cast iron boilers are somewhat higher.

These costs are, however, trifling, and may be ignored in any comparison of fuel costs, since they apply to all types in some form.

Examples of Running Costs.—It is impossible to devise a simple comprehensive formula embodying all the above factors that would give a correct answer in every case. Each job has to be considered on its merits, and what has been said above can be no more than a general guide requiring individual application.

TABLE LXII.

ii. *Inclusive Costs, per Annum.*

Building and Type of Heat Requirement	Type of Heating	Fue Cost (from (i) above)	Electric Power for Firing	Labour	Maintenance	Interest and Depreciation (on extra cost over C.I. hand-fired boilers)†	Total Annual Cost
Small Hotel : Continuous, except night-time	(*a*) Coke, Handfired	£86	—	—	£10	—	**£96**
	(*b*) Coke in Magazine Boiler	£75	—	—	£10	£28	**£113**
	(*c*) Coal with Automatic Stoker	£54	£8	—	£20	£29	**£111**
	(*d*) Oil	£84	£8	—	£10	£34	**£136**
	(*e*) Gas Boilers	£155	—	—	£5	£16	**£176**
	(*f*) Electrical Thermal Storage	£236	—	—	£20	£50	**£306**
Secondary School : Part daytime	(*a*) Coke, Handfired	£132	—	£50	£15	—	**£197**
	(*b*) Coke in Magazine Boiler	£114	—	£25	£15	£38	**£192**
	(*c*) Coal with Automatic Stoker	£70	£10	£25	£25	£63	**£193**
	(*d*) Oil	£136	£10	£20	£15	£50	**£231**
	(*e*) Gas Boilers	£200	—	—	£10	£20	**£230**
	(*f*) Electrical Thermal Storage	£320	—	—	£25	£90	**£435**
Municipal Offices : Daytime, excluding week-ends	(*a*) Coke, Handfired	£264	—	£80	£20	—	**£364**
	(*b*) Coke in Magazine Boiler	£230	—	£40	£20	£55	**£345**
	(*c*) Coal with Automatic Stoker	£147	£20	£40	£30	£70	**£307**
	(*d*) Oil	£288	£20	£30	£15	£65	**£418**
	(*e*) Gas Boilers	£423	—	—	£15	£25	**£463**
	(*f*) Electrical Thermal Storage	£670	—	—	£30	£180	**£880**
Hospital : Continuous	(*a*) Coke, Handfired	£955	—	£450	£30	—	**£1,435**
	(*b*) Coke in Magazine Boiler	£825	—	£150	£30	£75	**£1,080**
	(*c*) Coal with Automatic Stoker	£618	£50	£200	£50	£100	**£1,018**
	(*d*) Oil	£1,200	£50	£200	£20	£110	**£1,580**
	(*e*) Gas Boilers	£1,780	—	£50	£20	£40	**£1,890**
	(*f*) Electrical Thermal Storage	£2,800	—	£50	£40	£230	**£3,110**

† Based on First Costs from Table LXI. Interest, 5 per cent. all cases; depreciation, 5 per cent. all cases, except (*e*), which is 10 per cent.

TABLE LXIII

EXAMPLES OF FUEL COSTS PER ANNUM.
(Heating Plus H.W.S.)

Type of Building	Gross Cube (cu. ft.)	Fuel	Amount used per Annum	Cost per Ton or Unit	Total Cost per Annum	Annual Cost in Pence per cu. ft.
1. Banking Institution, London	5,000,000	Oil	520 tons	72/6	£1,890	·091d.
2. Bank Head Office, London	3,129,000	Oil	269 tons	74/6	£1,002	·080d.
3. Bank Head Office, London	2,000,000	Oil	183½ tons	80/-	£738	·089d.
4. Bank Head Office, London	2,000,000	Coke	218 tons	33/8	£367	·044d.
5. Bank Head Office, London	915,000	Oil	68 tons	86/-	£262	·068d.
6. Bank Head Office, London	2,250,000	Electricity (Thermal Storage)	1,500,000 units	·3d. and ·27d.	£1,820	·194d.
7. Government Office Building, London ..	1,127,000	Oil	110 tons	72/6	£400	·085d.
8. Government Office Building, London ..	1,349,000	Oil	157 tons	75/-	£590	·105d.
9. Private Office Building, London	962,000	Coke	164 tons	32/6	£256	·067d.
10. Private Office Building, London	18,200	Anthracite	2¾ tons	55/-	£7 11s.	·10d.
11. Church, London ..	933,000	Oil	61 tons	86/-	£262	·068d.
12. Private House ..	120,000	Coal	12.35 tons	38/7	£23 16s.	·048d.
13. Private House ..	25,000	Anthracite	5.5 tons	55/-	£15 2s.	·145d.
14. Boarding School (South of England)	6,500,000	Coal	2,050 tons	22/9	£2,335	·087d.
15. Secondary School (West of England)	523,000	Coke and Anthracite	121 tons	29/3	£177	·081d.
16. Secondary School (Lancashire)	611,000	Anthracite	117½ tons	40/-	£235	·092d.
17. Hotel (London) ..	3,500,000	Coal	1,500 tons	20/-	£1,500	·10d.
18. Hotel (North of England	425,000	Coke	260 tons	30/-	£390	·22d.
19. Hotel (Midlands) ..	6,200,000	Coal	2,000 tons	20/-	£2,000	·08d.
20. Hotel (Scotland) ..	3,250,000	Coal	1,800 tons	20/-	£1,800	·13d.
21. Infectious Diseases Hospital (Midlands) with Laundry, etc.	1,048,000	Coal	945 tons	16/7	£738	·177d.

Cost per bed £4 19s. 6d. p.a. = 22·8d. per week/bed.
L.C.C. average for 9 fever hospitals = 32·4d. per week/bed.
Ratio heating cost : total cost (L.C.C.) 3·6 per cent.

In order that this question of running costs may be brought to a conclusion, therefore, the annual expense with different fuels for four specific cases have been estimated and are given in Table LXII. The four cases are of different character, and the various methods of firing and times of use produce a different comparison in each case. That is why generalizations are useless when discussing such problems.

The four jobs chosen are the same four for which costs of installation were given in Table LXI, so that a complete set of figures for these cases is now furnished.

The results show again that with continuous heating the cheaper fuels are those which are cheapest per unit of heat, but with more intermittent use, such as in the school example, the differences with various fuels are much less marked.

It should be noted that the calculated figures are for heating only.

Actual Fuel Costs.—Table LXIII gives fuel costs for heating and H.W.S. of a number of actual installations together with the cube and the cost per foot cube.

Figures of this kind are not often published, indeed, it is uncommonly hard to come by them. They have been collected over a long period and are quite authentic.

It should be noted that the building cubes given are gross, i.e., including walls, roofs, basement, etc. That is why banks are relatively low per foot cube, since their large vaults increase the cube, but have practically no heating. Buildings of a type should be considered together, both for this reason and because their period of use is so different. Thus the electric thermal storage system in its own group will be seen to be over double the cost per foot cube of similar buildings heated by oil, whereas, comparing the figure with another group, such as a hospital with its continuous heating and absence of basements, etc., there might appear to be little to choose on cost.

These figures do not bring in the other factors discussed above, labour, maintenance, etc., as the comparison would be too unwieldy.

It is hoped that this information will will prove helpful.

In this matter of running costs, there is nothing more convincing than the knowledge that "such and such a building uses so much coal and is almost the same as ours." If such figures only corroborate a theoretical estimate, they will have served their purpose.

Much more could be done were costs with systems of all types and kinds more freely disclosed. Perhaps this will form a start for such a movement and the writers would be glad to help. If any readers care to send to them, through the Editor, ARCHITECTS' JOURNAL, any information as to running costs of buildings within their knowledge, coupled with an estimate of the gross cube, they shall be published in suitable form when occasion permits.

Comparison with Direct Electric Systems.—So far, systems only of the indirect category have been considered, i.e., with a boiler, and pipes for the conveyance of the heat to the rooms.

Direct electric heating gains the advantage at once of having no boiler losses, and no wastage of heat from mains.

Further, it has no night banking loss, and is instantly responsive to thermostatic control. If a room rapidly fills with people, or the sun comes out, it will be found that the thermostat has shut off the current. With a hot water system overheating results, as even if individual room control is provided (which it rarely is) the time lag of the system is too great to take advantage of these rapid changes.

This is particularly the case with schools, where the introduction of 20 or 30 children to a classroom is often enough to keep it warm in mild weather without artificial heat. A coke system would be running all the time, the electric system is automatically cut off.

It is quite reasonable to anticipate a much lower heat input to suffice in such a case with electricity than with any other fuel.

Some figures stated to be taken from the Kent Education Committee's report for 1931, would appear to confirm this. Two schools for 480 children, one heated by electricity direct, and one by oil, consumed in the year :—

Electricity	Oil
54,200 units equivalent to 1,860 therms. Cost at ·75d. = £150	23 tons equivalent to 6,946 therms. Cost at 80s. per ton = £92.

Roughly four times the heat input with oil as compared with electricity, yet results are understood to be equally satisfactory.

As regards first cost, both were priced at £800, but the hot water scheme is believed to have cost £700 more for builders' work.

Further running consumptions for a

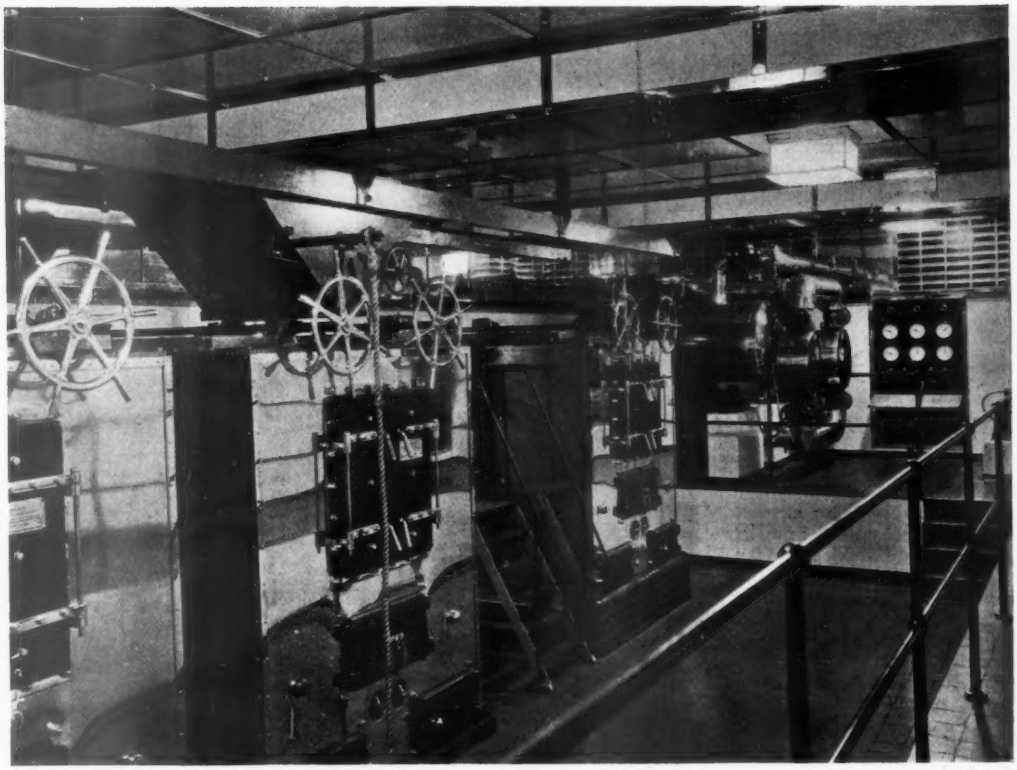


Fig. 204.—*Example of cleanliness of coke with magazine boilers. Note the travelling coke skip over.*

number of schools per cubic foot (net) have been submitted to the authors as follows :—

	Units per cu. ft. p.a.
Schools, London	·31
,, ,, ...	·29
,, Belfast	·276
,, Cambridge	·24
,, Torquay	·26
,, Glasgow	·204
,, Kent	·294

From the above a figure of ·3 might be assumed to be normal.

A figure of ·3 per ft. net cube might be reduced to ·25 gross cube.

This consumption at ·75d. a unit gives a cost of ·187d. per ft. cube, compared with the two coke fired schools given in Table LXIII at ·09d. approximately.

Taking labour, maintenance and interest on builders' work into account, it may be shown in some cases that a fairly close comparison is possible As mentioned in a previous article, however, in the one case (hot water) a generous heat is provided, in the other (electricity) it is precise and limited. Some difference in comfort must result, though for schools it is of little value.

This comparison for schools is as favourable to electricity as any, for reasons already stated.

Some figures obtained for a private house are given below. It is heated by electric radiant ceiling panels to 55 deg. for living rooms and 45 deg. for bedrooms, augmented by direct electric radiators.

Water heating is by electric storage heater.

The radiant panels are thermostatically controlled, and it is found that a saving results by shutting off at night.

Cube net 16,240 cu. ft.
Gross 20,000 (estimated).

Average for 2 years 1933-4, 1934-5		Unit per cu. ft. gross
Heating, lighting, cooking	11,790 units	=·59
Water heating	7,320 ,,	=·37
	Total	·96

The current is obtained at ½d. a unit in summer, and ¾d. a unit in winter for all purposes, plus a standing charge of £4 18s. per annum. Water heating is priced at ½d. a unit all the year, and is cut off by a time switch at peak load.

Allowing a deduction for cooking and lighting, the annual cost for heating and hot water is approximately £45 per annum.

This gives a cost of ·54d. per foot of gross cube, which will be seen to be about four times the cost given in Table LXIII of a similar sized house heated by a combined heating and hot water system fired with anthracite. The latter, incidentally, is known to maintain constantly higher temperatures in the rooms than those mentioned above.

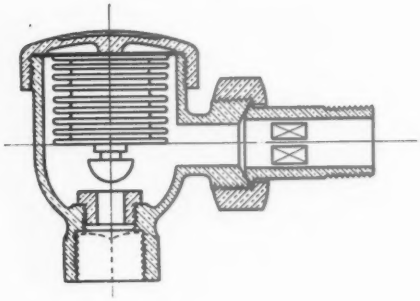
It will be clear that the more nearly continuous the heating, the less favourable will be the case for electricity.

Cleanliness and Convenience.—These important matters have already been mentioned. The fuels and methods of firing come in the following order, the least cleanly and convenient being placed first :

Hand fired coke or coal.
,, ,, anthracite.
Automatic coal stokers.
Magazine fired boilers with top feed.
Oil firing.
Gas firing.
Electric thermal storage.
Electric direct heating.

As regards cleanliness, Fig. 204 shows what can be done with coke using magazine boilers. This would not have been thought possible a few years ago with anything but oil.

Under the heading convenience, nothing can equal the turning on or off of a switch, possible only with electric systems, or the turning of a cock with gas. It is only rarely, however, that owners are prepared to concede much increase in running cost on account of these advantages.



TRADE NOTES

[EDITED BY PHILIP SCHOLBERG]

Safety Sockets

THE dangers of alternating current at 230 volts, gradually being brought home to the general public, have for some time been fully appreciated by the electrical industry. Although the trade papers have consistently proposed that only properly qualified men should be allowed to carry out wiring work, no control is possible over the householder who possesses a screwdriver and a pair of pliers.

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Nearly all agreements for the supply of current contain a clause stipulating that no alterations to wiring may be done without the approval of the companies' engineers, but unskilled wiring by handy men goes on continuously, generally with the cheapest possible cut-price fittings.

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The more reputable firms have consistently refused to manufacture the cheap fitting, and the British Standards Institution issued last year a specification (No. 546) for two- and three-pin plugs, which has been adopted by many manufacturers as a minimum safety standard.

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The sketch on this page shows a three-pin safety socket and plug which has recently been produced by William Sanders and Co., of Wednesbury. The live contacts are covered by a bakelite shield which only moves aside when the plug is inserted. This movement is produced by a trigger in the socket for the third pin, which can only be inserted when the two current-carrying pins are in the right position. The roots of the two pins are also insulated for a short distance, so that even if the plug is not pushed right home, it is still not possible to get a shock, even by inserting a casual hatpin or knife blade.

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Prices are reasonable, varying from 16s. 8d. a dozen for the 2 amp type in standard walnut finish to 34s. 8d. for the 15 amp size in white; sunk patterns are roughly 50 per cent. higher in price.

Nails for Shuttering

Having been asked from time to time where it is possible to buy double-headed nails for use on shuttering, I discovered, quite by accident, at the Shipping Exhibition, that these are sold by nearly all foundry and pattern-makers' suppliers.

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Whether or not their use is worth while I do not know. Experienced workmen generally leave projecting ends on battens, and can reduce shuttering to its original boards in a very short time; but nails are frequently hammered over and left to blunt carpenters' saws when the boards are used again.

Steam Traps

A neat small steam trap has just been marketed by Holden and Brooke, and is shown in the headpiece to these notes. It is intended for domestic work generally, and thus is available in one size only, ½ inch finished either in chromium plate or matt for painting.

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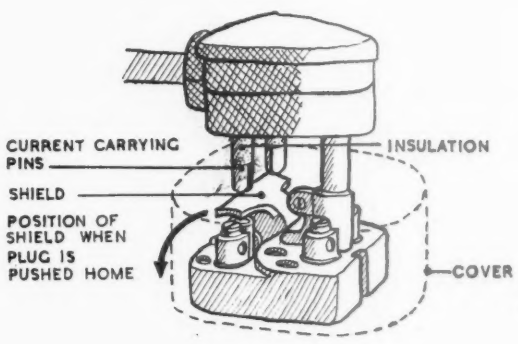
The design seems perfectly sound mechanically and incorporates a renewable stainless steel valve seat. The trap is suitable for all pressures up to 150 lb. per sq. inch, and will deal with a maximum of 500 lb. of water per hour.



A safety socket with shielded contacts and insulated pins. (See accompanying note.)

THE BUILDINGS ILLUSTRATED

List of General and Sub-Contractors

SHOP AT EALING (pages 551-554). The general contractors were Messrs. Courtney Pope and Co., Ltd. The principal sub-contractors and suppliers included: Tube Products, Ltd., tube radiators; Wilton Royal Carpet Factory Co., Ltd., carpets; Art Pavement and Decorations, Ltd., flooring; Finmar, Ltd., furniture; Makers of Simple Furniture, cash desk; Frederick Tibbenham, wood panelling; G. V. D. Illuminators, Ltd., lighting; James Clark and Son, Ltd., wall glazing; Venesta, Ltd., Plymax; Hagger and Hawes, lighting and reflectors to shop windows.

GYMNASIUM AT BEDFORD SCHOOL (pages 564-565). The general contractors were Messrs. Samuel Foster. The principal sub-contractors and suppliers included: *Structure.*—Aston Construction Co., Ltd., steel roof trusses; Messrs. Langley, tiles; Williams and Williams, Ltd., casements. *Finishes and Equipment.*—Acme Flooring Co. Ltd., woodblock flooring; George Jennings, Ltd., sanitary fittings; Henry Bacchus, Ltd., central heating and electric wiring; Comyn Ching, Ltd., door furniture; Tucker and Edgar, Ltd., metalwork. *Specialist Supplier.*—Niels Larsen and Son, Ltd., gymnastic apparatus.

LAW REPORT

CORPORATION AND ITS RIGHTS

Joseph v. *East Ham Corporation—Court of Appeal. Before Lords Justices Slesser and Roche and Mr. Justice Swift.*

THIS appeal involved a question as to the right of a Corporation, supplying electricity, to cut off the supply in the event of a dispute as to the amount supplied and consequent payment.

The Corporation claimed payment from Mr. Harold Joseph, of Barking Road, East Ham, for the consumption of 2,021 units, and Mr. Joseph disputed the accuracy of the meter, contending that this amount was enormously in excess of his ordinary consumption. Mr. Joseph paid what he considered a fair sum, and the Corporation, whilst accepting it on account, demanded the balance, and when it was refused, cut the supply off. Mr. Joseph then commenced his action in the High Court, claiming an injunction to restrain the Corporation cutting off his supply. The matter was referred to the Bow County Court, and His Honour Judge Owen Thompson determined the action in favour of Mr.

Joseph, and the Corporation now appealed.

After long legal arguments the Court dismissed the appeal with costs.

Lord Justice Slesser in giving judgment, said the matter was of some importance. Here the appellant said that the Corporation had never installed in his premises a meter that came within the meaning of the Electricity Acts, which said that the meter must be of the construction and pattern provided by the Corporation, and must be certified by an electric inspector. Here it had not been disputed that the Corporation had appointed no such inspector. That being the case, it was clear that as there never was any inspector or meter that came within the Acts, the appeal therefore failed, as owing to the absence of a statutory meter, no sum had been found to be due, and further, on the ground that there was a finding of fact, there was a *bona fide* dispute, from which there was no appeal.

Lord Justice Roche and Mr. Justice Swift agreed.

THE WEEK'S BUILDING NEWS

LONDON & DISTRICTS (15-MILES RADIUS)

EALING. *Shops and Flats.* Messrs. Warwick Estates, Ltd., are to erect 14 shops and flats at The Fairway and Curry Road. The architects are Messrs. Marshall and Tweedy.

EALING. *Bank.* Premises are to be erected at The Mall for The National Provincial Bank, Ltd. Plans have been prepared by Mr. W. F. C Holden.

EALING. *Houses.* Messrs. Evan Bros., Ltd., are to erect 126 houses at Alderney Gardens, Lytton Close, and Harewood Avenue. The plans have been prepared by Messrs. Grant Lightband and Edwards.

EALING. *Flats.* Mr. S. H. West, 40 The Broadway, W.5, has prepared plans for a proposed block of 80 flats at Haven Green.

FINCHLEY. *Houses, etc.* Plans passed by the Corporation: Eight houses, Oakdene Gardens, and 16 houses, Gordon Road, for Oakdene Estates, Ltd.; 27 houses, Hutchins Walk, for Mr. G. C. Swanson; research workshop, Woodside Lane, for Mr. R. S. Arnell; four houses, Bancroft Avenue, for Messrs. Smerdon Bros.; three houses, Kingsgate Avenue, for Mr. J. Norris; four houses, Spencer Drive, for Mr. L. C. Gibson; eight houses, Brim Hill, for Mr. H. Meckhonik; church hall, All Saints', Durham Road, for London Diocesan Fund.

FULHAM. *Maternity Hospital.* The B.C. has approved revised plans for the erection of a maternity home at Parsons Green.

FULHAM. *Flats.* The B.C. is to acquire, by compulsory purchase, a site in Bagleys Lane and Stephendale Road for the erection of from 100 to 150 flats. A site in Margravine Road, owned by the Imperial Tobacco Company, is also to be purchased, where it is proposed to erect 75 flats.

GREENFORD. *Shops and Flats.* Messrs. Towndrow and Kaufmann have prepared plans for 10 shops and 20 flats over, to be erected in Greenford Road, for Messrs. M. E. and A. Snapper.

GREENFORD. *Church, etc.* Subject to the submission of plans and details for approval, consent has been given to an application, by Messrs. Harkby, Stewart and Wadeson, for the proposed erection of a church and church hall on a site in Medway Drive and Hadder Drive.

HACKNEY. *Housing Site.* The B.C. recommends the acquisition of a housing site at a cost of £55,700 in Nisbet Street.

HACKNEY. *Flats.* The Hackney Estates, Ltd., are to erect flats on a site in Well Street and Shore Road, Hackney, on behalf of Classic Estates, Ltd.

LEWISHAM. *School, etc.* Plans passed by the B.C.: School, Coopers Lane, for Messrs. Albert Monk; block of flats, Honor Oak estate, for Messrs. Gee, Walker & Co., Ltd.; 12 houses, Callander Road, and two houses and pavilion, Crantock Road, for Messrs. J. Watt (Catford), Ltd.; flats, Honor Oak Park, for Messrs. Dunsmore Bros.; buildings, St. Mildred Road, for Mr. A. Frampton; shops, etc., Lee Terrace and Lee Road, for Mr. C. J. W. Hider; extensions, 114 High Road, for Mr. G. T. Harman; buildings, site of 40 Manor Park, for Mr. R. C. Thirlow.

NORTHOLT. *Estate Development.* The London and Provincial Building Co., Ltd., are to develop further the Belvue Estate by the erection of 60 houses in Court Farm Road.

PERIVALE. *Flats.* Mr. E. W. Palmer, of Clock Chambers, London Road, Enfield, has prepared lay-out plans for the erection of 164 flats in 23 blocks in Western Avenue.

SOUTHALL. *Flats.* The Buntin Construction Co., Ltd., are to erect 112 flats in Livingstone Road, Southall.

SOUTHALL-NORWOOD. *Swimming Baths.* The U.D.C. has prepared plans for the construction of an open air swimming bath at Dorners Wells.

SOUTHALL-NORWOOD. *Cinema, etc.* Plans passed by the U.D.C.: Cinema and three shops, High Street, for Odeon Theatres, Ltd.; five shops and flats, Uxbridge Road, for Mr. Mark Cowan; mission hall, Norwood Road, for Bath Mission trustees; hotel, Lady Margaret Road, for Messrs. Truman, Hanbury and Buxton, Ltd.; estate development, Hambrough Terrace and Beresford Road, for Mr. F. S. Honey; six houses, Brent Road, for General Housing Co., Ltd.; three houses, Minterne Avenue, for Messrs. Warren and Woods; 36 houses, Lady Margaret Road, for Messrs. George Wimpey & Co., Ltd.; alterations, factory, Scotts Road, for Crown Cork Co., Ltd.; 150 houses, Viaduct Fields estate, for Messrs. R. Fielding and Son; factory extensions, Scotts Road, for Messrs. Kearley and Tonge, Ltd.

SOUTHERN COUNTIES

BEXHILL. *Flats, etc.* Plans passed by the Corporation: Block of flats, Fairmount Road, for Messrs. White Bros.; development, Bidwell estate, for Mr. J. E. Maynard, architect, on behalf of Mr. R. A. Larkin; club house, Barnhorn Road, for Mr. A. E. Joyce; three houses, Ringwood Road, for Mr. J. W. Cripps; five houses, St. David's Avenue, for Mr. J. Lye.

BRIGHTON. *Flats, etc.* Plans passed by the Corporation: Flats, 29 Sussex Square, for Mr. Augustus Hall; 10 houses, Wilmington Way, for Nevill Land and Development Co.; eight houses, Overhill Drive, for Messrs. Braybons, Ltd.; two shops and flats, Winfield Avenue, for Mr. Charles Kingston; alterations and additions, Bristol Hotel Mansions, Marine Parade, for Kemp Town Brewery, Ltd.; 16 houses, Sunnydale Close, for Mr. Edwin John Street; 20 houses, Mayfield Crescent, for Mr. Charles W. Parkes; 16 shops and 60 bungalows, Wick estate, Woodingdean, for Coastal Estates (Eastbourne), Ltd.; hotel and recreation hall, Mackie Avenue, Patcham, for Tamplin and Sons Brewery, Ltd.; eight houses, Overhill Drive, for Mr. F. J. Wellman: six bungalows, Downs estate, Woodingdean, for Mr. John Jones; 29 houses, Ladies Mile estate, Patcham, for Ladies Mile Estate, Ltd.

BRIGHTON. *Houses.* The Corporation has asked the borough engineer to prepare plans for the erection of 200 two-bedroom type houses on the Chichester estate.

OXFORD. *College.* The Education Committee is to prepare plans for the erection of a college for further education on a site in Cowley Road.

WORTHING. *Shops, etc.* Plans passed by the Corporation: Shops and showrooms, Liverpool Road, for Messrs. Montague Holmes and Sons; 28 houses, Ham Way, for Messrs. Payne and Linfield; 20 houses, Littlehampton Road, for Chatsmore Estates, Ltd.; four houses, Garrick Road, for Worthing Estates Building Co.; four houses, Sea Lane, for Mr. Sam Nove; two houses, Beechwood Avenue, for Mr. W. T. Bagnall; two houses, May Tree Avenue, for Mr. R. G. Pierce; 46 houses, Mulberry Lane, for Messrs. Wignall and Ainsworth; maternity block, Worthing Hospital, Lyndhurst Road, for Mr. J. S. Snell; four houses, May Tree Avenue, for Mr. C. E. Parsons; two houses, Ashurst Drive, for Messrs. Rimmer and Nicholl; seven houses, Broomfield Avenue, for Mr. E. W. Owen; eight houses, Findon Road, for Jeffrey Houses, Ltd.; two houses, Coastal Road, for Messrs. Duncan B. Gray and Partners; 26 houses, Loxwood Avenue, for Gladeside Estates, Ltd.; 46 flats, Brighton Road, for Onslow Estates, Ltd.; four shops and flats, Tarring High Street, for Messrs. G. Baker and Son; 14 houses, Mulberry Lane, for Mr. A. T. W. Goldsmith; two houses, South Street, Tarring, for Messrs. Braybons, Ltd.; 10 houses, Trent Road, for Messrs. Maddison and Brookes; alterations and additions, Southdown Hotel, Northcourt Road, for Messrs. Tamplin and Sons, Ltd.; four houses, Findon Road, for Mr. J. P. Chaplin; six shops, Tarring Road, for Mr. F. J. Clements; 10 houses, Ladywell Road, for Mr. E. J. Woodward; four houses, Offington Drive, for Mr. S. Barker; two houses, Offington Avenue, for Mr. C. H. Hobbs; 36 flats, Downview Road, for Mr. M. R. Fletcher; six houses, Beechwood Avenue, for Mr. W. B. Allchorn.

MIDLAND COUNTIES

SUTTON COLDFIELD. *Houses, etc.* Plans passed by the Corporation: Two houses, Chester Road, for Mr. T. M. Latimer; four houses, Fernwood Grange, for Midland Dwellings, Ltd.; three houses, Monmouth Drive, for Mr. W. J. Phillips; six houses, Oakwood Road, for Mr. Alec Coleman; 18 houses, Tower Road, for Mr. J. N. Lovell; 2 houses, Kingstanding Road, for Mr. T. A. Glynn; 74 houses, Bearwood Road, for Messrs. F. C. Price, Ltd.; two shops and houses, Boldmere Road, for Mr. P. Arnold; six houses, Tamworth Road, for Messrs. Davis and Son; two shops and houses, Chester Road for Birmingham Housing Co., Ltd.; 30 houses, Lichfield Road, for Mr. H. H. Laskey; two houses, Tudor Hill, for Messrs. T. Morgan and Sons.

NORTHERN COUNTIES

BLACKPOOL. *Houses, etc.* Plans passed by the Corporation: Four houses, Devonshire Road, for Mr. J. W. Lee; 10 houses, Teesdale Avenue, for Messrs. R. Fielding and Son; extensions, Headlands Hotel, South Promenade, for Mr. C. F. Rickards; three houses, Dauntessey Avenue, for Messrs. Burke and Gilbert; three houses, Guildford Avenue, for Mr. R. Jackson; eight houses, Caxton Avenue, for Mr. J. Ridyard; five houses, Bispham Road, for Mr. J. Parker; 110 houses, Blairway Avenue, for Mr. Wilson; three houses, Warbreck Drive, for Messrs. Bryning and Done; six houses, Burgess Avenue, for Mr. T. Harrison.

HULL. *Wash-houses.* The Corporation has purchased land in Beeton Street for the erection of wash-houses.

WAKEFIELD. *School.* The Corporation has approved the scheme for the erection of a school of arts and crafts at a cost of £24,000.

WALLSEND. *School.* The Education Committee has purchased a site in Station Road for the erection of an elementary school.

WALLSEND. *Extensions to Library.* The Corporation is considering plans for extensions to the library at a cost of £12,000.

WALLSEND. *Houses.* The Corporation is to erect 50 houses in the vicinity of Station Road at a cost of £15,400.

RATES OF WAGES

The initial letter opposite every 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_1	ABERDARE ..	S. Wales & M.	1 5	1 0½
A	Aberdeen ..	Scotland	1 6	1 1½
A_1	Abergavenny ..	S. Wales & M.	1 5	1 0½
A	Abingdon ..	S. Counties	1 4	1 0
A	Accrington ..	N.W. Counties	1 5½	1 1½
A	Addlestone ..	S. Counties	1 4	1 0
A	Adlington ..	N.W. Counties	1 5½	1 1½
A	Airdrie	Scotland	•1 5½	1 1½
A	Aldeburgh ..	E. Counties	1 1½	10½
A	Altrincham ..	N.W. Counties	1 5½	1 1½
B	Appleby ..	N.W. Counties	1 2	10½
A	Ashton-under-Lyne	N.W. Counties	1 5½	1 1½
B_1	Aylesbury ..	S. Counties	1 3	11½
B_1	BANBURY ..	S. Counties	1 3	11½
B_1	Banger ..	N.W. Counties	1 3	11½
A_2	Barnard Castle ..	N.E. Coast	1 4	1 0
A	Barnsley ..	Yorkshire	1 5½	1 1½
B	Barnstaple ..	S.W. Counties	1 3½	11½
A	Barrow ..	N.W. Counties	1 5½	1 1½
A	Barry	S. Wales & M.	1 5½	1 1½
B_1	Basingstoke ..	S.W. Counties	1 3	11½
A_2	Bath	S.W. Counties	1 4½	1 0½
A	Batley ..	Yorkshire	1 5½	1 1½
A_2	Bedford ..	E. Counties	1 4½	1 0½
A_1	Berwick-on-Tweed	N.E. Coast	1 4½	1 0½
A_2	Bewdley ..	Mid. Counties	1 4½	1 0½
B	Bicester ..	S. Counties	1 2	10½
	Birkenhead ..	N.W. Counties	•1 7	1 2½
A	Birmingham ..	Mid Counties	1 5½	1 1½
A_1	Bishop Auckland	N.E. Coast	1 5	1 0½
A	Blackburn ..	N.W. Counties	1 5½	1 1½
A	Blackpool ..	N.W. Counties	1 5½	1 1½
A	Blyth	N.E. Coast	1 5½	1 1½
B_1	Bognor ..	S. Counties	1 3	11½
A	Bolton	N.W. Counties	1 5½	1 1½
A	Boston	Mid. Counties	1 4	1 0
A_2	Bournemouth ..	S. Counties	1 4½	1 0½
B_2	Bovey Tracey	S.W. Counties	1 2½	11
A	Bradford ..	Yorkshire	1 5½	1 1½
A_1	Brentwood ..	E. Counties	1 5	1 0½
A	Bridgend ..	S. Wales & M.	1 5½	1 1½
B	Bridgwater ..	S.W. Counties	1 3½	11½
A_1	Bridlington ..	Yorkshire	1 5	1 0½
A	Brighouse ..	Yorkshire	1 5½	1 1½
A_2	Brighton ..	S. Counties	1 4½	1 0½
A	Bristol	S.W. Counties	1 5½	1 1½
B	Brixham ..	S.W. Counties	1 2½	11
A	Bromsgrove ..	Mid. Counties	1 4½	1 0½
B	Bromyard ..	Mid. Counties	1 2	10½
A	Burnley ..	N.W. Counties	1 5½	1 1½
A	Burslem ..	Mid. Counties	1 5½	1 1½
A	Burton-on-Trent	Mid. Counties	1 5½	1 1½
A	Bury	N.W. Counties	1 5½	1 1½
A	Buxton	N.W. Counties	1 5	1 0½
A_1	CAMBRIDGE ..	E. Counties	1 5	1 0½
B_1	Canterbury ..	S. Counties	1 3	11½
A	Cardiff	S. Wales & M.	1 5½	1 1½
A	Carlisle ..	N.W. Counties	1 5½	1 1½
B	Carmarthen ..	S. Wales & M.	1 3½	11½
B	Carnarvon ..	N.W. Counties	1 3½	11½
A	Carnforth ..	N.W. Counties	1 5½	1 1½
A	Castleford ..	Yorkshire	1 5½	1 1½
A_1	Chatham ..	S. Counties	1 4	1 0
A	Chelmsford ..	E. Counties	1 4	1 0
A	Cheltenham ..	S.W. Counties	1 4	1 0
A	Chester	N.W. Counties	1 5½	1 1½
A	Chesterfield ..	Mid. Counties	1 5½	1 1½
B_1	Chichester ..	S. Counties	1 3	11½
A	Chorley	N.W. Counties	1 5½	1 1½
B_1	Cirencester ..	S. Counties	1 3	11½
A	Clitheroe	N.W. Counties	1 5½	1 1½
A	Clydebank ..	Scotland	1 5½	1 1½
A	Coalville ..	Mid. Counties	1 5½	1 1½
A_2	Colchester ..	E. Counties	1 4½	1 0½
A	Colne	N.W. Counties	1 5½	1 1½
A_2	Colwyn Bay ..	N.W. Counties	1 4½	1 0½
A_1	Consett ..	N.E. Coast	1 5	1 0½
A_2	Conway ..	N.W. Counties	1 4½	1 0½
A	Coventry ..	Mid. Counties	1 5½	1 1½
A_2	Crewe	N.W. Counties	1 4½	1 0½
A	Cumberland ..	N.W. Counties	1 4	1 0
A	DARLINGTON	N.E. Coast	1 5½	1 1½
A	Darwen ..	N.W. Counties	1 5½	1 1½
B_1	Deal	S. Counties	1 3	11½
A_2	Denbigh ..	N.W. Counties	1 4	1 0
A	Derby	Mid. Counties	1 5½	1 1½
A	Dewsbury ..	Yorkshire	1 5½	1 1½
B	Didcot ..	S. Counties	1 3½	11½
A	Doncaster ..	Yorkshire	1 5½	1 1½
B_1	Dorchester ..	S.W. Counties	1 3	11½
A	Driffield ..	Yorkshire	1 4	1 0
A_2	Droitwich ..	Mid. Counties	1 4½	1 0½
A	Dudley ..	Mid. Counties	1 5½	1 1½
A_2	Dumfries ..	Scotland	1 5	1 0½
A	Dundee ..	Scotland	1 5½	1 1½
A	Durham ..	N.E. Coast	1 5½	1 1½
A_2	EASTBOURNE ..	S. Counties	1 4½	1 0½
A_1	Ebbw Vale ..	S. Wales & M.	1 5	1 0½
A	Edinburgh ..	Scotland	1 5½	1 1½
A_1	E. Glamorgan-shire, Rhondda Valley District	S. Wales & M.	1 5	1 0½
A_2	Exeter	S.W. Counties	•1 4½	1 0½
B	Exmouth ..	S.W. Counties	1 3½	11½
A_2	FELIXSTOWE	E. Counties	1 4	1 0
A	Filey	Yorkshire	1 4	1 0
A	Fleetwood ..	N.W. Counties	1 5½	1 1½
B_1	Folkestone ..	S. Counties	1 3	11½
A	Frodsham ..	N.W. Counties	1 5½	1 1½
B_2	Frome	S.W. Counties	1 2½	11
A	GATESHEAD	N.E. Coast	1 5½	1 1½
B	Gillingham ..	S. Counties	1 3½	11½
A	Glasgow	Scotland	1 6	1 1½
A_2	Gloucester ..	S.W. Counties	1 4½	1 0½
A_2	Goole	Yorkshire	1 4½	1 0½
A_2	Gosport ..	S. Counties	1 4½	1 0½
A_2	Grantham ..	Mid. Counties	1 4	1 0
A_1	Gravesend ..	S. Counties	1 5	1 0½
A	Greenock ..	Scotland	•1 5½	1 1½
A	Grimsby ..	Yorkshire	1 5½	1 1½
B	Guildford ..	S. Counties	1 3½	11½
A	HALIFAX ..	Yorkshire	1 5½	1 1½
A	Hanley ..	Mid. Counties	1 5½	1 1½
A	Harrogate ..	Yorkshire	1 5½	1 1½
A	Hartlepools ..	N.E. Coast	1 5½	1 1½
B	Harwich ..	E. Counties	1 3½	11½
B_1	Hastings ..	S. Counties	1 3	11½
A_2	Hatfield ..	S. Counties	1 4½	1 0½
B	Hereford ..	S.W. Counties	1 3½	11½
A_2	Hertford ..	E. Counties	1 4½	1 0½
A	Heysham ..	N.W. Counties	1 5½	1 1½
A	Howden ..	N.E. Coast	1 5½	1 1½
A	Huddersfield ..	Yorkshire	1 5½	1 1½
A	Hull	Yorkshire	1 5½	1 1½
A	ILKLEY ..	Yorkshire	1 5½	1 1½
A	Immingham ..	Mid. Counties	1 5½	1 1½
A_2	Ipswich ..	E. Counties	1 4½	1 0½
B_2	Isle of Wight ..	S. Counties	1 2½	11
A	JARROW ..	N.E. Coast	1 5½	1 1½
A	KEIGHLEY ..	Yorkshire	1 5½	1 1½
A_2	Kendal ..	N.W. Counties	1 4	1 0
A_2	Keswick ..	N.W. Counties	1 4	1 0
A_1	Kettering ..	Mid. Counties	1 5	1 0½
A_2	Kidderminster	Mid. Counties	1 4½	1 0½
B_1	King's Lynn ..	E. Counties	1 3	11½
A	LANCASTER ..	N.W. Counties	1 5½	1 1½
A_1	Leamington ..	Mid. Counties	1 5	1 0½
A	Leeds	Yorkshire	1 5½	1 1½
A	Leek	Mid. Counties	1 5½	1 1½
A	Leicester ..	Mid. Counties	1 5½	1 1½
A	Leigh	N.W. Counties	1 5½	1 1½
B	Lewes	S. Counties	1 2	10½
A_2	Lichfield ..	Mid. Counties	1 4½	1 0½
A	Lincoln	Mid. Counties	1 5½	1 1½
	Liverpool ..	N.W. Counties	•1 7	1 2½
A_2	Llandudno ..	N.W. Counties	1 4½	1 0½
A	Llanelly ..	S. Wales & M.	1 5½	1 1½
	London (12-miles radius)		1 7½	1 2½
	Do. (12-15 miles radius)		1 7	1 2½
A	Long Eaton ..	Mid. Counties	1 5½	1 1½
A	Loughborough ..	Mid. Counties	1 5½	1 1½
A_1	Luton	E. Counties	1 5	1 0½
A	Lytham ..	N.W. Counties	1 5½	1 1½
A_1	MACCLESFIELD	N.W. Counties	1 5	1 0½
A_2	Maidstone ..	S. Counties	1 4	1 0
A_2	Malvern ..	Mid. Counties	1 4	1 0
A	Manchester ..	N.W. Counties	1 5½	1 1½
A	Mansfield ..	Mid. Counties	1 5½	1 1½
B_1	Margate ..	S. Counties	1 3	11½
A	Matlock ..	Mid. Counties	1 4	1 0
A_1	Merthyr ..	S. Wales & M.	1 5	1 0½
A	Middlesbrough	N. E. Coast	1 5½	1 1½
A_2	Middlewich ..	N. W. Counties	1 4½	1 0½
B_2	Minehead ..	S.W. Counties	1 2½	11
B_2	Monmouth & S. and E. Glamorganshire	S. Wales & M.	1 2½	11
A	Morecambe ..	N.W. Counties	1 5½	1 1½
A_2	NANTWICH ..	N.W. Counties	1 4½	1 0½
A	Neath	S. Wales & M.	1 5½	1 1½
A	Nelson ..	N.W. Counties	1 5½	1 1½
A	Newcastle ..	N.E. Coast	1 5½	1 1½
A	Newport ..	S. Wales & M.	1 5½	1 1½
A	Normanton ..	Yorkshire	1 5½	1 1½
A	Northampton	Mid. Counties	1 5½	1 1½
A	North Staffs ..	Mid. Counties	1 5½	1 1½
A	North Shields ..	N.E. Coast	1 5½	1 1½
A_1	Norwich ..	E. Counties	1 5	1 0½
A	Nottingham ..	Mid. Counties	1 5½	1 1½
A	Nuneaton ..	Mid. Counties	1 5½	1 1½
A	OAKHAM ..	Mid. Counties	1 4	1 0
A	Oldham ..	N.W. Counties	1 5½	1 1½
A_3	Oswestry ..	N.W. Counties	1 4	1 0
A_1	Oxford ..	S. Counties	1 5	1 0½
A	PAISLEY ..	Scotland	•1 5½	1 1½
B_2	Pembroke ..	S. Wales & M.	1 2	10½
A	Perth	Scotland	•1 5½	1 1½
A_1	Peterborough ..	E. Counties	1 5	1 0½
A	Plymouth ..	S.W. Counties	•1 5½	1 1½
A	Pontefract ..	Yorkshire	1 5½	1 1½
A_1	Pontypridd ..	S. Wales & M.	1 5	1 0½
A_2	Portsmouth ..	S. Counties	1 4½	1 0½
A	Preston ..	N.W. Counties	1 5½	1 1½
A	QUEENSFERRY	N.W. Counties	1 5½	1 1½
A_1	READING ..	S. Counties	1 4½	1 0½
B	Reigate ..	S. Counties	1 3½	11½
A	Retford ..	Mid. Counties	1 4	1 0
A_1	Rhondda Valley	S. Wales & M.	1 5	1 0½
A	Ripon	Yorkshire	1 4	1 0
A	Rochdale ..	N.W. Counties	1 5½	1 1½
B	Rochester ..	S. Counties	1 3½	11½
A_1	Ruabon ..	N.W. Counties	1 5	1 0½
A	Rugby ..	Mid. Counties	1 5½	1 1½
A_2	Rugeley ..	Mid. Counties	1 4½	1 0½
A	Runcorn ..	N.W. Counties	1 5½	1 1½
A_1	ST. ALBANS ..	E. Counties	1 5	1 0½
A	St. Helens ..	N.W. Counties	1 5½	1 1½
B_2	Salisbury ..	S.W. Counties	1 2½	11
A_1	Scarborough ..	Yorkshire	1 5	1 0½
A	Scunthorpe ..	Mid. Counties	1 5½	1 1½
A	Sheffield ..	Yorkshire	1 5½	1 1½
A	Shipley ..	Yorkshire	1 5½	1 1½
A_2	Shrewsbury ..	Mid. Counties	1 4½	1 0½
A_2	Skipton ..	Yorkshire	1 4½	1 0½
A_2	Slough ..	S. Counties	1 4½	1 0½
A_1	Solihull ..	Mid. Counties	1 5	1 0½
A_2	Southampton ..	S. Counties	1 4½	1 0½
A_1	Southend-on-Sea	E. Counties	1 5	1 0½
A	Southport ..	N.W. Counties	1 5½	1 1½
A	S. Shields ..	N.E. Coast	1 5½	1 1½
A_1	Stafford ..	Mid. Counties	1 5	1 0½
A	Stirling ..	Scotland	1 6	1 1½
A	Stockport ..	N.W. Counties	1 5½	1 1½
A	Stockton-on-Tees	N.E. Coast	1 5½	1 1½
A	Stoke-on-Trent	Mid. Counties	1 5½	1 1½
B	Stroud	S.W. Counties	1 3½	11½
A	Sunderland ..	N.E. Coast	1 5½	1 1½
A	Swansea ..	S. Wales & M.	1 5½	1 1½
A	Swindon ..	S.W. Counties	1 4	1 0
A_1	TAMWORTH ..	N.W. Counties	1 5	1 0½
B	Taunton ..	S.W. Counties	1 3½	11½
A	Teesside Dist. ..	N.E. Counties	1 5½	1 1½
A_2	Teignmouth	S.W. Coast	1 4½	1 0½
A	Todmorden ..	Yorkshire	1 5½	1 1½
A_1	Torquay ..	S.W. Counties	1 5	1 0½
B_2	Truro	S.W. Counties	1 2½	11
A_2	Tunbridge Wells	S. Counties	1 4	1 0
A	Tunstall ..	Mid. Counties	1 5½	1 1½
A	Tyne District ..	N.E. Coast	1 5½	1 1½
A	WAKEFIELD	Yorkshire	1 5½	1 1½
A	Walsall ..	Mid. Counties	1 5½	1 1½
A	Warrington ..	N.W. Counties	1 5½	1 1½
A	Warwick ..	Mid. Counties	1 5	1 0½
A_1	Wellingborough	Mid. Counties	1 5	1 0½
A	West Bromwich	Mid. Counties	1 5½	1 1½
A_2	Weston-s.-Mare	W. Counties	1 4½	1 0½
A_2	Whitby ..	Yorkshire	1 4½	1 0½
A	Widnes ..	N.W. Counties	1 5½	1 1½
A	Wigan ..	N.W. Counties	1 5½	1 1½
B	Winchester ..	S. Counties	1 3½	11½
A_2	Windsor ..	S. Counties	1 4½	1 0½
A	Wolverhampton	Mid. Counties	1 5½	1 1½
A_2	Worcester ..	Mid. Counties	1 4½	1 0½
A_2	Worksop ..	Yorkshire	1 4	1 0
A_1	Wrexham ..	N.W. Counties	1 5	1 0½
A	Wycombe ..	S. Counties	1 4	1 0
B	YARMOUTH ..	E. Counties	1 3½	11½
B	Yeovil ..	S.W. Counties	1 3½	11½
A	York	Yorkshire	1 5½	1 1½

* In these areas the rates of wages for certain trades (usually painters and plasterers) vary slightly from those given.

The rates for every trade in any given area will be sent on request.

CURRENT PRICES

The wages are the standard Union rates of wages payable in London at the time of publication. The prices given below are for materials of good quality and include delivery to site in Central London area, unless otherwise stated. For delivery outside this area, adjustment should be made for the cost of transport. 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. The whole of the information given is copyright.

WAGES

		s.	d.
Bricklayer	per hour	1	7½
Carpenter	,,	1	7½
Joiner	,,	1	7½
Machinist	,,	1	8½
Mason (Banker)	,,	1	7½
,, (Fixer)	,,	1	8½
Plumber	,,	1	7½
Painter	,,	1	6½
Paperhanger	,,	1	6½
Glazier	,,	1	7½
Slater	,,	1	7½
Scaffolder	,,	1	3½
Timberman	,,	1	3½
Navvy	,,	1	2½
General Labourer	,,	1	2½
Lorryman	,,	1	5½
Crane Driver	,,	1	6½
Watchman	per week	2	10	0

MATERIALS

EXCAVATOR AND CONCRETOR

		£	s.	d.
Grey Stone Lime	per ton	2	2	0
Blue Lias Lime	,,	1	16	6
Hydrated Lime	,,	3	0	9
Portland Cement, in 4 ton lots (d/d site, including Paper Bags)	,,	2	0	0
Rapid Hardening Cement, in 4-ton lots (d/d site, including Paper Bags)	,,	2	6	0
White Portland Cement, in 1-ton lots	,,	8	15	0
Thames Ballast	per Y.C.		6	3
¾" Crushed Ballast	,,		6	9
Building Sand	,,		7	3
Washed Sand	,,		8	3
2" Broken Brick	,,		8	0
¾" ,, ,,	,,		10	3
Pan Breeze	,,		6	6
Coke Breeze	,,		8	9

DRAINLAYER

BEST STONEWARE DRAIN PIPES AND FITTINGS

		4" s.	4" d.	6" s.	6" d.
Straight Pipes	per F.R.	0	9	1	1
Bends	each	1	9	2	6
Taper Bends	,,	3	6	5	3
Rest Bends	,,	4	3	6	3
Single Junctions	,,	3	6	5	3
Double ,,	,,	4	9	6	6
Straight channels	per F.R.	1	6	2	6
¾" Channel bends	each	2	9	4	0
Channel junctions	,,	4	6	6	6
Channel tapers	,,	2	9	4	0
Yard gullies	,,	6	9	8	9
Interceptors	,,	16	0	19	6
IRON DRAINS:					
Iron drain pipe	per F.R.	1	6	2	6
Bends	each	5	0	10	6
Inspection bends	,,	9	0	15	0
Single junctions	,,	8	9	18	0
Double junctions	,,	13	6	30	0
Lead Wool	lb.		6		—
Gaskin	,,		5		—

BRICKLAYER

		£	s.	d.
Flettons	per M.	2	15	0
Grooved do.	,,	2	17	0
Phorpres bricks	,,	2	15	0
,, Cellular bricks	,,	2	15	0
Stocks, 1st quality	,,	4	11	0
,, 2nd ,,	,,	4	2	6
Blue Bricks, Pressed	,,	8	17	6
,, Wirecuts	,,	7	17	6
,, Brindles	,,	7	0	0
,, Bullnose	,,	9	0	0
Red Sand-faced Facings	,,	6	18	6
Red Rubbers for Arches	,,	12	0	0
Multicoloured Facings	,,	7	10	0
Luton Facings	,,	7	10	0
Phorpres White Facings	,,	3	17	3
,, Rustic Facings	,,	3	12	3
Midhurst White Facings	,,	5	0	0
Glazed Bricks, Ivory, White or Salt glazed, 1st quality:				
Stretchers	,,	21	0	0
Headers	,,	20	10	0
Bullnose	,,	27	10	0
Double Stretchers	,,	29	10	0
Double Headers	,,	26	10	0
Glazed Second Quality, *Less*	,,	1	0	0
,, Buffs and Creams, *Add*	,,	2	0	0
,, Other Colours	,,	5	10	0
2" Breeze Partition Blocks	per Y.S.		1	7
2½" ,, ,, ,,	,,		1	10
3" ,, ,, ,,	,,		2	1
4" ,, ,, ,,	,,		2	6

MASON

The following d/d F.O.R. at Nine Elms:		s.	d.
Portland stone, Whitbed	F.C.	4	4½
,, ,, Basebed	,,	4	7½
Bath stone	,,	2	10
York stone	,,	6	6
,, ,, Sawn templates	,,	7	6
,, ,, Paving, 2"	F.S.	1	8
,, ,, ,, 3"	,,	2	6

SLATER AND TILER

First quality Bangor or Portmadoc slates d/d F.O.R. London station

		£	s.	d.
24"×12" Duchesses	per M.	28	17	6
22"×12" Marchionesses	,,	24	10	0
20"×10" Countesses	,,	19	5	0
18"×10" Viscountesses	,,	15	10	0
18"× 9" Ladies	,,	13	17	6
Westmorland green (random sizes)	per ton	8	10	0
Old Delabole slates d/d in full truck loads to Nine Elms Station:				
20"×10" medium grey per 1,000 (actual)		21	11	6
,, ,, green ,,	,,	24	7	4
Best machine roofing tiles	,,	4	10	0
Best hand-made do.	,,	5	0	0
Hips and valleys	each			9½
,, hand-made	,,			10
Nails, compo	lb.		1	4
,, copper	,,		1	6

CARPENTER AND JOINER

		s.	d.
Good carcassing timber	F.C.	2	2
Birch	as 1" F.S.		9
Deal, Joiner's	,, ,,		5
,, ,, 2nds	,, ,,		4
Mahogany, Honduras	,, ,,	1	3
,, African	,, ,,	1	1
,, Cuban	,, ,,	2	6
Oak, plain American	,, ,,	1	0
,, Figured ,,	,, ,,	1	3
,, plain Japanese	,, ,,	1	2
,, Figured ,,	,, ,,	1	5
,, Austrian wainscot	,, ,,	1	6
,, English	,, ,,	1	11
Pine, Yellow	,, ,,	1	0
,, Oregon	,, ,,		4
,, British Columbian	,, ,,		4
Teak, Moulmein	,, ,,	1	3
,, Burma	,, ,,	1	2
Walnut, American	,, ,,	2	3
,, French	,, ,,	2	3
Whitewood, American	,, ,,	1	1
Deal floorings, ¾"	Sq.	18	6
,, ,, 1"	,,	1	1	6
,, ,, 1¼"	,,	1	2	0
,, ,, 1½"	,,	1	5	0
,, ,, 1¾"	,,	1	10	0
Deal matchings ¾"	,,		14	0
,, 1"	,,		15	6
,, 1"	,,	1	4	0
Rough boarding ¾"	,,		16	0
,, 1"	,,		18	0
,, 1¼"	,,	1	6	0

Plywood, per ft. sup.

Thickness	¼" A	¼" B	¼" BB	⅜" A	⅜" B	⅜" BB	½" A	½" B	½" BB	¾" A	¾" B	¾" BB
Qualities	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Birch 60 × 48	4	2½	2	5	3	2½	7	5	4	8	6	5
Cheap Alder	–	2	1½	–	3½	2	–	–	–	–	–	–
Oregon Pine	–	2½	–	3	2½	–	4	3½	–	5	4½	–
Gaboon Mahogany	4	3½	–	5	4½	–	7	6½	–	8	7	–
Figured Oak	6½	5	–	7½	5½	–	10	8	0	1/–	9	–

	d.
Scotch glue	lb. 8

SMITH AND FOUNDER

Tubes and Fittings:
(The following are the standard list prices, from which should be deducted the various percentages as set forth below.)

		½"	¾"	1"	1½"	2"
Tubes, 2'-14' long, per ft. run		4	5½	9½	1/1	1/10
Pieces, 12"-23" long	each	10	1/1	1/11	2/8	4/9
,, 3"-11½" long	,,	7	9	1/3	1/8	3/–
Long screws, 12"-23½" long	,,	11	1/3	2/2	2/10	5/3
,, ,, 3"M-½" long	,,	8	10	1/5	1/11	3/6
Bends	,,	8	11	1/7½	2/7½	5/2
Springs not socketed	,,	5	7	1/1½	1/11½	3/11
Socket unions	,,	2/–	3/–	5/6	6/9	10/–
Elbows, square	,,	10	1/1	1/6	2/2	4/3
Tees	,,	1/–	1/3	1/10	2/6	5/1
Crosses	,,	2/2	2/9	4/1	5/6	10/6
Plain sockets and nipples	,,	3	4	6	8	1/3
Diminished sockets	,,	4	6	9	1/–	2/–
Flanges	,,	9	1/–	1/4	1/9	2/9
Caps	,,	3½	5	8	1/–	2/–
Backnuts	,,	2	3	5	6	1/1
Iron main cocks	,,	1/6	2/3	4/2	5/4	11/6
,, with brass plugs	,,	—	4/–	7/6	10/–	21/–

Discounts:

TUBES.	Per cent.		Per cent.
Gas	65	Galvanized gas	52½
Water	61½	,, water	47½
Steam	57½	,, steam	42½

FITTINGS.			
Gas	57½	Galvanized gas	47½
Water	52½	,, water	42½
Steam	47½	,, steam	37½

SMITH AND FOUNDER—*continued.*

		s.	d.
Rolled steel joists cut to length	cwt.	12	9
Mild steel reinforcing rods, ¾"	,,	10	6
,, ,, ⅞"	,,	10	3
,, ,, 1"	,,	10	0
,, ,, 1¼"	,,	9	6
,, ,, 1½"	,,	9	6
,, ,, 1¾"	,,	9	6
,, ,, 2"	,,	9	6
,, ,, 2½"	,,	9	6
,, ,, 3"	,,	9	6

		3" s.	3" d.	4" s.	4" d.	6" s.	6" d.
Cast-iron rain-water pipes of ordinary thickness metal	F.R.				8		10
Shoes	each		2	0	3	0	
Anti-splash shoes	,,		4	6	8	0	
Boots	,,		3	0	4	0	
Bends	,,		2	7	3	9	
,, with access door	,,		—		6	3	
Heads	,,		4	0	5	0	
Swan-necks up to 9" offsets	,,		3	9	6	0	
Plinth bends, 4½" to 6"	,,		3	9	5	3	
Half-round rain-water gutters of ordinary thickness metal	F.R.				5		6
Stop ends	each				6		6
Angles	,,		1	7	1	11	
Obtuse angles	,,		2	0	2	6	
Outlets	,,		1	9	2	3	

PLUMBER

		s	d.	s.	d.
Lead, milled sheets	cwt.			26	3
,, drawn pipes	,,			26	3
,, soil pipe	,,			26	3
,, scrap	,,			18	0
Solder, plumbers'	lb.				9½
,, fine do.	,,			1	0
Copper, sheet	,,				8½
,, tubes	,,				11

L.C.C. soil and waste pipes:	3"	4"	6"
Plain cast F.R.	1 0	1 2	2 6
Coated ,,	1 1	1 3	2 8
Galvanized ,,	2 0	2 6	4 6
Holderbats each	3 10	4 0	4 9
Bends ,,	3 9	5 3	10 3
Shoes ,,	2 10	4 4	9 6
Heads ,,	4 8	8 5	12 9

PLASTERER

		£	s.	d.
Lime, chalk	per ton	2	5	0
Plaster, coarse	,,	1	10	0
,, fine	,,	4	15	0
Hydrated lime	,,	3	0	9
Sirapite	,,	3	6	0
Keene's cement	,,	5	0	0
Gothite Plaster	,,	3	6	0
Pioneer Plaster	,,	3	6	0
Thistle plaster	,,	3	6	0
Sand, washed	Y.C.		11	6
Hair	lb.			6
Laths, sawn	bundle		2	4
,, rent	,,		3	9
Lath nails	lb.			3

GLAZIER

	s	d.	s.	d.
Sheet glass, 21 oz., squares n/e 2 ft.	s. F.S.		2	2½
,, ,, 26 oz. ,, ,,	,,			3
Flemish, Arctic, Figures (white)*	,,			7
Blazoned glasses	,,		2	6
Reeded; Cross Reeded	,,			11
Cathedral glass, white, double-rolled, plain, hammered, rimpled, waterwite	,,			6
Crown sheet glass (n/e 12 in. x 10 in.)	,,		2	0
Flashed opals (white and coloured)	,,	1 0 and	2	0
¼" rough cast; rolled plate	,,			5½
¼" wired cast; wired rolled	,,			9½
¼" Georgian wired cast	,,			11
¼" Polished plate, n/e 1 ft.	,,	†10 to	‡1	1
,, ,, 2	,,	†1 2 ,,	‡1	4
,, ,, 4	,,	†2 3 ,,	‡2	6
,, ,, 8	,,	†2 9 ,,	‡3	2
,, ,, 20	,,	†3 7 ,,	‡4	2
,, ,, 45	,,	†3 11 ,,	‡4	7
,, ,, 100	,,	†5 0 ,,	‡5	7
Vita glass, sheet, n/e 1 ft.	,,		1	0
,, ,, ,, 2 ft.	,,		1	3
,, ,, over 2 ft.	,,		1	9
,, ,, plate, n/e 1 ft.	,,		1	6
,, ,, ,, 2 ft.	,,		3	0
,, ,, ,, 5 ft.	,,		4	0
,, ,, ,, 7 ft.	,,		5	0
,, ,, ,, 15 ft.	,,		6	0
,, ,, over 15 ft.	,,		7	6
"Calorex" sheet 21 oz., and 32 oz.	,,	2 6 and	3	6
,, rough cast ¼" and ½"	,,		8½ ,, 1	0
Putty, linseed oil	lb.			3

* *Colours, 1d. F.S. extra.*
† *Ordinary glasing quality.* ‡ *Selected glasing quality.*

PAINTER

		£	s.	d.
White lead in 1 cwt. casks	cwt.	2	8	6
Linseed oil	gall.		2	3
Boiled oil	,,		2	9
Turpentine	,,		4	1½
Patent knotting			14	0
Distemper, washable	cwt	2	6	0
,, ordinary	,,	2	0	0
Whitening	,,		4	0
Size, double	firkin		3	0
Copal varnish	gall.		13	0
Flat varnish	,,		14	0
Outside varnish	,,		16	0
White enamel	,,	1	15	0
Ready mixed paint	,,		13	6
Brunswick black	,,		7	6

CURRENT PRICES FOR MEASURED WORK

The following prices are for work to new buildings of average size, executed under normal conditions in the London area. They include establishment charges and profit. While every care has been taken in its compilation, no responsibility can be accepted for the accuracy of the list. The whole of the information given is copyright.

EXCAVATOR AND CONCRETOR		£	s.	d.
Digging over surface n/e 12″ deep and cart away	Y.S.		2	9
,, to reduce levels n/e 5′ 0″ deep and cart away	Y.C.		8	6
,, to form basement n/e 5′ 0″ and cart away	,,		9	0
,, ,, 10′ 0″ deep and cart away	,,		9	6
,, ,, 15′ 0″ deep and cart away	,,		10	0
If in stiff clay	add ,,			6
If in underpinning	,, ,,		4	0
Planking and strutting to sides of excavation	F.S.		1	0
,, ,, to pier holes	,,			5
,, ,, to trenches	,,			5
,, ,, extra, only if left in	,,			3
Hardcore, filled in and rammed	Y.C.		10	0
Portland cement concrete in foundations (6-1)	,,	1	6	0
,, ,, (4-2-1)	,,	1	12	6
,, ,, underpinning	,,	1	16	0
Finishing surface of concrete, space face	Y.S.			7

DRAINLAYER		4″ s.	d.	6″ s.	d.
Stoneware drains, laid complete (digging and concrete to be priced separately)	F.R.	1	6	2	3
Extra, only for bends	Each	2	8	3	9
,, junctions	,,	3	9	4	6
Gullies and gratings	,,	16	6	18	0
Cast iron drains, and laying and jointing	F.R.	4	9	6	9
Extra, only for bends	Each	10	6	15	6

BRICKLAYER		£	s.	d.
Brickwork, Flettons in lime mortar	Per Rod	26	10	0
,, ,, in cement	,,	27	12	6
,, Stocks in cement	,,	34	0	0
,, Blues in cement	,,	50	0	0
Extra only for circular on plan	,,	2	0	0
,, backing to masonry	,,	1	10	0
,, raising on old walls	,,	2	0	0
,, underpinning	,,	5	10	0½
Fair Face and pointing internally	F.S.			1½
Extra over fletton brickwork for picked stock facings and pointing	,,			8
,, ,, ,, red brick facings and pointing	,,			11
,, ,, ,, blue brick facings and pointing	,,		1	4
,, ,, ,, glazed brick facings and pointing	,,		3	6
Tuck pointing	,,			7½
Weather pointing in cement	,,			3
Slate dampcourse	,,			10
Vertical dampcourse	,,		1	1

ASPHALTER		s.	d.
½″ Horizontal dampcourse	Y.S.	4	6
½″ Vertical dampcourse	,,	6	9
½″ paving or flat	,,	4	0
1″ paving or flat	,,	5	6
1″ × 6″ skirting	F.R.	1	0
Angle fillet	,,		2
Rounded angle	,,		2
Cesspools	Each	5	0

MASON		s.	d.
Portland stone, including all labours, hoisting, fixing and cleaning down, complete	F.C.	17	9
Bath stone and do., all as last	,,	13	6
Artificial stone and do	,,	13	0
York stone templates, fixed complete	,,	10	6
,, thresholds	,,	13	6
,, sills	,,	1	0	6

SLATER AND TILER		£	s.	d.
Slating, Bangor or equal, laid to a 3″ lap, and fixing with compo nails, 20″ × 10″	Sqr.	3	10	0
Do., 18″ × 9″	,,	3	7	0
Do., 24″ × 12″	,,	3	17	0
Westmorland slating, laid with diminished courses	,,	6	0	0
Tiling, best hand-made sand-faced, laid to a 4″ gauge, nailed every fourth course	,,	3	0	0
Do., all as last, but of machine-made tiles	,,	2	16	0
20″ × 10″ medium Old Delabole slating, laid to a 3″ lap (grey)	,,	2	16	0
,, ,, ,, ,, ,, (green)	,,	4	15	0

CARPENTER AND JOINER		£	s.	d.
Flat boarded centering to concrete floors, including all strutting	Sqr.	2	2	6
Shuttering to sides and soffits of beams	F.S.			7
,, to stanchions	,,			7
,, to staircases	,,		1	6
Fir and fixing in wall plates, lintols, etc.	F.C.		3	9
Fir framed in floors	,,		4	6
,, ,, roofs	,,		6	6
,, ,, trusses	,,		7	6
,, ,, partitions	,,		8	6
¾″ deal sawn boarding and fixing to joists	Sqr.	1	14	6
1″ ,, ,, ,, ,,	,,	1	17	6
1¼″ ,, ,, ,, ,,	,,	2	3	0
1″ × 2″ fir battening for Countess slating	,,		9	0
Do. for 4″ gauge tiling	,,		12	0
Stout feather-edged tilting fillet	F.R.			4½
Patent inodorous felt, 1 ply	Y.S.		2	3
,, ,, ,, 2 ,,	,,		2	9
,, ,, ,, 3 ,,	,,		3	3
Stout herringbone strutting to 9″ joists	F.R.			10½
1″ deal gutter boards and bearers	F.S.		1	2
1½″ ,, ,, ,,	,,		1	6
2″ deal wrought rounded roll	F.R.			8
1″ deal grooved and tongued flooring, laid complete, including cleaning off	Sqr.	2	1	0
1¼″ do.	,,	2	10	0
1½″ do.	,,	2	17	0
1″ deal moulded skirting, fixed on, and including grounds plugged to wall	F.S.		1	6
¼″ do.	,,		1	9

CARPENTER AND JOINER—*continued*		s.	d.
1½″ deal moulded sashes of average size	F.S.	1	9½
2″ ,, ,, ,, ,,	,,	1	11½
1½″ deal cased frames double hung, of 6″ × 3″ oak sills, 1¼″ pulley stiles, 1¼″ heads, 1″ inside and outside linings, ⅝″ parting beads, and with brass faced axle pulleys, etc., fixed complete		3	7
2″ ,, ,, ,, ,,	,,	3	10
Extra only for moulded horns	Each		6
1½″ deal four-panel square, both sides, door	F.S.	2	0
2″ ,, ,, ,, ,,	,,	2	8
1½″ ,, but moulded both sides	,,	2	4
2″ ,, ,, ,, ,,	,,	3	0
4″ × 3″ deal, rebated and moulded frames	F.R.	1	0
4½″ × 3½″ ,, ,, ,,	,,	1	4
1¼″ deal tongued and moulded window board, on and including deal bearers	F.S.	1	9
1¼″ deal treads, 1″ risers in staircases, and tongued and grooved together on and including strong fir carriages	,,	2	6
1½″ deal moulded wall strings	,,	2	1
1½″ ,, outer strings	,,	2	4
Ends of treads and risers housed to string	Each	1	9
3″ × 2″ deal moulded handrail	F.R.	1	3
1″ × 1″ deal balusters and housing each end	Each	2	0
1½″ × 1½″ ,, ,, ,,	,,	2	9
3″ × 3″ deal wrought framed newels	F.R.	1	3
Extra only for newel caps	Each	6	0
Do., pendants	,,	6	0

SMITH AND FOUNDER		£	s.	d.
Rolled steel joists, cut to length, and hoisting and fixing in position	Per cwt.	16	6	
Riveted plate or compound girders, and hoisting and fixing in position	,,	1	0	6
Do., stanchions with riveted caps and bases and do.	,,		19	0
Mild steel bar reinforcement, ½″ and up, bent and fixed complete	,,		17	6
Corrugated iron sheeting fixed to wood framing, including all bolts and nuts 20 g.	F.S.			11
Wrot-iron caulked and cambered chimney bars	Per cwt.	1	10	0

PLUMBER		£	s.	d.
Milled lead and labour in flats	cwt.	2	0	3
Do. in flashings	,,	2	3	9
Do. in covering to turrets	,,	2	9	3
Do. in soakers	,,	1	15	9
Labour to welted edge	F.R.			3½
Open copper nailing	,,			3
Close ,, ,,	,,			4

Lead service pipe and fixing with pipe hooks	F.R.	½″ s.	d.	¾″ s.	d.	1″ s.	d.	1¼″ s.	d.	2″ s.	d.	4″ s.	d.
		10		1	0	1	3	2	0	2	10	—	
Do. soil pipe and fixing with cast lead tacks	Each	—		—		—		—		—		5	6
Extra, only to bends	,,	—		—		—		—		2	0	6	9
Do. to stop ends	,,	6½		8		9		11		1	0	—	
Boiler screws and unions	,,	3	3	3	9	5	0	8	0	—		—	
Lead traps	,,	—		—		—		6	3	8	9	—	
Screw down bib valves	,,	5	9	9	6	11	0	—		—		—	
Do. stop cocks	,,	7	0	9	6	12	6	—		—		—	

		s.	d.
4″ cast-iron ½-rd. gutter and fixing	F.R.	1	0
Extra, only stop ends	Each	1	0
Do. angles	,,	1	6
Do. outlets	,,	2	9
4″ dia. cast-iron rain-water pipe and fixing with ears cast on	F.R.	1	2
Extra, only for shoes	Each	1	3
Do. for plain heads	,,	5	0

PLASTERER AND TILING		s.	d.
Expanded metal lathing, small mesh	Y.S.	2	0
Do. in n/w to beams, stanchions, etc.	,,	2	9
Lathing with sawn laths to ceilings	,,	1	3
½″ screeding in Portland cement and sand or tiling, wood block floor, etc.	,,	1	5
Do. vertical	,,	1	7
Rough render on walls	,,	1	2½
Render, float and set in lime and hair	,,	1	9
Render and set in Sirapite	,,	1	11
Render, backing in cement and sand, and set in Keene's cement	,,	2	9
Extra, only if on lathing	,,		4
Keene's cement, angle and arris	F.R.		6
Arris	,,		
Rounded angle, small	,,		3
Plain cornices in plaster, including dubbing out, per 1″ girth	,,		1½
1″ granolithic pavings	Y.S.	3	6
1½″ ,, ,,	,,	4	6
6″ × 6″ white glazed wall tiling and fixing on prepared screed	,,	17	6
9″ × 3″ ,, ,, ,, ,,	,,	1	2	6
Extra, only for small quadrant angle	F.R.			8

GLAZIER		s.	d.
21 oz. sheet glass and glazing with putty	F.S.		6½
26 oz. do. and do.	,,		7½
Flemish, Arctic Figured (white) and glazing with putty	,,	1	1
Cathedral glass and do.	,,	1	2
Glazing only, British polished plate	,,		7
Extra, only if in beads	,,		2
Washleather	F.R.		4

PAINTER		s.	d.
Clearcolle and whiten ceilings	Y.S.		6
Do. and distemper walls	,,		9
Do. with washable distemper	,,	1	1
Knot, stop, prime and paint four coats of oil colour on plain surfaces	,,	3	3
Do. on woodwork	,,	3	6
Do. on steelwork	,,	3	0
Do. and brush grain and twice varnish	,,	5	6
Stain and twice varnish woodwork	,,	1	11
Stain and wax-polish woodwork	,,	4	6
French polishing	F.S.	1	2
Stripping off old paper	Piece	2	0
Hanging ordinary paper	from ,,	2	9

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WALL INSULATION ONLY :

COMPARATIVE EFFECTS ON FUEL CONSUMPTION & HEATING PLANT.

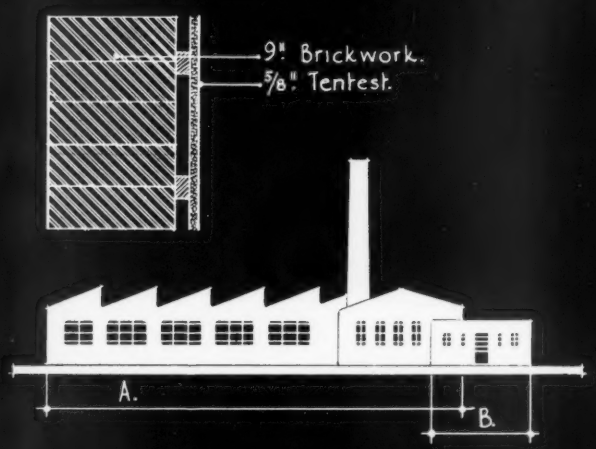
DATA USED IN THE CALCULATIONS :

Average EXTERNAL temperature ——— 43°F.
October 1st to April 30th
Minimum EXTERNAL temperature ——— 30°F.

THERMAL CONDUCTIVITY :
(B.T.Us. per hour per sq. ft. per °F. for 1" of thickness).
Tentest (N.P.L. test.) ——— 0·38

TRANSMISSION COEFFICIENTS :
9" Brickwork ——— 0·42
9" Brickwork with
⅝" Tentest lining on battens ——— 0·203

Diagram showing the sections A and B and the wall construction considered in this analysis.



ANALYSIS OF TEMPERATURE REQUIREMENTS.

SECTION OF BUILDING	TYPE OF WALL.	SQUARE FEET OF WALL SURFACE.	HGT. OF MIDDLE OF WALL ABOVE FLOOR.	DITTO ABOVE BREATHING LINE (5' 0")	TEMPERATURE AT BREATHING LINE.	2% RISE FOR EACH FOOT OF HEIGHT. ?	AVERAGE WALL TEMPERATURE	TEMP. DIFF. INTERNAL & EXTERNAL.	
								max.	av.
A.	9" BRICK.	10,000	11' 0"	6' 0"	55° F.	6·6° F.	61·6° F.	31·6° F.	18·6° F.
B.	9" BRICK	1,800	5' 0"	0	62° F.	0	62° F	32° F.	19° F.

? Note. The 2% rise in temperature is taken for each foot of height between the Breathing line & the middle of the wall.

NOTE: An annual heating period of 5,000 hours has been assumed (October 1st to April 30th) with an effective heating capacity of 6,000 B.T.Us. per pound of fuel and a heat output from hotwater pipes and radiators of 160 B.T.Us. per hour per square foot.

ANALYSIS OF INSULATION.

SECTION A. UNLINED.	SECTION A. ⅝" TENTEST.		SECTION B. ⅝" TENTEST.	SECTION B. UNLINED.
	£. s. d.	CAPITAL COST OF WALL INSULATION. Tentest at 1/8 d. per sq. yard for 10,000 sq. feet.	£. s. d.	
●	92. 11. 10.		16. 13. 4.	●
29·06	14·05.	ANNUAL FUEL CONSUMPTION In tons of coal.	2·58	5·34
£. s. d.	£. s. d.	VALUE OF FUEL CONSUMED.	£. s. d.	£. s. d.
36. 6. 6.	17. 11. 3.	at 25/- a ton.	3. 4. 6.	6. 13. 6.
	£. s. d.	SAVING IN COST OF FUEL PER YEAR.	£. s. d.	
●	18. 15. 3.	over unlined wall.	3. 9. 0.	●
£. s. d.	£. s. d.	CAPITAL COST OF HEATING INSTALLATION.	£. s. d.	£. s. d.
186. 12. 9.	90. 4. 2.	at 4/6 d. per sq. ft. of heating surface.	16. 8. 10.	34. 0. 5.
	£. s. d.	SAVING IN CAPITAL COST OF ABOVE.	£. s. d.	
●	96. 8. 7.	over unlined wall.	17. 11. 7.	●

Information from the Tentest Fibre Board Co. Ltd. (6.)

INFORMATION SHEET: COMPARATIVE THERMAL INSULATION OF BUILDINGS.
SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON W.C.1. Oscar A. Bayne.

Supplement to THE ARCHITECTS' JOURNAL for October 17, 1935

THE ARCHITECTS' JOURNAL
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INFORMATION SHEET

• 265 •

THERMAL INSULATION

Product : Tentest Fibre Board

General :

This is the sixth of a series of Sheets in which the insulating value of various forms of construction are being analysed.

For this purpose a common type of building has been taken ; a factory having a small office block and a larger workshop.

This typical building forms the basis on which all Sheets are calculated ; the analysis given on one Sheet is therefore comparable with that given on any other Sheet.

As will be seen on this Sheet, only the walls of the buildings are dealt with, as various types of roofs have been analysed in previous Sheets. This method, by separating entirely the calculations for the roof from those for the walls, will allow the figures for any type of roof to be used in conjunction with the figures for any type of wall, in order to determine the combined effect.

Basis of Calculation :

The figures used as the basis of these calculations are set out on the face of this Sheet, and normal practice and figures have been followed throughout. The transmission coefficient of 9" brickwork is taken from a standard reference book.

Area of Walls :

In determining an arbitrary but reasonable figure for the wall area of the factory the following method has been employed :—

In previous Sheets of this series a roof area of 20,000 sq. ft. has been used ; this area might represent a factory say 200 ft. long by 100 ft. wide.

Assuming that side walls contain windows, that end walls are solid, and that the average height of the walls throughout is 22 ft., the wall area will be :—

End walls—$100' \times 22' \times 2 = 4{,}400$ sq. ft.

Side ,, including windows—$200' \times 22' \times 2 = 8{,}800$ sq. ft.

If the side walls are taken as 30% window and 70% wall the wall area will be—

$\frac{8{,}800}{100} \times 70 = 5{,}280$ sq. ft. and the total area of all walls—4,400 plus 5,280 = 9,680 sq. ft.

For the purposes of this analysis therefore, 10,000 sq. ft. has been taken as a reasonable figure for the wall area not including windows.

The wall area of the office block (section B) was determined in a similar manner.

Average Temperature of Walls :

In calculating the average temperature of the walls, 2 per cent. of the temperature at the breathing line (5 ft.) is added for each foot that the mean height of the walls is above breathing line, i.e., in a wall 22 ft. high the mean height is $\frac{22}{2}$ ft. = 11 ft.

This is (11 ft.—5 ft.) = 6 ft. above the breathing line, so that the temperature rise to be added is $55° \times 6 \times 2$ per cent. = 6·6° F.

As the office block is 10 ft. high there is no addition to be made.

Fuel consumption for one Fuel-Year (calculated for the walls only).

$$\text{Fuel consumption in tons} = \frac{\text{Area in sq. ft.} \times \text{Transmission Coeff.} \times \text{Average Temp. diff.} \times \text{hours per year.}}{\text{B.T.U. per lb. of fuel} \times 2{,}240}$$

Section A.

9 in. brick wall uninsulated... $= \frac{10{,}000 \times 0{\cdot}42 \times 18{\cdot}6 \times 5{,}000}{6{,}000 \times 2{,}240} =$ 29·06 tons.

Ditto insulated with ⅝ in. Tentest on battens ... $= \frac{10{,}000 \times 0{\cdot}203 \times 18{\cdot}6 \times 5{,}000}{6{,}000 \times 2{,}240} =$ 14·05 tons.

Section B.

9 in. brick wall uninsulated... $= \frac{1{,}800 \times 0{\cdot}42 \times 19 \times 5{,}000}{6{,}000 \times 2{,}240} =$ 5·34 tons.

Ditto insulated with ⅝ in. Tentest on battens ... $= \frac{1{,}800 \times 0{\cdot}203 \times 19 \times 5{,}000}{6{,}000 \times 2{,}240} =$ 2·58 tons.

Capital cost of Heating Installation (calculated for the walls only).

$$\text{Capital Cost} = \frac{\text{Area in sq. ft.} \times \text{Transmission Coeff.} \times \text{Max. Temp. diff.} \times \text{cost per sq. ft.}}{\text{Heat output per sq. ft. radiation.}}$$

Section A.

9 in brick walls uninsulated... $= \frac{10{,}000 \times 0{\cdot}42 \times 31{\cdot}6 \times 4{\cdot}5}{160 \times 20} =$ £186 12 9

Ditto insulated with ⅝ in. Tentest on battens ... $= \frac{10{,}000 \times 0{\cdot}203 \times 31{\cdot}6 \times 4{\cdot}5}{160 \times 20} =$ £90 4 2

Section B.

9 in. brick walls uninsulated... $= \frac{1{,}800 \times 0{\cdot}42 \times 32 \times 4{\cdot}5}{160 \times 20} =$ £34 0 5

Ditto insulated with ⅝ in. Tentest on battens ... $= \frac{1{,}800 \times 0{\cdot}203 \times 32 \times 4{\cdot}5}{160 \times 20} =$ £16 8 10

Annual Fuel Consumption :

The fuel consumptions given are based on the calculations given in the tables above.

Lining :

It will be noticed that in giving the cost of insulation, variations in the cost of fixing have not been taken into account, the price given being the cost of the material itself.

Previous Sheets :

The previous Sheets of this series were Nos. 220, 230, 236 revised, 250 and 256.

Information from : The Tentest Fibre Board Co., Ltd.

Address : Astor House, Aldwych, London, W.C.2

Telephone : Holborn 8018

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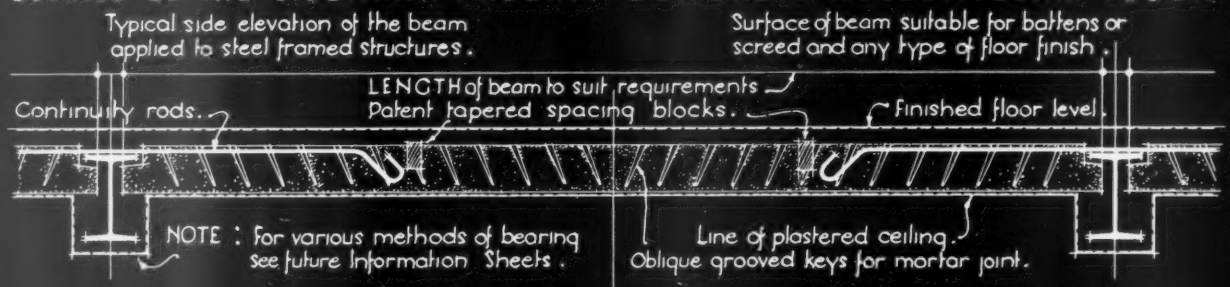
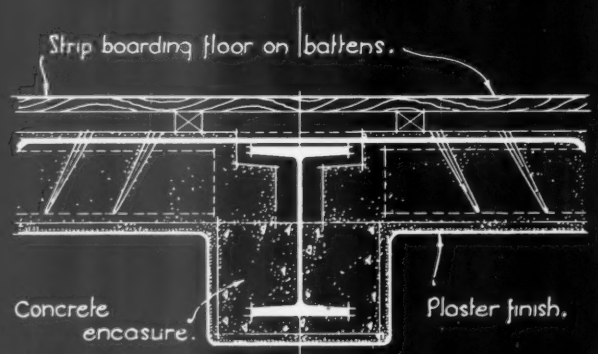
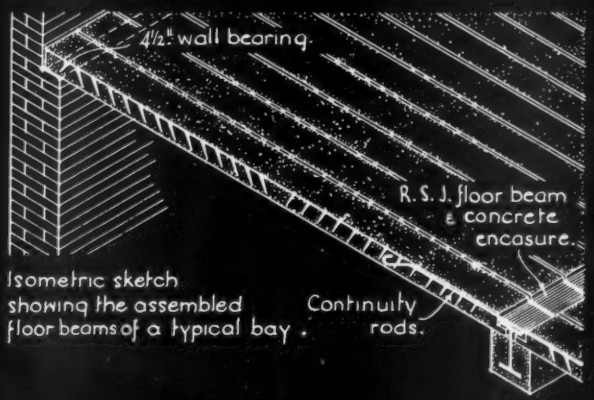
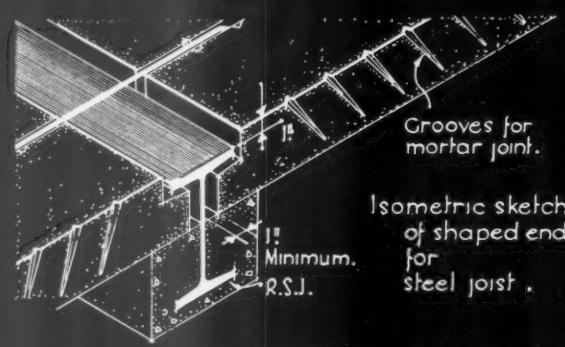
DETAILS OF THE SIEGWART PRECAST CONCRETE HOLLOW BEAM FLOOR

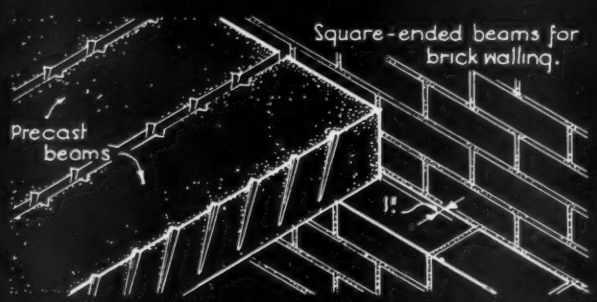




1" Scale typical section at supports.







STANDARD VARIATIONS OF SECTION :

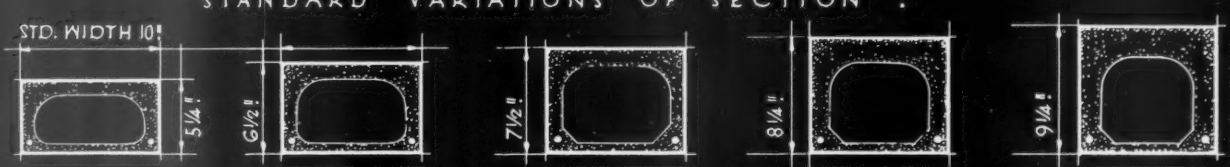


TABLE GIVING MAXIMUM PERMISSIBLE FREE SPANS FOR ANY GIVEN LOADING.

NOTE • This table is calculated to the requirements of the London Building Act, 1930.

Thickness of floor.	Weight per sq. ft.	SUPERIMPOSED LOADS IN POUNDS PER SQ. FT. Effective spans in feet and inches : 56.	60.	70.	84.	100.	112.	120.	140.	168.	180.	224.	280.	336.
5¼"	36 lbs.	10' 9"	10' 9"	10' 4"	9' 10"	9' 3"	8' 11"	8' 9"	8' 3"	7' 9"	7' 6"	6' 11"	6' 4"	5' 10"
6½"	42 "	13' 0"	13' 0"	13' 0"	12' 6"	11' 10"	11' 6"	11' 2"	10' 7"	10' 0"	9' 8"	8' 11"	8' 2"	7' 7"
7½"	45 "	15' 0"	15' 0"	14' 10"	14' 1"	13' 5"	13' 0"	12' 8"	12' 0"	11' 3"	11' 0"	10' 2"	9' 3"	8' 7"
8¼"	54 "	16' 6"	16' 6"	16' 6"	16' 3"	15' 6"	15' 0"	14' 9"	13' 11"	13' 2"	12' 10"	11' 10"	10' 10"	10' 1"
9¼"	61 "	18' 6"	18' 6"	18' 4"	17' 6"	16' 9"	16' 3"	15' 11"	15' 2"	14' 3"	14' 0"	12' 10"	11' 10"	11' 0"
4½"	28 "	FOR SLOPING ROOFS : LIVE LOADS 28 LBS PER SQ. FT. FOR SPANS UP TO 8' 6"												

Information from the Siegwart Fireproof Floor Co. Ltd.

INFORMATION SHEET : SIEGWART PRECAST FLOORS : No. 1.

SIR JOHN BURNET TAIT AND LORNE ARCHITECTS ONE MONTAGUE PLACE BEDFORD SQUARE LONDON WC1 • Olca A. Bayne

Supplement to THE ARCHITECTS' JOURNAL for October 17, 1935

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INFORMATION SHEET

• 266 •

FLOOR CONSTRUCTION

Type of Product : Siegwart Precast Floors

The Precast Beam.

This Sheet is the first of a series devoted to precast floor construction, and it sets out in general the use and main variations of the Siegwart Floor made up of precast hollow beams.

Succeeding Sheets will deal in detail with the various types of bearing which may be used with the precast beam ; the fixing of pipes, machinery, etc., to the floors; trimming of openings; large and small heavy-duty floors, and pitched roof work ; mansards and all other details connected with floor construction.

General.

The company undertakes the design, manufacture and erection complete of hollow concrete floors and roofs to the Siegwart system of construction. This means that no centering is required in the erection, as the floors and roofs are composed of hollow concrete beams, precast and matured at works to required sizes, so that they can be delivered and fixed at a very quick rate. The floors and roofs are formed by laying the precast beams side by side with spaces between about 1 in. wide. These spaces are grouted in and the floor is then finished and may be used in 48 hours.

All details will be illustrated in these Sheets.

Standard Sizes.

As will be seen from this Sheet, the Siegwart precast beam is made in five standard sizes, each designed on the same principle, with a hollow interior and solid ends ; the beam being reinforced according to the span and the load for which it is designed.

End Shapes.

It is important to point out that the beam is standardised as far as possible for each job, but that the use of the floor is not limited by this standardisation, as the end shape of the beam is designed to suit the type of bearing provided and the beam is especially designed for each job. As is shown on this Sheet, for typical steel frame construction, with joists of I section, the ends of the beams are shaped to fit in under the flange of the steel and into a close bearing ; in typical brick or masonry construction a square-end beam is provided.

Sides of Beams.

The sides of all beams are indented with slanting grooves which, in the case of a plain panel floor, give extra key to the grouting up and, in the case of a floor reinforced with continuity rods, greatly assist in transmitting the stresses between steel and concrete.

Spacing Wedges.

Patent brick wedges are driven in between beams to obtain the correct spacing and to hold the beams firm while the grouting hardens.

Cross Reinforcement.

Where required, cross reinforcement is provided on the underside of the floor, in specially cast channels running across each beam (not shown in this Sheet). This patent system provides a cross tie between beams where it is most effective in the underside of the floor. Details will be given in a later Information Sheet.

Concrete Bearings.

The concrete bearings, which also form the fire protection in steel frame buildings, are carried out by the company, and it is recommended that wherever possible this work should be done by the company, as it prevents overlapping and divided responsibility and makes for faster erection. Concrete and other bearings will be dealt with in a later Information Sheet.

Design.

The table given on this Sheet is, as noted, calculated to the requirements of the London Building Act, 1930. The table is, however, only a guide and the company should be asked to work out the most economical design for every specific case.

Finish.

The surface obtained in floors laid with the precast beams is reasonably true and even, and strip floors on battens may be laid direct on the beams ; for wood blocks, lino and other floorings, a 1 in. screed is required to give a fine surface. The surface obtained on the underside of the bare beams is sufficiently true for factory and warehouse work which requires only distemper, paint or other surface application. For more finished interiors, plaster and other finishes are applied in the usual way, the key and suction provided for plaster being specially good.

The General Advantages of Precast Construction.

The advantages of the Siegwart system may be summarised under the following points :—

(*a*) No centering required for erection.

(*b*) Speed of construction.

(*c*) Suitability for immediate use : the precast Beams can be used immediately after erection, whether grouted or not, and may be put to full use within 48 hours of grouting.

(*d*) Rigidity : for stiffness and resistance to sound vibration, the precast floor beams are designed of not less depth than 1/24th of the span.

(*e*) Ease of trimming, fixing finishes, hung ceilings, pipes, etc., as will be shown in future Information Sheets.

(*f*) Continuity of spans : continuity rods bedded between beams enable advantages of the cast in situ floor to be obtained in addition to those of precast construction.

(*g*) Uniformity of material : the units being produced under factory conditions, the irregularities of site work and of weather conditions are avoided.

Manufacturers : Siegwart Fireproof Floor Co., Ltd.

London : Thanet House, 231, Strand, W.C.2

Telephone : Central 4894

Birmingham : Winchester House, Victoria Square

Telephone : Birmingham, Midland 1664

Manchester : Millgate Buildings, 18, Long Millgate

Telephone : Manchester, Blackfriars 3033

Glasgow : 121, St. Vincent Street

Telephone : Central 7277

Belfast : c/o Robert Kirk, Ltd., Exchange Street

Telephone : Belfast 6637

Leicester : Enderby

Telephone : Narborough, Leicester 67