THE ARCHITECTS' JOURNAL

Wednesday, April 4, 1928

"APPRECIABLE" MOVEMENTS

THE pronouncement of the London County Council that "no appreciable change" has taken place in the state of Waterloo Bridge for some months may calm the fears of those who, trusting to their own observation and the evidence of their senses, have convinced themselves that its deformation is increasing to a notable extent. The chief engineer of the Council is reported to have said that: "Readings at the bridge were taken every week, and that such changes as were recorded were negligible. The bridge was still perfectly safe, and there was no question of closing it to traffic."

Such statements are particularly comforting when the evidence given by the Council's engineers as to the serious state of the bridge at the time of the early sittings of the Royal Commission on Thames Bridges is borne in mind. The dangers of delay and the burden on the engineer in charge were then very forcibly insisted upon, and if, despite the recent floods, no further harm has come to the structure, lovers of Waterloo Bridge must rejoice. But what is it that differentiates an "appreciable" from a "negligible" movement? Both these descriptive qualifications of movement have direct reference to human powers of observation and judgment, as well as to matters of fact, and both may be taken, in the ordinary course of English speech, as implying that movement has actually been observed. They also imply that the engineers in charge of the bridge have noticed movement, and have come to the conclusion that they can afford to ignore it.

Such observations and such deductions come rightly within the functions of the custodians of an ancient monument who are aware of their responsibilities, and who call upon their experience and their imagination to assist them in forming a correct judgment as to whether the building is, or is not, in immediate need of further works of support or repair. It is not necessary to suppose that every crack in a building is a sure and certain sign that collapse of the building is imminent, any more than that a scratch made with a clean needle will have the same deadly effect as a scratch from the same needle after it has been charged with poisonous germs. Obviously, the accompanying symptoms of decay, and the forces which tend to produce it, must be taken into consideration as well as the one factor of recorded movement. The whole circumstances of the building, its size, shape, weight, strength of material, historical distortion, existing distortion, and the normal and abnormal forces of destruction to which it is subjected must be reviewed again in connection with the appraisement of any new movement, however slight. That the engineers of the London County Council have performed these operations, in which both imagination and mathematics play their part, we have no reason to doubt, but it is possible that other observers might classify as "appreciable" the movements which have been considered "negligible" by the Council's observers. The matter is not one of abstract science alone, but of judgment and discretion, in which opinions may legitimately be found to vary. As to the fact itself, no two opinions are possible. Observation of Waterloo Bridge during the past year reveals beyond a doubt that movement of a damaging sort is taking place, and these movements are all the more significant in that they have taken place since the erection by the Council of temporary works designed to prevent movement. Can this slight additional damage be ignored with safety? It is the last straw that breaks the camel's back, and though greater and more rapid movements may have taken place in the past, without producing the fall of the bridge, there is no guarantee that the final adjustment of the masonry before its collapse will be anything more than such another trivial movement as has just been observed, and treated as "negligible" by the observers.

The history of the fall of the Venetian Campanile after emphatic warnings had been ignored would suggest that it is distinctly unwise to place too great emphasis upon the trivial or "negligible" nature of movements occurring in heavily stressed structures which already have a bad record of progressive deformation and partial failure.

Appreciable progress has been made in the scientific analysis of movements in ancient buildings in recent years, and the change in technical and public opinion upon the matter is by no means negligible. When, in the spring of 1925, articles were published in THE ARCHITECTS' JOURNAL, insisting upon the use of reinforcement at St. Paul's Cathedral in addition to the scheme advanced in the St. Paul's Commission's report, the warning was received with derision by the Dean; yet within a month the Dean's expert advisers had added the use of reinforcement to their scheme! The analytical survey of ancient buildings in connection with their gravitational drifts discovered by Mr. William Harvey has lately been blessed by the Society for the Protection of Ancient Buildings, and now the *Morning Post* has found this subject sufficiently interesting to give an article and a leaderette on the recent movements in Waterloo Bridge in one issue, and to publish photographs of the bridge on the following day.

Whatever may be the ultimate fate of Waterloo Bridge, its treatment at the hands of the Council's engineers and its response to natural forces will be scrutinized with anxious and intelligent interest as a highly significant test case in the conservation of an important building in an advanced state of disrepair. Whatever else is uncertain, it is no longer possible to suppose that the fall of Waterloo Bridge will be mutely acquiesced in as an inscrutable "Act of God."

A photograph of this detail is given on the preceding page.

NEWS AND TOPICS

A RUSTLESS AGE—A STATUE WITH A STAIRCASE—ACOUSTIC RESEARCH

A RUSTLESS age, it seems, is on the way. Considerable progress is very quietly being made in this and other countries toward the production on a commercial scale of a rustless material or alloy which will indefinitely resist corrosion under most conditions. The stage is being approached when the material will be cheap enough for use on a large scale. Already five American steel companies are producing "rustless iron"—a low-carbon steel high in chromium content. The demand is growing constantly and the interest in it is expanding rapidly. It can now be made in bars, plates, shapes, sheets, wire, castings, and in many other forms. Conceive the possibilities if such a rustless and long-enduring, even when brightly polished, material replaces steel on bridges, buildings, fences, sheet-metal buildings, and so on.

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Three processes for its manufacture are now available. The patent situation, however, is intricate and a hindrance to development, but this is gradually being straightened out. From Germany come rumours of a much lower-cost product than the American. As against a considerably higher cost only four or five years ago, "rusting iron" is now obtainable through principal producers at about twenty-five cents per pound, and as developments continue the price will decline, as aluminium did years ago. So much for progress to date. Is the rustless age approaching? Without doubt the age-long dreams of engineers and metallurgists are slowly coming true. By the use of such a material—or possibly the strong, light aluminium alloys—rusting buildings and bridges may soon be a thing of the past.

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Recently I read an interesting description of the building of a new school at Modderpoort. Those responsible have decided to employ local labour, and to superintend the work themselves. Stone is cut from a quarry near by, and is carried on a primitive sleigh by bullock teams to the site. Here the cutters shape the blocks ready for the masons. The workmen are paid on the piecework system, according to the size of the finished blocks, and there are sometimes amusing scenes when half a dozen Basutos, mainly by means of gestures and grins, explain to an amateur clerk of works that their work has been reckoned up incorrectly. It is found that this way of doing things is saving the expense of a contractor, and ensures that the work is of the required standard.

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A village well worth visiting at holiday time, although it lies rather out of the beaten track, is Cerne Abbas, called "Abbot's Cernal" in Hardy's *Tess of the D'Urbervilles*. Here is an abbey of Saxon origin, which is, however, difficult to find, for the ruins form part of the buildings of a farm. The Gate House, containing a perfect oriel window, is now used for a chicken-house. The abbot's refectory, with beautiful mullioned windows, has become a dusty barn. Many of the cottages in the village contain building materials taken away in the past from the abbey. One small cottage occupied by an artist contains a hall paved with tiles, some of which are Roman. In repairing this house it was decided to take out a Victorian grate, and amid excitement a sixteenth-century fireplace, spaciously proportioned, was uncovered. In this room, under several strata of wallpaper, were revealed hand-hewn oak beams going crookedly along wall and ceiling. In another room old oak panels now stand in the light of day, after having been hidden for centuries by plaster.

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A colossal winged statue of "Victory" has been erected on the Colle della Maddalena, the highest summit of the range of hills to the east of Turin. The inauguration will take place on May 24, in commemoration of the anniversary of Italy's entry into the Great War. The figure, from the feet to the tip of the torch held in the upraised hand, is 60 ft. high, and each wing measures 21 ft. It is the largest statue in the world cast entirely in bronze, as the famous "Liberty" of New York is composed of metal sections soldered together. An underground passage and an inner staircase enable visitors to reach the shoulders of the statue; from between the wings the ascent continues outside, first along the left arm, then the right, until the summit of the torch is touched. The torch is fitted with a powerful electric lamp, and, by a special piece of mechanism, the electric flame, enclosed in a crystal case, has a rotary movement which will be intermittent, like that of a lighthouse. The lamp is to burn perpetually.

"It's clever, but is it art?"

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Those of us who find our water-rates a burden may be cheered by the reflection that men are not the only creatures who have to pay for their water supply. A South African scientist, Mr. E. N. Marais, has discovered that the termite or white ant has to excavate a deep well beneath its nest through the parched soil down to a water-bearing stratum. One such shaft he found and traced for more than 65 ft. to a point where water was available. Up and down the shaft, which had a diameter of approximately 2½ in., an endless procession of white ants passed in order to bring constant supplies of water to the nest, and to the specially cultivated crops of fungus upon which they feed. The activity of these hydraulic engineers of the insect world proved to be greatest at night, when extra workers were drafted in after spending their day's labours in other directions.

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In spite of the waste of energy involved in going down the well to fetch the water, this system has been employed by human beings as well as by insects. A primitive, inclined shaft, probably intended to reach water, was discovered by Professor R. A. S. Macalister at Gezer in Palestine, and the water supply of Mycenæ was also obtained by means of a sloping subterranean approach down which the water-carriers could walk without being exposed to an attacking force. It is interesting that, even as late as the sixteenth century, intelligent engineers, Antonio de San Gallo the younger and Simone Mosca designed the famous well of Orvieto on a similar principle, with two spiral inclined ways for asses to descend and ascend its 200 ft. depth.

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After listening to Dr. Stradling, of the Building Research Station, at the R.I.B.A. last Friday, a friend drew my attention to the fact that after ten years' agitation on the part of architects there is still no Sabine laboratory for acoustic research. Long ago the Science Standing Committee of the Royal Institute laid it down

that they were in favour of large-scale experiments on the Sabine principle rather than the stationary wave method. So long as we are without a properly equipped Sabine laboratory, thorough tests are impossible. The physicists themselves now recognize the necessity of taking building specifications and sizes into consideration. Messrs. Kay and Davis, in their excellent book recently reviewed in this JOURNAL, speaking of test partitions, say categorically: "In general, partitions should be of the size in which they will be used in practice." I am told that lack of funds alone is the cause of the delay. Yet architects are handicapped on all sides for lack of a smooth, sound-absorbing material, both hygienic and of a pleasant appearance. The materials on the market are in many ways excellent, but all have drawbacks of their own. The solution will only be found by continuous experiments with the requirements of architects in view. A Sabine laboratory would form the natural centre of experiments of this kind. Every day new materials are placed upon the market purporting to have acoustic qualities of one kind or another. These materials disappear as rapidly as they appear, and in the general flux of commercial activity the scientific advance is very small and real needs are not met. Yet commercial enterprise in other directions has succeeded. What is required is an intelligent co-operation between enterprising building merchants and our scientists and experts.

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One of the most satisfactory recent developments in British art—on what may be called the commercial side—has been the immense improvement in our posters, more particularly in those connected with the leading railways. Whereas a few years ago they were inartistic—and sometimes almost pitiable or simply vulgar and ineffective—I believe they will now often compare very favourably with anything we see on the continent of Europe. The movement was initiated by the London and North Eastern Railway, though other lines, such as the Midland, soon followed suit, and the posters on the London Underground must be mentioned here. Last month the London and North Eastern held its sixth annual poster display, and this time, instead of the Board-room at King's Cross, the more accessible New Burlington Galleries were chosen.

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Naturally, on a line serving the north, York and Durham came well into the picture, and it may be said that the average merit of the posters was a high one—notably so on the side dealing directly with architecture. Commencing with three posters by Frank Brangwyn, R.A., among which the "Royal Border Bridge" (1923) was finely characteristic, we came in the same room to some very good work by Fred Taylor. His "Architecture of York" and "Ipswich" (original design, 1928) were unquestionably among the finest there in drawing; especially the latter, where, against the background of the "Ancient House" in Pickwickian days, a cheerful company was escorting no other than the immortal Mr. Pickwick himself, still obviously under the gladdening influence of cold milk punch, through the streets of the old city to temporary seclusion. Fred Taylor's "Cambridge" showing that magnificent front of King's College Chapel, and Spencer Pryse's boldly drawn figures on "Whitby Cliffs," and, lastly, H. G. Gawthorn's admirable "Forth Bridge, 1928," with its suggestion of structure and its fine colour, must be mentioned in this successful display of poster art.

Artists are always benevolently inclined, and it was a very charming impulse which prompted Edmund Wimperis to hold an exhibition for the benefit of the Artists' General Benevolent Institution. His ninety drawings in water-colour, displayed at Walker's Galleries, show a very pleasant dallying with a sister art, disinterested and platonic; British and Continental. The references to architecture are few, but good; the rest are largely landscape and atmospheric studies—honest transcripts with a love for their subjects and a nice feeling for expression. Five hundred watercolours, mostly paintings rather than drawings, fill the galleries of the Royal Institute to repletion. Many of the pictures presented have no reference to traditional watercolour art, but are merely subjects treated in colour. Some, on the other hand, have true feeling for Nature: birds, seas, landscapes, and buildings, and in the last class are several very good things. A washy "Exterior of a Mosque," by W. B. E. Ranken; a careful "Elvet Bridge, Durham," by Bernard Gotch; a very good bridge study at Gerona, by A. Van Anrooy, with unusual tone treatment, are above the average. "Corfe Castle" is the subject of two drawings: one by Adrian Hill, a lonely and stately presentment with fine atmosphere; and another by Dennant Moss. The best drawing of the kind is Henry Brewer's "Provost Lupton's Tower, Eton College." All drawing pales by comparison with that of Albrecht Dürer in the magnificent collection of his prints at the Fine Art Society; the architecture in them is magical.

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The Sixteenth International Art Exhibition of the City of Venice will be opened on St. Mark's day, April 25, and promises to be of very great interest. The committee is representative of all sides of modern art in Italy, including the painters, Italico Brass, Beppe Ciardi, Efisio Oppo; with a lady, Donna Margherita Sarfatti, whose husband was a close friend of Mussolini in his earlier days. The new general secretary, Antonio Maraini, is a well-known sculptor residing generally at Florence; and the Podesta of Venice, Pietro Orsi, is the president of the exhibition. The foreign countries taking part and exhibiting in their own pavilions include England, France, Germany, Czecho-Slovakia, Belgium, and Holland, and Soviet Russia is this year included. In the decoration and applied art we are told that the exhibition will have the help of architects, who will in this way, and for the first time in this biennial, be called to take their place beside the sculptors and painters.

ASTRAGAL

ARRANGEMENTS

WEDNESDAY, APRIL 18

Royal Society of Arts. 8.0 p.m. "American Architecture." Paper by Alfred C. Bossom.

MONDAY, APRIL 23

R.I.B.A. 8.0 p.m. "The Work of Temple Moore." Paper by H. S. Goodhart-Rendel.

MONDAY, APRIL 30

Architectural Association. 7.0 p.m. "Modern German Architecture." Paper by Werner Hegemann.

BALBUS BUILT A WALL

[BY R. E. STRADLING]

I HAVE taken rather a liberty in using the old school-book Latin tag as a title for this lecture, for it may be inferred that I know something of Balbus and his wall, and, further, that I am a Latin scholar. Neither of these assumptions is true, for I do not even know whether the tag refers to a specific man, and my knowledge of the classics is nil. As far as I am aware the name Balbus is generally used as a synonym for builder, and the literal meaning of the word is "stammerer." However, I have used the title in the hope that it may bring to mind two things: first, the great age of our building industry and, second, the problem of wall construction.

The traditional methods of wall construction have grown up over thousands of years, and have been developed by trial and error methods. Such methods have one great technical disadvantage: the result obtained by practical test of a material or construction only applied to the actual case tested and cannot safely be applied in any other case where the conditions are not precisely the same. Unless the results of tests have been obtained from experiments which analyse all the conditions affecting the results, these cannot be safely applied in different cases. Such experiments can usually only be carried out under the carefully controlled conditions of a laboratory. The majority of failures, major and minor, are due to a disregard of this principle. Attempts are made to use traditional methods with materials different from those in use when the methods were developed or in positions or for purposes also not traditional.

The above is the substance of a paper read at the R.I.B.A. on Friday last.

When one is faced with the problem of analysing in detail the reasons for some of these failures one immediately meets with the difficulty that it is not known why the traditional methods were satisfactory. Hence at the building research station two main divisions of work exist: 1: the bringing together of organized knowledge as to why traditional methods as originally worked out were satisfactory, and 2: the analysis of the reasons for present-day troubles in the light of the organized knowledge collected under 1.

The demands made on walls are:

1: Weather protection.
2: Suitable external appearance.
3: Suitable internal appearance.
4: Lasting qualities.
5: Economy and cheapness in construction.

The chief considerations here, at any rate in England, are *a*: protection from rain; *b*: protection from temperature changes. The first of these is really not difficult to secure, although in the early attempts of engineers to use steel framing and a concrete skin in some of the methods suggested for small house construction since the war has resulted in anything but rainproof walls. Many other "alternative methods" for this particular purpose have produced similar results, but considered generally the difficulty of meeting this requirement has not been as great as that experienced in trying to comply with some of the others. The second demand, that of walls capable of giving reasonable heat insulation, has been more troublesome when departures have been made from traditional

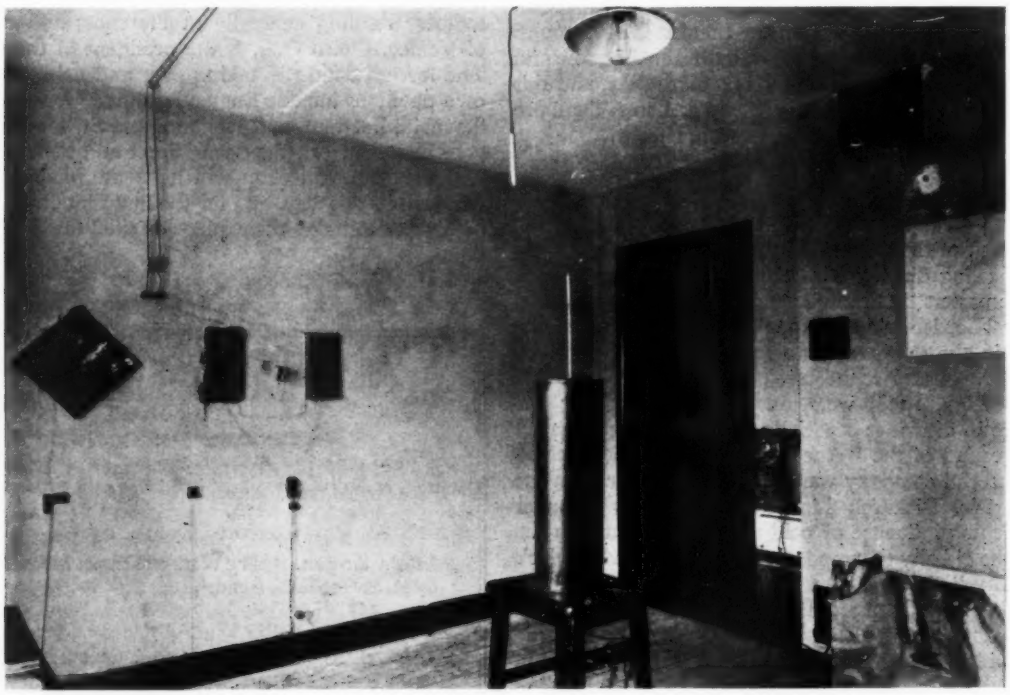


Figure one.

practice either in methods of construction or in methods of heating. It has not been realized, for instance, that although air is a good insulator under certain conditions, such conditions are not always supplied by a cavity wall with thin outer and inner skins. Methods of central heating are all departures from traditional English practice, and have brought difficulties, some of which even now have not been solved. Enough attention has not been given to the effects of radiation, and it is still extremely difficult to convince people requiring tests on new forms of construction consisting of thin skins that the major heat transmission effects are often those of radiation and not conduction. Even now it is not possible to analyse all heat losses from a room in a strictly accurate manner. Much more scientific work is required, and some of this is being attempted at the building research station. In figure one is shown the inside of a room in the experimental cottage at Garston. In the foreground is the control for the supply of heat to the room. It is a kind of dummy man whose "skin" temperature is kept constant, corresponding to a measure of comfort. Heat passes either to him or from him 1: by radiation, 2: by convection. If the walls, for example, are at a lower temperature than his "skin," then he radiates heat to them, and hence his own temperature tends to drop. By a thermostat control inside more heat is allowed into the room until the conditions are again adjusted to keep the dummy's "skin" at the predetermined temperature. The inflow of energy into the room is measured, and the apparatus seen on the wall is that designed to measure the losses through various portions of the walls. It is not possible here to give detailed descriptions of these, but in general they consist of instruments to measure losses by radiation and those by air convection, and also the temperature gradient through the wall itself.

Such work is rendered necessary in order to understand what are the heat requirements of a room, and how to examine and compare any new or old form of construction from this point of view.

In considering this demand of external appearance it is convenient to consider at the same time the question of durability. Everyone in the industry realizes the troubles met with under this heading. The preservation of the appearance, and sometimes the strength also, of existing buildings has become a national problem of some magnitude and of the greatest difficulty. The expression of artistic forms in constructional materials is often attended by failures to produce any degree of permanence in the structure. Let us examine a few simple cases. Figure two is an example, certainly not of a beautiful building, but of an interesting case of efflorescence from stock bricks. The structure consists of storage bins for sand and gravel. The sand was wet when placed in the bins, and the moisture passed through the brickwork to the outside of the wall, but in so doing carried certain salts present in the bricks to the surface. The salts did not come from the sand. This kind of thing is disfiguring, but in this case not permanently so, for after a few rainstorms the efflorescence disappeared and the brickwork appears to be quite sound.

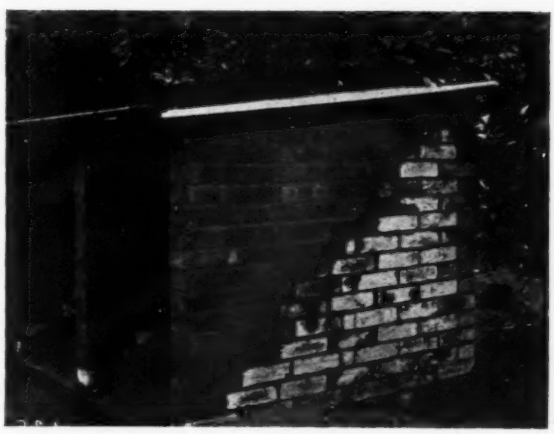


Figure two.

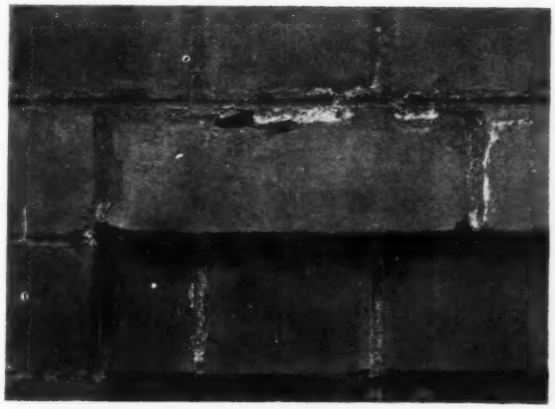


Figure three.

Compare this effect with that shown in figure three. Here are depicted some smooth-faced engineering bricks on one of the railway retaining walls at Hampstead. Here again is efflorescence, but here the brick is actually breaking up. This brick is much harder and stronger than the stock brick, yet the stronger decays whilst the weaker does not. Why is this? We do not know. This illustrates one of the most difficult problems in the work of the building research station. In my opinion, when we know the answer to this we shall have gone a long way towards the solution of the general problem of weathering and decay of stonework, etc.

One more example, and this time of a really fine building. Unsightly efflorescences are appearing around all the joints, and a close examination showed signs of incipient decay of the stone. I have had the opportunity of discussing this with the architect concerned, and I know that every precaution was taken that traditional practice could suggest. Every care was taken to stick closely to traditional materials, both for mortar and stone, and yet this is happening after very few years' exposure. Why is it? Again we have to admit we do not know. In some way the mortar and the stone are incompatible. There are buildings in existence of the same stone which appear quite sound after many years' exposure. Obviously there must be some factor different in the case referred to. At a guess I would suggest that probably both the stone and the mortar are different from the products sold under the same names a hundred to two hundred years ago, and hence even very close and particular attention to tradition cannot bring about the traditional result.

This problem of unsuitable association of materials is met with on all sides in the industry, especially when new materials are employed. One has only to bring to mind the troubles experienced with repointing old walls, and the

consequent decay of the stone which sometimes occurs, to realize how universal the problem is.

Perhaps no trouble is so common in the industry today as those concerned with the internal linings of walls. The number of plaster failures reported to the building research station is very large indeed, and the causes are usually either bad craftsmanship or lack of uniformity of new materials. Perhaps the majority are due to the materials. The traditional plastering medium was lime, but the demand for the speeding up of work gave great impetus to the use of sulphate plasters. These are not traditional materials in England, at any rate to the extent to which lime is, and, in addition, there are proprietary articles sold under trade names. Purchasing under a trade name is, after all, a guarantee of nothing except the faith of the purchaser in the vendor.

A manufacturer of a specific material which is sold merely under a trade name is under no obligation to provide exactly the same article each time. In fact, if he is progressive, he will probably seek to improve his material

Figure four.

both as to more economical manufacture and suitability as a plaster. Unfortunately, the manufacturer's idea of requirements as a plaster and those of the plasterer may not be the same. One of the commonest methods of use sanctioned by tradition of very few years' standing is the mixing of various plasters and/or lime to give a workable mix. A certain mixture may have been found by experience to suit a certain purpose, but such practice will be completely upset if one consignment of a specific plaster differs from a previous one, although this fresh consignment may in itself be an improved article if used alone. Such troubles have been repeatedly reported to the building research station.

Another quite common trouble is shown in figure four, which is actually a paint failure. The case shown is that of an internal partition wall of breeze blocks covered with cement rendering and painted after three weeks. The paint stood up for three months and then failed due to condensation of moisture from the atmosphere. Painting on plasterwork is a great source of trouble, and here again the trouble arises with certain proprietary plasters

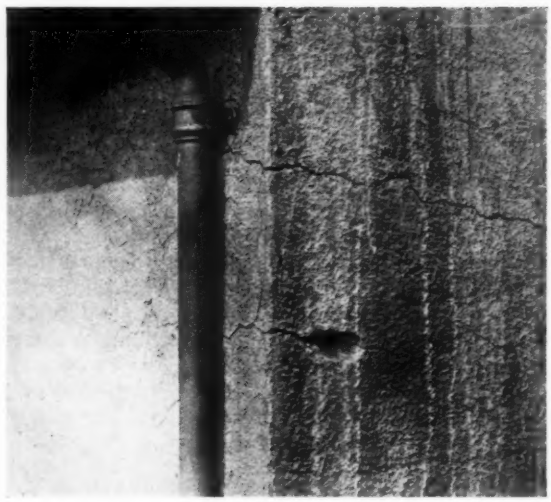


Figure five.

sold under trade names, and which vary slightly from alkaline to neutral or faintly acid.

Paint will be affected by the first, but not by the other two, and under present conditions the builder does not get any warning till the failure has occurred. A very elementary knowledge of chemistry would enable such alkalinity to be detected; in fact, the almost blind use of one of the standard indicators such as phenolphthalein would give the information required. Yet such failures often occur.

Already something has been said about the lasting qualities of wall surfaces, so perhaps all that is necessary is to draw attention to certain structural failures of a rather different kind. I will exclude foundation troubles, and take one example of a failure due to the use of quite a modern material. It is well known in the industry that although quite sound concrete *can* be made with clinker or breeze as an aggregate, yet there have been large numbers of failures.

Figure five shows an example of this in the case of small house construction. In this particular case a group of eight houses was affected. The walls consisted of 6 in. poured concrete with clinker as an aggregate and having a cement rendering on the outside. The clinker concrete expanded and cracked the rendering. The cracks were repaired, but the expansion continued until the houses became structurally so unsafe that the tenants had to leave.

We have had very many similar cases reported, and the building research station has been trying to devise some means of distinguishing between good and bad clinkers for this work. I am glad to be able to say that these efforts have been successful as far as laboratory tests are concerned, and that there is every hope of an efficient and simple works test being available in the near future.

It will be realized, I think, that this use of clinker is quite a modern problem. The industry had offered it as a cheap and light aggregate and started to use it. Sometimes great success was attained and at other times failure. This is a present-day example of full-scale experimentation and the development of a traditional building material. What the end will be is hard to see. Should we ever have obtained a traditional method of choosing between a good and bad clinker just by practical experience? It is

doubtful, I think; for the tendency amongst architects and builders recently has been to forbid the use of clinker. By laboratory research it has been possible to sort out the reasons for the troubles, and to distinguish suitable from unsuitable material. Many other cases of failure to achieve lasting properties in wall construction might be given, but time will not allow.

The demand made upon a traditional industry like building by the post-war housing conditions could only be met in the way in which it has been met. Thousands of experiments have been performed in practice in order to find a more rapid and a cheaper method of construction, and, in my opinion, no outstanding alternative method of construction has been evolved which can be said to have thrust the standard methods of construction into the background. The designers of new forms of construction have not realized all the factors involved, have had to deal with new materials whose properties are not known, and have had to organize craftsmen not trained in any but traditional methods to handle these new forms. I do not wish to suggest blame on the designers for this state of things. It is the natural condition of an industry founded upon tradition alone. If building research had been started thirty to forty years ago and the education of the industry developed on scientific lines parallel with the progress of research, we might by this time have been in a position to know the underlying reasons for our difficulties.

This brings me to one of the main points I wish to press. The State has initiated research work for the industry, and this is being more and more supported by manufacturers of various building materials, but no start has yet been made with the essential scientific education of the industry. I wonder whether it is realized how urgent this is. I have tried to indicate one or two points in building research and how an effort is being made to develop a real science of building. I have tried to show how, in two cases —clinker concrete and the post-war housing work—the industry has endeavoured in our own time by practical full-scale experiments to answer demands made upon it by the community; I have tried to show how and why those experiments failed. The building research work has managed to get solutions of several problems connected with materials, but I feel certain that neither building research alone nor the industry as it now exists can hope to adjust in any reasonable time the traditional methods to bring about cheaper and more economical construction.

From the standpoint of the community at present there cannot be said to be very much real economy in building. We are groping in the dark trying to develop our industry by its traditional method of practical experiment, and every failure is a charge on the community directly or indirectly. By taking a few examples I want to try to make this even clearer.

The last report of the Chief Inspector of Factories and Workshops (Home Office) is rather disturbing, for on page 12 the statement occurs: "Building again comes first among all industries as causing the greatest number of deaths, and docks follow not far behind." This refers, of course, to accidents reportable under the Factory and Workshops Acts. I have not got an analysis of these building accidents, but I have looked through the Building Research Station files of accidents connected with walls, and have picked out three typical cases, and the three figures (numbers six, seven, and eight) illustrate these.

In figure six is shown diagrammatically the case of a basement wall which overturned during construction and caused the death of a workman.

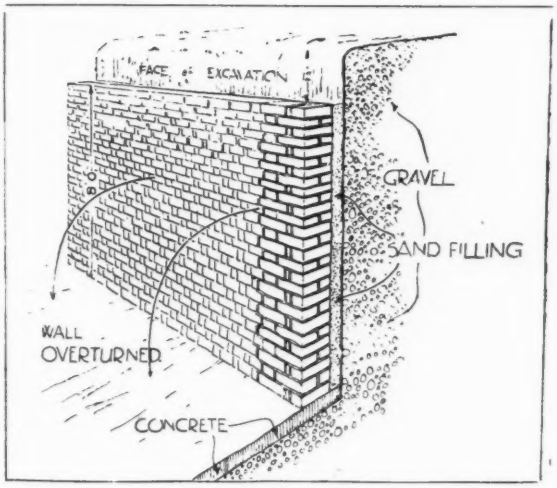


Figure six.

An excavation about 25 ft. long was dug for the basement of a commercial building. The final wall construction was to consist of 9 in. brickwork against the earth, with an inner wall of reinforced concrete. When complete the structure would, of course, be amply strong enough, but during construction the 9 in. brick wall was built as shown, and as the courses were gradually laid the space between the back of wall and the excavation was packed with sand. The weather was wet and the ground surrounding the excavation drained into the sand filling. As the water rose in the sand a pressure was ultimately produced which was sufficient to overturn the wall and cause the accident. At the inquest held, the verdict was death by misadventure, and in the present state of the industry no other conclusion was possible. But this does not relieve the community from some responsibility for this man's death. Knowledge does exist which, if applied, might have rendered the accident impossible.

In figure seven is shown an example of a scaffolding failure. It shows quite a common difficulty. A heavy

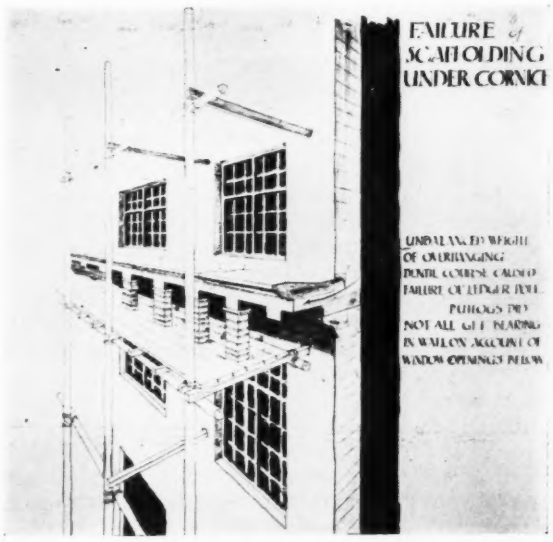


Figure seven.

E

overhanging cornice had been designed, and no anchoring apart from superimposed loads from the wall above was specified. Hence this heavy stonework had to be supported from a scaffolding until sufficient work had been added above to make the ornament stable. There were windows above and below, and due to the presence of the lower window openings the putlogs could only be given a bearing in the piers between these. As will be seen from the diagram the outer ends of the cornice were supported from the planking on piers of bricks surmounted by wedges. For some reason the scaffolding collapsed, killing one or two men. At the inquiry the balance of evidence appeared to point to the failure of a putlog, but there is obviously a large number of possibilities. The deflection of the planking, either due to men walking about or due to unloading stone or other heavy material on to the platform, might easily upset the equilibrium of such a supporting device as described.

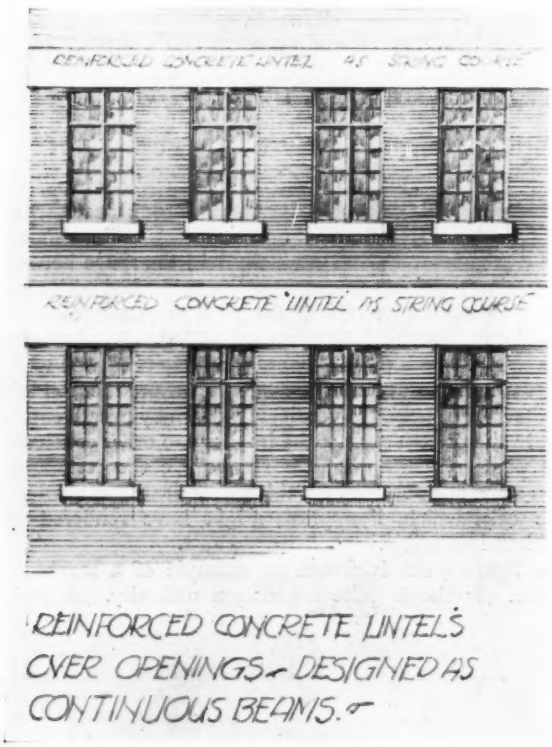


Figure eight.

In figure eight is shown the elevation of a portion of a wall which collapsed, and in the general smash five men were killed. The elevation of the building showed a stringer course of reinforced concrete running round the building and acting as lintols over a series of window openings. Into this stringer course ran the beams of a flat, reinforced concrete roof. The shuttering for the lintol beam stringer course was partly supported on the brick piers between the windows. There were a number of contributing causes to the failure, but the primary one was the removal of the supports of the lintol beam at the brick piers, thus making the series of short but continuous lintol beams into one long beam—a purpose for which it was not designed.

In this case we have the introduction into building work of a new constructional material and method. An essential structural feature is made of a portion of a wall, and through lack of knowledge of modern theory of structure men's lives may be endangered. The necessary knowledge is already in existence. We have not to wait for further research—yet the builder is not using it. A new material is being used which cannot be handled by traditional methods.

A consideration of these three accidents makes it clear, I think, how urgent is the need for higher education in the building industry, and, in conclusion, I wish to summarize what is the present position of training in the building industry.

The personnel engaged can be considered as divided into three classes: *a*: the craftsman; *b*: the building supervisor; *c*: the professional man (architect and engineer).

a: *The Craftsman* is trained by a period of apprenticeship, together, in the best cases, with a period of technical school training in the science of his craft. The primary object the whole time is to develop a man skilled in the use of his hands. Virtually this means a request to the craftsman only to think in terms of craft skill and to leave the larger problems of construction to those organizing his labour.

b: *The Building Supervisor*. By this term I mean the master builder, general foreman, etc., who have the organizing of the craftsmen. The training of this group is very haphazard in England. Probably the best types are those who have served as craftsmen and then shown special capabilities for organization, etc., and have thus been given the wider work. The less efficient types have received no training other than that of a builder's office, starting, maybe, as office boys, and viewing the whole problem of building construction and craft organization purely as one of £ s. d. Of course, we all know exceptions to these rather sweeping generalizations, but I think it will be agreed that the picture I suggest is generally true. In my opinion one of the serious causes of trouble in the industry at the present day is in the lack of real training for this group of building supervisors.

c: *The Professional Man* (architect and engineer). With the passage of time, as already indicated, the designer of buildings gradually became divorced from actual craft experience and study. He has become more highly trained as an artist and interpreter of the requirements of his client in terms of general layout, etc. When problems arise involving structural strength he calls in the structural engineer; but here also is met a man who often possesses very narrow training when viewed from the standpoint of building. The structural engineer is a specialist in stress calculations for the employment of materials which obey Hook's Law; but the builder has to use very many materials which do not allow of such mathematical analysis, and because of this rather specialized training of the engineer, and the lack of any appreciable scientific training for the architect and building supervisor, many of the troubles of today arise.

Such is a brief summary of the conditions of training of the personnel of the building industry. We are training our craftsmen and asking them to specialize on craft skill. We introduce new materials and new methods where no craft skill has been developed. Then we organize our craftsmen by means of supervisors who in most cases have had no more advanced scientific training than the craftsmen themselves. Has the time not come when insistence should be made upon the better and more scientific training of the building supervisor? Can we afford the loss in efficiency to the community?

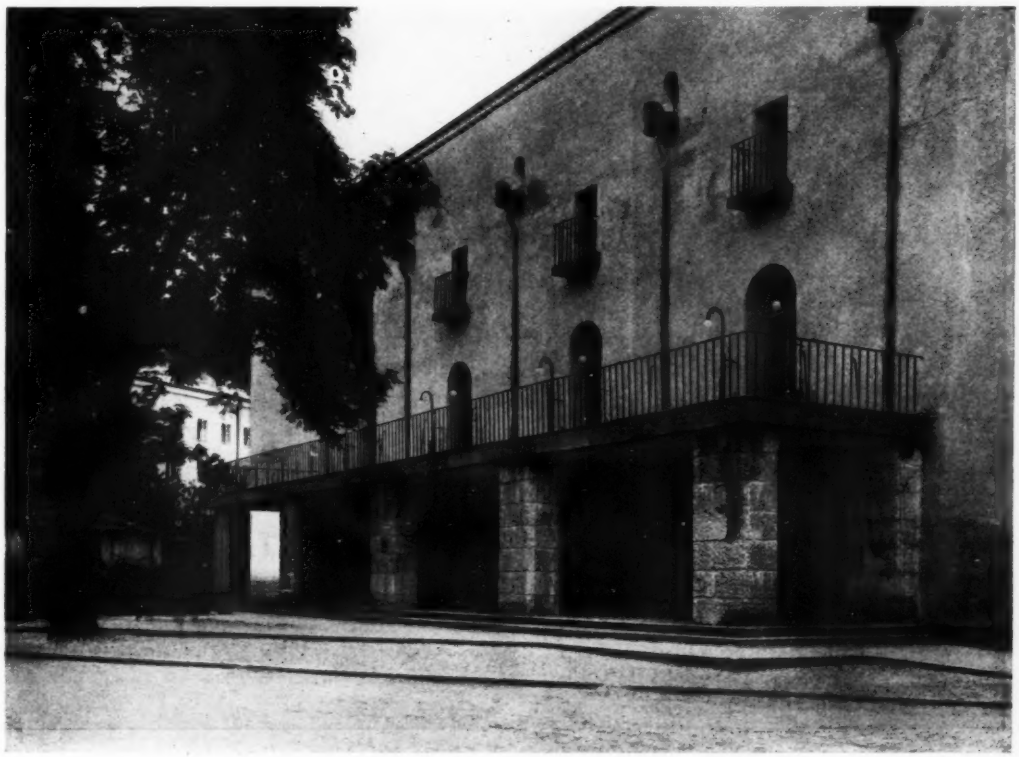
THE FESTIVAL PLAYHOUSE IN SALZBURG

[BY A. S. LEVETUS]

THE Playhouse at Salzburg is an adaptation of the winter and summer riding-schools. The history of these riding-schools is interesting. Salzburg was the seat of a princely archbishopric. State and Court were maintained as at the Imperial State and Court at Vienna, and part of the courtly entertainments consisted of feats of dancing, prancing, and so forth by specially trained horses. The riders were the sons of princes and of the nobility. These performances were witnessed by the high society from far and near, and rivalled those in the Court riding-schools of Vienna. The buildings were erected in the seventeenth century. Riding continued till far into the second half of the nineteenth century, when it gradually fell into disfavour. The riding-schools were consequently neglected, and fell into disrepair.

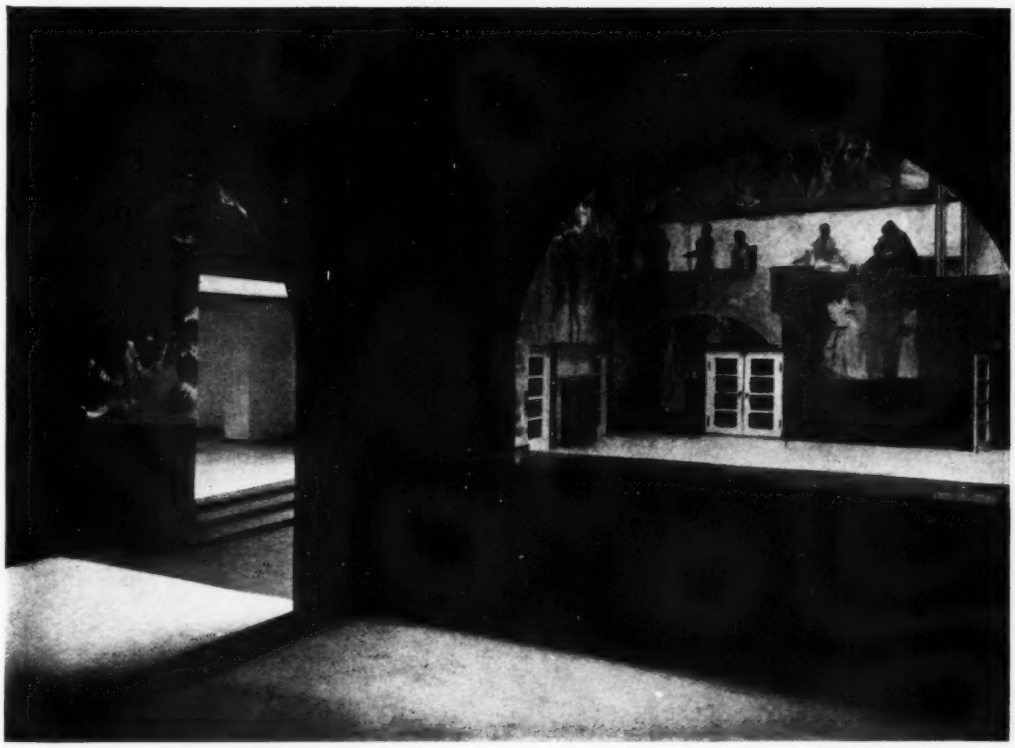
Salzburg contains a large number of beautiful old buildings. Among the more prominent are a seventh-century abbey, an imperial palace known as the Residenz, a seventeenth-century Italian baroque cathedral by the Italian Solari, a Romanesque Franciscan church of the thirteenth century, and the wonderful Kollegium Church, a masterpiece of the Vienna master of baroque, Fischer von Erlach. Salzburg is surrounded by high mountains, one of which is crowned by a fortress, and lies in the valley, the lovely silver stream of the Salzach cutting the city into two parts. The riding-schools are close to the Residenz, the Kollegium Church, and other baroque buildings. The riding-schools themselves show baroque influences, and these account for the baroque elements in the Festival Playhouse.

Reinhardt wanted a Gothic building with high vaults. This was attempted, but the result was unsatisfactory. The acoustics were bad; but, nevertheless, performances were given, and these attracted an international public. The experience gained showed where the faults lay, and Professor Holzmeister was called to remedy them. But so much delay occurred that only a few weeks remained for him to plan and adapt and provide for use a playhouse which, under ordinary circumstances, would have taken months. The funds available were so small in comparison with the work to be achieved that the strictest economy was necessary. Professor Holzmeister, in reconstructing the building, rejected none of the old features that could possibly be used, and out of a number of parts bearing no relation one to another he has produced a harmonious whole with a unity of character and excellent practical possibilities. The Festival Playhouse is exactly suited to such performances as Reinhardt produces in Salzburg. It shows a richness of decoration in harmony with that offered on the stage, whatever the play may happen to be,

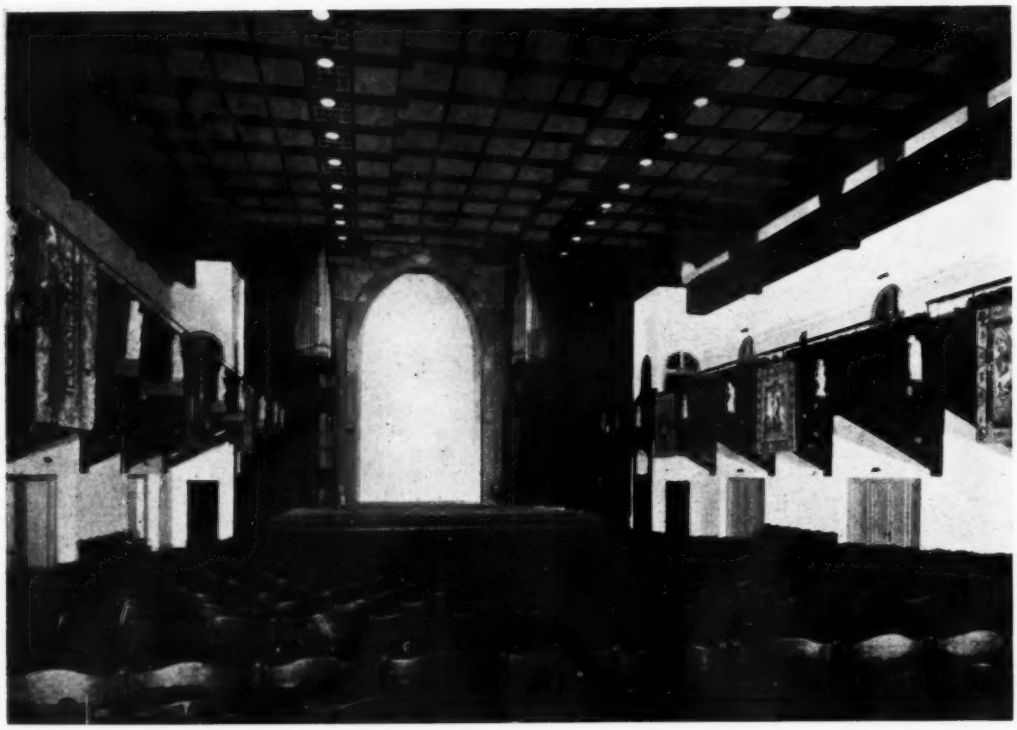


The Festival Playhouse, Salzburg. By Clemens Holzmeister. The street front.

The Festival Playhouse, Salzburg. By Clemens Holzmeister. Above, view from what was formerly the summer riding-school. Below, a gallery.



The Festival Playhouse, Salzburg. By Clemens Holzmeister. Above, frescoes by Anton Faistauer. Below, view of foyer.



The Festival Playhouse, Salzburg. By Clemens Holzmeister. The auditorium.

The Festival Playhouse, Salzburg. By Clemens Holzmeister. The city hall of reception.

but there is an absence of all pertaining to the usual theatre glamour.

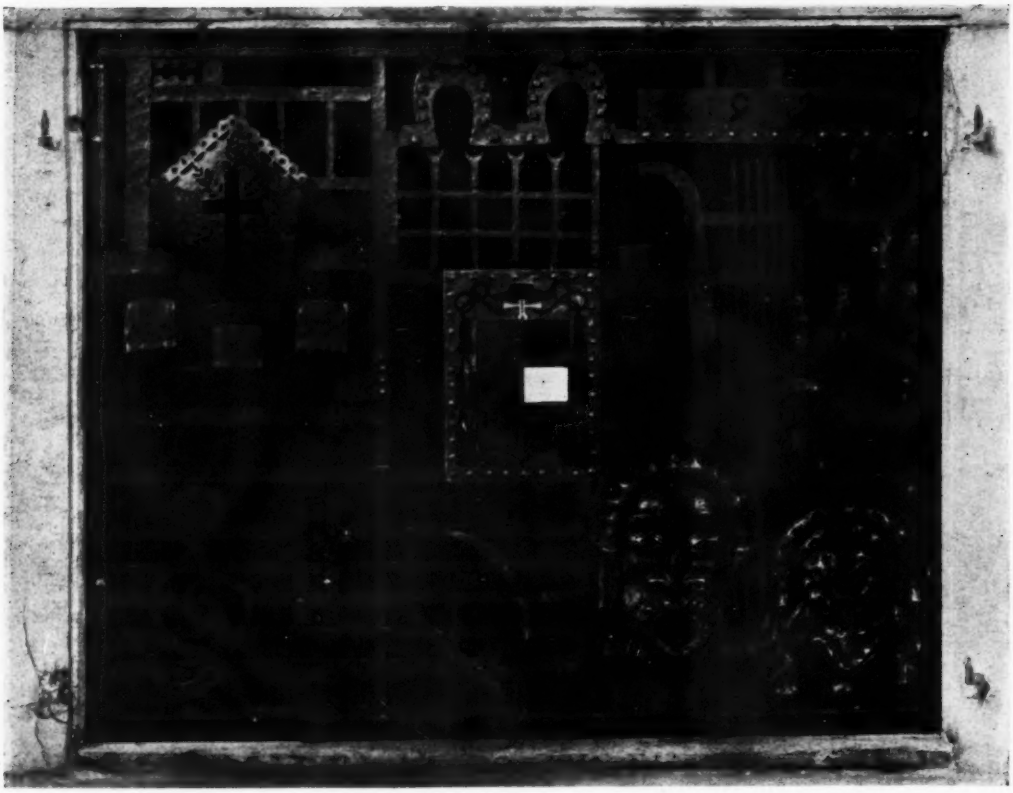
The upper part of the building, with the terrace, already existed, hence their baroque elements, and the lower part, which contains the entrance, is entirely new. The simple, harmonious lines are in accord with the entire façade. The terrace has a beautiful beamed roof; in fact, throughout the building the old woodwork has been retained. Briefly, the result of the additions and adaptations is a building suited to present-day requirements and bearing the stamp of freshness and modernness.

From the entrance one passes into broad corridors from which the cloakrooms, refreshment rooms, etc., are reached. The double corridors lead to the theatre and the City Hall, and between them is the foyer, decorated with lively frescoes showing scenes of theatrical and other entertainments in past days by the Austrian painter, Anton Faistauer. Other parts of the Playhouse are adorned with wall paintings by the same artist. The auditorium is the actual place of the old riding feats, and here all the woodwork has been retained, as well as the galleries. The galleries sculpture is by H. Pontiller, R. Bohr, and K. Bodingbauer, and the pendant banners were designed by A. Kolig and R. Andersen, and hand-woven in gobelin technique in the Gobelin weaving workshops in Vienna. The stage reaches into the auditorium. Owing to the construction of the old riding-school it was not possible to make a deep-set stage, neither does Reinhardt require one. He brings everything forward, so that wherever one may happen to sit one has full command of the whole of the stage and performers. Moreover, this is admirably adapted to the acoustical arrangements. The Salzburg authorities were anxious to have a civic hall which could be used at all periods of the year, and the old reception hall has been adapted for this purpose. The ceiling fresco was done in the eighteenth century by Alt, an Austrian painter. The electroliers are modern, and were designed specially by Professor Holzmeister. In the summer riding-school nothing has been altered. One side of the ground is filled in with the façade of the Playhouse, and behind is the Kollegium Church before the main entrance of which "Everyman," or another mystery or miracle play, is performed in the open. The boxes at the far end are hewn into the cliffs of the Mönchsberg. In former days it must have been an entrancing sight to witness the performance of the horses and their riders underneath the starry skies, with the soft moonbeams tempering the scene and with the Mönchsberg ranging above.

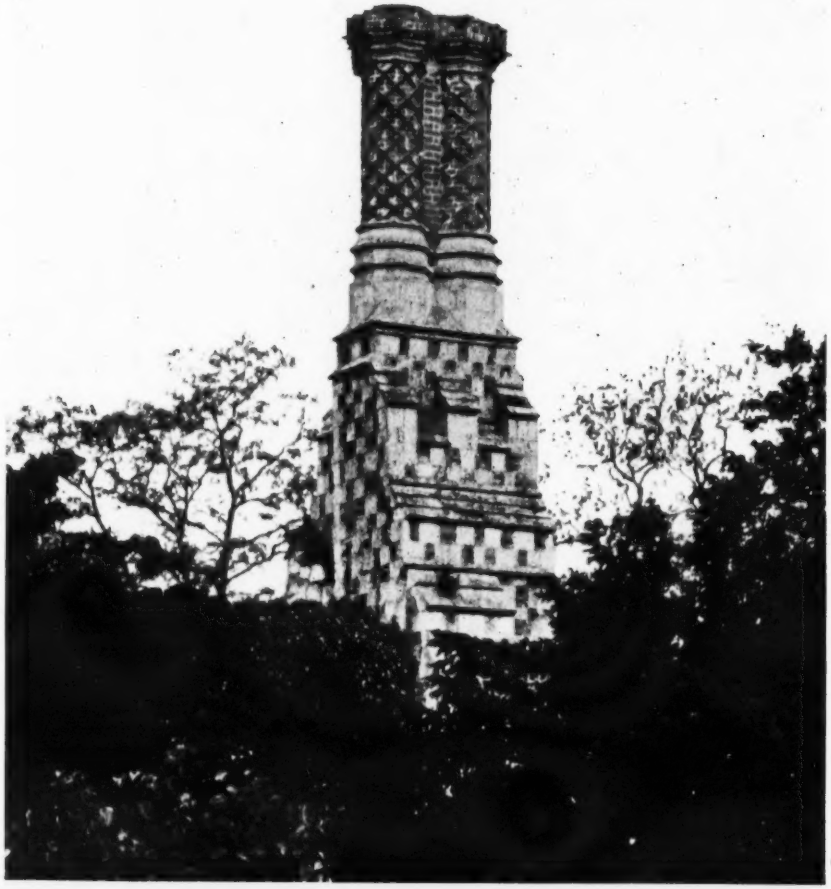
Professor Holzmeister has done good work. He was born in 1886 in Fulpmes in South Tyrol. He was called to Vienna over three years ago to fill the place of the late Professor Ohmann. He had already done considerable work in the Tyrol, and he has done still more since his appointment. Among his work are peasant homes in his native country, churches in Vorarlberg and elsewhere, dwelling-houses, villas, and a crematorium in Vienna. His is a sound architecture, essentially simple and modern. In the Festival Playhouse he has given something which, if not entirely new in architecture, is a serviceable, harmonious structure, masterful yet reticent, purposeful and beautiful. He studied at Vienna at the Technical College under Professors Ferstel, Krauss, and Simony. There he gained his Doctorate, after which he became an assistant there for six years, and then settled at Innsbruck, where he gained name and fame. From there he received his call to the Vienna Academy of Arts.

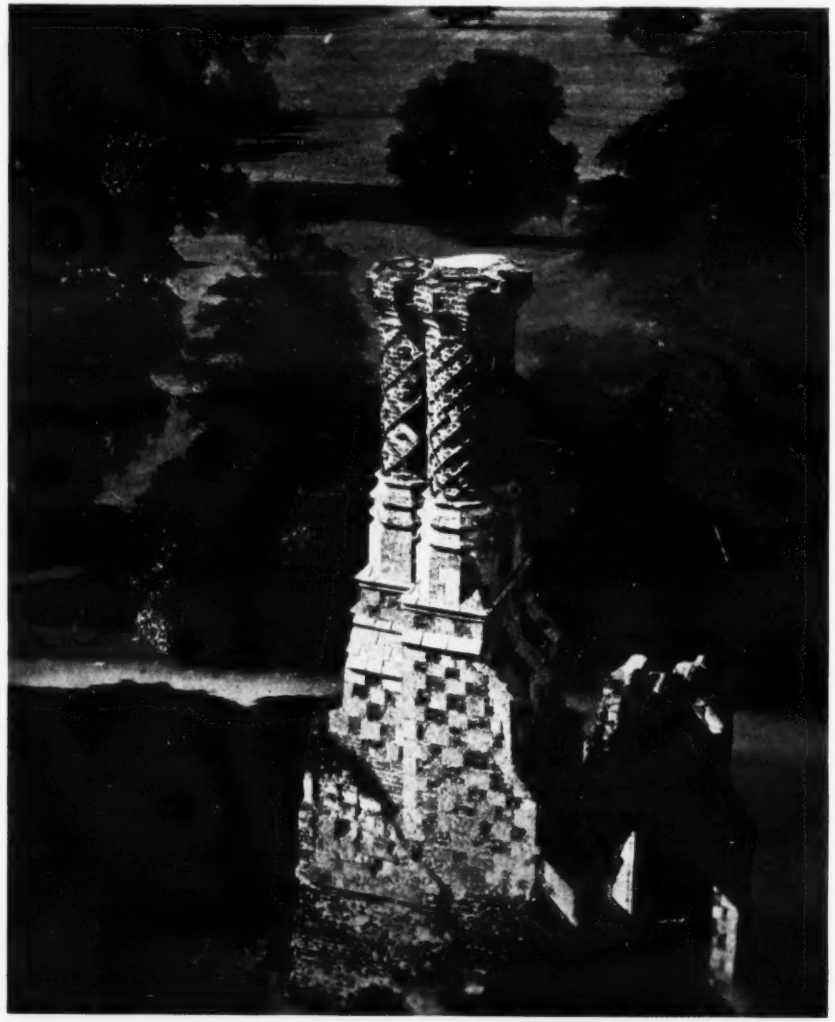
The Festival Playhouse, Salzburg. By Clemens Holzmeister. Banners by R. Andersen.

The Festival Playhouse, Salzburg. By Clemens Holzmeister. Banners by A. Kolig.



The Festival Playhouse, Salzburg. By Clemens Holzmeister. Above, a fireplace grille. Below, banners by A. Kolig.





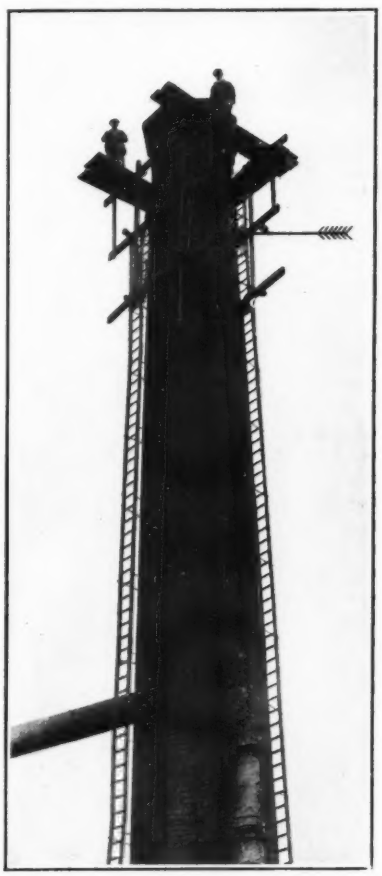
12 *Brick chimney shafts on stone base, at St. Osyth's Priory, Essex, first half of the sixteenth century. A charming feature of house building in the reign of Henry VIII was the brick chimney shaft, the "schanks" of which were moulded and rubbed into many forms. Perhaps the most remarkable are the twisted or screw-thread shafts, which were carried out in ingeniously diverse forms. Lozenge and square diapers, net patterns and quatrefoils were amongst other patterns in favour. The chimney illustrated suffers from the web of modern brickwork with which the shafts have been tied, but otherwise is in an excellent state; even the caps have not yet suffered mutilation by resetting of their bricks. The treatment of the stone base with its crenellated offsets, its chequer work in alternate stone and flint panels, and the admirable proportions of the whole are unsurpassed—probably unequalled.*—[NATHANIEL LLOYD.]

ENGLISH PRECEDENT

LIGHTNING CONDUCTORS, STEEPLEJACKS, AND THEIR WORK

[BY G. A. COLLIER]

IT is said the first lightning conductor was erected by one Divisch, a learned priest at Prendiz, Bohemia, in 1754. This lightning conductor was 130 ft. high, and, although blessed by certain influential people, it had to be taken down a year later because it occasioned a terrible drought!!! To Benjamin Franklin, however, is given the credit of investigating and inventing the lightning conductor. Up to 1881, however, knowledge of the subject was little, and there were no rules or requirements regarding protection against lightning. In this year, owing to the efforts of the Royal Meteorological Society, a report after much investigation was given, known as that of the Lightning Rod Conference, and a set of rules issued. In 1905, after a very exhaustive examination of the subject, a committee termed "The Lightning Research Committee" (of which Sir Oliver Lodge was a very active member) issued a report, rules and advice upon the subject, and mainly these rules stand good today.



A chimney after being struck by lightning. The conductor was of an obsolete type.

Lightning frequently discharges to the earth, instead of always from cloud to cloud. Imagine a cloud positively charged with electricity passing over the earth at a low altitude. The charge will induce on the earth's surface nearest it a charge of electricity of the opposite sign—negative—and when the difference in potential is sufficiently great, an electrical discharge between the two will take place. The point of contact is usually an object such as a building or tree. This type of discharge has been named by Sir Oliver Lodge as the "A" type. There is another type of flash called by him the "B" type. Think again of the "A" cloud approaching the earth. This cloud is positively charged, it passes over another cloud, the two clouds form a condenser, a discharge may take place from "A" to "B." The potential difference between the cloud "B" and the earth is suddenly enormously increased, with the result of a very violent discharge to earth.

All are familiar with the appearance of an ordinary lightning conductor on a chimney shaft or church. Crow's foot, or as usually termed multiple points, mounted on a rod and projecting above the building. The rod having a length of copper tape or rope taken to the ground, attached to an earthing plate or similar device. The popular idea is that a conductor is simply acting as a kind of drain pipe to conduct a flash of lightning, without undue ceremony, into the ground and lose it—true to a degree. An efficient lightning conductor, however, has to function in two ways. "A" as a preventative, "B" as a protective.

"A." Think again of the "A" flash inducting an earth charge. If a building be fitted with sufficient lightning conductor points the induced earth current will be provided with a path of escape, as a continuous brush discharge from the points. The continuous brush discharge from the points is not usually audible, and is termed "the silent discharge," although if rapid it can be heard as a crackling noise.

"B." Now, as to its protective capacity. The brush discharge from the points may be insufficient to prevent a disruptive discharge—as "A" or "B" flashes, and either of these would pass to the points—the brush action having prepared the way for this. In this event, providing the conductor system be efficient, the discharge, owing to brush action, would be greatly modified and pass to earth, through the excellent path provided for it, without damage or trace.

If the disruptive charge be very sudden, then the popular drain-pipe theory can be invoked and the protective action consists solely from its affording a better discharge path as an alternative from the building on which it is fixed, owing to its lower impedance and direct course.

Where a conductor is fixed passing or adjacent to an independent mass of metal, such as a lead roof, rainwater pipe, etc., in the event of the lightning conductor functioning, induced electricity may be produced in these masses of metal, and a sufficient tension attained to cause a disruptive flash between the metal and the lightning conductor, or any gas or water pipes, that may be in close proximity. Buildings have been fired through this cause. Fires occurred simultaneously in several buildings of an explosive factory in the year 1917, and were attributed to this cause. The importance attached to this question is shown by the fact that with danger buildings, explosive stores and the like, all metalwork, window frames, door hinges, rainwater pipes, gutters and heating pipes—in fact all metal, whether inside or outside the building, is bonded to the lightning conductor.

I have seen it stated in print—most emphatically—that it is 'ridiculous to suppose that a lightning conductor is capable of receiving a discharge and transmitting it to earth," saying that "the conductor would be destroyed by fusing." There are many cases sufficiently convincing to refute this. I would point out that actual contact with the lightning conductor need only show

[The above are extracts from a paper read by Mr. G. A. Collier before the Nottingham Society of Engineers.]

very slight evidence as regards fusing. The chimney illustrated on page 487 had a lightning conductor which had been allowed to get into a bad state. The conductor was of an obsolete type, fixed through insulators; the elevation rod or air terminal as it is sometimes called had broken away from its supporting holdfasts—in fact being of iron they had corroded away, allowing the elevation rod to fall about 6 ft. down, where it hung for some considerable time to my knowledge. The copper rope made a sharp right-angle bend near the base and was in two pieces looped together at the bend; no attempt at joining electrically. I predicted what might happen if it remained in its existing condition, and remarked that the top stones would be distributed on the surrounding houses. In February 1916 there was a snowstorm and one flash of lightning occurred. Afterwards I found that my words had become true.

The top of the chimney received the flash on the lightning conductor side, demolishing that particular cant and damaging the adjoining cants down so far as the elevation rod. The discharge was then taken to earth and dispersed. The evidence was:

a: Slight fusing of the copper rod at the uppermost point;

b: Fusing rather less at the alleged joint in the two copper ropes.

This is a good illustration of *a*: The fallacy of saying that a lightning conductor cannot take a discharge because the conductor would be destroyed by melting or fusing, and *b*: the necessity of a lightning conductor being kept in proper working condition.

It might be asked, Was not the defective conductor an attraction and therefore the primary cause of the damage, or was it functioning as a preventative and passing the brush discharge? I would answer "No" because of the following reasons:

1: Remember the air terminal was in a hanging position several feet below the top.

2: There were no points to facilitate the brush discharge—just the rod bent over.

3: The damage undoubtedly commenced at the extreme top of the chimney, otherwise a hole would have been punched into the brickwork near the uppermost part of the rod, leaving some of the top brickwork or stones above this point (luckily, no damage to life occurred).

4: Conditions were not favourable. Just one flash in a snowstorm. The heated column of air through the chimney would probably be the attraction.

The discharge I should say would be a "B" one—some portions of stone and brick were projected 80 ft. Afterwards I fixed two conductors.

The components of a simple lightning conductor are:

a: Air terminal, or sometimes called elevation rod. This being the uppermost part of the conductor should project two or three feet above the part of building on which it is to be fixed.

b: The path of copper ribbon usually called tape—sometimes copper rope is used.

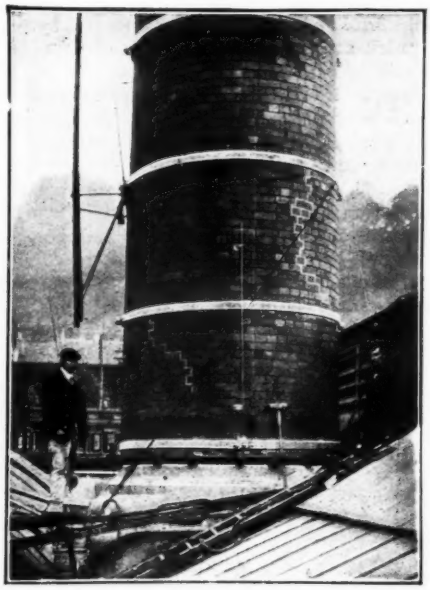
c: The holdfasts for fixing the conductor.

d: The earth termination.

The selection of these fittings should depend upon the class of building to be protected. For instance, a house does not require such a heavy conductor as a factory chimney. It has the same brand of lightning to deal with, but naturally the air terminal of a chimney shaft is subject to greater wastage owing to heat and fumes. The latter usually are sulphurous, and with moisture in the atmosphere chemically attack the copper, and cause wastage by corrosion. Therefore on a factory chimney shaft it is advisable to use solid copper, not less than ¾ in. and preferably of 1 in. diameter. The holdfasts or fixings for the conductor only perform a mechanical duty, but, as with most things, the best are always the cheapest, and the holdfasts built in or caulked in with lead are permanent—clips and nails are not.

The earth termination is the most important part of the conductor, but alas! as this is not seen it is very often taken for granted. In testing lightning conductors I have frequently found the earth termination was only "reputed." A few months ago, testing the conductor on a powder magazine of a mine. I had to condemn the earth on account of resistance, and recommended it to be excavated and examined. Result—the copper rope was simply stuck into the ground a few inches, without any earth terminal.

The usual form of earth termination is a copper sheet, varying from two superficial feet up to 16 ft., thicknesses 1/16 in. or 1/8 in.



A chimney shaft at the Bath Electricity Works, after straightening.

The advantage of the 1/8 in. plate is that it lasts a much longer time—there is actually no gain in efficiency otherwise. The plate or sheet should be buried horizontally, at a depth according to the nature of the ground. For instance, it is better 5 ft. down, if the ground is of the same nature down to this depth, as it stands a chance of always being, even in times of drought, in moderately moist earth. If placed close to the surface, the ground may become very dry and result in loss of efficiency at a period when most required. If the soil be shallow, say 2 or 3 ft. with sand, chalk or rock below, then it is better to keep the plate near the surface and improve the conditions by:

1: Increasing the area of the plate.

2: Embedding it in either charcoal or carbon—never coke.

3: Allowing rainwater to drain to the plate.

You will note I advise against the use of coke, although I have often seen it recommended and indeed sometimes specified. It should be obvious that coke, containing a large proportion of sulphur, is bound to attack copper, when moisture is present.

Tests are a simple matter really, but the judgment as to what is good and bad, is where experience wins. As to the method—one consists of passing an electric current of known voltage through the lightning conductor and earth, ascertaining the amount of current taken, applying the ohms law which gives the resistance. Thus, if there be a bad joint or break, the resistance, previously referred to as impedance, would be high, and the conductor not efficient. It may be, however, that the conductor be perfect mechanically and electrically, and the impedance high—well, this is the fault of the ground. If the earth termination is in dry sand, chalk or rock, this will occur even if all steps to improve it are taken. Well, then, nothing more can be done—but the conductor will be efficient, because the path provided by the conductor will be much less in resistance to earth than the building it protects.

Lightning conductors are usually fixed by steeplejacks. Here are a few of the jobs that may fall to the lot of the steeplejack:

1: Repairing church spires, pointing, taking down faulty masonry, and replacing with new.

2: Felling chimney shafts.

3: Taking down brick by brick dangerous or obsolete chimney shafts.

4: Straightening ditto.

5: Raising or heightening ditto.

6: Repairs to inaccessible roofs, such as on lofty turrets, re-slating, tiling, painting, gilding clocks, and ornamental metal work at heights, repairs to rainwater pipes, plumbing, etc.

7: Building new chimneys.

The method of straightening a brick chimney shaft consists of cutting or sawing through the base of the opposite side to the lean, allowing the portion of the chimney above the cut to lower gradually into the cut a sufficient distance to counteract the lean and then make good the brickwork which has been removed.

I illustrate a chimney shaft at the Bath Electricity Works. The chimney is a round one, of brick, total height 120 ft. (105 ft. of circular on a square base, 15 ft.). Owing to bad foundations it developed a lean of 25 in. It was decided to try and arrest the movement by straightening, and this was successfully done.

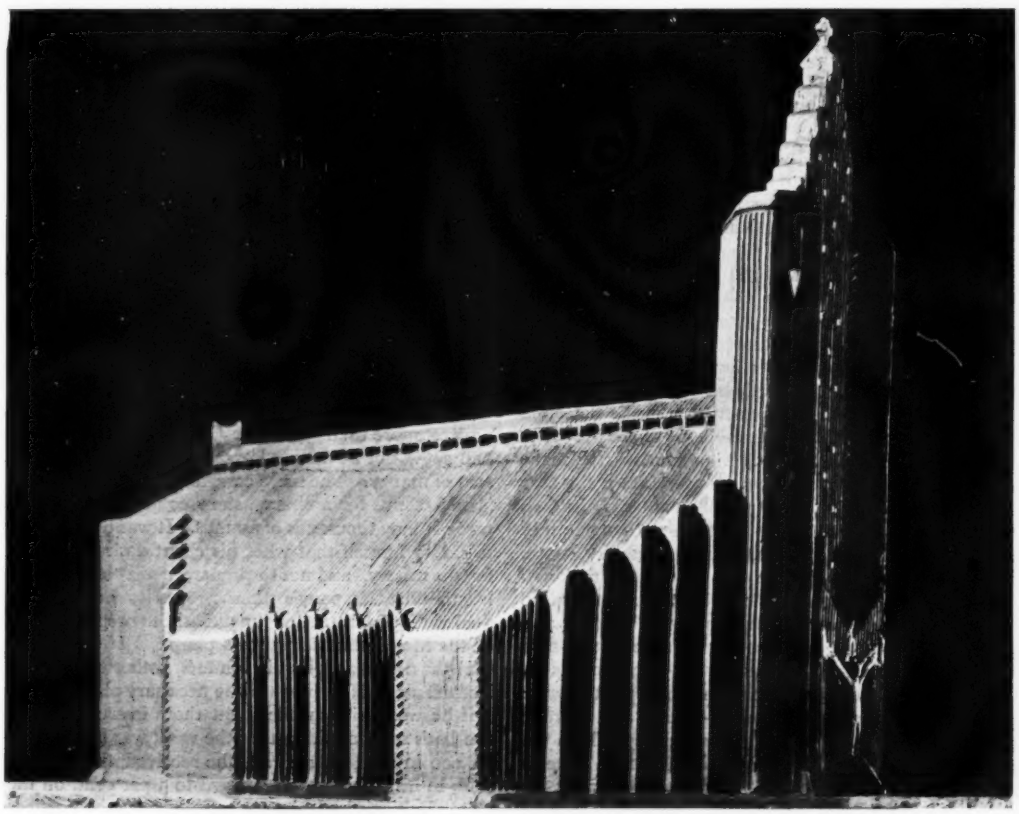
The first thing to do was to ladder, place a beam across the top, and lower a plumb bob to the bottom, inside the chimney. The amount of lean and direction was thus ascertained. The next thing was, where to cut. The chimney is surrounded by roofs and adjoins a railway line, and clear working at the bottom was difficult. We decided, therefore, at the bottom of the circular portion immediately above the base was our best place.

The next thing to do was to make and fix an iron band immediately over the brickwork to be cut. At four points equidistant, 35 ft. above the intended cut, we then drove dogs or spikes into the chimney, each spike projecting a like distance, about 9 in. No. 1 spike was driven first and on the side opposite to the lean, and a line and plumb bob attached. This was adjusted to hang clear of the chimney; then the others were fixed. Naturally, the first one governed the distance at which the plumb lines were fixed from the shaft, because this bob, owing to the lean, was nearest the chimney, the opposite one on the leaning side hanging farther away. The accurate adjustment is most important.

The next operation was to cut out a course of brickwork right through to the inside of the chimney, and we commenced doing this at No. 1 plumb bob, working equally to right and left. As we got a clear opening through the wall, we inserted steel wedges —two, one on the other—with a flat steel plate as a bed for them. As the cut progresses, more of these wedges are inserted at distances of 9 in. apart, the top wedge in each case slightly overhanging and tapped in—not hammered with a sledge, but fairly tight.

Well, we know that the movement we require cannot take place until we approach the gravity line, and as the chimney is leaning we can expect to cut about half the circumference. Similar conditions to cutting for a fall now prevail, and, as we get on with the cutting, being careful to work equally right and left, we test the wedges. Comes a time when we find the brickwork is crushing on to the wedges below No. 1 plumb bob. This is where the steel band is useful. It holds the brickwork immediately above the cut and prevents it crushing. (I know of one case where the band was not used, and the weight caused the bricks to crush and some fall out, giving a very bad few minutes to the men.)

Well, we are now at the critical part of the job—the weight is on the wedges. You can see actually they carry the same proportion of the total weight of the chimney as was done by the bricks removed; if the wedges were now removed the chimney would fall.



The new Cathedral of the Christ, Cork, Ireland. By Barry Byrne (Chicago). Building work has just started.

We want the greatest deviation to come on Wedge No. 1, so we gently tap the upper wedge sideways, and draw it just a fraction, but it must still be fairly tight. The same is done with each of the others—must be kept equal weight, not let any be slack. This done, we examine the plumb bobs, and from these we find whether the shaft is moving in the way required—perhaps it is going slightly to the left. We counteract this by easing the wedges on the right; or if inclining to the right, then the left hand wedges get attention.

After careful manœuvring in this manner we get close to our requirements to, say, 1/8 in. in the 35 ft. We won't go closer as settlement must be allowed for. We commence now to build back, starting at the ends of the cut. Specially cut bricks will have to be built in if the job is to be sound. We remove the end wedges at these points, taking care it is always the opposite pairs, and finish with the centre one at No. 1. If we now look at the back of the shaft, we shall find there is a longitudinal crack. This has to be made good by cutting out and building in, if a large one. We then plumbed the chimney from the top, inside, and found to the chief engineer's and our own satisfaction that it was only 3/16 in. out of vertical.

LAW REPORTS

ARCHITECT'S CLAIM FOR FEES

Ingram v. Supershous (Battersea) Ltd. King's Bench Division. Before Mr. Justice Salter

In the King's Bench Division, Mr. Justice Salter delivered a considered judgment on a claim by Mr. Geo. Ingram, F.R.I.B.A., of Verulam Buildings, Gray's Inn, against Supershows (Battersea) Ltd., of Wandsworth Road, to recover the sum of £1,021 for fees alleged to be due for services rendered as architect and surveyor, and to recover certain payments made in such capacity. Defendant denied liability beyond an agreed sum of £200.

Mr. Holman Gregory, K.C., and Mr. Burton appeared for the plaintiff, and Mr. J. P. Eddy for the defendant.

The facts of the case are fully given in his lordship's judgment.

His lordship said the questions he had to consider were: Was there on the part of the plaintiff such a fundamental breach of the contract of employment as would justify the defendant rescinding it? and if so, was it rescinded? and if not, what is a fair and proper amount due to the plaintiff on a *quantum meruit*? and, lastly, there was the question of damages for breach of contract, if it were shown he was entitled to any.

The facts were as follow: In June 1924, or a little before, the defendant had been in negotiation with Messrs. Meux, the brewers, in regard to securing the lease of certain property belonging to them. The property was situated in the York Road, Battersea, and consisted of two public-houses almost adjoining each other, the "Royal Standard" and the "Washington," and in the rear a music-hall, which had been known as the Battersea Empire. Defendant was negotiating for the lease of the property, and if he could acquire it defendant's intention was to make certain alterations with a view to using the premises in the rear for the purposes of a cinema theatre. Defendant did, in fact, obtain a lease for forty years, and it was a term of the lease that the defendant should expend £5,000, and, if necessary, more, in decorations and repairs, and that he should complete the work by the end of 1924. The proposal for converting the hall into a cinema involved, of course, some alterations to the building and redecoration. Defendant had been in communication with a firm of builders, the Monolithic Company, upon the question of conversion, and it was understood that they were to do all the work proposed, both to the music-hall and public-houses, and that the alterations to the hall were to cost £4,500, and the work on the public-houses £2,000, being £6,500 in all. In that state of things the defendant consulted the plaintiff, and the terms of the service was that the plaintiff was to prepare the necessary plans for approval by the licensing justices, and prepare detailed specifications and obtain competitive prices for the work. This was set out in a letter of June 19, 1924, and also the remuneration he was to receive, which was put at the lump sum of £200. Under that agreement plaintiff was to do everything as to the cinema, except the preparation of the plans, because they had been prepared by the Monolithic Company. Those were the original terms of employment. The defendant alleged in his defence that it was a condition fundamental to the employment of the plaintiff that this work should not cost more than £8,000 at the outset. Plaintiff denied that, and said no proposed expenditure was ever discussed. His lordship said that was one of the questions he had to consider. It seemed to him that the probability was, as the defendant had said, that he told the plaintiff that the work was not to cost more than £8,000. That was the amount the defendant said he was prepared to go to, and it seemed to his lordship that the defendant would discuss that amount with his architect. He was completely unable to accept the suggestion that a competent architect at the outset of the work was not able to give his client any reasonably approximate estimate of what any given plan or scheme might cost. The scale of the R.I.B.A. contemplated this as being one of the essential duties of an architect at the very outset of his service. It was extremely probable that a person engaging an architect would make it a condition of employment to keep within the limit he had conceived. The total expenditure had been fixed more or less by the defendant, and from the circumstances of this case it appeared to point to the fact that the defendant told the plaintiff that his outside limit of expenditure was £8,000.

In April 1925 tenders were received on the plans which the plaintiff had prepared, and the highest tender was £24,000, and the lowest £21,000. His lordship was satisfied that the defendant protested when this information came to his knowledge, as he regarded his limit as £8,000. He was satisfied there was an interview between the plaintiff and defendant, at which the position was discussed, and defendant went through and examined the bill of quantities. In July the defendant wrote the plaintiff and hoped that the alterations would be kept down to between £7,000 and £8,000. There was no denial that the work was not to cost £8,000. That was not all, for the defendant asked: What have you to say for this disregard of my instructions? The letter was in express terms; and later there was a similar letter. The letter was that of a business man anxious not to have a bill for extras. The probabilities were overwhelmingly in favour of the defendant, and the correspondence was conclusive. But that was not the whole position, for he had the evidence of Mr. Conolley. He was in the employ of the defendant, but he had long since left that employment. He was present at some of the interviews between the plaintiff and defendant, and his evidence was that at all these interviews defendant continually impressed upon the plaintiff that this work must not go beyond £7,000 or £8,000, and that the work must be schemed and planned accordingly. He had no hesitation in saying that the employment of the plaintiff by the defendant from the first was on the fundamental condition that the plans must be so drawn, or arranged, that this work should not cost more than £7,000 or £8,000. No one suggested that this hall could not be adapted except with the expenditure of a large sum of money. The mere carrying out of alterations and making arrangements for a cinema show could not involve the expenditure of many thousands of pounds. It was the duty of an architect to satisfy himself that what his client desired could not be done for the money, and not to prepare plans that were useless. The Monolithic Company's plans proved to be useless. Defendant denied that he instructed the plaintiff to prepare plans in the place of the Monolithic Company's plans. His lordship was satisfied that the defendant, by his conduct, rather than by his words, did instruct plaintiff to prepare the necessary plans for reconstruction. But he was quite satisfied that those instructions were given on the basis and condition that the work was not to cost more than £8,000 in all. Plaintiff said he received those instructions, and said, in his view, he was entitled to 5 per cent. on the cost. If it were made, his lordship was satisfied that the parties had in contemplation about £400, being 5 per cent. on the £8,000. Throughout the defendant was continually urging dispatch. Plaintiff

prepared the plans and they were sent for approval. There was a dispute about a quantity surveyor retained by the plaintiff. He was satisfied that the defendant did intend to have tenders and to submit the matter to open competition, and that it was the custom of the trade so to do, and it involved obtaining quantities. It was unnecessary for his lordship to decide whether his employment was authorized or not. He thought there was a fundamental breach of the contract of employment by the plaintiff. In his opinion, if the defendant had then elected to rescind, he would then have been within his legal rights. No complaint was made about the plaintiff's work on the public-houses. But it was quite clear and obvious that the defendant did not so elect. The tenders received were very high, and in his opinion no effort was made to cut down the plans and bring them within the limit; but the right to rescind was gone. Then there followed delay, and Messrs. Meux complained. The delay was due to plans. Whose fault was that? It was that of the plaintiff. Defendant wrote three times for specifications promised him, and receiving no satisfactory reply he, in September 1925, withdrew his instructions. The lowest tender that had been received for the work was some £21,000. His lordship thought there was some breach of contract on the part of the plaintiff on the ground of delay, but it would not justify the right to rescind. Under these circumstances the plaintiff was entitled to recover on a *quantum meruit*, subject to the defendant's counterclaim. The *quantum meruit* he had considered with great care. He could not allow anything for time and skill expended on the revised plans, as that was work brought about by the fault of the plaintiff. The counterclaim was for delay. He thought there was some delay, and that it involved some pecuniary loss to the defendant. Mr. Fermand, F.R.I.B.A., was afterwards employed to do the work, and he prepared plans, obtained consents, etc. Mr. Fermand received £260, and that was a guide to his lordship in this matter. He thought the fair and proper sum for the plaintiff to receive for his services was £200, having taken into account the counterclaim. He did not think plaintiff could recover the sum he paid the quantity surveyor. Judgment for plaintiff for £200 and costs, defendant to have the costs of the issues on which he succeeded.

ELEVATION AND ARCHITECTURAL DECORATION: IMPORTANT JUDGMENT

Westminster Bank v. *Salter and the United Sweet Stores, Ltd. Chancery Division. Before Mr. Justice Tomlin*

This action was one of much interest and importance to the architectural profession, having regard to the legal decision of points in regard to elevation and architectural decoration.

The Westminster Bank brought an action to recover damages for alleged breach of covenants in a sub-lease granted by them to Joseph Salter, of 17a Mount Pleasant, and assigned by him to the United Sweet Stores, and they also sought a mandatory order upon the defendants to restore the shop to its former condition. The defendants denied that there had been any breach of the covenants and counterclaimed for a declaration to that effect.

Mr. Gavin Simonds, K.C., and Mr. Cunliffe appeared for the plaintiffs; Mr. Spens, K.C., and Mr. Evershed for the defendant company; Mr. Roxburgh for Mr. Salter, and Mr. Farwell, K.C., and Mr. Hunt for the ground landlord, Sir Robert Gower.

Mr. Gavin Simonds said that the head lease and the sub-lease contained convenants that the tenant must not cut, maim or alter any part of the principal timbers or walls of the shop, or erect any new or additional building or wall, or make any alteration in the plan or elevation or architectural decoration of the premises. The defendants had taken out the shop front and replaced it with a highly ornamental front with a particularly small window. It was for his lordship to say what alteration in elevation or architectural decoration was, but he thought it could hardly be said that the alterations made were reasonably incidental to the carrying on of the business. The bank was quite willing to allow the alterations to be made; but since the ground landlord, Sir Robert Gower, refused his consent they had no option but to ask for a mandatory order.

Mr. Stanley Philpot, architect, High Street, Tunbridge Wells, who inspected the alterations, said that in his view there had been a clear breach of the covenants.

Mr. Spens said that all that had been done was to take out an old, temporary shop front and put in a new one with a filling of plaster and tiles. He argued that a temporary shop front could not have any architectural decoration. A plate-glass window could not be architectural decoration, and no architectural decoration could be found on the premises. If elevation meant external aspect, he agreed that it had been altered, but submitted that there must be a substantial alteration or otherwise the covenant would be extremely burdensome.

Mr. W. H. Woodroff, of Messrs. W. H. Woodroff and Son, architects, Bedford Row, giving evidence for the defence, said that in his view the shop front was no part of the structure.

Mr. Walter Epps, F.R.I.B.A., Bank Chambers, High Holborn, said that in his opinion the special architectural meaning of "principal walls" constituted either part, internal or external walls, and in the same sense "principal timbers" meant the principal rafter in the main roof.

His lordship, in giving judgment, said: The question is whether what has been done is a breach of covenant. I have heard much debate on the matter and I have been referred to a number of cases, and, as is usual in matters of this sort, one case is of very little assistance when one is dealing with another. Having regard to the view I take of the meaning of elevation, make it as narrow as you will, there has been an alteration in the elevation by reason of the complete alteration in the window plan. That, of course, is the real matter of substance, because the window plan has been altered in such a way that the premises may not be suitable for another tenant, while the company who has made the alteration has put itself under no obligation to restore matters to their original condition or to some other suitable condition when they come to the end of their tenancy. I am, therefore, of opinion that, speaking generally, there has been a breach of this covenant and that in particular the window alteration is an alteration in the elevation within the meaning of the covenants.

It is next said on the part of the defendant company that if it is so, the matter is one in which I ought not to make any mandatory order. My attention has been called to some cases upon that point, but I am clearly of opinion that this is essentially a case where I ought to make a mandatory order. There is no evidence by the defendants that the alteration is not a material one. To my mind, on the materials before me, everything points to it being a material one; the course which the defendants have adopted seems to me to be one which renders it essential, if I am to do what is equity, to make an order upon them to restore to its former condition that which they ought never to have altered without a licence. It is, however, obvious that many of the alterations are matters of unimportance, and the plaintiffs now being content with a restoration of the window area, I propose to make a declaration to the effect that the works carried out by the defendant company were a breach of the covenants contained in the under-lease and to order them to restore the window area, but not to include in the mandatory order anything more. So far as the first defendant is concerned, he cannot resist the liability for damages. Of course, against him there should be no injunction. In the circumstances I do not see my way to make any distinction in regard to costs so far as he is concerned. There will therefore be an inquiry as to damages against both defendants, and an order for costs against both in favour of the plaintiffs.

Now that leaves me with the counterclaim, and the counterclaim is a counterclaim by the defendant company against the bank and the head lessor. So far as Sir Robert Gower is concerned, I am unable to see upon what any action against Sir Robert Gower, who is not a party to the under-lease, can be based for a construction of the under-lease. That seems to me to be misconceived. With regard to the head-lease, inasmuch as the defendant company is not a party to the head-lease, I am unable to see how they can have any right of action for a declaration as to the construction of the head-lease against either Sir Robert Gower or against the Westminster Bank. The question is whether, in those circumstances,

the defendant company have any such right to relief as they seek in the counterclaim. In my judgment the counterclaim in this respect is misconceived. It is quite true that the relief must be sought before re-entry, but it is equally true that relief cannot be sought unless the lessor is proceeding by action or otherwise to enforce a right of re-entry or forfeiture. In my judgment the serving of the statutory notice is not a proceeding otherwise to enforce a right of re-entry or forfeiture; it is a condition precedent to doing that particular thing. That is to say, you do not qualify yourself to do it until you have served the notice; but you cannot be said to be doing a thing when you are only qualifying yourself to do it. That being so, so far as the service of the notice is concerned, I do not think he was proceeding to enforce, and nothing has happened since to justify the view that he is today proceeding to enforce within the meaning of the section.

The result, I think, is this, that the counterclaim fails and must be dismissed, with costs.

IN PARLIAMENT

[BY OUR SPECIAL REPRESENTATIVE]

There is at least some hope that steps may be taken to prevent the disfigurement of the countryside by the erection of unsightly petrol pumps and filling stations. The House of Commons recently passed a motion instructing the Committee which would consider the Petroleum Amendment Bill "to make provision for enabling local authorities to make by-laws for preventing injury being caused by petroleum-filling stations to the amenities of rural scenery and places of historic beauty and interest."

The Committee lost no time in acting on this instruction, and inserted a new clause in the Bill providing that existing structures should not be disturbed for two years, but giving county councils and borough councils the power to make by-laws in respect of new erections, enforcing such designs as will be in consonance with the amenities of the neighbourhood.

An attempt was made, during the report stage of the Rating and Valuation Bill, to induce the Government to accept a new clause, moved by Mr. Rye, the Unionist member for Loughborough, providing that a special deduction from rateable value shall be allowed for structural repairs which have been rendered necessary in consequence of damage directly attributable to passing motor traffic. Heavy motor traffic, he said, seriously affected premises which, in normal conditions, would stand for many years, and in some cases rebuilding had become necessary. Ceilings had fallen, and the value of the hereditaments had been reduced.

Mr. Chamberlain, however, said he was unable to accept the proposal, which would prevent that uniformity of valuation throughout the country which the Bill sought to establish. The ratepayer who suffered injury from heavy traffic could take the matter into the courts or await revaluation, when he could put in a reasonable claim for reduction of gross value.

The new clause was negatived.

Two interesting matters were raised in the House of Lords. The first was on the consideration of the report from the Select Committee of the House of Lords Offices. Lord Crawford said that the fourth paragraph of the report referred to the Royal Gallery and the war memorial of the House of Lords. The committee had recorded its opinion that designs in connection both with the memorial and with the proposed decoration of the Royal Gallery should be referred forthwith to the Royal Fine Art Commission. As a member of that Commission, he said that if the House expressed such a wish, his colleagues on the Commission would do their utmost to be of service. The subject was one of real complexity, and advice had already been offered on several questions connected with the war memorial. He doubted if his colleagues would be in a position to add anything to their views about the memorial itself, but a new issue would be brought before them arising from the projected decoration of the gallery. That certainly raised points of great interest and great difficulty, because any large scheme of mural decoration must be considered in relation to the scale of the gallery itself, and equally in relation to the two great pictures by Maclise, from one of which the gallery took one of its names. Furthermore, the relation of a large suite of paintings to the war memorial was naturally of great importance.

The other matter arose during the second reading of the Bermondsey Borough Council (St. Olave's Garden) Bill, when Lord Arnold explained that, under an Act of 1918, St. Olave's Church was to be demolished, only the tower remaining. Half the site of the church and the churchyard were to be vested in the Bermondsey Borough Council and used as an open space. The other half was to be sold by the trustees, and the proceeds were to be used for the erection of churches in the newly-developed areas of South London. It was eventually purchased by the proprietors of Hay's Wharf. But this so-called open space had become useless for its purpose, and it was now proposed, under the Bill, to sell the second half of the St. Olave's site to the proprietors of Hay's Wharf, who were prepared to buy it for £10,000, the same sum as they gave for the first half. An open space would be provided elsewhere. Hay's Wharf proprietors would erect a building on the half site, but the first floor would be so high that 100 motor vehicles could be parked on the ground floor. The tower, which stood on the sixth of an acre, was of no real historical or artistic value, and it would be demolished.

The Bill was read a second time.

In the House of Commons, Mr. Chamberlain, the Minister of Health, informed Mr. Adamson that the number of houses completed under the Housing, etc., Act, 1923, during January 1928 was 2,256, and during February 1928, 2,684; under the Housing (Financial Provisions) Act, 1924, the numbers completed during the same months were 3,703 and 3,939 respectively. The numbers authorized for erection but not completed by March 1 were 85,298 under the Act of 1923, and 59,194 under the Act of 1924.

CORRESPONDENCE

WHY I WROTE THIS ADVERTISEMENT

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—All robust controversialists will welcome the appearance of Mr. Warwick Wright as a contributor to your JOURNAL, for Mr. Wright asks himself a very simple question and then covers a page and a half in answering it. He has discovered commercial possibilities in the fine old English sport of architect-baiting, and has developed the astonishing theory that his opinions on buildings will encourage people to buy motor-cars.

If I really thought that Mr. Wright believed in theories of this sort I should be prepared to test them by calling upon him in order to explain my views on motor-cars. Mr. Wright, confident in his theory, would then recognize my ignorance of motor-cars by entrusting me with a commission to design a building for him. I shall not call on Mr. Wright, however, because I am certain that he would only throw me out of his shop.

Mr. Wright says loudly that: "The mere sight of some of the new blocks of flats is enough to make you want to get right away into the country." His time has obviously been so fully occupied in writing architectural criticisms and "visiting most of the cities of both the old and new worlds" that he is still unaware of the fact that the English countryside has practically disappeared behind a creeping barrage of advertisements imploring pedestrians to purchase motor-cars, beseeching wayfarers to make mental notes of innumerable brands of oil and petrol and pneumatic tyres, and reminding careless fellows such as myself of the existence of the easy payment system. If anybody desires to see the last remnants of the English countryside before they are all gone, they had better hurry along to No. 150 New Bond Street (Mayfair 2904) and see Mr. Wright at once about a car.

Again, all true citizens are interested in the smoke problem, and will agree with Mr. Wright that smoke ought not to be allowed to belch from chimneys of new blocks of flats. How splendid it would be, too, if purple, green, and yellow fumes were not allowed

to belch into the faces of pedestrians from those queer little pieces of pipe that jut out behind motor-cars! I trust Mr. Wright will look into this matter also as soon as ever he can spare the time to do so, as I am rather tired of having my clothing scorched on attempting to cross any public thoroughfare during a traffic block.

It is to be hoped that Mr. Warwick Wright will continue his literary work in order to induce people to buy motor-cars. The more cars he sells, the more showrooms and factories he will obviously require. Mr. Wright may, of course, decide to design such new premises himself. In that case, however, I am sure he will find himself far too busy even to write advertisements about architects, and your JOURNAL will lose its most humorous contributor.

F. R. JELLEY

THE EXHIBITION OF WORKING DRAWINGS

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—The working drawings exhibited at the R.I.B.A. were intended as models for the instruction of students. Of their neatness and architectural character there can be no criticism, but some of the fundamental rules of setting out were ignored in nearly all the drawings, and some of the drawings revealed the absence of nearly every precaution the draughtsman should take for the safe execution of the work.

On all drawings it is advisable to have a drawn scale, even on full-sized details when there is a doubt about the printing process. Some of the drawings had no reference to scale at all, neither in diagram nor in words, and it is not safe to rely on all the contractors and sub-contractors who have to handle the drawings being conversant with the customs of the profession. The north point was never in evidence, neither on some drawings were the streets named, and thus the quick identification of the site would be difficult.

It is a vital principle that all floor heights should be figured from floor to floor, yet some I noticed were figured from floor to ceiling. The stairs would be made in the joinery shop, and any slight variation in the depth of joist or thickness of floor-board or plaster would alter the floor level, and the difference would be made out in the top stair! If floor to floor dimensions are shown and followed, any variation occurs in ceiling height, which rarely upsets the finished result.

An horizontal datum, usually ground-floor level, should be the basis of all vertical dimensions, which should be figured from floor to floor, up and down from this datum. All steps should be numbered continuously up and down from this datum and not from floor to floor.

Door openings should be figured with the finished sizes of the opening, and not the sizes of the carcass, as the finished size is the effect that is wanted, and the brick opening sizes must be calculated from the linings and bracketings and grounds and the finished size dimension by the contractor.

All fireplace openings should be numbered and the flues should bear these same numbers up to the top of the stacks on each plan on which they occur. This is very necessary and was ignored by most of the drawings. The way of the joists and of the strutting in a wooden floor should be indicated on plan and not left to the contractor. R. S. J.'s should be lettered with reference letters, and the letters should be used in the schedule in the specification in which they are described. This was also ignored on most of the drawings, but aids quick reference to the steelwork.

When a long dimension is figured and is subdivided by several unequal divisions of plan, all the subdivisions should not be figured. This is not because of any doubt of the draughtsman's addition, but because the finish may be varied during the course of the work, and if all the dimensions are figured, the foreman is left to decide which divisions must be sacrificed. If the unimportant divisions whose dimensions do not matter are left undimensioned, this will emphasize the important ones of which the dimensions must be strictly followed. Equal subdivisions should not, for the same reason, be figured, but indicated in words as "equal," as an equal finish is required, and some figures may be varied without instructions being given as to others.

Heading notes were not greatly in evidence. Here are some very essential ones:

"All dimensions for setting out to be taken from the actual work."

"See also half-inch and full-sized details."

"Figured sizes of doors are finished sizes."

"All flues to be 9 in. by 9 in. except ————."

"Setting out and datum to be agreed upon site."

"Heights shown indicate finished floor levels."

"All stairs are figured up and down from datum, which is ground-floor level."

All these precautions go to make the job foolproof and leave the architect free from worry.

A. STANLEY ROBERTS

A.B.S. SCHEME OF HOUSE PURCHASE

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—May I emphasize a feature of the A.B.S. scheme of house purchase, which seems to me particularly worthy of notice, and which has already attracted the attention of a large number of practising architects? The outline of the scheme, which was explained in detail in a letter to all members of the Institute in Great Britain last November, is that the purchase or the erection of a house is made easy and immediately possible by an advance of 75 per cent. of the certified amount of the value of the property mortgaged, repayable over a period of fifteen or twenty years, by means of an endowment assurance.

The point I wish to make is that this scheme is not confined to architects, but extends also to their clients. Provided the house is designed by an architect and the applicant is introduced by a member of the Institute, the Architects' Benevolent Society will gladly enrol him on their lists and make him free of all the advantages and concessions which are embodied by the scheme.

All inquiries should be addressed to the Secretary, Architects' Benevolent Society, 9 Conduit Street, W. Telephone: Mayfair 0434.

MAURICE E. WEBB
Chairman, A.B.S. Insurance Committee

PROFESSOR CHARLES GOURLAY MEMORIAL SCHEME

To the Editor of THE ARCHITECTS' JOURNAL

SIR,—The late Professor Charles Gourlay, B.SC., F.R.I.B.A., F.S.A.(SCOT.), perhaps more than any other has laid the foundation of the study of architecture and building for Scotland. Few of those engaged in the professions of architect, surveyor, estate agent, and the other allied trades today have not passed through his hands directly or owe him a debt of gratitude for the splendid technical work from his pen. In like manner, the learned societies, technical, scientific, and antiquarian, found the late Professor ever ready to place his delightful gifts of mind and heart at their disposal.

Not only so, but there are many in the City of Glasgow who are indebted to him for their enjoyment of the city's chief architectural gem, the cathedral, upon which the late Professor was the greatest authority as to its history and who made it live because of its civic and religious significance in the community. For this and other reasons many wish to commemorate his memory and have taken part in the promotion of a scheme to execute a threefold memorial. The first part of the scheme was the erection of a headstone in Creetown grey granite with bronze plaque in bas-relief of the head of the late Professor, forming a medallion upon it. This was unveiled in Hillfoot Cemetery by Miss Chrissie Gourlay in June of last year, and at the ceremony the Very Rev. G. H. Morrison, M.A., D.D., officiated. Simultaneously a similar medallion on a base of Italian dove marble was erected in the corridor of the Royal Technical College, Glasgow, adjoining the late Professor's room.

The third, and perhaps the most important, aim of the scheme

was to endow a scholarship or prize fund for the students of the Royal Technical College, Glasgow, for which the sum of at least one hundred pounds is desired.

Rather more than half of this figure has been subscribed, but the committee are anxious to receive further support, and are endeavouring to complete the scheme before the college closes this month, and they earnestly appeal to all past students, colleagues, and friends of the late Professor Gourlay to give the objects of the scheme their sympathetic consideration. Donations should be sent to Mr. James Rodger, honorary treasurer, Professor Charles Gourlay Memorial Scheme, The Royal Technical College, Glasgow.

J. MACAULAY,
Honorary Secretary

VANISHING LONDON

The following letter by Mr. Walter Tapper, P.R.I.B.A., appeared in the *Times* last week: "It appears that Dorchester House is to be demolished. The dust has hardly settled from the destruction of Grosvenor House. Devonshire House is becoming a memory. The fate of the Foundling Hospital is in the balance. Fine new buildings are covering the gardens that once lined the Euston Road. A giant factory covers half the gardens at Mornington Crescent.

"Is it not time that those who care about the historic character, the beauty, and the health of London should take stock of the situation as a whole? Present methods will not do. As each building or site in turn is threatened an agitation is hastily worked up. It is generally too late. It has no funds and no machinery. The forces of destruction have clear aims and plenty of money. The result is generally a foregone conclusion.

"Do the people of London desire that this process should continue unchecked? Do they agree that in matters of this kind the only consideration should be whether a syndicate can see its way to make a profit by a transaction? If they really think this, perhaps we who think otherwise had better save our breath, and we must just be content to see London robbed year by year of the possessions that make it the city we love. The power of the purse has spoken, and there is an end of it."

COMPETITION CALENDAR

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

September 1. The Council of the R.I.B.A. have accepted an offer from the directors of the Gloster Aircraft Co., Ltd., and Messrs. H. H. Martyn & Co., Ltd., to give a prize for the best imaginative scheme for a London aircraft terminus suitable to the supposed requirements of air traffic fifteen years hence. The competition is open to Associates, elected Students, or registered Probationers of the R.I.B.A. below the age of thirty years on September 1. The competition will be in two stages. From the preliminary competition ten competitors will be selected for the final, and each will be paid £5 for his expenses. The closing date for the final is January 10. There will be two prizes in the final, a first prize of £125 and a second prize of £25. The following have consented to form the jury to award the prizes: Sir Sefton Brancker, K.C.B., Mr. C. Cowles-Voysey, Mr. E. Vincent Harris, Sir Edwin Lutyens, R.A., Major R. Mayo (consulting engineer, Imperial Airways, Ltd.), Mr. T. S. Tait, Mr. Maurice E. Webb, Mr. G. E. Woods-Humphery (general manager, Imperial Airways, Ltd.). Particulars may be obtained free on application at the R.I.B.A.

September 5. School at Rickmansworth to accommodate 400 senior girls, for the governors of Royal Masonic Institution for Girls. Assessor: Mr. H. V. Ashley, F.R.I.B.A., Premiums: £750, £500, £400, £300, and £200. Particulars from Mr. M. Beachcroft, 31 Great Queen Street, W.C.2. Deposit £2 2s.

No date. Town Hall and Municipal Buildings, Art Gallery, etc., for the Corporation of Southampton. Assessor: Mr. H. Austen Hall, F.R.I.B.A. Premiums of £500, £300, £150. Particulars from Mr. R. R. Linthorne, Municipal Offices, Southampton. Deposit £2 2s.

THE NEW STANDARD BUILDING CONTRACT

Mr. W. Sanders Fiske makes the following criticism in the *Times* of the proposed new form of contract from the building owners' point of view.

The old form left certain matters to the sole discretion of the architect, e.g. as to proper materials being used, dismissal of incompetent employees of the contractor, and removal and re-execution of improper work. All these matters are peculiarly within the province of the architect and should be left to his sole decision; but by Clause 31 of the new form even such matters can, at the instance of the contractor, be referred to arbitration, the contractor himself having the ultimate selection of arbitrator from two names put forward by the President of the R.I.B.A. Clause 2 of the new form provides for the issue of further drawings, instructions, etc., by the architect "in his absolute discretion," with regard to removal and substitution of materials on the site, the removal and re-execution of works, and the dismissal of any person employed thereon, etc., and although this clause leaves such matters to the "absolute discretion" of the architect, yet by Clause 31 the contractor can apparently still refer such matters to an arbitrator. Clauses 2 and 31, therefore, appear to be contradictory.

The position of sub-contractors, specialists, etc., will be an unhappy one, as under Clause 25 (*c*), nothing is due to them until the architect has given the contractor a certificate including the work done under the sub-contract "and the same has been paid." Presumably, this means payment to the contractor, although not so stated. Under Clause 19 sub-contractors may be in an awkward position, if either employer or contractor become bankrupt (unless Clause 25 (3) is used extensively by architects), with the result that sub-contractors will insist upon agreements direct with the employer. Also, when the financial standing of a contractor is bad and he has entered into a contract in which provisional amounts have been included for various sub-contractors, they, on finding the state of his credit, will not supply goods unless the architect certifies payment direct, which the new form does not permit.

Clauses 16 and 18 in the new form are likely to cause many arbitrations, as they provide that if the works are delayed by any cause, etc., outside the control of the contractor, the contractor shall be entitled to reasonable extension of time for completion; but in Clause 25 of the old agreement the reasons for doing so are more or less defined. I foresee contractors taking every possible advantage of any delay owing to sub-contractors not keeping to time or failing to deliver goods promptly. The contractor under this clause is also entitled to be paid damages for delays caused by neglect or default of the architect, and, as every one knows, it is easy to raise a case against an architect, say, as to delay in furnishing drawings, etc., and thereupon arises a dispute as to whether the contractor was ready for such drawings even if they had been furnished.

The provision as to prime cost and provisional sums in Clause 24 of the new form is likely to prove unsatisfactory both to sub-contractors and to building owners. Amounts due to sub-contractors will be held up under Clause 19 as being partly included in the Retention Fund. Will they be allowed the same rate of interest on their money as the contractor? If his money is held up, the sub-contractor should not be asked to give any cash discount, and I believe it is only in the case of monthly accounts that a cash discount is ever allowed, and then only 2½ per cent., and yet this clause appears to legalize a discount "not exceeding 5 per cent." and contractors will probably demand such 5 per cent. from sub-contractors, who will increase their prices correspondingly, and the building owner will have to pay what appears to be a gift to the contractor.

The new agreement contains many useful provisions, but it seems framed more in the interests of builders and contractors than in the interest of building owners, and I should never myself enter into a building agreement in the form now proposed, nor advise anyone else to do so.

THE WEEK'S BUILDING NEWS

Plans passed by the HACKNEY B.C.: Additions, 98 Clapton Common, for Mr. R. J. W. Newman; building, Paragon Road, abutting Valette Street, for H.M. Office of Works; rebuilding, 93-100 Stoke Newington Road, for Messrs. Hobden and Porri; workshop, 232 Richmond Road, for Mr. S. Sunshine; workshop, garage, and stable, 189 Amhurst Road, for Commercial Structures, Ltd.; addition to factory, 23 and 25 Brampton Road, for Mr. F. Goff; factory, Middlesex Place, Elsdale Street, for Messrs. Mullen and Lumsden, Ltd.; factory, 65 and 67 Ridley Road, for Messrs. J. Jennings and Sons, Ltd.

*

Plans passed by the NEWBURY Corporation: Alterations and additions, Northbrook Street, for Messrs. Blacket Turner & Co.; house, Salcombe Road, for Mr. T. Brazier; extensions, G. W. Rly. goods depot, Newbury, for Shell-Mex, Ltd.; house, Andover Road, for Messrs. Cooke Bros.; alterations and additions, Donnington Square, for Mr. W. H. Gore.

*

The RIPON Corporation has decided to erect thirty-eight houses on the Aismunderby site.

*

The Catholic authorities are to erect a school for 200 children at WEST BARNES.

*

The Surrey Education Committee is to erect a school for 576 children on the Raynes Park site, MERTON.

*

The Surrey Education Committee is to take over and enlarge the Church of England School at EFFINGHAM.

*

Messrs. Perry and Bell, on behalf of a syndicate, have acquired from the L.C.C. a lease of the Aldwych site adjoining Melbourne Place, LONDON.

*

Plans passed at KENSINGTON: Conversion of Holland Park Rink, Holland Park Avenue, into a motor-car depot, for Messrs. Cooke, Davis and Goldsmith, on behalf of the Austin Motor Co., Ltd.

*

The BEXHILL Corporation has decided to reconstruct the Pergola.

*

The St. Margaret's School managers now propose to rebuild the Canning Place School, LEICESTER.

*

The Office of Works has acquired a site at CANE HILL for the erection of post office buildings.

*

The Surrey Education Committee is to obtain an alternative site for the erection of a girls' school at SUTTON.

Plans passed by the UXBRIDGE U.D.C.: Miniature rifle range, drill hall, for the Middlesex Territorial Association; three garages, Cricket Field Road, for Mr. P. A. Randall; office, Rabb's Mill, for Messrs. Dobell & Co., Ltd.

*

Plans passed by the HERNE BAY U.D.C.: Veranda, The Rosemary Home, for Mr. E. Edwards, on behalf of the Trustees; garages, Dence estate, for Mr. H. C. Hollis; garages, St. George's Baths, Marine Parade, for Mr. N. C. Holness; two bungalows, Grand Drive, for Mr. T. Pettman; shop and cottage, Gleetwood Avenue, for Mr. J. F. Osman; four houses, Selsea Avenue, for Messrs. Hobbs Bros.

*

Plans passed by the MERTHYR Corporation: New Castle Cinema on site of Castle Hotel, High Street, for Mr. F. Price; additions and alterations, 111 and 112 High Street, for Mr. S. Simons.

*

The Surrey Education Committee is to enlarge the Singleton School, MITCHAM.

*

The Surrey Education Committee is considering an application from the governors for extensions at WHITELEAFE County School for Girls.

*

Arrangements are being made by the county authorities of Hants and Surrey and the Southern Railway for the construction of a bridge at the level crossing and the reconstruction of the county bridge over the river at BLACKWATER at a cost of £52,000.

*

The Surrey Education Committee has instructed the architects to prepare sketch plans for a mixed secondary school to accommodate from 400 to 420 pupils at DORKING.

*

The WAKEFIELD Education Committee has considered the provision of a special school for mental defectives and decided to make provision for such a school during the ensuing year.

*

Plans passed by the LEAMINGTON Corporation: House, Cubbington Road, for Mr. A. W. Burns; workshop and stores, Clinton Street, for Mr. G. Goss; bakery, 26 Bedford Street, for Messrs. Burgis and Colbourne, Ltd.; shop front, 18 Victoria Terrace, for Messrs. Summers and Son; stores, Eagle Foundry, Clarence Street, for Messrs. S. Flavel & Co., Ltd.

*

The BRIGHTON Corporation Pavilion Committee has asked the director to report with suggestions for reconditioning and improving the dome and corn exchange in order to provide increased and improved accommodation.

The GLOSSOP Corporation has referred the question of the proposed extension of the isolation hospital to the Hospital Sub-committee for consideration.

*

Plans passed by the GLOSSOP Corporation: Two houses, Park Road, for Mr. Samuel Goddard; eight houses, Sheffield Road, for the Glossop-Dale New Industrial Co-operative Society, Ltd.

*

Plans passed by the BRIGHTON Corporation: Alterations, 59 Ship Street, for Messrs. Seymours (Brighton), Ltd.; extension of carpenter's shop, 9, 10, and 11 Albion Street, for Messrs. Saunders; store, 36 Duke Street, for Mr. E. Davis; twenty-two houses, Hollingdean Terrace, for Mr. C. Blaker; additional story, 33-34 North Street, for Mr. W. H. Vokins; alterations, 7 Western Road, for Messrs. Salmon and Gluckstein, Ltd.; shop and alterations, 21 Springfield Road, for Mr. C. C. Parsons; alterations, showrooms, etc., Hotel Metropole, King's Road, for the Gordon Hotels, Ltd.; reconstruction, 98 St. George's Road, for Mr. E. Tully; alterations, corner of Coobe Road and Buller Road, for Messrs. Price Bros.; two houses, Bavant Road, for Mr. S. White; additions, recreation rooms, etc., Eastern Road School for Blind Boys, for the committee; eight houses, Hollingdean Terrace, for Mr. J. Ticehurst; partial reconstruction, 92 London Road, for Mr. T. Birch; alterations, The Royal Spa, Queen's Park, for Messrs. Hooper, Struve & Co., Ltd.

*

Plans passed by the LEWISHAM B.C.: Rebuilding premises rear of Lewis Grove, Lewisham, for Mr. E. D. Hopkins; rebuilding, 100-104 Rushey Green, for Mr. E. A. Stone; buildings, 11-15 London Road, Forest Hill, for Mr. J. S. Beard; alterations, 197-199 Standstead Road, for Mr. Dudley G. Marsh; five houses, Boveney Road, for Messrs. Wm. Wilmot, Ltd.; 116 houses, Downham estate, for Mr. J. G. Stephenson, on behalf of the L.C.C.; ten houses, Warren Avenue, for Messrs. Walker, Clinging & Co.; pavilion, Crabb Hill, for Messrs. Thomas Cook and Son, Ltd.

*

The WAKEFIELD Corporation has asked the Health Committee to expedite the scheme for the establishment of buildings as a centre for maternity and other health services.

*

At the meeting of the BRIGHTON Corporation Waterworks Committee, the engineer submitted drawings for the new engine-house, coal shed, and railings at Patcham Works at an estimated cost of £12,200. The drawings were approved and the engineer authorized to invite tenders forthwith for the execution of the work.

RATES OF WAGES

			I s. d.	II s. d.
A	ABERDARE	S. Wales & M.	1 7½	1 2½
A₁	Abergavenny	S. Wales & M.	1 7	1 2½
B	Abingdon ..	S. Counties	1 5½	1 1½
A	Accrington	N.W. Counties	1 7½	1 2½
A₂	Addlestone	S. Counties	1 6	1 1½
A	Adlington ..	N.W. Counties	1 7½	1 2½
A	Airdrie ..	Scotland	*1 7½	1 2½
O₁	Aldeburgh	E. Counties	1 3	11½
A	Altrincham	N.W. Counties	1 7½	1 2½
B₂	Appleby ..	N.W. Counties	1 4	1 0
A	Ashton-under-Lyne	N.W. Counties	1 7½	1 2½
A₂	Atherstone	Mid. Counties	1 6	1 1½
B₂	Aylesbury ..	S. Counties	1 4	1 0
B₂	BANBURY	S. Counties	1 4	1 0
B₂	Bangor ..	N.W. Counties	1 4½	1 0½
A	BarnardCastle	N.E. Coast	1 7½	1 2½
A	Barnsley ..	Yorkshire	1 7½	1 2½
B₁	Barnstaple	S.W. Counties	1 5	1 0½
A	Barrow ..	N.W. Counties	1 7½	1 2½
A	Barry ..	S. Wales & M.	1 7½	1 2½
B₂	Basingstoke	S.W. Counties	1 4	1 0
B	Bath ..	S.W. Counties	1 5½	1 1½
A	Batley ..	Yorkshire	1 7½	1 2½
B	Bedford ..	E. Counties	1 5½	1 1½
A₂	Berwick-on-Tweed	N.E. Coast	1 6½	1 2
A₂	Bewdley ..	Mid. Counties	1 6½	1 2
B₂	Bicester ..	Mid. Counties	1 4	1 0
A	Birkenhead	N.W. Counties	*1 7½	1 2½
A	Birmingham	Mid. Counties	1 7½	1 2½
A	Bishop Auckland	N.E. Coast	1 7½	1 2½
A	Blackburn	N.W. Counties	1 7½	1 2½
A	Blackpool	N.W. Counties	1 7½	1 2½
A	Blyth ..	N.E. Coast	1 7½	1 2½
B₂	Bognor ..	S. Counties	1 4	1 0
A	Bolton ..	N.W. Counties	1 7½	1 2½
A₂	Boston ..	Mid. Counties	1 6	1 1½
B₁	Bournemouth	S. Counties	1 5	1 0½
B₂	Bovey Tracey	S.W. Counties	1 4½	1 0½
A	Bradford ..	Yorkshire	1 7½	1 2½
A₂	Brentwood	E. Counties	1 6½	1 2
A	Bridgend ..	S. Wales & M.	1 7½	1 2½
B₂	Bridgwater	S.W. Counties	1 4½	1 0½
A₁	Bridlington	Yorkshire	1 7	1 2½
A	Brighouse	Yorkshire	1 7½	1 2½
B₁	Brighton ..	S. Counties	1 5	1 0½
A	Bristol ..	S.W. Counties	1 7½	1 2½
B₁	Brixham ..	S.W. Counties	1 4	1 0
A₂	Bromsgrove	Mid. Counties	1 6½	1 2
C	Bromyard ..	Mid. Counties	1 3½	11½
A	Burnley ..	N.W. Counties	1 7½	1 2½
A	Burslem ..	Mid. Counties	1 7½	1 2½
A₂	Burton-on-Trent	Mid. Counties	1 6½	1 2
A	Bury ..	N.W. Counties	1 7½	1 2½
A₁	Buxton ..	N.W. Counties	1 7	1 2½
A	CAMBRIDGE	E. Counties	1 5½	1 1½
B₂	Canterbury	S. Counties	1 4	1 0
A	Cardiff ..	S. Wales & M.	1 7½	1 2½
A	Carlisle ..	N.W. Counties	1 7½	1 2½
B	Carmarthen	S. Wales & M.	1 5½	1 1½
B₂	Carnarvon	N.W. Counties	1 4½	1 0½
A₁	Carnforth ..	N.W. Counties	1 7	1 2½
A	Castleford	Yorkshire	1 7½	1 2½
B₁	Chatham ..	S. Counties	1 5	1 0½
B₁	Chelmsford	E. Counties	1 5	1 0½
A₂	Cheltenham	S.W. Counties	1 6	1 1½
A	Chester ..	N.W. Counties	1 7½	1 2½
A	Chesterfield	Mid. Counties	*1 7½	1 2½
B₂	Chichester	S. Counties	1 4	1 0
A	Chorley ..	N.W. Counties	1 7½	1 2½
B₂	Cirencester	S. Counties	1 4½	1 0½
A	Clitheroe ..	N.W. Counties	1 7½	1 2½
A	Clydebank	Scotland	1 7½	1 2½
A	Coalville ..	Mid. Counties	1 7½	1 2½
B₁	Colchester ..	E. Counties	1 5	1 0½
A	Colne ..	N.W. Counties	1 7½	1 2½
A₂	Colwyn Bay	N.W. Counties	1 6	1 1½
A	Consett ..	N.E. Coast	1 7½	1 2½
A₂	Conway ..	N.W. Counties	1 6	1 1½
A	Coventry ..	Mid. Counties	1 7½	1 2½
A₂	Crewe ..	N.W. Counties	1 6	1 1½
A₂	Cumberland	.....	1 6	1 1½
A	DARLINGTON	N.E. Coast	1 7½	1 2½
A	Darwen ..	N.W. Counties	1 7½	1 2½
B₂	Deal ..	S. Counties	1 4	1 0
A₂	Denbigh ..	N.W. Counties	1 6	1 1½
A	Derby ..	Mid. Counties	1 7½	1 2½
A	Dewsbury ..	Yorkshire	1 7½	1 2½
B	Didcot ..	S. Counties	1 5½	1 1½
A	Doncaster ..	Yorkshire	1 7½	1 2½
C₁	Dorchester	S.W. Counties	1 3	11½
A₂	Driffield ..	Yorks	1 6	1 1½
A₂	Droitwich ..	Mid. Counties	1 6	1 1½
A₁	Dudley ..	Mid. Counties	1 7	1 2½
A	Dundee ..	Scotland	1 7½	1 2½
A	Durham ..	N.E. Coast	1 7½	1 2½
B₁	EASTBOURNE	S. Counties	1 5	1 0½
A	Ebbw Vale	S. Wales & M.	1 7½	1 2½
A	Edinburgh	Scotland	1 7½	1 2½
A	E. Glamorganshire & Monmouthshire	S. Wales & M.	1 7½	1 2½
B	Exeter ..	S.W. Counties	*1 5½	1 1½
B₂	Exmouth ..	S.W. Counties	1 4½	1 0½
B	FELIXSTOWE	E. Counties	1 5½	1 1½
A₂	Filey ..	Yorks	1 6	1 1½
A	Fleetwood ..	N.W. Counties	1 7½	1 2½
B₂	Folkestone	S. Counties	1 4½	1 0½
A	Frodsham ..	N.W. Counties	1 7½	1 2½
B₂	Frome ..	S.W. Counties	1 4	1 0
A	GATESHEAD	N.E. Coast	1 7½	1 2½
B₁	Gillingham	S. Counties	1 5	1 0½
A₂	Gloucester	S.W. Counties	1 6	1 1½
A₂	Goole ..	Yorkshire	1 6½	1 2
B	Gosport ..	S. Counties	1 5½	1 1½
A₂	Grantham	Mid. Counties	1 6	1 1½
A₁	Gravesend	S. Counties	1 7	1 2½
A	Greenock ..	Scotland	*1 7½	1 2½
A	Grimsby ..	Yorkshire	1 7½	1 2½
B₁	Guildford ..	S. Counties	1 5	1 0½
A	HALIFAX ..	Yorkshire	1 7½	1 2½
A	Hanley ..	Mid. Counties	1 7½	1 2½
A	Harrogate	Yorkshire	1 7½	1 2½
A	Hartlepools	N.E. Coast	1 7½	1 2½
B₂	Harwich ..	E. Counties	1 4½	1 0½
B₂	Hastings ..	S. Counties	1 4	1 0
B₁	Hatfield ..	S. Counties	1 5	1 0½
B	Hereford ..	S. W. Counties	1 5½	1 1½
B	Hertford ..	E. Counties	1 5½	1 1½
A₁	Heysham ..	N.W. Counties	1 7	1 2½
A	Howden ..	N.E. Coast	1 7½	1 2½
A	Huddersfield	Yorkshire	1 7½	1 2½
A	Hull ..	Yorkshire	1 7½	1 2½
A	ILKLEY ..	Yorkshire	1 7½	1 2½
A	Immingham	Mid. Counties	1 7½	1 2½
B	Ipswich ..	E. Counties	1 5½	1 1½
C₁	Isle of Wight	S. Counties	1 3	11½
A	JARROW ..	N.E. Coast	1 7½	1 2½
A	KEIGHLEY	Yorkshire	1 7½	1 2½
B₁	Kendal ..	N.W. Counties	1 5	1 0½
B₁	Keswick ..	N.W. Counties	1 5	1 0½
B	Kettering ..	Mid. Counties	1 5½	1 1½
A₂	Kidderminster	Mid. Counties	1 6½	1 2
B₂	King's Lynn	E. Counties	1 4½	1 0½
A	LANCASTER	N.W. Counties	1 7½	1 2½
A₂	Leamington	Mid. Counties	1 6½	1 2
A	Leeds ..	Yorkshire	1 7½	1 2½
A	Leek ..	Mid. Counties	1 7½	1 2½
A	Leicester ..	Mid. Counties	1 7½	1 2½
A	Leigh ..	N.W. Counties	1 7½	1 2½
B₂	Lewes ..	S. Counties	1 4	1 0
A₂	Lichfield ..	Mid. Counties	1 6	1 1½
A	Lincoln ..	Mid. Counties	1 7½	1 2½
A	Liverpool ..	N.W. Counties	*1 10	1 4½
A₂	Llandudno	N.W. Counties	1 6	1 1½
A	Llanelly ..	S. Wales & M.	1 7½	1 2½
	London (12 miles radius)		1 9	1 4
	Do. (12-15 miles radius)		1 8½	1 3½
A	Long Eaton	Mid. Counties	1 7½	1 2½
A	Loughborough	Mid. Counties	1 7½	1 2½
B	Luton ..	E. Counties	1 5½	1 1½
A	Lytham ..	N.W. Counties	1 7½	1 2½
A₁	MACCLESFIELD	N.W. Counties	1 7	1 2½
B	Maidstone	S. Counties	1 5½	1 1½
A₂	Malvern ..	Mid. Counties	1 6	1 1½
A	Manchester	N.W. Counties	1 7½	1 2½
A	Mansfield ..	Mid. Counties	1 7½	1 2½
B₂	Margate ..	S. Counties	1 4	1 0
A₂	Matlock ..	Mid. Counties	1 6	1 1½
A	Merthyr ..	S. Wales & M.	1 7½	1 2½
A	Middlesbrough	N.E. Coast	1 7½	1 2½
A₂	Middlewich	N.W. Counties	1 6	1 1½
B₂	Minehead ..	S.W. Counties	1 4½	1 0½
A	Monmouth	S. Wales & M.	1 7½	1 2½
	S. and E. Glamorganshire			
A₁	Morecambe	N.W. Counties	1 7	1 2½
A₂	NANTWICH	N.W. Counties	1 6	1 1½
A	Neath ..	S. Wales & M.	1 7½	1 2½
A	Nelson ..	N.W. Counties	1 7½	1 2½
A	Newcastle ..	N.E. Coast	1 7½	1 2½
A	Newport ..	S. Wales & M.	1 7½	1 2½
A	Normanton	Yorkshire	1 7½	1 2½
A₂	Northampton	Mid. Counties	1 6½	1 2
A	North Staffs.	Mid. Counties	1 7½	1 2½
A	North Shields	N.E. Coast	1 7½	1 2½
A₂	Norwich ..	E. Counties	1 6	1 1½
A	Nottingham	Mid. Counties	1 7½	1 2½
A	Nuneaton ..	Mid. Counties	1 7½	1 2½
B	OAKHAM ..	Mid. Counties	1 5½	1 1½
A	Oldham ..	N.W. Counties	1 7½	1 2½
A₂	Oswestry ..	Mid. Counties	1 6	1 1½
B	Oxford ..	S. Counties	1 5½	1 1½
A	PAISLEY ..	Scotland	*1 7½	1 2½
C	Pembroke	S. Wales & M.	1 3½	11½
A	Perth ..	Scotland	*1 7½	1 2½
A₂	Peterborough	Mid. Counties	1 6	1 1½
A	Plymouth	S.W. Counties	*1 7½	1 2½
A	Pontefract	Yorkshire	1 7½	1 2½
A	Pontypridd	S. Wales & M.	1 7½	1 2½
B	Portsmouth	S. Counties	1 5½	1 1½
A	Preston ..	N.W. Counties	1 7½	1 2½
A	QUEENSFERRY	N.W. Counties	1 7½	1 2
B	READING ..	S. Counties	1 5½	1 1½
B	Reigate ..	S. Counties	1 5½	1 1½
A₂	Retford ..	Mid. Counties	1 6	1 1½
A	Rhondda Valley	S. Wales & M.	1 7½	1 2½
A₂	Ripon ..	Yorkshire	1 6	1 1½
A	Rochdale ..	N.W. Counties	1 7½	1 2½
B	Rochester	S. Counties	1 5½	1 1½
A₁	Ruabon ..	N.W. Counties	1 7	1 2½
A₂	Rugby ..	Mid. Counties	1 6½	1 2
A₂	Rugeley ..	Mid. Counties	1 6	1 1½
A	Runcorn ..	N.W. Counties	1 7½	1 2½
A₂	ST. ALBANS	E. Counties	1 6	1 1½
A	St. Helens	N.W. Counties	1 7½	1 2½
B₂	Salisbury	S.W. Counties	1 4	1 0
A₁	Scarborough	Yorkshire	1 7	1 2½
A	Scunthorpe	Mid. Counties	1 7½	1 2½
A	Sheffield ..	Yorkshire	1 7½	1 2½
A	Shipley ..	Yorkshire	1 7½	1 2½
A₂	Shrewsbury	Mid. Counties	1 6	1 1½
A₂	Skipton ..	Yorkshire	1 6½	1 2
B	Slough ..	S. Counties	1 5½	1 1½
A₂	Solihull ..	Mid. Counties	1 6½	1 2
A₂	South'pton	S. Counties	1 6	1 1½
B₁	Southend-on-Sea	E. Counties	1 5	1 0½
A	Southport ..	N.W. Counties	1 7½	1 2½
A	S. Shields ..	N.E. Coast	1 7½	1 2½
A₂	Stafford ..	Mid. Counties	1 6½	1 2
A	Stockport ..	N.W. Counties	1 7½	1 2½
A	Stockton-on-Tees	N.E. Coast	1 7½	1 2½
A	Stoke-on-Trent	Mid. Counties	1 7½	1 2½
B	Stroud ..	S.W. Counties	1 5½	1 1½
A	Sunderland	N.E. Coast	1 7½	1 2½
A	Swadlincote	Mid. Counties	1 7½	1 2½
A	Swansea ..	S. Wales & M.	1 7½	1 2½
B	Swindon ..	S.W. Counties	1 5½	1 1½
A₁	TAMWORTH	N.W. Counties	1 7	1 2½
B₁	Taunton ..	S.W. Counties	1 5	1 0½
A	Teeside Dist.	N.E. Counties	1 7½	1 2½
B	Teignmouth	S.W Coast	1 5½	1 1½
A	Todmorden	Yorkshire	1 7½	1 2½
A₂	Torquay ..	S.W. Counties	1 6½	1 2
C	Truro ..	S.W. Counties	1 3½	11½
B₁	Tunbridge Wells	S. Counties	1 5	1 0½
A	Tunstall ..	Mid. Counties	1 7½	1 2½
A	Tyne District	N.E. Coast	1 7½	1 2½
A	WAKEFIELD	Yorkshire	1 7½	1 2½
A₁	Walsall ..	Mid. Counties	1 7	1 2½
A	Warrington	N.W. Counties	1 7½	1 2½
A₂	Warwick ..	Mid. Counties	1 6½	1 2
B	Wellingborough	Mid. Counties	1 5½	1 1½
A	West Bromwich	Mid. Counties	1 7½	1 2½
B	Weston-s-Mare	S.W. Counties	1 5½	1 1½
A₂	Whitby ..	Yorkshire	1 6½	1 2
A	Widnes ..	N.W. Counties	1 7½	1 2½
A	Wigan ..	N.W. Counties	1 7½	1 2½
B₂	Winchester	S. Counties	1 4½	1 0½
B	Windsor ..	S. Counties	1 5½	1 1½
A	Wolverhampton	Mid. Counties	1 7½	1 2½
A₂	Worcester ..	Mid. Counties	1 6	1 1½
A₂	Worksop ..	Yorkshire	1 6	1 1½
A₁	Wrexham ..	N.W. Counties	1 7	1 2½
B	Wycombe ..	S. Counties	1 5½	1 1½
B₁	YARMOUTH	E. Counties	1 5	1 0½
B₂	Yeovil ..	S.W. Counties	1 4½	1 0½
A	York ..	Yorkshire	1 7½	1 2

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

* In these areas the rates of wages for certain trades (usually Painters and Plasterers) vary slightly from those given. The rates for each trade in any given area will be sent on reques'.

PRICES CURRENT

EXCAVATOR AND CONCRETOR

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

*

Broken brick or stone, 2 in., per yd.	£0 11 6
Thames ballast, per yd.	0 11 0
Pit gravel, per yd.	0 18 0
Pit sand, per yd.	0 14 6
Washed sand	0 15 0
Screened ballast or gravel, add 10 per cent. per yd.	
Clinker, breeze, etc., prices according to locality.	
Portland cement, per ton	£2 15 0
Lias lime, per ton	2 10 0
Sacks charged extra at 1s. 9d. each and credited when returned at 1s. 6d.	
Transport hire per day:	
Cart and horse £1 3 0 *Trailer*	£0 15 0
3-ton motor lorry 3 15 0 *Steam roller*	4 5 0
Steam lorry, 5-ton 4 0 0 *Water cart*	1 5 0

*

EXCAVATING and throwing out in ordinary earth not exceeding 6 ft. deep, basis price, per yd. cube	0 3 0
Exceeding 6 ft., but under 12 ft., add 30 per cent.	
In stiff clay, add 30 per cent.	
In underpinning, add 100 per cent.	
In rock, including blasting, add 225 per cent.	
If basketed out, add 80 per cent. to 150 per cent.	
Headings, including timbering, add 400 per cent.	
RETURN, fill, and ram, ordinary earth, per yd.	£0 1 6
SPREAD and level, including wheeling, per yd.	0 1 6
FILLING into carts and carting away to a shoot or deposit, per yd. cube	0 10 6
TRIMMING earth to slopes, per yd. sup.	0 0 6
HACKING up old grano. or similar paving, per yd. sup.	0 1 3
PLANKING to excavations, per ft. sup.	0 0 5
DO. over 10 ft. deep, add for each 5 ft. in depth, 30 per cent.	
If left in, add to above prices, per ft. cube	0 2 0
HARDCORE, 2 in. ring, filled and rammed, 4 in. thick, per yd. sup.	0 2 1
DO. 6 in. thick, per yd. sup.	0 2 10
PUDDLING, per yd. cube	1 10 0
CEMENT CONCRETE, 4-2-1, per yd cube	2 3 0
DO. 6-2-1, per yd. cube	1 18 0
DO. in upper floors, add 15 per cent.	
DO. in reinforced-concrete work, add 20 per cent.	
DO. in underpinning, add 60 per cent.	
LIAS-LIME CONCRETE, per yd. cube	£1 16 0
BREEZE CONCRETE, per yd. cube	1 7 0
DO. in lintels, etc., per ft. cube	0 1 6
CEMENT concrete 4 2-1 in lintels packed around reinforcement, per ft. cube	0 3 9
FINE concrete benching to bottom of manholes, per ft. cube	0 2 6
FINISHING surface of concrete spade face, per yd. sup.	0 0 9

DRAINER

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

*

Stoneware pipes, tested quality, 4 in., per ft.	£0 0 10
DO. *6 in., per ft.*	0 1 3
DO. *9 in., per ft.*	0 2 3
Cast-iron pipes, coated, 9 ft. lengths, 4 in., per yd.	0 5 6
DO. *6 in., per yd.*	0 8 6
Portland cement and sand, see "Excavator" above.	
Leadwool per cwt.	£2 0 0
Gaskin, per lb.	0 0 4½

*

STONEWARE DRAINS, jointed in cement, tested pipes, 4 in., per ft.	0 4 3
DO. 6 in., per ft.	0 5 0
DO. 9 in., per ft.	0 7 9
CAST-IRON DRAINS, jointed in lead, 4 in., per ft.	0 8 0
DO. 6 in., per ft.	0 10 0

Note.—These prices include digging concrete bed and filling for normal depths, and are average prices.

Fittings in Stoneware and Iron according to type. *See* Trade Lists.

BRICKLAYER

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

*

London stocks, per M.	£4 15 0
Flettons, per M.	3 0 0
Staffordshire blue, per M.	9 10 0
Firebricks, 2½ in., per M.	11 3 0
Glazed salt, white, and ivory stretchers, per M.	24 10 0
DO. *headers, per M.*	24 0 0
Colours, extra, per M.	5 10 0
Seconds, less, per M.	1 0 0
Cement and sand, see "Excavator" above.	
Lime, grey stone, per ton	2 17 0
Mixed lime mortar, per yd.	1 6 0
Damp course, in rolls of 4½ in., per roll	0 2 6
DO. *9 in. per roll*	0 4 9
DO. *14 in. per roll*	0 7 6
DO. *18 in. per roll*	0 9 6
BRICKWORK in stone lime mortar, Flettons or equal, per rod	£33 0 0
DO. in cement do., per rod	36 0 0
DO. in stocks, add 25 per cent. per rod.	
DO. in blues, add 100 per cent. per rod.	
DO. circular on plan, add 12½ per cent. per rod.	
DO. in backing to masonry, add 12½ per cent. per rod.	
DO. in raising on old walls, etc., add 12½ per cent. per rod.	
DO. in underpinning, add 20 per cent. per rod.	
HALF-BRICK walls in stocks in cement mortar (1–3), per ft. sup.	£0 1 0
BEDDING plates in cement mortar, per ft. run	0 0 3
BEDDING window or door frames, per ft. run	0 0 3
LEAVING chases 2½ in. deep for edges of concrete floors not exceeding 6 in. thick, per ft. run	0 0 2
CUTTING do. in old walls in cement, per ft. run	0 0 4
CUTTING, toothing and bonding new work to old (labour and materials), per ft. sup.	0 0 7
TERRA-COTTA flue pipes 9 in. diameter, jointed in fireclay, including all cuttings, per ft. run	0 3 6
DO. 14 ft. by 9 in. do., per ft. run	0 6 0
FLAUNCHING chimney pots, each	0 2 0
CUTTING and pinning ends of timbers, etc., in cement	0 1 0
FACINGS fair, per ft. sup. extra	0 0 3
DO. picked stocks, per ft. sup. extra	0 0 7
DO. red rubbers gauged and set in putty, per ft. sup. extra	0 4 9
DO. in salt white or ivory glazed, per ft. sup. extra	0 5 6
TUCK pointing, per ft. sup. extra	0 0 10
WEATHER pointing, do. do.	0 0 3
TILE creasing with cement fillet each side per ft. run	0 0 6
GRANOLITHIC PAVING, 1 in., per yd. sup.	0 5 0
DO. 1½ in., per yd. sup.	0 6 0
DO. 2 in., per yd. sup.	0 7 0
If coloured with red oxide, per yd. sup.	0 1 0
If finished with carborundum, per yd. sup.	0 0 6
If in small quantities in finishing to steps, etc., per ft. sup.	0 1 4
Jointing new grano. paving to old, per ft. run	0 0 4
Extra for dishing grano. or cement paving around gullies, each	0 1 6
BITUMINOUS DAMP COURSE, ex rolls, per ft. sup.	0 0 7
ASPHALT (MASTIC) DAMP COURSE, ½ in., per yd. sup.	0 8 0
DO. vertical, per yd. sup.	0 11 0
SLATE DAMP COURSE, per ft. sup.	0 0 10
ASPHALT ROOFING (MASTIC) in two thicknesses, ½ in., per yd.	0 8 6
DO. SKIRTING, 6 in.	0 0 11
BREEZE PARTITION BLOCKS, set in cement, 1½ in. per yd. sup.	0 5 3
DO. DO. 3 in.	0 6 6
BREEZE fixing bricks, extra for each	0 0 3

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

MASON

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

*

Portland Stone:	
Whibed, per ft. cube	£0 4 6
Basebed, per ft. cube	0 4 7
Bath stone, per ft. cube	0 3 0
Usual trade extras for large blocks.	
York paving, av. 2½ in., per yd. super	0 6 6
York templates sawn, per ft. cube	0 6 9
Slate shelves, rubbed, 1 in., per ft. sup.	0 2 6
Cement and sand, see "Excavator," etc., above.	

*

HOISTING and setting stone, per ft. cube	£0 2 2
DO. for every 10 ft. above 30 ft. add 15 per cent.	
PLAIN face Portland basis, per ft. sup.	£0 2 8
DO. circular, per ft. sup.	0 4 0
SUNK FACE, per ft. sup.	0 3 9
DO. circular, per ft. sup.	0 4 10
JOINTS, arch, per ft. sup.	0 2 6
DO. sunk, per ft. sup.	0 2 7
DO. DO. circular, per ft. sup.	0 4 6
CIRCULAR-CIRCULAR work, per ft. sup.	1 2 0
PLAIN MOULDING, straight, per inch of girth, per ft. run	0 1 1
DO. circular, do., per ft. run	0 1 4
HALF SAWING, per ft. sup.	£0 1 0
Add to the foregoing prices, if in York stone, 35 per cent.	
DO. Mansfield, 12½ per cent.	
Deduct for Bath, 33⅓ per cent.	
DO. for Chilmark, 5 per cent.	
SETTING 1 in. slate shelving in cement, per ft. sup.	£0 0 6
RUBBED round nosing to do., per ft. lin.	0 0 6
YORK STEPS, rubbed T. & R., ft. cub. fixed	1 9 0
YORK SILLS, W. & T., ft. cub. fixed	1 13 0
ARTIFICIAL stone paving, 2 in. thick, per ft. sup.	0 1 6
DO. 2½ in. thick, per ft. sup.	0 1 9

SLATER AND TILER

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

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

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Slates, 1st quality, per 1,200:	
Portmadoc Ladies	£14 0 0
Countess	27 0 0
Duchess	32 0 0

Old Delabole	*Med. Grey*	*Med. Green*
24 in. × 12 in.	£42 11 3	£45 1 0
20 in. × 10 in.	31 4 3	33 0 6
16 in. × 10 in.	20 18 0	22 4 9
14 in. × 8 in.	12 1 0	12 16 3

Green Randoms per ton	8 3 9
Grey-green do., per ton	7 3 9
Green peggies, 12 in. to 8 in. long, per ton	6 3 9
In 4-ton truck loads, delivered Nine Elms station.	
Clips, lead, per lb.	£0 0 6
Clips, copper, per lb.	0 2 0
Nails, compo, per cwt.	1 6 0
Nails, copper, per lb.	0 1 10
Cement and sand, see "Excavator," etc., above.	
Hand-made tiles, per M.	£5 18 0
Machine-made tiles, per M.	5 8 0
Westmorland slates, large, per ton	9 0 0
DO. *Peggies, per ton*	7 5 0

*

SLATING, 3 in. lap, compo nails, Portmadoc or equal:	
Ladies, per square	£4 0 0
Countess, per square	4 5 0
Duchess, per square	4 10 0
WESTMORLAND, in diminishing courses, per square	6 5 0
CORNISH DO., per square	6 3 0
Add, if vertical, per square approx.	0 13 0
Add, if with copper nails, per square approx.	0 2 6
Double course at eaves, per ft. approx.	0 1 0

SLATING with Old Delabole slates to a 3 in. lap with copper nails, at per square.

	Med. Grey	Med. Green
24 in. × 12 in.	£5 0 0	£5 2 0
20 in. × 10 in.	5 5 0	5 10 0
16 in. × 10 in.	4 15 0	5 1 0
14 in. × 8 in.	4 10 0	4 15 0
Green randoms	6 7 0	
Grey-green do.	5 9 0	
Green peggies, 12 in. to 8 in. long	4 17 0	

TILING, 4 in. gauge, every 4th course nailed, in hand-made tiles, average per square	5 6 0
DO., machine-made do., per square	4 17 0
Vertical Tiling, including pointing, add 18s. 0d. per square.	
FIXING lead soakers, per dozen	£0 0 10
STRIPPING old slates and stacking for re-use, and clearing away surplus and rubbish, per square	0 10 0
LABOUR only in laying slates, but including nails, per square	1 0 0

See "Sundries for Asbestos Tiling."

CARPENTER AND JOINER

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

*

Timber, average prices at Docks, London Standard	
Scandinavian, etc. (equal to 2nds):	
7 × 3, per std.	£21 0 0
11 × 4, per std.	33 0 0
Memel or Equal. Slightly less than foregoing.	
Flooring, P.E., 1 in., per sq.	£1 2 6
DO. *T. and G., 1 in., per sq.*	1 2 6
Planed boards, 1 in. × 11 in., per std.	30 0 0
Wainscot oak, per ft. sup. of 1 in.	0 1 4
Mahogany, Honduras, per ft. sup. of 1 in.	0 1 3
DO. *Cuba, per ft. sup. of 1 in.*	0 2 3
DO., *African, per ft. sup.*	0 1 0
Teak, per ft. sup. of 1 in.	0 1 3
DO., *ft. cube*	0 12 6

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FIR fixed in wall plates, lintels, sleepers, etc., per ft. cube	0 5 6
DO. framed in floors, roofs, etc., per ft. cube	0 6 6
DO. framed in trusses, etc., including ironwork, per ft. cube	0 7 6
PITCH PINE, add 33⅓ per cent.	
FIXING only boarding in floors, roofs, etc., per sq.	0 13 6
SARKING FELT laid, 1-ply, per yd.	0 1 6
DO. 3-ply, per yd.	0 1 9
CENTERING for concrete, etc., including horsing and striking, per sq.	2 10 0
TURNING pieces to flat or segmental soffits, 4½ in. wide, per ft. run	0 0 4½
DO. 9 in. wide and over per ft. sup.	0 1 2

continued overleaf

CARPENTER AND JOINER: *continued.*

SPLUTTERING to face of concrete, per square	£1	10	0
DO. in narrow widths to beams, etc., per ft. sup.	0	0	6
USE and waste of timbers, allow 25 per cent. of above prices.			
SLATE BATTENING, per sq.	£0	12	6
DEAL boarding to flats, 1 in. thick and firrings to falls, per square	2	10	0
STOUT feather-edged tilting fillet to eaves, per ft. run	0	0	6
FEATHER-edged springer to trimmer arches, per ft. run	0	0	4
STOUT herringbone strutting (joists measured in), per ft. run	0	0	6
SOUND boarding, ⅞ in. thick and fillets nailed to sides of joists (joists measured over), per square	2	0	0
RUBERCID or similar quality roofing, one-ply, per yd. sup.	0	2	3
DO., two-ply, per yd. sup.	0	2	6
DO., three-ply, per yd. sup.	0	3	0
TONGUED and grooved flooring, 1¼ in. thick, laid complete with splayed headings, per square	2	5	0
DEAL skirting torus, moulded 1¼ in. thick, including grounds and backings, per ft. sup.	0	1	0
TONGUED and mitred angles to do.	0	0	6
WOOD block flooring standard blocks laid herringbone in mastic :			
Deal 1 in. thick, per yd. sup.	0	10	0
DO. 1¼ in. thick, per yd. sup.	0	12	0
Maple 1¼ in. thick, per yd. sup.	0	15	0
DEAL moulded sashes, 1¾ in. with moulded bars in small squares, per ft. sup.	0	2	6
DO. 2 in. do., per ft. sup.	0	2	9
DEAL cased frames, oak sills and 2 in. moulded sashes, brass-faced pulleys and iron weights, per ft. sup.	0	4	6
MOULDED horns, extra each	0	0	3
DOORS, 4-panel square both sides, 1⅜ in. thick, per ft. sup.	0	2	6
DO. moulded both sides per ft. sup.	0	2	9
DO. 2 in. thick, square both sides, per ft. sup.	0	2	9
DO. moulded both sides, per ft. sup.	0	3	0
DO. in 3 panels, moulded both sides, upper panel with diminished stiles with moulded bars for glass, per ft. sup.	0	3	6
If in oak, mahogany or teak, multiply 3 times.			
DEAL frames, 4 in. × 3 in., rebated and beaded per ft. cube	£0	15	0
Add for extra labours, per ft. run	0	0	1
STAIRCASE work :			
DEAL treads 1¼ in. and risers 1 in., tongued and grooved including fir carriages, per ft. sup.	0	2	6
DEAL wall strings, 1¼ in. thick, moulded, per ft. run	0	2	6
If ramped, per ft. run	0	5	0
SHORT ramps, extra each	0	7	6
ENDS of treads and risers housed to strings, each	0	1	0
2 in. deal mopstick handrail fixed to brackets, per ft. run	0	1	6
4½ in. × 3 in. oak fully moulded handrail, per ft. run	0	5	6
1¼ in. square deal bar balusters, framed in, per ft. run	0	0	6
FITTINGS :			
SHELVES and bearers, 1 in., cross-tongued, per ft. sup.	0	1	6
1¼ in. beaded cupboard fronts, moulded and square, per ft. sup.	0	2	9
TEAK grooved draining boards, 1¼ in. thick and bedding, per ft. sup.	0	4	6
IRONMONGERY :			
Fixing only (including providing screws) :			
TO DEAL—			
Hinges to sashes, per pair	0	1	2
Do. to doors, per pair	0	1	7
Barrel bolts, 9 in., iron, each	0	1	0
Sash fasteners, each	0	1	0
Rim locks, each	0	1	9
Mortice locks, each	0	4	0

SMITH

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

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Mild Steel in British standard sections, per ton	£12	10	0
Sheet Steel :			
Flat sheets, black, per ton	17	0	0
DO., *galvd., per ton*	19	0	0
Corrugated sheets, galvd., per ton	18	10	0
Driving screws, galvd., per grs.	0	1	10
Washers, galvd., per grs.	0	1	1
Bolts and nuts per cwt. and up	1	18	0

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MILD STEEL in trusses, etc., erected, per ton	25	10	0
DO., in small sections as reinforcement, per ton	16	10	0
DO., in compounds, per ton	17	0	0
DO., in bar or rod reinforcement, per ton	20	0	0
WROT-IRON in chimney bars, etc., including building in, per cwt.	2	0	0
DO., in light railings and balusters, per cwt.	2	5	0
FIXING only corrugated sheeting, including washers and driving screws, per yd.	0	2	0

PLUMBER

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

*

Lead, milled sheet, per cwt.	£1	9	0
DO. *drawn pipes, per cwt.*	1	10	0
DO. *soil pipe, per cwt.*	1	12	0
DO. *scrap, per cwt.*	1	0	0
Copper, sheet, per lb.	0	1	9
Solder, plumber's, per lb.	0	1	3
DO. *fine, per lb.*	0	1	9
Cast-iron pipes, etc. :			
L.C.C. soil, 3 in., per yd.	0	4	0
DO. *4 in., per yd.*	0	4	9½
R.W.P., 2½ in., per yd.	0	2	2
DO. *3 in., per yd.*	0	2	7
DO. *4 in., per yd.*	0	3	6½
Gutter, 4 in. H.R., per yd.	0	1	6½
DO. *4 in. O.G., per yd.*	0	1	10½

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MILLED LEAD and labour in gutters, flashings, etc. per cwt.	3	2	6
LEAD PIPE, fixed, including running joints, bends, and tacks, ½ in., per ft.	0	2	0
DO. ¾ in., per ft.	0	2	3
DO. 1 in., per ft.	0	3	0
DO. 1¼ in., per ft.	0	4	0
LEAD WASTE or soil, fixed as above, complete, 2½ in., per ft.	0	6	0
DO. 3 in., per ft.	0	7	0
DO. 4 in., per ft.	0	9	9
WIPED soldered joint, ½ in., each	0	2	6
DO. ¾ in., each	0	3	2
DO. 1 in., each	0	3	8
BRASS screw-down stop cock and two soldered joints, ½ in., each	0	11	0
DO. ¾ in., each	0	13	6
CAST-IRON rainwater pipe, jointed in red lead, 2½ in., per ft. run	0	1	7
DO. 3 in., per ft. run	0	2	0
DO. 4 in., per ft. run	0	2	10
CAST-IRON H.R. GUTTER, fixed, with all clips, etc., 4 in., per ft.	0	2	0
DO. O.G., 4 in., per ft.	0	2	3
CAST-IRON SOIL PIPE, fixed with caulked joints and all ears, etc., 4 in., per ft.	0	4	6
DO. 3 in., per ft.	0	3	6
Fixing only :			
W.C. PANS and all joints, P. or S., and including joints to water waste preventers, each	2	5	0
BATHS, with all joints	1	3	6
LAVATORY BASINS only, with all joints, on brackets, each	1	10	0

PLASTERER

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

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Chalk lime, per ton	£2	17	0
Hair, per cwt.	2	0	0
Sand and cement see "Excavator," etc., above.			
Lime putty, per cwt.	£0	2	9
Hair mortar, per yd.	1	7	0
Fine stuff, per yd.	1	14	0
Sawn laths, per bdl.	0	2	5
Keene's cement, per ton	5	15	0
Sirapite, per ton	3	10	0
DO. *fine, per ton*	3	18	0
Plaster, per ton	3	0	0
DO. *per ton*	3	12	6
DO. *fine, per ton*	5	12	0
Thistle plaster, per ton	3	9	0
Lath nails, per lb.	0	0	4

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LATHING with sawn laths, per yd.	0	1	7
METAL LATHING, per yd.	0	2	3
FLOATING in Cement and Sand, 1 to 3, for tiling or woodblock, ⅜ in., per yd.	0	2	4
DO. vertical, per yd.	0	2	7
RENDER, on brickwork, 1 to 3, per yd.	0	2	7
RENDER in Portland and set in fine stuff, per yd.	0	3	3
RENDER, float, and set, trowelled, per yd.	0	2	9
RENDER and set in Sirapite, per yd.	0	2	5
DO. in Thistle plaster, per yd.	0	2	5
EXTRA, if on but not including lathing, any of foregoing, per yd.	0	0	5
EXTRA, if on ceilings, per yd.	0	0	5
ANGLES, rounded Keene's on Portland, per ft. lin.	0	0	6
PLAIN CORNICES, in plaster, per inch girth, including dubbing out, etc., per ft. lin.	0	0	3
WHITE glazed tiling set in Portland and jointed in Parian, per yd., from	1	11	6
FIBROUS PLASTER SLABS, per yd.	0	1	10

GLAZIER

GLAZIER, 1*s.* 8½*d. per hour.*

*

Glass : 4ths in crates :			
Clear, 21 oz.	£0	0	4½
DO. 26 oz.	0	0	5
Cathedral white, per ft.	0	0	7½
Polished plate, British ¼ in., up to 2 ft. sup. per ft.	0	1	2
DO. *¼ ft. sup.* „	0	2	3
DO. *⅜ ft. sup.* „	0	2	6
DO. *20 ft. sup.* „	0	3	1
DO. *45 ft. sup.* „	0	3	3
DO. *65 ft. sup.* „	0	3	5
DO. *100 ft. sup.* „	0	3	10
Rough plate, ⅛ in., per ft.	0	0	6½
DO. *¼ in. per ft.*	0	0	6½
Linseed oil putty, per cwt.	0	15	0

*

GLAZING in putty, clear sheet, 21 oz.	0	0	11
DO. 26 oz.	0	1	0
GLAZING in beads, 21 oz., per ft.	£0	1	1
DO. 26 oz., per ft.	0	1	4

Small sizes slightly less (under 3 ft. sup.).

Patent glazing in rough plate, normal span, 1*s.* 6*d.* to 2*s.* per ft.

LEAD LIGHTS, plain, med. sqs. 21 oz. usual domestic sizes, fixed, per ft. sup. and up | £0 | 3 | 0

Glazing only, polished plate, 6½*d.* to 8*d.* per ft. according to size.

PAINTER AND PAPERHANGER

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

*

Genuine white lead, per cwt.	£2	7	6
Linseed oil, raw, per gall.	0	3	6
DO., *boiled, per gall.*	0	3	8
Turpentine, per gall.	0	4	0
Liquid driers, per gall.	0	8	6
Knotting, per gall.	0	18	0
Distemper, washable, in ordinary colours, per cwt., and up	2	5	0
Double size, per firkin	0	3	6
Pumice stone, per lb.	0	0	4½
Single gold leaf (transferable), per book	0	2	0
Varnish, copal, per gall. and up	0	12	6
DO., *flat, per gall.*	1	2	0
DO., *paper, per gall.*	0	16	0
French polish, per gall.	0	17	6
Ready mixed paints, per gall. and up	0	15	0

*

LIME WHITING, per yd. sup.	0	0	3
WASH, stop, and whiten, per yd. sup.	0	0	6
DO., and 2 coats distemper with proprietary distemper, per yd. sup.	0	0	9
KNOT, stop, and prime, per yd. sup.	0	0	7
PLAIN PAINTING, including mouldings, and on plaster or joinery, 1st coat, per yd. sup.	0	0	10
DO., subsequent coats, per yd. sup.	0	0	9
DO., enamel coat, per yd. sup.	0	1	2½
BRUSH-GRAIN, and 2 coats varnish, per yd. sup.	0	3	8
FIGURED DO., DO., per yd. sup.	0	5	6
FRENCH POLISHING, per ft. sup.	0	1	2
WAX POLISHING, per ft. sup.	0	0	6
STRIPPING old paper and preparing, per piece	0	1	7
HANGING PAPER, ordinary, per piece	0	1	10
DO., fine, per piece, and upwards	0	2	4
VARNISHING PAPER, 1 coat, per piece	0	9	0
CANVAS, strained and fixed, per yd. sup.	0	3	0
VARNISHING, hard oak, 1st coat, yd. sup.	0	1	2
DO., each subsequent coat, per yd. sup.	0	0	11

SUNDRIES

Fibre or wood pulp boardings, according to quality and quantity.

The measured work price is on the same basis . . . per ft. sup. | £0 | 0 | 2½

FIBRE BOARDINGS, including cutting and waste, fixed on, but not including studs or grounds per ft. sup. . . . from 3*d.* to	0	0	6
Plaster board, per yd. sup. . from	0	1	7
PLASTER BOARD, fixed as last, per yd. sup. . . . . from	0	2	8
Asbestos sheeting, 5/32 in., grey flat, per yd. sup.	0	2	3
DO., *corrugated, per yd. sup.*	0	3	3
ASBESTOS SHEETING, fixed as last, flat, per yd. sup.	0	4	0
DO., corrugated, per yd. sup.	0	5	0
ASBESTOS slating or tiling on, but not including battens, or boards, plain "diamond" per square, grey	2	15	0
DO., red	3	0	0
Asbestos cement slates or tiles, 5/32 in. punched per M. grey	16	0	0
DO., *red*	18	0	0
ASBESTOS COMPOSITION FLOORING : Laid in two coats, average ¾ in. thick, in plain colour, per yd. sup.	0	7	0
DO., ½ in. thick, suitable for domestic work, unpolished, per yd.	0	6	6
Metal casements for wood frames, domestic sizes, per ft. sup.	0	1	6
DO., *in metal frames, per ft. sup.*	0	1	9
HANGING only metal casement in, but not including wood frames, each	0	2	10
BUILDING in metal casement frames, per ft. sup.	0	0	7

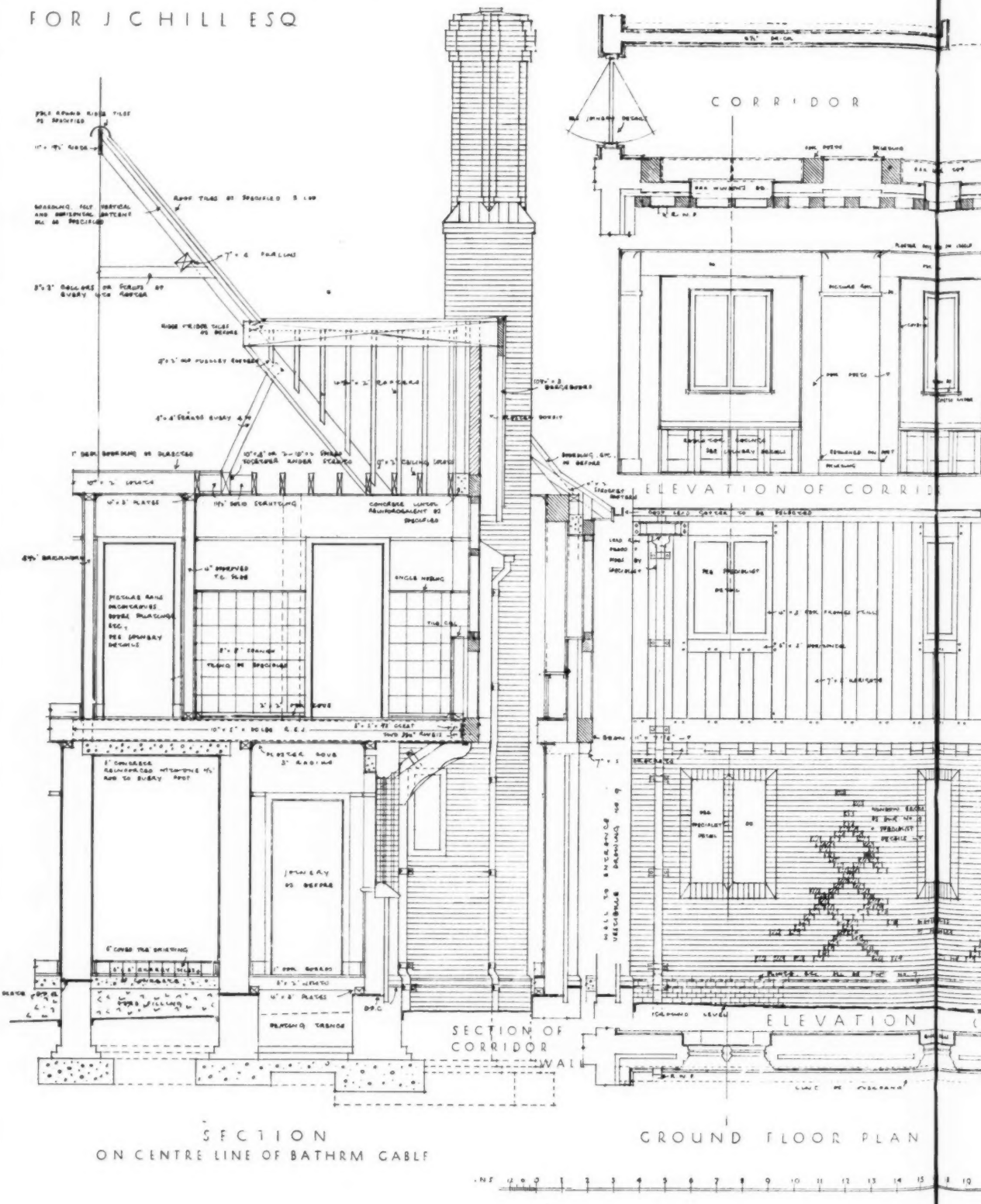
Waterproofing compounds for cement. Add about 75 per cent. to 100 per cent. to the cost of cement used.

PLYWOOD, per ft. sup.

Thickness	3/16 in.			¼ in.			⅜ in.			½ in.		
Qualities ..	AA.	A.	B.	AA.	A.	B.	AA.	A.	B.	AA.	A.	B.
	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
Birch	4	3	2	5	4	3	7½	6	4½	8½	7	5
Alder	3½	3	2	5	4	3	6½	5½	4½	8	7	6
Gaboon												
Mahogany	4	3	3	6½	5½	4	9½	7½	—	10	9½	—
Figured Oak	5½	7	—	10	8	—	11½	—	—	1	6	—
Plain Oak												
1 side	6½	6	—	7½	7	—	9	—	—	1	0	—
Oregon Pine	5	4	—	5½	5	—	9	—	—	—	—	—

HOUSE AT STONE WORCS

FOR J C HILL ESQ



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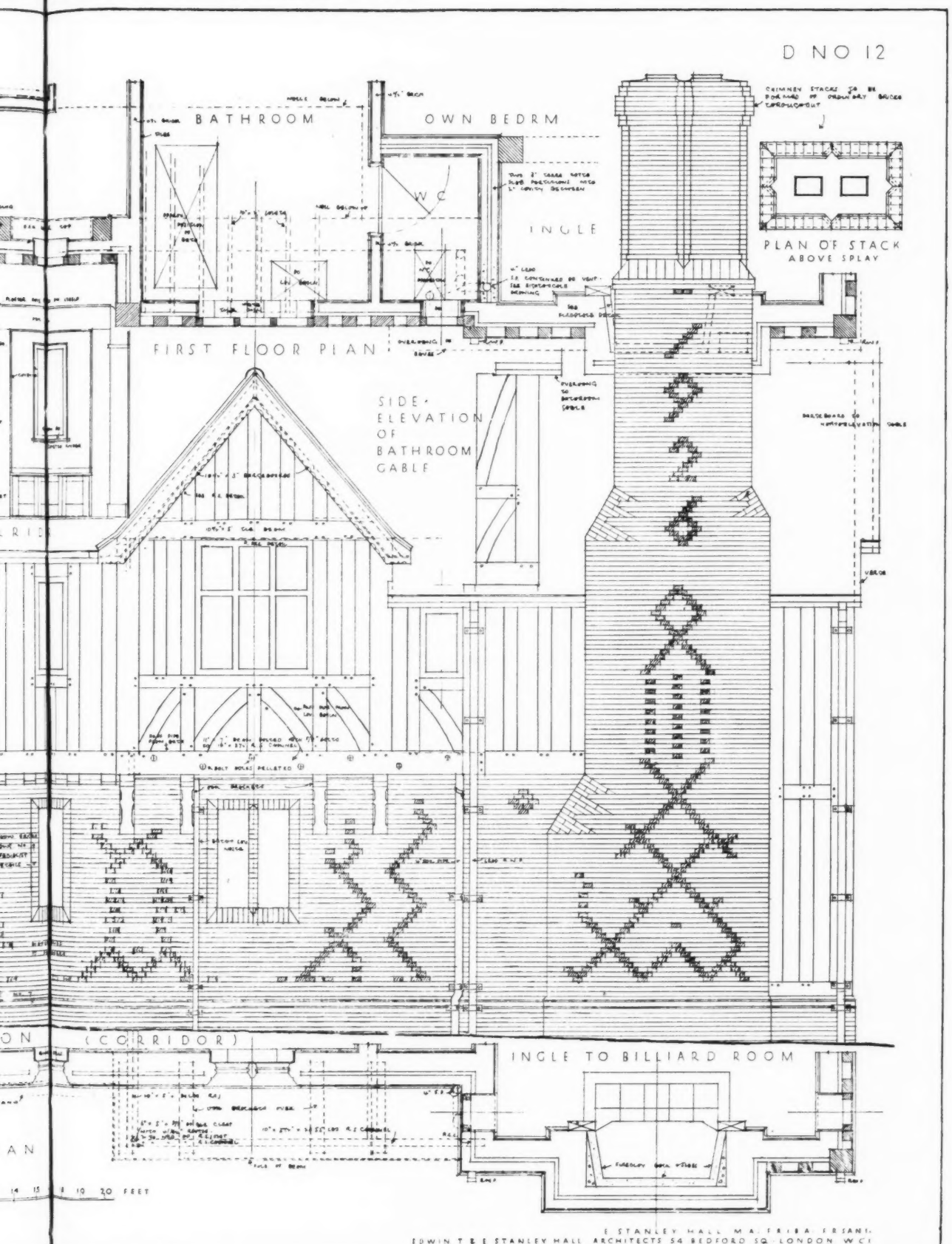

HOUSE AT STONE, WORCESTERSHIRE.
BY E. STANLEY HALL. DETAILS