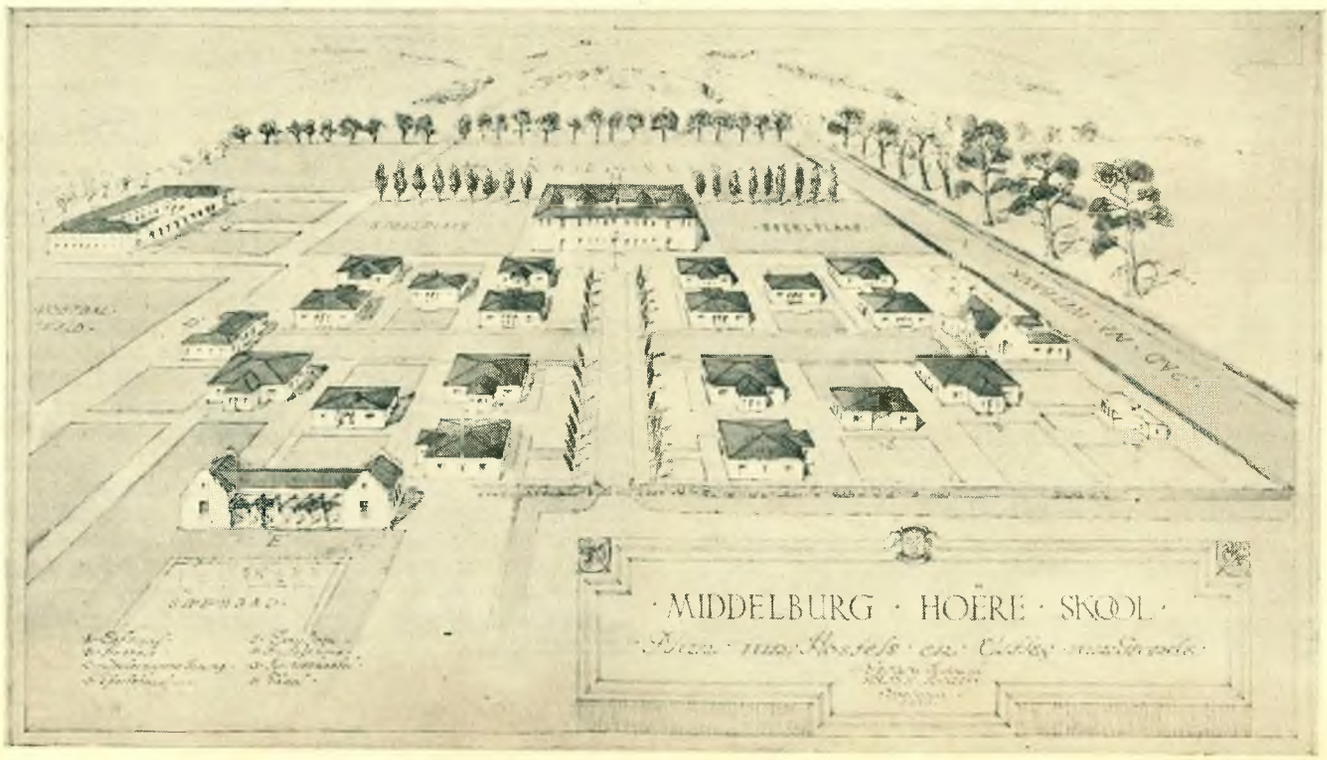
Residence at Waterkloof, Pretoria. *Mr. V. S. Rees-Poole, Architect.*



High School Hostels, Middelburg, Transvaal *Mr. G. Moerdijk Architect.*

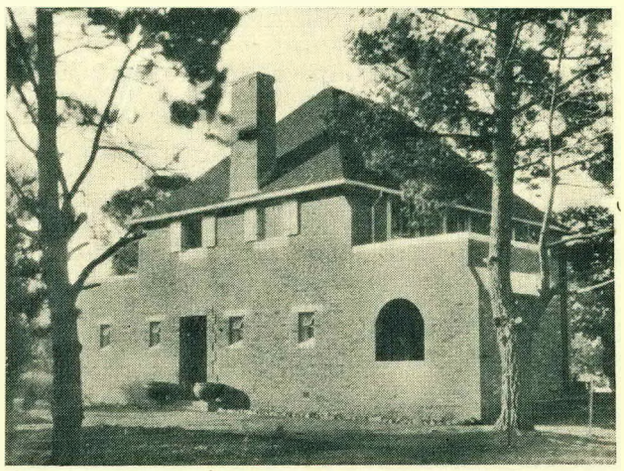
Pretoria members of the Surveyor's Institution (London), in common with other members who are Quantity Surveyors, received by last mail a memorandum from the Institution dealing with the "Chartered Quantity Surveyor and His Work." In a covering letter the Secretary suggests that each member should give a copy of this Memorandum to his Architect friends. If every Architect would read the memo with that unbiassed mind which all Architects possess, nothing but good and better understanding could follow.

The award of the Assessor (Mr. J. S. Cleland) in the "Moeders Bond" Hospital Competition is not available as these notes are written, but great interest attaches to the result.

Most Pretoria Architects (like all other South African Architects) have been busy on the Johannesburg Library Competition and hectic days are spent getting the designs ready for the sending in date.

Pretoria Architects and Quantity Surveyors wish their fellow practitioners in all other centres a very happy and prosperous 1931.

Church at Morgenzn, Transvaal. *Mr. G. Moerdijk, Architect.*



Cottage at Hillcrest, Pretoria, Mr. V. S. Rees-Poole, Architect.

RECENT BOOKS.

Modern Theatres and Cinemas, by P. Morton Shand, B. T. Batsford, London. Price 15/-

In this publication the author has illustrated the modern tendency in theatre design as expressed in Germany, Scandinavia, France, Italy, England and America. The book is full of interest to Architects and includes such recent buildings as the Skandia Theatre, at Stockholm, and the Theatre Pigalle in Paris.

There are seven sections dealing respectively with Modern Pleasure, The Modern Theatre, The Social Function of the Cinema, The Cinema considered as a Building, Facades, Foyers and Auditoriums, Plans and Sections.

The work is profusely illustrated with one hundred and twenty-eight plates, chiefly full page, showing exteriors and interiors, proscenium and openings, foyers, passages, entrance halls, box offices, lighting in a very wide variety, seating, mural decorations and details of every kind.

Mr. Shand deals with the subject in a very able and interesting way, treating it from a practical as well as critical standpoint.

This volume is the first of a series to be published by Batsford, entitled "The Architecture of Pleasure," which should be of great value to the practising Architect and student as the series will include Concert Halls, Casinos, Restaurants, Cafes, etc., as well as Stadiums, Swimming Baths, Railway Stations, Liners, Clubhouses, etc.

The Principles of Structural Mechanics. by Percy J. Waldram. Batsford, Price 12/6.

This book is a second edition of the author's work originally published in 1912. It is divided into five main parts and concludes with three appendices.

Part One deals with such fundamental conceptions as the nature of force, stress, behaviour of materials under stress, leverage and couples as also the conditions which must be satisfied for the equilibrium of force.

These subjects are dealt with in a simple and straightforward manner, points of interest are illustrated by appropriate examples and analogies, while a number of simple experiments relating to some of the problems involved are fully described.

Part one should be closely studied and digested before the student attempts to proceed to the subject matter of the later chapters and it is advisable that he carry out the experiments described if he is to gain a thorough insight into the fundamental principles controlling the subject under discussion.

This portion of the book concludes with chapters dealing with the solution of certain problems by the use of graphical methods and is conspicuous

for the clarity of treatment of the link or funicular polygon. The chapter upon the use of the slide rule is particularly welcome and should be of great value to anyone unfamiliar with this labour-saving device.

Part Two deals chiefly with the factors contributing to the resistance of beams and girders. The mode of treatment is simple and straightforward, while the necessary formulae are developed and analysed.

The author brings home to the reader the role of applied load as the "attacking forces" and that of the resistance of the beam as the "defending force." Throughout the book he seldom misses an opportunity of illustrating the essential fact that in structural design equilibrium is always the result of the balancing of active and passive forces.

Shear is treated in greater detail than is usual in works of this type and the many complex factors associated with this difficult subject are handled with skill. The question of the curtailment of flanges of plate girders and that of the effect of fixing of beams appears to be out of place here and is likely to confuse the student. It might well have been relegated to a later portion of the book. In addition the synonymous use of the words force and stress is apt to be confusing to the beginner.

In the final chapters of part two, the subject of deflection is handled in an able manner without much mathematics and an excellent impression is produced.

Part Three deals in a straightforward and effective manner with the design of retaining walls, buttresses and simple foundations while sufficient attention is paid to the mode of action of earth pressure to give the student a sound conception of the nature of this force.

Part Four deals with the design of roofs and introduces the methods of sections as a means of determining the forces in the members of a pin jointed structure. The hammer beam roof is treated in some detail and while the author succeeds in showing that the problem is not as complicated as is usually believed, he does not adequately stress the fact that the simple solution is based upon the fact that rigidity must be provided at a joint at which there is an inclination to consider the structure as pin jointed. In dealing with wind pressure the author departs from the usual stereotyped treatment which is known to involve definite misconceptions and concentrates his attention upon emphasising conditions which are more closely allied with those occuring in actual practice.

Part Five deals with arches and domes and presents these allied subjects in a convincing manner. The chapters upon columns form attractive reading and fully emphasise the salient points to be considered. The concluding chapter upon shoring deals with this subject in a concise and satisfactory manner.

Appendix A deals briefly with the relation between bending moment and shear. The phraseology, however, does not strike one as being harmonious. It would appear that the substitution of the words "zero shear" for "minimum shear" would have been a definite improvement. The use of the words clockwise and anti-clock wise shear are unfortunate, for they are likely to confuse the student and convey a wrong impression of the nature of shear force.

Appendix B deals with continuous beams and beams fixed at their ends and represents a sound presentation of the subject without the use of much mathematics. The subject is one which is likely to prove difficult to the average architect and is one in which he is not likely to persevere with his studies.

Appendix C refers to the elementary design of non-homogeneous members and is, in fact, the starting point for the study of reinforced concrete.

The book represents a successful attempt to deal with the elements of structural enginering in a manner suitable for the architect. It is essentially a work whose purpose is to develop the type of student who has a sound grasp of first principles as opposed to the dangerous type who places his confidence in formulae, applicability of which he has in many cases only the vaguest conception.

The author's mode of treatment is of such a nature that it is likely not only to make the architect conscious of the point at which the limitations of his own knowledge make it necessary for him to consult the structural expert, but, by giving him a correct insight into the fundamental principles of structural design, should naturally assist him in his work of true architectural design.

W.G.S.

PROFESSIONAL NOTES AND NEWS.

Mr. F. L. H. Fleming, F.R.I.B.A., has recently returned from a trip to England and the continent and we sincerely hope that his general health is sufficiently restored to enable him to once more take an active part in the activities of the Transvaal Provincial Institute.

His son, Mr. L. H. Fleming, who has spent two and a half years at the University of the Witwatersrand is continuing his studies at the Architectural Association School in London.

Mr. R. A. Bruce, who has been employed in the office of Mr. Gordon Leith for some years and who recently obtained the Diploma in Architecture at the University of the Witwatersrand has been elected an Associate of the Royal Institute. Mr. Bruce is at present in the office of Sir Herbert Baker, in London.

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Mr. R. D. Martienssen, who obtained the Degree of Bachelor of Architecture at the University of the Witwatersrand this year has been elected an Associate of the Royal Institute.

Mr. G. E. Gordon Leith, M.C., has been elected a Fellow of the Royal Institute of British Architects.

* * *

Mr. H. G. Porter, who was for some time in the office of Mr. J. Waterson has been elected an Associate of the Royal Institute after having completed a joint course in Architecture at the University of the Witwatersrand and the Architectural Association School, London. Mr. Porter is at present employed in an office in New York.

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Mr. F. K. Kendall, F.R.I.B.A., and Professor John Wheatley, of the University of Capetown, have been spending a few days in Johannesburg and Pretoria in connection with the South African Art Gallery at Capetown, of which they are trustees

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Mr. F. D. Hickman, M.C.Q.S., is removing his office from Stanley House to Green's Buildings, Commissioner Street, from 1st January, 1931.

REGISTRATION.

Since the Union Architects and Quantity Surveyors Act was passed the Architects of Southern Rhodesia have achieved registration and we now hear that the Government of Kenya has passed its Architects Act.

It is interesting, therefore, to read that the Architects Registration Bill in England, has passed the second reading in the House of Commons, and there is every reason to hope that it will become law.

These various Acts should augur well for the future of the Architectural profession in Britain and the British Dominions.

The following report taken from the *Architects Journal,* London, will be of interest to readers :—

The Architects' (Registration) Bill.

Somewhat to the general surprise of members, the House of Commons on Friday, November 7th, gave a second reading without division to the Architects (Registration) Bill, the debate on the Rabbits Bill, which was first on the Order Paper, having lasted only a couple of hours, instead of the whole day, as had been expected. The Architects Bill will now be the second on the list of Bills to go to a Standing Committee, and its future prospects are favourable.

The Bill this year was in the hands of Lt.-Col. Moore, the Unionist member for Ayr Burghs, who moved the second reading in an able and conciliatory speech. He disarmed much of the criticism that the Bill might have encountered by stating frankly that the promoters were not asking for anything unreasonable. They wanted to be assured that when a man was called an Architect he had the qualifications necessary to give efficient and useful service to those who employed him. If the House allowed the Bill to go to a Standing

Committee, the promoters would be ready to consider any reasonable suggestion for its improvement. Lt.-Col. Moore also traced the history of the Bill in some detail, and explained that the promoters were the R.I.B.A., which had a membership of about 8,000. The Bill provided for the establishment and maintenance of a Register of Architects, to which would be admitted without examination all persons practising as *bona-fide* Architects, all those who were under instruction, and those engaged as architects' assistants. The Bill allowed these persons five years in which to apply for admission to the register. Persons desiring to join at a later date would have to pass an examination ; and an Architectural Examination Board, consisting of men of high knowledge and wide experience, would be set up. Clause seven established a Discipline Committee, on which representatives of the Law Society and of the Ministry of Health would be co-opted. This committee would have the power to remove names from the register, with a right of appeal to the Law Courts. The Bill would protect the public and make the architectural profession safe, secure and dignified.

Mr. Ben Tillett, one of the Labour leaders, who seconded, knew of no profession which called for more organisation than that of the architect. The profession that was not organized stood to lose a great deal through chaos and uncertainty, and if architects could command an authoritative body of opinion, nationally expressed, they would do a great deal to abolish "jerry-building." The architects of the country had the power to reorganize our housing system in such a way as to make it worth handing down to posterity as a lesson and an example.

The approval of the architects of Northern Ireland was voiced by Col. Sinclair, who said that a system of registration would have a beneficial effect both morally and materially on the profession, and would benefit the public as well.

Mr. Mills, the Labour member for Dartford, was doubtful of the effect which the Bill would have on young men who, working as plasterers, joiners, and bricklayers, were giving their spare time to improving their capacity to serve their crafts.

Mr. Geoffrey Shakespeare, from the Liberal benches, pointed out that, if ever a Bill had been subject to the scrutiny of Parliamentary procedure and debate, it was this Bill. The principles of the Bill, he declared, were in accordance with the tendencies of modern life, and the House ought not to deny to the oldest and most honourable profession the right to raise its status, as other professions had done.

Mr. March, however, the Labour member for Poplar, said that, unless assurances of reasonable consideration were given to other associations outside the R.I.B.A., he would oppose the Bill.

Sir Martin Conway made a powerful speech in favour of the Bill, and repeated the assurance that the R.I.B.A., was ready to meet objections with the utmost willingness to satisfy legitimate criticism.

Mr. Short, the Parliamentary Secretary to the Home Office, then put the Government view. He said that they must all recognise that there was a wide divergence of opinion among architects as to the merits of

the Bill. There was a large body of opinion, including the Incorporated Association of Architects and Surveyors—the second largest association, he thought, of architects—who were very much averse to the provisions of the Bill. It would, therefore, be well, if the Bill reached the Committee stage, that these facts should not be ignored, and that a real attempt should be made to secure agreement. While not going into the merits or demerits of the Bill, he said they could all agree with it so far as it sought to establish a higher educational standard. Many people feared that the Bill would create another very close corporation. They were entitled to regard the matter from a different point of view from the case of doctors, dentists, or lawyers. They were dealing with creative art and it would be unfortunate if art should be robbed of great artists because they were not registered. The Government intended to leave the Bill to a free vote of the House.

After a strong speech in opposition to the Bill from another Labour member, Mr. Broad, who declared that it was unnecessary, that it would bring about a close corporation and would maintain the profession for a certain class only, the Bill was read a second time. It was referred to a Standing Committee.

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CENTRAL COUNCIL NOTICE.

THE INSTITUTE'S YEAR BOOK.

The 1931-1932 edition of the Year Book will be issued early in April, 1931.

The new edition of the Year Book will be considerably enlarged. In addition to the present contents, the Act and Regulations (containing all amendments), will be included, thus making the Year Book most helpful and valuable.

It is especially desired that Members of the four Provincial Institutes and the Chapter notify their respective Secretaries of changes in address, and of such titles as they are permitted to use which they wish to appear after their names.

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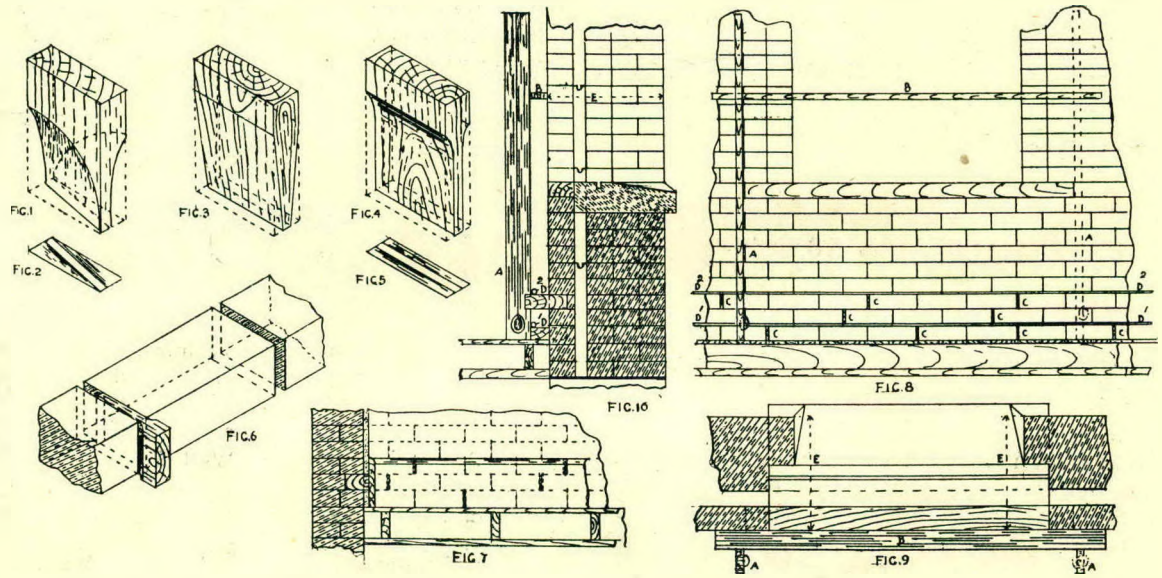
WOODEN PLUGS.

By R. WILD.

Plugs are pieces of wood or metal, or of wood encased in metal, that are inserted in the joints of brickwork or stonework, or are driven into holes bored in brickwork or stonework for the purpose of affording a holding-place for all those fixtures that are fixable by carpenters and joiners. A plug that is at present claiming some attention is the so-called twisted plug, which has been accepted without any proper investigation of its alleged merits, and was no doubt designed to overcome the tendency of a wedge-shaped plug to jump back from the opening into which it is being driven. The twisted plug is shown in Figs. 1 and 2,

and is made from a piece of dry straight-grained pine, the opposite corners of which are cut off; that is, a slice of wood is removed from each corner of the piece of pine in such a manner that the thin or entering edge of the plug is left of equal thickness along its width, and its edges parallel. In Fig. 2, which shows the plan looking up, the wood contained in the two triangles is the portion removed. It is supposed that the cutting off of these opposite corners gives a twist to the cut face of the plug, so that it holds better when driven into the joints of brickwork or stonework. It may not perhaps be easy, from the description here given, or from the illustration, to discover the twist which is the merit of this plug, so it will be better to make a plug of the ordinary kind, as well as a twisted plug, and compare them. The manner of making a twisted plug has already been described; it is nothing more than an ordinary wedge-shaped plug cut slightly across the grain. An ordinary plug is shown in Fig 3, and needs little



description. Cut it down each side till it tapers somewhat like a wedge, keeping the thin edge of the plug of equal thickness along its width, and its edges parallel. On comparing the two plugs it will be seen that as regards slope or angle or thickness there is no difference between the two wedge-shaped pieces of wood, and that one is not a bit better than the other.

As already stated, the twisted plug was designed to counteract the tendency of the ordinary plug to spring back from the joint into which it is being driven; but the designer forgot or overlooked the fact that all the angles of bricks are right angles, and that the joint between two bricks is a joint with parallel sides, and that a wedge driven into a joint, the sides of which are parallel, is only in contact with the edges of the joint. The only way, then, of making a serviceable plug is to abandon the wedge-shape, and make the sides of the plug parallel (Figs. 4 and 5), and to fit each plug to the opening it is intended to fill.

For securing skirting in ordinary cottage work, joints about 3 feet apart are made in the brickwork with a plugging chisel. The plugs should be made of the shape shown in Fig. 4, each being fitted in its own joint, and they are driven in up to the shoulder (Fig. 6). A chalk line is then stretched from the first plug to the last, the line being held sufficiently far from the surface of the bricks to allow for the thickness of the plaster. The plugs are marked at this point, and the superfluous wood is cut off. Fig. 7 shows the common way of fixing the skirting.

In buildings of a more pretentious character, and superintended by a clerk of works, a higher class of work is expected. Suppose an order has been given to fix two sets of grounds for a 9-in. skirting, the walls of the room to be perfectly square and plumb when plastered. When the room is on the ground floor, the floor level, if it has not been marked, must be obtained. It may sometimes be got from an adjoining room, where the floor level has been determined by the floor joist running over one of the cellars. The room must now be squared by the outside wall, working through the window opening (Fig. 9), the inside walls being plumbed from floor to ceiling, trying the window side first to see if it inclines inwards (a 10 foot rule should be used) or outwards at the top or at the bottom. Then the joints to receive the plugs (beginning with the window side), must be cleared, making the joints 18 in. apart along the wall, and placing the bottom ground or row of plugs about 1 in. or $1\frac{1}{2}$ in. from the floor, and the top ground $\frac{1}{4}$ in. or $\frac{3}{8}$ in. below the top edge of the skirting.

When all the plugs have been driven in on the window side, fasten the chalk line across the room to the bottom row of plugs. Then place a rule across the window opening on the inside, keeping it parallel with the outside of the wall (Figs. 8, 9 and 10), and drop a plumb line from the rule as a guide to set the chalk line, which should be parallel with the rule.

The reference letters in Figs. 8, 9 and 10 are as follows: A, plumb rule; B, parallel rule; C, plugs; D, chalk line; E, equal thickness.

The chalk line should be kept back the thickness of the grounds, so that the latter may finish flush with the face of the plaster. If the face of the wall is not quite straight or flat (it is sometimes rounded a little), the face of the ground must be $\frac{7}{8}$ in. from that part of the surface that protrudes most.

Plugs, to which pieces of wood called "soldiers" must be nailed, should also be placed in the joints between the top and bottom rows: these plugs must be about 2 feet apart (FF, Fig. 11). The grounds should be so fixed that the walls may be perfectly straight, plumb and square when plastered; and the least amount of plaster on any part of the walls must be of the specified thickness (say $\frac{7}{8}$ in.). Figs. 11, 12, 13, 14 show the method of preparing the grounds and fixing skirting in first-class work.

If the wall on the window side slopes inwards (that is, towards the inside of the wall), say, $\frac{1}{2}$ in. at the top, the faces of the ground must be fixed $\frac{7}{8}$ in. from the most protruding point at the bottom, and there will then be $1\frac{3}{8}$ in. of plaster at the top.

When the chalk line (D, Fig. 10) is set parallel with the outside face of wall, the line D2 may be run along the top row of plugs keeping it perfectly plumb to the bottom line. You now measure back from these lines and mark the plugs allowing for the thickness of plaster as described.

Now take away the chalk lines and with a small plumb rule, say 18 in. long, $2\frac{1}{2}$ in. wide by $\frac{1}{2}$ in., with its edges splayed down to about $\frac{1}{8}$ in. of the square edge so as to be able to see the cut off marks, for sometimes the plugs will have to be marked with the plumb cut line close up to the bricks.

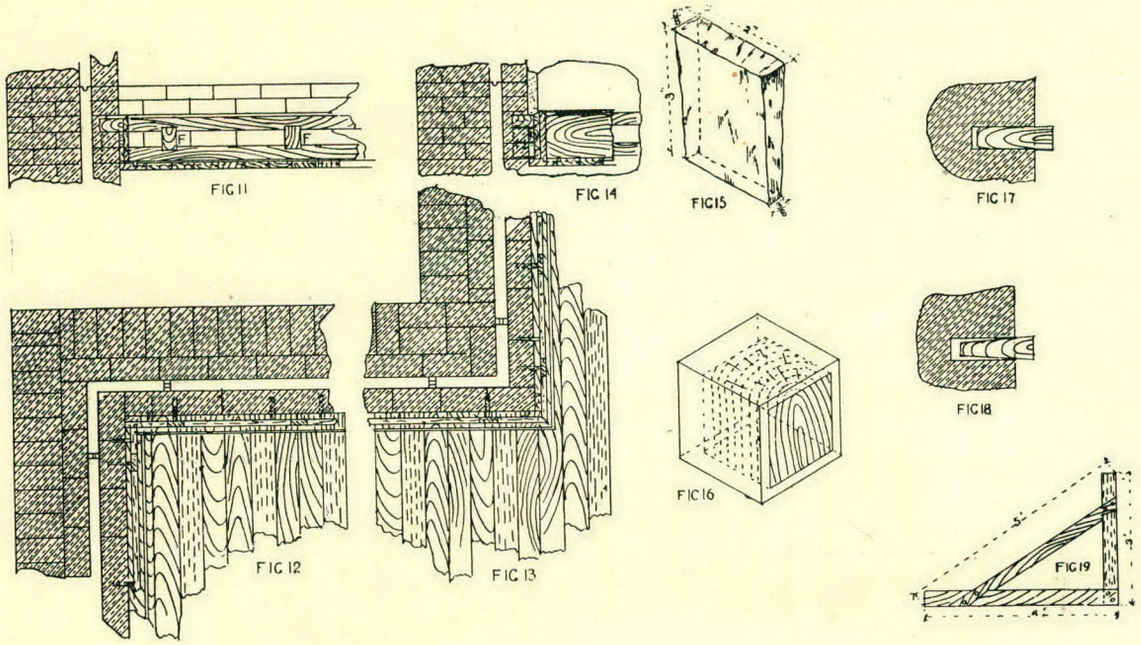
If you wish you may refix the chalk lines to these new marks and mark the plumb cut of the plugs with the plumb rule from these chalk lines.

In illustrations Fig. 9 and 10, each side of window opening is perfectly parallel which is scarcely what you would find in practice.

All the plugs being marked are cut off, and the window side will be ready to receive the grounds. Before, however, any grounds are fixed, the other three sides of the room must be made perfectly true. The plugs already fixed can be used as a base to work from in squaring the other sides, taking first the side to the right and plumbing the wall from floor to ceiling as before, making due allowance in setting the ground for any roundness or other irregularity on the face or at the top or bottom of the wall. To square this side from the plugs on the window side, a square with arms about 8 feet long will be required, one edge being placed against the face of the sawn plugs, and the chalk line set parallel to the other edge. This side may now be plugged and the chalk line run along the plugs as before, after which the other two sides of the room can be done.

All plugs should be kept at least 9 in. from fireplaces or flues, and if a plug is required within the prescribed area, it must be made of lead (Fig. 15). If a gas bracket has to be fixed on the chimney breast or opposite a flue, the wood block must be tightly encased in a $\frac{1}{2}$ in. cast-iron box of 14 in. cube (outside dimensions), the grain of the wood being vertical (see Fig. 16). If these boxes are to be fixed after the walls are up, they must be fastened with iron wedges, then made tight all round with good mortar. As already stated all wood that is to be plastered over, such as plugs, etc., must be kept back $\frac{1}{4}$ in. from the face of the plaster.

When the plugs for the skirting ground have been cut off, the window and door openings must be plugged to receive the grounds for the architraves. The joint grounds must be plumb and parallel, and the heads must be square, level, and $\frac{1}{4}$ in. or $\frac{3}{8}$ in. from the outside edge of the architrave. The joints must be lined out to the grounds behind the window linings and the door casings. All the internal angles of the



grounds must be grooved and tongued, and the external angles mitred. When the grounds have been fixed, the soldiers (FF, Fig. 11) may be fixed between them, one being placed on each side of the external and internal angles to form a solid angle. The soldiers should be let into the grounds.

When the grounds are fixed, a nail must be driven into the wall on each side of the corners of the room near the ceiling, plumb with the face of the grounds. The nails must not be more than 9 feet apart, and on each nail a pat of plaster must be laid, to which the plaster will afterwards have to work.

The round wooden plug, to contain which a hole is drilled in brick or stone, is often so thick as to be almost useless for the purpose it is intended to serve. The sides of the hole made to receive it are jagged and uneven, and unless the substance of the plug is forced into these indentations, it will, when the wood dries and shrinks, work loose and perhaps fall out. The screw that is driven into the plugs is intended to act as a wedge, so that the fibres of the wood may be forced into and become locked in the rough sides of the hole ; but if the plug is too thick the force exerted by the screw is effectually resisted, and the plug does not lock, and, in addition, the larger the plug the more in proportion will be the shrinkage in drying. The plug, therefore, should bear an exact relation to the size of the screw. A $\frac{1}{2}$ in. or $\frac{3}{8}$ in. plug is quite large enough for a twelves or fourteens screw. It has already been pointed out that wedge-shaped flat plugs cannot exert any holding power, neither can a tapering round plug. Fig. 17 shows the best form of round plug ; Fig. 18 is a bad form, but one that is often ignorantly used.

Many workmen think that a large and perfectly accurate square is difficult to make, but it may be done by observing a simple rule of arithmetic as follows: The square root of the sum of any two squared sides or lengths is the length of the third ; take, for example, the square roots of 4 and 3 ; the square of 4 is 4 x 4=16, the square of 3 is 3 x 3=9 ; 9 + 16=25, which is the sum of the two given sides when squared. the square root of 25 is 5 x 5=25, so that 5 is the length of the third side (see the square shown in Fig. 19). It is easy, therefore, to make a square of any dimensions by drawing a perpendicular line and a horizontal line, and prolonging them until they bisect each other, then the sum of the squares of the two given sides will, when squared give the length of the third side, if the largest angle is a right angle. Suppose one line is 8 feet long and another line 6 feet long, then the angle at the point of bisection will be a right angle if a triangle can be formed by connecting the ends of the two lines by a third line 10 feet in length.