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J. W. SIDDALL, ARCHITECT.

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AUGUST, 1903

STUDIO RESIDENCE FOR J. C. PINKEY, HUDSON HEIGHTS, QUE.
W. H. WATTS, ARCHITECT.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
AUGUST, 1903

HOUSES IN MAITLAND PLACE, TORONTO.
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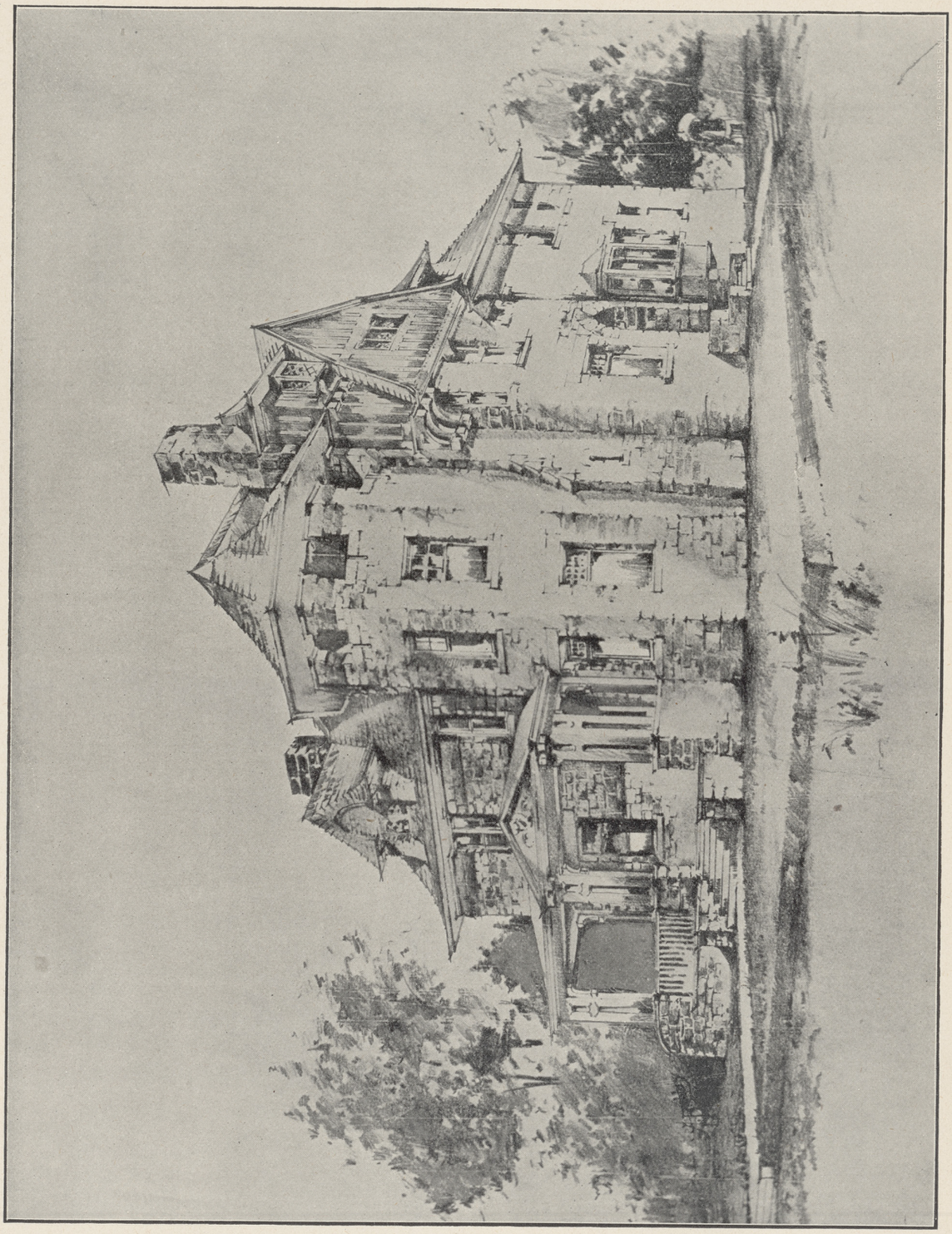

HOUSE IN JAMIESON AVENUE, TORONTO.
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SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
AUGUST, 1903

The Canadian Architect and Builder

VOL. XVI.—NO. 188. AUGUST, 1903.

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SPECIAL CONTRIBUTORS.

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" S. H. TOWNSEND, " "
" FREDERICK G. TODD, Landscape Architect, Montreal
" W. H. ELLIOTT, Toronto.
" J. C. B. HORWOOD, Architect, Toronto.
" A. F. DUNLOP, R.C.A., Architect, Montreal.
" FRED. T. HODGSON, Architect, Collingwood, Ont.

Fire Protection Engineering.

The Armour Institute of Technology, Chicago, has recently established a four years course in Fire Protection Engineering. Special instruction will be given three hours a week during the second year in the chemistry of fire protection, eight hours during the third and fourth years in fire protection engineering, and eight hours during the fall and winter terms of the fourth year in schedule rating, special hazards, underwriters' requirements and insurance practice.

Colour in Churches.

It is usual for writers about mediaeval architecture to speak with great sadness of the glories of the wall colouring, that time, assisted by whitewash, has caused to disappear. It is true that the small portions of frescoes that remain here and there have usually the peculiar softness of colour of a faded fresco. But it is not likely that the colouring was always so. And if it were —with the varieties of coluor and scale, the beauty, if there was any, must have been the beauty of a patch-work quilt ; interesting perhaps in part, but queer as a whole. But as a matter of fact, what remain in the way of wall paintings are hideous in their grotesqueness, regarded singly, and could give no real pleasure, or be of real value, except to an antiquary. The church, when it is scraped down to the stone, is really more suitable and more pleasing. The present generation owes a debt of gratitude to the vandalism of the past. The best architectural colour is the colour of stone, especially of old stone. This is equally true of wood. Looking up at a perpendicular roof of carved oak beams, whitened on the outer surfaces of the mouldings and darkened in the hollows, one thinks with horror of the fragments of red and blue and gold which are said to be visible to close inspection. What if the whole roof were to be covered with them ! The wtiters upon the church may regret, as much as they like, the loss of this ancient blaze of colour, but an architect is thankful.

Common Entrances.

A good arrangement, constantly to be met with in London, is a row of houses set back some distance from the road and having a common carriage drive. It is in fact a double road, as far as it goes ; or, when both sides of the street have the same plan, a triple road ; the public highway flanked by private entrances, which turn out into the public way at each end of the block and are divided from it by a railing of

some kind and a row of trees. In one case at any rate, this plan is carried through the whole length of the street and makes a handsome street of it.

This is nothing more than the ordinary spacing of town lots, so common in Canada; where each lot, whether the houses are detached or in rows, is too narrow to admit of a carriage entrance from the street up to the front door; and where the building line is set back so far from the street that, without a carriage entrance, any one arriving or departing in a carriage must cross some fifty feet of pathway, exposed to possibilities of rain or snow. In the case of the London house, the kitchen department is in the basement and the garden is on the interior side of the house, so that the only use of the set back on the exterior side is as a set back—to remove the house from the public way. That the space should be occupied by a private driveway is no loss but a gain. In our cities, as the rear is usually occupied by the service department and a yard, the set back in front becomes the garden and an airing place for the family; but there are occasional variations in which the London plan would be the thing to aim at.

In order to have the best effect of privacy and to keep the street well marked, a wall is necessary, or at least a railing. A plain, low wall is better than anything that can be made of wood, and even better than iron for purposes requiring clear distinction; but the most beautiful form of street wall—which is something that should define without concealing, and that, while serving its purpose, should also serve for adornment—is a low wall with a railing on top.

Winter Foliage.

There is great beauty in the mere trunk and branches of a well-shaped tree; and to have this before the eye in winter, especially when, seen through a window, the ramifications form, as it were, decorative pattern, running through the panes of glass and crossed by the sash bars, would be sufficient reason for having trees in a garden if there were no such thing as foliage. But when the time comes for the foliage to break out, it always seems to be a little better than we expected, and we look forward with regret to the time when it will fall again. As a matter of fact, the thing which particularly surprises us always is the abundance of the foliage. It is only by noting in one spring the extent to which the full sized leafage surpassed our expectations that we can be prepared for what to expect when summer comes again. This should be the cure for the discontent of winter; for the green gloom which we enjoy in summer would be an uncomfortable surrounding to a house in winter. But a green object that casts no gloom is as good in winter as in summer. What is wanted is an evergreen tree of some sort that does not grow too large and is not too funereal.

Japanese trees of this sort seem to answer every requirement except proof that they will stand our climate. They grow well in the north of England where it is very cold at times; yet it is not so much cold according to the thermometer as just beastly cold; and it is only thermometer cold that vegetation seems to mind, on the other hand, however, there is no protecting snow; but the sort of open winter that a few years ago decimated our hedges and climbers. Japanese ivy failed in that year when it was planted against a south wall; no doubt because its roots, when not protected by the cool covering of the snow, were beguiled by the sun to send up sap, only to have it frozen when the sun had passed. Ordinarily, Japanese ivy succeeds and the presumption is in favor of Japanese fir.

The peculiarity is, like other Japanese plants, a variegated foliage which relieves the gloom that is so unpleasant in other evergreens. A variety called Retinospora Aurea makes an excellent garden tree, in summer or winter. It does not grow too tall, has a fine close foliage, which makes good masses, but of a delicate texture. The tips of the leaves are nearly yellow for an inch or so, which brightens up the tree and gives its light and shade the *chic* effect of a piece of colored modelling which has had the tint wiped off the highest surfaces.

There is another Retinospora in which the foliage on the back part of a bough is of a very dark green, while the tips are of a very light, almost silvery, tea green. The effect of this is even more delicately beautiful than in the golden variety.

Table of Architectural Periods.

The following is a convenient table of architectural periods drawn up by an English architect:

A.D.				
1200	Early English.	Gradual Change		
1250				
1300	Decorated		..... Edward I	1272
			..... Edward II	1307
			..... Edward III	1327
1350		Gradual Change	..... Richard II	1377
			..... Henry IV	1399
	Perpendicular		..... Henry V	1413
1400			..... Henry VI	1422
			..... Edward IV	1461
1450			..... Edward V	1483
			..... Richard III	1483
1500		Gradual Change	..... Henry VII	1485
			..... Henry VIII	1509
			..... Edward VI	1547
1550	Elizabethan		..... Mary	1553
1600			..... Elizabeth	1558
			..... James I	1603
1650	Jacobean		..... Charles I	1625
			..... Commonwealth	1649
			..... Charles II	1660
1700				

The steel work in Chicago's new postoffice has been given three or four coats of graphite, one at foundry, one at building and two coats after erection.

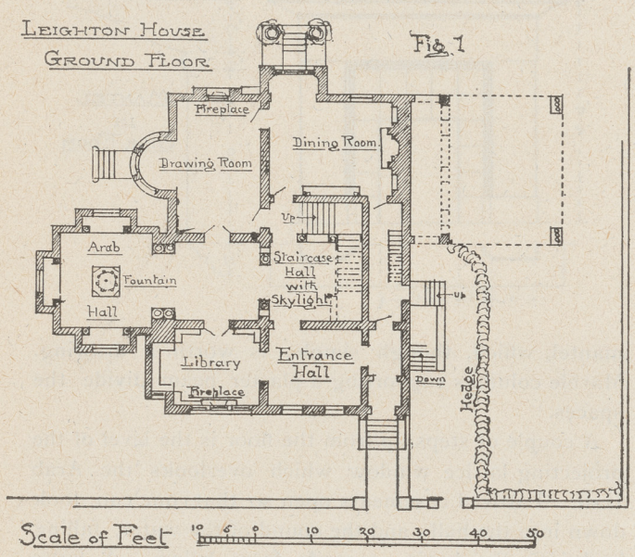
It is reported that the deposits of silica and gypsum near Truro, N. S., will be developed by a New York company. The ores will be shipped to the United States by water from either Bedford or Richmond, and from 100,000 to 150,000 tons a year will be mined and disposed of. Messrs. King, of New York, are said to be developing their plaster property at Hillsboro', Albert County, New Brunswick, which they have owned for a number of years. If the quarry turns out right it is expected that a large business will be done and their plaster mill in New York will be supplied directly from the quarry.

NOTES OF TRAVEL.—III.

LEIGHTON HOUSE

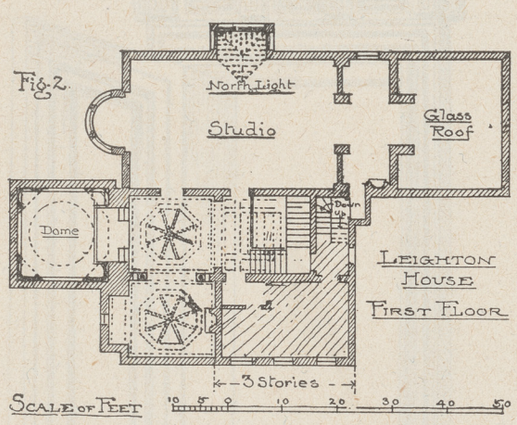
(Concluded)

The entire suite of halls is paved with mosaic work of marble. The openings, between the different parts, are finished with marble columns. This solidity is carried to the staircase, in which the steps of the first flight are of stone. This flight is contained by a stylobate wall, on which stand marble columns to take the staircase wall above; for the first flight of the stair is

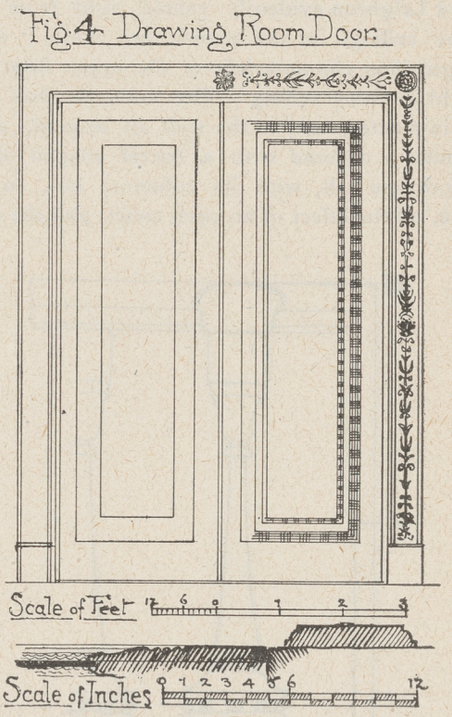


not within the staircase proper, but in a space beyond, which forms a sort of vestibule to the drawing room and dining room. The camparative retirement of the drawing room and dining room doors and of the bottom of the staircase, and the retirement of the latter behind a wall and a screen of columns, are good points in the plan; and an appearance of spaciousness and dignity is given to the hall by the added size and richness.

The drawing room depends for its interest upon the



bow in the centre of the west side. These windows open down to the ground, and from the window in the middle proceeds a flight of stone steps, leading to the garden. The boundary of the garden is not more than fifty feet in this direction. The direction of its greatest extent is to the north, where the limit is practically out of sight. The garden is large and has trees which intercept the sight of what is beyond it. The window on this side does not seem to have been specially designed for looking upon the garden—not downwards at any rate. The window is four feet wide and the stool is not less than 3′. 6″ high. The fireplace is under it; and no doubt, in winter, the branches of the trees, as seen through the window, would form a good decoration over the mantel; better if the sashes were barred, which they are not. But, unless there was some idea of gaining wall space for large paintings on the east, with which a fireplace would interfere, the result does not seem to justify the arrangement. The fireplace opening is a semicircle, about 2′ 6″ in diameter, faced with white marble, inlaid with black in the form of an iris or rush-leaved plant, to decorate (rather thinly) the sides and spandrils. The mantel shelf runs into the window recess.



The wall of the drawing room are painted a deep red; the ceiling is white, panelled with moulded plaster beams; the wood work is finished with shining, though not glossy, black paint. This is the manner of finishing the woodwork throughout the house. It is rather sombre, but dignified; and in respect of its shininess has this point in its favour, that the diffused light within doors is better calculated to give effect to mouldings designed to catch light than to those intended to make shadow. The incised work of the door architraves, in the drawing room, is peculiarly indebted to the way in which the wood is finished. A first sight of this incised ornament did not command admiration. Sunk patterns are but one remove from jig-saw work, and one might expect something better in Lord Leighton's "front room." But for some reason this ornament gave pleasure, and close inspection showed that the sinkings are not square, but pitched or curved. Stems are v'ed, but flowers and leaves are delicately and not monotonously curved and the shining surfaces reflect light like an intaglio. The flowers or rosettes, at the bottom, centres, and angles of the architrave are gilded. The panel moulding has a curious, delicate effect of being scored horizontally. Inspection showed that the mouldings are, at this member, subdivided by a number of small beads, which are run with a surfacethat waves on the plane of the face of the mouldings, producing horizontal bands of light and shade.

The Dining Room is trimmed in the same manner

as the Drawing Room but not with the same detail. The gilding is here carried into the baseboard of which the top member is gilded. A gilded moulding also finishes the bottom of the wall beam of the ceiling. It is not a picture moulding, but is evidently introduced for the line of gold : the pictures are carried on brass rods below. The ceiling beams, which are deep and heavily moulded, are coloured a deep red, something near crimson in colour. The walls are deep red also—a paper with a small pattern, a little lighter than the ground. The panels of the ceiling are white.

Lord Leighton evidently valued light from above. All the ceilings in the rooms, are white ; and the distinguishing characteristic of the upper floor is the skylight in every ceiling. The staircase has a long panel in plaster, next to the wall all around, and the remainder is covered with a barrel shaped skylight. The staircase hall, with its columns, has, in consequence, all the effect of an open court; and the striking

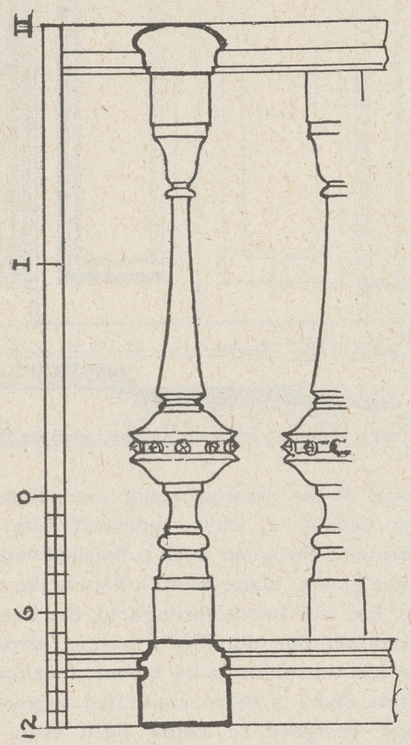


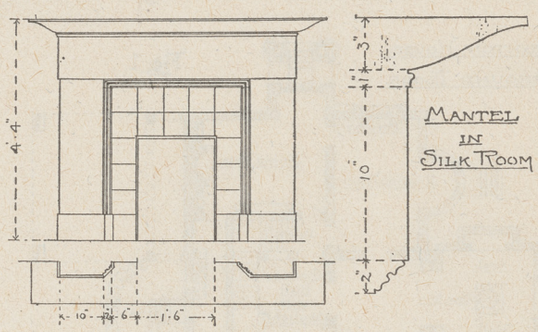
Fig. 6. Baluster.

balusters (which like the rest of the woodwork are a shiny black) are shown to advantage.

The remaining room down stairs—the Library—has black bookshelves, to the height of the window stools, round most of the walls. There is a fireplace in green marble, under the window again · about as effectually tucked away out of sight as it is possible for a fireplace to be. Lord Leighton does not seem to have been of the same mind as the rest of the world who have adopted the Latin word for a fireplace, Focus, as the general term for an essential central point.

The most instructive feature in this little room of which the ceiling is as high as the other rooms on the floor, is its cornice, which must be of 3′ 0″ girth and has a good effect upon the proportions of the room. It must be remembered that there is a heavy base of book shelves.

Upstairs, the distinguishing characteristic is abundance of light. The double hall, between the staircase and the upper part of the Arab Hall, was evidently intended for the display of pictures. Each division has a skylight, in the form of an octagonal pointed dome, in the middle of the ceiling. The walls are hung with stuff of one colour : canvas of a bronze yellow in the northern division, and gold yellow silk in the southern. This latter division is dignified also with a marble

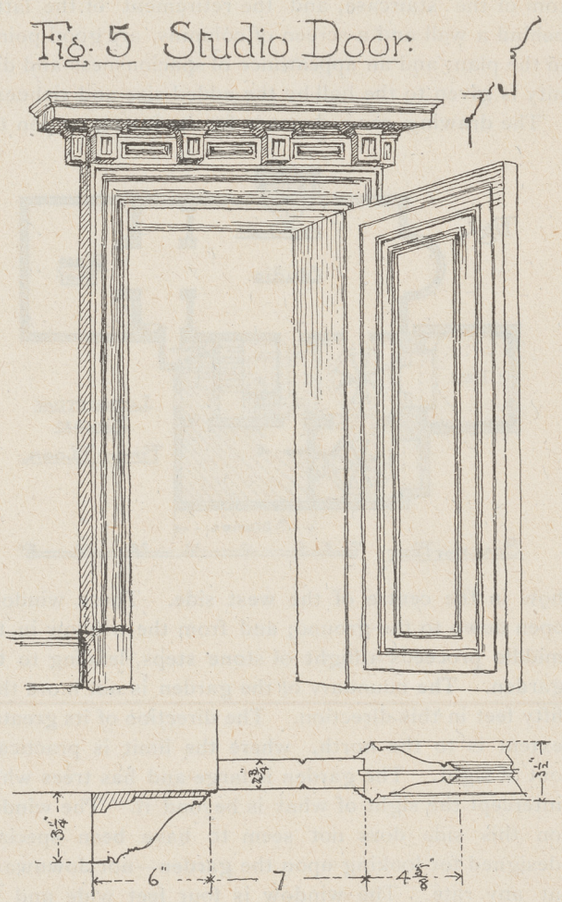


mantel, which, though simple, is worth a drawing. Marble columns supporting a plaster beam divide the spaces.

A couple of steps up from the floor is the level of the projecting lattice window which overlooks the Arab Hall. Latticed casements open so that one can look down into the hall ; and the sound of the water, falling back into the basin, ascends from below. A large plant standing upon the platform between the steps, shows well under the skylight, with the lattice work as a background.

The Studio is of course the principal room of the

Fig. 5 Studio Door.



house in scale. Its finish is correspondingly bold. The main door in the centre of the Studio, which is shown

above, is made a central feature by the vigour of its detail. The secondary door, to the middle hall, is subordinated by its flatness. The shaded section shown at the back of the section of the architrave, in the drawing, represents the whole projection of the artritrave in this door ; and its panel is similarly subdued.

The north light of the studio runs practically from floor to ceiling ; and, being in the form of a projection, has a hipped roof, which is also in glass, giving a vertical light. The original studio ended with the gallery, which is now a passage room between the large studio and a later addition with a glass roof. This addition is carried on iron columns. The passage room is also clear of the ground, but not to the same height ; there is a sort of well, (for the storage of canvases, etc., no doubt,) which extends a few feet below the studio floor ; below this the structure is carried on piers. It seems a pity that this space was not included in the lower floor, where it would have made an excellent pantry, adjacent to the dining room, opening off the back hall. There is height enough for both a pantry and the storage well above.

Over the passage in the studio is a gallery, approached by a small stair—which should have been shown in the plan, at the north end, by the little window. A door at the other end of the passage, communicating with the back stair, was evidently the entrance for models. It will be observed that, in connection with this, there is a side entrance to the back hall, at the ground floor ; apart from the kitchen entrance, which is by area steps to the basement. W. A. LANGTON.

SOME LESSONS OF THE RECENT STRIKES.

As predicted last month the painters' strike in Toronto, like those of the other trades, has collapsed. The present season has witnessed the greatest conflict in the building trades that has ever been fought on this continent. The responsibility for the fight to a very large extent lies with the unions, whose demands were such that they could not be acceded to, and the employers were forced to organize for defence.

In Canada, public sympathy has largely been on the side of the contractor, the general feeling being that the workmen were pressing their demands too far. It is a pity that the men did not realize this fact before resorting to extreme measures and blocking commercial enterprises for the greater part of the year. They appear to have forgotten the old song which declares that "The mill will never grind with the water that is past." Neither will these strikers ever be able to give to the support and comfort of their families the money which they might have earned during the first three months of this season.

However, there is usually more or less silver lining to every dark cloud, and there is reason to hope that some benefits may accrue from the present disturbed conditions. The labor agitators have been discounted not only by the public but also in the eyes of the unions whose interests they are supposed to represent. In some instances they have been proven disloyal, even to the extent of asking for and accepting bribes to call off strikes which were instituted by their advice and direction. This should open the eyes of the unions to the character of some of the men who aspire to be their leaders and will no doubt lead to such a revision of regulations as will curtail the powers of the walking delegate. The unions have been taught that it is unwise to press demands which are out of relation to and not warranted by prevailing commercial conditions. To do so is to alienate public sympathy and court defeat. It may safely be asserted that an earlier appreciation of this fact would have saved the labor organizations connected with the building trades in Canada the very serious set-back which they have sustained.

The president of the International Typographical Union, in an address delivered at the annual convention of that body in Washington recently, advocated effort on the part of labor organizations in the direction of the better education of workmen and apprentices. He upheld the right of the employers as well as the workmen to organize, and suggested, correctly, no doubt, that such organizations might prove to be the mediums through which negotiations between employers and employees could more easily be conducted, and by means of which more satisfactory relations might be established.

If the labor organizations would approach the problem on the broader lines suggested in this address, they would find the employers ready to listen to their representations and to co-operate with them in securing necessary reforms. The interests of both classes are identical and should be so considered.

While the evil results of a long-sustained conflict are still so clearly visible this would seem to be an opportune time to look the situation squarely in the face and see if the policy of the past under which such strife and hardship have been suffered should not be superseded by one which would seek to improve the mental and mechanical ability of the artizan.

The effort to place all workmen on the same level, disregarding the widely varying standards of ability with which the Creator has endowed them, is one of the greatest errors of the union system as it exists to-day, and its abolition should form part of any system of reform which may be inaugurated. Workmen should be graded according to their ability and the rate of wages arranged to correspond.

Attention should be directed to devising means for improving the standard of workmanship, so that the presentation of a union card might be regarded as a guarantee of the competency of the workman. This important matter has hitherto received no attention whatever, but, on the contrary, employers have been made weary and disgusted by the repeated demands for shorter hours and more pay.

What is now wanted is a policy which will encourage workmen to make the most of the ability which God has given them, and teach them that by so doing they will achieve the highest measure of success in life, financially and otherwise. Such a policy would receive the approval and support of employers, would fit workmen to become themselves employers, and go far towards re-establishing the sympathetic relations which formerly existed between employers and their workmen, but which unfortunately have of late been in a measure destroyed.

A Chicago court recently decided that the owners of a building having a smoky chimney are liable for damages to persons whose property is injured by the smoke and soot. The award for damages was $1,500.

FINISHINGS IN WOODWORK.

By Fred T. Hodgson.

More attention is now being given throughout the country to the artistic finishing of houses and fine business structures, and more expert carving is done for the purposes named, the appearances indicate, than in the manufacture of furniture, which industry for a long time laid claim upon the greater share of this class of mechanical talent. The reasons for this may not be fully self-evident or patent, but it would seem that it is largely because the real value of hardwood in this direction had never been fully realized or understood in this country, and because, also, the real high art in decorative architecture is scarcely native to American ingenuity and talent, which is famous in other ways, since there are oriental splendors in building and interior display in the palace-like habitations of many a pagan, or uncivilized native, which would never have been deemed possible of execution by our own designers, however artistic their eye, or however deft their touch.

Processes and appliances for producing excellent results are known to many European workmen, in whose breasts the secret of such achievements is firmly locked. During the past few years many of these expert operatives in wood-carving have come to Canada, and their superior abilities have begun to manifest themselves in the wood manufacturing industry of this country, and latterly, to a very marked extent, so that a renaissance in wood-working may be fairly said to have resulted. The importation and employment of this class of talent led to a responsive sentiment in the the community, or such channels of it as evidenced a sufficiently refined or artistic taste to appreciate and encourage a sensible and utilitarian form of art, which was experiencing an important enhancement of its excellence, and now quite a pronounced stimulus has been given the industry of wood-work for house finishing.

Many of our native woods readily yield to the carver's tools and lend themselves to the artistic development of Canadian workmen, and many of our young native workmen have rapidly attained a state of proficiency as advanced as that of our foreign born fellow subjects.

The very finest workmen, especially those in the possession of some secret processes of doing difficult work, receive wages as high as $6 a day. The average pay of good wood carvers is from $3 to $4 a day. The process of ebonizing cherry wood, for instance is a secret known only to the workman who does it. Even the members of the firm in which he is employed have no right to ask what his secret is. The fact that he can get a finer, more ebony-like surface than any other man gives him a high value at once. Although the use of mechanical devices for carving wood are so much disliked by the best workmen, that sandpaper is forbidden, machinery is now used to cut away the rough parts of a bit of carving. A peculiar tool driven by steam power eats out the wood wherever it goes, and thus a skillful man blocks out in a rough way as much work in a day as 20 men could have done formerly.

The delicacy and lightness of wood carving, and the good pay which fair workmen receive for it, have already attracted many Canadian apprentices, who, untrammelled by union rules, are making rapid headway, and promise to surpass the foreigners.

Oak, cherry, birch, walnut and maple are the favorite woods used for interior finishing, oak and cherry being the most popular. The latter of these is now becoming very scarce, while there appears to be no limit to oak. Red oak, when properly finished, makes very handsome work and is quite popular in some localities. The heart wood of beech, when skillfully treated, has a beautiful appearance, and it is a matter of surprise that it is not more generally employed in hardwood finishings. Perhaps, when birch and maple get scarce, beech will have its innings.

BY THE WAY.

The expeditious manner in which the construction of the King Edward Hotel, Toronto, was pushed through by the contractors, Messrs. Illsley & Horn, has been the subject of much favorable comment. It is a subject for particular regret therefore that the firm have not been rewarded by a substantial profit, such as their energy merited. On the contrary they lost so heavily by the transaction as to be obliged to ask the indulgence of their creditors.

× × ×

Some of the persons who incite and engineer strikes of workmen as well as the workmen whom they represent, seem to be seriously afflicted with moral obliqnity. As an example, I would refer the reader to the case of one Samuel Parks, a walking delegate for the bridgemen's union of New York. Parks was arrested charged with accepting from the Hecla Iron Works the sum of $2,000, as blackmail for having agreed to call off a strike at the company's works, yet the bridgemen's union to whose interests Parks appears to have played traitor, is said to have re-elected him by a large vote as the union's walking delegate.

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Difficulty has arisen between the architect of the King Edward Hotel, Toronto, and the New York artist who designed and painted the mural decorations. The courts have been asked to grant an injunction to prevent any person other than the author of the paintings from making changes in them. The architect states that the panels were made too large for the spaces they were to occupy, and that in attempting to fit them in position the artist or the workmen deliberately cut the canvas, and in so doing mutilated the figures in the paintings. In an interview with a reporter the architect is reported to have said that the contractors for this work seemed to think that anything was good enough for Canada. The significance of this remark should not be lost upon Canadian architects who may be tempted to go abroad for skill which could probably be found at home. Some of our Canadian artists have done creditable work in the line of mural decoration, and the question is asked why was not the opportunity given them to submit sketches for these panels? It would have greatly added to the interest of this costly building if, as far as possible, it had been given a distinctively Canadian character, instead of being made a replica of the great hostelries of the United States. One of the charms to the traveller is to be brought into contact with distinctive national characteristics, as exemplified in architecture, social, customs, etc., differing from those to which he has been accustomed.

INTERCOMMUNICATION.

[Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries, neither do we undertake to answer questions in issue following their appearance.]

From "Young Workman":—Isn't there some short method or rule by which a workman can get the bevels for polygons and for different pitches of rafters and similar work by the steel square without being obliged to make a diagram?

ANS.—Almost any angle or degree can be found by aid of the steel square when properly handled; by taking the proper figures on the blade and on the tongue. We know that if we take 12″ on the blade and 12″ on the tongue and place the square with these figures on the edge of the board, we get the mitre cut, a half pitch as it is called, on both edges of the square, the edge of the board being the base line to which the bevel must be applied. Quoting from an authority on this subject, we get the following: "By very common usage among carpenters and builders, the pitch of a roof is described by indicating what fraction the rise is to the span. If for example, the span is 24 feet, then 6 feet in height would be called quarter-pitch, because 6 is one quarter of 24. The rule is somewhat arbitrarily expressed, that is applicable in such cases in roof framing, where the roof is one quarter pitch, is as follows: "Use 12″ on the blade and 6″ on the tongue, and the longer side of the square will be the inclination of the roof. For other pitches make use of the figures appropriate thereto in the same general manner."

The diagram shown at Fig. A., indicates the figures for sixth pitch, quarter pitch, third pitch, and half

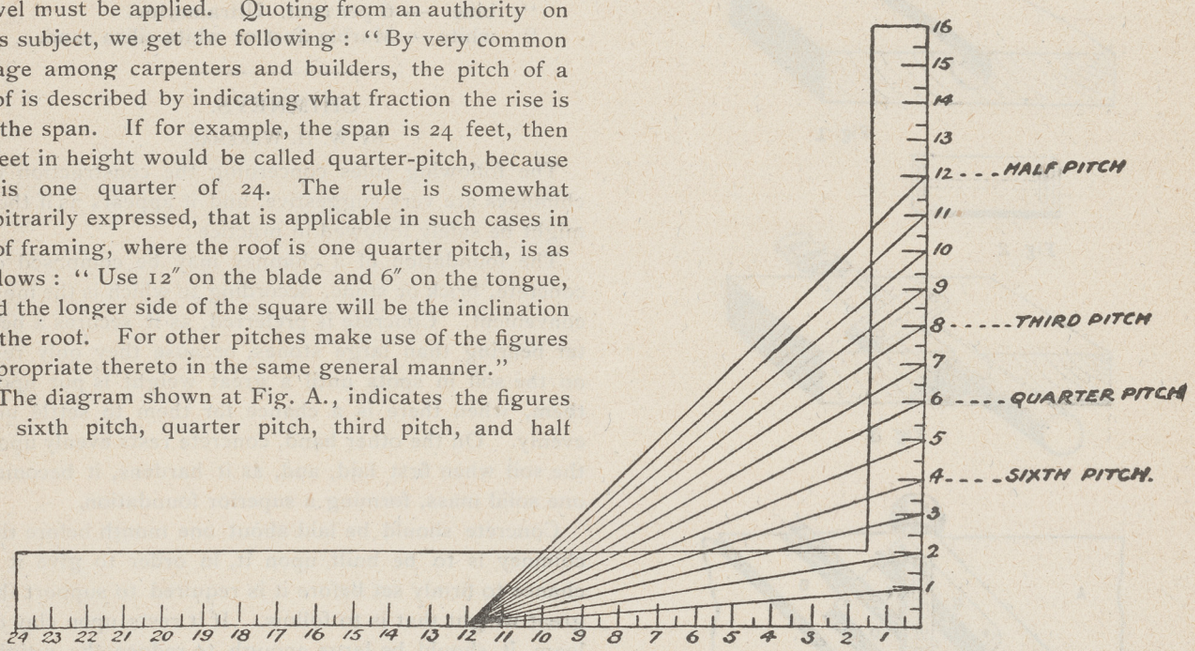


FIG. A.

pitch. The last three of these are in common use, although the first is somewhat exceptional. The tables given herewith show what figures to make use of for obtaining cuts for polygons, for common rafters and for hips and valleys:

12	and	12	square	mitre	12½	and 6	Heptagon mitre.
7	"	4	triangle	"	18	" 7½	Octagon "
13¾	"	10	pentagon	"	22½	" 9	Nonagon "
4	"	7	hexagon	"	9½	" 3	Decagon "

COMMON RAFTERS.

The following figures on the square will give the plumb and horizontal cuts for the pitches enumerated below:

	Rise.	Run.		Rise.	Run.
⅛ pitch	3	12	⅓ pitch	8	12
⅙ "	4	12	½ "	12	12
1/5 "	4 8/10	12	⅔ "	16	12
¼ "	6	12	Gothic	21	12

HIP RAFTERS.

The cuts for hips may be got by taking 17 for the run, instead of 12, using the same rise as for common rafter on the same pitch roof.

From "A Country Mill Hand":—I have been informed that there is a device that can be attached to a "sticker" or a "shaper," that will cut out rope or spiral mouldings. I would be pleased to see such device described and illustrated in THE CANADIAN ARCHITECT AND BUILDER if you think it important enough, and of interest to the other readers as well as myself?

ANS.—There was a device invented a number of years ago, by a Mr. Pendell, but which has been very much improved by a Mr. James Long. It is made as follows:—"The stock should be sawed out and struck round a sticker, or run through a hollow rounding chuck. Over the cutter-head of any machine you wish to use, fix a movable table with a opening in the bottom, through wnich the knives can come up. Then take a block of wood 1½ inches thick by 6 inches wide, 16 inches or 18 inches long, and bore, say, a seven-eight inch hole to one side and through the block, letting the bit cut out be about one-eighth inch (as in Fig 1). Fasten this block on the table over the knives, so that a rod in the block will lie at an angle of about 45 to the cutter-head. Then run bed of machine up until knife will cut a full bead or beads. The best to experiment on will be the three-strand when cut with a common stocker knife, with three beads one-half inch or thereabout, with the centre head dropped back a little. The next thing to be considered is the arrangement for twisting the stock through the block. Take a block of hard wood 4 inches wide, seven-eighth inch thick, and 8 inches long; slot each end about 2 inches. Take two thin pieces of steel (old band saw blades will do), make them sharp on the back, and drive them into the block lengthwise in saw kerfs about one-fourth inch apart (see Fig. 2); the object of the slot is to make the beads intersect. Fig. 3 shows the twister in position. The stock is twisted through by hand. In case the knives do not cut out the feed marks, move the twister until they do. The tighter you have the twister the more positive the feed.

Figs. 4 and 5 show improvements originated by Mr. James Long. Fig. 5 is an end view of the form, which is V-shaped in order to lessen the friction and cause the work to feed easier; at the same time it keeps the

piece tight in the form. This diagram also shows a three-eighth inch piece, which is fastened to the form by screws. This three-eighth inch is cut out just enough to let the bead cutters come through in the center, and it is secured to the table of machine by iron hand screws. Fig. 4 shows a plan or top view of the wooden form. It will be seen that one of the V-shaped pieces is secured to the three-eighth inch piece by wood screws, and is stationary, while the other V-shaped piece is adjustable and is held in place by a spring, which is secured to the outside square piece and also to the V-shaped piece. The arrangement for twisting the stock through the form is the same as Mr. Pendell's. The whole arrangement is very perfect, producing first class work, and even cypress can be turned out finished without sandpapering. The arrangement of this form is such that it can be easily

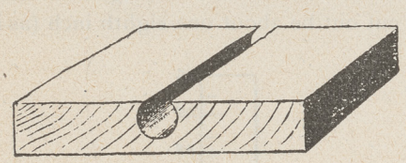


Fig. 1

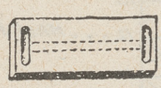


Fig. 2

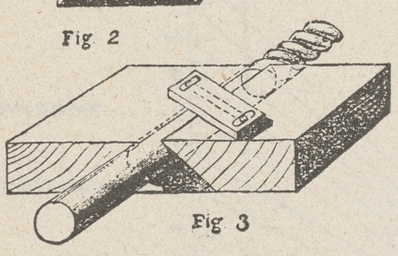


Fig. 3

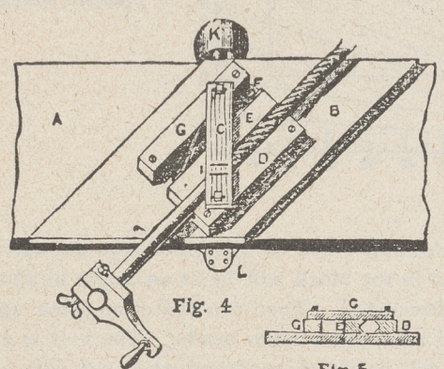


Fig. 4

Fig. 5

FOR MAKING SPECIAL MOULDINGS.

adjusted if the idea is understood and a little patience exhibited until satisfactory results are obtained. A crank handle about 8 inches long, with a thumb-screw to tighten the crank on the stock, is shown in Fig. 3, and is a great help in twisting. There is nothing neater or prettier in appearance than a small rope moulding placed in the corners of panels and other ornamental cabinet work and the general run of joiner's work; and the cheap and simple manner in which these mouldings can be made, after the plan here described, commends them for a great many purposes. Fig. 1.—Block bored out right size to receive stock. Fig. 2.—Piece of wood showing slotted ends for adjusting screws: Dotted lines are saw kerfs to receive pieces of steel for feeding stock. Fig. 3.—Fixture complete, with work in place. Figs. 4 and 5.—A table of machine; B, base piece, three eighth inch thick; C, the holding down piece, in which are inserted the two pieces of steel on the under side, for feeding the stock along; D, stationary V-piece; E, movable V-piece; F, spring; G, spring support piece; K, driving pulley on spindle; L, spindle-box.

From "Contractor": What materials can I use for coloring cement? I wish to lay a floor of cement blocks in alternate colors?

ANS.—Cement metallic colors should be made from the best metallic oxides, free from sulphur. Never use venetian red or lamp black, as they run and fade and weaken the mortar. Excelsoir carbon black is the strongest black known. Mix the following colors with either lime, flour or stainless Portland cement to obtain the best results:

For black — 2 per cent. Excelsior carbon black.
" red —10 per cent. Best raw iron oxide.
" brown— 6 per cent. Best roasted iron oxide.
" buff —10 per cent. Best ochre.
" blue — 6 per cent. Ultramarine.
" white — Marble dust or white silica sand.

CHIMNEYS.

BY W. H. WAKEMAN.

The following rules concerning the construction of chimneys are very suggestive, and it appears as if they might be safely followed in practice:

The foundation of a chimney may be composed of concrete, brick or stone, according to which is the most convenient. Concrete is preferred, as it secures a better bearing than large stones, because they only rest on the soil in spots until a great weight is put upon them, when there is a chance for them to settle unevenly. On the other hand, concrete rests evenly upon the soil when first laid, and, as it hardens, it becomes one solid mass, forming a superior foundation.

Concrete should be laid about one month before the chimney is to be built upon it, in order to give it a chance to firmly set before it is required to support the great weight that is to follow. If it rests upon clay or loam, it should be large enough to reduce the weight resting upon it to two tons per square foot, but if there is a thick bed of gravel to build on the load may be increased to four tons per square foot. If the soil is spongy it must be excavated down to something more solid, but if this is not practical, piles must be driven down until they reach soil that supports them firmly.

The external diameter at the base should not be less han one-tenth of the height, and the outside batter may be from one-sixteenth to one-quarter inch per foot, according to the judgment of the designing engineer. The location of it will assist about deciding this point, for if it is to be exposed to fierce gales it will need to be broader at the base, hence will naturally have the greater batter, but if it is surrounded by high buildings the batter may be less, for obvious reasons.

For chimneys from two and a half to say five feet in diameter the upper part for eight or ten feet need be only one brick, or eight inches thick. For those exceeding five feet, a wall twelve inches thick is right. The whole should be so planned that the walls shall decrease in thickness (as the superstructure increases in height) at the rate of four inches for each twenty or twenty-five feet.

The cap should either be made in one piece, or, if composed of several, they ought to be firmly bound together, but wrought iron bands should never be used

for this purpose, as they rapidly oxidize and are unsatisfactory on this account. It is obvious that a cap should be as heavy as possible, yet small, so as to avoid presenting too much surface for gales of wind to act on.

The flue may be built of uniform diameter its full length, or it may be slightly contracted at the top without reducing the intensity of the draft. Some engineers prefer to have a flue larger at the top, but this does not improve the draft, yet it renders the construction more difficult, hence more expensive, without giving adequate returns.

This was proved in at least one case. It was an iron stack that was larger at the top as originally constructed, but during the course of other changes at that plant this was reversed and put on the same foundation, to be used under like conditions as formerly, but the draft was not affected by the change.

We are sometimes told that chimneys should never be built into buildings, and this is a good rule to go by. Still there are exceptions to it, for sometimes a chimney forms part of a building without objectionable results.

One objection presented to this plan is that when a chimney is built independently of other structures it is swayed by the wind. If a high chimney is to be built near a one-story boiler house it had better stand alone, but where the building is nearly as high as the chimney, which is frequently the case, it must be held by the building, hence this objection is dispensed with.

The expansion of a chimney is greater than the walls of the building, when heavy fires are carried under the boilers, and while this is an objection, it is at least partially overcome by building the core independent of the outer walls, with a good air space between them. While this is expensive, it is necessary in order to provide for expansion of heat, whether the chimney stands alone or forms a part of some building.

This air space should be covered at the top to prevent ashes and cinders from collecting in it, but at the same time care must be taken to prevent binding the two together, as such a plan will destroy the outer wall near the top.

We find that some engineers believe that a lightning rod on a tall chimney is of no benefit, probably because a defective rod has not afforded full protection to some other chimney, but how are we to tell how many times a well laid rod prevents damage by lightning.

If it is carried well down into earth that is always moist it may carry off much of the dangerous fluid without making much fuss about it, hence it is some what like a good steam engineer, as neither gets full credit for the damage they prevent.

About a year ago an imposing chimney was built in a northern city, and when finished the scaffold used was taken down, but a few days ago workmen were said to be erecting another scaffold around that chimney, and investigation disclosed the fact that lightning had damaged the top of it, causing numerous cracks, but not displacing any of the bricks.

A short distance from it stands another chimney, above the top of which appears the points of two rods, and as this is a new one it is very plain to even the casual observer that the owners of it are profiting by the misfortunes of their neighbors to the extent of avoiding their mistakes.

When we consider the comparatively narrow or small dimensions of a chimney foundation, then compare it with its height, it becomes plain at once that a slight imperfection in the foundation, causing it to settle unevenly, although to a small extent, must affect the shaft to a much greater degree. It is both unpleasant and unsafe to have a tall chimney leaning to one side, therefore measures must be taken to correct the evil, and this can be accomplished by sawing out some of the bricks on the high side and putting thinner ones in their places. This allows the high side to settle, bringing the shaft into a vertical position, provided good judgment is used in reducing the size of the bricks, for if they are made too thin the effect might be disastrous, especially if the brick structure is sur mounted by a heavy cap, which is needed to make the whole thing more solid, and thus prevent excessive swaying.

Another plan for plumbing a leaning chimney is to weight the high side of the foundation, or to puddle it until it settles enough to afford a remedy, but this is more dangerous than removing some of the bricks, for the simple reason that there is no way of telling just when the puddling has reached its highest state of perfection, making it risky to prolong the process.

Steel chimneys or stacks are no longer a novelty, and are so designed and constructed that no braces are necessary. The lower courses of such a chimney must, of necessity, be made of thick plates, in order to stand the heavy strain put upon them by bolting them down to a heavy masonry foundation, after which the pressure of wind against the upper parts causes a very great leverage to be brought to bear on the lower courses.

Such a chimney looks well and gives good results in practivec, but is more expensive than one supported by guys, because the absence of support to the upper parts makes a much more elaborate foundation necessary, also increases the cost of the lower part of the chimney itself.

A steel chimney or stack is less liable to be destroyed by accident than one composed of brick, as the latter cannot be held as rigidly together as one made of plates riveted to each other.

The larger sizes of steel chimneys are lined with fire brick, in order to prevent rapid destruction of the lower plates, and to retain the heat as much as possible, for if the hot gases are quickly cooled it tends to reduce the intensity of the draft.

More attention has been given to the design and construction of chimneys during the past few years than ever before, resulting in fine specimens of both steel and brick structures, that are ornamental as well as useful.—The Tradesman.

THE TESTING OF BUILDING STONES.

M. Gautier recently made a report to the Commission of Testing Building materials, relating to the system for testing stone. There is a furthur discussion of the subject in the Building News in which the writer says :

"The testing of all materials suitable for constructive purposes and employed therein is one of the prominent signs that mark the gradual progress and advancement of architectural and engineering science and technology. Petrean monoliths of sizes and dimensions hitherto unsurpassed were used in bygone days in positions and situations which must have exposed them

to nearly every known species of stress, without any preliminary trial or experiment respecting their capabilities to withstand the same. Natural stones, as distinguished from those produced by more modern artificial manufacture, were, in those times, when the means of transport were few, tedious and, frequently, non-existent, taken on their own merits. Their qualities, properties and fitness for the work required of them were gauged by the very practical standard of the manner in which similar examples and specimens had performed their duty in structures previously erected. In the present day these conditions are very materially altered. Building stones are now brought from very great distances, and their strength, powers of resistance, durability and other indispensable qualifications can no longer be taken on trust. Besides, new quarries are continually being opened, and experience has abundantly proved that however valuable and excellent the stone of one quarry may be, it furnishes no guarantee that the product of another, although adjacent to it, will be equally serviceable. The first acknowledgment of the necessity of instituting some test with regard to the properties possessed by building stones was in evidence only a few years ago, when experiments were conducted with the object of determining at least two of their qualities—viz., their specific gravity or density, and their resistance to crushing. It was not until subsequently that it became fully recognized that, in addition to ascertaining the general characters of different stones, it was equally essential that their special fitness for the particular kind of work they were put to should be carefully investigated.

"As a rule, the specific gravity, or the weight of a building stone, is a fairly good indication and criterion of its value as constructive material; that is, the heavier the speclmen, the better. Tests conducted for this purpose are of great importance, insomuch as they are closely connected with the weathering, which is almost synonymous with the durability of stones, which, after all, is the qualification which is the most prized by the architect and the builder. Wherever practicable, it will be advisable to examine any old strnctures which may have been built of the description of stone proposed to be used. The hardness of stones affects their use in various ways, and there are several means of determining this property, which includes tests for the resistance of stones to friction, or to ordinary wear and tear—when, for instance they act as paving stones. Under the same heading is comprised the resistance to shock and impact, to boring and the attacks of the chisel. When freshly quarried, stones are generally rather softer and more tractable under the tool than when, some time afterwards, they have got rid of their quarry water. Although the chemical composition of building stones is not per se, of any great practical value, yet the aid of chemical analysis—or, in other words, a chemical test—is required in order to discover the existence ot foreign substances, which are to be found in all stones, and also the proportions of silica, alkalis and lime they may contain. For instance, if there should be too largea percentage of clay in stones, they should not be exposed to sudden and frequent changes of alternate damp and dryness, since they rapidly disintegrate under such changes. Stones also which, similar to the dolomites, contain a certain amount of magnesia, are seriously deteriorated by the action of sulphur, which, in the state of sulphurous and sulphuric acid, exists in abundance in both the atmosphere and the soil. Equally, if not more, important than the chemical test, is that performed by the aid of the microscope, which reveals the manner in which the constituent particles or ingredients of the material are mixed together and incorporated. It may not, perhaps, be generally known, that some descriptions of stones, which are of excelleut quality when quarried in summer, are worth little or nothing when taken from the quarries in winter time. Limestone and marble are particularly liable to this incongruous defect.

"Another property of building stones which it is desirable to investigate is that of absorption, which is approximatefy proportional to its porosity or permeability. This demands another trial, which may be termed the porous test, and is one of considerable utility. The best stones absorb the least proportion of water, or of other fluid, which is an important consideration, when they are exposed to the influence of the gases and acids held in rain, with which they frequently become strongly impregnated. If we now pass on to the action of frost upon stones, it will be at once apparant that another test must be called for. Certain specimens behave in one manner, and others in another, when acted upon by exceptionally low temperature for any length of time. Some gradually and slowly disintegrate, go to pieces and break up. Others develop a process of superficial peeling off by the formation of scales, while others, again, suddenly fly into fragments in precisely the same manner as if they had been blown up by dynamite or other powerful explosive. One of the difficulties attending the successful application of a freezing test is the impossibility of assimilating the condition of the experiments with those obtaining under the natural phenomena of congelation. Various methods have been employed to imitate the operation of freezing. One may be mentioned which consists in immersing the specimen in a highly concentrated solution of sulphate of soda. As the compound forms into crystals it causes a partial disruption of the stone, by breaking off pieces of different sizes. Although this method affords some indication of what may be the effect of natural frost upon building stones, not much reliance can be placed upon it. A few concluding remarks will accentuate those already made, which unmistakably indicate the necessity for the tests to which we have already drawn the attention of our readers.

"It is well known that our information respecting the transverse, tensile and shearing strength of different stones used in the constructive arts is not nearly as full as it ought to be, and that our records of what has been ascertained regarding those properties are exceedingly meagre and incomplete. The results of experiments conducted with regard to the crushing resistance, demonstrate that there is a wide difference of strength per square unit, even in the same descriptions of stone. The varying results are due to the fact that the circumstances were far from being identical in the individual tests. Some of the samples, which were mostly in the form of cubes, were left rough on the sides and beds, and others were dressed and sometimes polished. The last mentioned bore six tons more than the first, per same unit of area. Our want of accurate knowledge—which is fortunately in the course of being supplied—regarding the tensile strength and the transverse resistance of stones, has not been productive of any great damage or injury. Nevertheless, that is no reason why we should not make ourselves thoroughly up-to-date in everything that has been accomplished towards elucidating and placing on a better and a more scientific basis the details of a subject so important.

PROPOSED STANDARDS OF FIRE RESISTANCE.

The executive of the British Fire Prevention Committee, having given their careful consideration to the common misuse of the term "firepoorf," consider the term "fire-resisting" more appicable for general use, and that it more correctly describes the varying qualities of different materials and systems of construction intended to resist the effect of fire for shorter or longer periods, at high or low temperatures as the case may be, and they advocate the general adoption of this term in place of "fireproof."

Further, the executive, fully realizing the great variations in the fire-resisting qualities of materials and systems of construction, consider that the public, the professions concerned, and likewise the authorities controlling building operations, should clearly discriminate between the amount of protection obtainable or in fact requisite for different classes of property. For instance, the city warehouse filled with highly inflammable goods of great weight requires very different protection from the tenement house of the suburbs.

The executive are desirous of discriminating between fire-resisting materials and systems of construction affording temporary protection, partial protection, and full protection against fire, and to classify all building materials andsystems of construction underthese three headings. The exact and definite limit of these three classes is based on the experience obtained from numerous investigations and tests, combined with the experience obtained from actual fires, and after due consideration of the limitations of building practice and the question of cost.

The executive's suggested minimum requirements of fire-resistance for building materials or systems of construction will be seen from the standard tables appended for—I. Fire-resisting floors and ceilings. II. Fire-resisting partitions. III. Fire-resisting doors, but they could be popularly summarized as follows: (a) That temporary protection implies resistance against fire for at least three quarters of an hour. (b) That partial protection implies resistance against a fierce fire for at least one hour and a half. (c) That full protection implies resistance against a fierce fire for at least two hours and a half.

The conditions under this resistance should be obtainable, the actual minimum temperatures, thickness, questions of load, and the application of water can be appreciated from the annexed tables by all technically interested, but for the popular discrimination which the executive are desirous of encouraging—the time standard alone should suffice.

It is desirable that these standards become the universal standards in this country, on the Continent and in the United States, so that the same standardisation may in future be common to all countries, and the preliminary arrangements for this standardisation are already in hand.

STANDARD TABLE EOR FIRE-RESISTING FLOORS AND CEILINGS.

Classification.	Sub-Class.	Duration of Test at Least.	Minimum Temperature.	Load per Superficial Foot Distributed.	Minimum Superficial Area under Test.	Minimum Time for Application of Water under Pressure.
Temporary protective class	A	45 mins.	1500° F.	Optional	100 sq. ft.	2 mins.
	B	60 mins.	1500° F.	Optional	200 sq. ft.	2 mins.
Partial protective class....	A	90 mins.	1800° F.	1 cwt.	100 sq. ft.	2 mins.
	B	120 mins.	1800° F.	1½ cwt.	200 sq. ft.	2 mins.
Full protective class.....	A	150 mins.	1800° F.	2 cwt.	100 sq. ft.	2 mins.
	B	240 mins.	1800° F.	2½ cwt.	200 sq. ft.	5 mins.

STANDARD TABLES FOR FIRE-RESISTING PARTITIONS AND SINGLE DOORS, WITH OR WITHOUT FRAMES.

Classification.	Sub-Class.	Duration of Test at Least.	Minimum Temperature.	Thickness of Material.	Minimum Superficial Area under Test. For Partitions.	Minimum Superficial Area under Test. For Doors.	Minimum Time for Application of Water under Pressure.
Temporary protective class.	A	45 mins.	1500° F.	2 in. and under	80 sq. ft.	20 sq. ft.	2 mins.
	B	60 mins.	1500° F.	Optional.	80 sq. ft.	20 sq. ft.	2 mins.
Partial protective class.	A	90 mins.	1800° F.	2½ in. & under	80 sq. ft.	20 sq. ft.	2 mins.
	B	120 mins.	1800° F.	Optional.	80 sq. ft.	20 sq. ft.	2 mins.
Full protective class	A	150 mins.	1800° F.	2½ in. & under	80 sq. ft.	25 sq. ft.	2 mins.
	B	240 mins.	1800° F.	Optional.	80 sq. ft.	25 sq. ft.	5 mins.

FAILURE IN A BUILDING CARRIED ON COLUMNS.

Some interesting and instructive data are given in the appendix to a recent report by Sir Wm. Garstin of the Public Works Department of Egypt regarding the failure of a four storey prison building in Cairo, and the method employed to repair the same. The ground, first, and second floors provide accommodation for 250, and the third floor for 200 persons. The corridor-wall of the top floor is carried by two cast-iron columns, one above the other, having a total height of 35 feet 6 inches, and transmitting a load of 58 tons to the stone base of the columns. The building is founded on a float of pozzuolana concrete, 4 feet in thickness, laid at permanant infiltration level. This form of foundation was adopted because the excavation showed that the whole area covered by the foundations had at one time been a deep depression which, many years previously, had been filled up with earth, stones, and rubbish.

The infiltration water prevented the excavation being carried any deeper to get to the virgin soil. As there are no cracks in the outer walls of the building, it may be assumed that this float of concrete is intact.

Soon after the completion of the building, cracks appeared in the brick cross-walls of the top storey. Starting at floor-level, where this wall rests on the corridor-wall below, the cracks followed a straight line drawn from this point to a point where the ceiling meets the corridor-wall of the top storey, which is carried on the columns.

These cracks were evidently caused by the columns settling, and on investigation it was found that the base-flanges of some of the columns were cracked. On stripping the asphalt off the stone bases these also were found to be cracked, and the failure was therefore attributed to the crushing of the stone. It appeared also that the base-stone had been dressed hollow, which would have the effect of throwing the pressure on the outside of the base-flange, and would account for its being cracked. It was further observed that the stones were saturated with damp, which made them soft. This was the result of the water used in swabbing down the ground floor finding its way to the stone, through the joint between the asphalt and the cast-iron column. By calculation it was found that the base-stone, which was of limestone and measured 2 feet 8 inches square by 1 foot 6 inches in depth, was overloaded, as it was exposed to a pressure of 590 lbs. per square inch, whereas ordinary samples of this stone are crushed at a pressure of 3,000 lbs. per square inch, giving a factor of safety of only 5. This explanation of the failure was not very convincing. That the stone should have crushed when only loaded to one-fifth of its laboratory crushing-strength, even although it was weakened by being saturated with damp, seemed doubtful. New stones 3 feet 6 inches square by one foot 6 inches in depth were ordered from Trieste, and new columns from England. Tripod shores on wide timber bases were erected round the columns, and gypsum tell-tales showed that the movement continued. Much deliberation was given to deciding on the best means of supportiug the superstructure (a load of 58 tons) while the thirteen columns and base-stones were changed. No risks could be run which would endanger the lives of between 400 and 500 people who inhabited the building. The result of this forethought was so satisfactory that during the work no change was found necessary either in shoring or in the method of working.

The shoring consisted of a pair of A-frames set up under the girder carrying the gallery at first-floor level. Their feet were let into timber bed-plates, 2 feet 4 inches by 1 foot 2 inches, with a tightening-wedge under each foot. These wedges were especially useful in loosening the shoring before removing it. Under the bed-plate and directly below each foot were inserted iron folding-wedges working between iron plates. The lower plates rested on a bed of cement concrete 12 feet by 12 feet by 3 feet 6 inches in thickness. This bed of concrete was necessary to distribute the pressure, all of which came on new filling, 10 feet in depth between the concrete foundation and the bottom of this concrete. The pressure on the earth was thus reduced to less than ½ ton per square foot.

The longtitudinal rolled joist (1 foot 2 inches in depth) at the first-floor level not being stiff enough to carry the weight between the A-frames when the column was removed, iron joists which bore on the A-frames were packed in under the flanges of the saddle-piece between the upper and the lower column. Also vertical shoring with tightening-wedges was carried up to main girder carrying the top-story corridor-wall. The upper columns were thus relieved of their weight during the operation. All the shoring was braced across the building and tied to the main walls. To avoid vibration as much as possible in tightening up the wedges when transferring the load to the shores, two 50-ton hydraulic jacks were set up between the A-frames and the base-stones. These took the first lift. A piano wire was stretched between the main walls, touching the columns, to enable the vertical movements to be recorded.

On excavating to put in the cement-concrete for the first column, the cracks in the base-stone, which were little more than visible on the surface, were found to be wide enough at the bottom of the stone to allow of the insertion of the fingers of the hand up to the palm. Wrought-iron straps were quickly fixed round the stones to prevent them opening further, and shoring was erected under the longitudinal girder of the first floor at the edge of the pit. A boxing of 1½-inch boards was made round the pit, to prevent the earth-filling from falling in while the concrete was being rammed. The concrete was allowed to set for 7 days before the shores for changing the columns were erected. When all was in place the wedges on the first and second floors were driven hard with a sledge-hammer. The jacks were then worked until a slight rise (1/32 to ⅛ inch) was observed on the wire. The iron folding-wedges under the A-frames were then driven hard. Stone-cutters with chisels then cut away 1 inch clearance under the column, which was thus left suspended by the bolts of its upper flange. The jacks were next slacked, when a drop of 3/32 inch to 3/16 inch* occurred. After a short pause to let the shores settle down to the weight, the rest of the base-stone was cleared.

The main cause of the failure was then discovered. The stone had been levelled by means of wooden wedges, which were left in place, and had been grouted with pozzuolana mortar. The grouting in some cases had not even touched the underside of the stone at the centre, and in all cases the bed was found to be hollow, so that the whole weight was supported on the wedges and an outer margin of about 6 inches in width where the mortar could be rammed under with a trowel. Consequently the stone had broken into four pieces. There was not much evidence of what might strictly be called crushing, and the dip of the stone in breaking and settling into the hollow gave the appearance which was attributed to faulty dressing, and accounted likewise for the flanges of the column becoming cracked.

The old base-stone having been cleared, the old column was removed, and, in order to provide clearance for getting in the new stone and column, the top course of the rubble masonry under the stone (about 6 inches in depth) was demolished. The new Trieste stone base was then slung into place, by means of a lewis and differential blocks, without being set, and was left about 6 inches below its ultimate level. The new

*These figures represent the maximum and minimum observations taken on the thirteen columns.

column was then slung and bolted up permanently into its place. A wrought-iron plate, 1 inch thick and planed on its upper face, was laid between the stone and the base of the column. The stone base was next raised on wooden wedges so as to leave only ⅜ inch to ½ inch clear below the column. After the stone had been levelled, a grouting basin in brick masonry in cement was built round it, at a little distance from it, the walls being 8 inches higher than the bottom of the stone. Neat cement grout was introduced under the centre of the stone by means of a 2-inch pipe. The grout was under a head of 4 feet or 5 feet. In this manner the space under the centre of the stone ought to be as well filled as any part. By having a head on the grout a flow was established from the centre to the outside of the stone, which carried with it the air and cement scum. The basin was filled up by this means, thus throwing 8 inches head on the grout, which allowed the water in excess to rise to the surface. The horizontal portion of the pipe was not withdrawn.

Thin steel wedges were used to force the wrought-iron plate against the base-flange of the column, and the ⅜-inch space under the plate was grouted with neat cement under about 4 inches head. After setting for 7 days, the wedges under the stone, as well as the steel wedges, were withdrawn, and the shoring was removed. The drop on removing the shoring varied between nothing and 3/32 inch. The greatest collective drop on any column, adding all the movements together, was less than ¼ inch, the mean drop of the thirteen columns being 5/32 inch and the least drop 3/32 inch.

NOTES.

In setting cut stone work in England lime mortar only is used. Cement is never used for that purpose, as it stains the stone.

Flatted work will sometimes require a coat of size before gilded work is put upon it, as at times there is a little suction. This would draw the size and cause imperfect gilding.

The City Engineer of Winnipeg has submitted an estimate to the city council for the construction of a railway connecting Winnipeg with the city quarries, at a cost of $138,425.

The report of the building inspector shows that in proportion to size, Westmount's activity in the building line has been more marked than that of Montreal.

The assets of the Holywood Paint Company, of Hamilton, have been purchased by the McLennan Paint Company, Limited, of Buffalo, who will continue the business.

Instead of the iron fireproof curtains generally used in French theatres, one made of sheet aluminium has been adopted for the opera house at Besancon. It is one-fifth the weight of an iron curtain of equal dimensions.

Dr. J. M. Woodbury, commissioner of street cleaning in New York, proposes to manufacture paper bricks from the dry city rubbish, of which 90 per cent. is waste paper. These bricks are intended for fuel and Mr. Woodbury estimates that private consumers could purchase them for 4 cents a cubic yard.

A meeting of the Executive Committee of the National Master Painters' Association of the United States and Canada, was held in Toronto in the early part of last month, to consider arrangements and outline the programme for the annual convention, which will meet in Toronto next February. A very interesting meeting with a large attendance is looked for.

A machine for splitting laths for plaster work has been introduced in Great Britain. It is said to turn out in a day as many laths as would in the ordinary course be produced by 20 skilled men. The advantage of split as against sawn laths is said to be that they are tougher (following the grain) and have a rougher surface, so that plaster adheres more firmly.

The launching of new cement manufacturing companies in Canada goes merrily on. Hardly a month passes without witnessing the granting of charters to new companies in this line. In every case, if we may believe the statements of the promoters, there is going to be millions in it for the stockholders, but our opinion is that if the manufacturing capacity continues to increase at anything like the ratio witnessed during the last two years, there will soon cease to be a fair profit in the business for anybody. Admitting that the demand for cement has increased at a truly wonderful rate, it is nevertheless being outstripped by the growth in manufacturing capacity.

The master and journeymen carpenters of Halifax agreed to submit their differences as to scale of wages, to a board of arbitrators composed of the County Judge, the President of Dalhousie College and a representative of the Trades and Labor Council. The arbitrators have concluded that 25 cents an hour be paid to first-class workmen only, the men to be entitled to the new scale of wages from the first of June. The decision as to who are first-class workmen is to rest with the foremen of the several firms who, it is agreed, shall not be members of any union. The day shall be nine hours, and all who cannot rate as first-class men are to receive the old rate of 12 cents per hour. The dicision has been accepted by all parties concerned.

Nothing probably has exasperated the average architect more often or more thoroughly than the average mill company's book of stock designs of doors, mouldings, balusters, railing, newels, etc. Just why it is necessary to turn out such abominations, when it would not cost them a cent more to produce something along correct lines, artistically speaking, is one of the unsolved problems of the day. Did they but realize that these things all have their legitimate effect upon the public taste, especially those who seldom rub up against architects, possibly they would revise their books and get out something equally pleasing to the critical taste of the architect and the untutored ideas of their customers, who must certainly be easily pleased, judging by the stuff they continue to buy and use.

In answer to a correspondent the Painters' Magazine says it depends to a great extent on the composition of the plaster as to whether a new or "hot" wall can safely be painted. We have seen walls that were painted in less than two weeks after being finished, and yet with only two coats of lead, zinc and oil paint they did not spot or streak in the least. A wall that we do not know anything about is always safest to paint after a year or so, but as people will not wait, it is best to take the precaution of giving a coat of strong vinegar direct to the plaster. Let this stand two days, then prime with pure lead and raw linseed oil, adding a trifle of japan. Over this, when dry and hard, give a coat of glue size, which will save at least one, probably two coats of paint and will prevent spotting or discoloration.

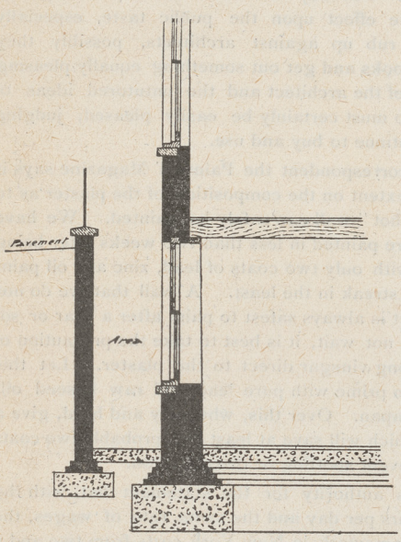
The Iron Age is authority for the statement that, with the same number of hours per day and the same rate of wages, the erection of steel framework in New York costs from two and a half to three times as much as in other cities which are also supposed to be cities of high building costs. It is stated that a hand riveter who could easily average 250 to 300 rivets a day contents himself in that city with 80. In other cities, on straight work, a good man finishes up 80 an hour. The pneumatic riveter, which has proved such an annihilator of time in other cities, finds something different in the air of New York, and strikes a slow gait. The same tool in the hands of a man elsewhere will drive 1,500 to 2,000 rivets in a day, and only 250 to 300 in New York. The claim is, in fact, made that structural erection in New York costs $15 to $18 per ton, against $6.50 to $8 per ton in other large cities. This is a "condition and not a theory," and must be faced alike by employers and by the men themselves.

Tensile tests of wrought iron bars, showing the effect of overstraining followed by intervals of rest, were made at the Watertown Arsenal upon four kinds of wrought iron: Common Refined, Best Puddled, Burden's Best and Norway. One test on each kind was made in the ordinary manner. With the other specimens an overstraining load was applied, ranging from 25,000 to 45,000 pounds per square inch, followed by an interval of no load, after which the loading was resumed until rupture was reached. The gain in the elastic limit produced by the overstraining loads was well shown throughout the series, and ranged from 2,000 to 6,000 pounds per square inch. It was also apparently shown, although these effects are not so well marked, that the greater the magnitude of the overstraining load and the longer the interval of rest between the two loadings, the greater was the gain in the elastic limit. No effect of the overstraining load upon the contraction of area was apparent.—Engineering Record.

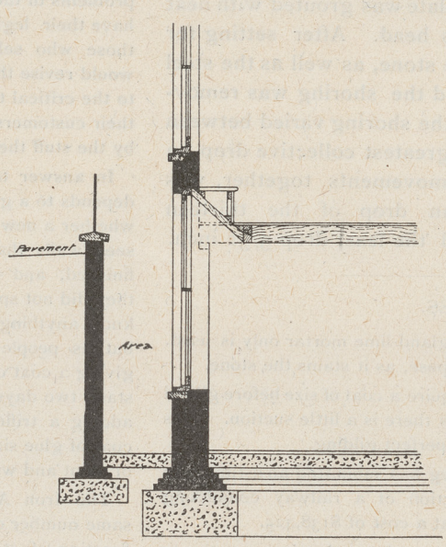
NATURAL LIGHT TO BASEMENTS.

An inexpensive means of providing additional light to a basement room is given in the sketches accompanying this article by B. Wand, reprinted from the Builders' Journal. Fig. 1 shows a basement room abutting upon an area and looking out upon a dead wall. The ceiling-line of this room is practcially level with the pavement, and in the figure the window is kept to its full height—at a height which would, as a matter of fact, necessitate the threading of a short length or rolled steel joist, or some other contrivance, through those ends of the floor joists which run above the window openings.

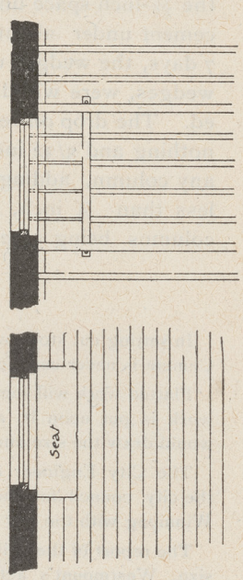
In Fig. 2 is shown precisely the same room, area and wall, but with the window carried well above pavement-level, and giving the room a very considerable increase of natural light. The floor-joists are trimmed at the window openings just as they would be for a fireplace, the trimmed space being filled in with pieces of 3in. by 2in. or other light stuff to carry the lathing and plaster or matchlining with which the soffit is to be covered. Fig. 3 shows (a) the trimmed space with filling-peices



—Fig. 1—



—Fig. 2—



—Fig. 3—

—Scale of Feet—
0 1 2 3 4 5 10

and (b) the floor when laid. The objection to this mode of dealing with a floor has been that small bulkheads are formed over those portions of the floor beneath which come the basement windows; and this is met in my plan by the provision of window seats, which in their turn entirely cover the bulkheads. It may still be objected that these window seats would in themselves be unsightly; but when I say that I have seen them just as described in one of the finest block of flats in London—Albert Court, Knightsbridge —I think that that contention also is met. As a matter of fact, neatly panelled, and finished to match the other work in the room, they form quaintly attractive features, which the tenants contrive to render still more attractive by rugs, cushions and general "drapery."

In the plan I have shown the trimming is applied to a floor with wooden joists running from front to back of the building; but with joists thrown across, or with concrete or any other kind of floor, the idea is just as easy of adoption. In the case of shop property the bulkheads might not be objected to, or, if they were, countering or show-casing might take the place of the window seats. Where an area is covered with pavement lights the same idea is practicable so long as the lights are on private ground and no objection is made by the local authority to their being raised to a level with the added height of the windows. They could then be thrown back at an angle from window head to pavement level, or built square out from the head with a return to pavement level, the prisms being arranged to throw the light right back into the room; and, either way, a considerable increase of light would be obtained.

SANITARY CHARACTERISTICS OF MADE GROUND.

Architects and house owners should be interested in learning the results of an investigation recently conducted by Dr. W. G. Savage and Mr. J. H. Sugden, bacteriologists for the Corporation of Cardiff, Wales, to determine to what extent made ground should be regarded as a menace to the health of the occupants of houses built thereon, and how far local authorities are justified in passing by-laws prohibiting the use of such ground as building sites. The following deductions are made based on a long and careful examination :—

"The refuse as deposited contains a very large number of organisms, many of which are in the main different from those met with in ordinary soil. These made-soil organisms, as they may be called for convenience of reference, rapidly diminish in number under the conditions under which they are placed. This diminution goes on for the first two or three years. After two or three years, however, the ordinary soil organisms begin to invade this material, and apparently thrive abundantly in the rich organic material available to them. This causes a marked increase in the total number of organisms present in the soil, and the total number remains large, until in quite old soils a diminution is again met with. These soils begin to lose their special bacterial content after two or three years, and from that time begin to take on the characters of ordinary soil."

NOTES.

One of the features of the modern house that makes or unmakes its finished elegance is the plumbing and all care and attention given to that branch of the house will prove profitable. So rapid have been the strides toward betterment in plumbing fixtures during the last few years that not everyone is familiar with the high grade sanitary appliances which are sold to-day. The James Morrison Brass Manufacturing Company, Limited, of Toronto, have for years been the designers of many of the improved appliances used by plumbers and their line of equipment for every purpose to-day represents the highest attainment in manufacture. Anyone who is interested in modern plumbing would find the catalogue of the Morrison Company of interest and value.

—THE—

CANADIAN ARCHITECT AND BUILDER

A Monthly Journal of Modern Constructive Methods,

(With a Weekly Intermediate Edition—The CANADIAN CONTRACT RECORD).

PUBLISHED ON THE THIRD WEDNESDAY IN EACH MONTH IN THE INTEREST OF

ARCHITECTS, CIVIL AND SANITARY ENGINEERS, PLUMBERS DECORATORS, BUILDERS, CONTRACTORS, MANUFACTURERS OF AND DEALERS IN BUILDING MATERIALS AND APPLIANCES.

The C. H. MORTIMER PUBLISHING CO. of Toronto, Limited.

Publishers,

Confederation Life Building, - TORONTO, CANADA.

Telephone Main, 2362.

Branch Offices:

IMPERIAL LIFE INSURANCE BUILDING, MONTREAL.
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22 GREAT ST. HELEN'S, LONDON, E.C.

SUBSCRIPTIONS.

THE CANADIAN ARCHITECT AND BUILDER will be mailed to any address in Canada or the United States on the following terms: Architects' Edition, $3.00 per year; Regular Edition, $2.00 per year. The price to foreign subscribers is: Architects' Edition, 16 shillings; Regular Edition, 12 shillings. Subscriptions are payable in advance. The Journal will be discontinued at expiration of term paid for, if so stipulated by the subscriber; but where no such understanding exists, will be continued until instructions to discontinue are received and all arrears of subscription paid.

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NOTES.

The demand for hand-molded brick is increasing in the East. The machine-made brick now sells at from $6 to $7 per thousand while the hand-molded brick readily bring $10 a thousand. Many brick yards are adding to their hand-molding facilities. It is contended that machine-made brick chip easily at the corners and disintegrate more readily under the action of fire when used for furnaces and boiler linings than the hand-molded product.—Brick.

BRITISH AND AMERICAN STANDARDS OF WORKMANSHIP.

The commission of trades unions representing leading British industries, which recently accompanied Mr. Alfred Moseley, C. M. G., on a tour of investigation through the United States and Canda, have presented their reports.

The representive of the Operative Bricklayers' Society, Mr. H. R. Taylor, while admitting that bricklayers on this side the Atlantic lay more bricks per day than does the British workman, states that the work is by no means substantially done, and indeed would not pass muster with any British architect or engineer worthy of the name. He goes on to say: "Nearly all the faced work consists of stretching courses only (merely a veneer), although on the rough and interior walls of any thickness there is usually one course of headers or bonders to every five or six courses of stretchers, instead of English bond consisting of alternate courses of headers and stretchers, or the Flemish bond, consisting of headers and stretchers laid alternately in each course, either of these systems (the English for preference) securing the proper bonding of the brickwork both logitudinally and latitudinally. Flushing up or grouting," he says, "is very seldom practised."

Mr. M. Deller, of the National Association of Operative Plasterers, reports that the work in this line, which he saw in the United States is far and away behind that executed in England.

Mr. Harry Ham, one of the delegates, refers to the injurious effects on the workmen of the highly specialized processes prevailing in the United States. On this head he says: "The awful monotony of constantly performing some part in, say, the making of a door for a cabinet, not only destroys the skill of the workman, but leads to lack of interest in his work and a general mental and physical deterioration."

The Menzie Wall Paper Company, Limited, of Toronto, capital $250,000, has been incoporated by R. E. Menzie, J. F. Brown and others.

NOTES.

Work has been commenced on the new plant of the Superior Portland Cement Company at Orangeville, Ont.

The Standard Ideal Sanitary Co., Limited, of Port Hope, Ont., are now putting out a superior class of lavatories, closets, bath tubs, basins, &c. This company is under the able and expert management of Mr. H. Thos. Bush. The high class goods produced are already attracting attention. When our representative called he was shown a model plant.

LEGAL.

French laws are quite different from our own. A fire having begun in a paint shop and spread so as to damage neighboring property, the authorities found that because of neglect of proper care of his premises, the owner of the place in which the fire started became responsible for the loss incurred by the neighbors, and as the evidence showed that the official inspector had failed to require better care of the premises, he was fined for neglect of duty. This is a good law.

In France municipalities as well as individuals are held to strict account for carelessness resulting in personal injury or loss of life. A case in point is the recent decision of the courts condemning the City of Paris to pay an indemnity of 2,500 francs to each of five children whose parents were killed by the fall of a foot bridge on the Paris Exhibition grounds. The judges decided it was the duty of the civic authorities to withold the concession until a detailed plan of structure, with the calculations of strength, had been submitted and tested.. The works were allowed to be commenced and carried on without any official superintendence, and no steps were taken to insure public safety. The first care of the authorities was therefore neglected. The contractors have also been condemned to give 500 francs a year to the two youngest children until they have attained their majority.

NOTES.

The death took place in Toronto recently of Mr. W. H. Ferguson, a well known contractor.

The masters and journeymen plumbers of Winnipeg have come to an agreement with regard to wages. The schedule of wages agreed upon is 50 cents per hour for first class men, and 25 cents per hour and upwards for second class men. Nine hours to constitute a day's work. Overtime shall count as time and a quarter up to 10 p.m., after 10 p.m. time and a half. Sunday and Labor day double time. First-class steam fitters shall be allowed only two helpers. The apprentice system shall be governed by joint meeting of the masters and the union.

The petroleum wells in Russia are in some cases 1,750 feet deep, and some are cased with riveted pipe, with the interstices filled with cement to exclude the ground water. The waterproofing is effected with a solution made with 100 parts of Portland cement and 122 parts of Caspian sea water, which is delivered into the well through a ¾ inch pipe and hardens within two days. Sometimes a pressure of 40 atmospheres is used. It is considered that sea water is preferable to distilled water, and that grout made with it hardens more rapidly under pressure. The temperature of the water does not affect the hardening, but it is more satisfactory with pure cement than with cement and sand mixed.

NOTES.

The price of brick at Vancouver, B. C., has been advanced from $9 to $11 per thousand.

Transverse breaking tests of plate glass furnished by several different makers were recently made at the Watertown Arsenal. The thickness of the glass varied from ⅛ inch to 1 inch, and the span from 8 inches to 24 inches. The modulus of rupture, which ranged from 2,000 to 8,000 pounds per square inch, was generally greater with the lesser thicknesses. Of the various kinds of glass tested, rough, ribbed, polished and wired, there was little difference in strength; except in the case of wired glass, which showed somewhat greater strength than the other kinds; the strength being also greater for the sandwich rolled than for the solid rolled wired glass. The strength of glass set in frames was practically double that of the specimens tested transversely. Very little difference appeared between samples submitted by different factories.

Quero writes as follows to the London Builders' Record: "How is the paintwork measured inside and outside respectively in the following cases:—(a) a double-hung window, top and bottom sash in one square only; (b) the same, but and bottom sash in four squares each, or more or less, as the case may be?" The answer given is as follows: (a) This would be measured as No. 2 on sash-frames (one for each side) and No. 4 on squares (two for each side). If the sash-frames are over 24 ft. super. describe as "large," and if over 36 ft. super. as "extra large." If the squares are over 2 ft. super. describe as "large," and if over 4 ft. super. as "extra large." (b) The last description will apply to this. Casement windows would be measured in the same way. If the frames have mullions or transoms, describe them as in so many lights, i.e., with one mullion and one transom would be in four lights; or, as an alternative, describe the frame as "with one mullion and one transom." In the case of bays it is well to take each side as a separate window, with an extra quantity (added to the superficial work) for the large angle mullions where they occur. The edges to opening casements are "numbered."

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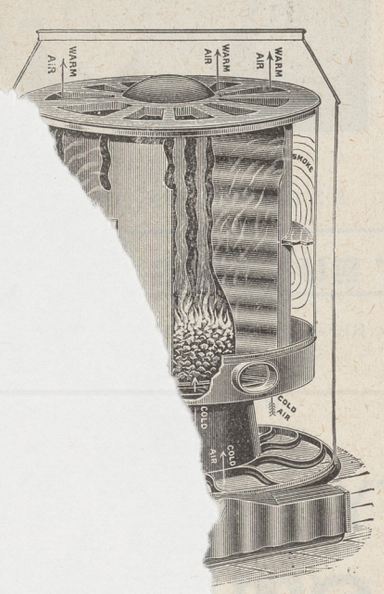

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