

the financial obstacles are the greatest, but when the money is forthcoming I have no doubt a way will be found to reach the island.

The last great project I have to notice is the proposed ship railway between the Bay of Fundy and the St. Lawrence, located in the neighborhood of the route surveyed for the *Bark Verte* canal. I will not anticipate the paper to be presented to the Society by one of our members, who is the projector of the scheme, by an attempt to describe it in detail, but will only say: No route could be more favorable in an engineering sense for the inauguration of this new system. A practically straight and level line less than 20 miles in length, is available. I have the utmost faith in the practicability of the enterprise. There is no novelty in raising or moving vessels on wheels. France is now transferring torpedo boats between the Atlantic and the Mediterranean by rail. Ships have been hauled out on wheels, and been put back in the same water; the ship railway only proposes to carry them farther and put them in another water.

NOTES ON CARPENTRY AND JOINERY.

By WM. SIMPSON.

THE following notes on the above subject formed the basis of a very interesting and practical address delivered by Mr. Wm. Simpson, Secretary of the Master Carpenters' Association, to the members of the Architectural Drawingsmen's Association of this city, on Feb. 27th:

Regarding joisting I would suggest that trimmers should, as a rule, be hung on iron hangers, or stirrups as they are sometimes called, with tie-bolt to bring snug up to trimmer joists. It is quite enough for the tail joists to be framed with the usual double tenon. I have on several occasions been called on to put supports at this point on account of the trimmers splitting.

For deafening I would recommend that felt be used in place of mortar, as being equally effective, and adding only a trifling weight to the floors. The value of felt will depend on its quality, and the number of thicknesses to be used.

I think strips should be used in brick walls, and plugs in stone. The strips should be kept at least half an inch from face of wall in order to give sufficient depth for rendering by plasterer. In many cases they are all but flush, so that to give the wall a proper coat the ground is lost sight of, and the carpenter is obliged to scrape off the mortar, or as is very often done, drive his nails into the bricks if they are soft enough to receive them. In many parts of the wall I have known the mortar to be not over $\frac{1}{4}$ inch, which can be of no service whatever.

I will also remark with regard to strapping that an error is very often made by the carpenter not furring out beams and trimmers coming flush with ceilings and walls. This neglect is the cause of so much faulty plastering, especially in staircases. In frame houses this is particularly noticeable, when the lath is nailed on the girth or plate as the case may be.

I consider that in all cases grounds should be used for trimmings, even when the jointer work may be fixed on the first coat of mortar. As to the grounds being bevelled, I do not think it is of much consequence, nor do I think that their being dressed is at all necessary. When the job is first-class I think the windows should have the ground and strap combined—that is, a piece $2\frac{1}{2}$ with $\frac{3}{4}$ checked out, thus giving good and firm nailing.

The subject of roofing is so extensive that I will only offer a thought on the commonest treatment of the jack rafter. I think that in many cases the introduction of principal and purlines could be avoided by increasing the depth of the common rafters and collar ties, and by the use of struts or braces where the span is wide. I have seen principals of great strength on church roofs, but placed at such a distance that the purline was overtaxed, and, as a consequence, the dipping of the ridge would be quite apparent, and were you to cast the eye along the wall line at the eave, you would find that it was rounding considerably.

I will next give you my opinion as to the treatment of rafters when moulded at the line of cornice. You will readily see that it is difficult, as well as a laborious task, to mould the rafter on itself. I believe that more accurate work can be assured by the rafter proper terminating at the wall plate, and the mould portion being nailed or bolted on as a separate piece.

I have just a word or two to say on the subject of arches. You will have noticed that in many cases the elliptic arch is crippled to such an extent as to be painful to witness, and as the carpenter has usually to stand the consequences of the line being true, I would simply say that in my opinion the best method of describing the ellipse is with the trammel. I would also point your attention to a defect in masonry. You will have noticed what a variety of lines is in practice in the formation of the skewback of a flat arch. Now I believe I am correct in saying that generally speaking the bricklayers

have no fixed rule to work by, and the consequence is the arches in many of our speculation buildings are scarcely self supporting. I think the angle of 60 degrees is the best and simplest rule for guidance in this matter.

On the subject of joinery I desire, first of all, to say that the carpenter has much to contend with in the matter of window finish, as no matter how carefully the frame may have been squared on the bench, or how plumb it may have been set, he often finds when he comes to finish that it is neither plumb nor level, and thus gives him much trouble should the window be finished with box shutters. This, of course, is all avoided when the building is of stone, as the carpenter then sets the frame with "screeds," and wedges it to its true position. The weight drags on back pulley stile when made of thick material. Pulley stiles should not be more than $\frac{3}{4}$ inch thick, instead of $1\frac{1}{2}$ to $1\frac{3}{4}$ as is often the case. I might describe various methods of hanging shutters and blinds, for example, a separate shutter in front hinged to architrave, the shutter and blinds proper being hung to window casing, and thereby being concealed, the window presenting a finished appearance at all times, also a method lately introduced of sliding the shutter into a pocket similar to sliding doors.

In a jib head window the bottom sash should have the horn of stile left long and moulded so as to carry up the slip head without coming in contact with sash fastener.

The subject of stairs is to my mind one of the most interesting in the department of joinery, but I will have time to give it only a passing notice, and will simply refer to such points as may have happened to escape your observation. The dog-legged stair being the most common, requires no comment, but I would suggest that when the stair is a good one, and situated between walls, the first flight might be wider than the return flight. This will give the stair a finer appearance towards the hall, and show less soffit, besides giving more light to the staircase window. Where there are quarter landings I would suggest square newells where at all practicable in order to meet the different heights of rail. In an open newell stair I would also advise that the position of step be such as to procure equal height of newells on landing. In the treatment of a cylinder stair, it is advisable to diminish the step before reaching the cylinder, which will have the effect of lowering the height of rail over the nosing from pitch to pitch. With regard to the art of hand-railing I would observe that the hard and fast rules as laid down by Nicholson and others need not be followed in their entirety, but should be humored to suit the hand as well as to appear pleasing to the eye. As to difficulties often met with in stairbuilding, these can best be overcome by the practical stair-builder if well skilled in the art.

The soffits of stairs in good buildings should either be sheathed or panelled according to finish. When a stair has a continuous rail string moulding should be eased, and mitred in a newel stair. Steps of inside stairs should have a fall of $\frac{1}{4}$, and outside steps $\frac{3}{4}$.

The proper height of rail over nosing is usually considered to be 2-6 $\frac{1}{2}$, and the landings 2-8. As to the fixing of balusters, I think the better plan is to groove out the rail and cap of string with pieces set in between. The curtail step is of great advantage in fixing the newel, as well as enhancing the appearance of the stairs. In fixing rises and step it is best to tongue the riser into tread, but not the cove, as used to be the practice, and in all cases the joint should be plain at back of step.

In the hanging of doors the first thing to be done after the door is fitted is to apply it to the frame at right angles, and project the bottom hinge to suit any irregularity of the floor.

If possible, casings should not mitre through, but only as far as the first moulding, so that the other members may break the joint, thus preventing shrinkage.

When difficult to obtain thoroughly seasoned lumber for counter tops, etc., it is well to fasten same to the frieze and button down to counter framing.

DRIVING STONE HEADINGS WITHOUT EXPLOSIVES.

IN driving a stone drift at the Bois de Boissau Colliery, in the Mons District, Belgium, the strain were found to be so charged with fire-damp that it became impossible to continue the use of explosives. Recourse was therefore necessarily had to other means of carrying on the driving. The system adopted has shown itself to be adequate to the circumstances of this case, and is worthy of mention as a successful solution of a somewhat difficult problem. The rock was a very hard grit, lying in horizontal beds. A machine drill, of the Dubois & Frénois type, was employed on the face of the heading in the following manner: Across the middle of the face a row of holes was bored, from 3 to 4 inches in diameter and 3 feet deep, the distance of the holes apart being from 5 to 6 inches. When all these holes had been bored a special tool was substituted for the drills, having a rectangular

striking surface 6 inches long, by 2 inches wide, and provided with teeth like a saw. By means of this tool the rock left between the holes was cut through, leaving a horizontal groove, varying in width from a inches to 6 inches, and of a depth of 3 feet, extending across the face of the heading. This groove was intended to serve the same purpose as the "holding" or undercutting in coal. Other holes of smaller diameter were then bored above and below the groove, and in greater or less proximity to it, according to the strength of the rock. Conical iron wedges of slow taper, placed in these holes and driven by the machine drill, provided with a hammer for the purpose, broke down the rock between the holes and the groove. These operations were continued until the whole face had been brought down, when an advance had been made of about 3 feet 8 inches. The shifts, which were of 8 hours, consisted of three men, one in charge of the drill and two laborers. The drifter worked 18 consecutive hours. The average rate of progress made under these conditions was 8 feet 2 $\frac{1}{2}$ inches a week, the section of the heading being 6 feet 11 inches by 7 feet 2 $\frac{1}{2}$ inches.

BUILDING PLAN ASSOCIATIONS.

THE receipt of a small book, well gotten up, as far as advertisements and general appearance are concerned, published by a building plan association in a western city, is the reminder that a note of warning should be given as to the character of these somewhat fascinating but very fallacious publications. The book referred to, like others of a similar description, contains designs of buildings purporting to be possible of erection at most absurdly low figures. It is about time that the public should realize exactly what such associations are. Any organization in any profession that pretends to cut rates to the extent they do must be dangerous. One can have no hold on them. They prepare plans in their offices for buildings which they say can be put up for a certain amount of money, often forty or fifty per cent. lower than the building would cost if erected by honest labor and from the plans of a responsible architect.

These organizations are formed either by "smart" business men or by architects who have failed to support themselves in the legitimate practice of their profession. They employ one or two good draughtsmen at a small salary and the portion of the business relating to the building plans is left in their hands. Frequently the men at the head of these organizations are capable only of misrepresenting and twisting facts to the beguilement of unfortunates clients, and the rest of the business is left to the draughtsmen. These last may be clever men with the pencil, but when they act as full-fledged architects they are apt to prove failures, not in the way of drawing an attractive design, but in the matter of estimating expenses. This point is the most important one, and the knowledge of it can be gained only by experience. No amount of books in regard to estimating can do away with the necessity of practical experience.

A case came to our knowledge but recently of a man living on a very moderate salary who, tempted by the advertisements of one of these "Plan Associations," procured a set of plans for a small cottage on the representation of the "Architects" (?) that it could be built for \$1,500, bought a lot for \$500 and prepared to build. He then obtained bids from builders and found their estimates far exceeded both his expectations and his means, and not having the money to erect the cottage he had to give up the idea of building and was left with a vacant lot on his hands which he could not use.

We are safe in making the statement that in seventy-five per cent. of the cases, plans furnished by these building associations can not be carried out for the amount of money stated by them, and we are willing to follow up this assertion by stating that a large proportion of such plans, examined by a responsible architect and estimated on by a reliable builder, will prove to be faulty. These organizations endeavor to catch the eye of the public by attractive books containing, in many cases, good designs of cottages and buildings, which will stand little or no scrutiny by a man who has any experience in architecture. A portion of the public, notably those residing away from the commercial centres, do not realize at all the duties of an architect. We urgently advise any one wishing to build that the first step necessary towards the guarding of his interests is the employment of a responsible architect. The fee paid to him for his services is well worth the money, and any one getting plans by other means will find out, sooner or later, that he has made a serious mistake.—*Building.*

Inspector O'Reilly in his yearly report to the Ontario Legislature says that the floors of the London Jail need a thorough repainting. All the old brick floors should be taken up and replaced with flagging or good cement.

It is reported that the Dominion Government has decided to enlarge the St. Lawrence Canal to equal the proportions of the Welland canal. The work is estimated to cost \$15,000,000. Of this amount the following sums will be expended during the coming fiscal year: On the Cornwall canal, \$24,000; Lachine canal, \$38,000; Williamsburg canal, \$175,000.