Correspondence.

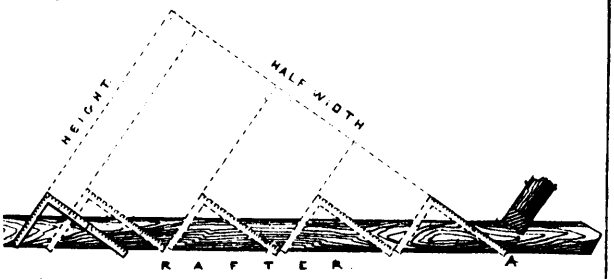
To the Editor of the Scientific Canadian and Mechanics' Magazine.

Mr. Editor,—Your notice to subscribers—page 346, November, 1878—reminds me that some time ago I wrote the *Scientific American* a query which remained unanswered, though the solution is of a very interesting nature. May be some of your scientific friends will feel equal to the task.

Some years ago an explosion took place at Archer's Mills, at Sillery, near Quebec. A fragment of the lateral shell of a cylindrical boiler some 5 feet diameter, ⅜ inch thick, of irregular shape, say 5 x 6 feet, or 30 feet are, retaining more or less of its original curvature, was projected to such a height that in falling it cut 14 inches deep into a 24 inch log of pine situated at a distance of about one hundred yards from the site of the explosion. The plate was found by me solidly imbedded in the log of timber, the cut being in a vertical plane and crossing the length or fibre of the timber at very nearly a right angle, say 85° to 90°. A building intervened between the boiler and the timber, so that the fragment of boiler plate, or rather of several plates rivited together in the ordinary way, was not projected direct from the boiler towards the timber, but must have risen nearly vertically to an immense height to have acquired the momentum necessary to produce the result above described. To what height approximately was this fragment—which I estimated at the time to weigh about 500 lbs.—hurled? The portion which had entered the log had been flattened out to a plane surface by the force of the explosion, the remainder being irregularly bent and twisted.

Chs. Baillairge, Chev.,
City Engineer, Quebec.

Dear Sir,—In response to your invitation, and stimulated by an article in the last number of the Magazine in reference to a method of getting bevels and lengths of rafters, I beg leave to give you the benefit of my experience in the use of the framing square, hoping it may be of some benefit to the mechanical class of your readers.



In determining the length and bevel of rafters, take any number of inches on the long and short arms of the square representing the proportion of half the width and the pitch of roof (which in a third pitch would be 24" and 16" or 12" and 8") and apply these divisions directly to the back of rafter (as shown below) the longer arm giving the cut of rafter at plate and the shorter the cut at ridge. Then, to get the length—if the calculation of width is from face of plates—first lay out the projection of rafter beyond the plates, using the figures on the framing square as a bevel, and then commencing at the line representing the face of plate (a); apply the diagonal length between the figures to back of rafter as often as the 34 inches (or the 12 inches) is contained in half the width, and if any fraction of the width occurs add on the fractional part by measuring at right angles to ridge cut and pass the bevel through this point for whole length.

You will notice that the square and pencil are the only instruments used in this operation, and it is perfect in its results.

This method, applied to braces, is very simple and accurate. If the run is 3 feet each way, take 18 inches on each arm of the square and apply twice to brace and the lengths and bevels are got at once. If the runs are 4 feet and 3 feet, take 24 inches and 18 inches and apply twice, because in both cases the figures used on the square are half the run. In the case of rough and fractional parts, divide both runs by any common division until the quotants are within the limits of the square, and then using these figures, apply the square as often as there are units in the division, thus, say runs are 7" 6" and 5" 6", divide both by 6, giving 15 inches and 11 inches. These figures being used on square applied 6 times will give the length and cut at both ends of braces; or using the figures of run as a scale of an inch to the foot, making 7½ and 5½ inches, these figures would be applied 12 times, but by doubling both and applying 6 times the same result is obtained as before. The above applications of the square is founded on the ordinary geometrical proportion that in similar triangles the sides are proportional to each other, therefore, if the figures used on the square are proportional to the base and perpendicular lines formed by "half the width" and "height" in case of the roof, and the "runs" in case of the braces, then the diagonal measurement between the figures on the square must be proportional to the whole length of rafter or brace, and if the figures on the square are contained any given number of times in half width or height of roof, or runs in braces, then the diagonal measurement between the figures on the square is contained the same number of times in the whole length of rafter or brace.

W. I. & S., Kingston.

Shoe for Interfering Horses.—"A Subscriber" sends a sketch (from which we have made the engraving, fig. 1) of a shoe which he has devised and tried successfully to prevent horses from interfering. It is made twice as wide and heavy on the outside as on the inside. To equalize the wear, the inner and lighter portion of the shoe is made of steel.

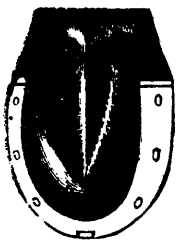


Fig. 1.

Errata.—On page 355 of the last (December) number, on the subject of "Clark & Standfield's Depositing Dock," our correspondent desires to correct an error which occurred in his manuscript, viz., that the "Imperial Government was about to construct a graving dock at Quebec." This was a mistake, and was entirely overlooked in reading the proof.