

the importance of applying science to practical uses. If they could only supplement the fragments of higher knowledge they have often obtained by herculean efforts, with the elementary instruction that may be procured in a common day school, they might rank with that intellectual class with whom systematic knowledge enters as a vital element into all operations under their care."

If in past years it was important that the various classes of operatives should be well informed on subjects connected with their several employments in life, how much more important is it in this age of the world's progress? Our country is covered with educational institutions of every order, from the common school to the university, and the rising generation have every opportunity that can possibly be afforded them for the attainment of all the ordinary as well as the higher branches of education; but if our mechanics and artisans are not supplied with that scientific and mechanical knowledge so necessary to practical men, and of which as a general thing they are now so lamentably deficient, they will lag behind in the world's history, and, as a people, we shall make no rapid or even creditable progress in the race of competition with the more intelligent and better educated industrial classes of other countries.

We close by quoting Sir Isaac Newton on the value of scientific knowledge in its relation to seamanship, but which is just as applicable to every one engaged in any kind of mechanical pursuits:—

"Without the learning in this article (Mechanics) a man cannot be an able and judicious mechanic, and yet the contrivance and management of ships is almost wholly mechanical. 'Tis true that by good natural parts some men have a much better knack at mechanical things than others, and on that account are sometimes reputed good mechanics; but yet, without the learning of this article, they are so far from being so, as a man of a good geometrical head who never learnt the principles of Geometry, is from being a good geometer. For whilst Mechanics consist in the doctrine of force and motion, and Geometry in that of magnitude and figure, he that can't reason about force and motion is as far from being a true mechanic, as he that can't reason about magnitude and figure from being a geometer. A vulgar mechanic can practise what he has been taught or seen done, but if he is in error he knows not how to find it out and correct it, and if you put him out of his road he is at a stand; whereas he that is able to reason nimbly and judiciously about figure, force and motion is never at rest till he gets over every rub. Experience is necessary, but yet there is the same difference between a mere practical Surveyor or Guager and a good Geometer, as between an Empyric in Physic and a learned and a rational Physician."*

OUTLET DOORS AND ROOFS OF PUBLIC BUILDINGS.

The fatal catastrophe of which we have just been informed as having occurred at Santiago, in South America, in the burning of a Catholic Cathedral, and the loss of upwards of two thousand lives, occasioned to a considerable extent by the insufficiency in number of outlet doors, and the blocking up of those that were provided as soon as the alarm was given, reminds us of the wrong construction, and insufficiency in number of outlet doors to most of our public buildings. From observation we are led to believe, that the doors of such buildings are generally hung to open inwards, so that if fire or any other cause of alarm occurs in the audience, a hundred chances to one but the ordinary doorways would at once become so blocked on the inside that they could not be opened, and a large number of persons would perish ere relief could be afforded.

This is really an unpardonable oversight on the part of the architects and others connected with the erection of public buildings; and wherever loss of life does occur from these causes, as was the case in a theatre in the City of Quebec a few years since, on the heads of such parties rests the responsibility. Persons attending at large assemblies in the Music Hall of the Toronto Mechanics' Institute may have the comfort of knowing that one of the large pairs of doors entering that Hall swing clear both outwards and inwards (and the sooner the other pair is altered to do so the better), and that the two pairs of outlet doors on the main front both open outwards, so that a jam or blocking up on the inside can never take place. How much more satisfactory would it be if the doorways of all our public halls, theatres and churches were constructed on the same principle.

While on this subject, we would suggest to architects and others engaged in their planning, that some great improvement is necessary on the general mode of constructing the roofs of large buildings. We can point to public buildings in this city that are seriously damaged every spring from the melting of the snow on the roof, followed by a freezing up of the gutters, and the consequent backing of the water resulting from the next thaw over the wall plates into the building, destroying the plaster ceilings and the paper or other finishing on the walls. We do not here offer any suggestions as to how this may be prevented, but have no doubt whatever in our mind that an efficient remedy can be found, if proper consideration is given to the subject by those whose business it is, more especially, to make it their study. Our pages are open to the discussion of this as well as all other improvements of a practical character.

* Appendix to the "Correspondence of Newton and Cotes," p. 283.