

person skilled in the art of navigation who is ignorant of the science of astronomy; or of mensuration, who knows not geometry; or of logic, who was unacquainted with the science of reasoning; as an engineer, who had not mastered the science of mechanics; or one able to direct the search for, and profitable working of minerals, to whom geology, chemistry, hydraulics, and other cognate sciences were not familiar.

The question is sometimes narrowed as to what are the best means of acquiring technical proficiency, and it is asserted that the practical details of civil engineering may be best learned by pupils in the field, and in the offices of engineers engaged in the execution of extensive works—in fact, dealing with the professional man as with an ordinary tradesman, and insisting that he should be taught as is the apprentice to the shoemaker or hatter. Now, we are not obliged to admit or deny this proposition, for it embraces only one portion of the general subject, and the conclusion drawn from it, that private tuition, under an exceptionally favourable state of circumstances in both master and pupil, is, or may be, that best calculated to ensure a certain proficiency, is not the true issue. What is required is—not a partial adept in some one branch, or a few branches of work, but a man with comprehensive learning, which embraces the wide range of philosophic theory, the precepts of which invigorate the understanding, and keep him from the perpetual blunder and mischance into which the practical empiric is so prone to fall; and who, in addition to this, can apply those precepts with readiness and aptitude. Yet even on this point it may be well maintained that isolated pupilage amongst seniors of different dispositions, engrossed with their own independent responsibilities, more prompt to neglect or chide than to instruct, cannot be so congenial to the young man as the association with his fellows of the same age, all mutually bringing to bear on each other in honourable rivalry the knowledge which they daily acquire. And as it is in a great degree a parent's question, the school presents the protection of superintendence, the exercise of moral restraint, and the absence of temptation to idleness and dangerous self-indulgence, not so well insured against in the early emancipation of the other system.

But what testimony can be more eloquent than the lamentations of our most distinguished practical workers, at their not having been blessed with the benefit of education in early life? What more

touching than their struggles, what more worthy of respect than the spirit of enquiry and perseverance by which they were animated? What more convincing than the care they took and the expense they incurred to secure for their children that early instruction the want of which was by them so feelingly deplored? However profitable it might be to exhibit instances of this, displaying in almost every variety of form, intelligence, strength of character, firmness of purpose, frugality, intense sensitiveness, and many a manly virtue—such would be more suitable for another occasion.

It is not to be imagined that those invited to give their support to this institution are to be stirred solely by appeals to self-interest, or by an exposition of the fallacies of obsolete prejudices. Members of an intelligent community when in search of reasons to guide them at such a juncture will look back upon the experience of the past to guide their actions, forward for a motive for their conduct.

Now, there is in history, perhaps, nothing more deserving attentive consideration from the point of view we are now regarding it than the astonishing impulse given to all the industrial and mechanical arts since the beginning of the present century. That this is to be ascribed in some degree to the increase of population and the very augmentation of wealth which reduplicates itself, is true; nevertheless, far the greater portion of the prosperity is due to the improved means of intercourse, the discoveries painfully elaborated by means of the singular intellectual activity of the age, the spirit of inquiry, and the bold and persevering researches of scientific men. While nothing is so truly surprising as to observe the rapidity of development of several of these grand implements of pacific revolution swelling from the tiny nucleus which was seen on our own horizon to the gigantic proportions which they have already assumed.

Chemistry, enfranchised from the superstitious trammels of alchemy, had moved forward for some time with halting steps and slow; but it is within our own day, so to speak, that she has enlisted the services of those utilitarian workers, unnecessary to enumerate by name here, who investigated the mysteries of nature, evolved from inert matter a host of elementary substances, the existence of which as such was unsuspected before, capable of forming new alliances, and in simple compound or allotropic forms delighting us by the unexpected nature and energy of their action, their usefulness, and their beauty. Operations in most of the industrial arts, including the cul-