

elements with which its operations are connected, involve considerable departments of Chemistry, Mineralogy, Physiology and Natural Philosophy; subjects which it appears to me form essential parts of a good mechanical education. But the substances with which mechanism has to do, are to be formed into various implements, materials and structures, and controlled in various ways for the purposes of human life. This requires a knowledge of mechanical forces and the laws by which they are regulated; nor can these be calculated and determined without some acquaintance with Arithmetic and Geometry. And on the laws of Light, Heat and Electricity depend also unnumbered mechanical operations—the construction of edifices and instruments, and provisions for numerous wants and conveniences of human life; while the manufacture of the hats, clothes and shoes we wear, involves both chemical and mechanical processes of a multifarious character. The mechanic should likewise be able to delineate the objects of his actual and contemplated workmanship; but this he cannot do without some skill in Linear Drawing. He should furthermore know how to keep his accounts accurately and systematically; and for want of ability to do this many a mechanic has been involved in loss and ruin.\*

Such are the principal subjects in which I think every youth should be instructed who is intended for mechanical pursuits. I have said nothing on what might be considered ornamental in his education; I have restricted my remarks to what appears to me to be essential—not indeed equally essential to every individual trade, but to mechanical employments generally. Nor would I convey the idea, that the School should teach trades, as the German Universities teach professions; but I mean that the School should teach the elements and principles of what the trades are the development and application, and that the intended tradesman should commence his apprenticeship with an educational preparation adapted to it the same as does the intended lawyer, or physician, or naval or civil engineer enter upon the study of his profession. It is true, a parent may apprentice his son to a trade without any such preparation; † but in doing so he closes up the way against the advancement of that son in his trade, and dooms him to the fate and temptations of hopeless inferiority for life.

II. Having given this very summary view of the nature of an education proper for a mechanic, it is my next duty to illustrate its importance. It is important in two respects:—first, to the mechanic himself—secondly, to society. It is also invested with a two-fold importance to the mechanic—involving both his *profit* and his *enjoyment*.

I. I remark then in the first place, that a good education is of great importance to the mechanic, *as educated labour is more productive than uneducated labour*. I will select my illustrations of the truth of this remark from examples the least favorable for its establishment—not where, as in this country, every operative mechanic is for the most part his own master, and needs greater intelligence and discretion for his guidance; but where the mechanical labourers are wholly under the superintendence of others, and may therefore be supposed to be least advantaged by educational training. From many similar illustrations which I might adduce, I will limit myself to two;—the one from Continental Europe, the other from the New-England States—the manufacturing workshop of America. In the Report of the English Poor Law Commissioners for 1841, will be found the evidence of A. G. ESCHER, Esq., of Zurich, in Switzerland—first a practical Engineer, and then a wealthy manufacturer—an illustration of

\* So important is an elementary knowledge of these subjects of chemistry and natural philosophy, linear drawing, book-keeping, &c., to even the common employments of life, that they are embraced in the course of instruction given in the Provincial Normal School for the training of Teachers, with a view to their introduction into the Common Schools generally; and I anticipate the day when the teaching of them in our Common Schools will be regarded as much a matter of course, as the teaching of elementary arithmetic and geography is now.

† In the principal Cantons or States of Switzerland, (which are more democratic in their system of government than the neighbouring States,) a boy, before he can be bound as an apprentice to a trade, must pass a prescribed examination before a State Committee, as to his preparatory education, the same as candidates for the study of law in Upper Canada are required to pass a prescribed examination before examiners of the Law Society, in order to their admission as Students-at-Law.

the fruits of a good early education. In reply to the question of Her MAJESTY'S Commissioners, as to the effects of a want of education on the success of mechanical employments, Mr. ESCHER, who was accustomed to employ hundreds of workmen, states as follows:—

“These effects are most strikingly exhibited in the Italians, who, though with the advantage of greater natural capacity than the English, Swiss, Dutch or Germans, are still the lowest class of workmen. Though they comprehend clearly and quickly any simple proposition made, or explanation given to them, and are enabled quickly to execute any kind of work when they have seen it performed once, yet their minds, as I imagine, from want of development by training or School Education, seem to have no kind of logic, no power of systematic arrangement, no capacity for collecting any series of observations, and making sound deductions from the whole of them. This want of capacity of mental arrangement is shown in their manual operations. An Italian will execute a simple operation with great dexterity; but when a number of them is put together, all is confusion. For instance: within a short time after the introduction of cotton spinning into Naples in 1830, a native spinner would produce as much as the best English workman; and yet up to this time, not one of the Neapolitan operators is advanced far enough to take the superintendence of a single room, the Superintendents being all Northerners, who, though less gifted by nature, have had a higher degree of order and arrangement imparted to their minds by a superior education.”

In reply to the question, whether Education would not tend to render them discontented and disorderly, and thus impair their value as operatives, Mr. ESCHER states:—

“My own experience and my conversation with eminent mechanics in different parts of Europe, lead me to an entirely different conclusion. In the present state of manufactures, where so much is done by machinery and tools, and so little done by mere brute labour, (and that little diminishing,) mental superiority, system, order, punctuality, and good conduct,—qualities all developed and promoted by education,—are becoming of the highest consequence. There are now, I consider, few enlightened manufacturers, who will dissent from the opinion, that the workshops, peopled with the greatest number of well informed workmen, will turn out the greatest quantity of the best work, in the best manner. The better educated workmen are distinguished, we find, by superior moral habits in every respect.

“From the accounts which pass through my hands, I invariably find that the best educated of our work-people manage to live in the most respectable manner, at the least expense, or make their money go the farthest in obtaining comforts.

“This applies equally to the work-people of all nations, that have come under my observation; the Saxons, the Dutch, and the Swiss, being however decidedly the most saving without stinting themselves in their comforts, or failing in general respectability. With regard to the English, I may say that educated workmen are the only ones who save money out of their very large wages.”

My second illustration of this point is taken from the New England States. In the year 1841, the Honorable HORACE MANN, late Secretary of the Massachusetts Board of Education, made a most laborious inquiry into the comparative productiveness of the labour of educated and uneducated manufacturing operatives in that State. The substance of the answers of manufacturers and business men to whom he applied, is stated by Mr. MANN, in his fifth Educational Report, in the following words:—

“The result of the investigation is the most astonishing superiority in productive power on the part of the educated over the uneducated labourer. The hand is found to be another hand when guided by an intelligent mind. Processes are performed not only more rapidly, but better, when faculties which have been cultivated in early life furnish their assistance. Individuals, who without the aid of knowledge, would have been condemned to perpetual inferiority of condition and subjected to all the evils of want and poverty, rise to competence and independence by the uplifting power of education. In great establishments, and among large bodies of labouring men, where all services are rated according to their pecuniary value, there it is found as an almost invariable fact, other things being equal, that those who have been blessed with a good Common School Education, rise to a higher and higher point in the kinds of labour performed, and also in the rate of wages paid, while the ignorant sink like dregs to the bottom.”

In his Report for 1847, (which I received a few weeks since,) Mr. MANN reverts to the same subject in the following impressive language:—

“In my fifth Annual Report, I presented the testimony of some of the most eminent and successful business men amongst us, proving from business data, and beyond controversy, that labour becomes more profitable as the labourer is more intelligent; and that the true point of wealth,