

travelling came into fashion, and in this comparatively short period one hundred and fifty thousand miles of railway have been made in different countries, at an outlay of about fourteen thousand millions of dollars, and involving an expenditure of engineering skill and work of such vast magnitude and importance that, in comparison, all the previous engineering works of the world seem to fall almost into insignificance. Look for a moment at the development of the manufacturing industry as applied to cotton, and we learn that Mr. Arkwright built his first mill at Cromford, in Derbyshire, England. It was driven by water, but it was not till 1790, or some time after, when the steam engine of Watt came into use, that the cotton trade advanced at such an accelerated speed, as to render its increase and present magnitude almost beyond conception. This universal extension is not only a subject of deep interest to the philosopher and statesman, but one which is likely to furnish a larger field of observation for the future historian of his country.

Our knowledge of force, too, has become so complete, and so extended are our powers of adapting it to useful ends, as to render it by no means improbable that ere long all the severer forms of labour will be performed entirely by machinery. And still the progress continues, and we are ever craving for a fuller knowledge of outward things and natural forces, and for a deeper insight into, and a clearer conception of this wonderful universe of ours. But with all this advancement there has been a consequent increase of the subjects of knowledge, and these have multiplied so exceedingly as to render it utterly impossible for the most ardent and successful student to cope with more than a very small portion of them. We have the ancient and modern languages, the corresponding literature, all the "ologies," and all the sciences, and it has thus become a matter of the utmost importance to select from these, the subjects which will enable a youth to qualify himself most effectually for that particular occupation which he intends to pursue, and which shall teach him that his education is not merely intended to make him a skilful workman or a prudent man of business, but also to develop his manhood, to make him upright in his walk in life, and true in word and thought. Now, the prosperity of a country depends, undoubtedly, in a very great measure upon the condition of its industries, and it is therefore most essential to study them in every branch, and endeavour by all possible means to bring them into a state of good and healthy progress. To do so effectually, the people must be raised and educated to a higher degree of scientific attainment, so that for the time to come, we may possess a better educated class of masters and workmen, who will be able to meet the requirements of the age, which demand an increased intelligence, not only in the workshop, but in all departments of knowledge.

I cannot, then, impress too strongly upon the people of this Dominion, the necessity of providing for the more complete education of students in Practical Science. Canada is a young and growing country, and, in all probability, has a great future in store, and in the natural course of events railways will have to be laid down and worked, towns will have to be drained and supplied with water (for example, Montreal), roads will have to be made, ports and harbours will have to be constructed, and rivers will have to be made navigable. These are works involving enormous cost, and of the greatest importance to the people; they require, in their execution, the most consummate knowledge and skill, and the people will therefore do well to pay the utmost attention to the training and selection of those who will have to carry out such works. Consider our modern railways, and we shall find that in those countries in which the engineering systems have been prudently selected, and in which the engineers have been carefully trained and educated in their work, the railways have been laid down cheaply, and have been worked with economy and profit; but where they have been reckless and ignorant, the railways have been very costly, have been extravagantly worked, and have been altogether unprofitable. In a very able and instructive work on technical education, Mr. Scott Russell, in speaking of foreign railways, says:—

"It is notorious that those foreign railways which have been made by themselves in the educated countries of Germany and Switzerland, have been made far cheaper than those constructed by us in England; it is known that they have been made by pupils of the industrial schools and technical colleges of these countries, and I know many of their distinguished men who take pride in saying that they owe their positions entirely to their technical schools. I find everywhere throughout their work marks of that method, order, symmetry, absence of waste which arise from plans well thought out, the judicious application of principles, conscientious parsimony, and a high feeling of professional responsibility. In the accurate cutting of their slopes and embankments, in the careful design and thoughtful execution of their beautiful and economical stonemasonry, in the self-denying economy of their large span bridges, the experienced traveller can read as he travels the work of a superiorly educated class of men; and when we come down to details, to the construction of permanent way, arrangement of signals, points and sidings, and the endless details of stations, we everywhere feel that we are in the hands of men who have spared no pains, and who have applied high professional skill to minute details."

Our early practitioners in architecture and engineering were, with the exception of a few remarkable men, totally unacquainted with the first principles of their profession, and their reasonings were consequently difficult, precarious and unsatisfactory, and led them into malconstruction and many of those errors which a knowledge of science would have warned them to avoid. At the hands of such men as these, an immense expenditure has been made in the production of totally unscientific work, and we have often been called upon to witness failures and abortion in the art of construction which an extended knowledge and superior skill would have prevented.

To render the subject of these articles as intelligible as possible, I shall treat it under the following heads:—

- I. On the harmony between theory and practice.
- II. Educational institutions in Great Britain, Europe, and in the United States.
- III. Educational institutions in Canada.
- IV. General conclusions.

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THE SOUL AND FUTURE LIFE.

[The following article and another which will follow, are taken from *The Nineteenth Century*—an English high-class monthly, devoted to the free discussion of all matters of importance. Mr. Frederic Harrison is a disciple of Auguste Comte—the celebrated French positivist philosopher—and in these articles defines and defends his teachings on "The Soul and Immortality." The articles are followed by a modern symposium—written by the leading Philosophers, Scientists and Theologians of England. That symposium will be given as it appeared in the above named periodical. It is hoped that it will be found to interest and edify.—EDITOR.]

How many men and women continue to give a mechanical acquiescence to the creeds, long after they have parted with all definite theology, out of mere clinging to some hope of a future life, in however dim and inarticulate a way! And how many, whose own faith is too evanescent to be put into words, profess a sovereign pity for the practical philosophy wherein there is no place for their particular yearning for a Heaven to come! They imagine themselves to be, by virtue of this very yearning, beings of a superior order, and, as if they inhabited some higher zone amidst the clouds, they flout sober thought as it toils in the plain below; they counsel it to drown itself in sheer despair or take to evil living; they rebuke it with some sonorous household word from the Bible or the poets—"Eat, drink, for to-morrow ye die"—"Were it not better not to be?" And they assume the question closed, when they have murmured triumphantly, "Behind the veil, behind the veil."

They are right, and they are wrong: right to cling to a hope of something that shall endure beyond the grave; wrong in their rebukes to men who in a different spirit cling to this hope as earnestly as they. We too turn our thoughts to that which is behind the veil. We strive to pierce its secret with eyes, we trust, as eager and as fearless; and even it may be more patient in searching for the realities beyond the gloom. That which shall come *after* is no less solemn to us than to you. We ask you, therefore, What do you *know* of it? Tell us; we will tell you what we hope. Let us reason together in sober and precise prose. Why should this great end, staring at all of us along the vista of each human life, be for ever a matter for dithyrambic hypotheses and evasive tropes? What in the language of clear sense does any one of us hope for after death: what precise kind of life, and on what grounds? It is too great a thing to be trusted to poetic ejaculations, to be made a field for Pharisaic scorn. At least be it acknowledged that a man may think of the Soul and of Death and of Future Life in ways strictly positive (that is, without ever quitting the region of evidence), and yet may make the world beyond the grave the centre to himself of moral life. He will give the spiritual life a place as high, and will dwell upon the promises of that which is after death as confidently as the believers in a celestial resurrection. And he can do this without trusting his all to a *perhaps* so vague that a spasm of doubt can wreck it, but trusting rather to a mass of solid knowledge, which no man of any school denies to be true so far as it goes.

I.

There ought to be no misunderstanding at the outset as to what we who trust in positive methods mean by the word Soul, or by the words 'spiritual,' 'materialist,' and 'future life.' We certainly would use that ancient and beautiful word Soul, provided there be no misconception involved in its use. We assert as fully as any theologian the supreme importance of spiritual life. We agree with the theologians that there is current a great deal of real materialism, deadening to our higher feeling. And we deplore the too common indifference to the world beyond the grave. And yet we find the centre of our religion and our philosophy in Man and man's Earth.

To follow out this use of old words, and to see that there is no paradox in thus using them, we must go back a little to general principles. The matter turns altogether upon habits of thought. What seems to you so shocking will often seem to us so ennobling, and what seems to us flimsy will often seem to you sublime, simply because our minds have been trained in different logical methods; and hence you will call that a beautiful truth which strikes us as nothing but a random guess. It is idle, of course, to dispute about our respective logical methods, or to pit this habit of mind in a combat with what. But we may understand each other better if we can agree to follow out the moral and religious temper, and learn that it is quite compatible with this or that mental procedure. It may teach us again that ancient truth, how much human nature there is in men; what fellowship there is in our common aspirations and moral forces; how we all live the same spiritual life; whilst the philosophies are but the ceaseless toil of the intellect seeking again and again to *explain* more clearly that spiritual life, and to furnish it with reasons for the faith that is in it.

This would be no place to expound or to defend the positive method of thought. The question before us is simply, if this positive method has a place in the spiritual world or has anything to say about a future beyond the grave. Suffice it that we mean by the positive method of thought (and we will now use the term in a sense not limited to the social construction of Comte) that method which would base life and conduct, as well as knowledge, upon such evidence as can be referred to logical canons of *proof*, which would place all that occupies man in a homogeneous system of *law*. On the other hand, this method turns aside from *hypotheses* not to be tested by any known logical canon familiar to science, whether the hypothesis claim support from intuition, aspiration, or general plausibility. And again, this method turns aside from ideal standards which avow themselves to be *lawless*, which profess to transcend the field of law. We say, life and conduct shall stand for us wholly on a basis of law, and must rest entirely in that region of science (not physical but moral and social science) where we are free to use our intelligence in the methods known to us as intelligible logic, methods which the intellect can analyse. When you confront us stated in terms of the rest of our knowledge, if they are disparate to that world of sequence and sensation which to us is the ultimate base of all our real knowledge, then we shake our heads and turn aside. I say, turn aside; and I do not to knowledge in our aspirations or our presentiments, as there might be in our dreams by night as well as by day; we courteously salute the hypotheses, as we might love our pleasant dreams; we seek to prove no negatives. We do not pretend there are no mysteries, we do not frown on the poetic splendours of the

FROM THE HINDOO POINT OF VIEW.—A native paper of Madras says:—"We are notoriously a superstitious race, while the English, those resident in India at least, are so emancipated from superstition that they protest against paying their priests; and these are accordingly paid out of the taxation of the superstitious natives."