ADDRESS ON SCIENTIFIC EDUCATION.

DELIVERED AT THE ENCŒNIA OF KING'S COLLEGE, WINDSOR, N. S., BY PROF. HOW, D. C. L., THURSDAY, JUNE 30TH., 1870.

SINCE ever to be changing his condition, and, on the whole, to improve it, has always been the destiny of man, and it would therefore be improper to say that change is at all peculiar to the times we live in, there cannot be the shadow of a doubt that there never was a period to compare with our own in the rapid, complete, and numerous changes resulting from intellectual activity.

Throughout the world, numberless minds are busily directing the energies of nations in carrying out a multitude of useful projects. In the best parts of Europe we see a polished civilization rejoicing in all the phases of the most complete life man has ever known. There is not a material want allowed to the senses; all that can delight those avenues of pleasure and of pain, that can bring health or ease in sickness, or soften the frequent agonies of the inevitable hour, is at command. Every contrivance by which intercourse is rendered safer, quicker, and more agreeable is being continually improved upon. In varied degrees all levels of society, even to the every lowest, partake of these benefits so that there is a diffusion of advantages such as was never yet experienced. The independent States of America and the Colonial Empires of the World shew in many portions of their vast extent a luxury more than equal in certain features to that prevailing in the parent lands. Turkey and Egypt are fast losing many of their distinguishing features. The old old isolation of China and Japan has melted away in the heat generated by the friction of western life, and from the flood of their yellow natives pouring forth to the centres of that life and their reception of its exponents,—its steamers, it railways, its telegraphs, its miners, its engineers—at home, these countries must partake of the general activity and so advance to a more elevated condition of existence.

These are not days in which old abuses can bear the strong light thrown upon them or withstand the determined spirit in which they are simply dissected and buried away. Much that has been too long looked upon as right, because old, or, if not right, at least tolerable for the same reason, has had to give place to some thing better, because more adapted to the wants of our times, since it has been found either that original intentions have been perverted, or believed that their fulfilment would not in all probability have been insisted on, had those who expressed them lived to see the altered circumstances to be met So it is that many institutions have been put upon a more suitable footing, and a more liberal view of things generally has tended to prevail. Still, great is the inertia of long lived error and accumulated misconception, and there must be very much more improvement before man can be said to live all his life in almost any country, and in many lands, alas! before he can be said to live any considerable amount of his complete existence. It is interesting in the mean time, even if sad, to watch the futile efforts of obstructives to arrest the progress of advancing though with all its ameliorating tendencies.

As it is beyond dispute that man is now more of one family than he ever was, since the time he greatly multiplied, that the barriers of national, sectional, and local exclusiveness have been partially removed, and that there is a community of feeling among the best portions of all divisions of people which did not exist till recently, it is certain that this happy result has been brought about to a great extent by the ever increasing freedom of intercourse only possible of late years. We have come for the most part to bear with more equanimity than our forefathers did the differences which must ever exist, and to work together as a matter of course on the broad platform of philanthropy, and this because people have been able to meet and talk together.

If the intermingling of individuals has made social life less angular, and not seldom turned bitterness into sweetness, how much have the meetings of nations not done to advance the well-being of mankind. It may be that these meetings of the nations in Exhibitions by means of representative objects collected by their thinkers and workers, the native products of their countries, and manifold proofs of skill and industry, have been the natural outcome of widespread activity in the Arts and Sciences. It is a fact that they have given an immense impulse to all those applications of science which minister to the progress of civilization. Who that was fitted by education to understand, even moderately well, the meaning of one of those Exhibitions could fail, as he looked upon such a gathering, to muse upon the benefits derived from scientific knowledge. He could not question, of course, the fact of existence being much more agreeable to those living among the chosen products in view, and capable of the enjoyments and appreciation of their excellence, than to those less privileged, nor could he be unaware that gradually the good effects of improvements would spread on all sides from their birthplace, but he would, as I suppose, wonder without measure at the practical answers everywhere visible to the question *cui bono* as put to the student of pure science. To take but one example, I can imagine him looking at the series of varied and exquisite colours produced from coal tar—the practical consequence of the purely scientific experiments of Faraday as supplemented by those of my old master in practical chemistry, Hofmann. Millions of money yearly put in motion by those who knew how to apply accurate chemical acquaintance with a few of the things in coal tar! What that means, anyone who cares that people should be usefully employed will allow to be a sufficient answer to the question,—what is the good of spending the time and thought of an intelligent man on such a stuff as coal tar.

How carefully should we preserve the characteristics of those people who still persist in asking what is the use of studying science, for they are the lingering types of beings prevailing in the pre-modern period. These curious creatures may ask this question now across the oceans and receive an answer almost before their ink is dry; and the answer might be that space is annihilated and time is far more profitable. They may ask the question in the darkness of night and see their portraits produced in a few moments, and the answer might teach them that darkness is not able to prevent the photographer, who used to wait for bright sunshine, from working by night as by day. And so we might go on finding answers almost sufficient to convince them that science is not without value even from their own point of view.

I do not know that we can find a more strikingly interesting illustration of the practical use made of purely scientific discoveries than by referring again to that "great high priest of nature" Faraday. Thirty years after he had witnessed the birth from his own brain of magneto-electricity as a feeble force able to deflect a delicate needle, he was vastly moved to find its developed power equal to the melting of a rod of iron. He lived to behold this one of his discoveries "grow into a mighty power; he saw it everywhere employed and fortunes founded on its free use; he saw it adopted for telegraphy and the luxury of private telegraphs made possible by its means; he saw it used on a grand scale for electro-metallurgy; he saw it generating ozone, and thereby refining sugar; he saw its light used by the photographer to enlarge his negatives; and, finally, he saw it shine like a midnight sun over the reefs around the coasts of England." There was no child of his body, but he had this most noble progeny of grand children and great grand children from this one of the infants of his brain to rejoice over as he saw it developing its marvellous capabilities of adaptation to the service of his fellow creatures.

In fact the answer which the majority of scientific men might give to the question I am speaking of might well be: The material advantages derived from our labours, so far as they benefit all, we share, but the greater part of them is for others only; they turn our thoughts into money and live more or less luxuriously while we are no better off than the juniors in some good mercantile establishment. People are glad enough to pick our brains for they make much money of them, though they do not think them worth more than a trifle to ourselves. To keep to the case of Faraday; when he was rising to the very height of his fame, all the committee of the Royal Institution, where he had achieved his great triumphs, could say was, "that certainly no reduction could be made in his salary of £100 per year, with rooms, coals, and candles." Many a foreman conducting a business within a short distance of the scene of Faraday's labours would have felt insulted by the suspicion that he earned less than four or five times as much as the philosopher. Since the British Government, like most governments, needs all credit due for any official encouragement of science, it must be added that Faraday actually received a pension of £300 a year, and, finally, at the hands of our truly noble Queen, a residence at Hampton Court. He was well aware how little our nation appreciates deep and philosophical pursuits, for he said. "For its own sake our Government should honour the men who do honour and service to their country. I have as a scientific man, received from foreign countries and sovereigns honour which pass, in my opinion, anything which it is in the power of our own to bestow." These foreign honours amounted to about 60 in number, in his own country he may have received perhaps half as many. Such honours are the main delight as they are the chief reward of the man of pure science, over and above, of course, the love he has for his work on the one hand, and, on the other, the additions he is conscious of making to the happiness of his fellows.

The question—of what good is science—is answered by many in a very different way from that in which I have as yet answered it to-day. Viewed in connection with education, they say it is of much good, perhaps of more good than any other subject of study. Side by side with the Exhibitions which changed the face of the world, were held discussions on sundry topics naturally started on the meeting of many active intellects ripened under diverse conditions to the comprehension of those gatherings of the riches of the earth, and the signs of man's delegated power to use and improve them. The relation of Science to Education could hardly fail to form one of those topics and so partly no doubt has arisen the strongly expressed opinion that the teaching of natural science is essential in education. Nothing can well be clearer than that this subject demands the instant and most careful attention of those who have the direction of education, and that all Councils of Public Instruction, Governors of Colleges, and Trustees of Private Schools, and those who have young people to be brought up as intelligent members of society should be familiar with its details and bearings. It is impossible to do more on this occasion than touch very lightly on its most salient features, for it extends over ground so very wide that a long lecture or two might well fail to exhaust it when treated as it should be for the consideration of those whose duty it is to understand the vastly changed aspect of the educational world. There is an opinion already wide-spread and fast gaining in force that the whole system of education is wrong; not only that the sub-