

science—he was now speaking simply of the physical science that was seriously cultivated. In France and Germany, especially in the latter country, the laboratories for practical teaching had now attained marvellous magnitude and astonishing completeness of equipment. Even in this country, slow as we are, great changes had been carried out. Within the last few years both of our great Universities had established laboratories for practical teaching, and it was being done where it could be carried out in the Universities of Scotland. Our great University of Edinburgh, one of the most important educational institutions of the three kingdoms, in regard to science was simply not doing all she might do in this matter for lack of material aids. The University buildings were absolutely inadequate for the purpose, and the sooner Scotchmen understood this to be the case the better it would be, because the teaching of the University at present was seriously impeded for the want of the practical appliances to which he referred. He did not mean to say, that although such complete appliances were absolutely necessary to the effectual teaching of the sciences, anything that fell short of this might not be exceedingly useful, but the value of the teaching would be diminished exactly in proportion as the practical element was omitted. Because, what did scientific teaching mean? It was not merely instruction. It was in a great measure that. It was the acquainting of the mind with the laws which governed the phenomena of nature, and he needed not to enlarge upon the well-worn topic of the value of such knowledge. But there was about scientific teaching a value as an educational discipline of a particular kind. The first element of value of scientific teaching arose from the fact of its cultivating the power of observation, which he thought was the most difficult to cultivate, or at any rate the least cultivated, and at the same time probably the most valuable of the faculties that man possessed. It was astonishing how difficult a thing it was to say exactly what was to be observed in anything, and to state what one had observed without putting in anything more or leaving out something. He should say that upon the whole it was the very rarest of all human qualifications, and the lack of it was at the bottom of half the miseries of human life. Any of them who had lived thirty years in the world could not have failed to see that half the evils of society, the malice, hatred, and uncharitableness of this world, arose not exactly from bad intention; He did not think human nature was altogether of so malicious a character as it was represented. But it was because people allowed their statements of actual occurrences to contain hypotheses in addition to the objective matter of fact. He would not give illustrations; they were to be found in daily experience. He knew of no educational discipline—he would not speak of moral discipline—which was of so great value in relation to this apparently fundamental difficulty of human nature as scientific discipline, for the source of all our mistakes in science was to be found in this unlucky habit of not being able to see what was before us, and putting into our statements more than was really in the facts. But, besides knowing, besides being able to use the mind, there were other faculties, powers, tendencies, and instincts in man's nature. He could imagine a person with endless knowledge and with great facility and dexterity in using it, yet being a man devoid of culture in the highest sense of the word. Mere knowledge was no very great thing, and mere dexterity in using it was no very great thing, looked at in relation to a man's own nature. What he meant by culture was something higher than this: it meant the disposition of the mind, a certain understanding of one's relations to that which is not of one's self, a certain confidence in the order of

things; and no other study could give this particular form and disposition of the mind which alone deserved the name of culture so well as scientific training. They might say that he submitted this because it was his especial business and training; and very likely that might weigh very much with him, but yet that could not be the whole explanation of the case. He had seen the announcement a day or two previously of the death of the greatest woman of our times—certainly the person of the largest ability; so far as his knowledge went, and eminently an artist, who had exhibited in very different shapes the highest powers of the genius of the artist—he referred to George Sand. She died at the age of seventy, and in the year 1861 she published, when she was in the ripeness and maturity of her powers, one of the most remarkable of her books. In that work occurred a passage in which she gave her view of the function of science in this world in relation to the highest culture. She said—"The man who reflects, knows well that he is weak, that he is always liable to exhaust himself by an excess of the powers with which he is endowed. It is in forgetting his own miseries that he finds a renewal or preservation of his faculties, but this salutary forgetfulness is to be found neither in idleness nor in intoxication of the emotions; it is to be found only in the study of the great book of the universe. You will see that as you grow older." As he had said, all these results of scientific training could only be expected of perfect and complete scientific training; but he would again repeat that he did not wish to throw a shadow of reflection upon less amounts of scientific training. A great deal of information might be got by listening to lectures and by an intelligent reading of books, which was endlessly better than ignorance. He would now approach the question of science in relation to schools. Having formed an ideal, and knowing what was essential to the sound teaching of science, they had to consider how far was it desirable to introduce this teaching into the schools, how far was it possible to do it, and, if possible, what were the conditions and limitations under which it could be done. With respect to the advisableness of it, he did not think, looking at the question in the abstract, he needed to enlarge upon that. He did not think anybody could be found to seriously oppose the proposition that a boy or girl should not leave school absolutely unable to understand the commonest phenomena of nature, absolutely unable to comprehend the commonest complaints of our social life. Again, he did not think any one would seriously argue that it was not advisable, if possible, that young people should get something of that sort of discipline they had been talking of. It was not well that they should go through their whole educational course without understanding that there was some authority in the world beyond books and teachers—that there were such things as facts in the world, natural facts; and that it was possible in very simple and easy ways to ascertain things for themselves. He could not but think that if young people were constantly disciplined and trained in that habit of accurate observation, learning to mistrust their immediate impressions and warned against mixing hypotheses with observation of fact, they would be better prepared to do their duty in life when they left school, than they were now. There was an infinite curiosity in man, one of those faculties that he shared with his poorer relations in the lower world—a source of sorrow and one of his highest pleasures. Whether they approved or not of it, it was perfectly certain that it existed, and the mind of a child especially was given by nature to speculate and form hypotheses of everything that came within its reach; and if they did not give it the means to form a right, it would certainly form a wrong hypothesis,