

Universities to honours taken in those subjects. Of course there was great difference of opinion when the questions were answered at all, and in several instances they were not, some were altogether opposed to interfering with the old system, others had doubts, but some on the other hand were most decided in their expression of opinions favourable to teaching science and other modern subjects in schools, and giving them proper rank in the Universities. An Oxford man said boys should be, "when of somewhat mature age, put through one or two courses of physical lectures, on the principles of mechanical and chemical science. Their minds could not fail to be enlarged by work quite new to them, and by facts which would connect their work with the world around them." As for the University, he said, "the average work done at Oxford was scarcely worth the name, and we would act wisely, both for the University and the men, were we to give a freer scope, and allow some part of the work done here to bear practically on each man's special line of life." One Cambridge man was much more critical in his remarks, and thought "it is what is usually called Physics or Experimental Science which is best suited for school work. Mechanics and hydrostatics treated experimentally, in sciences relating to heat and electricity, and chemistry." These appeared to afford an exercise of the greatest possible variety of mental powers.

Having gone first to the heads of the chief educational establishments from whom it was only natural to expect a decided opinion in favour of the old classical system, the commissioners desired to hear from men who had distinguished themselves as teachers of science, what they thought on the matter, and so they called upon a few men eminent in various sciences of observation, classification, and experiment. The first of these was Dr. Carpenter, a well known writer on Physiology, and Registrar of the London University. He dwelt upon the fact that the matriculation examination at this place included as much classics as the middle class examination of Oxford and Cambridge; but he maintained that the training of the faculties by the study of classics and mathematics alone or combined was very imperfect, and that there ought to be a change of a plan according, not only to objects in life, but to mental particularities; and he strongly advocated beginning with some science of observation very early in life, because any right system of education will take up faculties in the order of their development, and the observing faculties of the young are keen and very readily trained age makes up badly for neglect of the exercise of the faculty of observation. He had been acquainted with several gentlemen who had passed with distinction through a course of public school and university training, and who confessed to him with regret their inaptitude to understand any scientific subject whatever—their want not only of the knowledge, but of the mental aptitude, which arose from not having studied any science when young. He told a curious anecdote about teaching absolutely nothing but classics, as was formerly done at Eton. A young man had gone through the complete course there, and it was found accidentally that while he was intelligent in other respects, he had not only never learned his multiplication table but he did not know there was such a thing as a multiplication table. He was buying several pairs of silk stockings in a shop, and to find out how much he had to pay, he was adding the price of one pair to the second pair, and that to the third pair, and so on. When he found how much easier it would be to work by the multiplication table, he applied himself to master it, and learnt it off in the course of a few days with the keenest pleasure.

Sir Charles Lyell, the geologist, said that since all branches of natural science are so closely connected, if

the elements of any one are to a certain degree mastered, it will train the mind in the same way and be the same exercise as any other, and afford a very useful training which to a certain extent the study of the classics will not supply. He thought the great reason why there was no attempt to furnish science at the public schools was because it was slighted at the universities as inferior to classics. A merely elementary knowledge of chemistry and natural philosophy should be included in every matriculation examination, because it is of immense importance that these subjects should be recognized, as if there is not some idea, he would almost say some respect for these things, implanted at an early period, there is a great disadvantage in after life, and this is a reason why so few persons of rank and influence are enlightened patrons of these branches. He mentioned the false idea among those who have never been grounded in them, that they are comparatively trifling, and do not require the same searching mind and the same severe study as the classics; and he thought too that the reasoning power and the judgment are more cultivated by these subjects than by the exclusive study of the classics. He dwelt particularly on the fact that scientifically instructed men, such as surveyors and mining engineers, had to be sought in Scotland and Germany, in which last country you would find at a gymnasium or second rate school, a teacher exclusively of science. He showed that the middle classes of England (educated, not at public, but at private schools) had greater knowledge of science than the upper, and that there was a dangerous want of sympathy between the better informed working classes of manufacturing districts and the church clergymen, educated at the University, on this account.

Michael Faraday, the chemist, did not speak as an educated man, in common language, but he found it strange that the natural language accumulating for fifty years should be left untouched, and that no sufficient attempt should be made to convey it to the young mind growing up and obtaining its first views of these things. He dwelt most upon the state of mind he found in various classes—want of judgment especially—which he set down to the total absence of scientific training. Going to a stratum of life not touched by former witnesses, as officer of the Trinity House, he found it very difficult to get men of ordinary intelligence, prepared by instruction, to do any thing at all out of the way. Thus men could hardly be found fit to look after a common light-house lamp, still less an electric light; while in France, were men of less wages, able to give a reason, or supply a correction, or act for themselves, who were selected from a class that had instruction. The want of judgment in natural things he found in those learned in literature as well as the unlearned; indeed, it was the highly-educated men he found going to him again and again and asking the most simple questions in chemistry or mathematics; and when we spoke of such things as conservation of force, permanence of matter, or on the unchangability of the laws of nature, they could not comprehend them. Many of those instructed persons were as far from having the power of judgment of such thing as if their minds had never been trained. He found them greatly deficient, not in their own studies, but when taken into the natural sciences; they had no peculiar aptitude for grasping a new subject; he found the same grown-up mind going back to him with the same questions over and over again; he had told the same person a dozen years in succession that water was composed of oxygen and hydrogen. Such minds are not prepared to receive or embody these notions, and that is where you want education; to teach them the A B C of these