education of the young. In examining this question, it is very desirable that we should have a clear idea as regards two points of fundamental importance, namely, the meaning to be attached to the word "Science," and the object, or objects, which are to be aimed at by any rational form of education. Perhaps no better definition of "Science" need be sought than that which simply defines the term as including all those branches of human knowledge, the ultimate data of which are to be acquired solely through the medium of the *senses*. I am aware that this definition would exclude such so-called sciences as Psychology and Metaphysics, the ultimate data of which can only be acquired by the operation of the internal consciousness of each individual. I am aware, also, that the generalizations of all branches of science are the result of intellectual operations, and are not acquired by any study of merely sensual phenomena, however profound. Still, for our present purpose, the above definition may be taken as sufficient, since it includes all the sciences which are ever likely to be taught in schools. In other words, it includes the so-called Physical and Natural Sciences, embracing all those branches of knowledge which are concerned with the investigation of the phenomena of the inorganic and organic worlds of nature. We may stop, then, here to note that under this definition the sciences may be regarded in a two-fold aspect, whether we look at them from an educational or from any other point of view. The data of the sciences, the facts which each comprises, are learnable by the senses, and are not truly or genuinely learnable by any other medium or channel. It is true that we may learn some or all of the facts of a science out of a book, by the exercise of a mental power alone, and without ever having submitted a single one of these facts to the test of the five senses. We may do so ; but assuredly no genuine knowledge of sense was ever obtained in this way, and the sciences, if they are to be learnt or taught after this fashion, certainly present no advantages over many other studies. On the other hand, the scientific, as compared with the non-scientific knowledges, have the peculiarity that they are grounded in the sensuous and natural life of the human being. They reach the higher spiritual plane of the organism through the senses, and it is properly by "the five gateways of knowledge" that scientific truths should be imparted to the learner. Hence, the sciences present, to begin with, the inestimable advantage that they can be taught, as regards their simpler and mere fundamental data, at a time when the higher mental faculties are comparatively undeveloped and in abeyance. Indeed, from the moment that an infant opens its eyes upon the world, it commences a course of scientific education, which is carried out exclusively through the senses, and which is none the less complete because it is involuntary and unguided. Science may, and often is, so taught in later life as to deprive it of this inevitable advantage, but it remains certain that the *practical* teaching of science can be commenced at an earlier period of life than can profitably be attempted with the more ordinary branches of education—if only upon the ground that the senses attain their working powers much sooner than do the intellectual faculties. Whilst the data of the sciences are grounded in the senses, the deductions from these data are purely intellectual, and hence science, in this second aspect of its two-fold constitution, stands in precisely the same educational position as any non-scientific branch of knowledge. The *facts* of the sciences can only be discovered in the first place through the medium of the senses ; and even after they have been once discovered, and have thus become common property, they should nevertheless be handed down from individual to individual through the same channel. On the other hand, the *generalizations* of science are super-sensual, and are the result of purely intellectual operations. The observation of the celestial phenomena which constitute the ground-work of the science of astronomy can be carried out solely through the sense of sight, but no acuteness of vision, no complexity of apparatus, no repetition of investigation and research, would lead to the discovery of the law that the radius vector describes equal areas in equal times. We pass here from the region of sense into that of rational mind and intellect. The physical properties and phenomena of a thistle are presumably as well known to a donkey as they are to the highest of human beings—in so far, at any rate, as the senses of the two are equally efficient ; but the latter can draw certain deductions from the facts which he knows about the thistle, which might perhaps embrace the constitution of the solar system in their scope, and which, at any rate are entirely undreamed of in the philosophy of the former. Hence, science is in its essential condition composed of two departments—one embracing the facts of science, which are acquired by the use of the senses, the other comprising the deductions and generalizations of science which are due to the working of the intellect upon the facts previously determined by the senses. Hence also, science, from an educational point of view, must be regarded as fundamentally a quality—its data being most fitly taught to the young, in whom the senses are most active, whilst its generalizations are most suitable for later periods of life, in which the senses are not so acute, but the intellectual faculties are more highly developed. This leads us to consider next, very shortly, what are the objects which should be sought to be attained by any form of education, and we cannot hesitate in arriving at a decision on this point. All conceivable forms of education must, to be of any value at all, do one of three things, or more than one of these things combined. The conceivable advantages to be derived from any study come under one or more of the following heads: 1. *Discipline*, or the training and development of the mental faculties: 2. *Culture*, or the improvement and development of the emotions and higher faculties, together with the unfolding of the natural æsthetic capabilities of the individual : 3. *Utility*, or the acquisition of certain knowledges, which will be of actual practical value to the individual in his struggle for existence in the particular society in which his lot may be cast, and will secondarily enable him to be of use to his fellow-men. I do not propose to enter at all into a discussion of the great controversy, whether the above objects of all sound education are attained more perfectly by a scientific or a classical training, or a judicious intermingling of the two. For my present purpose, leaving other branches of education to fight their own battle, it will be sufficient to show that science fulfils at any rate two of these objects—fulfils them at least as perfectly as any more generally favoured department of knowledge. At the same time there can be no question but that an ideal education is many-sided ; and no knowledge, however profound, of a *single* subject entitles a man to the honourable designation of "educated." The learned German philologist, who did not know what potatoes were when he saw them, in spite of his enormous erudition, was no more an "educated" man, in the proper sense of the term, than is a man of science who is totally devoid of literary culture. To be altogether "*teres atque rotundus*," a man must know something of many things, and everything of something. The only real practical question lies in whether those individuals—and there are, unfortunately, many of them—who have time and opportunity for examining but one of the facets of the crystal of knowledge, should confine their attention to the scientific, or the non-scientific, branches of study. Into this question, as I have already said, I do not intend to enter ; but I shall endeavour to point out how far the sciences fulfil the three great objects of education, namely, discipline, culture, and utility, and how far they fall short of securing these objects when they are compared with other departments of study. Firstly, as regards *discipline*, I apprehend that I need say very little as to the value of scientific studies. That the study of physical and natural science is at least as efficacious in developing and training the mental powers as any other branch of human knowledge, I shall assume, I hope rightly, as being generally admitted. Witness—if witness be needed –the unchallenged position occupied by Mathematics, at once the handmaiden and the mother of so many of the sciences. There is, however, one point of view in which the disciplinary value of science is especially apparent, as depending upon the two-fold constitution of science to which I have already alluded. Other branches of knowledge develop more especially the intellectual faculties, but science, in addition, trains the senses. The labour necessary for acquiring the *facts* of science, immensely increases the power of observation, and sharpens and develops the senses : whilst the study of the generalizations of science constitutes one of the severest forms of intellectual training. It may fairly be claimed, then, that the educational discipline afforded by the study of science presents certain advantages over that afforded by all non-scientific branches of study, It cannot, however, be too strongly insisted, that in order to realize these advantages, science must be taught *practically*. It is not enough for the teacher to rely upon books, either for his own knowledge or for his teaching. He must himself have some personal knowledge of his subject, and the facts which he brings before his pupils must be illustrated by actual examples, drawn from the world around him. Any science which cannot be taught thus practically had better be omitted from school education. Every school pretending to teach science should have a small museum and laboratory attached to it. Every pupil pretending to learn science should be encouraged to collect and examine natural objects for himself ; to verify in person all the more important facts which he is asked to believe ; and to test by his faithful senses the truth of the statements which he hears from his teacher or meets with in his books. Of course, some sciences are more susceptible of this mode of treatment than others, and there is nothing invidious in saying that in this most important respect chemistry has immense advantages, as regards school education, over other branches of science. There is no excuse for not teaching chemistry practically, but there would also be little difficulty in the practical teaching of geology, physiology, zoology, or botany in schools. In any case it is not fair to judge of the value of science, as an educational agent, from its results, when