

sake of an intellectual discipline, which can be imparted in no other way, and without which a young man is sent forth, at the end of his University course, blind of one eye, halting upon one leg, maimed of one hand, imperfectly prepared for manly life. They trace the evil effects of this neglect in a multitude of delusive theories and blunders of practice detrimental to our social and political state. They submit, therefore, with considerable show of reason, that natural science is quite as necessary a portion of scholarship as the grammar and prosody of the Greek and Latin languages, and that it is the due complement of mathematical studies. For it calls into exercise the powers of observing facts, of weighing probabilities, and of reasoning by induction from particular instances to general laws, which are not sufficiently developed by geometry and algebra on the one hand, or by grammar, philology, rhetoric, and formal logic on the other, in the existing schemes of University education.

It appears to us even more urgent to grant this argument a fair hearing since the two ancient English Universities have taken such wise and liberal measures to gain a broader basis of popular support. The success of the Oxford and Cambridge local voluntary examinations all over the country, and the esteem in which the degrees and certificates are everywhere held by middle-class people, show a confiding desire on the part of these to avail themselves of the same elements of education, bearing the credentials of the same authority, which are conventionally supposed to guarantee the social superiority of the privileged, wealthy and fashionable classes. In this matter, as in other affairs of domestic life and personal habit or taste, we are happily so free from the spirit of an envious democracy, that there is rather a disposition, without prejudice to the distinctions of rank, to enable all to rise to a common ground of respectability and of mutual appreciation. But, if the highest education received by the sons of the nobility and gentry at the Universities lacks an essential portion of that which should go to the complete education of the youthful mind, we hope the Universities will hasten to repair such defect before they extend their guiding and controlling influence to the education of the whole people. They have done so much in the way of reform during the last twenty or thirty years that we may expect they will see to this. We have the example of the late Dr. Whewell, whose lecture, at the Royal Institution, "On the Influence of Scientific Discovery on Intellectual Education," is among the essays collected in this volume.

Dr. Whewell remarks, accordingly, that every great attempt ever made for the improvement of intellectual education, every advance of the standard of mental culture recognised in any age and nation, has been the effect of some considerable scientific discovery or group of discoveries in the preceding years. In support of this proposition, he observes that the dialectic method of Socrates and Plato, or which Plato employed and ascribed to Socrates, in his ethical inquiries and his disputes with the rhetorical Sophists, came into use immediately upon the discovery of a connected body of geometrical truths, from which the Greeks of that age had learned what is the genuine aspect of truth in general, and that the discovery of truth is within the reach of the human mind. The Romans, for their part, cultivated the science of jurisprudence in its most comprehensive form, the doctrine of civil rights and obligations; and their discoveries in that science, with the method of its procedure, came to have the strongest influence upon the educational systems and the habits of thought in Western Europe, from the time of the Roman Empire, through the Middle Ages, and to the present day, especially in France and Italy, Germany and Spain. But Dr. Whewell further remarks, that neither the study of geometry and mathematics, nor that of the Roman law and general jurisprudence, nor both studies together, can give the intellect all its needful discipline, because they are both deductive sciences, in which every conclusion is to be demonstrated from axioms or first principles. He even suggests that an exclusive attention to processes of deductive logic may have an injurious effect on the mind, and unfit it for the investigation of truth in subjects requiring a different mode of treatment. The remedy or preventive of this evil is to cultivate the inductive faculty by the study of one or more of the natural sciences. "The knowledge of which I speak," says Dr. Whewell, "must be a knowledge of things, and not merely of names of things; an acquaintance with the operations and productions of nature, as they appear to the eye, not merely with what has been said about them; a knowledge of the laws of nature, seen in special experiments and observations, before they are conceived in general terms; a knowledge of the types of natural forms, gathered from individual cases already made familiar. By such study of one or more departments of inductive knowledge, the mind may escape from the thralldom and illusion which reigns in the world of mere words."

Has this been done? asks the late Master of Trinity; has the plan of a liberal education been thus extended? The answer is to be found in the evidence laid before the Public School Commis-

sioners, some extracts from which are reprinted in the Appendix. We have the testimony of such witnesses as Sir John Herschel, Sir Charles Lyell, Professor Owen, Professor Faraday, Professor De Morgan, Dr. Joseph Hooker, and Dr. W. B. Carpenter, who agree in saying that, as the physical sciences and natural history have been almost entirely ignored in the teaching of the higher classes in this country, they find daily occasion to lament their deficiency of those faculties of observation and judgment which such studies are proper to exercise. In this respect it appears to Professor Owen and Sir Charles Lyell that the middle classes, who have not had the advantage of going to Eton or Harrow, to Oxford or Cambridge, are not quite so ignorant as their superiors in social rank. "If I were to select any," says Professor Owen, "it would be the governing and legislative class, which, from the opportunities I have had of hearing remarks in conversation and debate, appears to be the least aware of the extent of the many departments of natural history, of the import of its generalisations, and especially of its use in disciplining the mind." Mr. Herbert Spencer's remarks on the elements of a political education, and Dr. Hodgson's admirable sketch of the subjects of economic science, forbid us to allow that presumption.

"The Education of the Judgment," however, which is the title of Professor Faraday's discourse, includes yet more important considerations. We earnestly commend its perusal, in connection with the other lectures and addresses, which show precisely how the judgment is to be trained by means of the several branches of natural science; as, for example, by the study of physics, chemistry, vegetable and animal physiology, botany and zoology, of which respective branches Professor Tyndall, Dr. Daubney, Dr. James Paget, the late Professor Henfrey, and Professor Huxley are the masterly exponents and champions in this volume. The advice of Dr. Faraday is inspired by a quiet and homely wisdom, allied with the simplicity and humility which are the most beautiful accomplishments of the true philosophical spirit. It leads us to view this matter in the light of a moral and religious duty, as we are responsible for the use of our minds.

We have no intention here to notice another aspect of the question, with reference to the practical benefits that must result from applying scientific methods of inquiry to the study of human nature, as in the newly-discovered truths of cerebral psychology and of the conditions of social life, the phenomena of which have seldom been examined in the true spirit of scientific research. On this part of the subject Dr. Youmans, the editor of the essays, himself supplies a very instructive chapter. But the argument for scientific education purely for the sake of mental culture is enough to call for immediate attention. It is a challenge not to be shirked, and not easily to be refuted by literary antiquaries or pedants of scholastic routine. The existing fault will be admitted and amended by the consent of all but these. It seems to be high time, for much goes wrong just now for want of a check on the vagaries of an unphilosophical imagination. Dr. Faraday deploras the belief in spirit-rapping and table turning; he finds that even great mathematicians and fine classical scholars are liable in such cases to a fatal paralysis of judgment. The complaint extends to all human affairs. Everywhere is a lack of clear, definite, and consistent opinions. The imagination runs too wild: chaos is coming again. It was not so with our forefathers. The Englishmen of the eighteenth century drank harder than we, but they had more intellectual sobriety. We, too, might have learned from John Locke the duty of cherishing habits of regular thinking. Is physical science, after all, a phisic and medicine for silly and feeble minds? Then one ought not to be a fool, if one may be cured. "Keep thy heart with all diligence," is a precept enjoining some care of the understanding as well.—*Illustrated London News.*

II. Papers on Education in various countries.

1. ENGLISH LAWYERS AND THE UNIVERSITIES.

The fact that few of the present occupants of the judicial bench—and, we believe, still fewer of the recently appointed law officers—are University men, has been made the theme of remark in some quarters, and it has even been insinuated that this is a matter of reproach to them. If there be ground for reproach in any quarter, it seems to us that it is not to these gentlemen, but to the Universities, that the odium attaches. If University training be desirable in our legal functionaries—and we do not by any means dispute that—there must be some reason either why University-trained men do not succeed at the Bar, or why men who devote themselves to the law as a profession do not go to the Universities to be trained. The Universities must either not afford a training that gives special advantages to their alumni, or an equally good education can be obtained elsewhere. As able lawyers, as good Judges, are turned out