

SIR DAVID BREWSTER ON THE PURSUIT OF SCIENCE.

The winter session (1861-62) of the Edinburgh University was opened on Monday with an inaugural address by Sir David Brewster, Principal of the University. The ceremony took place in the Assembly Hall, in consequence of the limited accommodation afforded by the largest apartment in the university. The hall was crowded for some time before the proceedings commenced, chiefly by students, but also with a considerable proportion of citizens.

Sir DAVID BREWSTER'S address was of considerable length, but the following is an abstract. He said—The duty which annually devolves upon me, at the opening of the session, however agreeable in itself, presents some difficulty in its discharge. While many of you have just left the school in which you commenced your literary career, a large number have made considerable progress in their studies, and others are about to commence or continue those peculiar pursuits which may fit them for one of the learned professions, or for the more adventurous occupations of a commercial or military life. Occupying, as you do, such different positions in the curriculum of study, I might offer you a few words of counsel or of warning in reference to the branches of knowledge which you are about to cultivate; but, believing that this will be better and more appropriately done in the class-room, I shall content myself with calling your attention to some general topics which may be of use to all of you. To every class of students the most important of all acquirements is that of professional knowledge. Without this every accomplishment, however high—every intellectual gift, however valued within the social circle—even wit in its highest meaning—will be only an encumbrance in your ascent to that professional eminence to which all of you must aspire. But professional knowledge alone is not a qualification for professional distinction. Society has demanded other qualifications, which must be acquired at our university seats, and ascertained by examination. They are achieved, however, with but little labour, and serve only a temporary purpose. When the student, thus prepared, enters upon the practice of his profession he is not absolved from the prosecution of unprofessional studies. The knowledge of literature and science which he has acquired is but the foundation of that general knowledge which society expects from every educated man, and to the acquisition of which he must devote every hour of leisure which is not claimed for still higher duties. During your early and later education your attention has been directed, almost exclusively, to classical literature. You have acquired, to a considerable extent, a knowledge of the languages of Greece and Rome, and some acquaintance with the writings of their historians and orators and poets; but with the exception of a little arithmetic, a small portion of mathematics, and some elementary geography, your acquirements are chiefly of a literary nature. Such of you as have a taste and a capacity for these pursuits will, of course, prosecute them with zeal, and many of you may require in your professional calling to increase your knowledge of modern as well as of ancient languages. Placed as we are upon a globe of matter—surrounded by its elements—born of its dust—and fed and clothed by its productions, we can hardly dispense with some knowledge of its fruits and its flowers, and of the denizens of the earth, the ocean, and the air, which have been placed under our dominion. Chemistry and botany, and natural history, therefore, become the departments of study which, in their elementary form, the humblest of you in capacity may advantageously pursue. After referring to those physical sciences which are the most prolific fountains of general knowledge, Sir David continued—You cannot fail to see the importance, if not the necessity, of adding some acquaintance with these to your professional acquirements. Some of you who have the genius and taste for original research may be induced to devote yourselves to the investigation of some of the branches of science which I have mentioned, and add your names to the list of eminent members of this university who have done it honour by their writings and their discoveries. But though it can be the lot of few to attain this distinction, it is in the power of all of you, and it is the duty of all of you, to acquire that knowledge of the Creator's works without which no man is fitted even for the humblest position in the social scale. So important indeed is the knowledge for which I am pleading, that I hold it to be indispensable even in our elementary education. When the village scholar has learned to read, to write, and to count, and even when he has acquired some knowledge of ancient and modern tongues, he has obtained only the tools of instruction. He may have learned to read his Bible—the greatest of all lessons, provided he reads it; he may have committed to memory every sentence in the Decalogue; appropriated all the wisdom of Solomon, and apprehended the Divine precepts of a greater than Solomon, while he is utterly ignorant of everything above him, around him, and within him—ignorant of the form, the magnitude, and the motions of his terrestrial home, ignorant of the gigantic structures which constitute the material universe—ignorant of the wonderful mechanisms by which he thinks and breathes—ignorant of the fabrics which industry prepares for his use, and of the luxuries which commerce brings from the ends of the earth and places at his door—ignorant even of the wonderful operations of that beneficent commissariat which, while he sleeps and dreams, is elaborating the materials by which he is clothed and fed. To enlighten minds so dark, the existing system of education is utterly inefficient. The teacher, however wisely chosen, has not at his command the means of imparting knowledge. He may pour it into the ear of his pupils, or extract it from the printed page, or exhibit it in caricature in the miserable embellishments of the school-book, but unless he teaches through the eye—the great instrument of knowledge—by means of truthful pictures, instruments, and models, and by the direct exhibition of the products of nature and of art, no satisfactory instruction can be conveyed. Every school, therefore, should have a museum, however small in value and limited in extent. The liberality of the neighbourhood would add to its stores, and we have no doubt that when the value of such information

was recognised by the public the overflowing collections of our university and other public museums would gradually surrender their superfluities to our provincial or parochial institutions. The knowledge to be thus acquired at school, or in after life, if not acquired there, is of course neither extensive nor profound. It will therefore be stigmatised as a mere smattering of knowledge, and there are persons who will concur in the dictum of the poet, that "a little knowledge is a dangerous thing." There are, doubtless, certain opinions and speculations which, though things known, are not knowledge, which have no useful bearing, either moral or physical, and which foster intellectual pride, and lead to dangerous errors. There are facts, too, which, when ill observed, or ignorantly misinterpreted, may lose their intrinsic value as elements of general knowledge; but a fact in science rightly understood, however simple in its nature, and isolated in its place, is a truth upon which God has set His seal, and the possession of which places in his august presence the man who has embraced and appreciated it. He who intelligently apprehends the great truth that the sun, which greets him every morning, is a globe of light and heat which is hourly preparing the nectar and ambrosia of his food; that this sun is fixed in space, and that the earth on which he dwells is revolving with a daily and an annual motion, and is but one of eight planets controlled by the same central power, and enjoying the same benefits—the man, I say, who possesses this knowledge will be a devout astronomer, though he can neither predict celestial phenomena nor understand the theory of the planetary motions. I might appropriately call your attention to certain other studies which I would advise you to avoid and abjure. Among the advantages of a general knowledge of physical truths, one of the most important is its protective influence against credulity and superstition, and to such of you as are educating for the medical profession such a safeguard is peculiarly valuable. In the discussion of questions of a medical nature, we must not expect that kind of evidence which we demand in matters of law or of physical science. The principle of life, and the action of the mind on the bodily organs, introduce new and complex relations which expose all our reasonings to new sources of error. Hence it is, as Sir Henry Holland justly states, "that it is the want of a right understanding of medical evidence which makes the mass of mankind so prone to be deceived by impostors of every kind; whether it be the idle fashion as to particular remedies, or the worse, because wider deception of some system, professing to have attained at once what the most learned and acute observers have laboured after for ages in vain." In proof of this he states the remarkable fact (writing in 1852) "that during the last 29 years he has known the rise and decline of five or six fashions in medical doctrine or treatment, some of them affecting the name of systems, and all deriving too much support from credulity, or other causes, even among medical men themselves." I am glad to say that the teaching in our university has not been tainted by heresies like these. The eminence of our professors has been recognised in foreign lands, where the healing art is in the highest state of cultivation, and I am sure you will join me in congratulating my distinguished colleague, Professor Syme, on the intelligence of this morning that he has been nominated a Chevalier of the Legion of Honour by the Emperor of the French. The difficulties inherent in all medical questions are increased tenfold in the examination of those sciences falsely so called to which I have referred. If medical men highly educated, and occupying a distinguished social position, have been seduced from the sober paths of their profession into new and ephemeral systems, which fashion sanctions and imposture sustains, we need not wonder at the temporary success of wilder theories where the illiterate are the adepts and the ignorant are the victims. It is among the middle and upper classes chiefly that this credulity and love of the marvellous is most conspicuous. It is rank and luxuriant among the votaries of gaiety and idleness, who are incapable of continuous thought, and who have, therefore, no faith in those forces in the material world, and in those cosmic laws which are in daily operation around us. Who that is acquainted, even superficially, with the facts of electricity and magnetism, can for a moment believe that similar forces emanate from human hands, rushing through non-conducting materials, floating then even in the air, and imparting to them a knowledge of the past, the unseen, and the future? Who that confides in revealed truth, or has the least knowledge of the relations between our mental and physical nature, can allow himself to believe that impostors, male and female, can summon the dead from their graves, and marshal them under the table, to perform the paltriest tricks that would hardly amuse the inmates of the nursery or the school-room? All such beliefs are the results of an imperfect education—of the want of general knowledge. They are the observations of ill-trained faculties, the cravings of morbid and mystic temperaments, that have been suckled on the husks and garbage of literature, and reared on the rank pastures of our mushroom publications. In the past history of our race these superstitions have operated fatally on the happiness of man; and no sooner has science exploded the most rampant, than another

starts into its place. At the present moment, a very remarkable speculation is claiming the recognition of science; and so distinguished is its author, both from his scientific and social position, that it demands the most rigid scrutiny from the friends of religion and physical truth. This speculation is contained in the very able work of Mr. Darwin, entitled, "On the Origin of Species by Means of Natural Selection; or, The Preservation of Favoured Races in the Struggle for Life." In this volume, replete with facts in natural history of the most interesting kind, Mr. Darwin endeavours to prove that, as "all living things have much in common in their chemical composition, in their germinal vesicles, in their cellular structure, and in their laws of growth and reproduction," we may infer from analogy that all the organic beings which have ever lived on this earth, have descended from one primordial form into which life was first breathed by the Creator. Such of you as have observed animal and vegetable life only in the organic forms which exist in your vicinity, may well be surprised at a doctrine like this; but those who have visited our metropolitan museums, and seen the glorious forms of

life which they contain, from the mite to the elephant, from the tadpole to the whale, from the humming bird to the eagle, from the mushroom to the oak, from the trilobite of the rocks to the mammoth, and from the ape to man, will be still more startled at the conclusion, that man, brute, reptile, fish, fowl, and plant have one common ancestor. But Mr. Darwin has appealed to facts and principles in support of his theory, and therefore we must appeal to facts and principles for its refutation. He maintains:—1. That variations in species actually arise in the course of descents from a common progenitor. 2. That many of these variations are an improvement on the original stock. 3. That by a continued natural selection from among these improved specimens, occasioned by a struggle for life, the most vigorous individuals become the progenitors of the next generation. 4. That there is a power in nature everywhere effecting this selection. Naturalists of high authority have followed Mr. Darwin through all his arguments, and have shown in the clearest manner that his theory is inconsistent with the very facts upon which he has rested it. It is out of my sphere, and yours also, to discuss this question as one of natural history, but even in this aspect of it, we may allow that species do admit of great variations, and may by new methods of feeding and culture rise to a higher scale, and yet deny that there is any evidence even of one species of the same genus having passed into another, and still less that fish have passed into fowl, or birds into beasts, or quadrupeds into men. We have absolute proof, indeed, of this immutability of species, whether we search for it in historic or geological times. The cat and dog embalmed in Egypt four thousand years ago are the same as the cat and dog of the present day; and in the fossil remains of the pre-Adamite ages there is not the slightest proof of any variations in the successive inhabitants of the earth. Mr. Darwin himself admits, to use his own words, "that this is a most obvious and grave objection to his theory;" but yet he conjectures that rocks still undiscovered, and myriads of years older than the Cambrian or azoic strata, may still bear testimony to his views. When such strata with such indications are discovered—when the instinct of the elephant shall have expanded into reason, and the chatter of the parrot have its climax in speech, we may then claim kindred with the brutes that perish.