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TABLE OF CONTENTS.

On Teaching Natural Science in Schools.....	137	History.....	145
On the Ways in which Mechanical Powers &c., Are Illustrated in the Vegetable and Animal Kingdoms.....	139	Measures, Weights, and Coins.....	146
Suggestions on the Teaching of History.....	140	University Intelligence--McGill College, Montreal.....	148
Poetry: Autumn Woods.--Picture of Autumn.....	140	Official Documents: Supplementary List of Grant in Aid of the Poor School Municipalities for the year 1869.--Supplementary List of the Apportionment of the Superior Education Fund, for 1869.....	149
History of Canada.....	141	Miscellany: Education.....	149
History of England.....	142	Literature.....	150
A Geographer's View of 1869.....	143	Science.....	150
Age.....	143	Art.....	150
Official Notices: Appointments,--Erections, Annexations, Separations, &c., of School Municipalities--Notice--Diplomas Granted by Boards of Examiners.....	143	Contributions to Canadian Meteorology.....	151
Editorial Department: The Metrical System.....	145	Meteorology.....	152
		Advertisements: Wants.....	152
		The Dramatic Reader.....	152
		The Journal of Education.....	152

On Teaching Natural Science in Schools.

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WHAT ought to be the relations of Science and Literature in a liberal education, is one of the most important questions which come before those who reflect on the theory of education. It is only lately that the question has been distinctly stated. No complete answer can yet be given. It needs no proof that the present state of education into which we have drifted is not satisfactory, and among its most marked defects is the neglect of science. This is equally the opinion of the many and of the few; and lately some valuable contributions have been made to public opinion on this point by Mill, and Thirlwall, and others, to whom this neglect is a matter of astonishment and regret. I shall not attempt an essay on the relation of science and literature in human culture in general; nor the effect of scientific method on the minds of scientific men; nor can I touch on the proper position of these studies at the universities. It is with school education alone that I am concerned at present. I intend in the following pages to put forward some reflections on teaching natural science in schools that occur to me after having been occupied for eight years as a mathematical and natural science master at Rugby School. What I may have to say will not indeed come with the weight that attends the words of some previous writers on this subject, but it comes from an entirely different point of view, and from one who has

at least honestly endeavoured to form his theories by experience and reflection, and to put his theories into practice.

I shall endeavour, therefore, to state distinctly some of the reasons why it is believed that the introduction of some teaching of science into schools is so very desirable as its advocates hold it to be; to meet some of the objections that are urged against it; to make some suggestions as to the spirit and method of the teaching of science at schools, a subject on which there is much misconception; and to add some reflections on the obstacles that retard improvement in school education and the probable results of a more general cultivation of science.

Few will deny that the present results in our classical schools are not very satisfactory. The astonishing ignorance of Latin and Greek, or at least of all the finer part of this knowledge on which so much stress is laid; and the ignorance—which is less surprising, if not less lamentable—of everything else, with which so many boys leave most schools, has been dwelt on again and again. Is it remediable or is it not? Is it due to the carelessness and inability of masters; to the inherent unsuitability of the subjects taught; to neglected early education and bad preparatory schools; or to the illiterate tone of the society in which boys are brought up; to excessive novel reading and devotion to the games; or to the great fact that the majority of the species are incapable of learning much? Partly perhaps to them all; certainly to an ill-advised course of study. For at present, literature, or the studies which are subordinate to it, has almost a monopoly; and on language the great majority of boys fail in getting much hold. The exclusive study of language at schools weakens the fibre of those who have genius for it, fails to educate to the best advantage the mass who have fairly good sense but no genius for anything, and obscures and depresses the few who have special abilities in other lines; and it precludes the possibility of learning much besides. So that even at a school where classics are well taught, where the masters are able and skilful, and the boys industrious, not very much is learnt. It was said of a Scotchman who enjoyed a cheap reputation for hospitality, "that he kept an excellent table, but put a verra leetle upon it." This epitomizes the report of the Public Schools Commission: the schools are excellent, but they teach "verra leetle." And this is the less excusable because the experience of the best foreign schools is showing the advantage of