

study. A wider net is cast; fewer minds repose in unstirred apathy; more varied abilities are recognised; there is less over-estimation of special branches of knowledge; and, what is of more importance, the variety itself seems to be a stimulus.

And if the extension of the school curriculum is not absolutely forbidden by an appeal to reason or to experience, the claims of science to become recognised as a branch of liberal education are exceedingly strong. For, in the first place, most boys show a degree of interest in their scientific work which is unmistakably greater than in any other study. I am no advocate of a theory of education in which boys should learn nothing but what they show a taste for. I hold this to be a pestilent heresy. It would be worse than allowing children to eat whatever they pleased, because the mischief is more irreparable and the detection of it longer delayed. The thing that is valuable in all education is effort; and it is an advantage which science possesses that the interest that boys take in it induces them to make efforts in its study. If it were less interesting it would be right to teach it. I utterly repudiate the notion that a lecture ought to be made interesting, and merely observe that it happens to be so, and that it therefore secures an amount of attention and active thought which is very difficult to get on other subjects. The excitement, and interest, and competition in games make boys endure and enjoy an amount of fatigue and pain that they would naturally shrink from; and this fatigue and pain are the means by which they win the *corpus sanum*. The *mens sana* must be sought by similar efforts and pain; and if an interesting subject induces efforts, then, and then only, is its interest a merit. The temple of knowledge in the apologue had twelve gates, and the student had but one key given him to open them all. This master key is the power of active thought. And it is perhaps worth remarking, that since the introduction, three years ago, of a little natural science into our school course at Rugby, there has already been noticed an increase generally of what is described by different and acute observers as docility, love of work, aptitude for attention, grasp, power of seeing the point, in the average material of which our classical forms are composed. It is in fact an increase of mental activity and logical power. This is due to three causes which simultaneously began to operate,—to our system of superannuation, which prevents the existence of aged ringleaders of idleness in the forms; to the entrance examinations, by which a few very idle boys are rejected who would in former times have been admitted; but it is also commonly and reasonably attributed in a still greater degree to the study of natural science, a new and positive influence which has begun to operate.

And again, there are mental instincts just as there are bodily instincts. The bodily instincts anticipate the experience of physicians and experiments of physiologists, and are their guide to the treatment of the body; but the mental instincts, which are even more important, are nevertheless almost ignored in the art of education. One of these instincts is curiosity. It is a mental phenomenon which the skilful master studies, a power which he turns to account in the education of the boy. It is the one principle that makes self-education possible. It is a form of the love of knowledge; and when it concerns natural objects we call it curiosity, and half despise it. That it is often weak and unaccompanied with effort, I admit. But it is often altogether repressed—"little boys should not be curious:" whereas it ought to be guided, stimulated, and strengthened. The guidance of curiosity is to lead a boy to observe more, to combine, to reason. The stimulation of it is to show how much more there is still to be learnt. The strengthening of it is to make it deep and lasting; to check the mere love of novelty, the idle discursiveness that asks disconnected questions, and forgets, even if it waits for, the answer; and to refuse information till the foundation is laid on which it can securely rest. Guidance often takes the form of repression. Curiosity is the ordinary form of activity in a young mind, and it is unnatural and foolish to ignore it as we do. There is a fine passage on this subject in Goethe's "Hermann and Dorothea," which I

shall make no apology for quoting at length. If any one despises this power in a child's mind, I ask him to weigh these words. The village apothecary had been blaming the curiosity which led all the people out to see the sad procession of exiles pass near the town—

"Unverzeihlich find ich den Leichtsin: doch leicht er im Menschen;"

and to him, the wise and intelligent pastor, experienced in life and well versed in learning, replied—

"... Ich tadle nicht gerne was immer dem Menschen.

Für unschädliche Triebe die gute Mutter Natur gab;
Denn was Verstand und Vernunft nicht immer vermögen, vermag oft
Solch ein glücklicher Hang, der unwiderstehlich uns leitet.
Lockte die Neugier nicht den Menschen mit heftigen Reizen,
Sagt! erfähr er wohl je, wie schön sich die weltlichen Dinge
Gegen einander verhalten! Denn erst verlangt er das Neue,
Suchet das Nützliche dann mit unermüdetem Fleisse;
Endlich begehrt er das Gute, das ihn erhebet und werth macht."

And where this curiosity exists in boys it is almost exclusively directed towards external objects, and may be best cherished and ennobled into a genuine love of knowledge by guiding it to find some food in natural history and science. How much better and more intelligent would early training be if curiosity were looked on as the store of force, the possible love of knowledge in embryo in the boy's mind, which in its later transformations is so highly valued. "For our incitement,—I say not our reward, for knowledge is its own reward,—herbs have their healing, stones their preciousness, stars their times."

And even if scientific knowledge were not selected by a boy's natural interest and curiosity, yet let us reflect for a moment on its dignity and grandeur. This is no mean, and peddling, and quibbling knowledge, as the ignorant believe; it is the key to the possession of the loftiest ideas. We count a man educated in proportion to the exactness, width, and nobleness of his ideas. What is needed to elevate a man's intellectual nature is not that he should be an encyclopædia, but that he should have great ideas. And these must be based on knowledge. They do not, indeed, always accompany knowledge. Great ideas may be got by various studies, and all studies may be pursued by men who fail to gain great ideas. I know men with a wide and microscopic knowledge of history who know nothing of the love of freedom, of national justice, of the progress of the world, of the power of genius and will;—men who are theologians by profession, whose thoughts still revolve in the narrowest circle of earthly prejudices;—scholars indifferent alike to literature and learning. And so there are scientific men who combine poverty of intellect with width of knowledge. A botanist may be as foolish as a crest collector; a geologist, and even an astronomer, may, perhaps, be a pedant not more ennobled by the sphere of his thoughts than a cathedral spider is affected by the majesty of his abode; but I will venture to assert, that the great thoughts and principles which are to be gained only by scientific knowledge are not only intrinsically glorious and elevating, but are not inferior, whether we regard their effect on the intellect or on the imagination, to those which may be reached by other studies. And I am not speaking only of the discoverers in science. There is a special charm, indeed, and stimulating power in original research, in exploring new regions; but there are splendid ideas, magnificent points of view, which, though others have reached them before, yet to attain is a life-long pleasure. The ordinary tourist may climb to some well-worn spot in the Alps, he may ascend by the beaten track, he may even be carried there, and yet he will be richly rewarded by the view that unfolds itself before his eyes. He may not feel the glow of health, the buoyant soul of the first mountaineer that stood there; but he will see what he will remember for ever; he will get more than a new sensation, he will have enlarged his soul. So to be the first to climb, as Newton did, with solitary steps to the untrodden heights from which he gazed on the solar system spread out at his feet, can never again be given to mor-