

the steppes of Asia, and in the heart of Cathay. Voiceless, nameless, unhonored, and unsung, they went to their graves as beds, so that knowledge might be increased, and others might profit by their labours. Living in the exercise of a sublime humility, the pioneers of science, the benefactors of their race, they died to be forgotten of all men. All honor be to them ! for, so living and so dying, they have not lived in vain.

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Science Teaching in Schools.

Paper read by R. WORNELL, Esq., D. Sc., M. A., before College of Preceptors.

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Fifteen years ago, a Commission was appointed to enquire into the education given in our Public Schools, and one of the impressive points in the report of the Commission was that which exposed the almost universal neglect of Science teaching. After this report was issued, efforts were put forth on all sides to remedy the defect. The press and the profession were alike unanimous in advocating reform ; and, for a time, it seemed as if success must crown the exertions which were called forth by this educational " demonstration." Since that time much has been said—ably and forcibly said—on the advantages to be reaped from the teaching of Science. It has been shown, that it tends to develop faculties which no other educational instrument will develop, and therefore that it ought to form a part of every liberal system of education. So thoroughly has the subject been dealt with that it is by no means easy to discover a new argument to urge in its favour. Yet it seems to me that the unanimity which characterised writers on these subjects ten or fifteen years ago, has disappeared, and, what is of far greater importance, masters of schools speak with less and less confidence of their scientific work. The reason is, that masters are becoming painfully aware of the very great difficulties in the way of so teaching Science as to make it of real educational value ; and their misgiving are observed by critics who neither understand nor respect scientific thought, and who, regarding scientific instruction as a rival of the traditional means of education, are ready to seize the opportunity for speaking of it in disparaging terms.

But, I believe that the latter condition, namely, that in which we now find ourselves, is much more hopeful than the former.

If a new branch of study could be so easily introduced with a staff of teachers who had never seen it taught, and who had little or no preparation for the work, the new study would be but of little value. If Science teachers could be made in a day, they might be dispensed with, and the world would not miss them. If all men continued to laud a system of education as immatured as that which has been grafted on to the older system, what hope would there be of its ever arriving at a healthful maturity ? What we have now to do is to try to understand the present position of Science, the causes of opposition, failure, and disappointment. Then we shall be better able to remedy what is defective. Believing that this can be done only by the practical teacher, I accepted our Secretary's

invitation to introduce the subject for to-night's discussion.

In what I have to say, I shall adopt the orthodox three divisions, with an application. I shall consider—(1) The tone of the opponents of Science outside the profession ; (2) Some of the defects and some of the causes of inefficiency in Science teaching in Public Schools and their remedies ; and (3) I shall conclude that, being practical teachers in schools, you expect me to give some practical suggestions as to the manner in which, in my opinion, Science should be taught in schools.

And, finally, if time permits, I will sketch a lesson for young children.

First, with regard to external opposition to the introduction of Science. I wish to point out how rarely now anyone directly disparages the sort of discipline which it affords. Few there are now who say that men and women are properly educated who have had no training in habits of accurate observation, and whose minds have never been led to search out any of the laws which govern the phenomena of nature about them. No ! their hostility is indirect, and usually resolves itself into parading and exalting some other branch of knowledge, and instituting a comparison between it and Physical Science to the disadvantage of the latter.

A greater attention to Science is advocated, and the reply is, " Let us cultivate the imagination." As if the world could be divided into men and women who have some knowledge of Science and no imagination, and others with imagination and no knowledge of Science. As if a man could have a cultivated imagination without a knowledge of nature and her laws, or as if one could know nature and be unimaginative. Cultivate the imagination by all means. The injunction could not come with a better grace, as it could not come with a wider meaning, than from a man of science. It is one object of the training we advocate, that it extends the range of the imagination—it is a result of this training that it gives a wider sympathy—it enables one to realise more fully one's relations to others. This wider sympathy and deeper knowledge of that which is not of one's self must necessarily afford a broader basis and a deeper incentive for the exercise of the imagination. Don't for a moment let us accept it as an alternative, that we may either cultivate the imagination or teach Science. Too frequently men of Science have been drawn into discussions of such an alternative. When this is the case, there follows an unprofitable wrangle something like the following, which, I need hardly say, is an imaginary picture, a burlesque if you please. An advocate of Art presents himself and begins : " You recommend Science, I recommend Art. The question between us is, what are the relative educational values of our respective clients. The case is Art *versus* Science. The grand and sublime *versus* the small and mean. Art deals with what is ethereal and celestial ; Science with what is coarse and terrestrial. Art elevates man ; Science degrades him. Art moves him to great and noble deeds, inspires him with mighty aims and high desires ; Science fills his life with petty details, and mere matters-of-fact. Art is like a bird of the air, " with its wing on the wind, and its eye on the sun " ; Science is like a beast of the field, for ever " getting his foot in the mud and his snout in the mire."

The advocate of Science is now tempted to reply in the same tone ? " Which is the more truthful, Science or Art ? " " Science deals with what is real,—it supplies man not only with the necessities, but also the luxuries of life ; Art deals with the unreal, with shadows,