

and they have no knowledge of the first principles of reasoning. Accordingly there is a general agreement among the best teachers that quite little boys should be set to work with rule and compasses at simple problems in practical geometry, and that the illustration in any easy form of some of the first principles of logic should precede the study of propositions in geometry. Such logical outlines are given in Henrici's "Geometry of Congruent Figures," and in the textbook of the Association. These are two works fairly representative of several which are essays towards a more rational system of teaching geometry. As the whole subject of instruction in this part of mathematics is now being actively considered by those who are far better 'fitted than myself to deal with it, I may be excused from saying more about it.

As a summing up of the whole matter, algebra, geometry, trigonometry, being taken all together, let me quote the eloquent words of Professor Sylvester, giving his ideal of mathematical teaching, and then let me conclude with a few words of practical commentary. After contrasting the methods of instruction in natural and experimental science with those in mathematics, the Professor says.

"I should rejoice to see mathematics taught with that life and animation which the presence and example of her young and buoyant sister could not fail to impart—short roads preferred to long ones—Euclid honourably shelved or buried 'deeper than did ever plummet sound' out of the schoolboy's reach—morphology introduced into the elements of algebra—projection, correlation, motion accepted as aids to geometry—the mind of the student quickened and elevated and his faith awakened by early initiation into the ruling ideas of polarity, continuity, infinity, and familiarization with the doctrine of the

imaginary and inconceivable. It is this living interest in the subject which is so wanting in our traditional and mediæval modes of teaching."

To this, no doubt, many teachers will reply, "Just in so far as we move on towards this high ideal, we move farther away from the examination tests which our pupils must undergo, and for which we are bound both in honour and for our own interests to prepare them." This is a practical matter, where each must judge for himself. Speaking from my own experience, I believe teachers need not look on examinations as their masters. The first great consideration is to teach the subject thoroughly. When that is done, the adaptation of the pupil's knowledge to the limitations and rules, often very absurd, of the examination is not very difficult. For my own part, I look upon some examinations as a kind of obstacle races.

If boys are to compete in swimming with one hand tied behind, or in playing cricket with broomsticks, it is surely better to train them in normal swimming and cricket to begin with, and practise the restrictions later on. I have often found among both teachers and pupils a nervous anxiety lest something or other should be learnt "which is not wanted in the examination," however much that something might render easier the task of learning what was wanted. Even in the lowest and most material sense, it is the best, most thorough teaching which pays the best, and not that which veers about with every change in the regulations.

But there are far higher considerations than these. If mathematics has come to be almost a by-word for something dry, without human interest, without life, without soul, it is we teachers that have made it so. Studied freely and ungrudgingly, it has a music and a poetry of its own; the