

Having uttered this platitude, the old-fashioned scientist thinks he has settled the claims of science to be taught in our high schools. He would bundle it out of school, body and bones, and devote all the school time to the fine old studies—mathematics and classics. I may confess at the outset to a warm feeling for classics. Seven years' study of Latin and Greek before I saw even the outside of a university has left its influence upon me, and so I shall be sorry when the day comes—if it ever does—that these honoured studies shall be deposed from the position in which the highest culture of Europe has for ages enthroned them. There is a culture derivable from the study of language which can be obtained in no other way. Mathematics will not give that culture, and it is just as certain that science cannot. But while asserting that great benefit is obtained from study of the ancient languages, I must assert just as strongly that the study of science in our high schools is as important and necessary as that of the ancient or modern languages. Doubtless there are an appalling number of guesses registered in school note books every term. But it would be quite easy to equal them with the guesses of grown up children as to the cause of our periodic hard times. The guesses for "conclusions" are not by any means confined to children. E'en ministers they have been kenned to guess, and to reach the most preposterous conclusions from very simple data. Intelligent and successful business men have been known to do the same thing. Take for example Andrew Carnegie's book, "Triumphant Democracy." It was real last year by thousands of America's most successful business men, and was universally praised as a marvellous array of facts and figures—all testifying to the wonderful progress of the United States, in population, in agriculture, in education, in literature, in manufactures, and in trade and commerce. So far as I have seen, few indeed have questioned the accuracy of the astonishing statistics which he has compiled and strung together in a rather interesting volume. But just as

few would admit the correctness of the conclusion which this railroad millionaire teaches—that the rapidity and magnificence of the development of the United States have been entirely due to its Republican form of government. Mr. Carnegie's *guesses* are not exceptional; hundreds of instances of it could be found in the literature of every department of human activity. "Jumping at conclusions" has even become proverbial, and Macaulay's school boy is not responsible for the proverb. Business men, lawyers, doctors, clergymen, even judges, "jump at conclusions" occasionally; in fact often, and why not children? The truth is that if science were properly taught in all our schools there would be infinitely fewer "guesses for conclusions" than there are now amongst intelligent men and women. But science must be well taught; an ignorant teacher or a bungler in experimentation should never be allowed in a science room. In physics and in chemistry every pupil should experiment for himself, and should record his observations neatly and accurately in a note book. He should be encouraged to put down nothing but what he sees, and he should express it in his own language. Young students cannot be trusted at first how to make correct observations. They must be taught even this. After the experiment has been repeated by a pupil and he has written out his observations and "guesses," he must be subjected to a rigid cross-examination by his teacher to discover what knowledge he has acquired and how he has reached his conclusions. It will at first often be necessary to repeat the experiment, but the careful teacher will not consider that time thus spent is wasted. "Slow and sure" is a grand motto in all teaching. Make the pupil repeat the experiment, and then repeat the cross-examination. Don't aim at teaching theory. Theories are founded upon a study of facts. See therefore that your pupils master the facts. Some of those learned college professors with giant intellects and jaundiced faces, who now groan and lament that science is execrably taught in the high schools, will some day stumble across your patient work in the person of a brilliant pupil, and