

caricaturing his caricatures. It ended in his increasing them to that degree that the largest board could contain only a few figures of a complicated calculation.

At another time he mistook the cloth for cleaning this board, covered with chalk, for his pocket handkerchief.

The students looked to him less for mathematical instruction than for food for their mirth, and his genius was rendered unavailing by a few ungainly habits contracted in his youth "though for all things equal, for all unfit."

In the same work, Professor Arago entertains us with some reminiscences of his own youth, and enriches the record with anecdotes connected with the examiners some of whom were eminent and others not so. It was the habit of one of these latter to make himself acquainted with the answers to his own questions, while he remained ignorant of the way of working them out. This was successful for a time, but the pupils at last discerned it, and in their replies committed intentionally the most absurd blunders, finally however reaching a correct result. Professor Hassenfratz pronounced the work "good, perfectly good" and was laughed at by the pupils. This excited his ire, and he once selected an eminent culprit on whom to wreak his scientific vengeance. "Monsieur le Boullinger," commenced the Professor, "you have seen the moon." "No Sir," replied the pupil. "Now Sir you say that you have never seen the moon."—"I can only repeat my answer, No Sir." Beside himself, and seeing his prey escape him by means of this unexpected answer, he addressed himself to the inspector charged with keeping order for that day. "Mr. Inspector, there is Mr. Le Boullinger who pretends never to have seen the moon! "What would you have me to do" stoically asked this official. Repulsed on this side, the Professor once more turned to the offending pupil who remained calm and earnest in the midst of the unspeakable amusement of the whole amphitheatre, and cried out in undisguised anger, "You persist in maintaining that you have never seen the moon?"

"Sir, returned the pupil," I should deceive you if I told you that I have not heard it spoken of, but I have never seen it.

After this M. Hassenfratz was Professor in name only.

We have here two examples of failure in the work of teaching which we cannot but regard with very different sentiments since these failures arose from totally different causes. The smile excited by Ampère's natural awkwardness and want of skill in imparting information, is tempered by respect for his master knowledge of his subject.

The laugh at the other's discomfiture is one of contempt for ignorance, of satisfaction that it was exposed, and not without something of anger that it succeeded so long. Of the three requisites to form a good teacher viz. good moral character—attainments in knowledge and—skill in the art of imparting it, the second is inferior in importance only to the first.—I have the pleasure of bringing before you this evening the results of some reflection and some reading on this point not indeed as well digested as the subject deserves, but corrected by the light of my own experience, not only as a teacher but as a student. It at first suggested itself to me that if I were to take some one study in which I had ground for thinking I had succeeded best and were to give you some account of the method and the means by which I had accomplished such success, as also of the causes which prevented my effecting more—for failure is quite as instructive as success if it be rightly understood and traced to its source—I should thus put what I had to say in a more practical and profitable light. But I could not then well divest it of an egotism which in a lecturer would be equally disagreeable to you and myself. I shall therefore treat the subject in a more general manner, and as these lectures are I believe intended to lead to discussion, I shall be gratified when I have finished, by hearing some particulars of the personal experience of others, and shall not object to tell of my own.

At the same time I see in the outset an objection to this generality. There is indeed a secret affinity among all studies, but there are also wide differences in their nature, so that it is

impossible to lay down any one method by which to pursue all. For example a cursory perusal of history as preliminary to the closer study of it is advantageous. But it would not be so for a synthetical subject like geometry or for Greek. To render a lecture on the subject before us profitable to its full extent, it would therefore be positively necessary to examine into particular studies each of which might be made the matter of an essay, simply in regard to the plan on which it should be followed. Besides I am not competent to lay down rules by which every department of knowledge is to be mastered.

What I have to say will therefore have reference to such points as "What a teacher ought to study, in what spirit and with what object," rather than the methods to be adopted.

There are two motives to study—the love of learning and the necessity of acquiring knowledge, the higher of these is only a little less uncommon among men than among boys, with teachers than with their pupils. We have so much to do with books, that we are disposed when the routine of the day is over to seek the necessary recreation in some employment perhaps frivolous, or if it be intellectual, at any rate unprofitable. We are most of us confined into our teaching to the elements of knowledge. We should do well to retaliate upon the dryness of this by attacking in our leisure the higher parts of our subject. There is something in progress itself which is refreshing. It is the want of success that creates weariness. The feeling that we have gained an advantage is a relaxation. The gradual mastery of any study, first creates and then fosters a love of it. We should find our work of teaching it less irksome because of the increased ease with which we are enabled to perform it. I am satisfied that those who take the greatest pleasure in instructing the young are those who have the most extended knowledge of what they teach. Indeed, a great authority in matters of education, Dr. Arnold, was of opinion that no man was competent to teach the elements of any study until he understood the higher parts of it. Having acquired some mastery of that which we profess to teach, by devoting our energies entirely to it, by being as has been said "a whole man to one thing at a time" we should find recreation in a change of subject selecting some one which has the most intimate relation to our proper work. While engaged chiefly in this new study we should not forget to review from time to time our previous acquisitions, taking advantage of all opportunities of applying our knowledge and it appears to me that teachers have an advantage in this matter over other students. It has been said that by teaching others we learn ourselves. I am not sure that we can by the mere instruction that we give to our pupils add much to our own knowledge. This can only be done by study. But we certainly have the advantage of daily opportunities of fixing in our minds the information that we have acquired. If this be frequently reviewed it will be associated with all our other knowledge and be thoroughly engraved in the memory. If it be laid aside for a month or two, it will be almost as difficult to recover it as to acquire new truth; and will, moreover, be destitute of the interest derived from novelty. A few words as to the motive of necessity, that which actuates teachers who are content to get through their day's work by being one lesson in advance of their pupils. It is a miserable substitute for the love of study and though it may succeed for a time, must fail in the end as in the case of Professor Arago's Algebraical Lecturer. A teacher who has not a love of his work had better betake himself without loss of time to something else.

In one point of view, however, every teacher ought to be one lesson in advance of his pupils, that is to say, he ought not to present himself before them for the day's lessons without having carefully examined into them the evening before. His reliance on his general knowledge of the subject should not lead him to despise the drudgery of getting up the details of portions of it that he has set for his class lesson. There is usually a good deal of collateral information which it is his duty to explain to his young friends, and memory is often treacherous. For instance if he has to give a lesson on the Geography of Spain and suddenly finds that he is uncertain whether borax—a product of the east coast—is a veget-