

the experiment is not one which should be presented to the pupil in order to deduce from it that the earth's attraction depends, not on the nature of a body, but merely on its mass, but he should be skillfully led to suggest this experiment as a test of the truth of this proposition. In fact, it is an experiment of *verification*, not an experiment of *discovery*.

It was my intention, when I consented to address you on this subject, to present you with an outline of how actually to proceed in order to give children a systematic training in observation, selecting plants as the objects for examination. Botany has been called a science of mere names, and it must be confessed it has too often been presented as such; but, rightly treated, it offers a wide field and ample scope for observation of the forms, the positions, and the functions of the various parts of plants, of the relations of these parts to each other, and of their modifications and adaptations to varying conditions, as well as for many other observations just such as children in our primary classes are capable of making. But all, and more than all, I purposed doing, has been done, and so well done, by Miss Eliza A. Youmans, in her "First Book of Botany," that I believe it will be better to refer you direct to that work, rather than to enter on details here. If one of you will take, say, a second class through the first twenty exercises in Miss Youmans's little book, working them out conscientiously and thoroughly, I do not hesitate to predict that that class will by this means acquire more real knowledge and more intellectual power than it would acquire from all the reading, writing and ciphering done in the first four classes, if done without such a course. Furthermore, the power gained and the habits acquired in the study of plants, or even in the examination of leaves, will not be confined

solely to these, but will be directed to and exercised upon all other objects coming within the range of the children's observation; thus their general knowledge will be extended, and, as a result, your pupils will read with more intelligence and with fuller comprehension of what they are reading about. As for arithmetic—and here I can speak with some authority—you will find that you have somehow bridged over the, to many seemingly impassable, gulf between the mere art of ciphering and the application of that art to the resolution of numerical problems. Words will no longer be mere vacant forms or empty sounds, their content will be restored to them, the data of the problem will be mentally *realized*, and their inter-relations discovered and comprehended. In nine cases out of ten, it is the inability to realize the data, to project before the mind's eye a picture of the reality, that is the actual stumbling-block in the way of children who fail in the solution of arithmetical problems.

But the work had better not be done at all if it be not done *thoroughly* and *conscientiously*. All that can be done in a text-book is merely to set up numerous finger-posts to guide the student or the teacher; the scenery on the route can not be presented in all its fullness of detail, with all its play of light and shade; to behold it one must actually travel the road. In the course of teaching these twenty exercises, thousands of questions will arise of whys and wherefores, some of which you will have to put aside for the time being at least; but to others you must lead your children to find the answers for themselves. All these questions can not possibly be anticipated in any book; and it is well they can not be so, for, ever new, ever changing, they afford mental exercise to the teacher as well as the pupils, and thus prevent any danger of stagnation on either side. Let me take