

THE USE AND CARE OF APPARATUS.—Some general remarks in relation to the handling of apparatus, may not be inappropriate at the close of this chapter. The teacher should understand his subject thoroughly before he attempts to illustrate it. The object of such illustration is, to teach, to convince and to impress the subject on the mind; if the illustration is not as complete and satisfactory as the apparatus is capable of making it, failure and mortification is the result. Comprehending the subject as clearly as possible, the teacher should practice all the experiments in private, that he may be well prepared when he comes before his school or class. He should try them repeatedly, in order to be perfectly familiar with their operation, and in order to acquire accurate, delicate, and successful manipulation. When about to use the apparatus, it should be thoroughly examined and freed from dust or specks, which it may have contracted since it was last used. When in use, it should be carefully treated and not entrusted to the indiscreet working of thoughtless, careless children. Children should not be permitted to handle, or even to touch any article, except by the express permission of the teacher. Not even a black-board, to say nothing of anything else more liable to accident, injury, and abuse, should be used by the scholars, unless under the eye of the teacher.

Sometimes a teacher may find a portion of his apparatus not in complete working order. Something in the complicated machinery, very trifling, perhaps is wrong. A little care, a little management and study, and a little patience (always a cardinal virtue in a teacher,) will, in most cases, make all right; if not, no bungling careless hand should be permitted to attempt its repair, but it should be put carefully by, that a proper person may be employed to investigate the mischief and apply the remedy.

For the greater security of the property of the school, the article of agreement between the teacher and the board should be so written, as to make the teacher individually responsible for all damage to school furniture, windows, apparatus, &c., caused by his own misuse, carelessness, or neglect. Such a specification would insure interest and attention in those matters, which are so often neglected, because the teacher would have a pecuniary interest in their preservation. No teacher should be employed who would not willingly assume such an obligation.

After the apparatus has been used, it should be carefully examined and immediately put in the case. Every particle of dust, dirt, soot, oil or water which may disfigure, corrode or injure the instrument should be removed. Everything should be put by in complete order; and if thus treated, and occasionally examined when not in use, a case of apparatus will last a long time, and preserve all its excellence and much of its original lustre and beauty.

(To be continued.)

EDUCATIONAL TOOLS AND INSTRUMENTS;

OR, THE TRUE USE OF TEXT-BOOKS.

(An essay read before the Illinois State Teachers' Association, held in Chicago, December, 1886, by Chauncey Nye.)

No set of tools will supply the place of tact in the method of use; but tact will sometimes compensate for deficiencies in implements. One Bull will play a good tune on a poor violin, and he will play a better one on a good instrument. The music, then, is really in the man; and the superiority of better instrument is valuable only as aid. By whatever means and in whatever way he applies himself, it is music still.

In *teaching*, if the thing exists in the *man*, it will usually be found in the *subject* and in the *occasion*. Formality and rule, beyond what is required for harmonious operation, only render the routine of school duties still more monotonous. In the use of text-books there is a right and a wrong way; but in particular instances the teacher is to judge which is the right and which the wrong. Out of the one grows the development of many good habits; out of the other that of as many bad ones.

Every thing that we are in duty bound to teach is not found in books. These pertain mostly to the training of the intellectual faculties and the powers of mechanical execution. A large part of the matter for thought which the pupil tries his powers upon is contained in them. The philosophy is found here. They also supply in all cases most of the information that the scholar gets, and in too many the whole. To one class of teachers they are the nucleus about which every thing is gathered that can be which will interest and inform the pupils; to the other they are all that can be presented upon the subject. To the one the book is a way of doing a thing; to the other it is the way of doing it. To the one it is an aid, to the other a necessity.

Every object and principle in nature or science affects the mind with an intensity proportionate to the acuteness of perception. Principles, clearly seen in their origin, and understood in their relations, are the mind's charmers, the excitants of enthusiasm. We are not to suppose that the vibrations which entered the of Mozart or Beethoven nor that

the tints which Michael Angelo Raphael saw were more brilliant than any others. Those understood the relations of sounds; these are the relations of light and shade. And each glowed with a growing fervor and a growing zeal as the premises of his art became more familiar and distinctions more delicate. Hence, the necessity of a well-defined knowledge of first principles and definitions seems to spring out of the *nature of mind*. This is the threshold at which many a tyro has stumbled, and ever after been unable to gain a firm stand-point. The first use of the text-book, then, is to make it define its position.

In study, *time* can not fully compensate for vigorous application. A subject may be mastered in one hour, or by moderate effort it may be mastered with equal thoroughness in two hours. Now it may be that the benefit derived from the performance of a given task does not vary inversely as the time expended, but certain is it that he who takes hold of a subject with all the mental manliness that he has secures to himself an efficiency which less energetic exertion never reaches. The majority of mind with which we meet in public schools is scarce capable of close application. It is governed by impulse. The merest accident snatches off the attention in the midst of a demonstration, and the boy's course of reasoning falls, like his block-house, into ruins. Again! If the pupil has a will to resist every foreign influence, is it then sure that he will make the best of his time? Let the number of studies be sufficient to fill up the whole of the time with vigorous effect, and will there not be danger of frequent and hurried interchanging, and consequently of partial distraction? And if this be the case, is it not enough to put the book into the pupil's hand and hear him recite at the appointed time? The recitation-hour affords opportunity to awaken an interest in the coming lesson and point out the best method to be pursued in preparation. But in schools where the exercise is necessarily short, if the scholar constantly has his book at hand, can sufficient attention be given to the cultivation of *speed* in mental operations? How would the advantages and disadvantages of allowing the pupil to have his books but for a stated time compare with the course usually pursued? *Previous preparation* should be such as to render text-books unnecessary at the time of recitation, unless it be an exercise similar to that of reading or spelling. In most cases where the text-book is closely followed, it is probably the best that can be done under the circumstances. No teacher who clearly understands the subject in hand will be willing to be encumbered by it. If the pupil has mastered preceding lessons and studied faithfully the one before him—if the teacher has mastered the whole—if books of reference have been consulted and a plan of operation determined upon, it makes but little difference with the teacher who is a teacher whether the text is used or not.

A principle is a veritable thing, having a beginning and an end, various in its capability of application, but always the same. To make it plain, comprehension must encompass it. It must be kept before the mind till its parts are located and its most important relations are traced out. It must be studied *as a subject*, and not as a number of pages of the text. It must be varied, and looked at from more than one position. We define *words* by means of synonymous expressions. The word itself is no available definition of itself. And thus the text-book, which is, or ought to be, only a compend of the science, can not through its own explanations become really clear to the pupil.

The *practical* application of what is learned is a matter replete with importance in this utilitarian age and country. The pupil of a formal book-knowledge may be thorough in his way, and yet detect no connection between what he studies and what he hears, sees and does. Many a young geographer who can answer the questions promptly would find himself at his wit's end if asked whether he ever saw the earth or not. The boy who at length found one question in the lesson that he could answer, and whose eye brightened as he declared that Connecticut River was behind the barn, had a more *practical* knowledge of the subject than some of his class-mates, who laughed at him, and who could give a description of the river, word for word. The same can not be said, however, of the girl who was sure that Turkey was at home, in the yard, with the rest of the poultry. There was also an exhibition of philosophy, quite as satisfactory as is found in many other instances where more book-phrases are used, when the pupil said that he wrought this example thus and so to "fetch it."

To be able to hold the attention of the class is the right arm of the teacher's power. To pretend to instruct without this is mockery. The true teacher, with a subject so clear as not to deaden the natural intonations of voice and the magic eloquence of the eye, will easily secure and retain the attention; but, whatever be the ability brought to the task, unless the subject *be clear*, and independently handled, interest will flag. The questions, which in the mind of the pupil are frequently the only things that have any connection with the answers, become monotonous, and as potent in soporific influence as the "ninthly" and "tenthly" of a dog-day sermon.

Let, then, the premises be made clear; let the circumstances be such as to produce vigorous study; let there be no necessity for the text-book at the time of recitation; let illustration and language be varied by the use of synonyms; let it be required to go over the book