

delibly impressed upon the mind. The slightest error causes the repetition of the exercise.

3. Should a teacher break in upon a recitation to attend to matters of discipline?

Not if he can avoid it. A teacher with tact will be able to quell the ordinary little attempts at mischief-making by a look or a simple movement of the head or hand. Even a pupil's name may be spoken between the sentences of an explanation without attracting the attention of a single pupil but the one addressed, if the name be uttered in the natural tone of voice. Idleness or wrongdoing should always be checked, if possible, without any scholars but the offender knowing anything about the matter. It is often advisable, when the teacher cannot catch the eye of the little culprit, to allow the matter to pass until recess, or some other time, when the pupil can be spoken to quietly and alone. Nothing gives a boy a surer conviction of the superiority of his teacher than the knowledge that his teacher saw him engaged at something which he fancied he was doing so cleverly and slyly as to avoid detection. It is a good rule not to interrupt a recitation to quell disorder, if the teacher's interruption will cause more loss of time and distraction of attention than the pupil's disorder would have done.

4. Should a teacher explain the principles of "carrying" and "borrowing," in addition and subtraction?

Yes. It is a pity that any child should ever learn any part of arithmetic by symbols before it has performed the operation with real things. If children were allowed to do their arithmetic with objects of some kind before they were required to perform operations with mere marks, they would not require much explanation in order to make them understand the subject..

METHOD.

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II.

We endeavored to show in a previous article that children should be taught through objects and individual examples. Young children are not accustomed to the higher processes of thought, and hence they cannot understand that knowledge which has been thus elaborated and which is expressed in general terms. They may indeed commit to memory the verbal expression of principles and recite it glibly enough; but they have gained words only, and the recitation is mere sound—*vox et preterea nihil*. The exercise is often worse than useless, as the children acquire the habit of getting words without looking for ideas.

We propose by means of two or three illustrations to show how arithmetic may be taught to beginners in accordance with the principles enunciated.

NOTATION.—We should assume that the children can count—that they understand what is meant by the words *eight, fifteen, twenty-four, &c., &c.* They have learned the meaning of these words in the natural way, from objects, getting the idea first and then the term. We wish to teach them notation—how to write numbers.

For each number under ten we have a distinct character; hence the decimal system of notation does not appear in the writing of these numbers. Each figure must be learned independently. In teaching to write numbers under ten we may place on the black-board lines, words, and figures as below:

1	11	111	1111	11111	111111	1111111	11111111	111111111
one	two	three	four	five	six	seven	eight	nine
1	2	3	4	5	6	7	8	9

The children become familiar with these figures by writing them on their slates.

As we have no new significant characters for higher numbers, we must show how the value of a figure is affected by its position. As a preparatory step we shall lead the children to think numbers above ten as combinations of ten with other numbers. The words used to designate the numbers above ten will aid us in developing this idea. Take a number of objects, as pencils—count, say to fourteen. Separate them into two parcels, four and ten. Bring from the children the statement of the numbers, *four, ten*. Tell them that *teen* is another form for ten, and hence we say *fourteen*. Proceed in like manner with *fifteen, sixteen, &c.*

Returning now to the fourteen, tie up the parcel of ten into a bundle, so as to give the idea of unity. It is one bundle which we call *ten, one ten*. Holding up the four loose pencils, ask how many, and call upon some child to place the figure 4 on the black-board. Then, as the ten pencils form a bundle, one bundle, have the figure 1 placed on the board. A difficulty now appears. How shall it be known whether this figure means one pencil or one bundle of ten? Draw vertical lines on the board, making two columns, and write at the top the headings, *units, tens*. Now write the figures 4 and 1 in their appropriate places, thus:

tens.	units.
1	4

State to the children that the right hand column is for the *units*, or united pencils, and the second column for the bundles or *tens*. They then read the number written, *four-ten—fourteen*.

In the same manner teach to write the other numbers between ten and twenty. In writing ten show that we have one bundle and nothing over, and give the character 0 to indicate the absence of units. Finally remove the vertical lines and the headings, leaving the children to determine the value of the figures from their position.

The method thus briefly indicated can easily be extended to higher numbers. Twenty-five, for instance, can be shown to contain two tens and five units. Make two bundles of ten each, place the figure 5 in the place of units and the figure 2 in the place of tens.

HOW TO TEACH MENSURATION.

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SUPERFICIES.—The Square, Rectangle, Parallelogram, Right-angled triangle, Triangle, Trapezoid, Circle, Sector of a Circle, Segment of a Circle.

SOLIDS.—Cube, Prism, Pyramid, Cone, Frustum of Cone, Cylinder, Sphere, Spherical Sector of Sphere, and Segment of Sphere.

In order that Mensuration may be studied at all a knowledge of Arithmetic is required, and if studied to any extent, a knowledge of at least Euclid and Algebra are indispensable.

There are five methods of teaching the subject. (1.) By mechanical proofs. (2.) By geometrical proofs. (3.) By mechanical and geometrical proofs combined. (4.) By the worst of all, and one too frequently used, that of teaching by rule without giving any reason whatever for the process. (5.) By rule and mechanical proofs.

The fifth method I would recommend for pupils who have never studied Euclid, and the third for those who have studied it.

There are three units of measurement (1.) The lineal unit for measuring distance. (2.) The square unit for measuring the area of a surface. (3.) The cubic unit for measuring the volume of solids. Each of these should be thoroughly explained by the teacher and understood by the pupils as soon as it is required.

Commence by explaining the lineal unit, (inch, foot, yard, rod or