

Primary Department.

METHODS IN ARITHMETIC.

(Continued from last week).

ARNOLD ALCOTT.

In my last paper Long Division was outlined as it would be introduced to beginners in technical Division. Now, let none of my readers mistake the assertion which was made, viz., that Long Division was introduced as preparatory to Short Division. It is not the intention to perfect pupils in Long Division at once, so that they may be able to use any divisor, but merely to introduce them to the different processes in a more gradual way than is afforded by Short Division. Practice with such divisors as 102536, 1034 down to 105, 102 etc., will be quite sufficient preparation for Short Division.

SHORT DIVISION—SLATE WORK.

1.—Divide first by 2 and give only even numbers, so as to have no remainder. The teacher puts a row of figures across the board thus,

246, 486, 624, 688, 246

and pupils divide as fast as possible. This is followed by slate problems of a similar character.

Get pupils perfected in *working fast*. All processes in arithmetic may be divided into two parts, *thought* and *work*.

It is obvious that many of us can think ahead of our power to work; for, we can solve many abstruse problems, but how many of us teachers can add, subtract, multiply and divide "faster than lightning," as the boys say.

Let us spur on our work processes, and get our pupils to travel fast with their fingers, in such work as the four simple rules.

2.—*Rapidity* having been gained, we can proceed in a similar way with 3 as divisor, using only the figures 3, 6, 9 in the dividend.

3.—Time-tests with about eighteen figures across the slate are good for developing rapidity.

4.—Of course the next difficulty will be when the divisor is not contained an exact number of times in any digit of the dividend, as $2 \overline{)32}$. Explain this by the bundle idea with which you first taught notation and numeration. Pupils know that 2 goes into 3 once, and the bundle idea shows them that one over is one bundle, or ten of the next lower denomination

$2 \overline{)32}$ $2 \overline{)111}$

5.—As was said in previous numbers on Methods in Arithmetic, so again, do not allow the carrying figures, the divisor or the multiplier to be put down.

6.—While watching my class working time-tests the other day, I noticed one nervous little fellow who was working tolerably fast for so young a boy, putting his pencil in his mouth quite frequently. By the way, have you ever done it yourself?

Of course we showed him that he lost time and that it was of no use to him to wet his pencil. Do not allow any of your pupils to do like this little one of mine.

7.—Get your pupils to do their work in

numbers with the brain, and not with the lips and fingers. The latter should be a machine for registering the results, but should not assist in obtaining results. Lastly, and I think I have said it several times in previous articles, do not forget that *time-tests are the best means of developing rapidity in the work processes in arithmetic*.

Time-tests may be of two kinds:—

(a) We limit the time and give our pupils a certain amount of work, which must be finished in that time. Time limited and work limited.

(b) We limit the time but give our pupils a chance to do as much as they possibly can do in that time. Time limited, work unlimited.

The latter it seems to me is the better, from an ethical point of view.

Let me illustrate:—

The former (a) includes in Addition a question of say 60 figures, 5 across, and 12 lines down, time one minute, or one and a half minutes according to grade of class.

It also includes what might be called Continuous Division. Thus, divide by 2

846973
423486—1
211743
105871—1

And so on to zero. Do not have lines drawn between, or the divisor put down. Subtraction tests may be given by taking a number such as, 846986, and telling pupils to subtract 2 every time. Thus:

846986
624764
402542
380320
158098
35876

We may leave the digit on the left hand side when it is smaller, as in the last case, and go on as before.

The latter (b) includes Continuous Multiplication of which we have already spoken in previous articles. In Addition, work may be unlimited, but time limited by telling pupils to start with a number say 3 and add 4 continuously thus,

3
7
11
15
19, etc.

This may be taken orally as well, and it is a panacea for sluggishness, dullness, etc., in a class. It is one of the best of cures. Five minutes of this work is sufficient to enliven a class to your satisfaction.

Let me show how to apply the terms divisor, dividend, etc., etc.

These have been learned incidentally of course, and may be reviewed thus, Pupils have worked this question.

102635) 5569936874 (54321 times
512680

78,818 over.

Now write a statement as follows:—
This is a question in Long Division.

102,536 is the Divisor.
..... is the Dividend.
54,321 is the Quotient, and
78,818 is the remainder.

I shall conclude my articles for the present on Methods in Arithmetic, unless some one wishes further papers on other parts of our number work, or wishes to ask pertinent questions bearing on the information already given.

SINGING SOFTLY.

RHODA LEE.

SINGING is not always music. The experienced teacher, will, I presume, agree to this statement. The word music suggests at once a sweet, soft, melodious harmony that is not at all times found in the public schools of our land. Music and nothing but real music is found in a great many of our schools we can thankfully say, and yet on the whole there is room for improvement. Thinking over the subject of primary singing I felt that there was no feature of it that required more attention than the quality of softness in tone. An eminent teacher of music stated once that, although she had little or no knowledge of music as a science, yet she was confident that she had never spoilt a voice. On being questioned as to her methods, she replied that she had one ever-present rule which was, "*Sing easily and softly*." That seems to me to supply the key to the successful teaching of music.

Of course the only rational way of teaching music to children is by the method now so well-known and tried—the Tonic-Sol-fa—which, through the manuals prepared by Mr. Cringan and others, is at this time within reach of every one.

We cannot give any great amount of voice-training in our schools, but we can prevent voice destruction and that by means of soft singing. How wonderfully those harsh voices and rasping tones can be softened and sweetened! Yes, until they produce nothing but the most perfect harmony. Some of the sweetest class singing I ever heard was from thirty or forty rough, poorly-clad boys, who loved singing with all the intensity of their natures and had the advantage of training from a skilled teacher of music. Their power of imitation was of considerable assistance, I imagine. The voices of little children properly trained and with good home surroundings are naturally gentle and sweet, and it is only when they hear harsh, loud, and disagreeable tones on the street and elsewhere that we find that element creeping into their voices also. This is what we try to overcome in the school life, and we can best do it by imitative exercises in both speaking and singing voice. Call it the mocking-bird game or anything else you please; it will delight your scholars and work wonders in their speech.

A great deal of our training for singing is given in connection with that of the speaking voice. The training is embraced in the following seven points; 1. Proper position of the body. (*Hands resting easily*