20   5. Draw a map of the coast of Asia from Behring's Straits to Cape Comorin, showing all the important physical features with their names neatly printed upon them.

16   6. Locate the following: Obi, Papua, Zambezi, Tunis, Moron, Cyprus; Venice, Lyons, Copenhagen, Borneo, Cheviot Hills, Crimea, Quito, Port-au-Prince, Trinidad and Loffoden.

PRACTICAL HINTS ON TEACHING.

LONG MULTIPLICATION WORKED WITH A SINGLE LINE OF FIGURES.

To the Editor of the Educational Times.

SIR,—If the following brief method of working Long Multiplication should prove to be new, I hope you may think it worth publishing:—

Suppose we wish to multiply 56248 by 8726. We set the sum in the usual way, thus:—

$$56248$$
$$8726$$

We then write out the upper line, *backwards*, on the lower edge of a separate slip of paper, placing a mark over the unit-digit, as a guide to the eye: with this slip we cover the upper line of the given sum, bringing the marked digit over the unit of the lower line, thus:

$$\overline{8}4265$$
$$8726$$

We then take the product of the digits which are in the same vertical line (viz., 8, 6); this gives us 48; we write the unit of this (viz., 8) vertically under the scored digit, and " carry " the 4, thus:

$$\overline{8}4265$$
$$8726$$
$$8$$

We then shift the slip one place to the left, thus:—

$$\overline{8}4265$$
$$3\overline{7}26$$
$$8$$

We then add together the carried digit and the products of the digits which are in the same vertical lines, and write the result as before. The mental process being, " 4+24 = 28, +16 = 44; set down 4 and carry 4."

$$\overline{8}4265$$
$$5726$$
$$48$$

We then shift the slip again, and proceed as before; the mental process being, " 4+12 = 16; +8 = 24; +56 = 80; set down 0 and carry 8."

$$\overline{8}4265$$
$$8726$$
$$048$$

We then shift the slip again, and so on; the last step being reached when the sum stands thus, with 5 to carry:

$$\overline{8}4265$$
$$8726$$
$$9580048$$

Hence the mental process of the last step is, " 5+15 = 20.; set it down." We then remove the slip, and the result appears thus:—

$$56248$$
$$8726$$
$$209580048$$

A similar method will serve for multiplying decimals; all we have to remember is, to bring the marked digit of the slip vertically over whatsoever decimal place we wish to carry the working to. For example. if we wish to multiply together ·68624 and ·25878; and if, in order to have the answer correct to 8 places, we wish to carry the working to 4 places, we set the example thus:—

$$0·68624$$
$$0·25878$$

We then write 42686̄0 on a separate slip of paper, and place it so that its marked digit comes vertically over the 4th decimal place in the answer, thus:—

$$42·6̄ \ 60$$
$$0·25878$$

The mental process of the first step will be, " 0+48 = 48; +15 = 63; +12 = 75; set down 5 and carry 7."

$$42·6̄8̄6̄0̄$$
$$0·25878$$
$$5$$

We then shift the slip to the left and proceed as before, the last step being reached when the sum stands thus, with 1 to carry:—

$$42686·0$$
$$0·25875$$
$$685$$

Hence the mental process of the last step is "1+0=1; set it down." We then remove the slip, and the result appears thus:—

$$0·57624$$
$$0·25878$$
$$·1685$$

Hence the answer, correct to 8 places, will be ·164.

This method seems to me not only to save space and time, but also to avoid the risk of mistakes involved in writing all the intermediate lines of figures required in the old method, as well

as the constant risk of losing one's place while carrying the eye obliquely from one figure to another figure several rows above it.

Your obedient servant,
CHARLES L. DOBSON,
Senior Student and Mathematical Lecturer
of Christ Church, Oxford.

ON SCHOOL METHODS.

In his outlines of a course of lectures on the "Science and Art of Teaching," Professor W. H. Payne, professor elect to the new Chair of Education lately established in the Michigan University, gives the following :

"One grand purpose of primary instruction should be to teach the art of interpreting language and expressing thought."

The type of school work is the acquisition of accumulated knowledge rather than that of original knowledge ; the use of books rather than attempts at discovery.

As the typical work of schools is the imparting of accumulated knowledge, the teacher's typical method should be the method of instruction as distinguished from the method of discovery: 1. The method of instruction applies when knowledge has already been acquired and expressed in the form of general laws, rules, principles, or truths. 2. The method of discovery is employed in the acquisition of knowledge, and really consists in those processes of inference and deduction by which general truths are ascertained from the collection and examination of particular facts. [Jevons.] 3. The method of instruction employs language as its chief agent, and has for its chief purpose to put the pupil in possession of desirable portions of knowledge already acquired and systematized. 4. The method of discovery repeats in brief, the process by which knowledge was originally acquired ; it is inductive in its procedure, and its purpose is to attain truth by rediscovery. 5. The method of instruction regards accumulated knowledge as so much assured capital that is to be transmitted to a new generation of learners without the cost of rediscovery. The learner is to accept the greater part of this on trust ; only a limited part can be verified by personal experience. 6. The method of discovery assumes that the only *real* knowledge is that which is gained *de novo*, by personal experience ; and would have each child repeat in brief the history of the race.

The method of discovery has necessary limitations that unfit it for the general purpose of education : 1. If it be applied systematically and thoroughly, it would limit the child's acquisitions to a very few of the most elementary notions. It would require several years' exclusive study by the method of discovery to attain a knowledge of chemistry that could be secured by the ordinary method of instruction within a few weeks. 2. The method of discovery is wholly inapplicable to history, applicable only to a very limited extent to geography, and, in actual practice, only partially applicable to mathematics and natural sciences.

While the typical method is the method of instruction, the method of discovery should be employed for purposes of illustration : 1. The method of discovery, by appealing directly to the senses, excites interest and enlists attention. It is therefore useful in introducing pupils to a new science ; and, to all stages, in sustaining interest and attention. 2. The less the skill in interpreting language, and the weaker the power of reflection, the more necessary becomes the method of discovery.

The method of instruction sets out with a definition, a classification, a general law, an abstract truth, or a proposition, and then proceeds by way of explication—division : 1. " In ' Plato's Republic ' (one of the noblest examples of method), successive definitions of justice are brought to the test and rejected ; and the division preponderates, in the enumeration of the powers of the human soul, and of the classes in a state that answers to them.—*Thompson*. 2. The method of instruction is the classical method, the one employed by the great teachers of all ages for conveying ascertained truth. It is the only royal road to knowledge."

GOING TO SCHOOL.

If you are bound for a college, it will do you good to know, in advance, the best thing the best university can do for you. Probably any bright boy or girl, under private instruction, could obtain