four, and eighty-six million two hundred and seven thousand five hundred and four tenths of billionths ; by the d. m., thirty-nine, dot, three, seven, naught, seven, nine, and 80504, dot, 0, 0, 8, 6, 2, 0, 7, 5, 0, 4. It will be noticed that the d. f. m. *virtually* requires double pointing off (for the numerator and for the denominator), and in writing a decimal read thus few pupils without much practice can write directly from left to right, but after writing the integral part will proceed to the numerator, leaving at random a space to be filled in, and, having finished this part, will point it off to obtain the requisite number of 0's between the first significant digit and the decimal point. Neither method, but especially the d. f. m., will readily give to a listener one hundredth as an approximate value of the latter of the above decimals. I suggest to the teachers of Canada a third method, adopted by many "continental" mathematicians, and by several of the more accurate English ones. It has none of the disadvantages of the other methods, and adds this, that it follows the rule for integers, thus preserving the analogy in the notation. To read ANY number—*Beginning at the decimal point, mark off the number both ways into periods of three figures each* (six for the English method), *and then read each period in succession from the left and give it its name.* Ex. 80,504·008,620,750,4, read 80 thousand 504 (units), 8 thousandths, 620 millionths, 750 billionths, and 4 tenbillionths ; 5,602,402·000,000,047,835,04, read 5 million, 602 thousand, 402 (units), 47 billionths, 835 trillionths, and 4 hundred trillionths. The first decimal period read will give an approximate value of the decimal.

Two other changes in elementary arithmetic I suggest—first, in the table of avoirdupois weight ; second, in the process for extracting the cube root of a number. How many business men in Canada use 25 lbs. 1 qr., 4 qrs. 1 cwt., compared to those who use 100 lbs. 1 cwt. ? The great argument for the change from the old standard in the weight of the cwt. was the adapting of the system of our weights to that of our money. By the table in our arithmetics we lose this advantage. Let any teacher try a class of beginners in the compound rules with the two tables and no further argument will be needed for the change.

In extracting the cube root it is time that Horner's method were adopted in elementary arithmetics. By it, the process for the cube root is but slightly more difficult than that for the square root, and that, too, up to any number of root digits. It is actually no labour to extract a cube root to from ten to fifteen root digits. With my own classes I use the *uncontracted* method, for on the very same principle ANY ROOT can be extracted and ANY NUMERICAL EQUATION solved ; but if mere speed and compactness of work be desired, a contracted method should be used.—*J. C. Glashan.*

2. MENTAL ARITHMETIC.

To the Editor of the Journal of Education.

SIR,—Perhaps we might say and boast honestly that apart from the unrivalled working of the great system of Common School Instruction in this Province, there is no other country that can produce a better catalogue of text-books more suitably adopted to the practical demands of any business community, and few countries can show a more able class of teachers to explain the elementary principles therein contained. Still, I fear that subject, to a business man, is more immediately demanded than any other, does not receive the tithe part of attention to which its importance would entitle it. I refer to Mental Arithmetic. "Oh, we have it," may be the instant exclamation. That we have it, I can not deny, *i.e.*, most Arithmetics give a few suggestions, guiding us to the easiest and most rapid methods of mental calculation, and some advance strong reasons for proficient attainment in it. Nor do I wish to infer that it receives no attention. On the contrary, I am persuaded that a good number of teachers give their pupils the most thorough drilling in oral calculation, while others again, I am convinced, do not submit a mental solution to their schools from one end of the year to the other.

The general excuse appears to be the non-existence of a suitable text-book wholly devoted to the subject. But whether it cannot be successfully taught without a special book, or whether the teacher is responsible for its omission, I will not venture to say. If, however, the presence of a book is absolutely esssential, I should recommend its appearance as early as possible.

Others, again, consider it a very inferior acquisition, and draw the inference, that a rapid calculator, like a fancy penman, is generally limited to the attainment. But I consider this no reason whatever why it should not be taught to everyone—and all are capable of receiving a vast amount of benefit from it, if they only get the proper instruction. I do not apprehend that the mere fact of making a boy an adept in figures, would be the means of deterring him from prosecuting his other studies. He might, it is true, entertain a little vanity, but his teacher could relieve him of that encumbrance very easily.

I think that one-half of the time at least, that is devoted to arithmetic, should be employed at oral solutions. Few teachers will, perhaps, conform to this opinion, and may desire to be informed, whether the slate and pencil are to be dispensed with altogether. To such enquirers, I should say that every problem within the limits of mental solution, should be treated by the analytical system, if possible, even if the teacher should find it necessary to submit a few preparatory exercises that would convey hints, or throw light on the main question. If this plan were universally adopted, I have no hesitation in saying that the slate and pencil, instead of being clung to so tenaciously, would soon be thrown aside entirely, or at any rate, would not be required in ordinary business.

If, however, it is expected that a boy will always have a slate dangling from his neck, and a pencil attached to it with a string—in that case the necessity of it receiving so much attention would not strike us so forcibly if we expect the great amount of precious time that would otherwise be saved, and the useless labor of making all the figures he would employ.

Surely we can conceive of nothing more humiliating to a man of pretended literary attainments, than the exposure to which he is sometimes subjected, by resorting to figures for simple solutions, that some men of no education whatever, could tell to a fraction mentally, and in a very short time. In fact it is not usual to see men of good mathematical abilities placed in situations far from enviable—men who could demonstrate some of the most abstruse principles of algebra or geometry, yet ask them to multiply a number of three, or it may be only two digits by thirteen, and their heretofore confident features become covered with the most abject confusion. And all this chagrin and mortification is caused by the omission of a subject that is easily acquired, a very pleasant and interesting exercise, and a subject calculated as much as any other that is taught in our schools to develop the intellectual faculties of the young.

J. P. T.

Reach, Sept. 27, 1870.

3. THE PRINCIPLES AND PRACTICE OF EDUCATION ;

OR, THE SCIENCE AND ART OF TEACHING.

BY GEORGE VICTOR LE VAUX, F.C.T.

(Continued from last No.)

POWERS, DUTIES, AND RESPONSIBILITIES OF THE TEACHER—THE TEACHER'S RESPONSIBILITY.

In all the avocations of life there is no position in which the responsibilities are so great, nor is there any in which so much real permanent good or enduring evil can be done, as in that of the teacher. It is an old and true saying that "Example is better than precept." They labor in vain, who teach by precept and not by example. Vain and fruitless will be the efforts of him who fails to vary his teachings by example. In our opinion, example should always precede precept. The precept should be the expression of the example, as a rule is the expression of the principle. The person who does not teach by example does not deserve success. "Do as I say, but not as I do," should never be the motto of the teacher, for of all the powers he possesses that of example—(or of setting example) is the greatest and most influential. All of us who have ever heard a *proud* clergyman preach a sermon on *humility*, or a rich bishop hold forth on the merits and obligations of *fellowship and charity* must recollect the smile of contempt, or the look of scorn his respective remarks evoked from the audience. Why was this ? Was it because the people approved of pride or revered selfishness ? Certainly not. It was because the preacher's words condemned himself—because his precepts and his example were inconsistent with each otner—because he fain would have arrayed himself in garments of light without paying any attention to the cleanliness of his person—because he condemned the "mote in his brother's eye," whilst approving of the "beam" in his own. Successful teaching, like successful preaching, is always accompanied by example. The teacher, like the early preachers of Christianity, (if desirous of success) must be a living model of the doctrines which he inculcates. There must be no hypocrisy about him—he must be thoroughly in earnest. His acts, words, and even the expression of his face, have their effect, for good or evil, on his pupils.

POWERS OF EXAMPLE MAKING IMPRESSIONS.

Example is infectious. In early youth and childhood it rules supreme, as the imitative powers are then far stronger than reason or judgment. Ben. West declares that a kiss from his mother made him a painter ; an approving smile from Madame Bonoparte made her illustrious son a soldier and an emporor ; a story related by his teacher made Livingston a traveller. So it is in every stage in life,