There is such a thing as considerable celerity in manipulating figures and very little understanding of numbers. One boy brought in this problem he had worked in the preceding class, $\frac{1\frac{3}{4}}{2\frac{5}{8}} \times \frac{3\frac{3}{5}}{4\frac{5}{7}}$ and, by changing and cancelling, produced $\frac{2\frac{2}{5}}{6\frac{6}{7}}$; it was a piece of juggleiy with figures. I believe pupils must understand what they do; such a feat as the above gives no power of thought. I gain a great deal by keeping the idea of the baseball game before me as a model for class work. In that they understand what they are about.

Many questions are proposed to young pupils in arithmetic that they ought not to waste time over; these should be delayed until they reach the high school. It is far better that boys and girls study natural history or physics and acquire mental power, than to work out problems that demand sleight-of-hand merely. I do not like to see a bright boy puzzling out things in arithmetic. All the best authorities say that arithmetic and geometry should demonstrate themselves. "A boy had 4 apples and bought 4 more, how many had he?" This is a case of *seeing*—the pupil sees that the boy has 4 and 4, and when he knows what 4 and 4 are, he sees that he had 8.

The best teachers endeavor to give a pupil power *to see through* a problem. They begin by practising him to see through two steps, then three, and so on. There must be a good deal of practice —as in the baseball game.

In reviewing in fractions I have a large card, and put on $\frac{1}{2}$; then call numbers, as 12, 28, etc. In order to save time they put down 10 answers, and these are compared; then 10 more, and so on. Then $\frac{1}{3}$ is put on the card, and 10 numbers called—this is done rapidly; then $\frac{2}{3}$, and so on.

Then $\frac{1}{2}$ of 12 is $\frac{1}{3}$ of what? Ten of these. $\frac{1}{3}$ of 12 is $\frac{1}{2}$ of what? Ten of these.

I have had 500 such questions answered in twenty minutes.

$1\frac{1}{2}$ is a half of what? Ten of these.

$2\frac{1}{2}$ is a third of what? Ten of these.

This gives celerity with figures, and this is necessary; but working out these with numbers is also necessary until they see there is a reality.

I take 48 splints and show 6, and then 24, and ask for a problem; $\frac{1}{8}$ of 48 is contained how many times in 24? Or 24 is how many times $\frac{1}{8}$ of 48?

My conclusion is that the reason so many boys fail in arithmetic is, that they are dealing with nebulous materials instead of real materials; with figures instead of numbers.

It must be constantly borne in mind in the elementary classes that there is a distinct difference between numbers and figures; the latter are the arbitrary symbols that represent numbers. To learn to use figures is really a language lesson; to make the pupil learn the language before he knows numbers will certainly destroy that innate love for knowledge that is a priceless gift from the Creator. —*The School Journal.*

THE RIVERS OF CANADA.

BY MISS M. A. WATT.

Our lesson-chart said "Rivers of Canada." I had sketched an outline of Canada on the board (though we had a large putty-map, five feet by four feet, made by pupils under my directions, I wanted something clear and sketchy); on the map I marked Hudson and James Bays; the Rockies; the St. Lawrence and its lakes; the Great Bear and Great Slave Lakes, with the Mackenzie running out of them into the Arctic Ocean; the Winnipeg Lake, with the Saskatchewan, Assiniboine, and Red Rivers running in, and the Severn and Nelson out into Hudson Bay and the Fraser River. I had noticed that my class had very misty ideas about the direction of rivers and the slope of land, thinking, in spite of teaching, that north was *up*, and that the St. Lawrence emptied its waters into Lake Ontario, as "water naturally runs down."

"This, then," thought I, "must be the first part of our lesson; the rivers and their names must come afterwards."

I had a bottle of water, a large sheet of blotting-paper to keep things neat, a cup, a slate or two, a trough of boards placed at an angle of 120°, and I met my class with good courage. I should have liked to have had a sprinkler to illustrate better the rainfall, but our can had lost its rose.

"Now, boys and girls, I want to teach you a very useful lesson, and I shall be pleased if you can find out for yourselves what it is. I think you are all clever enough, if you watch me closely."

I held a slate in my right hand, level, and poured water on it. It spread all over the slate. I laid it carefully down. I took a second slate and held it slantingly, and poured on water. The water ran downward, spreading somewhat.

"What did you notice about the first slate?" "What about the second?" (The first level, the second slanting.)

"What did you notice about the water on the first slate?" "What about the second?" (Water spread all over first, ran down second.) "Why this difference?" (Difference in way of holding slates.)

I then took the trough and poured water into it, from sides and end, first holding the trough pretty level, then giving it more and more of a slant.

Again, I took the slate and poured water on it, and tried to get the stream into narrow compass enough to pour into the mouth of a pickle bottle held below it. But the stream was broad, quite different from that in the trough.

"Which makes the better stream, the slanted slate or the trough?" (The trough.) "Why?" (The trough has its sides slanted, and itself is slanted as well.) (Three slants better than one.)

So far all was well, but the link between the trough and the rivers of Canada had to be forged. I wished that there might have been rain that day, but there was none.

I took the bottle, and, approaching the edge of the platform, I said, looking as if I were about to suit the action to the word:

"If I were to pour this water on the floor, and you saw it running in a stream to that corner, what would you learn about the floor?" (That the floor sloped or slanted in that direction.)

"Well, I shall not pour it on this time, but you can try it, if you like, in the yard. And, when it rains, you can easily learn where the slopes are in the road. If I tell you this line on the board is to represent a stream of water, and that it runs from A to B, which is higher, A or B?" (A is higher.) "Why does the water run from A to B?" (Because A is higher, and water naturally runs downwards.)

I drew aside the curtain from my sketch, and pointed to the Mackenzie (because it was the one most likely to be mistaken, as *up* on the map). Almost at once I came face to face with a difficulty. I had neglected to give the point that would lead them to know the probable beginning in the event of a stream ending and beginning in large bodies of water, as the Mackenzie does.

"Which way does the Mackenzie run?" A division ensued; some thought into the Arctic, some considered the Great Slave Lake more likely to be its outlet.

I briefly reviewed north, south, east, and west, found that north was not *up* and south was not *down;* then the questions were asked:

"Which is larger, the Arctic Ocean or the Great Slave Lake? Then which is more likely to be in the larger and deeper hole in the ground? Which is likely, then, to be lower, and to have the Mackenzie flowing into it?"

So the Mackenzie was marked with an arrow pointing northwest, to the Arctic Ocean.

The Fraser had its arrow fixed; the St. Lawrence was discussed, reference made to a sketch (taken from the High School Geography) on the side blackboard, of "From Lake Superior to the Falls of Montmorenci," and an arrow pointing northeast indicated its course, towards the Gulf of St. Lawrence. The central drainage system was especially interesting. From the falling of rain on the Rockies to the mighty tides of the Saskatchewan and Assiniboine, as they flow into Lake Winnipeg at north and south ends respectively, to be carried on to the Hudson Bay by the Nelson and its companions at last. Incidentally the pupils used the names of the rivers, they drew on their slates, pointed to the putty map, and I drew other unnamed rivers to show the drainages into the Hudson Bay, the James Bay, and St. Lawrence River.

Questions were asked by pupils. Near the end of the lesson, after a serious moment of deep consideration, a grave and important question, indeed, was asked by a young philosopher. He noticed that the rivers emptied into large bodies of water, and with puzzled brow he inquired:

"How is it they all end in big bodies of water? They all do on the map."

Though amused, I did not show my amusement, but said:

"We have about five minutes left, and any one who can answer Robbie's question may come up and whisper his answer in my ear as I sit at the desk."

Many and ingenious were the answers, some wide of the mark, others gropingly near, befogged with words, but the germs of thought were there, and I felt that the lesson had not been a failure.

We have since then examined the rivers and their origin, the rivers and their slopes, the rivers and their outlets, and the country drainage by them, as well as the character of the streams, whether rapid and full of falls, or broad, slow, and placid. Their suitability for navigation was touched upon. In the meantime the names and positions of the rivers have impressed themselves deeply, without any dry memorizing to disgust the pupils.

WORD MEANINGS.

What wonderful new meanings sometimes rise
In words grown old in memory! We throw
The worn small coins of talk, and scarcely know
Through the dust of use the thought that in them lies.
These are for common handling. What we prize,
The golden guineas made our own by slow
And deep experience, not so lightly flow
Into the world's great coffers. When one dies
The name we know him by becomes so dear
We henceforth hoard it. So the holy thought
Of love we hold too precious and too high,
To jingle for the passer-by to hear;
And with a hush the laboring mind is brought
To that Great Name whose echo fills the sky.
—*Curtis May.*

SUGGESTIONS FOR GOVERNMENT.

1. In making or enforcing rules look back to your own childhood; recall your own experiences, your impulses. Put yourself in the place of the child to be governed, then act.

2. Regard all pupils as trustworthy until you find them otherwise. Children rarely forgive a teacher who suspects them of wrong when they are innocent.

3. Encourage them to be truthful by remitting penalties as far as possible when they make a full and free confession.

4. Common sense and the ability to judge the guilt or innocence of a pupil is a requisite in successful government.

5. Allow pupils the largest liberty consistent with their welfare and the welfare of the school, and when restrictions are placed on them explain the necessity for such restriction.

6. Do not attempt to compel pupils to inform on one another under threats of punishment. Rather let your own tact govern you in the detection of an offence.

7. Explain to your pupils the necessity of proper deportment and prompt obedience.

8. Do your own governing as far as possible; it weakens your authority to call upon the Superintendent or the members of the School Board for assistance.

9. Give no unnecessary commands.

10. Make only such rules as you are willing to enforce.—*Raub's School Management.*

It is a very bad symptom in a school when a considerable number of the pupils are ever ready to manifest their pleasure at the success of mischief and wrong. I was once present at an interview between the lady principal of a high school and a young man, one of her pupils. The young man said to her rather petulantly: "I'd like to know what you have against me. I have'nt been doing anything." The teacher replied: "I can tell you very quickly what I have against you. You are always on the side of wrong. You show that you are pleased when any disorder occurs, or when anything wrong is done in the school. I want to find you on the other side." The young man stood convicted; the teacher had made her case.—*Samuel Findlay.*