



MONTREAL CITY AND DISTRICT SAVINGS BANK.

the stray bullets that fell around him, the grim soldiers alternately wept and wiped their eyes. But all this is changed now; and Louis, having received his "baptism of fire" has been sent away out of danger to amuse himself with his bullets, while his imperial father endeavours to regain his lost prestige.

DEPARTURE OF THE GARDE MOBILE FOR THE FRONT.

The scene along the whole route taken by the Garde Mobile on their departure from Paris was one continued ovation. It must be remembered that this force, which corresponds in many particulars to our own volunteer force, is composed entirely of private individuals of every rank and social status; rich and poor, employer and employee combine alike to swell its ranks. So it can be understood that when the order was issued for the mobilization of the Garde Mobile every family was more or less affected; and the whole city turned out to greet with enthusiastic demonstrations the amateur soldiers who, for the sake of their country, were leaving behind their families and their homes for the hardships and dangers of a campaign. To the cries of *Vive la Mobile*, and the notes of the everlasting *Marseillaise* and the Hymn of the Girondins, the men marched to the Aubervilliers station. Here the last greetings were exchanged between the men and their families. Here and there were little groups of lovers, husbands and wives, mothers and sons, looking upon one another perhaps for the last time, and bidding each other a passionate farewell. Their partings over, the men disappeared through the iron gate of the station, and as the last passed through, the crowd gave a deafening cheer.

The Garde Mobile were to be stationed at Châlons, where they were to perfect themselves in drill before being led to the front. Unfortunately, in the great camp itself, no arms could be found for them, and they were put through their drill much like schoolboys, with broomsticks for guns, and laths in lieu of swords. Food was also not so plentiful as it might have been, and the Mobile ran a great risk of being starved to death before the time came for their march against the enemy. Under such management, and subjected to such treatment as this it is not astonishing that the young soldiers mutinied and demanded to be led back to Paris. There, at all events, though there are no arms for them, they need not be afraid of starving, and they may wait patiently until the Chassepots that have been ordered in Birmingham are ready, when they will have an opportunity of proving their prowess, and re-establishing their reputation.

SPEED OF THOUGHT.

When it comes to the relation of mental action and time, we can say with Leibnitz, "*Calculus*," for here we can reach quantitative results. The "personal equation" or difference in rapidity of recording the same occurrence, has been recognized in astronomical records since the time of Maskelyne, the royal astronomer, and is allowed for with the greatest nicety, as may be seen, for instance, in Dr. Gould's recent report on transatlantic longitude. More recently the time required in mental processes and the transmission of sensation and the motor impulse along nerves have been carefully studied by Helmholtz, Fizeau, Marcy, Donders, and others. From forty to eighty, a hundred, or more feet a second are estimates of different observers, so that, as the newspapers have been repeating, it would take a whale a second, more or less, to feel the stroke of the harpoon in his tail. Compare this with the velocity of galvanic signals, which Dr. Gould has found to be from fourteen to eighteen thousand miles a second through iron wire on poles, and about sixty-seven hundred miles a second through the submarine cable. The brain, according to Fizeau, takes one-tenth of a second to transmit an order to the muscles, and the muscles take one-hundredth of a second in getting into motion. These results, such as they are, have been arrived at by experiments on single individuals with a very delicate chronometric apparatus. I have myself instituted a good many experiments with a more extensive and expensive machinery than I think has ever been employed, namely, two classes, each of ten intelligent students, who with joined hands represented a nervous circle of about sixty-six feet, so that a hand pressure transmitted ten times round the circle traversed six hundred and sixty feet, besides involving one hundred perceptions and volitions. My chronometer was a "horse-timer," marking quarter seconds. After some practice my second class gradually reduced the time of transmission ten times round, which had stood at fourteen and fifteen seconds, like that of the first class, down to ten seconds; that is one-tenth of a second for the passage through the nerves and brain of each individual; less than the least time I have ever seen assigned for the whole operation; no more than Fizeau has assigned to the action of the brain alone. The mental process of judgment between colours (red, white, and green counters), between rough and smooth (common paper and sand-paper), between smells (camphor, cloves, and assafoetida), took about three and a half tenths of second each; taste twice or three times as long, on account of the time required to reach the true sentient portion of the tongue. These few results of my numerous experiments show the rate of working of the different parts of the machinery of consciousness. Nothing could be easier than to calculate the whole number of perceptions and ideas a man could have in the course of a lifetime. But as we think the same thing over many millions of times, and as many persons keep up their social relations by the aid of a vocabulary of only a few hundred, or, in the case of some very fashionable people, a few score only, of words, a very limited amount of thinking material may correspond to a full sense of organs of sense and a good development of the muscular system. The time-relation of the sense of vision was illustrated by Newton by the familiar experiment of whirling a burning brand, which appears as a circle of fire. The duration of associated impressions on the memory differs vastly, as we all know, in different individuals. But in uttering distinctly a series of unconnected numbers or letters before a succession of careful listeners, I have been surprised to find how generally they break down in trying to repeat them between seven and ten figures or letters, though here and there an individual may be depended on for a large number. Pepys mentions a person who could repeat sixty unconnected words forward or backward, and perform other wonderful feats of memory, but this was a prodigy. I suspect we have in this and similar trials a very simple and mental dynamometer which may yet find its place in education.—*Dr. Helmes*.