

of the leaf of gold; and that is something you can take between your fingers and feel.

Now as to an appreciation of the fraction of a second; you can call all count to ten in half a second or to twice ten between two successive beats of a seconds pendulum. I do not say to twenty but to twice ten, thus avoiding the two syllable'd words thirteen, fourteen, twenty which would be longer in the saying. If on the Queen's Birthday you stand at one end of a range of 500 men firing a volley and as the sounds will reach your ear successively — sound travelling say 1000 ft. per second—then as the 500 men at say 2 ft. centres, will cover that distance their firing will to your ear divide the second into 500 distinctly separate intervals. Now go a step further, take up a book of say 500 sheets or leaves to the inch, you can finger it and feel each successive leaf rush past your thumb nail in the tenth part of a second — then have you the second divided into 5000 parts. Again let there be a wheel divided into 1000 parts, each part an inch or so, the circumference therefore say 83½ ft. and the diam 26½ or thereabout — this is only an ordinary sized wheel, and may revolve once in a second, suppose now the 1000 teeth or cogs or parts are made up each of 1000 thicknesses of paper, then would you have the second divided by this process into a million parts, as each component leaf would pass your eye or abutting thumb or finger in the millionth of a second.

Nor need you be at a loss to understand how the velocity of shot is measured or ascertained, though invisible by the very fact of such tremendous speed on its way. Electricity akin to light, flies around the world at nearly 200,000 miles a second, or for our purposes we may say instantaneously. Then let a screen of tiny wire be put up at say 100 ft. from the gun and another at another hundred ft. further off, so the ball will pass through and strike them both, thus breaking the wire and the electric circuit; the interval of time between these successive breaks gives the velocity of the ball which is as much as 2000 ft. per second more or less according to calibre and charge of powder.

This is enough to guide you and have you understand how the motion of a horse for instance, on the race, may be photo'd 20 times a second, or in 20 different positions of one or a single leap from earth to earth again, and this same process can be pursued with an athlete somersaulting, with a circus man revolving a ball in mid air on his feet, with a juggler throwing and in succession catching balls or knives, etc. and if these photos, or paintings made thereof be placed successively around the inside of a hollow cylinder, with slits in the cylinder above the line of pictures, and if this cylinder be revolved say 8 times in a second, and as the human eye retains the impression of any thing it sees during the 8th part of a second, then thus are you made to see any object in motion you may desire, such as of a man sawing wood, a horse on the gallop, an acrobat's contortions and the like.