acceleration is positive; if a decrease, it is negative. The latter is sometimes called a retardation. On going down hill the acceleration is positive, but when slowing up on the opposite hill it is negative.

Suppose the sleigh is allowed to start from rest (*i.e.*, without being pushed), and that at the end of one second its speed is 2 feet per second; if it continues to gain speed at the same rate, the speed at the end of 2 seconds will be 4 feet per second; at the end of 3 seconds, 6 feet per second: and so on. At the end of 20 seconds the speed will be 40 feet per second. In this case the rate of increase, or the *acceleration*, is uniform, namely, 2 feet per second in each second.

Next, let a stone be thrown upon the ice with a speed of 20 feet per second, and let the friction of the ice gradually reduce the speed by 1 foot a second during every second. Here the acceleration is negative. It is evident that, as the speed during each second is reduced by 1 foot per second, the entire speed will be lost, and the stone will come to rest, in 20 seconds.

We shall consider one more example, namely, that of a freely-falling body, which is a good illustration of uniform acceleration.

Let a stone be dropped from a high tower. As everyone knows, it will rapidly gain in speed. At the end of the 1st second its speed will be about 32 feet per second; in one second more the speed will be 64 feet per second; at the end of the 3rd second it will be 96 feet per second; and so on. At the end of 30 seconds the speed would be 30×32 or 960 feet per second, while in 6 minutes from the beginning it would be $6 \times 60 \times 32 = 11{,}520$ feet, or over two miles per second!

If a body is projected vertically upwards it gradually loses its speed at the same rate, namely, 32 feet per second during every second. Thus if a rifle bullet be shot vertically upwards