

sensation (giving us the starting points on our scales) and the smallest perceptible differences of excitation as we proceed upward in the graduation of our scales. The results of this second research may be stated in general language thus : *in order that sensation may increase by successive equal additions, their excitations must increase by a constant fraction of the excitation itself, i.e., by additions which are not equal, but which increase as we ascend the scale of intensities.* For example, the successive additions to a sound, to be barely perceived would require the following series of additions to the stimulus :

$$\frac{1}{3}, \quad \frac{1 + \frac{1}{3}}{3}, \quad \frac{1 + \frac{1}{3} + \frac{1 + \frac{1}{3}}{3}}{3}, \quad \text{etc., or } \frac{1}{3}, \quad \frac{4}{9}, \quad \frac{16}{27}, \quad \text{etc.,}$$

and the actual excitations would be the series :

$$1, \quad \frac{4}{3}, \quad \frac{16}{9}, \quad \frac{64}{27}, \quad \text{etc.}$$

This general principle is called the *Law of Weber*, and may be stated in a variety of ways, of which, perhaps the easiest to carry is this : that in order that sensations may increase in intensity in an arithmetical series, their excitations must increase in a geometrical series. The law may be exhibited in a linear way to the eye in the following diagram (1.) :

• (1.)

