musical ratio

Ramsay

are always when they have returned to the side from which they were started. The Pendulographer, also, when writing the beautiful pictures which the **musical ratios** make when a pen is placed under the control of the pendulums, always finds his figure to begin again when the pendulums have finished their period, and have come for a fresh start to the side from which the period began. This confirms our author's definition of an oscillation of a pendulum. Fig. 3 is an illustration of the correct definition of a Musical Vibration, as also given in this work. Although the definition of an oscillation is not identical with that of a vibration, yet on account of their *movement in the same ratios* the one can be employed in illustration of the other as we have here done. Fig. 4 is a uniform rod suspended from the end as a pendulum; it will oscillate, of course, at a certain speed according to its length. In such a pendulum there are *three centers* related in an interesting way to the subject of Music in its three chords - subdominant, tonic, and dominant, which roots are F, C, and G. The center of gravity in the middle of the rod at 2, suspended at which the rod has no motion, corresponds to F, the root of the subdominant, in which there is the maximum of musical gravity. The center of oscillation at 3, which is one-third of the length of the rod from the end, is like the root of the tonic whose number is 3 in the genesis of the scale from F1. In this point of suspension the oscillations are the same as when suspended from the end at 1. The point at 9 is at a *ninth* from the center of oscillation. Our author discovered that, if suspended at this point, the pendulum had its highest rate of speed. Approaching the end, or approaching the center of oscillation from this point, the rate of speed decreases. Exactly at one-ninth from the center of oscillation, or two-ninths from the end, is this *center of velocity*, as Ramsay designated it; and it corresponds in some sort also to the root of the dominant G, which is 9 in the genesis of the scale from F1; its rate of vibration is nine times that of F1. The dominant chord is the one in which is the maximum of levity and motion in music. [Scientific Basis and Build of Music, page 105]

PLATE V.
PROXIMATE AND DIFFERENTIAL OSCILLATIONS.

When 25 pendulums are arranged and oscillated to represent the different **musical ratios** in their natural marshalling, they will all meet at 1 when 64 of the highest is counted. This plate is intended to show that there are two kinds of meeting and passing of the pendulums in swinging out these various ratios. In the ratio of 8:9 the divergence goes on increasing from the beginning to the middle of the period, and then the motion is reversed, and the difference decreases until they meet to begin a new period. This may be called the *differential* way. In the ratio of 45:64 there is an example of what may be called the *proximate* way. In this kind of oscillations meet and pass very near to each other at certain points during the period. In 45:64 there are 18 proximate meetings; and then they exactly meet at one for the new start. This last of the ratios, the one which finished the system, is just as if we had gone back to the beginning and taken two of the simplest ratios, [Scientific Basis and Build of Music, page 105]