well that he should be); for instead of being called on to listen to musical compositions with all their varied charms of melody and harmony, he is most frequently obliged to examine individual sounds which often must be prolonged in order to submit them to a sort of process of vivisection. For such investigations one requires the patient attention and observant ear of the tuner, rather than the skill of the performer. The importance of these varied accomplishments for the study of acoustics is well exemplified in the history of the science. The first steps in its progress in later times were made by the mathematicians Euler, Bernouilli, and others; Chladni, to whom we owe great advances in the subject, especially the beautiful experiments on vibrating plates, was an accomplished musician; whilst Helmholtz, who may be called the Newton of the subject, is equally celebrated as a mathematician and physiologist, and is at the same time an accomplished musician.

Amongst the instruments which have enabled acousticians to make the great advances of recent times, none occupy so important a place as the Tuning Fork. Its use as a standard of pitch for the singer and the tuner all have long been familiar with. Its functions now, however, are largely extended. In the accurate measurement of time, in the analysis and synthesis of sounds, in the graphical and optical examination of vibrations, it has become invaluable. As its value for these purposes depends on the peculiar nature of the vibrations of its prongs, I shall proceed in the first instance to describe some of the simplest forms of this so called harmonic motion. Let us consider first the case of a point moving as a particle at the end of a prong. The character of such a harmonic motion is best understood by shewing its relation to the more familiar case of uniform motion in a circle. When a point is moving uniformly in a circle we can imagine perpendiculars to be drawn from it at every instant to a fixed diameter. The foot of the perpendicular will thus change its position from instant to instant, and its motion will be what is called simple harmonic, of the same kind as that of a particle of the tuning fork. By varying the size of the circle and altering the speed of the point on the circumference, we can represent any simple harmonic motion whatsoever. The movement along the diameter, you will observe, is oscillatory, the extent of the motion on either side of the centre is the length of the radius, and the velocity is continually changing from zero at the end of the course up to a maximum as it passes through the centre. Such motions are not generally of any considerable amplitude. Approximately, however, they are realized on a large scale when, in viewing the heavenly bodies, we observe the motion of a secondary round its primary, the eye being in the plane of the motion. The end of a rod moving in a straight slot will also approximately execute such a motion, if its other end is connected with a uniformly turning crank. The clearest notions, however, of the movement in question are obtained by graphical representation. When a point moves in any manner whatsoever in a right line, we can indicate its position at every instant by an auxiliary figure in which there is a system of lines, one of which denotes the times, and the other the corresponding distances of the moving point from some fixed position. Thus let Oy be the line of motion, Ox perpendicular to it the line of times. Divide the former according to some scale (say inches) to represent distances, and the latter according to some scale to represent divisions of time (say seconds). Then the distances of