

of the impression of the same sound on the two ears and two sides of the head.\*

The loudness of sounds appears to depend on the *extent* of vibration of the particles of air, and this is determined by the vibrations of the sounding body.

3. The *pitch*, or the *differences of acute and grave*, in sounds, form another important property, and one which fits them for a great part of their purposes. By the succession of different *notes*, we have all the results of melody and harmony in musical sound; and of intonation and modulation of the voice, of accent, cadence, emphasis, expression, passion, in speech. The song of birds, which is one of their principal modes of communication, depends chiefly for its distinctions and its significance upon the combinations of acute and grave.

These differences are produced by the different *rapidity* of vibration of the particles of air. The gravest sound has about eighty vibrations in a second, the most acute about one thousand. Between these limits each sound has a musical character, and from the different relations of the number of vibrations in a second arise all the differences of musical intervals, concords and discords.

4. The *quality* of sounds is another of their differences. This is the name given to the difference of notes of the same pitch, that is the same note as to acute and grave, when produced by different instruments. If a flute and a violin be in unison, the notes are still quite different sounds. It is this kind of difference which distinguishes the voice of one man from that of another: and it is manifestly therefore one of great consequence; since it connects the voice with the particular person, and is almost necessary in order that language may be a medium of intercourse between men.

5. The *articulate* character of sounds is for us one of the most important arrangements which exist in

\* Mr. Gough in Manch. Mem. vol. v.