

loudness, a certain pitch and a certain character, or timbre of its own, by which we recognize it from other sounds of similar pitch and loudness.

Now, when we study the production of voice, we find that these three characteristics originate principally in three different parts of the vocal apparatus.

- (1) The pitch of the voice is determined by the vocal cords.
- (2) The loudness by the abdominal or expiratory muscles; and
- (3) The quality or timbre by the parts above the vocal cords.

1. The lips of the glottis open and close with great rapidity, and the frequency of the vibration is mainly determined by the tension of the vocal cords.

2. Air escapes from the lungs through this vibrating glottis in a series of puffs, and the force of emission is chiefly determined by the action of the abdominal or expiratory muscles.

3. The upper part of the larynx, together with the pharynx, nares, and mouth, constitutes a passage-way, or tube, of variable size and shape, through which the vibrating current of air is passed. It is here that the voice is moulded, so to speak, on its way to the ear, and the shape of the passage-way largely determines the quality or timbre of the voice.

You can produce a crude voice-like sound by the vibration of the lips of the mouth. Press your lips very firmly together while you blow air between them, so as to cause the edges to vibrate. The sound produced is not very pleasant, and resembles more than anything else the hum of a bee, or the buzz of an imprisoned fly. But place the buzzing lips at the end of a tube—for example a trumpet—and at once the quality changes. Out come the clear ringing tones so familiar to us in a brass band! In this case the source of sound is found in the vibration of the lips, but the timbre or metallic quality is due to the trumpet.

In a somewhat similar manner the passage-way or tube, through which the voice is passed, affects the quality of the sound produced by the lips of the throat; and if we could decapitate a singer in the midst of a song, so as to hear the sound produced by his vocal cords alone, I fancy we should find as great a change in