his ear, the vowels formed an ascending series, *ee* having the lowest, and *ă* the highest pitch. The fact is, we were both right, for these vowels have a double resonance. The passage-way for the voice extends from the vocal cords to the lips, and if you constrict it at any point, you divide it into two parts forming bottle-shaped cavities placed neck to neck. (See diagram, Fig. 3.) There is a cavity in front of the point of constriction and another behind it.

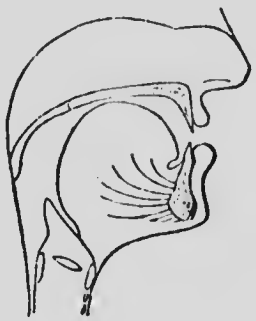

Fig 3.

In forming *ee*, the front cavity is very small, and the pitch consequently high; but the back cavity is low in pitch, because it possesses an extremely narrow neck at the point of constriction. In pronouncing the other vowels of the series mentioned, the front cavity increases in size, and, therefore, falls in pitch; but the pitch of the back cavtiy rises because the neck at the point of constriction is enlarged. I can demonstrate the double resonance of these vowels by a simple experiment. I shall hold the side of a lead pencil against my cheek, and tap it forcibly with my thumb nail, so as to agitate the air in the front cavity, while I whisper the vowels *ee, ĭ, ā, ĕ, ă*. You perceive at once a descending series of sounds, in which *ee* is the highest, and *ă* the lowest pitch. I shall now hold the pencil against my throat so that each tap may agitate the air in the back cavity. Upon whispering the same vowels, the taps produce an ascending series, *ee* having the lowest pitch and *ă* the highest. The effect is improved by closing the glottis so as to convert the back cavity into a bottle closed at the bottom. The front cavity also yields a much louder effect if it is shut off completely from the back cavity, by allowing the soft palate to fall into contact with the back of the tongue (*ng* position). In these cases, of course, the vowel positions must be silently assumed. When we pronounce these vowels aloud, feeble "partial tones," due to the