

forcible emission of air is caused by the contraction of the abdominal muscles, and these are the muscles that we employ in throwing out the voice. For example:—Prolong a vowel sound, suddenly increasing the force into a shout, a number of times in succession, without stopping the voice, thus:—ah, AH-ah-AH-ah-AH. At every shout a forcible contraction of the abdominal muscles can be felt by the hand, and the front wall of the chest is thrown upwards by the force of the compressed air within the thorax, pulsating outwards with every shout.

Alternate inspiration and expiration, result from alternate expansion and contraction of the thoracic cavity. This can be effected in two ways.

We can expand the cavity; (1) by using muscles that tend to raise the ribs and cause them to separate from one another slightly; and (2) by depressing the diaphragm.

We can contract the cavity; (1) by allowing the chest wall to fall, using muscles that tend to bring the ribs nearer together; and (2) by employing the abdominal or waist muscles.

Of these two possible modes of action, it will be seen that one involves the expenditure of less energy than the other. It is less laborious to breathe by using the diaphragm and waist muscles, than by moving the heavy bony framework of the chest.

When the diaphragm contracts, changing from the dome-like to the conical shape, it presses downwards upon the viscera, thus causing an expansion of the abdominal cavity. When the abdominal muscles contract, the circumference of the waist diminishes. Thus in natural breathing, produced by the alternate action of the diaphragm and the abdominal muscles, the circumference of the waist increases during inspiration, and diminishes during expiration.

I doubt the advisability of directing a pupil's attention to these motions, for his attempts at reproduction are often attended by ludicrous results. The end desired would, I think, be better attained by directing his attention to the chest, and not to the abdomen. Get the pupil to expand the chest and keep it continuously expanded even when breathing out. If the bony framework of the chest is kept raised and fixed, breathing can only be performed by the diaphragm and waist muscles; and, as the pupil cannot help breathing, nature will work the proper muscles without his knowledge or will.

This effort of continuous expansion can only be sustained for a