VOICE STRAIN

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EVERYONE whose work includes the care of the larynx is only too familiar with voice strain. Clergymen, school teachers, actors, and last, but not least, singers are liable to recurrent laryngitis. Theories are numberless —"Quot homines, tot sententiae", and this in spite of hundreds of schools of music, drama and elocution, scores of speech therapists and of course the medical profession who are called in to make good the damage done by bad teaching only too often based on fallacies.

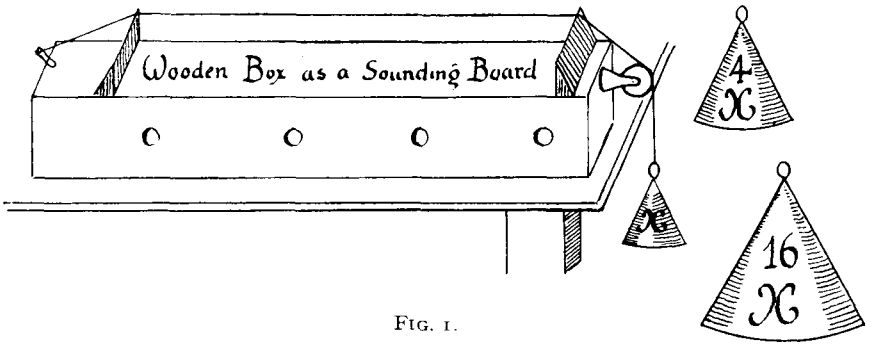


FIG. 1.

In these rather depressing circumstances it may help to note a few facts that are beyond dispute, facts clearly stated and explained in elementary science manuals. Here we learn that in the case of vibrating strings pitch is raised by increase of tension, or decrease of length or decrease in diameter. While it is self-evident that the vocal bands are very different from vibrating strings, whether the strings are of fixed length and under constant tension as on a piano, or with variable length and tension as on a violin, there is some definite analogy between the *tension* of a string and the *resistance* offered by the vocal bands to the air that causes their vibration. All singers and teachers of singing will agree that high notes require far more effort than low ones, the increased effort being felt in the body which is controlling the extra pressure of the air. All agree too that damage or risk of damage is when using the high notes. Just how these notes should be produced, what share should be taken by increase of tension, decreases of length and diameter may be

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proved by photography, but the value of photographic evidence will depend on the status of the singer, the quality of the voice and the condition of the larynx and the clearness of the photographs.

In the matter of singing much remains to be learned, but for speech the problem is comparatively simple and there is no valid excuse for so much failure on the part of the teachers. A singer to be useful in a choir or choral society will require a range of two octaves; first-class singers have a wider range but two octaves is a fair average for ordinary purposes, that is to say, fifteen notes, or twenty-five if we count the semitones. For speech rather more than half the singing range will be enough, so that if we reckon the singing range as 1-15, we may reckon the pitch for speech to lie between 1 and 9. The difficult notes for the singer are from 10 to 15. It is when speakers use a pitch of 10 or over 10 that they encounter trouble, many of them using a pitch between 6 or 7 and 11 or 12. Every case of recurrent laryngitis that has come to my notice has used a speaking pitch that was much too high and the lowering of pitch and releasing the tension has solved the problem.

We know from the science manual that tension (effort) rises sharply for the higher notes, so for economy of effort the use of the lower range is an obvious advantage, but it helps us in other ways. With the lower pitch it is possible to teach the "open" production, that is, relaxation of the neck and throat muscles not actually contributing to the production of vocal tone. The chief value of the open production is that it sets into vibration the air in the thorax. Here again, if we turn to the text book we find that if a tuning fork is set into vibration the resultant sound can be heard only if the fork is held close to the ear, but if its stem is held on an empty wooden box the sound is amplified so that it can be heard all over the room. It is worth noting that the loud sound is that of the vibration of the air in the box which has passed down the stem of the fork. In a similar manner the open production of the voice in the larynx sets up the vibration of the air in the thorax so that the minimum effort in the larynx produces a maximum volume of sound in the room enabling any ordinary voice to be heard at the back of a large hall or theatre.

There are still many elocutionists who do not understand or believe in thoracic amplification; they talk or write vaguely about a "full" tone being due to resonance in the air spaces above the larynx; fortunately for our purpose, which is to marshal facts so that further advances may be made towards a comprehensive knowledge of the voice and its control, there is a pretty general agreement among phonologists about the vowel sounds and their formation.

We have all had the experience of filling a jug at a tap and of knowing *without looking* when to turn the water off. This is because we hear an ascending scale of sounds, in fact, air vibrations—Par, Par, Per, Per,

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Pip, Pip, Pee ; then we turn the tap off knowing *by sound* that the jug is full. Here is the explanation. It is because water falling into a column of air sets up a vibration appropriate to the length of the air column. As the water rises, the air column is shortened and with the correspondingly diminished air space, the pitch of the vibration rises.

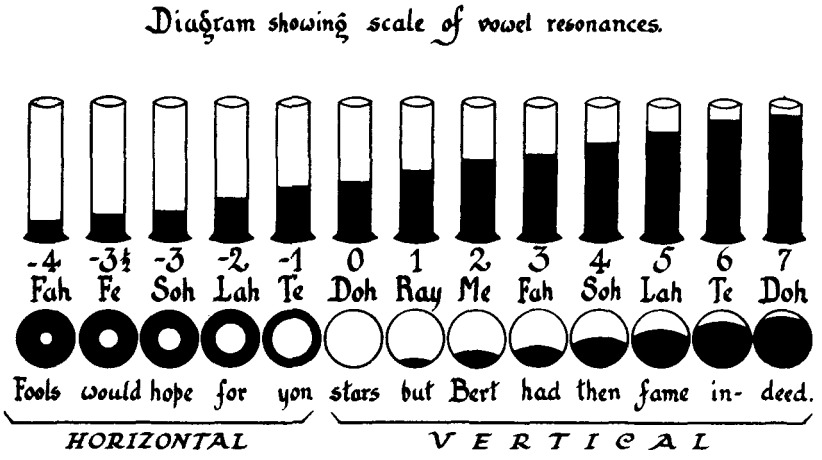


FIG. 2.

The top line of the composite diagram represents a cylinder being filled with water.

Taking another example of air vibrations : many of us have seen modern bands playing with bronze bowler hats held over the brass instruments. Whether we like or dislike brass instruments we shall all agree that they are complete in themselves ; therefore to play them into bowler hats is to add extraneous resonances the artistic value of which is doubtful.

Taking a third example of air vibration. We all know how the voice is produced in the larynx by approximation of the vocal bands, but this larynx-level vocal tone is *never heard*, because it is projected into another air space—the mouth—where it collects some further resonance, just as the brass instrument collected a further resonance from the bowler hat, but there is an important difference. In the case of the hat, its shape and size being constant, its resonance was constant, but this does not apply to the mouth because its air space can be varied in two directions, vertically by raising the tongue and horizontally by protruding the lips. These movements are indicated diagrammatically by the row of circles shown by kind permission of Messrs. Longmans, Green & Co., publishers of the late Dr. Aikin's book—*The Voice*. This rising scale of resonances can be heard clearly if we whisper very gently the vowel sounds of the sentence below the row of circles ; these are the

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thirteen simple English vowels. We have accounted for the contribution of the mouth as an air space ; it forms the vowels.

Simultaneously with the raising of the tongue the larynx is drawn down and the cavity in the neck immediately above the larynx is increased. For AR and the vowel above it, the air spaces in the mouth and neck are in unison, but after that as the resonance pitches rise in the mouth they fall in the neck as shown below. The figures are those shown in the composite diagram.

AH	BUT	BERT	HAD	THEN	FAME	IN –	DEED	
0	1	2	3	4	5	6	7	Mouth pitch
0	1	0	−1	−1½	−2	−3	−4	Pharynx pitch

It is not at all easy to hear the descending scale of the pharyngeal resonances, but if the ears are closed by placing a finger in each and the vowels are whispered very gently the descending scale can be heard. With the ears closed we hear the lower resonances by bone conduction ; the mouth resonances being heard in the normal manner. So another air space is accounted for.

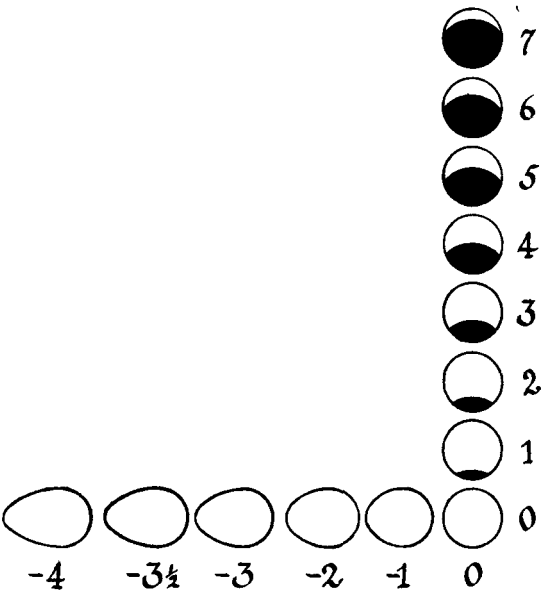


Fig. 3.

Turning now to the horizontal series, working again from AR, we see the air space gradually increased by pushing the lips forward ; this will, of course, produce a lower resonance pitch, but this lowering of pitch is aided in another way. Pitch is lowered by enlarging air space and/or by diminishing the opening to that air space. Both these methods

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are used in the horizontal series, the lengthening being shown on the right-angled diagram and the openings on the composite one. We have then the complete range of the thirteen English simple vowels—a rising octave of resonating pitches from AR vertically and a falling musical fifth from AR horizontally.

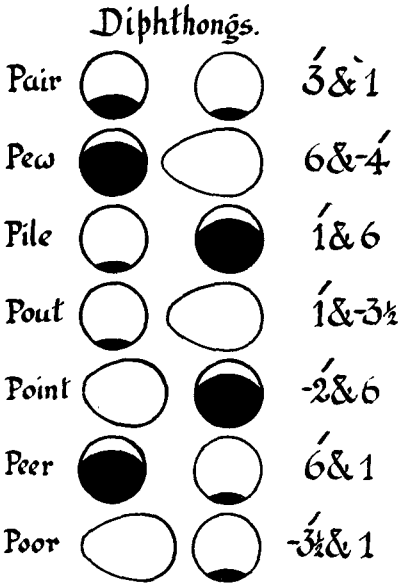


FIG. 4.

While on the subject of vowels it may be of interest to show the diphthongs diagrammatically. The first group explains itself.

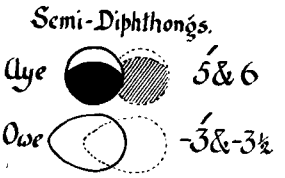


FIG. 5.

These two diphthongs differ slightly from the others. In the first group the component parts of each diphthong appeared in the table of simple vowels. In the case of the vowel sounds heard in "Owe" and "Aye", they are not so much a sequence of two mouth positions, as a slight alteration to facilitate the termination of the vowel. It is indeed almost impossible to finish either "Owe" or "Aye" without a further

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movement of the mouth. For this reason I call them the two " Shadow " diphthongs.

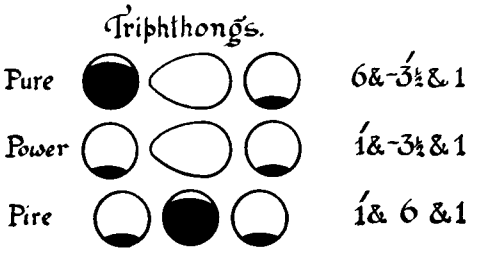


FIG. 6.

The diagram of the three triphthongs is chiefly interesting because it shows the considerable mouth movements required for an accurate rendering of a triphthong. It also accounts for so often hearing the lazy version of " power " as " par " and of " fire " as " far ".

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