

Chapter Six

PRIMARY VIBRATIONS AND THEIR AMPLIFICATION

SO FAR THERE HAS BEEN described the building up of the living musical instrument as a preparation for singing. In this and subsequent parts is described the psychophysical development of the instrument during singing.

The basic laws of physics pertaining to freedom of musical tone are applicable to vocal tone. Vocal tone, like all other musical sound, is due to regularly recurring vibrations and is propagated by sound waves. Vocal tone—tonal sound waves of the living instrument—has the same definite qualifications of all musical tone: viz., regularity of vibrations (as distinguished from noise), pitch (rate of vibrations), volume (amplification of vibrations), timbre (complexity of vibration). Sound waves can be freed only at their source.

No primary functional activity takes place above the vocal cords in voice production. The action of the breath on the vibrators of the singing instrument, the vocal cords, produces primary vibrations. These vibrations produce sound waves. The production of primary vibrations is the source of vocal tone. *Freedom in the production of primary vibrations is the fundamental factor on which complete freedom in singing is based.*

The causal factor in singing is the mental demand

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for tone—the primitive urge to sing. Freedom in singing, however, is dependent on freedom of functioning of the singing instrument—the reaction of the body to fulfill this demand. When posture is correct and breathing is free, interferences to freedom in the production of primary vibrations lie in the functioning of the larynx, the phonating part of the singing instrument. These interferences come from structural faults, weaknesses, lack of elasticity of the larynx, or sluggishness in the responsiveness of its various parts while functioning. *Weaknesses and interferences in the functioning of the larynx and of the vocal cords are overcome, as far as is possible, through singing under conditions which permit the elimination of such interferences. These conditions are: (1) the correct posture (this makes possible freedom of functional co-ordination of all parts of the singing instrument, gives security and stability, without rigidity, to the larynx during phonation, and optimum resistant strength as well as the correct taut approximation of the vocal cords); (2) functional freedom in breathing (which permits a full intake of breath without abnormal tension). The full distention of the lungs and chest through the intake of breath then gives to the instrument its highest resistant strength and greatest intensity of functional activity. Singing under such conditions—no compensatory adjustments being necessary—will eventually compel the elimination of functional interferences in the larynx and the vocal cords, strengthen all parts of the larynx in their co-ordination and adjustment, and so overcome interferences to primary vibrations.*

The living instrument differs from all other instruments in that the instrument itself is constantly

undergoing minute changes of adjustment to fulfill the mental demand for differences of pitch, volume, and articulation. The various mechanisms which function in these minute adjustments are: The mechanism of the vibrators for primary vibrations, of the resonators for resonance, of pitch for changes of pitch, of volume for differences in volume, of the articulatory mechanism for differences of vowels and consonants. These changes of adjustment take place involuntarily. *They can take place freely only when conditions permit—when primary vibrations are free in their production.*

The tension of the vocal cords varies in the changes of adjustment of the larynx for differences in pitch: The higher the pitch, the greater the degree of tension; the lower the pitch, the lesser the degree of tension. (This is a law of sound.) It follows that as pitch rises, the degree of contraction of the tissues of the vocal cords is greater and inner laryngeal space grows smaller. The free production does not vary throughout the entire range of the voice (it is the action of the breath on the vocal cords which produces primary vibrations). *All changes of adjustment of the vocal cords and of the larynx for differences in pitch take place freely when the tone remains constant in its freedom, intensification, and concentration during phonation—when primary vibrations are free in their production.* We do not feel these changes of adjustment for differences in pitch when they are free to take place. When interferences in production prevent, differences in pitch take place with effort and strain. (The limitations in the range of a voice are determined by the limitations of the mechanism of pitch in the larynx.)

Besides changes of adjustment in the larynx for differences in pitch, there are also changes of adjustment in and above the larynx for differences in vowels, and for vowel modifications in ascending pitch. (See section on Articulation.) Changes in the larynx for differences in pitch and for differences in vowels and vowel modifications do not usually coincide. *The correct modification of the vowel regulates itself automatically to the change of adjustment in pitch when the tone, regardless of pitch, remains constant in its freedom, intensity, and concentration.* (Tone and vowel are synonymous terms for vocal sound, the source of both being primary vibrations.)

Security, firmness, and resistant strength of the larynx are necessary in singing to ensure intensity, concentration, volume and steadiness of tone. A flexible stability of the larynx permits such firmness and resistant strength without violating the laws of physical functioning. Security, firmness, and resistant strength of the vocal box in singing can, however, also be attained through compensatory activity of the swallowing muscles. (The swallowing muscles are the ventricular bands, the hyoglossal muscles in the base of the tongue, the soft palate, and other contractible muscles used in swallowing.) Such stability is rigid; this viselike hold is the security of a plaster-of-Paris cast; such stability destroys the elasticity of the larynx.

The swallowing muscles should be in a condition of repose during singing. *There should be no extraneous muscular pressure from the sides of the throat or from above on the larynx.* (The most evident violations of this are the wide-open stretched position of the mouth during singing, particularly for tones of high pitch, and the exaggerated functional activity of the lower

jaw in the "pronunciation of vowels." The mouth opens—and only to a minimum degree—because we sing; we do not open the mouth to sing.) The normal, correct position of the soft palate in singing is low and forward. It should not be consciously raised, distended, or contracted. In a free production, the tongue is flexibly free, without tension or rigidity, the base and back slightly elevated and forward. *Compensatory activity of the swallowing muscles in singing can be eliminated only when primary vibrations are free in their production.*

Compensatory activity of the swallowing muscles in singing prevents the free functioning of the instrument. It is a major interference to freedom in singing. The "strength" built in by such compensatory adjustments is, moreover, harmful to the muscles of the throat which function in singing. Putting them in a viselike hold—which this does—weakens them. It weakens the vocal cords. Weak vocal cords do not have the resistant strength needed for the hookup. To overcome the lack of resistant strength, strong compensatory adjustments are built in. This brings about a vicious circle in singing. Under such conditions, it is necessary to use force to produce tone which, to ensure stability of the larynx, builds in a still greater clutch. Throat stiffness results, the elasticity of the larynx is destroyed, the production of tone grows more and more difficult, deterioration sets in, and it is only a question of the degree of resistance of the individual equipment before singing must stop.

The use of the swallowing muscles in singing further tends to irritate and inflame the mucous membranes of the throat and the tonsils. It is the cause of many throat ills.

The functioning of the larynx is involuntary. It cannot be consciously controlled. When the production of primary vibrations is free, the functioning of the larynx is not felt. The effect of this functioning, the tone, can be felt and heard. In a free production, the tone can be felt as a stream of intensified, concentrated tonal sound waves above the larynx and at the focal point of amplification against the hard palate in the mouth, free of any pressure and tension of neck and laryngeal muscles. When the production is not free, the tone is felt at its source in the larynx. In singer parlance, the tone "falls back," it loses its position.

Both hearing and feeling tone are to the singer confirmations of production. As such, they are at first closely interrelated as sense perceptions that are indistinguishable. With finer sensory perception—a development in freedom of voice production—the singer learns to distinguish between them to a high degree, and in so doing acquires a more positive means of self-control.

A positive self-control for the singer lies in the sensation of tonal vibrations and the inner-ear sound of his tone. These always remain constant, regardless of acoustical changes, for they are dependent only on voice production. The outer-ear sound of his own voice (the singer hears with outer- as well as inner-ear) varies with each change of acoustic conditions—external changes bring disconcerting differences in effect. An experienced singer does not try to "fill" an auditorium with vocal sound. His mental demand is for freedom, intensity, and concentration of tonal vibrations; he depends on his production.

As in other qualifications of free tone, purity of

intonation is possible only when primary vibrations are free in their production. The constituent parts of a vocal tone are (1) a fundamental, and (2) partial tones—overtones. (The fundamental is produced by the vibration frequency of the full swing of the vocal cords; the partials are produced by the vibration frequency of the swing within the swing of the segments—halves, thirds, quarters, etc.—of the vocal cords.) Purity of intonation and the best quality of tone in singing are achieved when there is freedom from all constriction and pressure in the functioning of the larynx, for then the swing of the vocal cords is without interferences—the balanced vibration frequencies of fundamental and partials are without constriction. The true timbre of the voice (full complexity of vibration) is a natural effect; artistic interpretation can be given natural expression when primary vibrations are free. An artificial production produces artificiality in expression. (Simplicity and naturalness in the manner of “singing” explain the great appeal of the crooner to the masses. His appeal is direct; he awakens emotions and imagination through tone and text; he has no artificial theoretical method of singing.)

It is not necessary for the singer to know in what manner the vocal cords produce vibrations. It suffices that he feels the effect of these vibrations, the tone. The control lies in the conscious sensitivity for the freedom of the functioning of the instrument and in the feel of tonal vibrations in their unimpeded freedom, intensity, and steadiness above the larynx.

Freeing the instrument of interferences, overcoming weaknesses, and building up strength, to repeat, is an organization, co-ordination, and integration of repeated stimuli and functional responses in which

the various parts of the singing instrument are so conditioned through singing that their perfect co-ordination is achieved. Each singer has individual interferences. A teacher cognizant of the procedure of development to be taken is a necessity if experimentation is to be avoided.

Primary sound vibrations in singing cannot be heard, for they have been amplified by the action of the air in the various resonance cavities before they reach the ear. The sympathetic action of the air in the various resonance cavities, when singing begins, produces resonance. I quote Dr. Floyd S. Muckey in his definition of resonance:

Resonance is the reflection of the phases of condensation of many air waves, in such a manner that they are brought together or concentrated near, and within, the restricted outlet of a cavity. The result is a great amplification of sound. The particular kind of reflection mentioned above requires a peculiar shape of cavity. Such a cavity is called a resonance cavity.

The head and throat contain a number of such cavities—the lower and upper pharyngeal cavities containing the ventricular cavities and the nasal cavities, the mouth, etc.

Resonance results automatically, provided the singing instrument is correctly co-ordinated and provided there are no physical obstructions. It is of no value for the singer to know the anatomy of the resonators in detail or how they function. When the instrument is functioning correctly, all that the singer need do is allow resonance to take place. In so doing, a sensory awareness of resonance, a sensation of effect and of

confirmation in production, is attained. Sympathetic vibratory sensations are felt in the bones of the head and face as well as in the wall of the chest. (These may influence quality of tone but have no effect on amplification.)

All tones, good and bad, have resonance to a certain degree. The optimum resonance comes with a freely produced tone of full intensity. Forcing the instrument to try to "make" resonance can never give full resonance. Such forcing throws the singing instrument out of adjustment and prevents free functioning. It is an interference to the production of primary vibrations.

The resonance of the violin tone is produced through the agency of the body of the violin. It cannot be influenced in any way except through the stroke of the bow on the strings. In the living instrument, however, the shape of certain of the resonance cavities, particularly the mouth, can be directly modified by the singer and so influence the resonance. This should not be done. All work on resonance per se is compensation for errors in the primary production. All attempts to direct, to control, or to make resonance, prevent freedom of voice production and prevent full amplification.

The terms "white tones" and "open tones," in singer parlance, are used for tones lacking in resonance. To strive to improve such tones by "covering" them, by attempting to give them a "made" resonance, is incorrect. Such tones lack resonance because of interferences in the production. Conscious efforts to control or to increase resonance by the forming of the lips, puckering the nose, raising the soft palate, distending the mouth in any way, or "focusing" the tone

in or back of the nose, are wrong. Raising the soft palate actually reduces resonance, for it cuts off the upper pharynx resonators. In using these artificial helps, freedom of voice production is prevented.

The hum is often used as a means of "developing" resonance. This is entirely wrong. Humming is simply singing with closed lips, and is dependent, just as is singing, on the laws of freedom of voice production.

Physical impediments in the vocal box or in the resonators will prevent resonance from taking place. A sick condition of the vocal cords or of the cartilages of the larynx will not permit free primary vibrations. The cause of lack of resonance, in these instances, lies in the source of tone. In such cases, attempts to offset the lack of resonance by trying to "make" or force resonance, will aggravate the abnormal condition.

Frequently, singers have clogged resonance cavities. In order to attain resonance in these cases, muscles are developed which constitute serious interferences to vocal freedom. This eventually destroys the natural flexibility of the larynx. If, with a healthy condition of the larynx and a free production, the tone is deficient in resonance, there are physical limitations or obstructions. In the first case, nature has not been gracious as concerns the resonance cavities; in the second case, there may be a seriously bent septum, or the resonators in the head may be clogged by polypous growths. Physical obstructions should be removed by a physician. Other conditions are helped, often cured by correct singing, under the guidance of a teacher thoroughly cognizant of the principles of freedom of voice production. It is possible to cure nodules through correct functioning.

The singer learns, through feeling and hearing, to recognize characteristic vocal sound vibrations as a confirmation of his production. This, with the feeling of co-ordination, freedom, and strength in the production, constitutes an important factor of self-control while singing. Of primary importance is the correct mental concept and the mental demand for the desired vocal sound.

A correct mental concept of singing is attained from a development based on the laws of freedom of voice production. Each phase of this development is recorded in the intelligence as a sensory perception and grows clearer and more positive as development progresses. When free singing has been attained, the correct mental concept is clear. The understanding of the logic of freedom of voice production helps toward its attainment. Full attainment, however, is only possible through correct singing.

Chapter Seven

ARTICULATION

THERE ARE MEN whose profession compels them to speak in public. Some of these people have taken lessons in "how to speak"—elocution lessons. They sound that way. The very fact that they are trying to speak with a method prevents their speaking freely and clearly. The more they try consciously to articulate, the more artificial they sound. Their articulation is "made"; they "make" every consonant, "form" every vowel, thinking in this way to make their diction more distinct. They attain exactly the opposite effect. In trying to make the consonants and to form the vowels, they prevent freedom of articulation, clarity of enunciation. Again, we have others who do not try consciously to articulate and yet their enunciation is exceptionally distinct and natural. The answer is this: the first group has a method; the second group has freedom of production in speaking—a free articulation.

The principles governing free articulation in singing are similar to those governing free articulation in speaking. Freedom of articulation in singing requires a finer development—the range of pitch is more extensive, the voice is more sustained, and there are definite musical demands. Both in speaking and singing, free articulation is dependent upon freedom of