The effects on the vocal cords of improper methods of voice production and their remedy / by H. Holbrook Curtis.

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Voice Production and their Remedy

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H. HOLBROOK CURTIS, M. D. Ph. B.

118 Madison Ave., New York.

PRESENTED AT THE

PAN-AMERICAN MEDICAL CONGRESS,

Washington, D. C., 1893.

READ BY INVITATION BEFORE THE

NEW YORK STATE MUSIC TEACHERS' ASSOCIATION,

Rochester, 1893.

NEW YORK
EDGAR S. WERNER
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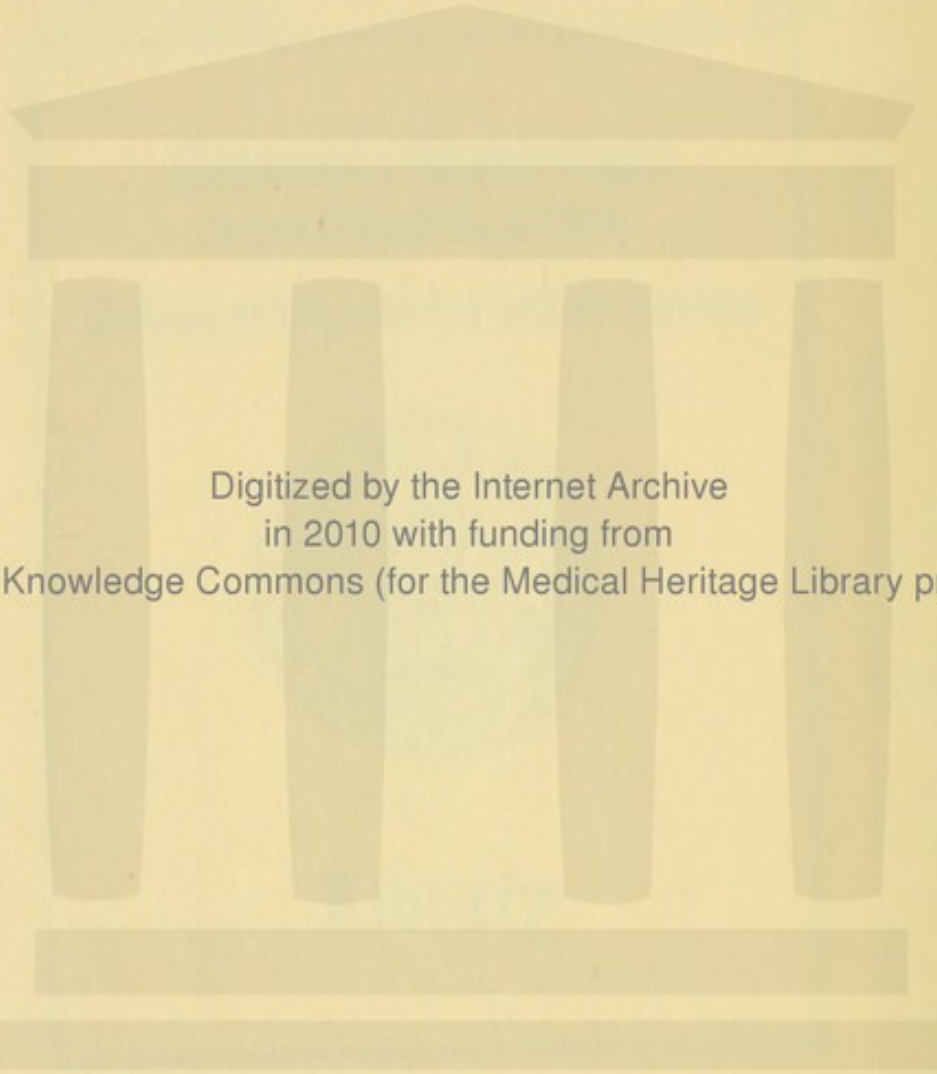

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THE DYNAMICS OF SINGING.

By H. Holbrook Curtis, M. D., of New York.

It would be strange indeed, if a laryngologist who was daily in the habit of examining very many throats of singers did not have his attention particularly attracted to the difference in the appearance of the glottis as the direct result of different methods of voice-production. Several years ago, as early as 1884, I observed, that many pupils of a certain professor of singing, presented marked peculiarities in regard to the position of the free borders of the vocal-bands. The slightly elliptical shape of the chink of the glottis which this class of pupils presented, in emitting the usual sounds to allow the proper view of the larynx, led me to inquire as to the particular method of teaching, which would produce in so many throats a typical appearance. I soon found out that these pupils were in the habit of taking daily exercises almost entirely on a single vowel, that single vowel being the letter "O." The vocal cords appeared striated, with frequently a congested area at their anterior attachment. Frequently a nodule, more or less defined, would be observed about the center of the free edges on either cord: this is a picture which every laryngologist will recognize. Another type of which the study is most interesting, is that of a class of pupils undergoing instruction at a conservatory, where the pernicious French method, the so-called stroke of the glottis (coup de glotte), is daily practised. In this type the writer has observed the middle-third of the cords to be slightly bulged, the cords presenting a convexity, in contradistinction to the concavity exhibited in the last group. These pupils had been singing chiefly on the vowel "A," pronounced as "Ah" in English, and with the emission of each note the middle portion of the cords would clash and by constant attrition become hardened and callous. The cords in this particular type do not usually show congestion; their appearance is usually of a good pearl color and healthy-looking in every way. The complaint which they make upon consultation, is a difficulty in singing the so-called *mezza voce* and a lack of richness of tone and timbre, with extreme weakness of two or three notes in the upper-medium register. It was these two opposite appearances of vocal cords, which are every day observed in singers' throats, that led to an investigation of methods employed by the various schools of singing, and has opened up a field which I think has been entirely neglected, though of the greatest importance to every laryngologist who has to do with the singing voice.

Two names are intimately linked with the traditions of method in

singing: Those of the elder Lamperti, (that illustrious exponent of the best Italian school) and Mandl, who by his ingenious arguments, though founded on a false physiological basis, succeeded in completely overturning the art of voice-production which previously had been taught throughout Europe. He substituted in place of the so-called Italian school a method of abdominal respiration, which was at once adopted in the Paris Conservatory, and has obtained to within the last three years an almost universal recognition in the best schools of the Continent.

It is the writer's purpose, without going too deeply into the history of singing, to discuss the various methods of respiration and initial tone-production, and to show, by a series of experiments made upon individuals, the effects of certain methods of voice-building, hoping to arrive at some definite conclusion as regards the proper exercise and position of the larynx and consequently proper tension of the vocal cords, during tone emission. For the brief historical sketch which I shall give, I am indebted almost entirely to the able article of Dr. Joal of Mont-Dore, which appeared in the Revue de Laryngologie d'Otologie et de Rhinologie, Nos. 8, 9 and 10, 1892, Paris. The position which Dr. Joal occupies at Mont Dore (the favorite resort of almost all the European artists) has enabled him to consult freely, for a number of years, the most distinguished vocal talent in Europe, and his views upon voice-production should be carefully read by every instructor who wishes to profit by the exceptional opportunities which that author has enjoyed. One can not read his able discourse upon the singing-voice without feeling that his every utterance is *ex cathedra*. In 1842 Beau and Maissait divided the respiration of singers into three characteristic types: the superior-costal, inferior-costal and abdominal. The superior-costal may be illustrated as the breathing of a woman tightly laced; the respiratory expansion taking place chiefly in the cone of the thoracic cavity, the upper ribs, collar-bone and sternum rising and falling during the respiratory act. In the inferior costal type, the inferior ribs (commencing with the seventh downward) are rotated and elevated; the sternum moving only in its inferior portion, the abdominal wall being contracted during the respiratory act. In the true abdominal type, the thorax is supposed to remain completely fixed, the diaphragm taking the ribs as a fixed point, lowering the abdominal viscera, thus distending the wall of the abdomen in inspiration. It is this latter type of breathing, which has been taught for the last thirty years in France. Mengozzi,* together with the masters of one of the conservatories, determined upon the following rules illustrative of the breathing of singers: "The respiratory act in singing differs somewhat from that used in speaking. In speaking, the abdomen is extended in inspiration and recedes in expiration, while in singing, the abdomen must be drawn in during inspiration, returning slowly to its natural state

* Op. Cit.

as the chest contracts in expiration, thus retaining as a negative force the air which has been introduced into the lungs." In a revision of this method, published in 1866 by Baptiste, these laws are repeated, with the addition of a note by Dr. Mandl (the apostle of abdominal respiration), who advocated the advancing of the abdomen in inspiration. Mandl carried his point and his ideas became generally adopted by the Conservatory. M. Bonheur and Dr. Cheval, of Brussels, advocated the superior-costal type of breathing, in contradistinction to the method of Mandl. Mandl in his work states that the larynx becomes very much depressed and the glottis enlarged in the costal-method of respiration. Joal answers him in these words: "We do not find this depression of the larynx referred to in any of our classical treatises on physiology, anatomy, nor in any one of the numerous works which have appeared since 1855 on laryngology; consequently, we suppose that writers do not share the ideas of Mandl on the subject. Besides, we have examined a number of persons whom we engaged to breathe alternately from the abdomen and from the shoulders. We ourselves, in singing, have often observed the movements of our larynx, and we have never observed that the clavicular inspiration caused the thyroid to fall." Nicaise explains this fact by demonstrating, experimentally, that during strong inspirations the trachea contracts and becomes shorter, which draws down the larynx *

It is very difficult for a professional man to take cases of distinguished singers in his own private practice and hold them up by name as models of perfection of certain types. Joal made the assertion in an article published in 1890, that great artists, especially women, used the superior-costal method. The distinguished critic of "Le Temps" challenged Dr. Joal at once to mention some of these artists; the Doctor responded: "I would be happy to gratify Mr. Weber's desire, but it is very difficult for a physician to go into personalities and to say that a certain singer is using a vocal method considered disastrous and execrable by masters of criticism." Melchissedec, however, offered himself as an example of the superior-costal respiration, saying that it had enabled him to sing constantly for twenty-five years. Both his strength of tone and tremendous endurance, with an almost perfect glottis, attest that the method has not been injurious to him.

The abdominal method of breathing has many powerful advocates: M. Obin and M. Faure, for example, speak most highly of it: Shakespeare, of London, Behnke and Lennox Browne are also its advocates. The instructors of both methods are very apt to quote great artists as the exponents of their particular school. Joal cites the case of Rubini, the celebrated tenor, who Massini and his pupils declare, originated abdominal respiration; Bonheur, on the contrary, states that he expanded his upper chest; Walshe even going so far as to say that he fractured his collar-bone in making a violent effort to reach B-flat in "The Talisman of Pacini." Lablache and Laget acknowledged that, in

* *Revue de Medecine*, 1889.

spite of long and attentive observation, they had not been able to distinguish in the theatre how this illustrious tenor breathed. Joal goes on to state that the famous Lamperti is alternately represented as a partisan or opponent of the abdominal type of breathing, but I think that, having treated many of the elder Lamperti's pupils and interrogated them very particularly upon this question, I may unhesitatingly affirm that the elder Lamperti was a strong advocate of the lower costal-respiration, always arguing that the abdominal wall should remain quiet, or be slightly drawn in during inspiration. The evidence of Campanini, Jean de Reszke and Clara Heyen is in support of the above. Joal says if we except the works of Laget and Bonheur we find nowhere the praise of clavicular breathing in men. The ancient method of the Paris Conservatory and the works of Maunstein, Caruth and Manuel Garcia, all advise thoracic respiration by the elevation of the ribs and drawing in of the abdomen.

If we take up any work upon the voice and study the photographic appearances of the cords during the emission of certain notes, we remark that the cords are not vibrating longitudinally, but that their free borders approximate, touch or overlap, and that the posterior opening of the chink is longer or shorter and different in appearance for each note. I wish to put on record here my opinion, of the absolute impossibility of photographing the vocal-cords during the proper emission of tone, from the very fact that the laryngoscopic mirror placed in the pharynx interferes with the right focus of the respiratory attack, and it is only possible to observe the vocal-cords in the photograph when the so-called stroke of the glottis is used in the emission of a note. The photographs of singers' cords, and the deductions that have been drawn from their appearance during the emission of different notes, only demonstrate, in every case that I have ever seen, that the larynx is elevated by the pulling up of the thyroid, the cords relaxed, and the free borders more or less approximated. If we ask a singer who is in the habit of using the so-called high-chest method of costal-respiration to take a note (the attack entirely taken from the cords and focussed in the masque, bringing into play the harmonics lent by the sound-waves passing behind the uvula and soft-palate), introducing the smallest possible size of mirror, so that the color given to the note by nature's resonance-pipes, the antra and nasal cavities, will be as little as possible interfered with, we are surprised to find that on the emission of every note of the soprano medium register the cords appear equidistant from each other, throughout the entire extent that it is possible to see them.

The part which the intrinsic muscles of the larynx play in the tension of the vocal-cords becomes an interesting study. It is very easy for us to see by the depression of the thyroid how the cords must be elongated, but it is extremely difficult for us to comprehend the minute differences of tension caused by the movements of the thyro-arytenoid and crico-arytenoid muscles. I have frequently been surprised upon exami-

nation of the vocal-cords with the head held down, the chin resting upon the chest, to find the cords present a beautiful pearly appearance, entirely homogeneous; but upon attempting to show the patient his own cords by an adjustment of double mirrors, the head being slightly thrown back, upon the same note the cords suddenly have become dusky, semi-congested and striated. How much of this is due to the slight elevation of the thyroid cartilage, and how much to the intrinsic muscles of the larynx, or to the relationship between the chink of the glottis and the trachea, it is difficult to determine. To a careful study of these differences of tension am I indebted for the discovery of a fact which I here write about for the first time, the appreciation of which fact, however, has entirely changed my treatment of the singing-larynx and has caused me to institute a system of tone exercises by which certain intrinsic muscles of the larynx are so strengthened, that any medicinal application through the medium of sprays, probangs, and I may say instrumentation, has oft-times been entirely done away with.

If we take a good sized laryngoscopic mirror, No. 4 for example, and ask a patient to sing E or Ah, the cords come into view for two reasons: First, the epiglottis becomes more perpendicular, allowing a better view of the bands, and, secondly, the cords themselves are on a more elevated plane, owing to a slight elevation of the thyroid cartilage and consequent relaxation of the intrinsic tensors of the cords. In this position we remark that the free borders of the cords come together in the anterior and central portions, and we are able to study the initial tone attack, the membrane separating as the tone bursts through the closed chink. This picture may be said to be an imitation on a small scale, of the so-called stroke of the glottis. In this method of producing a tone, the initial attack being upon the cords themselves, the central portions of the cords necessarily touch. The pecular muscular equilibrium which is employed in this mode of attack, invites a reflex elevation of the soft-palate, cutting off the oral from the nasal cavities. As we look at this picture our minds revert to the singing teacher who commands her pupils to keep their palates up, sing in the back of their heads, and strike the glottis. Could ever villainy be more compounded? Let us take the same patient and require him to sing the same note, but in an entirely different way. We will first ask him to expand his upper-chest, not necessarily by respiration, but by elevation of the superior ribs by a muscular effort, at the same time slightly drawing in the abdominal wall. We now introduce the smallest mirror and ask our patient to sing A, pronounced as in law, or maw. With this position of the larynx and muscular poise we observe two things: First, the epiglottis does not assume its most vertical aspect, not inclining as near the perpendicular, and the soft-palate and uvula do not spring upward and backward to make the partition between the mouth and naso-pharynx. Different in every respect is the tone produced by the cords, which may be assumed to vibrate longitudinally, but never touching

each other in the middle portion, even in making the initial attack. The cords appear narrower, tenser, lower anteriorly, equidistant from each other, more homogeneous and whiter in color.

These two pictures should be well considered, as they become the basis of criticism in distinguishing the correct and eliminating incorrect methods on the one hand in singers' voices, and of the greatest assisttance to the laryngologist in correcting pathological conditions, the result of bad training. The proper appreciation of these opposite conditions and their effect on the quality of tone immediately calls our attention to the subject of respiration.

Within the past three years the entire theory of musical education has changed in France; the explanation of this change being that there is at present a better appreciation of the influences bearing upon the production of tone and a better understanding of the physiology of the larynx by reason of the advances made in laryngoscopy.

Modern teaching tends to cultivate tone harmonies and sympathy in the voice at the expense of brilliancy of execution. The same judgment should be exercised in the training of an individual who proposes to make singing his or her art, as should be employed in advising the painter that his special forte lies in landscapes, rich in color, to which he may give expression to his imaginative genius, rather than to the sterner *fac simile* of portraiture.

How many singers we hear whose technique and brilliant staccato in the Bell Song of Lakme calls forth our admiration and amazement, but who are as absolutely unable to put any sympathy whatsoever into the simplest ballad. We should study color harmonies in music in the same way that they must be studied in painting. There is no rule for the palpitating sunlight effects and prismatic play of colors in the school of Claude Monet; it is certainly a subtile feeling which is given by an ingenious mingling of pure spectrum colors. In the human voice, that added coloring of tone, which appeals to the heart as well as to the ear of the listener, must be brought about by the employment of those harmonics, which are added to the original tone by intervibrations within the accessory cavities of the nasal passages. To sing *dans le masque,* as the French say, is to give this added richness to the initial tone; but to sing in this manner requires the soft-palate and uvula to be lowered in the production of tone. Likewise to make the purest initial tone from the cords, we must get the utmost possible tension, which may only be arrived at when the thyroid, or "Adam's apple," is depressed, for in proportion as the thyroid is elevated, the cords tend to assume the base of a right angle triangle instead of its hypotenuse. Several elements beside this enter into the question of the greatest possible tension, one of the most important of which is, that the trachea be drawn down to assume the position that it takes when the apices of the lungs are filled to their greatest extent with air. One of the greatest singers that the world has ever known told me, that the reason he adopted a fixed high chest was,

that he had found after an operation performed on one of his cords, that the only way in which he could be at all sure of his voice while singing, was in the maintenance of the so-called high chest respiration. This is easily explained by the fact, that in this position the upper ribs remaining fixed, the apices of the lungs always remaining in contact with the thoracic wall, are expanded to their fullest extent; the cords tending to keep in their state of greatest possible tension. In this position the breathing becomes entirely inferior-costal and diaphragmatic. The position of the thoracic cavity as indicated above permits the lungs to expand to their fullest extent, thus adding a secondary resonance to the voice from below—a sort of complementary timbre—the fixed upper thorax allowing of the least possible change of color during tone-production.

It is this combination of facial and thoracic tone fortification, which gives the enormous carrying power to tones produced by this method. For a number of years, before I made a special study and estimated the great significance of these factors in singing, I have deluged the throats of singers with sedative and astringent sprays when their cords appeared congested and swollen, oftimes presenting nodules in their centre which I had never previously recognized as being due entirely to singing with an improperly poised larynx.

I may cite several cases to show you the difference from a medical standpoint, in the treatment of the singer's throat, where I now substitute respiratory and tone exercise for the amelioration of conditions, that I have always been taught were only to be cured by rest and the diligent use of drugs. The cases cited are typical of a class of singers which I have treated with equally good results, since I have made a particular study of the peculiar value of the proper tone production in the human voice.

The first day of January last I was consulted by Miss F., age twenty-three, who had had a contralto voice of large power which she had employed constantly for several years, and had finally, after a prolonged concert tour with a well-known orchestra, entirely broken down. Her cords were congested with a slight nodule in the middle of either band; she complained of great pain in producing her notes, and her medium register had no power in it whatsoever. She had been told by two of the best authorities on the throat that she must not sing a note for a year, and must have her cords painted with astringent solutions and tone up her general health. Upon testing her voice, I remarked an extremely breathy tone and clavicular respiration.

In accordance with the principles which I have attempted to demonstrate, I forbade her speaking a single word for a week, but placed her at once upon the so-called inferior-costal respiration, maintaining a high chest, and giving her directions to take a medium "C" with the chin almost resting upon the clavicle, singing the word "ma" for five minutes of each hour of the day, the tone first to be focussed in the face with the mouth closed, and the attack to break upon the lips as much as

possible on opening the mouth. At the end of seven days the cords, instead of presenting an elliptical appearance, were straight, and the nodule was so far rotated upward on either cord, that it did not touch the nodule of the opposite side in the emission of tone. At the end of the week this young lady, who considered her voice hopelessly destroyed, having acquired a new method of respiration, sang in a concert. She has since sung regularly in church, in many oratorios during the winter, and is at present singing three times a week in grand opera, learning new roles continually, apparently perfectly restored. She tells me her voice is far more powerful than she had ever anticipated.

Case II:—Miss P. H. consulted me on March 2 in great distress. She was obliged to sing in a comic opera on that evening or close the theatre. Examination showed inflamed and bulged cords with great hoarseness in the speaking voice; middle register impossible, but the high notes obtained with great effort. I sent her at once to my assistant who gave her exercises to maintain tension and at the end of an hour's work with tension exercises and inferior-costal breathing the cords responded and she sang with ease.

Case III:—Miss H. B. consulted me in May having lost her position as prima donna by reason of loss of voice. Had been constantly treated. Her cords showed the nodules of attrition, the result of the employment of the *coup de glotte* and faulty respiration. In this case a week's work caused the nodules to disappear. She adopted a proper laryngeal poise and again assumed the leading role.

Observation:—In this class of cases, rest causes a relaxation of the cords and singing becomes impossible for some time, whereas, constant work with tension of the cords and non-approximation of the same, gives immediate relief.

Case IV:—Fräulein K. consulted me in the spring, her cords appeared swollen and the membrane was injured but not hyperæmic. Had been obliged to cancel her engagements and return to New York for treatment. I recognized the familiar picture and sent her to my assistant, who cured her in a week without other treatment than the establishment of a proper laryngeal poise.

With many cases like these may I not be excused, in calling attention to what I consider the most important ground principle of the singer's art, namely: The proper employment of the muscles of respiration, the poise given the cords and the proper use of the intrinsic muscles of the larynx, not forgetting thebringing into play of the accessory cavities of the face, which lend so much color to the tone, removing entirely from the cords the deleterious effects of an improper initial attack?

To rehearse briefly the deductions which I have attempted to draw from my argument, I maintain that the best method of respiration is the inferior-costal or diaphragmatic, faithfully maintaining the elevation of the upper ribs without raising the shoulders. Next in im-

portance is the depression of the thyroid cartilage, brought about through the agency of the crico-thyroid muscles, and the pulling down of the trachea, by increasing the capacity of the upper lobes of the lung. Anatomically speaking a pose causing the thyro-arytenoid muscles to produce tension instead of the crico-arytenoids. Be careful that the initial attack is removed entirely from the cords. Lower the uvula and soft-palate, that the sound-waves may obtain their intercurrent vibrations or harmonics, by partly passing into the nasal cavities from behind. Let us not fall into the error, that the roof of the mouth alone is the sounding board of the singing voice, for without that added richness and *timbre* to be given by calling into play nature's resonance pipes, the nose and its accessory cavities, we may perhaps sing, but the singing is at the expense of the cords, and the life of the voice is necessarily shortened.

If I have said enough to arouse a new interest in what I consider a most necessary accessory to laryngology, I shall feel amply repaid for my endeavors to set the theme before you in a clear and comprehensive manner.