

To Science, Or Not To Science, That Is the Question

Kimberly Broadwater



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prov·e·nance (prŏv'ə-nəns) *n.* Place of origin, source. [LAT. *Provenire*, to originate.]

FROM ATTENDING KINDERGARTEN THROUGH my undergraduate degree, I was not the ideal student. In hindsight, I have tried to understand what was not connecting for me in those formative years. I would like to say that I was bored and not being challenged, but that would be inaccurate—for the most part. However, there came a time when I decided to pick up the mantle of learning and embrace its worth. The turning point for me was in graduate school when I was introduced to voice pedagogy and voice science by Dr. Stephen Austin. Dr. Austin genuinely loves this field and that passion overflows to his students. I quickly became addicted; I fell in love with learning through the prism of voice pedagogy.

Along with my newfound passion came a propensity to advocate and protect. The only way to teach voice was to position yourself with a rigorous and thorough foundation in science. Johan Sundberg and Richard Miller inhabited my vocabulary. I could not absorb enough. It was almost a spiritual epiphany that transformed me into this nonconforming elitist. Voice science was the only way.

As part of my well rounded curriculum in graduate school at Louisiana State, I took a course that required that I observe all the university's voice faculty teaching lessons. One day, as I sat in a studio observing, the faculty member looked at the student and said, "Think blue." I was familiar with imagery, but this was more than my "scientific mind" could stand. My internal eye roll may have allowed me to see my brain. The student began to sing, "thinking blue," and *it worked*, much to my dismay. This result went against all I believed in. How could this be? The tenured faculty member understood that each learner is different. And while with student "A" you discuss the zygomatic arch, student "B" needs to hear about singing "blue."

I left that studio with an important lesson: you must teach the student. *You* may be a science nerd, but that does not mean your "learner" will understand. *You* may be a "blue" teacher, filling the room with visual platitudes, but if the student cannot interpret, the cause is lost. Students are diverse in their learning styles and teachers must be prepared to approach each learner with an entire toolbox of teaching skills.

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Please do not interpret me saying that a thorough, scientific knowledge of the way our instrument works is not important. The opposite is true. However, my first semester teaching voice pedagogy at a university proved to me that I may not have to teach the “pressure/relaxation curve” to a group of students that will be exclusively conducting choirs and that time could be better spent in practical applications of direct teaching (apologies to Dr. Austin).

The knocking heads of “To Science, or not to Science” is not a new discussion. Almost as soon as Manuel Garcia peered into his first larynx, there has been a backlash against using science in the studio. Teachers now use computer software to analyze tone production, etc., as a tool of possibly discovering vocal faults. I have used software to show students their vibrato rate and then compare theirs to norms in classical singing. As a visual tool, I have found this to be quite effective, as opposed to saying, “Your vibrato is too fast.” Science certainly has its place in the studio. However, all do not feel the need to use these tools and may get the same results by using their words and modelling.

In 1917, D. A. Clippinger wrote *The Head Voice and Other Problems: Practical Talks on Singing*, a book that is widely available online. Clippinger devotes Chapter 9 to this exact debate. I may not agree with every word, but there is considerable information that one can glean from this discussion. I hope you enjoy this “thread” and would appreciate hearing your response. For voice pedagogy instructors, having this discussion in your classroom could prove to be most fruitful . . . and entertaining.

[N.B. Articles written in earlier times usually use male pronouns and subjects. From the beginning of accepting to write “Provenance,” I decided to present materials as they were written, without modernizing language or spelling.]

SCIENTIFIC VOICE PRODUCTION



The immediate effect of the laryngoscope was to throw the whole subject into almost hopeless confusion by the introduction of all sorts of errors of observation, each claiming to be founded on ocular proof, and believed in with corresponding obstinacy.

Sir Morell Mackenzie. *Hygiene of the Vocal Organs*.

He who studies the voice in a physics laboratory naturally considers himself a scientific man, and those teachers who make his discoveries the basis of their teaching believe they are teaching the science of voice production. The scientist says: “Have I not studied the voice in action? I have seen, therefore I know.” But the element of uncertainty in what he has seen makes his knowledge little more than speculative. But suppose he is sure of what he has seen. Of what importance is it? He has seen a vocal organ in the act of producing tone under trying conditions, for one under the conditions necessary to the use of the laryngoscope is not at all likely to reach his own standard of tone production.

Scientists would have us believe that the action of the vocal mechanism is the same in all voices. This claim must necessarily be made or there would be no such thing as scientific production. But of all the vocal vagaries advanced this has the least foundation in fact.

Scientifically and artistically speaking there is no such thing at present as perfect voice, and there will be no such thing until man manifests a perfect mind. The best examples of voice production are not altogether perfect, and most of them are still a considerable distance from perfection. It is with these imperfect models that the scientific man is dealing and on which he bases his deductions.

Be it right or wrong singers do not all use the vocal mechanism in the same way. I have in mind two well-known contraltos, one of whom carried her chest register up to A, and even to B flat occasionally. The other carried her middle register down to the bottom of the voice. Can the tenor who carries his chest voice up  to be said to use his voice in the same way as one who begins his head voice at .

In the examination of a hundred voices selected at random all manner of different things would be observed. Perhaps this is responsible for the great diversity of opinion among scientists, for it must be said that so far there is little upon which they agree. Before absolute laws governing any organ or instrument can be formulated the nature of the instrument must be known. The scientists have never come anywhere near an agreement as to what kind of an instrument man has in his throat. They have not decided whether it is a stringed instrument, a brass, a single or double reed, and these things are vital in establishing a scientific basis

of procedure. Not knowing what the instrument is, it is not strange that we are not of one mind as to how it should be played upon.

If we are to know the science of voice production, we must first know the mechanism and action of the vocal organ. This instrument, perhaps an inch and a half in length, produces tones covering a compass, in rare instances, of three octaves. How does it do it? According to the books, in a variety of ways.

A majority of those voice teachers who believe in registers recognize three adjustments, chest, middle, and upper, or chest, medium, and head, but Dr. MacKenzie claims that in four hundred female voices which he examined he found in most cases the chest mechanism was used throughout. Mancini (1774) says there are instances in which there is but one register used throughout.

Garcia says there are three mechanisms—chest, falsetto, and head, and makes them common to both sexes.

Behnke divides the voice into five registers—lower and upper thick, lower and upper thin, and small.

Dr. Guilmette says that to hold that all of the tones of the voice depend on one mechanism or register is an acknowledgment of ignorance of vocal anatomy. He further declares that the vocal cords have nothing to do with tone—that it is produced by vibration of the mucous membrane of the trachea, larynx, pharynx, mouth; in fact, all of the mucous membrane of the upper half of the body.

When it comes to the falsetto voice, that scarehead to so many people who have no idea what it is, but are morally sure it is wicked and ungodly, the scientists give their imaginations carte blanche. Dr. Mackenzie, who says there are but two mechanisms, the long and short reed, says the falsetto is produced by the short reed.

Lehfeldt and Muller hold that falsetto is produced by the vibrations of the inner edges or mucous covering of the vocal cords, the body of the cords being relaxed.

Mr. Lunn feels sure that the true vocal cords are not involved in falsetto, that voice being produced by the false vocal cords.

Mantels says that in the falsetto voice, the vocal cords do not produce pitch, that the quality and mechanism are both that of the flute, that the cords set the air in vibration and the different tones are made by alterations in the length of the tube.

Davidson Palmer says that the falsetto is the remnant of the boy's voice which has deteriorated through lack of use, but which is the correct mechanism to be used throughout the tenor voice.

Mr. Chater argues along the same lines as Mr. Mantels except that he makes the instrument belong to the clarinet or oboe class. Others believe the vocal cords act as the lips do in playing a brass instrument.

But the action of the vocal cords is but the first part of the unscientific controversy. What takes place above the vocal cords is equally mystifying. The offices of the pharynx, the mouth, the nasal cavities, the entire structure of the head in fact, are rich in uncertainties.

Some think the cavities of the pharynx and head are involved acoustically and in some way enlarge, refine and purify the tone, but one famous man says the head has nothing whatever to do with it. Another gentleman of international reputation says the nose is the most important factor in singing. If your nasal cavities are right you can sing, otherwise you cannot.

And so this verbal rambling continues; so the search for mind in matter goes on, with a seriousness scarcely equaled in any other line of strife. There is nothing more certain to permanently bewilder a vocal student than to deluge him with pseudo-scientific twaddle about the voice. And this for the simple reason that he comes to learn to sing, not for a course in anatomy.

What is scientific voice production? Books without number have been written with the openly expressed intention to give a clear exposition of the subject, but the seeker for a scientific method soon finds himself in a maze of conflicting human opinions from which he cannot extricate himself.

We are told with much unction and warmth that science means to know. That it is a knowledge of principles or causes, ascertained truths or facts. A scientific voice teacher then must know something. What must he know? Books on scientific voice production usually begin with a picture of the larynx, each part of which is labeled with a Greek word sometimes longer than the thing itself. It then proceeds to tell the unction of each muscle and cartilage and the part it plays in tone production. Now if this is scientific, and if science is exact knowledge, and this exact knowledge is the basis of scientific voice teaching, then everyone who has a perfect knowledge of these facts about the voice, must in the

eternal and invariable nature of facts be a perfect voice teacher, and every one of these perfect voice teachers must teach in exactly the same way and produce exactly the same results. Does history support this argument? Quite the reverse.

There is a science of acoustics, and in this science one may learn all about tones, vibrating bodies, vibrating strings, vibrating cavities, simple, compound and complex vibrations. Will this knowledge make him a scientific voice teacher? When he has learned all of this he has not yet begun to prepare for voice teaching. There is no record of a great voice teacher having been trained in a physics laboratory.

It is possible to analyze a tone and learn how fundamental and upper partials are combined and how these combinations affect quality. Does this constitute scientific voice production? This knowledge may all be gained from the various handbooks on acoustics. Has anyone the hardihood to assert that such knowledge prepares one for the responsible work of training voices? One may know all of this and still be as ignorant of voice training as a Hottentot is of Calvinism.

Further, who shall decide which particular combination of fundamental and upper partials constitutes the perfect singing tone? If a tone is produced and we say, there is the perfect tone, all it proves is that it corresponds to our mental concept of tone. It satisfies our ear, which is another term for our taste.

Can a tone be disagreeable and still be scientifically produced? One combination of fundamental and overtones is, strictly speaking, just as scientific as another combination. The flute tone with its two overtones is just as scientific as the string tone with its six or eight. A tone is pleasant or disagreeable according as it corresponds to a mental demand. Even the most hardened scientist would not call a tone which offends his ear scientific. Therefore he must first produce, or have produced the tone that satisfies his ear. The question then naturally arises—when he has secured the tone that satisfies his ear of what value beyond satisfying his curiosity is a physical analysis? A tone is something to hear, and when it satisfies the ear that knows, that in itself is unmistakable evidence that it is rightly produced.

If this scientific knowledge of tone is necessary then every great artist in the world is unscientific, because

not one of them makes any use whatsoever of such knowledge in his singing.

No. All of the scientific knowledge one may acquire is no guaranty of success as a teacher, but is rather in the nature of a hindrance, because it is likely to lead him into mechanical ways of doing things. Further, the possession of such knowledge is no indication that one will use it in his teaching. How much of such knowledge can one use in teaching? How can he tell, save from the tone itself whether the pupil is producing it scientifically? It is a well-established fact that the more the teacher tries to use his scientific information in teaching the less of an artist he becomes.

Could it be possible that a beautiful tone could be produced contrary to the laws of science? It would be an extraordinary mind that would argue in the affirmative.

The most beautiful tone is the most perfectly produced, whether the singer knows anything of vocal mechanism or not. In such a tone there is no consciousness of mechanics or scientific laws. The vocal mechanism is responding automatically to the highest law in the universe—the law of beauty. The most scientific thing possible is a beautiful idea perfectly expressed, because a thing inherently beautiful is eternally true, hence it is pure science.

Every tone of the human voice is the expression of life, of an idea, a feeling, an emotion, and unless interfered with the vocal mechanism responds automatically.

He who by experiment or reading has learned the action of the vocal mechanism, and attempts to make his pupil control every part of it by direct effort may imagine that he is teaching scientific voice production, but he is not, he is only doing a mechanical thing in a clumsy way.

Is it a scientific act to tell a pupil to hold his tongue down, as one writer argued recently? Is a teacher calling into action the eternal laws of science when he tells his pupil to drive the tongue through the head, hoist the soft palate, groove the tongue and make the diaphragm rigid? No. He is simply doing a mechanical thing badly for want of a better way. It is no more scientific than kicking the cat out of the way if she gets under your feet.

Anyone who has learned the elements of psychology or philosophy knows that everything exists first as idea. The real universe is the one that exists in the mind of the creator. The real man is the part of him that thinks.

To hold that the body thinks or acts is equivalent to saying that Gray's "Elegy" was in the pen with which the poet wrote.

To a natural scientist the only real thing is what he can see, therefore he bases his faith on what he conceives to be matter; but if we study the great ones—Oswald, Huxley, Grant, Allen, and the like, we find that they have long ago reached the conclusion that there is no such thing as matter. According to Schopenhauer the world is idea, and this so-called material environment is thought objectifying itself.

Vocal teachers, like the members of other professions, are not altogether immune to an attack of intellect, and at such times the thought that they are doing something scientific is particularly agreeable.

The only study of science that can benefit any one is the study of causation, and causation cannot be cognized by the physical senses. We never see, hear, feel, taste, or smell cause. What we see or hear is effect. Causation is mental. Natural science is dealing with phenomena, with effect not cause. A regular recurrence of phenomena may establish a so-called natural law, but the law is that which caused the phenomena, "Law is force" says Hegel, and it is therefore mental. We are told that the law of the earth is its path around the sun. This is not true, the law of the earth is the mind which makes it revolve around the sun. If we would learn the nature, activity, and cause of anything we must look for it in mind not in matter. For this reason the process of voice production is psychologic not physiologic. When a pupil sings, what we hear is effect not cause. If he is doing all manner of unnecessary things with his lips, tongue, larynx, etc. what we see is effect and the cause is in wrong mental concepts. The thing which caused the tone is mental, the force which produced it is mental, and the means by which we know whether it is good, or bad is mental.

Of this we may be sure, that the tone the pupil sings will not be better than the one he has in mind. A tone exists first as a mental concept, and the quality of the mental concept determines the quality of the tone.

If there be such a thing as scientific voice production it will be found in the sense of what is inherently beautiful, and the scientific tone is one which will perfectly express a right idea or emotion, and in the nature of things there is an appropriate tone for everything that may be legitimately expressed, for they are correlated ideas.

Whence originated this so-called scientific voice teaching? That the old Italian knew nothing of it is well understood. They considered the process artistic rather than scientific. How does it sound, was their slogan. The thing uppermost in their minds was beautiful tone, and they were wise enough to know that when one has a definite concept of the pure singing tone he has a more valuable asset than all the mechanical knowledge he can acquire. They had but one end in view, namely, a finished artist, and everything they did was made to contribute to it. The artist always has in mind the finished product. The scientist tries to find out how it is done. The artist begins with the idea and works forward to its complete expression. The scientist begins with the physical mechanism and works backward toward the idea.

What is responsible for the change from the methods of the seventeenth and eighteenth centuries? It is safe to say that it did not come through the voice teachers.

In the early part of the nineteenth century an interesting thing happened. How it happened or why it happened at that particular time is not known nor does it matter. The human mind became all at once aggressively inquisitive. The desire to get at the ultimate of everything took possession of humanity and still holds it. The result was an era of scientific analysis and invention, the aim of which was to control the forces of nature. Previous to that time methods of living, production, transportation, agriculture, etc. were little different from that of biblical times. People and nations lived much to themselves. They looked within for their inspiration and developed their own national characteristics. But with the invention of the steamship, railway, and telegraph a change came. These improved methods of transportation and communication brought all of the mentalities of the world together, and soon all habitable parts of the globe were in daily and hourly contact. The result was a mental fermentation which increased the complexity of civilization immeasurably and the present exaggerated and unnatural condition of society is the outgrowth.

Between 1809 and 1813 were born Mendelssohn, Chopin, Schumann, Liszt, and Wagner. These men are known as the founders of the modern romantic school of music. They grew up with the new civilization and could not do otherwise than reflect its complexity in their music. That the new civilization was responsible for the new art there is no doubt whatever. All old types

have passed away. All branches of art have suffered radical changes in conforming to new ideals.

Since the wave of scientific investigation started around the world nothing has been able to escape it. The hand of the scientist has been upon everything, and to him rather than to the voice teachers must be given the credit for originating scientific voice teaching.

When the scientists began publishing the results of their investigations voice teachers at once became interested. The plan looked promising. It offered them a method shorn of uncertainties. A method that brought everything under the operation of physical laws; a method that dealt only with finalities, and would operate in spite of a lack of musical intelligence on the part of the student, and at the same time enable them to lay to their souls the flattering unction of science. True it ignored altogether the psychology of the matter. It said "do it this way and a beautiful tone will come whether you are thinking it or not, because scientific laws eternally operating in the same way eternally produce the same results."

The scientific method gave voice teachers an opportunity to work with something tangible, something they could see; whereas the development of tone concept, the artistic instinct, musical feeling, and musicianship had to do with things which to most of them were intangible and elusive. No one doubts the honesty of the teachers who became obsessed with the scientific idea. To them it meant increased efficiency and accuracy, quicker results with less effort, and so they broke with the old Italians, the basis of whose teaching was beautiful tone and beautiful singing. In spite of the honesty of purpose of all those who followed the new way, the results were calamitous. The art of singing received a serious setback. Voices without number were ruined. From the middle to the end of the nineteenth century the scientific idea was rampant, and during that period it is probable that the worst voice teaching in the history of the world was done. Large numbers of people with neither musicianship nor musical instincts acquired a smattering of anatomy and a few mechanical rules and advertised themselves as teachers of scientific voice production.

The great body of vocal students, anxious to learn to sing in the shortest possible time, having no way of telling the genuine from the spurious except by trying it, fell an easy prey, and the amount of vocal damage and disaster visited upon singers in the name of science is beyond calculation.

Fortunately the reaction has begun. Slowly but surely we are returning to a saner condition of mind. Every year adds to the number of those who recognize singing as an art, whose vision is clear enough to see that the work of the scientific investigator should be confined to the laboratory and that it has no place in the studio. We are beginning to see that the basic principle of singing is freedom in the expression of the beautiful, and that the less there is of the mechanical in the process the better.

Do not go gentle into that good night,
Old age should burn and rave at close of day;
Rage, rage against the dying of the light.

Though wise men at their end know dark is right,
Because their words had forked no lightning they
Do not go gentle into that good night.

Good men, the last wave by, crying how bright
Their frail deeds might have danced in a green
bay,
Rage, rage against the dying of the light.

Wild men who caught and sang the sun in flight,
And learn, too late, they grieved it on its way,
Do not go gentle into that good night.

Grave men, near death, who see with blinding sight
Blind eyes could blaze like meteors and be gay,
Rage, rage against the dying of the light.

And you, my father, there on the sad height,
Curse, bless, me now with your fierce tears, I pray.
Do not go gentle into that good night.
Rage, rage against the dying of the light.

Dylan Thomas, "Do Not Go Gentle"