INVESTIGATING F.M. ALEXANDER'S HUMAN VOICE

A SINGER'S PERSPECTIVE

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Abstract

An aspiring young actor, producer, and impresario with a few provincial credits to his name, F.M. Alexander likely found that he needed to teach in order to support himself. Like many performers from any period, teaching voice was a logical and practical extension of his artistic activities. Few artifacts exist that provide us with clues regarding what a singing lesson with F.M. Alexander might have entailed. His early pamphlet circa 1900, The Human Voice Cultivated and Developed for Speaking and Singing (HV), leaves us a few clues.

Editor's note: Voice- and breath-related terms italicized in the text are defined in the glossary located at the end of the article.

An aspiring young actor, producer, and impresario with a few provincial credits to his name, F.M. Alexander likely found that he needed to teach in order to support himself. Like many performers from any period, teaching voice was a logical and practical extension of his artistic activities. Few artifacts exist that provide us with clues regarding what a singing lesson with F.M. Alexander might have entailed. His early pamphlet circa 1900, The Human Voice Cultivated and Developed for Speaking and Singing (HV), leaves us a few clues.

Musically speaking we know that Alexander studied the violin for a brief period, and even helped to establish the short-lived Sydney Dramatic and Operatic Conservatorium with a conductor, where he was to teach acting (Bloch 2004, 26, 48). However, I have found no evidence to suggest that Alexander ever sang. Indeed, it has even been observed that in his later years he seemed to care little for music (Bloch 2004, 26). That Alexander promoted himself as a singing teacher is not in doubt. What is less clear is how someone with no discernable singing instruction himself taught singers.

As a professional opera singer specializing in leading Italian roles internationally for over 20 years and a teacher of the Alexander Technique, this question is of intense interest to me. This article will discuss and contextualize Alexander's early views on voice production from the practical performance perspective of an opera singer.

The human voice

From the extant literature, including *HV*, we know that Alexander identified two foundational skills for voice building. The first was 'full chest breathing' and the second 'proper manipulation' (n.d., 5). Each skill will be discussed with consideration given to specific music references made within the historical pedagogical context of the period, practical performance considerations, and current scientific thinking.

Full-chest breathing method, the first principle

Like many vocal pedagogues during his time, Alexander identified three systems of respiration (n.d., 6–8). These are generally identified by a prevailing movement in one part of the body during inspiration, and are paraphrased below:

- Clavicular: movement is generally seen in the shoulders and sternum
- Costal: movement is concentrated in the ribs, with abdominal contraction
- Diaphragmatic: outward displacement of the abdomen

To counter the above-listed prevailing respiratory approaches, Alexander proposed a fourth method that he identified as full-chest breathing. Determining how this method differs from costal breathing solely based on the *HV* pamphlet is not obvious since the differences between chest and costal respiration are not delineated in this pamphlet. Plausible inspiration for Alexander's full-chest breathing method comes from Browne & Behnke, a source cited in *HV*, in which they recommended 'the importance of filling the chest primarily at its base' (1884, 107). The specificity of their instruction is likely due to the context of the quote, which relates to the injurious effect of women's corsets on respiration compelling a high clavicular breath. Alexander relies on Dr. Merkel's description of costal respiration referenced above (8), which is quoted verbatim from *The Art of Breathing* (Kofler 1890, 38). Although Leo Kofler is not quoted in the *HV* pamphlet we know that Alexander was familiar with this source (Williamson 2009, 3). Kofler may be the most influential source for Alexander's breathing method since he describes the advantages of a fully expanded chest for singers, while cautioning against 'laborious effort' (1890, 44). While Kofler didn't claim that full chest respiration was unique or new, he did indicate that it was generally accepted as the most advantageous for singers (44). These pedagogical sources seem to have provided the foundation for Alexander's breathing method and the inspiration for using the word chest in lieu of costal or rib.

At the end of the nineteenth century, the growth of Alexander's practice was enhanced by medical doctors' referrals, due to his success in helping patients improve breathing function (Carrington 1994, 63). His respiratory method 'New in Australasia' (5) was likely borrowed from others and perhaps merely the beginning of his Technique's evolution. In order to better understand the progression of his vocal and respiratory teaching, we must consider more recent, firsthand sources.

We know that by 1909 Alexander had abandoned the full-chest breathing label and rejected the suggestion that one breathes 'with a particular part of the body' (2015, 91). This comment was made in a response to a lecture on respiration by one of his pupils, Dr. Scanes-Spicer, that promoted back breathing. Fueled by animus due to a feud conducted through public letters and a claim that the doctor was plagiarizing his work (Bloch 2004, 86), it's possible that Alexander was quibbling. Dr. Scanes-Spicer's narrative is supported in a more contemporary account of Alexander's respiratory method by Dr. Barlow, a trainee, who also suggests that inhalation is a back activity (1990, 196). Based on these firsthand accounts from doctors, it's conceivable that

Alexander's students would have described his method as back breathing, at least in comparison to what they had previously experienced.

Breathing-gymnastics

In order to master his respiratory method, Alexander identified three areas requiring what he referred to as 'breathing-gymnastics' exercises to address faulty respiration. These are paraphrased below:

- Development and control of the inhalatory muscles
- Training and control of the muscles related to the extended exhalation
- Quick replenishment of air exclusively through the nose (n.d., 9)

Notice that the inhalatory and exhalatory phases are separated, as they are in the contemporary pedagogy texts previously discussed with which he was familiar. He seems to have simply adopted the nomenclature and breathing exercises then in vogue. What Alexander does acknowledge in *HV*, even at this early stage in his development, is that inhalation and exhalation are connected, stating that from 'the voice-user's standpoint the one is useless without the other' (9). It is notable that there is no specific mention of physical coordination of the entire individual in conjunction with the proposed breathing-gymnastics in this early pamphlet. While this term evokes a sense of flexibility in modern-day parlance, based on the breathing examples cited later it's likely he meant something less acrobatic.

Alexander defaulted to the descriptive word gymnastics when speaking of the exercises he offered. This aligns with the language in this era's vocal literature (Browne and Behnke 1884, 125). The focus on exercises during this time may also serve to illustrate the dominant voice training culture to which Alexander had to adapt as a teacher. Singing exercises or *vocalises* in particular were and still are taught in a systematic way to build the coordination necessary for singing.

In fact, an even stricter vocal approach was exercised during Alexander's period than is used today, as singing teachers such as Mathilde Marchesi (1821–1913) would often withhold repertoire until a student could execute vocalises well (1970, xvii). However, a voice student would not expect to restrict their activities solely to breathing. While vocalises require phonation, they often seek to integrate the breath in specific ways. These types of singing exercises were composed and published by many famous teachers including Marchesi. Since Alexander invoked her name in *HV*, her vocal contributions will be discussed in more detail later.

Inhalation

It is unclear from this early pamphlet how Alexander sought to develop the necessary muscular coordination during inhalation. Although he acknowledged that each student was assessed individually (n.d., 9), much is left to the imagination. One possible source of inspiration comes from the singing teacher Behnke, who appended a breathing exercise to his book specifically addressing inhalation (1895, 106–107). The exercise is curiously similar to the semi-supine procedure used by teachers of the Alexander Technique.

Extended exhalation

The second phase of respiration related to breathing-gymnastics is the controlled or extended expi-

ration. Again, specifics in *HV* are lacking. Since facility with this respiratory phase is foundational to how singers control the voice, a quick synopsis of current research regarding the phenomenon of passive elastic recoil in the lungs is helpful.

At high lung volumes there is a mechanically advantageous passive pressure. This means that at the beginning of a controlled exhalation, when the lungs are full, the inherent recoil pressure requires very little active muscular participation. The physical effort required is just enough to act as a brake, so the natural elastic recoil action doesn't release the air all at once. As lung volume depletes during expiration, active muscular pressure is gradually increased to become the dominant regulating factor controlling the balance and coordination of the exhalation (Hixon 2006, 78). It is this regulation and coordination that makes expiration efficient. Alexander viewed 'economy in exhalation' (n.d., 10) as the key factor to attain what he considered vocal perfection. The ability to effectively coordinate breath pressure and phonation during expiration is what singers refer to as support or *appoggio* (Stark 1999, 120) and what Alexander was referring to as antagonistic action in respiration by 1906 (2015, 46–47).

The corollary to elastic recoil at high lung volumes is the laryngeal pull theory. This working hypothesis suggests that as the diaphragm descends there is a systemic caudal pull on the trachea and attached larynx (Iwarsson and Sundberg 1998, 164). Studies of singers and non-singers show pulls of varying degrees, likely due to the singers' ability to counter the effects on the larynx during phonation (Hixon 2006, 107–108). This pull affects the vertical laryngeal position, which will be explored in more detail during the discussions on vocal manipulation and the *articulators*.

Nasal respiration

The third area Alexander identified as an essential element to good respiration was the rapid intake of the breath exclusively through the nose. He was likely familiar with at least two elocutionists who promoted this principle. Thomas Padmore Hill, father of Fred Hill, one of Alexander's teachers (Bloch 2004, 31), advocated for nasal inhalation exclusively (1873, 18). Although Alexander didn't often credit Hill, it has been noted that he borrowed liberally from this source (Staring 2015, 2). Conversely, Charles Hartley was directly identified in Alexander's 1894 "natural elocutionist" advertisements (Staring 2015, 2). In contrast to Hill, Hartley's respiratory instructions include inhalation through both the mouth and nose in order to facilitate a more rapid intake of air when necessary (n.d., 14). Alexander may have been predisposed to adopt the strict nasal approach due to his own childhood breathing difficulties (Brennan 1992, 1), which may have been exacerbated by his premature birth (Kellow 2020).

There are many vocal pedagogues that advocate for nasal inhalation when possible due to its health and sanitary benefits. However, breathing exclusively through the nose is a difficult concept for singers to reconcile because it's simply not always possible to inhale nasally in the allotted time during or between phonation tasks. Unlike actors, singers cannot extend the time they have to breathe. Although there is evidence to suggest that singers have a *vital lung capacity* that is 20% greater than non-singers, indicating that they are trained to use their lungs more efficiently (Sundberg 1987, 35), the physics governing respiration indicates that inhalation is not instantaneous. It takes about a second during rapid inhalation to refill a singer's vital capacity, even when inhaling through both the nose and mouth (Sundberg 1987, 38). Some types of extended musical phrases are simply more conducive for performance by an instrument not fueled by the breath, like a keyboard or violin.

Respiration before the initial phrase and longer intervals between phrases are the only practical times to use nasal respiration during a musical performance. In professional operatic

performances the conductor establishes all tempos. There is a lot to balance and they cannot always wait for singers to breathe nasally. It is interesting to note that Alexander acknowledged that even doctors believed it necessary to breathe through the mouth during periods of high respiratory demand (1905, 33), even though he continued to disagree. His hyperbolic claim that nasal replenishment happens in an "infinitesimal part of a second" (2015, 77) was perhaps meant to inspire his pupils. However, it is optimistic at best and from this singer's experience functionally impractical especially during demanding or rapid phonation. Alexander's unswerving commitment to the nasal respiration principle resurfaces in 1923 when he states that breathing through the mouth is a perversion (Alexander 1987, 105). It is my opinion that a rigid attachment to this idea would deprive the world of many expert musical and athletic endeavors. Perhaps the relevant Alexander Technique principle to discuss concerns conscious awareness during the execution of a task so that undue tension is kept in check and recovery is swifter after extreme exertion.

When summarizing respiration, it's worth noting that multiple studies have shown that muscle recruitment for breathing during singing is highly individual, and may include the abdomen, thorax, and even the neck (Massery 2006, 703; Pettersen 2005, 5–6; Sundberg 1987, 28). The extent to which these muscles engage depends generally on how efficient the singer's coordination is and, more specifically, on the musical demands. When considering respiration for high load professional singing, it's helpful to consider a balanced muscular coordination that includes both the thorax and abdomen working synergistically (McCoy 2012, 91). Inhalation through both the nose and mouth is necessary at times.

Manipulation of air, the second principle

The second foundational principle that Alexander identified as key to voice building was the manipulation of air during the controlled exhalation. It's important to note that he conceded a difference between air manipulation during speech and song but did not elucidate further (9–10). This view is consistent with Browne and Behnke, who further note that there is speech in song and song in speech (1884, 35). They continue by identifying differences between the two including an extended exhalation phase and greater pitch range during singing (35). Hartley agrees that the two are distinct for those reasons (n.d., 3, 14). Recent research has shown differences between speech and singing on a neural level. Specifically, the brain prepares the larynx for vocal fold *adduction* before the exhalation phase begins for singing, contrary to speech (Dichter et al. 2018, 26). This supports the longstanding pedagogical instruction of a pre-phonological set for singing (Stark 1999, 30). Simply stated, while speaking may be initiated without laryngeal preparation, singing coordination must be prepared in advance of the exhalation phase. This allows for a sustained tone while meeting the demands of volume and pitch.

Singing is *periodic* in nature, due to the sustained regular and predictable acoustic patterns produced during classical singing (Doscher 1988, 72). As a rule, speech does not have this quality and is considered acoustically aperiodic. Periodicity can contribute to efficient phonation due to the acoustic interactions between the *glottis* and the *vocal tract*, known as *nonlinear source/filter theory*, which is discussed in more detail later. For now let us continue our discussion of speech, since this was Alexander's primary area of vocal interest.

To understand the style of elocution during the late nineteenth and early twentieth centuries, we might consider the performances of actors like Sarah Bernhardt. Alexander presumably thought highly of her, since he later claimed to have seen all of her Melbourne performances (Bloch 2004, 31). French theatre critic Paul de Saint-Victor observed that she had a "sing-song" style (Huret 1899, 31, 43). We can hear for ourselves how the Divine Sarah spoke since some of her recordings are still available. The quality of imbuing song in speech is easily discerned. It is reasonable to

note that vocal qualities that were prized in the pre-amplified Victorian era differ from what one commonly hears today. This sing-song quality tends to sound artificial to our modern ears, and the acoustic advantage it may have afforded is less relevant in the age of amplification.

While Alexander did not mention Bernhardt in *HV*, he did cite Mathilde Marchesi, a famous contemporary voice teacher based in Paris. In the quote below, he seeks to create a level of developmental equivalency between the disciplines of speech and song.

> Every speaker must produce the voice properly before the organ will develop its full powers, and singers must study the art of speaking to perfect the singing voice. Marchesi, the famous teacher, insists upon the study of elocution with all pupils. (30)

Madame Marchesi's curriculum included more than singing lessons: "pronunciation" was indeed part of the training for the young ladies attending *L'École Marchesi* (1989, 225). She believed that the ability to be understood was a vital part of the art of singing. Marchesi also stated adamantly that singing should not be "common property" and that few were competent to teach it. "Each one seeks to invent a new system, and each one thinks he has found the right thing" (179). One might say that while she wanted her students to be able to communicate the text, she did not think that doing so was a substitute for proper training as a singer.

Scientifically, there is little evidence to suggest that we should assume a developmental link between speech and song. In the past 25 years there have been a few studies examining the link between singing instruction and speech. Results on the benefits of cross training are inconclusive. In one study the transfer effect of voice training in students found no parallel enhancement in speech as a result of singing improvements (Mendes et al. 2004, 83-89). In another, even with measurable acoustic progress in the students' singer power ratio, differences between singer and non-singer speech were not perceptible (Lundy et al. 2000, 490–493). However, there is some evidence to suggest that professional singers' speech does differ from non-singers (Omori et al. 1996, 228–235). It could be hypothesized that this relates to the extended period of vocal instruction, as well as to the level of overall vocal expertise demonstrated by professionals over students and non-singers.

The acoustic spectrum

The singing voice produces complex tones. This means that the fundamental sound we hear as the "pitch" is enhanced by an entire spectrum of formants that sound simultaneously (Sundberg 1991, 24–25). Generally speaking, the classical voice is concerned with the first five formants. The first two allow us to identify a specific vowel (Sundberg 1987, 23) and the next three are typically thought to be crucial to timbre and the *singer's formant* (Sundberg 1991, 123). The singer power ratio referenced in the study above is also known as the singer's formant and colloquially as *ring*. The resulting timbre is usually identified as operatic, but it is also used in traditional twentieth-century musical theatre. Formants define the vowel, give the voice its unique color, and help to perceptually define one musical style from another.

Opera and symphonic singers, performing with an orchestra, benefit from a boost in the singer's formant, or overtones, around 3 kHz (Sundberg 1991, 118). This is the level at which the frequencies in an orchestra attenuate (McCoy 2012, 49). Essentially, the instruments in a symphony orchestra start to cancel each other out in this specific acoustical range where, coincidentally, the human ear is the most sensitive. This is how one unamplified singer can be heard over a large symphony. The singer's formant phenomena could be considered the acoustical equivalent of mechanical advantage for classical singers. A ringing sound improves audibility without an increase

in pulmonary pressure and muscular effort. Its development is desirable for operatic singing and is especially helpful for men who phonate at lower frequencies than women (McCoy 2012, 118). This acoustic advantage is enhanced through the manipulation of the articulators, including the larynx, which will be made clearer in the vocal tract section.

Resonance

Given the predominant singing style at the turn of the twentieth century and the operatic names cited in this pamphlet, it is fitting to discuss Alexander's concept of manipulation and resonance in terms of the demands for operatic or high load acoustic singing. His description of manipulation is referenced here.

> By manipulation I mean the throwing of air back upon the vocal chords [sic] after the inhalation. Upon this throwing back of air upon the vocal chords [sic] the quality, power, etc., of the voice depends…After the manipulation has been perfected the student must turn his attention to the proper formation of the resonance cavities which convert the tone into the different vowel and other sounds necessary to vocalization. (n.d. 10)

If I paraphrased the entire quote in more modern scientific terms, resonance could be defined as the way in which air is managed at the laryngeal level and propagated in the vocal tract to affect the sound quality. We can see from the above quote that Alexander intimates that manipulation of the air happens at the vocal fold or glottal level. Assuming that his use of the word manipulation means skillful adjustments of the air flow, this must also be applied to the vocal tract, as we will see in the section following. Alexander abdicated responsibility for defining resonance, preferring simply to adopt Helmholtz's description of the oral pharynx as the place where vowels are formed and resonate (10). The overtone theory Helmholtz espoused is prescient and established the basis for modern formant theory (Stark 1999, 46-47). However, Alexander displays only a basic understanding of it here. As previously discussed, resonance is responsible for more than the specific vowel we hear. In addition, the vocal tract is comprised of several air cavities used during resonation, only one of which is the mouth. The mobility of each articulator can affect changes in the size and shape of the entire vocal tract, which in turn affect resonance. The human voice depends on air molecule vibration and sound wave reflection in all of the air cavities of the vocal tract, an interaction that is referred to as *free resonance* (McCoy 2012, 27).

The vocal tract

The vocal tract enhances or attenuates different sound waves or frequencies depending on its shape. The articulators (lips, tongue, jaw, velum, and larynx) continuously influence the resonant properties in the vocal tract in an ongoing and dynamic process, as figure 1 shows (Sundberg 1987, 93). Using MRI technology allows us to see how the articulators shift not only for different vowels and consonants but also for different vocal styles (Ross 2017). To add even more complexity to our understanding of how the voice functions, current nonlinear source/filter theory indicates that some sound waves in the vocal tract (filter) reflect back onto the vocal folds (source), which can directly affect glottal oscillation (Titze 2008, 1913). Singers employ acoustic strategies by exploiting their articulators to boost specific formants to enhance phonation effectiveness. Skillful application of acoustic principles can ensure that source/filter interactions boost oscillation

efficiency and can even increase volume without additional physical effort (Titze, 1913). The most efficient type of phonation at the laryngeal or source level balances glottal tension with air pressure. Voice scientist Johan Sundberg refers to this as *flow phonation* (1987, 80). The air cavity closest to the glottis or vocal source, called the *epilarynx*, is located in the laryngopharynx. This is often overlooked as an area of vocal tract resonance by non-singers. Each little air pocket or area of constriction in this area has the potential to affect the resonance in profound ways. One example of this is the periform sinuses, which have been hypothesized to enhance the singer's formant and ring when closed, as seen in figure 2 (Titze 1997, 2234). Through a laryngoscope, we can observe one way in which this closure might occur. As the root of the tongue moves back, or retroflexes, it impinges on the epilarynx, causing it to narrow and the epiglottis to close slightly (Obert and Ballantyne 2019). The periform sinuses are closed indirectly through this movement. The result of this maneuver will likely resemble the "bulge" to which Wragg objected (2017, 26). It would behoove us to keep an open mind and ask whether it's a case of undue tension or if a singer is making this choice based on the acoustic advantage it provides. It is important at this point to note that not every singer adapts the articulators or vocal tract in the same way. All singers and vocal tracts are unique.

The larynx

The larynx, an important and mobile articulator at the base of the laryngopharynx, is able to alter the quality as well as the volume of a sound through changes in its vertical orientation (Echternach et al. 2016, e0153792). The laryngeal pull hypothesis, mentioned earlier, that occurs as part of the respiratory cycle plays a role here. A lower laryngeal position is considered desirable for the production of a classical singing tone because of the darker color and ringing quality it produces (Sundberg 1987, 120). This is an important point because many teachers of the Alexander Technique see this vocal maneuver as a depressed larynx. Each approach to vocal technique must reflect the demands of its specific acoustic environment as well as the particular vocal style required. A lowered larynx is not a universally desired outcome. The sound generated by a lower larynx may not be advantageous in other musical genres (Popeil 2018, 91).

In his *HV* pamphlet, Alexander referenced the larynx in two ways. He disparaged the fixed larynx, while noting that laryngeal position changed with pitch (7–8). If we combine these two elements, we could say that he advocated against laryngeal rigidity and acknowledged that the height of the larynx rises for high pitches and lowers as the pitch descends. As we have now seen, laryngeal height is not limited to pitch; it can also affect the musical style, volume, and timbre of a sound. Curiously, Alexander didn't mention the depressed larynx in *HV*, which is what he identified as his persistent habit in a number of publications including notably *The Use of the Self* (2001, 27).

It has too often been my experience that Alexander Technique teachers have a fixed idea regarding the lowering of the larynx as necessarily undesirable based on Alexander's recounting of his own experience. When adjusting a singer's articulators, teachers ought to be aware of the immediate effect any small movement in the vocal tract has on resonance and vocal quality. Imposed changes are not always a net positive for the singer. Because an opera singer vocalizing in close proximity can be overwhelming to the uninitiated, a teacher must carefully consider if their ears are educated enough to suggest changes to the articulators, and consequently to the vocal tract. I contend, based on my experience and the scientific evidence, that the larynx must remain flexible enough to lower as needed. This lends a distinct mechanical advantage for many classical singers. An Alexander Technique teacher's objective should be to eliminate undue tension, while allowing for adequate stability to support high demand vocalization. Laryngeal flexibility and

stability must be balanced to meet the demands of the specific vocal task. Today's professional operatic standard requires a ringing rich timbre, which is enhanced by a lower laryngeal position.

F.M. Alexander speaks to singers

There is one specific short passage in *HV* in which Alexander directly addresses singers. Here he references breathing-gymnastics yet again and ends with a litany of historically well-known operatic names.

> For the benefit of singers, it may be mentioned that the breathing-gymnastics imparted at my studio include the exercises in full by which the celebrated singer Farinelli (pupil of Porpora and Bernacchi) gained that marvellous [sic] control over the breath for which he was noted. (11)

It's helpful to clarify this statement by putting it into context. Farinelli (1705–1782) and Bernacchi (1685–1756) were famous eighteenth-century castrati, and sometime rivals, known for their *canto d'agilità* common to this period. It is mere conjecture to state that Farinelli formally studied with Bernacchi, although it is interesting to note that this statement also appears verbatim in Kofler's book (1890, 89). Nicola Porpora (1686–1768) has been identified as Farinelli's teacher by many, including noted musicologist Stark (1999, 205).

Porpora, a composer and voice teacher, would likely have focused on the skills required to sing the rapidly moving and ornamental music common to Baroque vocal literature. Australian singers at the end of the nineteenth century would likely have been expected to sing rapid scales and other florid exercises to develop and expand their vocal flexibility. In fact, this type of vocalization is still common today. These types of exercises could easily be described as gymnastic from a singing perspective. However, as we shall see, it cannot be assumed that this is what Alexander taught.

Neither Farinelli's nor Porpora's exercises are believed to have been published by either musician. Therefore, determining exactly what exercises Alexander is referring to requires a little deduction. Kofler records one exercise that he attributes to Farinelli (89, 94–95). Noting that he was exposed to many singers in his father's house in Austria, as well as in Berlin (9, 13), Kofler nevertheless neglects to cite his source for Farinelli's breathing exercise. He notes the exercise details, including an oral inhalation, which he insists does not contradict his strict nasal inspiration principle due to the narrow lip aperture (89). Richard Miller identifies a similar but more rigorous exercise attributed to Farinelli in which respiration is broken into three distinct periods including an inhalation, suspension, and exhalation of equal and increasing length (1986, 31). These voiceless, exclusively respiratory exercises may well represent a version of what F.M. Alexander taught to singers.

Domenico Corri (1746–1825) is arguably a more direct source for Porpora's breathing since he was his student (1810, 1, 14). Assuming that Porpora's training methods were accurately represented, and these exercises were the ones used by Farinelli, then singing respiration at that time was based on what is known today as *messa di voce*. Lamperti (1839–1910) stated that the messa di voce should be attempted only by more advanced singers and is "produced solely by breath control" (1905, 21). This lends credence to Alexander's use of it. The view that messa di voce is not for beginners is held by many pedagogues, although Stark notes that some voice teachers pre-dating this period thought that messa di voce was one of the first exercises that must be mastered (1999, 99). The antithesis of florid musical phrases, this exercise consists of dynamic control on a single pitch. It is challenging to accurately represent the difficulty of this exercise to non-singers because dynamic shifts on one note sound like a clear-cut and simple vocal exercise.

As a performer and vocal pedagogue, I can simply state that it involves a very complex coordination. Air pressure and laryngeal tension must be dynamically balanced based on the specific pitch and vowel combination. I have yet to meet a beginner who could execute this exercise successfully. It is likely that any singer who came for voice lessons with Alexander, a non-singer, would have been less experienced and would have lacked sufficient expertise to perform this exercise adequately. It is equally questionable that Alexander had the vocal ability or experience to guide singers through the execution of this exercise in order to improve vocal quality.

Did Alexander instruct his singers to sing the messa di voce, or perhaps use the equivalent spoken exercise as set forth in Russell's *Orthophony*? Vocal gymnastics in this publication were identified as the "daily practice of the various gradations of force" (Russell 1877, 76). These instructions reflect the dynamic changes throughout the sung messa di voce. The question regarding whether messa di voce was included in Alexander's lessons remains. However, it is fitting to ask which vocalises were used, since it is unlikely that singers would have been content to study respiration alone.

Before abandoning this inquiry into the exercises Alexander might have used to instruct vocalists, it's worth looking at an interaction he had with a singer, which was recorded in the *Daily Express* in 1904, shortly after his arrival in London (*Daily Express,* 1904). This article describes an encounter in which the singer sang a few scales during an examination, likely held at Dr. Scanes-Spicer's office. Based on the narrative in this article, it seems very possible that singers would have vocalized at least a little during lessons with him, although his emphasis was predominately on the breath not tonal quality. The writer does not capture any demonstration of singing expertise by Alexander the "specialist."

One biographer suggests that an elocution lesson with Alexander would be considered a voice lesson today (Bloch 2004, 39). I propose that perhaps a voice lesson is not always a singing lesson, and many people can listen to singers vocalize without providing salient vocal contributions.

Singing at the dawn of the twentieth century

In the late nineteenth and early twentieth centuries, when Alexander was teaching voice, the earlier styles of singing had been undergoing a change for some time. The bel canto era, evolving from Porpora's time, had developed into a highly ornamented and florid singing style with an expanded vocal range. However, this trend was giving way to the increasingly more dramatic compositions of Giuseppe Verdi (1813–1901) in Italy and Richard Wagner (1813–1883) in Germany. By the twentieth century, Giacomo Puccini (1858–1924) was among the composers writing in a more realistic or *verismo* style, which posed new challenges for opera singers. Orchestras and opera houses had both grown dramatically in size, and by the time Richard Strauss (1864–1949) penned his operas, the number of orchestra members could exceed 100. This is a lot for a singer to acoustically overcome, and performance practice was heavily impacted by these changes as vocal flexibility was often sacrificed for a more robust vocal quality (Stark 1999, 219). At the end of the 1800s, the preference for a less specialized and fuller vocal sound, or *canto spianato*, overtook the canto d'agilità style. In reality, both singers and teachers tended to lag behind musical innovation (Stark 1999, 217). This indicates that agile and florid singing using a lighter vocal weight was likely still the Australian ideal during Alexander's time.

Conclusions

Throughout this article I have attempted to contextualize the athletic demands required of pro-

fessional opera singers and relate them to Alexander's early writing on the human voice. As a teacher of the Alexander Technique, it's important to consider the pragmatic requirements of high load singing, and how it might differ from a neutral, less athletic vocalization. Much like Walter Carrington's account of the extra stability required when horseback riding (Carrington 1994, 124), operatic singing requires a performer to harness a tremendous amount of energy. If we equate singing to the various horse gaits, then singing "Happy Birthday" is walking, while singing karaoke might be a trot. More effort and expertise are required when singing a solo recital with a piano making it more of a canter. The gallop is reserved for high load vocal exertion. In the classical world this would equate to singers performing with a symphony orchestra. Even within this latter category there is a wide range of repertoire and voice types, with the heavier more dramatic voices having to balance artistry with the highest air pressures and effort. Current Western classical singing tradition requires a warm, resonant vocal quality, facilitated through a lower laryngeal position (Callaghan 2014, 91).

I trust that I have given some perspective into how singers may adapt their instrument to take acoustic advantage when performing music requiring a perceptual ring. Vocal quality ought to be enhanced according to the professional standards of a particular genre and should not be altered based on any teacher's opinion it they lack the requisite musical foundation to evaluate the sound. I submit again that the most relevant Alexander Technique principles to follow when working with professional opera singers are eliminating undue tension while allowing adequate stability and adjustments for acoustical advantage, skill maintenance through conscious awareness, and recovery after exertion.

The *Human Voice* pamphlet is a promotional tool that yields few clues to F.M. Alexander's teaching. Ultimately, it provides a somewhat obscured snapshot related to his grounding in vocal pedagogy and the limits of his knowledge of the singing voice. Although there have always been a myriad of vocal styles, HV was written during a period in which classical singing dominated both the training as well as the vocal publishing industry. Throughout the operatic world, vocal production was shifting from a lighter, flexible, and clear singing ideal to darker and richer tones that

demanded a perceptual ring. Practically speaking, amplitude had a great impact on the vocal sound by the end of the nineteenth century, as singers were routinely required to produce greater volumes (Bethell 2020). I suggest when working with professional singers that teachers of the Technique consider the specific performing environment as well as the expected timbre and amplitude their pupils are required to produce.

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Glossary

Adduction: Describes the closing phase of the glottis, or medial movement of the vocal folds toward each other to facilitate phonation.

Appoggio: Refers to the complex equilibrium and coordination between respiration and phonation. This is what singers also call support.

Articulators: Refers to the moving parts in the vocal tract to create language and affect vocal resonance. The articulators are the lips, tongue, velum, and uvula, as well as the vertical laryngeal position.

Bel canto: Translated this means beautiful singing. It also refers to a particular period in opera primarily the early nineteenth-century compositions of florid and highly ornamented music by Rossini, Donizetti, and Bellini. The phrase is used by many to describe an expert singer able to skillfully execute a chiaroscuro timbre, as well as shifts in pitch and dynamic intensity. Other qualities include equal registration, coloratura skills, and a pleasing periodic vibrato.

Canto d'agilità: A highly florid and ornamented style of singing. The style of vocal production is generally clear and light.

Canto spianato: Refers to a broad style of music encompassing extended use of legato, smooth registration, messa di voce, clear articulation, varied timbres, and limited but tasteful ornamentation. The vocal production is generally quite full and rich.

Castrati: (Plural of castrato) Refers to singers who were castrated while young in order to preserve their soprano range. As these singers matured they attained the strength and lung capacity of an adult. Their voices were valued for the combination of flexibility and power. Because of those traits, the castrato is thought by some to epitomize the ideals of bel canto singing.

L'École Marchesi: The name of Matilde Marchesi's school where she trained female singers in Vienna and later Paris. She devised her own curriculum formed entirely around group classes. These included studies in the formation of the voice, pronunciation, and style. Singers on a professional track would also train in either concert or operatic repertoire.

Epilarynx: This is the area directly above the glottis. It refers to part of the laryngopharynx that is sometimes referred to by speech language pathologists and also referred to in France where it is considered by some as a separate anatomical area.:

Flow phonation: A phrase coined by voice scientist Johan Sundberg. This is considered the most efficient vocal production at the vocal fold level due to the optimal balance of the air pressure and the tension in the closed glottis (adduction force) during oscillation cycles. This type of vocalization can be contrasted with breathy phonation on one end of the spectrum and pressed or pushed phonation on the other end.

Free resonance: Refers to a sympathetic vibration of air molecules in a void or cavity. This includes sound waves reflected within the void. Unlike forced, or conductive, resonance that is used in the piano or violin, there is no transfer of vibration to the body of the instrument affecting the resonance perceived by a listener. The voice uses free resonance to propagate sound. While forced resonance may be felt in a singer's body during phonation, it does not directly affect what a listener hears.

Glottis: The opening between the vocal folds through which we breathe. This is where phonation occurs as vocal folds oscillate to create the source of the vocal sound.

Messa di voce: A single one-note vocal exercise requiring an even crescendo and decrescendo from a very soft dynamic to a loud peak and returning to the initial soft dynamic. This exercise is executed in one breath and historically singers were trained to sustain the tone for eighteen to twenty seconds. Ideally the intonation, vibrato, and vocal quality remain the same—only the dynamic changes. During the nineteenth century this exercise would have been developed throughout the entire range, generally two octaves.

Nonlinear source/filter theory: Source/filter theory refers to the sound produced at the vocal source (glottis), which is then filtered by the articulators of the vocal tract to enhance or attenuate specific formants. In nonlinear theory the interaction of the sound waves in the vocal tract reflect back on the glottal source either boosting or interfering with vocal fold oscillation.

Periodic: Refers to a sound wave with a repeated pattern and a regular oscillating frequency. Strictly speaking, most sung vowels are considered quasi-periodic because there are slight im-

perfections in each sound wave, but perceptually they sound regular and therefore they are called periodic.

Singer's formant: An acoustic strategy used primarily by male opera singers to enhance the overtones in the 2400 to 3200 Hz range. When a combination of the 3rd, 4th, and/or 5th formants in the vocal tract are boosted, the overtones lend an operatic ring to the tone. This helps the singer to be heard over a large orchestra.

Verismo: Refers to a post-romantic operatic movement that moves toward dramatic realism. It is derived from the Italian word vero meaning true.

Vital lung capacity: This is the difference between the total lung capacity and the residual volume, which is the amount of air always present in the lungs. This capacity is essentially the working capital during phonation.

Vocal tract: Refers to the areas of vocal resonance. It consists of a series of continuous air cavities (laryngopharynx, oropharynx, and nasopharynx) in which the sound source from the glottis is filtered to create the individual qualities of a sound including the vowel, timbre, or vocal style.

Vocalise: A singing exercise used to develop vocal flexibility and technical skill often consisting of a musical passage without text.