

SONG AND WIND: AN EXPLANATION OF THE APPROACH FOR TEACHERS OF
BEGINNING BRASS STUDENTS

by

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TABLE OF CONTENTS

Chapter	Page
I. INTRODUCTION.....	1
II. SONG.....	4
III. WIND.....	12
IV. BUZZING AND SINGING.....	20
V. PRACTICE AND PERFORMANCE.....	29
VI. TOOLS AND DEVICES.....	49
BIBLIOGRAPHY.....	56

I. INTRODUCTION

The purpose of this lecture-document is to serve as a reference to Arnold Jacobs's philosophy of *Song and Wind* and an easily accessible guide for the music educator. Many books, articles, and method studies involving Arnold Jacobs' teaching are referenced in this document. Each chapter identifies content related to the topic of each chapter title.

The content in this document is primarily meant for the knowledge of the music educator. Arnold Jacobs did not discuss every topic with each student. Instead, Jacobs provided the student with the information the student needed and allowed the student to continue with habits that were already successful. Knowledge is power, but too much information may hinder a student's growth. Each quote or topic should be used to help guide a student towards healthy habits, but not detract from the healthy habits present.

The quotes provided in Bruce Nelson's *Also Sprach Arnold Jacobs* are frequently referenced in this document.¹ Nelson took many of Jacobs' statements and expounded upon these statements in his collection. This lecture-document includes many of Jacobs' statements, but is categorized by an explanation of the approach, practice techniques used away from the instrument, and suggestions for building practice sessions and reducing performance anxiety. This document, by no means, is meant as a replacement to *Also Sprach Arnold Jacobs*, but should be considered an additional resource for an educator.

Later drafts of this document contain references to Kristian Steenstrup's *Blow Your Mind*. This invaluable resource gives exceptional detail to Arnold Jacobs' approach, and provides other insights that can help a student at any level. The material extracted and adapted from Steenstrup

¹ Jacobs, Arnold and Bruce Nelson. *Also Sprach Arnold Jacobs: A Developmental Guide for Brass Wind Musicians*. Mindelheim, Germany: Polymnia Press, 2006.

is also not meant as a replacement, but will hopefully serve as a catalyst to encourage further exploration into Steenstrup's work.

Song and Wind has become a prominent approach for brass students, originating from the teachings of Arnold Jacobs. Jacobs performed with the Chicago Symphony for forty-four years, and Jacobs's success as a teacher was largely because of his understanding of human anatomy and the mind. Jacobs's students have held prominent positions both as teachers and performers throughout the world. Jacobs's area of influence in pedagogy is large; however, few documents have been directed at persuading an early instrumental educator to adopt Jacobs's approach, such as Gregory Irvine's *Arnold Jacobs's Legacy: Sound Advice for Developing Brass Players*.² This lecture-document will seek to explain Arnold Jacobs' approach and its importance in early brass education.

Jacobs' brass pedagogy later became known as *Song and Wind*. This phrase originates from song being a reference to the importance of sound in the mind, and wind being a reference to airflow at the lips. Jacobs independently studied many different medical books throughout his life and even collaborated with medical professionals, many of whom he met when the student came to study tuba with him. Jacobs frequently applied this knowledge of the body to explain how breathing more efficiently could produce a greater sound, with ease and physical comfort.

Jacobs taught a multitude of private students and gave numerous masterclasses around the world. However, Jacobs' academic writing was limited to a commentary in Harold Rusch's *Hal Leonard Advanced Band Method for Basses (Tuba)*, and a few articles attributed to Jacobs but edited by staff from the *Instrumentalist*.³⁴ In some instances, Jacobs did allow students to

² Irvine, Gregory B. *Arnold Jacobs's Legacy: Sound Advice for Developing Brass Players*. Scholar Publications, 2015.

³ Rusch, Harold W. *Hal Leonard Advanced Band Method for Tuba: Special Studies by Arnold Jacobs*. Hal Leonard, 1963.

record lessons and masterclasses, and these recordings in addition to student recollections have been documented and disseminated to brass players throughout the later part of the twentieth century. A brief list of links is provided in the audio section of the bibliography, and those documents are the inspiration of this lecture-document. Note: every quote in this document is from Arnold Jacobs unless specified otherwise.

⁴ Frederiksen, Brian. "Arnold Jacobs A Bibliography." *Windsong Press*, www.windsongpress.com/jacobs/written/.

II. SONG

Arnold Jacobs often discussed the connection between brass playing and singing. The process of creating sound for a singer and brass player is remarkably similar. As a singer begins to sing, he or she activates the tenth cranial nerve, also called the vagus nerve. The tenth cranial nerve sends signals through a branch of the nerve, called the laryngeal nerve, to the larynx. In conjunction with wind, these signals allow the larynx to produce a pitch. Instead of the tenth cranial nerve, the brass player utilizes the seventh cranial nerve, or the facial nerve, which ignites signals to the lips. This signal, in conjunction with wind, causes the lips to vibrate. The vibration occurring at the lips and inside the mouthpiece produces the pitch.

The similarities of a singer and brass player are both physiological and psychological. Many instruments, for example piano, can produce a sound using one specific motion or technique to create the desired pitch. The voice, however, is not as easily controlled. A singer must have a strong mental concept of the sound he or she wishes to create, and this signal is sent from the tenth cranial nerve. This concept of sound is also how a great brass player produces the specific pitch and sound. This chapter contains Arnold Jacobs quotes that illustrate the importance of the mind in creating music and producing a great sound.

“To develop the player one must develop the musician.”

In Kristian Steenstrup’s *Blow Your Mind*, he categorizes music into four perceived parameters: pitch, duration, loudness, and timbre.⁵ These parameters should be cultivated in the brass musician as he or she listens to music, practicing and exploring each category both physically and mentally, so that the musician may expand his or her concept of sound. The

⁵ Steenstrup, Kristian. *Blow Your Mind*, (Royal Academy of Music, 2017). p. 20.

categories can be studied separately, but will ultimately blend together as a student develops his or her concept of sound and allows his or her brain to send these messages to the lips.

Jacobs advocated for using a variety of practice techniques, specifically to engage a standard of sound.⁶ These practice techniques involve singing the music a student is currently preparing, sight-singing, buzzing, and aural skills/dictation. Sight-singing exercises tend to focus on the parameters of pitch and duration, although the other parameters may certainly be involved. Intonation and the subdivision of time should be strongly encouraged as a student develops his or her sight-singing skills.

Loudness should be developed both through playing and through listening. A student should be exposed to musicians that explore dynamics with good and bad quality sounds, although the time spent listening to good quality should be greater. The experience of listening will give a student ideas and help motivate his or her brain to send these messages to his or her instrument when he or she begins to explore dynamic ranges. As a brass player is able to produce and change dynamics with more control, he or she will then be able to demonstrate these dynamic changes in his or her phrasing.

Timbre is the spectrum of frequencies that constitute a sound. This spectrum consists of the fundamental pitch of the sound and the harmonics created by the fundamental. Having a vast library of sounds in the mind, and specifically the timbre of various instruments, will enhance a brass player's ability to adapt these sounds into his or her playing. A great brass player not only produces a pleasing timbre characteristic of his or her instrument, but can also mimic the timbre and performance practices of other instruments and vocalists.

⁶ "UNITUBA - Arnold Jacobs - Organize Practice Time." Edited by Jeff Funderburk, *YouTube*, YouTube, 1 May 2010, www.youtube.com/watch?v=Lry9sIwDbwQ.

"Let the music teach the meat."

A music educators will often begin teaching how to play a brass instrument by discussing how to physically produce the sound. The teacher may ask a student to recreate a horse whinny, an elephant call, or some other suggestion to provoke vibration at the lips. This is a good starting point; however, as soon as a student is creating a characteristic tone, the student's physical approach to playing the instrument is no longer the most important aspect of playing. Instead of addressing how a student should physically play the instrument, this quote is meant to encourage a student to subconsciously order motor function by thinking of the music, not the student's body (meat).

"The product is musical sound not mechanical function. Go for the product."

A student that struggles with a passage of music may still be trying to control the muscles, instead of mentally singing the music as the student plays. Chapter IV and V contain suggestions to assist in re-calibrating the student's mental concept; however, the inaccuracies are often a result of concentrating on the physical aspect of playing and not allowing the mind to subconsciously control the lips.

Our goal for brass playing should be to avoid "paralysis by analysis," a phrase that Jacobs believed he brought to the music world.⁷ A student must be unburdened with how he or she is playing and embrace what he or she is playing. Much like any human activity, a student can do many things on an instrument without thinking about how the student is physically doing these actions. Music is the end result and should also be the motivation, and a student must have this abstract thought as the goal. A simple example is throwing a ball. When one throws a ball, he or

⁷ "SONG and Wind Arnold Jacobs 'Almost Live.'" Edited by Brian Frederiksen, *You Tube*, YouTube, 6 Sept. 2017, www.youtube.com/watch?v=-qiXa9B8Zjs.

she does not focus on fingers tensing and releasing, his or her arm moving back then forward, or any other small task in the process. Instead, the thought is where the ball is going, and the mind naturally controls the body to throw the ball.

“Play by sound, not by feel.”

Brass instruments are only capable of resonating vibrations: brass instruments do not produce pitches in the absence of the vibration of the lips. For the instrument to resonate a specific pitch, the brass musician must order that sound in his or her mind, firing signals from the seventh cranial nerve as discussed previously. Good, bad, or any other adjective to describe how it feels to create the vibration is a byproduct of the action. This is especially important on days when a brass musician may not feel well. The mind is still capable of ordering the lips to vibrate, creating the desired sound.

“Fill your mind with sound.”

When a brass player is performing, there are two sounds occurring: the sound the player is producing and the sound the player has in his or her mind. Ideally, these two sounds match. However, the stronger sound must be the sound in the brass player’s mind. If a student has a beautiful sound concept in his or her mind, he or she will subconsciously adjust his or her physical playing to match that sound concept. The mind is so powerful that it is unimportant to think of the process, but instead think of the goal, and allow the mind to naturally control the body.

There is no wrong way to build a concept of sound. A teacher should provide a student with a library of ideal sounds, with examples of the student’s instrument and many other

instruments. A student's mental image of sound will develop as the student is exposed to great sounds, and the student's desired sound will be as individual as each human's individual physical characteristics. In addition to other instruments, music throughout the ages should be heard. From chant to contemporary music, classical to popular styles, each piece of music has value and sound concepts that can be adopted and adapted. The goal is for the sound in the student's mind to become more dominant than the sound the student is creating.

“Keep song dominant.”

A brass player should have an array of sounds in his or her mind to call upon as he or she plays, but the brass player must also stay focused as he or she plays to send these signals to the lips. This focus may be difficult for a developing or even advanced musician when the student knows that he or she is about to play a difficult passage. Every note must be present in the mind to be ordered into the lips. Chapter V contains more information on the topic of focus while performing.

“Conceive, don't perceive.”

Evaluation is an excellent tool for helping a student target challenges in the student's playing. However, it is important to emphasize to the student that evaluation and performance must happen separate from each other. A student should conceive how he or she wants to express the music, but not perceive how the music is being heard by the audience. Encourage the student to practice concentrating on the music when the student simulates performance. This activity will help the student to maintain focus when he or she is actually performing. As

mentioned above, a student may be susceptible to “paralysis by analysis” if he or she is evaluating while performing.

“Think product, not methodology.”

Imagine any task that a person learns throughout his or her life. In the beginning, he or she concentrates on the small aspects of accomplishing the task. However, in the performance of music, a musician should only think of the product and strive to achieve his or her goal without being prohibited by the process. For instance, every day we walk to different locations. During these walks, we do not concentrate on each individual leg moving one in front of the other. Instead, we envision where we are going, and our brain takes care of the process. This is the same idea as to why a student must think of the music instead of his or her body.

A student may form less than desirable habits while playing, but these habits should be isolated within practice sessions. This is akin to how an athlete prepares in practice versus performance in games. An athlete practices drills to refine smaller tasks so that in games the athlete is not considering the drills, but is naturally performing the tasks that the athlete has refined through these drills. A musical equivalent will be provided in the Chapter V. Practice and Performance. The following two quotes, compiled by Michael Grose, compare the mindset of Arnold Jacobs and Michael Jordan:

"During every practice I spend time imagining myself playing in the game so when the actual game comes it's no big deal because I've already done it all."
- Michael Jordan

"There should be a period of time during each practice session when you perform. Invite some friends in to your practice room and play a passage or a page of something. ... What I'm trying to indicate is that each day should contain some amount of performing. You should engage in the deliberate act of story-telling"

each day you practice. Don't only gather information when you practice, spend time imparting it. This is important." - Arnold Jacobs⁸

The fifth and seventh cranial nerves are heavily involved when playing a brass instrument. The fifth cranial nerve, the trigeminal nerve, serves as both a sensory and motor nerve. More specifically, the fifth cranial nerve sends information to the brain about sensation in the tongue and lips, and it sends information that creates motor functions such as chewing or biting. This information sent to the brain from the fifth cranial nerve can be unimportant or even distracting.

The seventh cranial nerve, the facial nerve, sends information from the brain to the lips, but the motor function is different than the fifth cranial nerve. The facial nerve controls facial expressions, which are vital for the formation of an embouchure. The fifth cranial nerve sends signals for vowel shape and tonguing. Having a clear image in the mind of the desired sound one wishes to create will send signals from the fifth and seventh cranial nerves to the lips and tongue.

“The worse we feel, the stronger the song must be.”

A brass student must allow the fifth and seventh cranial nerves to fulfill motor functions while attempting to ignore the sensory information provided. Sensory and motor pathways do not travel in the same directions, so the outgoing pathway is most important for brass playing. The best way to avoid concentrating on the sensation is to focus on the music itself. If the concept of sound is a stronger message than the information received from the lips, sensation can be partially ignored and solid vibration can be present at the lips.

⁸ Grose, Michael. “Michael Grose (@2baMike).” *Twitter*, Twitter, Sept. 2009, twitter.com/2baMike

“Don’t encourage mediocrity. Play at your best and don’t be second class in the head.”

Sound and tone quality are key to creating music. An educator must be vigilante to address any substandard sounds as soon as the sound occurs. Although performance deadlines may be looming in the near future, it is important to always strive for strong, basic fundamental sounds that are characteristic of the instrument. It is important to praise a student and build confidence as the student grow, but praise should be objective and clear. Reinforce this good concept of sound without encouraging substandard tone quality.

III. WIND

“Breath like a baby, play like an angel.”

After establishing a great concept of sound, the next aspect of playing a wind instrument is using effective and efficient respiration. While music must be the focus of a brass student, practice must involve excellent breathing habits that become second nature when playing. At birth, the lungs of a human child expand naturally and the child takes full, effective breaths. As we get older, we tend to take smaller breaths, forming a new habit of more shallow breathing.

The habit of shallow breathing must be overshadowed with a stronger, more childlike approach: taking full, deep breaths. Unfortunately, the more we are aware of our breathing, the less natural our breathing is. Thinking the word suction, or wind at the lips, should be the focus when encouraging good breathing habits.

“Always maintain good posture.”

Posture is often the first topic addressed when teaching a student how to play an instrument. If a student has difficulties breathing, it is vital to evaluate posture at any level. Even a student that has acquired advanced skills may become complacent and play with bad posture. This should still be addressed, because the student’s lungs may be unable to inflate fully as a result of this poor posture.

Sound is also affected by posture, especially with directional instruments. Higher harmonics travel in one direction, while lower harmonics travel in all directions. If a brass player exhibits poor posture, the position of the instrument will be affected, and in turn the

audience's perception of that instrument will be affected. Specifically, higher tones will be absent from the sound, removing the characteristics that makes a sound rich.

“Weakness is your friend, strength is your enemy.”

Our lungs are essentially balloons, so it is important for us to visualize the lungs as such in the process of playing a wind instrument. Wind is the motor force for the embouchure vibration, not lip tension. If we blow up a balloon and then let it go, it will travel the furthest when it is the most full. Therefore, we can maximize the vibration that will occur in lip vibration by being comfortably full. Encourage the student to let the wind do the work and imagine using less pressure while playing. Jacobs used imagery such as “blowing to the end of the concert hall”, “moving a little sailboat”, and “blowing out candles on a birthday cake.” Any idea can be used that creates a healthy use of wind while concentrating on an abstract concept.

Soft and loud playing may pose a challenge for the student as the student develops physically and mentally. As a student hears loud sounds, he or she may start to associate loud playing with great muscular exertion. On the opposite spectrum, a student may hear soft sounds and associate soft playing with a closed or restricted airway. In both circumstances, remind the student that wind must be at the lips, and the vibration in the mouthpiece is what creates the sound, not muscles or airflow.

Airflow refers to the air passing through the lips, and air pressure is the force acting on the lips. As a brass player descends in pitch, airflow increases and air pressure decreases at constant dynamic levels, and the inverse occurs as pitch ascends.⁹ As explained in Chapter II, desirable sounds are rich with lower harmonics, attained through lower air pressure and greater

⁹ Kruger, Jonathan et al. A comparative study of air support in the trumpet, horn, trombone, and tuba. In Baroni, M. et al. *Proceedings of the 9th International Conference on Music Perception and Cognition*, University of Bologna (2006).

airflow, which are opposite to thin sounds that contain less harmonics, created through tight lips, restrained airflow and affected pitch.

Resources such as *The Breathing Gym* are excellent for daily use and building great breathing habits. By reinforcing these habits daily, the student should naturally begin to breath well. However, not all exercises in *The Breathing Gym* coincide with the approach of *Song and Wind*. Any exercises that encourage or create unnecessary tension should be strongly considered before being utilized. Breathing exercises are meant to create strong habits, not build capacity or stronger muscles. A teacher should spend five to ten minutes during every class dedicated to great breathing, and observe breathing in addition to posture and other fundamentals frequently. While this may be time-consuming, the separation between a good musician and an outstanding musician is found in solid fundamentals.

Always make sure the instruments are put away while working on breathing. This insures that the student is safe if he or she becomes dizzy, and any disruptive habits connected to holding the instrument are avoided. “Establish good breathing habits through exercises away from the horn,” Jacobs said. Breathing exercises should center on the inhalation of large quantities of air quickly and with minimal effort; building muscles or exhaling with tension can detract from this purpose.

Encouraging “quiet” breathing may be more damaging than helpful. Wind moving at a healthy rate, especially for quick breaths, will create some noise. If the breath is quiet, the student may be expanding without actually breathing. The “WOH” syllable should be used for a relaxed inhale with less noise and less tension.

In addition to being comfortably full each time we play, we should also breath as often as necessary to provide a thick airflow to the lips. Specifically, a student should be encouraged to

breathe when reaching forty to fifty percent of his or her capacity. The more empty a student's lungs are, the more difficult it is to take in the next breath. Tone quality also suffers tremendously when a student is attempting to force air out instead of naturally expelling air as a balloon would if released. After the positive relaxation pressure (described in more detail below) has elapsed, the intercostal muscles create tension against the lungs, and this tension can be heard in the sound. You can demonstrate this suffering quality by expelling much of your air and then talking. It is better to sacrifice longer phrases over great tone quality than it is to sacrifice great tone quality for longer phrases. Always protect the ends of your phrases. It must be said that more efficient buzzing will allow students to better utilize air and create longer phrases. However, if students are unable to play the longer phrases, breathing more often is preferred.

“Keep breaths full and relaxed.”

Boyle's Law states that the volume of a gas is inversely proportional to the pressure of a gas in a closed space. The process of breathing can be explained through Boyle's law. There are two conditions of the body that affect this process, the elasticity of the lungs, and the muscles that compress the lungs.

The diaphragm is a dome-shaped muscle just below the lungs. As we breathe in, our diaphragm contracts. In contraction, the diaphragm flattens, allowing the lungs to increase in volume. At this point, the air pressure in our lungs is low, and the atmospheric pressure outside of our body is high. The air outside will enter the lungs, seeking to stabilize the pressure between the two spaces. Air will cease to enter once the lungs are full, or the inspiratory muscles have stopped contracting.

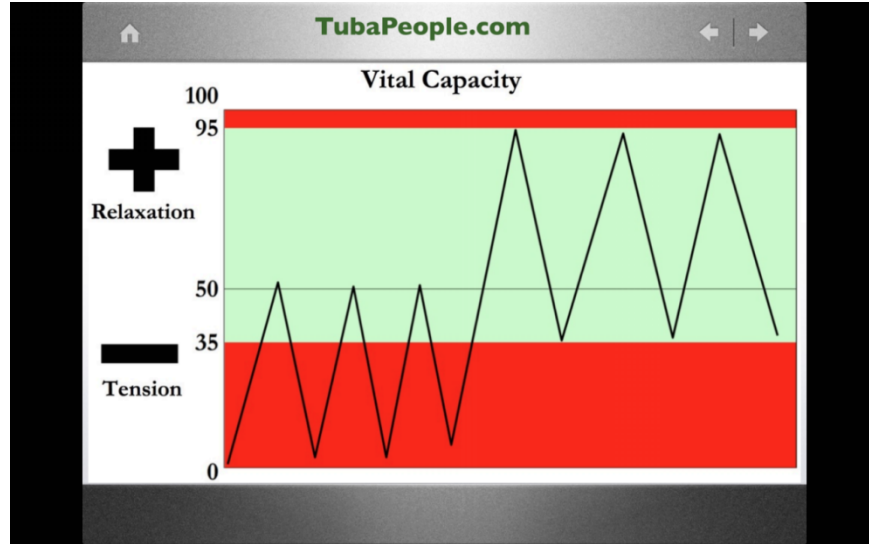
The lungs will then naturally collapse and/or the contraction of the expiratory muscles will compress the lungs. The collapsed and compressed lungs will decrease in volume, and the air pressure will be greater than the atmospheric pressure. This change in pressure causes the air to flow out of the lungs and back into the atmosphere. Breathing is similar to a bellows system, which enlarges to bring air in, and compresses to blow air out.

Jacobs encouraged breathing often and getting comfortably full. The optimal capacity for brass playing is in the upper two-thirds of the lungs. By doing so, a brass player remains in the positive relaxation pressure, which is the natural release of air from the lungs elasticity, before the expiratory muscles are more heavily involved. This comfortable exhalation will also ensure that the end of any phrase will be free of tension.

At the point of the positive relaxation pressure, the respiratory muscles are working the least, and air pressure is high as the volume in the lungs is decreasing. The positive relaxation pressure will reach zero when the lungs are at 40% capacity.¹⁰ Subconsciously, the brain will signal to the diaphragm to initiate inhalation once the lungs are close to empty. As the diaphragm begins to contract, the abdominal muscles will also be contracting to push the remaining air out. This opposition is not optimal for wind playing, so it is best to breath often to avoid this tension. The following figure, provided by Michael Grose, illustrates the vital capacity and points of relaxation and tension. The y-axis displays the percent of air in the lungs.

¹⁰ Steenstrup. *Blow Your Mind*. p. 50.

Vital Capacity Diagram by *Michael Grose*



11

“Breath to expand, not expand to breath.”

Parts of the body not associated with the lungs and respiratory muscles are not necessary for the breathing process, and focusing on these parts can potentially hinder the process. Raised shoulders, extended arms, etc. are not connected to the respiratory function. Jacobs would often close his mouth and nose and expand his torso, but respiration did not occur. “The body can lie,” Jacobs would point out. If a student imagines suction at the lips, the expansion of the lungs and respiratory muscles will naturally occur, causing some body change.

“Order air as external wind, not internal pressure.”

Two concepts that are frequently discussed in the breathing process of brass playing are having a tight gut, and pushing with the diaphragm. A brass player may have a firm abdomen when playing, but this is a result of the tension the player is exerting while playing, not the cause. The diaphragm is an important muscle in the respiratory process, but it is involuntary and only

¹¹ Grose, Michael. “Tuba People.” *Vital Capacity Diagram*, www.tubapeople.com/.

contracts in the inhalation process. As we exhale, the diaphragm relaxes, returning to its dome-shaped position. Back muscles are also not involved in respiration.

After a full breath, the inspiratory muscles begin to relax, and the elasticity of the lungs release air, also known as the “positive relaxation pressure.” Once this air is released, the abdominal muscles contract and compress the lungs, and the internal intercostals compress the chest. The diaphragm relaxes and lowers to its resting position. Then the abdominal muscles move inward, pushing air out of the lungs in the lower torso. At this point in the exhalation process, much of the air has left the lungs.

The abdominal muscles have secondary functions in addition to respiration. One function is to protect organs in combat. The abdominal muscles harden against the lowered diaphragm, and in the process can trigger throat closure. It is because of this specific function that teaching a tight gut approach should be avoided when establishing good breathing habits. One suggestion to avoid this approach is to encourage the student to pull in his or her abdomen when blowing, which can only happen when the diaphragm is raised. By doing so, the brass player is compressing the lungs instead of the intestines, a much more useful technique for wind playing.

“Thick air” versus “thin air”

Jacobs used the terms “thick air” and “thin air” to encourage the student to focus on airflow. The description of airflow versus air pressure is important, but often less words are more when teaching. Embouchure has a role in affecting airflow and air pressure, but it is more important for the student to imagine using thicker air as he or she orders wind to the lips. An easy exercise to help a student feel the difference in thick versus thin air is to blow wind on the

back of his or her hand. With a relaxed embouchure and low tongue position, the air will be thick. If the embouchure is tense, the student will blow a thinner airstream.

The syllable “WOH” has several benefits in establishing solid, fundamental brass playing techniques. One example is that it creates the ideal space for wind to enter and exit the lungs. When pronouncing WOH, the air can be felt near the front of the mouth, which can perfectly reinforce “wind at the lips.” WOH is preferred over “HA”, which will open the mouth larger than the diameter of the windpipe. The effect is that of a funnel, where the input is more than the aperture can accept. This funnel, or bottleneck, creates more tension than airflow.

Tight corners at the lips can also cause more tension than necessary when breathing. Restricting the lips also prevents more air from entering, which may result in a thinner airstream during the exhale. This added pressure on the embouchure may also lead to endurance and sound quality problems.

IV. BUZZING AND SINGING

Buzzing and singing are useful practice tools and should be used often, preferably daily. However, the quantity of use is not as important as the quality. These tools will help reinforce the mental and physical aspects of *Song and Wind* and should reflect mindful practice and solid fundamentals. By maintaining a good quality of relaxed buzzing and singing, the student will build strong, successful habits.

Explaining how the instrument resonates may clarify why buzzing is important. When the mouthpiece is attached to the brass instrument, the buzz inside the mouthpiece cup ignites the air column in the instrument, causing resonance based on the tube length and valves (if depressed). Once the air has caused vibration at the lips, the air becomes a waste product; it is not the source of projection. The focal point is the vibration occurring at lips and the mouthpiece. Clear, rich vibrations from mouthpiece buzzing are only amplified when the mouthpiece is inserted back into the instrument.

The fundamental pitch of the mouthpiece is quite high because of the short length of tube behind the mouthpiece. When buzzing below the fundamental pitch, there are no “slots” to lock in the buzz. Instead, the brass player must have a stronger sense of pitch to buzz accurately. The absence of the instrument also allows new neuropathways to be formed.

The desired avoidance of paralysis by analysis is mentioned in the first chapter and applies to buzzing as well. When discussing buzzing, it is important to let the student explore and discover his or her own physical approach to creating a sound. Through providing examples and allowing exploration, the student’s concept of sound will determine how a student will produce the buzz, which will then amplify into a characteristic sound.

One benefit of buzzing is the increased control of the lips' vibration frequency. Especially in the higher range of brass instruments, the close proximity of notes in the harmonic series require control, allowing a brass player to more accurately produce the desired note. This is not to say that the brass player should constantly buzz higher pitches, but instead accurately buzz in comfortable ranges, and allow that efficient buzz and concept of sound to transfer into high range playing.

The long-term goal of buzzing is to maximize vibration, or tone, and minimize inefficient air use. A student may not be able to perform longer phrases at first, and the embouchure will not be as refined in the beginning. Buzzing daily or frequently throughout the week will help assure that the student is building an efficient embouchure and a quality vibration. Buzzing can also be done with the help of a pitch source, such as a keyboard, radio, Youtube, etc. Isolating the mouthpiece from the instrument will also dampen any unwanted habits or behaviors that may occur when a student is holding the instrument. "Strangeness is your friend." Jacobs encouraged "strangeness" to avoid habits built through specific actions. Just as an athlete isolates certain drills in practice to improve his or her performance in a game, the brass student should isolate fundamentals so that these fundamentals are naturally executed in performance.

Arnold Jacobs stressed the importance of singing, often recommending the student learn Solfege, or at the very least adding words to the music being practiced or performed. Singing the music before playing sets a strong mental foundation for the student.¹² This practice allows a student to hear the pitches before he or she plays a note. Instead of questioning what sounds will come out of the instrument, the student will demand the vibrations at the lips.

¹² Steenstrup, Kristian. *Blow Your Mind*. p. 22.

Solfège is recommended because of the strong connections made between syllables and pitches over time.¹³ Fixed or Movable Do present challenges, but either will help build stronger connections for the student as he or she reads and hears music in his or her mind. Steenstrup suggests that there may be more merit to learning Movable Do considering Do is then relative to the pitch center of the piece, requiring a greater understanding of the harmonic language of the music. However, some late-Romantic and 20th-century may prove to be impossible if there is no defined pitch center.¹⁴

“Sing with the lips.”

If the student is unable to sing the music, he or she will be less likely to order sounds into the instrument. While a student are singing, demand everything he or she will play to be sung correctly with excellent intonation. Do not allow the student to settle for less, because the sound in his or her mind will not be as strong, and the signals the student sends into the instrument will reflect those flaws. Singing at slower tempos should help if the speed is the cause of the inaccuracies.

“You can do no more harm on the mouthpiece than you can on the instrument.”

If you can buzz and/or sing it, you can play it! This chapter relates closely to the first chapter discussing the *Song* philosophy in *Song and Wind*. There are many habits that are built when a student plays an instrument, and some of these habits may hinder proper technique. By buzzing or singing, we isolate the music from many of the mechanics involved in playing.

¹³ Steenstrup. *Blow Your Mind*. p. 21.

¹⁴ *Ibid.*, p. 22.

Characteristic brass tone qualities that are described as “rich” contain many overtones. These higher harmonics are more easily heard, which makes intonation between the upper and lower instruments easier to obtain. Buzzing helps isolate inefficiencies in the vibration, which in turn will cause the brass musician to play with more overtones in his or her sound.

Singing allows the student to express himself or herself without the mechanics of the instrument, and it helps demonstrate the strength of the musical idea in the student’s mind. Even when singing, the product should be convincing and engaging. Encourage each student to sing, no matter how “good” the student may think he or she is or is not. The process alone is very helpful in developing musicianship.

Buzzing gives the student information about both technique and musicality. We can imagine the importance of the buzz in an analogy of a television. In this analogy, the instrument is a television, and the buzz is the HDMI cable that provides information to the television. Without the cable, the television can create some images; however, when the HDMI cable sends clear information through the television, we can then see vivid movies, shows, etc. The better the buzz is, the better the picture is once amplified.

“You can blow without buzzing, but you cannot buzz without blowing.”

Wind can be expelled without vibration of the lips, but this vibration is how sound will be produced in the brass instrument. The airstream expelled excites the lips, which in turn creates vibration in the lips. The lips cannot vibrate without adequate wind. When we buzz, we should have great airflow and produce a rich, duck-like sound. Minimizing the “airy” sound in the buzz will help produce a richer tone on the instrument. The beginning mechanics should be discussed as the student is learning to create buzz; however, after the student is initiating a buzz, allow the

student to explore to create the desired sound. Every individual has a different phenotype, so what works for one student may or may not work for the next. Allow the student to discover his or her approach as he or she strives for sound, not shape.

Mass, stiffness, and tension are the primary factors that determine the vibration frequency of the lips.¹⁵ Mass refers to the surface area of the lips and mouthpiece. Generally, less mass creates a higher frequency, and more mass creates a lower frequency. However, this is still subject to the other factors influencing vibration (stiffness and tension). Rim size can affect frequency, but it may also affect sound quality.

The embouchure should be puckered to provide more mass in the vibration. Saying “WOH”, previously mentioned in Chapter III, can help create a puckered embouchure. Jacobs also used the word “mother” to create puckering. Stretched embouchures, or “smiling” embouchures, have less mass, which would in turn facilitate higher vibrations; however, accessing lower pitches may become problematic as more mass is needed. The quality of tone will ultimately decide how much shift will occur in the embouchure.

Stiffness and tension act in opposition to mass. As mass increases, stiffness and tension decrease, and vice versa. What occurs inside the mouthpiece is not easily observable; however, we do know that too much tension can cause a loss in circulation and damage to the lips, and it will reduce the contributions to lower harmonics.¹⁶

The relationship between mass, stiffness, and tension, may be most noticeable in the high range of brass instruments. Sound will continue to dictate how a brass player should approach high playing, but knowing the relationship of mass, stiffness, and tension may lead a brass player to isolate exercises that increase mass and decrease stiffness and tension. The goal of these

¹⁵ Steenstrup. *Blow Your Mind*. p. 38.

¹⁶ *Ibid.*, pp. 39-40.

exercises is to create an ideal sound in the buzz or instrument, not find specific positions for the embouchure.

“Over-blowing”, or “forcing”, occurs when a brass player uses the amount of effort needed for the high range in the middle range. This sound will be less than ideal, and is a result of force too great for efficient resonating. In other words, the muscles in the embouchure are working much harder than necessary.

In summary, a balance between mass, stiffness, and tension can be found through the exercise of ordering a musical product: correct, in-tune pitch and full sound through the use of plentiful air at the lips. A great sound is a result of balance between the factors producing the vibration and most often through the use of minimal physical effort. Just as a singer envisions and subconsciously creates a great sound, so must a brass player allow his or her embouchure to be subconsciously controlled by a great message from the mind.

“Create good habits away from your instrument; use strangeness.”

We know that neurons that order tasks build connections when performed together, or as Jacobs would say, “Neurons that fire together, wire together.” Taking away the instrument can prevent some of the habits that are connected to that task, and allow the student to perform separate tasks unencumbered by the instrument and mind. Many tasks that help a brass player to be successful can be performed away from the instrument. Breathing, buzzing, fingering, and singing all reinforce skills used while playing the instrument. Strangeness, in this instance, refers to things outside of our daily routine.

“Strangeness is your friend. Sameness is your enemy.”

Routines are great for building long-term skills and refining our musical craft, but unhealthy habits may develop. These habits can be anything from incorrect technique to simple complacency. Breaking up routines, adding exercises away from the instrument, taking breaks during practice, playing passages with different dynamics, tempo, etc., are all ways to disrupt sameness.

“Communicate with the tongue via diction.”

Singing will also greatly improve performance. Singing does not engage all of the same motor functions as brass playing; however, many benefits are occurring. Articulation should be as speech-like as possible. When articulating, the first consonant should sound, but the vowel is where the tone production occurs. If visualizing articulation using the word “tah,” the “t” would be small, but pronounced, and the “ah” would be capitalized. (I.e. tAH.) This will prevent a cumbersome attack of the note while producing a rich, thick column of air at the lips.

The use of the syllable “tOH” for articulation may help facilitate an efficient use of the tongue. The small t should get the tongue out of the way quickly. The quick removal of the tongue allows the vibration to initiate immediately. The H-consonant is important because it relaxes the diaphragm and causes moderate contraction of the abdominal muscles.

“The tongue produces no sound.”

Strong diction helps to add clarity to notes; however, vibration is not caused from the tongue, but instead from wind at the lips. A student may become fixated on articulation, but it is important to remind the student that vibration occurs at the lips. The tongue should be as relaxed

as possible, as it is with speech. Blowing wind patterns can be a helpful tool to ensure that the student is focused on ordering air to the lips.

Teaching concepts on tonguing are as varied as breathing and embouchure, and much of the content is based on pseudoscience or a lack of understanding the real role of the tongue. As with the embouchure, each tongue varies in shape and size, as does each oral cavity. These variations make it impossible to set specific rules for articulation. Language is the best example of how a student should imagine the role of the tongue. At an early age, we become fluent in a language that has many complex sounds, but we create the sounds through mentally imagining the sounds and ordering the message to the lips, tongue, and oral cavity.

In *Blow Your Mind*, Steenstrup provides great detail about the function of the tongue and how placement can affect airflow and tone quality, all while maintaining that sound should be the focus, not the process. The following concepts will be summarized in this section: notes start from vibration, not the tongue; diction should guide articulate, tongue placement can improve the sound, and tongue placement has little to no effect on range.

A student that believes the upward movement of the tongue starts the note will have difficulty creating a clear entrance and an accurate pitch. The increased pressure of the tongue will also cause unnecessary tension, affecting the pitch and tone as well. Remind the student to conceptualize a small “t”, accompanied by plenty of airflow.

Diction should be practiced often, and this practice should help establish effective tongue position. Saying phrases with many t’s, such as “it’s time to talk turkey”, “twenty-two”, etc. will assist a student in conceptualizing articulation. These phrases should create a lighter, quicker articulation, and an instant sound of the vowel. The immediate sound of the vowel will translate to an immediate sound of the instrument through quicker vibration. In addition to diction

exercises, the teacher should supply the student with examples of professional musicians that play with excellent articulation and tone.

The tongue should move in a back and forth motion, with the tongue staying generally low. When the tongue is lower, more harmonics are present in the sound, and the intonation is lower, removing the affected sound that may occur with a raised tongue.¹⁷¹⁸ Jacobs believed that trumpet players were especially susceptible to having too high of a tongue position in the mid to high range, causing more resistance in the air stream. This approach can lead to limitations in use of dynamics and stamina.¹⁹ A simple exercise to help the student experience the lack of change from a raised tongue is to have the student blow air on the back of his or her hand. The airstream should be steady. The students should start with an O-vowel, then move to an E-vowel. There will be no increase in speed as the vowel changes.

¹⁷ Steenstrup. *Blow Your Mind*. p. 68.

¹⁸ Wolfe, J. et al. Some effects of the player's vocal tract and tongue on wind instrument sound. *Proceedings of the Stockholm Music Acoustics Conference*, August 6-9, 2003 (SMAC 03).

¹⁹ Steenstrup. *Blow Your Mind*. p. 68.

V. PRACTICE AND PERFORMANCE

Practicing varies largely depending on where a student is in his or her development; however, the guidance in this chapter should help serve as a starting point to be refined by each teacher and student as he or she grows. Requiring practice logs is up to the teacher's discretion, but a student's drive will be largely self-motivated. It is important to gauge a student's interests and attempt to provide extra motivators/literature if possible to keep the student wanting to practice independently. As is with most things in life, our success is strongly, but not solely, connected to our desire to accomplish a task.

Integrating singing into practice frequently. As introduced in Chapter II, the mind creates connections between the pitches and syllables, so any syllable or word will be beneficial when building a stronger mental image of the music. Introducing music by singing first is a great way to establish an understanding of the pitch, duration, loudness, and timbre.

Teachers should encourage practicing often; however, before discussing length and frequency, it is vital to define practice and understand how different approaches can positively affect students. These approaches include: deliberate or deep practice versus mindless practice; blocked, random, and varied practice; and mental practice. The descriptions of these approaches should provide a foundation for the teacher to begin exploring what type of practice will be most helpful for the student given his or her current goals.

Developing skills in any task takes time and effective practice. A student is no longer being labeled as talented or not, but instead educational focus is being placed on how to develop skills most efficiently and effectively. Talent is no longer being thought of as innate, but is recognized through a student's behavior and time dedicated to acquiring and developing skills.

Although the application of the results is debated by the researchers of the study, a commonly accepted theory is that a person can master a given task by repeating this task over roughly ten thousand hours.²⁰ Ericsson argues that there is no definitive time needed, and the time-frame is significantly different for each individual.²¹ Knowing that each student is different and that mastery is developed over an extended period of time, the educational approach is instead centered on finding ways to motivate and cultivate students' musicianship through maximizing time and effort.

Three effective structures for practice are blocked, random, and varied. Each of these categories involves specific goals, but achieve different results. Blocked practice sets significant time to work on warm-ups, exercises, literature, etc. In each block, the focus is only the designated topic. The following is an example of blocked practice:

20 minutes: Warm-ups
20 minutes: Exercise/Etude
20 minutes: Literature

Random practice is structured with much less time on each topic. The topics are chosen with no specific order in mind, and no topic is meant to be practiced in preparation for the next.

The following is an example of random practice:

5 minutes: Breathing
5 minutes: Etude
5 minutes: Singing
5 minutes: Lip slurs

²⁰ Gladwell, M. *Outliers: The Story of Success* (Little, Brown and Co., 2008).

²¹ Ericsson, Anders et al. The role of deliberate practice in the acquisition of expert performance. *Psychology Review* 100, 363-406 (1993).

The third structure is varied practice. Varied practice can be any length of time and can be predetermined or random, but each practice session is spread throughout the day. Blocked, random, and varied each have proven merits. Blocked practice provides immediate results and shows great benefit for short-term growth.²² Random practice does not yield immediate results, but is actually more beneficial for long-term growth.²³

Repetition is proven to effectively build habits, but habituation occurs when one repeats something to the point of mindless operation.²⁴ Blocked practice provides repetition that develops motor skills, and random and varied practice provide stimulation that may cultivate higher concentration.

“Bad notes can be made into good notes; silence can’t.” “You don’t start with skill; you start with crudity, and from crudity you develop skill.”

Musicians at every level should practice fundamentals. These fundamentals should include breathing, buzzing, and singing. Each practice session should be specific, as well. This means that run-throughs of all music should be avoided unless the student has an upcoming performance. Instead, the student should practice sections of his or her current music, and specifically the parts in which the student is having trouble. How much time on each part will depend on the level of student, but no student should avoid music that is too difficult at the time. The student should practice difficult passages as slow as necessary to play the passage well.

Each beginning student should practice between fifteen to thirty minutes daily. Early practice should mostly be an exploration of the mid-range of dynamics, between mezzo-forte and

²² Steenstrup. *Blow Your Mind*. p. 90.

²³ Hall, Kellie G. et al. Contextual interference effects with skilled baseball players. *Perceptual and Motor Skills* 78, 835-841 (1994).

²⁴ Rankin, Catharine H. et al. Habituation revisited: an updated and revised description of the behavioral characteristics of habituation. *Neurobiology of Learning and Memory* 92, 135-138 (2009).

forte. By staying within this range, the beginning student will build the foundation of a characteristic sound. The student's basis of tone quality should then be transferred into extremes; otherwise, extreme playing may lack a good quality of sound, and thus affect the mid-range sound. Extensive repetition is not necessary for first-year students. The student will learn a lot just from the exploratory playing time that the student devotes. However, after the first year, more deliberate practice should be implemented.

An intermediate student should practice between thirty minutes to an hour daily. It is at this point that a teacher should encourage three-minute drills. The student will set a timer for three minutes, and in those three minutes the passage (between eight and sixteen measures) will be played as many times as possible. The tempo should be a speed where the student can play as accurately and musically as possible. Students must be critical and not be afraid to slow down or isolate passages that are technically difficult. After the three minutes has expired, the student will move on to another segment, not returning to that passage until another day. At this stage in development, a student playing with a solid characteristic sound should begin to explore more extreme dynamics, with the encouragement of carrying that quality, characteristic sound into the extreme dynamics.

Breaks are vital for practice sessions. A student should rest five minutes for each thirty minutes he or she practices. Depending on the student, he or she may practice for thirty and rest for five, or practice for fifty and rest for ten. However, a student should not practice for more than fifty minutes without resting.

An advanced student desiring to play professionally should practice between one and three hours daily. A student on this level should have enough experience to recognize how much time is required; however, this information can be shared with a student that may desire to

perform at this level eventually. Knowing future expectations can only help the student in development. A professional musician generally practices fundamentals daily, with at least five to ten minutes of breathing, buzzing, and singing implemented throughout his or her practice sessions. A professional musician may also develop routines over time, and a beginning student should be encouraged to develop fundamental routines to create strong habits throughout the student's musical career.

“Neurons that fire together, wire together.”

Every task that we conceive and order with our mind is completed through one or more nerve cells that send signals to the motor nerves that complete this task. When we order multiple tasks, the neurons responsible for each task begin to make connections with each other as well. For this reason, a brass student should isolate tasks, such as breathing exercises, buzzing or singing away from the instrument. These neurological connections also mean that a brass player should practice with greatness in mind. If a student practice with good posture, repeat passages using correct pitch and technique, the neurons for each task accomplished will connect. Likewise, incorrect notes and technique will also be committed to habit in these connections.

Developing a great sense of time will help coordinate different tasks that are accomplished simultaneously. A brass player cannot independently focus on the lips, the tongue, breathing, the fingers, and so forth while playing. Instead, a great brass player concentrates on the product, which is improved through his or her sense of time, allowing his or her brain to subconsciously complete each task in the process.

A brass player can improve his or her sense of time by subdividing rhythms internally. This division reduces the distance between beats, reigning in opportunities to stray from the path. The increased number of beats also gives the musician a sense of stability.

The connections of neurons can build positive habits, but can also build negative habits. If a student is unable to blow air freely, removing the instrument from the activity of breathing may help the student to avoid the neurological connections that have been made between breathing and playing. The conditioned reflex of restricted air may be connected with the process of playing, and when the instrument is removed, the conditioned reflex will be removed as well. Then, the student can build effective breathing habits and transfer these stronger habits back to the instrument.

“Imitate great musicians and create your own greatness.”

Imitation is an excellent learning tool, and great musical examples will foster stronger concepts of sound in a student. A strong concept of sound will become the foundation of musical expression. From this foundation, the student can adapt and expound upon musical concepts to refine himself or herself as a musician.

“Practice should always be performed musically.”

Routines help build consistency, and in this consistency expression should be present always. Every sound should be approached with an audience in mind. This dynamic will improve the student’s musicianship as well as help keep the student engaged and thinking critically.

In addition to providing information about the thickness of air, wind patterns can provide information about the lips and the tongue. Blowing wind patterns should be a musical exercise, simulating the brass player's approach to playing the instrument. The student should hear the music in his or her mind as he or she imitates playing the instrument. The information provided through the student's wind pattern should be: low range passages involve plenty of airflow and relatively little pressure in the embouchure, high range passages involve more air pressure and firmness in the embouchure, loud playing involves faster air, and soft playing involves slower air.

“Let the lower notes teach the upper notes.”

In Chapters II and IV, mid-range practice was encouraged as a foundation for dynamics and buzzing the mouthpiece. This approach is equally as important for playing higher notes on the instrument. Sounds that are open and free in the mid-range of a brass instrument should be the mental image for playing in the higher range. High range playing should be as tension-free as possible.

There are many warm-up exercises that begin in the mid-range and progress into the high range. A misconception about warm-ups is that the primary focus of a warm-up is to prepare the facial muscles for playing. However, establishing the desired concept of sound is most important goal of warming up. When playing warm-ups that shift from mid to high range notes, a student should focus specifically on the replication of good sound between these ranges. Any mediocre sound in the mid-range, caused by deficient technique, will only worsen as the embouchure struggles in the higher range. If a brass student transfers the ease of mid-range playing into the high range through this repetition, the student will establish good habits that will be present while playing in the high range more frequently.

“Your muscles have the potential for great stiffness. You must find weakness through minimal effort. Strength is your enemy; weakness is your friend.”

The mind is a vital part of purposeful practice, but the body should also be observed when necessary. The respiratory process engages muscles, but not as a primary function of respiration. The muscles contract and expand as a byproduct of the respiratory process. With this in mind, inhalation and exhalation will occur most efficiently and effectively with minimal muscular effort. The student should maintain as much physical relaxation as possible while playing his or her instrument or performing breathing exercises.

Practicing in the High Range

Kristian Steenstrup outlines the following approach, suggesting that high range practice should consume, at most, 20% of a brass player’s overall practice time:

1. Rest frequently.
2. Play very lyrically, as this stimulates beauty of sound.
3. Play nice ballads or lyrical tunes in the high range, rather than exercises, to stimulate the singing approach.
4. Develop your lip muscles at moderate dynamic ranges (mp to mf), so the lips are not being forced into vibrating by a powerful airstream.
5. Establish your ability to play high notes in legato at first, to avoid the complications of the tongue blocking the supply of air to the lips. Add tonguing later, when good production and sound have been established.
6. Use vibrato to let the lips find where each note resonates best. The point of best resonance is not always where the intonation is correct, as on any instrument the higher notes tend to be less well in tune. This vibrato is for therapeutic reasons: it allows the lips to resonate with the instrument’s air column, at least part of the time, while disguising the intonation problems by averaging over the varying pitch. This therapeutic vibrato can be turned off, as appropriate for the musical and stylistic context. A tasteful vibrato can of course also be used as an expressive tool, but the therapeutic vibrato is specifically meant to help with tone production.

7. The higher you play, the less resonance the instrument's air column provides, to help the lips vibrate; this is partly why it is harder to produce a stable tone there, and why stamina is a problem in the high range. You can get the same effect by playing the mouthpiece alone, as here again there is no standing wave to help the lips vibrate. Practicing the mouthpiece, even an octave lower than the pitches you are aiming for, will benefit your high range.
8. Practice playing a higher-pitched instrument: piccolo trumpet for the trumpet player, alto trombone for the trombonist, and baritone horn or euphonium for the tubist. The pitches that are located in the high register of the bigger horns are in the mid- to low range of these instruments, making them better resonators. This makes it easier for the lips to vibrate at these pitches, and to build up the tissue for playing them. The facility established on the smaller horn can be transferred to the bigger one, leading to a more rapid improvement of the high range.
9. Make sure you breathe fully and frequently when working in the high range. Although the volume of air required to play in the high range is less than for lower notes, the air pressure needed to vibrate the lips is higher, so the lungs (really, the expiratory muscles) need to compress more to generate this. The fuller the lungs, the easier it is to compress the air.²⁵

“Create good habits; don’t try to correct bad habits.”

Memory is created by electricity firing between cells in the brain. As the electricity flows through the synapses, memory is created. Memory can be impossible to erase without harm, so new habits must be built to “override” old habits. This retraining will allow a student to form stronger habits that cause the older habits to return less frequently. Jacobs often described this process using an analogy detailed below by Michael Grose:

The brain works on percentages, which means that what the person does the most of is what s/he becomes the best at. Mr. Jacobs would often remind his students that it is impossible to break an existing (presumably unwanted) habit, but that it is possible to replace such a habit with a new (presumably desired) habit. By focusing the mind on the new desired outcome in the imagination, a new habit begins to be formed (through new neuropathway development), and through repetition is strengthened. Similarly, neglect of attention given to the unwanted habit causes it to weaken and eventually disappear, though the neuropathways

²⁵ Steenstrup. *Blow Your Mind*, pp. 44-45.

which represent that habit remain in the brain. Mr. Jacobs would often analogize the disappearance of habits to a set of railroad tracks. In his example, the track represented the habit's path in the brain, while the train represented the thought which had formed the habit. His point was that neuropathways never completely disappear, but instead, through disuse, recede into the darkness of the mind. He explained that when a train stops going over a length of track the shiny top of the track rail begins to become discolored with rust, but it will quickly re-gain its shine when the train returns. However, if the train does not pass over that portion of track for a long period of time, not only does rust accumulate but weeds and other overgrowth eventually completely obscure the track, making it nearly impossible to see that there was ever a track there. This represents disuse, or disregard of the thought; yet the track (e.g. the habit's path in the mind) remains underneath the rust and brush. Continuing the analogy, Jacobs said that all it takes to make that train track again visible is for the train to return a few times clearing away all the brush and rust. Likewise, a receded habit will come back to life by the renewing of the thought that made it form in the first place. Therefore, once formed in the brain, the neuropathway that represents a habit can never be extracted from the mind. Jacobs usually went on to point out that, in fact, when one tries to break an existing habit one is actually putting one's mind onto (and therefore renewing) precisely what they do not wish to be doing. Thinking about what one does not want to do merely serves to renew and strengthen what it is they do not want to do. This is why he taught that old habits cannot be broken, but instead they can be replaced with new ones.²⁶

“Play music to develop embouchure, not the other way around.”

Practicing exercises devoid of musical expression may yield results physically, but it is less likely that students will mentally progress as much. The ultimate purpose of practice is to perform music, and there is no better teacher than music itself. If you have identified weaknesses in a student's playing, music should be selected to address these weaknesses. Through mindful practice, the student will be able to improve his or her deficiencies at a much greater rate than without musical context.

²⁶ Grose, Michael. “Jacobs on Habit Formation.” *Jacobs on Habit Formation*, 4 Mar. 2019.

“Embouchure problems often result from a lack of wind.”

The balance between pressure and wind is important to find. A student can have pressure without wind, but cannot have wind without pressure. Knowing that some pressure will be present, we must then find out how to minimize pressure to maximize results. Breathing exercises are key to refocusing a student’s airstream.

“I don’t set rules for embouchure, I set rules for sound.”

The embouchure of a brass player is constantly changing, adapting to the signals sent from the brain to the lips. Because of these constant adjustments, setting specific rules for an embouchure can negatively affect a student’s ability to subconsciously create the embouchure needed to produce the sound in the student’s mind. Jacobs instead encouraged setting rules to establish a strong mental concept of sound.

Changing an embouchure after teaching a student to create a characteristic sound should rarely occur. Every individual has his or her own unique physical structure, which means that there is no one-size-fits-all approach to creating a vibration. If a student makes a wonderful sound but uses what appears to be an unorthodox shape, let the student continue with that approach. If the sound is uncharacteristic, helping the student explore another shape is acceptable, but should be done with sound in mind. Ultimately, the student will be able to find what works best for him or her through exploration with a great fundamental sound as the guiding principle.

“Practicing is 85 percent making statements and 15 percent asking questions. When starting to practice, it is better to make a statement and practice what is right than ask questions and practice what is wrong.”

“Break phrases into manageable components.”

The human mind is an incredible computer, capable of amazing feats. However, concentration on one particular item for an extended amount of time is not the mind’s strongest suit. After three minutes of focus, a human’s memory achieves diminishing returns. Diminishing returns means that the mind will continue to remember or receive information, but the retention rate is significantly less than the initial three minutes of focus. With this in mind, three minutes is the ideal amount of time to perform repetitions of a section of music, warm-up activity, or routine drill.

The difficulty of the repertoire in each performance will decide how much time to spend with the literature. However, the student should always practice parts that the student is unable to play. Some progress will occur when the student successfully plays parts at his or her current skill level, but difficult parts must not be ignored. However, these difficult parts should be played at slower tempos and deliberately “correct,” meaning with a great sound as effortlessly as possible. This may mean at a softer dynamic or even half of the speed marked in the music. This may seem tedious, but the student will see significant results within just a few weeks if the student is patient and diligently uses three-minute drills.

“If you play a thousand notes a day but 800 are mediocre and 200 are magnificent, the brain will say, ‘Wow! Those two hundred notes were great and I am happy.’ Unfortunately, the 800 mediocre ones form the habit. Make sure you have 800 great ones!”

“Every time you put your instrument up, you always search out quality. ... The brain works on percentages.”

Motor skills are given permanence in the brain when a fatty substance called myelin wraps around axons, a threadlike part of the nerve cell, as we conduct activity. Sheaths of myelin covers the axons, and increase the speed in which the signals move through the nerves. Each repetition of an action causes more layers of myelin to form over the axon.²⁷ Steenstrup compares this development in speed similar to difference between dial-up modems and fiber cables.²⁸

The buildup of myelin occurs regardless of the quality (efficiency) of the action performed. Jacobs stressed the importance of quality repetitions because he understand the permanence that occurs through repetition. In order to ensure strong habits, a student must strive for his or her best sound all of the time. Otherwise, mediocrity will be the outcome regardless of the few times the student has accomplished his or her best sound.

“Try to have sub-phrases within the large phrase. Mentally you are more efficient in the brain with small groups of numbers.”

“Chunking” is a well-known concept in the field of psychology: collecting pieces of information and grouping those pieces into sequences. Steenstrup uses the following example in his book *Blow Your Mind*:

²⁷ McKenzie, Ian A. et al. Motor skill learning requires active central myelination. *Science* 346, 318-322 (2014).

²⁸ Steenstrup. *Blow Your Mind*. p. 78.

Similarly, the sentence, “this sentence makes sense because all the letters are grouped into words” is easier to decode when chunked into “this sentence makes sense because all the letters are grouped into words” - even though, when we hear the words being spoken, there is no audible space between them.²⁹

Chunking can be used to group information into smaller or larger units. Jacobs described breaking down larger phrases into smaller pieces of information for the ease of providing greater detail within the phrase, and Jacobs also encouraged subdivision, which increases the number of beats used for ordering time. Both approaches use chunking and can help a student increase focus as he or she conceptualizes music.

“Instead of *playing* the phrase, *create* the phrase note by note.”

A student should use the process of chunking to his or her advantage as the student builds phrases with each note. This should be a physical and mental exercise. Strangeness should be added in practice to help the student explore many ways to create and reinvent each phrase. The most important aspect of this concept is to encourage the student to find multiple paths to perform the same music.

“Don’t screw up the easy notes just because you have a hard one coming up.”

Song and Wind requires both concepts to successfully play a brass instrument. Mental focus is vital for our brain to send the right signals to the lips. It can be easy for a musician to fixate on a peak moment in music, but all notes leading to the peak must be clear. There are many techniques that can help a performer maintain concentration, such as sub-phrasing and centering. It is imperative that each student finds approaches that work for him or her.

²⁹ Steenstrup. *Blow Your Mind*. p. 34.

Marcel Tabuteau, the former principal oboist of the Philadelphia Orchestra, greatly influenced Arnold Jacobs's musical growth, especially with respect to phrasing. At Curtis, Tabuteau taught all music students a course called "Musicianship." During this course, Tabuteau introduced students to an approach called "The Dancing Phrase", which Jacobs would refer to as "sub-phrasing." sub-phrasing is another application of chunking, and in this application, the musician builds phrases by small groups of one, two, three, and four notes (most often one or two).

In an interview with Michael Grose, David Fedderly describes how Jacobs would introduce students to this approach. Jacobs would explain that when most students think of a phrase, the student may feel as though he or she is pushing forward, but would lose focus with some notes. Jacobs explained that as the student sub-phrases, it may feel as though the student is playing note by note, but the audience hears a phrase. In these smaller groupings of notes, syncopation turns into "pickups" into the next note, leading the listener. Jacobs, as Fedderly emphasized, would stress exploring many different ways of playing music. The student should group notes in many different ways, record, and allow the music to help the student decide how to approach these sub-phrases.³⁰

Another focusing technique performers use is centering. Examples of centering can be found on YouTube to help guide the experience.³¹ The following is a simplified outline for centering:

1. Form a clear intention
2. Pick a focal point
3. Breathe mindfully

³⁰ "TPTV - David Fedderly." Edited by Michael Grose, *YouTube*, Grose, Michael, 9 May 2013, www.youtube.com/watch?v=y4lyya6sQng.

³¹ theOpenScore. "Guide to Your Peak Performance (Centering)." *YouTube*, YouTube, 21 Jan. 2015, www.youtube.com/watch?v=WFfVNUk9NjA.

4. Relax key muscles
5. Find your center
6. Imagine the optimal sound and feel of the opening bar
7. Direct the energy to the focal point

Centering originates from the Japanese martial art of Aikido, or “spiritual harmony.”

Centering is intended to focus on the present and remove power from outside factors. Sport psychologist Dr. Robert Nideffer adopted the technique in the mid-1970s and described it in his book *Psyched to Win* in 1992.³² In art performance, Dr. Don Greene promoted centering for auditions and performance in *Fight Your Fear and Win*.³³

“Avoid excessive fatigue.”

Many musicians advance in their musical careers with varying levels of understanding practice habits. Some semi-professionals even achieve great success without knowing how to maximize practice time. However, once a musician is able to achieve more results with less time allotted, it is much more likely that he or she will have success in performance. Repetition is helpful as a musician, but quality repetition is key to success. A great way to achieve quality repetitions is through mindful practice.

Mindful practice may manifest itself differently for each student, but the most important concept of mindful practice is an outline or goal. Help the student understand these goals, both short-term and long-term, by defining upcoming performances or activities. All aspiring students should have upcoming performances. If not, performances should frequently be sought.

³² Nideffer, Robert M. *Psyched to Win: How to Master Mental Skills to Improve Your Physical Performance*. Leisure Press, 1992.

³³ Greene, Don. *Fight Your Fear and Win: Seven Skills for Performing Your Best Under Pressure--At Work, in Sports, on Stage*. Ebury Digital, 2010.

Once these goals have been recognized, then the student should design practice sessions that will help achieve success in these performances.

In addition to three-minute drills, a student should find warm-ups and routines that exercise facets of the student's playing that need improvement. Warm-ups should include long-tones, slurring and articulation studies, and other fundamentals, but should not cause fatigue to the student. If fatigue is occurring, these exercises should be placed in the routine, or "workout," section of practice.

Routines should be more rigorous than warm-ups, but it is up to the discretion of the student to target his or her own weaknesses. Depending on the upcoming performances, routines may include scale studies or passages that may be similar to the literature performed, or the student may over exaggerate dynamics or expressions that are expected in the music. Routines can be good for any level of musician. The earlier a student can build solid practice habits, the greater the chance that the student will perform consistently.

As mentioned above in this chapter, each practice session should be allotted rest time as well. Given a thirty minute practice session after warm-ups and routines have been performed, a student should be able to complete roughly ten three-minute drills per session. Depending on how much music is being performed, this should allow a performer to successfully review all of his or her music (or at least the most difficult sections) within one to three sessions. These drills should also include singing and buzzing, with the student critically evaluating his or her performance of each section.

“Set the stage, record, then listen.”

A student should practice as if performing, and additionally, should record to evaluate his or her approach. It can be easy to grow accustomed to how you may sound as you are performing, but when you are in the audience, the perspective can be quite different. Recording and listening allows the student to use fresh ears and critically think about how the student’s sound is being perceived.

“Overcome nervousness.”

The “fight or flight” can occur from anything that manufactures the feeling of a “life or death” situation in a person. This natural response was an excellent tool for humans when technology was less advanced and daily life more often involved the dangers of predators and natural disasters. We may not encounter as many dangers in our daily life as cultures before us, but events that are important to us can still evoke this instinct. Generally, the more prepared a musician is, the more confident he or she feels. However, there are additional steps we can take to reduce performance anxiety.

Good posture can improve one’s confidence and willingness to take chances. A study conducted by researchers at Harvard and Columbia universities showed that posture can, in fact, raise testosterone and lower cortisol. Forty-two volunteers were split into two groups, with one group holding a “high-power”, open limbs, position, and the other holding a “low-power”, closed limbs, position. These positions were held for two minutes, and afterwards the participants were partook in a gambling study to assess the participants’ willingness to take chances. The researchers took samples of the participants’ saliva to test changes in their hormone levels. The

saliva of the high-power posers contained increased testosterone and decreased cortisol, while the saliva of low-power posers had increased cortisol and decreased testosterone.³⁴

“The brain influences the body and the body influences the brain. So if the brain is in turmoil, then put the body in a calmer situation. If we start with slow, measured inhalations, the pulse starts to slow a bit. Normally, in anxiety, breathing becomes rapid and shallow. The pulse goes up. Blood pressure goes up. So try to create the opposite conditions!”

Nervousness is a natural response, and can even give some an edge as a performer. For some professional musicians, nervousness never goes away. However, musicians find ways to mitigate the feeling and/or build habits while in a state of nervousness. In order to build these habits, a student can look for more ways to perform or can try to simulate conditions that create some or all symptoms that are experienced when nervous.

A frequently used technique is running up and down stairs immediately before playing. The practice of collecting one’s thoughts and breath may be very similar to how the performer feels before entering the stage. Another is finding friends or family to listen without notice. This lack of preparation can easily cause the student to become anxious.

“The more you play in public, the easier it is.”

Easier is a relative term. For students that have severe performance anxiety, it may seem as though the student’s state of mind goes from extremely terrified to very terrified. However, improvement is always desired. Jacobs welcomed crudity as the starting point, and this concept

³⁴ Carney, D.R. et al. Power posing: brief nonverbal displays affect neuroendocrine levels and risk tolerance. *Psychological Science* 24, 1363-1368 (2010).

is fitting for performance as well. Much can be learned and gained from performing at any level, especially about the consequences of mistakes.

Anxiety often stems from the fear of failure or rejection. It can be difficult to release this fear, but the more one fails, the more he or she understands why. The experience of performing and receiving an audience is often left out of musical discussion, but in most cases, the audience is rooting for you. Experiencing both failure and the acceptance of a grateful audience will help performers overcome anxiety tremendously.

VI. TOOLS AND DEVICES

The breathing process is not easily measurable through observation, despite our ability to see what is happening outside of a brass player's body. Unscientific methods of breathing have likely flourished because of our inability to assess and diagnose breathing functions while teaching. Jacobs used a number of machines to quantify and qualify the breathing process, and to improve the respiratory function by using this scientific evidence. This chapter contains a list of devices he used, along with other tools that fit into the approach of *Song and Wind*.

Those unfamiliar with Jacobs's teaching style often misinterpreted the machines used as a means to build strength and respiratory muscles, but efficient and effective function is the actual goal. Students benefit from having a visual representation of wind. These machines add "strangeness" to the student's experience, removing reflexes connected to the instrument, and give the student an opportunity to build new habits that include a mental image of quantifiable data.

Music Software

A brass player grows tremendously when playing with others, especially in small chamber groups. However, access and time does not always allow for a musician to be able to practice with others. There are many applications and software that can help a student grow through listening and evaluating the student's performance. The following suggestions are: SmartMusic, Audacity, SmartRecord, TonalEnergy tuner, and iPhone cameras.

SmartMusic has recording and playback options, excellent methods for self-assessment. SmartMusic has many accompaniments available for solo literature, providing an opportunity for

the student to play along, hear, and study more than just the notes in the student's part. Many educators use SmartMusic as an assessment tool, requesting the student upload performances of music to be evaluated outside of class hours.

Audacity, SmartRecord, and iPhone cameras have playback options that not only play in real time, but can play back at half or even slower speeds. This is especially helpful to identify small irregularities, such as note quality within fast passages, entrances, releases, etc. Practice habits may cause a musician to ignore imperfections while playing, but these imperfections should be quite noticeable when listening with a uninhibited mind.

Drones

Access to music software is more readily available than ever before. Smart-phone applications for music often included the choice of drones, or sustained pitches. The brass player can utilize these pitches to help tune the instrument, removing any "beats" or "pulses" in the sound. Setting slides for the best intonation can improve both tuning and tone quality. The brass player should also sing along in his or her mind with the drone, reinforcing his or her mental image of pitch.

If a brass player is able to match the intonation by effectively setting his or her slides, he or she will be playing in the center of the pitch, where the instrument best resonates. If the pitch is not centered, the brass player is likely manipulating the embouchure to bend the pitch up or down. In doing so, the instrument is not resonating as well, or with as many overtones, and the player will begin to suffer from fatigue because of these alterations.

Buzz Ring

Using the buzz ring is an exercise of improving the quality of vibrations, not strengthening or developing muscles. While a teacher can see the embouchure through the use of a buzzing ring, sound is the key focus. The buzz ring can also assist with tongued passages. The ring will allow the student to focus on constant vibration at the lips instead of interruptions in the air. Use of the ring will also verify or expose the accuracy of pitch in the student's mind.



Breathing Bag

The Breathing Bag is used to give the student the feeling of being comfortably full. It is a 4-6 liter bladder that expands and contracts just like the lungs. The student should fill the bag with air from the lips, and keep his or her lips around the opening to seal in the flow from the lungs to the bag. The student will exhale and inhale in the bag, experience fullness in the lungs, and breathe out from that expanded state. Articulation can be monitored using the bag, and a mouthpiece can be attached to ensure flow is occurring as the student buzzes. Playing immediately after taking a breath from the bag can help students that are habitual shallow breathers.

³⁵ Frederiksen, Brian. *Windsong Press*, www.windsongpress.com/product/delrin-bass-trombone-rim/.

Breathing Bag



36

Breath Builder

The Breath Builder provides an opportunity for the student to build constant flow during inhalation and exhalation, allow the brain to subconsciously engage muscles efficiently during the breathing process, and ensure articulation that does not disrupt flow. The Breath Builder is a cylinder with a ping-pong ball inside that rises as air is inhaled and exhaled through the attached tube. This process should occur with minimal effort. The holes at the top of the cylinder, when covered, change the resistance in the flow.



37

³⁶ Frederiksen, Brian. *Windsong Press*, www.windsongpress.com/product/5-liter-rusch-air-bag/.

³⁷ Frederiksen, Brian. *Windsong Press*, www.windsongpress.com/product/breath-builder/.

Breathing Tube Using $\frac{3}{4}$ Inch PVC Pipe

The shape, as described in Chapter III, that a student creates when inhaling and exhaling is important. A simple way to reinforce this shape, or WOH syllable, is by breathing through a three-quarter inch PVC pipe. The PVC pipe should be long enough to be inserted at the lips, but not too long as to become cumbersome. This tool is relatively inexpensive, can be easily transported, and facilitates the aperture size most effective for breathing and brass playing.

Decibel Meter

Decibel meters can be found at many hardware stores, but there are also applications that allow smart-phones to serve as decibel meters as well. Decibel meters measure sound output, and more specifically, measure output with a quantifiable number. The student may “feel” that a big sound is being produced, but feel is not as accurate as an actual measuring tool. By placing the meter at a fixed distance from the bell, the student gains a visual representation of his or her projection. “Play by sound, not by feel” can be reinforced in this exercise, allowing the student to reevaluate the efficiency of the buzz and other factors that may cause the student’s sound to be less present. It should also be used to explore how soft a brass player can play with a good sound.

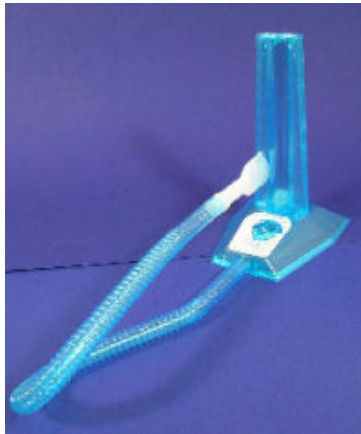


38

³⁸ “Advanced - Decibel Meter / Sound Level Reader - W/ Battery!” *BAFX Products*, bafxpro.com/products/bafx-products-decibel-meter-sound-level-reader-w-battery-advanced-sound-meter.

Inspiron (Incentive Spirometer)

The spirometer has a similar shape as the Breath Builder. It is also a cylinder with a ping-pong ball inside and an attached tube. However, the spirometer provides measurements for airflow instead of just facilitating it. The original intent of the spirometer is to measure inhalation; however, if turned upside down, the spirometer can measure exhalation as well. For brass playing, the spirometer changes breathing subjective measure to a quantifiable measure. The spirometer has an adjustable knob that can change the resistance of the device. This function allows a teacher to simulate different instruments or different ranges of an instrument. A mouthpiece can also be inserted into the tube, and airflow can be observed while buzzing and articulating, if desired.



39

Variable Resistance Compound Gauge

The Variable Resistance Compound Gauge was created by Arnold Jacobs to simulate resistance to any given instrument. Jacobs attached a tube with holes to a manometer, simulating

³⁹ Frederiksen, Brian. *Windsong Press*, www.windsongpress.com/product/inspiron/.

different air pressure needed for different instruments. This device provides a specificity in resistance that other devices are unable to replicate.



⁴⁰ Frederiksen, Brian. *Windsong Press*, www.windsongpress.com/product/variable-resistance-compound-gauge/.

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