SELECTED PUBLISHED LITERATURE CONCERNING TROMBONE EMBOUCHURE: AN EVALUATION AND REFERENCE

by

DANIEL K. TWENTEY

B.A., Virginia Polytechnic Institute and State University, 2010

M.M., Pennsylvania State University, 2012

A thesis submitted to the

Faculty of the Graduate School of the

University of Colorado Boulder

in partial fulfillment of the requirements

for the degree of

Doctor of Musical Arts

College of Music

2020

Committee Members:

Dr. William Stanley

Dr. David Rickels

Dr. Ryan Gardner

Prof. Michael Dunn

Dr. Donald McKinney

ABSTRACT

Twentey, Daniel K. (DMA, Music)

Selected Published Literature Concerning Trombone Embouchure: An Evaluation and Reference

Thesis directed by Dr. William Stanley

The primary focus of this project is to assess pedagogical literature concerning the trombone embouchure. This study will review and categorize pedagogical publications concerning trombone technique based on several criteria. The assessment criteria are derived from the embouchure pedagogy of Donald Reinhardt as revised and clarified by Doug Elliott, David Wilken and others. Topics to be addressed include mouthpiece placement, embouchure movement, tooth/jaw alignment and horn angle. Categorization is based on the scope and specificity in which each publication deals with those criteria.

The resulting project will be a reference resource for trombonists and teachers, providing accessible information about where embouchure-related content exists in trombone pedagogical literature and what is included. The scope of this review includes publications specifically concerning trombone embouchure as well as those that address embouchures of all brass instruments including the trombone. It does not include publications written concerning the other specific brass instruments (trumpet, horn, tuba, etc.).

DEDICATION AND ACKNOWLEDGEMENTS

First, I acknowledge my Lord and Savior, Jesus Christ, and give thanks for the unending grace and renewal that sustains me and fills my life with purpose, love, and hope. As Jesus said in Matthew 19:26, "With man this is impossible, but with God all things are possible." For "In His hand are the depths of the earth, and the mountain peaks belong to him. The sea is His, for He made it, and his hands formed the dry land (Psalm 95:4-5)." "In their hearts humans plan their course, but the Lord establishes their steps (Prov 16:9)." So, "Trust in the Lord with all your heart and lean not on your own understanding; in all your ways submit to Him, and he will make your paths straight (Prov 3:5-6)."

Thank you to my dearly beloved wife, Erin. With endless love and support, she allows me to pursue my passions, especially as a musician and teacher. And thanks to my young sons, Clark and Luke, whose cheerful smiles can turn the most stressful moments into joy and thankfulness.

Special thanks to my mother Sally Twentey and Ann Long, who's regular loving encouragement, council and immense support repeatedly rebuilt my spirit and ambition.

Thanks also for the love and support of my father, Kevin Twentey, stepmother Tracy Twentey, and wonderful sisters Rebecca, Erica, Leslie, and Andrea.

To Ann and John Klein, I offer deep gratitude for your endlessly dependable generosity and help to our family, which has been especially invaluable during this degree.

My deep gratitude goes out to my professor and advisor/committee chair, Dr. William Stanley, who's knowledge and experience patiently guided me through this doctoral program and helped me to further develop my scholarly perspective as a musician and teacher. My appreciation also goes out to my esteemed graduate committee members, Dr. David Rickels, Dr. Ryan Gardner, Professor Michael Dunn, Dr. Donald McKinney, Professor Michael Thornton, and Professor emeritus Terry Sawchuk. Thank you all for your time and positive influence during this long degree.

Thanks also to Professor Mark L. Lusk, whose profound musicianship, caring mentorship and genuine wisdom are continually inspiring.

Thanks to Doug Elliott and Dr. David Wilken, who have each personally shared their guidance, time and significant knowledge.

I'd also like to thank Dr. Jay Crone, and Dr James Miley, who fed and encouraged my interest in music during the early years of my music education. Thanks also to the many other teachers, conductors, peers, and friends for your support and inspiration, which helped bring me to this point.

I dedicate this project and doctorate to my amazing and inspiring grandparents, and to the dear loved ones who's journey on this earth ended before I was able to share with them the joy of completing this degree.

To Grandma Jill (Mommom/Mommommom), and to Grammy/GG, Carolyn and Karlton, and Nancy.

To Grandpa Ken and Grandma Pat,

To Grandpa John (Papaw on the Boat), Potpots, and Gramps,

To Grandma Klein, and Gloria and Bill Long,

And to my Aunt Amy and Uncle Dennis. Rest and rejoice in glory and peace.

TABLE OF CONTENTS

TABLES

Chapter I: INTRODUCTION

There are many existing brass methods and texts which address technique. Some of these address embouchure formation and function, but to varying degrees of specificity and scope. Of those that do, some are descriptive, some are prescriptive, and some are neither. Some texts account for the many variations in players' physiology and some profess a singular technique for all players. With the disparity among the available pedagogical texts, it is often difficult for players and teachers to identify, assess and understand what information is truly available on the topic of embouchure technique.

Therefore, both the trombone and music education communities would benefit from a clearly categorized review of the available published trombone literature that pertains to trombone embouchure. This project will provide such a resource, by surveying and systematically labeling each publication according to several criteria of embouchure information.

Donald S. Reinhardt (1908-1989) was the first to thoroughly study, analyze and categorize the embouchures of hundreds of successful brass players. Reinhardt's complex and exhaustive method, *The Encyclopedia of the Pivot System* (2000) arguably remains the most comprehensive of all the literature concerning trombone and other brass embouchures. The complexity of the text discourages many readers and some of his terminology is widely considered to be confusing. As a result, few of even the most skilled and knowledgeable brass players and teachers truly understand this system and the importance Reinhardt placed on differentiating between each student's physiology when teaching.

Several of Reinhardt students continue to clarify and provide insight into his teaching on embouchure. Rich Willey has published several books and articles including materials and

instruction pertaining to Reinhardt's teachings (Reinhardt 2004; Willey 2008). Doug Elliott is a prolific brass teacher and has continued to refine the concepts of Reinhardt's pivot system. Though Elliott focuses more on teaching than publishing, his pedagogy strongly influenced his own pupil, Dave Wilken. Wilken's public contributions on the subject of brass embouchure are quite extensive, including his dissertation (Wilken, 2000), an article in the Online Trombone Journal (Wilken, 2003), and his website ("Wilktone," n.d.), which offers many entries on the topic. David Ray Turnbull's dissertation (Turnbull, 2001) further supplements and clarifies Reinhardt's teaching with photographs of players exhibiting each of the different Reinhardt embouchure types.

Because of the thoroughness of Reinhardt's embouchure pedagogy and my firm belief in its value, this study will refer frequently to Reinhardt's philosophies as I review the embouchure information in the chosen texts.

Chapter II: METHODOLOGY

Previous Related Studies

An analysis and comparison of the brass methods by James Stamp, Donald Reinhardt, Carmine Caruso, and Claude Gordon, by Daniel R. King (2004) offers comparisons of existing brass methods, but focuses primarily on trumpet pedagogy, not trombone. Additionally, my study reviews a wider selection of texts which do not directly overlap King's work.

Wilken's study (2000), *The correlation between Doug Elliott's embouchure types and playing and selected physical characteristics among trombonists*, relates closely to the criteria with which I use to assess the texts reviewed in this project. However, that study is focused on clarifying physiological associations to each embouchure type, rather than using that information to review and categorize many of the existing trombone pedagogical texts.

David Ray Turnbull's *An analysis, clarification, and revaluation of Donald Reinhardt's pivot system for brass instruments* (2001) is focused primarily on trumpet playing and deals with issues about implementation of the embouchure-related elements of Reinhardt's teaching. Turnbull's study shares the goal of adapting some of Reinhardt's concepts for wider acceptance and comprehension, but does not review trombone pedagogical texts.

Other publications related to Reinhardt's teaching include Wilken's article, *OTJ: An Introduction to Donald S. Reinhardt's Pivot System* (2001) and Cook's *The life and teaching of Donald S. Reinhardt: Brass Pedagogue, 1908-1989* (2014). These both focus specifically on Reinhardt's life and teaching, whereas my project is a study of many trombone pedagogy texts as they relate to some concepts derived from the teaching of Reinhardt and Doug Elliott.

Isley's *A Theory of Brasswind Embouchure Based Upon Facial Anatomy, Electromyographic Kinesiology and Brasswind Embouchure Pedagogy* (1972) puts forth a single embouchure mode that the author believes to be most efficient for all brasswind players. As part of this study, Isley attempts "to list and briefly discuss all possible factors which enter into brass-wind embouchure" (p. 137). In doing so, Isley (1972) provides a survey of the brasswind literature available at the time of publication, organized within many categories representing minute elements of the embouchure. Though Isley does overlap with some of the texts reviewed within this project[1], that study neither aims to provide a book-by-book reference, nor does it focus on trombone-specific texts and pedagogy. Isley to create a new, informed theory for embouchure and does not attempt to categorize texts. That theory attempts to describe an "optimum embouchure," which largely depends on a specific, ideal anatomy (p. 201).

Steven Miles's dissertation, *Dispelling the myths of the brass wind embouchure: Methods, mechanics and practices* (2019), employs qualitative research to survey seventy-nine brass musicians and teachers to identify their practices and knowledge of embouchure. It also employs an observational study to identify the physical mechanisms employed during performance. "Significantly, the data collected through the survey and observational methods detailed in this research, indicate a lack of understanding of the physiological mechanisms at work during brass wind performance. The findings offers scope for further research and provides useful, relevant information to the brass musician and teacher on the complex subject of embouchure" (Miles, p. iv).

[1] An extensive bibliography of that research is presented on page 139 of Isley's study.

Additionally, Miles briefly summarizes the predominating "schools" of brass embouchure pedagogy and acknowledges the many contributions of Wilken and Elliott. Miles also provides an annotated bibliography of twenty brass tutorial method books selected as a result of his survey – none of which overlap with the texts reviewed in this project.

Selecting the literature for review

The search process, while not the primary focus of this study, started intuitively with known sources. An initial limitation was that the sources must be written in the English language. The search continued by reviewing college trombone studio handbooks and syllabi.[2] Of twenty-eight syllabi surveyed, I found that seven mentioned some pedagogical texts. Table 1 shows a list of texts most often recommended by college professors; all of these texts are included in this study.

Table 1
Texts Recommended in Studio Handbooks/Syllabi

Source	**Year**
Baker - *The Buddy Baker Tenor Trombone Handbook*	2001
Begel - *A Modern Guide for Trombonists*	2006
Ervin - *Rangebuilding on the Trombone*	1989
Farkas - *The Art of Brass Playing*	1962
Fink - *The Trombonist's Handbook*	1977
Johnson - *Brass Performance & Pedagogy*	2002
Kleinhammer - *The Art of Trombone Playing*	1963
Wick - *Trombone Technique*	1971/1996

I also searched publisher and music dealer catalogues. Especially fruitful was the exhaustive listing on the website of Hickey's Music Online ("Trombone Textbooks," n.d.). Additional books, journal articles, dissertations, etc., were found on the JSTOR and WorldCat databases, and others. This research yielded many publications and dissertations that mention

[2] For a list of the syllabi and handbooks, see Chapter VI: Appendix A.

trombone embouchure, but none of these were written with intent to assess and categorize the existing literature.[3]

Removal of any online-based web pages that narrowed the field of applicable sources for review. Without receiving notice of the updates and revisions that are likely to occur in the future, it would only be possible to confidently assess the web pages as they exist at the time of writing this dissertation. That would significantly reduce the value of my evaluation of those sources as part of a reliable reference in the future.

I have also chosen to exclude journal articles. The number of articles found was too large for the scope and goals of this project. I believe that the primary goal of this project is sufficiently satisfied without the inclusion of articles from journals and periodicals.

Texts used for training instrumental music educators in methods of teaching brass instruments are included. Their inclusion is intended to increase the utility of this project as a reference.

Inclusion of texts with a spectrum of publication dates was also considered. Publication dates span from 1942 to 2020. With such a range of publication dates, one can examine possible trends in content over time.

The final list of reviewed literature shown in Table 2 provides readers with a fair representation of the existing diversity of pedagogical ideas about trombone embouchure.

[3] A wonderful bibliography of note is Micah Everett's *Selected Bibliography for Low Brass*. Everett's bibliography offers eight pages of helpful texts, treatises, methods, and articles spanning a variety of subjects related to the history, use and teaching of low brass instruments. See a list of other helpful trombone bibliographies in Appendix B.

Table 2
Texts Selected for Review and Classification

Source	**Year**
Bailey et al. - *Teaching Brass: A Resource Manual*	1992
Baker - *The Buddy Baker Tenor Trombone Handbook*	2001
Begel - *A Modern Guide for Trombonists*	2006
Burba - *Brass Master Class*	1997
Burtis - *Time, Balance, & Connections*	2009
Colin - *Vital Brass Notes*	1967
Collwell/Hewitt - *The Teaching of Instrumental Music*	2011
Ervin - *Rangebuilding on the Trombone*	1989
Farkas - *The Art of Brass Playing*	1962
Fink - *The Trombonist's Handbook*	1977
Griffiths - *Low Brass Guide*	1980
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994
Johnson - *Brass Performance & Pedagogy*	2002
Kanda - *Trombone Unlimited*	2020
Kleinhammer - *The Art of Trombone Playing*	1963
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011
Knaub - *Trombone Teaching Techniques*	1964/1998
Mendez - *Prelude to Brass Playing*	1961
Moore/Neilson - *The Brass Book*	1964
Nelson/Jacobs - *Also sprach Arnold Jacobs*	2006
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000
Reinhardt - *Pivot System for Trombone*	1942
Roznoy - *Trombone - Low Brass Techniques and Pedagogy*	1978
Sweeney - *Teaching Techniques*	1953
Whitener - *A Complete Guide to Brass*	1997
Wick - *Trombone Technique*	1971/1996

Choosing Assessment Criteria

Criteria with which to assess the chosen sources were created by establishing various categories relevant to embouchure technique. This study draws upon the embouchure-specific terminology and descriptions presented as part of Reinhardt's method. I draw also upon Elliott's explanations of those same concepts, which were confirmed to be accurate descriptions in Wilken's research (2000, p. 71). My reason for using these specific terms and descriptions is mostly due to the fact that I have found none that more clearly and accurately describe the physical variations among brass players' embouchure setups. Though the content of this study may reveal that not all of the terminology I use is standardized among the trombone teaching community, such a realization is equally valuable.

Reinhardt noted that not all successful brass players achieve their positive results in the same way. Regarding embouchure Reinhardt defined four basic embouchure types with five subtypes. These types/subtypes are based on the alignment of a player's teeth, location of placement of the mouthpiece on the face, the upward or downward direction of air within the mouthpiece, and the direction of embouchure movement, which he termed, "pivot."

> "Reinhardt put a great deal of energy into defining what a pivot is, but the simple (early) definition is the transference of what little pressure there is in playing from one lip to another. After a period of observation, Reinhardt amended his ideas in the 70s and 80s and expressed the pivot concept as a pushing or pulling of the performer's lips rather than a transfer of weight. It was during this time that he used terms such as the 'track of the inner embouchure' to describe very slight movements and adjustments that the lips made in pucker configuration while moving over the teeth. Firm mouth corners and a natural pucker were goals of the functional pivot technique. Reinhardt stressed that these pivot movements were extremely subtle." (Dudgeon, 2000, p. 33)

Doug Elliott made one of the most significant refinements to Reinhardt's four types/five subtypes by defining three basic types. These three types, Very High Placement (VHP), Medium

High Placement (MHP), and Low Placement LP) are named based on the visible orientation of mouthpiece placement and embouchure movement direction.

Table 3 shows the Reinhardt's types and sub-types, Elliot's simplification, and Wilken's general description and explanation of the three types (Wilken, n.d., "Reinhardt-Elliott Embouchure Conversion Chart"):

Table 3
Reinhardt-Elliot Embouchure Conversion Chart

Reinhardt Type	**Elliott Type**	**General Description**
I, IIIA	Very High Placement	More upper lip than lower lip inside the mouthpiece (downstream, usually around 70% to 90% upper lip inside. Pushes the mouthpiece and lips together as a unit up towards the nose to ascend. Horn angle is typically close to straight out and teeth more or less aligned.
III, IIIB	Medium High Placement	More upper lip than lower lip inside the mouthpiece (downstream), usually between just over 50% and 70% upper lip inside. Often pulls the mouthpiece and lips together as a unit down towards the chin to ascend, with some exceptions. Horn angle is typically angled slightly downward and lower teeth are usually a bit receded behind the upper teeth, although there are exceptions.
IA, II, IIA, IV, IVA	Low Placement	More lower lip than upper lip inside, anywhere from just over 50% to 90% lower lip inside. Pulls the mouthpiece and lips together down towards the chin to ascend. Horn angle is most commonly close to straight out with the teeth aligned, buy many variations of horn angle can be found with this type.

My selection of criteria for reviewing and categorizing the selected literature includes no intended judgement as to the quality, validity, or value of the sources as pedagogical

resources. In so doing I have made no attempt to discourage, nor promote the use of any specific text.

Each selected text will be assessed using the following primary criteria:

Target Player Level

This identifies the player competency level toward which the text aims to provide information and instruction. When a text is directed toward teachers, this category identifies the level of the players taught by those intended teachers.

Mouthpiece Placement

The mouthpiece is placed in contact with the player's lips and skin at this location. The proportion of upper to lower lip beneath and within the mouthpiece is of primary importance.

Embouchure Movement/Motion

This describes the motion of the lips and mouthpiece, sliding in conjunction, along the teeth. The direction of this motion typically follows a vertical axis (a.k.a. track), moving up and down (toward the nose or chin, respectively). However, movement axis angles vary commonly due to physical differences among individual players.

Jaw/Tooth Alignment and Horn Angle

This category considers the position of the jaw and the related alignment of the upper and lower teeth when playing the trombone. Because of the close relation, the subject of mouthpiece and instrument angle is also included within this category.

For this study, I define "embouchure technique" as the combination of these elements: mouthpiece placement, embouchure motion, jaw/tooth alignment, horn angle, and any other considerations related to directing the airstream, changing the aperture, or using the muscles of the lips and face in relation to playing the trombone.

Creating Category Code Classifications

In each review, I assess the scope and extent to which the source addresses specific topics related to trombone embouchure technique. To do this, I assign classification codes for that resource, and provide a brief explanation for those code designations.

Using Doug Elliott's simplified nomenclature of Reinhardt's embouchure types, I created the Mouthpiece Placement category represented by the letter "A." This category indicates how many of the three embouchure types (VHP, MHP, and LP) are represented in a given source.

A second category for Embouchure Movement, "B," accounts for the Embouchure Movement represented by Reinhardt's Pivot Classification One and Pivot Classification Two.

Category "C" accounts for the variations in Jaw Position, Tooth Alignment, and Horn Angle, as described above in relation to the three basic embouchure types. Because these topics are closely related and sufficiently dependently correlated, I decided it best to combine them into this single category.

Category "X" indicates the Target Player Level of the resource.

Category "T" is intended to clarify whether the embouchure-related content provided in a given source describes or recommends techniques that are conducive to the specific functions of one or more of the three basic embouchure types. "T1" indicates that the source offers embouchure information approved for VHP players. "T2" sources are approved for MHP players, "T3" texts are approved for LP players. The code option "T4" indicates that the source offers embouchure information approved for trombonists with any of the embouchure types. In some cases, especially for texts in which little specific information is provided, "T4" code may also indicate that the source does no harm to players of any embouchure type.

For notable embouchure information that does not fit within the defined categories, I use the letter "M." Information written in this field of the review does not necessarily have any bearing on the classifications designated for the other categories but is notable and worth including in the review.

For several of the above lettered categories a number may further modify the extent the specific topic is addressed in the text. "1" represents the most thorough or complete treatment of the topic. "2" and "3" are progressively less thorough.

In the A, B and C categories I found it necessary to add a code classification modifier to more accurately represent the source, differentiated with a "D" or "P," placed just after the number. "D" indicates that the source addresses the specific topic in a descriptive manner. The "P" is used to indicate that the source addresses the specific topic in a prescriptive manner. A "DP" is used to indicate that the source addresses the specific topic in both a descriptive and prescriptive manner.

For example, a source stating only that "players should always place the mouthpiece on the lips with at least ⅔ upper lip and at most ⅓ lower lip inside the mouthpiece," followed by a supporting photograph or illustration would be assigned an "A3DP" code. This would indicate that the source accounts for only one mouthpiece placement option, but in both a descriptive and prescriptive manner.

Table 4 shows specific categories and modifiers used for the assessment of each text.[4]

[4] It may be helpful to note that numbering of the codes for each category is set up with "1" representing the most thorough or complete treatment of the topic. "2" and "3" are progressively less thorough. "4" is used for an all-encompassing option, such as "all" or "none."

Table 4
Category Code Classification Legend

	X. Target Player Level of Resource
X1	Advanced players.
X2	Intermediate players.
X3	Beginning players.
X4	All players: Intends to cover material for all levels of trombonists (or brass players).
	A. Mouthpiece Placement
A1	3 of 3 All Placements: accounts for at least the 3 basic placement possibilities.
A2	2 of 3 Placements: Accounts for 2 general mouthpiece placements (VHP, MHP, LP).
A3	1 of 3 Placements: Accounts for only one "correct" mouthpiece placement, even if vaguely.
A4	None: This resource does not address mouthpiece placement, or does not specify any particular mouthpiece placements.
	B. Embouchure Movement
B1	Both Movement Types: This resource accounts for both directions/types of embouchure movement between registers.
B2	1 of 2 Movement Types: This resource accounts for only one type of embouchure movement.
B3	Acknowledged: This resource acknowledges embouchure movement without accounting.
B4	None: This resource does not address embouchure movement, or even suggests that there should be none.
	C. Jaw/Tooth Alignment & Horn Angle
C1	3 Types: This resource accounts for the variations in jaw/tooth alignment & horn angle that relate to at least VHP, MHP, LP (even if the types are not specifically referenced).
C2	2 Types: Accounts for 2 possibilities as legitimate.
C3	1 Type: Accounts for only one "correct" jaw/tooth alignment and horn angle.
C4	None: Does not significantly discuss jaw/tooth alignment and horn angle.
	D/P. Descriptive or Prescriptive
D.	Descriptive of "proper" and/or "improper."
P.	Prescriptive explanation of how to reach "proper" or how to correct "improper."
DP.	Both Descriptive and Prescriptive on the subject code (ex. A2D; B1DP; etc.).
N.	Neither sufficiently descriptive nor sufficiently prescriptive.
	T. Approved Types
T1	VHP: All information is approved for Very High Placement players.
T2	MHP: All information is approved for Medium High Placement players.
T3	LP: All information is approved for Low Placement players.
T4	All: Approved for all players.
N.	None: Not all information in this source can be approved for any of the three embouchure types.

Chapter III: LITERATURE REVIEWS

Bailey, et al. - ***Teaching Brass: A Resource Manual*** **(1992)**

X4: All Player Levels

This book is "designed as a college textbook for brass methods students and as a resource manual for school music teachers." It includes specific sections covering pertinent information about each brass instrument, each written by a specialist on the respective instrument. As such, "it can be used when working with beginning to advanced students" as a resource manual (p. ix). Introductory chapters provide an overview to give the reader a general understanding of common brass subjects, then later chapters specify further with instrument-specific information.

In this manner, both the chapter 2, "The Embouchure," and the embouchure information within chapter 8, "The Trombone," are applicable to this review. It should be noted that "the authors strongly believe that the embouchure on each brass instrument must be formed differently" (p 4).

A1D: All Placements: Accounts for at least the 3 basic placement types.

Concerning embouchures of all brass instruments, the book states that "the mouthpiece must be placed correctly on the lips" and "there is no 'generic' brass embouchure," before referring the reader to find the applicable instrument-specific chapters (p. 4). Listed among common brass embouchure problems, "playing with the mouthpiece too low" is presented as a "cause of endurance, range, and flexibility problems" (p. 7). The associated photograph depicts a LP embouchure (using a trumpet rim visualizer) with the upper portion of the rim placed directly on the upper lip (p. 8).

Concerning trombone embouchures specifically, the book mentions both left-to-right and vertical placement of the mouthpiece. From left-to-right, the player is encouraged to center the mouthpiece, allowing for some variation while avoiding the extremes. About vertical placement, three options are listed: a "high" setting with two-thirds upper lip and one-third lower lip; a "low" setting with one-third upper lip and two-thirds lower lip; and third option to "place half the mouthpiece on each lip" (p. 68). These descriptions correspond, respectively, to VHP, LP, and MHP embouchure types. The recommendation is that each player "start with the mouthpiece approximately half on each lip and allow each player to find the best setting." The photo example provided (p. 69) shows a placement of approximately 60% upper lip (which is most representative of MHP).

B4: None: This resource does not address embouchure movement.

In reference to playing higher and lower in the tonal range, the book offers fairly simple information. The basic principle of vibrating the lips faster for higher notes and slower for lower notes is presented, followed by some "often-suggested procedures" for manipulating the vibration speed. Those include "focus the embouchure" and "diminish the aperture size" for playing higher notes and "increase the air supply" and "open the aperture" for playing lower notes (p. 72). Beyond this information, the text does not mention any adjustments, motion, or manipulation of the embouchure in order to change notes.

C3: 1 type: Accounts for one "correct" jaw/tooth alignment and horn angle.

About all brass embouchures, the book briefly advocates approximate vertical alignment of the upper and lower teeth (p. 4).

Photographs on page 67 provide examples of recommended posture for playing trombone in the sitting and standing positions. These both show a slightly downward angle of the instrument (approximately 15-30 degrees from horizontal).

T4: Approved for all players.

Because the information provided accounts for each mouthpiece placement and offers little other prescriptive details concerning the other classification criteria, this book is widely applicable to players of all embouchure types.

Extra Notes:

The trombone chapter of this book advocates both lip buzzing (free buzzing without mouthpiece or instrument) and mouthpiece-only buzzing as tools to develop the embouchure.

Baker/Carroll - *The Buddy Baker Tenor Trombone Handbook: A Sourcebook of Materials for Both Young and More Experienced Tenor Trombonists (Both Classical and Jazz Players) and for the Trombone Teacher* (2001)

X4: All player levels

The intended player levels are stated in the title - "for both young and more experienced tenor trombonists and for the trombone teacher."

A1D: All Placements: accounts for at least the 3 basic placement possibilities.

> "Most tenor trombonists have more mouthpiece on the upper lip than on the lower (⅔ upper and ⅓ lower is common). If the mouthpiece 'works' lower than this, look for a reason (usually teeth - a 'low' gum line) . . .
>
> "The top inside edge of the mouthpiece usually ends up on the top lip where the underneath teeth meet the gums. If this juncture is low under the top lip, mouthpiece placement will usually be quite low (less than ½ of the mouthpiece on the upper lip). Average placement is ½ to ⅔ top lip and ⅓ bottom lip" (p. 46).

B4: None: This resource does not address embouchure movement, or even suggests that there should be none.

By stating that "the embouchure 'works where it lives' - nothing 'goes anywhere' to do its job," the mere idea of embouchure motion is not encouraged. The impetus for this statement is a desire to maintain consistently engaged embouchure "corners." Baker states, "Besides jaw adjustments, the adjustments needed for high and low registers all occur inside the mouthpiece. Don't 'mess' with your corners!" (p. 45).

C3DP: 1 Type: Accounts for only one "correct" jaw/tooth alignment and horn angle.

Concerning the basic jaw/tooth alignment, Baker mentions that the "teeth are not close" in the middle and low register - "there must be an 'AW' (not 'AH') feeling in the mouth." He also states that, "for the middle register, usually the lower jaw will be slightly forward in a 'thread biting' position" (p. 45). This position would indicate that a player with a normal overbite might protrude the lower jaw forward in order to align the upper and lower teeth

vertically. From there, he states that the teeth should be opened a different distance apart for each pitch. "The lower the pitch, the farther the teeth are apart. Quality of tone dictates the proper jaw position for each pitch" (p. 45).

Baker also provides instructions for changing the register by changing the horn angle in relation to the face. He states:

> "Lower your chin (and head) slightly (causes the air stream to be directed in a more upward direction) for the low register; raise your chin and head slightly (causes the airstream to be directed in a more downward direction) as you ascend into the upper register. These are rather small adjustments!" (p. 45).

These instructions are most likely to affect positive results with the MHP and LP embouchures, as opposed to VHP embouchures.

T2: MHP: All information is approved for players with Medium High Placement Embouchures.

The call for only minute adjustments (especially focused inside the mouthpiece), in addition to the horn angle (or head angle) changes presented in the jaw/tooth alignment category, coincides most with MHP players.

Extra Notes:

Depth of information provided on these embouchure topics is fairly low, especially considering that only 2 of 160 pages address embouchure.

Begel - *A Modern Guide for Trombonists and Other Musicians* (2006)

X4: For All Player Levels

This text covers a variety of topics relevant to trombonists of many skill levels. Though the embouchure-specific information is quite limited, there is plenty of practical information presented with exercises for implementation.

A4: None. This resource does not address mouthpiece placement clearly.

B3D: Acknowledged. This resource mentions embouchure movement without any specifics.

Concerning range expansion, Begel writes:

> "Gradually expand your best tone higher and lower while maintaining the physical characteristics of your mid-register. Observe your practice in a full-length mirror. If your forehead, eyebrows, cheeks, or neck twitch when increasing range, back up and try to expand without the unnecessary movement. Your embouchure will adjust as range expands, but most of its changes should occur inside the mouthpiece. There is some give and take here for individual differences" (p. 39).

This passage acknowledges an adjustment of the embouchure when changing tessitura in a descriptive manner, without prescribing specific movements.

C4: None: Does not considerably discuss jaw/tooth alignment and horn angle.

While discussing tone quality, Begel states, "An open jaw and open throat (as if breathing through a breathing bag tube) contribute to a beautiful, open tone quality. However, opening up too much inhibits tone quality, projection, and range, and creates a tubby quality. This happens sometimes when trombonists strive for a sound that is too wide, almost like a euphonium" (p. 25).

While discussing range expansion, "Another incorrect technique is increasing the overbite, which chokes off the air supply" (p. 39). This is the only significant mention of jaw position, but it does not specify enough to correlate to any specific embouchure type.

T4. All: Approved for all embouchure types.

Embouchure information provided in this text is broadly applicable.

Burba - *Brass Master-Class* (2009)

X1, X2: Advanced and Intermediate Player Levels

Burba's goal with this publication is to expand the reach of his method to a large audience of brass players. His approach and writing style do not lend themselves to beginners, but would be more appropriate for intermediate and especially advanced players (p. 4). This is confirmed on page 46, where Burba states, "The method described in this book is unfortunately less suitable for a beginners' course."

A1N: All placements: Accounts for at least the 3 basic mouthpiece placements.

Burba gives only one rule for placing the mouthpiece on the lips - that is, "the inner edge of the rim must at the highest and lowest point remain in the white area[5] of the lips" (p. 55). This allows for any vertical placement, but without specifically naming the most commonly used placements.

B4: None: This resource does not address embouchure according to the definitions of this project.

[5] Burba uses this term, "white area," to describe the player's normal skin tissue, which is outside the fleshy part of the lips. The author should certainly have used more inclusive language here to represent the many players with other shades of skin. This is especially surprising, given the 2009 publishing date. Educators looking for texts to recommend to their students might do well to consider this language.

Burba very specifically identifies the muscle groups, and their accompanying stimuli, that are needed to play a brass instrument. He also explains how to utilize and train those muscles, away from the instrument, in order to receive the most benefit on the instrument. His various embouchure exercises may indeed help to produce the ideal embouchure movements automatically, when the player returns to the instrument. However, he does not discuss that embouchure motion in terms that can be assessed within the code classifications of this project.

C4P: None: Does not recommend or describe any specific jaw/tooth alignments or horn angles.

> "The angle at which the instrument is placed, slanting downwards, straight or slightly upwards, has absolutely nothing to do with the quality of playing… Changing the angle of the embouchure can only create health problems, especially with respect to the hinges of the lower jaw and their compensating muscular system" (p. 56).

This suggests that moving the jaw forward and back (as opposed to opening/closing the teeth in the normal radiused manner) while playing, in addition to altering the horn's angle relative to the embouchure, is of no benefit to the player. In this way, Burba passively argues against adjusting the horn angle and jaw from their initial natural position when the mouth is slightly open.

T4: All: The information here is approved for all players.

Because Burba allows for freedom within most of these categories, there are no undeniable conflicts against the defined functions of each embouchure type.

Notable Quotes:

> "Anyone who can eat, drink and speak is, from an anatomical standpoint, able to play a brass instrument. The often-heard contention that the anatomy may limit instrumental abilities is nearly always merely a foul excuse" (p. 46).

> "Most people think too little and at the wrong time about what they do and what is happening. Normally we do not begin to think about something until it does not work or is not suitable; then it is often already too late. It is at the stage when something is working well, functioning properly, that we must think and try to find out why this is so. Since there are always many fewer possibilities for doing something right than for doing something wrong, we are, through proper thinking, able to find the answer much faster" (p. 59).

Burtis - ***Time, Balance, and Connections: A Universal Theory of Brass Relativity: Trombone Edition*** **(2009)**

X1: Advanced level players

The content in this book is intended to be used in "three doses." First, it should be read entirely, absorbed and contemplated. Secondly, the author recommends the reader "set aside a number of days of practice time and go through the entire book exactly as it is laid out" on the instrument, playing through each exercise. After this, the reader is meant to "synthesize a practice approach that is at least partially based on the contents" in order to achieve their playing goals on the trombone (p. 7). Burtis writes that the aim of this book "is to teach you how to create your own method… that grows along with you as you progress in your musical pursuits" (p. 7). His primary philosophy is summed up by "try everything; use what works" (p. 8).

As such, the use of this text is certainly aimed toward more knowledgeable and accomplished players, as opposed to beginners and intermediate players.

A4DP: None: This resource does not specify particular mouthpiece placements, but does provide means by which to discover what works best.

In contrast with what he calls "fixed embouchure" approaches (where the player places the mouthpiece on the same place upon lips in any range), Burtis advocates a "multiple

embouchure" approach. Burtis believes that "the use of slightly different settings can facilitate the production of different ranges, and that the changes between those settings can be timed in and/or blended so that one can seamlessly bridge the potentially troublesome gaps between those positions" (p. 9). In other words, there can be multiple mouthpiece placements, slightly varying based on the tessitura, that are best suited for specific ranges. Burtis believes there are natural "breaks" in the range, which he compares to the chest and head voices of singers. He states, "the concept of break points is the secret to understanding and developing a brass embouchure" (p. 15). Much of the book is aimed at connecting the various settings, working to find and bridge the "breaks."[6]

This is not to say that each "setting" is different enough to be considered a different embouchure type (as defined by VHP, MHP, and LP).

B3: Acknowledged: This resource acknowledges embouchure movement without accounting specifically for either embouchure movement type.

As described above, Burtis advocates that the player uses various settings that work best in different, select ranges. He states, "when you do find a break point, that is as far as the embouchure with which you played the initial note will go without some sort of appreciable alteration," (p. 16). Burtis does not wish "to deal with what kinds of alterations these may be, because the various possibilities are too numerous, too subtle, and too changeable from day to day," (p. 16). He recommends creating "a number of fairly stable 'mixed voices' that are

[6] See also Burtis (2009), page 263 for more information.

analogous to the Bel Canto mixed voice idea, and you will learn how to flow smoothly and well throughout the entire range of your instrument," (p. 16).

In effect, Burtis's approach replaces the embouchure movement defined by this project with a number of different (relatively stationary) mouthpiece settings. In order to find those ideal settings for each range, Burtis recommends to "alter the angles at which the horn and mouthpiece and horn meet your face in very small increments and in all directions" and "while keeping the lips on the mouthpiece in the same position as usual, slide the lips and mouthpiece a little in all directions relative to your teeth and try altering your jaw position somewhat as well," (p. 18). These recommendations are perfectly in-line with the definitions for embouchure movement and jaw/horn angle adjustments presented by this study. Thus, Burtis's different mouthpiece placements are likely to be spaced evenly along the same path of Elliott/Reinhardt's defined embouchure movements, relative to the tessitura.

C1: This resource accounts for variations in jaw/tooth alignment and horn angle that relate to at least VHP, MHP, LP (even if the types are not specifically referenced).

Burtis's aforementioned "try everything; use what works" approach allows for whatever jaw/tooth positions and horn angles are most effective for each individual player.

T4: All: Approved for players of all embouchure types.

The approach is self-exploratory and designed to help the reader identify what works best for themself. There are no recommendations that exclude players from using any particular embouchure type (as far as VHP, MHP, and LP).

Extra Notes:

Burtis uses exercises to find "breaking points" then bridges them with "micro-connection" and "macro-connection" exercises. The micro-connection exercises include Carmine Caruso's "Six Notes,"[7] long tone intervals, moving intervals (increasing/decreasing scalar intervals, a la Arban), short scales, and repeated moving intervals. His macro-connection exercises[8] include harmonics, flexibilities, slide technique, long scales, and free blowing. Pages 252-260 summarize these concepts and exercises. He then offers several variations in which those exercises might be performed, as summarized on page 261.

Colin - *Vital Brass Notes* (1967)

X4: All player levels

This book does not expressly indicate a specific intended level of player. The book also does not specifically indicate that trumpet players are the intended audience. Most examples presented involve the trumpet, but can be applied to trombone as well.[9]

This book is not likely to be easily understood by a beginner, but a teacher could apply many of its principles to their early students, as well as more advanced students. The text is fairly dense with information, despite its modest 48-page length. It also should be noted that some terms used in the book are considered racially insensitive by current standards.

---

[7] Burtis describes Caruso's "Six Notes" philosophy and micro-connections on pages 23-29.
[8] Burtis describes the macro-connections on pages 30-33.
[9] Colin published several method books and studies including two, *Progressive Technique* (1958; out of print) and *Daily Warmups* (1959), that are recommended by Fink in *The Trombonist's Handbook (1977)*. That certainly suggests that Colin's teaching concepts could apply to trombonists. The latter of which is often printed within the same book as *Vital Brass Notes* (1967). Colin also published a photographic study, *Chops: 480 action photographs of brass players illustrating the wide range of embouchures and mouthpiece placements* (1990).

A1D: Accounts for at least the 3 basic embouchure types in relation to mouthpiece placement.

On page 7, the first mention of mouthpiece placement and embouchure is accompanied by an illustration showing a very clear example of an upstream, LP player. Here the author shares an interesting and fairly divergent perspective, writing "The tongue placement up and above the top teeth has a very specific effect. It directs the placement of the mouthpiece and sets the lip muscles. It also develops the vital and essential muscles in and around the placement of the mouthpiece and embouchure."

Colin promotes only one specific type of tongue position, which is not necessarily the position used by most trombonists. He believes this higher tongue placement sets up the embouchure and lip muscles to properly function with a low mouthpiece placement embouchure setup.

On page 7, beside another basic illustration of a player using a low mouthpiece placement, Colin states the following:

> "Among the many formulas used to get more or less lip into the mouthpiece vaguely are: (1) Red part of top lip on rim, not in mouthpiece; (2) Two-thirds of mouthpiece on top lip; (3) Half top lip, half bottom lip; (4) Red of both lips rounding around mouthpiece; (5) Top and bottom lips curled in mouthpiece. The most sensible group, however; advocates that wherever the mouthpiece feels most comfortable and the lips vibrate most freely, that is the correct placement. Lip formations of every player is as different as the individual itself. Therefore, it is obviously foolish to say that the best placement is 'half and half'" (p. 7).

With this and his previous LP illustration, the text certainly accounts for the three basic embouchure types (VHP, MHP, LP).

B4DP: None: This resource does not address embouchure movement as defined in this project.

> "In ascending from the low to the high register, the lips should be drawn together. This is done by raising the bottom lip slightly, thus tightening the muscles in the corners of the mouth. It also has a direct bearing in controlling the air stream. The process is in raising and lowering the air stream, and thus controlled resistance reverts back to the tightness of the embouchure. The technique is to lower the bottom lip for a slight opening, which gives both wider vibrations and a resonant bottom register. The compression of the lips results in a smaller opening and thus higher register" (p. 7).

The author is indicating the need to pucker up/forward with the lower lip to ascend and allow it to slightly relax and roll out further to descend, effectively controlling the aperture/airstream size. This does not expressly align with the specific embouchure movement types as stated in this project's criteria.

In lieu of considering embouchure movement as defined by this study, Colin primarily presents the following factors throughout the text: a forward focus of the embouchure musculature to balance mouthpiece contact pressure, air stream manipulation via tongue position[10], breath control, and air energy.

C4DP: None: the author does not account for any of the jaw/tooth alignment or horn angle variations in relation to the 3 embouchure types considered by this project.

> "The tongue muscles are connected with the jaw, and by tonguing high, the jaws come closer together. Elimination of as much as possible of the jaw opening is therefore essential, because it not only brings the lips into closer contact with each other, but it also strengthens the tongue muscles for both the control and release of the air stream. Such contact can never be too close. The means of obtaining perfect lip trilling and slurring is involved in the same principle since there is close contact of the tongue with the upper rear molars and the tongue moves up and down to expand the air columns, according to

[10] On pages 8-9, tongue placement is addressed in strong relation to embouchure function, but this terminology should not be confused with the "tongue controlled embouchure," promoted by Jerome Callet, which conversely involves the tongue remaining in contact with the lower lip (Wilken, n.d., "The Tongue Controlled Embouchure – Wilktone").

> the width of the interval. Such is the correct procedure in any form of slurring, whether it be a scale, chromatic scale, lip trilling, or the expanding of an interval from a second to two octaves or more" (p. 38).

This is the text's most applicable passage to this category. Even so, the explanation is focused primarily on the tongue position in relation to the teeth and does not account for any of the jaw/tooth alignment and horn angle variations considered within this category.

TN: None: Not all information in the source is approved for any of the embouchure types specified within this project.

Because this text provides very specific recommendations that contradict many of the characteristic embouchure techniques delineated in this study, the source is not considered approved for use by any of the three basic embouchure types. Players specializing in high register, especially employing a LP embouchure, are likely to have the most success with the instruction provided within this method.

Colwell & Hewitt - *The Teaching of Instrumental Music* (2011)

X2, X3: Beginning to intermediate player levels

The basic purpose of this book is "to provide pre-service and in-service instrumental music teachers the foundation and materials for successful teaching and learning" (p. xiii). In that respect, it is often used in the teaching of college methods courses and by in-service grade-school instrumental music teachers.

A2DP: 2 of 3 Placements: Accounts for two general mouthpiece placements (VHP and MHP)

> "Every effort should be made to center the mouthpiece on the lips horizontally and vertically. Though there are many shades of opinion regarding the vertical placement of the mouthpiece, most teachers prefer to have equal amounts of each lip vibrating for cornet, trumpet, and tuba, and more of the upper lip on the mouthpiece for horn and trombone" (p. 193).

The text states that the shape of the front teeth, as well as lip and jaw structure, also affect the placement. For example, students with fuller upper lips should place the mouthpiece "slightly higher on the lip" and students with a receding lower jaw (overbite) should place the mouthpiece "a bit farther down" (p. 193). Students with uneven teeth may also tend to let the mouthpiece drift slightly to one side or the other. So, readers may conclude that this book recommends a downstream trombone embouchure, with a mouthpiece placement covering more upper lip than lower lip. The degree to which the upper lip predominates would depend on the thickness of the lips and the amount of overbite present, allowing for VHP and MHP embouchures, but not LP.

This is confirmed on page 239, where a ⅔ upper and ⅓ lower lip guideline is offered, with the alternative option for "about half upper and half lower lip."

B3D: Acknowledged: This resource acknowledges embouchure movement without accounting specifically for either embouchure movement type.

> "When the airstream is increased in velocity to play pitches higher in the overtone series, the corners of the lips must become firmer to prevent the increased air pressure from blowing the lips open. The lips vibrate more rapidly when the airstream is moving more rapidly. Tension at the corners of the mouth makes the aperture smaller while retaining a similar shape" (p. 193).

The passage above provides the book's initial explanation, but a more thorough presentation follows.

"The direction of the air changes in different registers," generally with the air being directed more downward as the register becomes higher, which coincides with downstream embouchures. The text suggests that, though "the embouchure remains basically the same," this is accomplished through "a slight shifting of pressure from one lip to the other depending upon the register." During this slight shifting of pressure, the "upper and lower lips and teeth may not remain perfectly vertically aligned" and the "head or instrument may be pivoted just enough to transfer pressure from one lip to another" (p. 194).

The authors refer to Donald Reinhardt as the original source of this information. In order to affect the size of the lip aperture, the book references "pivoting," which they describe as "changing the position of the lower lip because it is not as crucial in producing the 'buzz'" or "raising or lowering the lower lip by rolling it in and out or, in extreme cases, by slightly lowering the jaw" (p. 194). This description is provided without any reference to specifically associated embouchure types and without the details of which direction to roll the lip and shift the mouthpiece pressure, in relation to the change of register (higher or lower). The provided description of airstream direction can be associated with downstream embouchures, but the VHP and MHP downstream embouchures each have different respective embouchure movements. The information is not complete enough to associate with either embouchure movement type.

C3D: 1 Type: Accounts for only one "correct" jaw/tooth alignment and horn angle.

The authors prescribe a lower jaw that is "exactly beneath the upper jaw, with the incisors aligned," with the purpose of "sending the column of air almost directly into the mouthpiece,

neither excessively upward nor downward." Thus, "most students must be encouraged to move their lower jaw forward to align the teeth and lips" (p. 193).

Because readers aren't given specific information as to how to manipulate the jaw, this cannot be associated with specific embouchure types. However, this aspect of ambiguity does potentially allow readers to experiment with movements without providing specifics that may inhibit some due to their specific embouchure types.

T1: VHP: Information is approved for Very High Placement players.

This book provides information approved for most MHP and VHP players, however, on page 198, the following passage may be detrimental to some MHP players (Reinhardt's type III, specifically):

> "The lower lip must not be allowed to collapse into the mouth over the lower teeth or behind the upper lip" (p. 198).

This is confirmed in the brass troubleshooting section on page 207, with two potential reasons provided for "difficulty in the upper range." The first reason is "try to direct air downward by rolling in lower lip," which is actually an effective technique for a relatively small number of MHP players (classified within Reinhardt's type III embouchure). The other reason of interest is "too much bottom lip in mouthpiece," which only applies as a detriment to the high range for VHP players.

Ervin - *Rangebuilding on Trombone* (1989)

X1 X2: Intended for Advanced and Intermediate player levels

From the book's preface:

> "The exercises here are not intended for young players, but for trombonists with several years of experience. Intermediate players would be well advised to consult a private teacher while working with these exercises, to avoid the accidental development of bad habits. Air, breathing and blowing should be working well before starting any high range projects."

A4: None: This resource does not address mouthpiece placement clearly.

On page 3, Ervin writes that "you 'set' your embouchure for a desired pitch, tune the instrument for the same pitch and buzz. That 'setting' of the embouchure is a matter of lip tightness and aperture size." On page 17, Erving states "of course you must change something to produce changes in pitch - aperture, air, pivot, etc. - but avoid resetting the mouthpiece onto different skin." This provides some additional clarity as to his meaning of the term "setting" the embouchure, suggesting it is not related to the mouthpiece placement.

B1D: Both Movement Types: This resource accounts for both directions/types of embouchure movement between registers.

With a short reference to Donald Reinhardt's Pivot System, Ervin mentions that "many (if not most) players make changes in the angle between the instrument and their face as they go from low range to high range." He also states, "clearly there are different types of embouchures among excellent players." Ervin describes this in relation to his own playing by stating "I pivot myself, but only a little. I dip the trombone (or raise my head) to go higher, and reverse this going lower. Some players reverse this" (p. 7). As such, he accounts for both movement types. By describing his own adjustments, he accounts for the movement of most MHP and LP players. Stating "some players reverse this" accounts for the movement of VHP players. Ervin

recommends that players read Reinhardt's book and try the exercises, stating, "some teachers seem to know quite a lot about it" but that he, himself, is "no expert on this 'system'" (p. 7).

C3DP: 1 Type: Accounts for one "correct" jaw/tooth alignment and horn angle.

On page 17, Ervin recommends trying to "play straight down the throat of the mouthpiece" as an alternative to beginning to "cover the red of the lower lip with the upper lip as they ascend into the high range, blowing down their chin to the floor of the mouthpiece." He believes an "overbite of the lips" of this type often results in a lowered upper limit to the player's high range. The recommendation to keep the lips more vertically aligned suggests that most players must make an adjustment with the lower jaw to align the teeth.

By recommending to "play straight down the throat of the mouthpiece," Ervin refers to keeping a more perpendicular horn angle in relation to the teeth, which he hopes to be more or less vertically aligned. Because the MHP type includes players (Reinhardt's Type III) who almost always exhibit a noticeably low horn angle and an "overbite of the lips," Ervin's advice for this category is more likely to be helpful for VHP (and some LP) players than for MHP. Within each of the three basic types there is some variance in horn angle from player to player.

Ervin accepts the technique of making small changes to the horn angle (either up or down) while moving between registers. His presentation of that information relates more directly to embouchure motion than to jaw/tooth and horn alignments.

On page 23, Ervin suggests finding "your best playing position" by noticing the "head posture, and angle of the mouthpiece on the face" at which mouthpiece buzzing is best

accomplished. This is offered as an alternative to players who "play too bent up, or at the floor, for weak reasons such as arm comfort, instrument weight, or pure bad habit" (p. 23).

T1, T3: VHP & LP: All information is approved for Very High Placement and Low Placement players.

Though most of the embouchure information in this text does not reach the level of detail and prescription needed to omit certain players, Ervin's comments against an "overbite of the lips" may conflict with the best technique for some MHP players.

Extra Notes:

This text is written as "a comprehensive book to help players develop endurance, good intonation, finesse, accuracy, reliability and agility in the high range" (p. iv). The text, however, is fairly brief (at 26 pages) and the passages mentioned above comprise the entirety of Ervin's commentary on embouchure technique. The remaining material consists largely of focused exercises, each presented with brief instructions.

Farkas - *The Art of Brass Playing* (1962)

X4: All player levels

This "treatise on the formation and use of the brass player's embouchure" is dedicated toward helping brass players of all levels. In the book's introduction, Farkas writes, "barring actual physical malformation of the lips or teeth, I feel that it is perfectly possible and practical

for the brass player to hope for and to expect a clear, well-defined solution to his particular embouchure problem or problems, and to that end this book is dedicated" (p. 4).

A1D: All Placements: accounts for at least the 3 basic placement possibilities.

On pages 32-34, Farkas explains his opinions on mouthpiece placement. He believes that "each type of brass instrument seems to respond to one particular lip position." For that reason, he provides a basic formula for mouthpiece placement on each instrument. From that starting point the player may make some small adjustments.

For the trombone, Farkas writes that the lip placement is "not nearly so consistent among trombone players." He states that "many fine players seem to prefer the two-thirds upper, one-third lower lip position. However, there are just enough excellent players who play with more lower than upper lip to prevent our formulating a strict rule…" Farkas thinks that the increased size of the trombone mouthpiece allows for "more choice in lip positions which are seemingly successful." He also recommends that each person "choose, through experience, experimenting, and plain logic, the very best position for one's own best results." He does believe that there is an ideal placement for each person and that finding that "ideal spot to place the mouthpiece will not only improve the tone and technique, but will also, when consistently used, lead to consistent, accurate playing" (pp. 32-34).

Thus, at least concerning the trombone, Farkas allows for the various mouthpiece placements associated with VHP, MHP, and LP embouchures.

B4: None: This resource does not address embouchure movement, or even suggests that there should be none.

Farkas explains that he considers the matter of ascending and descending in range to be dependent on finding a "perfect balance point between the cheek and lip muscles, where neither the smile nor the pucker wins the tug-of-war. When this is found, the entire range of the instrument can be encompassed" (p. 15) without moving the mouth corners. The effort of the lips and cheeks builds equally while ascending in range and lessens equally while descending. "So the muscular feeling while playing throughout the instrument's range is one of varying degrees of tension and relaxation but not one of lip motion - or commotion" (p. 15).

Farkas warns against allowing the lips to "pout" and protrude into the mouthpiece or let them swing inward over the teeth. He believes they should always be held at right angles to the mouthpiece and kept vertically aligned. The primary method for changing notes is the manipulation of lip aperture. For example, he states that "ascending notes require a constantly diminishing aperture" while "descending notes require a constantly enlarging aperture." To aid in the manipulation of the aperture, one may adjust the opening of the jaw slightly (while maintaining perfect vertical tooth alignment) and they may form various vowel shapes and change them according to register (p. 52).

Farkas also discusses and admonishes against what he calls "lateral mouthpiece pressure." His explanation of this term seems to coincide with the definitions of vertical embouchure motion used in this study.

> "[I] have found only an occasional player who forces the mouthpiece in a downward direction. But the practice of forcing the mouthpiece upward toward the nose can be observed in a large number of players. Usually, most of these players apply very little lateral pressure in the lower and middle registers, but apply more and more upward push as they ascend, until, in the highest register, they are exerting very noticeable

> amounts of this pressure. Evidence of this can be seen by the lessening distance between the top of the mouthpiece and the bottom of the nose." (pp. 55-56)

These movements are essentially an explanation of the VHP player's embouchure motion. Farkas states that players who have developed lateral pressure do it unconsciously and are usually unaware of it and unable to stop using it. He doesn't provide and support any significant reasoning for his belief that this movement is unnatural or unnecessary. But, he does suggest that the source of the problem is probably a receding jaw and that the solution is probably to "thrust the jaw forward, as suggested so often, and hold the horn at the resultant more horizontal angle so the mouthpiece is perpendicular to the upper front teeth" (p. 56).

Although he has noticed this embouchure motion and describes it fairly clearly, Farkas recommends against it in favor of a relatively motionless embouchure. Therefore, none of the information presented in this book constitutes an acceptance of any of the types of embouchure movement defined for this project.

C3DP: 1 type: This source accounts for one "correct" jaw/tooth alignment and horn angle.

> "When the air-column is found to deflect downward, in spite of the rim being held normally (that is, so the instrument, if it were attached, would point out more or less horizontally), it is almost invariably the fault of the lower jaw. We are concerned with having the upper and lower lips directly opposite each other, in an up and down consideration, so that they abut together, without one lip (usually the lower) sliding in behind the other. The foundation or support of the lips is the responsibility of the upper and lower front teeth. Therefore, if the lips are to line up so that they abut together without sliding one under the other, the upper and lower front teeth must also be exactly in line.
>
> "To sum it up, I believe that the air-column must continue in a straight line through the mouth, the lips, and finally the horn. The only way this can be accomplished is by aligning the front teeth, and consequently the lips, by the proper amount of forward thrust of the lower jaw" (p. 7).

Farkas recommends only this one jaw/tooth position for playing. In addition to the quotes above, on pages 8-9 Farkas provides an illustration of the "wrong" and "right" jaw/lip position (Fig. 3 and 4). His call for thrusting forward the lower jaw to align the teeth assumes that players have an underbite to some extent. He mentions on page 9 that players aiming the mouthpiece too high should correct "this fault" by "receding the lower jaw somewhat and carefully to equalize the lip pressure."

Farkas explains that the horn angle is a result of the player's tooth alignment, because mouthpiece pressure is to be "exactly and evenly distributed to both lips." He states that, in an effort to keep mouthpiece pressure even on both upper and lower lips, players with lips/teeth that aren't perfectly aligned must utilize an incorrect horn angle - incorrect because is not roughly horizontal, but angled downward to some degree. Farkas continues to explain the dangers of an incorrect horn angle. He states that when mouthpiece pressure is applied in ascending passages, "the receding jaw and downward pointed mouthpiece often cause the mouthpiece to 'ride' or slide upward toward the player's nose… this is a most detrimental effect, rolling more and more upper lip and less and less lower lip as the player ascends in the instrument's range" (p. 9).

A receded lower jaw, rolled-in lower lip, and downward horn angle actually represent the proper embouchure/jaw function of some MHP players (especially those within Reinhardt's Type III). Though it may not describe the technique most likely to produce success for most VHP and LP players, there may be some readers whose experience directly contrasts these ideas from Farkas.

TN: None: Not all information in this source can be approved for any one of the three embouchure types.

Because this book contradicts some key elements of embouchure function used to define the various types of embouchures for the purposes of this project (especially concerning embouchure motion), the book as a whole cannot be entirely approved for any one embouchure type.

Extra Notes:

Later in 1970, Farkas published *A Photographic Study of 40 Virtuoso Horn Players' Embouchures*, which further depicts the mouthpiece placement and embouchure set-up of many horn players. Most of these players are shown with what is likely a downstream embouchure.

Fink - *The Trombonist's Handbook: A Complete Guide to Playing and Teaching the Trombone* (1977)

X4: All player levels

Fink's handbook is one of the most often used texts for trombone pedagogy. Because it provides information about a broad spectrum of subjects, including the elements necessary to start beginners and to further advanced technique.

A1DP: Accounts for all placements, though it favors VHP.

> "The mouthpiece is placed on the embouchure - the embouchure is not formed on the mouthpiece. After the M embouchure is formed, the mouthpiece is placed midway between the corners of the mouth and as high on the upper lip as is comfortably possible" (p. 10).

This passage, which includes illustrations, is indicative of the VHP embouchure type.

Fink continues on page 11:

> "Many old method books recommend a half and half or even a one-third upper and two-thirds lower lip placement. Most modern professional players place their mouthpieces so that there is more upper lip than lower lip in the mouthpiece. Only players with severe underbites use more lower lip than upper as a rule.
>
> "The size of the trombone mouthpiece influences its placement and the opening of the jaws. At first, you may form an embouchure which will not give you a large even surface for the seating of the mouthpiece. After a few trials, you will learn how far to spread the jaws so that the lips will make an air-tight seal with the mouthpiece. You will make this jaw spread as part of your embouchure formation and after a few weeks of careful practice, you will be able to form an embouchure and place the mouthpiece without adjusting the spread of your jaws" (p. 11).

B1DP: Both Movement Types: This resource accounts for both directions/types of embouchure movement between registers.

On pages 12 and 13, Fink refers to "pivoting" the weight of the mouthpiece pressure "from one lip to the other: shifting the weight to the lower lip when ascending and to the upper lip when descending." This definition is concurrent with Reinhardt's *Pivot* System. Fink recommends this for beginners with a downstream embouchure, and "For the more advanced player, the concept of pivoting the mouthpiece weight is helpful in both the extreme upper and lower registers" (pp. 12-13).

Fink states "upstream players will pivot in the opposite direction as downstream players. That is, if you are an upstream player you will pivot up to ascend and down to descend" (p. 13). He then refers the reader to Reinhardt's *Pivot System* for a more complete description. He does

state that "it must be slight and is not a change of embouchure" and that "the lower jaw may move slightly, but the basic mouthpiece placement on the lips remains the same. The mouthpiece does not slide on the lips" (p. 13).

Through all this, Fink is describing and seemingly prescribing Reinhardt's teachings, but then states that "many find that pivoting the weight is helpful when first learning or reviewing the smoothness of a register change, but that it fails them under pressure when they need it most. In other words, the pivoting should be used as a way of thinking or as a device for changing registers and not as a substitute for proper technique (breath control, endurance, embouchure control, etc.)" (p. 13).

C1DP: All: This source accounts for horn angles and jaw positions related to all 3 basic embouchure types.

Again indicating a VHP embouchure, Fink writes "The mouthpiece tends to slant slightly downwards, because the upper rim of the mouthpiece usually rests on or above the bump on the gums at the base of the upper teeth. The teeth may be perfectly aligned, but the bump on the gums pushes the rim of the mouthpiece forward" (p. 11). The accompanying illustration (labeled "Correct Alignment of Teeth"), best represents a VHP embouchure as well.

Fink then denounces teachers who "insist that you sit and stand erectly with the trombone held parallel to the ground," saying "For most trombone players, this 90 degree angle is WRONG. The jutting of the lower jaw (to which the base of the tongue is attached) forces you either to tongue between the teeth, or curl your tongue to be able to tongue behind the upper teeth" (p. 11). Later, Fink provides the alternative:

> "You should not point your instrument at the ground (as a furrow digger), but should allow the instrument to slope downward at a 20 degree to 30 degree angle to the ground. This angle is not the same for all players and in a marching band some will have to lean their heads back and some will have to lean very slightly forward in order to have the trombone slides aligned. The 30 degree angle to the ground should be a good compromise position. Only the underbite players can achieve a parallel position without strain or embouchure distortion" (p. 11).

In this passage, Fink allows again for the variances of horn angles and jaw alignments, while stating a preference for a VHP embouchure setup. He also refers to a national trombone workshop where "only a few of the 142 embouchures did not recede" (p. 11). Fink defines a receding embouchure as "the bump on the gums makes the embouchure appear to recede, even though the teeth may be properly aligned" (p. 11). This definition corresponds with downstream embouchures, including VHP and MHP.

Fink then allows for the LP alternative by stating, "With the usual receding embouchure, the air stream tends to leave the lips in a slightly downstream angle. The underbite player is the exception to this rule. The underbite player tends to be an upstream player" (p. 12). He then references Reinhardt's *Pivot System* and Farkas's book, *The Art of Brass Playing*, in comparison and contrast (respectively) to his own views on teaching players with an underbite.

T4. All: Content approved for all embouchure types.

Despite the book's clear preference for the VHP embouchure technique, it provides information accounting for all the embouchure type variations.

Extra Notes: Some of the other notes Fink mentions about embouchure.

> "In general, the embouchure is formed as though you were pronouncing the letter M…
>
> "Pronouncing an M will not automatically produce a correct embouchure. HOW the M is pronounced is more important. The muscles of the face are set in a combination pucker and smile which stops the puffing of the cheeks and forms the corners of the embouchure. In short, the embouchure has a strong and determined set which looks like "the brass player's face (Farkas, *The Art of Brass Playing*, p. 19)" (p. 10).

Griffiths - *The Low Brass Guide* (1980)

X1 X2: For Advanced and intermediate level players

"I have written this text mainly for the use of senior high school students, college music majors and private low brass teachers who may be seeking a source to clarify their own thoughts on playing and effective teaching." (Forward, p. iii)

A1DP: Accounts for all mouthpiece placements

Although Griffiths states that "no placement is ideal", he does state "almost all low brass players use a vertical placement of the mouthpiece which uses two-thirds upper and one-third lower lip or, at the very least, half and half...this is definitely not to say that a reverse ration (i.e., ⅓-⅔) is incorrect" (p. 6).

Concerning low mouthpiece placement, Griffiths continues "However, in the vast majority of cases, although the upper range may be facilitated (though strained) the general control and tonal quality suffers" (p. 6). This suggests that Griffiths is not in favor of students continuing with a low placement embouchure.

Griffiths' explanations are mostly descriptive, but he does suggest that the player "try to have the embouchure as centered as possible considering your own dental formation" and suggests experimentation is an effective way to find ideal placement (p. 6).

B2DP: Accounts for 1 of 2 movement types.

Griffiths mentions the term "embouchure 'shift' or pivot" (p. 6). This is mentioned in reference to the angle of the lead-pipe in relation to the embouchure, about which he states that the air stream should go fairly straight down the bore, except when playing in the extreme upper and lower tessituras.

When referencing jaw movement, Griffiths mentions "embouchure shift," as a tool for "facilitating a smooth transition from mid to bottom pedal range" while descending (pp. 13-14). "The shift is accomplished by sliding the mouthpiece slightly upward and jutting the lower jaw out," aligns well with the other references to embouchure shift or pivot (p. 14). Because he uses the word "sliding," This does not refer to a shift that requires removing and replacing the mouthpiece. In each reference, Griffiths describes embouchure & jaw movement which may coincide well with an MHP embouchure type.

Griffiths describes a need for an embouchure aperture that maintains the same general shape (being a somewhat flattened oval) throughout registers but in continually smaller dimensions as one ascends (p. 15). He continues:

> "The air column should be pivoted downward to gain upper range rather than an exertion of vertical muscle pressure. . . . In terms of air stream direction, the player should pivot upwards in the low register (while moving the jaw down)" (p.15).

Thus, Griffiths describes and prescribes only embouchure movement which coincides to MHP and LP embouchures.

C3DP: Accounts for mainly one type of jaw movement and horn angle (MHP)

Griffiths addresses jaw alignment very explicitly in his fifth chapter, entitled "The Efficient Use of the Jaw in Playing Low Brass" (pp. 13-14). Here he briefly covers many useful topics as they relate to jaw alignment, including pitch accuracy, articulation, range extension, and the embouchure "shift."

Griffiths suggests that a relaxed and fluid jaw muscle which moves forward and back, allows for a consistent sound (matching in all registers), with greater control over pitch, more confidence in attack, and maximum flexibility (p. 13).

As the information becomes more specific, it becomes more narrowly applicable. With some specific examples of sound issues, Griffiths provides brief solutions that don't accurately follow the recommendations for either Pivot Classifications used by the three embouchure types.

Under the "Range Extension" subtitle, he mentions that "Theoretically, high range extension is unlimited" using the principle of moving "the jaw up and back thereby forcing the rapidly-moving air stream down into the bottom of the mouthpiece . . ." (p. 13). He refers to a chart drawn by Arnold Jacobs (without providing the image) to support this. In kind, Griffiths continues "The opposite action of the jaw is necessary, of course, for low range extension. I advocate a downward and outward movement of the lower jaw until in pedal range it protrudes noticeably" (p. 13). This dropping of the jaw is not a recommended part of either of Reinhardt's pivot classes, being considered a technique to be avoided for optimal function, however, it does describe the movements of many players.

Griffiths most clearly states/repeats his basic rule of jaw movement in Chapter 8 (range extension). He states "The lower the range, the lower the jaw, and vice versa. The jaw, in fact,

moves down and out for low range and up and in for the upper register" (p. 20).

T2: MHP approved

Based on this analysis, I classify the information in this text as most appropriate for MHP players, whether or not it agrees with the ideal techniques recommended for that embouchure type.[11]

Other Notes:

In his discussion of the embouchure, Griffiths also suggests that, "as a general rule the embouchure should appear 'flat' from a side view" as part of his description of the appearance of a proper embouchure (p. 6). He also describes the shape and function of the aperture without any instruction or explanation in the surrounding text. The reader may find aperture information in the sixth chapter, entitled Low Brass Articulation (p. 15). Though many aspects of brass technique relate closely, there are some areas of Griffiths' *The Low Brass Guide* which could stand to be reorganized for an improved reference experience.

About players' cheeks, Griffiths gives the general rule that players "should not puff your cheeks when playing any wind instrument (except, perhaps, the bagpipes)." He offers no instruction about how to stop puffing the cheeks for those with that issue. About the embouchure corners, Griffiths mentions the mistake of "allowing the corners of the mouth to rise as their range goes up (the classic "smile" embouchure)." Instead, he suggests keeping the corners straight or slightly angled downward (p. 7).

[11] See Wilken (2000), page 106, for an alternative view about the jaw usage recommended by Griffiths.

The Low Brass Guide is rather concise and lacks depth in its details and descriptions. For those players who employ a Medium High Placement embouchure type, this text could more likely be helpful as a quick-reference for many topics, especially for type-specific range extension/coordination information. Other readers (especially those with VHP embouchure types) attempting to employ the book's embouchure-related recommendations might unfortunately find it to be inversely related to the nature of their own embouchure. The differing techniques of LP players is not specifically addressed.

Hunt/Bachelder - *Guide to Teaching Brass* (1968/1994)

X4: All Player Levels

This text serves as a guide "for the preparation of the instrumental music teacher" as well as "a reference for the studio music teacher, the performer, and as an in-service guide for the music teacher already active in the field" (p. vii). As such, it is intended to help inform player levels from beginner to advanced.

A1DP: All Placements: Accounts for at least the 3 basic mouthpiece placements.

This book states, "mouthpiece placement depends on anatomical size and position of the teeth, jaw, and lips, as well as an individual's register of concentration" (p. 20). The recommendations for mouthpiece placement differ between brass instruments, suggesting: ⅔ lower lip and ⅓ upper lip for trumpet/cornet; ⅔ upper lip and ⅓ lower lip for horn; as high on the upper lip as possible for the tuba; and almost always "more upper lip than lower" for trombone and euphonium. The authors state about trombone, "many orchestral players prefer two-thirds

upper lip and one-third lower; however, this varies with each performer's concept, range, and physical requirements… The placement that produces the best results is correct, even though [a specific] mouthpiece placement is suggested" (p. 20).

Though the embouchure chapter discusses upstream and downstream players, interestingly the author doesn't explicitly attribute or connect mouthpiece placement to the cause. Instead, the authors claim that the direction of the airstream is "governed by the alignment of the upper and lower jaws and the vibrating surface of the lips" (p. 18). They also state that "even if the teeth are perfectly aligned between the upper and lower jaw, the airstream tends to be directed downward to some degree, depending on the register being played" (p. 18), which seems to call into question their jaw alignment causation theory.

B4: None: This resource does not address embouchure movement.

The text focuses primarily on directing the airstream direction differently to affect the tonal register. This doesn't correlate with this project's definitions for embouchure motion.

C2D: 2 Types: Accounts for 2 possibilities of legitimate jaw/tooth alignment.

This text offers a list of "requirements to play a brass instrument," including "proper lower and upper jaw alignment, straight teeth," among other items. Proper alignment of the jaw consists of the "teeth aligned with the outline of the jaw bones, the lower teeth resting against the upper with their grinding surfaces striking one another" (p. 17).

The book discusses direction of the airstream as a factor of jaw alignment, stating:

> "Most brass players direct the airstream toward the throat of the mouthpiece in the lower register and progressively increase the angle of the airstream downward as they go higher. The change in airstream direction is due to the need to increase the upper lip's vibration to produce sounds in the upper register. When a musician plays in the lowest

> register, the upper and lower lips vibrate equally, while when one plays in the upper register the upper lip does most of the vibrating over the lower lip" (p. 18).

This accounts for downstream players, but the text goes on to make an exception for upstream players, "who reverse the function of the upper and lower lips" (p. 18). In a way, this book recommends only one base jaw/tooth alignment, but with two ways to manipulate that alignment in order to adjust the tonal register. Horn angle is not mentioned in relation to jaw position.

T4: All: Approved for all players.

Although not all criteria categories are addressed, the information provided is not in direct conflict with the procedures by which any one specific embouchure type functions. So, this book is approved for all types.

Johnson - *Brass Performance and Pedagogy* (2002)

X4. Intended for players of all levels.

> "This book is intended for persons who teach brass players. It is hoped that it will be of use not only to brass specialists but also to people whose own performance area is in another medium...the present work is written for the teacher who deals with all the brass instruments. It is by intention of a more general pedagogical nature." (p. xiii-xiv)
>
> "The ideas expressed here are intended to serve teachers who deal with brass students at all stages of development" (p. xiv).

The author focuses only on theoretical concepts rather than breaking down the technical specifics required to enact the concepts. Johnson focuses on altering one's perspective rather than directly altering one's physical actions. These concepts can be applied to all levels of players, especially by teachers with their students.

A1N: All Placements: accounts for at least the 3 basic placement possibilities.

> "While there is some variation among players of different brass instruments as to the most desirable mouthpiece placement, there are certain general qualities and guidelines that are more or less universally agreed upon. (Please see the excellent photographs in Philip Farkas's *The Art of Brass Playing* for fine examples of embouchure formation as well as indication that there is variation even among the finest players)" (p. 32).
>
> "Virtually all good embouchures have a number of readily identifiable characteristics that include: . . . Reasonably centered mouthpiece placement from side to side and top to bottom and still allowing for well-defined tendencies for the characteristic sounds associated with each particular instrument" (p. 32).

Here Johnson accounts for some variance without explicitly describing or referring to them. Though the author clearly engages in the subject, he provides little descriptive or prescriptive information to contribute toward the topic of mouthpiece placement.

B3N: Acknowledged: This resource acknowledges embouchure movement without accounting specifically for either embouchure movement type.

> "For all its seeming complexity, the embouchure is a rather simple entity that, much like a singer's vocal cords, tends to be not so much changed or improved in and of itself but rather improved by changing the energy (i.e., the breath) that activates it. Time spent on improving the air will usually do more to improve the workings of the embouchure than the same amount of time spent directly on the embouchure" (p. 33).
>
> "An embouchure that is locked in a position of rigidity will have neither the responsiveness to assist in producing a warm sound nor the ability to change pitch and volume with facility. A well-functioning embouchure has a balance of firmness and relaxation and responds readily to the air column. It focuses the sound well at any dynamic level and still retains the elasticity and mobility to make rapid, sometimes large, sometimes subtle adjustments in all registers" (p. 34).

In regard to embouchure movement Johnson describes the necessity for mobility and adjustments without describing the adjustments themselves. He favors a focus on the air, suggesting that the embouchure's characteristics are more a function of the air input.

C4N: None: This text does not cover the topic of tooth and/or jaw alignment and horn angle

T4: All: Approved for all embouchure types.

Extra Notes:

Johnson offers helpful information in his chapter concerning embouchure, but very little specific information. The book is approved for all types based on the fact it is likely to do no harm.

Kanda – *Trombone Unlimited* (2020)

X4: All Player Levels

Kanda provides multiple versions of exercises specifically labeled noted, "Beginning/Intermediate players" and "Advanced players," respectively (p. 7).

A1DP: All Placements: accounts for at least the 3 basic placement possibilities.

Kanda describes mouthpiece placements with "more upper lip inside the mouthpiece and a tendency to slant the mouthpiece angle and airstream slightly downward" to the "slight overbite" which "most people have." This accounts for downstream embouchures, including VHP and MHP (p. 13).

She also states, "If you have an underbite, you will likely have a horizontal or even slightly upward mouthpiece angle, more lower lip in the mouthpiece, and an upward stream." This accounts for the mouthpiece placement of LP embouchures. She recommends basing a player's placement and horn angle on the alignment of their teeth, confirming correct placement by checking that "mouthpiece weight is even" (p. 13).

B4: None: This resource does not specifically mention embouchure movement, instead focusing on adjustments to jaw position and horn angle.

Kanda describes movement into the upper register and lower registers. She states:

> "As you ascend to the upper register, you will use more of the upper lip for vibration. You may also naturally pull the lower chin in slightly. In order to keep the weight distribution even and allow your upper lip to vibrate without restriction, you can pivot the mouthpiece to create the downward airstream. The other option is to direct the airstream downward toward the bottom of the mouthpiece cup without pivoting the mouthpiece. Both methods produce similar results" (p. 13).

In this passage, Kanda seems to refer to Reinhardt's early definition of the pivot, where the mouthpiece pressure is adjusted from one lip to another (changing the horn/mouthpiece angle relative to the player's head), as opposed to the later definition (which would more closely relate to the definitions of embouchure motion defined for this project).

Her reference to "pull the chin in slightly" indicates receding the jaw slightly. That, in combination with her statement, "the tendency is to put too much pressure on the upper lip," suggests that she recommends lowering the horn angle in relation to pivoting to ascend into the upper range (p. 13). Because she mentions this in relation to a downstream embouchure, her description most accurately represents an MHP embouchure motion.

In reference to descending into the lower register, Kanda states:

> "...you will use more of the lower lip for vibration. This naturally produces a slight protrusion of the lower jaw. To maintain equal weight distribution and the best lower lip vibration, the mouthpiece needs to angle upwards to free the lower lip. Your airstream must move upwards toward the top of the mouthpiece" (p. 13).

With the downstream embouchure (with more upper lip in the mouthpiece) that she specified, the description in this passage is commonly associated with MHP embouchures. Though these descriptions directly specify instructions more related to jaw

alignment and horn angle than to embouchure movement (as defined for this project), these instructions do potentially correlate with the MHP embouchure movements. The text does not explicitly indicate that. By stating "these movements are meant only to help keep equal weight distribution of the mouthpiece on your lips", Kanda confirms that these are angle adjustments conforming to jaw movement (p. 14). She ends the section stating, "This setup method does not require an embouchure change; these are slight adjustments to help you play in the most natural and efficient manner" (p. 14). Thus, her recommendations are intended only to relate to jaw/tooth alignment and horn angle.

About LP players, Kanda mentions that for those with a "natural upward airstream" and lower lip predominating, "mouthpiece placement angles will be the opposite of the descriptions above" (p. 13). Despite their opposite airstream direction, LP and MHP embouchures most often share similar embouchure movement directions in relation to ascending and descending in the tonal range. This conflicts with Kanda's description of LP players.

C1DP: 3 Types: This resource accounts for the variations in jaw alignment and horn angle that relate to at least VHP, MHP, and LP (even if the types are not specifically referenced).

Kanda mentions different horn angles that associate with an overbite, and with an underbite. She writes, "let your bite be your guide to finding the correct mouthpiece angle" (p. 13). This description warrants the C1 classification code.[12]

However, as explained in category B above, her more in-depth description of jaw and horn angle movements pertains to MHP embouchures. She mentions and describes LP players as well, but only as functioning in an opposite manner to her MHP description.

---

[12] See Kanda (2020), pages 13, 17, 40, 45 for more information.

T2: MHP: All information is approved for Medium High Placement players.

This book accounts for the MHP embouchure technique fairly accurately, according to this study's definitions. The fact that embouchure motion isn't addressed specifically is of less concern because MHP players tend to show less vertical movement than VHP and LP types.

The embouchure techniques of VHP and LP types are not represented as accurately. For example, not all upstream players necessarily have an underbite. Also, in most cases, the horn angle adjustments and embouchure motion exhibited by MHP players is more similar to those of LP players than to those of VHP players. So, by describing LP technique as the opposite of her MHP description, LP readers may become confused. The VHP movements were not actually represented in the text, which assumes that all downstream players use the MHP technique described.

Extra Notes:

The fact that Trombone Unlimited offers a greater level of description of MHP embouchures than the other types may be related to the author's own embouchure; Megumi Kanda falls neatly within the MHP embouchure category (based on my own observations of her playing, in person).

Like the texts by Burtis and Baker, Kanda's book offers a great deal of musical exercises and etudes, which are intended to be played as a means to address her commentary.

Kleinhammer - *The Art of Trombone Playing* (1963)

X4: All player levels

> "This book is written for the student who has no teacher available or for the teacher seeking more fundamental knowledge in the field of trombone playing. It is written for the trombonist (in any stage of proficiency) who is always a student" (p. iii).

A1D: All Placements: Accounts for all 3 basic mouthpiece placements.

> "Upon examining the embouchures of some of the finest brass players in this country it is found that they all differ somewhat in their physical appearance, both when playing and when using the embouchure visualizer. In addition, the placement of the mouthpiece on the embouchure varies with individuals, depending on dental structure, amount of overbite, and even by the player's concentration on a certain tonal range. However, if the individual has a fine tone, technical flexibility, endurance, and good ranges of tone and volume, it is safe and logical to assume that he has a good embouchure" (p. 23).

Most of the text in this book is confidently definitive, whereas the commentary on proper mouthpiece placement and embouchure appearance is closer to a "you'll know it when you hear it" approach. Though mouthpiece placement is loosely defined, the remaining details of embouchure formation and function are quite detailed in both anatomical explanation and prescriptive function.

Most of the text in this book is confidently definitive, whereas the commentary on proper mouthpiece placement and embouchure appearance is closer to a "you'll know it when you hear it" approach. Though mouthpiece placement is loosely described above, the remaining details of embouchure formation and function are quite detailed in both anatomical explanation and prescriptive function.

Kleinhammer mentions:

> "The generally-advocated correct placement of the mouthpiece is two-thirds of its area on the upper lip and one-third on the lower lip. As mentioned earlier, this proportion is sometimes altered by the dental structure of the individual . . ." (p. 25).

In this passage, Kleinhammer describes a downstream embouchure with more upper lip predominating in the cup. Kleinhammer leaves room for players with different physiology but does not prescribe any specific mouthpiece placements. In two accompanying illustrations (pp. 25-26), Kleinhammer depicts what is likely a VHP mouthpiece placement (or possibly MHP), demonstrated with a mouthpiece visualizer.

Kleinhammer does, however, indicate that careful consideration and repetition should be applied to embouchure and mouthpiece setting. He states, "pay attention to the degree of inside and/or outside surfaces of each lip used as the vibrating surface and strive to maintain consistency in all the delicate settings of your embouchure." The author includes exercises designed for repetition of mouthpiece placement.

B4: None: no clear mentions of embouchure movement

I found no significant mention or description of what would be considered embouchure movement for the purpose of this study. Most of the changes mentioned regarding embouchure are directly related to the aperture size. Changes to aperture size are not within the definition of the embouchure movement defined in this project.

Kleinhammer's brief mention of "mouthpiece pivot" is not synonymous with this project's definitions of embouchure movement. His use of this term does however pertain to the next category of jaw/tooth alignment and horn angle (p. 46).

In relation to legato playing, Kleinhammer mentions that "In playing lip slurs, the player will begin to get the feel of the function of the lips in producing a 'rolling' from one tone to another" (p. 72). It is unclear whether or not the feeling mentioned here describes a specific movement of the embouchure.

C3DP: Accounts for 1 Type of jaw/tooth alignment and horn angle

> "Do the jaw hinges become tight and the jaws clamp upward? . . . These are all detrimental to good high tones, and should be eliminated . . . Keep the sensation of a hot potato in your mouth for the upper tones. This will help avoid clamping the jaws together" (p. 46).

In this passage, without acknowledging any slight movements of the jaw, Kleinhammer is warning against carrying that movement too far.

The most applicable passage is the following:

> "Feel as you ascend that you are blowing more toward the bottom of the mouthpiece. A small amount of mouthpiece pivot is permissible. The instrument can be lowered in angle as one ascends in pitch and raised for the lower register. This is by only a small degree of course, and must not be overdone" (pp. 46-47).

Here Kleinhammer describes one type of slight adjustment in horn angle as the player changes tessituras. Interestingly, these horn angle adjustments are unlikely to be congruent specifically with those of a textbook VHP example, despite the book's previous embouchure depictions.

"The player may find low register aid in blowing more toward the top of the mouthpiece, using more of the inside surfaces of the lips in so doing" (p. 49). This passage also correlates with the previously mentioned movements.

T2: MHP: All information is approved for Medium High Placement players.

Kleinhammer generally avoids including information that might not work well for some players. However, when he does mention specifics, the suggestions often conflict with some embouchure types.

The suggested horn angle adjustments mentioned in the category "C" assessment above

are more likely to be helpful for players with Reinhardt's pivot classification 2 (MHP and LP players). This recommendation does not always coincide with the downstream ideas of "blowing more toward the top of the mouthpiece" in low register and "blowing more toward the bottom of the mouthpiece" for high register, for example, in the case of upstream LP players. So, not all players with VHP and LP embouchures are recommended to take heed of these embouchure-related technique recommendations. MHP players are most likely to find these comments beneficial.

Extra Notes:

Kleinhammer is a supporter of mouthpiece practice in addition to using an embouchure visualizer (mouthpiece rim on a stick/handle). He devotes a significant number of words to explaining the technique and benefits of mouthpiece buzzing.

Kleinhammer/Yeo - *Mastering the Trombone* (2000)

X4: All player levels

> "Herein are offered exercises and printed words to enable all trombonists from beginners to seasoned professionals to achieve a better sound and a better technique with increased ease" (p. 7).

A1: All Placement: accounts for at least the 3 basic mouthpiece placement possibilities.

With a similar description to the Kleinhammer's *The Art of Trombone Playing*, page 19 mentions the individual variance between players' anatomy in relation to embouchure, stating, "It is safe to say that no other person in all the world has an embouchure like yours. Placement

of the mouthpiece depends upon the structure of the teeth, jaw, overbite and possibly on one's concentration of tonal range" (p. 19).

They reference photographs included Farkas's *The Art of Brass Playing*, depicting the embouchures of the entire brass section of the Chicago Symphony Orchestra (1962) to show that their mouthpiece placements are not uniform, "except that in most cases, there is more upper lip in the mouthpiece than lower lip" (p.19). This indicates that most of the players in that section play with VHP or MHP embouchures.

It also mentions, "Strive to maintain consistency in the placing of the mouthpiece on the embouchure, including the angle" (p. 19).

B4: None: This resource does not address embouchure movement as defined by this project.

> "The embouchure is the origin of pitch and, assuming everything else is functioning properly, therein lies our tonal range" (p. 26).

In contrast to his book, *The Art of Trombone Playing*, Kleinhammer/Yeo offer relatively fugacious, but similar, information within this text concerning embouchure technique. Again, embouchure movement, as defined by this project, is not addressed.

C3D: Accounts for one type of jaw/tooth alignment or horn angle adjustment

> "There may be a slight change of angle for some players when playing in the extreme tonal ranges. Since the lower lip is more movable, it may protrude into the mouthpiece a bit more when producing low tones and, conversely, it may curl in more when playing high tones" (p. 19).

> "As previously mentioned, the lower lip is the more moveable of the two, and perhaps for you a slight downward movement of the instrument will aid the embouchure in developing a better high range - blowing more to the bottom of the mouthpiece using

> more inner surfaces of the lips. Conversely, a slight opposite movement may aid the lower register. I say 'perhaps' because no person has a mouth structure exactly like yours!" (p. 26).

If the authors had also suggested that players who experience no benefit by trying the above horn angle adjustments might benefit instead from exploring an inverse movement, the classification of this category could have accounted for more embouchure types. Because it was left open-ended, but without any prescription, the classification remains C3D.

T4: All: Approved for all players.

This text presents similar, slightly less in-depth information relevant to this project in comparison to *The Art of Trombone Playing*. It also presents the included information with more thorough disclaimers. Because of the slightly increased ambiguity, the text is approved for all embouchure types, whereas *The Art of Trombone Playing* is only approved for MHP players. This isn't to say that the information here is more helpful to most players, but it is potentially less unhelpful to some players.

Extra Notes:

Kleinhammer presents exercises for mouthpiece buzzing and use of embouchure visualizers (mouthpiece rim on a stick/handle). He also provides musical examples and excerpts with which to apply many of the book's principles.

Knaub - *Trombone Teaching Techniques* (1964)

X4: All player levels

In the foreword, Knaub expresses the intent of the book to help any prospective teacher of the instrument, non-trombonist brass teachers, and performing trombonists.

A3DP: Accounts for only one correct mouthpiece placement (MHP)

Knaub writes, "The mouthpiece should be placed so that approximately half is on the upper lip and the other half on the lower, and so that it is centered from left to right. Slight changes may be made to accommodate individual differences in lip, jaw and teeth formations" (p. 9). It is unclear exactly what slight changes Knaub might suggest for such accommodations, but the following text might suggest reduced variance in those "individual differences" among Knaub's students. He discourages readers from selecting students with malformations to play trombone, saying, "it is of prime importance to use students with fairly normal lip, jaw and teeth structure for all brass instruments" and that it's difficult enough to play the trombone without malformations (p. 9).

The half upper and half lower lip placement most closely matches MHP. From there, it is reasonable to assume that Knaub's "slight changes" in mouthpiece placement would not be large enough to constitute the obviously visible differences between LP and VHP mouthpiece placements.

B3: Acknowledged: This resource acknowledges embouchure movement without accounting specifically for either embouchure movement type.

Describing how to produce an upward slur, Knaub briefly mentions lip changes. He describes "rolling the lower lip in and directing the air stream down into the mouthpiece" (p. 11). This description acknowledges a change, but does not correspond clearly to either of the embouchure movement types specified by this project.

C2DP: 2 Types: Accounts for jaw/tooth alignment and horn angle associated with two embouchure types (VHP and MHP).

Knaub mentions, concerning posture, that the trombone should not be required to be held parallel to the ground, or in an "awkwardly elevated position" often required by marching bands. He recommends an angle of approximately 30 degrees to the ground, with a normal, comfortable position that doesn't require any neck adjustment or "strain on the upper lip" (p. 8). Though it is not necessarily a definitive connection, many MHP players have a lower horn angle than most VHP and LP players.

Knaub suggests that players should "direct the air stream right at the throat of the mouthpiece" to make a note in the middle register. From there, higher notes require "a change in direction of the air stream (more toward the bottom of the mouthpiece)" and low notes require dropping the jaw slightly to open the lips and "a slight upward direction of the air stream" (p. 10). These changes of the air stream direction are commonly associated with downstream players, which includes the VHP and MHP types.

T2: MHP: All information is approved for Medium High Placement players.

Mendez & Gibney - *Prelude to Brass Playing* (1961)

X3: Beginner Level Players

In the first chapter, the book clearly states its intended purpose "of helping to fill a gap encountered by many brass-playing instrumentalists; this being the lack of introductory material leading to the first sound produced on an instrument" (p. 3). The text is intended to aid young brass players that may not have the benefit of private lessons available to them. With that in mind, the author writes in an emphatic, conversational style intended to be more engaging for younger readers.

A1DP: All mouthpiece placements are accounted for.

> "As to the amount of mouthpiece on each lip, there can be no hard-and-fast rule. One player will get his best results from half on each lip; one will find that more mouthpiece on the upper lip suits him; another will use more on the lower lip. It is important that you adapt a position that is natural to you. This will be determined largely by the shape of your mouth and teeth. I suggest you try half the mouthpiece on each lip. If that is not comfortable, move it slightly up or down until it seems to fit. If you do have to move from half-and-half, be sure that the outer rim of the mouthpiece does not come onto the red of the lips. The outer rim is to be on the white of both lips. Pay close attention to this point!" (p. 35).

Mendez mentions that placement may vary higher or lower based on the player's mouth and teeth shapes, even to the point of either the top or lower lip predominating inside the cup. This description allows for all the embouchure types.

Mendez is strongly in favor of keeping the mouthpiece touching some of the skin (as opposed to only "the red" lip tissue), which may be more difficult for VHP or LP players on instruments with very small mouthpiece rim diameters (trumpet and horn).

Mendez does reasonably account for all of the embouchure types, but only to the extent that might be most helpful for a beginner level player who is still searching for their correct

mouthpiece placement. As one of the few sources intended specifically for young readers, this is an admirable accomplishment.

B4P: None: Does not address embouchure movement, according to the definition defined for this project. The information that is provided certainly qualifies as prescriptive.

> "...that connection between ourselves and the mouthpiece will come only through keeping to one position of the mouthpiece on the lips. We have first to find our natural position, and then stay with it. The mouthpiece never moves! Regardless of where in the register of the instrument we play—low, middle, high—the mouthpiece remains in exactly the same position on the lips. This is a must. Keep it in mind now and always!" (p. 36).

I believe Mendez is stating that the mouthpiece contact point on the lips should not be moved - as to say, avoid removing and replacing the mouthpiece at a slightly higher or lower position on the lips in order to facilitate certain tessitura changes. In my experience, this movement is what many players may call a "shift." According to that interpretation, Mendez's instruction does not address my definition of embouchure movement in regard to "the lips and mouthpiece moving together" either upwards or downwards while ascending or descending.

C4: Jaw/tooth alignment & Horn Angle are not addressed significantly.

T4: Approved for All Embouchure Types

Extra Notes:

Mendez mentions many helpful concepts related to the embouchure without explicitly explaining the underlying mechanics. This seems appropriate considering his intended

audience. For example, in the third through fifth chapters (which, like chapter seven, are notably all entitled "Embouchure Training"), Mendez presents concepts of "unnatural" versus "natural" playing. He uses the terms "firm" and "loose," frequently in relation to the lips and mouth corners, in various contexts. But he constantly redirects the reader's attention toward goals of building patient, deliberate, consistent practice in order to make progress. He specifies the intended technical goals and provides a pretty solid basis of knowledge upon which new students might stand.

For more advanced readers, this book also provides a pleasurably friendly read with plenty of valuable wisdom and advice from one of the most accomplished and lauded brass players in history. Mendez's book is honestly a refreshing departure from some of the more in-depth texts cited within this project.

Moore/Neilson - *The Brass Book* (1964)

X3. Beginning Players

> "Much time can be saved by the band instructor who teaches the entire brass section as a unit or 'choir' of instruments. While certain performance features are idiomatic to individual members of the brass 'choir' there are many teaching principles basic to them all. This is especially true in elementary teaching classes. It tends to simplify teaching techniques if the teacher can think of the tuba as a contra-bass cornet, making due allowance for the length of its tubing, the diameter of its bore, and the size of its mouthpiece. Fundamentally, both cornet and tuba are 'cup' mouthpiece instruments, and many things can be taught uniformly to each" (p. 3).

This text is directed clearly toward the *teachers of beginners*, and is not intended for direct consumption by the beginning players themselves.

A1: All mouthpiece placements

The author allows some flexibility in the mouthpiece placement from player to player, laying out a seven step "formula" through which a teacher might help students to find "the correct placement." The accompanying illustrations show a player using what looks to be a LP mouthpiece placement, with more lower lip than upper lip (pp. 7-8). However, the text does not prescribe this specific placement.

> "Then the mouthpiece is placed on his lips… by me. Here is my formula:
> 1) Anchor the mouthpiece firmly on the lower lip, making sure that the rim is supported on both lips by an equal amount of muscular sinew. This is determined by the size and thickness of the fleshy tissue of the lips. If the lower lip is fuller, it will seem that more of the mouthpiece rim is resting on the lower lip. The converse is true when the upper lip is fuller. No hard and fast rule, such as - 'one third on the upper, two thirds on the lower' - can be given.
> 2) The student forms the embouchure.
> 3) I bring the mouthpiece into contact with the upper lip, being mindful of the precept laid down in observation 1.
> 4) The student "buzzes" into the mouthpiece, using the rhythms that have been taught him.
> 5) The entire process is repeated until the student is able to find the correct embouchure placement with little help from me.
> 6) The student is shown how to produce higher and lower "buzzing" sounds by changing the tension of the embouchure.
> 7) The student is cautioned continually never to allow the cheeks to puff out during the "buzzing," or push the fleshy tissue of the lips into the mouthpiece cup" (pp. 7-8).

B1D: Both movement types: the source accounts for both directions of embouchure movement between registers.

> "There is also the sensation of producing tones in the upper register by directing the "buzz" of the lips up, and the lower tones by directing the "buzz" down. Some brass players aver that the opposite is true. What really happens here, the sensation as described, may possibly be controlled by the facio-dento formation. It has always appeared to me more natural to direct the buzz up for upper tones and down for lower. . .. the sensation of directing the air column one way or the other will induce ease and confidence in playing throughout the entire range" (p. 8).

Although the author expresses a clear personal preference for the embouchure movements displayed in an LP embouchure (and MHP), a disclaimer is provided to concede that some brass players subscribe to the opposite movements (VHP). In this case, it is likely that the author uses an LP embouchure type as the photograph on page 7 suggests.

C2DP: 2 Types: Accounts for two types.

> "Unless there is an unusual under or overbite, the jaws remain in a regular position. However, when there is an overbite the lower jaw must be brought forward into position. For an underbite, the jaw must be pulled backward a bit. The teeth remain apart while playing" (p. 7).

The "jaws remaining in a regular position" likely intends to suggest that the upper and lower teeth are aligned vertically. It seems here that the author encourages players to adjust the natural resting position of their jaw/tooth alignment in order to achieve a playing position with vertically aligned (or approximately aligned) teeth. This is not an unusual suggestion and coincides with many players of the VHP and LP embouchure types.

The resulting horn angle of vertically aligned teeth is typically closer to horizontal. Because the jaw/tooth alignment of many MHP players is typically slightly lower, this text's recommendations apply best to only two of the three possible embouchure types (VHP and LP).

T3: LP: All information is approved for Low Placement players.

As a whole, this text offers some information that seems applicable to each of the three embouchure types. Between the authors recommendations (with disclaimers) for LP/MHP type embouchure movements and playing position with aligned teeth/jaw, I believe that players with the LP embouchure type will find the best results from applying the embouchure-related

information within this text.

Nelson - ***Also Sprach Arnold Jacobs: a development guide for brass wind musicians*** **(2006)**

X4: All Player Levels

"This book is an attempt to preserve Arnold Jacobs's teaching methods in a systematic written form." The author hopes that it "will provide the brass musician with some of the inspiration" of Jacob's teaching and "be helpful to those who never had the opportunity to benefit from his teaching, and remind those of us who have" (pp. 10-11).

A4: None: This resource does not account for specific mouthpiece placements.

Jacobs directs the player toward imagination of sound and the feelings related to a healthy buzz, rather than specifics of how the body functions. He states, "Concentrate on sound, not on the set-up of the embouchure or breath. Feel the 'tickle' of the buzz on the rim" (p. 29).

> "Where you place the mouthpiece on the lips can vary; find your own mouthpiece placement. Focus on musical results, not physical positions, and let the placement or angle change or vary as needed to obtain the desired product" (p. 31).

At least within this text, Jacobs does not describe or prescribe any specific mouthpiece placements. Instead, he argues that "you can play with the mouthpiece anywhere on the lips, provided there is a hypertrophy through training" (p. 30). His reasoning is that "the pitch signal is sent all over the surface of the lips, so the mouthpiece can be placed anywhere on the lips." Jacobs's main idea here is summed up by, "don't be concerned with mouthpiece placement" (p. 30).

He extends this idea even to the point of stating the player should not pre-set the mouthpiece, prepare the embouchure before the attack, set up the embouchure, feel their lips, or test a note before playing (p. 27). This includes waiting to "have mouthpiece pressure simultaneously with the attack" of the note. His brief explanation for all this is that "finding mouthpiece placement involves sensory nerves; playing involves motor nerves" (p. 27).

Jacobs shares only that the "embouchure varies with the individual, and automatically according to the requirements of the music." By stating only that the embouchure looks different in different people due to anatomical differences, without explaining those differences explicitly, Jacobs encourages players not to examine or consider those differences further. He instead suggests, "you should not try to change or control the embouchure, but control the music" (p. 32).

B3: Acknowledged: This resource acknowledges embouchure movements without details.

> "The embouchure is not complicated; it consists of only the vibrating surfaces of the lips inside the mouthpiece. When a musical stimulus ("song in the brain") signals the embouchure, the length, thickness, and tension of the lips respond, just as the vocal chords do when singing. Pitch is not in the lips, but in the brain" (p. 28).
>
> "Don't reach for notes with your lips; reach with your brain. Think rich, resonant sound. Transfer this vibrancy to the horn" (p. 28).

Jacobs acknowledges that there are adjustments to be made in the embouchure. He states, "allow the embouchure to change if it wants to." The most specific instruction Jacobs provides is to "start embouchure adjustments from the buzzing part of the lips." But, even here, he qualifies this with, "but 85% of your mental activity should be directed to "song" through buzz" (p. 28). Like his message about mouthpiece placement, Jacobs doesn't seem to want the player thinking about the embouchure. He gives purposefully simple explanations of the

embouchure to encourage "simple, childlike thoughts" about the physiological aspects of playing.

Even when Jacobs provides more detailed specifics of some aspects of embouchure function on page 34, he is sure to mention that "playing musically on the mouthpiece clears up embouchure problems right away."

C4: None: Does not significantly discuss jaw/tooth alignment and horn angle

"The lips have no brains, so send the musical message from inside your head, and your lips will respond appropriately. You may, or may not, notice changes in the position or angle of the mouthpiece, or different feelings in your embouchure. Let the changes happen; go for musical results" (p. 27).

This passage, as well as others quoted above and elsewhere in the book, show that Jacobs believes whatever needs to happen in the embouchure, whether that be jaw/tooth position and horn angle or other movements, will happen subconsciously when you think about the sound you wish to produce. Furthermore, Jacobs believes that embouchure "development is not achieved with instructions on how to use your lip." Instead, "we have to do it by playing music" (p. 32).

T4: All: Approved for all players.

Because this book doesn't give specific rules for how to perform any of the categories above, the information is approved for any embouchure type.

Extra Notes:

Jacobs is a strong advocate for mouthpiece buzzing and buzzing on only a rim, but not a proponent of free-buzzing.

Reinhardt - *Donald S. Reinhardt's Pivot System for Trombone* (1942)

X4: All Player Levels

The goal of this text was to explain the basic playing principles used for the "outstanding achievements of many hundreds" of Reinhardt's students "occupying enviable positions in the music profession." This system is "moulded around the natural qualifications of the player," accounting for the "vast mental and physical differences among players" (p. 3). It is intended to help players of any level.

A1DP: All Placements: accounts for at least the 3 basic placement possibilities (VHP, MHP, LP)

Pages 8-13 present Reinhardt's 4 standard embouchure types, which are differentiated by the player's dental alignment. Page 11 shows diagrams for mouthpiece placement recommendations in relation to the teeth, for each of those 4 types. When referenced in the text, the top and bottom lips are each called either the anchor-spot or the control-point.

Anchor spot refers to the lip which receives the greater area of contact from the rim of the mouthpiece and indicates the lip which predominates into the mouthpiece cup. The control point is the other lip, which predominantly controls the various levels of embouchure/lip compression. The control point lip is also the lip that the rim closes in toward during

embouchure movement while ascending in the tonal range. This is part of what helps to increase the compression.

In this text Reinhardt states which lip is the control point and which is the anchor spot for each of the standard embouchure types he delineates. That, in conjunction with the small diagram is the limit of his mouthpiece placement directions.

B1DP: Both movement types

Pages 8-11 briefly explain embouchure movement (pivot). His definitions of the pivot presented here include "putting the correct pressure on the correct lip, at the correct time, thereby eliminating any obstruction in the air-stream as it passes between the lips into the mouthpiece." That "transfer of the mouthpiece pressure" can be performed by "tilting or tipping the instrument up or down as the case may require."

C1D: 3 types: This resource accounts for the variations in jaw/tooth alignment and horn angle that relate to at least the three basic embouchure types.

Reinhardt created his four basic embouchure types based upon their jaw/tooth alignment. In this book he does not include much in regard to the way the jaw might be manipulated while playing.

T4: Approved for players of all embouchure types

Although this early manual doesn't specifically include information about every one of Reinhardt's embouchure subtypes, he does account for types that fit into each of the VHP, MHP, and LP types for this project.

Extra Notes:

As most of this book is devoted to musical studies and examples, only the first 15 pages include prose descriptions. For those readers interested in using this text, I recommend augmenting it with Reinhardt's *Encyclopedia of the Pivot System* to get the full understanding of Reinhardt's pedagogical concepts.

I also feel it is worth mentioning that I have heard from some of Reinhardt's own students that much of the prescriptive instructions within his books are meant more as a pedagogical means to an end (or resultant technique) than a literal blueprint of movements. For example, some jaw movements described in the *Encyclopedia* in relation to the two Pivot Classifications are essentially recommended in order to prevent the player from performing the opposite movements while ascending or descending. The player is meant to feel as though they are performing the indicated movement, when the end result may show very little movement - the incorrect movement is thereby prevented. I'm told this is a fairly common theme within Reinhardt's teaching and it certainly agrees with his repeated mentions of learning a specific movement and then minimizing it gradually to increase efficiency. It may be valuable to apply this perspective when using either of the two Reinhardt texts included in this project.

Reinhardt - *Encyclopedia of the Pivot System* (1973)

X4: All Player levels

> "The study of the Pivot System is absolutely essential for all brass instrument performers because a strict adherence to a musical approach deprives the student of basic mechanical necessities which are vital to his uninterrupted improvement on the instrument" (p. XI).

"This tremendously lengthy text of interrelated questions and answers" is intended to supplement Reinhardt's previously published volumes, which were released some 30 years prior.

> "I sincerely hope that the numerous questions and answers concerning the many problems which confront both the playing and the teaching professions will prove stimulating and instructive to all individuals who are interested in the entire brass field, whether it is from a playing or teaching viewpoint" (p. XII).

A1DP: All Placements: accounts for at least the 3 basic mouthpiece placements

To describe the many players Reinhardt encountered and analyzed over many years, he devised four standard embouchure types (based on the player's tooth alignment at rest) with five subtypes that differentiate further between the function of those four standard types. The three types I defined for this project consolidate Reinhardt's types that essentially function in the same way, no matter the player's resting tooth alignment. See Table 1 to reference the equivalency details.

Reinhardt shows diagrams of the mouthpiece placements that relate to each of his nine embouchure types on pages 202-203. Pages 197-211 explain these types of players and Reinhard's observations about their ideal function.

B1DP: Both Movement Types: This resource accounts for both directions/types of embouchure movement between registers.

Reinhardt created two Pivot Classifications to describe the ways in which players maintain "the all-essential lip vibrations over the entire playing range" by lining up the lips with the teeth in such a way that the teeth do not impede the lip vibrations in any way (p. 198). As the register changes, the alignment must change slightly to maintain a consistent vibration,

successful lip pucker, and well-centered sound. Reinhardt explains how the two pivot classes correspond with the various embouchure types in pages 199-210.

These two pivot classes were used as part of the creation of the embouchure movement assessment criteria for this project. Therefore, they coincide mostly with the definitions I have provided in the methodology. The embouchure movement definitions in this text are closer to my own definitions used for this project than those provided in Reinhardt's previous manual.

C1DP: 3 types: This resource accounts for the variations in jaw/tooth alignment and horn angle that relate to at least VHP, MHP, and LP embouchures.

Though the definitions are not exactly equivalent to those I used to create the assessment criteria for this project, the material in this source provides specific recommendations and descriptions of jaw/tooth alignment and manipulation in relation to the various embouchure types and classifications. This information is also within pages 199-210.

T4: All: Approved for players with all embouchure types.

There is information directly relating to each of the VHP, MHP, LP embouchure types in this book. See the conversion/equivalency chart in Table 1 of this project to help differentiate the information within Reinhardt's *Encyclopedia*.

Extra Notes:

The material presented in this book is expressly "designed for profitable study and practice, not for performance on the bandstand or orchestra pit." Reinhardt intends for the diligent thought and practice of his system to gradually carry over into performance, and for the

player to change their focus, both mentally and physically, between the practice room and performance. "The player's powers of concentration should be devoted entirely to the matter of making a good showing" when it's time to play music (p. XII).

> "...the student may master the art of relaxation by thoroughly understanding the numerous mechanical playing details, giving him a free mind to devote to musical interpretation. It is upon this basis that the Pivot System was founded" (p. 2).

Roznoy - *Trombone-Low Brass Techniques and Pedagogy* (1978)

X2 X3: Targets beginner to intermediate player levels

On the first page, Roznoy states:

> "...this collection has information relevant to people who will be teaching at any level -- from beginning students through the later years of high school. It stops short of providing enough information for the teacher of the advanced student, presuming that the conscientious music educator will steer the advanced student toward private instruction." (p. X)

The exact target students for this text are students in college low-brass methods classes, or "classes of students who are not principally trombone-low brass performers." The author compiled these materials to allow the "university-college music student" not to "need to waste the effort of playing from elementary method books which deal with many basic elements of reading music..." Roznoy intends for "the conscientious teacher [to] combine the information in this collection with additional information to be found in the books on the reading list" (p. X).

A4N: None: This source has no mention of placing the mouthpiece whatsoever.

Roznoy writes about the first day of teaching trombone, "Open the case and take out only the mouthpiece. Do some buzzing, and possibly tonguing. Explain embouchure to the degree

you believe necessary" (p. 5). This is the extent to which the text addresses mouthpiece placement; where and how to place it is completely absent from the instructions.

B4N: None: This source does not address embouchure movement.

Roznoy describes slurring between notes which are on different partials. He states:

> "...it is possible to use a continuous air stream and use the natural break which occurs between partials to give the slurred notes definition. When using this method of slurring, simultaneous coordination between the air stream, the embouchure, and especially the slide is extremely important. Without all three elements working together, the slur will have imperfections. Indeed, even when not using this method of slurring, all these factors must be carefully coordinated" (p. 15).

Interestingly, despite stating the extreme importance, Roznoy chooses not to specifically explain the actions of the air stream, embouchure, and slide that "must be carefully coordinated."

C4N: None: This source contains no mention of jaw/tooth alignment or horn angles.

T4: All: Approved for all players.

This text certainly includes no information that could negatively affect players of a specific embouchure type. It also provides no relevant information to positively affect the embouchure-related technique of those players. Readers interested in a text that completely avoids this subject may find value in Roznoy's contribution to this literature.

Extra Notes:

This text was initially included because of its specific intended purpose for use as a resource to low brass methods classes. Though in this project I review other texts used often for

this purpose, Roznoy's book provides a contrasting view about the content it deems important for inclusion. For example, in the book's preface, Roznoy states:

> "In particular, there is nothing regarding the embouchure formation contained herein, partly because it is explained thoroughly elsewhere (see Phillip Farkas, The Art of Brass Playing, among others), and partly because my own teaching philosophy maintains that excessive explanation can confuse young students; like slide lubricant, "less is best" when it comes to teaching embouchure. It is highly recommended that the music educator work toward acquiring as many of the items on the required and supplementary reading list as is possible, for his or her professional library."

Included in the items of Roznoy's reading list are the following books, reviewed in this project:

- Farkas's *The Art of Brass Playing*
- Fink's *The Trombonist's Handbook*
- Kleinhammer's *The Art of Trombone Playing*
- Wick's *Trombone Techniques*

Sweeney - *Teaching Techniques for the Brasses* (1953)

X4: All brass player levels

The author addresses technical issues applying to both beginners and advanced players. It is intended for use by students (and their private teachers) in conjunction with exercise books, in order to avoid development of bad habits and injury.

Sweeney writes:

> "The information presented here should be considered as a guide toward the mastery of the instrument...
> "This book is written with a special emphasis on the Cornet and Trumpet. Most of the problems met in playing them are very similar in all other brass instruments except the French horn and Trombone, in which there are technical problems peculiar to each...
> "This is not an exercise book. It should help one in using any exercise book intelligently… This book, then, is intended to assist the teacher and student to use them wisely, and to avoid the pitfalls which await one who proceeds unassisted" (p. 3).

A1DP: Accounts for all mouthpiece placements

This book accounts for 5 different mouthpiece placements: perfectly centered; up to ⅔ upper lip; up to ⅔ lower lip; more than ⅔ upper lip; more than ⅔ lower lip. The author suggests that, theoretically, a perfectly centered mouthpiece is ideal - both vertically and horizontally centered on the mouth (p. 16). However, Sweeney provides neither an example of such a player, nor supportive reasoning behind that claim.

Sweeney states, "Where to place the mouthpiece on the lips is a point of great controversy among brass players... Theoretically, one should place the mouthpiece so that the vertical and horizontal axis meet at the center of the mouth. Practically, however, many factors may make this impossible" (p. 16).

Sweeney states, "If the mouthpiece is as much as two-thirds on the upper or the lower lip… there will be little effect noticeable in the playing…" For cases in which the variation from center is larger, the author mentions some playing deficits which might occur. To that point, nearly the second half of this fifth chapter is directed toward teachers, listing a number of imperfect facial characteristics which indicate a student who "should never attempt to play cup-mouthpiece instruments" (p. 16).

Sweeney does not suggest how a student might overcome the effects that any mouth imperfections might incur. Instead, for students with lip injuries, scars, and malformations, or uneven dental structures (such as crooked or unsymmetrical front teeth), Sweeney suggests "generally the student should be encouraged to choose a string instrument or perhaps a flute" (p. 18).

B4N: None: Embouchure movement is not significantly addressed.

Sweeney prescribes practicing lip slurs by "taking care that the change of tone is made with the muscles of the embouchure, assisted by the diaphragm. . ." (p. 50). This is the closest the author comes to describing an effective method of embouchure movement.

C3DP: 1 Type: accounts for only one "correct" jaw/tooth alignment and horn angle

Sweeney recommends teeth aligned to provide a horizontal horn position. He refers to a low horn angle (the bell is tilted significantly downward) for players with a recessed lower jaw as a fault. For the sake of posture, a raised, horizontal position is prescribed (p. 53).

Two methods are presented to correct this fault and bring the horn to a horizontal position. The first involves purchasing a special, custom-made mouthpiece. The second recommends to "thrust the jaw out to effect an even bite and to provide an even surface for the mouthpiece to rest on." Sweeney continues, "In most cases in which this correction is made there is a marked improvement in tone. Generally, a receding lower jaw throws the lower lip beneath the upper teeth, causing the lower lip to vibrate against the teeth, making the tone fuzzy and weak. When the correction is made, the lips vibrate freely, the airstream is directed straight into the mouthpiece instead of at an angle, with a resulting improvement in the ease of playing" (p. 52).

When this method is uncomfortable due to a jaw that is overly recessed, the author writes that "about the only remedy is to have a special mouthpiece made" (p. 52).

Sweeney's recommendation for a horizontal horn angle, is likely most applicable to players of VHP type. Perhaps some LP and MHP type players could also relate, but because this

method does not account for moving the jaw and horn angle during playing, it does not technically apply to the specifications of these specific embouchure types.

T1. VHP Approved Type

Throughout the book, Sweeney's recommendations usually correspond with the functions of a Very High Placement embouchure type. Aligned jaw/teeth and horizontal horn angle (p. 52) are most typical for VHP. Other information and suggestions provided throughout the book are vaguely descriptive of VHP players, while potentially destructive for other embouchure types. For example, a horn angle below horizontal may be desirable or necessary for a player with a Medium High Placement, especially to achieve notes in higher tessituras.

Extra Notes:

The "No-Pressure System" that Sweeney prescribes (pp. 47-49), however, is generally applicable to all brass players in that it does not affect players of different embouchure types inversely. He basically recommends using the embouchure muscles, oral syllables, and breath support to produce and change notes, as opposed to relying on increased pressure of the mouthpiece against the lips. It also encourages long-term improvement of endurance and strength through diligent practice instead of using a quick fix, like increasing mouthpiece pressure to achieve notes when tired.

Whitener - *A Complete Guide to Brass* (1997, 2nd ed.)

X4: All Player Levels

As stated on the back cover, this text is intended to be a "valuable resource for the teaching of brass methods and a comprehensive reference guide to the world of brass instruments."

A2DP: 2 of 3 Placements: Accounts for 2 general mouthpiece placements (VHP and MHP).

Whitener states that the preferred horizontal position of the mouthpiece rim should be centered upon the embouchure, but that some successful players "play slightly off-center due to variations in dental structure." As far as vertical placement, "these vary somewhat between instruments." About low brass: "most trombone, euphonium and tuba players use a placement somewhat above half and half" (p. 139). This accounts for only the downstream embouchures - VHP and MHP. LP is not mentioned for low brass.

On page 170, the author also warns to "beware especially of a too-low placement that causes the upper rim to rest on the red part of the upper lip," especially for horn students.

B4: None: This resource does not address embouchure movement.

> "To change pitch on brass instruments, there are very subtle adjustments of embouchure firmness, jaw and tongue positions, as well as variations in the air stream. These adjustments are too subtle and complex to control consciously" (p. 141).

This passage and the explanation that follows do not mention embouchure motion, as defined by this project. The explanation focuses primarily on adjusting the internal volume of the oral cavity with the tongue, using vowel shapes.

C3P: 1 Type: Accounts for one "correct" jaw/tooth alignment.

The only passage indicating a preferred jaw position states, "the best way to convey embouchure formation is to ask the students to bring their upper and lower teeth into alignment, leaving a small space for the air…" (p. 167).

T1, T2: VHP, MHP: All information is approved for Very High Placement and Medium High Placement players.

Despite its comprehensive intent, Whitener's text does not thoroughly cover the topics related to embouchure function.

Wick - *Trombone Technique* (1971)

X4: All player levels

Page - Introduction

> "I believe that whatever his musical environment, the following pages will be of at least some use to every trombonist; even the very best performers may not be fully aware of the mechanics of playing. If they smooth the way for some students, help the older player who finds in mid-career that his playing has suddenly gone wrong, or even stimulate argument among trombonists, then I shall be satisfied."

A1D: All Placements

> "It has been erroneously suggested and assumed that the airstream, once it reaches the mouthpiece, goes straight through into the instrument. This can easily be disproved. In the great majority of cases, the air-flow is not, as might be supposed, at right angles to the facial profile, but rather at a downward angle. A hand held out under the chin can easily detect the downward movement of air when the lips are formed into an embouchure and 'buzzed'. (I should add here that there is a very small minority of players of whom the reverse is true; a short upper lip and an undershot jaw may have caused the opposite 'upward' airstream to have been adopted. Very rarely do such players make a success of the trombone. There are just enough of them to prove the exceptions to the rule - the few really fine, mainly jazz players who play this way are to

be congratulated upon their very difficult achievement)" (p. 18).

In this passage, Wick accounts for both downstream and upstream embouchures. Because placements with more upper lip predominating inside the cup are downstream (VHP, MHP) and placements with more lower lip predominating inside the cup are upstream (LP), Wick accounts for the 3 basic embouchure types in this description.

His commentary, "very rarely do such players make a success of the trombone," about upstream/VHP players is unlikely to be encouraging to readers with that embouchure type. However, Wick does account for them in this description. Later, Wick restates the above ideas, but also shares more about his encounters with LP players (see below).

Wick also mentions:

> "Most trombone players place the mouthpiece more on the top lip than the bottom lip - say two-thirds top, one-third bottom. This usually produces the best results. There are, however, some excellent players who reverse these proportions, and who play too well for their mouthpiece placement to be considered wrong. In my own experience, they include players with a brilliant tone-quality, which sometimes appears hard. This is only a tendency, though, and they often more than compensate for it in scintillating technique and 'never-miss' high register" (p. 21).

Page 22 includes more recommendations for finding the proper mouthpiece placement for each student, stating that "there is always an ideal position for the mouthpiece, which, when it has been discovered, produces conspicuously better results in tone-quality, flexibility, and clarity of articulation." Wick continues to offer additional information on that subject on pages 22-23, in addition to giving some preventative warnings on the subject.

On pages 21 and 22, Wick offers information about the horizontal position (side-to-side location) of mouthpiece placements, stating "almost all players play fractionally off-center, some very much so. It is futile for a teacher to insist on moving a student's mouthpiece position to a

more central one, except, of course, when it is wildly wrong..." He also mentions that some players may end up placing the mouthpiece farther to their right side in an effort to enable easier reach of the right arm to extended positions. Wick recommends resisting this "misplacement," possibly by use of a Bb/F trombone that allows for playing 6th and 7th position notes in 1st and 2nd positions, respectively. This specific information is not assessed within the category code classifications of this project but is certainly related to mouthpiece placement and may be helpful for some readers.

B3D: Acknowledged: This source mentions embouchure movement without information that directly pertains to the definitions used by this project.

> "...command of the subtle movements of the insides of the lips, especially the lower lip, to be able to use his theoretical knowledge of directing the air into different parts of the mouthpiece. ...When the idea of directing the airstream is a reality, he should try to minimize the amount of movement, keeping the lips parallel in an upward movement, and slightly restricting the downward and outward movements. At the same time he should listen continuously for the best sound quality" (p. 21).

This passage recommends learning to use small movements of the aperture and lower lip to direct the airstream, then trying to minimize those movements (especially the downward/outward lip movement which presumably opens the aperture larger). In my experience, this description relates most closely to the personal explanations recounted by MHP players about their own embouchure function. However, the definitions do not fit clearly with any of the specific definitions of the project.

> "I would really emphasize that a properly working embouchure must give complete command of this register, so that it can be used just as any other part of the trombone's range. It should be possible to slur easily into and out of the 'pedal' register. If this cannot be done without altering the position of the mouthpiece on the

> embouchure, then there is need to examine closely the embouchure structure and the advice of a good teacher must urgently be sought" (p. 50).

This passage, targeting the low register, makes it clear that Wick believes the entire range of the trombone should be possible with one mouthpiece placement. Wick accounts for the necessary movement of descending into the low/pedal register by stating "The pedal note will eventually sound on what is basically the same embouchure (except for a projected bottom jaw and lip) as the octave above" (p. 50). Throughout the book, Wick describes the motion needed to change registers as primarily a change in air stream direction and corresponding movement of the jaw and focusing/widening of the aperture. This suggests the necessity of some movement within the embouchure, however, there is no mention of the embouchure movements defined by this study.

C3DP: 1 Type: Accounts for only one jaw/tooth alignment and horn angle.

> "...the lower jaw should be pushed forward until the teeth are opposite, and arched slightly downwards" (p. 17).

In this passage, my interpretation is that Wick is recommending that, in playing position, one should make sure the upper and lower teeth are aligned vertically (doing whatever must be done with the jaw to facilitate this). And based on another use of the term "arched," on page 21, I believe Wick means to describe that the jaw is opening in the path of its hinged arc. This is applicable to some degree for players of all embouchure types, however a larger number of MHP players are likely to play with a slightly more recessed jaw/tooth position and corresponding horn angle that may be slightly lower than the other VHP and LP types. In that regard, the description more closely represents the VHP and LP types. However, the extent to which the

jaw is "arched slightly downwards" may affect a lower angle, so I don't feel this sentence alone is definitive enough to narrowly classify the book's content on the subject.

> "It can be seen quite easily that, as the player moves upwards into the high register of the trombone, he blows more narrowly downwards, eventually playing the highest notes, down almost on to his chin… Pedal notes are the only ones that seem to go straight into the bore of the mouthpiece. It can be readily seen that the intelligent pointing of the airstream into different parts of the mouthpiece will give, or help to give, a great diversity of range. By altering the shapes of the lip profiles, or, in extreme cases (low register) by pushing out the entire jaw and lower lip, the airflow direction can be changed" (pp. 18-19).

This passage is accompanied by illustrations of the air stream direction as it enters the mouthpiece. The description is clearly representative of a downstream embouchure, which includes VHP and MHP.

> "By protruding the lower lip, arching the chin forward and down, and relaxing the muscular tension within the embouchure it becomes very easy to move into the lower register of the trombone. Here the speed of the flow of air is very much slower, although more air is displaced because the opening in the middle of the embouchure is much wider" (p. 20).

This passage contains recommendations that are most likely to be helpful to MHP players. "Arching the chin forward and down" while protruding the lower lip is a technique most commonly used by MHP players to facilitate a consistent sound while descending specifically into the lower register. This forward jaw drop is not likely to be as effective for VHP players in particular for descending. A classification of C3DP is therefore most appropriate.

T2: MHP: All information is approved for Medium High Placement players

Chapter IV: CONCLUSIONS

In my experience prior to this project, most teachers and players seemed to base or derive their beliefs (and thus, their teaching approaches) about embouchure technique primarily on two main factors. The first factor is whatever embouchure technique works best for themselves. Sometimes that factor could also be affected by observing respected peers. The second factor is whatever embouchure technique was championed to them by their most influential mentor, teacher, or musical role model.

This is logical and predictable, especially in a Western musical field historically dominated by a somewhat protective educational process of personal mentorship. One might assume that the treatises and pedagogical texts in such a field are likely to mimic these tendencies, especially given the fact that most of the texts are written by lauded players or professors.

Among the literature reviewed (earliest published 1942; latest published 2020), the most inclusive texts that received approval for all embouchure types included publication dates within each decade, excluding the 1980s, from the 1940s through the 2000s. Two theoretical reasons for that come to mind.

Firstly, a number of the texts throughout this timeframe present the examined embouchure technique criteria with such ambiguity and/or brevity that they cannot be considered a hinderance for players any specific embouchure type. Such brevity may be a reflection of the author's purposeful pedagogical choices about topical focus, a lack of depth of knowledge on the topic, or an attempt not to "stir the pot" concerning a somewhat controversial topic.

Secondly, there are a significant number of authors/teachers throughout this timeframe who recognize the differences (and similarities) among successful players and students well

enough to navigate the topic in an inclusive manner. Such an achievement would certainly be more easily accomplished in a 1-on-1 private teaching environment that in a written book.

Ironically, the texts published since the transformational information age in the 1990s with available internet searches, online resources, and internet forums, show neither an increase in the comprehensiveness, nor inclusiveness, pertaining to the review criteria categories A, B and C. Table 5 shows all of the category code classification information for the books reviewed.

Table 5
All Classification Information

Source	Year	T. Approved	X. Level	A. Placement	B. Movement	C. Jaw/angle
Bailey et al. - *Teaching Brass: A Resource Manual*	1992	T4 All	X4	A1D	B4	C3
Baker - *The Buddy Baker Tenor Trombone Handbook*	2001	T2 MHP	X4	A1D	B4	C3DP
Begel - *A Modern Guide for Trombonists*	2006	T4 All	X4	A4	B3D	C4
Burba - *Brass Master Class*	1997	T4 All	X1, X2	A1N	B4	C4P
Burtis - *Time, Balance, & Connections*	2009	T4 All	X1	A4DP	B3	C1
Colin - *Vital Brass Notes*	1967	TN None	X4	A1D	B4DP	C4DP
Collwell/Hewitt - *The Teaching of Instrumental Music*	2011	T1 VHP	X2, X3	A2DP	B3D	C3D
Ervin - *Rangebuilding on the Trombone*	1989	T1, T3	X1, X2	A4	B1D	C3DP
Farkas - *The Art of Brass Playing*	1962	TN None	X4	A1D	B4	C3DP
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Griffiths - *Low Brass Guide*	1980	T2 MHP	X1, X2	A1DP	B2DP	C3DP
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994	T4 All	X4	A1DP	B4	C2D
Johnson - *Brass Performance & Pedagogy*	2002	T4 All	X4	A1N	B3N	C4N
Kanda - *Trombone Unlimited*	2020	T2 MHP	X4	A1DP	B4	C1DP
Kleinhammer - *The Art of Trombone Playing*	1963	T2 MHP	X4	A1D	B4	C3DP
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011	T4 All	X4	A1	B4	C3D
Knaub - *Trombone Teaching Techniques*	1964/1998	T2 MHP	X4	A3DP	B3	C2DP
Mendez - *Prelude to Brass Playing*	1961	T4 All	X3	A1DP	B4P	C4
Moore/Neilson - *The Brass Book*	1964	T3 LP	X3	A1	B1D	C2DP
Nelson/Jacobs - *Also sprach Arnold Jacobs*	2006	T4 All	X4	A4	B3	C4
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D
Roznoy - *Trombone - Low Brass Techniques and Pedagogy*	1978	T4 All	X2, X3	A4N	B4N	C4N
Sweeney - *Teaching Techniques*	1953	T1 VHP	X4	A1DP	B4N	C3DP
Whitener - *A Complete Guide to Brass*	1997	T1, T2	X4	A2DP	B4N	C3P

The most comprehensive and inclusive texts were Fink's *The Trombonist's Handbook* (1977) and Reinhardt's *Encyclopedia of the Pivot System* (1973). Of 26 books, these are the only two books that received the most thorough code classifications in every category, including T4, X4, A1DP, B1DP, C1DP. That doesn't necessarily mean that every individual reader will find these texts most helpful for their own playing or for their students, but it does suggest that these texts offer helpful information to a broader number of diverse players (with various embouchure types).

In contrast to most of the texts reviewed, Burba's *Brass Master Class*, Burtis's *Time, Balance, & Connections*, and Nelson's *Also sprach Arnold Jacobs* each offer a significantly different perspective on how to best conceive of, advance, and teach embouchure technique. All three of these texts provide well-developed approaches that don't necessarily conform easily to the project's criteria categories. For readers interested in exploring diverse, yet inclusive, pedagogical perspectives about teaching embouchure technique, these five books might satisfy your needs well - Burba, Burtis, Fink, Nelson/Jacobs, and Reinhardt (*Encyclopedia of the Pivot* System, 2000).

Target Player Level

Of the eighteen X4 classified books (69.2%) that intend to cover material for all levels of trombonists (or brass players), ten (55.5%, or 38.5% overall) received approval for players of all embouchure types.

Embouchure Types

Half of the texts were designated with approval for players of all embouchure types. As shown in Table 6, thirteen texts received the T4 classification, which indicates they are approved for all types of embouchure.

Table 6
Classification T4: Approved for All Types

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Bailey et al. - *Teaching Brass: A Resource Manual*	1992	T4 All	X4	A1D	B4	C3
Begel - *A Modern Guide for Trombonists*	2006	T4 All	X4	A4	B3D	C4
Burba - *Brass Master Class*	1997	T4 All	X1, X2	A1N	B4	C4P
Burtis - *Time, Balance, & Connections*	2009	T4 All	X1	A4DP	B3	C1
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994	T4 All	X4	A1DP	B4	C2D
Johnson - *Brass Performance & Pedagogy*	2002	T4 All	X4	A1N	B3N	C4N
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011	T4 All	X4	A1	B4	C3D
Mendez - *Prelude to Brass Playing*	1961	T4 All	X3	A1DP	B4P	C4
Nelson/Jacobs - *Also sprach Arnold Jacobs*	2006	T4 All	X4	A4	B3	C4
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D
Roznoy - *Trombone - Low Brass Techniques and Pedagogy*	1978	T4 All	X2, X3	A4N	B4N	C4N

As shown in Table 7, Seventeen texts (65.3%) are approved for Very High Placement players. Of those, two (11.8%, or 7.7% overall) are approved only for VHP – Collwell/Hewitt and Sweeney.

Table 6
Classification T1: Approved for Very High Placement Type

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Bailey et al. - *Teaching Brass: A Resource Manual*	1992	T4 All	X4	A1D	B4	C3
Begel - *A Modern Guide for Trombonists*	2006	T4 All	X4	A4	B3D	C4
Burba - *Brass Master Class*	1997	T4 All	X1, X2	A1N	B4	C4P
Burtis - *Time, Balance, & Connections*	2009	T4 All	X1	A4DP	B3	C1
Collwell/Hewitt - *The Teaching of Instrumental Music*	2011	T1 VHP	X2, X3	A2DP	B3D	C3D
Ervin - *Rangebuilding on the Trombone*	1989	T1, T3	X1, X2	A4	B1D	C3DP
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994	T4 All	X4	A1DP	B4	C2D
Johnson - *Brass Performance & Pedagogy*	2002	T4 All	X4	A1N	B3N	C4N
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011	T4 All	X4	A1	B4	C3D
Mendez - *Prelude to Brass Playing*	1961	T4 All	X3	A1DP	B4P	C4
Nelson/Jacobs - *Also sprach Arnold Jacobs*	2006	T4 All	X4	A4	B3	C4
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D
Roznoy - Trombone - Low Brass Techniques and Pedagogy	1978	T4 All	X2, X3	A4N	B4N	C4N
Sweeney - *Teaching Techniques*	1953	T1 VHP	X4	A1DP	B4N	C3DP
Whitener - *A Complete Guide to Brass*	1997	T1, T2	X4	A2DP	B4N	C3P

Twenty texts (77%) are approved for Medium High Placement players, as shown in Table 8. Of those, six (30%, or 23% overall) are approved only for MHP.

Table 7
Classification T2: Approved for Medium High Placement Type

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Bailey et al. - *Teaching Brass: A Resource Manual*	1992	T4 All	X4	A1D	B4	C3
Baker - *The Buddy Baker Tenor Trombone Handbook*	2001	T2 MHP	X4	A1D	B4	C3DP
Begel - *A Modern Guide for Trombonists*	2006	T4 All	X4	A4	B3D	C4
Burba - *Brass Master Class*	1997	T4 All	X1, X2	A1N	B4	C4P
Burtis - *Time, Balance, & Connections*	2009	T4 All	X1	A4DP	B3	C1
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Griffiths - *Low Brass Guide*	1980	T2 MHP	X1, X2	A1DP	B2DP	C3DP
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994	T4 All	X4	A1DP	B4	C2D
Johnson - *Brass Performance & Pedagogy*	2002	T4 All	X4	A1N	B3N	C4N
Kanda - *Trombone Unlimited*	2020	T2 MHP	X4	A1DP	B4	C1DP
Kleinhammer - *The Art of Trombone Playing*	1963	T2 MHP	X4	A1D	B4	C3DP
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011	T4 All	X4	A1	B4	C3D
Knaub - *Trombone Teaching Techniques*	1964/1998	T2 MHP	X4	A3DP	B3	C2DP
Mendez - Prelude to Brass Playing	1961	T4 All	X3	A1DP	B4P	C4
Nelson/Jacobs - *Also sprach Arnold Jacobs*	2006	T4 All	X4	A4	B3	C4
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D
Roznoy - *Trombone - Low Brass Techniques and Pedagogy*	1978	T4 All	X2, X3	A4N	B4N	C4N
Whitener - *A Complete Guide to Brass*	1997	T1, T2	X4	A2DP	B4N	C3P
Wick - *Trombone Technique*	1971/1996	T2 MHP	X4	A1D	B3D	C3DP

Fifteen texts (57.7%) are approved for Low Placement players, as shown in Table 9. Of those, only Moore/Neilson's *The Brass Book* (3.85%) is approved only for LP.

Table 8
Classification T3: Approved for Low Placement Type

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Bailey et al. - *Teaching Brass: A Resource Manual*	1992	T4 All	X4	A1D	B4	C3
Begel - *A Modern Guide for Trombonists*	2006	T4 All	X4	A4	B3D	C4
Burba - *Brass Master Class*	1997	T4 All	X1, X2	A1N	B4	C4P
Burtis - *Time, Balance, & Connections*	2009	T4 All	X1	A4DP	B3	C1
Ervin - *Rangebuilding on the Trombone*	1989	T1, T3	X1, X2	A4	B1D	C3DP
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994	T4 All	X4	A1DP	B4	C2D
Johnson - *Brass Performance & Pedagogy*	2002	T4 All	X4	A1N	B3N	C4N
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011	T4 All	X4	A1	B4	C3D
Mendez - *Prelude to Brass Playing*	1961	T4 All	X3	A1DP	B4P	C4
Moore/Neilson - *The Brass Book*	1964	T3 LP	X3	A1	B1D	C2DP
Nelson/Jacobs - *Also sprach Arnold Jacobs*	2006	T4 All	X4	A4	B3	C4
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D
Roznoy - *Trombone - Low Brass Techniques and Pedagogy*	1978	T4 All	X2, X3	A4N	B4N	C4N

Ervin, and Whitener (7.7%) were each approved for two of the three types. These both included VHP, with the second types being LP and MHP, respectively. Similarly, only two texts (7.7%), Colin's *Vital Brass Notes* and Farkas's *The Art of Brass Playing*, received a TN

classification that indicates not all information can be approved for any of the three embouchure types.

As shown in Table 10, eighteen of the twenty-six texts (69.2%) accounted for all three basic mouthpiece placements (VHP, MHP, and LP) and received an A1 classification. Only two (7.7%), Collwell/Hewett and Whitener, accounted for two of the three mouthpiece placements, resulting in an A2 classification. Only Knaub (3.85%) accounted for just one mouthpiece placement, resulting in an A3 classification. Five texts (19.2%) do not address mouthpiece placement, or do not specify any particular mouthpiece placements, resulting in an A4 classification.

Table 9
Classification A1: Accounts for All 3 Mouthpiece Placements

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Bailey et al. - *Teaching Brass: A Resource Manual*	1992	T4 All	X4	A1D	B4	C3
Baker - *The Buddy Baker Tenor Trombone Handbook*	2001	T2 MHP	X4	A1D	B4	C3DP
Burba - *Brass Master Class*	1997	T4 All	X1, X2	A1N	B4	C4P
Colin - *Vital Brass Notes*	1967	TN None	X4	A1D	B4DP	C4DP
Farkas - *The Art of Brass Playing*	1962	TN None	X4	A1D	B4	C3DP
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Griffiths - *Low Brass Guide*	1980	T2 MHP	X1, X2	A1DP	B2DP	C3DP
Hunt - *Guide to Teaching Brass (5th ed.)*	1968/1994	T4 All	X4	A1DP	B4	C2D
Johnson - *Brass Performance & Pedagogy*	2002	T4 All	X4	A1N	B3N	C4N
Kanda - *Trombone Unlimited*	2020	T2 MHP	X4	A1DP	B4	C1DP
Kleinhammer - *The Art of Trombone Playing*	1963	T2 MHP	X4	A1D	B4	C3DP
Kleinhammer/Yeo - *Mastering the Trombone*	2000/2011	T4 All	X4	A1	B4	C3D
Mendez - *Prelude to Brass Playing*	1961	T4 All	X3	A1DP	B4P	C4
Moore/Neilson - *The Brass Book*	1964	T3 LP	X3	A1	B1D	C2DP
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D
Sweeney - *Teaching Techniques*	1953	T1 VHP	X4	A1DP	B4N	C3DP
Wick - *Trombone Technique*	1971/1996	T2 MHP	X4	A1D	B3D	C3DP

Embouchure Movement

Five B1 texts (19.2%) account for both directions of embouchure movement between registers (see Table 11). Those are the texts by Ervin, Fink, Moore/Neilson, and both by Reinhardt. Only the Griffiths received B2 classification, accounting only for MHP and LP embouchure movement (Reinhardt's "Pivot Class Two"). Seven of twenty-six texts (26.9%) acknowledge embouchure movement without specifying the directions, resulting in B3.

Table 10
Classification B1: Accounts for Both Embouchure Movement Directions

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Ervin - *Rangebuilding on the Trombone*	1989	T1, T3	X1, X2	A4	B1D	C3DP
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Moore/Neilson - *The Brass Book*	1964	T3 LP	X3	A1	B1D	C2DP
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D

Thirteen texts (50%) do not address embouchure movement, or even suggest there should be none. Those receive a B4 classification. This is especially interesting since both the observational studies by Steven Miles (2019, p. 227) and David Wilken (2000, p. 72) confirmed that all participants employ some degree of embouchure motion.

Miles (2019), whose study involved all brass instruments, reports:

> "Every participant employs either a tracking or pivot action, or both, during performance…" and "Where only a small movement is made, there is a significant amount of facial muscle movement evident. Where a larger movement is made, the facial muscle movement is much less" (p. 227).

Similarly, Wilken (2000), whose study only involves trombonists, reports:

> "It was found that all test subjects either slid the mouthpiece and lips in conjunction along the teeth as they changed register, altered the horn angle as they changed register, or a combination of both. The amount and direction of embouchure motion or horn angle change varied from subject to subject. All Very High Placement Type trombonists used an embouchure motion of up towards the nose for high notes and down towards the chin for low notes. Very Low Placement trombonists used an embouchure motion of down towards the chin for high notes and up towards the nose for low notes. Trombonists who were Medium High Placement Types used either embouchure motion or altered the horn angle, with a majority pushing up towards the nose for high notes and pulling down towards the chin for low notes" (p. 72).

Perhaps, without such intense observation as was utilized in those two studies, most pedagogues whose text were reviewed for this project didn't notice the embouchure motion as readily as the more obvious variation in mouthpiece placements. If they did notice it, at the very least, those authors deemed it unnecessary for inclusion in their text. Some others, like Farkas, expressly noticed the vertical motion as a prominent occurrence among players, but seemingly deemed it incorrect based on the fact it conflicted with their other fundamental beliefs about the embouchure.

The majority of authors who recommend playing with steady and consistently firm/activated mouth corners and little obvious movement in the facial muscles are also indirectly calling for the use of embouchure movement according to Miles's study. It is logical that there must be a physical change in order for the resulting pitch to change. Miles reported smaller visible changes in the facial muscles for players who showed more embouchure movement.

Jaw/Tooth Alignment and Horn Angle

As shown in Table 12, only five texts (19.2%) account for the variations in jaw/tooth alignment and horn angle that relate to the three embouchure types, resulting in C1. Only three texts (11.5%) account for 2 possibilities of jaw/tooth alignment and horn angle, resulting in C2 – Hunt, Knaub, and Moore/Neilson. Eleven texts (42.3%) received a C3, describing/prescribing one jaw/tooth alignment and/or horn angle. Seven texts (26.9%) received a C4 classification, as they do not discuss this topic significantly.

Table 11
Classification C1: Accounts for All Types of Jaw/Tooth Alignment and Horn Angles

Source	Year	T. Approved	X. Level	A. Placement	B. Mvmt	C. Jaw/angle
Burtis - *Time, Balance, & Connections*	2009	T4 All	X1	A4DP	B3	C1
Fink - *The Trombonist's Handbook*	1977	T4 All	X4	A1DP	B1DP	C1DP
Kanda - *Trombone Unlimited*	2020	T2 MHP	X4	A1DP	B4	C1DP
Reinhardt - *Encyclopedia of the Pivot System*	1973/2000	T4 All	X4	A1DP	B1DP	C1DP
Reinhardt - *Pivot System for Trombone*	1942	T4 All	X4	A1DP	B1DP	C1D

This means that most of the reviewed texts (69.3% combined) either promote only a single jaw/tooth alignment and horn angle or do not address the topic at all. Comparatively, the other 30.7% of texts dealt with variations in jaw/tooth alignment and horn angle. Over twice as many texts give only a single or no options in this category. Though fewer texts totally avoid this category than the embouchure motion category, it is nowhere near as common for the authors to consider multiple possibilities in this category in contrast to the mouthpiece placement category.

The reviewed texts from Griffiths, Kleinhammer and Wick mention a jaw drop technique, moving the lower jaw position forward/outward and downward to descending into the lower registers. A similar description can be found in Kanda's suggestions for downstream players. In contrast, Reinhardt recommends an almost opposite movement for players of both his pivot classifications, stating "the performer's jaw should protrude slightly while ascending and recede slightly while descending" (2000, p. 199-200). It seems there may be two different elements at work in these descriptions. The first is the jaw drop which is essentially an opening of the jaw/teeth when descending into the lower register. The second element is a forward and backward adjustment, which is intended to maintain an even distribution of mouthpiece pressure to each lip.[13]

Overall, I believe this list of reviewed texts provides a reasonable variety of options for players and teachers to consider. It also provides some valuable information as to the way many of the most prominent texts in the trombonists' literature present the topic of embouchure pedagogy.

In this study, I have made my best effort to create a method of objective assessment to justify each classification code decision with reference to specific passages. Other interpretations may be valid and justified. Teachers and players are encouraged to use the

[13] Doug Elliott's explanations and thoughts about these jaw movements, and their purposes can be found on pages 105-109 of Wilken's study (2000).

interpretations presented within this project to inform their own decisions as to what pedagogical texts and strategies to employ in their own teaching and playing.[14]

[14] In order to maximize the utility of this project, I've also devised an embouchure type self-assessment. Readers hoping to find answers for their own embouchure troubles (or those of a specific student) might do well to discover their own embouchure type, thereby allowing them to filter the texts in this project and identify those most likely to help them. There are guidelines suggested in Reinhardt's *Encyclopedia* for this purpose. Wilken's interview (2000) with Doug Elliott (p. 119-120) also provides information about how Elliott works with students to discover how their embouchure will work best for them.

References

Bailey, W., Miles, P. J., Siebert, A., Stanley, W. J., & Stein, T. G. (2008). *Teaching Brass: A Resource Manual* (2nd ed). McGraw-Hill.

Baker, B., & Carroll, K. M. (2001). *The Buddy Baker Tenor Trombone Handbook: A Sourcebook of Materials for Both Young and More Experienced Tenor Trombonists (Both Classical and Jazz Players) and for the Trombone Teacher*. International Trombone Association Manuscript Press, University of Texas at Austin.

Begel, R. (2006). *A Modern Guide for Trombonists and Other Musicians* (3rd ed.). Wealthy Dog Productions/Richard Begel.

Burba, M. (1997). *Brass Master-class: Method for Brass Players : The Logical Way to Attain Unlimited Control, Endurance and Range*. Schott.

Burtis, S. (2009). *Time, Balance, and Connections: A Universal Theory of Brass Relativity: Trombone Edition*. S. Burtis.

Colin, C. (1967). *Vital Brass Notes*. C. Colin.

Colwell, R., & Hewitt, M. (2011). *The Teaching of Instrumental Music* (4th ed). Pearson Education/Prentice Hall.

Cook, B. C. (2014). *The Life and Teaching of Donald S. Reinhardt: Brass Pedagogue, 1908-1989*. https://open.bu.edu/handle/2144/10971

Ervin, T. (1989). *Rangebuilding on the Trombone* (1.0). Cherry Classics Music.

Farkas, P. (1962). *The Art of Brass Playing*. Brass Publications.

Fink, R. H. (1977). *The Trombonist's Handbook: A Complete Guide to Playing and Teaching the Trombone*. Accura Music. https//catalog.hathitrust.org/Record/000293906

Griffiths, J. R. (1980). *The Low Brass Guide*. Jerona Music Corporation.

Hunt, N. J., & Bachelder, D. F. (1994). *Guide to Teaching Brass* (5th ed). Brown & Benchmark.

Isley, C. L., Jr. (1972). *A Theory of Brasswind Embouchure Based upon Facial Anatomy, Electromyographic Kinesiology, and Brasswind Embouchure Pedagogy - ProQuest* [UNIVERSITY OF NORTH TEXAS]. https://www-proquest-com.colorado.idm.oclc.org/docview/302632507/CB82B368D9C941CFPQ/5?accountid=14503

Johnson, K. (2002). *Brass Performance and Pedagogy*. Prentice Hall.

Kanda, M. (2020). *Trombone Unlimited*. Encore Music Publishers.

King, D. R. (2004). *An Analysis and Comparison of the Brass Methods by James Stamp, Donald Reinhardt, Carmine Caruso, and Claude Gordon* [The Ohio State University]. https://www-proquest-com.colorado.idm.oclc.org/docview/305139250/CB82B368D9C941CFPQ/11?accountid=14503

Kleinhammer, E. (1963). *The Art of Trombone Playing*. Summy-Birchard Company; Alfred Music Co.

Kleinhammer, E., & Yeo, D. (1997). *Mastering the Trombone* (1st ed). Edition Piccolo.

Knaub, D. (1964). *Trombone Teaching Techniques*. Rochester Music Pub.

Méndez, R., & Gibney, E. G. (2005). *Prelude to Brass Playing*. C. Fischer.

Miles, S. J. (2019). *Dispelling the Myths of the Brass Wind Embouchure: Methods, Mechanics and Practices: A Thesis Submitted for the Degree of Doctor of Philosophy at the University of Otago, Dunedin, New Zealand*.

Moore, E. C., & Neilson, J. (1964). *The Brass Book*. Leblanc Publications.

Nelson, B. (2006). *Also Sprach Arnold Jacobs: A Development Guide for Brass Wind Musicians.* Polymnia Press.

Reinhardt, D. S. (1942). *Donald S. Reinhardt's Pivot System for Trombone: A Complete Manual with Studies*. Vogel.

Reinhardt, D. S. (2000). *Encyclopedia of the Pivot System (Original Unabridged Edition).* Charles Colin Publications.

Roznoy, R. T. (1978). *Trombone - Low Brass Techniques and Pedagogy*. publisher not identified.

Sweeney, L. (1953). *Teaching Techniques for the Brasses*. Belwin.

Trombone Textbooks. (n.d.). Hickey's Music Trombone Catalog. Retrieved September 13, 2020, from https://www.hickeys.com/music/brass/trombone/tenor_trombone/books_about_trombone.php

Turnbull, D. R. (2001). *An Analysis, Clarification, and Revaluation of Donald Reinhardt's Pivot System for Brass Instruments* [Arizona State University]. https://www-proquest-com.colorado.idm.oclc.org/docview/230778321

Whitener, S. (1997). *A Complete Guide to Brass: Instruments and Technique*. New York : Schirmer Books. http://archive.org/details/completeguidetob0000whit

Wick, D. (1996). *Trombone Technique*. Music Dept., Oxford University Press.

Wilken, D. (n.d.-a). *Brass Embouchures: A Guide for Teachers and Players*—YouTube [Video Playlist]. Retrieved September 13, 2020, from https://www.youtube.com/playlist?list=PL0B2FA974B7302711

Wilken, D. (2003, October 29). *OTJ: An Introduction to Donald S. Reinhardt's Pivot System*. Online Trombone Journal. https://www.trombone.org/articles/view.php?id=240

Wilken, D. (n.d.-b). *Reinhardt/Elliott Embouchure Type Conversion Chart – Wilktone*. Retrieved September 13, 2020, from https://wilktone.com/?p=2500

Wilken, D. (2000). *The Correlation Between Doug Elliott's Embouchure Types and Playing and Selected Physical Characteristics Among Trombonists*— [Ball State University]. https://www-proquest-com.colorado.idm.oclc.org/docview/304582289

Wilken, D. (n.d.). *The Three Basic Embouchure Types – Wilktone*. Retrieved October 20, 2020, from https://wilktone.com/?p=92

Wilken, D. (n.d.). *The Tongue Controlled Embouchure – Wilktone*. Retrieved September 14, 2020, from https://wilktone.com/?p=307

Wilktone. (n.d.). Retrieved September 13, 2020, from https://wilktone.com/

APPENDIX A

Trombone Studio Handbooks/Syllabi

Bowman, B. L. (2016). *UNT Brass Area Private Study Handbook*. http://trombone.music.unt.edu/sites/default/files/Brass%20Handbook%20fall%202016.pdf

Clark, J. (2005). *TAMUC Trombone Syllabus*. http://www.tamuc.edu/academics/colleges/humanitiessocialsciencesarts/departments/music/documents/trombone/Trombone_Syllabus.pdf

Cook, J. (2016). *Syllabus for Trombone Lessons UCA Fall 2016*. http://www.ucatrombones.com/uploads/2/2/8/8/22882870/syllabus_for_trombone_lessons_uca_fall_2016.pdf

Cook, J. (n.d.). *UCA Trombone Course of Study*. Retrieved February 14, 2017, from http://www.ucatrombones.com/uploads/2/2/8/8/22882870/trombone_course_of_study.pdf

Crist, M. R. (2002). *YSU Dana School of Music Trombone Studio Syllabus Spring Semester 2002*. http://web.ysu.edu/gen/fpa_generated_bin/documents/basic_module/trombone.pdf

Decker, J. T. (n.d.). *TTU Trombone Studio Applied Trombone Syllabus, Fall 2017*. http://www.depts.ttu.edu/music/TTUTromboneStudio/TTUTromboneStudio_Applied_Trombone_Syllabus_Fall2017.pdf

Dickinson, C. (n.d.). *IUP Syllabus, Applied Music: Private trombone I-VIII*. Retrieved February 14, 2017, from http://iuptrombones.weebly.com/uploads/2/5/8/5/2585197/trbsyllabus.doc

Ellefson, P. (n.d.). *Ellefson Studio Handbook 2016-2017*. Retrieved August 25, 2020, from http://www.peterellefson.com/assets/ellefson-studio-handbook-f16.pdf

Everett, M. (2017). *Ole Miss Course Syllabus: Low Brass Techniques*. http://www.olemiss.edu/lowbrass/studio/lowbrasssyllabuss17.pdf

Hauser, J. (2019). *TTU Handbook for Applied Study in Trombone*. http://sites.tntech.edu/jhauser/wp-content/uploads/sites/14/2019/12/Applied-Tbn-Syllabus-2019-20.pdf

Lawrence, P. (2011). *Trombone Studio Handbook and Syllabus*. http://pdlawrence.com/Trombone%20Studio%20Handbook%2011-09.pdf

Lenthe, C. (2012). *Studio Lenthe Syllabus Fall 2012*. http://www.indiana.edu/~trombone/LentheSyllabus.pdf

Lusk, M. L. (2010). *The Complete Warm-Up Routine*. http://personal.psu.edu/mll7/Penn_State_Trombone_Studio/The_Complete_Warm-Up_Routine_files/The%20Complete%20Warm-up%E2%80%A8Complete%C2%A0%20%E2%80%A8Warm.pdf

Mindeman, J. S. (n.d.). *Handbook for Low Brass Techniques Mus. 136*. Retrieved August 25, 2020, from https://www.johnmindeman.com/uploads/8/1/2/8/8128270/handbook_for_low_brass_techniques.pdf

Paiewonsky, M. (n.d.). *Trombone Studio Handbook and Lesson Notebook—The University of Arizona School of Music*. Retrieved August 25, 2020, from http://trombone.music.arizona.edu/documents/handbook.pdf

Palmer, B. E. (2011). *Schwob School of Music Course Syllabus MUSA 2312 Applied Trombone Spring 2011*. https://music.columbusstate.edu/trombone/pdf/MUSA2311Palmer.pdf

Phillips, B. (2011). *Trombone Curriculum at Baylor 2011-12*. http://baylortrombones.weebly.com/uploads/1/4/5/0/14502268/trombone_curriculum_at_baylor_2011-12.pdf

Phillips, B. (2018). *Baylor Applied Trombone Syllabus—2018-19*. http://www.baylortrombones.com/uploads/2/3/9/9/23994240/applied_trombone_syllabus_-_2018-19.pdf

Shinn, E. (2016). *Recommended Trombone Methods*. https://arts.ufl.edu/site/assets/files/93212/recommended_trombone_methods.pdf

Stanley, W. (n.d.). *CU Trombone Studio Recommended Readings*. Retrieved August 27, 2020, from https://www.colorado.edu/music/academics/departments/brass-and-percussion/studios/trombone-studio/trombone-recommended-readings

Stuart, D. (n.d.). *Iowa State University Applied Trombone Syllabus, Spring 2015-2016*. https://www.music.iastate.edu/files/119g_stuart.pdf

van Duuren, A. (n.d.). *UTK Trombone Studio Handbook and Syllabus*. Retrieved August 25, 2020, from https://music.utk.edu/trombone/UTK%20Trombone%20Studio.pdf

Watters, H. (n.d.). *Harry Watters-Syllabus with Curriculum Benchmarks. Retrieved February 14, 2017*, from http://www.bandworld.org/pdfs/watterssyllabuscurriculumbenchmarks.pdf

Whitakre, J. (2015). *University of Alabama Trombone Studio Syllabus*. http://www.rollslide.com/assets/syllabus-f15.pdf

Wilkinson, M. (2012). *UCF Applied Trombone Syllabus—Fall 2012*. https://www.cah.ucf.edu/common/files/syllabi/MVB44430001Fall2012.pdf

Wilkinson, M. (2016). *Trombone Lesson Syllabus—UCF F16*. https://www.cah.ucf.edu/common/files/syllabi/MVB34330002Fall2016.pdf

Wilson, J. (2016). *Blair Trombone Syllabus Spring 2016*. https://static1.squarespace.com/static/57523e2707eaa0e9cd84496b/t/5758e86c86db43e1afc65aa5/1465444471534/Blair+Trombone+Syllabus+Spring+2016.pdf

Wolfinbarger, S. (2016). *WMU Applied Trombone Syllabus 2016-2017*. https://www.wmich.edu/sites/default/files/attachments/u829/2016/Applied%20Trombone%20Syllabus,%202016-2017_2.pdf

APPENDIX B

Trombone Bibliographies

Everett, M. (n.d.). *Selected Bibliography for Low Brass*. Retrieved August 25, 2020, from https://olemiss.edu/lowbrass/studio/lowbrassbibliography.pdf

Fasman, M. J. (1990). *Brass Bibliography: Sources on the History, Literature, Pedagogy, Performance, and Acoustics of Brass Instruments*. Indiana University Press.

George, S. P. (1982). *An Annotated Bibliography of Trombone Methods and Study Materials.* University of Northern Colorado.

Hofacre, M. J. (2002). *Teaching Collegiate Trombone: Or, what I did anyway...* Self-Published.

Lane, G. B. (1999). *The trombone: An annotated bibliography*. Scarecrow Press.

Saito, M. (2008). *A Critique of Etudes and Method Books for Advanced Euphoniumists: Status Quo and Future Recommendations* [University of North Texas]. https://digital.library.unt.edu/ark:/67531/metadc6057/m2/1/high_res_d/dissertation.pdf

Shinn, E. (2016). *Recommended Trombone Methods*. https://arts.ufl.edu/site/assets/files/93212/recommended_trombone_methods.pdf

Skei, A. B. (1985). *Woodwind, Brass, and Percussion Instruments of the Orchestra: A Bibliographic Guide* (0-8240-9021-7, 978-0-8240-9021-0). Garland.

APPENDIX C

Other Sources

Colin, C., & Spilka, B. (1990). *Chops: 480 Action Photographs of Brass Players Illustrating the Wide Range of Embouchures and Mouthpiece Placements*. New York Brass Conference for Scholarships.

Colin, C. (1959). *Daily Warmups for Trombone*. C. Colin.

Colin, C. (1958). *Progressive Technique for Trombone*. New Sounds in Modern Music.

Farkas, P. (1970). *A Photographic Study of 40 Virtuoso Horn Players' Embouchures*. Wind Music, Inc.

Reinhardt, D. S. (2004). *Reinhardt for Beginners*. Pivot Publishing.

Wilken, D. (n.d.). *The Tongue Controlled Embouchure – Wilktone*. Retrieved September 14, 2020, from https://wilktone.com/?p=307

Willey, R. (2008). *Focal Point—A Centered Approach To Embouchure Development for Trombone.* Pivot Publishing.