THE COMPOSER'S GUIDE TO THE TUBA: CREATING A NEW RESOURCE ON THE CAPABILITIES OF THE TUBA FAMILY

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ABSTRACT

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The solo repertoire of the tuba and euphonium has grown exponentially since the middle of the 20th century, due in large part to the pioneering work of several artist-performers on those instruments. These performers sought out and collaborated directly with composers, helping to produce works that sensibly and musically used the tuba and euphonium. However, not every composer who wishes to write for the tuba and euphonium has access to world-class tubists and euphonists, and the body of available literature concerning the capabilities of the tuba family is both small in number and lacking in comprehensiveness. This document seeks to remedy this situation by producing a comprehensive and accessible guide on the capabilities of the tuba family. An analysis of the currently-available materials concerning the tuba family will give direction on the structure and content of this new guide, as will the dissemination of a survey to the North American composition community. The end result, the *Composer's Guide to the Tuba*, is a practical, accessible, and composer-centric guide to the modern capabilities of the tuba family of instruments.

To Sara and Dad, who both kept me going with their never-ending love. And to Mom, who didn't get the chance to see the end of this journey, but whose love and support helped make it possible.

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INTRODUCTION

Although the members of the tuba family and their direct predecessors have been in existence in one form or another since 1835, the first major solo composition for the tuba only dates back to 1954.[1] This work, Ralph Vaughan Williams' *Concerto for Bass Tuba and Orchestra*, marked the foundation of an entirely new era of compositional output for the tuba family, one that continues to the present day. In all that time, though, composers have often been forced to rely on flawed information concerning the instruments; orchestration manuals routinely contain incomplete or outright false data on the instruments, while dedicated resources for the tuba family are both scarce and often outdated. This is especially problematic for the current age, as composers are becoming more and more adventurous in their utilization of the extremes of instrumental technique.

Beyond the relative paucity of comprehensive literature concerning the tuba family, there is a systematic lack of support for the instrument within the broader new music community. All but a few of the top new music festivals lack a dedicated tuba/euphonium instructor (and sometimes even a low brass instructor entirely), effectively closing off tubists and euphonists from the meaningful composer-performer collaboration that happens at such programs. Likewise, there are very few professional new music ensembles that include a tubist or euphonist within the core member list; stand out examples to the contrary include the International Contemporary Ensemble in New York (Dan Peck), and Ensemble Musikfabrik (Melvyn Poore). All of these factors have the potential to create a negative feedback loop: the tuba and euphonium are closed

[1] "Concerto for bass tuba and orchestra – Ralph Vaughan Williams – Oxford University Press", Oxford University Press, accessed January 3, 2019, https://global.oup.com/academic/product/concerto-for-bass-tuba-and-orchestra-9780193694569?cc=us&lang=en&.

off from most avenues of meaningful collaboration within the new music community, leading to a relative lack of new repertoire, which leads back to a smaller role within the new music community, and so on. Fortunately, through the efforts of a growing list of intrepid performers and a number of adventurous composers, this situation is slowly being rectified. There still exists a lack of comprehensive literature directly concerning the contemporary capabilities of the tuba family, though, and closing this knowledge gap will hopefully lead to an even greater utilization of the tuba and euphonium in the new music community.

Review of Scholarly Literature

The issue of how to foster greater composer-performer collaborations within the tuba/euphonium community has not been fully explored as of yet in the academic literature. That being said, there have been several efforts since the 1960s to illuminate the contemporary tuba and euphonium literature, often through the lens of specific works or pedagogical approaches. One of the most prominent documents in this field is David Randolph's 1977 dissertation from the Eastman School of Music, *New Techniques in the Avant-Garde Repertoire for Solo Tuba*.[2] Randolph focused his study exclusively on the unaccompanied tuba repertoire, a limitation that was also adhered to in several important dissertations written during the ensuing decades. Nine different solo compositions were considered, and the new techniques presented in each work were examined from three different angles: Notation, Method of Production, and Musical Context.[3] Randolph intended for his document to be of use to performers, instructors, and composers alike, providing a useful touchstone for the current project.

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[2] David Mark Randolph, "New Techniques in the Avant-Garde Repertoire for Solo Tuba" (doctoral dissertation, Eastman School of Music, 1977).
[3] Ibid, V.

Given the year in which it was published, and the relatively sparse state of the solo tuba literature in the late 1970s, the nine compositions considered in Randolph's document run the gamut from solos that are now firmly placed within the standard solo repertoire of the tuba to works that have dropped in prominence over the ensuing decades. One example of the former category is William Kraft's *Encounters II*, arguably one of the most important solo works in the tuba literature.[4] So important is Kraft's composition to the solo tuba literature that multiple dissertations have been written around various aspects of the work's specific performative challenges.[5] Rather than focusing on each individual work, Randolph instead focuses on contemporary techniques as a whole, referencing each work where relevant. In this way, the compositions act as lenses, providing a focus on certain technical issues. This aspect of Randolph's dissertation is of importance to the composer who wishes to learn about the capabilities of the tuba family, as such a person would potentially be more interested in the techniques themselves. In this way, Randolph's research provides a useful touchstone for the current project by demonstrating the usefulness of a techniques-first approach.

Solo tuba music is likewise the focus of Jeffrey Funderburk's 1992 dissertation from the University of Illinois, *An Annotated Bibliography of the Unaccompanied Solo Repertoire for Tuba*.[6] Unlike Randolph's dissertation, though, Funderburk's thesis adheres to a standard

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[4] *Encounters II* occupies a place as one of the first truly difficult and genre-expanding works written for the tuba. In the first few years of its existence, it was thought that only Roger Bobo (the dedicatee) could perform the work. In the decades since its composition, it has established itself as a cornerstone of the tuba repertoire, and is often played by professionals and college students alike (see Roger Bobo, "Roger Bannister and the Four Minute Mile", http://bomaestro.blogspot.com/2012/07/roger-bannister-and-four-minute-mile.html)

[5] See dissertations from Danny Rowland, Stacy Baker, Ruben Puebla (covered later in this document).

[6] Jeffrey Lee Funderburk, "An Annotated Bibliography of the Unaccompanied Solo Repertoire for Tuba" (doctoral dissertation, University of Illinois Urbana-Champaign, 1992).

bibliographical format. One area in which Dr. Funderburk's dissertation provides a useful model is the codification of nearly the entire range of extended techniques on the tuba.[7] Only a few techniques are missing from Dr. Funderburk's list, notably the use of split tones and, due to the age of the dissertation, any discussion of embedded electronics. In the *Conclusion* of Dr. Funderburk's document, it is noted that nearly half of all unaccompanied works surveyed at the time of writing utilize extended techniques.[8] Although the cataloging of such data is not the goal of the current document, it is likely that a high number of works written since 1992 likewise utilize extended techniques. Dr. Funderburk's document is potentially very useful for composers who wish to learn more about solo tuba music but given the extremely limited circulation of this document[9], it is of little practical use to composers. The codification of extended techniques, along with the copious number of musical examples utilized by Dr. Funderburk in his bibliography, provide a further model from which to structure the current research.

Published one year prior in 1991, Dr. David Royal Miles' *An annotated bibliography of selected contemporary euphonium solo literature by American composers* (University of Maryland, College Park) is similar to Funderburk (1992) in its focus on cataloging the then-current state of the euphonium solo literature.[10] Dr. Miles' project focuses exclusively on works by American composers. Because of the publication date, this guide is necessarily outdated at this current moment, but the existence of such a bibliography demonstrates the rapid increase in

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[7] Jeffrey Lee Funderburk, "An Annotated Bibliography of the Unaccompanied Solo Repertoire for Tuba" (doctoral dissertation, University of Illinois Urbana-Champaign, 1992), 9-11.
[8] Ibid, 178-81.
[9] The only copy of this dissertation exists in the University of Illinois Urbana-Champaign collection, and it is only disseminated through Interlibrary Loan services.
[10] David Royal Miles, "An annotated bibliography of selected contemporary euphonium solo literature by American composers" (doctoral dissertation, University of Maryland, College Park, 1991).

the number of works written for the euphonium during the twentieth century. Dr. Miles' dissertation catalogs one hundred and eleven compositions featuring the solo euphonium, both unpublished and published. Dr. Miles notes that the vast majority of the works listed were composed after 1950, a date which is in-line with the genesis of the modern solo tuba literature.[11] This dissertation also includes brief historical and analytical information about each work, similar to Funderburk (1992). Though outdated, this dissertation provides a valuable window into an earlier stage of the euphonium solo literature, and as such is worthy of attention for those who wish to learn more about this important member of the tuba family.

Kevin Joseph Jenkins' 1994 dissertation from Arizona State University, *A Study of Seven Compositions for Tuba and Electronic Sound Source*, focuses primarily on the performance challenges facing the tubist who wishes to explore the contemporary electroacoustic repertoire for the instrument.[12] Within this document, though, is an explicit call for greater collaboration between composers and performers.[13] The bulk of the document considers the technical and musical demands of seven electroacoustic works, and given the time period in which this dissertation was written, the vast majority of the technical discussion revolves around the use of magnetic tape playback systems. Dr. Jenkins dedicates a chapter of his thesis to a discussion of the performance issues endemic to electroacoustic performance, although much of the technical aspects of this discussion is outdated.[14] The topic of performing with electronics has only become more prominent as the electroacoustic repertoire for the tuba and euphonium has grown

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[11] David Royal Miles, "An annotated bibliography of selected contemporary euphonium solo literature by American composers" (doctoral dissertation, University of Maryland, College Park, 1991), 18.
[12] Kevin Joseph Jenkins, "A Study of Seven Composition for Tuba and Electronics Sound Source" (doctoral dissertation, Arizona State University, 1994).
[13] Ibid, 13.
[14] Ibid, 57-74.

in size over the last few decades, and any new research on the capabilities of the tuba family would do well to cover some of the issues inherent in the electroacoustic medium.

Dr. Neal Corwell's 1996 dissertation *Original Compositions for Solo Euphonium with Tape* is an important document concerning the relatively small genre of works for euphonium and tape.[15] It is telling that Dr. Corwell's research includes a listing of all extant works for euphonium and tape that only numbers ten compositions in length. Six of these compositions are by Dr. Corwell himself, meaning that only four works for euphonium and electronics were composed and published by other composers between the years of 1970-1996 (to the best knowledge of Dr. Corwell). Dr. Corwell includes a short section on the process that he conducted in the composition of his own works, but aside from that, this dissertation is largely aimed at the euphonist. Each work is considered in turn, with a focus on performance issues inherent to the medium. Although the discussion of magnetic tape technology is obsolete considering modern digital technologies, there is much historic value to be found in Dr. Corwell's dissertation.

Andy Larson's 2013 dissertation from Louisiana State University, *Investigating "Experimentalism": A Case Study of the Tuba and its Repertoire*, uses Randolph (1977) as a stepping stone towards a greater discussion of experimental elements within the solo tuba literature.[16] William Kraft's *Encounters II* is once again discussed here, along with Krzysztof Penderecki's *Capriccio* and Morgan Powell's *Midnight Realities*. One particularly relevant feature of Dr. Larson's dissertation is a conscious effort to define the term "experimental" as it

[15] Neal Lynn Corwell, "Original Compositions for Solo Euphonium with Tape" (doctoral dissertation, University of Maryland at College Park, 1996).
[16] Andrew Brian Larson, "Investigating 'Experimentalism': A Case Study of the Tuba and its Repertoire" (doctoral dissertation, Louisiana State University, 2013).

applies to the solo tuba repertoire.[17] Although he largely relies on Dr. Randolph's definition[18], Dr. Larson endeavors to expand the notion of the "experimental" from its traditional usage in describing certain strands of twentieth century musical composition into an expanded view of the use of contemporary instrumental techniques. With this definition, Dr. Larson creates a vocabulary of experimental techniques that encompasses the most widely-used contemporary techniques in the solo tuba repertoire.[19] This is immensely relevant to the current research; the primary basis of the new *Composer's Guide to the Tuba* is likewise the codification of the current field of contemporary tuba techniques.

The cataloging of contemporary techniques is likewise a key component of Dr. Sean Kennedy's 2016 dissertation from Texas Tech University, *An Approach to Standardizing Pedagogy for Extended Techniques on Tuba*.[20] Although the principle goal of Dr. Kennedy's document is to formulate a new approach to the pedagogy of extended techniques, the dissertation additionally includes an in-depth discussion of the techniques under consideration. Dr. Kennedy's descriptions of each contemporary technique are much greater in detail than any of the previous dissertations, with a marked emphasis on the physiological basis of said techniques.[21] Dr. Kennedy also categorizes the different techniques according to the method of production, which, along with Larson (2013), informs greatly the creation of the new *Composer's Guide to the Tuba*.[22]

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[17] Andrew Brian Larson, "Investigating 'Experimentalism': A Case Study of the Tuba and its Repertoire" (doctoral dissertation, Louisiana State University, 2013), 6-7.
[18] Ibid.
[19] Ibid, 27-30.
[20] Sean M. Kennedy, "An Approach to Standardizing Pedagogy for Extended Techniques on Tuba" (doctoral dissertation, Texas Tech University, 2016).
[21] Ibid, 6.
[22] Ibid, iii-iv.

One of the most recent dissertations under review is Dr. Michael James Casey's *Extended Techniques in Unaccompanied Works for Solo Tuba Written Between 1965-1973 and 2002-2013* (2017, Florida State University).[23] Dr. Casey's research project considered the different extended techniques present in certain works within the solo tuba repertoire. The dissertation is formatted as a typical bibliography, with each work being considered as separate yet connected entities. In this regard, Dr. Casey's document is functionally like Funderburk (1992), with an exclusive focus on works that utilize extended techniques. Dr. Casey's analysis of extended techniques is likewise similar in scope to that found in Larson (2013), albeit with a much broader focus on the integration of extended and traditional playing techniques.

While the previously-discussed dissertations took a broad view of extended techniques, Dr. Stacy Baker's 1999 research project from the University of Illinois, *Vocal Technique Performance Challenges for the Tubist With a Soprano Vocal Range*,[24] focuses exclusively on the performative issues that face high-voiced performers of the contemporary solo tuba and euphonium repertoire. Besides giving a thorough historical analysis of the use of vocal multiphonics within the brass repertoire[25], Dr. Baker's document serves as a useful window into some of the issues that face a growing portion of the tuba-euphonium community, namely those performers that are female, trans, or non-binary. These issues are important to consider when writing for the tuba and euphonium, and care must be taken to be aware of the pitfalls of [un-]intentionally gendered composition.

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[23] Michael James Casey, "Extended Techniques in Unaccompanied Works for Solo Tuba Written Between 1965-1973 and 2002-2013" (doctoral dissertation, Florida State University, 2017).
[24] Stacy Ann Baker, "Vocal Technique Performance Challenges for the Tubist With a Soprano Vocal Range" (doctoral dissertation, University of Illinois Urbana-Champaign, 1999).
[25] Ibid, 6-13.

Beyond Dr. Baker's work, William Kraft's seminal composition *Encounters II* has been the central focus of two additional dissertations within the years since its publication in 1970. Ruben Puebla's *The Avant-Garde Tuba: Analysis and Comparisons of Interpretations of William Kraft's Encounters II for Unaccompanied Tuba* is exclusively focused on Kraft's work, specifically on the variations found among the several commercially-released recordings of the work.[26] Although the content of Mr. Puebla's thesis sheds little light on the current research question, its status as an indicator of the importance of Kraft's work to the solo tuba repertoire is important. Dr. Daniel Rowland's 2015 thesis, *William Kraft's Encounters II for Solo Tuba: A Performer's Guide and Annotated Bibliography of Unaccompanied Works Written for Roger Bobo*[27] is likewise focused more on the history and analysis of the work, but it does include relevant materials in the form of a brief discussion of extended techniques.[28]

Luigi Nono's *Post-Prae-Ludium, 'per Donau'* is a major work within the solo tuba repertoire, due in no small part to its prominence among the scholarship of the late period music of Nono.[29] Despite the technical issues present in the performance of the work, it has seen an increasing number of performances in the twenty-first century. In 2009, Dr. Scott Tignor

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[26] Ruben Alexander Puebla, "The Avant-Garde Tuba: Analysis and Comparisons of Interpretations of William Kraft's Encounters II for Unaccompanied Tuba" (master's thesis, California State University, Long Beach, 2014).
[27] Daniel Jay Rowland, "William Kraft's Encounters II for Solo Tuba: A Performer's Guide and Annotated Bibliography of Unaccompanied Works Written for Roger Bobo" (doctoral dissertation, Florida State University, 2015).
[28] Ibid, 18-29.
[29] *Post-Prae-Ludium* is perhaps the only solo tuba work to be the sole focus of an entire workshop at a contemporary music symposium; at *Utopian Listening: The Late Electroacoustic Music of Luigi Nono*, a symposium held in March of 2016 at Tufts University in Medford, MA, tubist Max Murray and engineer Joshua Fineberg held a workshop on *Post-Prae-Ludium n. 1 per Donau*. Additionally, there were two different performances of the work throughout the symposium (https://music.fas.harvard.edu/nono_about.html).

submitted to the University of North Texas his dissertation *A Performance Guide to Luigi Nono's Post-Prae-Ludium n. 1 per Donau*, and to date this marks the only dissertation-length treatment of Nono's solo tuba work.[30] Besides analyzing the wide range performance issues inherent in Nono's composition, Dr. Tignor also discussed the process of modernizing the electronics for performance (as the original work required the use of several tape loop recording decks, a rarity in today's digital age). Although the analysis included in Dr. Tignor's document is mostly relevant for performance of this particular work, the techniques present in Nono's work still represent many of the most prominent contemporary techniques for the tuba. Brief as it is, Dr. Tignor's discussion of performing with live electronics is also relevant to the current project in its treatment of that important contemporary technique.

Dr. Danielle Duron-VanTuinen's 2017 dissertation *Euphonium and Live Interactive Electronics: A Performer's Examination of Three New Works* likewise provides some concrete and performer-centric information on performing with live electronics.[31] In the case of Dr. Duron-VanTuinen's dissertation, the euphonium is the central instrument, and a major component of the research conducted in the work is centered on the relative paucity of works for euphonium and live electronics. For reasons that are only lightly discussed in this dissertation, the euphonium has relatively little in the way of works of this nature.[32] The main thesis of the work is the commissioning and performance of three new compositions for euphonium and live

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[30] Scott Edward Tignor, "A Performance Guide to Luigi Nono's Post-Prae-Ludium n. 1 per Donau" (doctoral dissertation, University of North Texas, 2009).
[31] Danielle Duron-VanTuinen, "Euphonium and Live Interactive Electronics: A Performers [*sic*] Examination of Three New Works" (doctoral dissertation, Arizona State University, 2017).
[32] There is an error in Dr. Duron-VanTuinen's dissertation; in the "Purpose" section of her dissertation, the claim is made that no known works for euphonium and live interactive electronics were written before the time of the dissertation's writing. This is not true, as at least a few different works fit that bill (including Karlheinz Essl's 2012 work for tenor tuba and electronics, *Si!*).

electronics, all of which use the Max/MSP interactive programming language. Each work is examined from a performer's standpoint, with much practical information regarding the performance of music in this relatively new repertoire. Dr. Duron-VanTuinen's research thus represents new ground for scholarship concerning the contemporary repertoire of the euphonium.

A similar dissertation can be found in Dr. Irving Paul Ray's *A Comprehensive Performance Guide for the Use of Advanced Technology in Euphonium Repertoire with Electronic Media Through Analysis of Works by D. Edward Davis, Neal Corwell, and Lucy Pankhurst* (University of North Texas, 2017), which also takes the form of a performance guide for specific compositions.[33] Dr. Ray's dissertation goes into great detail concerning the technological means for performing three different works by the titular composers, and this information is of much use to the intrepid euphonist. Compared to Dr. Duron-VanTuinen's work, Dr. Ray's research focuses more on compositions that include live analog electronics, such as the use of guitar effects pedals. Although Dr. Ray's guide is almost exclusively targeted at performers, it is still important to note the growing trend in the academic research for music written for the combination of euphonium and electronics.

Dr. Lewis Elijah Westerfield's 2017 dissertation *Selected Works for Tuba and Electronic Media* (University of Alabama, 2017) takes the form of a historical and performative analysis of selected works for the electroacoustic genre.[34] Dr. Westerfield's research document was written primarily as an accompaniment for a final doctoral recital, and as such is primarily targeted at

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[33] Irving Paul Ray, "A Comprehensive Performance Guide for the Use of Advanced Technology in Euphonium Repertoire with Electronic Media Through Analysis of Works by D. Edward Davis, Neal Corwell, and Lucy Pankhurst" (doctoral dissertation, University of North Texas, 2017).

[34] Lewis Elijah Westerfield, "Selected Works for Tuba and Electronic Media" (doctoral dissertation, University of Alabama, 2017).

performers wishing to learn more about the selected works and the medium of tuba with electronics. Of note is the inclusion of a newly composed work, *Lavender Cigarette* by Dr. Amir Zaheri. The author includes a light discussion of the processes surrounding this work's composition, before turning back to performance issues. A similar research direction can be found in Dr. Craig Garrett Potter's *The Electroacoustic Tuba: A Study of Selected Works for Tuba with Fixed Media and Live Processed Electronic Accompaniments* (University of Maryland at College Park, 2018).[35] Dr. Potter discusses a much larger list of compositions, reaching fourteen in length. This list includes a mix of works written for tuba with fixed media, and tuba with live electronics. Each work is given a slight historical and performative summary, which is in-line with the document's purpose as the accompaniment to a series of required doctoral recitals. Both of these dissertations provide little direction to the current research project, but they are useful in so far as they are emblematic of the growing popularity of writing for tuba/euphonium and electronics.

Of a similar performer-centric vein is Dr. Lukas Storm's 2017 dissertation *Wolfgang von Schweinitz's Plainsound Brass Trio in Theory and Practice: A Guide for Performers*.[36] Dr. Storm's research centers on the titular work, written in 2008 for Dr. Storm's brass ensemble Trio Kobayashi. Central to this work's compositional aesthetic is an almost complete use of microtonal tunings, necessitating a number of adjustments in the way that the tubist approaches performing the work. Dr. Storm goes over the process of microtonal performance in great detail,

[35] Craig Garrett Potter, "The Electroacoustic Tuba: A Study of Selected Works for Tuba with Fixed Media and Live Processed Electronic Accompaniments" (doctoral dissertation, University of Maryland at College Park, 2018).
[36] Lukas Timothy Storm, "Wolfgang von Schweinitz's Plainsound Brass Trio in Theory and Practice: A Guide for Performers" (doctoral dissertation, University of California, Los Angeles, 2017).

as well as the experience of working within the Helmholtz-Ellis Just Intonation Pitch Notation system. This dissertation serves as one of the few resources exploring microtonal tuning on the tuba, and as such will be cited within the relevant sections of the new *Composer's Guide to the Tuba*.

Dr. Jennifer Ann Jester's wide-ranging dissertation *Interdisciplinary Performance and Education: The Study, the Project, the Challenge* (University of California, Los Angeles, 2008) provides a thorough look at the medium of theatrical composition.[37] Of interest is the author's theatrical work *The Last Tango*, composed as a demonstration of the theatrical and expressive capabilities of the euphonium. In the process of chronicling the creation of *The Last Tango*, Dr. Jester provides a detailed description of the genre of theatrical musical works.[38] This dissertation does not bear much similarity to the current research project, but Dr. Jester's definitions for theatrical music will be of some use for the equivalent sections within the *Composer's Guide to the Tuba*.

Outside of the realm of the tuba and euphonium, there are a number of dissertations that directly discuss contemporary performance techniques and literature for the trumpet, trombone, and horn. Although the author reviewed several of these for the current project, they will not be explicitly discussed in this document. The process of working directly with composers on the utilization of extended techniques was apparent in a few of these research projects, but not to the extent of the current research project. A few notable dissertations will, however, be listed in the bibliography, due to their prominence for their respective brass instruments.

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[37] Jennifer Ann Jester, "Interdisciplinary Performance and Education: The Study, the Project, the Challenge" (doctoral dissertation, University of California, Los Angeles, 2008).
[38] Ibid, 6-14.

Outline of Document

The ultimate outcome of this document is to create a new resource on the tuba family, which will continue to be expanded upon and improved for the foreseeable future. In Chapter 1, the accuracy and efficacy of currently available resources on the tuba family will be examined, with a focus on issues that may be addressed in a new guide to the tuba family. This discussion will start first with a definition of a key term for this research project, that of the "composer-centric" resource, which will help to direct the construction of the new guide.

Chapter 2 will address the survey that was created explicitly for this research project.[39] This survey was designed to ascertain the general knowledge level of the capabilities of the tuba family amongst professional composers in North America, and the provided analysis of this survey will offer direction towards the creation of the new *Composer's Guide to the Tuba*.

Chapter 3 concerns the formulation of the structure for the new guide to the tuba family, based on the synthesis of insights gathered from the previous analysis and concepts received from the field of contemporary music practice. The dual guiding principles behind the new resource on the tuba family are accessibility and comprehensiveness, and these issues will be fully addressed here. In particular, the creation of the website component of the *Composer's Guide to the Tuba* will be detailed in this chapter, along with a brief discussion of the Creative Commons license that both print and online versions of the guide will carry.

In the final chapter of this document, the findings of all of these research elements will result in the creation of a new resource on the members of the tuba family, referred to throughout this project as the *Composer's Guide to the Tuba*. The version of the *Composer's Guide* included in this document is functionally identical to the version contained in the website version of the

[39] See Appendix A.

guide, as well as the standalone version that will be disseminated after the completion of the research project.

CHAPTER 1. IDENTIFYING AND ANALYZING COMPOSITIONAL RESOURCES

Definition of "Composer-Centric" Materials

The majority of extant scholarly projects concerning the tuba family are geared towards performers first and foremost. Although these documents often have some tangential benefit to those wishing to write music for the tuba family, the topic at hand (the creation of a new resource on the tuba family aimed at composers primarily) has never been addressed in the academic literature. Indeed, the literature for the tuba is often focused on pedagogical or performative resources, as in Kennedy (2016) and Larson (2013). As such, these research projects provide limited guidance for the current document, geared as it is towards the compositional community. Instead, the available commercial literature concerning the tuba family will be examined as possible models for this research project.

For the purposes of this document, the body of resources to be considered for analysis is limited to documents that are meant for use primarily by composers. These resources will henceforth be referred to as "composer-centric" materials, and will primarily focus on documents that address the tuba family directly and in a format that belies their use as compositional resources, not performance guides. Although traditional orchestration manuals are often cited by composers, the issues inherent in their treatment of the tuba family are a problem that could take up an entirely separate study, beyond what is covered in this document. The goal of this document is to create a new and comprehensive resource *solely* focused on the tuba family of instruments and their capabilities *beyond the typical ensemble setting*, and thus these orchestration manuals will not be discussed directly (except where necessary to provide context). A preliminary list of composer-centric resources will be cataloged in the following section and

further analyzed in Chapter 2 by utilizing insights gathered from the composer's survey (as seen in Appendix A).

Narrowing the Field of Available Materials

Within the wider family of brass instruments, there exist several documents and treatises that directly concern the production and proper utilization of contemporary performance techniques. A few of these guides are specifically meant for use by composers as well as performers, and will serve as useful models for the current research. Before focusing on those documents that directly concern the members of the tuba family, a few of the more prominent and relevant materials for other brass instruments will be discussed briefly.

There are very few informational resources addressing the composer on the performance of contemporary techniques on the trumpet. In contrast, there are several trumpet etude books concerning contemporary performance, including books by Alfred Blatter/Paul Zonn/David Hickman[40], Robert Nagel[41], Anthony Plog[42], and Thomas Stevens[43]. The book of studies by Blatter, Zonn & Hickman is particularly notable for its extensive notation guide, which is valuable for both performers and composers.[44] By comparison, the horn has one major printed resource on the utilization of contemporary techniques, while the trombone has two major resources. For the horn, this work is Douglas Hill's *Extended Techniques for the Horn: A Practical Handbook for Students, Performers and Composers*, first published in 1983 and re-

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[40] Alfred Blatter and Paul Zonn, *Contemporary Trumpet Studies*, ed. David Hickman (Denver, CO: Tromba Publications, 1976).
[41] Robert Nagel, *Trumpet Studies in Contemporary Music* (Albuquerque, NM: Mentor Music, 2012)
[42] Anthony Plog, *Sixteen Contemporary Etudes* (Denver, CO: Tromba Publications, 1977).
[43] Thomas Stevens, *Contemporary Trumpet Studies* (Paris: G. Billaudot, 1976).
[44] Alfred Blatter and Paul Zonn, *Contemporary Trumpet Studies*, ed. David Hickman (Denver, CO: Tromba Publications, 1976), 2-7.

issued in 1996 and 2010.[45] After a short introduction, Hill's guide launches straight into a consideration of a variety of contemporary techniques on the horn. Each chapter focuses on a certain topic in-depth, such as Range, Mutes, Trills and Tremolos, and Quarter-Tones. Within each chapter, there is a description of the technique, charts depicting the notation, effects, and other varied comments concerning the individual aspects of each technique, and extensive musical examples demonstrating the techniques. For instance, the chapter on Hand Muting describes several variations of the process of hand muting, along with a detailed description of the physical aspects of the technique and comments on the efficacy of the technique in various ranges.[46] Prof. Hill's resource is particularly prominent within the corpus of modern methods on brass performance, and provides a useful model for the efficient and methodical presentation of contemporary brass techniques.

In comparison to Prof. Hill's concise resource, Stuart Dempster's *The Modern Trombone* takes a much more prosaic approach to the explication of contemporary brass techniques.[47] *The Modern Trombone* was published as part of a series entitled "The New Instrumentation", edited by bassist Bertram Turetzky and composer Barney Childs; as of 2019, the trombone remains the only brass instrument to have an entry in the series. Although forty years old as of this document's writing, *The Modern Trombone* is still applicable for the vast majority of contemporary techniques on the trombone (many of which are suited well for the other brass instruments). Although some techniques are not covered in as much detail as in more recent

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[45] Douglas Hill, *Extended Techniques for the Horn: A Practical Handbook for Students, Performers and Composers* (Eau Claire, WI: Really Good Music, 2010).
[46] Ibid, 21-5.
[47] Stuart Dempster, *The Modern Trombone* (Berklee, CA: University of California Press, 1979).

methods (i.e., the technique of split tones, which is covered in only one page)[48], *The Modern Trombone* is still highly valuable due to its very even-handed coverage and thorough description of nearly the entire range of contemporary techniques on the trombone. Bolstering this resource's reputation is the fact that it was written by one of the most prominent solo trombonists of the 20th century, as well as one of the leading interpreters of contemporary music as a whole.

Although *The Modern Trombone* is still a valuable resource for trombonists and composers, there are a few areas within the purview of modern brass performance that have advanced considerably between 1979 and 2019. Covering this gap in information is part of the focus of Michael Svoboda and Michel Roth's *The Techniques of Trombone Playing*.[49] Whereas *The Modern Trombone* consciously focuses on contemporary techniques without a detailed explanation of standard performance practice on the trombone[50], the resource by Svoboda/Roth endeavors to describe in great detail the entirety of trombone technique.[51] Like Dempster's manual, *The Techniques of Trombone Playing* is an entry in a larger series of works on the standard and contemporary performance techniques of different instruments; in the case of this manual, the encompassing series is published by Bärenreiter, and referred to in name as "Die Spieltechnik…", or "The Techniques…".[52] Svoboda and Roth elected in this manual to categorize each type of technique into one of five categories, including *Basic techniques*, *Sound*

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[48] Stuart Dempster, *The Modern Trombone* (Berklee, CA: University of California Press, 1979), 9.
[49] Michael Svoboda and Michel Roth, *The Techniques of Trombone Playing* (Kassel, DE: Bärenreiter-Verlag, 2017).
[50] Stuart Dempster, *The Modern Trombone* (Berkley, CA: University of California Press, 1979), 1.
[51] Michael Svoboda and Michel Roth, *The Techniques of Trombone Playing* (Kassel, DE: Bärenreiter-Verlag, 2017), 11-2.
[52] "Bärenreiter-Verlag – Musicpraxis", accessed February 2, 2019, https://www.baerenreiter.com/en/catalogue/books/musical-practice/.

modulation, *Multiphonics*, *Special sound effects*, and *Moving the sound with the instrument*.[53] This resource includes extensive score examples and notation examples, as well as numerous pictures and graphics demonstrating every aspect of the different techniques discussed by the authors. The amount of detail is also a strength of this resource, as each technique gets a full and thorough description in both English and German. Although *The Modern Trombone* remains an important contribution to the literature on contemporary brass techniques, *The Techniques of Trombone Playing* contains an even broader and more detailed description of contemporary brass performance. As such, it is of much value in the construction of a new resource for the tuba family of instruments.

Resources About the Tuba Family

As of the writing of this document, there is a moderately-sized body of literature focusing exclusively on the tuba family. The clear majority of these resources are intended primarily for use by tubists and euphonists, rather than composers. Standard works in this genre include Arnold Jacobs' *Song and Wind*[54], Don Little's *Practical Hints on Playing the Tuba*[55], and Brian Bowman's *Practical Hints on Playing the Baritone*[56]. Although these documents are highly useful and filled with much practical knowledge on the tuba family, their pedagogical emphasis renders them of limited use for composers.

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[53] Michael Svoboda and Michel Roth, *The Techniques of Trombone Playing* (Kassel, DE: Bärenreiter-Verlag, 2017), 5-7.
[54] Brian Frederiksen, *Arnold Jacobs: Song and Wind*, ed. John Taylor (Gurnee, IL: WindSong Press, 2006).
[55] Donald C. Little and James D. Ployhar, *Practical Hints on Playing the Tuba* (Melville, NY: Belwin Mills, 1984).
[56] Brian Bowman and James D. Ployhar, *Practical Hints on Playing the Baritone* (Melville, NY: Belwin Mills, 1983).

Once the purely pedagogical documents have been filtered out of the list of available tuba-centric materials, the list of documents available for analysis is narrowed down to four resources: *The Tuba Family* by Clifford Bevan[57], *The Contemporary Tuba* by Barton Cummings[58], *Le Tuba Contemporain* by Gérard Buquet[59], and "A Guide to the Contemporary Tuba", a website compendium by Jonathan Piper and Brian Griffeath-Loeb[60].

Of these four, Clifford Bevan's *The Tuba Family* is an outlier, as it is concerned exclusively with the history of the tuba family of instruments. This resource is still included, though, as it is the only comprehensive resource available that discusses every member of the tuba family of instruments; many of the other resources considered here are focused primarily on the contrabass and bass tubas, and neglect the euphonium and other adjacent instruments within the tuba family. Cummings (2006) and Buquet (1993) are more traditional in their format, being structured like many other technical manuals for Western orchestral instruments. Both resources spend a majority of their page count discussing the contemporary capabilities of the tuba in an organized and taxonomic format, while the Buquet additionally includes a brief discussion of the standard performance issues of the instrument. The Piper/Griffeath-Loeb website is a living, online document, yet is still largely formatted as a traditional technical manual, with dedicated sections to many different technical areas of tuba/euphonium performance and the inclusion of sample audio clips of contemporary techniques. Buquet (1993) likewise includes an extensive set of audio clips, while Cummings (2006) and Bevan (2000) do not. Taken together, these

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[57] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978).
[58] Barton Cummings, *The Contemporary Tuba* (Irving, TX: Cimarron Music, 2006).
[59] Gérard Buquet, *Le Tuba Contemporain* (Villiers-sur-Marne, France: Ambrioso Editions, 1993).
[60] Jonathan Piper and Brian Griffeath-Loeb, "A Guide to the Contemporary Tuba", accessed January 3, 2019, http://www.contemporarytuba.com/.

resources cover a wide swath of what there is to know about the tuba and euphonium (with more emphasis on the former class of instrument). However, no one resource is comprehensive in its treatment of the members of the tuba family. The following section summarizes the strengths and weaknesses of each of the resources that have been discussed so far, prioritizing the four composer-centric documents listed previously.

Appraisal of Selected Materials

Clifford Bevan's *The Tuba Family* is primarily concerned with the historical evolution of the tuba family of instruments. This history is presented in exhausting detail, and it is the most comprehensive of its kind in the English language. Throughout the book, Bevan discusses the technical and musical capabilities of the tuba family of instruments, primarily as it concerns the development of instruments through the years following the tuba's initial invention. Bevan's discussion of the contemporary capabilities of the tuba family is limited to the use of the tuba and euphonium in modern orchestral works. Beyond these occasional references, the bulk of the resource is dedicated to a thorough accounting of the evolution of the instrument itself, rather than technical information on how the instruments work in practice. The primary strength of Bevan's book, then, is the comprehensive historical information found within its pages. Bevan's book also contains a large number of musical examples and illustrations, which are immensely helpful in providing context for the timeline of the tuba family's development.

Whereas *The Tuba Family* is a historical treatise rather than an instructional manual, Barton Cummings' *The Contemporary Tuba* is explicitly intended for practical use. First published in 1984, *The Contemporary Tuba* is very much a product of its time. From the outset, Cummings confesses to his intention to draw exclusively from his own experiences as a tubist and commissioner of new works for the tuba, essentially locking out any issues that have not

been encountered within his own experience.[61] As a result, there is much of substance concerning contemporary techniques that is left out of this contemporary manual. For instance, the use of vocal multiphonics, (which has been one of the hallmarks of the contemporary solo tuba literature since Mauricio Kagel's *Mirum* and William Kraft's *Encounters II)*, is only discussed in a cursory manner, taking up no more than four pages of the treatise's length.[62] Additionally, both the fixed nature of this treatise and its provenance from a time in which the contemporary solo tuba literature was still in its formative stages means that this manual is now severely out of date. Given these issues, though, there is still much of value to be found in this treatise. The emphasis on contemporary performance practice is valuable for composers, as is the extensive use of musical examples. The fact that this was the first major published work to focus exclusively on contemporary performance techniques is also a contributing factor to its importance within the oeuvre of tuba-centric resources. It is similar in many ways to Dempster's *The Modern Trombone,* with the latter resource providing a much more detailed account of the contemporary capabilities of its respective instrument. Despite the problematic aspects of *The Contemporary Tuba*, it is still a vital stepping stone on the path to a comprehensive contemporary resource on the tuba family.

Whereas Cummings' manual was eventually made obsolete by the passage of time and the ever-evolving solo tuba repertoire, *Le Tuba Contemporain* by Gérard Buquet[63] contains information that is still largely relevant for the modern tubist. Buquet's treatise, originally published in 1993, is thorough in its treatment of contemporary technique. The document is filled

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[61] Barton Cummings, *The Contemporary Tuba* (Irving, TX: Cimarron Music Press, 2006), III.
[62] Ibid, 1-4.
[63] Gérard Buquet, *Le Tuba Contemporain* (Villiers-sur-Marne, France: Ambrioso Editions, 1993).

with a number of charts that detail the subjective difficulty of nearly the whole range of contemporary techniques, both on their own and when combined with other techniques. There is also a surplus of musical examples, as well as charts that deal with such topics as vocal multiphonics and microtonal tuning tendencies. The beginning of the treatise contains a condensed history of the tuba & euphonium, and since this treatise was originally written for a French readership, there is a notable mention of the saxhorn (an ancestor of the modern tuba that is still used in limited circumstances in France). The treatise also includes an expansive set of audio samples, demonstrating the various techniques described within its pages. With the exception of some small details, this treatise would serve well as a manual for anyone wishing to thoroughly explore the capabilities of the tuba family. However, there are three issues that work against the effectiveness of this resource. First, it is only available in the original French, limiting its usefulness for those that don't speak or read the language. Additionally, it is no longer in print, although a version of the document is readily obtained in PDF form via the author's website. After some correspondence between the author and Prof. Buquet, the original sound clips were recovered, but this is a step that few composers are likely to attempt. Finally, this resource contains only a cursory explanation of the use of live electronics. The use of electronics has undergone numerous upheavals and changes since this manual's original publication date, and given the prominence that electronics have secured within the contemporary music community, this is an area which must be addressed in greater detail in any new comprehensive resource. It is safe to say that, while successful in its treatment of the tuba as a contemporary instrument, *Le Tuba Contemporain* falls short of providing a broadly accessible and thorough treatment of the tuba family of instruments.

The newest resource being considered is Jonathan Piper and Brian Griffeath-Loeb's website, *A Guide to the Contemporary Tuba*.[64] Created in 2015 and updated periodically since then, this website is meant to serve as a useful catalog for a number of contemporary techniques that were explored during the authors' years-long collaboration (Piper as the tubist, and Griffeath-Loeb as composer). From the outset, the authors state that this website is "not intended to be authoritative or complete,"[65] but is rather a catalog of techniques and ideas that were found to be useful in their collaboration. As such, the compendium of techniques available on this site do not represent the entire breadth of performance techniques available to the members of the tuba family. Little attention is paid to the euphonium, as the intention of the authors' collaboration was to write music for the bass and contrabass tuba. There is some historical information provided, but given Piper's preference for F and CC tubas, there is little information provided about the BBb and Eb tubas beyond a cursory discussion of their traditional roles in military bands and wind ensembles. Despite these shortcomings, the website is of much practical value for composers—the techniques discussed are given concise yet easily understandable definitions, and nearly every technique is accompanied by a sound clip demonstrating said technique. The method in which the authors have divided the pool of techniques into an organized taxonomy based on their primary function is also a positive feature of the website.[66] Just like *Le Tuba Contemporain*, the *Guide to the Contemporary Tuba* website is not without

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[64] Jonathan Piper and Brian Griffeath-Loeb, "A Guide to the Contemporary Tuba", accessed January 3, 2019, http://www.contemporarytuba.com/.

[65] Jonathan Piper and Brian Griffeath-Loeb, "About - A Guide to the Contemporary Tuba", accessed January 3, 2019, http://www.contemporarytuba.com/about.

[66] The seven different categories are constructed in terms of the extent to which they extend "outwards" from the performer's body: Traditional, Embouchure, Tongue, Lungs, Valves, Hardware, Miscellaneous. This could be further modified in various ways, but the idea of a structured taxonomy of technique is very helpful in envisioning the means of performance involved in any given technique.

fault, but what is present is of much use both to the goals of this document and to composers in general.

Broadly speaking, the resources now discussed have all had a gap of some sort in their coverage, creating an opportunity for a new, comprehensive, and accessible document on the tuba family. By analyzing the strengths and weaknesses of each resource, it is possible to create a first draft of a list of topics which could potentially be included in this theoretical document. This includes: 1) a broad and accurate historical discussion of the tuba family of instruments, as in the Bevan, 2) a thorough discussion of contemporary techniques, as in the Cummings, 3) an objective appraisal of the entire breadth of techniques, as in the Buquet, 4) a taxonomic categorization of instrumental technique, as in Piper/Griffeath-Loeb, and 5) a living, website component, again as in the Piper/Griffeath-Loeb. This list of criteria is bolstered by the structure and content of resources written on other members of the brass instrument family; in particular, *The Modern Trombone* and *The Techniques of Trombone Playing* both demonstrate the utility of a structure that is based on a detailed categorization of contemporary techniques. Taken together, this provides a strong beginning framework from which to construct a new, comprehensive document on the tuba. The next step is to further reinforce this structure by ascertaining what areas are lacking within the composition community's collective knowledge of the tuba family. In order to discover this information, a survey with questions pertaining to the tuba family was disseminated to composers throughout North America, and the results of that survey will be analyzed in the next chapter.

CHAPTER 2. ANALYSIS OF SURVEY

Prior Knowledge of Tuba Family Amongst Composers

In order to determine the level of knowledge of the tuba family amongst the North American compositional community (and thus to dictate what materials need to be reinforced in a new guide to the tuba family), a forty-nine question survey was created and submitted to 600 composers.[67] Eight questions concerning the use of orchestral manuals were eliminated from consideration early in the research process, a decision made by the author and doctoral advisor for this project; the question list found in Appendix A has been updated to reflect that change, with the total question count now numbering forty-one. The boundaries that dictated the recipients of the survey included the following: 1) all composers must have written for a brass instrument at some point during their career, (either solo or in an ensemble), 2) survey recipients must have their permanent residence in North America, and 3) survey recipients must be enrolled at the doctoral level or higher, or are no longer a student. These restrictions were set in place primarily to ensure that the survey results were both manageable and varied enough to represent a statistical cross-section of the North American compositional community.

Of the 600 recipients who received an invitation to complete the survey, 132 followed through and answered at least one question. Besides the sorting question at the beginning of the survey ("Have you ever written a work that utilizes any of the common brass instruments (trumpet, horn, trombone, euphonium, tuba), in any context of possible instrumentation?"), each

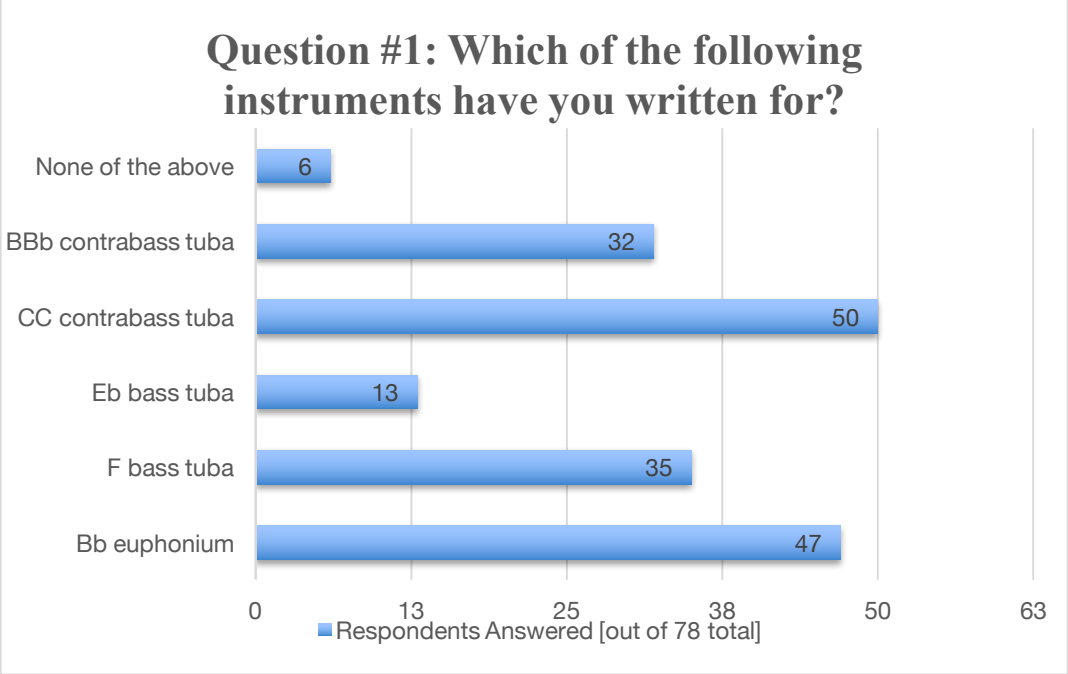
[67] See Appendix A for the list of questions, Appendix B for the survey solicitation email, Appendix C for the Consent Form, and Appendix D for the IRB Exemption Letter.

question could be skipped by the survey respondents. This lead to a varying degree of question completion.[68]

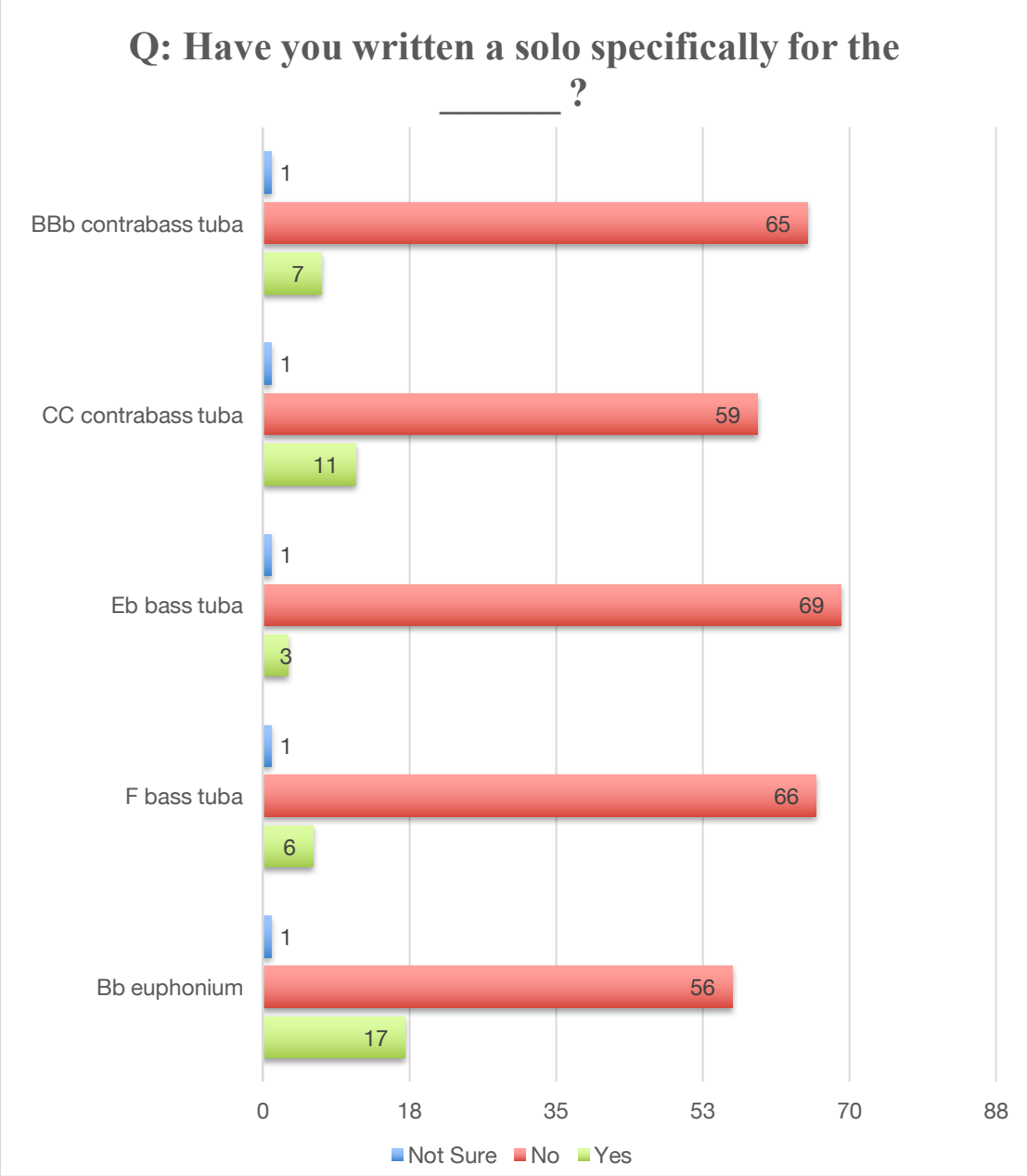
The first goal of the survey was to ascertain whether the respondents had written for a specific member of the tuba family before. Among the seventy-eight respondents who answered this question, the CC contrabass tuba and Bb euphonium were most often written for specifically (at fifty (64.10% of total for question) affirmative and forty-seven (60.26% of total for question) affirmative, respectively), with the F bass and BBb contrabass tubas trailing closely after (at thirty-five (44.87% of total for question) affirmative and thirty-two (41.03% of total for question) affirmative, respectively). Far behind the rest is the Eb bass tuba at thirteen (16.67% of total for question) affirmative, which may be partially explained by that particular instrument's association with playing cultures based outside of North America.[69] Six respondents said that they had not written for a specific instrument of the tuba family (Graph 1). The survey respondents were also asked to answer whether they had written a *solo work* for a specific instrument in the tuba family, and given the low affirmative response levels, it becomes clear that the composers involved in this survey have primarily written for the tuba family in a non-solo setting (Graph 2).

[68] Complete survey result data may be accessed at the following link (created January 3, 2019): https://www.surveymonkey.com/results/SM-GLDZVTT2V/

[69] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments,* ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 152-3.

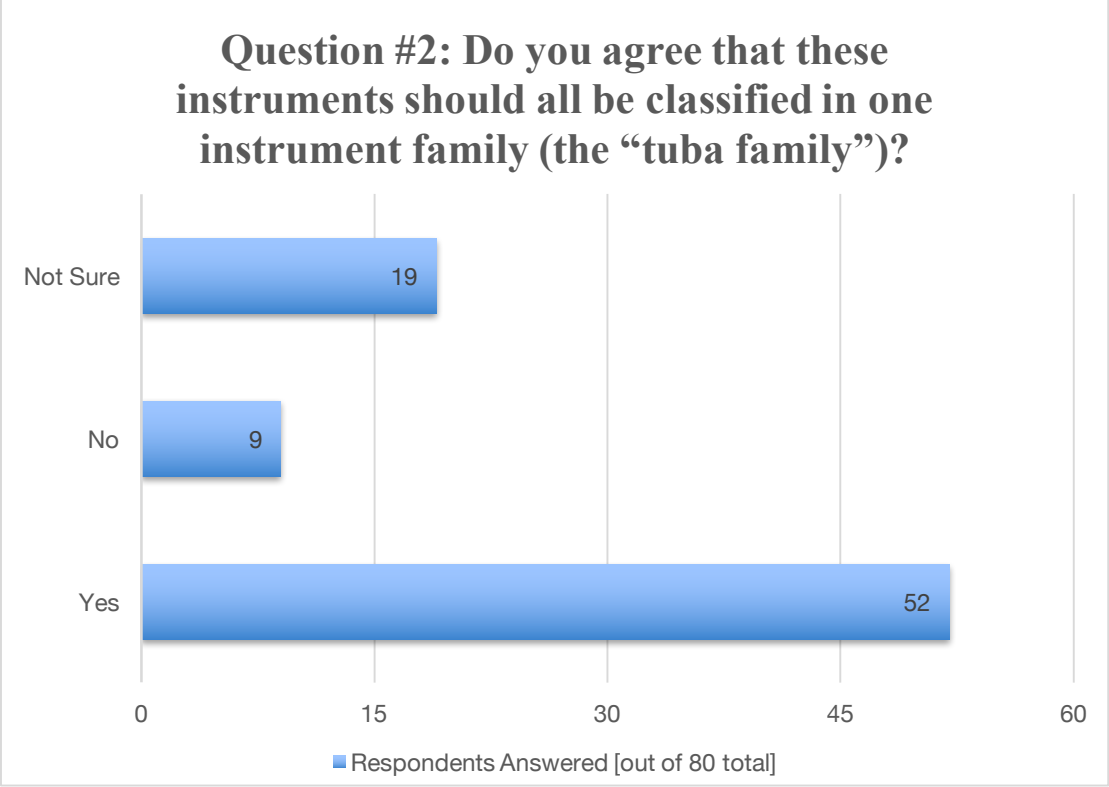


Graph 1 – Results of Question 1



Graph 2 – Results of Questions 8-12

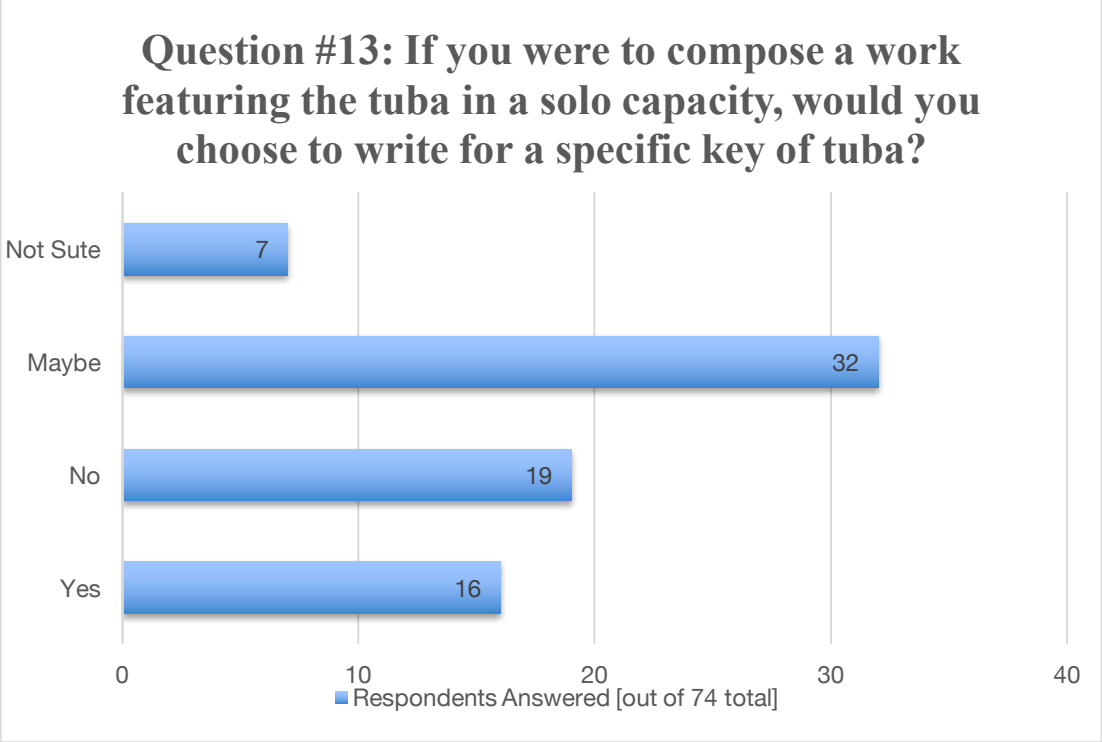
Regarding the classification of the Bb euphonium and F, Eb, CC, and BBb tubas, fifty-two respondents (65% of total for question) answered "Yes," that these instruments should be considered as a single instrument family (the "tuba family" of the document's title), while nineteen (11.25% of total for question) respondents answered "No," and nine (23.75% of total for question) respondents answered "Not Sure" (Graph 3). In the follow-up question that asked respondents to clarify their answer, the most commonly given reasons for answering in the affirmative include the similar construction and history, similar tones, and their similar functions within the brass family.



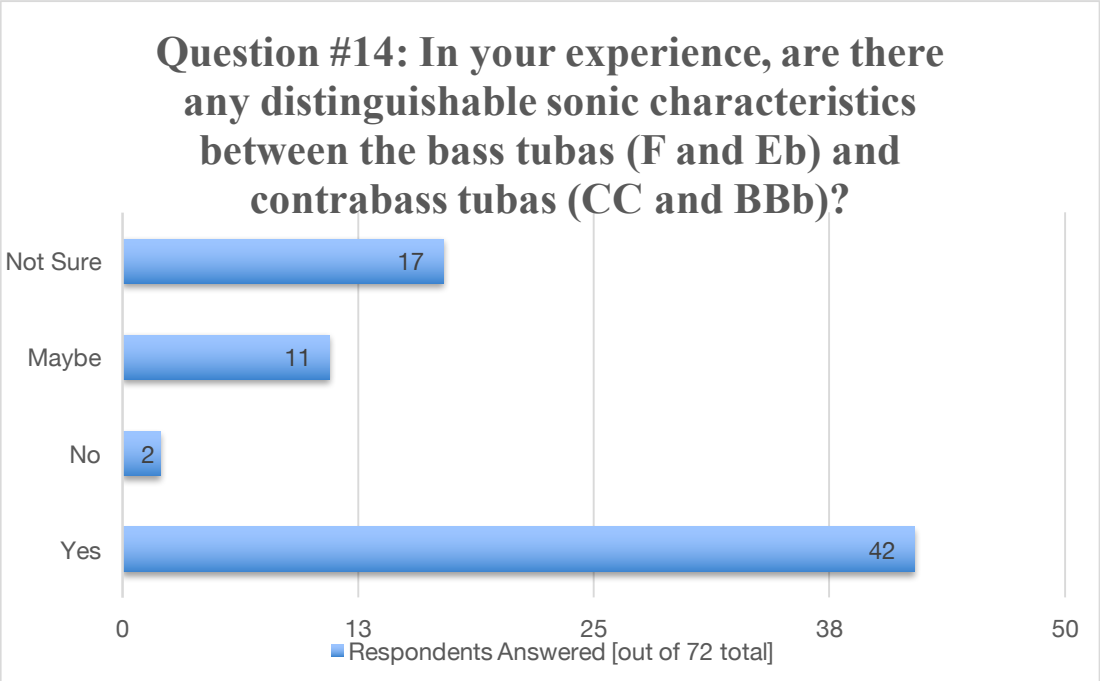
Graph 3 – Results of Question 2

Given this data, it is apparent that composers are broadly aware of the different keys and instruments of the tuba family but may not necessarily utilize specific instruments in their compositions. This is reinforced by a later question that asks composers if they would write for a

specific tuba, in any setting; thirty-two respondents (43.24% of total for question) answered "Maybe", while nineteen respondents (25.68% of total for question) answered "No" and sixteen respondents (21.62% of total for question) answered "Yes" (Graph 4). Along with the seven respondents (9.46% of total for question) that answered, "Not Sure", these results may indicate that choice of tuba is considered only sparingly when writing for the tuba family of instruments. This could be problematic for composers, given the objective dissimilarities between the members of the tuba family; although many composers appear to not be concerned with using specific keys of tuba, the fact remains that the use of different types of tubas can impact the resultant composition in tangible ways. For instance, if a composer is unfamiliar with the comfortable operating ranges of the different keys of tuba, there may arise a situation in which a new work places extreme registral demands on the tubist, necessitating the use of more than one instrument. Although tubists are trained to switch between multiple instruments, this is not always a viable or practical solution in performance. As it is, only forty-two respondents (58.33% of total for question) to Question 14 ("In your experience, are there any distinguishable sonic characteristics between the bass tubas (F and Eb) and contrabass tubas (CC and BBb)?") answered that there are differences in the sonic characteristics between bass and contrabass tubas (Graph 5). Although it is not always apparent, there generally is an audible difference in sonic characteristics between bass and contrabass tubas, and this represents a noticeable gap in general knowledge that should be addressed in a new document concerning the tuba family.



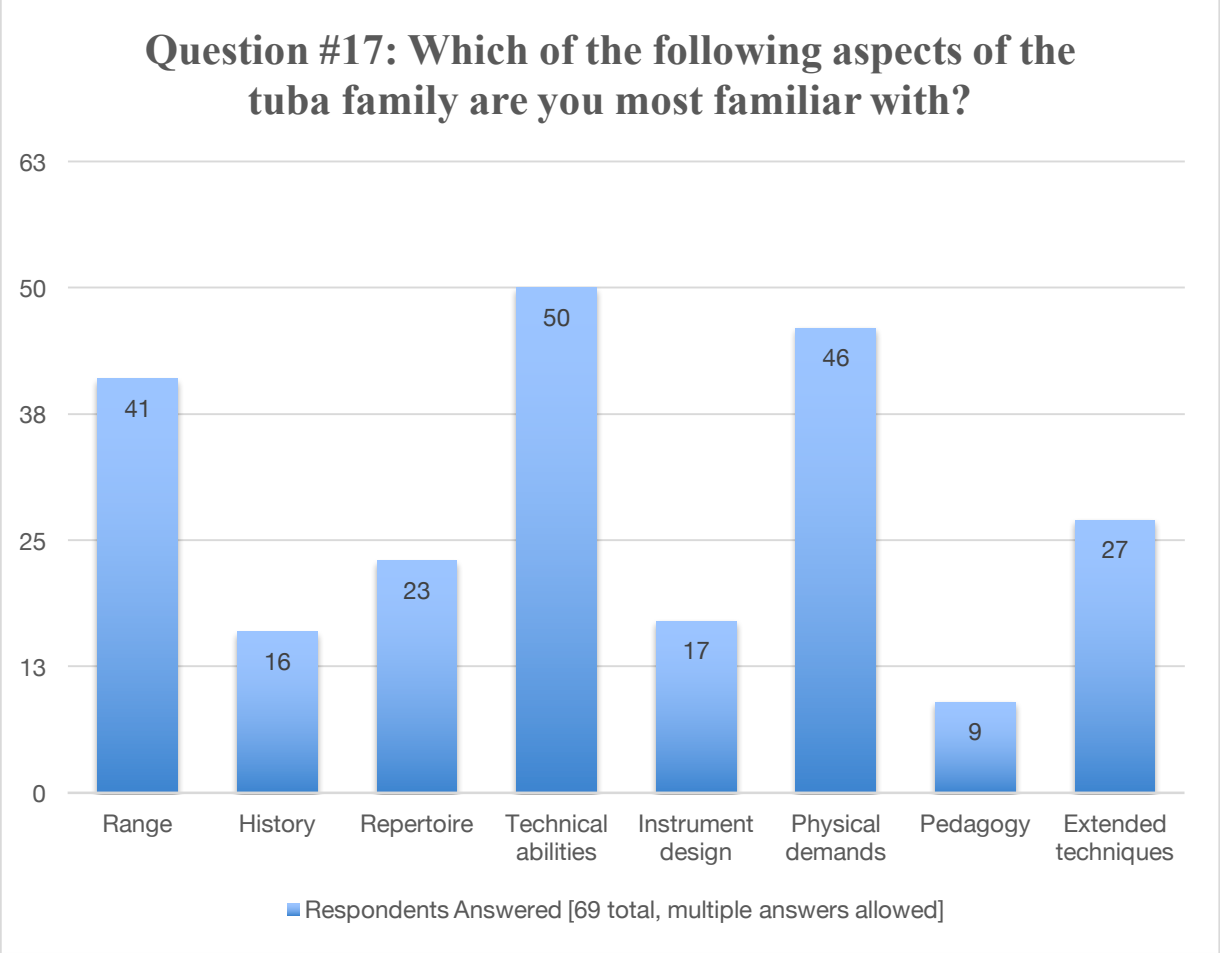
Graph 4 – Results of Question 13



Graph 5 – Results of Question 14

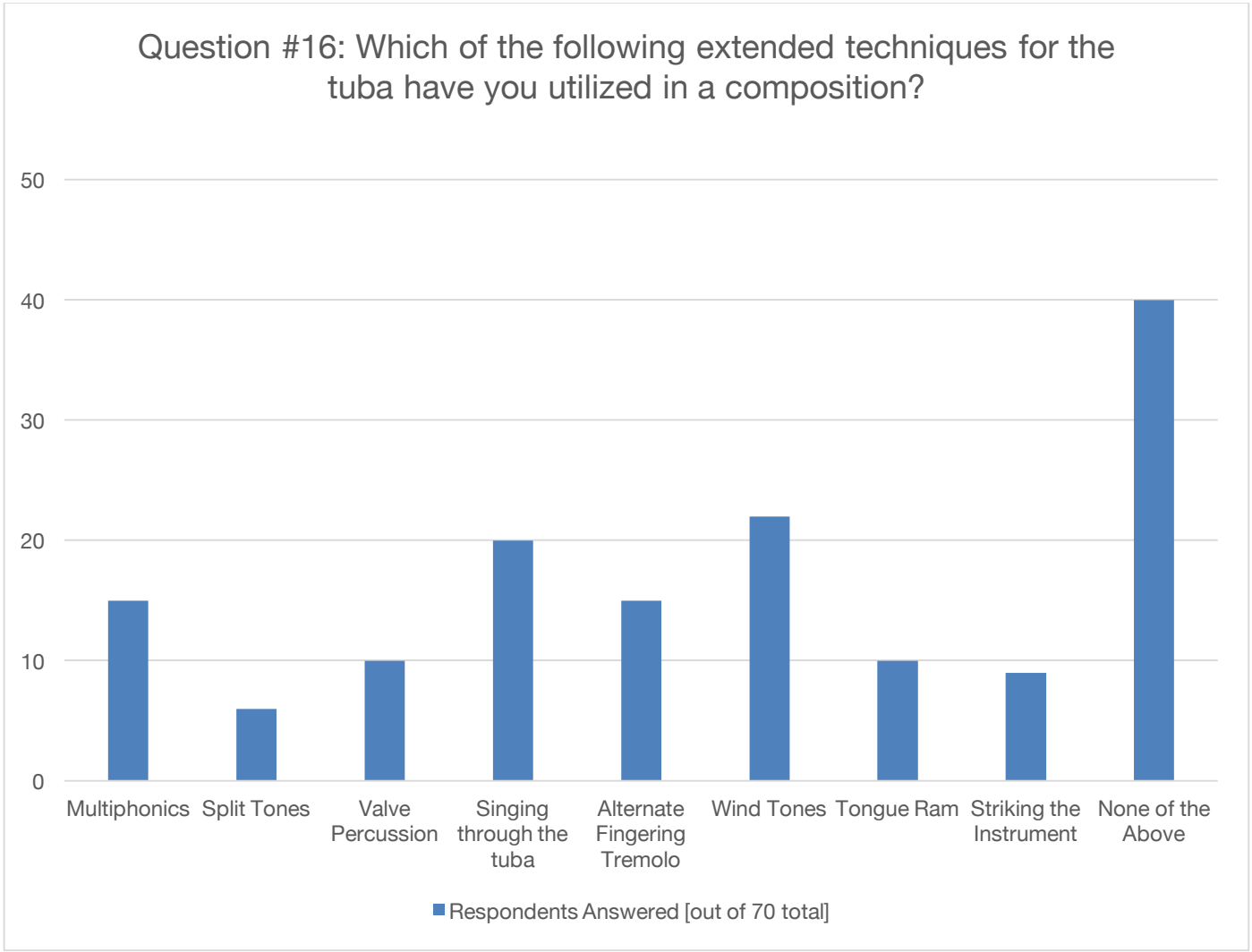
When it comes to other aspects of the tuba family, the respondents of this survey indicated that they were most knowledgeable of the technical capabilities, physical demands, and ranges of the members of the tuba family, and least familiar with pedagogy, instrument design, history, and repertoire (Graph 6). When asked specifically about the working ranges of each of the tuba family members, many of the respondents generally used each instrument's fundamental pitch as the guideline; for the BBb contrabass tuba, as an example, the range offered usually started at Bb0 in scientific notation, and extended upwards to a nominal high limit. The vast majority of respondents also quoted the upper limit of the tuba's range as F4, regardless of pitch; this is an acceptable baseline from which to expand further.[70] Any contemporary resource on the tuba family would necessarily have to include a discussion of ranges, but the general knowledge of range among the respondents is already fairly capable.

[70] This upper limit was given a total of 35 times in the responses for range-specific questions.



Graph 6 – Results of Question 17

When it comes to the technical capabilities of the tuba family, many of the respondents demonstrated a level of knowledge that is largely accurate. Questions about contemporary techniques garnered the highest percentage of correct answers, even if 57.14% of the respondents for Question 16 have reportedly never used any of the techniques in their own compositions (Graph 7).



Graph 7 – Results of Question 16

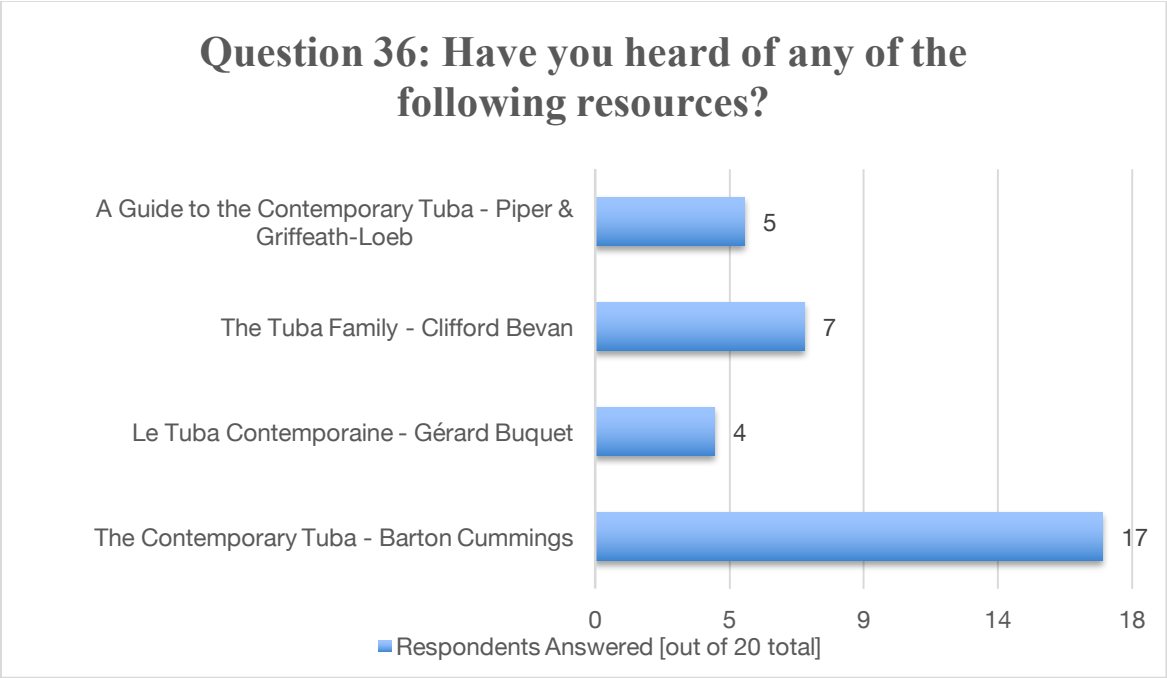
The composers that did use contemporary techniques primarily utilized the techniques of *Singing Through the Instrument*, *Wind Tones,* and *Multiphonics*. Multiphonics in particular scored well among the respondents; when asked various questions about the specifics of producing vocal multiphonics, the respondents answered correctly an average of 75% of the time (with percentages of correct answers being roughly equal across the four questions asked). The respondents also answered correctly an average of 75% of the time when asked about split tones, with one outlier: a question addressing the physical method of producing a split tone was only answered correctly by fifteen respondents (35.71% of total responses for the question), in comparison to the more evenly distributed positive answers for multiphonics. Questions about the tongue ram technique exhibited a further drop in correct answers, with an average of 64% correct. Of importance for this technique is the number of respondents who incorrectly answered Question #32 (*T/F – The pitch produced when performing a tongue ram can only move downwards chromatically from the instrument's fundamental pitch*), which concerns the melodic motion capable of being produced with the tongue ram technique. When producing tongue rams, the tubist/euphonist can only move downwards in pitch from the open fundamental. Nineteen respondents (44.19% of total for question) incorrectly answered that this is False, which means that a little under half of respondents misunderstand an important part of the tongue ram technique.

The results are indistinct when it comes to the respondents' answers to the question "Are you aware of any differences in fingering patterns between all five members of the tuba family?." Only nineteen respondents (28.36% of total for question) correctly answered in the affirmative. The very next question asks if the composers would need to know what key of tuba to write for if they wanted to dictate an alternative fingering, and thirty-five respondents (52.24%

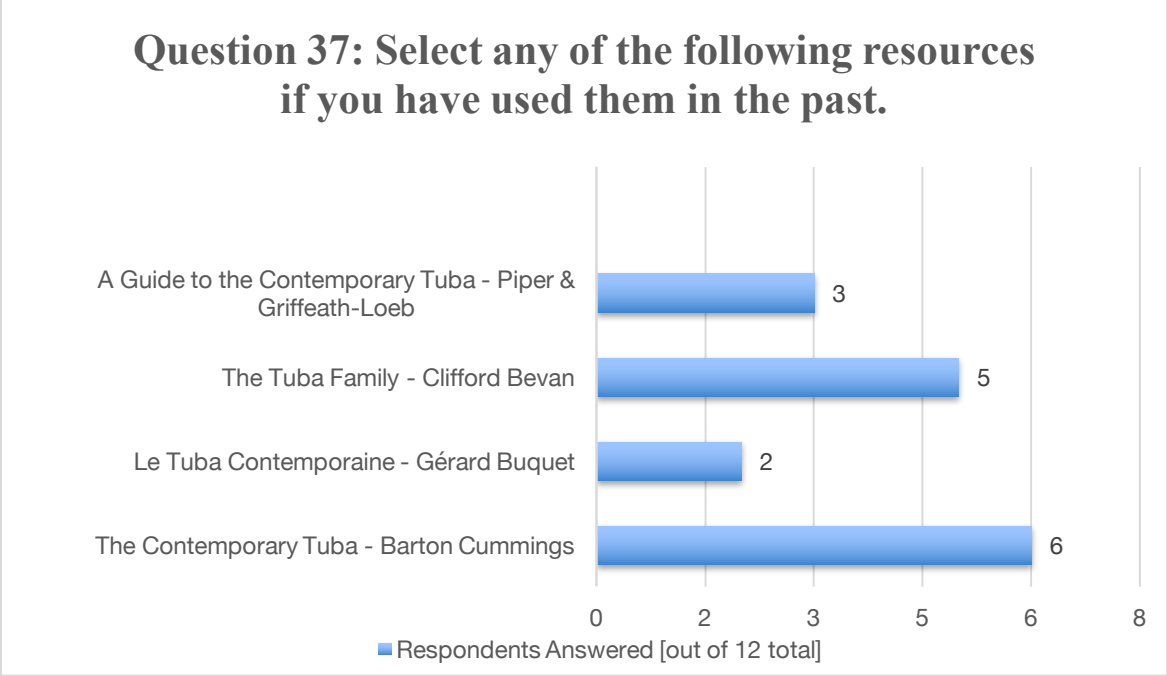
of total for question) answered correctly ("Yes"). This indicates some confusion about the fingering patterns of the tuba family, which must be addressed in the new resource.

Assessing Demand for Tuba Family Resources

Going into this survey, the working assumption of the author was that the sources dedicated exclusively to the tuba family of instruments were A) little known outside of the tuba community, and B) not utilized in any widespread fashion. This theory was borne out through the results of the survey; the questions that specifically asked about respondents' knowledge of the few resources dedicated to the tuba (Questions 36 & 37) were answered by twenty and twelve respondents, respectively, out of a total of 131 (see Graphs 8 and 9). Since both questions allowed the respondents to select multiple answers, it became clear which resources were more commonly known, even among the small answer pool. Although a total of seventeen respondents were previously aware of Barton Cummings' *The Contemporary Tuba*, only six respondents answered that they have used the resource in the past. Bevan's *The Tuba Family* is the next most widely cited resource, at five respondents, followed by Piper and Griffeath-Loeb's *A Guide to the Contemporary Tuba* at three respondents and Buquet's *Le Tuba Contemporain* at two respondents. The relatively low number of affirmative responses to Questions 36 & 37 gives a potential view of the level of knowledge of the tuba family among composers in North America.

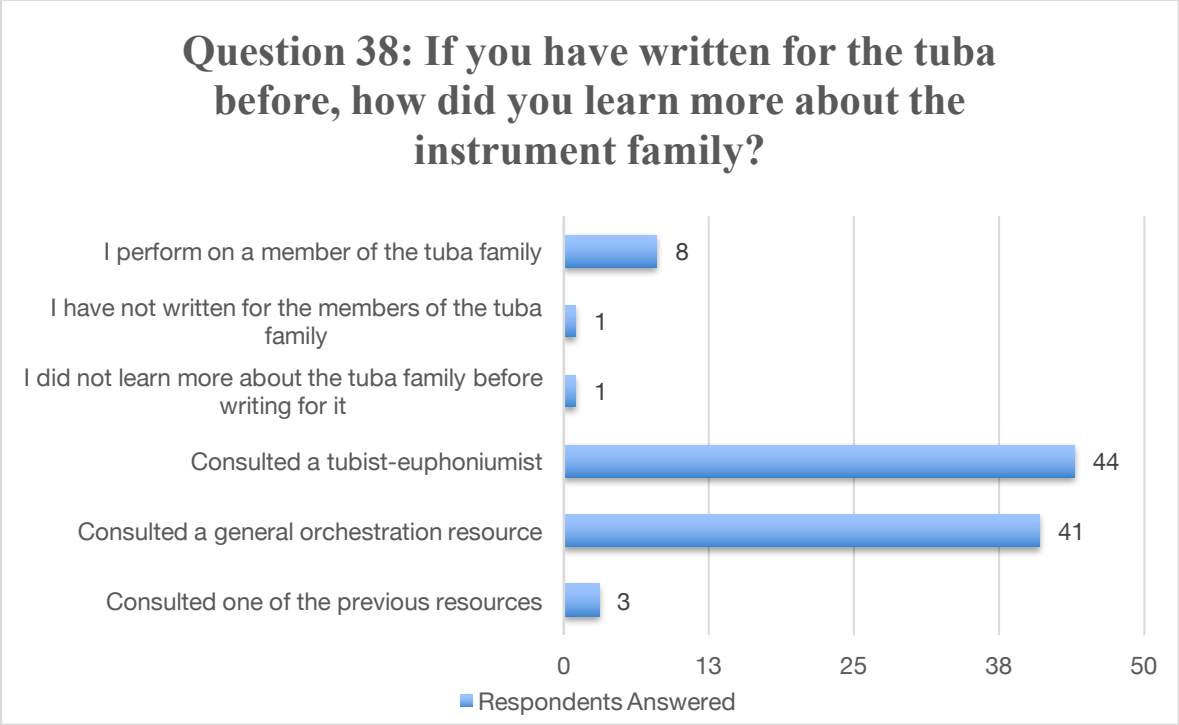


Graph 8 – Results of Question 36

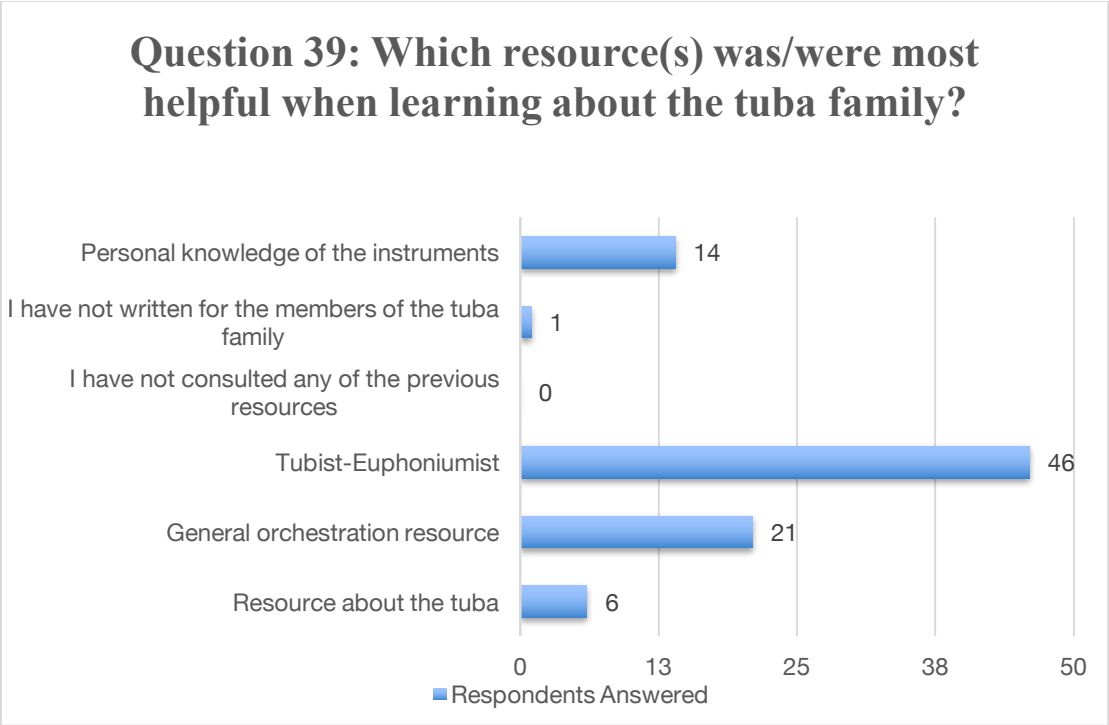


Graph 9 – Results of Question 37

Questions 38 & 39 concerned the methods by which the respondents learned about the capabilities of the tuba family, with forty-four respondents (68.75% of total for question) stating that they consulted with tubists/euphonists directly, while forty-one (64.06% of total for question) consulted general orchestration resources (Graph 10). It is telling that the next highest answer for this question is the answer, "I perform on a member of the tuba family," scored at eight respondents (12.50% of total for question). Only three respondents (4.69% of total for question) indicated that they consulted one of the dedicated tuba family resources when writing for said instruments, while only six respondents (9.84% of total for question) to Question 39 indicated that these dedicated resources were helpful in learning about the tuba family in general (Graph 11).



Graph 10 – Results of Question 38



Graph 11 – Results of Question 39

At the very least, this indicates a lack of engagement with the currently available dedicated resources on the tuba family. The data suggests that there are likely occasions in which a composer is aware of the existence of dedicated resources on the tuba family, and yet still uses other means to learn more about the instruments. Complicating the matter is the fact that, according to the responses to Question 41 ("If there existed a comprehensive resource on the tuba family, would you consider consulting it before writing for any of the instruments in that family (Bb euphonium, F tuba, Eb tuba, CC tuba, BBb tuba)?"), fifty-six (84.85%) of the total number of respondents to this question answered that they would consult such a resource. Four dedicated resources on the tuba family already exist, so the question now becomes: why are these resources not referenced as high as demand would indicate? One possible solution can be found in the previous Chapter; all four resources exhibit some key issue that may have prevented them from achieving widespread adoption, such as difficulty of access (as in the Buquet), relative

obsolescence (as in the Cummings), or subjectivity of material (as in the Piper/Griffeath-Loeb). The other potential reason for the differential in demand vs. usage is far more practical: the tuba is still relatively young amongst the established repertoire, and so perhaps many composers simply haven't explored the instrument thoroughly enough to merit the use of a dedicated manual. Additionally, many survey respondents indicated that they had worked with performers directly to ascertain any missing knowledge about the tuba family. While this is a highly effective and, in many cases, ideal way to learn about the tuba family, it is not always a practical means for acquiring knowledge. It is not a guarantee that a composer will have access to a professional-level tubist or euphonist; unless someone works within an area that has the demand necessary to attract professional tubists/euphonists, it can be difficult to find suitable performers with which to collaborate. Although there is little that can be done within this document to address the second and third situations as listed, the first few reasons (lack of access, obsolescence of data, and subjectivity of data) can be rectified through the creation of a freely accessible and up-to-date comprehensive resource for the tuba family of instruments.

Given the data found in the above analyses, a comprehensive, composer-centric resource on the members of the tuba family must at a bare minimum address the following areas: 1) instrument design and history, 2) the similarities and differences between each of the five members of the tuba family, 3) a thorough discussion of the ranges of all five instruments, 4) discussion and clarification of the differences between bass and contrabass tubas, 5) the repertoire of the tuba family, 6) an in-depth and factually-correct look at contemporary performance techniques, 7) a comprehensive set of fingering charts, and 9) discussion of the use of different tubas in different settings. Many of these structural components are reinforced by the data found in the analysis of available resources in Chapter 1. The last step before writing such a

resource is to create a structure that is influenced by the information compiled up to this point, and to briefly discuss the ways in which this resource can exist as a living, up-to-date resource, accessible to those who may benefit from its information. While many composers may choose to use other resources in their search for information about the tuba family, there is still a use-case for a new and comprehensive resource (as demonstrated by the fifty-six survey respondents that said they would consult such a resource).

CHAPTER 3. FORMULATION OF MODEL FOR NEW TUBA RESOURCE

Building a Structure Based on Gathered Data

After analyzing the four major composer-centric tuba manuals in Chapter One, we know that the *Composer's Guide to the Tuba* should contain: 1) an accurate, in-depth historical account of the instrument family, 2) a thorough discussion of the technical/musical capabilities of the tuba family, 3) a particular focus on the performance of contemporary music, and 4) a format and taxonomy that allows for the document to exist as a living, growing entity. The survey answered by 132 members of the North American compositional community reinforces this preliminary structure, while also giving us further data such as the need for audio clips and musical examples. However, most of this data is aimed at telling us *what* type of content is needed, rather than *how* that content will be structured.

The three performance treatises analyzed previously exhibit roughly the same structure: begin with the history of the tuba, continue to discuss in detail the standard performance techniques of the instrument, and move from there to discuss contemporary techniques. Given that the new guide to the tuba family will be a continuation and elaboration of work that has been done before, this structure serves as a model from which to expand. The difference in the new resource will be in the depth and, as is already seen with the Piper/Griffeath-Loeb website, increased accuracy of content and ease of access.

The sections pertaining to the history and purely technical information of the tuba family (i.e., ranges, fingering patterns, construction, and so on) are straightforward in their structural demands. The structure of the section on contemporary techniques poses a different issue, that of categorization. This issue has been successfully dealt with in both the Piper/Griffeath-Loeb and Kennedy (2016), both of whom utilize a taxonomy of techniques based on the physical methods

of production. Organizing a body of techniques in this manner is consistent with much of the current performance practice theory, as demonstrated in the work of Aaron Cassidy, Fernanda Navarro, and Liam Hockley, among others. Consider Aaron Cassidy's 2004 article "Performative Physicality and Choreography as Morphological Determinants," in which he states the following: "…the primary morphological unit—not only in my music but also in music in general—is not merely the *aural* gesture, but far more importantly, the *physical* gesture."[71] Contemporary performance practice seizes upon this morphological shift by elevating the actions of the body beyond the level seen in traditional classical performance. As Liam Hockley says,

> "Performers are charged with developing a responsible interpretation of complexist music that acknowledges the impossibility of perfectly realizing the score given the conflicting and overlapping nature of the material without shrinking away from the challenge: in other words, the demand for empirical representation that has come to characterize traditional classical performance is often impossible and unwanted—the immense amount of surface detail is not merely a virtuoso display, but a physical means to a sonic end."[72]

Given this paradigm shift in the way that the technical aspects of contemporary music are perceived, it is vital that any such description of those techniques be structured in a way that reflects the new morphological identity of contemporary performance practice. To bring it back to the existing research, both Piper/Griffeath-Loeb and Kennedy (2016) deal with this new

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[71] Aaron Cassidy, "Performative Physicality and Choreography as Morphological Determinants," in *Musical Morphology,* eds. Claus-Steffen Mahnkopf, Wolfram Schurig, Frank Cox, (Germany, 2004), 34.
[72] Liam Hockley, "Towards a Redefinition of 'Performer'," FOCI Arts, accessed July 12, 2018, https://fociarts.com/towards-a-redefinition-of-performer-liam-hockley/.

performance identity by classifying techniques according to physical demands. In the author's previous research, this method has proven beneficial.[73]

In the new *Composer's Guide to the Tuba*, then, contemporary techniques will be structured in the following categories: Air, Voice, Lips, Tongue/Oral Cavity, Movement, Instrument, and Digital/Analog. These categories are similar in construction to those seen in Piper/Griffeath-Loeb, with a few categories added. Each category is structured according to primary means of production: as an example, the technique of split tones would be classified under 'Lips', as it is a technique actuated by the modification of the lips while buzzing. By stratifying the physical means of production, a new kind of physical relationship to the tuba family is developed. Beyond the aesthetic implications of this classification, the separation of physical actuation from sound production also provides a useful method for cataloging the wide field of contemporary performance techniques.

The issue of accessibility also affects the creation of a new guide to the tuba, and specifically pertains to the inclusion of musical score examples. Although the use of such examples is highly beneficial, the extensive use of material that is potentially copyrighted precludes the wide and unfettered dissemination of this resource. To combat this issue, the musical examples used in this guide will all be composed by the author, to ensure the continued dissemination of the guide. All materials created for this guide, including the guide itself, will be released under a Creative Commons license, ensuring its wide dissemination and continued relevance in this age of digital scholarship.[74]

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[73] Aaron Hynds, *An Annotated Bibliography for Contemporary Techniques on the Tuba*, unpublished.

[74] The *Composer's Guide to the Tuba* will have a Creative Commons ShareAlike license that adheres to the guidelines of the Attribution-ShareAlike 4.0 International (CC BY-SA 4.0).

To summarize, the structure of the *Composer's Guide to the Tuba* is the following: 1) History of the Tuba Family, 2) Technical Considerations (Instrument Design and Choice, Fingering Patterns, Range/Harmonic Series, Articulation, Breathing), 3) Contemporary Techniques (Air, Voice, Lips, Tongue/Oral Cavity, Movement, Instrument, Digital/Analog), 4) Repertoire Lists, 5) Bibliography.

Methodology for Updating Resource Over Time

Although the ultimate outcome of this document is the creation of a new, comprehensive resource on the tuba family, this document will ultimately become outdated as the instruments and the abilities of their performers continue to grow and evolve over time. With that certainty in mind, it behooves this new resource to evolve along with the changing times. The *Composer's Guide to the Tuba* will first exist as a chapter of this document, but that does not preclude its dissemination in other, more flexible mediums. In particular, the creation of a website version of the *Composer's Guide to the Tuba* will enable future contributions and adjustments to be made with a minimum of effort. Each of the five categories established in the previous section are easily formatted within a standard website architecture. Typical website design would indicate the need for a home page introducing the guide, with several sub-sites that contain the information from each category of the *Composer's Guide to the Tuba*. From there, it's a simple matter to display any musical examples and recorded samples, as audio and graphics are intrinsic to website design. Piper/Griffeath-Loeb's *Contemporary Tuba* website is built in just such a manner, although in a compact form.

The *Composer's Guide to the Tuba* website will be built on the WordPress.com content management system, with the URL www.composerstubaguide.blog. The musical examples will be uploaded in either JPEG or MP3 form, depending on their medium, and a free download link

to download high-quality versions of the audio recordings will also be provided. Since the website will be freely modifiable by the author, any new adjustments to the document will be easy to implement. A tracking system for new modifications will be included, showing visitors to the website what changes have been made and when. The written content within the website will initially be copied directly from the *Composer's Guide to the Tuba* as it is found in Chapter Four. Minus the addition of the website-specific introduction and structural text, the written and online versions of the *Guide* will be identical upon publication of this document. The finished *Composer's Guide to the Tuba* will also be available in print form, at a yet-to-be-determined future date.

CHAPTER 4. THE COMPOSER'S GUIDE TO THE TUBA

Introduction

Since the first half of the twentieth century, the tuba family of instruments has staked a claim as one of the newest solo voices within the orchestra and beyond. Like its distant cousin, the saxophone[75], the tuba existed as an integral part of many different musical cultures before it began to find a voice as a solo instrument. From such early luminaries as August Helleberg, John Kuhn, and Dumitru Ionel, the list of prominent tubists and euphonists has grown at an exponential rate for nearly a century. Thanks to the work of Steven Mead, Harvey Philips, Roger Bobo, Brian Bowman, Melvyn Poore, Robin Hayward, and many others, an ever-growing solo repertoire has been established, primarily through one-on-one consultation with composers. Although this has produced a number of landmark compositions, it is a simple truth that not every composer that wishes to write for the tuba or euphonium has access to a professional-level performer, and as such must turn towards other resources to gain the necessary information about the tuba family of instruments. The need for such a resource is exacerbated by the fact that the available literature concerning the capabilities of the tuba family is often lacking in one or more key areas, such as accessibility, veracity, or utility.

This guide provides a comprehensive resource concerning the totality of the musical and technical capabilities of the tuba family. The audience for this resource consists of any composer who wishes to write for the tuba or euphonium, now or in the future. This guide exists in both physical and Internet-based forms, with formatting being the key distinction between the two. Besides containing extensive text-based information about the tuba family, this treatise also

[75] As will be seen further on in this resource, the saxophone and tuba both benefit from the inventiveness and technical expertise of Adolphe Sax.

contains score samples (written specifically for this guide), as well as recordings of all newly-written material. The recordings are available as a freely downloadable set of files, hosted online for ease of access. The author's goal is to update this guide periodically, whenever the information in it needs to be updated or appended.

The structure of this guide closely mirrors other similar treatises, with the key difference being increased accuracy and breadth. The first section details the history of the tuba family of instruments, as well as a discussion of certain playing schools and prominent performers. Following this is a discussion of the technical aspects of tuba performance, such as Range/Harmonic Series, Articulation, Dynamics, and Fingering Systems. The next section of the treatise proper is dedicated to discussion of the myriad contemporary performance techniques of the tuba, broken down into the following cross-referenced categories: Air, Voice, Lips, Tongue/Oral Cavity, Movement, Instrument, and Digital/Analog. The penultimate section is a brief discussion of possible future directions for the tuba family, particularly as it concerns the composition of new works. The bibliography then contains repertoire lists of both standard and contemporary literature and a recommendation list of recordings.

Section 1. Towards a Definition of the Tuba Family

Ancestors Both Near and Far: The Serpent and Ophicleide

Like many of its counterparts in the larger wind instrument category, the tuba family is the product of many years of experimentation and continual adjustment on the part of inventors, musicians, and instrument builders all over the world. The main difference here is in the relatively rapid standardization of the instrument, especially when compared to many other brass instruments; while the trumpet, trombone, and horn benefited from many centuries of refinement, the tuba as it is known today was largely developed within the space of 180 years.

This has mainly to do with the reasons behind the invention of the tuba; the instrument does not have a definitive ancestor, but is rather the result of an avid multi-generation search for a true bass wind instrument.[76] One of the earliest notable results of this search includes an instrument that has recently made a resurgence among specialists of archaic instruments: the serpent.[77]

The serpent is thought to have been invented as a kind of bass cornett around the year 1590 by a canon of the French city Auxerre, Edmé Guillaume.[78] The instrument consisted of a bent wooden tube in an "S" shape, with a curved brass crook and wooden or ivory mouthpiece.[79] Soon after its invention, the serpent was used as a supporting voice for church choirs throughout 17th century France.[80] Initially intended for use primarily within the church, the intonation and tonal qualities of the serpent were seen as lacking; the ergonomically-designed tone holes were designed to fit three fingers on each hand, and not for any acoustical reason, while the instrument's wide, cone-shaped bore caused further issues with intonation.[81] Nevertheless, the serpent was later adapted for use in military bands in the late eighteenth century as the *serpent militaire*, with a modified shape (to facilitate performance on horseback), a more robust construction, and keyed tone holes for more practical usage.[82] There were also at this time a number of serpent-like instruments built in a bassoon shape, most notably the *basson russe*, or

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[76] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments,* ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 143-8.
[77] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 47-8.
[78] The source for this claim comes from the Abbé Jean Leboeuf, in his 1743 history *Mémoire concernant l'histoire ecclesiastique et civile d'Auxerre* (see Grove Music article on the Serpent, written by Reginald Morley-Pegge, et al.). Even so, this date is not considered established fact, and there is still much debate about the instrument's true provenance.
[79] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments,* ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 143.
[80] Ibid.
[81] Ibid.
[82] Ibid.

Russian bassoon (most likely built by Régibo of Lille in 1789).[83] Additionally, the *English bass horn*, an invention of French serpentist Alexandre Frichot, was popular for several decades in mainland England; it consisted of a conical tube bent into a V-shape and with a long, curving crook for the mouthpiece.[84] To varying degrees, each of these "serpent-likes" was designed to occupy the bass role within an ensemble of wind and/or vocal voices, (a feature that would later link the serpent in conception to the tuba). Despite usage in works by Ludwig van Beethoven (Military March in D Major, 1816 – Fig. 1), and, in a locally-produced upright form, several opera scores of the Italian composer Vincenzo Bellini, the acoustical flaws of the serpent would soon lead to its demise in favor of the more refined ophicleide.[85]

[83] Reginald Morley-Pegge, "Russian bassoon", Oxford University Press, accessed November 26, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/24169.
[84] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments*, ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 143.
[85] Ibid.

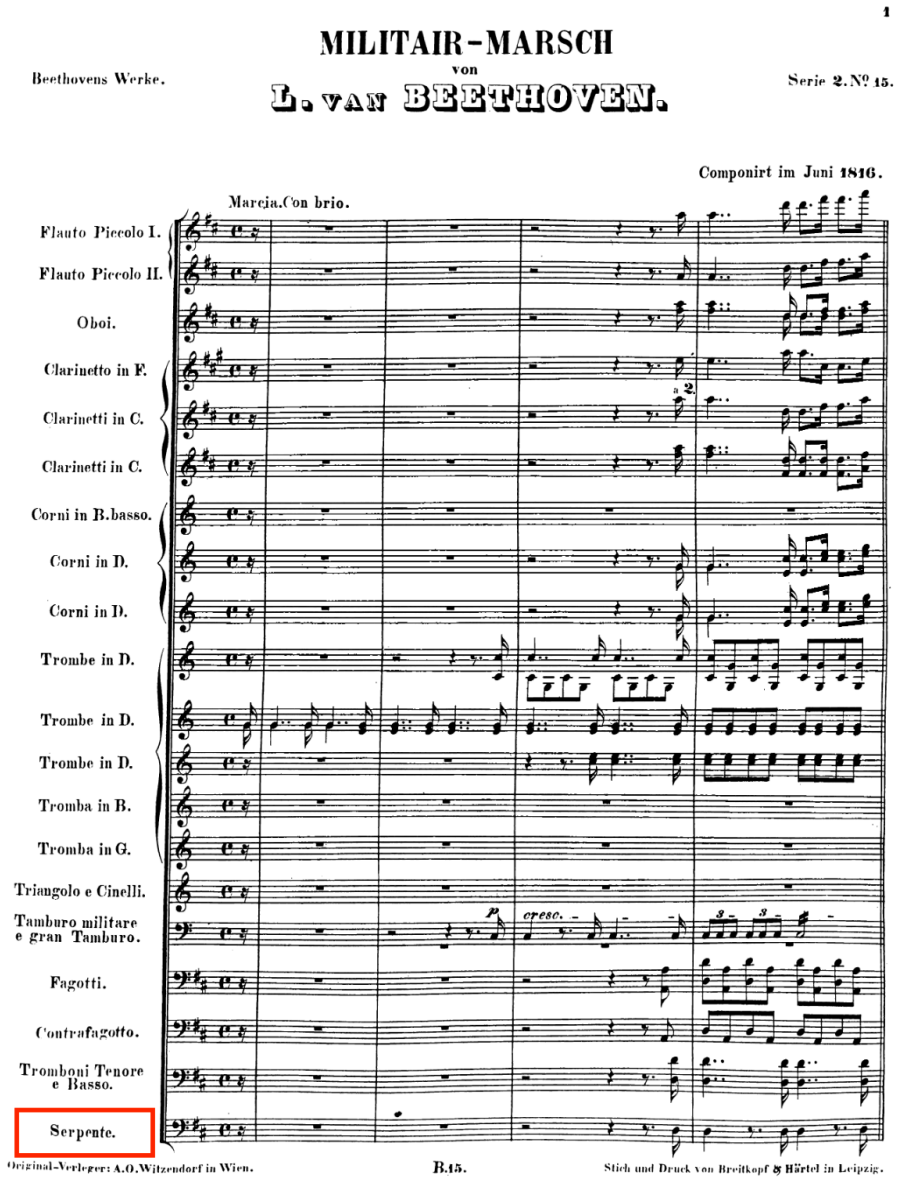

Fig. 1 – The First Page of Ludwig van Beethoven's *Militair-Marsch*, WoO 24, Featuring a Part for the Serpent

First patented by Jean-Hilaire Asté ("Halary") in Paris in 1821, the ophicleide covered the same range as the serpent but featured a much-improved temperament and tone quality via the use of brass construction materials and a more acoustically-refined key system.[86] The ophicleide was essentially a tenor/bass extension of the principles of the keyed bugle, which was also a patented instrument of Halary's design.[87] Although it would take some time for it to be in regular use across the European continent, the ophicleide did indeed see much wider usage than the antiquated serpent. Many composers started to use the ophicleide for roles previously assigned to the serpent, most notably Hector Berlioz, Felix Mendelssohn, and Giachino Rossini.[88] Military band usage was limited, due to the fragile mechanisms of the instrument, but ophicleide solos became increasingly popular as more and more accomplished ophicleidists mastered the instrument and performed widely.[89]

The ophicleide, though, would suffer the same fate as the serpent, as the search for an effective bass wind instrument continued unabated. At issue was the still relatively-narrow pitch range of the ophicleide: although seen as a major upgrade from the serpent and bass horn, the ophicleide could only reach a further one and a half tones lower in comparison.[90] What many composers, conductors, and instrument makers sought was a bass instrument that could reach lower pitch depths than the current bass winds, while also retaining the higher register. The search for such an instrument led to the filing of Prussian Patent No. 19 on September 12th, 1835,

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[86] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 59-61.
[87] Anthony Baines, *Brass Instruments: Their History and Development* (Mineola, NY: Dover Publications, 1993), 198.
[88] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments*, ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 143-6.
[89] Ibid.
[90] Ibid.

specifying a "chromatic Bass-Tuba" that can "descend one octave lower than the serpent and English bass horn, and six notes lower than the ophicleide, while yet retaining the high notes of these three said instruments."[91] The filer, Wilhelm Wieprecht, applied for the patent in conjunction with the Berlin instrument maker, Johann Gottfried Moritz.[92] Such an instrument was made possible by a recent advance in valve design, dubbed the *Röhrenventil*, and later called the *Berliner-Pumpe*. Devised in 1827 by instrument maker and hornist Heinrich Stölzel, this valve was of a sufficient diameter to be used in the wide bore of a true bass instrument.[93] The resultant instrument combined the strength and stability of tone from an ophicleide with the increased agility and wide range afforded by the use of the new valve system. Wieprecht and Moritz's new "Bass-Tuba" featured many of the hallmarks of modern tuba design: the instrument was pitched in F and C (switched via valve mechanism), and featured five valves.[94] In order, the five valves of Wieprecht's tuba lowered the instrument by 1, ½, 1 ½, ¾, and 2 ½ tones.[95] In essence a "double tuba," this instrument allowed for a range that encompassed 6 whole tones beneath the ophicleide's lowest notes, while still allowing for the high range of the serpent and bass horn.[96] Although the initial prototypes of the horn were lacking in dynamic

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[91] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 83-4.
[92] Ibid.
[93] Because of the acoustic requirements of such a low fundamental pitch, a true bass wind instrument requires a large diameter in order for the lip vibrations entering the horn to vibrate at the correct frequency. Before this time, there were no valves of a suitable diameter that would allow such an instrument to be built, but the *Berliner-Pumpe*, changed that (see Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments,* ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 148.)
[94] Robin Hayward, "The Microtonal Tuba," *The Galpin Society Journal* 64 (March 2011): 126.
[95] Reginald Morley-Pegge, "Tuba (i)", Oxford University Press, accessed November 26, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/28525.
[96] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 83-4.

range, the new tubas were warmly received in many quarters; one famous example is Berlioz's adoption of the new instrument, going so far as to rewrite old scores to replace the ophicleide with new tuba parts.[97]

New Directions: Sax, Červený, Moritz, and the Creation of the Modern Tuba Family

The new tuba proved to be a fertile framework for experimentation. Wieprecht himself further refined the design of the instrument, producing a *bombardon* (a generic term indicating a bass valved instrument) that would be more indicative of the widely-flared, large bore shape that later manufacturers of tubas would adopt for their own designs.[98] Among the many other instrument makers creating their own take on the new design, three would prove to be particularly influential: the Belgian Adolphe Sax (of saxophone fame)[99], Václav František Červený of Czechoslovakia[100], and Carl W. Moritz of Berlin.[101] In 1843, Adolphe Sax set up a shop in Paris and created a series of instruments known later as *saxhorns*.[102] Like his earlier work in woodwind instruments (most notably the saxophone), the range of saxhorns consisted of alternating instruments in the keys of Eb and Bb, extending from the sopranino saxhorn in Bb to the Bb contrabass saxhorn.[103] Similar to Wieprecht's tubas, the saxhorn was a horn of tapered bore, excluding the tubing through the valve section (a limitation that Sax would nonetheless

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[97] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments*, ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 149.
[98] Ibid, 149-50.
[99] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 87-8.
[100] Ibid, 113.
[101] Ibid, 90.
[102] Anthony Baines, *Brass Instruments: Their History and Development* (Mineola, NY: Dover Publications, 1993), 253-8.
[103] Philip Bate, et al. "Saxhorn", Oxford University Press, accessed November 27, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/24667.

eventually conquer, with mixed results).[104] The saxhorns used valves designed in 1839 by Étienne François Périnet, with the notable improvement being a much less circuitous tubing system (especially when compared to the rather large *Berliner-Pumpe* in common use at the time).[105] The Périnet valve, as it would become known, has remained largely unchanged since this time; modern piston valves fundamentally adhere to the same design.[106]

Although the historical veracity of the following claim cannot be confirmed for a certainty, the popularity of the saxhorn is generally seen as the result of a fortuitous meeting of Adolphe Sax and John Distin, patriarch of the famous Distin family of musicians from London.[107] Upon hearing the saxhorn, the family (nearly all of whom performed on a variety of brass instruments), commissioned Sax to build them their own set, and it was through their tours of the United Kingdom with this instrument set that the saxhorn made the jump from Continental Europe to the British Isles.[108] The growing popularity of the instruments in the United Kingdom provided the impetus for the brass band movement that would come to dominate English musical life well into the 21st century (and which will be discussed in greater length in the section on the British tuba culture).[109] Besides the work of the Distins, the saxhorn would further cement its popularity through a sales pitch given by Sax to the French army bands: after a play-off between

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[104] Philip Bate, et al. "Saxhorn", Oxford University Press, accessed November 27, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/24667.
[105] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 15.
[106] Ibid.
[107] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 103-4.
[108] Ibid.
[109] Ibid.

the existing instruments in use and Sax's improved designs, the French army granted Sax a commission for the production of saxhorns for use in the entire band program.[110]

Beyond the mechanical and tonal improvements found in the saxhorns, the idea of a related family of instruments in alternating keys would prove to be highly influential, establishing a pattern of paired key instruments that persists to the present day.[111] Throughout mainland Europe, many different countries would produce their own sets of matched instruments: similarities can be seen in the *flicorni* of Italy, the *fiscorn* of Spain, and the *flügelhorns* of Austria.[112] Additionally, Sax's tendency to create families of instruments can be seen in the continued existence of tubas in Bb, Eb, and BBb (corresponding to the Bb euphonium, Eb bass tuba, and BBb contrabass tuba). Indeed, modern-day tubas have somewhat clear predecessors within the original family of saxhorns: Sax's instruments included the *Saxhorn Baryton/Saxhorn Tenor en si bémol* (equivalent to the baritone, used primarily in British style brass bands), the *Saxhorn Basse en si bémol* (same pitch as the *Saxhorn Baryton*, but with a wider bore—essentially correlating with the modern Bb euphonium), and the *Saxhorn Contrebasse en mi en si bémol* (equivalent to today's Eb bass tuba and BBb contrabass tuba).[113] Combined with the F tuba of Wilhelm Wieprecht, this accounts for four of the five principle members of the tuba family. For the genesis of the CC contrabass tuba, one must turn to Czechoslovakia (now the Czech Republic), and to the instrument firm of Václav František Červený.

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[110] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 103-4.
[111] Clifford Bevan, "The low brass", in *The Cambridge Companion to Brass Instruments*, ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 149.
[112] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 111.
[113] Ibid, 102.

Founded in the Bohemian town of Königgrätz (now the city of Hradec Králové) in 1842, V.F. Červený's instrument factory had a reputation as a hotbed for experimentation.[114] Shortly after the factory's opening, Červený would set about making two large contrabass tubas, pitched in BBb and CC.[115] These instruments featured many design hallmarks that would persist to the present-day contrabass tuba: a massively large bore, rotary valves (especially in the case of BBb tubas), and a tall, open bell throat.[116] Prior to Červený's invention, there existed a *Kontrastbombardon* of an immensely low pitch in Munich, but since this predated the contrabass tuba, it is unknown whether this was a truly monstrous instrument or simply low in comparison to other known tubas of the time.[117] The new contrabass tuba would quickly gain hold in the wider musical world (for instance, being the preferred tuba in many of Wagner's operas, starting around the composition of *Das Rheingold* in 1853-4).[118] From here, there is only one piece remaining in the creation of the modern tuba family: the euphonium.

In the year of 1838, Berlin instrument maker Carl W. Moritz (son of Johann Gottfried Moritz, co-inventor of the original bass tuba) built a *Tenorbasshorn* in Bb.[119] This instrument was based on an instrument of the same name built by Wilhelm Wieprecht in 1823, and improved the earlier instrument by the use of a wider bore and an additional valve (for a total of four).[120] Following on the heels of Moritz's *Tenorbasshorn* was the *Euphonion* of Ferdinand

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[114] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 143.
[115] Clifford Bevan, "The low brass," in *The Cambridge Companion to Brass Instruments*, ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 150.
[116] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 143.
[117] Ibid, 122.
[118] Ibid, 135.
[119] Ibid, 90.
[120] Ibid.

Sommer of Weimar, featuring an even wider bore.[121] Similar instruments also included the so-called *Hellhorn*, a structurally identical horn from Ferdinand Hell of Brno.[122] This new instrument proved to be immensely popular, particularly amongst community and military bands. V.F. Červený produced the similar *Baroxyton* in 1848 for the Russian infantry bands, along with a peculiar instrument called the *Phonikon* (essentially, a euphonium with a bulbous bell, mimicking the English horn).[123] Both in design and intended usage, the *Tenorbasshorn*/euphonium was remarkably similar to instruments such as the *Saxhorn Basse en si bémol*, and the *Flicorno Basso in Do*.[124] The creation of the modern euphonium is somewhat tenuously linked to Alfred Phasey (1834-1888), an English ophicleidist. Phasey's main responsibility in creating the instrument supposedly involved taking a *saxhorn tenor* built by French manufacturer Courtois, enlarging the bore, and giving it the name *euphonium*.[125] Whether this story is entirely true or not, it is well-established that Phasey was active in promoting the new instrument as a solo voice.[126]

The shared heritage that exists between the tuba and euphonium demonstrates the widespread nature of the search for a true bass wind instrument. That the foundations of the euphonium point back to Wilhelm Wieprecht only further solidifies the connection between the modern euphonium and tuba. This connection will be discussed at length later in this chapter, but

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[121] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 90.
[122] Clifford Bevan, "Euphonium," Oxford University Press, accessed November 29, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/09077.
[123] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 90.
[124] Ibid, 100-14.
[125] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 10.
[126] Ibid.

first, it is necessary to discuss a major contribution to the evolution of the euphonium and tuba, the Blaikley compensating system.

By the time that Wieprecht and Moritz were perfecting the *Berliner-Pumpe* and producing the first tuba, it had long been known that there were a few acoustical problems inherent in all valved brass instruments. The first issue had to do with the fact that many conical valved instruments nevertheless contained a section of straight cylindrical tubing through the valve section.[127] Many attempts were made (and still are being made, as in the progressive bore model demonstrated in patent #US7161077 B1)[128], to ameliorate the negative effects of this disruptive section of cylindrical tubing. The more pressing problem, though, had to do with progressive intonation deficiencies inherent in the design of valved brass instruments. As multiple valves are pressed in tandem, minor intonation errors within each length of additional valve tubing start to compound and progressively detune the instrument.[129] With the higher brass instruments like the trumpet and horn, this issue is not as pronounced, but the longer tubing required for euphoniums and tubas only emphasizes this issue. The end result of this issue is that a 3-valve euphonium or tuba will not only have a diminished low range, but will also have severe intonation issues with notes that are technically within the compass of the instrument. Several instrument manufacturers combatted this issue by adding extra valves to the instrument, but due to the increase in cylindrical tubing involved in such a solution, the search for a true compensating system continued. Many different compensating systems were developed to

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[127] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 78.
[128] Details for this patent, *Gradually progressive bore BB-flat, CC, E-flat, F, or B-flat valved musical wind instrument and valved B-flat/F inverted double musical wind instrument*, can be found at the following: https://www.google.com/patents/US7161077.
[129] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 79-80.

address this issue, but the most lasting automatic compensating solution came in 1874, from the lab of acoustician David Blaikley.[130] In essence, the *Blaikley compensating system* adjusts the intonation in the low range of the instrument by introducing a second set of slides for each of the primary valves, which are activated by pressing the last valve in the series. In a 3-valve instrument, the compensating slides on the first and second valves are activated by pressing the third valve (compensating for the intonation problems inherent in the fingering combinations of 2+3, 1+3, and 1+2+3); in a 4-valve system, the compensating slides are on the first three valves and are activated by the fourth valve.[131] Thus, there is very little for the performer to do other than to press certain valve combinations down to adjust the intonation problems found within the tuba and euphonium's low range. By the last few years of the 19th century, the Blaikley compensating system would be in widespread use, and is still the preferred compensating system found on modern compensating tubas and euphoniums; indeed, as Clifford Bevan writes it, "…the first completely automatic compensation system turned out to be the best."[132]

Regional Schools of Tuba Playing, and Their Effect on Instrument Development

Up to the end of the 19th century, the evolution of the tuba family of instruments had primarily been based on experimentation and adaptation. As a result, a number of different variations on the core design of the tuba and euphonium existed across the Western world, many of which were tied to specific regional schools of tuba playing. In the interest of brevity, the following discussion will focus entirely on the major Western schools of tuba and euphonium playing. The tuba and euphonium both have been incorporated into a wide array of playing

[130] Clifford Bevan, *The Tuba Family*, (New York: Charles Scribner's Sons, 1978), 82.
[131] Ibid.
[132] Ibid.

cultures and traditions outside of the global West, however, and that is a topic more than deserving of future study.

As a result of the influence of Wieprecht and his original tuba, the F tuba would become primarily associated with the German school of playing.[133] This came about partially as a result of the musical demands found within military bands (the ensemble for which the tuba was originally invented), and the symphony orchestra; the tuba needed to be an agile, yet sonically-powerful bass instrument in both ensembles, capable of doubling and reinforcing nearly every other instrument in the group. Another factor in the sudden adoption of the tuba and euphonium was the sheer number of instrument manufacturers found in German-speaking Europe at the time, especially in the eastern part of present-day Germany (a quality not unknown in modern times—the manufacturer Mirafone was founded in 1946 in Waldkraiburg by thirty Czech refugee instrument makers).[134] V.F. Červený also played a major role in shaping the German school of playing, as his contrabass tubas in BBb were swiftly adopted within German orchestras.[135] As with many instruments of the extended brass family, the adoption of the contrabass tuba was spurred on by the works of Richard Wagner.[136] Beginning in 1853-4 with the composition of *Das Rheingold*, Wagner frequently asked for the contrabass tuba, and often wrote parts that utilized the massive low register of the contrabass tuba as the foundation of the brass section.[137] From Wagner's example, many German and Austrian composers followed suit, including Anton Bruckner and Richard Strauss.[138] Because of the somewhat recognizable

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[133] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 133-4.
[134] Ibid.
[135] Ibid, 135.
[136] Ibid, 135-7.
[137] Ibid.
[138] Ibid.

difference in tonal qualities between the F and BBb tubas, some German opera houses would eventually employ two tubists, (one each for the different keyed horns).[139] Although this practice is not nearly as common in the modern Austro-German orchestral practice as it once was, it is still relatively common to differentiate between bass and contrabass tuba parts when writing for orchestra.

For as much as he influenced the German school of playing, it can be argued that V.F. Červený played a more central role in the development of the tuba traditions of Russia. Even before he established a factory in Kiev, Červený was exporting a large number of instruments from his factory in Hradec Králové into Russia.[140] And although Russian artistic culture would soon look to France for many of its cues, the Russian tuba of choice would remain largely as Červený designed it: a massive bored instrument with rotary valves, regardless of pitch.[141] Another important factor in the cultivation of a uniquely Russian school of tuba playing was the influence of Rimsky-Korsakov on several generations of Russian composers. As inspector of the Russian naval bands, Rimsky-Korsakov marveled at the agility of the brass players found within the military at that time.[142] He later took this knowledge and passed it on to several hugely influential composers as a professor at the St. Petersburg Conservatory—Stravinsky and Glazunov number among his students, while Tchaikovsky, Borodin, and several others were colleagues and friends.[143] The influence of Rimsky-Korsakov's view would be felt well into the 20th century, as involved, musically-expressive tuba parts would remain a staple feature of the works of composers like Shostakovich, Prokofiev, and Stravinsky. Curiously, there is some

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[139] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 135-7.
[140] Ibid, 143.
[141] Ibid.
[142] Ibid, 144.
[143] Ibid.

evidence that a 3-valve Eb tuba might have been the preferred instrument for a time in Russia—according to Bevan, several orchestral tuba parts (including Glazunov's completed version of Borodin's *Prince Igor* and many of Tchaikovsky's symphonic works) fall within the compass of such an instrument.[144] This is merely a theory, though, and regardless of the veracity of the claim, it is true that the Russian tuba tradition would come to be primarily associated with the BBb contrabass as envisioned by Červený.

In the same way that the tuba and euphonium traditions of Germany and Russia were heavily influenced by the input of noted composers (Wagner and Rimsky-Korsakov, respectively), the tuba and euphonium tradition of France likewise flourished under the direction of Hector Berlioz.[145] Berlioz first heard the bass tuba while on a tour in Germany in 1843, and soon made use of it in his orchestration (first explicitly calling for it in *La Damnation de Faust,* from 1846).[146] He would continue to utilize a mix of bass tubas and ophicleides, and indeed the ophicleide would linger on in French orchestras for several decades after the invention of the bass tuba. One potential reason for this is the weakness of the original bass tuba's low range, even as the newer instrument had a much more expansive dynamic range.[147] Whatever the case, a small four-valve bass tuba in C (pitched one whole step above the modern Bb euphonium) would soon become a standard instrument in many small orchestras and dance ensembles in France. This instrument would be introduced into the pit of the Paris Opéra in 1874, and a five-valve version of the instrument would appear in 1880.[148] Finally, in 1890, the manufacturer

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[144] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 144.
[145] Ibid, 151.
[146] Ibid.
[147] Ibid, 153-4.
[148] Ibid.

Courtois would introduce a six-valve C tuba, and this instrument would be the *de facto* tuba for French orchestras until roughly the middle of the 20th century. This instrument, while pitched in a higher range than modern tubas and euphonium, was capable of the entire range of both instruments due to the use of 6 valves.[149] As a result, the tuba writing of many French orchestral composers would feature an unusually wide pitch range; although taxing on today's modern bass and contrabass tubas, this range was completely within the grasp of a professional tubist on a six-valve C tuba (hereafter referred to as the *French C tuba*). In the 1970s, an American tubist named Mel Culbertson would move to France to perform with the France National Radio Philharmonic, followed by the Bordeaux-Aquitaine National Orchestra.[150] He soon began to teach at the National Superior Conservatory in Lyon, and while there, his thoroughly 20th-century approach to playing the tuba would soon influence several generations of young French tubists and euphonists. By the time of his retirement and unfortunately early death in 2011, the tuba and euphonium culture of France had completely abandoned the French C tuba in favor of modern instruments and playing philosophy from Germany and the United States. F bass and CC contrabass tubas are the norm in France now, although the influence of the French C tuba can still be felt in the continued performance of countless French works written during the heyday of that particular instrument.[151]

To discuss both the British and American schools of tuba and euphonium playing is to consider two different traditions that nevertheless both spring from a common ground: the brass

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[149] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 153-4.
[150] Rex Martin et al., "Remembering Mel Culbertson," *International Tuba Euphonium Association Journal* 39, no. 1 (Fall 2011), http://www.iteaonline.org/members/journal/39N1/39N1melculbertson.php.
[151] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 158.

band. Both performance traditions were kick started by members of the Distin family, a famous group of traveling musicians who performed widely as a brass ensemble.[152] By 1845, the Distin family had set up shop as a music firm in London, and the following year became the first agent in the United Kingdom to sell Sax's instruments.[153] Henry (John) Distin took over the firm from his father in 1849, and although the firm acrimoniously lost the rights to sell Sax's instruments in 1853, the instrument manufacturing side of the business picked up and expanded.[154] As a result, both saxhorns and, after the rights to those instruments were lost, instruments similar to saxhorns became a common fixture in the military and community band culture of the U.K.[155] Playing alongside ophicleides and the occasional English bass horn, the new brass instruments quickly established their dominance in English musical life. Indeed, the availability of high-quality, easy-to-play, and affordable instruments, in conjunction with the increasing financial standing and greater amount of free time held by members of the British middle class, led to a boom in community and amateur brass bands.[156] By the middle of the 19th century, brass band competitions at the local, regional, and national levels were being held throughout the British mainland.[157] As the competition mentality became a bigger part of the brass band culture, there was a movement to standardize the instrumentation of the ensemble. The three most successful conductors of the middle 19th century (Edwin Swift, John Gladney, and Alexander Owen) helped

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[152] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 103-4.
[153] Robert E. Eliason and Lloyd P. Farrar, "Distin, Henry," Oxford University Press, accessed November 29, 2016, http://www.oxfordmusiconline.com/subscriber/article/grove/music/A2240659.
[154] Ibid.
[155] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 104.
[156] Keith Polk, et al, "Band (i)," Oxford University Press, accessed November 29, 2016, http://www.oxfordmusiconline.com/subscriber/article/grove/music/40774.
[157] Ibid.

pave the way for a standardized instrumentation with their ensembles, which all included three tenor horns in Bb (a related descendant of the baritone and likewise an offshoot from the saxhorns), 2 baritones in Bb, 2 euphoniums in Bb, 2 basses in Eb, and 2 basses in BBb.[158] Thus, the horns listed within this instrumentation garnered the highest demand amongst the newly-enabled mass market, leading in turn to a brass culture very much indebted to the band world.

Like their counterparts across the English Channel, British orchestras in the 19th century were very much beholden to the ophicleide, and when the instrument did eventually get replaced, it was often with a Bb euphonium instead of a tuba.[159] The issue wasn't that larger tubas weren't around (they were, and often relegated to military and community bands), but rather that the sound and heft of the Bb euphonium fit much better with the orchestra of the time; small-bore tenor trombones were the standard for the trombone section, with the third trombone playing on a unique British bass trombone pitched in G and with a straight bell section.[160] As a result, the British tuba tradition was, for a period extending over roughly the last half of the 19th century, focused primarily on the euphonium.[161] The popularity of the instrument led to advances in design and construction, most notably with the inclusion of the Blaikley compensating system and an increasingly-large bore.[162] As the modern euphonium began to solidify in its design, the British version of the instrument soon triumphed over the different variations on the euphonium

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[158] Keith Polk, et al, "Band (i)," Oxford University Press, accessed November 29, 2016, http://www.oxfordmusiconline.com/subscriber/article/grove/music/40774.
[159] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 167.
[160] Ibid.
[161] Ibid.
[162] Clifford Bevan, "Euphonium," Oxford University Press, accessed November 30, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/09077.

developed elsewhere.[163] That the modern British euphonium has remained largely similar to its original dimensions is further miraculous due to the remarkably convoluted chain of ownership it has endured: in 1868, the instrument firm Boosey & Co. bought the Henry Distin factory, then the largest manufacturers of the new instrument. In 1930, Boosey & Co. merged with Hawkes & Son to become Boosey & Hawkes, before then purchasing the (originally French) instrument maker Besson in 1948, along with the latter's Salvationist instrument building division in 1960s. Through this whole period, the design of the modern euphonium underwent very little change, apart from a slight expansion of the bore and adjustments to fit the changing pitch of Western music ensembles.[164] Even in the present day, euphoniums built in Switzerland, Germany, the United States, and Japan all largely adhere to the standard design established in the United Kingdom.[165]

Around the turn of the twentieth century, the tuba began to supplant the euphonium in British orchestras, with the preferred instrument a relatively small and lightweight bass tuba in F.[166] The commonly-held theory behind the use of such an instrument has to do with the training of those taking the tuba spots in Britain's orchestras—many, if not most, had been euphonium and ophicleide players, so the use of a relatively small tuba would smooth out the transition.[167] The pinnacle of the British F tuba would be a unique instrument in F built by manufacturer Besson in the 1930s, to the specifications of the famous tubist Harry Barlow of the Hallé

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[163] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 15.
[164] Ibid.
[165] Ibid.
[166] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 167.
[167] Ibid.

Orchestra.[168] By the end of World War II, though, these instruments had ceased to be built, giving way to the widely-available Eb bass tuba (used in numerous brass bands throughout the British Isles).[169] Of particular importance to the ascension of the Eb tuba was the influence of John Fletcher, legendary tubist with the London Symphony Orchestra from 1968 to his untimely death in 1987.[170] Throughout his career, Fletcher was involved in modernizing and improving the design of the Besson/Boosey & Hawkes compensating Eb, so much so that the standard Besson compensating Eb is still referred to as the "Fletcher" model.[171] From shortly before Fletcher's time to the present day, the British tuba school would be aligned with the Eb bass tuba. However, with the eventual globalization and standardization of instrument designs, orchestral tubists in the United Kingdom would also start to perform on a CC contrabass (or a BBb contrabass, owing to the region's strong brass band tradition).[172]

Despite the insulation from the major developments on the European Continent provided by the width of the Atlantic Ocean, the American school of tuba and euphonium playing grew steadily throughout the 19th century. A major early influence on the development of an identifiable American low brass identity was the Dodworth Band, a family-run brass band

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[168] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 167.
[169] Ibid.
[170] Edward H. Tarr, "Fletcher, John," Oxford University Press, accessed December 6, 2016, http://www.oxfordmusiconline.com/subscriber/article/grove/music/43958.
[171] For an account of John Fletcher's meteoric rise from horn player to legendary tubist and his, read these writings from Denis Wick (also a highly influential low brass player, on trombone): https://www.facebook.com/permalink.php?story_fbid=761924510553106&id=140534429358787 & https://www.facebook.com/permalink.php?story_fbid=1031237856955102&id=140534429358787
[172] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 168.

popular during the middle of the 19th century.[173] In particular, it was the over-the-shoulder (OTS) instruments developed by the Dodworths that proved to have a lasting impression on American brass playing. This brass instrument family, devised by the Dodworths and built by the Uhlmann shop in Vienna, featured top-action rotary valves and a long bell that, when placed in playing position, would stick out over the player's shoulder. According to Allen Dodworth, these instruments were developed in 1838 for use in parade formation, as the backwards-facing bells would be more clearly heard by military troops marching behind the band.[174] Coming in matching keys of Eb and Bb, these instruments proved to be popular well through the American Civil War, leading to several competing lines of instruments from makers such as Graves & Co., J.F. Stratton, Allen & Hall, and many others.[175] Upon the completion of the Civil War, a large number of by-now experienced military bandsmen were sent back into the general populace. As a result, an extensive community band movement was born, spreading throughout the United States.[176] Originally using the OTS instruments made popular during the war, many American manufacturers quickly began to import instruments in large numbers from Europe to supply the skyrocketing demand. This process, known as *stenciling*, involved importing instruments from somewhere else and stenciling on a different manufacturer's logo and name. Many American manufacturers carried both their own in-house instrument lines and stenciled instruments from Europe, thus contributing to the eventual supremacy of the newer European-style instruments

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[173] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 15.
[174] Ibid, 10.
[175] Ibid.
[176] Ibid, 11.

over the homegrown OTS instruments.[177] This meant an influx of Eb and BBb piston instruments, as well as the occasional CC contrabass tuba.[178]

The importation of European-style instruments into the United States would eventually lead to an increasingly hybridized tuba and euphonium culture. Later, as American manufacturers ramped up production and rolled back the volume of European imports, a distinctively American style of instrument became the default throughout the country. This led in part to the primacy of the "American baritone", an instrument with a smaller bore than the European euphonium.[179] Such an instrument, although technically a euphonium in its mostly conical construction, was often called a baritone due to the heavy influence of German musicians and immigrants in the American band culture.[180] At the same time, the invention of the "side valve" or front-action valve cluster (claimed by C.G. Conn, though some are doubtful of that claim's veracity) led to a uniquely American tuba and euphonium design.[181] This design has persisted to the present day, although the American baritone has largely been relegated to high school band rooms and marching band fields as the British style euphonium has ascended.

As befitting the nature of American musical culture, the identity of the American tuba and euphonium school is derived from a combination of traits from several other tuba cultures. Uniquely amongst the schools of tuba playing outlined so far, the American tuba tradition is

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[177] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 11.
[178] Clifford Bevan, *The Tuba Family*, Charles Scribner's Sons, New York, NY, 1978, 159-61.
[179] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 11.
[180] Clifford Bevan, "Euphonium," Oxford University Press, accessed November 30, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/09077.
[181] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 160-61.

largely based around the use of the contrabass tuba. To this day, the conventional path for the American tubist is to begin by learning the BBb contrabass tuba, before eventually moving to CC tuba (or not, as the case may be for many amateur tubists and some professional performers). This can be traced in part to the influence of a high number of German musicians coming to the United States during the 19th and early 20th centuries, bringing with them a predilection for BBb and CC contrabass tubas.[182] This tendency was reinforced by the influence of Henry Distin, who propagated the saxhorn style of instrument family pitch matching throughout the United States.[183] The Eb tuba was also a popular choice well into the 20th century, but due to the ascendancy of the F tuba at the mid-century mark, this instrument was until recently consigned into the category of a "junior band" instrument.[184] In fact, by the 1970s, the F tuba had become the bass tuba of choice for the vast majority of professional tubists in the United States, due in no small part to the influence of tubists such as Roger Bobo and Daniel Perantoni.[185]

The almost exclusive use of large, primarily piston front-action CC tubas in the American tuba culture can be traced in part to the enormous influence of longtime Chicago Symphony Orchestra tubist Arnold Jacobs, who performed on one of two large J.W. York CC tubas built in the 1930s for Philadelphia Orchestra tubist Philip Donatelli (Jacobs' teacher at the Curtis

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[182] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 159.
[183] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 10.
[184] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 161.
[185] These two tubists in particular happened to represent the two primary manufacturers of the F tubas that were available from roughly the 1950s-90s: Mirafone and B&S, respectively. Another indicator of the primacy of the F tuba is in Roger Bobo's 1959 monograph "Tuba: Word of Many Meanings," in which he mentions only the "F, small CC, or the large CC" as the tubas readily available to orchestral tubists in the United States. Incidentally, both Perantoni and Bobo performed in professional orchestras in Amsterdam early in their career, where they presumably might have become more aware of the F tuba.

Institute).[186] Jacobs was a highly-respected pedagogue whose influence on the tuba world is nearly unrivalled at the current time, and the large number of students that he mentored helped to propagate the use of a large piston CC tuba in the orchestra, (with the occasional use of F (or, rarely, Eb) tuba as dictated by the repertoire). A further major influence would be the work of two tubists who both happened to teach at Indiana University at different times, William Bell (1902-1971) and Harvey Phillips (1929-2010). Both tubists performed on the CC tuba (Bell on a rotary valve tuba built by the manufacturer King, and Phillips on a very distinctive Conn instrument), and Phillips in particular helped to propagate the use of such an instrument through his work as a noted pedagogue and performer of contemporary music. In recent years, some professional orchestral tuba players in the United States have re-adopted the BBb tuba for particular works, in particular the large German variant of the BBb tuba made by such makers as Melton/Meinl-Weston and Miraphone. Noted tubists Eugene Pokorny of the Chicago Symphony Orchestra and Anthony Kniffen of the Indianapolis Symphony Orchestra held a widely-attended clinic at the 2014 International Tuba Euphonium Conference at Indiana University on the use of the BBb tuba in certain orchestra repertoire, and others (such as Yasuhito Sugiyama of the Cleveland Orchestra, Chris Olka of the Cincinnati Symphony Orchestra, and Craig Knox of the Pittsburgh Symphony Orchestra) have made use of large BBb tubas in works by Wagner, Bruckner, Prokofiev, and more.[187]

Although the American euphonium culture of the 20th century initially revolved around instruments made in the United States, the British-style compensated euphonium would

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[186] Brian Frederiksen and John Taylor, *Arnold Jacobs: Song and Wind* (Gurnee, IL: WindSong Press, 2006), 182-86.

[187] The clinic mentioned here was held at the 2014 International Tuba Euphonium Conference in Bloomington, IN, and a description of the typical use of the BBb tuba in an American orchestra can be found at Craig Knox's personal website: http://www.craigknoxtuba.com/equipment.php.

eventually become the default throughout the vast majority of the euphonium community (American or otherwise). In the United States, the 3 or 4-valve "American baritone" was an instrument that fit between the traditional British baritone and euphonium, (both in bore and in general size). In contrast to the bass and contrabass tubas, the euphonium adopted several different and wildly-diverging forms throughout the early 20th century, the most prominent of which was a double-belled version.[188] In such an instrument, the second bell is activated through use of an additional valve, and is often more of a cylindrical and trombone-like shape.[189] Important early performers of the double-bell euphonium include Henry Whittier of the Gilmore Brand, Josef Michele Raffayalo of the Sousa Band, and, at a later date, Simone Mantia (also of the Sousa Band).[190] Such instruments were well-suited to the theme and variations style common in euphonium solos of the time, but despite its immense popularity, this instrument would eventually be supplanted as British euphoniums from Boosey & Hawkes and similar makers would become the preferred instrument.[191]

Similar to the way in which the F tuba became the *de facto* bass tuba in the United States, the adoption of British-style compensating euphoniums was also spurred on by the pedagogical and performative efforts of several individual musicians. Although the incredibly important euphonium player and teacher Leonard Falcone (1899-1985) did play an American-style euphonium/baritone hybrid, it was the influence of euphonist and pedagogue Dr. Brian Bowman that proved to be the most lasting. Soloist and section leader with the U.S. Navy Band for over

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[188] Lloyd E. Bone, Eric Paull, and R. Winston. Morris, *Guide to the Euphonium Repertoire: The Euphonium Source Book* (Bloomington, IN: Indiana University Press, 2007), 12.
[189] Ibid.
[190] Ibid.
[191] Ibid, 13.

20 years, Dr. Bowman would eventually become (at the time) the only full-time, non-adjunct Professor of Euphonium in the country, at the University of North Texas in Denton, TX.[192] This position (now belonging to British euphonist Dr. David Childs), would remain the only full-time position in euphonium until 2018, when Indiana University's Jacobs School of Music would appoint Dr. Demondrae Thurman as Professor of Euphonium.[193] Along with several of his fellow military bandsmen (military bands being one of the only places where one can make a living in the U.S. purely by playing the euphonium), Dr. Bowman helped to cement the primacy of the British-style euphonium in the United States. Since the middle of the 20th century, the euphonium has changed little, beyond a few small tweaks and additional details. This trend is very slightly changing, most noticeably with the recent small resurgence of the double-bell euphonium.[194] However, the most notable change to the euphonium culture in the United States is the tendency to specialize in more than one low brass instrument (choosing either the trombone or the tuba).

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[192] Richard Perry, "Bowman, Brian L.," Oxford University Press, accessed December 6, 2016, http://www.oxfordmusiconline.com/subscriber/article/grove/music/A2218732.
Also of note is the fact that Dr. Bowman was not the *first* full-time euphonium instructor, but rather the only full-time professor of only the euphonium. Dr. Earle Louder holds the distinction of being the first full-time Professor of Tuba and Euphonium that happened to be a euphonium player (at Morehead State University in Kentucky), a fine yet important distinction to make. Dr. Bowman retired as of the 2017-2018 school year, and was replaced by Dr. David Childs in this position. Also important to note is that the American euphonist Dr. Demondrae Thurman became the second full-time, tenure-track Professor of Euphonium in Fall of 2018, at Indiana University in Bloomington, IN.

[193] "Euphonium player Demondrae Thurman appoints to IU Jacobs School of Music faculty," Jacobs School of Music News, accessed January 2, 2019, http://info.music.indiana.edu/releases/iub/jacobs/2017/09/Euphonium-player-Demondrae-Thurman-appointed-to-IU-Jacobs-School-of-Music-faculty.shtml.

[194] Recent works for the instrument include Liza Lim's *The Green Lion Eats the Sun*, and Kurt Isaacson's *monkfish*.

The development of identifiable schools of tuba and euphonium performance has taken place across the entire world, and not only in the countries of Germany, France, Russia, Great Britain, and the United States. Although not as prominent as the schools profiled so far, they nevertheless constitute recognizable and important departures from the supposed *status quo* of the global tuba and euphonium culture. For the purposes of this document, I will refer to these playing cultures as "hybrid schools," as the formation of their practice was particularly informed by the combination of several aspects of the aforementioned schools of tuba and euphonium performance. As an example, one could consider the strong tuba and euphonium tradition of the Scandinavian countries; like Britain and the United States, the tuba and euphonium traditions of Scandinavia are built on the strong foundation of the military band, with a parallel development of community brass bands.[195] The primary instruments of choice, however, would soon be tubas of mostly Germanic provenance, giving the Scandinavian tuba and euphonium school a decidedly Teutonic sound quality. A similar trend is seen in many Eastern European countries, with a melding together of Russian and German tuba sensibilities anchored by a strong military and community band history. Examples of this hybridization include the Polish school of tuba playing centered on Zdzisław Piernik (performing most often on a heavily-modified German B&S F tuba), the Hungarian school with József Bazsinka, Roland Szentpáli, and Vilmos Szabó, and the numerous variations seen in countries including Belarus, Estonia, Latvia, and Lithuania.[196]

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[195] Trevor Herbert, "Brass bands and other vernacular traditions," in *The Cambridge Companion to Brass Instruments,* ed. Trevor Herbert and John Wallace, (Cambridge, GB: Cambridge University Press, 1997), 185.

[196] Clifford Bevan, *The Tuba Family* (New York: Charles Scribner's Sons, 1978), 143-50.

Along with France, the Mediterranean countries of Italy and Spain both have identifiable, if somewhat isolated, playing cultures. As seen before, both countries have their own distinct evolutions of the Saxhorn: the *flicorno* in Italy and *fiscorn* of Spain. Both countries exhibit wildly diverse manifestations of community brass culture, starting in the mid-19th century and continuing to the present day. Italy in particular also experienced a massive amount of growth in instrument design, especially as it concerns the *cimbasso*. An offshoot of the Russian bassoon, this instrument developed from a valved wooden serpent into a true valved bass instrument in the late 19th century.[197] A further advancement of the cimbasso came as a result of Giuseppe Verdi's dislike of the tuba (or, as it was known in Italy, the *bombardoni*). Verdi specifically disliked the break in sound between the cylindrical trombones and conical tuba, and for want of a more unified low brass sound, commissioned instrument-maker G.C. Pelitti in 1881 to construct a contrabass trombone in BBb.[198] This instrument, also known as the *trombone bass Verdi*, would be used for his last two operas, and would further be widespread in Italian orchestras until the eventual adoption of the bass tuba in the 1920s. The cimbasso has made a comeback in recent years, due in part to the widespread use of the instrument in many film scores recorded in Hollywood (it's fairly directional and compact timbre is easier to record than the tuba, due to its higher ratio of cylindrical tubing and forward-facing bell). At the same time, the formerly high-priced and rare instrument has recently become much more prevalent due to lower-priced versions being produced in China.[199]

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[197] Renato Meucci, "Cimbasso," Oxford University Press, accessed December 27, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/05789.

[198] Ibid.

[199] "Cimbasso | Quality & Affordable Brass Instruments | Wessex Tubas," Wessex Tubas, accessed January 3, 2019, https://wessex-tubas.com/collections/cimbasso.

The Tuba Outside of the World of Western Art Music

With few exceptions, the discussion up to this moment has centered on the use of the tuba in Western art music. Although this genre is the foundation from which the tuba was developed, the instrument has since become a major player in many other genres and styles of music. Perhaps most notably, the tuba has been a key component of jazz music since its very inception in the early twentieth century. Early jazz bands developed out of a synthesis of African and European musical styles, and flourished outward from its foundations in New Orleans. As demonstrated in Dr. Thomas Bough's dissertation on early twentieth century jazz, the instrumentation of early jazz music was influenced in part by the necessity to perform both as a seated and marching ensemble.[200] The tuba, helicon, and sousaphone, (the last two being versions of the tuba made for marching) were the natural choices in this instance, as similar bass instruments like the string bass and bass saxophone were far less suitable for marching. Early jazz tubists often doubled on the string bass, and would usually switch over to that instrument when performing in a seated context.[201] Another factor causing the early and widespread use of the tuba in jazz was the relative primitiveness of recording equipment in use at the time; when recording to wax cylinder (as was common), instruments like the string bass were difficult to effectively capture. The tuba, often with a forward-facing bell (called a "recording bell"), had no such issue being recorded. Advancements in recording technology would soon cause the tuba to lose ground to the string bass, as the greater facility of the latter instrument became more in vogue with the evolving jazz style. After this initial boom and bust, the tuba would eventually

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[200] Thomas Bough, "The Role of the Tuba in Early Jazz Music from 1917 to the Present: A Historical, Pedagogical, and Aural Perspective" (doctoral dissertation, Arizona State University, 1998), 17-20.
[201] Ibid.

come back as a hybrid bass and melodic instrument, notably being featured in many seminal mid-century jazz albums. Major proponents of the instrument during this time period include Ray Draper (who collaborated often with John Coltrane)[202], Bill Barber (tubist on many Miles Davis albums, notably *Birth of the Cool* and *Sketches of Spain*)[203], and Rich Matteson (performing on the euphonium, and influencing several generations of jazz musicians as a professor at the University of North Texas).[204] The tuba would also continue to be used in Dixieland jazz, harking back to its original use as a marching instrument. Major performers of the Dixieland tuba style include Anthony "Tuba Fats" Lacen, Philip Frazier, and Kirk Joseph. The jazz style of tuba playing has remained an important part of the instrument's playing culture, even infiltrating the wider pop culture consciousness; as of this document's writing, the house bands for both *The Late Show with Stephen Colbert* and *The Tonight Show Starring Jimmy Fallon* feature tubists in prominent spots (Ibanda Ruhumbika and Damon "Tuba Gooding, Jr." Bryson, respectively).[205] And no history of the tuba within jazz music is complete without mention of Howard Johnson, who has performed since the late 1960s on tuba, baritone saxophone, and several other instruments as a solo act, as leader of the house band for *Saturday Night Live* for several years, and with his jazz tuba ensemble *Gravity*.[206]

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[202] Scott Yanow, "Ray Draper | Biography & History | AllMusic," AllMusic, accessed May 11, 2019, https://www.allmusic.com/artist/ray-draper-mn0000343612/biography.
[203] Peter Keepnews, "Bill Barber, Who Brought the Tuba to Famed Jazz Sessions, Is Dead at 87," New York Times, accessed May 11, 2019, https://www.nytimes.com/2007/06/29/arts/music/29barber.html.
[204] "Rich Matteson Biography," Rich Matteson, accessed May 11, 2019, http://www.richmatteson.com/bio.html.
[205] Michael J. West, "Tuba in the House," JazzTimes, accessed May 11, 2019, https://jazztimes.com/features/profiles/tuba-in-the-house/.
[206] Scott Yanow, "Howard Johnson | Biography & History | AllMusic," AllMusic, accessed May 11, 2019, https://www.allmusic.com/artist/howard-johnson-mn0000276735/biography.

In much the same way that African and European musical cultures combined to create early jazz music, a similar synthesis would occur in northern Mexico. A primary event in the musical culture of this region was the importation of the German brass band culture in the mid-19th century, due to the influx of high numbers of European immigrants. This was especially focused on the Pacific northwest of the Mexican landmass, and it is here in the state of Sinaloa that the style of *banda sinaloense* would come to dominate the Mexican musical culture of the 20th century.[207] Originally coalescing as a style in the early 20th century, *banda* music would feature an ensemble of nine-to-twelve members, performing on clarinets, cornets/trumpets, valve trombones, a saxhorn, the tuba (increasingly a sousaphone), and two drum players.[208] The music performed by the group originally ranged from marches and patriotic numbers to operatic selections and pop tunes, but the group eventually found success with the dance styles of *cumbia* and *boleros*, and the distinctly Mexican *rancheras* and *baladas* (a love ballade with a slow background texture and heightened emotional expressivity). Regardless of the style played, *banda* ensembles would rely on the tuba as the foundation, often featuring highly virtuosic bass lines filled with figuration and ornamentation not often seen in traditional tuba parts. As the ensemble matured, the saxhorn would be replaced by the Eb alto horn, turning *banda* into one of the few types of music to natively feature that instrument. With an increasingly-strong presence throughout the rest of the North American continent, this particularly Mexican style of tuba and euphonium playing will be advanced for a long time to come.

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[207] Helena Simonett, "Banda," Oxford University Press, accessed December 28, 2016, http://www.oxfordmusiconline.com.ezproxy.bgsu.edu:8080/subscriber/article/grove/music/A2092842.
[208] Ibid.

Towards the end of the twentieth century, a new breed of jazz tuba player would be born. These performers would initially find their artistic expression in jazz music, but would eventually become notable in a broader improvisation-based context. Tubists such as Marcus Rojas, Oren Marshall, Bill Roper, Pauline Boeykens, and Dan Peck would stretch the boundaries of performance with their instruments, incorporating many different contemporary performance techniques along with performative inspiration from jazz styles. Their artistic forbearers would be performers like Zdzisław Piernik and Dietrich Unkrodt, performers whose experiments with the instrument in the 60s and 70s would be expanded upon by later generations of tubists. Many other tubists have also expanded out into rock and metal genres, including performers like Brian Wolff (Drums and Tuba, Wolff and Tuba), Matt Owen, Kristoffer Lo, and Jeanie Schroder (DeVotchka). The tuba would even find its way into the ambient genre, with the long-form explorations of Tom Heasley. The tuba in the twenty-first century is no longer confined to the restrictions of Western art music, and is a major component of a number of different genres.

The Argument for an Inclusive Tuba Family

In colloquial usage, the euphonium and tuba are generally seen as separate yet related instruments. Performers traditionally specialize in one or the other, with limited overlap between the two instruments. However, this situation is rapidly changing, due in part to two related trends: 1) the contemporary job market for academic teaching positions often requires the ability to teach the tuba, euphonium, and, increasingly, the trombone, and 2) several performer-pedagogues, such as Benjamin Pierce, David Zerkel, Chris Dickey, Matt Tropman, and Gretchen Renshaw, have demonstrated the ability to perform at a professional level on both the tuba and euphonium. This trend for equal emphasis on the tuba and euphonium also reflects the early history of the instrument. As discussed previously, the modern euphonium can be traced back to

the *Tenorbasshorn* in Bb, built in 1838 by Carl W. Moritz off of an earlier design by Wilhelm Wieprecht. From here, the euphonium evolved alongside the tuba, most notably through its inclusion in the family of saxhorns created by Adolphe Sax. Since the tuba and euphonium were both initially developed to cover the full bass and baritone range of a large ensemble, (inspired by the range and function of predecessors like the ophicleide and serpent), the similarity of the two instruments is logical.

Taking into consideration the history of the tuba and euphonium as previously outlined, one conclusion to be made is the consideration of the euphonium as a full member of the greater tuba family of instruments. Thus, the tuba family as discussed throughout this document will consist of the BBb and CC contrabass tubas, the Eb and F bass tubas, and the Bb euphonium (or tenor tuba, as it were).[209] The primary arguments for such a classification rest on the previously-mentioned shared provenance of the euphonium and tuba, and on the similar capabilities and playing characteristics of the two instruments.

Before continuing, a small note must be made of a few additional instruments that may eventually be incorporated into the core tuba family. Originally used in Italian operas during the late nineteenth and early twentieth centuries, the *cimbasso* has recently made a major resurgence in the greater tuba community. This has primarily been due to the production of cheap yet good quality versions of the cimbasso by various Chinese manufacturers, thus enabling a wider range of players to use an instrument that was previously only obtainable by performers with

[209] The use of the term "tenor" here instead of the more proper "baritone" is due to two factors: 1) to reference the early emphasis and usage of the term "tenor" in describing the instrument, and 2) to avoid confusion with the colloquial use of the term "baritone" to describe an instrument of the same length as the euphonium but slightly different construction (primarily through the use of a greater amount of cylindrical, rather than conical, tubing).

substantial funding.[210] The cimbasso has not quite made enough of an impression on the greater tuba repertoire to warrant its inclusion in this document, but this situation is poised to change in the coming years. Another candidate for inclusion is the traditional Bb *baritone*, a distinct instrument from the Bb euphonium (despite much confusion over the two terms in its colloquial American usage). This instrument is almost exclusively reserved for British brass bands, with supplemental usage as an instrument for beginners. At this time, the baritone is not enough of a separate entity to warrant inclusion, but this situation may also change. Finally, the *serpent* and *ophicleide* have both made a comeback since the 1970s, due to the championing of originals and recreations of the instruments by Christopher Monk, the London Serpent Trio, Douglas Yeo, Michel Godard, Patrick Wibart, and Roland Szentpali. The serpent and ophicleide are similarly primed to become even more notable instruments within the context of contemporary music, but their relatively limited usage to date has kept them from being classified on an equal footing alongside the tuba and euphonium.

Section 2. Standard Technical Information and Performance Considerations

Instrument Design and Choice

The tuba family encompasses five broadly-similar instruments, consisting of two contrabass tubas, two bass tubas, and the euphonium. As demonstrated in the previous section, all five of these instruments can be traced back to the same creative impetus: the need during the middle nineteenth century for a robust bass brasswind instrument. The divergent paths through which many different instrument makers developed these the tubas resulted in the bifurcated

[210] Compare the price point of these two instruments (as of 1/27/2018): the German-made Lätzsch cimbasso in F costs $17,290 (https://www.dillonmusic.com/latzsch-latzsch-cb-900-cimbasso-in-f.html), whereas the Chinese-made Wessex cimbasso in F costs $3,570 (https://wessex-tubas.com/collections/cimbasso/products/f-cimbasso-cb90?variant=42513350413).

classification system that is retained to this day; the contrabass tubas are larger physically and lower in pitch, while both bass tubas are lighter in timbre and weight. To the untrained ear, it may be difficult to tell the difference between bass and contrabass tubas, but there are some appreciable differences between the two sets of tubas, to be elaborated on in this section and beyond. The euphonium, although often considered a separate instrument from the tuba, is structurally similar to the tuba in almost every way, apart from its shorter length. It will be discussed as an equal partner to the tubas in all of the following sections.

Before we discuss the individual members of the family, it will be helpful to first summarize some of the common design elements of the tuba family, especially as it pertains to the instruments that one is likely to encounter in modern usage. As with all of the other brass instruments, the members of the tuba family consist of a series of tubes, closed on one end by a mouthpiece and embouchure (the playing apparatus consisting of the lips, tongue, and facial muscles around the mouth), and terminated on the other end with a flared bell. The shape of the tubing for both tuba and euphonium are "conical" in their design, lending a mellower, more diffuse timbre to the instrument than the "cylindrical" trombone and trumpet. In this way, the tuba and euphonium are both related to the horn, which likewise has a roughly conical shape. The baritone is a more cylindrical version of the euphonium, and although not considered in depth within this guide, will be discussed briefly where necessary.

Each member of the tuba family is denoted by its fundamental pitch, or the lowest pitch that can be performed without pressing any valves (playing on what is called the *open bugle*). Because of historical naming conventions and the use of double letters within Adolphe Sax's line of saxhorns, the contrabass members of the tuba family are the BBb and CC tubas. In colloquial use, however, these instruments are still called the "B-flat" and "C" tubas, potentially causing

confusion for the non-tubist. The BBb tuba open bugle has a length of 18 feet, and the CC tuba is measured at 16 feet. The bass tubas are in the keys of Eb and F, at a length of 13 feet and 12 feet, respectively. The euphonium is pitched in Bb (as opposed to the "BBb" tuba), and measures around 9 feet in length.[211]

Like most of its brasswind cousins, the tuba and euphonium utilize a set of valves to change the harmonic series available to the performer, and subtle embouchure adjustments allow different partials within the harmonic series to be produced. Technically speaking, there are 11 harmonic series', corresponding to the 11 total pitches starting from the open fundamental (the lowest note playable with no valves pressed) and moving downwards chromatically. In practice, though, most players are only able to play to around the tritone below the fundamental. At that point, the player can only continue down chromatically by switching to a 2nd partial or higher.

The members of the tuba family come with either piston or rotary valves, the selection of which is based on personal preference and/or playing tradition (see Figures 2 and 3).

[211] Anthony Baines, *Brass Instruments: Their History and Development* (Mineola, NY: Dover Publications, 1993), 26.

Fig. 2 – Example of a Rotary Valve Tuba. This is a CC Contrabass Tuba

Fig. 3 – Example of a Piston Valve Tuba. This is an Eb Compensating Bass Tuba (photo by Michiko Saiki)

The rotary valve consists of a paddle connected to a horizontally-placed rotor, and when depressed, different sections of tubing are opened and closed to change the overall length of the tuba/euphonium (thus changing the harmonic series available to the performer). The piston valve, in comparison, consists of a vertically-oriented piston that opens and closes various sections of tubing when depressed. The musical differences between the two valve systems are largely confined to subjective difference in performance, although subtle differences in tone may be noticeable to the refined ear. In general, rotary valves offer a greater amount of control over legato playing, while pistons offer a greater degree of articulate control. These differences are mostly subjective, though, and unless a specific type of valve is called for in your composition, there is little disparity between the two valve types.

One small quirk of the different valve systems of the tuba family is the fact that many tubas actually combine both kinds of valve in their construction. When a tuba has more than four valves, the additional valves are almost exclusively of the rotary valve variety (see Figure 4).[212]

[212] Some older instruments have five or more piston valves, but this design is outdated as of this writing. Other variations on this design include the Viennese-style F tuba, with six piston valves separated into two groups of three (one for each hand). This instrument is still used in Austria, notably in the Vienna Philharmonic Orchestra, but the odds of running into one of them in professional use outside of Austria are exceptionally low.

Fig. 4 – Example of a CC Contrabass Tuba with Four Piston Valves and One Rotary Valve (the Large Circular Valve)

Five-and-six-valve tubas either have *all* rotary valves, or four piston valves *and* one or two rotary valves. Instruments that follow the second case are still referred to as *piston valve tubas*, as that is the dominant style among the five or six valves present. The addition of fifth and sixth valves on a tuba is due to the use of a non-compensating valve design; this will be discussed shortly.

While the different keys of tubas are often seen with both rotary and piston valves (and sometimes both at the same time), the euphonium is almost always constructed with piston valves. There are a few seldom-seen rotary valve versions of the euphonium in different parts of the European mainland; the use of these instruments is largely confined to Europe, although they do appear from time to time in North America (especially in use by orchestral tubists who require a tenor tuba for one reason or another and prefer the more stereotypically "tuba-like" construction of these rotary euphoniums).[213] The dominant form of the euphonium is the British-style compensating piston euphonium. This brings us to another quirk that often causes issues for non-tuba-playing composers: the difference between compensating and non-compensating instruments.

Since the addition of multiple valves in combination causes intonation deficiencies in the low range of the tuba and euphonium, two different systems are used to correct the low range intonation of the tuba family instruments: the compensating and non-compensating systems. [214] In a compensating system, an additional set of tubes for each of the first three pistons is activated

[213] Two German manufacturers, Alexander and Miraphone, produce euphonium-like instruments with 4-5 rotary valves. Often called "tenor tubas", these instruments occupy roughly the same territory as the euphonium (see: https://gebr-alexander.de/en/portfolio-item/bb-baritone-tuba-%c2%b7-model-151/).

[214] Robin Hayward, "The Microtonal Tuba," *The Galpin Society Journal* 64 (March 2011): 129-38.

when the fourth valve is depressed. In this way, the generally sharp intonation tendencies of the lower notes of the tuba (between the first and second partials) are corrected by depressing the fourth valve and continuing downward in the normal fingering pattern. The non-compensating system, in contrast, deals with the intonation deficiencies of the low range by simply adding one to two more valves of smaller tubing length; this allows for a wider range of fingering options when playing in the low range, thus correcting intonation deficiencies by attrition.

The use of either compensating or non-compensating valve systems is dependent partially on playing traditions, and partly on player preference. Although there was a strong early twentieth century American euphonium-playing tradition that preferred the use of non-compensating baritone-euphonium hybrids, the dominant euphonium tradition across the entirety of the Western world now favors the British-style compensating euphonium, commonly referred to as a 3+1 valve system due to its configuration of three standard pistons for the right hand and one compensating piston valve for the left hand (which crosses in front of the body of the instrument). There are also a small but noticeable number of compensating tubas in common use. Notwithstanding the existence of a few prototype compensating tubas in the keys of F and CC, the compensating system is largely relegated to Eb bass and BBb contrabass instruments. Both tubas are considered hallmarks of the British and American brass band playing traditions, although the Eb 3+1 compensating tuba has slowly gained traction outside of the brass band world over the course of the twentieth and twenty-first centuries. The rest of the bass and contrabass tubas in professional use across the global tuba community are non-compensating, with five or (in the case of some F tubas) six valves. As discussed in the previous section, the boundaries dictating the particular tubas that one chooses to play are often tied to regional preferences.

Beyond the choice of valve system, there is much variation within even the same key of tuba, or within the relatively-standardized euphonium. There is a slight variance between different brands and models of the euphonium, with much distinction coming from the particular bell shape and size and the bore of the instrument. On the extreme end of the spectrum is an instrument like the Miraphone M5050 "Ambassador Edition", designed exclusively for noted euphonist Demondrae Thurman and with a large bell and bore (12.205" and 0.61-0.638", respectively).[215] Compare this to the relatively more common size of the Willson 2900TA, which has a bell diameter of 11.41" and a gradually progressive bore of 0.590-0.661".[216] The amount of variation between instruments is exponentially larger for the four keys of tubas; while one can hazard a guess on roughly which kinds of instruments one will find based on location and the playing school followed by a tubist, there are a bewildering amount of different brands and models available to the modern tubist. One of the biggest factors for variation is in the size of the tuba. The general size classifications for tubas follow a quarter system, which, for historical reasons to do with the general enlarging of instrument size throughout the second half of the twentieth century, range from 3/4 to 6/4 sizes. The classification of an instrument as a certain size in the quarter system is often done on a colloquial basis, and is based primarily on loosely-held definitions that are determined by both consumers and manufacturers.

When it comes to the choice of contrabass tuba, it is common convention that tubists seriously pursuing a career within the military band or orchestral audition circuit will perform on a 5/4 or 6/4 contrabass tuba (almost invariably a CC contrabass tuba in the United States). There are still many professional performers who utilize 4/4 and 3/4 contrabass instruments, however,

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[215] https://www.miraphone.de/instruments/euphonium/bb-euphonium-compensating-ergonomic-4-valves-391

[216] http://www.willson.ch/en/instrument/willson-euphonium-2900ta-0

and when it comes to solo and chamber literature, these instruments are sometimes found to be qualitatively easier to handle than their larger-sized brethren (again, a purely subjective stance that is informed by decades of performer bias). When it comes to bass tubas, the quarter system is still used to classify size. Generally speaking, though, the use of massively oversized bass tubas is less prevalent than the use of large contrabass tubas. At one point, it could be argued that the American preference in bass tuba was for a 4/4 or slightly larger German-style F tuba with five or six rotary valves, but this bias is slowly fading as more and more choices enter the market.

The choice of which tubas and euphoniums are commonly used can be summarized as such: in North America, most beginners start on the BBb tuba, and then eventually switch to using both the CC tuba and a bass tuba (with a large bias towards the F bass tuba over the Eb bass tuba, although the use of the Eb tuba has become much less stigmatized over the last few decades). In the European mainland, many tubists prefer the F tuba as their default tuba, although there are pockets of Eb tuba usage. For a contrabass tuba, the Austro-German preference is highly biased in favor of the BBb rotary valve tuba, although the CC tuba does pop up occasionally. Elsewhere on the mainland, the CC tuba is quite popular. In the British Isles, the Eb 3+1 compensating tuba still reigns supreme, with the CC contrabass tuba increasingly gaining ground as the contrabass tuba of choice for professional work. In many other tuba playing cultures throughout the world, the unofficial "international standard" takes hold: the CC and F tubas are the horns of choice, although again, this may be subverted from time to time. This brings up possibly the most important point of this entire section: ***when writing specifically for the tuba, never assume for a certainty which key, style, or size of tuba you'll be writing for***. The best course of action when writing for the tuba is to either write for the instrument from a

broad standpoint (i.e., for the bass tuba, or the contrabass tuba, or the euphonium), or to specify the exact instrument you're writing for and make that a part of the composition's framework.

Fingering Patterns

The tuba and euphonium both use the same general set of fingering patterns, dictated through the work of several instrument manufacturers during the 19th century. In all tubas and euphoniums, the first three valves follow the exact same descending pattern (all intervals in equal temperament): first valve lowers a whole step, second valve lowers a half step, and third valve lowers one-and-a-half steps. After that, the tuning of the additional valves begins to diverge slightly depending on instrument type. In a compensating system (as seen in most modern euphoniums and some Eb and BBb tubas), the fourth valve lowers the instrument a perfect fourth, while also activating secondary tubing on valves one through three. In a non-compensating system, the fourth valve still lowers the instrument a perfect fourth. The fifth valve almost uniformly lowers the instrument a flatted whole step; this allows for the note a perfect fifth down from the open partial to be more in-tune, as well as many notes that are subsequently lower in the pedal range.[217] When present, the sixth valve commonly lowers the tuba by a flatted half-step, to further facilitate the proper tuning of the lower range of the instrument.

For an exhaustive look at the evolution of the early tuba's fingering pattern system, and for a discussion of a new quarter-tonal system that revises the modern fingering patterns, the author highly recommends Robin Hayward's writings on his microtonal tuba design.[218]

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[217] The instrument manufacturer Miraphone had a different system for the fifth valve through the middle part of the twentieth century, in which the fifth valve lowered the open partial by a tritone. Although useful, this tradition would eventually lose ground to the now-common fifth valve tuning of a flatted whole-step.

[218] Robin Hayward, "The Microtonal Tuba," *The Galpin Society Journal* 64 (March 2011).

Euphonium (Compensating) Fingering Pattern

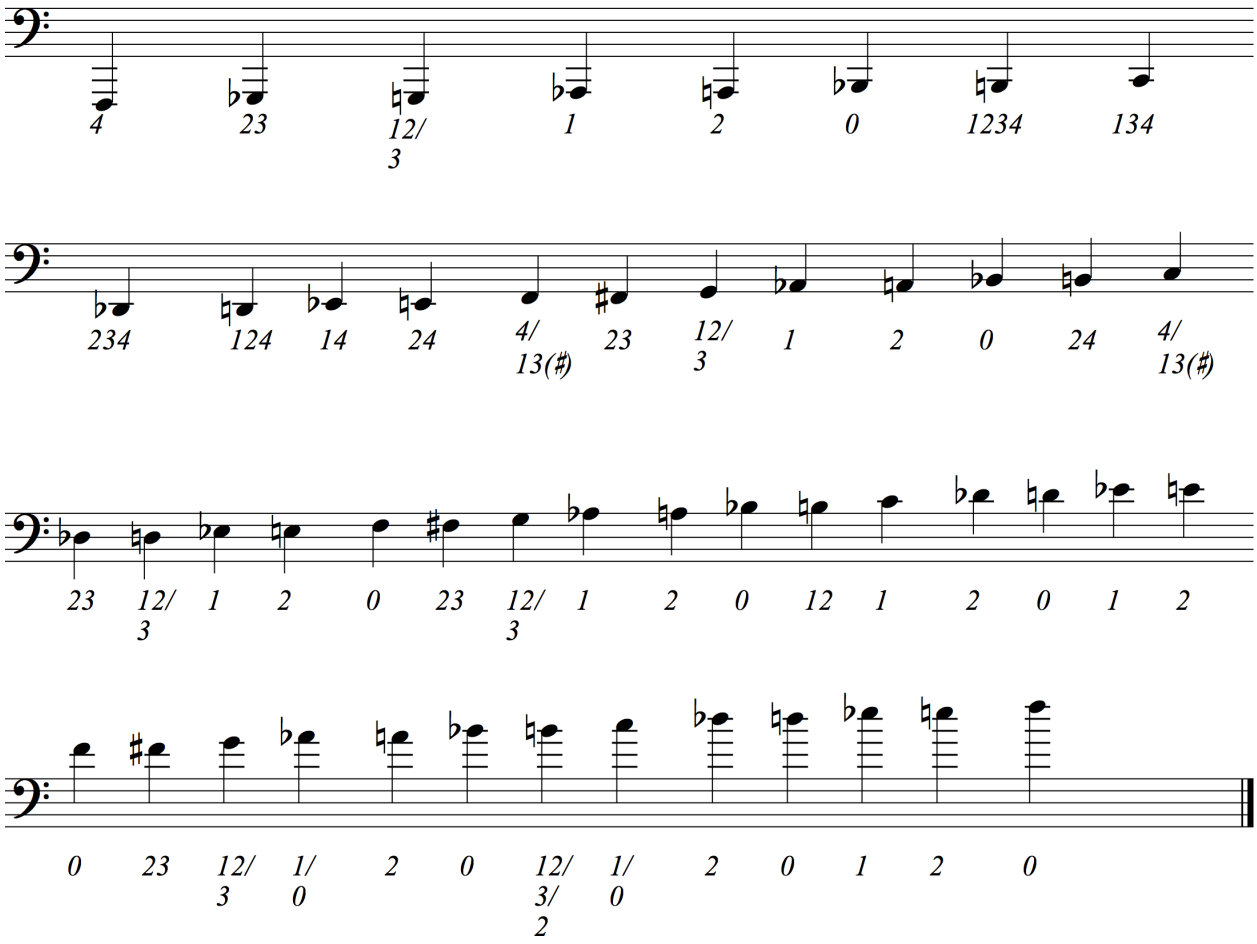


Fig. 5 – Euphonium (Compensating) Fingering Pattern Chart

Euphonium (Non-Compensating) Fingering Pattern

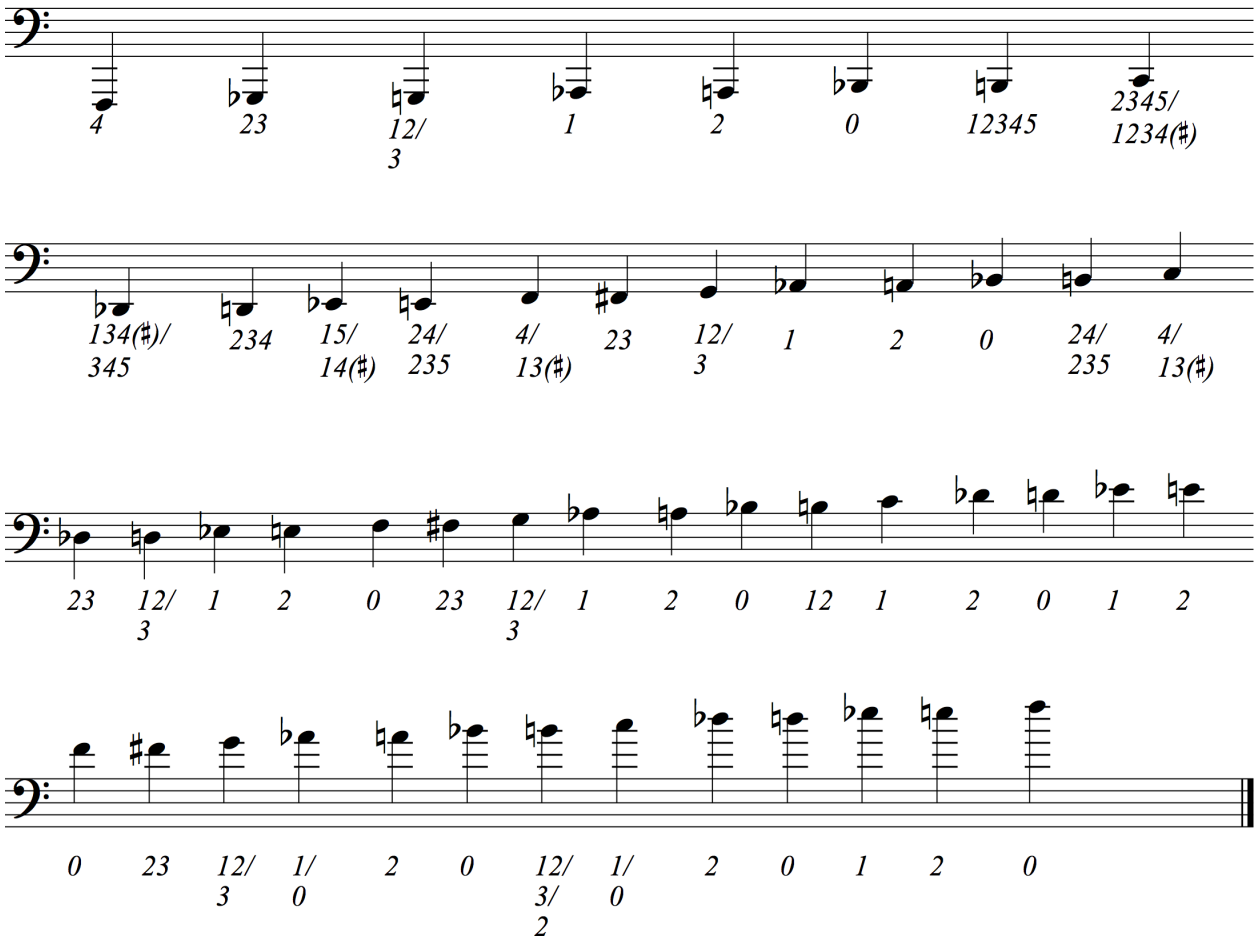


Fig. 6 – Euphonium (Non-Compensating) Fingering Pattern Chart

F Tuba Fingering Pattern

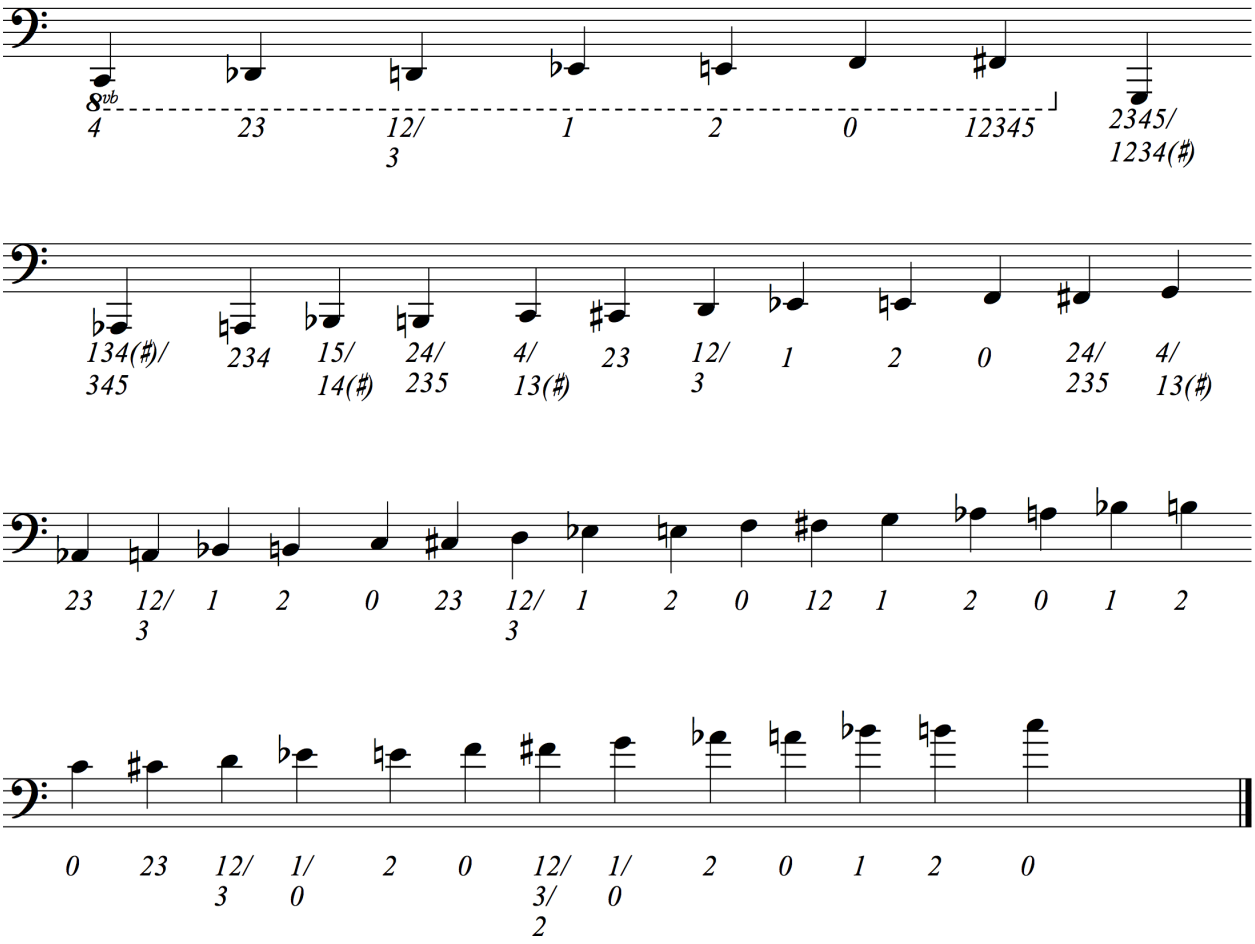


Fig. 7 – F Tuba Fingering Pattern Chart

Eb Tuba (Non-Compensating) Fingering Pattern

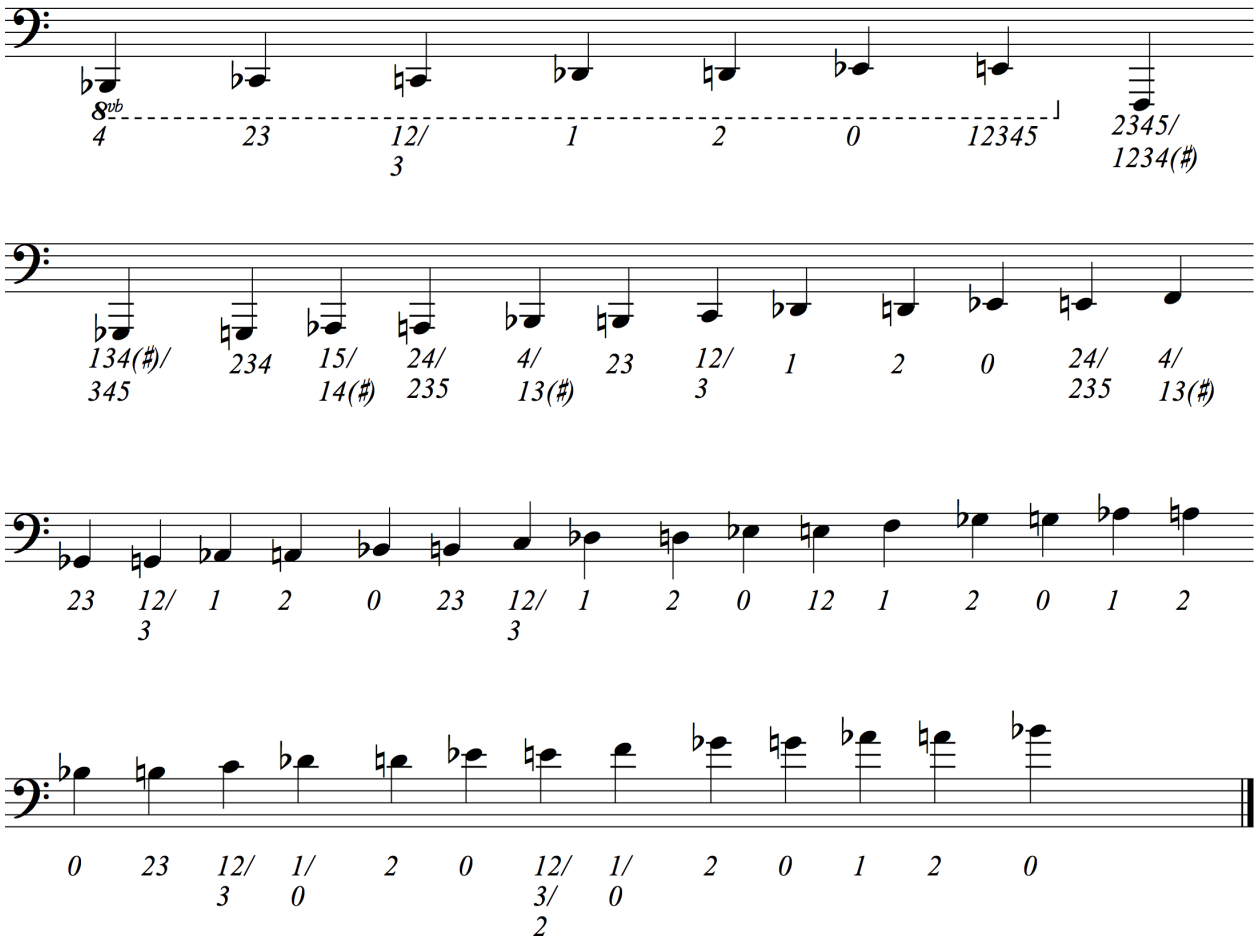


Fig. 8 – Eb Tuba (Non-Compensating) Fingering Pattern Chart

Eb Tuba (Compensating) Fingering Pattern

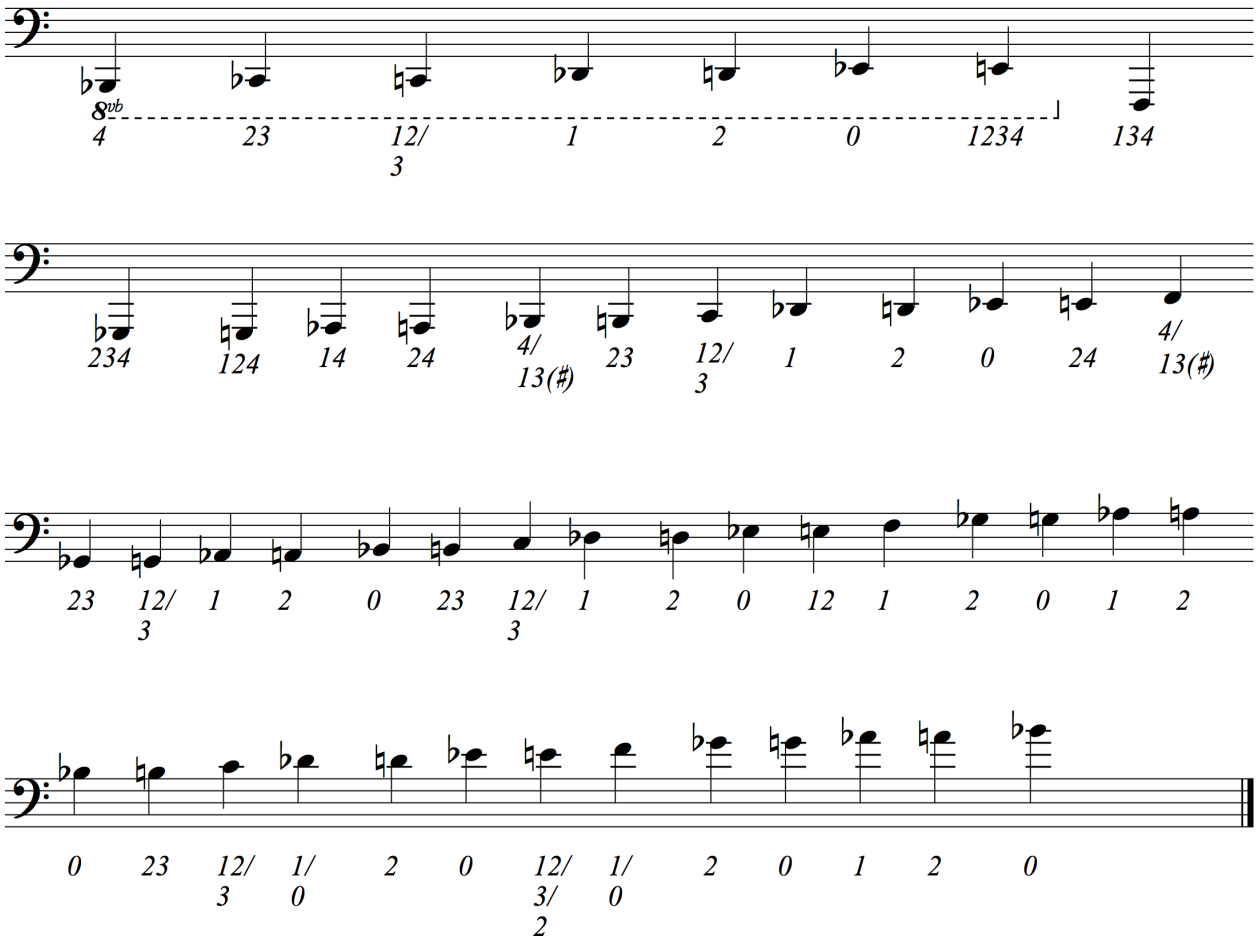


Fig. 9 – Eb Tuba (Compensating) Fingering Pattern Chart

CC Tuba Fingering Pattern

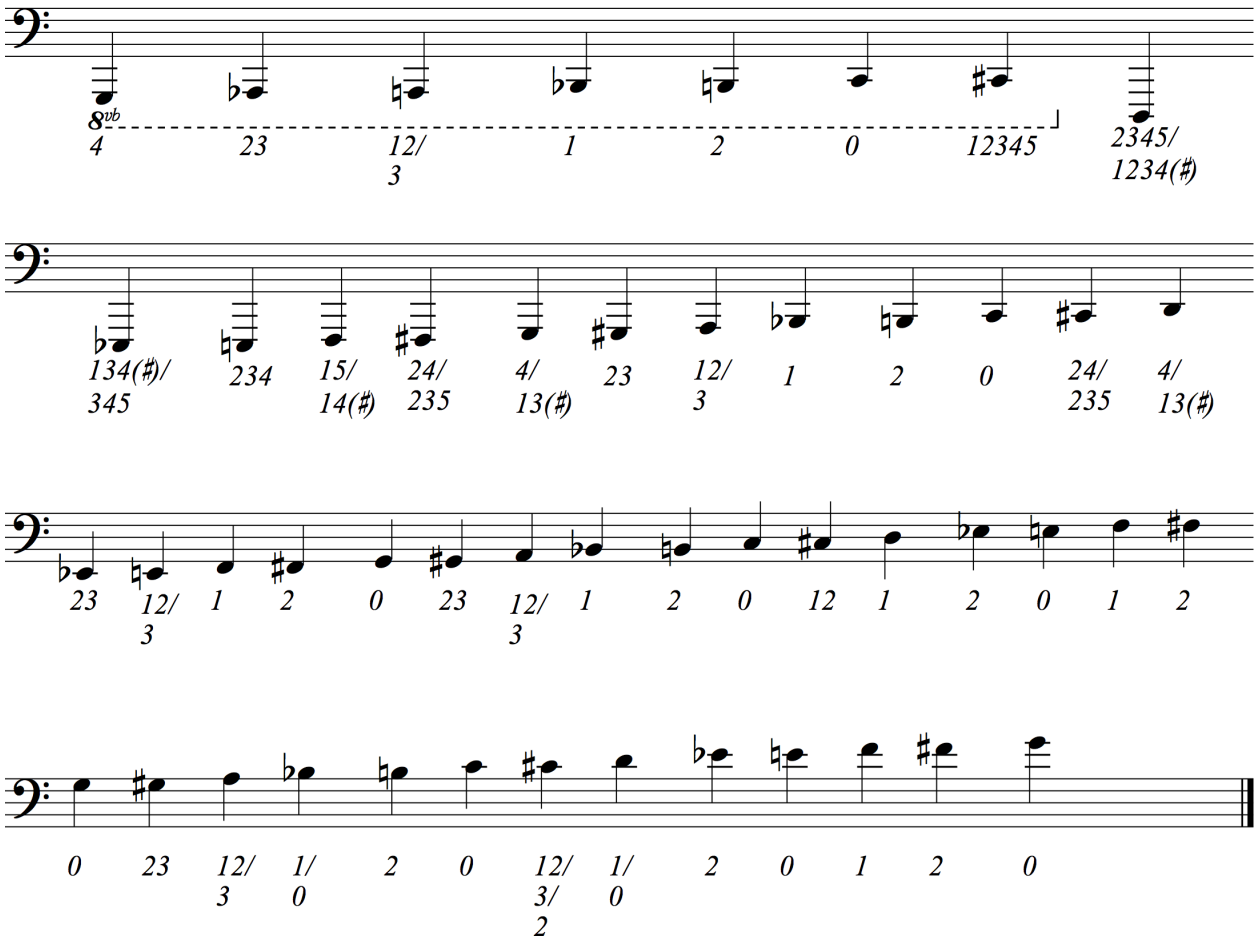


Fig. 10 – CC Tuba Fingering Pattern Chart

BBb Tuba Fingering Pattern

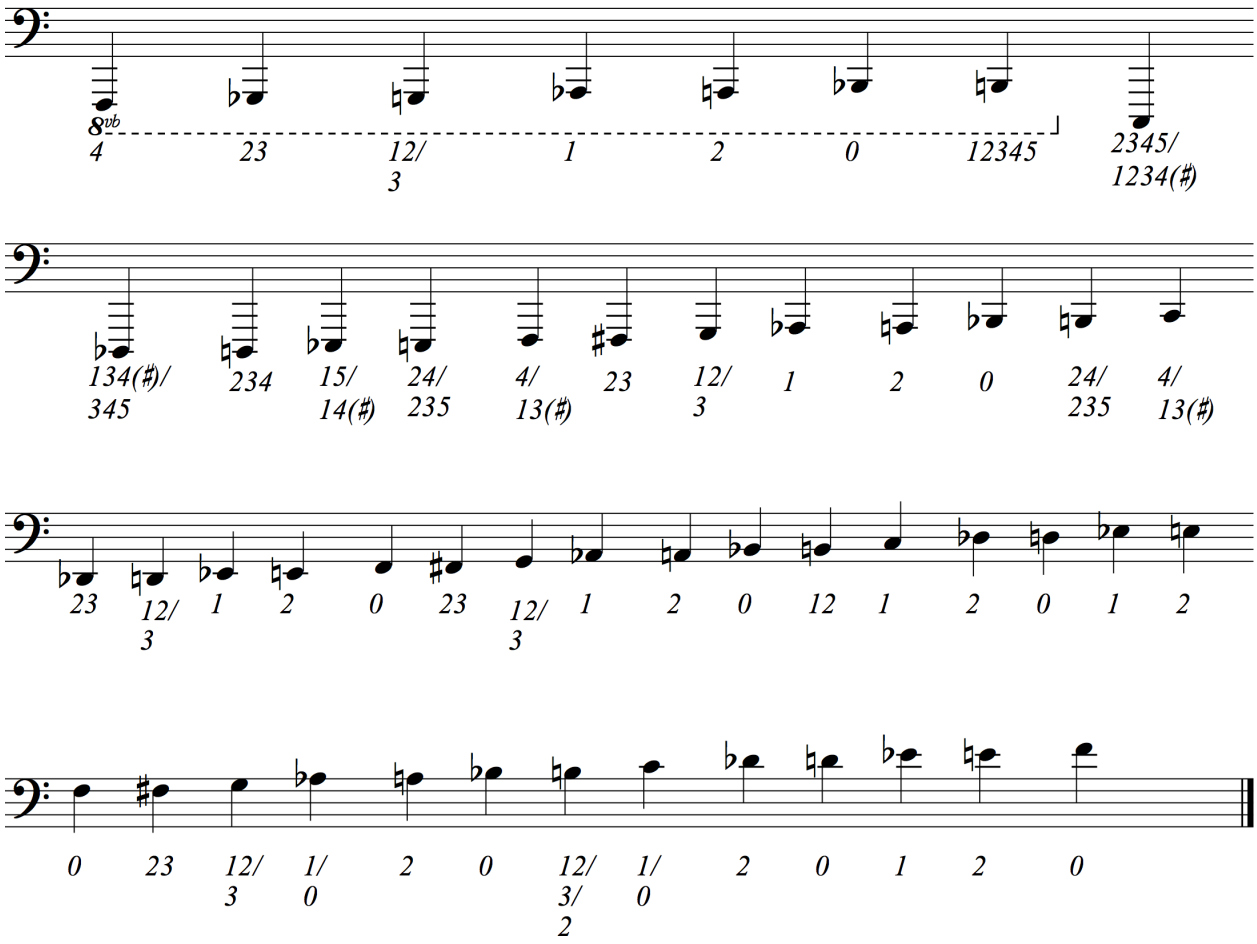


Fig. 11 – BBb Tuba Fingering Pattern Chart

Range/Harmonic Series

The bass and contrabass tubas have, effectively, the same range. The difference between the two sub-categories of tuba lies in the ranges in which they are most effective, i.e., the portion of the overall range in which the instruments are easier to navigate and speak with a clearer tone. The contrabass tubas excel in the middle-low and pedal ranges, as this corresponds with the lower partials of the BBb and CC tubas. The bass tubas, in contrast, excel in the middle and higher ranges, as the higher relative partial series of the Eb and F tubas allows for a more comfortable navigation through higher passages. All things being equal, though, a professional tubist will have access to the same range, regardless of tuba choice.

The range of the euphonium does not exhibit such variability, as there is only one key and type of euphonium commonly used by the professional euphonium community.

The following charts show the overall range for both the tuba and euphonium, and the effective ranges of the four keys of tuba and euphonium. The effective range is split into the following categories, delineated by partial series: fundamental (lowest partial), pedal (between first and the false partial, which is an acoustical phenomenon that allows most tubas and euphoniums to play the pedal notes of the horn on the open bugle), low (between the false and second partials), middle-low (between second and fourth partials), middle-high (between fourth and sixth partials), high (between sixth and eighth partials), and very high (eighth partial and higher).

In addition to the range charts given below, there is also a series of charts showing the partial series for each chromatic fingering pattern, from partials 1-16. This encompasses much of the range of each instrument, and can be useful in finding microtonal variations of different notes in the higher range of the instruments. It must be noted that the tuba and euphonium both can

play to a theoretically infinite upper partial, but in practice these 16 partials cover nearly the entirety of the range available to professional performers. Additionally, notes below the fundamental E on the tubas become exponentially difficult to perform, even for the professional tubist; notes lower than that are shown here simply to outline the basic limits of the tuba and euphonium range (indeed, some of the lowest fundamental notes listed here are beyond the range of human hearing).

When writing for the tuba and euphonium, as with any brass instrument, the composer must be aware of the ranges in which a piece of music dwells. Too much time spent in the higher ranges can be tiring, while the lowest ranges can be utilized much more extensively without noticeable fatigue.

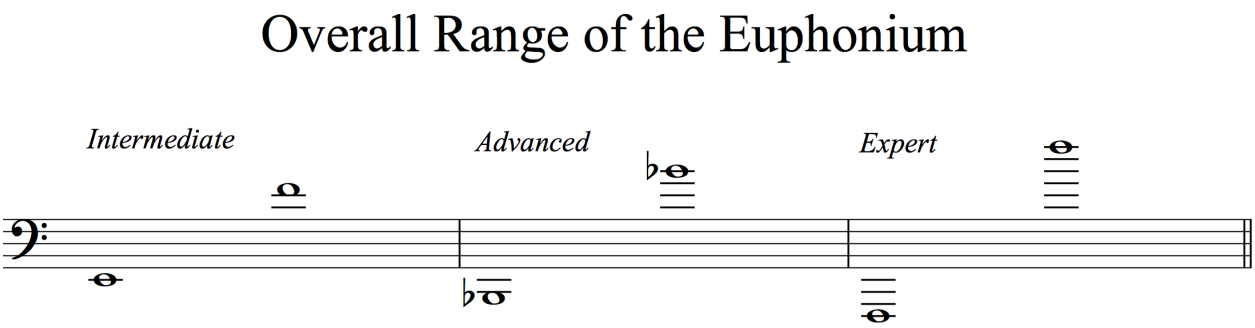


Fig. 12 – Chart for Overall Range of the Euphonium

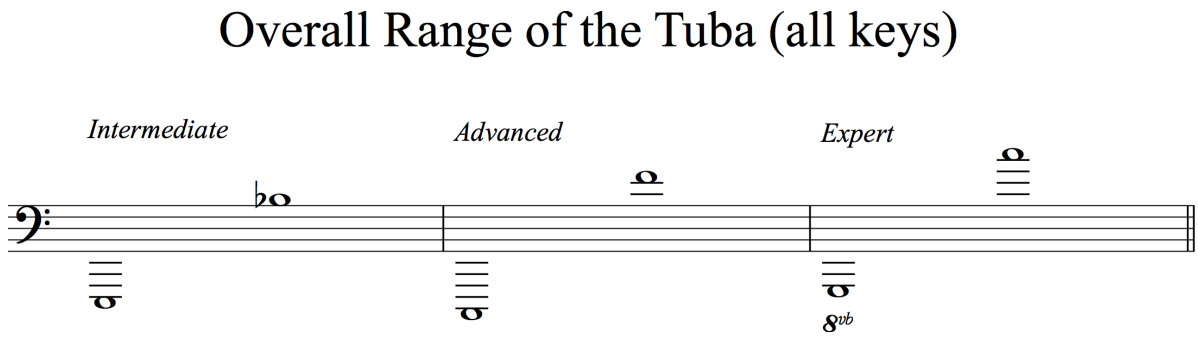


Fig. 13 – Chart for Overall Range of the Tuba (all keys)

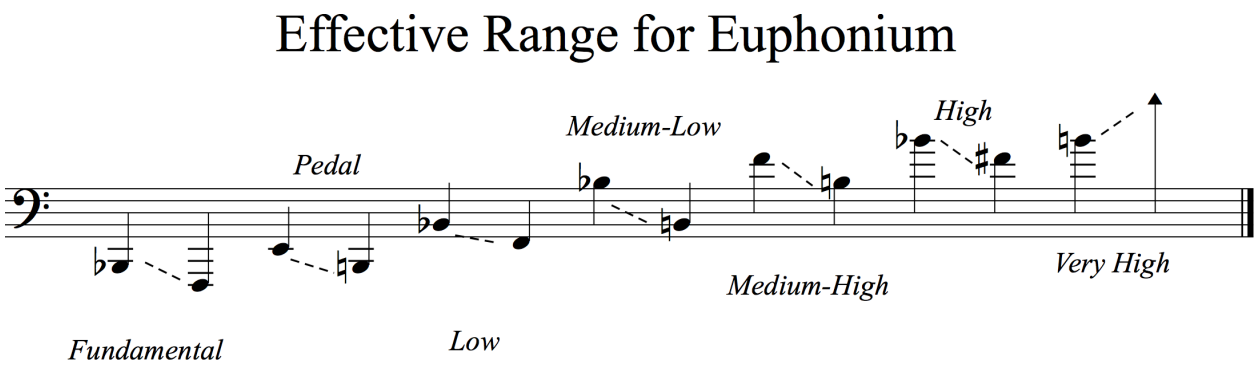


Fig. 14 – Chart for Effective Range of the Euphonium

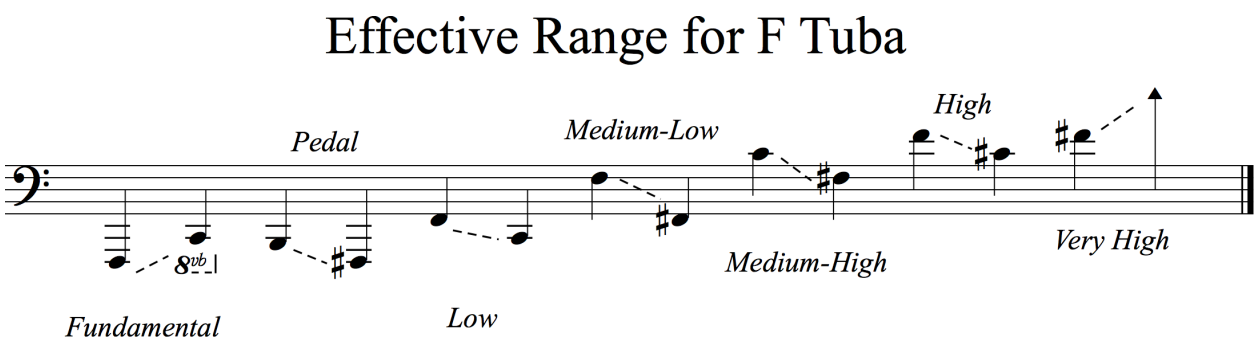


Fig. 15 – Chart for Effective Range of the F Tuba

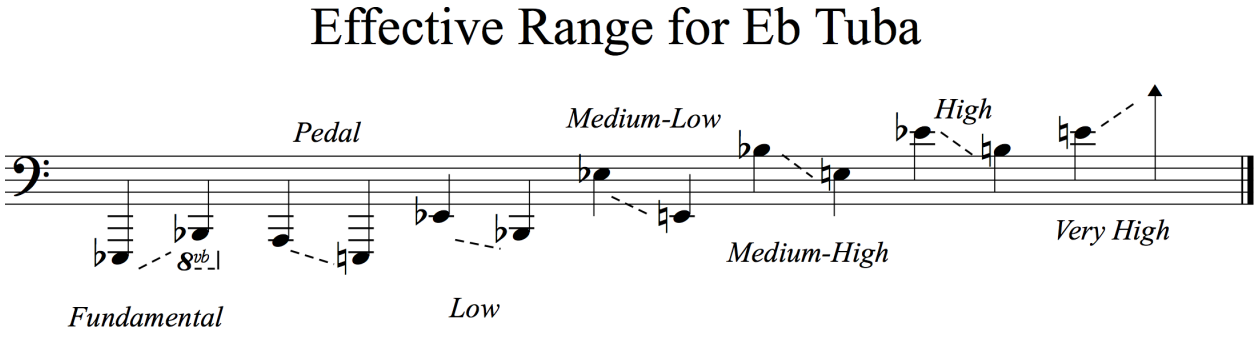


Fig. 16 – Chart for Effective Range of the Eb Tuba

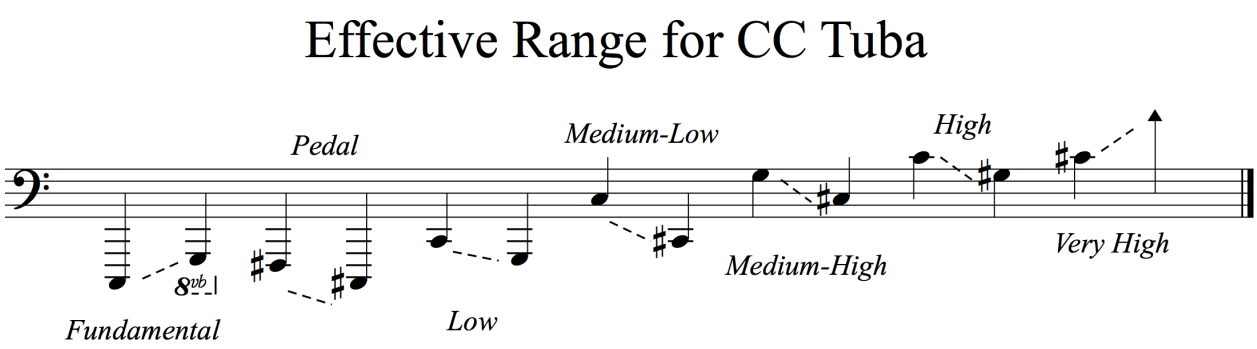


Fig. 17 – Chart for Effective Range of the CC Tuba

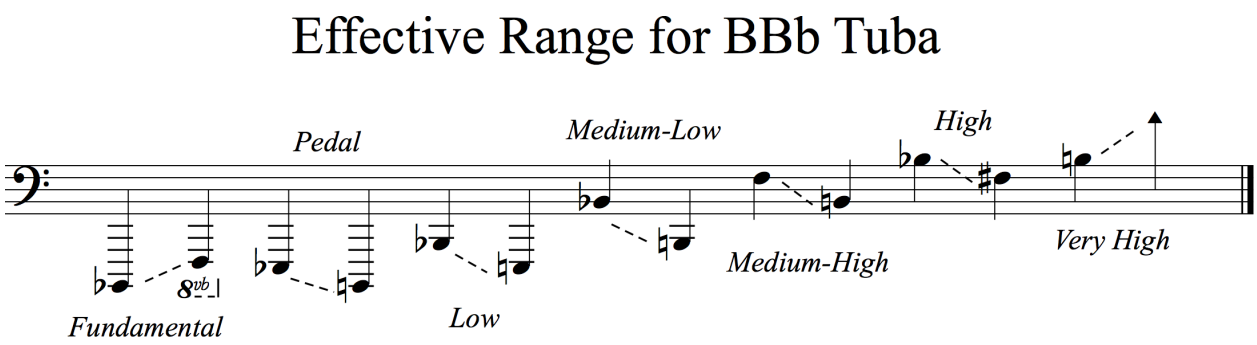
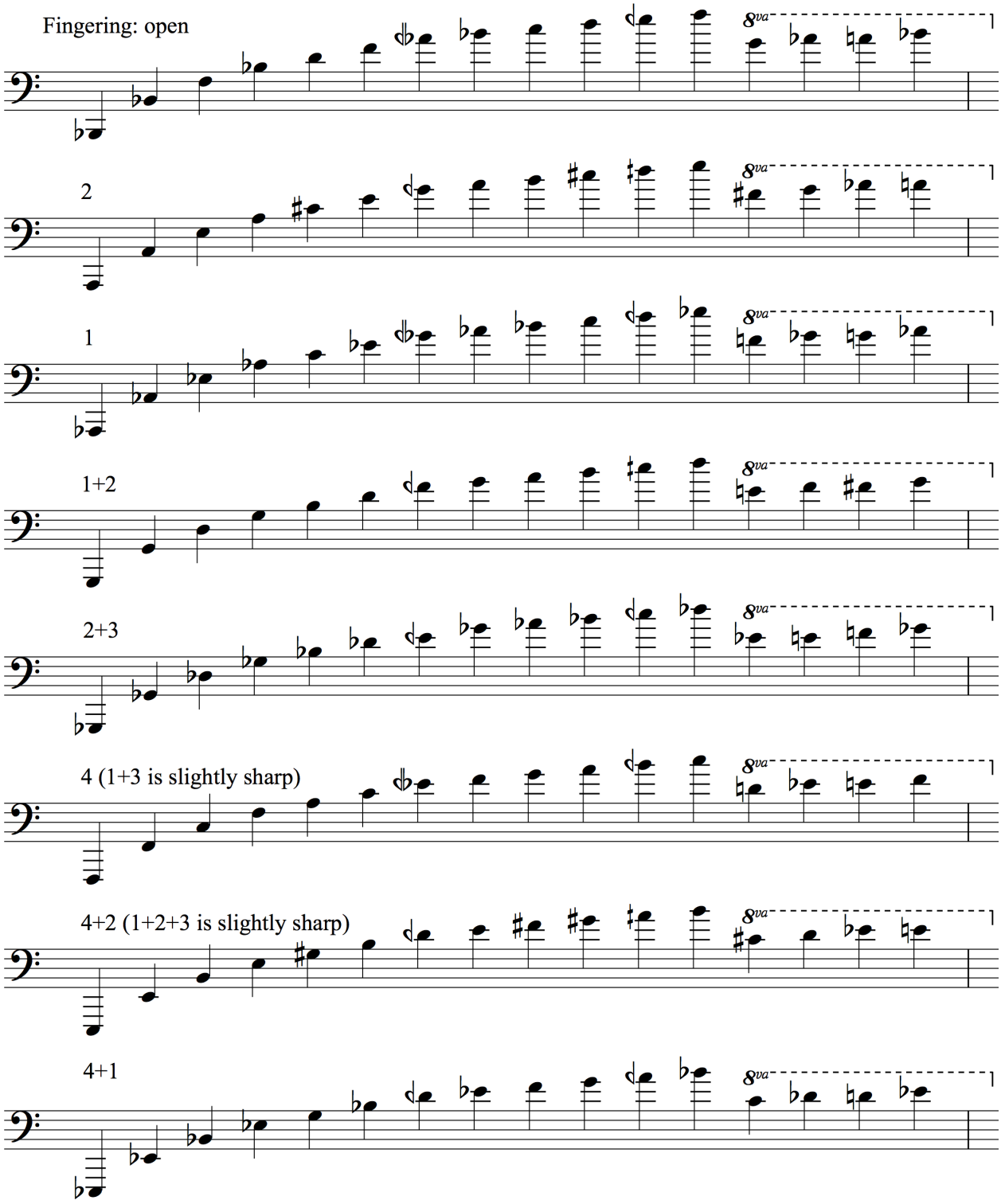


Fig. 18 – Chart for Effective Range of the BBb Tuba

Compensating Euphonium Overtone Chart
Partials 1-16



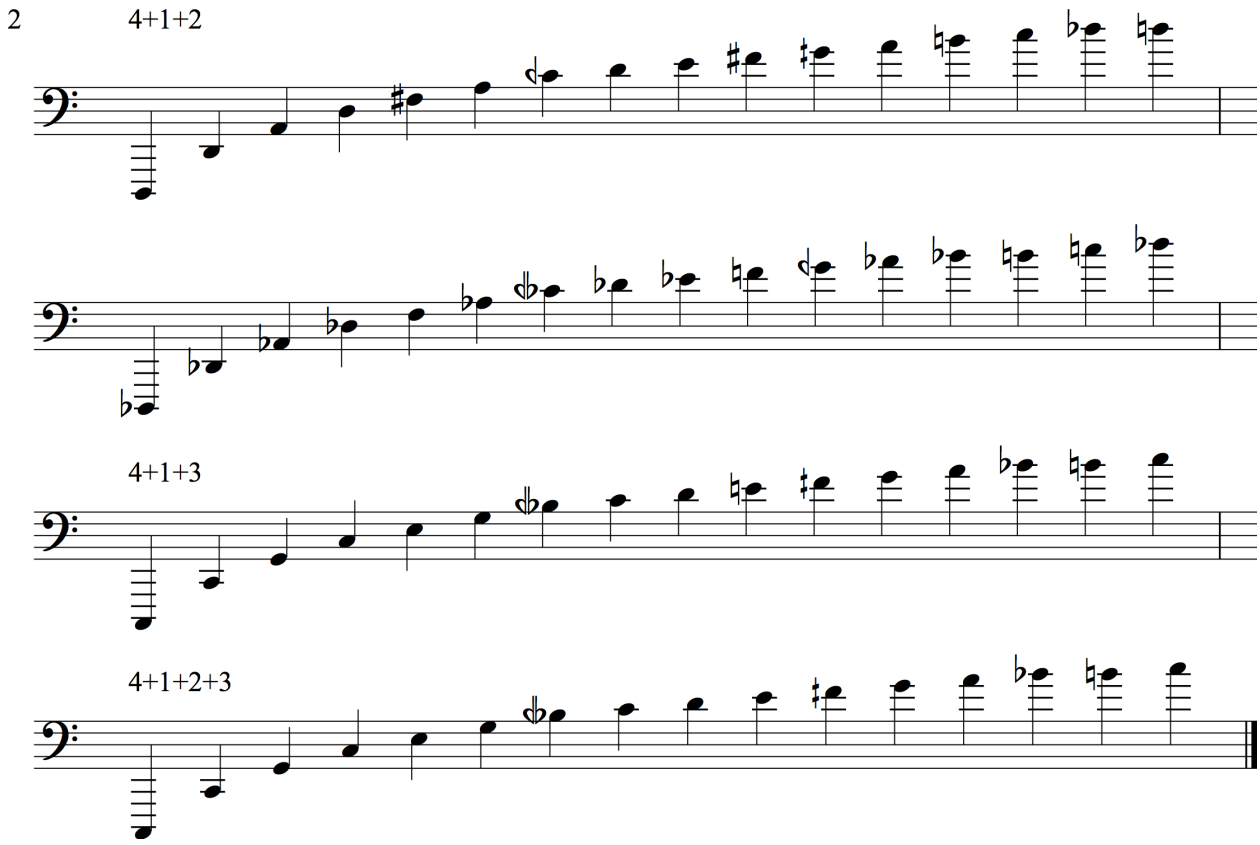
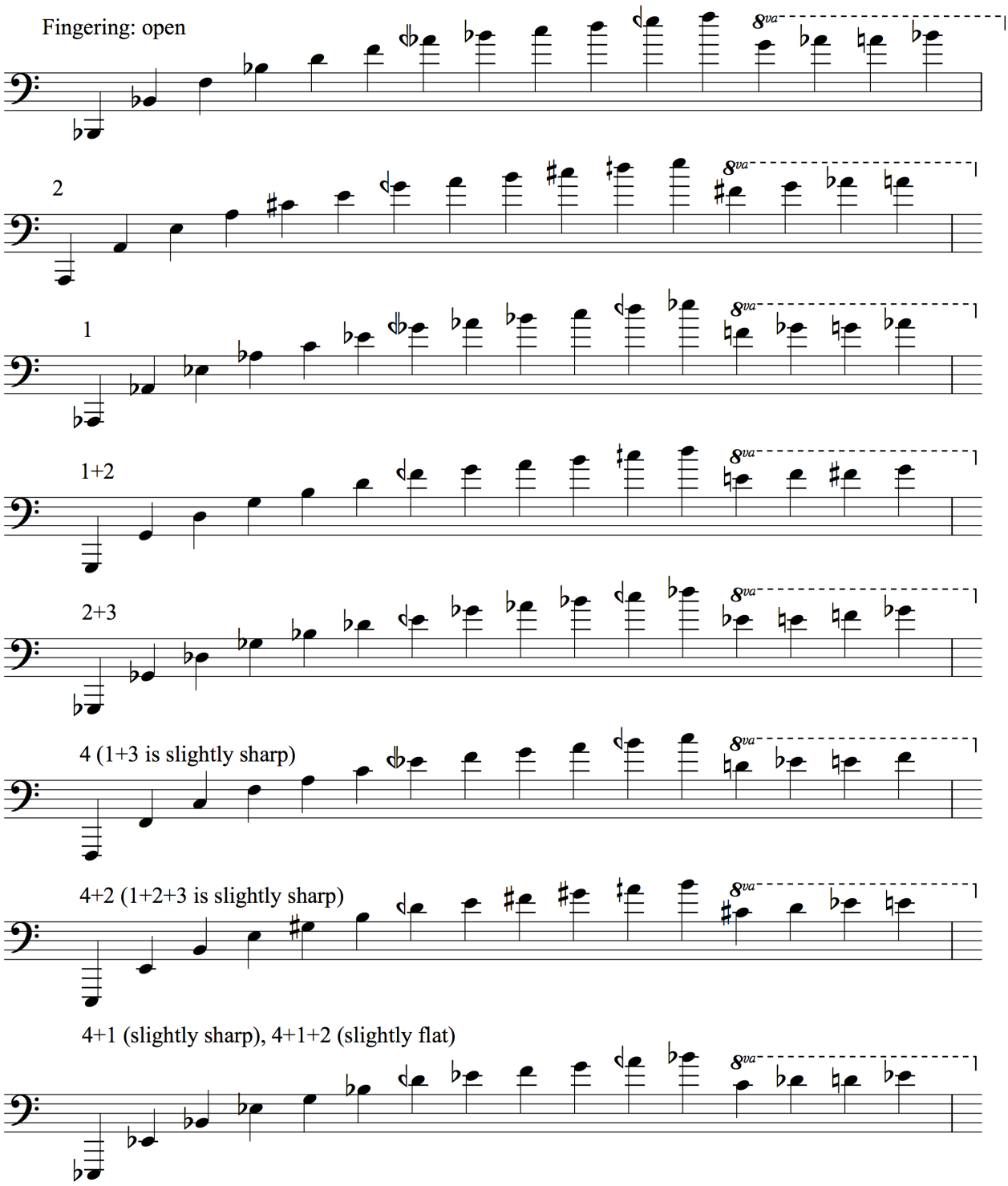


Fig. 19 – Chart for the Overtone Series of the Compensating Euphonium

Non-Compensating Euphonium Overtone Chart
Partials 1-16



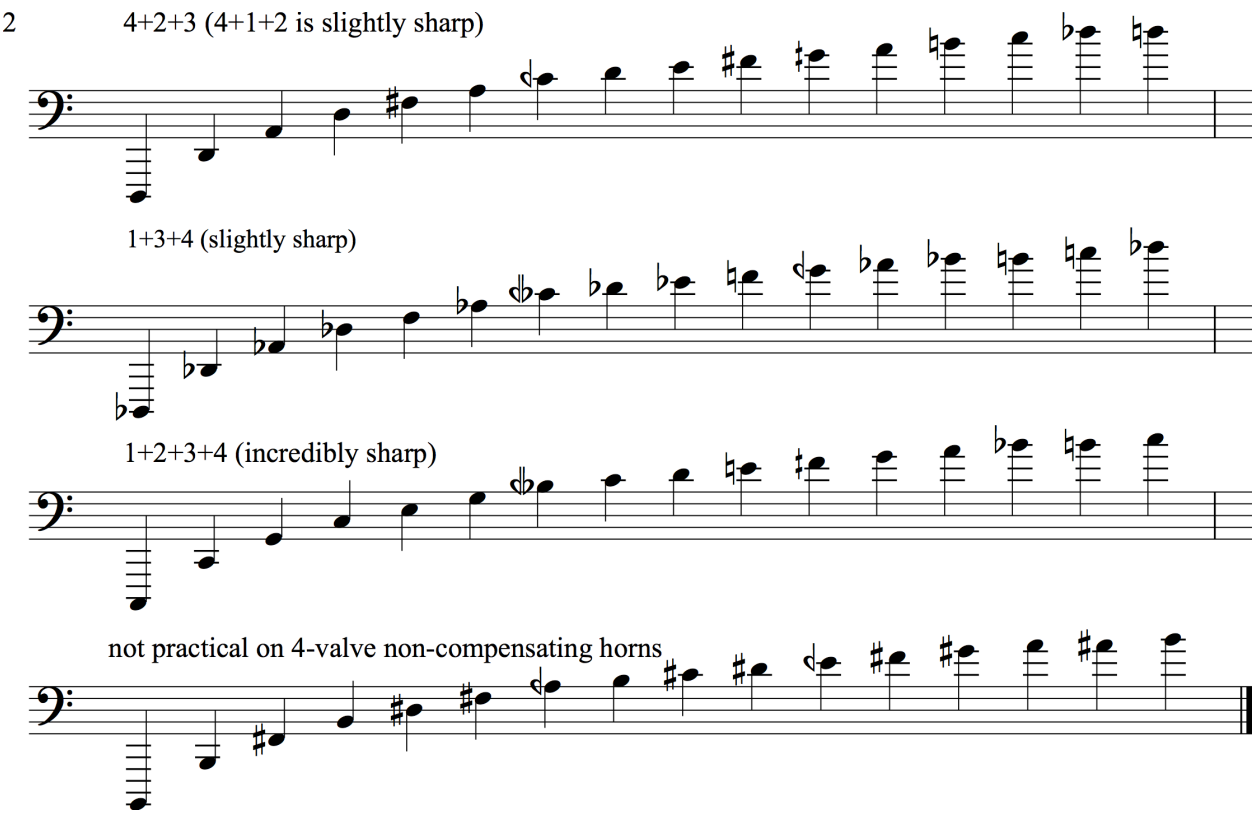
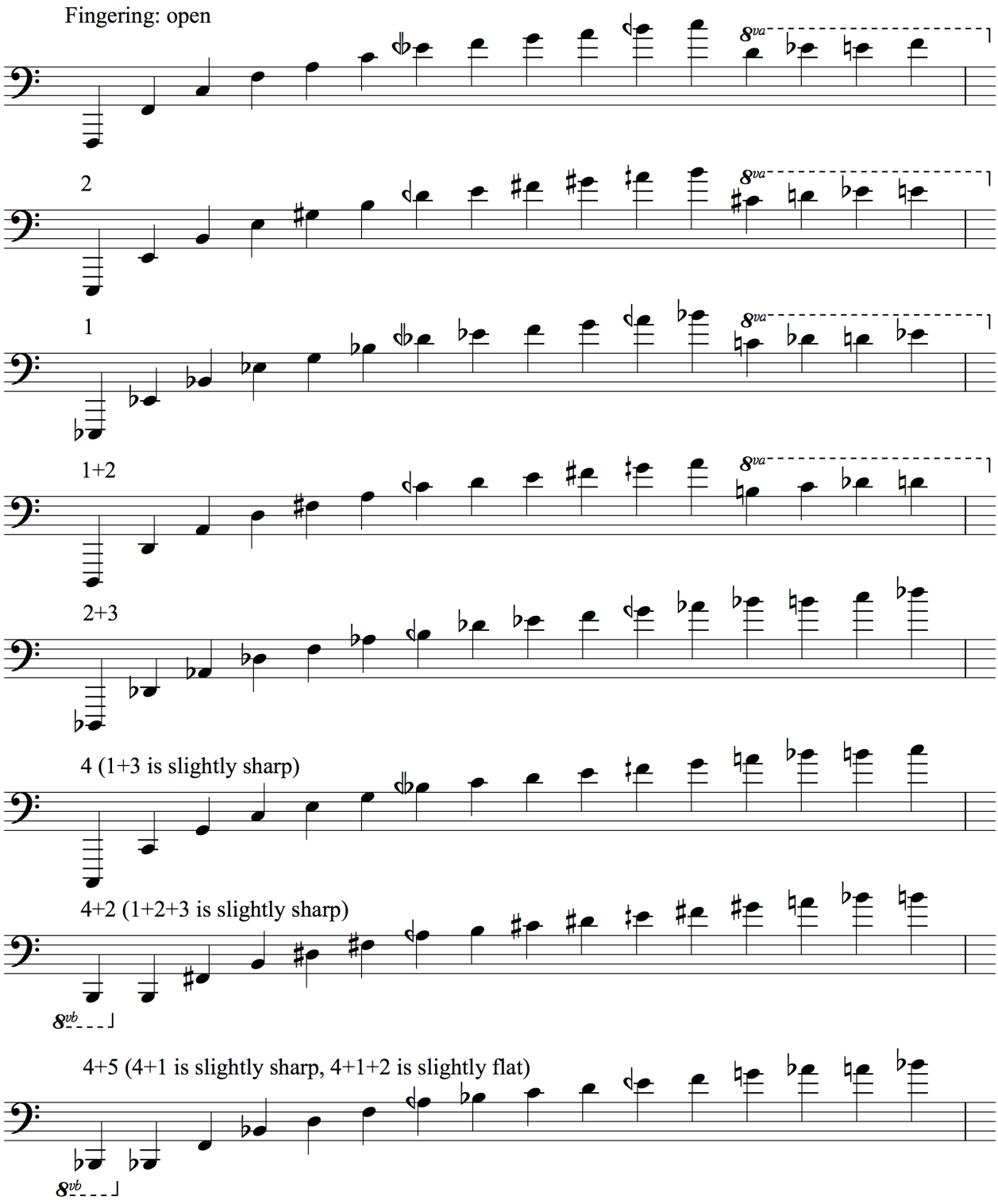


Fig. 20 – Chart for the Overtone Series of the Non-Compensating Euphonium

F Tuba Overtone Chart
Partials 1-16



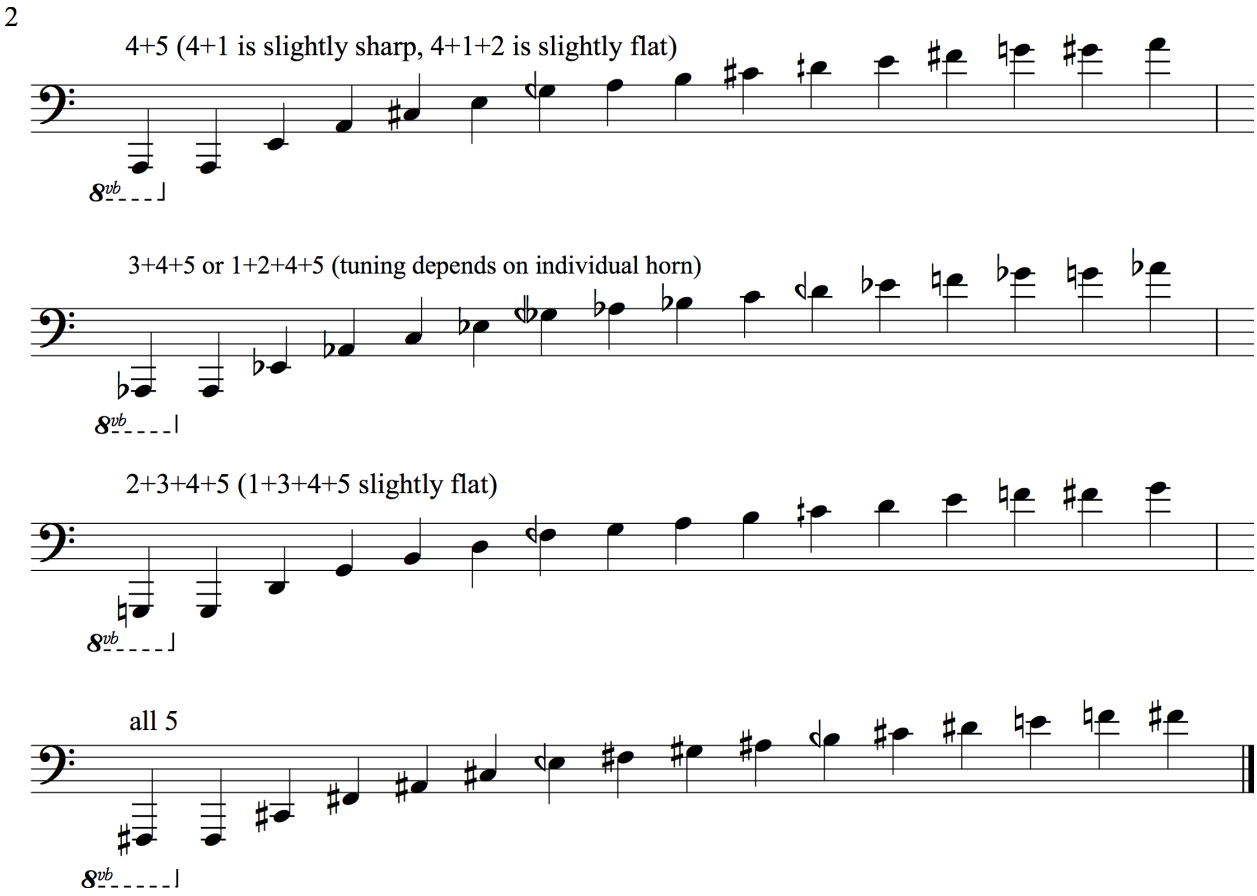
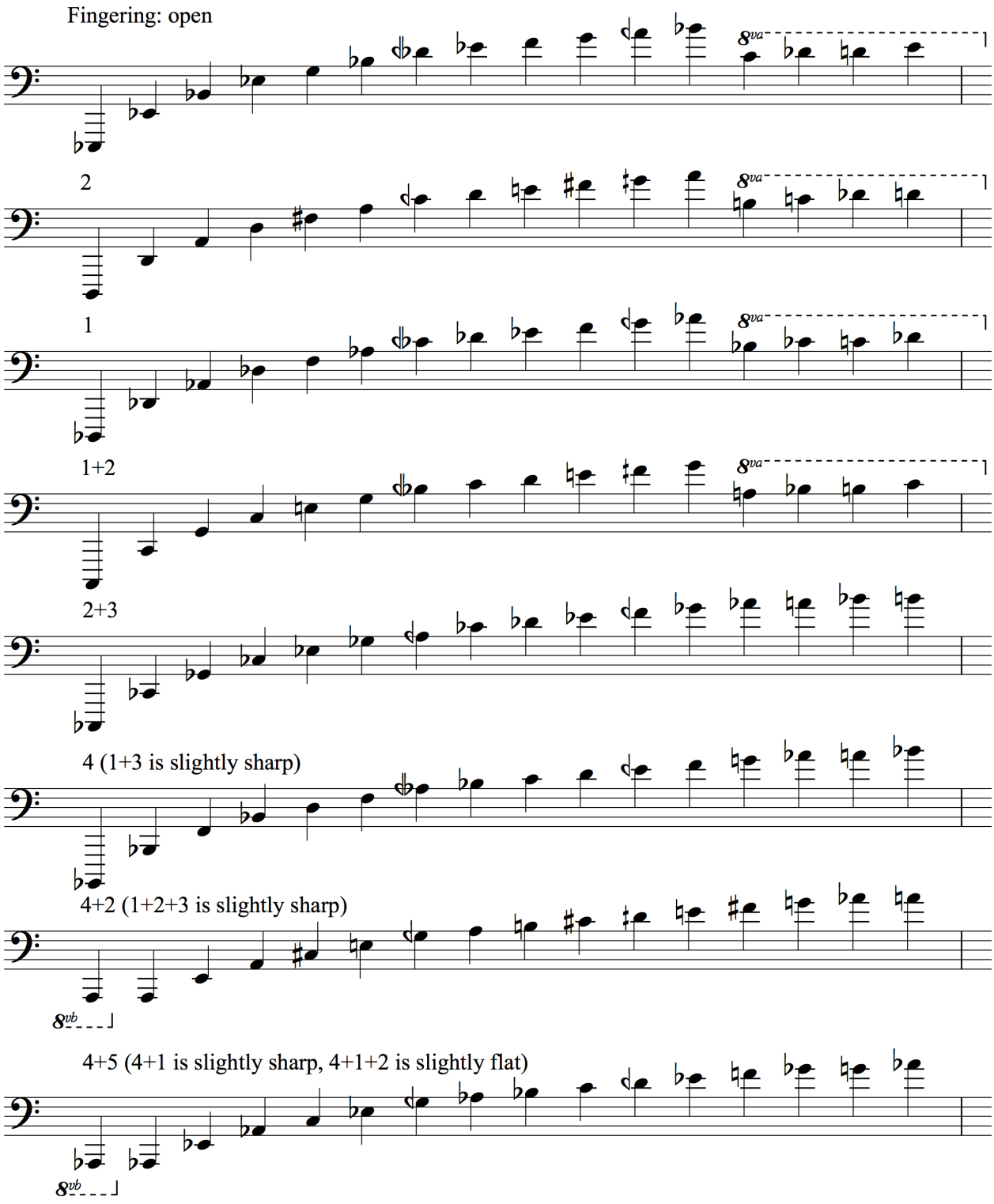


Fig. 21 – Chart for the Overtone Series of the F Tuba

Non-Compensating Eb Tuba Overtone Chart
Partials 1-16



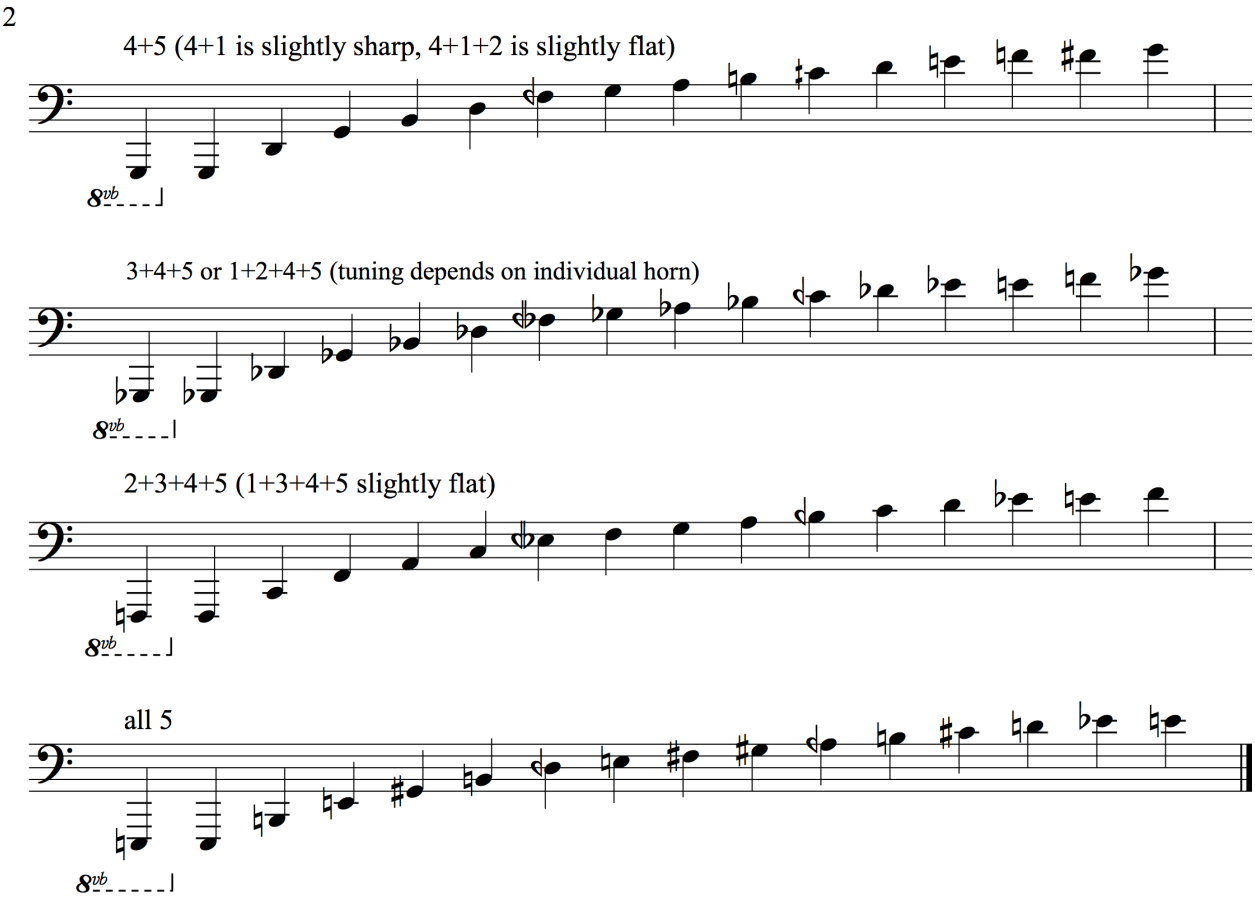
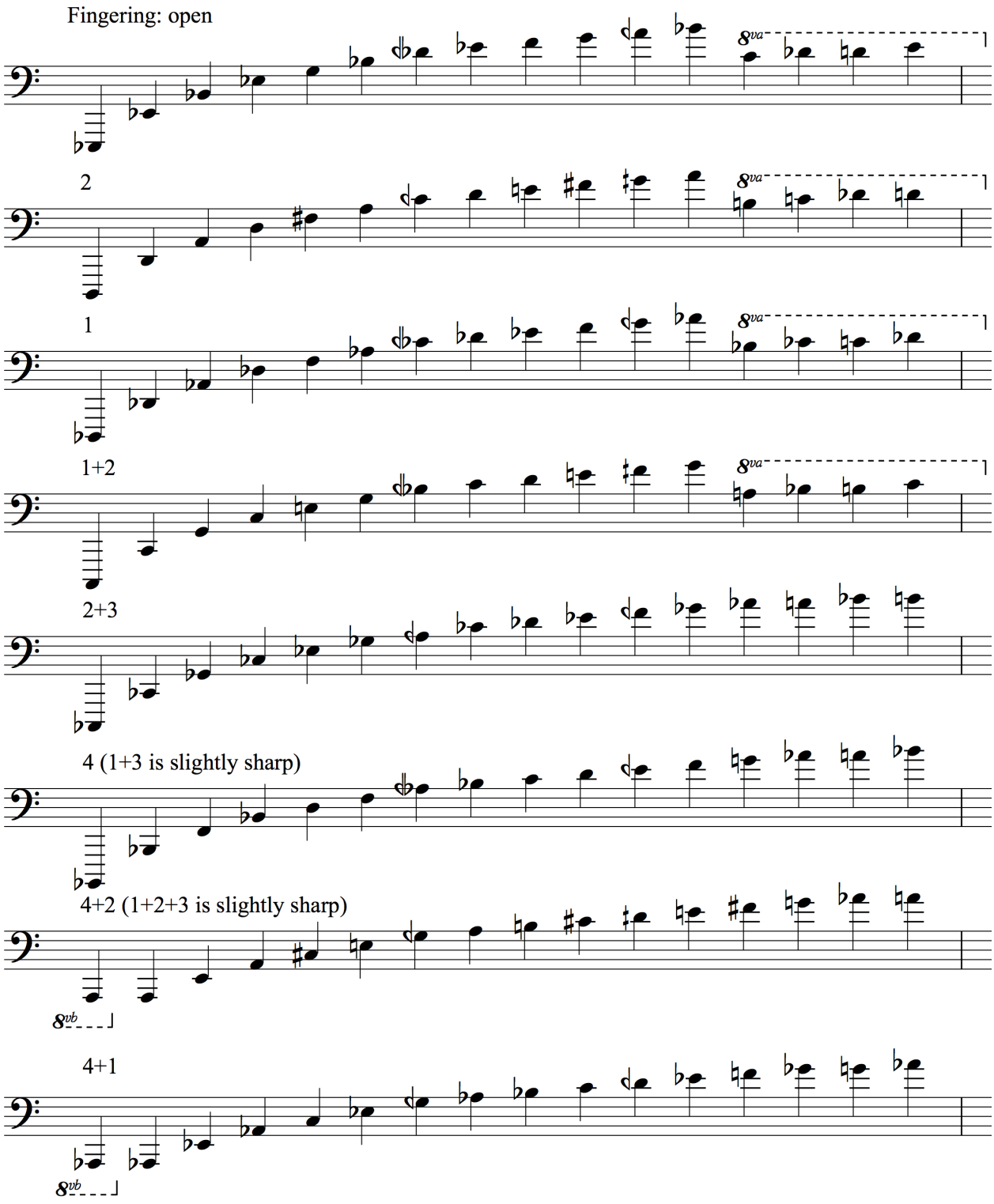


Fig. 22 – Chart for the Overtone Series of the Non-Compensating Eb Tuba

Compensating Eb Tuba Overtone Chart
Partials 1-16



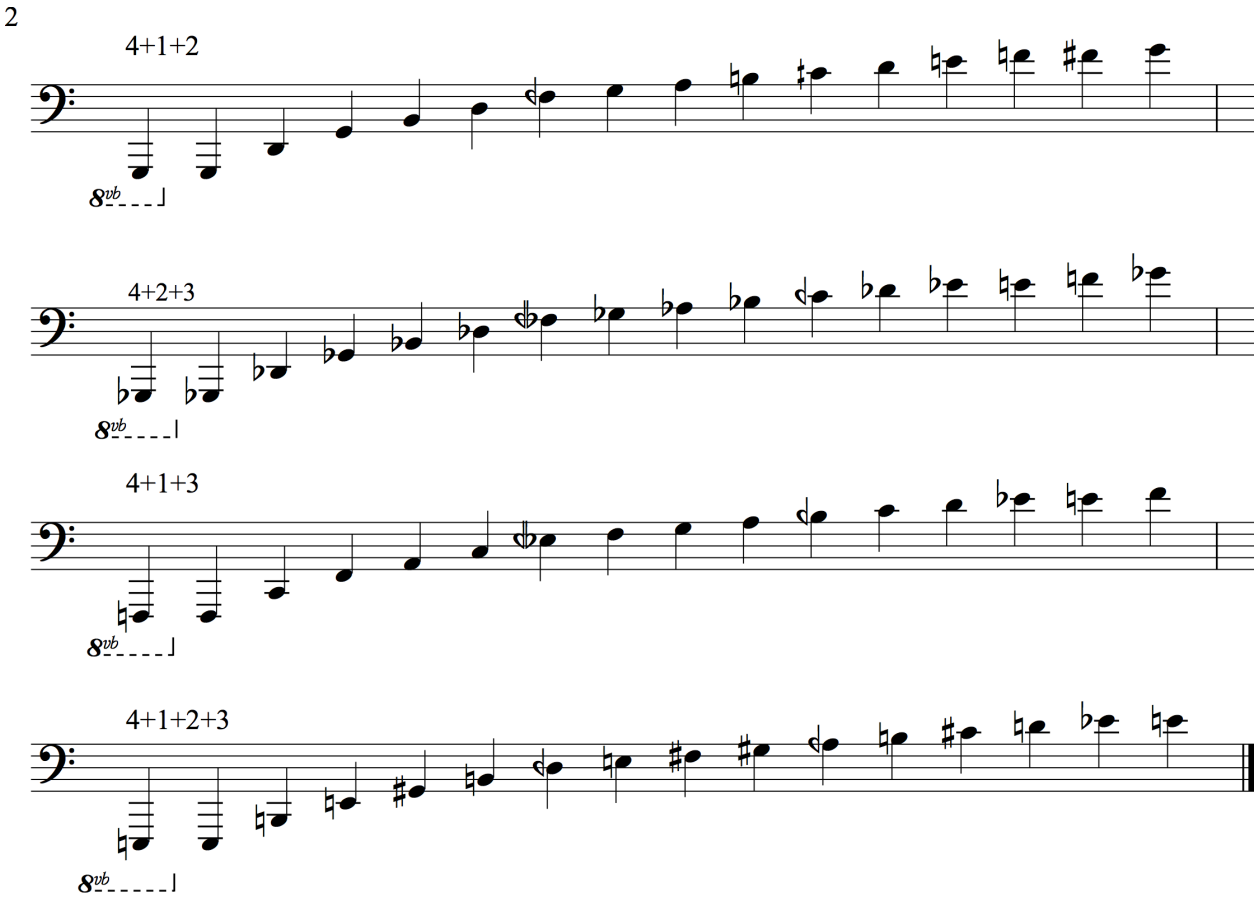
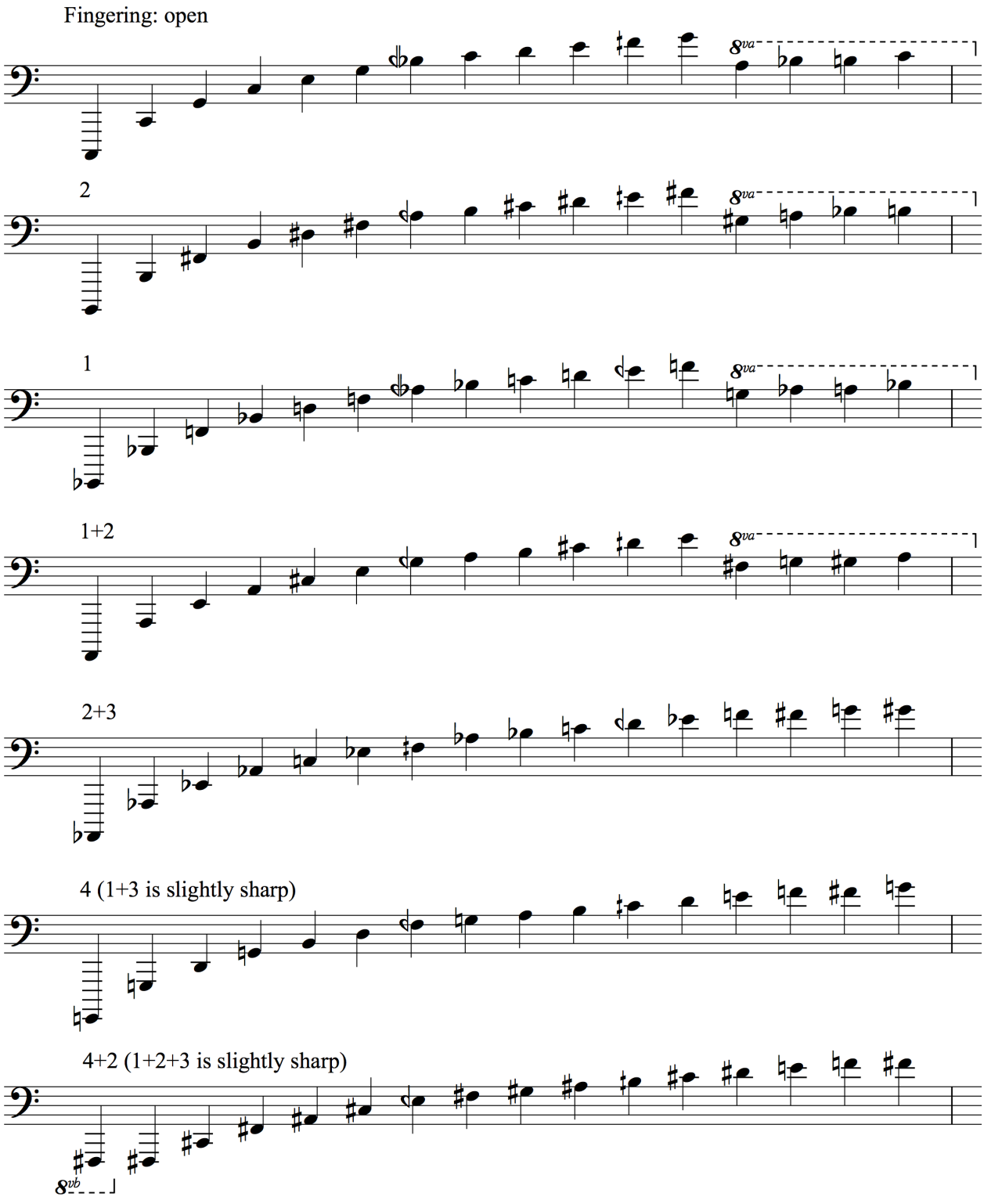


Fig. 23 – Chart for the Overtone Series of the Compensating Eb Tuba

CC Tuba Overtone Chart
Partials 1-16



2

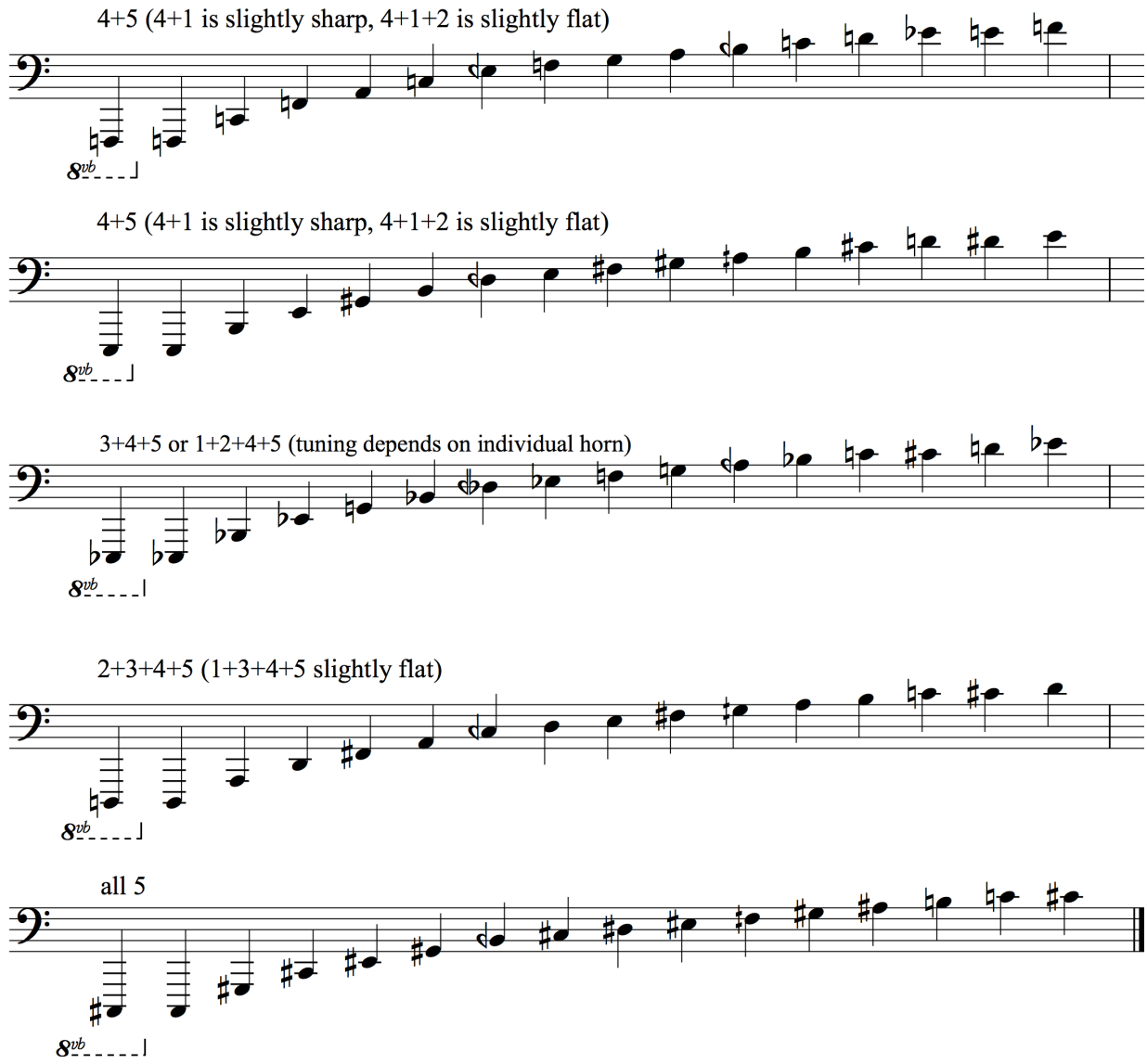
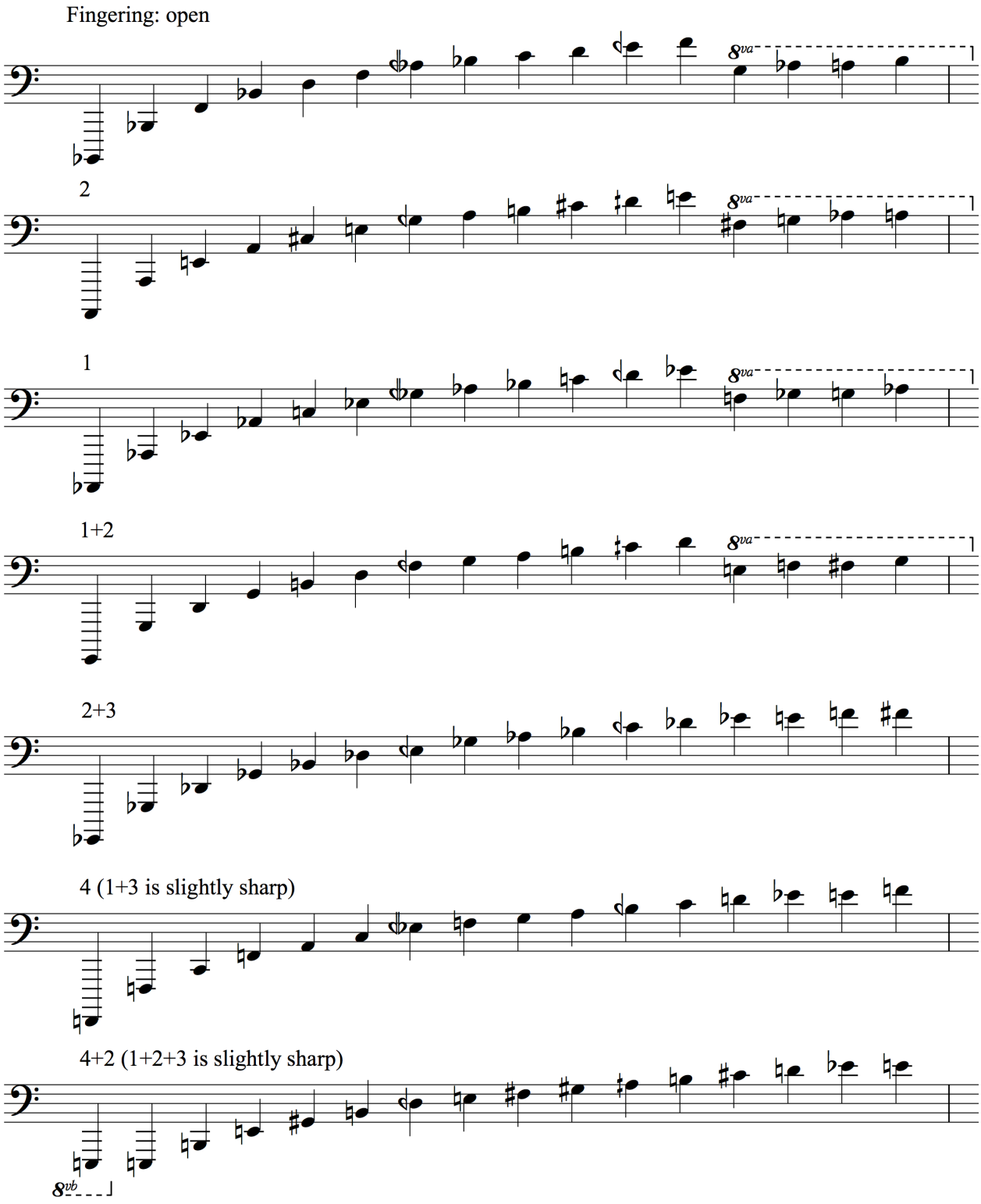


Fig. 24 – Chart for the Overtone Series of the CC Tuba

BBb Tuba Overtone Chart
Partials 1-16



2

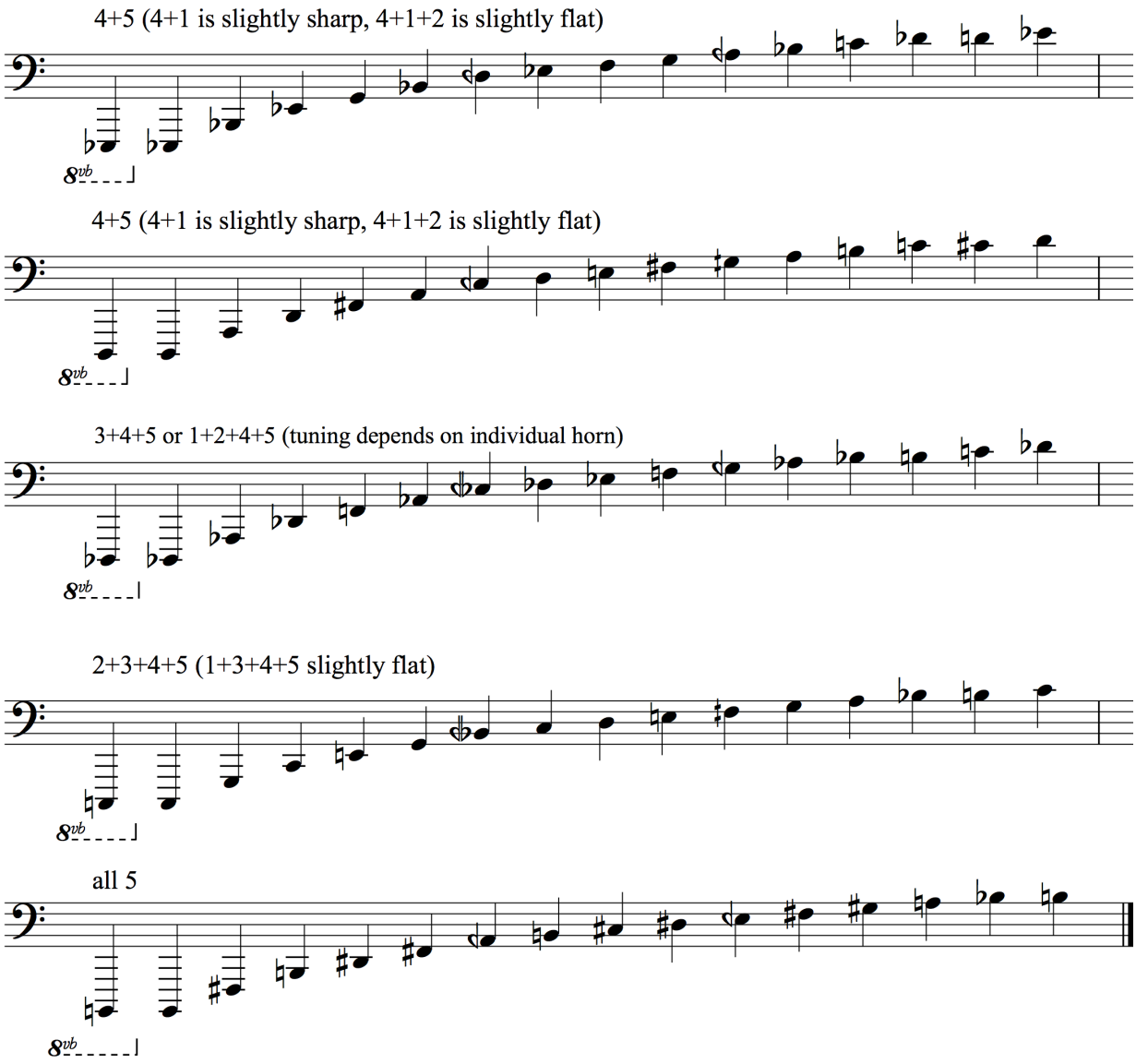


Fig. 25 – Chart for the Overtone Series of the BBb Tuba

Articulation

As with all the brasswind instruments, articulation on the tuba and euphonium is achieved by interrupting the air stream with the tongue while buzzing into the instrument. Compared to the smaller instruments like the trumpet and horn, the tuba family of instruments require a much larger amount of resonant space within the oral cavity. It is thus of great importance that tubists and euphonists from a young age learn to keep the tongue lowered within the oral cavity. When tonguing, the tip and/or front part of the tongue usually strikes around the point where the teeth and roof of the mouth meet. As the performer moves into the higher range of the instrument, the tongue usually strikes farther back on the roof of the mouth. Conversely, when playing in the low range of the instrument, the tongue moves forward in the oral cavity; in the lowest ranges, and especially on the tubas, the tongue may even be striking the tip of the teeth and the lips themselves. These physical distinctions are not fixed, though, and depend almost entirely on the individual physiology of the performer. Although the exact physiological composition of experienced performers varies wildly, the end result (clear articulation) is primarily an auditory issue, and as such may be accomplished by many similar yet slightly-different physical methods.

Compared to its higher-pitched relatives in the brasswind family, the tuba and euphonium articulation process takes quite a bit more physical effort to achieve the same result. This does not mean that fast, clean articulation is impossible: as a general rule, tubists and euphonists both develop the skill to cleanly and rapidly articulate individual notes, regardless of range. The main limitation is less the amount of effort required, and more the simple acoustical issues facing the euphonium and tuba, (especially the latter); at a certain point, no amount of clean articulation can make the low frequencies of the pedal range speak more quickly than is possible given the laws of acoustics.

Brasswind players almost uniformly learn to single, double, and triple tongue, and one of the goals of the professional brass player is to have a clean amount of overlap in speeds between the three styles of tonguing. The single tongue is often denoted by the "dah" or "toh" syllable (an onomatopoeia representing the sound made when speaking this type of articulation), while the double tongue is achieved by adding a second articulation further back on the roof of the mouth ("dah-gah", "toh-koh", or similar). The triple tongue can be represented with two different techniques: by two forward articulations with a backward articulation in the middle ("dah-gah-dah"), or two forward articulations followed by one backward articulations ("dah-dah-gah"). The choice of which to use is left to pedagogical preference, and in professional usage, there is no difference between the two methods of triple tonguing.

It bears repeating the issue of articulation in the extreme low range of the tuba and euphonium. Although this issue is less extreme with the euphonium, the use of rapid, detached articulations in the low range of the tuba can become a problem in certain contexts. The low frequencies of the tuba pedal range (reaching down nearly to the threshold of discernible pitch) are ill-suited to rapid, detached performance, unless a non-pitched rhythmic sound is desired. At the same time, the amount of air required to perform at an adequate volume in the pedal range of the tuba and euphonium both makes sustained, detached articulations difficult in many circumstances. If such a style of performance is desired within the low range of the tuba, it is the author's suggestion that either 1) the composer be prepared to lower the speed of the section of the work in question, or 2) that the composer acknowledge the slim likelihood of such a figure being accurately reproduced.

Breathing

The tuba and euphonium both require a high volume of air to function. For the lower keyed tubas, this can approach the exhalation of nearly 5 liters of air per second, (a figure which is put into stark relief when considering the average adult lung capacity of around 6 liters).[219] As a result, the young tubist and euphonist learns first and foremost how to control and regulate their breathing, in order to maximize their ability to perform for long periods of time.

For composers, this means that any work written for the tuba family must necessarily consider the demands that their music places on the performer's breathing, as the musical and physical elements of performance are necessarily intertwined for tubists and euphonists. In the author's experience, this can often be accomplished by simply allowing for the performer to place breathing spots where necessary throughout the work; from a very early age, all serious performers of the tuba family learn how to place musically-sensible breathing spots, and this is true even of the contemporary repertoire. If the composer is aware of the immense breathing demands placed by the tuba and euphonium, and is amenable to small, nearly inaudible breaks in certain musical phrases, then the performer will take care of the rest.

If the composer wishes to manually adjust their music for the breathing demands of the tuba and euphonium, a few guidelines are necessary. First, all members of the tuba family require a larger volume of exhalations in the low range than in the high range. There may be only a small differential between air usage in the low vs. the high range, but it is noticeable to the performer. Second, although it may seem counterintuitive, playing at a soft dynamic does not necessarily mean that the performer will need to use less air than at louder dynamics. This is due to the nature of the embouchure buzz; at high dynamics, a large quantity is required to sustain the

[219] "Lung Capacity and Aging | American Lung Association," American Lung Association, accessed January 3, 2019, http://www.lung.org/lung-health-and-diseases/how-lungs-work/lung-capacity-and-aging.html.

energy of the buzz, while at low dynamics a large quantity is still needed to sustain the shape of the lips while buzzing less vigorously. Finally, the tuba-euphonium community encompasses a wide variety of lung capacities, as a large vital capacity is not required to perform to a high standard on the tuba and euphonium. Everyone has a different physiology, and this is dealt with fully in the course of a traditional training as a tubist and/or euphonist. If you are composing a work for a professional tubist and/or euphonist, rest assured that the performer will know how to use and control their personal physiology to the best of their ability. If writing for an intermediate or beginning performer, then some caution might be taken to not write music that taxes the physical abilities of the performer (for instance, by eschewing overly long legato lines, being careful about extended sections of loud playing, and similar drains on the lung capacity of the performer).

Section 3. Contemporary Techniques

The entire field of contemporary techniques on the tuba family of instruments encompasses many different aspects of performance, and in order to provide a clear description of each technique, the following categories will be utilized: *Air, Voice, Lips, Tongue/Oral Cavity, Movement, Instrument,* and *Digital/Analog*. These categories were chosen primarily to provide a framework for discussion, as each technique utilizes many different aspects of the act of performance. *It is vital to recognize that many of these techniques cross over to two or more different categories*. For instance, the use of split tones could be categorized as a technique that utilizes the air stream, the lips, and the tongue, based on how the performer utilizes that technique. Instead of creating a complex system that relies on cross-categorization, each technique will instead be discussed in the category that most clearly pertains to the primary method of performance of said technique. What follows then is a catalog of contemporary

techniques, each of which includes a description of the method of performance, any necessary information for the use of said technique in a composition, a brief discussion of the notation of each technique in common practice, a listing of the relative difficulty of the technique (indicated with the levels *Beginner, Intermediate, Advanced,* and *Professional*), and a listing of pieces that demonstrate the technique in question. Where it is proper, each entry will also include a short musical example demonstrating the technique at hand.

A. Air

i. Breath sounds

Method

Given the fact that both the tuba and euphonium are large amplifiers of physical activity, it is possible and effective to use the sound of the breath as a compositional element. In normal practice, tubists and euphonists are careful to make sure that the breath is not amplified by the instrument: the breath is done outside of the mouthpiece, in order to minimize unwanted noise. When specifically utilized, though, a variety of sounds can be made by breathing in or out through the instrument (via the mouthpiece opening). The type of breath sound created through the instrument is determined primarily through the speed of air and the oral cavity shape. A tight oral cavity will result in a sound that consists mainly of upper harmonics, while an overly-large oral cavity will emphasize lower harmonics. The speed of air can be varied over time, so that a sort of "whooshing" or wind effect is created. This is generally easier to accomplish when exhaling, although it is possible to create a similar sound when inhaling.

Necessary information

A few guidelines are necessary to utilize this technique to its best effect. First of all, slow breathing in the instrument can be soft dynamically to the point of being nearly inaudible. If the

instrument is externally amplified, this is no big issue, but when played acoustically this can be a factor. Additionally, the use of loud, repeated breathing sounds (as in the creation of a 'bellows effect') can be physically taxing to the performer. There is little resistance when blowing air into the tuba, and doing this at a high volume for an extended period of time can lead to hyperventilation in the extreme, and physical discomfort in milder cases. Finally, breathing in through the instrument can, in some cases, lead to physical discomfort in the performer. This happens primarily if an instrument has been improperly maintained, as the leadpipe may have started to accumulate some debris. Regular maintenance on behalf of the performer will mitigate this issue. Moreover, the use of non-biodegradable valve oils may lead to a situation where a performer is inhaling harmful particles from the valve block. Again, this is non-issue provided that the performer observes proper maintenance and uses suitable valve oils (something that should be done regardless of intent to perform contemporary music).

Notation

There are a variety of notations used to delineate this effect in the score; as always, consistency and clarity of notation is advised. One common notation technique is to use wavy lines to indicate the relative pitch and motion of the air sound, as well as diamond, x-shape, or slashed noteheads to distinguish from standard notation. As the breath sounds carry the possibility of being rapidly alternated with standard notation, it is vital that the symbol used for this technique be clearly delineated from the standard notehead.

Relative difficulty

Beginner

Works to consider (bolded titles are particularly representative examples of this technique)

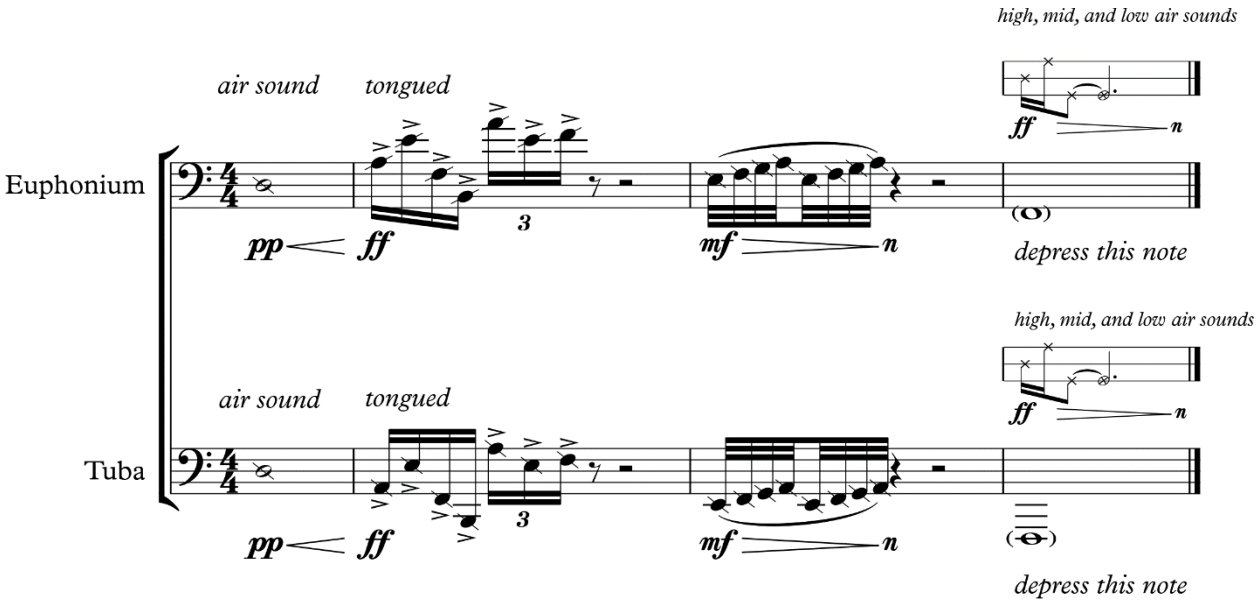
Solo Tuba Music – Cort Lippe

Solo No. 3 **- László Dubrovay**

Midnight Realities – Morgan Powell

From the Quiet… - Peter Hoch

Breath and Sounds **- Beatrice Witkin**



Ex. 1 – Breath sounds

ii. Circular breathing

Method

Circular breathing is the act of pushing air out through the oral cavity while breathing in through the nostrils. When done correctly, the performer can sustain a buzz for as long as necessary, although small dips in sound level may be discernible at the crossover points between stored and fresh air. Many higher pitched wind instruments utilize this technique in their repertoire, but due to the high air demands of the tuba family, this technique is seldom called for in the contemporary tuba/euphonium repertoire. This technique is more approachable for the euphonist (which requires a slightly smaller amount of air than the larger tubas), but even then, this technique will be seldom seen among professional performers. *It is still a valid technique for*

the tuba and euphonium, however! This technique must only be used if it is known for a certainty that the performer can comfortably circular breathe.

Necessary information

Although possible, it must however be said that circular breathing can be a very noisy affair on the tuba (and slightly less so on euphonium). The large amounts of air required for the tuba and euphonium necessitate a very rapid intake of a high volume of air through the nose, which creates a loud "sniff" sound. These sniff breaths must also be done at a rapid pace, due to the need for a constant air supply when performing even at soft dynamics on the tuba and euphonium.

Due to the active nature of this technique, it is most often used to create sustained sounds on the tuba and euphonium. Although it is possible to circular breathe and perform rapid passagework, this technique is not physically possible for some performers.[220]

As with many of the techniques described in this guide, care must be taken to ensure that the intended performer of a new work is able and willing to circular breathe.

Notation

A simple score direction above a sustain note or passage will suffice to let the performer know that you wish for them to circular breathe. This is true whether the note is for a determined duration or is indeterminate. When articulations are called for within a section of circular breathing, they can be notated traditionally (assuming that it is obvious that there should not be a break—tuba and euphonium players often place breaths at articulation breaks).

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[220] For a virtuosic example of this technique, listen to Dr. Benjamin Pierce's recording of Peter Christoskov's *Moto Perpetuo*, which features four minutes of circular breathing through a series of rapid passages.

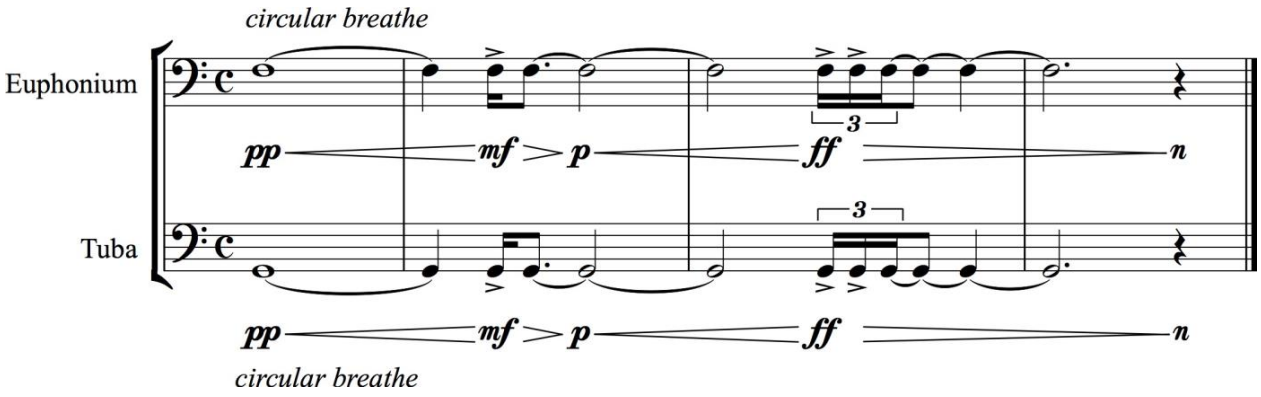
Relative difficulty

Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Jigsaw* – Mikel Kuehn**

***Music for Tuba and Computer* – Cort Lippe**



Ex. 2 – Circular breathing

B. Voice

i. Vocal multiphonics

Method

If there is one technique that is emblematic of the tuba and euphonium's contemporary capabilities, it is the vocal multiphonic. The vocal multiphonic has been a part of the brass repertoire since the 1800s (notably appearing in Carl Maria von Weber's *Concertino for Horn and Orchestra* in 1815). The large mouthpiece and conical bore of the tuba family make it a prime target for its usage in the contemporary repertoire.

In this technique, the performer sings while simultaneously buzzing a note. A variety of different chordal sounds may be achieved. Perfect intervals and major/minor chordal tones (major/minor 3rds and 7ths) tend to be the most stable and harmonically-rich, while close and/or dissonant intervals lead to a variable amount of difference tones. In general practice, the sung

note is almost always placed above the buzzed note in pitch. However, this is not a strict rule, and although more difficult to perform in general, it is certainly possible to sing below a buzzed note.

Necessary information

Since the vocal multiphonic is seen in several standard works of the solo tuba and euphonium repertoire, it is rare to find a professional-level performer that can't perform this technique. That being said, a few guidelines are helpful in the creation of an ideal vocal multiphonic. Care must be taken to accommodate the wide vocal range of the tuba/euphonium community—for instance, many mid-twentieth century solo works utilize vocal multiphonics that were written almost exclusively for the male voice, needlessly excluding the growing population of non-male performers on the tuba and euphonium. This can be accommodated for by either limiting the multiphonic to a narrow range of pitches, or allowing for octave displacement of the vocal multiphonic.

Although many professional and advanced tubists/euphonists are more than capable of performing vocal multiphonics, it must be said that extended and/or highly active multiphonics may be difficult for some to perform. Extremely florid sung phrases may also not sound clearly, given the low range of the instruments. Additionally, combining sung and buzzed lines that are highly independent from one another may become exponentially difficult to perform, especially for those unused to such figures.

Another major guideline to follow when writing vocal multiphonics is a consideration of the relative dynamics of the technique. Because of the interference caused by the buzzing lips and the nature of the instrument itself, a typical vocal multiphonic must be sung at a louder relative volume than the buzz in order to be heard at an equal dynamic level on the bell end of

the instrument. When done for too long, this can lead to fatigue, and even physical harm on behalf of the performer. For this reason, sustained vocal multiphonics often work best when written at a medium-to-low dynamic, and when a louder dynamic is required, shorter durations work better than longer durations.

Notation

The convention for notating vocal multiphonics is to use either diamond shape or X-head noteheads for the sung component. This has been the standard since the earliest uses of the technique in the solo repertoire (particularly in William Kraft's *Encounters II* for tuba and James Curnow's *Symphonic Variants* for euphonium), and as such is instantly recognizable as a vocal multiphonic to the professional tubist and euphonist. If an alternate notation is used, it must be properly annotated. In some works, the sung portion is notated either above the staff or on a separate stave, and as long as it is made clear that the sung portions exist on the separate stave, this technique is also acceptable. This is in line with the guidelines found in Elaine Gould's *Behind Bars.*

Relative difficulty

Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

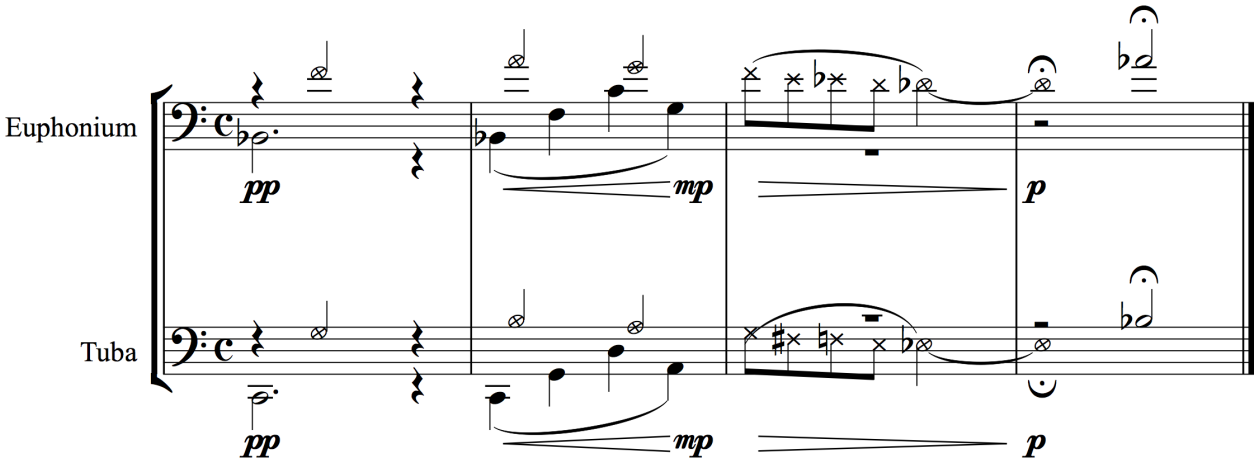
***Encounters II* – William Kraft**

Symphonic Variants – James Curnow

Five Studies for Tuba Alone – David Reck

***abscess* – Kurt Isaacson**

Concert Variations – Jan Bach



Ex. 3 – Vocal multiphonics

ii. Singing

Method

Similar to the way that breath sounds are amplified through the tuba, singing through the instrument creates a unique and relatively effortless audible effect. This is achieved by singing through the instrument, using the mouthpiece as the entry point for the voice. Provided the performer is comfortable with singing, the types of sounds created by singing through the instrument are as numerous as those created solely with the voice.

Necessary information

The limiting factors with this technique involve the physics of the instrument itself. When singing into the instrument, the lips must necessarily be restricted by the rim of the mouthpiece. This cuts down on the number of discernible consonants and vowels, affecting the range of words that are capable of being sung clearly. Furthermore, the instrument itself provides a fair amount of feedback; when singing into the instrument, any pitch not contained within the harmonic series available at that moment may experience a variable amount of interference. To

put it simply, the tuba and euphonium both act as reverse resonators, affecting the vocal cords in ways that are tangible.

The author has found through their own practice that it is possible to avoid some of these pitfalls by allowing a small portion of the mouth to slip outside of the mouthpiece rim while singing through the instrument. This tends to mitigate the negative feedback of the instrument, while also allowing for a wider range of vocal sounds. This does necessitate a louder sung dynamic, which might not be comfortable for inexperienced vocalists.

One particularly effective way to vocalize through the tuba and euphonium is by singing sustained vowel sounds. The instruments tend to amplify these sounds at a higher level, although this is a purely subjective opinion.

Notation

There are a few different options when notating a sung portion of a tuba/euphonium solo. If it is clear to do so in the score, the sung part may be notated on the staff above the tuba or euphonium component (although this is more valid for tuba rather than the higher-pitched euphonium). Barring that, the sung portion may be notated on a separate staff. When notating speech by itself (i.e., not combined with *ordinario* playing), it is common practice to use x-shape noteheads to notate the relative pitch content, *a la* Sprechstimme. If combined with other techniques (as in the provided musical example), the sung portion may be notated with a simple text direction, or on a separate stave.

Relative difficulty

Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

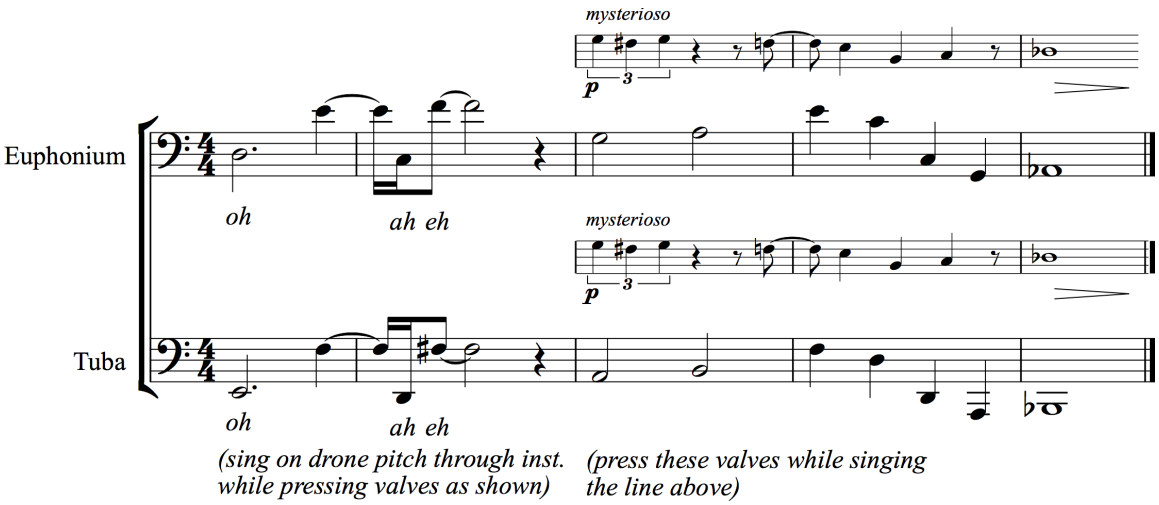
***Three Essays* - William Penn**

***The First Dream of Light* - Morton Subotnick**

Alter Ego – George Heussenstamm

***Post-prae-ludium 'per Donau'* – Luigi Nono**

***Berserker* - Hong-Da Chin**



Ex. 4 – Singing

iii. Screaming/yelling

Method

As with singing through the instrument, it is possible to amplify yelling/shouting through the tuba and euphonium.

Necessary information

Vocal effects have a tendency to lose articulation when projected through the tuba and euphonium, due largely in part to the restrictive effects of the mouthpiece opening. This can be mitigated in largely the same way as vocalizing, i.e., by allowing part of the mouth to slip out of the mouthpiece rim during performance. It is also beneficial for the performer to overly enunciate each word; the conscientious performer will do this as a matter of fact.

Although not specifically tied to the use of this technique with the tuba and euphonium, care must always be taken to ensure that the performer doesn't have to yell or shout to the point of damaging the vocal cords. Additionally, some performers may be uncomfortable with using such a technique; when writing with this technique, it is *highly* recommended that you check with the performer to ensure that they are accepting of such musical demands.

Notation

Screaming/yelling effects can be simply notated, either with simple words and directions printed above the main staff, or paired with its own staff and rhythmic notation (*a la* Sprechstimme). Other than that, the notation guidelines for the *Singing* section apply here.

Relative difficulty

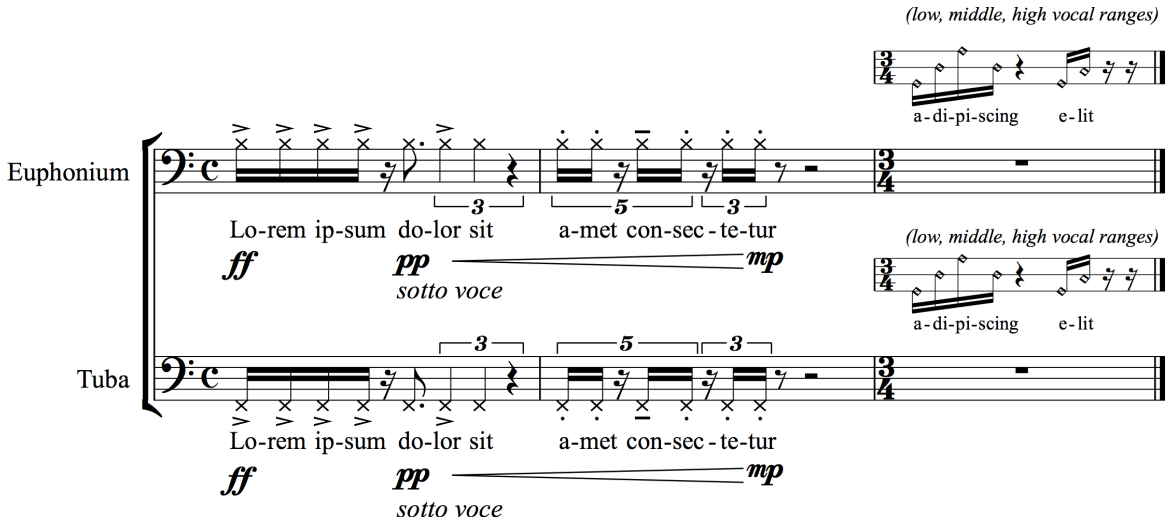
Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***19 E. Main St., Alhambra, CA 91801* – Nicholas Deyoe**

Solo Tuba Music – Cort Lippe

***SVPER-ANGRY DEATH-BLAST ASSAVLT COVNTDOWN III* – Francis Robert**



Ex. 5 – Screaming/yelling

iv. Theatrical speech

Method

Theatricality, and especially the delivering of theatrical speech, can be easily implemented within the performance of a work for tuba or euphonium. A few works, such as Mauricio Kagel's *Mirum* and Tom Johnson's *Monologue*, have expertly paired theatrical speech with tuba performance, and the limit for this technique is determined by the theatrical sensibilities of the performer.

Necessary information

Like its fellow brass instruments, the tuba and euphonium require some time for the embouchure to be properly set up. Although the experienced performer can shorten this time dramatically, it is still the case that removing the embouchure from the instrument in order to enunciate speech to a proper degree is necessarily a disruptive gesture. As long as the composer is aware of this disruptive nature, it can easily be accommodated for.

As with the more extreme techniques in this guide, the diligent composer must be aware of the fact that many tubists and euphonists are unfamiliar with this level of theatricality. Unless it is known for a certainty that the performer is able and willing to perform such theatrical actions, the author suggests that the intrepid composer be judicious with their theatrical directions.

Notation

Similar to other forms of vocalization, theatrical speech can be notated through the use of text prompts and/or a dedicated staff. Due to the nature of this technique, it is vital that the specific theatrical actions required for the work be explicitly and clearly written down within the work.

Relative difficulty

Intermediate to Professional

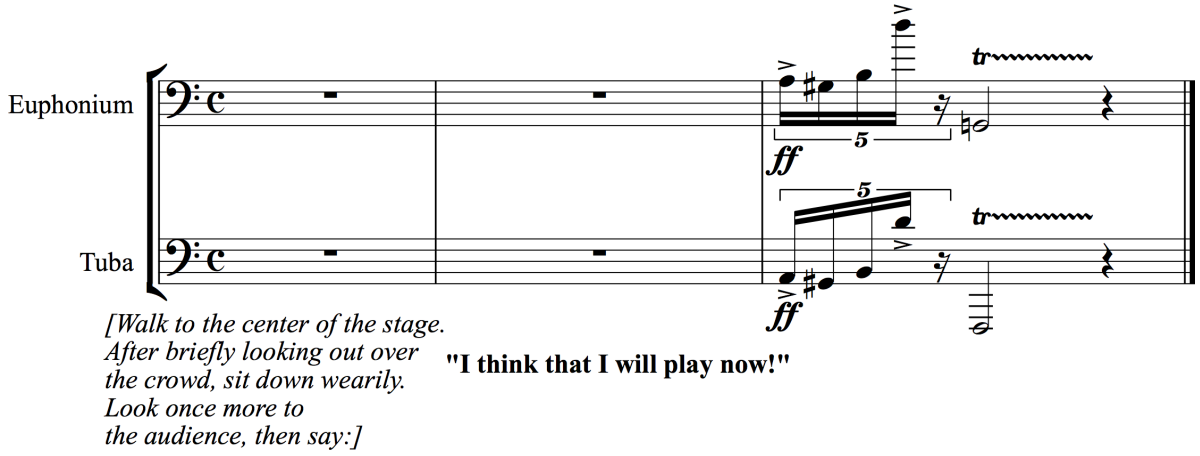
Works to consider (bolded titles are particularly representative examples of this technique)

***Mirum* – Mauricio Kagel**

***Monologue* – Tom Johnson**

From the Quiet… - Peter Hoch

Death Be Not Proud – Melvyn Poore



Ex. 6 – Theatrical speech

v. Vocal fry

Method

Vocal fry is created by narrowing the glottal closure and dropping to the lowest vocal range. In doing so, the voice is emitted as a low-pitched, raspy croak. This can in turn be projected through the tuba or euphonium, as with the normal singing voice.

Necessary information

Given the tensioned nature of this technique, it can be fatiguing (if not damaging) to sustain this technique at loud dynamics. Additionally, the mouthpiece rim opening can serve to limit the volume of this technique by in turn limiting the ability of the mouth to open and project

properly. As a result, this technique is often best utilized at lower dynamics, although, as is usually the case, this can be stretched in certain cases.

Many performers may find it difficult or painful to perform this technique, as the proper method for producing it can be difficult to achieve while keeping a seal on the mouthpiece. Additionally, this is not something that many people can achieve consciously, so it is advised that the composer check first with any intended performer (or, if there is no intended performer right away, the composer is well-advised to use this technique sparingly).

Notation

The majority of the times that the author has encountered vocal fry in a score, it has been notated as a generic vocal effect with either the direction "vocal fry" above the staff, or with a similar notehead dedicated to just the use of fry. This includes X-head and hollow noteheads. As always, the key is to be consistent and clear with the notation being used in a particular piece of music.

Relative difficulty

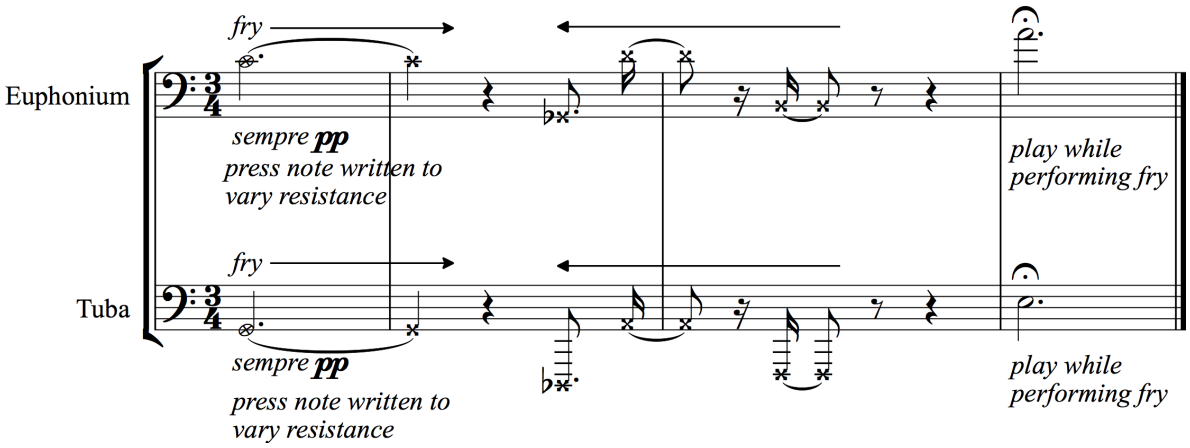
Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Tube space* – Dmitri Kourliandski**

***Digestion of Memory* – Élise Roy**

Colossus – Monte Weber



Ex. 7 – Vocal fry

C. Lips

i. Split tones

Method

Split tones are generated by modifying the lips in a way that allows for multiple harmonic partials to be activated through the buzz. This is primarily achieved by allowing the buzz to be loosened to the point of moving to the lower partial of a particular harmonic series. However, instead of allowing the lips to settle on the lower note, the performer instead holds the lips at the "break point" between the two partials. In doing so, a dyad multiphonic is created. Split tones are distinct from vocal multiphonics in that the multiple tones of the multiphonic are created with the lips, rather than a combination of the lips and vocal cords.

Necessary information

Split tones are generally more stable in partials 2-5 of the tuba and euphonium, as these partials contain a copious amount of acoustical space between adjacent notes. Of particular interest is the fact that the tuba and euphonium contain a "false" partial between the 1st and 2nd partials, which can be used in a split tone like any other true partial.

Split tones above partial 5 are certainly achievable, but are much less stable and more difficult to perform than lower STs. At this range, the method for performing split tones approaches that of overpressurization, a closely related yet distinct contemporary technique.

Performing split tones instantaneously takes a lot of control, and must be practiced rigorously in order to be achieved consistently. This is more of an issue for the performer, but knowledge of that fact is crucial in writing efficient split tones.

Split tones can be performed from a soft to a loud dynamic, although the mechanisms of the technique are more stable from medium-soft to medium-loud dynamics. It is possible to crescendo/decrescendo while performing split tones, as well.

Most importantly, it is *vital* to understand that split tones are still considered by an appreciable portion of the brass community to be a playing defect, rather than a contemporary technique. This belief is rooted in the fact that the split tone (which is a controlled effect) is linked very closely in many players' minds to double buzzing (an uncontrolled effect), the latter of which is a common issue with young brass players. Additionally, some performers are physically incapable of performing this technique. As a result, this technique still has a bit of a stigma attached to it, although that is slowly changing with each passing generation of brass players. For the moment, though, this is a technique best used when the composer is aware that the intended performer is comfortable with the technique. Although a vital component of the contemporary repertoire, it is still very much a technique for advanced players almost exclusively.

For more information about split tones, the author *highly* recommends trombonist Matt Barbier's manual *Face|Resection*. Mr. Barbier is one of the most skilled performers of split

tones, let alone of the trombone, and his manual goes into far greater detail on this important technique.[221]

Notation

The most common method for notating split tones is by notating a dyad, and then enclosing the lower note with parentheses. This correlates to the way that the technique is perceived by the performer: to perform a split tone, it is common to visualize the dyad as building *down* from the root note. Additionally, it is very helpful to notate a ratio above the dyad that explicitly indicates the partials to be split (as seen in the musical examples). This can also be seen and heard very clearly in the *Works to consider* for this technique, particularly in the case of the work by composer Ray Evanoff; in his composition, the split tones (notated specifically for the Eb tuba), are notated both as a common notehead dyad and as a ratio of the partials.

Relative difficulty

Professional

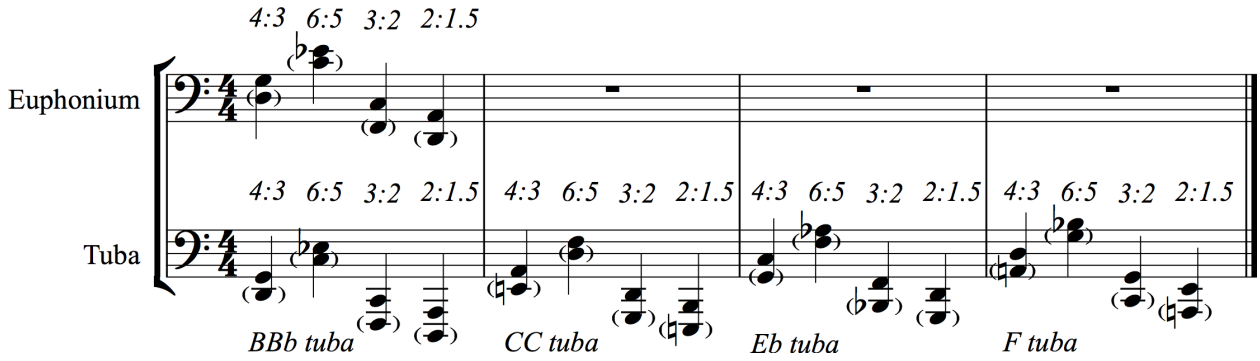
Works to consider (bolded titles are particularly representative examples of this technique)

***19 E. Main St., Alhambra, CA 91801* – Nicholas Deyoe**

category – Charlie Sdraulig

***Helpless Before a Creature Which Defies Physical Laws and Communicates Only Through Death* – Ray Evanoff**

[221] Matt Barbier, "face|resection," face|resection, accessed January 3, 2019, http://www.mattbarbier.com/face-resection.php.



Ex. 8 – Split tones

Bb Euphonium Split Tone Chart

This is a rough guide only; resultant sounds may vary.
Notes in parentheses (lower notes) are the secondary notes
caused by utilizing a split tone embouchure.

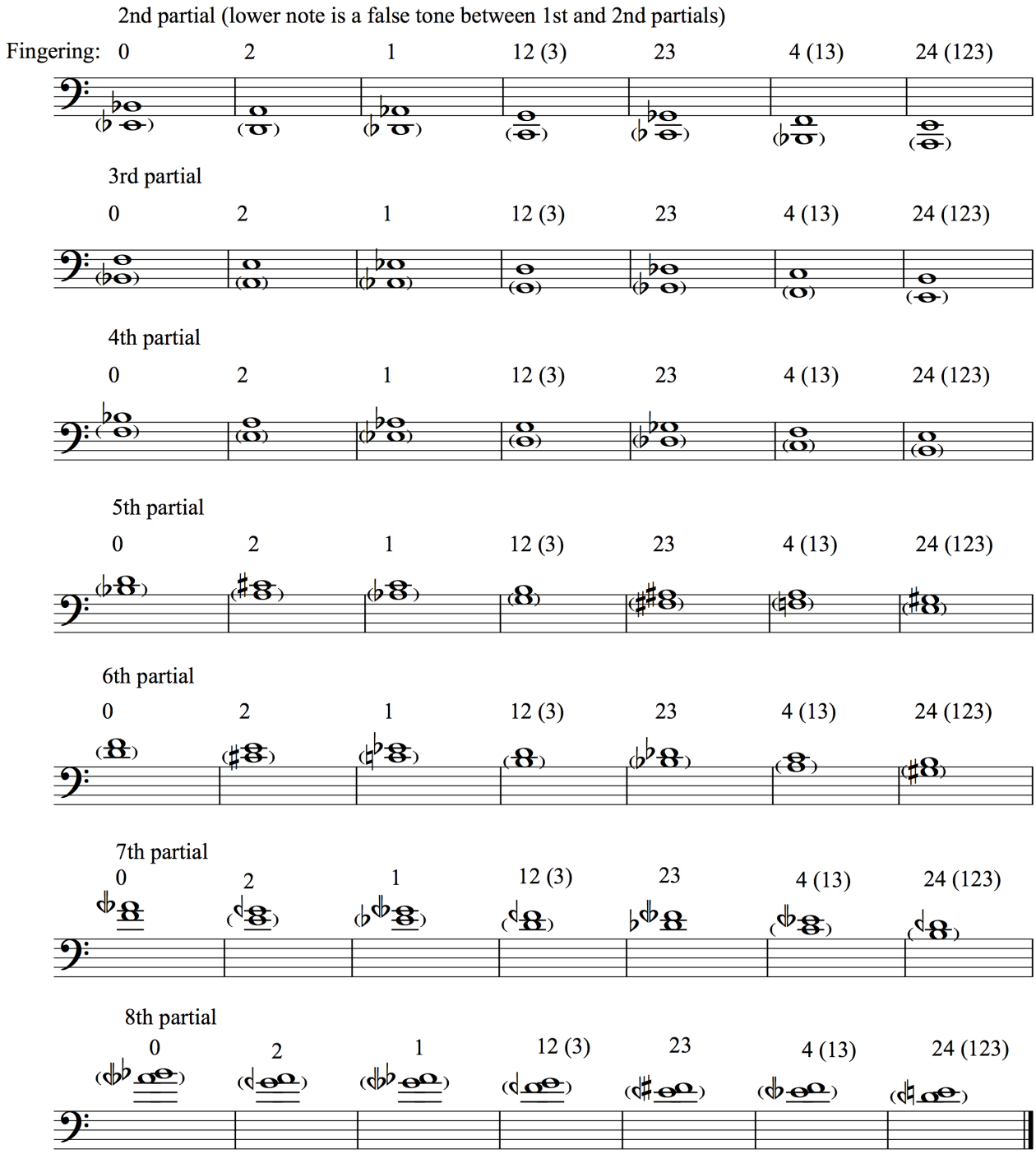


Fig. 26 – Split Tone Chart for the Bb Euphonium

F Tuba Split Tone Chart

This is a rough guide only; resultant sounds may vary.
Notes in parentheses (lower notes) are the secondary notes
caused by utilizing a split tone embouchure.

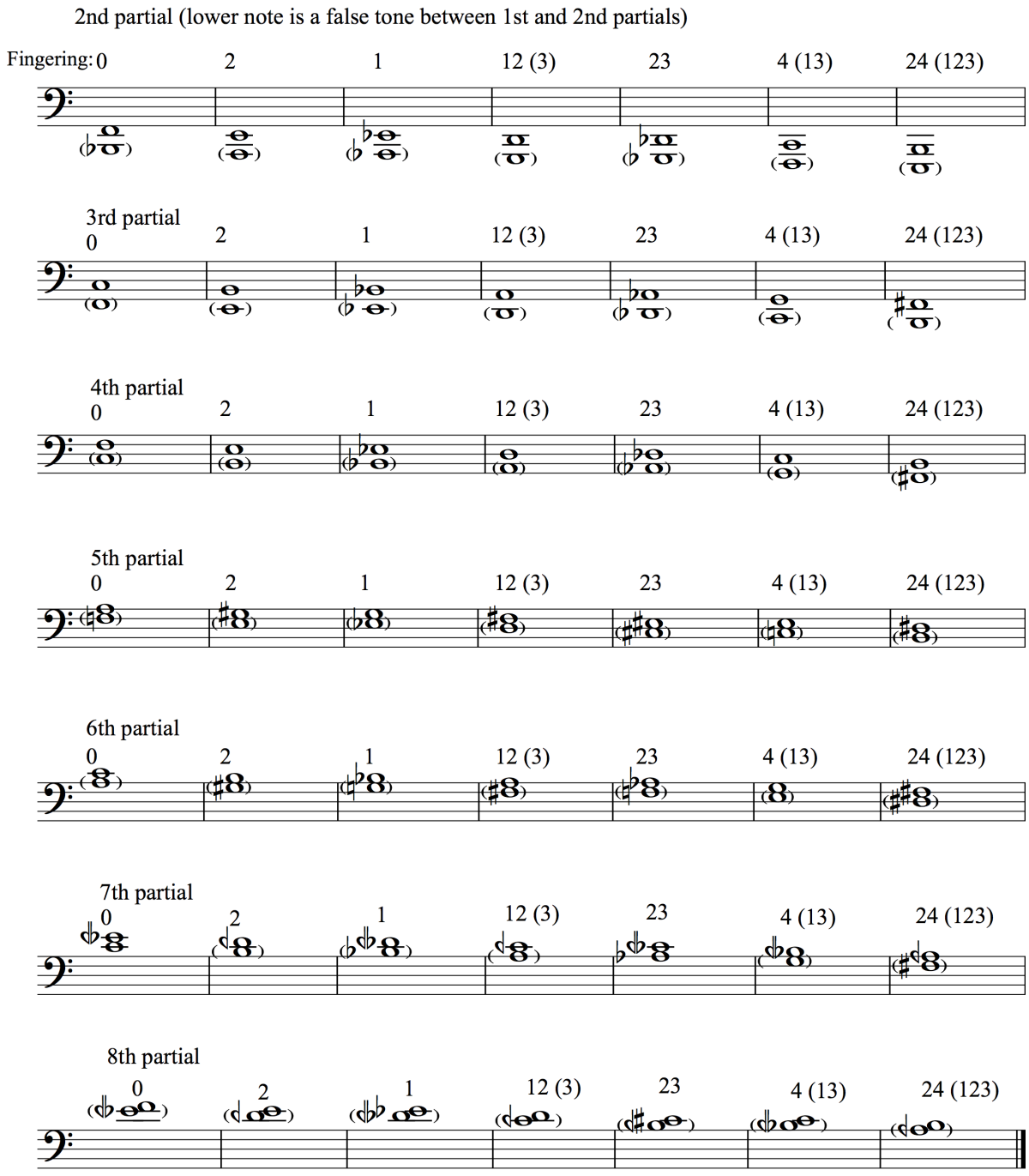


Fig. 27 – Split Tone Chart for the F Tuba

Eb Tuba Split Tone Chart

This is a rough guide only; resultant sounds may vary.
Notes in parentheses (lower notes) are the secondary notes
caused by utilizing a split tone embouchure.

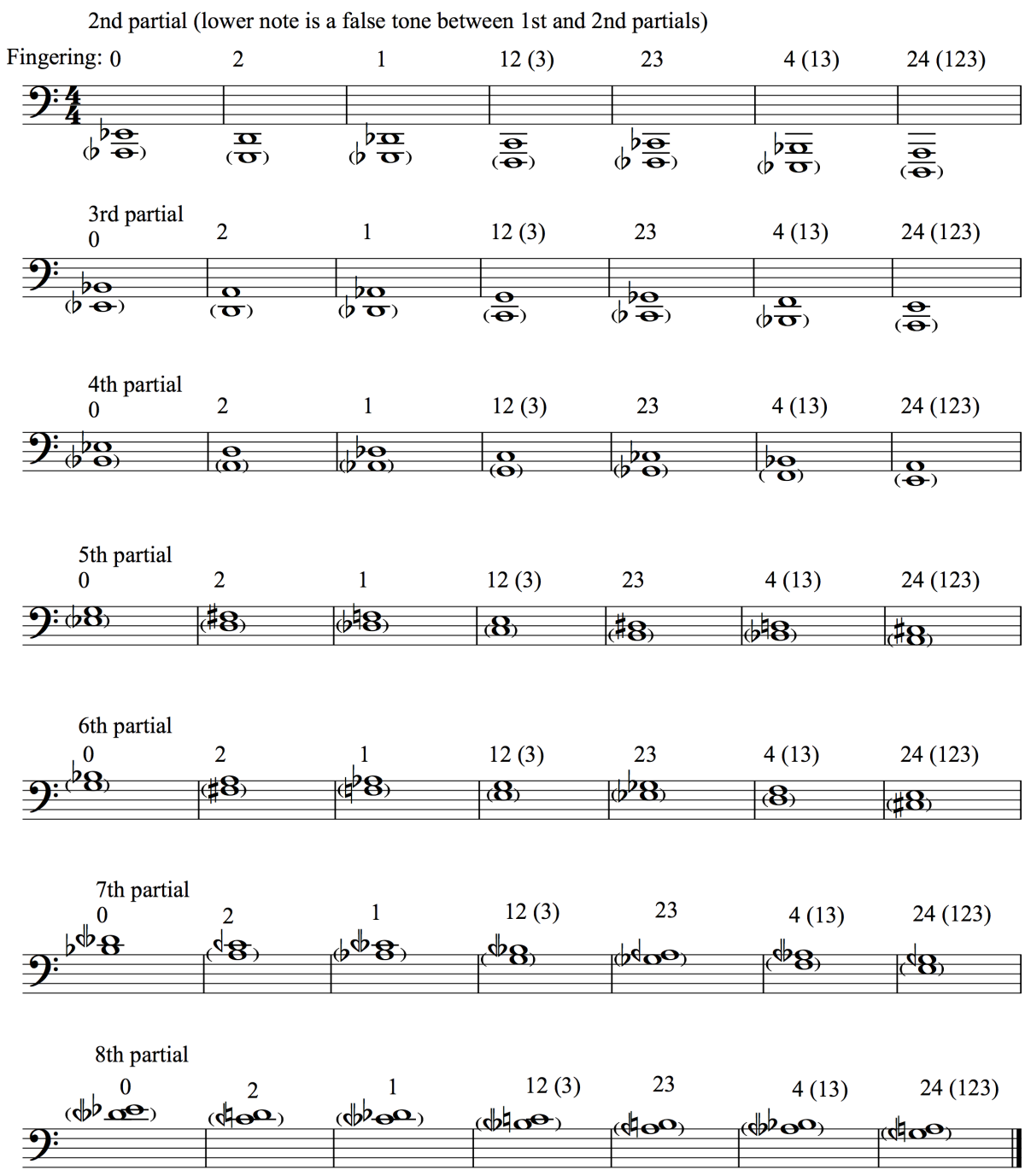


Fig. 28 – Split Tone Chart for the Eb Tuba

CC Tuba Split Tone Chart

This is a rough guide only; resultant sounds may vary.
Notes in parentheses (lower notes) are the secondary notes
caused by utilizing a split tone embouchure.

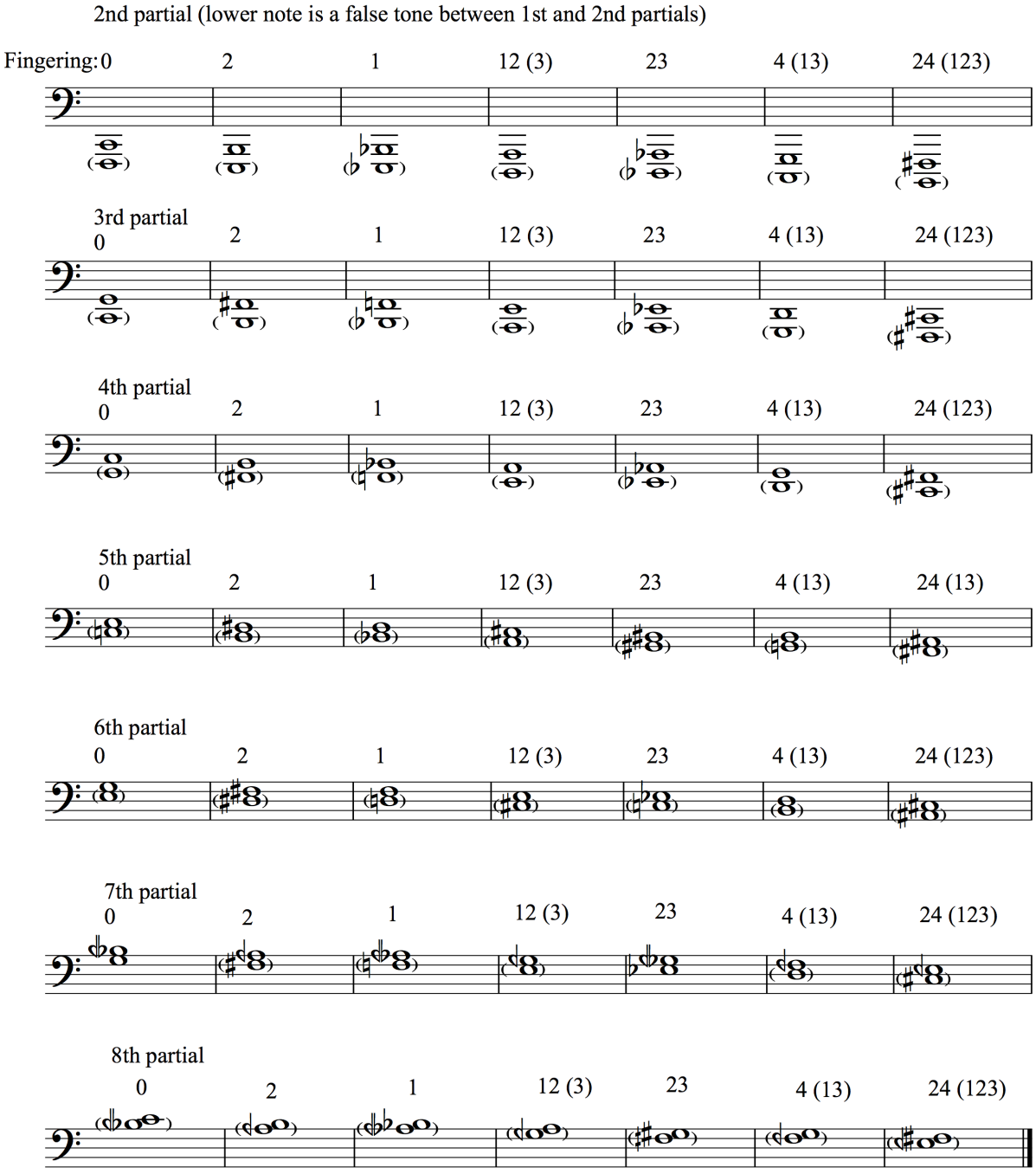


Fig. 29 – Split Tone Chart for the CC Tuba

BBb Tuba Split Tone Chart

This is a rough guide only; resultant sounds may vary.
Notes in parentheses (lower notes) are the secondary notes
caused by utilizing a split tone embouchure.

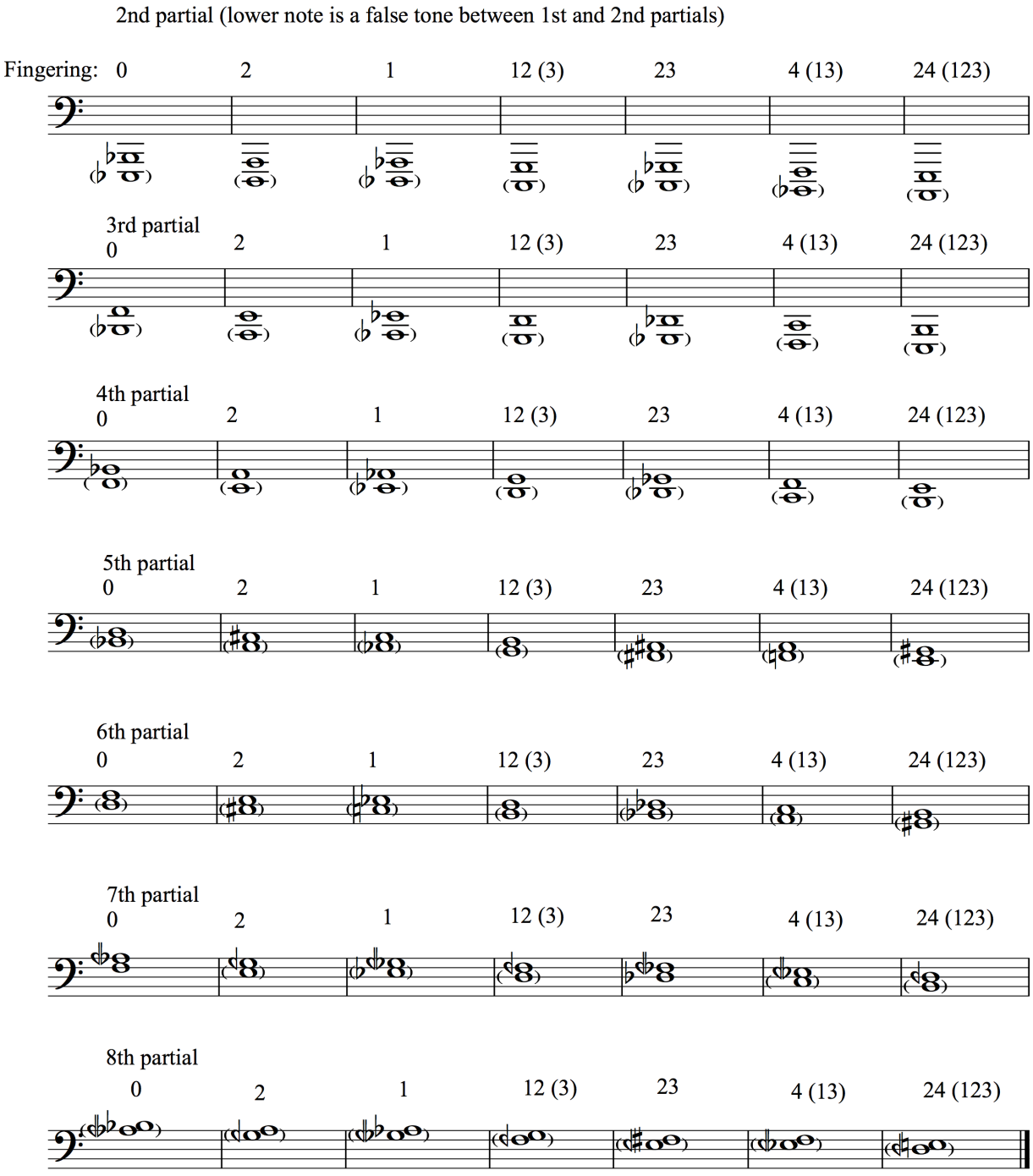


Fig. 30 – Split Tone Chart for the BBb Tuba

ii. Lip trills

Method

Due to the acoustical nature of the tuba and euphonium, it is possible to move rapidly between adjacent partials by subtly changing the embouchure. Although this technique is often difficult for less experienced performers, it is often included as part of a standard warmup and maintenance routine for tubists and euphonists.

Necessary information

Although technically possible between the lower partials, the lip trill is most effective between partials that are closer together in pitch (starting around the 4th partial and ascending). As noted above, this technique is also somewhat difficult for performers who have not thoroughly practiced the technique. The speed between partials in the trill may be variable, with higher rates of speed being slightly more idiomatic. The lip trill, especially at rapid speeds, is considered an advanced technique.

Notation

There are a few different standardized means for notating a trill, with the most common being a combination of the abbreviation “tr” and a wavy line across the area in which the trill is called for (if needed). The thickness and amount of “waves” present in the line may be varied in order to indicate a variable trill speed. When calling specifically for a lip trill, a simple text declamation above the trill will suffice. It may also be helpful to indicate either as a grace note or as a parenthetical notehead the note and direction in which the desired lip trill is moving.

Relative difficulty

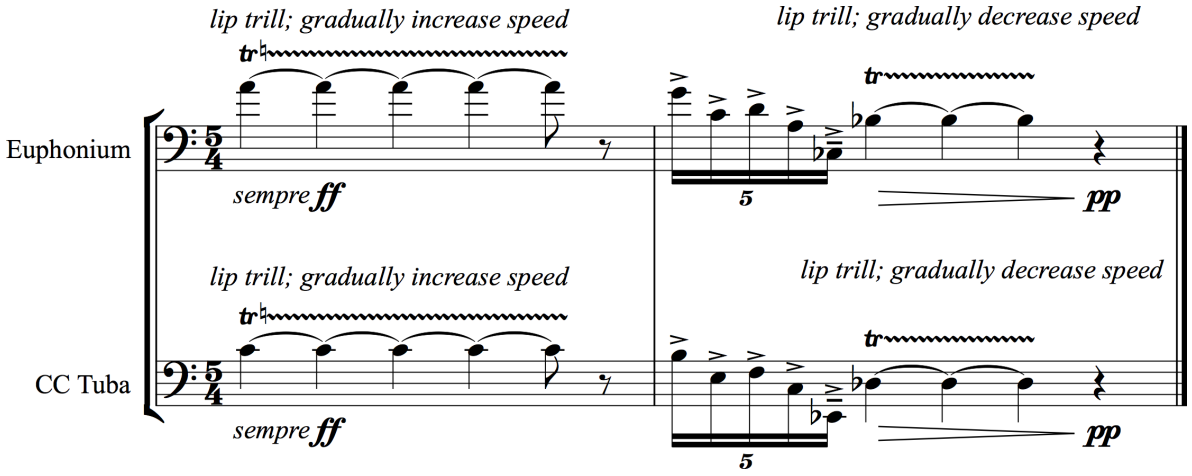
Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

Concerto for Euphonium – Robert Jager

Solo Tuba Music – Cort Lippe

***Midnight Realities* – Morgan Powell**



Ex. 9 – Lip trills

iii. Overpressurization

Method

Similar to the method in which a woodwind player performs with an excess of pressure on the reed, the tuba and euphonium player can tighten the lips past a normal amount in order to create a restricted, "choked-off" sound. This technique is structurally very simple—the player simply tightens the lips more than normal and attempts to perform normally.

Necessary information

This technique is much easier and effective in the middle to high registers. This is due to the tightening effect of the technique, as lower range notes require a much looser embouchure in order to speak properly. It *is* still possible in the lower range, though, but may not be as effective.

The most vital piece of information to know about this technique is its potential to be damaging to the embouchure. When done moderately and with practice, this technique is perfectly acceptable to the prepared tubist/euphonist. If called for excessively and/or at a sustained high volume, this technique begins to veer into dangerous territory. As with many techniques, care must be taken not to overly tax the performer. Given the difficulty and somewhat extreme physicality of the technique, this is not a technique that all performers will be comfortable performing, and indeed it is not a particularly well-known technique.

Notation

This technique is seldom used, and as such, does not have a standard notation. Since the technique is often used on a spectrum (from *ordinario* embouchure to overpressured), it is helpful to notate this technique in a way that can be changed over time. One possibility involves the use of a rectangle above the main staff, which can be filled with a solid color in order to show full overpressurization, and then left hollow for *ordinario* embouchure. In the provided musical example, the overpressurization is activated at a constant rate, and as such is notated using a wavy line and text direction above the affected note.

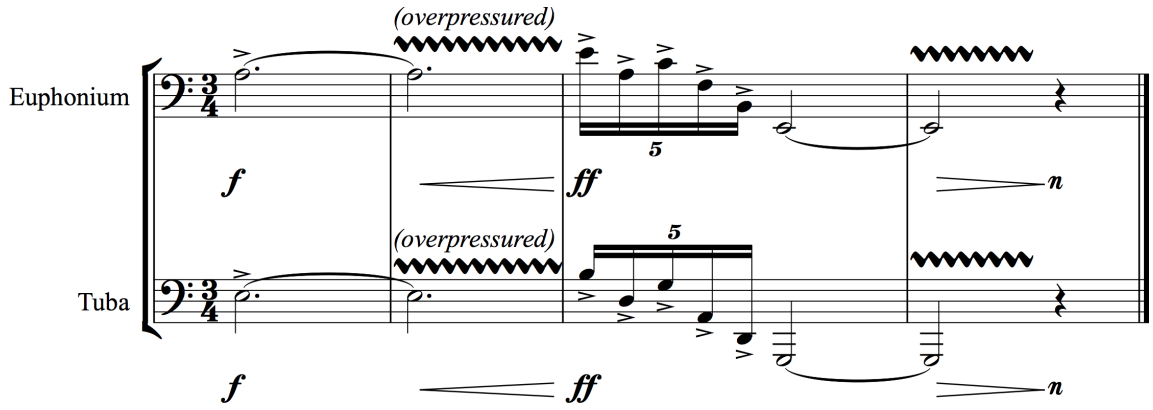
Relative difficulty

Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Tube space* – Dmitri Kourliandski**

Tabula 51 – Kari Besharse



Ex. 10 - Overpressurization

iv. Lip bends

Method

Although listed here as a contemporary technique, lip bends are actually well-ingrained within the brass players' standard practice. This stems from the fact that the conscientious brass player continuously performs micro-adjustments to their intonation, often taking the forms of slight lip bends one way or another. In this technique, the lips and muscles of the embouchure are either slackened or tightened subtly to lower or raise the pitch. Depending on the range, these lip bends can vary from as little as a microtone to as wide as a perfect fourth (or beyond).

Necessary information

Lip bends are most noticeable in the lower five partials of the tuba and euphonium, as the wide spaces in these partials allow for lots of embouchure wiggle room. They are certainly achievable in the higher range, but the reduced space between those partials only allow for so much room before a completely different partial or split tone is activated.

When performing large lip bends, the subjective tone of the note tends to become unfocused, due to the distortion of the normal embouchure placement.

Notation

Lip bends are often notated with the use of small slur lines in the score (for indeterminate lip bends), or with an explicit "lip-glissando" for explicit lip bends. See the example below for both styles.

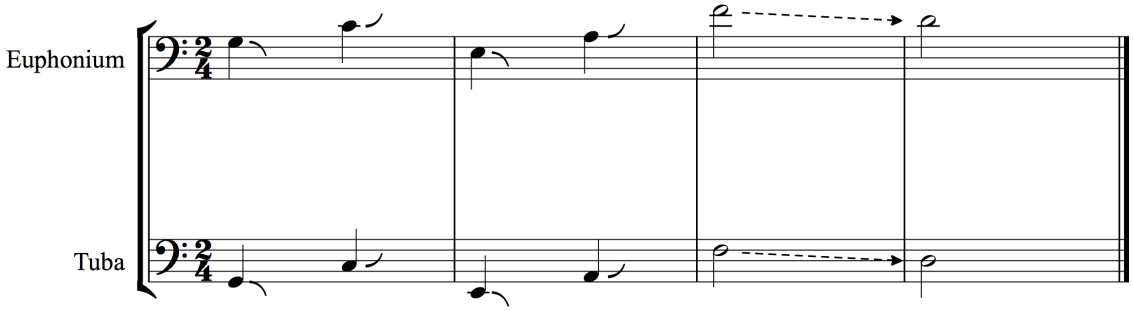
Relative difficulty

Intermediate

Works to consider (bolded titles are particularly representative examples of this technique)

***Maknongan* – Giacinto Scelsi**

Three Essays – William Penn



Ex. 11 – Lip bends

v. Airy sounds

Method

By loosening the lips, a tubist/euphonist can consciously un-focus the buzz to the point of creating an airy or "floofy" sound. This occurs because the buzz is likewise losing some fidelity, allowing for the types of air sounds normally suppressed to be re-introduced into the sound. This technique can also be performed by partially disrupting (i.e., removing the lips from) the seal of the embouchure on the mouthpiece.

Necessary information

Both methods of creating airy sounds are best performed at lower dynamics. This is due to the technique itself, which relies on a de-stabilization of the lips. That being said, some interesting effects may be created by slightly removing the embouchure from the mouthpiece and buzzing loudly. At that point, though, it turns into a different technique (that of free buzzing, which is not covered in this guide because it is as simple as it sounds—buzzing the lips freely from the mouthpiece). On the spectrum of techniques and their relative difficulty, this technique is on the easier end of the spectrum.

Notation

As with some techniques in this guide, there is no agreed upon method for notating this effect. Since it is a modification of standard performance practice, it is the author's belief that the best way to notate this is as a modification of standard notation—with an assigned notehead, or with some sort of symbol that directs the performer to use an airy sound.

Relative difficulty

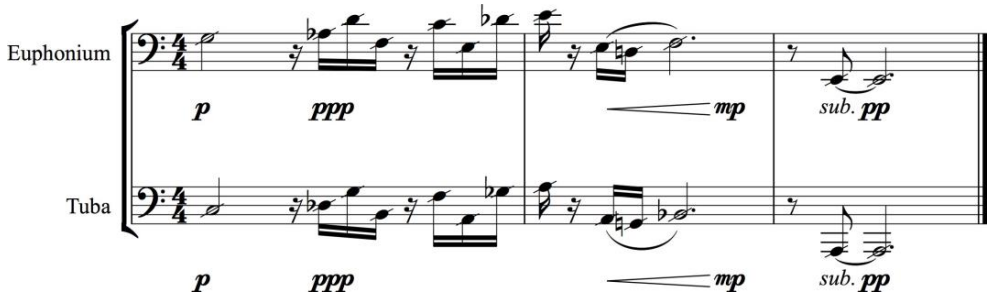
Beginner

Works to consider (bolded titles are particularly representative examples of this technique)

***center unmoored in the presence of infinite fringes* – Colin Tucker**

Tube space – Dmitri Kourliandski

19 E. Main St., Alhambra, CA 91801 – Nicholas Deyoe



Ex. 12 – Airy sounds

vi. Ingressive buzz

Method

The *ordinario* buzz is accomplished by exhaling, but this process can be reversed. When buzzing *ingressively*, a very noisy and raspy sound can be achieved. This is less controllable than the standard buzz, due in part to the simple fact that it is not practiced nearly as often.

Necessary information

As with inhaling through the instrument normally, the ingressive buzz can be physically taxing and unhygienic for performers that don't routinely clean their instruments or engage in basic maintenance.

Since the ingressive buzz is less controllable than the *ordinario* buzz, the resultant sound can vary quite a bit. Most of the time that this technique is performed, a high-pitched raspy sound results, but that is not always guaranteed. The approximate effect is reproducible, but there will likely be some small variation between performances.

For the tuba especially, the ingressive technique is particularly hard to control. This is due mostly to the size of the tuba mouthpiece, which is not amenable to a controlled ingressive buzz.

In order to perform the ingressive buzz, the performer must inhale at a rapid and sustained rate. This in turn tends to make the effect exist on the louder end of the dynamic spectrum. Thus, this technique is best utilized as a momentary effect.

If done with only a lax buzz or without a buzz entirely, this effect sounds more like a "kissing" effect; this is rarely used outside of the solo repertoire, and can be difficult to maintain with a proper seal on the mouthpiece rim.

Notation

The author has personally never seen a standardized type of notation for this effect. That being said, most of the techniques seen for the ingressive buzz have exhibited some sort of directionality, i.e., with some sort of arrow or other symbol that points in a direction to signify the "reversed" nature of the technique. Additionally, since the aural effect of the technique is somewhat unpitched and unstable, it is the author's opinion that it is best to use a notation that is both clear and without a specific implied pitch.

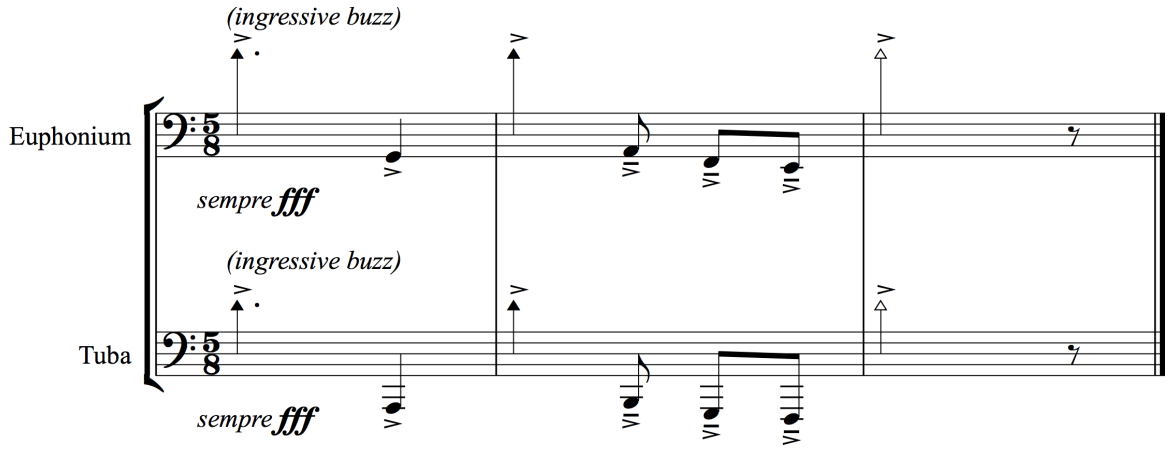
Relative difficulty

Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

Res/As/Ex/Inspirer – Vinko Globokar

***Aleph* – Asia Ahmetjanova**



Ex. 13 – Ingressive buzz

vii. Whistling

Method

Provided that the performer is able to whistle, it is possible to amplify this sound through the tuba/euphonium via the mouthpiece opening.

Necessary information

The largest hurdle to overcome with this technique is the ability of the performer to whistle in the first place. If not, then the technique must be approximated or omitted in performance. If there is an extensive section of whistling and the performer is physically incapable of whistling, then this is a huge obstacle for the performance of the work. With that being said, it is vital that the composer be aware of the fact that some tubists/euphonists will not be able to perform the work as intended.

Because of the shape of the mouthpiece opening, the whistle must be performed with a loose seal. This means that some of the sound will bleed out through the sides of the mouthpiece, which in turn will result in an effective dynamic range that eschews towards the softer end of the spectrum.

Performing a whistle into the mouthpiece also tends to diffuse the sound, creating a very airy whistle with a less-defined pitch center. As long as this is acceptable within the context in which it is used, the technique will be successful.

Notation

If specifics pitches are called for, it is acceptable to notate this technique in a relatively normal way. This assumes that some direction will be given to indicate that the intended passage is to be whistled, and not sung/buzzed. Because of its status as a separate technique from normal buzzing, it is helpful to use a clear and distinguishable alternative notehead; the provided example uses x-shape noteheads, which work well for this scenario.

Relative difficulty

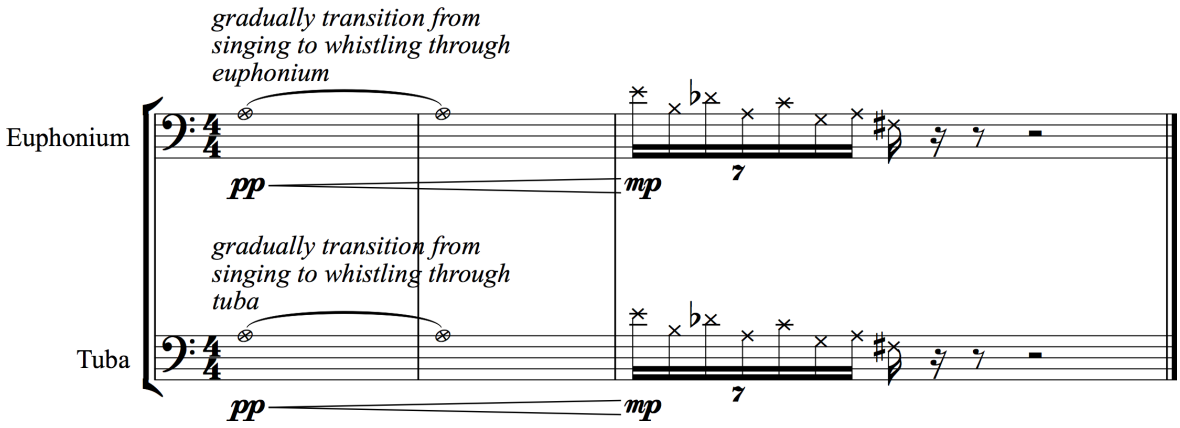
Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

From the Quiet… - Peter Hoch

***Helpless Before a Creature Which Defies Physical Laws and Communicates Only Through Death* – Ray Evanoff**

Bi[cusp]id – Brian Griffeath-Loeb



Ex. 14 - Whistling

D. Tongue/Oral Cavity

i. Fluttertongue

Method

By placing the tongue against the top of the hard palate and forcing air through the opening, a rattling sound is added to the pitch being buzzed. This is one of the most common and widely used contemporary performance techniques, having been in use for much of the twentieth century. Like vocal multiphonics, this technique can be found in a wide swatch of the solo tuba and euphonium repertoire, due to its relatively flexible nature and ability to be layered with many other techniques.

Necessary information

Just as in the act of rolling one's *R*s, not everyone is physically capable of producing a fluttertongue effect. For those that cannot produce this effect, a common alternative is to growl with the back of the throat, which produces a similar effect. That being said, the growl is

somewhat more physically taxing, and some people are incapable of doing that as well. This is to be considered when writing sections involving the fluttertongue in any work.

With practice, those that are about to fluttertongue can develop the ability to vary the volume of the fluttertongue effect, by adjusting the ratio between the "pure" buzzed tone and the amount of rattle produced by the fluttertongue.

At lower volumes, this technique may be more difficult to produce, as the prerequisite for the production of the fluttertongue is a constant and active stream of air. Additionally, the rattling sound of the fluttertongue itself is difficult to adjust in speed, due to the necessity of keeping the tongue firm against the palate.

At higher dynamics, the fluttertongue can cause quite a lot of disturbance to the buzzing lips. This may make it difficult, were the composer to call for both a loud fluttertongue effect and distinct, clear pitches within the buzzing lips.

Although possible across nearly the entire range of the tuba and euphonium, it is least effective in the extremely low and high ranges of the instruments.

Notation

There are many standardized ways to indicate fluttertongue, such as the use of what is normally considered the "tremolo" beam with a written direction for fluttertongue (often abbreviated to "Flz.", which stands for the German version of the word, *Flatterzunge*). Unless there are good reasons for abandoning these standard forms of notation, it is the author's suggestion that the composer stick with those established guidelines. When varying the speed or intensity of the fluttertongue, any text indications or simple declared notation symbols will suffice to get the message across to the performer.

Relative difficulty

Intermediate to Professional

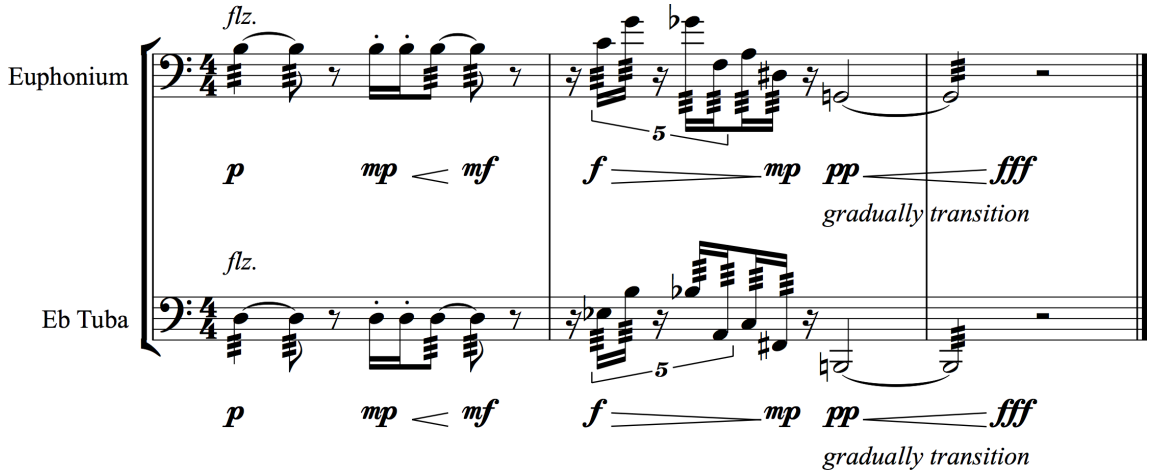
Works to consider (bolded titles are particularly representative examples of this technique)

Caverns – Frank Wiley

***Ach, es…* - Annette Schlünz**

Four Dialogues for Euphonium and Marimba – Samuel Adler

***Aria di Coloratura* – István Láng**



Ex. 15 – Fluttertongue

ii. Tongue rams

Method

Similar in technique to the technique of the same name used in woodwind repertoire, the tongue ram is achieved by stopping the airflow and buzzing of the lips with the tongue. This is often done rapidly, creating a rhythmic *thump* that is readily amplified by the instrument. In practice, the tongue moves forward to literally block the opening of the lips, abruptly stopping any airflow and buzz. The dynamic range of the tongue ram extends fully from nearly inaudible softs all the way to loud, aggressive *forte*s. The rhythmic pop of the tongue ram carries a diffuse but audible pitch center, corresponding to the fingering that is held down when the tongue strikes

the lips. This can be alternated rapidly, creating a pseudo-melodic rhythmic gesture. When done softly and gradually, a much subtler and less-pitched sound results.

Necessary information

One of the most common errors in writing tongue rams is the use of pitches that are not possible in normal usage. Starting in open position, the tongue ram is capable of creating pitched-rhythmic gestures that correspond to all 12 notes of the 1st partial, in descending order. *It is not possible to achieve notes above the open 1st partial*. Thus, any sort of melodic gesture that ascends above the open 1st partial will not be accurately replicated. This *must* be taken into account when writing pitched tongue rams.

It is certainly possible to tongue ram at a rapid pace, but the speed of this technique tends to slow down at higher dynamics. This is due to the physiology of the oral cavity, as the effort required to perform a tongue ram grows substantially the higher the dynamic. Thus, rapid tongue rams are most effective at a medium-to-low dynamic.

The tongue ram can be used to build up back-pressure inside the oral cavity, resulting in a *sforzando* articulation once the tongue ram is released.

Notation

Since the tongue ram can be both a melodic and rhythmic gesture, any sort of notation must take both idioms into account. The author has most commonly seen pitched tongue rams notated with X-shape noteheads, which accurately gets across both the pitch and rhythm aspects of the gesture.

Relative difficulty

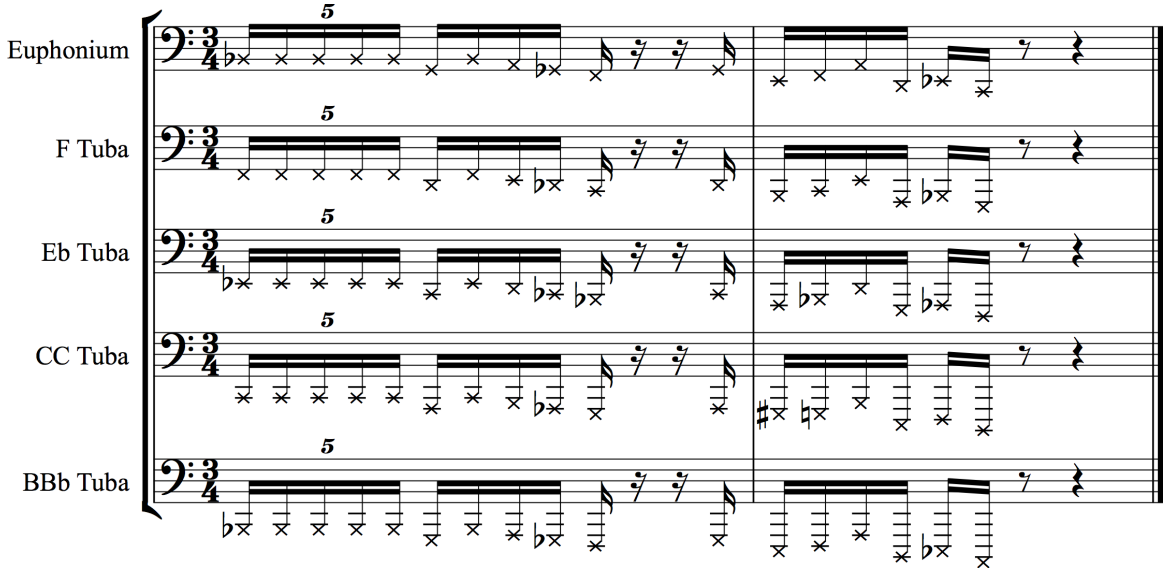
Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

Diligence is the Magic as Progress is to Flight – Katherine Young

***Colossus* – Monte Weber**

***19 E. Main St., Alhambra, CA 91801* - Nicholas Deyoe**



Ex. 16 – Tongue ram

iii. Glottal stop

Method

By closing the back of the throat, a choked-off sound can be achieved. This is rather abrupt, and often results in a slight *sforzando* articulation once released, due to the release of pressurized air from the lungs.

Necessary information

This is not a comfortable technique to perform, although it is relatively easy to perform. The speed at which it can be achieved is also on the slow side, due to the physical constraint inherent in its performance. Utilizing this technique with a large amount of force can be physically exhausting, which may also be uncomfortable for some performers; caution is recommended when using this technique extensively.

Notation

The author has not personally seen this technique used extensively in the contemporary repertoire, and there are no standardized ways to notate its use. Any consistently-applied notation that clearly indicates the technique is acceptable. In the provided example, the note that is "stopped" with the glottal motion is notated as a hollow notehead, which clearly demonstrates which notes are affected. A similarly-clear notation is recommended for other uses of this technique.

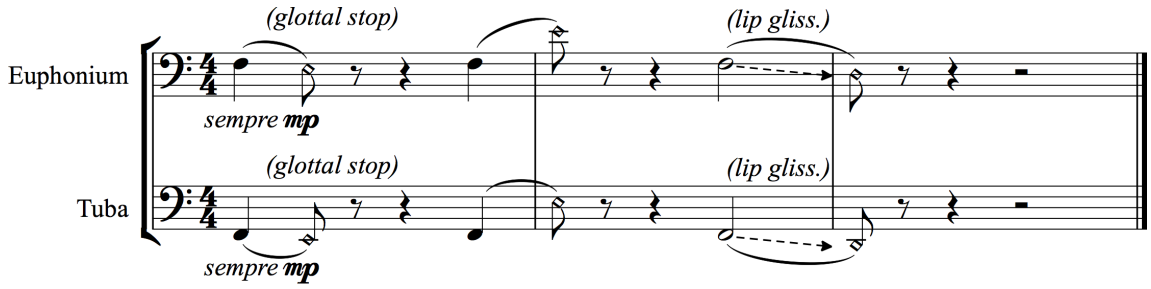
Relative difficulty

Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

Solo Tuba Music – Cort Lippe

***Tube space* – Dmitri Kourliandski**



Ex. 17 – Glottal stop

iv. Growl

Method

By slightly closing the back of the throat and letting air pass over the folds of skin, a growling sound can be performed. This is an effective technique, and is often used to approximate the fluttertongue effect by performers that can't roll their tongues. It is achievable

across the entire dynamic range, although louder dynamics are somewhat stressful to the throat muscles.

Necessary information

As mentioned above, the loud performance of this technique can be fatiguing over a long period of time. This technique can be done on its own, or in combination with singing and/or buzzing.

Some performers may not be physically able to perform this technique, or to perform it for longer periods of time. As with some of the more extreme techniques in this guide, it must be noted that extensive use of this technique may not be performed as intended when performed by a wider pool of tubists/euphonists.

Notation

Any clear notation that mentions the application of the technique is acceptable. Since it is often combined with singing or buzzing, it is suggested that some sort of overlay is used to depict the technique, rather than an alternate notehead. This notation is used in the musical example, and it is similar in form to many examples of the technique that the author has seen in other compositions.

Relative difficulty

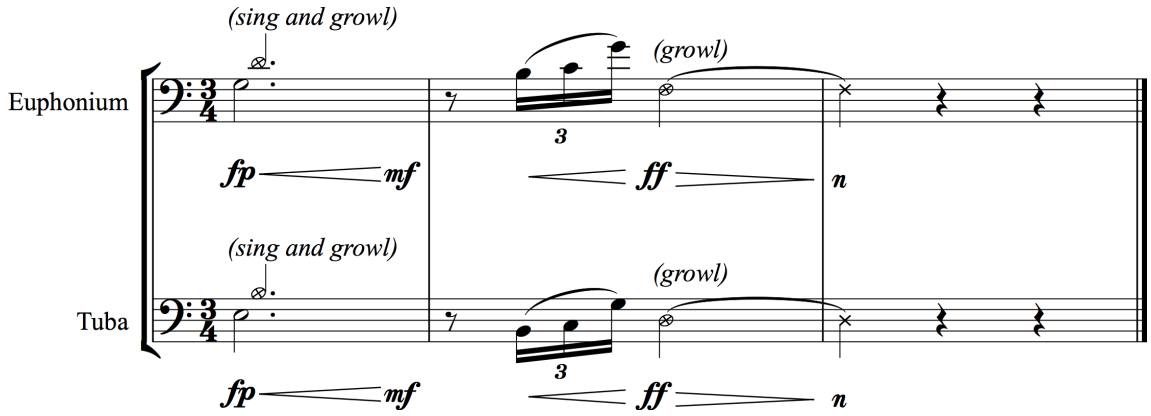
Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

Ursa – Libby Larsen

The Clock Tower – Roy D. Magnuson

***19 E. Main St., Alhambra, CA 91801* – Nicholas Deyoe**



Ex. 18 - Growl

v. Oral cavity modification

Method

The oral cavity can be adjusted in many different ways to affect the sound coming out of the instrument. By tightening or overly widening the space inside the oral cavity, the sound coming out of the tuba/euphonium likewise becomes narrow or diffuse in timbre. Additionally, the use of different vowels imparts different harmonic imprints to the resultant sound.

Necessary information

In standard performance, the tubist and euphonist both strive for a generally open and rounded “oh” shape inside of the oral cavity. Adjusting this shape can seem uncomfortable at first, but with only a small amount of practice this becomes a viable and achievable technique.

Both the tightening and widening of the oral cavity are both acceptable to perform as part of a composition, but the extensive use of these techniques can quickly lead to jaw fatigue and/or injury to the muscles of the embouchure.

Notation

Given this technique’s use as an overlay effect on top of other modes of performance, it is wise to pick a notation that can be combined with standard staff-based notation. For vowel

modification, this can simply come in the form of a listing of the desired vowel shapes above the staff. For general vowel shape, some sort of overlay notation is acceptable, assuming it is clear in its intent. As with vowel modification in vocal music, it can be helpful to utilize the International Phonetic Alphabet for notating the intended symbol. It must be noted, though, that tubists/euphonists do not receive training in the use of IPA, and any use of this notation must be explained clearly and thoroughly within the notes for the work.

Relative difficulty

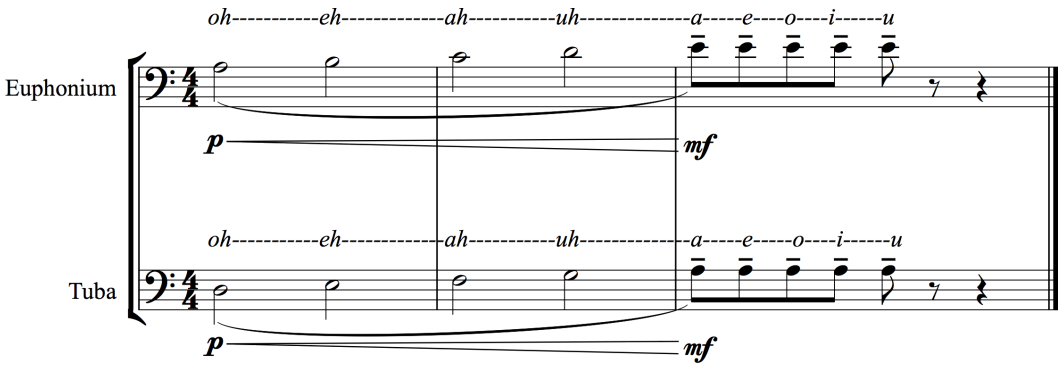
Beginner to Advanced

Works to consider (bolded titles are particularly representative examples of this technique)

Tube space – Dmitri Kourliandski

***Vox superius* – Melvyn Poore**

***Three Essays* – William Penn**



Ex. 19 – Oral cavity modification

E. Movement

i. Stage presence

Method

Although not unique to the tuba and euphonium, the size and presence of these instruments lend them a certain gravitas in a staged setting. This can be seized upon by the composer, especially when combined with theatrical stage directions (discussed in the next entry).

Necessary information

When working with younger performers (and even some experienced performers), it can be difficult to coax the proper theatrical effect out of their performance. The standard instruction for developing performers emphasizes a relatively staid and fixed stage presence, in part to help the young musician to develop a consistent approach to performance. When followed over many years, it can be difficult for the performer at first to add in any variations to this mode of performance.

Notation

There are a number of ways to notate variations on stage presence and/or theatrical movements, so any reasonable method of notating these effects is sufficient. Because of the nature of this technique, there is no notation sample given. The sample work given below, *Introspection d'un Tubist* by Vinko Globokar, is an extremely thorough and representative example of this type of technique.

Relative difficulty

Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Tuba Mirum* – Trevor Wishart**

Mirum – Mauricio Kagel

***Introspection d'un Tubist* – Vinko Globokar**

ii. Moving with instrument/Theatrical movements

Method

Although on the heavier side of instruments, it is still perfectly possible for the tubist/euphonist to move around with their instrument. This includes general movements that arise naturally out of performance as well as specially-directed and theatrical movements. Since the tuba and euphonium both have a rather imposing stage presence, their use as props for specialized movements can be very effective.

Necessary information

The main caveat was already touched upon above—it is perfectly possible to move around with the euphonium and tuba, but especially with the latter instrument it can be a little cumbersome if not approached sensibly. The contrabass tubas in particular can weigh up to 30 pounds, and given their immense size, it can be tiring to move too far away from the normal playing position.

The other issue which must be brought up is the fact that too much extraneous movement can lead to a situation where the player is injured, either through muscle strain or through hitting the embouchure area with the mouthpiece.

Specially prescribed actions, such as the pulling of slides, moving the bell around in space, and changing the orientation of the instrument may be met with varying levels of compliance, (as discussed in the preceding entry on *Stage presence*).

As with many of the techniques inscribed in this guide, it is best to consult with either the tubist/euphonist you're writing for or someone representative to assess the feasibility of any

specific physical movements.

Notation

There is a myriad of notation styles for theatrical movement—any of the more-or-less standard ways of notating movement are acceptable for the tubist/euphonist. Because of the nature of this technique, there is no notation sample given. The notation guidelines for the section on *Stage presence* also apply here.

Relative difficulty

Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Jonah and the Whale* – Garth Knox**

In Freundschaft – Karlheinz Stockhausen

***Tuba Mirum* – Trevor Wishart**

iii. Playing auxiliary instruments

Method

There is plenty of room to allow for the tubist/euphonist to incorporate auxiliary instruments into their performance. Examples include added percussion (the author has personally performed with a kick drum and a whistle in a new piece for tuba), various "toy" instruments like the kazoo and train whistle, and electronic instruments.

Necessary information

The ultimate concern with this technique is in making sure that the performer has adequate time to switch between or add in the auxiliary instruments.

Since this technique involves adding things not related to tuba or euphonium performance, there may be some hesitance on the performer's part. It is *highly* recommended that

the composer wishing to utilize this technique first check that the intended performer is comfortable with doing so.

Notation

Any clear and consistent method for notating this technique is acceptable. Given the auxiliary nature of the technique, it is advisable to keep the extra notation separated from the bulk of the musical gestures, either via a separate staff or directions above/below the main staff. The provided example demonstrates this notation method, and in the author's experience, this works very well and is quite easy to learn.

Relative difficulty

Advanced to Professional

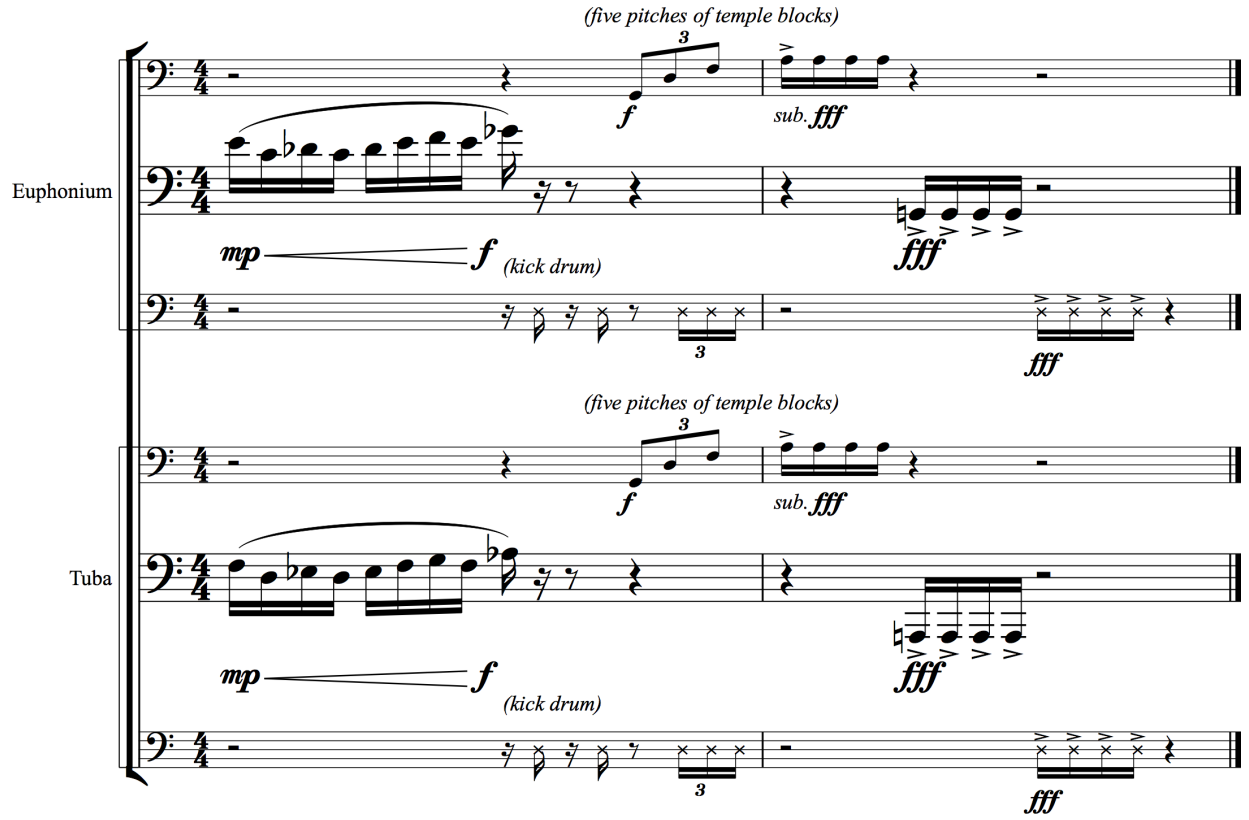
Works to consider (bolded titles are particularly representative examples of this technique)

***Hommage à Brian Ferneyhough* – Claus-Steffen Mahnkopf**

Tuba Mirum – Trevor Wishart

And What Rough Beast…? – Marc Satterwhite

***Code Fragments* – Carter John Rice**



Ex. 20 – Playing auxiliary instruments

F. Instrument

i. Valve trills

Method

As with many instruments of all shapes and sizes, the tuba family can trill in a variety of different ways. The lip trill has already been discussed (in C. Lips: ii. Lip trills), therefore this entry will concern the valve trill. This technique is created by simply moving between two notes, moving between them by use of a change in valve combinations. Like the lip trill, the *ordinario* trill (or valve trill, as it is sometimes called) can be done at a number of rates of speed, with or without a stable rhythm. When done quickly, the valve trill can approach a continuous sound. At lower speeds, the trill will sound like an alternation between two notes.

Necessary information

Depending on the distance between the constituent notes in a trill and the rate of speed, the resultant sound may be disruptive, smooth, or any shade in between. One factor to keep in mind is the potential for a partial split between the two notes of a trill; when moving from one partial to another, there is a varying amount of resistance that must be overcome by the performer. For instance, were a performer on the euphonium to trill between A3 and B3, there would be a partial break between the two notes (going from partials 4 to 5). This particular example is not overly difficult or disruptive, but difficulties will arise in larger interval trills (for instance, between F3 and B3 on the F tuba). These may be overcome with diligent practice, or if the composer is willing to let the trill exhibit some "looseness" in quality in order to compensate for the difficulty of such intervals. When in doubt, the best way to ensure smooth trills (if that is indeed the composer's goal) is to write trills that can be accomplished within the same partial.

Another important consideration when calling for a trill is to be aware of potential difficulties in certain fingering combinations. While some difficult trills may be tamed via the use of alternate fingerings, a few different restrictions apply. Generally speaking, it is easier to perform a rapid trill that involves the changing of only one or two valves, especially if one or more valves remain depressed throughout the duration of the trill. As an example, a trill between D2 and E2 on the CC tuba, while a difficult trill using standard fingerings (4 to 1+2), is exceptionally smooth when re-valved to 1+3 to 3. Likewise, a trill like A3 to Bb3 on an Eb tuba is incredibly easy to perform (2 to 0). Being cognizant of these differences can mean the difference between a smooth valve trill and one that is clunky (assuming smoothness is the goal; if not, then many of these rules may be disregarded).

Notation

The notation of trills is relatively standardized, especially compared to many of the other techniques discussed in this section. The most common method for notating the trill is to combine the abbreviation "tr" with a wavy line indicating the total length of the effect. When necessary, it is useful to also include an accidental, which indicates to the performer what type and tonality of trill to utilize. To be even more specific, it is helpful to include an ancillary note at the start of the trill.

Relative difficulty

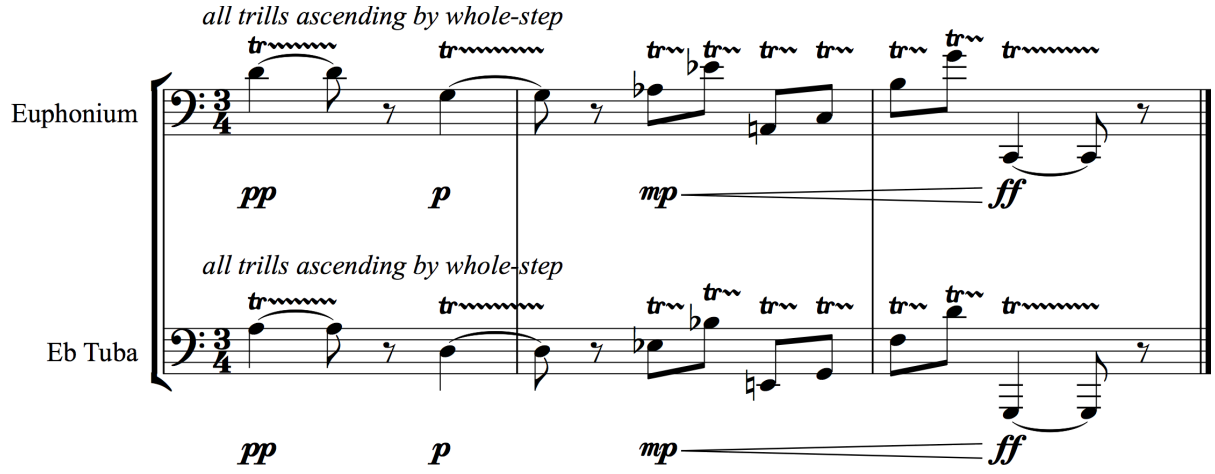
Beginner to Advanced

Works to consider (bolded titles are particularly representative examples of this technique)

Patterns III – James Fulkerson

Concerto for Euphonium – Robert Jager

***Vox superius* – Melvyn Poore**



Ex. 21 – Valve trills

ii. Pulling/manipulating slides

Method

In normal practice, every tuba and euphonium player is at least familiar with the act of pulling slides during performance. For many tubists, it is a vital part of their performance practice, as the vast majority of tubas (regardless of key) require some slide pulling in order to get certain notes in tune. When used as a contemporary technique, the act of slide pulling can be a subtle act, one with a lot of fanfare, or somewhere in between. The primary reason for pulling a slide is to use the tube that is opened up as a way of creating extra noise—when the valve corresponding to that tube is pulled all the way out, the buzz is routed through that tube when depressed. The corresponding sound can be soft, loud, and every dynamic shade in between.

A related technique involves the pulling of slides and adding in various objects to the valve opening. This includes alternate bells and other resonators, allowing for sound to resonate through the now-open valve circuit.

Necessary information

The design of tubas (and to a much lesser extent euphoniums) exhibit a bewildering variety of shapes. A slide that is easy to pull on one instrument may be exceedingly difficult to pull on another. This *must* be accounted for when using this technique.

The pulling of slides can be noisy, as the slide tends to pop free and clang against the other tubes when it finally is pulled out of its opening.

Pulling slides out to detune certain notes is certainly possible but is of questionable aural impact. Complicating the matter is that some slides tend to be longer than other, to allow for a greater variety of flexibility. The longest tube by far on any tuba or euphonium is the fourth valve, and this slide has quite a bit of leeway. Compare that to the second valve on a

compensating tuba or euphonium, which only has about an inch of pull (if that).

Pulling a slide open and then rapidly alternating between *ordinario* valves and the open slide can create an interesting tremolo effect.

Some performers prefer their valves *vented*, which means that a hole has been drilled into the valve casing to allow air to exchange while pushing and pulling the slide. Without this vent, the valve would make a popping sound when pressed after moving the slide, due to the change in air pressure created by the slide movement. It can be difficult to plan around the popping sound of the vent, as it is likely to run into situations where the performer of a work has vented valves and cannot create the requisite effect.

If alternative bells are to be inserted into the tuba or euphonium valve slides, some experimentation must be done ahead of time to find the right size of bell.

The composer must be aware of the tuba or euphonium's valve block when pulling slides, as an open slide negates the valves below it in the block when activated. For instance, if the first slide is pulled on a tuba, then when the first valve is pressed, all other valves are nullified. This is because the open slide breaks the valve circuit, disallowing the air from continuing through the valve block.

Notation

A simple text direction is usually enough to suffice for this technique. If the pulling of slides is more complex than a simple direction, any text-or-symbol-based notation will suffice, as long as it is clear and consistent. The example below achieves this technique through a text prompt, but it is also possible to notate the effect via the use of pitch modifications, (i.e., with a note sliding lower and back to pitch to indicate a slide pulled out and back in, and vice versa). It must be said, though, that this other notational form may be confused with a normal lip bend.

Relative difficulty

Intermediate to Professional

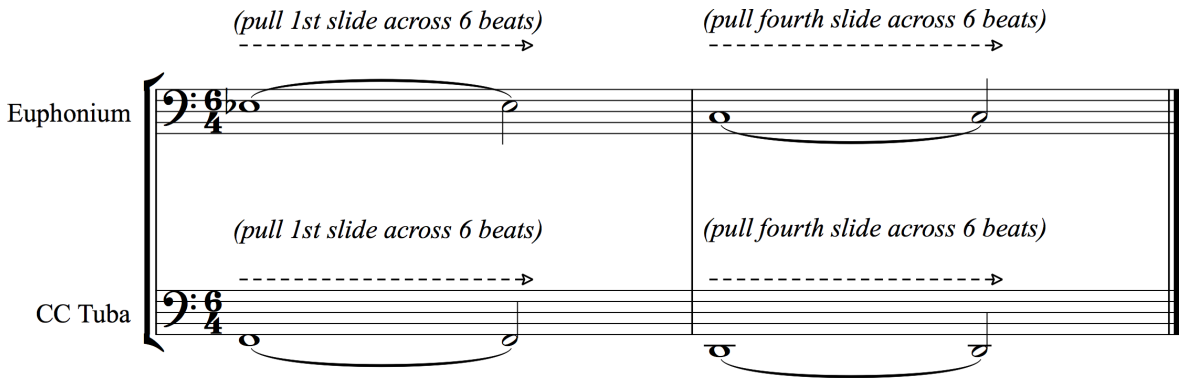
Works to consider (bolded titles are particularly representative examples of this technique)

19 E. Main St., Alhambra, CA 91801 – Nicholas Deyoe

Tube space – Dmitri Kourliandski

***Three Essays* – William Penn**

***Piernikiana* – Witold Szalonek**



Ex. 22 – Pulling/manipulating slides

iii. Filling with water

Method

The tuba and euphonium both can serve as vessels for water (or for more water than is created through the act of performance). When playing through slides filled with water, a gurgling sound is created. The act of filling and/or removing water from the instrument has theatrical value, as well.

Necessary information

As is obvious with this technique, there is a high potential for water to get all over the stage. This can be hazardous to the performer and stage.

The act of filling and/or removing water from the instrument is an all-or-nothing proposition; once filled with water, this technique *will* occur, and will not stop occurring until the water is removed.

The tuba and euphonium both contain several feet of very complex tubing—once an excess of water is introduced into the instrument, *it will be in there for a very long time!* As a result, this technique is not used very often (hence the listing of only one work in the example section).

Notation

Any clear and consistent method for notating the actions involved in this this technique is acceptable. Keep in mind that this is a one-time affair—as said above, once the water is in the instrument there is no turning back.

Relative difficulty

Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Tuba Mirum* – Trevor Wishart**

iv. Mutes

Method

The use of the tuba mute is a fairly divisive topic among the tuba community. Large and difficult to hold or move quickly, the straight tuba mute is only used on rare occasions. One of the main works of the tuba orchestral repertoire, Richard Strauss' *Ein Heldenleben*, calls for a mute, but this direction is sometimes ignored even among professional orchestras. The tuba mute is much more successful within solo and chamber settings, where it can serve to create a subdued tone. The euphonium has a greater access to the mute, and as such is called for at a greater rate

than the tuba. Both instruments have ready access to straight mutes, while only a few bucket mutes having been manufactured over the years. There are also practice mutes, which are designed to diminish the sound as much as possible.

Necessary information

The primary issue with mutes of all kinds for tuba and euphonium is the fact that even the best mute has a tendency to create "wolf tones," which are notes that don't speak well or are severely out-of-tune when the mute is inserted. This has to do with the way in which the mute functions, as it is placed very far into the tuba and euphonium bell and disrupts the acoustics of the open bugle. This issue is compounded by the variety of bell shapes found among euphoniums and [especially] tubas. The result is the reliance by mute manufacturers on a "one-size-fits-all" approach, leading to a mute that is slightly ill-fitting for just about every instrument.

Placing and removing the mute is a difficult task, and is often a fairly noisy affair. Tubists with shorter arms may even have to place the instrument on the floor in order to get the bottom of the mute clear of the bell rim before insertion.

Most tuba and euphonium mutes are made of metal, but this isn't a hard and fast rule. There are a few different popular lines of tuba/euphonium mutes that are made of wood or fiberglass, for instance.

Although most professional tubists and euphonists will have access to at least one mute, this isn't a guarantee. It is even less likely that the tubist/euphonist will have a practice mute that is suitable for their instrument.

Notation

For *ordinario* usage, the standard conventions for mute usage are more than sufficient. For anything more complex than that, any directions that are consistent and get the point across

are advisable. It is possible to achieve fractional insertions of the mute, but it must be kept in mind that holding the mute in the air is both very tiring and very awkward. If that is required, though, this can be achieved by a simple fraction that indicates the amount of the mute is to be inserted into the bell (i.e., ½ mute, ¾ mute, and so on). Indeed, this is only present in one of the works listed below (the double belled euphonium work by Liza Lim), and in that case, the performer has an assistant that helps with muting.

Relative difficulty

Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

Durations III – Morton Feldman

***The Green Lion Eats the Sun* – Liza Lim**

***center unmoored in the presence of infinite fringes* – Colin Tucker**

Polis for Unaided Tuba – Brent Dutton

v. Mouthpiece manipulation/Alternative mouthpieces

Method

The tuba and euphonium mouthpiece may be removed and used as a musical prop during performance. Some variations of this technique include: buzzing with just the mouthpiece, using the mouthpiece as a percussion instrument, striking the instrument with the mouthpiece (lightly!), rubbing the mouthpiece against the instrument to make a clanging metal sound, and rubbing the finger against the rim to create high-pitched squeaking sounds.

The tuba and euphonium both can also be performed with alternative mouthpieces. One method is to replace the mouthpiece with a smaller-sized brass mouthpiece. When performed with the smaller mouthpiece, a high-pitched and noisy sound results. More commonly, the

tuba/euphonium mouthpiece may be replaced with a single reed mouthpiece or double reed. In the first case, anything in size from a bass clarinet mouthpiece to a baritone sax mouthpiece may be placed in or over the mouthpiece receiver and played as in a reed instrument. An English horn or bassoon reed may also be placed directly in the receiver or secured into the backbore of a tuba/euphonium mouthpiece. Both methods of using reed mouthpieces results in a wide variety of sounds, from a piercing shriek down to an extremely loud pedal tone.

Necessary information

Removing and replacing the mouthpiece during performance can be done quickly, but doing so often leads to a certain amount of metal clanging sounds. If done slowly over a longer period, it is possible to have a nearly inaudible change.

There is a slight amount of variety among tuba and euphonium mouthpiece receiver sizes, so if using an alternative mouthpiece, some experimentation is likely to be required.

Although the range of sounds possible with the reed mouthpiece are extensive, it takes a lot of practice to control these sounds. This may make some performers hesitant to experiment with the technique.

The low pedal tones achievable with a single reed mouthpiece correspond to the open fundamental pitches of the respective tuba or euphonium. It is difficult to play and pinpoint specific notes above the fundamental.

Unless the performer is a dedicated contemporary music specialist, it is highly unlikely that they will have reed mouthpieces on hand (let alone the experience and technique to use them properly).

Notation

A simple text direction for the manipulation of the mouthpiece is usually enough to suffice for this technique. One particularly effective strategy for notating the various registers and types of sounds when using a single reed mouthpiece is to separate the low (fundamentals), middle (various reed/brass hybrid sounds) and high (shrieking and reed biting sounds). These can be plotted on a graphic score, or as loose symbols within the traditional score. The provided example demonstrates this technique. Additionally, the work *Piernikiana* by Witold Szalonek exhibits a fantastic and very detailed use of the tenor sax mouthpiece—recordings of the work can easily be found, and the author *highly* recommends consulting them when utilizing this technique.

Relative difficulty

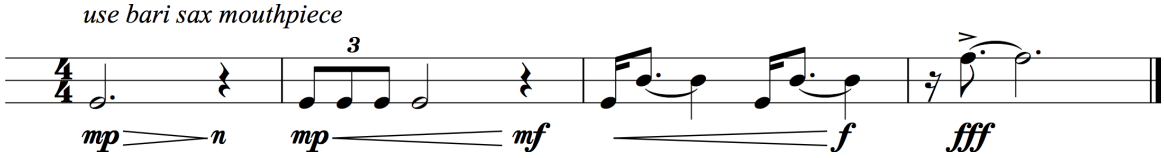
Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Piernikiana* – Witold Szalonek**

***Tubassoon* - Melvyn Poore**

Muzyka na tube – Andrzej Dobrowolski



Ex. 23 – Alternative mouthpiece (for both tuba and euph)

vi. Glissandi

Method

There are two primary methods for achieving glissandi on the tuba and euphonium—via the lips, in the form of a *rip* or *harmonic glissando*, or as a quasi-portamento involving the valves. In the first technique, the performer presses the desired number of valves down and uses

the backpressure of the valves to force a glissando through the harmonic series of whatever valve combination is activated. In the second form, the valves are pressed during the glissando either in a sliding roll, or as a complete unit. The momentary half-valve effect allows for the buzz to slide between notes more easily, and if done with the proper amount of effort, makes a relatively smooth glissando. The second form of glissando is often used when a subtler or measured glissando is desired.

Necessary information

The lip glissando can be performed at a high volume and speed rather easily, but is much more difficult at lower dynamics. In contrast, the valve glissando is much more effective at lower speeds, but is somewhat clumsy at a higher rate.

If overdone, the lip glissando can be very fatiguing for the performer's embouchure.

When performing the lip glissando, it can be difficult to pinpoint exact starting or ending points. It is exceedingly easy to "overshoot" an ending point, without dedicated practice.

The valve glissando can be difficult to perform at a high dynamic and for longer passages, but it is certainly achievable with practice.

Notation

Glissandi that are used *ordinario* may be notated in the typical fashion. It is advisable for the composer to clearly distinguish whether a lip glissando or valve glissando (quasi-portamento). The musical example below notates both a lip (overtone) glissando and a valve glissando, utilizing notations that are recommended for the techniques.

Relative difficulty

Intermediate to Professional

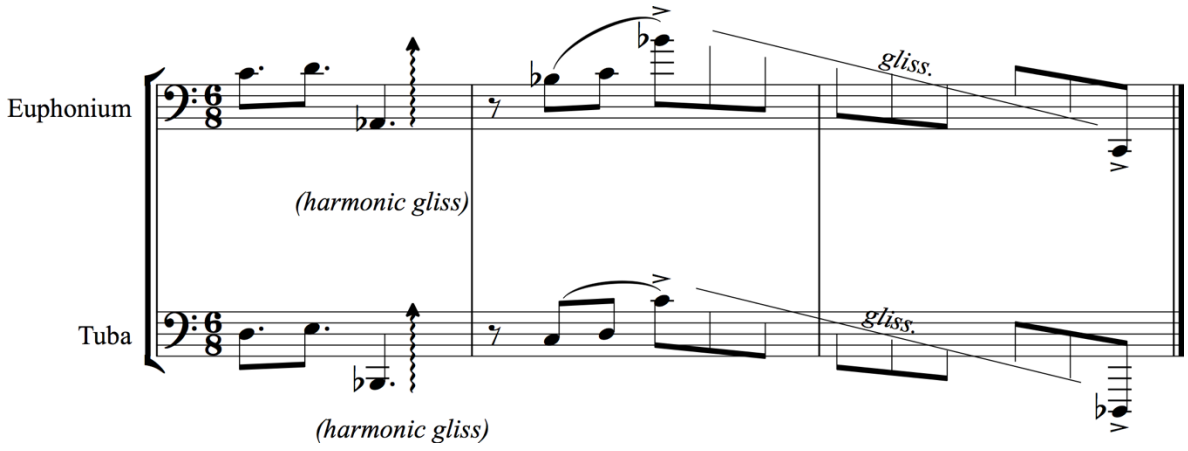
Works to consider (bolded titles are particularly representative examples of this technique)

***Encounters II* – William Kraft**

Concert Variations – Jan Bach

Three Essays – William Penn

***Five Studies for Tuba Alone* – David Reck**



Ex. 24 – Glissandi

vii. Rhythmicizing the instrument

Method

The tuba and euphonium both are resonant tubes of metal, and as such can be used to perform a variety of percussion sounds. This includes the use of implements to hit the instrument, using the fingers and hands to strike the instrument, and applying rhythmic gestures to the valves and tuning slides. The tuba and euphonium both can be struck in different locations to create different sounds; hitting the rim of the bell creates a loud sound that is not relative to the amount of effort required, while striking the bottom bow creates a dull thud (since it is deadened where it rests against the performer's body). This is a more viable option with the tuba, given its larger size compared to the euphonium, but the fundamentals of the technique are the same across both classifications of instruments.

The valves can be alternated in a rhythmic fashion, similar in concept to the key clicks on a saxophone or flute. This technique is more viable with the piston valve, as its increased mass and throw create a larger variety of sounds than the rotor. In a similar fashion, the slides can be pushed or pulled in rhythm, but this is not an effective technique. It is available to the intrepid composer, nonetheless.

The performer can also make a sudden squeaking sound by placing their palm flat against the bell or other appreciably flat portion of the instrument, and quickly pulling the hand down. This can be an inconsistent technique, however, and may also be painful to some performers.

Necessary information

The number one rule of this technique is to never require the performer to do something that may feasibly damage the instrument. Some performers (such as the author of this guide) may be fine with creating a few tiny dents in the instrument while learning a work, but the majority of professional-level performers will find such small damage to be enough to cease the performance of the work. A few ways to prevent such damage is to use implements that have been wrapped in a soft material like foam or cloth, or to utilize spots like the bell rim that create loud sounds without damaging strength.

The use of the valves as a rhythmic sound-making device likewise can cause damage to the instrument. If done with enough force or improperly, this technique can seriously damage the components of both piston and rotary valves. It is still a viable technique, provided that proper care is taken to ensure that the demands of the composition don’t necessitate the kind of damaging gestures described above.

This technique is outside of the usual body of technical work that a tubist/euphonist learns to do on their instrument, and as such may be seen a very advanced technique. For those

not specifically trained as new music specialists, it can be difficult to coordinate both the performance of the tuba/euphonium and the ancillary rhythmic activities. As such, caution is advised when utilizing this technique extensively.

Notation

This technique is best handled with the use of typical contemporary rhythmic notation. This may be applied to the traditional staff within the score or written on a separate staff or graphic score component. Additionally, the use of clear, precise text prompts to tell the performer what techniques to use is highly suggested. The provided example demonstrates two different kinds of rhythmic notation, both of which are suited for their respective techniques (bell and valve notation). It is also possible to notate these techniques with an alternate notehead, especially when mixed with standard notation. When utilized on its own and separate from buzzed materials (as in the example), common noteheads will suffice.

Relative difficulty

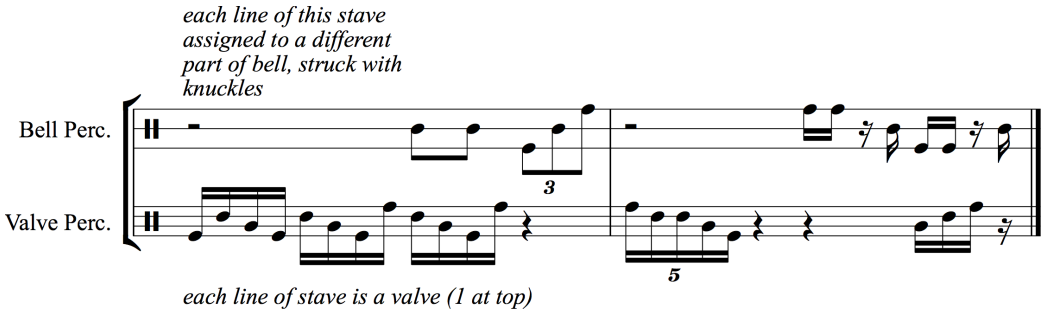
Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Jonah and the Whale* – Garth Knox**

Tabula 51 – Kari Besharse

***Omaggio e Fantasie* – Claude Baker**



Ex. 25 – Rhythmicizing the instrument (for both tuba and euph)

viii. Alternate fingering tremolo

Method

By alternating between a note and the same note with an alternate fingering, a slightly-detuned tremolo effect is achieved. This can be varied in tempo and dynamics, and combined with any number of other contemporary techniques.

Necessary information

It is *essential* that the composer either a) allow for multiple alternatives, given the prevalence of different keys of tuba, or b) write for a specific key of instrument and use the exact fingerings for the given tremolo combination. Either option is preferable, given the aims of the composer. This is not an issue with the euphonium, which uniformly is notated either in C bass clef or Bb treble clef. To determine possible alternative fingerings, please consult the overtone charts from Section 2, under "Range/Harmonic Series". For instance, on an F tuba, a middle C may be performed on the open bugle/6^{th} partial, on valves 1+2 in the 7^{th} partial, and on both valve 4 and valves 1+3 in the 8^{th} partial. Each fingering produces their own microtonal variant on the note of middle C, and alternating between them can create a variety of tonal shadings.

Notation

This technique can be notated via the use of traditional tremolo notation and a small text prompt describing the technique desired. If a certain key of instrument is being written for, it can be helpful to list the fingerings of the two component notes above the tremolo. If an alternate fingering tremolo is desired but the key of tuba is not specified, the technique can be simply notated without a specific fingering. In this case, the tubist/euphonist will find an alternate fingering that is suitable for the notes requested. This, however, may result in a less than ideal tremolo, depending on the note and key of tuba used.

Relative difficulty

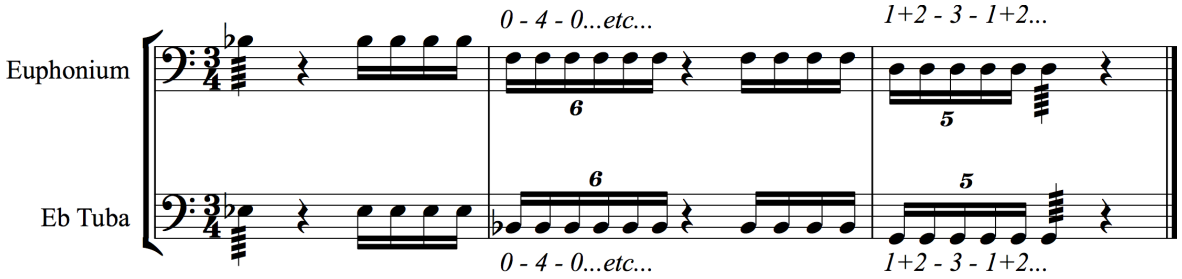
Beginner to Advanced

Works to consider (bolded titles are particularly representative examples of this technique)

***Omaggi e Fantasie* – Claude Baker**

***Five Studies for Tuba Alone* – David Reck**

Concert Variations – Jan Bach



Ex. 26 – Alternate fingering tremolo

ix. Valve notation

Method

A widespread trend within contemporary wind music from the middle of the twentieth-century onwards is to decouple the acts of pressing different valves or keys and the resultant sound. This is achieved by notating the valves or keys to be pressed down at a given moment, potentially also with a desired rhythmic gesture. This will naturally result in a melodic gesture that is halting and unstable, given the technique's bypassing of traditional fingerings.

Necessary information

When writing valve notation for the tuba and euphonium, there are a few potential pitfalls to avoid. First, it is helpful to remember the issue of the existence of multiple different kinds of tubas and (to a lesser extent) euphoniums. With the euphonium, one needs to be aware of

whether an instrument is compensating or non-compensating, while the tuba contains no less than six different kinds of tuba to consider (BBb and Eb compensating, F, Eb, CC, and BBb non-compensating). There is also the issue of number of valves for the tuba; the standard for all of the non-compensating tubas is to have five valves, but even that isn't a given.

It is *highly* recommended by the author that the composer either tailors their valve notation to a specific key and type of instrument, or allow for alternatives to be used by the performer in the case that they don't perform an instrument of the proper type. See the musical example in the *Rhythmicizing the instrument* category for a demonstration.

Notation

The most common method for notating this type of effect is through the use of either a specialized stave (where each line represents a valve), or through a symbolic notation that visually represents the opening and closing of the valves. Either method is acceptable; consult the example for *Rhythmicizing the Instrument* for a demonstration. When using a separate stave for the technique, it is very important to remember that not all tubas contain the same number of valves. This may cause serious issues, unless the technique is limited to four valves; the author is unaware of any professional-level tuba or euphonium that has less than four valves, and limiting the technique to that number ensures that all tubas and euphoniums may perform the technique as written. Some alternatives may be found for works that require additional valves; the author has personally adapted a work originally written for the five-valve F tuba for the four-valve Eb tuba, even though the work relied extensively on valve notation involving five valves. In that case, the author simply added a "compensating" fingering by combining the fourth valve with one of the main circuit valves, approximating the effect in a suitable manner.

Relative difficulty

Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***abscess* – Kurt Isaacson**

Hommage à Brian Ferneyhough – Claus-Steffen Mahnkopf

Tube space – Dmitri Kourliandski

x. Microtonality

Method

There are several ways in which the tuba and euphonium can access the world of microtonal music. The most common method is by utilizing alternate fingerings, which can exhibit certain intonation tendencies when compared to the primary method of fingering certain notes. The slides may also be used to adjust the intonation of the instrument on a micro-scale. Finally, the lips may be used to adjust notes up or down. No matter the method used, it is imperative that the performer have a strong and reliable set of ears when performing microtonally.

Necessary information

The capability of performers to utilize this technique varies widely from musician to musician. Advanced level microtonal performing is an art form in and of itself, and if the composer wishes for a high level of accuracy and consistency, then it is vital that they seek out a performer comfortable and capable of such techniques.

The author highly recommends the work of Dr. Luke Storm[222] and Dr. Robin Hayward[223] for further information on the microtonal capabilities of the tuba and euphonium. Dr. Storm's dissertation describes in great detail the performance practice of a work written for a low brass trio that relies exclusively on microtonal writing, and Dr. Storm is additionally an expert at adapting the standard F and CC tubas to microtonal works. Dr. Hayward's academic work, by comparison, involves the creation of an entirely re-worked valve tuning system for the tuba, which allows one to play both in standard equal temperament and in quarter-tone tuning systems. The article mentioned above by Dr. Hayward is one of the landmark pieces of scholarship on the tuba, and is worthy of extensive study in its own right.

Notation

The methods for microtonal notation are numerous enough to warrant a document in and of itself. Besides the previously-cited resources by Dr. Luke Storm and Dr. Robin Hayward, any other reputable manual on microtonal notation is acceptable.

The author *highly* recommends that the composer utilize a notation system that relies on the relatively well-established system of alternative quarter-tone accidentals (as in the half-flat, half-sharp, half-plus-whole-flat, and one-and-a-half-sharp). This is preferable for the simple reason that microtonal performance on the tuba is an act of approximation at its core, and in any microtonal works the tubist/euphonist is already endeavoring to find an alternative fingering for any given microtonal note. Other notation systems include ratios of intended intervals and similar mathematical formulations; these are very useful for dedicated performers of microtonal

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[222] Lukas Timothy Storm, "Wolfgang von Schweinitz's Plainsound Brass Trio in Theory and Practice: A Guide for Performers" (doctoral dissertation, University of California, Los Angeles, 2017).

[223] Robin Hayward, "The Microtonal Tuba," *The Galpin Society Journal* 64 (March 2011).

music (as Dr. Storm and Dr. Hayward both are), but may be too confusing for people that are relatively new to the technique. As such, it is recommended that simpler forms of microtonal notation (as described above) be used for the majority of works incorporating microtonal tunings.

By way of example, the works below by Liza Lim and Nicholas Deyoe use quarter-tone accidentals, and in the case of the Deyoe, specific microtonal fingerings are called for (throughout the work, several microtonal variations of middle C are specifically called for and notated; the work was written for the CC contrabass tuba, and the composer utilized the overtone charts from earlier in this guide to find several different alternate fingerings for that note). Dr. Hayward's compositions instead utilize a mathematical notation system of his own construction; in those works, he is often the performer as well, and since he is very familiar with his own notation system, it is no large effort for him to perform them. Others unfamiliar with the system would need an extensive amount of preparation time to read such notation, which many performers would find to be a daunting task.

Relative difficulty

Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Plateau Square* – Robin Hayward**

…aus freier Lust…verbunden… - Georg Friedrich Haas

Plainsound Brass Trio No. 1 – Wolfgang von Scheinitz

***The Green Lion Eats the Sun* – Liza Lim**

***19 E. Main St., Alhambra, CA 91801* – Nicholas Deyoe**

G. Digital/Analog

i. Amplification

Method

In addition to the tuba and euphonium's natural amplification properties, they are also well-suited to amplifying via electronic means. There are numerous ways to amplify the tuba and euphonium: with a mic placed a few feet from the bell, closer to the bell, inside, and with contact mics directly placed on the instrument.

When amplified, the tuba/euphonium sound can be sent through a variety of different sound reproduction systems.

Necessary information

There are numerous issues to be aware of when amplifying the tuba and euphonium, the most pressing of which is the immense loudness already inherent in the sound of the instruments. Combined with an improperly calibrated sound system, this can lead to a variety of issues, including feedback, fatiguing sound levels, and a lack of tonal definition. The same issues apply for amplification through a standalone amplifier.

In the author's experience, the best type of standalone system to use in this setting is either a keyboard amplifier or a self-contained PA systems. Both of these systems can sit on stage near the tubist, and with proper equalization and gain-staging, the risk for feedback may be minimized.

When amplifying the tuba and euphonium, the choice of which microphone to use is important. For close miking (as in placed on a stand above the instrument), a condenser mic is the best choice. When placed closer or inside the bell, a dynamic mic tends to work the best (unless a clip-on mic is used, in which case the standard condenser works well). A few common

microphones that work well for the tuba and euphonium include the AKG C414, the Shure SM57, the Sennheiser MD 421 II, and the Electro-Voice RE 20.

Regardless of which mic is used, it is absolutely vital that the chosen microphone exhibit a decent-to-excellent low range response (a minimum of 50 Hz, if not down to 20 Hz).

When used extensively, the act of amplification can become a part of the fabric of the composition itself; this is especially the case with both the work by Luigi Nono listed below and Monte Weber's *Colossus*, the latter of which would be unperformable without the aid of amplification technology.

Notation

The notation of amplification methods is not usually a concern, but if this technique is notated, the usual rules for clear and consistent methodology apply.

Relative difficulty

Advanced

Works to consider (bolded titles are particularly representative examples of this technique)

***Post-prae-ludium 'per Donau'* – Luigi Nono**

Still – Jonathan Harvey

Tube space – Dmitri Kourliandski

***Colossus* – Monte Weber**

ii. Sonification of instrument interior

Method

The interior space of the tuba and euphonium is a harmonically-rich series of tubes and curved surfaces, and as such it is ripe for experimentation and sonification. One way in which this is accomplished is by embedding speakers within the bell or other parts of the instruments and playing back sound through the body. This is especially effective when surface-mount

and playing back sound through the body. This is especially effective when surface-mount transducers are utilized, since the additional resonance of the metal transmits the sound to a very high degree.

A related technique involves playing sound into the instrument from the edge of the bell and varying the sound by changing the length of the instrument via the valves.

Finally, a whole host of normally inaudible sounds are revealed when placing a microphone deep inside the bell of the tuba. Mechanical valve noise, inhalation sounds, the sound of rubbing fabric on the bows of the instrument--they are all picked up by internal mics.

Necessary information

When placing objects like a speaker or microphone into the body of the tuba or euphonium, great care needs to be taken not to damage the instrument. The author has avoided these issues by placing a modest amount of padding when needed and utilizing painter's tape to secure objects without leaving residue on the material of the instrument.

Utilizing such an intimate technique plays a lot on the construction of an instrument, and as such this technique is partly affected by the huge variety of tuba and euphonium designs. In regular usage, however, this tends to not be a major issue.

One technique that would seem to work on principle is using a bass bow to bow the edge of the bell or other parts of the instrument. Although this may be effective in some limited circumstances, the author has never personally been able to get this technique to work properly in a reproducible fashion. If internal mics are used, this technique will yield much better results; as a purely acoustical technique, it is however of limited use (unless the theatricality of the technique is the sole criterion for its use; in that case, it may be used liberally).

Notation

The notation of sonification methods is not usually a concern, but if this technique is notated, the usual rules for clear and consistent methodology apply.

Relative difficulty

Advanced to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***abscess* – Kurt Isaacson**

***Duet Elephants* – Mark Trayle**

***Colossus* – Monte Weber**

iii. Contact mics

Method

Contact mics are an effective tool in the amplification of a wide variety of mechanical sounds on the tuba and euphonium. By placing them on the body of the instrument itself, the myriad sounds that are normally inaudible to the listener are amplified and made audible. This includes valve noise, air sounds, and resonant frequencies brought out by the metal of the instrument. They can be placed in a number of locations, but due to its status as the main resonator of the instrument, are often placed on the bell.

A related technique involves using a wooden practice mute and placing the contact mic on the surface of the mute. This lets a relatively clean signal of the tuba/euphonium through, while minimizing the audibility of the acoustic sound of the instrument. As such, it is a very useful technique for the use of analog effects pedals.

Necessary information

In the author's experience, the best results are achieved by using a powered contact mic.

This has a greater amount of sensitivity, but that comes with the risk of a very high amount of gain. Non-powered contact mics do work well, though, and are a perfectly suitable tool for this kind of work.

When fastening the mics to the body of the tuba/euphonium, it is best to use a non-residue-leaving adhesive like painter's tape or scotch tape.

Notation

The notation of contact miking methods is not usually a concern, but if this technique is notated, the usual rules for clear and consistent methodology apply. This is due to the simple fact that contact mics are almost always placed beforehand, and left on during performance. If that is not the case, any clear notation that indicates the movement of the mics is recommended. It may be helpful also to draw diagrams indicating the place to fasten the contact mics; as usual with such specificity, though, it is once again important to remember that not all tubas have the same shape.

Relative difficulty

Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Colossus* – Monte Weber**

iv. Use of analog effects

Method

When amplified in some capacity, the tuba and euphonium are both capable of using analog effects pedals. As in an electric guitar or bass, there needs to be some way to get from the instrument to the pedals themselves. Since miking the tuba or euphonium involves sending a signal out at microphone level, there must be a device of some kind that amplifies the mic level

signal to instrument level. In the author's experience, this is accomplished easily with some sort of on-stage mixer, or with a pedal designed to accept mic level signals (one example being the Boss RC-30 loop pedal, which has a built-in XLR input).

As described in the previous entry, an effective way to isolate the tuba/euphonium acoustic signal is to place a contact mic on top of a wooden practice mute, and then routing that direct signal into the pedals.

There is virtually no limit to the ways in which the tuba and euphonium sound can be used in combination with effects pedals, and experimentation is highly encouraged.

Necessary information

For tubas and (to a lesser extent) euphoniums, it is helpful to use effects pedals that are specifically made for electric basses. Although there is not a huge difference between guitar and bass pedals, the latter are built for the lower frequencies encountered with the tuba and euphonium.

Amplifying the mic level coming out of the tuba to instrument level brings the risk of feedback, as the extra gain makes the signal more prone to getting out of control.

When using effects pedals, it is often better from a technological standpoint to have the sound of the pedals routed through an on-stage amplifier or speaker. Suitable choices for this include bass and keyboard amplifiers, as they both extend into the low range of the tuba and euphonium.

Notation

If the composer wishes to have the performer switch between multiple effects pedals during the performance, it is *vital* that the score clearly mark the changes when they are to occur. Suggested methods include a graphic component that indicates certain pedals, or the use of a

staff whose lines indicate whether a pedal is off or on. See the musical example for a depiction ofthese methods. The works listed below by Clinton McCallum and Ruby Fulton in particular also give very clear demonstrations of this technique.

Relative difficulty

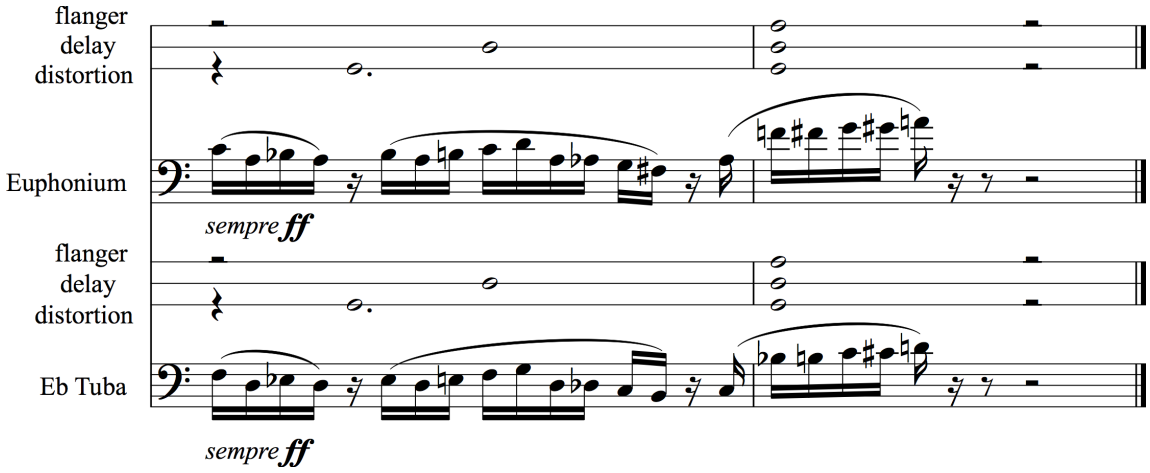
Intermediate to Professional

Works to consider (bolded titles are particularly representative examples of this technique)

***Breathe* – Ruby Fulton**

Wouldn't Need You – Nicholas Deyoe

***Jejunum Pummeller* – Clinton McCallum**



Ex. 27 – Effects pedals

Section 4. Future Directions

As with many of the other documents concerning the tuba family of instruments, this guide is a product of its time. As such, some of the information provided here is subject to change, especially concerning the use of the listed contemporary techniques in the ever-expanding tuba and euphonium repertoire. For this guide to claim any sort of comprehensive-ness, it must grow and change with the passage of time. This will primarily be accomplished

through the online component of the guide, at www.composerstubaguide.com. The sedimentary and collaborative nature of the online version of the guide is well-suited to further adaptations, and will be maintained in perpetuity by the author of this guide.

One avenue for possible growth is in the expansion of the constituent members of the tuba family. The cimbasso continues to gain in prominence among the tuba community; indeed, owning or having access to a cimbasso is practically a requirement for the tubists involved in the Hollywood film scoring scene. To a lesser extent, the serpent has made a comeback over the last few decades (as of 2019), and may yet experience further growth. The Chinese instrument manufacturer Wessex Tubas in particular has shown a desire to resurrect several instruments of older times, including the British style compensating F tuba and French single C tuba.[224] And with the growing British brass band movement in North America, the traditional baritone may continue to be a viable secondary horn for euphonists. Time will tell if these instruments gain enough prominence to warrant inclusion in the tuba family of instruments as defined in this guide, with the largest hurdle being the relative paucity of dedicated contemporary compositions for those instruments. It is worth keeping track of these changes, though.

The design and history of the tuba and euphonium has been in constant flux for almost two centuries as of this document's writing, and this process shows no sign of abating. One major evolution of the tuba is the microtonal tuba designed by Dr. Robin Hayward and B&S.[225] By incorporating a modified rotary valve cluster with seven valves, Dr. Hayward's design allows for the performance of music in both equal temperament and in quarter tones, throughout the

[224] "French C Tuba – TC236 – Wessex Tubas," Wessex Tubas, accessed January 4 2019, https://wessex-tubas.com/collections/tubas/products/french-c-tuba-tc236
[225] "Microtonal Tuba", Robin Hayward, accessed February 3, 2019, http://www.robinhayward.de/eng/mitontuba.php

tuba's entire range. As this design and other potential evolutions of the tuba and euphonium continue to proliferate, the manual will need to be updated. This will be accomplished easily via the use of the website version of the manual, and will additionally be incorporated into future print versions.

As the tuba and euphonium continue to gain stature within the new music community, a growing community of performers specializing in the performance of contemporary music will expand the instrument into new and uncharted technical territories. As the current body of contemporary techniques continues to be refined and expanded, this manual will need to likewise grow and incorporate new information. Given the Internet-first emphasis of the guide, this will be accomplished with relatively little issue.

In Section 1, a number of tubists and euphonists exploring the edges of the contemporary repertoire were highlighted. As more and more musicians continue to explore these far-flung fields of musical performance, the manual will be updated to include their activities.

An additional area for growth with this guide is in the future expansion of the provided musical examples. Although the musical examples already included serve their intended purpose, it is the author's hope that with further time and effort a wider selection of examples will be produced. This will also be necessary as the body of contemporary techniques continues to expand. The continuing art of musical notation is also constantly in flux, and will potentially need to be addressed as well in future versions of the manual.

As more and more compositions continue to enter the solo tuba and euphonium repertoire, the repertoire lists included in the next section of the guide will continue to grow. The same can be said for the list of recordings. The tuba family is going head-first into the future, and

it is the hope of the author that the tuba and euphonium will grow in stature among the contemporary musical world.

Section 5. Repertoire Lists, Recordings, and Bibliography

This section contains a selected list of the standard and contemporary repertoires of the tuba and euphonium, followed by a selected discography of relevant recordings. Following that is a list of some helpful printed resources, both for the tuba family itself and for contemporary brass performance in general.

Unaccompanied Tuba Solos

Adler, Samuel. *Canto VII*. New York: Boosey & Hawkes, 1974.

Adler-McKean, Jack. *Edges of Consciousness*. Louisville, KY: Potenza Music Publishing, 2013.

Aguilar, Moses. *The Restless Commemoration of Marble*. Moses Aguilar, 2014.

Ahmetjanova, Asia. *Aleph*. Berlin: Edition Gravis, 2018.

Antoniou, Theodor. *Six Likes for Solo Tuba*. Kassel, DE: Bärenreiter, 1968.

Arnold, Malcolm. *Fantasy for Tuba*. London: Faber Music, 1969.

Baker, Claude. *Canzonet*. Maryland Heights, MO: Lauren Keiser Music Publishing, 2008.

Bamert, Matthias. *Incon-sequenza*. New York: G. Schirmer, 1973.

Cage, John. *Solo for Tubas in B-flat and F.* New York: Henmar Press, 1960.

Chin, Hong-Da. *Berserker*. Hong-Da Chin, 2015.

Chorev, Yoav. *Pag*. Yoav Chorev, 2014.

Corcoran-Tadd, Athena. *SCWBA*. Berlin: Edition Gravis, 2018.

Deyoe, Nicholas. *19 E. Main St., Alhambra, CA 91801*. Alhambra, CA: Nicholas Deyoe, 2015.

Egan, Eric Skytterholm. *of her Skin*. Berlin: Edition Gravis, 2018.

Forbes, Michael. *The Grumpy Troll*. Vuarmarens, CH: Editions BIM, 2014.

Fulkerson, James. *Patterns III*. Champaign, IL: Media Press, 1969.

Globokar, Vinko. *Introspection d'un Tubist*. Paris: Ricordi, 1983.

Grant, James. *Three Furies*. Louisville, KY: Potenza Music Publishing, 2011.

Gregson, Edward. *Alarum*. Cheshire, GB: Intrada Music Publishing, 1995.

Griffeath-Loeb, Brian. *Crapiccio*. Brian Griffeath-Loeb, 2011.

Johnson, Evan. *Rückenfigur*. Evan Johnson, 2015.

Kagel, Mauricio. London: Universal Edition, 1974.

Kraft, William. *Encounters II*. Vuarmarens, CH: Editions BIM, 2009.

Kampela, Arthur. *Naked Singularity*. Arthur Kampela, 2004.

Kourliandski, Dmitri. *Tube space*. Paris: Jobert, 2011.

Kuehn, Mikel. *Jigsaw*. Mikel Kuehn, 1993.

Láng, István. *Aria di Coloratura*. Budapest: Editio Musica, 1984.

Lippe, Cort. *Solo Tuba Music*. Raleigh, NC: Borik Press, 1987.

Mahnkopf, Claus-Steffen. *Hommage à Brian Ferneyhough*. Hamburg: Musikverlag Hans Sikorski, 2014.

Penderecki, Krzysztof. *Capriccio*. Mainz, DE: Schott, 1987.

Penn, William. *Three Essays*. New York: Seesaw Music, 1975.

Persichetti, Vincent. *Parable XXII*. Bryn-Mawr, PA: Elkan-Vogel, 1983.

Persichetti, Vincent. *Serenade No. 12*. Bryn-Mawr, PA: Elkan-Vogel, 1963.

Poore, Melvyn. *Vox Superius*. Birmingham, GB: Arts Lab Music Publishing, 1977.

Ptaszynska, Marta. *Two Poems*. Kraków: Polskie Wydawnictwo Muzyczne, 1979.

Raum, Elizabeth. *Sweet Dances*. Annandale, VA: Tuba-Euphonium Press, 2002.

Reck, David. *Five Studies for Tuba Alone.* New York: Edition Peters, 1968.

Schlunz, Annette. *Ach es…* Berlin: Bote & Bock, 1993.

Schwartz, Laura. *Left Out*. Laura Schwartz, 2016.

Sdraulig, Charlie. *Category*. Charlie Sdraulig, 2014.

Silverman, Faye-Ellen. *Zigzags*. New York: Seesaw Music, 1988.

Stevens, John. *Salve Venere, Salve Marte*. Vaurmarens, CH: Editions BIM, 1995.

Stevens, John. *Suite No. 1*. Washington, D.C.: Manduca Music Publications, 1997.

Stevens, John. *Triumph of the Demon Gods*. Portland, ME: Queen City Brass Publications, 1981.

Szalonek, Witold. *Piernikiana*. Kraków: Polskie Wydawnictwo Muzyczne, 1980.

Tucker, Colin. *center unmoored in the presence of infinite fringes*. Colin Tucker, 2016.

Wolff, Christian. *Tuba Song.* New York: Edition Peters, 1992.

Unaccompanied Euphonium Solos

Aho, Kalevi. *Solo VIII*. Helsinki: Fennica Gehrman, 2003.

Clinard, Fred. *Sonata for Unaccompanied Euphonium*. Nashville, TN: Shawnee Press, 1978.

Constantinides, Dinos. *Fantasy for Solo Euphonium.* Irving, TX: Cimarron Music Press, 1994.

DeFotis, William. *Euphoniana*. New York: American Composers Alliance, 1973.

Frackenpohl, Arthur. *Sonata for Solo Euphonium*. Annandale, VA: Tuba-Euphonium Press, 1994.

Gillingham, David. *Blue Lake Fantasies*. Greensboro, NC: C. Alan Publications, 2012.

Hoch, Peter. *From the Quiet….* Annandale, VA: Tuba-Euphonium Press, 1996.

Isaacson, Kurt. *abbess*. Kurt Isaacson, 2015.

Isaacson, Kurt. *monkfish.* Kurt Isaacson, 2015.

Lebedeva, Elena. *Insects*. Louisville, KY: Potenza Music Publishing, 2013.

Lim, Liza. *The Green Lion Eats the Sun*. Milano: Ricordi, 2012.

Schulz, Patrick. *Constellation*. Mt. Horeb, WI: TubaQuartet.com, 1999.

Stevens, John. *Soliloquies*. Annandale, VA: Tuba-Euphonium Press, 2001.

Wiggins, Christopher. *Soliloquy IX*. London: Neuschel Music, 1997.

Tuba Solos with Electronics

Báthory-Kitsz, Dennis. *Llama Butter*. Northfield, VT: Westleaf Editions, 1993.

Bjørntvedt, Kaja. *Tubanitis*. Kaja Bjørntvedt, 2011.

Cope, David. *Spirals*. New York: Seesaw Music, 1976.

Corwell, Neal. *New England Reveries.* Clear Spring, MD: 1990.

Deyoe, Nicholas. *Wouldn't Need You*. Nicholas Deyoe, 2011.

Evanoff, Ray. *Helpless Before a Creature Which Defies Physical Laws and Communicates Only Through Death*. Ray Evanoff, 2018.

Fulton, Ruby. *Breathe.* Ruby Fulton, 2015.

Hackbarth, Glenn. *Low End [omaggio:cm]*. Glenn Hackbarth, 2008.

Hamlin, Peter. *Clones*. Annandale, VA: Tuba-Euphonium Press, 2000.

Harvey, Jonathan. *Still*. London: Faber Music, 1997.

Helmuth, Mara. *Expanding Space*. Mara Helmuth, 2011.

Hiller, LeJaren. *Malta*. Bryn-Mawr, PA: Theodore Presser, 1976.

Isaacson, Kurt. *abscess*. Kurt Isaacson, 2015.

Katzer, Georg. *Für Tuba mit Hegel*. Berlin: Edition Gravis, 2008.

Lanza, Mauro. *Burger Time ou les tentations de Saint-Antoine*. Paris: IRCAM, 2001.

Lazarof, Henri. *Cadence VI*. Berlin: Bote & Bock, 1974.

Lippe, Cort - *Music for Tuba and Computer*. Cort Lippe, 2008.

Martinaitytė, Žibuoklė. *Ab Initio*. Žibuoklė Martinaityte, 2004.

McCausland, Douglas. *Alone on Repeat*. Douglas McCausland, 2016.

McLean, Priscilla. *Beneath the Horizon III*. New York: MLC Publications, 1978.

Miyasaki, Ariane. *Hindsight*. Ariane Miyasaki, 2014.

Nono, Luigi. *Post-Prae-Ludium, 'per Donau'*. Milano: Ricordi, 1987.

Poore, Melvyn. *Death Be Not Proud*. Melvyn Poore, 2008.

Rice, Carter John. *Code Fragments*. Carter John Rice, 2014.

Ross, Walter. *Midnight Variations*. Medfield, MA: Dorn Publications, 1971.

Ross, Walter. *Piltdown Fragments*. Walter Ross, 1975.

Roy, Élise. *Digestion of Memory*. Élise Roy, 2016.

Ruggiero, Charles. *Fractured Mambos*. Okemos, MI: Charles Ruggiero, 1990.

Sannicandro, Valerio. *Sonnet X*. Valerio Sannicandro, 2008.

Srinivasan, Asha. *Dyadic Affinities*. Asha Srinivasan, 2013.

Subotnick, Morton. *The First Dream of Light*. Morton Subotnick, 1980.

Weber, Monte. *Colossus*. Monte Weber, 2014.

Witkin, Beatrice. *Breath and Sounds*. Melville, NY: Belwin-Mills, 1975.

Wyatt, Scott. *Three For One*. Annandale, VA: Tuba-Euphonium Press, 1992.

Euphonium Solos with Electronics

Batzner, Jay. *Calling*. Unsafe Bull Music, 2009.

Boda, John. *Sonatine*. Irving, TX: Cimarron Music Press, 1970.

Bryant, Steven. *Hummingbrrd*. Steven Bryant, 2012.

Buss, Howard. *Alien Loop de Loops*. Brixton Publications, 2015.

Carastathis, Aris. *Differentia*. Aris Carastathis, 1987.

Copeland, Brett. *Warrior*. Rochester, NY: Brett Copeland Music, 2016.

Corwell, Neal. *Distant Images*. Clear Spring, MD: Nicolai Music, 1994.

Corwell, Neal. *New England Reveries.* Clear Spring, MD: Neal Corwell, 1990.

Corwell, Neal. *Odyssey.* Clear Spring, MD: Neal Corwell, 2000.

Davis, D. Edwards. *Breathing Room*. D. Edwards Davis, 2001.

Davis, D. Edwards – *Let There Be Funk*. D. Edwards Davis, 2001.

Essl, Karlheinz – *Si!*. Karlheinz Essl, 2012.

Fountain, Matthew. *Run*. Matthew Fountain, 2014.

Heussenstamm, George. *Alter Ego*. Medfield, MA: Dorn Publications, 1981.

Jahn, Grant. *Petrichor*. Grant Jahn, 2017.

Keating, Brett. *Chamber[s]*. Brett Keating, 2017.

Kline, Tyler. *Basic Research 1*. Tampa, FL: Tyler Kline Music, 2014.

Meechan, Peter. *JET A*. Peter Meechan, 2010.

Murchison, Matthew. *Disquiet*. Matthew Murchison, 2016.

Nagano, Mitsuhiro. *Matrix*. Mitsuhiro Nagano, 1989.

Olencki, Weston. *pulse trains*. Weston Olencki, 2018.

Olencki, Weston. *Pylon*. Weston Olencki, 2017.

Pankhurst, Lucy. *Susurration*. Lucy Pankhurst, 2014.

Patterson, Merlin. *Dream Sequence*. Merlin Patterson, 1981.

Raes, Godfried-Willem. *3 for 1*. Godfried-Willem Raes, 1988.

Rito, Justin. *Zero Circle*. Justin Rito, 2016.

Scott, Andy. *My Mountain Top*. Astute Music, 2012.

Stockhausen, Karlheinz - *Kinntanz for Euphonium, Percussion and Synthesizer*. Kürten, DE: Stockhausen-Verlag, 1994.

Tuba Solos with Piano or Large Ensemble

Baker, Claude. *Omaggi e Fantasie*. Maryland Heights, MO: Lauren Keiser Music Publishing, 2008.

Birtwistle, Harrison. *The Cry of Anubis*. London: Boosey & Hawkes, 1995.

Bozza, Eugene. *Concertino*. Paris: Alphonse Leduc, 1967.

Broughton, Bruce. *Sonata for Tuba and Piano*. Boca Raton, FL: Masters Music Publications, 1987.

Casterede, Jacques. *Sonate pour Tuba et Piano*. Paris: Alphonse Leduc, 1963.

Daugherty, Michael. *Reflections on the Mississippi.* Ann Arbor, MI: Michael Daugherty Music, 2015.

Ellerby, Martin. *Tuba Concerto*. Surrey, GB: Maecenas Music, 1991.

Ewazen, Eric. *Concerto for Tuba and Orchestra*. San Antonio, TX: Southern Music Company, 1998.

Fujikura, Dai. *Tuba Concerto*. Berlin: Ricordi, 2018.

Gregson, Edward. *Tuba Concerto*. London: Novello & Co., 1978.

Heiden, Bernhard. *Concerto for Tuba*. San Antonio, TX: Southern Music Company, 1976.

Gubaidulina, Sofia. *Lamento*. Milwaukee, WI: Hal Leonard Corporation, 1991.

Hindemith, Paul. *Sonate für Tuba und Klavier*. Mainz, DE: Schott, 1957.

Jacob, Gordon. *Suite for Tuba*. London: Boosey & Hawkes, 1973.

Jolas, Betsy. *Trois Duos*. Paris: Alphonse Leduc, 1985.

Lachenmann, Helmut. *Harmonica*. Wiesbaden, DE: Breitkopf & Härtel, 1983.

Lang, David. *Are You Experienced?*. London: Novello, 1990.

Larsen, Libby. *Ursa, for Tuba and Wind Symphony.* Minneapolis: Libby Larsen Publishing, 2010.

Plog, Anthony. *Three Miniatures*. Vuarmarens, CH: Editions BIM, 1991.

Powell, Morgan. *Transitions*. Annandale, VA: Tuba-Euphonium Press, 1991.

Romhanyi, Aron. *Parallels*. Vuarmarens, CH: Editions BIM, 2008.

Schuller, Gunther. *Tuba Concerto No. 2*. Louisville, KY: Potenza Music Publishing, 2008.

Stevens, John. *Five Muses*. Louisville, KY: Potenza Music Publishing, 2018.

Stevens, John. *Journey for Contrabass Tuba and Orchestra*. Vuarmarens, CH: Editions BIM, 2008.

Vaughan Williams, Ralph. *Concerto for Tuba in F Minor*. Oxford, GB: Oxford University Press, 1969.

Wilder, Alec. *Suite No. 1 (Effie)*. Newton Center, MA: Margun Music, 1968.

Wilhelm, Rolf. *Concertino*. München: Strube, 1990.

Williams, John. *Concerto*. Milwaukee, WI: Hal Leonard Corporation, 1988.

Woodward, James. *Concerto*. Annandale, VA: Tuba-Euphonium Press, 2000.

Euphonium Solos with Piano or Large Ensemble

Aagaard-Nilsen, Torstein. *Concerto for Euphonium and Orchestra*. Oslo: Norsk Noteservice, 2010.

Bach, Jan. *Concert Variations*. Annandale, VA: Tuba-Euphonium Press, 1992.

Bourgeois, Derek. *Concerto (Trombone)*. Aylesbury, GB: G&M Brand Publications, 1989.

Bristol, Doug. *Fantasy for Euphonium and Orchestra*. Irving, TX: Cimarron Music Press, 2008.

Cosma, Vladimir. *Concerto*. Charnay-les-Macon, FR: Robert Martin, 2007.

Curnow, James. *Rhapsody*. Quainton, GB: Winwood Music, 2001.

Curnow, James. *Symphonic Variants*. Wilmore, KY: Curnow Music Press, 1998.

Ellerby, Martin. *Concerto*. London: Studio Music, 1997.

Ewazen, Eric. *Sonata*. New York: Theodore Presser Company, 2012.

Golland, John. *Euphonium Concerto*. London: Chester, 1984.

Golland, John. *Euphonium Concerto No. 2*. London: Studio Music, 1992.

Horovitz, Joseph. *Euphonium Concerto*. London: Novello, 1991.

Ito, Yasuhide. *Fantasy Variations*. London: Studio Music, 2004.

Jacob, Gordon. *Fantasia*. London: Boosey & Hawkes, 1973.

Jenkins, Karl. *Euphonium Concerto*. London: Boosey & Hawkes, 2009.

Linkola, Jukka. *Concerto*. Helsinki: Fennica Gerhman, 2004.

Schulz, Patrick. *Concerto for Euphonium and Wind Ensemble*. Manuscript, 2000.

Sparke, Philip. *Concerto*. London: Studio Music, 1995.

Sparke, Philip. *Pantomime*. London: Studio Music, 1988.

Stevens, John. *Autumn*. Vuarmarens, CH: Editions BIM, 2009.

Stevens, John. *Concerto*. Vuarmarens, CH: Editions BIM, 2006.

Stevens, John. *Trombone Sonata*. Vuarmarens, CH: Editions BIM, 2004.

Szentpali, Roland. *Pearls*. Vuarmarens, CH: Editions BIM, 2001.

Wilby, Philip. *Concerto for Euphonium and Orchestra*. Quainton, GB: Winwood Music, 1996.

Tuba or Euphonium in a Chamber Setting

Adler, Samuel. *Four Dialogues for Euphonium and Marimba*. New York: Carl Fischer, 1978.

Brown, Eliza. *The Subtler Arts of Lions*. Eliza Brown, 2016.

(F and CC tubas)

Cage, John. *Atlas Eclipticalis.* New York: C.F. Peters Corp., 1961.

(variable, includes three separate tuba parts)

Feldman, Morton. *Durations III.* New York: C.F. Peters Corp., 1962.

(tuba, violin, piano)

Feldman, Morton. *Vertical Thoughts 5*. New York: C.F. Peters Corp., 1963.

(tuba, celesta, violin, soprano, percussion)

Gillingham, David. *Diversive Elements*. Greensboro, NC: C. Alan Publications, 2013.

(Euphonium, Tuba, and Piano)

Hartley, Walter S. *Sextet*. Annandale, VA: Tuba-Euphonium Press, 1994.

(solo euphonium and woodwind quintet)

Heiden, Bernhard. *Variations for Solo Tuba and Nine Horns.* New York: Associated Music, 1977.

Knox, Garth. *Jonah and the Whale*. Niedernhausen, DE: Edition Kemel, 2016.

(tuba, viola)

Nehlybel, Vaclav. *Ludus*. Irving, TX: Cimarron Music Press, 2006.

(tuba trio)

Ustvolskaya, Galina. *Composition No. 1, "Dona Nobis Pacem"*. Hamburg: Sikorski, 1993.

(tuba, piccolo, piano)

Xenakis, Iannis. *Linaia-Agon*. Paris: Editions Salabert, 1973.

(tuba, horn, trombone)

Selected Discography

Tuba

Baadsvik, Øystein. *20th-Century Tuba Concertos*. BIS 1515, 2008. CD.

Baadsvik, Øystein. *21st-Century Tuba Concertos*. BIS 1685, 2009. CD.

Baadsvik, Øystein. *Danzas – Music for Tuba and Piano*. BIS 1585, 2006. CD.

Bazsinka, József. *Waves*. Hungaroton 31642, 1996. CD.

Bell, William. *Bill Bell and His Tuba*. Golden Crest 3015, 1957. Vinyl LP.

Bobo, Roger. *Bobissimo! The Best of Roger Bobo*. Crystal Records 125, 1991. CD.

Bobo, Roger. *Rainbo-bo: The Man with the Golden Tuba*. Crystal Records 398, 2007. CD.

Bobo, Roger. *Roger Bobo, Tuba Libera*. Crystal Records 690, 1994. CD.

Brown, Velvet. *Perspectives – Sound and Rhythm*. Crystal Records 694, 2007. CD.

Carolino, Sergio. *TGB TUBAGUITARRA&BATERIA*. Clean-feed Records CFO23, 2004. CD.

Draper, Ray. *John Coltrane/Ray Draper Quintet*. Prestige MPP 2507, 1980. Vinyl LP.

Drums & Tuba. *Vinyl Killer*. Righteous Babe RBR-023-D, 2001. CD.

Erickson, Martin. *Smile – The Music of Marty Erickson.* Willson/DEG Music, 2002. CD.

Funderburk, Jeffrey. *Journeys*. Mark Custom Records 3176, 1998. CD.

Gourlay, James. *Gourlay Plays Tuba*. Doyen Records 028, 1997. CD.

Griffiths, John. *Canadian Chops*. CBC, 1999. CD.

Hanks, Thompson (Toby). *Sampler*. Crystal Records 395, 2000. CD.

Hayward, Robin. *Nouveau Saxhorn Nouveau Basse*. Pogus Productions 21077-2, 2014. CD.

Hayward, Robin. *States of Rushing*. Choose Records, 2009. CD.

Hayward, Robin. *Valve Division*. Fringes Recordings 19, 2005. CD.

Heasley, Tom. *On the Sensations of Tone*. Innova Records 566, 2001. CD.

Heasley, Tom. *Where the Earth Meets the Sky.* Hypnos Recordings, 2001. CD.

Hübsch, Carl Ludwig. *119 Ways to Begin*. Nurnichtnur 1021018, 2003. CD.

Hübsch, Carl Ludwig. *Der Erste Bericht.* In+Out Records 77035-2, 1997. CD.

Jara, Jesús. *Obres per a tuba i electrònica*. Ars Harmonica 163, 2008. CD.

Johnson, Howard. *Howard Johnson & Gravity!!!*. Verve 314531021-2, 1996. CD.

Lacen, Anthony "Tuba Fats". *Anthony "Tuba Fats" Lacen*. GHB Records 344, 1995. CD.

Lind, Michael. *Virtuoso Tuba*. Caprice 21493, 1995. CD.

Lo, Kristoffer. *Anhedonia*. Propeller Recordings 237, 2017. CD.

Lo, Kristoffer. *Anomie*. Gigafon 007, 2013. CD.

Lo, Kristoffer. *The Black Meat*. Name Music & Publishing 005LP, 2016. Vinyl LP.

Manning, John. *Field Notes*. Summit Records 680, 2016. CD.

Manning, John. *Four Corners*. Summit Records 517, 2009. CD.

Marshall, Oren. *Introduction To The Story of Speedy Sponda – Part One: In A Silent Room*. Slowfoot 003, 2004. CD.

Marshall, Oren. *Time Spent at Traffic Lights*. The Charming Transport Band. Slowfoot 002, 2003. CD.

McDonald, Beth. *Still*. Single Action Rider 003, 2014. CD.

Microtub. *Microtub*. Sofa 536, 2011. CD.

Modern Jazz Tuba Project. *My Favorite Things*. Heartdance Music 1120, 2003. CD.

Moschner, Pinguin. *Pinguin Moschner: A Tuba Love Story*. Sound Aspects 005. Digital.

Myklebust, Kjetil. *Electric Tuba*. C-Y Contemporary 0904, 2009. CD.

Nahatzki, Richard. *Lachenmann: Harmonica for Large Orchestra and Tuba.* CPO Records 999 484-2, 1998. CD.

Nelson, Mark. *New England Reveries*. Crystal Records 691, 1991. CD.

New York Tuba Quartet. *New York Tuba Quartet: Tubby's Revenge.* Crystal Records 221, 2011. CD.

Peck, Dan. *Solo LP*. Tubapede Records tb01, 2013. Vinyl LP.

Perantoni, Daniel. *Daniel in the Lion's Den.* Summit Records 163, 1994. CD.

Perantoni, Daniel. *Perantoni Plays Perantoni*. Mark Custom Records 2433, 1998. CD.

Phillips, Harvey. *Harvey Phillips in Recital for Family and Friends*. Golden Crest RE 7054, 1973. Vinyl LP.

Phillips, Harvey. *Harvey Phillips in Recital, Vol. III*. Golden Crest CRS 4122, 1972. Vinyl LP.

Piernik, Zdzisław. *Plays Z. Piernik*. Polskie Nagrania Muza 1806, 1982. Vinyl LP.

Piernik, Zdzisław. *Tuba Universale*. Pro Viva ISPV 102, 1980. Vinyl LP.

Pokorny, Gene. *Big Boy*. Summit Records 283, 2001. CD.

Poore, Melvyn. *Death Be Not Proud*. WERGO 2064, 2013. CD.

Poore, Melvyn. *Groundwork*. Random Acoustics 005, 1994. CD.

Randolph, David. *Contrasts in Contemporary Music*. ACA Digital Recording CM20018-18, 1992. CD.

Rojas, Marcus. *Tattoos and Mushrooms*. ILK Music 150, 2008. CD.

Roper, William. *Juneteenth*. Asian Improv 0055, 2001. CD.

Roper, William. *Roper's Darn! Yarns: Tales of Love and Woe*. Asian Improv 0058, 2002. CD.

Rozen, Jay. *Killer Tuba Songs*. TTT Music, 1997. CD.

Sass, Jon. *Sassified*. ATS Records 0582, 2005. CD.

Schiaffini, Giancarlo. *Tuba Libre*. Random Acoustics 025, 2000. CD.

Self, James. *The Big Stretch.* Basset Hound Records 106-2, 1999. CD.

Seward, Steven. *Kansas City Dances*. Walking Frog Records 444, 1997. CD.

Sheridan, Patrick. *Storyteller*. Elf Records 1014, 2002. CD.

Sinder, Philip. *Aerodynamics*. Mark Custom Records 1701, 1995. CD.

Skillen, Joseph. *Blue Plate Special.* Mark Custom Records 3964, 2000. CD.

Sotto Voce. *Viva Voce: The Complete Quartets of John Stevens*. Summit Records 388, 2004. CD.

Sotto Voce. *Refractions: Old & New Music for Low Brass*. Summit Records 493, 2007. CD.

Stevens, John. *Power*. Mark Custom Records 20699, 1988. CD.

Stevens, John. *Reverie*. Summit Records 446, 2006. CD.

Stewart, Bob. *First Line*. JMT 834414-2, 1987. CD.

Szentpáli, Roland. *I Killed My Lips.* Fenox 001, 1999. CD.

Szentpáli, Roland. *Parallels.* Potenza Music, 2011. CD.

Tindall, Aaron. *Transformations*. Bridge Records 9471, 2016. CD.

Tubalaté. *Earth and Moon*. Horizon TCD 4, 2000. CD.

Tubalaté. *Move*. ASC 21, 2000. CD.

Turk, John. *Low Blows*. Dana Recording Project 4, 1991. CD.

Vogt, Michael. *Tuba Intim*. ReR Tuba1, 1994. CD.

Wallerand, Fabien. *Art of the Tuba*. Indésens!, 2010. CD.

Zerkel, David. *American Music: Something Old, Something New*. Mark Custom Records z5348, 2004. CD.

Euphonium

Baumet, Bastien. *Art of the Euphonium*. Indésens! 034, 2012. CD.

Benton, Robert. *Mirrors*. Potenza Music 1020, 2012. CD.

Bowman, Brian. *The First Carnegie Hall Euphonium Recital*. Crystal Records 393, 2009. CD.

Caillet, Anthony. *Libertalia*. Atalinna B002, 2012. CD.

Childs, David. *The Symphonic Euphonium*. Chandos 10830, 2014. CD.

Corwell, Neal. *Distant Images*. Nicolai Music 119, 1994. CD.

Craig, Mary Ann. *Out on a Limb*. Mark Custom Records 1794, 1995. CD.

Einfalt, Luka. *Slovenian Music for the Euphonium.* Ars Slovenica 2015101, 2015. CD.

Emmerik, Matthew van. *Utaki: The Sacred Grove*. Summit Records 539, 2010. CD.

Euphonix Quartet. *Brink*. Potenza Music, 2012. CD.

Flaten, Tormod. *From the Deep.* Bocchino Music 109, 2008.

Flaten, Tormod. *Norwegian Euphonium*. Doyen 190, 2005. CD.

Frey, Adam. *Beyond the Horizon, Vol. 1*. MSR Classics, 2007. CD.

Kilpatrick, Barry M. *American Music for Euphonium*. Mark Custom Records 2535, 1997. CD.

Kotera, Kana. *Discovery Euphonium*. Florestan 0004, 2016. CD.

Matteson, Rich. *Life's a Take*. Four Leaf 123, 1993. CD.

Mead, Steven. *Euphonium Virtuoso*. Bocchino Music 107, 2006. CD.

Mead, Steven. *The World of Euphonium Volume One*. Polyphonic QPRZ 014D, 1994. CD.

Meixner, Brian. *Praxis*. Potenza Music, 2013. CD.

Mireles, Matthew. *Prometheus*. Potenza Music 1038, 2014. CD.

Murchison, Matthew. *Everyone But Me*. Mulholland 2607, 2003. CD.

Pierce, Benjamin. *Notes from the Underground*. Ribbet Records, 2012. CD.

Pierce, Benjamin. *Wheels of Life*. Ribbet Records, 2006. CD.

Stuckemeyer, Pat. *footprints*. Potenza Music 1008, 2009. CD.

Thurman, Demondrae. *SoliloQuies*. Summit Records 439, 2002. CD.

Tropman, Matt. *Continuum*. Summit Records 279, 2000. CD.

BIBLIOGRAPHY

References

Baines, Anthony. *Brass Instruments: Their History and Development.* Mineola, NY: Dover, 1993.

Bell, William. *Foundation to Tuba and Euphonium Playing.* New York City, NY: Carl Fischer Music, 1931.

Bevan, Clifford. "The low brass." In *The Cambridge Companion to Brass Instruments*, edited by Trevor Herbert and John Wallace, 143-56. Cambridge, GB: Cambridge UniversityPress, 1997.

Bevan, Clifford. *The Tuba Family.* New York: Charles Scribner's Sons, 1978.

Blatter, Alfred, and Paul Zonn. *Contemporary Trumpet Studies*. Edited by David Hickman. Denver, CO: Tromba Publications, 1976.

Buquet, Gérard. *Le Tuba Contemporain: Nouvelles techniques de jeu appliquées au Tuba*. Villiers-sur-Marne, FRA: Ambrioso Editions, 1993.

Cummings, Barton. *The Contemporary Tuba*. Irving, TX: Cimarron Music Press, 2006.

Dempster, Stuart. *The Modern Trombone: A Definition of its Idioms*. Athens, OH: Accura Music, Inc., 1994.

Frederiksen, Brian. *Arnold Jacobs: Song and Wind*. Edited by John Taylor. Gurnee, IL: WindSong Press Ltd., 2006.

Gould, Elaine. *Behind Bars: The Definitive Guide to Music Notation.* London: Faber Music Ltd., 2011

Hayward, Robin. "The Microtonal Tuba." *The Galpin Society Journal* 64 (March 2011): 125-77.

Herbert, Trevor. “Brass bands and other vernacular brass traditions.” In *The Cambridge Companion to Brass Instruments*, edited by Trevor Herbert and John Wallace, 177-92. Cambridge, GB: Cambridge University Press, 1997.

Hill, Douglas. *Extended Techniques for the Horn: A Practical Handbook for Students, Performers and Composers.* Miami, FL: Warner Bros. Publications, 1996.

Nagel, Robert. *Trumpet Studies in Contemporary Music.* Albuquerque, NM: Mentor Music, 2012.

Phillips, Harvey. *Mr. Tuba*. Bloomington, IN: Indiana University Press, 2012.

Phillips, Harvey, and William Winkle. *The Art of Tuba and Euphonium Playing.* Van Nuys, CA: Alfred Music, 1992.

Piper, Jonathan, and Brian Griffeath-Loeb. *Tuba Performance Catalog*. Self-published, 2008.

Plog, Anthony. *Sixteen Contemporary Etudes*. Denver, CO: Tromba Publications, 1977.

Ray, Irving. “Live Electronics and Euphonium Solos.” *International Tuba Euphonium Association Journal* 46, no. 1 (2018): accessed April 3, 2019. http://www.iteaonline.org/members/journal/46N1/46N1euphoniumelectronics.php.

Stevens, Thomas. *Contemporary Trumpet Studies.* Paris: G. Billaudot, 1976.

Stone, Kurt. *Music Notation in the Twentieth Century*. New York City, NY: W.W. Norton & Co., 1980.

Svoboda, Michael, and Michel Roth. *The Techniques of Trombone Playing*. Kassel, DE: Bärenreiter-Verlag, 2017.

Vaughan Williams, Ralph. *Concerto for Bass Tuba and Orchestra*. Oxford, GB: Oxford University Press, 1969.

Dissertations

Baker, Stacy Ann. *Vocal Technique Performance Challenges for the Tubist With a Soprano Vocal Range*. DMA dissertation, University of Illinois at Urbana-Champaign, 1999.

Brevig, Per Andreas. *Avant-Garde Techniques in Solo Trombone Music; Problems of Notation and Execution*. DMA dissertation, The Juilliard School, 1971.

Casey, Michael James. *Extended Techniques in Unaccompanied Works for Solo Tuba Written Between 1965-1973 and 2002-2013*. DM treatise, Florida State University, 2017.

Cherry, Amy K. *Extended Techniques in Trumpet Performance and Pedagogy*. DMA dissertation, University of Cincinnati, 2009.

Corwell, Neal Lynn. *Original Compositions for Solo Euphonium with Tape.* DMA dissertation, University of Maryland at College Park, 1996.

Daussat, David M. *Birth of a Modern Concerto: An Explication of Musical Design and Intention in 'Journey: Concerto for Contrabass Tuba and Orchestra'.* DMA dissertation, University of North Texas, 2008.

Denton, William L. *Extended Trumpet Techniques: A Method for Their Exploration and Mastery.* DMA dissertation, University of South Carolina, 2006.

Dillon, Robert Morris. *Five Original Teaching Pieces in Contemporary Styles for Brass Instruments*. DME dissertation, The University of Oklahoma, 1971.

Duron-VanTuinen, Danielle. *Euphonium and Live Electronics: A Performer's Examination of Three New Works.* DMA Document, Arizona State University, 2017.

Edgley, Mackenzie Kay. *The Evolution of the Tuba Concerto: Significance and Musical Growth Beyond 'Tubby'.* DM treatise, The Florida State University, 2016.

Fox, Ronald S. *A Critical Comparison of Selected Orchestration Texts Concerning Brass*. DM Document, Indiana University, 1984.

Funderburk, Jeffrey Lee. *An Annotated Bibliography of the Unaccompanied Solo Repertoire for Tuba*. DMA dissertation, University of Illinois at Urbana-Champaign, 1992.

Halloin, Anthony. *The Development of the American Solo Tuba Repertoire*. DMA dissertation, University of Maryland, College Park, 2010.

Jenkins, Kevin Joseph. *A study of seven compositions for tuba and electronic sound source*. DMA dissertation, Arizona State University, 1994.

Jester, Jennifer Ann. *Interdisciplinary Performance and Education: The Study, the Project, the Challenge.* DMA dissertation, University of California Los Angeles, 2008.

Kennedy, Sean M. *An Approach to Standardizing Pedagogy for Extended Techniques on the Tuba*. DMA document, Texas Tech University, 2016.

Larson, Andrew Brian. *Investigating "Experimentalism": A Case Study of the Tuba and its Repertoire.* DMA dissertation, Louisiana State University, 2013.

McCormack, Timothy. *Instrumental Mechanism and Physicality as Compositional Resources*. MPhil thesis, University of Huddersfield, 2010.

Miles, David Royal. *An annotated bibliography of selected contemporary euphonium solo literature by American composers.* DMA dissertation, University of Maryland at College Park, 1991.

Navarro, Fernanda. *Regaining the Body: An Approach to Corporeality and Physicality in Composition and Musical Collaboration*. MA thesis, University of California Santa Cruz, 2013.

Potter, Craig Garrett. *The Electroacoustic Tuba: A Study of Selected Works for Tuba with Fixed Media and Live Processed Electronic Accompaniments*. DMA dissertation, University of Maryland at College Park, 2018.

Puebla, Ruben Alexander. *The Avant-Garde Tuba: Analysis and Comparisons of Interpretations of William Kraft's Encounters II for Unaccompanied Tuba*. MM thesis, California State University, Long Beach, 2014.

Randolph, David Mark. *New Techniques in the Avant-Garde Repertoire for Solo Tuba*. DMA dissertation, University of Rochester, 1977.

Ray, Irving Paul. *A Comprehensive Performance Guide for the Use of Advanced Technology in Euphonium Repertoire with Electronic Media Through Analysis of Works by D. Edward Davis, Neal Corwell, and Lucy Pankhurst.* DMA dissertation, University of North Texas, 2017.

Roche, Heather. *Dialogue and Collaboration in the Creation of New Works for Clarinet*. D.Phil dissertation, University of Huddersfield, 2011.

Rowland, Daniel Jay. *William Kraft's "*Encounters II*" for Solo Tuba: A Performer's Guide and Annotated Bibliography of Unaccompanied Works Written for Roger Bobo.* DM treatise, Florida State University, 2015.

Smoker, Paul Alva. *A Comprehensive Performance Project in Trumpet Literature with a Survey of Some Recently Developed Trumpet Techniques and Effects Appearing in Contemporary Music.* DMA dissertation, The University of Iowa, 1974.

Stevens, Milton Lewis, Jr. *New Techniques Required to Perform Recent Music for the Trombone*. DMA dissertation, Boston University, 1976.

Storm, Lukas Timothy. *Wolfgang von Schweinitz's Plainsound Brass Trio in Theory and Practice: A Guide for Performers*. DMA dissertation, University of California Los Angeles, 2017.

Thompson, Timothy F. *Extended Techniques for the Horn: An Historical Overview with Practical Performance Applications*. DMA dissertation, University of Wisconsin-Madison, 1997.

Tignor, Scott Edward. *A Performance Guide to Luigi Nono's* "Post-Prae-Ludium No. 1'*per Donau'."* DMA dissertation, University of North Texas, 2009.

Westerfield, Lewis Elijah. *Selected Works for Tuba and Electronic Media*. DMA dissertation, University of Alabama, 2017.

Williams, Benjamin John. *Music Composition Pedagogy: A History, Philosophy and Guide*. DMA document, Ohio State University, 2010.

APPENDIX A. SURVEY QUESTIONS

Questions about the tuba family

1) Which of the following instruments have you composed for?

[Bb euphonium/F tuba/Eb tuba/CC tuba/BBb tuba/None of the above]

2) Do you agree that these instruments should all be classified in one instrument family (the "tuba family")?

[Yes/No/Not Sure]

2a) Please explain your answer to the previous question.

3) What is the range of the **Bb euphonium** (using scientific pitch notation)?

4) What is the range of the **F tuba** (using scientific pitch notation)?

5) What is the range of the **Eb tuba** (using scientific pitch notation)?

6) What is the range of the **CC tuba** (using scientific pitch notation)?

7) What is the range of the **BBb tuba** (using scientific pitch notation)?

8) Have you written a solo specifically for the **Bb euphonium**?

[Yes/No/Not Sure]

9) Have you written a solo specifically for the **F tuba**?

[Yes/No/Not Sure]

10) Have you written a solo specifically for the **Eb tuba**?

[Yes/No/Not Sure]

11) Have you written a solo specifically for the **CC tuba**?

[Yes/No/Not Sure]

12) Have you written a solo specifically for the **BBb tuba**?

[Yes/No/Not Sure]

13) If you were to compose a work featuring the tuba in a solo capacity, would you choose to write for a specific key of tuba?

[Yes/No/Maybe/Not Sure]

13a) Please explain your answer for the previous question.

14) In your experience, are there any distinguishable sonic characteristics between the bass tubas (F and Eb) and contrabass tubas (CC and BBb)?

[Yes/No/Maybe/Don't Know]

14a) Please explain your answer for the previous question.

15) Which of the following extended techniques for the tuba are you aware of?

[Multiphonics/Split tones/Valve percussion/Singing through instrument/Alternate fingering tremolo/Wind Tones/Tongue Ram/Striking the instrument/Other (please list)/None of the above]

16) Which of the following extended techniques for the tuba have you utilized in a composition?

[Multiphonics/Split tones/Valve percussion/Singing through instrument/Alternate fingering tremolo/Wind Tones/Tongue Ram/Striking the instrument/Other (please list)/None of the Above]

17) Which of the following aspects of the tuba family are you **most** familiar with?

[Range/History/Repertoire/Technical abilities/Instrument design/Physical demands/Pedagogy/Extended Techniques/Other (please list)]

18) Which of the following aspects of the tuba family are you **least** familiar with?

[Range/History/Repertoire/Technical abilities/Instrument design/Physical demands/Pedagogy/Extended Techniques/Other (please list)]

Questions about extended techniques for the tuba family

19) Are you able to fully explain the process of producing **multiphonics** on the tuba?
[Yes/No/Not Sure]

20) T/F – Multiphonics involve the process of singing (or humming) while playing the tuba normally.

21) T/F - When performing a multiphonic, the tubist can only sing above the note that is being played.

22) T/F – The sung/hummed portion of a multiphonic sounds equally as loud as the played portion when both are performed with the same amount of effort.

23) T/F – Multiphonics can comprise any number of two-note interval structures.

24) Are you able to fully explain the process of producing **split tones** on the tuba?
[Yes/No/Not Sure]

25) T/F – Split tones are produced when the tubist presses a valve half-way down and uses the backpressure inside the mouthpiece to create a different sound.

26) T/F – Split tones can be used to produce a two-note chord, similar to multiphonics.

27) T/F – Split tones are easy to perform across the entire range of the tuba.

28) T/F – Split tones are based around the harmonic series, and the ways in which the tuba embouchure can be manipulated to play multiple partials.

29) Are you able to fully explain the process of producing a **tongue ram** on the tuba?
[Yes/No/Not Sure]

30) T/F – A tongue ram is produced on the tuba largely in the same way that the technique of the same name is performed on the flute.

31) T/F – When performing a tongue ram, the tuba produces a discrete pitch that correlates to the fingering that is being held down during the action.

32) T/F – The pitch produced when performing a tongue ram can only move downwards chromatically from the instrument's fundamental pitch.

33) Are you aware of any differences in fingering patterns between all five members of the tuba family?
[Yes/No/Not Sure]

34) If you were to write an alternate fingering for a note (for example, in a single-note tremolo), would you need to know the specific key of tuba in order to write the correct fingering?
[Yes/No/Not Sure]

35) As a whole, the members of the tuba family are non-transposing. However, certain members of the family do read transposed music in certain instances (i.e., British brass band music and beginning band music). Which members of the tuba family do read transposed music in these instances?
[Bb euphonium/F tuba/Eb tuba/CC tuba/BBb tuba]

Questions about instrumental resources:

36) Have you heard of any of the following resources on the tuba family?
[Cummings/Buquet/Bevan/Piper & Griffeath-Loeb]

37) Select any of the following resources if you have consulted them in the past.
[Cummings/Buquet/Bevan/Piper & Griffeath-Loeb]

38) If you have written for the tuba before, how did you learn more about the instrument family?
[Consulted one of the previous resources/Consulted a general orchestration resource/Consulted a tubist-euphonist/I did not learn more about the tuba family before writing for it/I have not written for the members of the tuba family/I perform on a member of the tuba family/Other (please list)]

39) Which of the following resources was most helpful when learning about the tuba family?
[Resource about the tuba/General orchestration resource/Tubist-euphonist/I have not consulted any of the previous resources/I have not written for the members of the tuba family/Personal knowledge of the instruments/Other (please list)]

40) When consulting a written resource on a given instrument, which of these aspects is most important to you?
[Clarity/Accuracy of information/Structure/Musical examples/Breadth of information/Editorial Commentary/Other (please list)/I do not consult instrumental resources]

41) If there existed a comprehensive resource on the tuba family, would you consider consulting it before writing for any of the instruments in that family (Bb euphonium, F tuba, Eb tuba, CC tuba, BBb tuba)?
[Yes/No/Not Sure]

APPENDIX B. SURVEY SOLICITATION EMAIL

Survey for Composer Awareness of Tuba Family

Aaron Michael Hynds

Fri 9/9/2016 12:02 PM

To:Aaron Michael Hynds <hyndsa@bgsu.edu>;

Greetings!

My name is Aaron Hynds, and I am a doctoral candidate and tubist currently attending Bowling Green State University, in Bowling Green, OH. I am writing to invite you to participate in a research study on the general level of awareness about the tuba family of instruments among professional composers. You were selected and are receiving this invitation because of your stature as a professional composer, thus inhabiting a viewpoint that is of interest to my doctoral research. I am very interested in your feedback on this issue, and I would truly appreciate your time should you be willing to complete the survey.

The estimated time for completion is 20 minutes. Participation in the survey is strictly voluntary, and can be halted at any point prior to completion. Submission of the completed survey will indicate your informed consent, as noted in the survey's introductory page.

To ensure that your responses are included in this research document, please complete the survey with the next month (by October 9th). A reminder email will be sent approximately a week before the deadline.

This research survey has been approved by the Bowling Green State University Human Subjects Review Board, published under exemption #903813-2. If you have any questions, please direct them to the principal investigator (Aaron Hynds, hyndsa@bgsu.edu / (217) 972-0464).

Survey Location: https://www.surveymonkey.com/r/tubasurvey

Thank you very much for your time!

Aaron Hynds
Doctoral Candidate, Bowling Green State University
hyndsa@bgsu.edu -- aaronhynds.weebly.com

APPENDIX C. CONSENT FORM FOR SURVEY

BGSU College of Musical Arts
BOWLING GREEN STATE UNIVERSITY

Informed Consent for Participation in Tuba Family Information Survey

Introduction: My name is Aaron Hynds, and I am a doctoral candidate in the Contemporary Music D.M.A. program at Bowling Green State University (Bowling Green, OH). I am working with my advisor, Prof. David Saltzman, to conduct research into the availability and effectiveness of materials concerning the musical and technical capabilities of the members of the tuba family (Bb euphonium and F, Eb, CC, and BBb tuba). You are being asked to complete this survey because of your background in writing for brass instruments, whether in an ensemble or as a solo voice.

Purpose: The purpose of this research is to ascertain the general awareness of the capabilities of the tuba family amongst professional composers, in order to design a comprehensive resource on the tuba family that addresses any commonly held misconceptions. Additionally, this survey is designed to compile a list of helpful resources on other woodwind and brasswind instruments, to serve as templates for the aforementioned tuba resource. There are no immediate benefits to participating in this study, but the creation of a new, comprehensive resource on the tuba family will potentially benefit the participant and other parties after the study is completed.

Procedure: The sole method of data collection for this study is the following survey, administered entirely online via the SurveyMonkey.com website. The estimated time of completion for this survey is 20-25 minutes.

Voluntary nature: If you agree to participate, your participation is completely voluntary. You would be free to withdraw at any time. You would be allowed decide to skip questions or discontinue participation at any time without penalty. Deciding to participate or not will not affect your relationship with the investigator and advisor for this project.

Confidentiality/Anonymity Protection: The data for this survey will be stored online via the SurveyMonkey.com service, utilizing SSL (Secure Sockets Layer) encryption. Only the principle investigator and project advisor will have access to this data. No data identifiers will be collected, which means that the following survey will be completed anonymously. Please also considering the following points, concerning the security of the online survey: (1) some employers may use tracking software, so you may want to complete your survey on a personal computer, and (2) do not leave survey open if using a public computer or a computer others may have access to.

Risks: There are no associated risks with this survey, as no data identifiers will be collected. The survey is completely anonymous, and any participants may cease participation at any time without penalty. The survey results will be stored securely, with access granted exclusively to the project investigator and advisor.

Contact information: If you have any questions about the research or your participation in the research, please contact the project investigator (Aaron Hynds, 217-972-0464) or advisor (David Saltzman, 419-372-2097) at the following addresses: hyndsa@bgsu.edu & dsaltzm@bgsu.edu. You may also contact the

Chair, Human Subjects Review Board at 419-372-7716 or hsrb@bgsu.edu, if you have any questions about your rights as a participant in this research. Thank you very much for your time.

By continuing on to the survey, you agree to the following consent statement:

I have been informed of the purposes, procedures, risks and benefits of this study. I have had the opportunity to have all my questions answered and I have been informed that my participation is completely voluntary. I agree to participate anonymously in this research.

APPENDIX D. BGSU INSTITUTIONAL REVIEW BOARD EXEMPTION LETTER

BGSU
BOWLING GREEN STATE UNIVERSITY
Office of Research Compliance

DATE:	May 17, 2016
TO:	Aaron Hynds, DMA
FROM:	Bowling Green State University Human Subjects Review Board
PROJECT TITLE:	[903813-2] The Composer's Guide to the Tuba: Creating a New Resource on the Capabilities of the Tuba Family
SUBMISSION TYPE:	Revision
ACTION:	DETERMINATION OF EXEMPT STATUS
DECISION DATE:	May 17, 2016
REVIEW CATEGORY:	Exemption category # *2*

Thank you for your submission of Revision materials for this project. The Bowling Green State University Human Subjects Review Board has determined this project is exempt from IRB review according to federal regulations AND that the proposed research has met the principles outlined in the Belmont Report. You may now begin the research activities.

Note that an amendment may not be made to exempt research because of the possibility that proposed changes may change the research in such a way that it is no longer meets the criteria for exemption. A new application must be submitted and reviewed prior to modifying the research activity, unless the researcher believes that the change must be made to prevent harm to participants. In these cases, the Office of Research Compliance must be notified as soon as practicable.

We will retain a copy of this correspondence within our records.

If you have any questions, please contact Kristin Hagemyer at 419-372-7716 or khagemy@bgsu.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Bowling Green State University Human Subjects Review Board's records.

APPENDIX E. SURVEY RESULT DATA

The survey result data may be accessed at the following link, created on January 3, 2019:

https://www.surveymonkey.com/results/SM-GLDZVTT2V/