The Contrabass Tuned in Fifths: Towards an Understanding of Past and Present Applications.

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Abstract

This dissertation examines the historical and contemporary practices of the contrabass tuned in fifths. Two descriptions of the tuning appear in the late eighteenth century: the three-string tuning, A2, D2, G1 (ADG), and its four-string counterpart, A2, D2, G1, C1 (ADGC). The ADG tuning was officially taught in the Conservatoire de Paris’s contrabass class from 1827 until 1832, when it was superseded by the four-string G2, D2, A1, E1 (GDAE) tuning in fourths for two major reasons: first, the additional whole-tone between open strings compelled contrabassists to shift more frequently; second, the tuning’s limited depth (G1) forced contrabassists to use octave transposition more than their counterparts tuned in fourths. Both of these issues were impacted by the difficulty of making the thick strings speak under the bow at fast tempos.

The research suggests that the ADGC tuning was tried, but apparently abandoned; the limitations of string technology dictated that a viable C1 string would not be developed until the late nineteenth century. Despite these supposed disadvantages, the ADG tuning and its practitioners maintained a presence in Paris into the latter half of the nineteenth century. Evidence suggests that practitioners preferred the resonance of their instrument in fifths tuning despite the criticisms of the tuning that are found in the literature, including orchestration texts, tutors and the French press. I explore the veracity of these criticisms to understand how current practitioners overcame such issues. The renewed interest in fifths tuning, currently taking place, suggests that these limitations have been addressed. This dissertation examines the tuning from the perspectives of its use in nineteenth-century France, and today. I also include a discussion of the ADGC tuning and its relationship to Beethoven’s use of lower-compass pitches.

Contemporary perspectives offered by orchestral contrabassists shed light on how this tuning can be successfully integrated in the orchestra as an alternative to the more widely practised GDAE, in that the ADGC tuning gives the player not only the complete range
to double the full range of the violoncello, but also the range to play material written for solo tuning F-sharp1, B1, E2, A2.
Keywords

Conservatoire de Paris, contrabass, double bass, harmonic overtone series, l’Opéra, simplification, Société des Concerts, transposition, tuning in fifths.
In the nineteenth century, the contrabass, the lowest-pitched string instrument in the orchestra, was still evolving in terms of its tuning and the number of strings mounted on the instrument. In 1827, French contrabasses had only three strings and were tuned in fifths, A2, D2, G1; sources also describe a four-string version tuned, A2, D2, G1, C1, one octave below the violoncello; however, the bulky, unresponsive C1 string was often removed, leaving the instrument with only three strings. Although string makers were constantly improving their product, they would not develop a playable C1 string until the late nineteenth century. The thick gut strings used by contrabassists were challenging to play at fast tempos, forcing some to simplify their parts. Consequently, the Conservatoire de Paris changed the official tuning taught in their contrabass class from three strings tuned in fifths to four strings tuned in fourths G2, D2, A1, E1; this tuning not only increased the lower range of the instrument, but made it easier to play by decreasing the interval between the open strings from a fifth to a fourth. This reduction would reduce the amount of shifting experienced by the player.

A number of contemporary contrabassists have successfully integrated playing a contrabass tuned in fifths in an orchestral bass section. With regards to the difficulties just mentioned, one might ask what aspects of playing the contrabass tuned in fifths have changed. First, playable C1 strings have been available since the early twentieth century. Contrabassists are now far better trained than their historic counterparts. Practitioners also state that the fifths-tuned contrabass exhibits a unique resonance, a benefit described as early as 1839. One further benefit is that this one tuning gives the player the ability to play the complete range demanded by the repertoire on one instrument. This paper examines the history of the tuning using historical and contemporary perspectives. As part of my research, I explore those issues that affected the tuning’s demise, using examples from the repertory played by contrabassists then and now.
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Introduction

This dissertation examines the practice of tuning the contrabass in fifths, situating that practice in the larger historical development of the instrument and its use, past and present, in Western orchestral music. I investigate two varieties of the tuning: the three-string tuning A2, D2, G1 (ADG) and the four-string tuning A2, D2, G1, C1 (ADGC). My research examines the period from the introduction of the contrabass to the Paris Opéra circa 1700 to the present day, with a specific focus on the history of the three-string ADG tuning used in Paris throughout the nineteenth century. During this time, contrabasses across Europe were mounted with three, four or five strings and were tuned in fourths, fifths or a combination of both; five-string contrabasses were tuned in thirds and fourths.1 The most common tuning used by French contrabassists was the three-string tuning in fifths, ADG. Historically, the references to the four-string ADGC tuning are less common and not as informative as those for the three-string version. I also discuss the modern application of the ADGC tuning based on interviews with current practitioners of the tuning as well as my own perspectives and experiences with the tuning.

In 1827, the Conservatoire de Paris founded its first contrabass class; Marie-Pierre Chenié (1773–1832), who held the position of principal contrabassist with two of Paris’s premiere orchestras, l’Opéra and the Société des Concerts, was the class’s first professor and taught the three-string contrabass tuned in fifths from 1827 until his untimely death in 1832. However, after Chenié’s passing, the Conservatoire moved to adopt the four-string tuning in fourths GDAE as its official tuning and ceased teaching the ADG tuning for several key reasons: first, the ADG tuning had G1 for its lowest pitch and consequently contrabassists, who used this tuning, were unable to play lower-compass pitches below G1; second, critics of fifths tuning argued that

1 For specific detail, see Appendix B.
contrabassists who used it were forced to shift more frequently as a result of the additional whole tone between open strings.

My research shows that even though the ADG tuning was no longer taught at the Conservatoire after 1832, it apparently continued to be used in Parisian orchestras. Seven contrabass tutors featuring exercises for the ADG tuning were published between 1836 and 1877, suggesting that the tuning was being taught outside the Conservatoire well into the latter half of the nineteenth century. This evidence is further supported by the fact that several prominent makers of musical instruments in Paris were making and selling three-string contrabasses and the strings for the ADG tuning as late as 1878. What is unclear is why the ADG tuning was still being used and by whom, despite its reputation of requiring a difficult technique and a limited lower compass. Was there one or more characteristics of fifths tuning that appealed to its players to the point where they overlooked the issues of technique and compass?

My interest in the tuning began in July 2007 when I attended the first of six contrabass master classes led by Joel Quarrington at the Centre d’Arts in Mt. Orford, Quebec. It was here that I observed that Quarrington tuned his contrabass in fifths A2, D2, G1, C1. The majority of orchestral contrabassists tune their instrument in fourths G2, D2, A1, E1; some use a fingerboard extension to extend the fourth string to a low C1 or B0, while others use a five-string contrabass tuned G2, D2, A1, E1, C1 or B0.

I also learned that renowned jazz contrabassist Red Mitchell began tuning in fifths in 1966. Mitchell gave a number of reasons for using the tuning: first, he could play the low C1 he required without adding a fingerboard extension, thus avoiding invasive modifications to his instrument; second, the low pitches added by the tuning, E-flat1--

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4 The design and construction of extensions has progressed greatly since 1966 and are far less destructive to the instrument. The initial impetus for Mitchell to change tunings came when he was told that he needed to play a C1 in Henry Mancini’s score for Peter Gunn. Chris Budhan and Thomas Helfin, “Red Mitchell: Biography.” http://www.redmitchell.com/redm/biography. Accessed 16 November 2018.
D1–D-flat1–C1 lay on the instrument’s original fingerboard and required no adjustments to Mitchell’s left-hand technique; third, tuning in fifths seemed logical to Mitchell in that it brought the contrabass into the same tuning scheme (fifths) as the violin, viola and violoncello; fourth, Mitchell reported that the sound of the contrabass tuned in fifths was more open and resonant and had better bow response as opposed to when it was tuned in fourths; fifth, Mitchell stated that he noticed issues between the violoncellists tuned in fifths and the contrabassists tuned in fourths but does not tell us exactly what these issues were; he could be asserting that there would be better intonation between the two instruments if both used a similar tuning scheme.

Joel Quarrington is arguably the world’s most prominent advocate of tuning the contrabass in fifths. His reasons for using the tuning echo those mentioned above by Mitchell. Additionally, Quarrington argues that the negative issues associated with the tuning, primarily shifting, are addressed by advances in pedagogy and a modified left-hand technique. After considering the arguments in favour of the ADGC tuning by Mitchell and Quarrington, there seemed to be logic in having the contrabass tuned in fifths, the same tuning system used for the violoncello, viola and violin; yet the standard orchestral tuning for the contrabass is fourths.

Whenever possible, I consulted primary sources such as contrabass tutors, instrumentation treatises, music journals and music dictionaries. Of the many nineteenth-century French contrabass tutors reviewed, Charles Labro’s method emerges as an important source for its brief, but detailed history of the contrabass and the Conservatoire’s contrabass class in Paris. French musicologist Constant Pierre’s history of the Conservatoire was an invaluable source of information for biographies of professors and students, past and present. Instrumentation treatises, such as those

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5 Although Mitchell is best known for his lengthy career as a jazz bassist, he was the principal bassist of the MGM studio orchestra from approximately 1959 to 1968. Bright, “Red Mitchell,” p. 8.
by Berlioz and his contemporary Georges Kastner, chronicle the evolving instrumentation in the Romantic Era orchestra and the many contrabass tunings practised throughout Europe.\(^9\) Other crucial sources are the music journals such as the Allgemeine Musikalische Zeitung, the Neue Zeitschrift für Musik, The Musical Times and The Harmonicon. Secondary sources examined include the two most comprehensive history textbooks written to date on the contrabass, Alfred Planyavsky’s Geschichte des Kontrabasses (1970) and A New History of the Double Bass by Paul Brun (2000). I have also made use of Michael Greenberg’s extensive research on the history of the contrabass in France.

One of the problems with this research was the scarcity of information about the tuning’s history, particularly, how contrabassists like Chenié were taught to play the instrument and how he taught his own students at the Conservatoire. We do not have a clear idea of how long the tuning was used in France prior to 1827. Although Diderot gave a description of the ADG tuning in 1767, he did not attribute the tuning to a specific country.\(^10\) The earliest example of instruction for fifths tuning is found in Michel Corrette’s tutor from 1781.\(^11\) The next method that featured instruction for the tuning was published forty-six years later in 1827 by Adolphe Miné.\(^12\)

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\(^11\) Michel Corrette, Méthodes Pour Apprendre à Jouer de la Contre-Basse à 3, à 4 et 5 Cordes, de la Quinte ou Alto et de La Viole D’Orphée (Genève: Minkoff Reprint, 1977).

\(^12\) Jacques-Claude-Adolphe Miné, Méthode de Contre-Basse (Paris: A. Meissonier, 1827).
My dissertation contains five main chapters and a conclusion:

- Chapter One: Organology of the Contrabass.
- Chapter Two: The Three-String French Contrabass Tuned in Fifths.
- Chapter Three: Repertorial Considerations.
- Chapter Four: Acoustic Characteristics.
- Chapter Five: Personal Views of Players.
- Conclusions

In the first chapter, I provide an overview of the contrabass’s construction, tuning and terminology to give the reader an understanding of its physical characteristics and terminology that will be used throughout this dissertation. This discussion includes past and present characteristics of the instrument’s design that allowed the player to play sub-E1 pitches including fingerboard extensions and the five-string contrabass. I also discuss the strings used at this time and how the limits of string-making methods affected the contrabassist’s ability to play bass lines.

In chapter two, I present a history of the three-string contrabass in France from the late-eighteenth century to the late-nineteenth century. The chapter begins with the introduction of the contrabass in France circa 1700. A significant amount of my research explores the history of the tuning and its players when it was taught at the Conservatoire. An important resource is the many contrabass tutors, some written specifically for fifths tuning, that were published during the nineteenth century. The information in these sources informs us about how contrabassists played bass lines using the three-string contrabass tuned in fifths and also identifies specific issues that they faced, such as the need to simplify and transpose portions of their bass lines. I also investigate those sources that mention the four-string ADGC tuning and its connection to Beethoven’s use of sub-E1 pitches.

My discussion in chapter three delves into the orchestral repertory that was played by contrabassists using the ADG tuning and focuses on two areas: first, I examine three compositions using autograph manuscripts whenever possible to explore how composers used sub-E1 pitches within the context of the composition; second, I wanted to understand how French contrabassists played this repertory on the three-string contrabass tuned in fifths from the perspectives of shifting and the limitations of the tuning’s lower compass. I chose compositions that were known to have been
performed by Marié-Pierre Chenié (who used the ADG tuning) in l’Orchestre de l'Opéra and the Société des Concerts, including an analysis of the trio from Beethoven’s Fifth Symphony.

Modern contrabassists who tune in fifths (ADGC) unanimously claim that the instrument exhibits more resonance when tuned in fifths than in fourths. In chapter four, I discuss the acoustic properties of the contrabass tuned in fifths. I set out to examine these subjective claims of better resonance to see if there was evidence to support them. To that end, I made three recordings, each with a different contrabass playing a chromatic scale in both tunings to see whether an analysis of each pitch’s overtone series could determine whether that contrabass demonstrated more resonance when tuned in fifths. I proceeded from the point of view that using only one type of strings on all three test instruments was important to reduce the number of variables in the test in order to maintain consistency, understanding that the same set of strings can sound different on two instruments. I discuss these issues and others used in my methodology that affected my test results.

In the fifth chapter I present the views of contemporary contrabassists who tune in fifths and those who tune in fourths with the goal of understanding how the members of each group thought about playing lower-compass pitches. Eleven participants were interviewed and asked the same thirteen questions about playing these pitches in relation to the broad range of repertory played in modern orchestras. During these interviews, participants offered their experiences within the hierarchy of the orchestra, taking into consideration the role of the conductor and the principal contrabassist. In addition to the ideas of autonomy and personal choice when playing lower-compass pitches, participants also explained that there were established norms and traditions within orchestras that had an effect on how and when to play them.

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13 The strings used for all three instruments were Pirastro Obligato and are constructed using a synthetic core material.
Chapter One: Organology of the Contrabass

1.1. The Contrabass

The orchestral string section consists of four types of instruments, the violin, the viola, the violoncello and the contrabass all of which are classified as bowed string instruments belonging to the violin family. The contrabass is the largest and lowest-pitched member of the violin family; its range (Ex. 1.1) begins at C1 or B0 and extends up to B-flat3 harmonic.\(^\text{14}\)

**EXAMPLE 1.1: Range of the contrabass.**

The range of the instrument’s lower compass can vary depending on how it is tuned. Example 1.2 shows a number of tunings being used by orchestral contrabassists.

**EXAMPLE 1.2: Tunings of the modern contrabass.**

The contrabass is a transposing instrument sounding an octave lower than written. Composers began the practice of notating both the violoncello and the contrabass on the same staff and in the same octave with the understanding that the contrabass

sounds one octave lower. The physical characteristics and design of the contrabass are similar to those found on other members of the violin family, but on a scale that is appropriate to the size of the instrument and its pitch range. Nevertheless, the contrabass stands apart from other members of the violin family in that luthiers frequently used a variety of body designs and dimensions that we do not see to the same degree in the construction of violins, violas and violoncellos. I discuss this issue in more detail below.

This dissertation does not presume to investigate or validate the competing claims made by scholars that the contrabass is a direct descendent of the viol or the violin families. What my dissertation does state is that the contrabass displays characteristics from both lineages.

1.2. General Construction

The following descriptions of construction materials and measurements refer to a three-quarter size contrabass unless stated otherwise. It should be noted that today, contrabasses are made in four different sizes: full size, three-quarter size, half size and one-quarter size to accommodate the height of the player from children to adults. The construction materials mentioned refer to a contrabass made from solid wood as opposed to one made from plywood.

The features of the contrabass can be classified into two categories: external and internal components. A solid-wood, fully-carved instrument describes the materials and the construction processes used by the luthier when shaping the top and back of the instrument. Student contrabasses are often made using plywood for the top, back and sides; these instruments are less labour-intensive than fully-carved instruments. In

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addition to plywood being a less expensive material than solid wood, its strength gives
an instrument made from plywood more resiliency to the effects of temperature and
humidity. A third type of instrument uses plywood for the back and sides, but features
a solid-wood top; this type of instrument is designed to give the player an economic
option of having an instrument with the sound of a solid-top instrument but with
plywood back and sides. A solid-wood instrument has a superior sound to the plywood
and hybrid instruments. The layers of wood used in the construction of plywood are
arranged in alternating directions of wood-grain, a feature that adds strength to the
material, but also restricts its ability to vibrate freely.

1.3. External Components

The neck of the contrabass has six main components: the scroll, the pegbox, the
nut, the fingerboard, the neck and the heel. The topmost feature of the contrabass is
the iconic scroll, a feature that is purely aesthetic and sometimes features the likeness
of an animal or a human face as a way for luthiers to display their artistry and the
quality of their craft.

The pegbox is a generic name used among bowed, string instruments to describe
the uppermost part of the instrument just below the scroll that houses the wooden pegs
used to loosen and tighten the strings. However, the contrabass uses mechanical tuning
machines with metal gears unlike the friction-fitted wooden pegs found on the smaller
members of the violin family. On many contrabasses, wooden spindles are used to
accept the strings, but these are still adjusted by the above-mentioned mechanical
tuners.

The neck is typically made from maple in order to withstand the tension exerted
on it by the strings. The shape of the neck must also allow the player’s hand to reach
the fourth string comfortably while supporting the instrument at the same time.

The nut is a small piece of ebony at the top of the fingerboard over which the
strings pass as they exit into the pegbox. A crucial function of the nut is that it and the
bridge dictate the vibrating length, or scale of the strings. The nut has slots filed into it
that establish the spacing of the strings. The width of each slot must match the
diameter of the string while the depth must be carefully cut so that the string does not touch the fingerboard where it exits the nut towards the bridge, and yet is not so high that the player exerts unnecessary pressure to close a note on the fingerboard.

As its name implies, the fingerboard is where the player presses down on the strings to change pitch. This long trapezoidal piece of wood, usually made from ebony, has a standard length of 85 centimetres. Contrabass soloists often use a slightly longer fingerboard that allows them to play pitches in the instrument’s higher register. The width of the fingerboard at the nut is 4.5 centimetres and at the end closest to the bridge is 9.4 centimetres. The fingerboard gradually widens as it extends down toward the bridge, a design necessary to accommodate the width of the bridge and the string spacing required to prevent the bow from touching adjacent strings. The fingerboard’s top is arched to match the contour of the bridge. On some fingerboards, the area directly beneath the fourth string is planed flat to create a surface that assists the player’s fingers when gripping the string.

The neck is attached to the body’s upper block by the heel, the part of the neck that extends out perpendicular to the length of the neck. The heel not only provides the means of attaching the neck to the body, but is critical in establishing the angle of the fingerboard. The block extends along the depth of the uppermost part of the contrabass where the upper shoulders of the body converge.

The body of the instrument has three parts: the front, the sides and the back. The top of the contrabass, also called the table or top plate, is the primary sound-production component of the instrument. The wood for the top is different from the hard wood used for the back and the sides, and is most commonly made from spruce, a tone-wood known for its sound-reproduction qualities. The thickness of the top is eight millimeters. The arch of the top is shaped by hand using wood gouges and planes.

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17 Measurements were taken from my own, three-quarter size contrabass.
18 Some luthiers attach the neck to the body by means of a bolt instead of the traditional method of gluing, allowing the player to remove the neck; once removed, the contrabass can be fitted into a smaller and lighter case when travelling. Additionally, a second bolt can be added that allows for adjustment of the neck’s angle.
The back of the instrument is usually made from the same material as the sides and has the same profile as the top. The wood chosen for the back and sides is typically maple. There are two distinct designs for a contrabass’s back: flat or round. Flat backs are associated historically with the *viola da gamba* family whereas round backs are associated with the *viola da braccio* family. However, the use of either design is common among contrabasses. A contrabass with a carved, round back is more expensive than a flat back due to the fact that the luthier must begin with a significantly larger piece of material in order to carve the arched shape, a process that requires considerably more time and effort. The same process is used on the top. A flat back is not shaped in the same manner as a round-back; it is usually made from two or three pieces of wood glued together and then planed to the proper thickness. Consequently, this design requires much less material and labour. There are also acoustic considerations with either design. The flat back projects the sound more quickly whereas the round back produces more tone.¹⁹ Contrabasses with flat backs are fitted with braces that reinforce it at the upper and lower bouts and at the C bouts. However, this same bracing also dampens the ability of the back to vibrate. An important design feature found on both flat- and round-back instruments is the slight inward slope of the back beginning midway on the upper bout toward the neck’s heel. This feature narrows the depth of the body, thus allowing the instrument to be held closer to the player.

Separating the front and back are the ribs or sides of the contrabass. A single side consists of three pieces of hard wood that form the upper bout, the C bout and the lower bout. The term bout is a synonym for round and in this case describes the rounded profile of the instrument’s bouts. Each piece, approximately two to three millimetres thick, is bent into the desired shape using a heated bending-iron and is then glued and clamped on a form. The upper bout is the distance measured across the widest part of the top of the body and the lower bout is the distance measured across the widest part of the bottom of the body. The C-bouts extend inward and provide the

necessary clearance for the bow when playing the two outside strings. A standard set of dimensions for the upper and lower bouts cannot be described in general terms because these measurements vary among different body types and designs. Nevertheless, the contrabass’s body is commonly classified as one of two types, gamba and violin. These two designs are easily distinguished from the shape of the corners, the points at which the upper and lower bout meet with the C bout. In the interior of the body, a wooden block spans the depth of the corner’s joint creating a larger gluing surface that reinforces that joint. The style of an instrument’s corners is another indicator of the dual lineage; violin corners curve slightly outward to form a point (see Fig 1.5); gamba corners do not form such a point (Fig 1.4).

The area where the upper bouts slope away from the neck is referred to as the instrument’s shoulders. The width and shape of the upper bout can vary significantly from instrument to instrument. An important design of the shoulders is the angle of the slope; if the upper bout is too wide, it can affect the player’s ability to transition smoothly from neck position to thumb position. However, a wider upper-bout results in an increase in the size of the top plate, creating a larger vibrating surface.

The tailpiece is where the strings are mounted on the instrument; it is a piece of ebony approximately 33 centimetres long, 10.3 centimetres wide at the string end and 5.5 centimetres wide at the bottom end. The tailpiece is not attached directly to the instrument, but is suspended on one end by the strings and on the other end by the tailpiece wire (anchored to the endpin) and held in place by the tension of the strings. The strings pass through four small holes in the wider end of the tailpiece closest to

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\[20\] Overhang is the amount of material belonging to the top and back that extends outward, approximately seven millimetres, over the instrument’s ribs from the glue joint.

the bridge where they are tied, in the case of gut strings, or held firmly in place by the ball end at the bottom of the string. The tailpiece wire attaches the tailpiece to the endpin. The different materials used for the wire include stranded steel and braided nylon cable. In addition, each of these materials has a different effect on the vibration of the strings and therefore, the overall sound of the instrument.

The tailpiece wire rests on the saddle, a small piece of wood resembling the nut found at the bottommost part of the top plate. The saddle is made from ebony to prevent the tension from the tailpiece wire from damaging the top’s softer spruce material. The endpin allows the player to adjust the instrument to the desired height and its spike also serves to anchor the instrument to the floor, preventing it from slipping.\textsuperscript{22}

Located on either side of the instrument’s bridge are the sound holes or \textit{f} holes, named for their recognizable shape. Sound holes serve two important functions: first, their placement and shape help to radiate the sound of the instrument; second, they provide internal access for sound-post adjustment. The small notches located midway at the widest part of the sound-hole’s opening indicate the position on the instrument’s top where the centre of the bridge’s feet should be positioned. Installing or fitting a bridge to the instrument requires shaping its feet to fit the curvature of the top to maximize contact.

The bridge’s main function is to transmit the vibration of the strings to the top. The bridge is not glued to the instrument, but is held in place by the downward tension of the strings. The height of the bridge determines how much energy is transferred to the top; a taller bridge transmits more energy to the top resulting in more sound. However, raising the height of the bridge increases the height of the strings and requires more effort to press the strings onto the fingerboard. Jazz bassists tend to use a lower string height (sometimes called action) to facilitate playing in the instrument’s upper register using thumb position.

\textsuperscript{22} Most often these spikes are covered with removable rubber stoppers to prevent them from damaging the floor.
The shape of the bridge has a significant effect on the sound of the instrument in that the bridge acts as a conduit between the strings and the instrument’s top. However, the bridge itself dampens some of the frequencies that are transferred to the top; therefore, changing its mass affects how those vibrations are transferred. Below are three different types of bridges. The first example (Fig. 1.1) is a standard bridge that is currently on my contrabass.

FIGURE 1.1: Standard bridge.

FIGURE 1.2: Low-mass bridge
The second style of bridge shown in Fig. 1.2 is a modified version of the bridge in Fig. 1.1 called a low-mass bridge due to the fact that material was removed from both sides of the bridge, reducing its mass and as a result of the reduction of material, the instrument sounded brighter and clearer when mounted with this bridge.

The bridge in Figure 1.3 is from the Dragonetti contrabass at the Royal Ontario Museum (ROM). I suspect that this bridge dates from the late-nineteenth or early twentieth century and was installed on the instrument when it was converted from three strings to four as I discuss below.

FIGURE 1.3: Contrabass bridge circa 1915.

Photograph by author. Used with permission by the Royal Ontario Museum.

One immediately notices that this bridge does not have the heart-shaped cut-out shown on the bridges in Figures 1.1 and 1.2 and that the area of the feet that make contact with the top are not as wide as the bridge in Fig. 1.1.

Another feature found on modern contrabass bridges are the aluminum adjusters that allow the player to raise or lower the height of the strings by twisting the threaded inserts inside the feet of the bridge. The height of the bridge is affected by the changes in humidity in climates that experience colder, drier weather in the winter months; these changes cause the instrument's top to expand and contract, thereby raising or lowering the string height. By having adjusters installed on the bridge, the player can
adjust the height of the strings by loosening the strings and twisting the adjusters to the desired height. The other option is to have a second bridge of a different (fixed) height that can be put on the instrument during those months when drier air affects the height of the strings.

1.4. Internal Components

The sound post is an internal element crucial to the sound of the contrabass. Typically made from spruce, this dowel-shaped post is designed to fit securely between the instrument’s top and back. The sound post is not glued to the instrument, but is held in place by the downward pressure from the strings. The top of the post must be shaped to fit the inside contour of the top’s arch while the bottom must be shaped according to whether the instrument has a flat or round back. The sound post is initially positioned to be in line with the centre of bridge’s right (or treble) foot. The location of the sound post is adjusted by trial and error to give the instrument its optimal sound.

The bass bar is a narrow piece of spruce that is glued to the underside of the top just beneath the bridge’s left (bass side) foot; it also has to be fitted to match the contour of the top plate. A bass bar typically measures 855 millimetres in length and 23 millimetres in width and runs almost the full length of the top. The height of the bar is smaller at either end and increases to approximately 40 millimetres in the centre, just below the bridge. There are two important functions served by the bass bar: first, it supports and distributes the downward pressure from the strings along the top; second, it transmits the vibration of the strings over the top plate.23

A block is an internal structural component that spans the depth of the body at major junction points on the ribs. The upper block is where the left and right upper bouts meet; it also provides the surface where the heel of the neck is attached to the

body. The lower block is where the two lower bouts are joined together at the bottom of the instrument. In addition, the lower block is where the instrument’s endpin is attached. This block needs to be made strong enough to support the weight of the contrabass as well as firmly anchoring the endpin while also providing the means of attaching the tailpiece wire. Each of the four corner joints is reinforced with smaller blocks.

1.5. Strings

In my research on string making, I discovered very little information regarding contrabass strings; most of the sources I examined dealt with violin strings or chanterelles. The most fruitful sources on contrabass strings were the eighteenth- and nineteenth-century contrabass tutors and orchestration texts.

One of the more significant limits imposed by string manufacturing would have been the contrabassist’s ability to play in the lower compass. In this statement, Stephen Bonta acknowledges the disparity between the lower-compass pitches written by composers and the ability of eighteenth- and nineteenth-century Parisian string makers to make strings that could reproduce these pitches on the contrabass. We have evidence (presented below) to confirm that contrabassists removed the fourth string from their instruments as these larger strings failed to produce satisfactory pitches in the lower compass. As a result, players had to transpose those pitches normally played on this string an octave higher; furthermore, they had to simplify the difficult violoncello parts that they had to double. In this section, I examine the playing conditions experienced by contrabassists who used gut and overspun strings through the lens of the players and authors as described in contrabass tutors and orchestration texts.

Contrabassists who played three-string instruments tuned in fifths used all-gut strings or a combination of gut and overspun strings: the first and second strings were gut and the third string, G1, was gut or overspun.\textsuperscript{25} Those contrabassists who used the four-string GDAE tuning used a similar set-up where the first and second strings (G2 and D2) were gut while the third and fourth strings (A1 and E1) were overspun, but sometimes only the E string was overspun.\textsuperscript{26} These string combinations, just described, were being sold in 1867 by Gautrot and were available in different grades in both tunings: for fifths tuning the third string G1, was available in gut or wound; the third and fourth strings for the GDAE tuning were offered only as wound strings.\textsuperscript{27}

1.6. Scale and Size

The difficulties faced by contrabassists using gut strings of such large diameter and tension resulted in the exertion of significant effort in order to press these strings onto the fingerboard.\textsuperscript{28} Prior to the standardization of the contrabass’s scale, bass instruments were sometimes built larger than human scale to reproduce pitches in a specific low register with the result that the contrabassist’s ability to play an instrument of that size became subordinate to the required length of the string.


\textsuperscript{26} Gordon stated in his tutor that the fourth string E1, was overspun. Ch. Gordon, Méthode de Contrebasse à Trois ou Quatre Cordes (Paris: Ikelmer Frères, 1877), p. 6.

\textsuperscript{27} These strings are discussed in more detail in chapter two.

The scale of the contrabass was significantly affected by advancements in string manufacturing. Moreover, the size of the human body dictated that any instrument that exceeded human scale was not practical and would not prevail primarily because a longer string length directly affected the contrabassist’s ability to encompass a whole tone between the first and fourth fingers of the left hand. In order to make a string’s pitch lower, a string maker must change the string’s length, tension or density. Once the size of the contrabass became standardized, and its strings became a fixed length, string makers were left with the two remaining options: change the string’s tension, density or a combination of both. The option of decreasing the string’s tension to lower its pitch was quite limited; therefore, string makers began winding the gut string with a fine wire, a process that added mass to the string, thus lowering its pitch without changing its length or tension. Additionally, the fact that the wire was very thin allowed string makers to keep the diameter of the string relatively small.

1.7. String Quality, Selection and Characteristics

As I discuss below, several authors point out the kinds of properties a string should have when buying strings for the contrabass. We see advice on how to inspect a string for its acoustic qualities while it is mounted on the instrument and how to check the string physically for problems related to its manufacture and quality of materials.

Fröhlich described how a false string could be identified by feeling for a string’s imperfections between the thumb and the index finger. A false string has inconsistencies in the thickness and mass along its length that can alter the relationship

29 The whole-tone interval encompassed between the first and fourth fingers is almost universally adopted as the maximum span in the left hand.
31 Fröhlich, Contrabass-Schule, p. 8.
between finger position and pitch. In addition, he emphasized the importance of watching the string while it was vibrating on the instrument to observe its oscillations; the naturally-occurring inconsistencies of the raw material could contribute to a string that was false with the result that it would not vibrate properly. This method is true today in that a faulty string will appear to wobble whereas a properly made string should oscillate smoothly.

An unavoidable characteristic of gut strings is that each string is unique in both its construction and subsequent response on an instrument as a direct result of being made from an organic material such as gut. Therefore, no two strings respond the same way. The other part of this equation is that every contrabass is also unique, having been constructed using wood, an organic material. Each instrument has its own unique response to strings. The only means available to a player to know if a string is true or suitable for the instrument is to mount that string on the instrument and listen for the sound quality, while carefully observing the string as it vibrated. This unpredictability forms part of the narrative on strings as a common situation experienced by contrabassists. I have personally experienced this phenomenon of instrument and string incompatibility when trying out a new set of strings, even those made of synthetic materials using modern manufacturing techniques. I have tried strings that came highly recommended only to discover that they were not a suitable match for my contrabass. String choice for contrabassists was, and is, a process of experimentation involving trial and error; it is also time consuming and can be very expensive.

1.8. Basic Construction

The string-making industry was dependent on local agriculture and the consumption of lamb for the supply of their raw materials. Accordingly, string makers set up their shops in towns and cities that were centres for raising sheep. String makers

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purchased the gut from a local butcher. It was important to harvest the animal’s intestines immediately after it was slaughtered to ensure the best quality of materials to make strings.33

The guts were sorted by size for use as specific strings and were then split into threads and twisted on frames before being bleached overnight with sulphur to whiten the strings. Next, the strings were cleaned and polished, and in a final stage, received a light wiping of oil before being dried in a drying stove. As a reference, a violin’s E string or chanterelle was made from four to six threads; a violoncello might have as many as ten threads, whereas a contrabass E string could have forty threads.34 In general, lower-pitched strings used more material than higher-pitched strings due to their larger diameters.

1.9. Overspun Strings

Contrabass strings were made from gut until the late seventeenth century when overspun strings were first manufactured in Bologna, Italy; their construction consisted of a (plain) gut core wound with thin copper or silver wire.35 In order to make an overspun string, the gut core was fastened at both ends between a pair of wheels and spun with thin strands of wire in a tight uniform coil. This revolutionary development in string manufacturing led to the development of deeper-pitched bass strings that could be made shorter, thinner and easier to play.36 The use of overspun strings quickly spread to neighbouring countries in Europe in the late seventeenth century. Still, the reproduction of pitches in the sixteen-foot compass with a clear fundamental tone and a crisp attack was only possible if the string had the necessary

tension and length to produce a good fundamental tone; therefore, the instrument’s size had to accommodate the scale required to produce that tone.

1.10. String Selection

Darmstadt contrabassist August Müller gives an informative, first-hand account below on the quality and selection of strings used during the mid-nineteenth century throughout Germany, France and Italy.

Wem es irgend um einen starken vollklingenden und doch dabei, wenn es nöthig ist, weichen Ton auf seinem Instrumente zu thun ist, der benutze immer italienische Saiten, die ohne allen Zweifel den Vorzug vor allen deutschen und französischen verdienen Wir haben das gute Material nicht wie die Italiener; auch sind unsere deutschen Saiten, so wie auch die französischen, wenn sie auf das Instrument gezogen sind, von einer unausstehlichen Härte und Starrheit. Die Ursache dieser letzten unangenehmen Eigenschaft ist, daß sie in viel längeren Wellen gedreht sind als die italienischen. Auch fasern sich die deutschen Saiten bei längerem Gebrauch weit mehr aus als die italienischen, und dies ist ein sicherer Beweis für die geringere Qualität des Materials. Zwar sind die italienischen Saiten noch einmal so theuer, und dies ist freilich keine empfehlende Eigenschaft, allein sie halten auch doppelt so lang (namentlich wenn mansie zuweilen mit seinem Del bestreicht und dann langsam wieder abreibt), und produciren, wie schon bemerkt, einen besseren Ton.


Zum Schluß noch die Bermerkung, daß nach meinen Erfahrungen eine übersponnene A-Saite (welche im fertigen Zuftande etwas dicker als die auf dem Instrumente befindliche G-Saite sein muß) der nicht übersponnenen vorzuziehen ist, da letztere im Spiele geniert, weil sie viel dicker als die
andersen Saiten sein muß, und auch bei weitem nicht den freien Ton wie die übersponnene hat.\textsuperscript{37}

According to Müller, strings made in Germany and France sounded harsh and were difficult to play because they were unbearably rigid.\textsuperscript{38} He added that locally-made German strings were inferior to the pricier Italian strings because German string makers used inferior raw materials and longer fibers both of which adversely affected the quality of their strings.

We learn two things from Müller: first, contrabassists needed to consider the construction of their instrument when choosing strings; second, the contrabassist must be mindful of the string’s tension and its subsequent effect on the instrument. Müller played a four-string contrabass tuned in fourths G2, D2, A1, E1.\textsuperscript{39} He stated his own preference for a wound A-string over one made entirely from gut, but cautioned players who use a gut A-string to be mindful of the tension that thick strings can exert.

\textsuperscript{37} “To anyone who likes a strong, full-sounding, and yet, when necessary, soft tone on his instrument, always use Italian strings, which, without any doubt, have the advantage. We do not have good material like the Italians; as well our German strings, as well as the French ones, when they are stretched on the instrument are of an unbearable hardness and rigidity. The cause of this last unpleasant feature is that they are turned in much longer waves than the Italian ones. Also, the German strings use longer fiber much more than the Italian, and this is a sure testament to the lower quality of the material. To be sure, the Italian strings are once more so expensive, and this, of course, is not a recommendable quality, but they last twice as long (especially when they are sometimes brushed with their del [oil?] and then slowly worn off), and produce, as already noted better tone. As far as the thickness of the strings is concerned, both the size and the construction of the instrument must be the yardstick. For smaller instruments, of course, no thick strings need to be used. The same is true of instruments that are thin of Hol [neck?]. A contrabass of usual size, in which the top and back are of comparatively thick wood, can be advantageously pulled up with strong strings. Just beware of applying too strong and almost finger-thick strings, as sometimes happens with non-overwound A-strings, which always give a dull, furry tone. This can be judged by the vibrations that the string makes. If it is disproportionately fat to its length, then it makes very short vibrations with the finger, has a dull, rapidly decaying sound, and must be removed as fitting for the instrument. Finally, the conclusion that, according to my experience, a spun A string (which in the finished version must be slightly thicker than the G string on the instrument) is preferable to the non-spun one, since the latter gnaws when played because it is much thicker than the other strings must be, and also by no means has the free sound like the overspun one.” Translation mine. August Müller, “Ueber den Contrabaß und Dessen Behandlung, mit Hinblick auf die Symphonien Von Beethoven,” Neue Zeitschrift für Musik 29 (1848): pp. 161–66.

\textsuperscript{38} Müller states that the cause of this rigidity was the result of these strings being made in much longer Wellen, or waves, a reference to the length of the gut during the string-making process. Müller, “Ueber den Contrabaß,” NZM 29, p. 162.

\textsuperscript{39} In his memoirs, Berlioz described hearing Müller perform on a four-string contrabass in Germany. Hector Berlioz, The Memoirs of Hector Berlioz, Member of the French Institute, Including His Travels in Italy, Germany, Russia and England, 1803-1865, ed. and trans. by David Cairns (London: Gollancz, 1969), pp. 348–49.
on the instrument. Müller’s comments reveal that gut and overspun strings were both in use at that time for the third and fourth strings on the contrabass. Furthermore, he acknowledged that there were differences in tension between the same string made as an overspun string versus one made entirely from gut.

Victor Frédéric Verrimst gave advice on how to choose contrabass strings, stating that each of the strings made (for the contrabass) were available in several thicknesses (or gauges) and that the style of the music being performed should also be taken into consideration when choosing the gauge of the strings. He proposed that thin strings were more appropriate for solo or chamber music because they responded faster under the bow, but for orchestral music, players should choose a medium string that would allow agility while providing maximum sonority.

Fröhlich also commented on what the contrabassist should know when selecting overspun strings. He argued that the proportion of the winding must match that of the gut core, and that the winding must be applied firmly around the core. When an

40 Müller describes these strings as being almost as thick as a finger. Müller, “Ueber den Contrabaß,” NZM 29, pp. 162.
41 “Les cordes ne doivent être, ni trop fines, ni trop grosses; trop grosses elles sont plus difficiles à mettre en vibration, donnent un son lourd, et sont généralement moins justes. Trop fines, elles ont une sonorité grêle et fouettent plus facilement sur la touche. Cependant pour la musique de chambre ou le Solo, les cordes fines sont préférables, car l’attaque en est plus facile et surtout plus instantanée, mais pour l’Orchestre où l’on doit chercher à obtenir une plus grande sonorité, tout en conservant l’agilité, il vaut mieux en choisir de moyennes; l’important est surtout de les prendre bien en rapport entre-elles.” Strings should not be too thin or too big; too big, they are more difficult to vibrate, give a heavy sound, and are generally less accurate. Too thin, they have a small sonority and more easily hit the fingerboard. However, for chamber music or solo [playing], thin strings are preferable, because the attack is easier and especially more instant, but for the orchestra where we must seek to obtain a greater sonority, while maintaining agility, it is better to choose medium ones; the important thing is to take them into account.” Translation mine. Victor Frédéric Verrimst, Méthode de Contre-Basse à 4 Cordes Suivie de 25 Études Progressives et d’Un Concerto Avec Accp.T de Piano (Paris: Meissonnier, 1866), p. 2.
42 “Vorzüglich genau muss man mit den übersponnenen Saiten seyn, damit das Verhältniss ihrer Dicke als noch ungesponnen, und der Dicke der Drathen genau getroffen, besonders dass sie fest übersponnen seyn, daher müssen die Saiten welche übersponnen werden sollen, entweder schon ausgedehnt, und gebraucht seyn, oder man muss sie erst vorher sehr ausdehnen, damit dieses nicht späterhin geschieht, wodurch der Drath losgeht und ein schnarrender Ton entsteht.” “One must be particularly precise with the spun strings, so that the ratio of their thickness as still unspun, and the thickness of the wires are precisely met, especially that they are firmly spun, therefore the strings which are to be spun must either already be stretched out and used, or you have to expand it very much beforehand so that this does not happen later, which causes the wire to go off and a rasping sound.” Translation mine. Fröhlich, Contrabass-Schule, p. 8.
43 Fröhlich does not describe these proportions. Fröhlich, Contrabass-Schule, p. 8.
overspun string is tightened to pitch, both its core and the winding are stretched simultaneously; if the string was not stretched to the proper tension while being wound, then the winding will fail to some degree.44 We can infer from Fröhlich that the quality and consistency of overspun strings varied by string maker. He also recommended using an instrument known as a chordometer to measure string tension and that these measurements could be used as a way of choosing a string set that was balanced across the instrument with regards to tension, and produced a smooth transition from register to register.45

Not every contrabassist preferred the use of overspun strings as demonstrated in the following excerpt from Bottesini:

Par emploi des trois cordes simples on évite le grave inconvénient des deux cordes filées, qui par le nature même de leur enveloppe hétérogène, offrent moins de prise et plus de difficultés à l’attaque de l’archet. Si l’usage de ces cordes est déjà penible pour les virtuoses et les musiciens d’orchestre jugez de ce qu’il doit être pour un jeune élève qui doit commencer à étudier un instrument si peu proportionné à sa taille.46

Bottesini played a three-string contrabass mounted with gut strings only tuned G2, D2, A1 (Fig. 1.4). He proposed that one of the benefits of the three-string tuning mounted with all-gut strings was that it avoided the use of overspun strings such as the type found on the third and fourth strings of the four-string GDAE tuning.47 He recommended that students should learn on a three-string contrabass using all-gut strings, explaining that overspun strings were difficult to grip with the bow as a result

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46 “By the use of the three simple strings, one avoids the serious inconvenience of the two spun strings [A1 and E1], which by the very nature of their heterogeneous envelope, offer less grip and more difficulty in pushing the bow. If the use of these strings is already painful for virtuosos and orchestra musicians judge what it should be for a young student who must begin to study an instrument so little proportioned to its size.” Translation mine. G. Bottesini, *Grande Méthode Complète de Contrebasse Divisée en Deux Parties* (Paris: Léon Escudier, 1869), p. 3.
47 Ibid.
of their inconsistent envelope. He also pointed out that the wider string-spacing on
the bridge of a three-string instrument would be beneficial to the student learning bow
technique. Bottesini also had reservations about the fourth string because the
additional pressure it placed on the instrument’s top restricted its ability to vibrate
sufficiently to give those notes played on the fourth string sufficient clarity and tone.
He argued that the three-string contrabass’s louder sound was the direct result of
removing the fourth string, thereby enhancing the instrument’s sound; moreover,
Bottesini claimed that this improvement in sound outweighed any advantages gained
by increasing the instrument’s lower compass by adding the fourth string.

FIGURE 1.4: Giovanni Bottesini.

48 The term envelope describes the initial sound of the bow gripping the strings. Bottesini, Grande
Méthode, p. 3.
49 Ibid., p. 2.
50 Bottesini with his three-string (G2, D2, A1) Testore contrabass circa 1865.
https://upload.wikimedia.org/wikipedia/commons/5/5e/BottesiniTestore.jpg
1.11. Visual Representations of Strings

Throughout the sources, images of the contrabass inform us about the strings that contrabassists were using. Some of the hand-drawn images of the contrabass demonstrate the author’s attention to detail, especially regarding the thickness and texture of the strings. Corrette’s diagram of a contrabass shows the relative thickness of each string including detail on the fourth string (Fig. 1.5). The illustrator drew diagonal lines on the E string identifying it as an overspun string or a thick, all-gut string wound like rope; however, the spacing of the diagonal lines suggests the latter. At the time that Corrette wrote his method (1781), overspun strings had been in use for more than one hundred years; therefore, it is possible that Corrette’s E string was overspun. The other three strings were drawn as a single colour, suggesting that they were all-gut strings.

51 Thicker, all-gut strings such as the A and E used on the contrabass were manufactured by a process similar to making rope. Strands of gut were twisted together to increase the mass required by the desired pitch. The twisted appearance of the finished string resembled rope. Corrette’s designation of the instrument as a contrabass is problematic in that the instrument illustrated has frets, C-shaped sound holes and sloping shoulders, all of which are consistent with a Gamba-style instrument. Corrette, Méthodes, front matter.
52 Stephen Bonta states that the origin of the overspun string dates to Bologna Italy in 1660. Bonta, “From Violone to Violoncello,” p. 77.
The illustration below of the contrabass in Amand Durier’s 1836 tutor (Fig. 1.6) is one of the few that we know that depicts a three-string contrabass tuned in fifths.⁵⁴

⁵³ Corrette, Méthodes, pl. 1.
The detail in this portrait is sufficient to show that all three strings were drawn with the same colour suggesting that they are all made from the same material. Although I cannot say with certainty that Durier’s instrument did not have an overspun G string, the first and second strings were most certainly gut. Although overspun strings were used for the third and fourth strings on the four-string contrabass, I found no evidence where a contrabassist was described using an overspun string on a three-string contrabass tuned in fifths.

The strings shown in Labro’s tutor 1860 (Fig 1.7) were drawn with enough detail to suggest that the third and fourth strings were overspun. At the time that Labro wrote

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55 The contrabassist in this picture is assumed to be Durier. The artist’s signature Lafosse appears in the lower left of the portrait. Durier, Méthode, p. 7.
his tutor, contrabassists at the Conservatoire were using the four-string GDAE tuning system.

FIGURE 1.7: Labro, *Méthode de Contre-Basse*, p. 15.⁵⁶

The illustration in Gordon’s 1877 tutor does not show sufficient detail to determine a string type; however, Gordon stated that the fourth string was spun with

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brass. The identical illustration and its description of strings appear in Jules Danby’s 1901 revision of Verrimst’s tutor.

1.12. Dragonetti’s Contrabass at the Royal Ontario Museum

On 13 November 2019, I was able to examine the da Salo contrabass donated by R. S. Williams in 1915 to the Royal Ontario Museum (ROM). The instrument, attributed to Gasparo da Salo, once belonged to contrabass virtuoso Domenico Dragonetti. In a letter dated 8 July 1915 from Williams to then-ROM director Dr. C. T. Currelly, Williams described how the instrument came into his possession, explaining that after Dragonetti had passed away in 1846, the contrabass was bequeathed to the third Duke of Leinster, Augustus Frederick Fitzgerald (1791–1874). However, the Duke was already in possession of this instrument for some time, having been a pupil of Dragonetti. After the Duke passed, the instrument was sold by his nephew, Lord Gerald Fitzgerald, to London violin makers Hill & Sons. Williams stated that he acquired the contrabass from Hill in August 1909.

The Duke of Leinster apparently had two contrabasses from Dragonetti in his possession at one time. In the 1872 *Catalogue of the Special Exhibition of Ancient Musical Instruments*, items 203 and 204 (Fig. 1.8) are described as being lent by the Duke of Leinster to the South Kensington Museum for their exhibit of musical instruments. However, item 203 is not identified in the catalogue’s description as having belonged to Dragonetti.

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The contrabass described as “The Giant” (item 204), was donated by the Duke to the Victoria and Albert Museum (where it resides today) after being on display at the Special Exhibition. This fact is also stated in Fiona Palmer’s book on Dragonetti.\(^6\)

The instrument listed as no. 203 is supposedly the contrabass that R.S. Williams donated to the ROM. The contrabass was originally a three-string instrument, but was converted to four strings at some point and remains this way at present (see Fig. 1.9).\(^6\)

The exact date of this conversion is unknown, but we can establish a time period between 1874 and 1915, the period between the year that the Duke passed and the year that Williams donated the contrabass to the ROM.


FIGURE 1.9: The Dragonetti Gasparo da Salo contrabass at the ROM.

Photo by author. Used with permission by the Royal Ontario Museum.

The curator at the ROM examined the instrument and reported that the original three-string neck, fingerboard, bridge, nut and tuners were replaced when the instrument was converted to four strings. The contrabass features an engraving on the brass plate on the treble-side of the scroll that was inscribed “Duke of Leinster” and directly below “D. Dragonetti.”
due to the historical significance and rarity of surviving instruments made by da Salo and by having once been owned by Dragonetti.\textsuperscript{64}

When I sought to establish a more precise date for the strings, I contacted W. E. Hill & Sons in July of 2020.\textsuperscript{65} They informed me that records from 1907 to 1910 showed the sale of a single contrabass to R.S. Williams, but there was no record of this instrument being a da Salo contrabass. They explained further that, with regards to the three da Salo contrabasses that they did sell, none of these were listed as being sold to Williams. It is possible that one of these three da Salo contrabasses was purchased from Hill by someone who then sold it to Williams.

The da Salo contrabass is mounted with four strings; the first three strings are all-gut and the fourth string is overspun with silver wire. I suspect that the instrument was tuned in fourths GDAE.\textsuperscript{66} The approximate diameters of these strings are: G2 (gut), 3 millimeters; D2 (gut), 4 millimeters; A1 (gut), 6 millimeters; E1 (overspun), 5 millimeters.\textsuperscript{67}

It is reasonable to propose that these strings are representative of those used by contrabassist in the late nineteenth or early twentieth centuries. Furthermore, the difficult playing conditions that led to simplification and transposition, as discussed below, can be attributed in part by the strings that were available. The photographs of the strings on the da Salo contrabass and their measurements give us a reasonable idea of the thickness of gut strings used in the nineteenth century. I would be surprised if contrabassists were not hindered by the thickness of these strings and whether or not these conditions contributed to simplification.

\textsuperscript{64} Barclay recommended that the instrument should not be restored. Barclay, \textit{To Play or to Preserve}, p. 10.
\textsuperscript{65} Sam Blade of W. E. Hill & Sons, personal correspondence 16 July 2020.
\textsuperscript{66} Although the strings are still mounted on the instrument, they have been loosened due to their own fragility and that of the instrument’s top.
\textsuperscript{67} I could not use calipers to get exact measurements due to the fragile condition the strings, therefore a ruler was used to measure the diameter of each string.
Another set of string diameters was listed in the Spanish translation of Asioli’s *Elementi per il Contrabasso* by contrabassist Mariano Herrero y Sessé (1825-?). He gave the following diameters for the three strings on his contrabass: three millimeters for the first, four millimeters for the second, and five millimeters for the third. Although Sessé does not tell us how his instrument was tuned, he informs us that contrabassist in Madrid (where he performed) adopted the Italian tuning G2, D2, A1 in 1860.

I compared the string diameters from a modern set of contrabass strings in fourths tuning with those from the ROM contrabass and from Sessé (Table 1.1). Sessé’s string diameters for the G and D strings are identical to those of the ROM contrabass; his A-string is one millimetre smaller than the ROM instrument’s A-string. The similarities between the string diameters described on Sessé’s instrument and those taken from the ROM contrabass suggest that the string sizes from both instruments are appropriate to the last half of the nineteenth century. Overall, the string diameters given by Sessé and those from the ROM contrabass are almost twice the size of the modern string set.

Not only are modern strings smaller in diameter, their surface is perfectly smooth. One can certainly appreciate the circumstances under which a nineteenth-century contrabassist might have used simplification because of the difficulty of playing on thick strings.

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69 Herrero y Sessé wrote several pages of his own observations at the end of his translation of Asioli’s tutor. The similarity between the diameters of the strings also indicates that Herrero y Sessé’s string were gut. Bonfasio Asioli, *Elementos Para el Contrabajo Con un Nuevo Modo de Hacer uso de los Dedos Compuestos por Bonifacio Asioli de Corregio Socio Honorario del Cesareo Real Conservatorio de Musica en Milan*, ed. and trans. by Mariano Herrero y Sessé (Madrid, 1823), pp. 28-30.

70 Asioli, *Elementos Para el Contrabajo*, p. 2a.
TABLE 1.1: Comparison of string diameters.

<table>
<thead>
<tr>
<th>String</th>
<th>Dia.</th>
<th>Material</th>
<th>Dia.</th>
<th>Material</th>
<th>Dia.</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>G2</td>
<td>3mm</td>
<td>gut</td>
<td>3mm</td>
<td>gut</td>
<td>1.5mm</td>
<td>cr. steel</td>
</tr>
<tr>
<td>D2</td>
<td>4mm</td>
<td>gut</td>
<td>4mm</td>
<td>gut</td>
<td>1.8mm</td>
<td>cr. steel</td>
</tr>
<tr>
<td>A1</td>
<td>5mm</td>
<td>gut</td>
<td>6mm</td>
<td>gut</td>
<td>2.5mm</td>
<td>cr. steel</td>
</tr>
<tr>
<td>E1</td>
<td>5mm</td>
<td>wound</td>
<td></td>
<td></td>
<td>3mm</td>
<td>cr. steel</td>
</tr>
</tbody>
</table>

The first and third strings on the three-string French contrabass tuned in fifths were tuned differently from the four-string instrument tuned in fourths; the second string D2, is common to both fourths and fifths tunings. The first string of the French tuning in fifths is A2, a tone higher than G2 (in fourths), and the third string, G1 is a tone lower than the A1 string in fourths. According to the advice put forward in the tutors, strings were chosen for pitch and tension; therefore, it could be hypothesized that the size of contrabass strings that were only a tone apart might have been similar in diameter. The string’s tension might have been the deciding factor that determined whether or not the first string was tuned to G2 or A2 or the third was tuned to G1 or A1 (third string).71

The resonance of a three-string instrument playing in a higher register with all-gut strings, in combination with the fingerboard layout of fifths would contribute to create a significantly different playing experience or aesthetic. Therefore, the French three-string contrabass tuned in fifths represents a different variety of contrabass compared to the four-string German contrabass tuned in fourths with regards to timbre, tuning and the playing aesthetic experienced by the performer as result of the number of strings and their material, the neck design, and the tuning system.

71 It is not uncommon for modern contrabassists to buy a string designed to be a tone higher and tune it down thereby reducing its tension slightly. The third string on my contrabass (tuned in fifths) is an A1 string from an orchestral set lowered one tone to G1.
FIGURE 1.11: Three-string contrabass.  

72 The description of item 426 indicates that this contrabass was made in Italy sometime in the eighteenth century and was tuned either GDA or ADG. Angul Hammerliche, Das Musikhistorische Museum zu Kopenhagen Beschreibender Katalog (Kopenhagen: Breitkopf & Hartel, 1911), pp. 99–100.
From an ergonomic perspective, the neck on a three-string contrabass was narrower than its four-string counterpart (see Fig. 1.11); its tone is also more prominent than a four-string instrument. This effect is true for three-string contrabasses tuned in fourths and is a function of the number of strings more than the tuning.

1.13. Summary

We can conclude from the evidence presented above that there were limitations to how contrabassists played their bass parts that were directly related to the strings they used. The difficulties contrabassists experienced articulating violoncello parts on the thick gut strings mounted on their instruments were further affected by the additional whole tone travelled by the left hand between open strings in fifths tuning. We also see that string-making technology during the time that fifths tuning was active in France was not yet able to make a useable low C1 string that would give the contrabass the ability to double the full range of the violoncello. The physical evidence of the string sizes from the da Salo contrabass at the ROM, specifically their diameters, gives us a good representation of the strings used by contrabassists who tuned in fifths and are also indicative of the limits of string-making at that time.
Chapter Two: The Three-String French Contrabass Tuned in Fifths

2.1. Inauguration of the Contrabass Class at the Conservatoire 1827

There is little written about the origin of the three-string ADG tuning even in textbooks specific to contrabass history. When Luigi Cherubini established the Conservatoire’s first contrabass class in 1827, the three-string contrabass tuned in fifths A2, D2, G1 (ADG) was the official tuning while Marie-Pierre Chenié (1773–1832) held the distinction of being the first and only professor to teach this tuning at the Conservatoire from 1827 to 1832. Details of Chenié’s life and career come from short biographies by François Fétis, Conservatory historian Constant Pierre, Charles Labro and more recent research by Michael Greenberg.\(^{73}\) Nowhere else do we see the system of fifths used as prominently as in France and consequently, between 1827 to 1832, we find a concentration of literature written specifically about the tuning and its players.

The earliest information on the ADG tuning’s history prior to 1827 is found in cursory references in a number of eighteenth-century treatises.\(^{74}\) Almost fifty years before the Conservatoire’s contrabass class was founded, we find a reference to the

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three-string contrabass tuned in fifths ADG in a chart in Denis Diderot’s 1767
*Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers*; this
tuning was described as “la Contre basse des Italiens.”

The tuning was also
mentioned in Laborde’s *Essai sur la Musique* published in 1780. In 1781, Michel
Corrette described the ADG tuning and wrote out fingerings for a scale; this method is
acknowledged to be the first to present any instruction for the ADG tuning.

2.2. Diversity of Tunings in Different Regions

With regards to the variety of different tunings, it becomes evident that the vast
number of tunings reflect efforts by contrabassists to extend the instrument’s lower
compass as demonstrated by the Conservatoire’s adoption of the GDAE tuning in
1832. These tunings also illustrate a point in time during the gradual extension of the
contrabass’s lower compass as string-making technology progressed to meet the
demand of composers who wrote pitches in the lower range.

In the first half of the nineteenth century, the tuning and number of strings
mounted on the contrabass varied throughout Europe depending on the tuning system
adopted by individual nations or national institutions such as the Conservatoire de
Paris. Contrabasses were mounted with three, four strings and five strings and were
tuned in fourths, fifths or a combination of both. These variations reflect the fact that
the contrabass was still in a process of evolution in the orchestra.

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75 Diderot credits the music entries in the dictionary to M. de Castillon, père. D. Diderot, *Supplément à
Encyclopédie ou Dictionnaire Raisonné des Sciences, des Arts et des Métiers*, vol. 1 (Paris: Berne et à
Lausanne, 1781), p. iv.
76 Laborde, *Essai sur la Musique* vol. 1, p. 293.
78 ADG in France: Bonfazio Asioli, *Elementi per il Contrabasso con una nuova maniera di digitare*
4; ADG in Italy: Asioli, *Elementi per il Contrabasso*, p. 3; Georges Kastner, *Traité Général
d’Instrumentation: Approuvé par l’Académie Royale des Beaux Arts de l’Institut de France, et Adopté
au Conservatoire Royale de Musique pour l’Enseignement dans les Classes de Composition*, 2nd ed.
(Paris: Prilipp, 1836), p. 14. GDAE in Germany: Asioli, *Elementi per il Contrabasso*, p. 3; Nicolai,
“Das Spiel Auf Dem Contrabass,” p. 258; Wenzl Hause, *Kontrabaß Schule. Gründliche, mit Regeln,
Beispielen, und Erklärungen versehene* (Dresden: Hilscher, 1828), p. 2; Kastner, *Traité Général* 1836,
In the example below, the open strings of each tuning system are listed in ascending order of pitch (Ex. 2.1). I use the terms sub-E1, sub-G1 and sub-A1 to identify the range of pitches below E1, G1 and A1 respectively down to C1. Each term identifies the range of pitches specific to that tuning that could not be played on a contrabass using that particular tuning; the range is defined by the tuning’s lowest pitch to the lower limit of C1. Therefore, contrabassists were forced to transpose these pitches up one octave. Another option, although somewhat limited, was the use of scordatura; Chenié used scordatura in Rossini’s opera *Siège de Corinthe*, as he described in his letter to Cherubini.\(^79\)

**EXAMPLE 2.1: Contrabass tunings and lower-compass pitch limitations.**

In addition to the national tunings described above, various other tunings were used across Europe, demonstrating the evolving nature of contrabass tunings at that time. The chart in Appendix B shows the tunings described in the literature that were examined in this dissertation. The French ADG tuning and the German GDAE tuning stand out as the two most frequently cited tunings.

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The GDAE tuning also had a presence in France during the eighteenth century as Michael Greenberg demonstrates on the basis of evidence in the archives of the French Court. The archival material examined by Greenberg contained bills of sale for instruments and strings, as well as detailed repair and maintenance records.

These records show that the court purchased four contrabasses from a French luthier between 1762 and 1766. Invoices for a wound third and a wound fourth string, both for a contrabass, indicate that they were purchased for an instrument with four strings. Another invoice from 1769 for contrabass strings named the pitches: G, D, A (wound) and E (wound). Greenberg asserts that this evidence establishes the exclusive use of the four-string contrabass tuning GDAE at the Chapelle Royale from approximately 1749 to 1788. I agree with Greenberg that the evidence found in the archives of the French Court establishes the use of the GDAE tuning at the Chapelle Royale at that time; however, the ADG tuning is mentioned in the literature as early as 1767 by Diderot, Laborde in 1780 and Corrette again in 1781, and I do not believe that the evidence found in these documents for the GDAE tuning precludes the possibility that the ADG tuning may have been in use. Furthermore, the records in the archives refer to those instruments that were owned by the court. Some contrabassists used their own instruments as is demonstrated in the accounts of Montéclair, contrabassist with l’Opéra circa 1700, who imported his contrabass from Italy, which was later purchased by another contrabassist Marchand. In addition to the Chapelle Royale,

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82 Greenberg, “Musical Instruments,” p. 19, invoice from Benoît Fleury, Archives Nationales, O1 3022, 7, no. 50. See also Greenberg, “Musical Instruments,” p. 19, invoice from Guersan, Archives Nationales, O1 2987, 1, 3B.
83 Greenberg, “Musical Instruments,” p. 18, invoice from Fleury to Torressani, Archives Nationales, O1 3053, 6, no. 63.
85 See footnote 104 regarding Montéclair’s contrabass.
there were other orchestras in eighteenth-century Paris including the Concerts Spirituel, the Comédie-Française, the Comédie-Italienne and the Opéra Comique. The literature examined so far does not tell us what tunings were practised by contrabassists in these orchestras.

Guillaume Gelinek, a contrabassist with the Chapelle Royale and the Opéra stated that the first contrabasses introduced to France came from Germany and Italy; these were four-stringed instruments tuned in fourths. He added that the three contrabasses in the king’s band at Versailles were tuned this way and that his father and uncle played two of these instruments sixty years earlier, situating these instruments at the Chapelle Royale in 1769. He added that two of the four instruments that were currently in use at the Chapelle of the Tuileries had four strings, allowing us to infer that the two remaining contrabasses had a different number of strings.

Gelinek further explained how the contrabass’s tuning had been changed from its original tuning in fourths to fifths by violoncellists, who, unable to find work on their own instrument, began playing the contrabass but retuned it in fifths, and removed the fourth string at some point, leaving the instrument with three strings tuned ADG. Gelinek does refer to this change in the past tense, noting that French music from that period was not as difficult to play on the three-string contrabass compared to the more modern works.

In his brief but informative history on the contrabass, Charles Labro tells the same history as mentioned by Gelinek: three contrabasses are held at la Musique du Roi à Versailles and two of these were tuned in fourths; and both were played by Gelinek’s father and uncle. However, he added that one of these instruments, presumably not either of the two that were tuned in fourths, showed evidence in its scroll of originally

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88 Labro, Méthode, p. 4.
being constructed as a four-string instrument.\textsuperscript{89} Such evidence would likely show the original four holes for the tuning pegs filled in with wood so that new holes for the three pegs could be placed on the scroll. Unfortunately, Labro does not tell us how this three-string contrabass was tuned or whether the conversion from four strings to three was to change the sound of the instrument or to facilitate a different tuning.

Greenberg proposes that the GDAE tuning was the only tuning practised at the Chapelle Royale until 1788 when, according to an invoice, a contrabass repair made that year shows that a four-string neck was thinned for use as a three-string instrument by the luthier Caron.\textsuperscript{90} He suggests that this instrument was intended for a player in the Opéra on the basis of several pieces of evidence: first, Greenberg points out that two contrabassists were listed in a 1765–66 roster of the Opéra’s musicians;\textsuperscript{91} second, an inventory document of the Opéra’s instruments in 1767 shows two contrabasses fitted with six strings.\textsuperscript{92} It is Greenberg’s assertion that the wording, “les...contrebasses garnies de six cordes,” described the plural “contrebasses” and therefore the interpretation that Greenberg suggests is two contrabasses, each with three strings. This number agrees with the two contrabassists named above in the 1766 roster. He also points out that three-string contrabasses are mentioned in the literature as early as Diderot (1767), Laborde (1780) and Corrette (1781).\textsuperscript{93}

Three important pieces of information that are not mentioned concern why the four-string neck was converted, for whom and what was the tuning of this instrument.

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\textsuperscript{89} We can infer from Labro’s description that the pegbox showed evidence of once having been fitted with four tuning pegs. Labro, \textit{Méthode}, p. 3.

\textsuperscript{90} Greenberg, “Musical Instruments,” p. 17, see fn. 70, invoice from Caron, Archives Nationales, O1 3081, 7, no. 196.


\textsuperscript{92} Greenberg, “Perfecting the Storm,” p. 20, see fn. 126, inventory of instruments owned by the Opéra, Opéra Archives, INV 2, f. 96; See also Jérôme de la Gorce, “L’Orchestre de l’Opéra et Son Évolution de Campra à Rameau,” \textit{Revue de Musicologie} 1 (1990): p. 27.

\textsuperscript{93} Greenberg, “Perfecting the Storm,” p. 20; Diderot, “Table du Rapport,” pl. XXII; Laborde, \textit{Essai sur la Musique} vol. 1, p. 293; Corrette, \textit{Méthodes}, p. 9.
post-conversion. We know that it was common for contrabasses to be mounted with three-strings because removing the fourth string improved the volume of the instrument; this improvement has been demonstrated in France, England and Italy. Furthermore, the removal of the fourth string was practised by contrabassists using either tuning.

We can only speculate on the tuning of the newly converted three-string contrabass in the absence of any description of how it was tuned. The majority of sources including the three described by Greenberg describe the ADG tuning in fifths for the three-string contrabass; furthermore, these sources are situated in the latter half of eighteenth-century Paris within the time-frame proposed (1733 to 1792) in Greenberg’s article. We can therefore establish the presence of the three-string contrabass tuned ADG from 1767 with respect to its mention by Diderot.94

In 1813, Fröhlich identified two varieties of contrabasses tuned in fourths: the four-string tuning GDAE and the three-string version GDA although he did not specify where these tunings were practised.95

A second reference to the GDA tuning comes from French contrabassist Guillaume Gelinek who wrote, “Les musiciens qui accordent par quartes la contrebasse à trois cordes, mettent un La au grave, Ré au médium, et Sol à l’aigu. On voit par cet accord que l’harmonie perd deux sons graves, et deux aigus, et qu’en ajoutant une quatrième corde au-dessus du Sol qui donnerait l’Ut on aurait cinq notes de plus, sans que la main changeât de position.”96 I believe that Gelinek is not referring to French contrabassists, but their English counterparts. Two points must be restated: first, Gelinek was on Cherubini’s committee to discuss the feasibility of changing the tuning of the French contrabass from fifths to fourths. The letters written to Cherubini from Höffelmeyer, Sorne and Chenié all agree that the proposed tuning

94 Diderot, “Table du Rapport,” pl. XXII.
95 Fröhlich, Contrabass-Schule, p. 83.
96 “The musicians who tune in fourths, the three-string contrabass, put a low A, a D in the middle, and a G treble. We see by this tuning that the harmony loses two bass sounds, and two treble, and that adding a fourth string above the G, which would give C, we would have five more notes, without the hand changing position.” Translation mine. Gelinek, “Contrebasse,” p. 170; Gelinek, “Double-Bass,” p. 298.
raised the contrabass’s lowest pitch by a whole tone (from G1 to A1) and recommended against the change. We can infer from Gelinek’s description, particularly the loss of two bass sounds, that the tuning he was referring to was GDA, the same tuning used throughout England at the time Gelinek wrote his article.

Second, the letters to Cherubini addressed changing the Conservatoire’s then current system of tuning in fifths to fourths. If we consider this information in context with Rossini’s invitation to Dragonetti to teach at the Conservatoire, and Dragonetti’s use of the GDA tuning, then Gelinek’s description of the GDA tuning most likely referred to its practice in England, not France. Georges Kastner also described the GDA tuning, but does not say where the tuning was practised.97

The following chapter provides a history of the contrabass tuned in fifths based on available primary sources. The picture that we are able to develop is that the three-string contrabass tuned ADG emerged sometime in the mid-eighteenth century as the tuning practised by French contrabassists until approximately 1832, after which time the Conservatoire replaced it with the four-string tuning GDAE that was already established in Germany. There were two important reasons why the Conservatoire replaced tuning in fifths with fourths: first, the addition of the fourth string tuned to E1 extended the contrabass’s lower compass by a minor third; second, the smaller interval between open strings in the GDAE tuning reduced the amount of shifting as compared to those who tuned in fifths.

2.3. Montéclair and the Introduction of the Contrabass to the Paris Opéra

Multiple sources credit Michel Pignolet de Montéclair as having introduced the contrabass to the Paris Opéra at the beginning of the eighteenth century.98 Montéclair

97 Kastner, Traité Général 1837, p. 8.
entered the Opéra in 1699 according to Graham Sadler who reports that a document known as *Detail de la regie actuel* [sic] de l’Academie Royalle de Musique avec un denombrment de tout ce qui fait la recette et la depense de ce spectacle en 1738 listed musicians in Rameau’s orchestra. According to the document, Montéclair entered the Opéra in 1699 and played the *basse de violon* and *contrabasse* in the *petit chœur*.  

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100 The actual date that Montéclair first played the contrabass has been put at sometime between 1700 and 1716. Greenberg discusses the discrepancies between these dates. As he points out, the report of a contemporary witness such as Titon du Tillet puts the date closer to 1700. See Greenberg, “Perfecting the Storm,” p. 12. See also Tillet, *Le Parnasse François*, pp. 696–97. See also Voillard, *Essai Sur Montéclair*, pp. 16–17.
The brief biography of Montéclair by Charles Whitfield claimed that Montéclair spent several years in Italy during which time he studied the contrabass.\footnote{Charles Whitfield, “Montéclair,” Larousse de la Musique by Antoine Goléa and Marc Vignal, vol. 2 (Paris: Librairie Larousse, 1982), p. 1053, no source provided. See also Larousse, “Contre-Basse,” p. 4.} Émile Voillard stated that he was unable to verify details of Montéclair’s time in Italy as maître de la musique for the Prince of Vaudémont.\footnote{Voillard, Essai Sur Montéclair, p. 5. Montéclair’s association with Vaudémont is stated on the front cover of his Nouvelle Méthode Pour Apprendre la Musique. Michel Montéclair, Nouvelle Méthode Pour Apprendre la Musique par Mr Montéclair de l’Académie Royale de Musique et Cy-devant Maître de la Musique de Monseign le Prince de Vaudémont en Italie (Paris: Chez l’Auteur, 1709), front cover.} Jules Carlez reported that Montéclair had the opportunity to hear Italian orchestras and learned their style while in Rome, especially the contrabasses, adding that Montéclair returned to Paris convinced of the superiority of the Italian contrabasses over the French bass viols.\footnote{Carlez did not give a source for this information. Jules Carlez, Une Opéra Biblique au XVIII Siècle (Caen: F. de Blanc-Hardel, 1879), p. 9.}

A number of sources suggest that Montéclair returned to France with an Italian contrabass; Brun states that this contrabass was built in Naples.\footnote{Larousse, “Contre-Basse,” p. 4, no source provided; Brun, New History, p. 266, no source provided. Carlez, Opéra Biblique, p. 9, no source provided; Paul-Marie Masson, L’Opéra de Rameau (New York: Da Capo Press, 1972), p. 37, no source provided. The similarities of these reports regarding the Italian origin of Montéclair’s contrabass suggest that the authors are relying on only one source—the announcement for the sale of his contrabass: “D’Instrumens de Musique, scàvoro très-bonne Contre-basse de Naples, fort ancienne, laquelle a ci-devant appartenu à M. Montéclair . . . (après le décès de M. Marchand, Ordinaire de l’Académie Royale de Musique).” “Musical Instruments, know very good contrabass from Naples, very old, which formerly belonged to Mr. Montéclair . . . (after the death of Mr. Marchand, Ordinary of the Royal Academy of Music).” Translation mine. Annonces, Affiches, et Avis Divers Soixante-quinzieme Feuille Périodique du Jeudi 23 Septembre 1756, p. 595.} Chouquet claims that the contrabass Montéclair played at the Opéra had three strings.\footnote{Gustave Chouquet, Histoire de la Musique Dramatique en France Depuis ses Origines Jusqu’a Nos Jours (Paris: Didot Frères, 1873), pp. 123–24, no source provided. Masson also claims that Montéclair returned from Italy with a three-string contrabass but does not indicate his source for this information; however, his bibliography lists the article named above in footnote 104, and he also cites Chouquet. I suspect that these are Masson’s sources. Masson, L’Opéra, p. 37.}

If Montéclair had acquired a three-string instrument while in Italy, then it could have been tuned one of three ways: first, A2, D2, G1; second, G2, D2, G1; and third, G2, D2, A1. All three tunings appear in the literature as having been practised in Italy.\footnote{For sources that describe the Italian tunings for the contrabass, see Appendix B.} I have yet to find a source that describes how Montéclair’s contrabass was tuned.
Montéclair retired from the Opéra in 1737 and was succeeded by Giuseppe Fedeli (known as Saggione).\textsuperscript{107} Until the 1765-66 season, there appears to have been only one contrabass in the orchestra of the Opéra. In 1766 two contrabassists, Huberti and Hanot are named in a roster for the Opera. In 1768, four contrabassists are listed; and by 1787 that number had increased to five.\textsuperscript{108} By 1815, there were eight contrabassists in the Opéra.\textsuperscript{109}

2.4. The Formation of the Contrabass Class and its Committee

The establishment of the Conservatoire’s contrabass class addressed the need to improve the state of playing the contrabass in France. In May 1827, Luigi Cherubini, then director of the Conservatoire, convened a committee of prominent contrabassists from the Chapelle Royale requesting their opinion on the feasibility of adapting the Dragonetti bow and its playing style as well as changing the tuning of the French contrabass from fifths to fourths.\textsuperscript{110} The members of the committee, Marie-Pierre Chenié, Nicolas-George Sorne, George-Joseph Gelinek, Marie-Joseph-Antoine Hyacinte-Valentin Höffelmayer and François-Nöel Lamy, responded to Cherubini in writing,\textsuperscript{111} the committee’s letters and their translations are found in Appendix C.\textsuperscript{112}

\textsuperscript{107} Greenberg, “Perfecting the Storm,” p. 16, B-Bk, MS II 4119, f. 157r; Opéra Archives, 18 [20, f. 63.\textsuperscript{108} For 1766, see Les Spectacles de Paris 15 (1766): p. 11–12; For 1787, see Les Spectacles de Paris 36 (1787): p. 27.\textsuperscript{109} Greenberg, “Perfecting the Storm,” p. 21, Opéra Archives, PE 2.\textsuperscript{110} François Joseph Fétis, “Sur la Contre-Basse et Sur Son Archet,” La Revue Musicale 19 (Paris: 1827): p. 470; See also Labro, Méthode, p. 4.\textsuperscript{111} According to Fétis, the committee comprised Chenié, Sorne, Gelinek and Lamy and several others. Fétis, “Sur la Contre-Basse,” p. 470. Labro repeated Fétis’s description of the committee almost word for word in his 1860 tutor. Labro, Méthode, p. 4. Greenberg lists Sorne, Lamy, Chenié and Gelinek; he cites Fétis as his source. Greenberg, “Double Bass Class,” p. 94, see fn. 18. Brun names Höffelmayer but does not include Lamy. He does not cite a source for his information. Brun, New History, p. 133. It should be noted that Fétis’s original description of those whose opinions were sought included the phrase “several others.” Höffelmayer did, in fact, write a letter to Cherubini as did Chenié, Sorne and Gelinek; Lamy apparently did not.\textsuperscript{112} Appendix C contains photocopies of these letters and my English translations. My sincere gratitude to Michael Greenberg for sending me the photocopies of these letters.
Labro informs us that the Conservatoire proposed changing the tuning of the contrabass taught at the Conservatoire and the number of strings mounted on the instrument from the three-string tuning in fifths A2, D2, G1 to the four-string instrument tuned in fourths, G2, D2, A1, E1. However, we learn from Chenié’s letter to Cherubini, that the proposed tuning that the committee was asked to consider was the three-string tuning in fourths G2, D2, A1, the tuning practised by Dragonetti. I suspect that Chenié’s reference to the GDA tuning speaks to the possibility that Dragonetti might accept Rossini’s written invitation to teach at the Conservatoire; had Dragonetti accepted, I suspect that he would have insisted on teaching his preferred GDA tuning. The committee’s written responses were mostly concerned for the loss of a whole tone from G1 to A1 in the instrument’s lower compass. Dragonetti declined Rossini’s invitation to teach; however, Dragonetti explained that tuning in fourths was by nature more correct, claiming that the French tuning (fifths) was lacking with regards to playing chords and in facility, evenness and strength of sound. It is unclear what Dragonetti meant when he described fourths as more correct by nature; he might have been referring to a less demanding left-hand technique. With regards to playing chords, Dragonetti was likely referring to double-stops played on adjacent strings. Cherubini received written responses from

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113 Charles Labro was admitted to the Conservatoire on 4 November 1831 and according to Greenberg, witnessed the changeover from fifths to fourths while he was a student of Chenié. Greenberg, “Double Bass,” p. 112, see fn. 114, Archives Nationales, AJ/37/194, 2, f° 201–202.

114 “On prend pour base et preuve la manière dont le célèbre Dragonetti à Londres tire parti de cet instrument accordé par quarte.” “We take as basis and proof the manner in which the famous Dragonetti in London plays this instrument tuned by fourths.” Chenié, Letter to Cherubini.


117 In his reply, Dragonetti stated that he had more to say on the issue of tuning but did not want to do so in the letter. Greenberg, “Double Bass Class.” p. 92; Palmer, Domenico Dragonetti, p. 69, Evanston, Northwestern University, Music Library, Moldenhauer 142, letter from Dragonetti to G. Rossini (Paris) 1827 in V. Novello’s hand.
Höffelmeyer, Chenié, Sorne and Gelinek. Sorne was in favour of keeping fifths with the rationale that the benefits derived from shifting less in fourths were counterbalanced with maintaining the low G in fifths tuning. He expressed concern over the loss of a full tone on the chanterelle (first string), explaining that this string, tuned to A in fifths, was more sonorous and better facilitated moving into the octave. He pointed out that a contrabass tuned in fifths overall had a larger range (two octaves and one tone) than when tuned in fourths (an octave and a minor seventh). With regards to the fingering and strings used by either tuning, Sorne explained that in his lengthy career, he had not established a preference for either tuning.

Chenié replied that the ADG tuning should remain the official tuning, specifically arguing against the loss of a whole tone in the lower compass by changing the third string to A1 from the current G1. He supported this argument by noting how effective these lower pitches sounded in religious and dramatic works.\footnote{See Appendix C, Chenié, Letter to Cherubini.} Höffelmayer agreed with Sorne that fourths provided greater facility, but he also stressed the importance of maintaining the instrument’s lower pitches as Sorne and Chenié argued.\footnote{See Appendix C. Marie-Joseph-Antoine-Hyacinte-Valentin Höffelmayer, Letter to Cherubini dated 22 fevrier 1827. Cited by Greenberg, “Double Bass Class,” pp. 83–140, Archives Nationales, AJ/37/38.} Gelinek’s letter to Cherubini did not comment on the issue of tuning; in an article published soon after, however, he returned to the issue, stating that bass parts in older compositions could be played without difficulty on the three-string French contrabasses in fifths because those bass parts were not as complicated as the modern bass parts being written at present.\footnote{Gelinek, “Double-Bass,” p. 297; Gelinek, “Contrebasse,” p. 170.} Moreover, he is stating the bass parts in newer compositions are more difficult to play and do not play so well in fifths tuning, a view that I discuss below. Overall, the committee’s replies to Cherubini were mostly focused on the loss of notes in both the high and low registers if the proposed system of fourths was adopted. Höffelmayer pointed out the benefits of having the chanterelle
tuned to A in fifths tuning, adding that “these days one often goes up to F-sharp, G, G-sharp and A.”

Chenié, Sorne and Höffelmayer argued against the loss of notes in the lower compass. Chenié explained that losing these notes forced contrabassists to play more on the D string in the same compass as the violoncello, a result of octave transposition. After considering the responses by Cherubini’s committee, the Conservatoire decided to keep fifths as their official tuning.

Very few contrabassists are actually described by name as having used the tuning. Chenié and Durier were certainly not the only contrabassists to tune in fifths; however, they are the ones mentioned by name in the literature, as having used the tuning. Marié undoubtedly used the tuning as one of Chenié’s students and then wrote a method for the ADG tuning. In a letter published in London in 1829 (shown below), Fétis praised the efforts of Sorne, Chenié, Gelinek and Lamy for showing devotion to their art despite having to use a disadvantageous mode of tuning for their instrument; we can infer from Fétis’s remarks that Sorne, Gelinek and Lamy tuned in fifths. It seems unlikely that Gelinek tuned in fifths in consideration of his written objections to the tuning and the fact that his father and uncle, both contrabassists, played four-string instruments tuned in fourths. Greenberg implies that François-Louis Perne tuned in fifths, stating that between 1792, the year that Perne joined the Opéra, and 1832,

121 Höffelmayer, Letter to Cherubini.
123 Wenceslas Hause, Méthode de Contrebasse Arrangée et Chiffrée Pour la Contrebasse Française par C. M. Marié (Paris, 1835).
French contrabasses were mounted with three strings and tuned in fifths. Perne and Chenié both studied music with Abbé d’Haudimont at Saint Jacques-de-la-Boucherie according to Fétis. It is certainly possible that both men learned to play the contrabass tuned in fifths from the same source.

2.5. Chenié’s Class 1827–1832

An important individual associated with the three-string contrabass tuned in fifths was Marie-Pierre Chenié, who taught the ADG tuning at the Conservatoire between 1827 and 1832. Chenié was born in Paris in 1773 and received his musical training from Abbé d’Haudimont at Saint Jacques-de-la-Boucherie according to Fétis, who adds that Chenié and fellow contrabassist François-Louis Perne were two of Haudimont’s best students. Chenié’s career was impressive: he was the principal contrabassist with the Orchestre de l’Opéra and the Société des Concerts (see Fig. 2.1) after which time he played with the Chapelle Royale and the Italian Theater Orchestra.

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126 Greenberg, “Double Bass Class,” p. 134, see fn. 146, Archives Nationales, AJ/13/54, fº 66. Greenberg states that Perne entered the Opéra in 1796, but does not say whether this same document describes Perne’s tuning.


In 1828, Chenié became principal contrabassist with the Société des Concerts according to records maintained by the Conservatoire. The documents show that the

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130 Chenié’s signature appears in the middle of the page towards the bottom. “This decree, having been communicated by Cherubini to the professors of the Royal School of Music and to a large number of successful students whom they had trained, was greeted with great marks of approval, and, forthwith, the artists whose names follow signed this membership: We, the undersigned, former students of the Royal School of Music, undertake to participate in the concerts which will take place, in accordance
Institut National de Musique had already proposed a class size for contrabassists consisting of one professor and eight students but that class would not be formed until 1827 when contrabass class retained this class size.\(^{131}\)

Jean-Baptiste Wekerlin described a document at the Conservatoire in Cherubini’s hand that lists the first pupils registered in Chenié’s class; seven students were admitted to the class in 1827 even though eight were permitted: Durier, Croizier, Dubarle, Bagna, Hemet, Mouillard and Guillion.\(^{132}\) I have not been able to find information on Crozier, Dubarle, Bagna or Mouillard; Durier is discussed in more detail below. Each year the contrabass class held an annual competition, awarding prizes for first and second place; students who placed first or second in this competition between 1827 and 1832 were named in Pierre’s book.

The table below (Table 2.1) shows those students who studied the ADG tuning under Chenié, the awards they won at the Conservatoire and the orchestras with whom they later played.

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\(^{131}\) L’Institut National de Musique was the name of the Conservatoire from 1793 until 1795, after which it was renamed Le Conservatoire de Musique. Pierre, *Le Conservatoire*, pp. 88, 108, Archives Nationales, D XXXVII, 2. See also Greenberg, “Double Bass Class,” pp. 83–140 at 88, see fn. 7.

TABLE 2.1: Students of Marie-Pierre Chenié 1827–1832.


<table>
<thead>
<tr>
<th>Student</th>
<th>Primary sources:</th>
<th>Secondary sources:</th>
<th>Student history</th>
<th>Orchestral affiliations</th>
</tr>
</thead>
</table>

I believe the volume number 12 should be 28 here and for Edouard Hémet.
### TABLE 2.1: Students of Marie-Pierre Chenié 1827-1832, continued.

<table>
<thead>
<tr>
<th>Name</th>
<th>Admitted</th>
<th>Admitted</th>
<th>Orchestre</th>
<th>My research.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charles-Amand Durier</td>
<td>1 March</td>
<td>1 July 1827</td>
<td>de l'Opéra</td>
<td></td>
</tr>
<tr>
<td>(1808-?)</td>
<td></td>
<td></td>
<td>Comique;</td>
<td></td>
</tr>
<tr>
<td>Berlioz, p. 3; F-Pan</td>
<td></td>
<td></td>
<td>Société</td>
<td></td>
</tr>
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<td>AJ/13/1059, I, IV;</td>
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<td></td>
<td>des Concerts.</td>
<td></td>
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<td>AI/37/208, 1; AI/37/150, 1;</td>
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<td></td>
<td></td>
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<td>BN D1733 [4]</td>
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<td>Greenberg, p. 110, fn. 76.</td>
<td></td>
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<tr>
<td>Brun, p. 197</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Antoine Bellarmine Guillon</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(1809–1856)</td>
<td>1 August</td>
<td>1 July 1827</td>
<td>de l'Opéra;</td>
<td></td>
</tr>
<tr>
<td>Pierre, pp. 620, 769.</td>
<td></td>
<td></td>
<td>Société des</td>
<td></td>
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<tr>
<td>Fétis, RM 6, p. 62;</td>
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<td></td>
<td>Concerts.</td>
<td></td>
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<tr>
<td>Pierre, p. 769; F-Pan</td>
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<td></td>
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<tr>
<td>AI/37/208, 2.</td>
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<tr>
<td>Greenberg, p. 12, fn. 82; p. 113, fn. 83, 89.</td>
<td></td>
<td></td>
<td>2nd prize 1828; 1st prize 1829.</td>
<td>Orchestra de l'Opéra (1832); Société des Concerts (1849–56)</td>
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<tr>
<td>Brun, p. 197; Wekerlin, p. 24.</td>
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<tr>
<td>Albert Guillon</td>
<td>1 August</td>
<td>1 July 1827</td>
<td>de l'Opéra (1835–38); de l’Opéra Comique.</td>
<td>Orchestra de l'Opéra (1835–38); Orchestre de l’Opéra Comique.</td>
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<tr>
<td>Pierre, p. 773.</td>
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<tr>
<td>Fétis, BU 1 v3, p. 111.</td>
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<tr>
<td>Pierre, p. 773; RM 12, p. 221.</td>
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<td></td>
<td>1st prize 1829.</td>
<td>Concert Musard; Orchestre du Théâtre Italien.</td>
</tr>
</tbody>
</table>

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135 The name Hémet (no first name) is listed as a contrabassist for the Orchestre du Théâtre Italien in 1835. *Almanach des Spectacles pour 1835*, p. 44.
TABLE 2.1: Students of Marie-Pierre Chenié 1827-1832, continued.

<table>
<thead>
<tr>
<th>Name</th>
<th>Source(s)</th>
<th>Prize</th>
<th>Institution(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pierre, p. 805; AdS 1834 p. 25; Fétis, RM 9, p. 20</td>
<td>My research.</td>
<td>2nd prize 1829; 1st prize 1829.</td>
<td>Orchestra de l’Opéra (1831–34); Orchestre du Théâtre Italien.</td>
</tr>
<tr>
<td>Pierre, p. 805; Fétis, RM 9, p. 20</td>
<td>Greenberg, p. 113, fn. 87.</td>
<td>2nd prize 1829; 1st prize 1829.</td>
<td>Orchestra de l’Opéra (1831–34); Orchestre du Théâtre Italien.</td>
</tr>
</tbody>
</table>

Chenié passed away on 6 May 1832; shortly thereafter, the Teaching Committee of the Conservatoire convened on 23 May 1832 and adopted the proposal by Cherubini and François-Antoine Habeneck, Inspector General of Studies, to teach only the system of fourths in the future. Cherubini informed the Commission de Surveillance pres le Conservatoire de Musique et de l’Académie Royale de Musique that he had, in fact, begun instituting the study of the GDAE tuning in approximately March of 1832.136

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The contrabass tuned in fourths expanded the instrument’s lower compass by a minor third from G1 to E1; a subsequent effect of this expanded range was that the amount of octave transposition that contrabassists in fifths were obliged to undertake was decreased. Furthermore, tuning in fourths reduced the amount of shifting and the distance travelled by the left-hand in those shifts. Overall, fourths not only expanded the lower range of the contrabass that composers were writing, but it gave contrabassists an easier solution to play the difficult parts.

François-Nöel Lamy was appointed as the next professor of the contrabass class and was charged with implementing the GDAE tuning as the official tuning moving forward; however, Lamy succumbed to cholera only six months into the new position.137 The Conservatoire then appointed Louis-François Chaft (1780–1856) to continue implementing the changeover.138

2.6. Debate in Contemporary Journals About the Contrabass Tuned in Fifths

Editorials and articles published in nineteenth-century music journals in France, Germany, and England such as La Revue Musicale, La Revue et Gazette Musicale de Paris, the Harmonicon and the Allgemeine Musikalische Zeitung (AmZ), document efforts by persons associated with the Conservatoire to change the official tuning of the contrabass from fifths to the four-string tuning GDAE.

The Revue Musicale, published between 1827 and 1835, was largely the work of Belgian musicologist, composer and teacher François-Joseph Fétis (1784–1871), who published the journal and was its main contributor. In November 1835, Fétis sold the journal to Maurice Schlesinger, who, at that time, published La Gazette Musicale de Paris. The two journals merged to become La Revue et Gazette Musicale de Paris (RGM), published weekly from 1835 to November 1880. The RGM was one of the most important sources of French musical culture in the nineteenth century.

137 Labro, Méthode, p. 4.
138 Ibid.
Between 1827 and 1832, Fétis wrote three articles in *La Revue Musicale* criticizing the French ADG tuning, even from the inception of the Conservatoire’s contrabass class. In an article dated 19 June 1827, he first stated that [contrabasses tuned in] fourths were preferable to those tuned in fifths because the left-hand had fewer shifts to make in fourths tuning than in fifths tuning.\(^{139}\) Sorne, in his letter to Cherubini, expressed a similar point with regards tuning in fourths, acknowledging the advantage of passing from one string to another without moving the hand.\(^{140}\) This specific reason, shifting, would be present in almost all of the future dialogue about the tuning.

Fétis reviewed the French edition of the method by Prague contrabassist Wenceslas Hause, a French edition of Hause’s German tutor for the four-string contrabass tuned in fourths GDAE.\(^{141}\) Fétis expressed his preference for the German GDAE tuning over the French ADG tuning, citing the *scherzo* and *trio* in Beethoven’s Fifth Symphony as examples where contrabassists tuned in fifths could not play the part as written. He makes a rather exaggerated claim that there would be infinitely less shifting when performing the *trio* on a contrabass tuned in fourths. Fétis’s article is discussed in more detail below.

In August 1832, just three months after Chenié’s death, Fétis reported on the *Concours du Conservatoire* for that year.\(^{142}\) He seem pleased with the Conservatoire’s decision to leave fifths tuning behind and change to fourths tuning. It is difficult to say how much influence Fétis may have had on the Conservatoire’s decision to discontinue teaching the tuning. Still, he held the position of professor of counterpoint and fugue at the Conservatoire and was its librarian from 1821 until 1833; furthermore, the remarkable output of writings in the French music press, combined


with his position at the Conservatoire affirm that he had a significant presence in Parisian musical culture.¹⁴³

The English journal *Harmonicon* was published in Great Britain from 1823 to 1833 and featured articles focused primarily on London’s musical institutions as well as news from major European music centres. On 1 May 1829, the *Harmonicon* published a letter written by Fétis while visiting England in which he compared English contrabassists of the Philharmonic Society to French contrabassists in the Société des Concerts. Fétis attributed the superior articulation he witnessed by English contrabassists over their French counterparts to their use of the Dragonetti bow and the fact that English contrabassists tuned their instruments in fourths. He writes:

With respect to details, after having stated the superiority of the French violins, I am obliged to allow that the same superiority exists in regard to the double basses of the Philharmonic Concert. Without speaking of Dragonetti, whose extraordinary talent I shall have occasion to analyse elsewhere, I must acknowledge that all the double basses of the London orchestra articulate with a precision, a minuteness, a delicacy, and a power, to which in Paris we are strangers. These excellent qualities have been produced by the school which Dragonetti has founded here. The artists who play the double-bass are, as you are aware, divided in our orchestras into two classes; the one composed of men full of energy and devoted to their art, such, for instance, as Messieurs Sorna, [sic] Chenié, Gelineck [sic], and Lanny [sic]; the other, in which are ranged those who do nothing more than exactly fulfil their duty. The former, having to contend against the difficulties of a disadvantageous mode of tuning their instrument, and of an ill constructed bow, can produce the desired effect only through dint of effort and fatigue; the others give themselves less trouble, and are content with executing the leading notes of the passages of the score before them. Not so the double basses of the Philharmonic Concert: these artists allow every thing to be heard, mark distinctly every part of their bowing, as well in legato as in detached passages; preserve all the shades of expression; strike the note with unerring precision, and seem to use no greater effort than if they were playing the violin or viola. There can be no doubt but that these advantages are derived from tuning the double bass by fourths, and from the admirable manner of employing the bow introduced into England by the school of Dragonetti.¹⁴⁴

The question remains as to just how much of Fétis’ perception regarding his stated superiority of the Philharmonic’s contrabassists can be attributed to fourths alone. We must consider, as Fiona Palmer also asserts, the influence of a contrabassist of Dragonetti’s calibre on the bass section as its principal.145

Most of Fétis’s writings that discuss the ADG tuning appeared in the Revue Musicale and according to Peter Bloom, the journal’s audience were some of the most prominent figures in the musical world of the 1820s and 1830s. He adds that Fétis had achieved an international reputation due to the success and circulation of the Revue Musicale.146 Fétis was also the music critic for several other French publications including Le Temps and Le National; Bloom notes that the same reviews Fétis wrote for the Revue Musicale appeared concurrently in these other journals, thereby exposing Fétis to a greater audience.147

Another prominent Parisian contrabassist, Guillaume Gelinek, made reference to the ADG tuning in the Revue Musicale. He explained that the contrabass had degenerated, in reference to its introduction to France circa 1700. The following excerpt is from Gelinek’s article published in the Harmonicon in December 1829. The article is almost identical to an earlier one published in the Revue Musicale in March 1829 and presents Gelinek’s unique and detailed objections to tuning in fifths:

This instrument being no longer practised as originally [tuned in 4ths], it was natural that the violoncellists, finding no employment for their instrument in the orchestras, should take the contrabass, tune it by fifths, in order not to derange the interval system in the bass as they had learned it, and suppress the fourth string, which cannot descend to ut; and, further, the French music of the period not having been so complicated as now, could be easily performed with the contrabass of three strings, tuned by fifths; which it would be extremely difficult and frequently impossible to do at the present day, for the following reasons: Every note would require a pressure of from five to six pounds, in order to yield a tone equally pure with that obtained on the open strings. There is half a tone for each two inches of

145 Palmer, Domenico Dragonetti, p. 86.
147 Bloom states that the reviews that appeared in Le Temps and Le National were mostly the same but approached from a different aspect. Bloom, “Fétis,” pp. 45–46, 53. Bloom’s source is Ernest Reyer, Notes de Musique (Paris: Charpentier et Cie., 1875), p. 404.
distance, and consequently eight inches for the third, and ten for the fourth: thus, as will be perceived, it must be almost impossible, in a rapid movement, to traverse such a space with the hand, giving to each note the suitable degree of pressure. By restoring the fourth string to the double-bass, a third unison is gained, which is found at eight inches in the perfect chord, and at twelve in that by fifths; thus the hand has four inches less to traverse in order to take a position. It is true that, while the left hand had fewer movements to make upon the finger-board, that which holds the bow made more on four strings than on three; but this slight inconvenience is more than compensated by the facility of fingering, more natural than even on the violoncello, to say nothing of the degree of pressure necessary for the contrabass. By a new system of bowing, which I shall propose, the inconvenience might easily be obviated.

Musicians who tune the three-stringed double-bass by fourths, make A the lowest string, d the middle, and g the upper. It will be seen that by this tuning, the harmony loses two low and two high sounds, and that by adding a fourth string above the g, which would give c, five additional notes would be obtained without the hand changing its position. These two low notes might be easily preserved by a simple means, which I shall propose, without thereby deranging the concord by fourths.  

Gelinek claimed that a contrabassist’s left-hand (fifths tuning) must exert five to six pounds of pressure on a string to reproduce the same tone as an open string; consequently, the additional whole tone added to a shift would make it impossible for the player to give each note the required five to six pounds pressure when playing a fast passage. His example would apply to players in either tuning who experienced similar issues of left-hand pressure; therefore, we see that Gelinek’s argument was ultimately about shifting—specifically, the additional whole tone difference required in a shift when the instrument is tuned in fifths.

2.7. Contrabass Tutors

Ten contrabass methods were published in the eighteenth and nineteenth centuries presenting a variety of materials for the contrabass tuned in fifths, including fingering solutions (appliqué), scales, positions, excerpts and tuning diagrams, as well as

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complete methods for the contrabass tuned in fifths.\textsuperscript{149} Material specific to fifths found in these methods ranges from a few pages showing tuning diagrams and basic scales and perhaps a fingerboard diagram with positions to complete methods written specifically for fifths tuning.

Methods written by contrabassists offer the most reliable overview of the ADG tuning in that we have information by individuals who practised the tuning; however, several of these methods were written by musicians who were not contrabassists, such as Miné and Javelot. Fétis’s biography of Adolphe Miné states that he studied the violoncello and harmony as a student of the Conservatoire after which he became the organist at Saint Roch. In addition to being a composer, Miné wrote methods for the violoncello, organ and contrabass.\textsuperscript{150} Regarding Jules Javelot, I did not find any biographical information on him; the Bibliothèque Nationale de France holds a number of \textit{petite} methods written by Javelot for the contrabass, violoncello, violin, cornet à pistons, flute and the saxhorn. I did not find any references in the literature that described either Miné or Javelot as being a contrabassist.

Contrabass instruction was a relatively new development in the early nineteenth century as demonstrated by the appearance of these methods and the establishment of contrabass classes in conservatories across Europe.\textsuperscript{151} Those tutors that include instruction for fifths can be categorized according to the content that pertains to fifths and the manner in which it is presented. First, we see tutors written exclusively for


\textsuperscript{150} François-Joseph Fétis, “Miné (Jacques-Claude-Adolphe),” \textit{Biographie Universelle des Musiciens et Biographie Générale de la Musique} vol. 6 (Bruxelles: Meline, Cans et Compagne, 1839), p. 422.

\textsuperscript{151} Brun, \textit{New History}, pp. 89–90.
fifths such as those by Miné, Durier, Winter and Javelot. Second, we have methods written for both the three-string ADG and the four-string GDAE tuning with exercises for both tunings, demonstrating that both were in use at the same time. An example of this type is the method written by Claude-Marie-Mécène Marié, a student of Chenié. Marié copied every scale from Hause’s method for fourths and added his own fingerings for fifths tuning (Fig. 2.2). Javureck, like Marié, wrote his tutor with fingerings for both fourths and fifths tunings, explaining that both tunings were still in use at that time.

152 Miné, Méthode; Durier, Méthode; Winter, Méthode; Javelot, Méthode.
153 Hause, Méthode Arrangée par C. M. Marié.
Another example is the Hartman method that was published in 1854, two decades after fourths officially replaced fifths at the Conservatoire.\textsuperscript{154} His tutor contains major and

\textsuperscript{154} Hartman (no first name given) is listed on the cover of his tutor as Professeur au Conservatoire de Cracovie (Krakow). Hartman, \textit{Méthode}, p. 1.
minor scales with fingerings for the three-string tuning ADG and for the GDAE tuning. Hartman wrote that tuning in fourths was easier with regards to shifting and playing *traits* but expressed regret that this manner (fourths) was not adopted universally.\(^\text{155}\)

Some of these sources gave the impression that fifths tuning was still being practised while others seem to be speaking of the tuning in the past tense. An interesting element in these last two categories is that we start to observe some bias towards fifths, most of which concerns the issues of shifting and difficulties with the left hand accompanied by the assertion that tuning in fourths is easier. Renowned contrabass soloist Giovanni Bottesini even stated that tuning in fifths was absurd.\(^\text{156}\)

Overall, the tutors present a history of fifths in three phases: when it was current, then co-existing with fourths (its future replacement) and finally at a point when the tuning was no longer officially taught at the Conservatoire, but as we also see, the tuning did not disappear entirely. Even after Chenié’s death in 1832, tutors with instructional matter for the ADG tuning continued to be published. Furthermore, the dates of publication of these tutors suggest that fifths tuning was used well into the latter half of the nineteenth century. Contrabassists who trained in fifths tuning and held orchestral positions would probably have continued to use that tuning to avoid the interruption in their playing career as a result of having to learn fourths.\(^\text{157}\) These issues are addressed below. Unfortunately, we do not know if a specific method was used when the contrabass class began in 1827. According to Kern Holoman, the professors of the Conservatoire were responsible for contributing official method books for their instrument.\(^\text{158}\) I have not found any evidence that Chenié had written a tutor.

\(^{156}\) “L’accord par quinte comme on le fait dans certains pays est absurde.” “The tuning by fifths as some do in some countries is absurd.” Translation mine. Bottesini, *Grande Méthode*, p. 15.
\(^{157}\) Prévost claimed that contrabassists changing to fourths tuning (presumably from fifths tuning) could do so in two months; however, there was no explanation for how he determined that two months were sufficient. Prévost, “Gouffé,” p. 463.
\(^{158}\) “CXCII. Décision relative à la rédaction des méthodes d’enseignement musical; 12 fructidor an 11-29 août 1794.” “Decision on the drafting of music teaching methods; 12 Fructidor, August 11-29,
Contrabass tutors written specifically for fifths offer the best evidence to understand how the tuning was practised, as a result of the exercises that include fingerings or appliqué. Characteristics observed within the fingerings might determine an approach or school and inform us about the development of this tuning prior to the time that it was taught at the Conservatoire. I examined major scale fingerings from the tutors written for fifths tuning by Miné, Marié, Durier and Javelot and compared them with similar material written for fourths tuning from the Hause style. The material for my comparison was limited to major scales due to the fact that many of the tutors, such as Miné’s tutor, did not include scales or exercises for minor keys. Other factors that affected the scales that I examined were the tuning, the number of strings in that system and the how the scale examples were presented. Hause’s method, written for the German GDAE tuning, had E1 as its lowest string; therefore his E major and minor scales begin on E1 in contrast to the E major scales for French contrabasses tuned in fifths that begin on E2 where the lowest pitch was G1.

The tutors written by Marié and Durier demonstrate a connection to the Conservatoire: first, Marié and Durier both studied at the Conservatoire under Chenié; Marié included his credentials on the method’s cover, writing “Méthode de Contrebasse par Wenceslas Hause. Arrangée et chiffrée pour la contrebasse Française par C. M. Marié, Artiste de l’Académie Royale de Musique.” Durier dedicated his method to “Habeneck, Chef d’Orchestre de l’Académie Royale de Musique et du Conservatoire, Chevalier de la Legion d’Honneur.” Greenberg speculated that


159 I did not include the Winter analysis for two reasons: first, Winter’s fingerings were identical to those by Durier; second, Winter omitted a significant number of scales from his method, leaving out five major and six minor scales. Winter, Méthode.

160 Hause, Méthode Arrangée par C. M. Marié, p. 1; See also Greenberg, “Double Bass Class,” p. 118, see fn. 103.

161 Durier, Méthode, front cover.
Miné’s and Marié’s tutors may have been used at the Conservatoire, adding that Marié’s adaptation of Hause’s method was more comprehensive.\(^{162}\) I have found no evidence that either method was used at the Conservatoire.

2.8. Wenzel Hause

I chose to use Hause’s left-hand technique in my discussion of fourths and fifths tunings for several reasons: first, the comparison of his method with those written for fifths tuning gives us a perspective to understand some of the technical aspects of the two tunings (such as fingering and shifting) by observing them together. Furthermore, Fétis specifically cited Hause’s method when discussing the benefits of tuning in fourths with regards to the amount of shifting; therefore, the criteria that were used to determine Hause’s shifting must be applied to both tunings in our discussions about shifting. Second, Hause’s method was adapted by C. M. Marié for the three-string contrabass tuned in fifths. Marié and Hause were well-trained contrabassists: Hause’s training has been mentioned above; Marié won the contrabass class’s second prize in 1829 and then first prize in 1830.\(^{163}\) The comparison of fingerings for both tunings shown in Marié’s method gives us as good an opportunity as possible to observe the two tunings side by side when the techniques for both were well developed. Critics of the ADG tuning compared it to GDAE arguing that tuning in fourths did not force the player to shift when playing a scale. However, my analyses of scales in both tunings determined that these statements are misleading in that the criteria for determining what constitutes a shift in fourths tuning was not applied equally in fifths tuning. This issue is discussed below and in the section on shifting.

According to Alfred Planyavsky, Hause’s method established a comprehensive school of playing the four-string contrabass tuned in fourths that is still relevant


Hause wrote a French-language version of his original German contrabass method for the four-string contrabass tuned in fourths. The French edition bears no date; however, Fétis reviewed Hause’s method in July of 1828 and so we can give an approximate year of publication as 1828. Hause described his method as a matured school that had been cultivated over forty years of teaching experience while he was professor of contrabass at the music conservatory in Prague. If we consider Hause’s claim that his method had developed over forty years, that would establish the beginning of his career and possibly situate his use of the tuning to approximately 1788.

I have shown a page from Hause’s method as well as one from Bonfasio Asioli’s method. A defining characteristic of each school was the proposed fingering technique, and more specifically, which of the four fingers were used. In the two examples below by Hause (Fig. 2.3) and Asioli (Fig. 2.4), both fingering systems are clearly laid out; Hause uses fingers 1, 2 and 4 whereas Asioli uses fingers 1, 3 and 4.

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165 Hause, Kontrabaß Schule; See also Hause, Méthode.
167 Hause, Méthode, front matter.
A key distinction between fifths and fourths tunings is that on an instrument tuned in fifths, the player’s left-hand has to advance up the fingerboard an additional whole tone before the next (ascending) open string can be played. As a result of this extra

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168 Hause, Méthode Arrangée par C. M. Marié, p. 1.
169 Asioli, Elementi per il Contrabasso, p. 7.
whole tone, most scale passages require an additional shift per string and so the player must factor in this additional shift when creating a fingering solution to play a particular scale.

My examination of the fingerings in methods for fifths tuning found some similarities in instructional methods that predated the earliest method for fifths by Miné. These similarities include a demonstrated use of fingers 1 and 3 to play semitones within a specific area of the fingerboard.

The earliest extant tutor written specifically for the three-string contrabass tuned in fifths is the 1827 *Méthode de Contre-basse* by Jacques-Claude-Adolphe Miné (1797–1854) who entered the Conservatoire as a student in 1811 studying violoncello under Mr. Baudiot. None of the biographies examined describe Miné as having played the contrabass. In addition to being an organist and a composer, Miné wrote instruction methods for organ and violoncello. His uncle was François-Louis Perne, who played contrabass in l’Orchestre de l’Opéra (1792–1816) as well as the Royal Chapel (1802–1824). If we consider that Miné was not a contrabassist, we must ask where did he get his knowledge of the instrument’s technique, and its *appliqué*. It is possible that Miné may have been influenced by works that preceded his own including those by Michel Corrette (1781) and works for the contrabass tuned in fourths by Johann Samuel Petri (1782) and C. Nicolai (1816). I discuss these aspects of fingering in more detail below.

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170 There is no publication date in this edition of Miné’s method; however, Fétis mentions Miné’s method in the *Revue Musicale* in 1827. François Joseph Fétis, “Annonces: Galerie des Musiciens Célèbres. Adolphe Miné, Méthode de Contrebasse,” *Revue Musicale* 21 (1827): p. 531. The British Museum (BM) holds a physical copy of this method and lists additional bibliographic information beyond what is shown on the BnF site. The BM records the title as *Méthode de contre-basse composée et rédigée par A. Miné* and the publisher as A. Meissonnier.

171 According to Fétis’s biography, Miné played organ and was accompanist at Saint-Etienne-du-Mont, Saint-Roch in Paris and the Chartres Cathedral. Fétis, “Miné,” p. 422.

2.9. Michel Corrette

Corrette was known primarily as a music teacher and an organist and, like Miné, is not described in the literature as having played the contrabass despite having written about the instrument in his 1773 method.\textsuperscript{173} Corrette wrote a number of instrumental methods including those for the violoncello, the violin, the flute and the organ.

Corrette stated that the compass of the four-string contrabass (tuned GDAE) was thirteen natural tones without shifting;\textsuperscript{174} his example (Fig. 2.5) is a diatonic C major scale from E1 to C3 with three additional tones D3, E3 and F3. In the example, he uses fingers 1 and 3 to play the whole tone between F1 and G1 on the fourth string, the semitone between B1 and C2 on the third string and the semitone between E2 and F2 on the second string.

\textbf{FIGURE 2.5:} Corrette, \textit{Méthodes Pour Apprendre à Jouer de la Contre-Basse}, p. 6.

We see that Corrette used 1–3 to play both whole tones and semitones within the four semi-tone area from the nut. Corrette’s use of 1 and 3 to play the whole tone from F1 to G1 is, in fact, a shift if we view his \textit{appliqué} using the examples of positions that Hause taught in his method for the GDAE tuning.\textsuperscript{175} The scale continues on the first string from G2 to F3 but for the first time in this example, the left-hand must shift up the neck to play the B2–C3 using 2–4, demonstrating a different fingering for semitones outside the four semi-tone area.

\textsuperscript{173} François-Joseph Fétis, “Corrette (Michel),” \textit{Biographie Universelle des Musiciens et Biographie Générale de la Musique} vol. 3 (Bruxelles: Meline, Cans et Compagne, 1839), p. 198.

\textsuperscript{174} Corrette, \textit{Méthodes}, p. 6.

\textsuperscript{175} Hause described \textit{la premier situation ordinaire} (the first ordinary position) where the index finger is one semitone from the nut, and the second ordinary position where the index finger is one whole tone from the nut. Hause, \textit{Méthode}, p. 2.
Michel Corrette’s method was the first to illustrate a fingering for the three-string contrabass in fifths (Fig. 2.6), using a diatonic C major scale starting from the lowest open string G1 and ascending to D3.

FIGURE 2.6: Corrette, Méthodes Pour Apprendre à Jouer de la Contre-Basse, p. 9.

We see that Corrette’s *appliqué* incorporates left-hand shifts on each string as a result of the additional whole tone interval between open strings compared to contrabasses tuned in fourths. For example, the first three pitches of the scale G1, A1 and B1 are found within the first four semitones from the nut. As a result of the additional whole tone between open strings in fifths tuning, the hand must shift up the fingerboard to play the next note in the scale C2, after which the open D string can be played.

Corrette gives the options of using 1–2 or 1–3 to play the semitones E2–F2 on the second string and B2–C3 on the first string. The reason he presents this choice appears to be related to the shift required by the additional whole tone between open strings in fifths tuning. The fingering 1–3 is problematic in that the player would play the whole tones F2–G2 and C3–D3 using 3–4; I suspect that most players would use the 2–4 fingering as it is more secure and more natural in the lower compass of the instrument. I suggest that Corrette used 1–3 alongside 1–2 in his tutor to demonstrate that he was aware of two finger choices and presented both options. His choice also suggests that he was applying the same fingering that he wrote for the GDAE tuning to the scale in fifths tuning.
2.10. Johann Samuel Petri

The example below by Samuel Petri demonstrates the range of the GDAE tuning. Like Corrette’s example, Petri plays a C major diatonic scale beginning on E1 and plays up each of the three lowest strings, taking the next open string when available. On the fourth-string, the scale ascends up to A3. We see that Petri used uses fingers 1 and 3 for the second, third and fourth strings (Fig. 2.7) similar to that used by Corrette. This similarity suggests a common approach to fingering.

FIGURE 2.7: Petri, Aneiltung zur praktischen Musik, p. 458.176

2.11. D. J. C. Nicolai

In 1816, D. J. C. Nicolai, a contrabassist in the Rudolstadt court, wrote the article “Das Spiel Auf Dem Contrabass” where he presented twelve major scales with fingerings.177 He stated the following with regard to his approach to fingering: “denn die Stimmung nach Quarten macht die Fingersetzung sehr bequem, indem auf den mittlern Saiten nur zwey Töne gegriffen werden, und deshalb die Hand immer in ihrer Lage bleiben kann.”178 Nicolai’s statement that only two notes are fingered on the middle strings informs us that his approach to fingering shares some common elements with the types of appliqué that we have seen in Corrette and Petri in that tuning in fourths allows the hand to remain in position. In other words, contrabassists

177 Nicolai used the tuning G2, D2, A1, D1. Nicolai, “Das Spiel Auf Dem Contrabass,” p. 259.
178 “for the tuning in fourths makes the fingering very comfortable, as only two notes are fingered on the middle strings, and therefore the hand can always remain in its position.” Translation mine. Nicolai, “Das Spiel Auf Dem Contrabass,” p. 273.
using fourths tuning tended to play mostly in this area of the neck and according to Nicolai, this area was considered a position.

EXAMPLE 2.2: Nicolai, Corrette and Petri fingerings.

Therefore, we see that the similarities found in Petri, Nicolai and Corrette (Ex. 2.2) show an approach to *appliqué* for the contrabass tuned in fourths that consistently uses 1 and 3 within a specific area of the fingerboard, the first four semitones (designated by the area from the nut to the red-dotted line in Ex. 2.3). In my discussion on shifting, I point out that most contrabass tutors taught a technique where the left-hand spans no more that one whole tone between the first and fourth fingers. If we apply this convention to the fingerboard in Ex. 2.3 we see that a contrabassist playing an F minor scale, beginning with the first finger on F1, must shift one semitone up the fingerboard in order to play the third degree, A-flat1, with the fourth finger.

EXAMPLE 2.3: Fingerboard area defined by Nicolai as “in position.”

Nicolai claimed that [tuning in] fourths allowed the hand to remain in its position; I argue that Nicolai’s position described above defines the area from the fourth semitone or red dotted line to the nut. Furthermore, this area appears to have been treated by some as though it was a single position, or home position; and even though the hand moved within this area, these movements were not considered to be shifts by some. This interpretation would shed light on the comments made by Berlioz and Gevaert
who both suggest that contrabassist who tune in fourths are not obliged to shift when playing a scale.\textsuperscript{179} The idea that players tuned in fourths did not shift when playing a scale was rejected by Labro who pointed out that the only two scales that could be played without shifting were one octave, F and B-flat major scales.\textsuperscript{180} I make this point because those who criticized fifths tuning consistently pointed out how much more shifting contrabassists experienced when tuned in fifths compared to those who tuned in fourths. However, when we consider the one-sided nature on the narrative about the tuning, the issues of shifting were not based on applying the same standards equally to both tunings, particularly, what constitutes a shift.

My analysis of the Corrette, Petri and Nicolai scales and their fingerings reveals common elements with the fingerings examined below in the methods for fifths—the use of 1 and 3 within a minor third of the nut. These similarities suggest a common approach that, regardless of the tuning, was used to play in this particular area of the fingerboard because of the distance between semitones, and possibly the tension of the strings so close to the nut. I believe that the same use of 1 and 3 is demonstrated in the tutors for fifths tuning.

Now that we have discussed some of the works that may have influenced Miné, my discussion turns to his method and those other methods written specifically for the contrabass tuned in fifths.

2.12. Jacques-Claude-Adolphe Miné

Miné begins his method by situating the French three-string contrabass (tuned in fifths) alongside the Italian three-string contrabass tuned G2, D2, G1, (GDG) and the less common four-string German solo tuning C3, G2, D2, A1 (CGDA), yet he does not mention the more widely-used GDAE tuning. The reason for this exclusion is not

\textsuperscript{180} Labro, \textit{Méthode}, p. 19.
clear; Miné may have presented the CGDA tuning as an example of the solo tuning used by German contrabassists. He does imply that the state of contrabass playing in Germany was more refined as demonstrated by the fact that there were German contrabassists who played it as a solo instrument. Miné adds that the French contrabass was only considered to be an orchestral instrument, implying that French contrabassists had yet to explore the instrument’s potential as a solo instrument compared to German and Italian contrabassists.

Miné’s brief twenty-eight page tutor includes ten major scales, bowing exercises and a four-page section with seven exercises illustrating how to reduce violoncello passages for the contrabass using simplification and octave transposition. The significant amount of content devoted to simplification in a tutor of this size emphasizes the importance of this technique. Moreover, this instruction informs us that contrabassists who tuned in fifths faced challenges when doubling the violoncello and gives us a lens into their playing conditions.

In his general approach to fingering, Miné provided the perspective that a violoncellist used one finger for each semitone, implying that the pitch range encompassed by the left-hand was three semitones or a minor third, whereas the contrabassist needed two fingers to play a semitone and four fingers to play a whole tone. However, the consistency that we see in the method by Hause is absent in Miné’s appliqué with regards to the use of the second and third fingers; Hause used 1, 2 and 4 exclusively; Miné’s fingerings are far more varied in that he used five different combinations to play semitones: 1–3, 2–4, 3–4, 4–4 and 1–4. Overall, the methods by Miné, Durier and Marié, all exclusively for fifths, contain a variety of fingerings.

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181 Miné, Méthode, p. 1.
182 Ibid.
183 There are inconsistencies and errors in Miné’s major scale fingerings. In the F major scale, he begins the scale with F1, a pitch not found on the ADG-tuned contrabass. He instructs the player to play this pitch an octave higher on the second string with the third finger, making it in actuality F2. In doing so, he has the contrabassist play an F-major scale as though it were being played from F1 to F2 but with the first and last notes transposed up an octave. His A-major scale ends with the fingering to play the A1 as an open string.
that use all four fingers without a discernible school of *appliqué* observed in Hause’s method even though all four works appeared at approximately the same time.

The predominant use of the 1–3 fingering throughout Miné’s tutor suggests an influence from a previous source because Miné was not a contrabassist. Therefore, the strong presence of 1–3 implies that Miné’s technique was derived from a source that presented 1–3 as part of its *appliqué*; and the sources that used 1–3, as I mention above, can be observed in the works by Corrette (1781), Petri (1782) and Nicolai (1816) that pre-date Miné’s tutor.

2.13. Claude-Marie-Mécène Marié

The title page of Marié’s tutor informs us that Marié had copied all twelve major scales and all twelve melodic minor scales and interval exercises (also written in all twelve keys) from Hause’s four-string GDAE method and added his own fingerings for the three-string contrabass in fifths. 184 Hause’s original fingerings appear above the staff while Marié’s fingerings were written below. There is no date of publication in this method, but we can place it after 1828, and more approximately between 1831 and 1835 during which time Marié played contrabass with the Opéra, the Concert Musard, the Theatre Italien and the Cirque; after 1835 he abandoned the contrabass and began a successful career as a singer. 185 Marié’s tutor is the earliest extant method for the three-string contrabass in fifths that was written by a contrabassist who used the ADG tuning. His history as a student at the Conservatoire was documented by Constant Pierre not just as a student of Chenié but also as one of the top students in the contrabass class demonstrated by the fact that in 1829 and 1830 he received two consecutive awards at the Conservatoire’s annual contrabass competition. 186

186 Marié won second prize in 1829 and first prize in 1830 in the Conservatoire’s annual prize competition. Ibid., p. 620.

Amand-Charles Durier was born in Paris in 1808 and entered the Conservatoire on 1 March 1827 as a contrabass student of Chenié.\(^{187}\) His 1836 method is one of the few connections we have to the system of fifths taught at the Conservatoire. From a pedagogical perspective, four of the twenty-three excerpts in Durier’s tutor were written by Cherubini, director of the Conservatoire; another four are identified as *Solfège du Conservatoire*, indicating that these pieces were used as some form of teaching material in the contrabass class. The presence of these eight pieces surely established a firm link with the Conservatoire. According to Greenberg, these pieces could have been used for examinations.\(^{188}\)

Durier’s method is important for the fact that it was being published as late as 1878, and was being sold alongside instrument makers who were making three-string contrabasses tuned ADG. Although several methods were written for the three-string ADG tuning, Durier’s method emerges as the one mentioned most frequently with respect to the ADG tuning.

Durier’s time as a student was very brief; he appears to have left the Conservatoire on 6 March 1828.\(^{189}\) According to a biography by Fétis, Durier joined the Opéra Comique in 1829 and the Opéra shortly thereafter in 1831.\(^{190}\) Greenberg notes that he began playing with the Société des Concerts on 14 September 1836, the same year that his method published.\(^{191}\)

\(^{187}\) Fétis, “Duryer,” p. 94.

\(^{188}\) Greenberg notes that Pierre’s book contains a list of contrabass examination pieces used by the Conservatoire beginning at 1843. However, he states that a hand-written, sight-reading piece from 1836 attributed to Durante is the same one that appears in Durier’s tutor. Greenberg, “Double Bass Class,” p. 116, see fn. 94, Paris, An X [i.e., 1802]), pp. 56–57, 168–171. Pierre, *Le Conservatoire*, p. 620.

\(^{189}\) Greenberg, “Double Bass Class,” p. 110, see fn. 76, Archives Nationales, AJ/37, 150, 1. Durier was a minor when he began playing with l’Opéra Comique and required his mother’s permission to play with the orchestra. Greenberg, “Double Bass Class,” p. 110, see fn. 76, Archives Nationales, AJ/13, 208, 1.


\(^{191}\) Greenberg, “Double Bass Class,” p. 110, see fn. 76, Bibliothèque Nationale, D 17331 [4].
There is evidence to suggest that Durier achieved a level of prominence as a contrabassist. The same year (1836), prominent Parisian composer, George Onslow, produced a string quintet that was composed and dedicated to Monsieur Amand Durier. In the contrabass part, Onslow observed the pitch range for the ADG tuning used by Durier: the bass part never descends below G1; furthermore, Onslow wrote several harmonics to be played on the open A2 string.

Fétis referred to Durier one of the best contrabassists in Paris. When commenting on the Beethoven festival held at Bonn in 1845, Berlioz proposed Beethoven’s music deserved an elite contrabass section comprised of “Dragonetti de Londres, Durier de Paris, Müller de Darmstadt et Schmidt de Brunswick.” A German source from 1873 called Durier one of the most capable artistic forces in the Opera Comique.

Michael Greenberg’s research in the Archives Nationales reveals that Durier was considered for the position of professor at the Conservatoire. The publication date of Durier’s method makes one wonder why a method for the three-string contrabass tuned in fifths, a tuning no longer taught by the Conservatoire after 1832, was published four years later.

2.15. Jules Javelot

The last method to be discussed that was written specifically for fifths is Jules Javelot’s _Petit Méthode de Contrebasse à 3 Cordes_. This method was unique in that it

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192 George Onslow, *String Quintet No. 21, G minor, op. 51* (Leipzig: F. Kistner, 1836).
193 Onslow also wrote the contrabass part for a second violoncello should one be used instead of the contrabass.
194 Fétis, “Duryer,” p. 94.
was written exclusively for fifths tuning but was published in 1863, twenty-seven years after Durier’s method. One interesting fact about Javelot's method is that he presents an unusual technique for that time called *arrière* or back position fingering, a technique espoused by Labro three years earlier in his 1860 tutor for fourths. This specific fingering shown in Figure 2.8 harkened back to a crude technique called fisticuffs, formerly practised by some contrabassists as a means of coping with the immense pressure expended by the left-hand to stop strings close to the nut.\footnote{For a description of fisticuffs, see Brun, *New History*, p. 83.}

FIGURE 2.8: Javelot, *Petit Méthode de Contrebasse*, p. 11.

![Figure 2.8: Javelot, Petit Méthode de Contrebasse, p. 11.](image)

Using this technique, the player gripped and pressed the string to the fingerboard using the strength of the entire hand directed through the second and fourth fingers; the second finger closed the first semitone below the nut, and the fourth finger closed the next semitone. Labro wrote the following description for this position (Fig. 2.9):

Comme on le voit par exemple ci-dessus, au lieu de faire une tierce Mineure ou une tierce Majeure du son de la corde à vide, au 4me doigt de la main gauche, comme dans la 1re Position, 1re et 2me Degrés, on ne peut faire qu’une seconde Mineur ou une seconde Majeure. Quoique très restreint, ce doigté est excellent et doit être choisi de préférence dans les phrases de l’arrière Position: La pression des Cordes près du sillet étant extrêmement pénible, il est bon de rechercher et d’employer tous les moyens qui doivent en faciliter l’exécution.\footnote{“As seen above, for example, instead of making a minor third or a major third from the sound of the open string, at the 4th finger of the left hand, as in the 1st position, 1st and 2nd Degrees, we can only make a minor or a major second. Although very limited, this fingering is excellent and should be chosen preferably for the phrases of the back position: because the pressure of the strings near the nut is extremely painful, it is good to look for and use all the means that must facilitate execution.” Translation mine. Labro, *Méthode*, p. 32.}
As seen in Figure 2.8, Javelot incorporates the arrière position fingering in an A major scale using the fingering 4–1 to play the first two degrees A1–B1. We must keep in mind that Javelot applied this unique fingering for a contrabass tuned in fifths whereas Labro’s exercise is for the four-string contrabass in fourths. He then uses 4 to play the E2 in bar 5, but uses 1 to play the B2. The A1, E2 and B2 all lay in the same position on the fingerboard.

The need for such a technique reminds us that even as late as 1860, contrabassists still faced limitations as a result of the strings they had to use. Javelot was the only author of a fifths method that incorporated the back-position fingering.

2.16. Peter von Winter

The contrabass tutor by German composer Peter von Winter is perplexing for a number of reasons. The tutor was written specifically for the French three-string contrabass tuned in fifths ADG. One must wonder why a German contrabassist working in Munich would write a tutor for a foreign tuning system when the national tuning used by German contrabassists was the four-string tuning GDAE.

Another puzzling aspect is that Winter’s method was published posthumously by J. Meissonnier in 1843, eighteen years after his death in 1825. Winter was born in Mannheim in 1754 and by the age of eleven was playing violon at the Electoral Chapel.200 According to R. Eitner, Winter played the contrabass for only eight years between 1770–78.201 We must take into consideration the fact that nouvelle edition

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201 Evidence of Winter being a contrabassist is cited by R. Eitner, *Biographisch-Bibliographisches Quellen-Lexicon der Musikern und Musikgelehrten der Christlichen Zeitrechnung bis zur Mitte des*
appears on the front cover, an indication of an earlier edition written by Winter. Any work that bears Winter’s name as author could only have been written by him prior to his death in 1825, making Winter’s method the earliest extant contrabass method for fifths tuning, predating Miné’s 1827 tutor by at least two years and Durier’s 1836 tutor by at least eleven years. Unfortunately, my research found no bibliographic records of an earlier edition of Winter’s tutor.

2.17. Durier and Marié Comparison

There are definite similarities in *appliqué* between Durier and Marié, most likely due to the fact that both men studied under Chenié. Marié included scales for all twelve major and minor keys whereas Durier omitted three minor scales, D-flat minor, E-flat minor and A-flat minor; therefore, a comparison of only twenty-one scales was available. Of these scales, Marié and Durier used identical fingerings throughout fourteen scales: C major, D-flat major, D major, D minor, E-flat major, E minor, F major, F-sharp major, F-sharp minor, G major, G minor, A-flat major, B major and B minor. Another five scales, A minor, B-flat major, B-flat minor, C minor and E major, are very similar with the exception of a single shift. We can therefore state that there is a great deal of consistency between the two methods.

It is difficult to characterize the fingerings of Durier and Marié as being derivative from one particular school such as the Hause or Asioli schools primarily because Hause exclusively used fingers 1, 2 and 4 and Asioli used 1, 3 and 4. A distinct characteristic of the *appliqué* found in Durier’s and Marié’s methods is that both use 1, 3 and 2, 4 to play semitones. Of the twenty-one scales that I examined in both tutors, 1 and 3 were used to play semitones nine times and always within a minor third of the

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202 These dates could be extended when we consider that it is possible that Winter wrote his method before 1825. It should be noted that Durier’s method was also published by Meissonnier.

203 I believe that Marié’s choice of 4 to play the B-flat2, one semitone from the nut is a mistake and should be 1; Marié uses 1 to play the B-flat2 in every scale that contains this pitch.
open string, or the first position of the left-hand on the fingerboard, the same area indicated in Ex. 2.3. Semitones played using 2 and 4 appear eighteen times out of nineteen and occur in the area of the fingerboard between the fourth and sixth semitones. The lone exception is the D-flat major scale; the seventh and eighth degrees (C3–D-flat3) appear at the third and fourth semitones from the nut.

Example 2.4 shows the pitch layout of the ADG contrabass with two different fingerings for a one octave B melodic-minor scale (scale pitches appear in yellow with fingerings indicated in the upper-left corner). The top fingerboard shows the fingerings from Marié and Durier, the bottom fingerboard is an alternative fingering for the same scale by Durier. There are two options for playing the last two degrees of the scale: the top version uses 1–3 to play to A-sharp2–B2 on the first string and was the same in both Marié’s and Durier’s tutors; in Durier’s alternative fingering, he plays the A-sharp2 and B2 up the second string using 2–4.

EXAMPLE 2.4: A: Marié and Durier, B minor scale.

![Fingerboard Diagram]

Durier’s decision to use 2–4 to play the A-sharp2–B2 semitone on the D string may consider the smaller distance between semitones closer to the bridge and how the 1–3 combination used closer to the nut was better suited allow the left-hand to span these larger-spaced semitones comfortably.

Another characteristic observed in my analysis is that Marié shifts earlier in the scale (1–1 between the fourth and fifth degrees) whereas Durier shifts later (4–4) between the fifth and sixth degrees of the scale (Ex. 2.5). In fact, Marié consistently shifts one scale degree earlier than Durier. Therefore, nineteen of the twenty-one
scales common to both Marié’s and Durier’s fingerings are identical or nearly identical.

EXAMPLE 2.5: Marié and Durier, shifting.

My analysis determined that Marié and Durier consistently used 1 and 3 for the semitones between the third and fourth degrees of a major scale if that semitone occurred within the first three semitones after the open string, or the distance of a single hand position from the open string. This area on the fingerboard is also defined as a single hand position, often called half position.

Despite some irregularities found in Miné’s fingerings such as his inconsistent fingering for semitones, his method overall was consistent with much of what we see in Durier and Marié; the irregularities were likely the result of the fact that Miné was not a contrabassist.

2.18. Durier and Winter Comparison

A comparison between the Winter and Durier methods reveals that the two works are remarkably similar. Each method contains three distinct sections: basic music theory, contrabass technique and orchestral excerpts. The sections on contrabass technique and excerpts are similar enough to suggest that one method was copied directly from the other. Almost all of the contrabass technique and musical excerpts found in Winter’s tutor are reproduced verbatim in Durier’s tutor, but not vice versa. Durier’s tutor is fifty-four pages long; Winter’s tutor is twenty-seven pages. There are only seven major scales in Winter’s tutor (C, G, D, A, F, B-flat and E-flat) whereas Durier wrote exercises for all twelve keys.

Example 2.6 shows a graphic representation summarizing the material from seven scale exercises (C, G, D, A, F, B-flat and E-flat) common to both tutors.
EXAMPLE 2.6: Durier and Winter scale comparison and similarities.

<table>
<thead>
<tr>
<th>Scale</th>
<th>C major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26</td>
</tr>
<tr>
<td>Winter</td>
<td>A</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>G major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26</td>
</tr>
<tr>
<td>Winter</td>
<td>A  B</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>D major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26</td>
</tr>
<tr>
<td>Winter</td>
<td>A  B  C</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>A major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26</td>
</tr>
<tr>
<td>Winter</td>
<td>A  B</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>B-flat major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30</td>
</tr>
<tr>
<td>Winter</td>
<td>A</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>F major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32</td>
</tr>
<tr>
<td>Winter</td>
<td>A  B  C</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Scale</th>
<th>E-flat major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bar no.</td>
<td>1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29</td>
</tr>
<tr>
<td>Winter</td>
<td>A  B</td>
</tr>
<tr>
<td>Durier</td>
<td>A</td>
</tr>
</tbody>
</table>

The row marked Bar no. shows the number of bars from the longest version of the two exercises; the Winter exercise is on top, the Durier exercise is on the bottom. The lighter grey areas represent material found in both methods that are identical in pitch and fingering. The darker grey areas represent additional material found only in Durier’s tutor. The areas marked with the letters A and B allow us to visualize how the additional material in the Durier version divided the sections that are common to both versions. The exception is the C major exercise which is exactly the same in both works and therefore contains no addition material in Durier.  

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204 Two minor exceptions to this formatting are marked with asterisks. First, at bar 13 in the A major exercise, Winter uses two half notes A1–A2. In Durier’s version of this exercise, bar 24 the third last bar (24) has two half-notes A2–A2. The second exception occurs in the F major exercise at bar 18; Winter uses the fingering 3–4 to play the half notes F3–D3 whereas Durier uses 4–4.
In view of the fact that Winter’s tutor predates those by Miné and Durier, I felt it was necessary to determine whether Winter’s work was the earliest method for fifths tuning. The overarching question here is, do the Winter exercises represent shorter, edited versions of the Durier exercises, or do the Durier exercises represent expanded versions of the Winter exercises? We do not know whether the authors, Durier and Winter, were responsible for these similarities or whether this was the work of the publisher Meissonnier. However, I propose that the majority of the material in Winter’s method was copied directly from Durier’s method.

In order to support this assertion, we must first look at the dates when each work was published; Durier’s method was published in 1836, seven years before Winter’s method. We cannot ignore the fact that Winter died in 1825, and as a result, the publisher (Meissonnier) would have been responsible for any changes to Winter’s method after his death. However, we lack any evidence of an earlier version prior to 1843 by Winter other than the implication of such a work by the words *nouvelle edition* on the cover. It was not uncommon to have methods translated into different languages as demonstrated by the French and German editions of the contrabass method by Hause; therefore, it is possible that the *nouvelle edition* was such a translation because Winter was German. We have to assume that Meissonnier had some form of a method or perhaps a manuscript written by Winter dating from 1825 or earlier to justify using his name as the author of this work and for reasons unknown, they chose to publish it in 1843.

In the following table (Table 2.2), all eight excerpts common to both methods are listed. From left to right, the description gives each excerpt’s name, key, instrumentation, bar numbers (from the original composition if available), the length of the excerpt and the page number.
A significant difference between how these arrangements were presented in both methods is that all of Durier’s excerpts were arranged as duets for two instruments, either two contrabasses or violoncello and contrabass whereas Winter’s excerpts were arranged for a single contrabass with the exception of the No. 4 Durante Fugue that was arranged to two contrabasses. The choice by Durier to include so many duets would strengthen the method’s usefulness as a teaching method.

The first excerpt in the Winter tutor, the Durante Fugue No. 1, is identical to the top staff from Durier’s version; the main difference between the two is that Winter’s excerpt was arranged for one contrabass whereas Durier’s version is a duet for two contrabasses.

The third piece in Winter’s tutor is the No. 3 Catel Canon. All eighty-one bars of the Winter excerpt are identical to the top staff in Durier’s version that was identified as Catel Canon à l’Octave, Solfèges du Conservatoire, No. 173 Première Partie.

The second piece in Winter’s tutor is No. 2 Hasse Fugue, the same composition found in Durier’s tutor with two exceptions: first, Winter’s excerpt was arranged for a
single contrabass whereas Durier’s excerpt was arranged for two contrabasses. Second, Durier’s excerpt is significantly longer at 180 bars; the Winter excerpt is 108 bars.

Excerpt number four in the Winter method is another Durante fugue arranged for two contrabasses similar to the same piece in the Durier tutor. Winter’s excerpt is sixty-nine bars in length, twelve bars shorter than the eighty-one bar Durier excerpt. A comparison between the two versions shows that the Durier excerpt contains twelve bars of additional material, divided into two groups, each six bars in length. The first group appears after bar 21 and the second group appears after bar 68 in Winter’s method. Again we see the convention of altering a piece while preserving the beginning and ending. Les Folies D’Espagne (arranged by Corelli) is Winter’s fifth excerpt, arranged for a single contrabass. The same piece in Durier’s method was arranged for violoncello and contrabass and is significantly longer, including eight variations in addition to the theme; Winter’s version features the theme and only one variation (variation two in Durier).

It is in Winter’s excerpt of Beethoven’s Fourth Symphony that we find compelling evidence that this excerpt was plagiarized from Durier’s tutor. The first twelve bars of Durier’s excerpt (see Ex. 2.7) were compiled from bars 21–24 and 29–36 of the original bass part from the fourth movement of Symphony No. 4. The top staff, although marked Vc. by Durier was the part to be played by both the violoncello and the contrabass. The bottom staff is Durier’s reduction.

Winter’s example shown below (Ex. 2.8) was presented in his tutor as the second excerpt in a section titled *Passages Tirés des Symphonies de Beethoven*. This excerpt is identical to the bottom staff of Durier’s excerpt above. In other words, the person responsible for including this excerpt in Winter’s method, copied the simplified contrabass part directly from Durier’s excerpt seemingly unaware that this was Durier’s reduction and not Beethoven’s original bass part.


\[ \text{Allegro} \]

The Durier piece could not have been edited by Winter because he had been deceased for eleven years when Durier’s method was published; therefore any changes to Winter’s tutor after 1825 could only have been made by Meissonnier. The explanation that an earlier edition by Winter’s tutor predates Durier’s tutor is not supported primarily because we have no physical evidence of such an version. Furthermore, all of the material that is common to both methods appears in the Winter tutor in an edited, shorter form than it does in Durier, a circumstance that suggests Meissonnier wanted to publish a shorter method.

It is interesting that the Winter method appeared when it did, in view of the fact that between 1841 and 1843, three contrabass methods were published by three different publishers and one of these was published exclusively for fifths. One result of the similarities between these two tutors is that Winter’s tutor, having been shown to be a direct copy of Durier’s method, cannot be considered to be new, additional pedagogy for the contrabass tuned in fifths. Its real value lies in the fact that the Winter method appeared eleven years after the tuning was rejected at the

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Conservatoire and so we may deduce that Meissonnier felt there was some demand for a method to teach this particular tuning at that time.

Winter does, however, have a connection to Paris, having visited the city during the time that fifths tuning was used in French orchestras. Although there is very little written of his time as a contrabassist, Winter achieved considerable success and notoriety as an opera composer, travelling throughout Europe. According to the biography by Fétis, Winter arrived in Paris in early 1802, spending much of that year in the city before leaving for London sometime in 1803. During his time in Paris, Winter wrote the opera *Tamerlan*, which was performed in Paris on 14 September 1802 and received an additional twenty-one performances. A notice in the *Courrier des Spectacles* dated 8 September 1802 reported that Winter’s overture for *Marie de Mantalban* was performed at the Conservatoire in the author’s presence. Furthermore, this overture was performed at least four additional times by the Conservatoire’s student orchestra between 1810 and 1823.

During the time that Winter stayed in Paris, Chenié played contrabass for the Opéra and it is certainly likely that the two men met each other. These circumstances do not explain why Winter wrote his method; however, Winter would have heard Chenié playing the three-string contrabass tuned in fifths at the Opéra and this circumstance might account for his knowledge of the ADG tuning.

The fact that Winter wrote a tutor for the French ADG tuning in fifths and not for the GDAE German system does seem unusual. In 1825, at the time of Winter’s death, the French three-string bass tuned in fifths was the *de facto* instrument used in Parisian orchestras; therefore if Winter had written a method for this tuning, it would have been timely. The most likely scenario was that Parisian publisher Meissonnier added these

excerpts to an existing manuscript of some form by Winter and called this work a *nouvelle edition* to bolster the method’s appeal among French contrabassists while advertising the fact that it was written by a renowned opera composer.

2.19. Simplification

Below, I discuss how simplification and octave transposition were presented by Corrette and Müller and in methods written for fifths tuning by Miné and Durier using examples from each method. Throughout this discussion, we find the terms *fundamental* or *principal* used by authors to identify those notes that the contrabassist must strive to keep in their simplifications. These terms were often presented without explanation and therefore were open to interpretation by contrabassists without knowledge of music theory. I have left some of these terms intact to demonstrate the instruction as it was presented by the author and the issues that arise when terms like these are presented without explanation.

I also used research by Shanti Nachtergaele who wrote extensively about simplification. Nachtergaele classified simplification into categories that considered the bass line’s harmonic, melodic and rhythmic structure. Moreover, some reductions can involve all three categories. In harmonic reductions, bass lines with chordal content are reduced with the goal of preserving that content. Melodic reductions seek to preserve melodic content while simplifying ornamentation in the line. Harmonic and melodic reductions are differentiated by the content of the original bass line and nature of its ornamental figurations. In rhythmic reductions, repeated notes could be reduced to a single note of a longer value; these reductions also serve to improve metric structure and articulation.

Contrabassists who used the ADG tuning were frequently compelled to change the bass lines that they were given to play. They had to simplify the complicated

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violoncello parts they were asked to double as these proved to be too difficult to execute when trying to articulate notes at faster tempos, a problem that was further exacerbated by the limitations of the strings they were using. Treatises and contrabass methods that discussed simplification often presented excerpts from the orchestral repertory juxtaposed with lessons on how to simplify these same parts. Contrabassists were placed in an awkward situation where their attempts to play the part as written were often criticized; Berlioz called these vain attempts “overzealous.”

Simplification also contributed to a stigma that contrabassists were lazy, poorly trained or both. Berlioz complained of lazy or incapable contrabassists who simplified their parts at the first sign of difficulty.

2.20. Octave Transposition

In addition to simplification, contrabassists regularly used octave transposition because they frequently encountered bass parts with lower-compass pitches that were not playable on their instruments, forcing them to transpose these pitches an octave higher. This practice was used to different degrees in countries such as France, Italy and England, where three-string contrabasses were commonly used although German contrabassists still had to contend with sub-E1 pitches. The specific range of pitches that had to be transposed was determined by the lowest pitch of that tuning with the result that the alteration of a composer’s original bass line could involve different solutions depending upon the instrument’s tuning. Therefore, there were two factors that dictated when octave transposition had to be used: first, the lowest pitch of that particular tuning; and second, the number of pitches in the composition that exceeded that limit.

A French contrabassist (tuning in fifths), whose lowest string was G1, would have to transpose a larger range of pitches (G-flat1/F-sharp1, F1, E1, E-flat1/D-sharp1, D1,

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D-flat1/C-sharp1, C1) compared to a German contrabassist (tuning in fourths) whose lowest string was E1 (E-flat1/D-sharp1, D1, D-flat1/C-sharp1, C1). Cipriani Potter reported that English contrabassists who used the ADG tuning transposed the entire trio in Beethoven’s Fifth Symphony up one octave, playing it on the first string.\(^{212}\)

Contrabassists would not only transpose single notes but would also consider the entire bass line in order to make the transposed phrase sound musical, including pitches that were playable on their instruments. An example of this approach appeared in August Müller’s series of articles published in the *Neue Zeitschrift für Musik*.\(^{213}\) Müller chose twenty-one bars (350–369) from the development section of Beethoven’s Third Symphony, first movement (Fig. 2.10) to illustrate octave transposition.

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The top staff is Beethoven’s original contrabass part and the bottom staff is Müller’s example demonstrating octave transposition.²¹⁴

Although Müller played the four-string contrabass tuned GDAE, his example revealed that Beethoven’s use of E-flat₁, D₁, D-flat₁ and C₁ affected this tuning despite the fact that its lower compass descended three semitones below the French contrabass tuned ADG and five semitones below the English GDA tuning. In summary, this example contains four pitches that were out of range and could not be

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²¹⁴ The contrabass and violoncello play the identical line in this excerpt.
played on the German contrabass tuned GDAE, the French contrabass tuned ADG or the English contrabass tuned GDA. As a result, contrabassists of all three tunings were forced to use octave transposition. Müller’s excerpt consists of four four-bar phrases where each phrase arpeggiates a different chord. The first chord is A-flat major with C1 in the bass; the second chord is D-flat major with D-flat1 in the bass; the third chord is B-flat major with D1 in the bass; the fourth chord is E-flat minor with E-flat1 in the bass. Müller recognized that these ascending arpeggiated lines were based on bars 3 to 6 of the first movement’s theme. His solution, shown in the bottom staff, preserved the ascending contour of the theme and as a result, he transposed the entire ascending line.

2.21. Harmonists

Throughout the literature, the contrabassist’s knowledge of harmony or lack of it, was often cited as an issue that directly affected simplification; those contrabassists who had this training were called harmonists as Perne and Kastner use the term to describe contrabassists with knowledge of music theory. A number of authors suggest that contrabassists who were simplifying bass parts would benefit from a basic understanding of music theory. The problem with simplification performed by untrained contrabassists was the lack of a written, simplified part, and as a result each player’s reduction was different depending upon their harmonic knowledge and the result was chaos as described by Berlioz.

Those authors that presented simplification of the bass line noted the importance of playing the fundamental or principal notes of the harmony.

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215 Müller only transposed up to bar 364. The last five bars in the excerpt needed no transposition.
217 “mais la simplification des uns n’étant pas celle des autres, puisqu’ils n’ont pas tous les mêmes idées sur l’importance harmonique des notes diverses contenues dans le trait, il s’en suit un désordre, une confusion horribles.” “but the simplification of some not being that of others, since they do not all have the same ideas on the harmonic importance of the various notes contained in the line, the result is a horrible disorder, a confusion.” Translation mine. Berlioz, Grand Traité, p. 55.
2.22. Michel Corrette’s Simplification

Michel Corrette was one of the few authors who gave us a basic set of guidelines in his section on simplification. He instructed the contrabassist to play the *principal* notes of the harmony, notes found in the *basso continuo* part. He added that this approach was preferable and easier for the contrabassist than having to search the score for the *basse fondamentale*. Nachtergaele notes that Rameau’s concept of *basse fondamentale* was well known in France and might explain Corrette’s reference to that term. If Corrette was applying this concept then we can infer from his statement that *basse fondamentale* referred to the root of the chord and that *principal note* referred to the lowest bass note in the continuo part.

Corrette also advises the contrabassist that it is necessary to play all the tonic and dominant notes that appear in the basso continuo part without numbers. His example (Fig. 2.11) shows a contrabass line simplified from the violoncello part. FIGURE 2.11: Corrette, *Méthodes Pour Apprendre à Jouer de la Contre-Basse*, p. 11.

In the example, the simplified contrabass part shows both rhythmic and melodic reductions. The melodic ornamentation figures in bars 1 and 3 have been reduced to eighth notes on beats one and two of each bar, demonstrating rhythmic reduction. The descending C major scale in bar 2 is also a melodic reduction in which Corrette has

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221 See Nachtergaele, “Extemporaneous Bass Line Reduction,” p. 44.
kept the tonic and the dominant in the contrabass part as he advised. The first three bars of the contrabass staff are also melodic reductions of the ornamentation of the tonic and dominant in bar 1 and the tonic and mediant in bar 3.

2.23. Miné’s Simplification

Miné wrote that attempts to play all the notes in a lively passage can be unpleasant and lead to confusion; we can infer from his statement that he is talking about two or more contrabassists interpreting the same part differently. He added that harmonists were more likely to play the right notes. He attributed the need to simplify as a result of the force required by the left hand to play each written note, acknowledging the difficulties of playing these instruments at that time.

The first example (Ex. 2.9), is a seven-bar excerpt for violoncello and contrabass marked *vif*, a lively tempo. The first bar of the contrabass part demonstrates a rhythmic reduction of repeated eighth-note triplets to single quarter notes. However, in bar two, Miné left the triplet figure on beat three to be played as written, an odd choice in light of the fact this figure is certainly more difficult to play than the repeated eighth-note triplets playing D and then B on beats one and two of bars 1 and 2 respectively. I suggest that Miné left some triplet figures intact so as to maintain a sense of forward motion and not reduce the entire passage to quarter notes. It might be possible that Miné’s placement of the triplets throughout the excerpt resulted in downbows occurring on the first beat of each measure. Throughout the seven-bar exercise, Miné introduced more triplet figures in the contrabass part, suggesting a deliberate use of rhythmic activity moving towards the arrival at the dominant in bar seven.

223 Miné, *Méthode*, p. 3.
In Example 2.10, Miné uses both rhythmic simplification and octave transposition. The quarter notes in bars one and two required no simplification; the F on beat one was transposed. In bar three, Miné’s rhythmic reduction eliminated the second eighth note on each of the four beats and lengthened the first eighth note to a quarter note. In the fourth bar, Miné transposed the last three eighth notes (B-flat\textsubscript{2}, A\textsubscript{2} and G\textsubscript{2}) an octave higher even though they were playable on the contrabass. Miné’s transposition is necessary because the tonic F\textsubscript{1}, on the first beat of the following bar, had to be transposed, as did the entire fifth bar.

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225 I believe that the B-flat\textsubscript{1} on beat three in bar 8 in the violoncello part is a mistake and should be a C\textsubscript{2} when compared to the C\textsubscript{2} on the same beat in the contrabass part.

226 In this example we see that Miné was writing specifically for the ADG-tuned contrabass. Corrette’s examples on pages 11 and 14 of his tutor have F\textsubscript{1} and E\textsubscript{1} pitches indicating that he was writing for the GDAE tuning. Corrette, Méthodes, pp. 11, 14.

Although each eighth-note triplet was reduced to a quarter note to demonstrate how to simplify the rhythm, the quarter-note values in the contrabass part now clash with the upper-neighbour notes in the violoncello’s triplets in bars five through eight. If the contrabass’s quarter notes were played staccato or further reduced to a single eighth note, the clashes with the violoncello part would be lessened.

In the next excerpt (Ex. 2.11), Miné presented a questionable reduction of the eighth-note triplets on the first two beats of bars 16 and 17. Instead of reducing the first note of each triplet to a single quarter note as he did previously in bars 14 and 15, he chose to play two eighth notes against the triplet. The resulting three against two rhythm is a questionable choice in light of the clarity previously demonstrated in bars 14 and 15.\footnote{See also Nachtergaele, “Extemporaneous Bass Line Reduction,” pp. 52–53.}

In the example below (Ex. 2.12), Miné chose to include an excerpt for a slow movement marked *Adagio*. The contrabass part shows no reduction, only octave transposition. Here, Miné is echoing Corrette’s advice that the player is expected to play every note in slower movements. ²²⁸


Miné wrote the excerpt in E-flat major, perhaps to demonstrate how certain keys involve more octave transposition than others, especially in the ADG tuning. The violoncello part contains a number of pitches played on its fourth string (F₂, E₂, E-

flat2, D2, D-flat2 and C2) that cannot be doubled at the octave on the ADG tuned contrabass and therefore have to be transposed up one octave. As a result, a contrabassist using the ADG tuning will have to perform a significant amount of transposition. The contour of the contrabass line was significantly affected by octave transposition. Neighbouring pitches on either side of the transposed pitch were also transposed so as to make the sudden jumps in register sound musical as though it were part of the composer’s original line. This last example implies that every note must be played in slower tempos, an approach stated more definitively by Corrette in his instructions on simplification. The point at which Miné takes the contrabass part up an octave throughout the excerpt considers arriving at the downbeat of each bar by step except for the G1 (on the last eighth note of bar 6) ascending to C2 on the down beat of bar 7.

2.24. Durier’s Beethoven Reductions

Amand Durier used fourteen different excerpts from Beethoven’s first seven symphonies to demonstrate how a contrabass part could be reduced in comparison with the violoncello part. In his examples, he notated the violoncello part on the top staff and the simplified contrabass part below. In all but one of these excerpts, Beethoven’s original bass part shows the violoncello and the contrabass doubling the exact same part (an octave apart). Durier stated at the beginning of his tutor that the need for simplification was a result of the bass parts found in more modern works, citing Beethoven’s symphonic works as an example.

229 Excerpt 8, Beethoven, Sym. No. 4, IV, bars 96–99. The violoncello and contrabass are notated in unison with the exception of the first beat on bar 96.

230 “Dans les ouvrages modernes on rencontre des parties de Contrebasse dont l’exécution présente de grandes difficultés souvent impossibles à exécuter, alors on doit chercher à conserver les principales intentions de l’auteur, et se contenter de seconder seulement le Violoncelle en jouant la principale note de l’accord. L’habitude de faire de la musique d’ensemble aidera graduellement à surmonter tous les obstacles; d’ailleurs on trouvera à la fin de cette méthode plusieurs passages de Violoncelle tirés des Symphonies de Beethoven et écrits à deux portées: sur la première on verra le trait ainsi que l’auteur l’a conçu, et sur celle de dessous, le choix que j’ai cru devoir faciliter l’exécution.” “In modern works we find parts of the contrabass, the execution of which presents great difficulties often impossible to
As we will see, Durier took liberties not only with his simplified parts but also with the presentation of the original bass parts themselves. His excerpts were written as complete segments from the original score, or as multiple segments within a movement that were edited together; Durier also modified certain bars to join the segments together. For example, the eighth excerpt, from movement four of the Fourth Symphony is fifty-three measures long and was assembled from seven different segments of the movement between bars 21 and 234. This excerpt will be discussed in more detail below.

Throughout these excerpts, Durier wrote *Simil* above slash marks to indicate that the two parts are the same. In my examples, I have written out the contrabass part instead of using the slash marks, including bar number changes as well as double bar lines to identify where two segments have been linked together.

Durier proposed that contrabassists should observe two conditions when simplifying their bass part: first, the simplified part should preserve the *principal intentions* of the composer; second, the contrabassist must be content to play the *principal* note of the harmony when doubling the violoncellos. As we will see below, his interpretation of these terms was sometimes questionable.

Durier’s simplifications can involve a rhythmic reduction where he removed pitches or changed note values from a rhythmic figure, or a melodic reduction of the bass line based on his interpretation of the principal notes of the original part.

The first excerpt (Ex. 2.13) is twelve bars long and shows modification in only two bars. Beethoven’s original tempo marking *Allegro con brio* was changed by Durier to *Allegro moderato*, indicating that the excerpt be played at a slower tempo. In bar 43, Durier reduced the repeated eighth notes on beat one to a single quarter-
note. This reduction of repeated notes is similar to what we saw in Corrette’s reduction in Figure 2.13, demonstrating some continuity regarding the techniques presented by those discussing simplification.


![Musical Example]

Durier also used melodic reduction and appears to have taken into consideration the phrasing and harmony of the entire excerpt. The first two bars of the top staff establish the beginning of an ascent from the tonic C to the dominant G in bar 45. Durier replicates the rhythms in bars 41 and 42 using the same quarter note, two eighth-notes format but compresses it into the first two beats of bar 43. The ascending quarter notes beginning on beat three in bar 43 and extending through bar 44 represent a melodic reduction of the four pairs of ascending thirds in the violoncello part. The resulting quarter-note line from bar 41 to 44 is an ascending C major scale. As a result, Durier’s quarter-note line delays the rhythmic activity (by six beats) that Beethoven introduced in bar 43 as it builds towards the dominant. Furthermore, beats three and four of bar 44 and all of bar 45 and 45a were not simplified, suggesting that this part of the phrase was not so difficult that it needed simplification.233 Bar 45 may seem like a questionable choice to have repeated and then not simplified in a chapter demonstrating simplification. Still, one must remember that Durier wrote this method

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232 Excerpt 1: Beethoven, Sym. No. 1, I, bars 41–45, 45a, 46+227 (altered), 228–42.
233 In the full score edition of the symphony, bar 45 is not repeated. Durier repeated bar 45 for aesthetic reasons. I am calling this bar 45a.
from the perspective of someone who tuned in fifths; therefore, the fingerings are based on that tuning. In bar 45, the G1 can be played as an open string and the G2 played on the adjacent D-string; the descending line beginning on beat three of bar 45 is a descending C major scale beginning on F2 and descending to C2. This figure, played in fifths or fourths tuning, should not require simplification.

Durier’s second excerpt (Ex. 2.14) demonstrates a rhythmic reduction of the ornamental sixteenth-note figures that appear in bars 47–49, 53, 57 and 59; in each case the figure was reduced to a single quarter note.


In the following example (Ex. 2.15) Durier has essentially rewritten the contrabass part by changing note durations and by altering the pitch intervals between the contrabass and the violoncello.

\[\text{Excerpt 2: Beethoven, Sym. No. 2, I, bars 47–59.}\]


The original bass part (shown in the top staff) is a series of arpeggiated figures based on an E2 pedal pitch. Each interval is notated as a pair of eighth notes and is repeated with the result that the interval changes every two beats. For example, in bar 62, Durier transformed each group of four eighth notes into a single pair of quarter notes, with the result that two consecutive melodic intervals, written as eighth-notes, have been reduced to a single melodic interval written as two quarter notes. However, Durier’s reduction altered the pitch intervals between the contrabass and the violoncello with the result that the contrabass part no longer doubles the violoncello part an octave below on beats two and four. Instead, his reduction created a series of harmonic intervals: a major third between the E2 and the G-sharp2 on beats two and four in bar 61; a perfect fourth between E2 and A2 on beat two and a minor sixth between E2 and C3 on beat four in bar 62; a perfect fifth between E2 and B2 on beat two and a minor-seventh between E2 and D3 in bar 63. The remaining harmonic intervals in bars 64 to 66 have already been described. Although Durier’s part outlines the harmony in each bar, the line’s contour has changed. Rhythmically, the pulse is moving half as fast as the part it is supposed to double. In this instance, it seems clear that Durier has determined that the melodic intervals in the violoncello part were the

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principal notes of the harmony and because they repeated, two pairs of notes could be reduced to only one pair.

In Example 2.16, Durier demonstrates both simplification and octave transposition in this excerpt characterized by eighth-note arpeggios. In the example below, Beethoven’s original contrabass part (top staff) descends to F-sharp1 several times; the French contrabass could not play this pitch because it was not found on the French contrabass. As a result, every pitch that descends below G1 was transposed.


![Music Example](image_url)

On beat three of bar 346, Durier transposed the F-sharp1 shown in the top staff as well as the three notes preceding it, thus preserving the descending scalar approach to the F-sharp2 on beat three, the bottom pitch of a first inversion D-major arpeggio. The transposition of these additional pitches also avoided a sudden jump in the line if the F-sharp1 was the only pitch transposed. This example also illustrates how the key in which the composition was written can have an effect how the piece was performed by either tuning. If a contrabassist tuned in fourths were to simplify this part, they would

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not have to transpose any pitches unlike their counterpart using the ADG tuning. As a result, a simplification of the same piece would look different for each tuning.

The reductions throughout this excerpt also function as harmonic reductions.\textsuperscript{237} The eighth-note arpeggios in bars 346, 347 and 350 to 353 have been reduced to quarter notes using chord-tones from the arpeggios.\textsuperscript{238} However, Durier’s choices regarding those notes that he deemed to be the principal notes seem inconsistent. For example, the first-inversion D-major arpeggio on beats three and four of bar 346 was reduced to two quarter notes, F-sharp and D; both of these pitches align vertically with the F-sharp and D in the violoncello part.\textsuperscript{239} In bar 347, Beethoven wrote a first-inversion E minor chord, arpeggiated over the first two beats of the bar followed by a root-position A-major chord over beats three and four. Instead of playing the E3 from the violoncello part on beats two and four, Durier chose instead to write two quarter notes, G and A respectively, doubling the bass note in each chord an octave higher. This approach is not consistent with his reduction of the D-major chord in the previous measure where he used the same rhythmic reduction on beats three and four but kept the D2 on beat four. As a result of these changes, Durier altered the vertical alignment of the two parts, creating a major sixth between the G2 and E3 on beat two and a perfect fifth between the A2 and the E3 on beat four; this same reduction is repeated in bars 351 and 353. As a result of this alteration, the contrabass no longer doubles the violoncello part. Although Durier’s reduction outlined the IV–V–I chords, the new harmonic intervals that his reduction have introduced, contrast with the octaves and unisons that are heard throughout the excerpt; furthermore, his solution has inadvertently introduced accents on beats two and four.

\textsuperscript{237} Nachtergaele, “Extemporaneous Bass Line Reduction,” p. 44.
\textsuperscript{238} In bar 350, the C-sharp\textsuperscript{3} on beat four in the violoncello part is a mistake and should be D3 according to the score. Ludwig van Beethoven, “Symphony No. 2, Op. 36,” A Compleat [sic] Collection of Haydn, Mozart, and Beethoven’s Symphonies, in Score, Most Respectfully Dedicated, by Permission, to H. R. H. the Prince of Wales (London: Cianchettini & Sperati, 1808).
The eighth excerpt is from Symphony No. 4 and at fifty-three bars in length, it is the longest of the fourteen excerpts although twenty-six bars contain no reductions of any kind. This excerpt is also different because Beethoven’s autograph manuscript reveals that the violoncello and contrabass parts were written on two staves and not as a single bass part as Durier’s example implies. Example 2.17 below shows the violoncello on the top staff, Durier’s reduction of the violoncello part on the middle staff and Beethoven’s original contrabass part on the bottom staff. Beethoven had the violoncello and contrabass play in unison from bars 96 to 100, with the exception of the first beat in bar 96.

EXAMPLE 2.17: Durier, *Méthode Complete de Contre-Basse*, p. 49.²⁴⁰

In the example above, Durier once again makes significant changes to the original line. In bar 96, he transposed the violoncello’s F₂ up a major tenth with the result that the contrabass’s A₂ sounds a major third higher than the violoncello’s F₂. Moreover, the contrabass’s E₂, on the last eighth note of the bar, forms an augmented unison

²⁴⁰ Excerpt 8: Beethoven, Sym. No. 4, IV, bars 96–100.
above the E-flat2 in the violoncello part, and is a very questionable decision on Durier’s part. I suspect that any contrabassist would reject playing Durier’s line because of the augmented unisons played in four consecutive bars. Moreover, the C2–D2–E-flat1–E1–F1 phrase is very playable in either tuning and does not require simplification. In light of these changes, the contrabass part does outline the F-major and C-major harmonies in these measures; his use of the E-natural maintains the shift in tonality towards the dominant F major. Inasmuch as this is a simplified part, Durier’s solution involves three string changes and several shifts when played in fifths tuning at the tempo *Allegro ma non troppo*. As demonstrated earlier, Durier has rewritten the contrabass part.

**EXAMPLE 2.18:** Durier, *Méthode Complete de Contre-Basse*, bars 1–40, p. 62.\(^{241}\)

Example 2.18 is the *trio* from the third movement of Beethoven’s Fifth Symphony. Durier made only one minor change to the contrabass part: in bar 157, he

\(^{241}\) Excerpt 10: Beethoven Sym. No. 5, III, bars 141-159.
I argue that Durier’s simplification, if it can be called that, demonstrates that this part, the fugal theme doubled by the contrabass and violoncello, was integral to the trio; therefore simplification was not an option. Durier’s inclusion of this excerpt and the way he presented it must be considered in context with the history of the Fifth Symphony at the Société des Concerts and the ADG tuning. I suggest that Durier included this excerpt without reduction as a way of informing contrabassists that this part was integral to the trio and all the more important due the popularity of the Fifth Symphony at that time. The alternative to simplifying this part was to cut it altogether.

It is curious that five of Durier’s excerpts contain no simplification whatsoever, and there are no instructions for the student explaining why he presented these five excerpts virtually unchanged. The question remains then, why include these pieces with others that were simplified. We can only conclude that Durier was telling the student that these excerpts should not be simplified.

The simplifications presented throughout the methods and treatises deal mostly with the difficulties faced by contrabassists having to double difficult or fast violoncello parts known as traits. It appears that the techniques presented by Corrette, Miné and Durier all agree that the contrabassist should play the principal or fundamental notes of the harmony although little explanation was given on how one determines what constitutes a principal or fundamental note. Corrette’s instructions that directed the player to read from the basso continuo part would be out of date as keyboard instruments ceased to be used in orchestras. These directions were further complicated by the fact that many contrabassists lacked harmonic training. As a result, each contrabassist was acting more or less autonomously when simplifying their part. The fact that Durier and others address contrabass simplification informs us that the practice was not only common, but was also a necessary skill. However, this practice would soon change and those who simplified their bass lines were criticized as belonging to the old school of contrabass playing as described by Berlioz in the Grande Traité. What we are seeing here is the point where modern works placed

242 Berlioz, Grande Traité, p. 55.
more demands on the contrabassist, but their ability to play said parts was lacking. If we consider the time when fifths was in use throughout France, contrabassists found themselves caught between simplification and expectations to perform the bass part as written.

2.25. ADG After the Conservatoire

As we have seen, much of the literature concerned with the three-string ADG tuning of the contrabass in the nineteenth century rejected the system. The only unequivocal support I have found exists in the letters to Cherubini written by the committee charged with his initial request to consider the possibility of adopting fourths tuning. The support for fifths tuning at that time, as stated by Chenié, was limited to the potential loss of pitches in the instrument’s lower compass if the Conservatoire had adopted the GDA tuning practised by Dragonetti. As a result, the literature shows a one-sided narrative of the tuning without any positive aspects of the tuning. However, we also learn from these same sources that the tuning persisted after 1832.

One year after the publication of Amand Durier’s 1836 method, Georges Kastner’s review appeared in La Revue et Gazette Musicale de Paris where he praised Durier as one of the “best contrabassists we have heard” and well qualified to write this method. Kastner critiqued Durier for still using the ADG tuning, asking why an artist of his calibre had not endorsed nor explained the advantages of the German GDAE tuning that the Conservatoire had adopted. Curiously, he does not dismiss Durier’s method as out of date, even though the tuning had not been taught at the Conservatoire for five years. We can infer from his comments that fifths tuning was still being practised: “on est obligé en France de les jouer à l’octave, parce que la

corde la plus bass est G.” at the end of the review, Kastner praised Durier’s section on simplification as a useful resource for contrabassists that addressed the complexity of modern bass parts.

In 1839, seven years after Louis-François Chaft began teaching the GDAE tuning at the Conservatoire, French contrabassist Achille Gouffé (1804–1874) published his *Traité Sur la Contrebasse à Quatre Cordes*, the first method adopted and approved to teach the GDAE tuning to the Conservatoire’s contrabass students.

It is beyond the scope of this study to discuss Gouffé’s significant contributions to the development of contrabass playing in Paris; however, Gouffé’s positions as Artiste de l’Académie, Membre de la Société des Concerts et de la Musique du Roi affirm his accomplishments as a contrabassist. Gouffé’s tutor becomes a point of entry into the discussion of the ADG tuning that continued to be practised in French orchestras after 1832.

Two reviews of Gouffé’s tutor were published in *La Revue et Gazette Musicale*: the first, written by Hippolyte Prévost, appeared in 1839; the second by Georges Kastner in 1844. In both reviews, the authors comment on the continued presence of the ADG tuning. I discuss Prévost’s review in detail because of the unique insight he presents.

The majority of Prévost’s review comes across as a polemic against tuning in fifths; it did not critique or analyze Gouffé’s method at all except to say that the method was excellent, noting that the Conservatoire had lacked such a method (for fourths tuning) until now. In his review, we discover that proponents of the three-string ADG-tuned contrabass defended its use, claiming that it had more resonance.

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244 “We are obliged in France to play them [pitches from G-flat to E1] at the octave, because the lowest string is G.” Translation mine. Kastner, “Durier,” p. 63.
246 Gouffé states these titles on the front cover of his method. Gouffé, *Traité*, front cover.
than the GDAE contrabass and that this greater sound is directly attributed to the
tuning itself. Prévost writes,

La résonnance de la contrebasse à trois cordes, accordée par quintes, est
peut-être plus grande; ce mode d’accord peut, d’après des lois
physiques, être plus aux vibrations du corps sonore. Mais cet avantage
disparaît entièrement dans la pratique, et en définitive, les prétentions
des contrebassistes de l’ancien régime ne sont pas plus fondées sous ce
rapport que sous les autres.\textsuperscript{248}

Prévost was referring to the resonance of the contrabass tuned in fifths, a
phenomenon explained, as he states, by physics directly related to the tuning itself.
This explanation is the first of its kind to rationalize the use of the ADG tuning with
regards to resonance, predating Billé’s 1918 discussion of the same phenomenon by
seventy-nine years.\textsuperscript{249}

Prévost criticized Durier and others who still used the ADG tuning, claiming that
their stubborn adherence to it had stifled the progress of contrabass playing, and
further pointing out that France had yet to produce a contrabassist who could play the
instrument in a soloistic manner like Dragonetti, Langois, Dalocka [\textit{sic}] or Müller.
Moreover, Prévost confirmed that Durier and others continued to tune in fifths tuning
after 1832.\textsuperscript{250}

In 1839, an un-named author published a note in the \textit{Allegemeine Musikalische
Zeitung} reporting on the contrabass in France, writing the following:

Der Kontrabass wird in Frankreich fast überall noch nach Quinten
gestimmt; doch erkennen Viele die Vorzüglichkeit der Stimmung in
Quarten an, welcher sie vorzüglich die Ueberlegenhest der teutschen
Kontrabassisten über französischen zuschreiben. Cherubini und Habeneck
in Paris haben sich unbedingt für die teutsche Stimmart entschieden, und
ein gewisser Gouffé hat kürzlich darüber ein Werkchen herausgegeben
unter dem Titel: Traité Sur la contrebasse à 4 cordes, nach welchem im

\textsuperscript{248} “The resonance of the three-string contrabass, tuned in fifths, is perhaps greater; this tuning mode
can, according to physical laws, be more to the vibrations of the sound body. But this advantage
disappears entirely in practice, and in the end, the claims of the bassists of the old regime are no more
\textsuperscript{249} Isaia Billé, \textit{Nuovo Metodo per Contrabbasso. Parte I Corso Teorico-pratico} (Milan: Ricordi, 1922),
p. iii.
\textsuperscript{250} Prévost names Durier and “two or three others.” Prévost, “Gouffé,” p. 462.
Pariser Konservatorium der Unterricht auf jenem Instrumente eingerichtet werden soll.\textsuperscript{251}

Georges Kastner also confirms the continued use of fifths tuning in his review of Gouffé’s tutor in 1844 reporting that “nos orchestres s’obstinent à conserver la contrebasse à trois cordes.”\textsuperscript{252}

Hector Berlioz’s 1844 treatise on instrumentation began as a series of articles on instrumentation that were published in the Revue and Gazette Musicale de Paris beginning in 1841. In the third article, he noted that some contrabassist continued to use the ADG tuning despite its limited lower compass and the fact that the tuning increased the amount of shifting compared to the German GDAE tuning.\textsuperscript{253}

Labro reported in his tutor that “at the time of writing” (1860) there was one artist out of eight who still played the three-string contrabass in fifths tuning.\textsuperscript{254} In fact, between 1832 and 1877, seven tutors were published that contain teaching material for the ADG tuning; three of these, Durier (1836), Winter (1843), Javelot (1863) were written exclusively for fifths tuning. We can infer from Gordon’s 1877 Méthode de Contrebasse à trois ou Quatre Cordes that the tuning was being taught outside the Conservatoire. He states the following: “Les quatre cordes de la contrebasse sont SOL, RÉ, LA, MI, et celles de la Contrebasse à trois cordes sont LA, RE, SOL; cependant nous engageons les élèves possédant une Contrebasse à trois cordes de l’accorder comme celle à quatre cordes, afin de les préparer à l’étude de ce genre de

\textsuperscript{251} “The contrabass is still tuned in fifths almost everywhere in France; but many recognize the excellence of the tuning in fourths, to which they primarily attribute the superiority of the German contrabass players over the French. Cherubini and Habeneck in Paris absolutely decided in favour of the German tuning, and a certain Gouffé recently published a little work on it under the title: Traité Sur la Contrebasse à 4 Cordes, according to which lessons on that instrument should be arranged at the Paris Conservatory. “Feuilleton,” Allgemeine Musikalische Zeitung 36 (1839): p. 714.


\textsuperscript{253} Berlioz, “De l’Instrumentation,” p. 543.

\textsuperscript{254} Labro, Méthode, p. 4.
I believe that Gordon is also advising students who wanted to study at the Conservatoire that they should prepare themselves by changing the tuning of their three-string instrument to fourths, GDA.

These sources confirm that the ADG tuning was still popular and being used in Parisian orchestras. Additional research into the musical instrument manufacturing industry reveals that there was in fact a market for contrabasses using the ADG tuning, and a number of companies strove to meet that demand.

2.26. Contrabasses Manufactured in the Late Nineteenth Century

In the latter half of the nineteenth century, a number of French manufacturers of musical instruments published catalogs featuring three-string contrabasses tuned in fifths, and their strings for the ADG tuning. These three-string contrabasses were listed alongside the four-string instruments. In 1867, the company of Gautrot and Cie. listed five different models of three-string contrabasses (Fig. 2.12); these included the option of a round back or flat back in addition to three different grades of quality.  

255 “The four strings of the Contrabass are G, D, A, E and those of the Contrabass with three strings are A, D, G; however, we encourage students with a three-stringed Contrabass to tune it like four-string, to prepare them for the study of this type of contrabass.” Translation mine. Gordon, Méthode, p. 8.

256 The differences in grades between instruments would most likely be determined by the quality of the materials used including the wood and fittings on the instrument. Gautrot, Catalogue 1867, p. 182.
Each tuning (ADG and GDAE) was advertised in five configurations that included the option of a carved or flat back and two different qualities of wood used in the instrument’s top; however, the list shows that the best quality four-string contrabass was 200 francs more than the best quality three-string model.

The 1878 catalogue offered a selection of gut (boyau) and wound (filés) strings in both tunings as the price list in Fig. 2.13 shows.
Gautrot sold different grades of strings for fifths tuning: the first string A, was plain gut available in first or second grade; the second string D (common to both tunings) was also available in two grades; the third string, G was available as plain gut or wound; the A string and E strings for the GDAE tuning were also wound. I suspect that those players using the GDAE tuning that needed a first string G, simply bought the A (first) string and detuned the pitch from A to G. In their 1878 catalog, Gautrot expanded their selection of three-string contrabasses, offering eight models including three in violin form. Additionally, Gautrot was selling the 1836 method by Durier for the three-string ADG tuning in their 1867 and 1878 catalogues. Another Parisian manufacturer, François, was also selling three-string contrabasses in 1884 (Fig. 2.14).
The increased selection of three-string contrabasses tuned ADG offered by Gautrot instruments suggests more demand for this instrument.

Despite the criticisms of the ADG tuning that appeared in music journals years after 1832, three different types of sources tell us that the tuning was being used

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throughout the late nineteenth century: first, the comments mentioned above in the
music press describe the ADG tuning that was still actively used in Paris after 1832,
although not at the Conservatoire; second, the majority of contrabass tutors that
present content for teaching the ADG tuning (nine out of eleven) appear after 1832
including Marié (1831–35), Durier (1836), Brulon (1841), Winter (1846), Hartman
(1854), Javelot (1863) and Delamour (1874); third, the catalogs of instrument
manufacturers Gaudrot and François show an increase in demand for the three-string
contrabass tuned in fifths ADG as demonstrated by the fact that between 1864 and
1887, the two companies actually expanded the number of models (and options) of
these instruments that they offered for sale. Further research is needed to establish
who was buying these instruments.

2.27. The Four-String Contrabass Tuned in Fifths ADGC

Although the majority of references to contrabasses tuned in fifths describe the
three-string French contrabass tuned ADG, there is evidence that a fourth string tuned
to C1 was mounted on the instrument, making the tuning A2, D2, G1, C1. Paul Brun
lists ten sources that identify a low C1 as the fourth string: Johann Christoph Stößel,
*Kurzgefaßtes Musicalisches Lexicon* (1737); Johann Philipp Eisel, *Musicus
Autodidaktos oder der Sich Selbt Informirende Musicus* (1738); Joseph Sauveur,
*Principes d’Acoustique et de Musique ou Systeme General des Intervalles des Sons, &
de son Application à Tous les Systèmes & à Tous les Instruments de Musique* (1767);
Vincenzo Panerai, *Principj Di Musica* (1770); Francesco Galeazzi, *Elementi Teorico-
Pratici di Musica* (1791); Joseph Gehot, *Complete Instructions for Every Musical
Instrument Containing a Treatise on Practical Music in General to Which is Added
the Scale or Gamut for Thirty Five Different Instruments* (1791); Thomas Busby, *A
Complete Dictionary of Music to Which is Prefixed, a Familiar Introduction to the
First Principles of That Science* (1791); Louis-Joseph Francoeur, *Traité Général des
Voix et des Instruments d’Orchestre Principalement des Instruments à Vent, à l’Usage
des Compositeurs (1813); Dr. C. Nicolai, “Das Spiel Auf Dem Contrabass” (1813); G. Jones, History of the Rise and Progress of Music, Theoretical and Practical (1818).

Due to the persisting issue of terminology throughout the literature, we cannot rely on nomenclature alone to ascertain whether or not we are talking about one specific instrument and its tuning. Several criteria help us to confirm that the author is making specific reference to a four-string contrabass tuned in fifths ADGC. We have firmly established the use of the three-string tuning ADG in France; therefore, we must have some minimum conditions met if we are to identify the four-string tuning ADGC.

First, we must know the number of strings mounted on the instrument and how they were tuned; it is crucial to make these determinations because of the widespread use of misleading terminology. I refer to Joëlle Morton’s methodology where she states, “The lack of consistency in the theoretical documents argues against the use of historical terminology, and it is for this reason that I propose, and will employ, the system of classification described above, which is based on tuning.” Her methodology emphasizes that the actual tuning of the instrument be used as the primary means of identification as opposed to relying on nomenclature, and for that reason this methodology informs us more accurately regarding what kind of instrument we are talking about based on how it was tuned and in what register it sounded.

Additionally, we need to know whether the instrument’s compass places it in the sixteen-foot range as opposed to the eight-foot range. This factor is crucial because conventional notation frequently shows the contrabass and the violoncello sharing the same staff when the two instruments are doubling the bass part. The contrabass is a transposing instrument and is customarily notated an octave higher than it sounds to avoid the use of ledger lines below the staff, making the line easier for the player to

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read while simultaneously improving the appearance of the score. When we consider the scarcity of references to the contrabass tuned ADGC, along with the fact that the violoncello was also tuned ADGC, there is room for confusion if the sixteen-foot descriptor is not attached to the contrabass. The contrabass and the violoncello are closely tied to each other, as discussed above; consequently composers wrote the same part to be played an octave apart; therefore references to the contrabass playing an octave below the violoncello provide more evidence of the instrument’s identity.

In his treatise, Berlioz commented that Beethoven’s use of C1 in contrabass parts suggested that he was writing these pitches for a contrabass with a C1 pitch. He says, “Remarquons que Beethoven dans cet exemple et dans beaucoup d’autres passages a donné aux contrebasses des notes graves qu’elles ne peuvent executer; ce qui ferait supposer que l’orchestre pour lequel il écrivit possédait des contrebasses descendant jusqu’a l’Ut octave basse de l’Ut des violoncelles, et qui qu’on ne trouve plus aujourd’hui.” Berlioz does not pursue this point any further. My research has found that although there are sources that clearly describe the ADGC contrabass tuning, none of these describes anyone actually playing a four-string contrabass tuned in fifths. If we observe how often Beethoven wrote sub-E1 pitches to be played specifically by the contrabass, then it is prudent to ask why he would have written pitches for an instrument that could not play in that range at that time and that Berlioz supposed that he did have access to instruments that could play those notes. We will likely never know whether Beethoven had access to contrabasses with the low C but we cannot dismiss the fact that he deliberately wrote bass parts with pitches from E-flat1 down to C1. Furthermore, if we consider that there are sources that acknowledge the tuning then it is important that these sources be investigated. Some of these sources are less detailed than others to the point where we cannot confirm that they talking about the ADGC tuning; I examine these sources below.

\[261\] “Note that Beethoven in this example and in many other passages gave the contrabasses low notes which they cannot perform; which would lead one to suppose that the orchestra for which he wrote had double basses going down to the C bass octave of the C of cellos, and which we no longer find today.” Translation mine. Berlioz, Grand Traité, p. 57.
2.28. Johann Christoph Stößel

The entry for *Bass-Violon* by Stößel describes a *gar groß Baß-Geige* or really large bass violin with six strings tuned g, d, a, F/E, C, G.\(^{262}\) This instrument is likely a *G-Violone* based on the number of strings, the highest and lowest pitches both tuned to G and the open-string tuning in fourths with the third in the middle.\(^{263}\) In the same work, Stößel defines a *Violone* as a *grosse Baß-Geige* and then describes (in the same entry) a *Violone grosso* as an octave bass violin with a sixteen-foot contra C tuned by fourths but does not give us the actual tuning other than the sixteen-foot C. It is likely that Stößel’s *violone grosso* is in fact a contrabass in view of the consistent open-string interval of fourths, the sixteen-foot compass and the fact that Stößel describes this instrument as *eine Octave-Baß-Geige* compared to the violoncello to which he gives the description *kleine Baß-Geige*. However, we do not know the number of strings on the *Violone grosso* or their tuning. If the instrument was tuned in fourths from its low C, the tuning would be (beginning with the first string) E-flat2, B-flat1, F1, C1. Given these facts, I am hesitant to qualify this instrument as a contrabass tuned ADGC.

2.29. Johann Philipp Eisel

The information in this source suggests that Eisel is talking about the ADGC tuning because of the reference to the low C in the sixteen-foot compass and the fact that it sounds an octave lower than the violoncello. However, we encounter the same ambiguities that appear in Stößel’s work, including the fact that this instrument is

called (by the Italians) *Violone grosso* and is tuned by most *in fourths* [emphasis mine] with a contra C.

Dieser Violon führet gleichfalls ein so grosses doch breiteres corpus, und hat nur 4 Saiten darauf das 16 Füßige contra C. Wird von vielen wie ein Violoncello (eine Octave tiefer) von den mehresten aber per quartam gestimmet, schneidet in der Music besser durch denn der 6 saitichte, will auch im spielen mehr Force als alle beyde erfordern, und wird von denen Italianern *violone grosso* genennet.\(^{264}\)

Without a specific reference to the instrument’s open string tuning and the fact that Eisel says that the instrument in tuned in fourths, I cannot confirm that Eisel is talking about the ADGC tuning.

### 2.30. Denis Diderot

One of the sources named by Brun for the ADGC tuning is Joseph Sauveur. Brun’s bibliography credits Sauveur for the “Table du Rapport de l’Etendue des Voix” that appears in Diderot’s extensive section on Lutherie called *Recueil de Planches, sur les Sciences, les Arts Libéraux, et les Arts Mécaniques.*\(^{265}\) Diderot explained at the beginning of the section on Lutherie, that Table XXII was extracted from a similar table by Joseph Sauveur.\(^ {266}\) The last sentence for this section regarding Table XXII states, “L’explication de cette derniere Planche a été fournie par M. de Lusse.”\(^ {267}\) Eric Halfpenny posits that the reference to M. de Lusse was likely Jacques Delusse, a

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264 “This violon also has such a large but wider body, and has only 4 strings on it, the sixteen-foot contra C. Used by many like a cello (one octave lower) tuned by most in fourths, cuts better in music than the 6-string, wants to require more force than all of them when playing, and is called *violone grosso* by the Italians.” Johann Philipp Eisel, *Musicus Autodidaktos oder der Sich Selbt Informirende Musicus* (Erfurt: Finke, 1738), pp. 50–51.


267 “The explanation of this last plate was provided by M. de Lusse.” Translation mine. Diderot, *Recueil de Planches*, p. 7.
Parisian woodwind maker.\textsuperscript{268} Moreover, Diderot credited the music entries to M. F. de Castillion.\textsuperscript{269} Sauveur’s original plate does not contain the three tunings for the contrabass that appear in Diderot’s table. It is not entirely clear who was responsible for adding these tunings.

Three different contrabass tunings are described in Diderot’s table: the first is a three-string tuning B1, F2, C2 with the description “Contre-basse les uns sonnent la quinte les autres l’octave au dessous de la basse.”\textsuperscript{270} The B1 is an error and should be B-flat\textsubscript{1} in order for it to be tuned in fifths. The second tuning, the Viennese tuning A2, F-sharp\textsubscript{2}, D2, A1, F1, was described as “the best way to tune the contrabass according to the Germans;”\textsuperscript{271} the third tuning is the A2, D2, G1\textsubscript{1} tuning in fifths, described by Diderot as “the contrabass of the Italians.”\textsuperscript{272} It is not clear if Diderot was identifying this tuning as having originated in Italy, or if he was saying that ADG is the tuning currently practised in Italy. Brun identifies this last tuning as “(C) G d a” The C in brackets is Brun’s and does not appear in Diderot’s table; therefore I cannot agree with Brun that this source describes the four-string ADGC tuning, but it does describe the three-string tuning ADG.\textsuperscript{273}

\textsuperscript{269} Diderot, \textit{Supplément}, pp. i, iv.
\textsuperscript{270} “Contra-bass, some sound a fifth, others an octave below the bass.” Translation mine. Diderot, “Table du Rapport,” pl. XXII.
\textsuperscript{271} Ibid.
\textsuperscript{272} Ibid.
2.31. Vincenzo Panerai

The first scale shown in Figure 2.15 is identified as “Scala per il Contrabbasso” and shows a diatonic C-major scale with a range from C1 to A3. The second scale (Fig. 2.16) shows a diatonic C-major scale marked with fingerings and open strings played on a contrabass tuned GDAE.


It is my contention that in the first scale, Panerai is demonstrating the range that the contrabass can expect to play when doubling the violoncello as there are no indications that any of the pitches in this scale are open strings as we see in Figure 2.16. Therefore, the only tuning that I can securely attribute to Panerai from this work is the GDAE tuning.


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2.32. Thomas Busby

Four music reference texts were published between 1786 and 1828 by English writer and composer Thomas Busby. He deliberately wrote brief subject entries, but explained that he had not sacrificed necessary information in these entries.

The contrabass appears in Busby’s works under several different terms, all of which cross-reference to the double-bass: contre-basse (Fr.), contra-basso (Ital.), double-bass and violono (Ital.). In summary, Busby’s descriptions of the double-bass contained the following characteristics: it was the largest and deepest of the string instruments; its lowest pitch was C1; its pitches sounded an octave lower than written; its cordature was similar to the violoncello; the scale of the double-bass was equally perfect with that of the violoncello.

He added a unique definition for the term contra-bass, not as an instrument, but as a lower-bass part or “under-bass” played by the double-basses under the violoncello.

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276 Busby promoted the idea and justified the brief entries as a way of creating a portable and compact reference manual for academics. Busby, *Complete Dictionary* 1786, SCA–SCI.


280 Busby defined cordature as the system upon which the strings of any instrument are tuned. Busby, “Cordatura,” *Musical Manual* 1828, p. 47.
part when there are two basses in a composition. His definition situates the double bass [contrabass] in its familiar role doubling the bass part an octave below the violoncello in terms of their relationship as bass instruments. Although, he does not describe the open-string tuning by name or with notation, Busby provides credible evidence for the ADGC tuning because its lowest note was C1 and its scale and cordature was the same as that of the violoncello.

2.33. Francesco Galeazzi

The short description of the controbasso by Italian theorist Francesco Galeazzi (1758-1819) provides strong proof of the A2, D2, G1, C1 contrabass tuned in fifths. Galeazzi writes,

Il controbasso suona in Chiave di Basso, ma la sua situazione Armonica è all’ ottava bassa del Violoncello. V’ha chi accorda questo strumento in quarta con tre sole Corda, la più bassa delle quali è A, e poi le altre due D, e G; altri l’accordano in quinta all’ ottava bassa del Violoncello, cioè colle quattro Corde CGDA di questro Stromento, e della Viola altri ancora l’accordano come il Violino GDAE ma profonde più del Violoncello. Il Controbasso è l’anima dell’ Orchestre, ma da pochissimi Professori si suona a Solo. The information provided by Galeazzi, particularly a contrabass using the open-string tuning ADGC, the fact that it was tuned in fifths and sounded an octave below the violoncello, is irrefutable evidence for the contrabass tuned in fifths ADGC. Moreover, Galeazzi situates this tuning in 1791. The EADG tuning mentioned by

282 “The contrabass plays in the bass clef, but its harmonic situation is in the low octave of the violoncello. There are those who tune this instrument in fourths with only three strings, the lowest of which is A, and then the other two D, and G; others tune it in fifths to the low octave of the Violoncello, that is, with the four CGDA strings of this instrument, and of the Viola still others accord it like the GDAE Violin but deeper than the Violoncello.” Translation mine. Francesco Galeazzi, Elementi Teorico-Pratici di Musica, con un Saggio Sopra l’Arte di Suonare il Violino Analizzata, ed a Dimostrabili Principij Ridotta, Opera Utillissima a Chiumque Vuol Applicare Con Profitto Alla Musica, e Specialmente a’ Principianti, Dilettanti, e Professori di Violino, di Francesco Galeazzi (Rome: Stamperia Pilucchi Cracas 1791), p. 312, https://www.loc.gov/resource/muspre1800.101491/?sp=330&r=0.048,0.144,0.961,0.582,0. Accessed 17 August 2021.
Galeazzi describes a contrabass in fifths tuned E3, A2, D2, G1. This tuning was not encountered elsewhere.

2.34. D. J. C. Nicolai

In the article “Das Spiel Auf Dem Contrabass” that appeared in the AMZ, Nicolai makes specific reference to a contrabass tuned ADGC and its compass sounding an octave below the violoncello; this example also provides credible proof for the ADGC tuning. An interesting fact mentioned by Nicolai in reference to the three-string ADG tuning was that only so-called Pfundnoten or pound notes were usually played on these contrabasses tuned ADG. Nicolai seems to be implying that these Pfund notes have weight and this may be a reference to playing root notes. If so, this description is in line with other commentary on contrabassists who tuned in fifths and were practising simplification.

2.35. G. Jones

G. Jones’ History of the Rise and Progress of Music was published in the same year as Busby’s A Grammar of Music (1818). The contents of Jones’s book appeared one year later in the music section of the 1819 Encyclopædia Londinensis. Jones’s subject entry for “Violone, or Double Bass” is identical in both works and is shown in Figure 2.17. Inasmuch as this title suggests that the two instruments are the same, we see that Jones was describing two different instruments performing a similar function in the orchestra; moreover, each instrument had a different number of strings and was

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tuned differently. He soon distinguishes between the double-bass with three strings tuned G2, D2, A1 and the Italian violone tuned A2, D2, G1, C1. Although the terminology Jones used is open to doubt, his description of the instrument is clearly a four-string bass instrument tuned in fifths ADGC. Jones added that the most commonly used double-bass had three strings tuned in fourths GDA; this was most likely a reference to the English tuning for the contrabass.

2.36. Joseph Gehot

In 1834, Joseph Gehot described the same two tunings for the double bass: the first was the English three-string tuning G2, D2, A1; the second was the Italian four-string tuning A2, D2, G1, C1 adding that this tuning was out of use (Fig. 2.18).²⁸⁶


Gehot’s illustration shows the ADGC tuning in notation. His description of the two tunings completely agrees with that of Jones mentioned above. With these two tunings described side by side, there can little doubt that the tuning is a four-string contrabass (double bass) tuned in fifths. What we do not know is how long the tuning had been out of use.

In addition to these sources just described, several others present the four-string ADGC tuning as the source for the three-string ADG tuning; they state that the C string was removed, leaving the instrument mounted with only three strings. We can infer from these sources that the ADGC tuning predated the ADG tuning, but we do not yet know by how much; these references are discussed below.

2.37. Alexandre Choron / Louis Francoeur

I attribute this information to Choron who, in 1813, revised Francoeur’s original 1772 treatise written for wind instruments only; the section on string instruments was added by Choron. He described the three-string ADG tuning (Fig. 2.19) in reference to the low C string as a modification of the ADGC tuning, writing that the contrabass was strung an octave below the violoncello and because the last string gave no sound and was hard to play, it was removed leaving the instrument with three strings.

2.38. Wenzel Hause

Wenzel Hause identified the ADGC contrabass tuning in his 1828 French language tutor (Fig. 2.20), naming all four open strings in addition to the fact that they are tuned in fifths. Hause echoed Choron’s statement about the fourth string, writing that it was removed because it was too low and as a result, the contrabass was left mounted with three strings tuned in fifths A2, D2, G1.  

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288 A table in Francoeur’s treatise from 1772 shows a four-string tuning for the contrabass A2, D2, G1, F1. Francoeur, Traité Général, p. 82.  
289 “The contrabass is tuned in two ways. 1. In fifths, A, D, G, C: from treble to bass, and in this way usually the last string C is removed, as being too low, so that the instrument is mounted no more than
2.39. Guillaume Gelinek

In 1829 Guillaume Gelinek hypothesized that contrabassists who played in fifths were former French violoncellists who, unable to find employment playing their own instrument, took up the contrabass, retuned it in fifths and then at some point, removed the fourth string tuned to C1.

2.40. Charles Labro

Almost thirty years later, Charles Labro proposed the exact same reason described above by Gelinek, that violoncellists turned to the contrabass and tuned it in fifths. The wording of Labro’s statement on this matter is remarkably similar suggesting that it may have been copied from Gelinek’s earlier statement. In any case, Labro agrees with Gelinek.

Once the C string was removed, contrabassists would have experienced a louder and brighter sound as a result of the decreased pressure on the instrument’s top. We know that Bottesini and Dragonetti both favoured the contrabass mounted with only three strings for precisely for that reason.

We can surmise that a contrabassist who

three strings G, D, A: proceeding in fifths from low to high. 2. In fourths, from high to low, G, D, A, E. This is the way we follow in this Method.” Hause, Méthode, p. 1.

291 “Cependant la Contre-Basse en France jusqu’en 1834 a eu rarement plus de trois cordes, car on avait abandonné promptement l’usage des Contre-basses à quatre cordes qui est au contraire presque général tant en Allemange qu’en Italie. Pour trouver le motif de cette exclusion, on a pensé que certains Violoncellistes Français ne trouvant pas d’emploi dans les orchestres pour leur instrument, prirent la Contre-Basse, l’accordèrent par Quintes, pour ne pas déranger le système d’interrale de la Basse et supprimèrent la 4me Corde qui descendue à l’Ut n’avait plus assez de sonorité.” “The Contrebasse in France until 1834 had rarely more than three strings, for the use of the four-string contrabass was soon abandoned, which is most common in both Germany and Italy. In order to find the reason for this exclusion, it was thought that certain French Violoncellists did not find employment in the orchestras for their instrument, took the contrabass, tuned in Fifths, so as not to disturb the interval system of the bass and suppressed the 4th string which descended to the C had no more sonority.” Translation mine. Labro, Méthod, p. 3.
292 Bottesini argued that the loss of the lower pitches as a result of removing the fourth string was outweighed by the improvement in sound. Bottesini, Grande Méthode, p. 2.
removed the fourth string would have experienced not only a change in sound, but they would also have benefited from not having to play on such an unresponsive string.

2.41. Beethoven and ADGC

Hector Berlioz hypothesized on Beethoven’s use of sub-E1 pitches speculating that the orchestra for which he wrote had contrabasses with a C1 but added that “such instruments are no longer to be found.” Berlioz does not actually describe how the contrabass for which Beethoven supposedly wrote for may have been tuned, only that it had a C1, an octave below the violoncello. Still we see that whenever Beethoven’s contrabass parts descend below E1, they are usually doubling the violoncello part. If in fact Beethoven was writing for an instrument with a C1, the most logical tuning would be an instrument that matched the full scale of the violoncello tuned one octave lower A2, D2, G1, C1.

The sources just described above that give us firm evidence for the four-string ADGC tuning in writing, or using musical notation all share one important characteristic: we are convinced that instruments using this particular tuning were known to the persons who describe them. Three of authors, Nicolai, Hause and Labro were contrabassists who described the ADGC tuning in their respective tutors. The fact that all three men were contrabassists and Hause and Labro were professors at their respective conservatories in Prague and Paris lends confidence and credibility to their reports of the ADGC tuning.

294 Gevaert makes a similar comment writing that it was believed that the contrabasses in Germany were tuned like a violoncello because Beethoven frequently descends to C1. Gevaert, *Traité Général*, p. 36.
295 Nicolai’s work was published in the *Allgemeine Musikalische Zeitung*; he did not write an actual tutor as did Hause and Labro; his work should be considered pedagogical for the reason that it contains scales with fingerings. Nicolai, “Das Spiel Auf Dem Contrabass,” pp. 257–66.
A number of sources make hypothetical references to the ADGC tuning where the author questions whether a C1 string or the instrument on which it was mounted even existed at all; these references typically addressed the use of sub-E1 pitches by Beethoven. Ch.-M. Widor claimed that the contrabasses used by Beethoven were three-string instruments that did not have access to the low E1 and therefore practised simplification and octave transposition.\textsuperscript{296} Widor may be referring to the French ADG tuning or the British GDA tuning. He reasoned that if these lower-compass pitches were written for a specific instrument, then physical evidence of these instruments should have survived. It must be pointed out that the literature in this research mentions over twenty different tunings used by contrabassists from the mid-eighteenth century to the mid-nineteenth century and there are likely more to be discovered. Moreover, all of these tunings were tried on one type of instrument—the contrabass. The sheer variety suggests that there was significant experimentation with different tunings; therefore, evidence of a tuning is likely to be found primarily in the literature and not necessarily on an extant instrument. It has also been demonstrated above in Greenberg’s research that a contrabass could be converted from having a four-string neck to a three-string neck.

Stephen Buckley suggests that Beethoven’s use of sub-E1 pitches can be explained by proofreading inconsistencies and the fact that he did not concern himself with the compass of the contrabass when he wrote these bass parts.\textsuperscript{297} I argue that Beethoven’s use of sub-E1 pitches for the contrabass was deliberate as demonstrated in his autograph scores. Furthermore, extant written evidence for the ADGC tuning was published during Beethoven’s lifetime; therefore, it is reasonable to suggest that Beethoven may have been aware of this tuning through these sources.\textsuperscript{298}

At the beginning of the fourth movement of Beethoven’s Fifth Symphony, there is a dramatic key change from C minor to C major. In the examples below Beethoven has demonstrated that the sub-E1 pitches written for the contrabass are unambiguous. The first excerpt (Fig. 2.21) shows bars 1 to 3 from the fourth movement where the violoncello and contrabass are written on two staves, indicating that the differences between the two parts required separate staves. The top staff shows the violoncello playing a C2–C3 double-stop in bars 1 and 2; the contrabass, shown on the bottom staff, does not play a C1, but plays C2 in unison with the violoncello’s open fourth string C2. Beethoven wrote “Contrafagotto col Bassi” below the contrabass staff indicating that it should double the contrabass part.

FIGURE 2.21. Beethoven, Symphony No. 5, IV: bars 1–3.299

At bar 7, there is a change in notation; Beethoven wrote a single line in the violoncello staff to be doubled by the contrabass; Beethoven indicates these instructions writing “col Violoncelli” in the contrabass staff (Fig. 2.22). In bars 7 and 8, the violoncello part descends to its lowest pitch, C2. The pitches that the contrabass has to double include the two sub-E1 pitches, D1 and C1. As we see in these examples, Beethoven demonstrated clear and unambiguous uses of the C2 and C1 pitches in his scoring for the contrabass.

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In Symphony No. 9, we see additional examples for notating the violoncello and contrabass parts. Figure 2.23 demonstrates how Beethoven notated both instruments on the same staff. The writing in the left column clearly indicates that the violoncello and the contrabass occupy the same staff. The violoncello part is written stems up whereas the contrabass remains tacit until bar 8, where it is notated stems down; Beethoven has illustrated how he notated the contrabass and violoncello individually whenever these parts differ.

FIGURE 2.23: Beethoven Sym. No. 9, II, bars 12–19.\textsuperscript{301}

In the first bar of the third movement (Fig. 2.24) Beethoven has again used a single staff for both instruments but with the text “Violoncelli” above the staff. The F2 is written stem up; the contrabasses are tacit until bar 18.

\textsuperscript{300} Ibid.

When the contrabasses play the B-flat1 in bar 18 (Fig. 2.25), Beethoven indicates that they now join the violoncellos with text “Bassi e Violoncelli” by notating the B-flat with a down stem for the contrabasses.

The examples just presented demonstrate consistency in Beethoven’s notation and it is reasonable to say that when he wrote pitches below E1 to be played by the contrabass, they did not make their way into the score by mistake. Additionally, those who argue that the lack of evidence for a specific ADGC-tuned instrument have not considered the fact that contrabasses can be and were modified to accept different tunings and a different number of strings as well. We can revise Berlioz’s quotation (above) to state such tunings are no longer to be found.

One issue regarding the descriptions of the ADGC tuning is that these sources do not establish a time-frame when the tuning was in use. Therefore, our knowledge of the tuning, as explained in the literature, suggests that it existed at the date of publication or from a date specified by the author.

302 Ibid.
303 Ibid.
304 See Greenberg, “Musical Instruments,” p. 18, see fn. 70, Archives Nationales, O1 3081, 7, no. 196.
2.42. Charles-Joseph Delamour

In 1874, London-based J. R. Lafleur published the *School or Method for Contre-Basse, 3 or 4 Strings* by contrabassist Charles Delamour, translated, adapted and expanded for the English contrabass tuned GDA by F. Clayton. Delamour was a French contrabassist who studied at the Conservatoire between 1854-1855, according to the biography by Pierre, winning the Conservatoire’s contrabass second prize in 1854 and the first prize the following year in 1855. He performed with the Concerts Pasdeloup, the Société des Concerts and was principal contrabassist with the Italian Opéra in Paris.

The fact that F. Clayton was credited as translator is an indication of an original method, certainly in French; however, I was not able to find a copy or a reference to such a method. The majority of Delamour’s tutor was written for the four-string GDAE tuning; however, the last four pages are curiously devoted to tuning in fifths featuring a fingerboard diagram (Fig. 2.26) and eight major scales with fingerings for the three-string contrabass tuned ADG. Also included was a fingerboard diagram for a four-string contrabass tuned ADGC (Fig. 2.27).

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305 I was not able to locate the original method in French by Delamour. Delamour, *School*.
307 Delamour’s position as principal bassist with the Italian Opera is listed on the method’s front cover. Delamour, *School*, cover.
Illustrated Example of the French mode of tuning the Double Bass with 3 Strings.

**OPEN STRINGS.**

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<td>6th</td>
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Neck of the Neck.

Tuned in Fifths ascending.

G – D – A

To obtain a full tone on the 3rd String the French use a covered string.

Compass

Instruction Book (French Text) for the above system by Durieu — Price 6/.

Lafleur & Son, Music Publishers 15 Green St, Leicester Sq., London, W.
Illustrated Example of the new 4th String, tuned down to C C C C, invented by Dr Stone and exhibited at the International Exhibition of 1872, upon a Double Bass of Messrs Lafleur's own make. See Drawing at the Commencement of the Book.

Except the addition of the 4th String the finger. ing is the same as the French 3 string Bass. The new 4th string is specially made and can be adapted to all 4 string Basses. Price 12/6.
The addition of this material for fifths tuning seems to have been designed to complement the advertisement placed by J. R. Lafleur inside the front cover of the tutor. The advertisement (Fig. 2.28) shows a four-string contrabass by Lafleur tuned in fifths; the tuning for this contrabass is confirmed in the fingerboard illustration for the
four-string ADGC tuning on page twenty-two (Fig. 2.27). There are three advertisements placed throughout tutor that pertain to the contrabass tuned in fifths: the first is the advertisement of the instrument; the second is for the method in fifths tuning by Durier; and the third is for the C1 string developed by Dr. Stone that I discuss below.³⁰⁸

On 2 November 1874, Dr. W. H. Stone presented a paper to the Musical Association for the Investigation and Discussion of Subjects connected with the Art and Science of Music where he discussed his goal of extending the compass of the contrabass to C1. Below is a section from that paper where he discusses the problems he encountered and how he solved them.

Turning to the special subject of his paper, the author said that he had been, as some of his audience might be aware, endeavouring for several years to extend the compass of orchestral instruments downwards. In the wind department he thought he might say that he had succeeded, by introducing an old instrument, the contra-fagotto, remodelled, and he hoped improved. He had found the same want in the string department. He had exhibited a double bass, strung down to the same pitch, CCC on the organ, in the Exhibition of 1872. The note was frequently used by Beethoven, Onslow, and other great writers; while Gounod used even the B flat below. The author said his object had been to obtain the low notes of the 16-foot octave without increasing the size of the instrument. There were three ways in which a string might be made to give these slow vibrations: first, by increased length; secondly, by increased thickness; thirdly, by increased weight-the last of which had been too much overlooked. The result of the first plan of increased length can be seen in the monster double-bass of the late Duke of Leinster at South Kensington, which would require a giant to play it. The first plan, then, did not answer. He next tried increase of thickness, but found that this also failed, owing to its aptness to produce squeaks, in consequence of transverse vibration. The other means was to increase the specific gravity of the string. It was this third plan which he had adopted. The gut string was covered with heavy copper-wire, like the bass strings of a pianoforte; and this proved to be fairly successful, though probably gold or platinum would answer still better. The double-bass shown at South Kensington was rather lacking in tone, as more resonance was wanting to bring it out fully, and this had led to his consulting Mr. Meeson as to the

possibility of reinforcing the vibrations by means of longitudinal struts or bars. It was evident the belly of the instrument required to be made more homogeneous to vibration, and stiffer without increasing its weight or bulk. Mr. Meeson had carried out this idea most ingeniously. Four strips of white deal, curved to an elliptical figure, pass parallel, from end to end, on the inside of the belly. Thus they intercept the S-shaped sound-holes and remove a well-known cause of weakness and a break in the vibrating body. The result is the removal of what the musicians term ‘wolf,’ or inequality and falseness of tone, with a great increase of power throughout the instrument.\(^{309}\)

Stone admits that the string was fairly successful while acknowledging that there were still some winding materials yet to be tried that might improve the current string. The success of a playable C1 string marks an important milestone in string-making and for the development of the contrabass, giving contrabassists the ability to play pitches from E-flat1 down to C1, the full octave below the violoncello’s fourth string.

Without Delamour’s original work as a reference, it is difficult to know what information is original to that method and what was added by Clayton or by Lafleur. Evidence of Delamour’s tutor as a source appears in the use of the French spelling Contre-Basse on the method’s cover and title page. The *Fugue* by Durante is the same piece found in Durier’s method. It seems more likely that this Fugue was in Delamour’s original method and was kept for that reason. I do not suspect that the section on fifths tuning was added by Delamour. During his time as a student at the Conservatoire, Delamour would have studied the four-string GDAE tuning under Charles Labro who taught contrabass from 1853 to 1882.\(^{310}\) Moreover, the GDAE tuning is presented as the tuning used throughout the method with the exception of the section devoted to the ADG and ADGC tunings.

What seems more likely is that the instructional material on fifths tuning was added by Clayton, possibly at the request of publisher Lafleur, to complement the advertisement and promote sales of Lafleur’s ADGC contrabass in addition to Durier’s

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\(^{309}\) Stone, “Extending the Compass,” p. 2.

Durier’s method for fifths tuning and the C1 string. According to the advertisement, Lafleur’s contrabass dates from 1872 while the tutor was published in 1874.

The eight major scales are presented with fingerings, string changes and shifting marked. There is some evidence to support that the fingerings were added by Clayton. His fingerings for G, D, A, F and B-flat major scales are the same as those in Durier’s tutor except that Clayton uses 2–4, 4–2 for the semitones whereas Durier uses 1–3, 3–1; had Clayton used the first finger for these five scales then they would have been identical to Durier’s fingerings.

We do not see the 1–3 fingering in Clayton’s appliqué that we observed in the methods by Marié, Durier, Winter and especially in Miné. The shift away from 1–3, combined with Clayton’s application of positions demonstrates a more widespread adoption and development of left-hand technique specifically for the contrabass that we see in the methods by Hause, Gouffé and Simandl.

2.43. Isaia Billé

Italian contrabassist and pedagogue Isaia Billé is one of the first in the literature to discuss a country where the four-string ADGC tuning may have been practised; he situates the four-string ADGC tuning in Italy circa 1700, at the same point in time where the violin, viola, violoncello and contrabass emerged as the four instruments in the orchestral string choir. Billé proposed that Italian contrabassists retuned from fifths to fourths because the continuous changes of position that they experienced in fifths tuning made the instrument difficult to play. Billé does suggest that the tuning for fourths was GDAE.

Billé also informs us that he had undertaken a study of the ADGC tuning and was considering writing a separate chapter on its usefulness. He praised the ADGC tuning

311 Billé, Gli Strumenti, p. 39. Billé does not give a source for this claim.
312 Ibid.
as being the most perfect, one of the few authors to describe a benefit of the tuning; this same comment implores us to inquire what characteristics made it perfect:

Do (1), Sol (1), Re (2), La (2): quest’accordatura sarebbe la più perfetta se non l’ostacolasse la grande difficoltà della digitazione, non potendosi, come con l’accordatura in quarta, passare da una corda all’altra, per grado tonale, senza spostare la mano, ed il difetto del La-b basso, che si riscontra in molti strumenti sarebbe evitato per quanto esso, il più delle volte, dipenda dalla non giusta inclinazione del manico o dalla catena sottile.\footnote{\textit{C1, G1, D2, A2: this tuning would be the most perfect if it did not hinder the great difficulty of the fingering not being able, as with the tuning in fourth, to pass from one string to the other, for tonal degree, without moving the hand.” Billé, \textit{Nuovo Metodo}, p. ii. In this edition, Billé’s instructions appear in Italian, French and English.}}

In light of his criticism that the fingering was the deciding factor to reject its use, we can surmise that other characteristics associated with fifths tuning were seen as beneficial and part of Billé’s initial interest in the tuning: the resonance of the instrument tuned in fifths, and the fact that a contrabass tuned ADGC was capable of doubling the complete range of the violoncello.

Billé also addressed the tuning’s effect on the resonance or sound of the instrument tuned in fifths as compared to when it is tuned in fourths, a characteristic that was mentioned above by Prévost. I discuss the issue of resonance in chapter four. In the preface of his 1922 tutor, he writes, “the instrument tuned with the sounds A2, D2, G1, C1 [displayed in notation], is more sonorous, ampler in its vibrations and more perfect in its acoustic and didactic proceeding.”\footnote{Ibid.} Billé’s use of the phrase \textit{didactic proceedings} [emphasis mine] as one of the tuning’s benefits is not clear, although he might be implying that existing violoncello pedagogy might by used for the contrabass tuned in fifths, although this interpretation is speculative. Although Billé noted that tuning in fifths did have benefits important enough to have considered this tuning as the best solution for contrabassist to play in sub-E1 range, we see that issues of fingering and shifting were insurmountable and prevented him from using...
the tuning.\textsuperscript{315} He added that the use of the five-string contrabass was becoming more widespread in Belgium, Germany and throughout Italy. Therefore, we can surmise that his decision to teach the five-string contrabass tuned in fourths moving forward considered the fact that it gave contrabassists the ability to play sub-E1 pitches as well as a uniform system of tuning that agreed with those of other nations.\textsuperscript{316}

The above sources speculate that the French contrabass tuning ADG was the result of contrabassists removing the fourth string from a contrabass tuned ADGC because it lacked sonority. Gelinek and Labro speculated that the ADG tuning was the result of unemployed violoncellists who took up the contrabass, changed the tuning from fourths to fifths and then removed the C string. Hause also stated that the C1 string was removed from the ADGC tuning, but did not attribute this action to violoncellists.\textsuperscript{317} If the ADG tuning was in fact derived from the ADGC tuning, then at what point was the fourth-string removed?

The evidence discovered in this research leads to the opinion that the four-string ADGC tuning was tried and appears to have failed. Billé argues that in Italy, the ADGC tuning was discarded due to the continuous changes in position and replaced by tuning in fourths GDAE.\textsuperscript{318} Hause and Labro both state that the fourth string, tuned to C1, was discarded for practical reasons because of its poor sound. This description appears throughout the tutors to explain why French contrabasses were tuned ADG. The number of sources that attribute the place of origin of the ADGC tuning to Italy gives us reasonable cause to say that that attribution may be accurate.

\textsuperscript{315} Billé states that he began writing a method for the ADGC tuning but abandoned it before it was finished. Billé, \textit{Gli Strumenti}, p. 138.
\textsuperscript{316} Billé stated in his method that his five-string contrabass had a C1; however, he also implied that both the C1 or B0 tunings could be used for the fifth string. Billé, \textit{Nuovo Metodo}, p. iii; Billé, \textit{Gli Stromenti}, p. 137.
\textsuperscript{317} Hause, \textit{Méthode}, p. 1.
\textsuperscript{318} Billé, \textit{Gli Stromenti}, p. 36.
2.44. Summary

Prior to the documented use of the ADG tuning at the Conservatoire, our knowledge of the tuning’s origins remains incomplete. The tuning’s history emerges just over half a century after Montéclair introduced the contrabass to the Paris Opéra in approximately 1700; his instrument was said to have been imported from Italy. We have no source that tells us how this first contrabass was tuned, only that it may have had three strings. Sixty-seven years later, Castillon documented the ADG tuning in 1767 in Diderot’s Encyclopedia, describing it as the contrabass of the Italians. Michael Greenberg’s research places a three-string contrabass at the Chapelle Royale at this time, alongside the four-string GDAE tuning. Is it possible that Castillon was describing the tuning of this three-string instrument? The time period between Montéclair’s debut of the contrabass and Diderot’s entry reveals a significant gap in our knowledge about the tuning.

Details pieced together from instrumentation treatises, contrabass tutors and music journals that were published in the late eighteenth and nineteenth centuries reveal that French contrabassists using the ADG tuning frequently had to simplify and transpose the difficult violoncello parts that they doubled. These practices were deemed necessary as demonstrated by the exercises found in the contrabass methods at that time; but this practice was also denounced. The Conservatoire, dissatisfied with this practice and with the overall level of proficiency of French contrabassists, established the first contrabass class in 1827 to address these issues.

With the growing popularity of Beethoven’s symphonies, critics of the ADG tuning within the Conservatoire proposed that the ADG tuning failed to keep pace with these demanding bass parts due to the amount of shifting inherent in the tuning and its limited lower compass; these issues were also affected by the limitations of the strings that were available. As a result, the German four-string GDAE tuning was adopted by the Conservatoire in 1832.

In addition to the three-string ADG tuning, evidence of the four-string ADGC tuning appears in the literature. Some sources suggest that the ADG tuning was a
modification of the ADGC tuning, with the fourth string removed, leaving the instrument with three strings. However, there are sufficient references to the tuning to state that it was not hypothetical or theoretical as Berlioz and others suggested, wondering if the instrument for which Beethoven (and others) wrote descended to a low C1. Two facts are clear however: it has been established above that Beethoven’s use of sub-E1 pitches was intentional; second, the majority of sources that describe a contrabass tuned ADGC were published during Beethoven’s life. We may never know the specifics of the bass instrument for which Beethoven wrote sub-E1 pitches; however, the sources published during his life that describe the ADGC tuning suggest that it is possible that he may have seen such instruments.

After the ADG tuning ceased to be taught at the Conservatoire, it persisted into the late nineteenth century as is demonstrated in the tutors for fifths written after 1832—Javelot’s method dates from 1863 and J. R. Lafleur had an advertisement in the Delamour’s 1874 method for Durier’s three-string method. Additional evidence can be found in Parisian music journals describing those contrabassist who still practised the tuning, and the advertisements of three-string contrabasses tuned in fifths and their strings found in catalogues of instrument manufacturers. Exactly why the tuning survived is not known as of yet. The literature shows that the narrative about fifths tuning was mostly one-sided and typically negative. However, the sound of the contrabass when tuned in fifths appears to have convinced some to keep using the tuning as reported by Hippolyte Prévost. One wonders if this characteristic of the tuning contributed to its use well into the late nineteenth century.
In this chapter, I study the sub-G1 pitches that appear in the contrabass parts in late eighteenth- and early nineteenth-century repertory that were performed by Paris’s two preeminent orchestras, the Academy Royale de Musique (Opéra) and the Société des Concerts (Société) between 1828 and 1832. My purpose is to understand how French contrabassists played this repertory on the three-string contrabass tuned in fifths in view of the inherent increase in shifting and the limitations of the tuning’s lower compass. Much of this section investigates octave transposition for the primary reason that the limits of the ADG-tuned contrabass forced contrabassists to transpose pitches below G1.

3.1. The Société des Concerts and Chenié

On 15 February 1828, the Société des Concerts, an orchestra boasting the finest musicians in Paris, was established after Viscount Sosthène de La Rochefoucauld signed the decree finalizing its creation.\(^{319}\) Most of orchestra’s members were professors at the Conservatoire.\(^{320}\) The brief period between 1828 and 1832 marks an important time in the history of the contrabass tuned in fifths for it is during this time that Marie-Pierre Chenié was the principal contrabassist for l’Opéra and the Société des Concerts in addition to his position as professor of the contrabass class at the


Conservatoire.\textsuperscript{321} He was listed as the principal contrabassist for the Opéra in the 1828 edition of the \textit{Almanach des Spectacles}.\textsuperscript{322}

In addition to the faculty’s participation, students from the Conservatoire were required to perform with the Société des Concerts at the request of the director.\textsuperscript{323} We can conclude from this requirement that some of Chenié’s better students may have been asked to play in the orchestra and would have been using the ADG tuning that he taught and practised.\textsuperscript{324} Chenié was a well-respected player as demonstrated by the comment made by Berlioz to his companions at the Opéra one night. Berlioz writes, “Oh! ce gros rouge, là-bas! c’est la première contre-basse, c’est le père Chénié \textit{[sic]}; un vigoureux gaillard malgré son âge; il vaut à lui tout seul quatre contrebasses ordinaires; on peut être sûr que sa partie sera exécutée telle que l’auteur l’a écrite; il n’est pas de l’école des simplificateurs.”\textsuperscript{325}

According to Berlioz, Chenié played his parts as written and did not simplify them. However, he would have transposed a significant number of sub-G1 pitches in view of just how often they appeared in the repertory, especially in Beethoven’s compositions. With the knowledge that Chenié had to perform octave transposition as a direct result of the pitch limitations of his tuning, I examine how composers used

\footnotesize{
\begin{itemize}
\item \textsuperscript{321} Pierre, \textit{Le Conservatoire}, p. 440.
\item \textsuperscript{323} “Article: 4. Les élèves qui sont encore dans les classes de l’École Royale seront obligés de concourir gratuitement aux concerts lorsqu’ils seront désignés par le directeur. Ceux qui se refuseraient à ce service ou qui manqueraient seulement aux répétitions pour lesquelles ils auraient été convoqués, cessereraient dès lors de faire partie de l’École royale.” “Article: 4. The students who are still in the classes of the Royal School will be obliged to participate free of charge in the concerts when they are appointed by the director. Those who would refuse this service or who would miss only the rehearsals for which they would have been summoned, would therefore cease to be part of the Royal School.” Société des Concerts, \textit{Actes de fondation} (Paris: 1828).
\item \textsuperscript{324} See Appendix C, Chenié, Letter to Cherubini.
\item \textsuperscript{325} “Oh! that big red [man] over there! it’s the first contrabass, it’s Father Chénié \textit{[sic]}; a vigorous fellow, despite his age; he alone is worth four ordinary contrabasses; we can be sure that his part will be executed as the author wrote it; he’s not from the school of simplifiers.” Translation mine. Hector Berlioz. “Feuilleton du Journal des Débats. Souvenirs d’un Habitué de l’Opéra,” \textit{Journal des débats} (9 septembre 1835).
\end{itemize}
}
sub-G1 pitches within the structure of these pieces and how these pitches affected the performance of the bass part using the ADG-tuned contrabass.

TABLE 3.1: Repertory for the Société des Concerts in 1828.

<table>
<thead>
<tr>
<th>Composer</th>
<th>Composition</th>
<th>Year</th>
<th>Concert</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auber</td>
<td>La Cour</td>
<td>1826</td>
<td>5th</td>
<td>4 May 1828</td>
</tr>
<tr>
<td>Auber</td>
<td>De la Niege</td>
<td>1823</td>
<td>5th</td>
<td>4 May 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Symphony No. 3</td>
<td>1804</td>
<td>1st</td>
<td>9 Mar. 1828</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2nd</td>
<td>23 Mar. 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Symphony No. 3, minuet</td>
<td>1804</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Symphony No. 5</td>
<td>1808</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5th</td>
<td>4 May 1828</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Benedictus with choir</td>
<td>1807</td>
<td>2nd</td>
<td>23 Mar. 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Piano Concerto 1: 1st mvt.</td>
<td>1800</td>
<td>2nd</td>
<td>23 Mar. 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Quartet from Fidelio</td>
<td>1814</td>
<td>2nd</td>
<td>23 Mar. 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Violin Concerto</td>
<td>1806</td>
<td>2nd</td>
<td>23 Mar. 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Le Christ au mont des Oliviers</td>
<td>1804</td>
<td>2nd</td>
<td>23 Mar. 1828</td>
</tr>
<tr>
<td></td>
<td>oratorio w/choir</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beethoven</td>
<td>Egmont Overture</td>
<td>1810</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Agnus Dei</td>
<td>1807</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Coriolan overture</td>
<td>1807</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Beethoven</td>
<td>Gloria from Mass in C</td>
<td>1807</td>
<td>Concert</td>
<td>21 Dec. 1828</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Extraordinaire</td>
<td></td>
</tr>
<tr>
<td>Beethoven</td>
<td>Romance for Violin</td>
<td>1801</td>
<td>Concert</td>
<td>21 Dec. 1828</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Extraordinaire</td>
<td></td>
</tr>
<tr>
<td>Boieldieu</td>
<td>Pharamond</td>
<td>1825</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>5th</td>
<td>4 May 1828</td>
</tr>
<tr>
<td>Brod</td>
<td>Oboe concerto</td>
<td>n/a</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Cherubini</td>
<td>Blanche de Provence, choir</td>
<td>1821</td>
<td>1st</td>
<td>9 Mar. 1828</td>
</tr>
</tbody>
</table>

326 The concert performed on this date, called Concert Extraordinaire, was not part of the Société’s regular concert season, but was arranged as a benefit at the request of Paris’s prefect of police for “a fund for the extinction of mendacity,” according to Holoman, who adds that the Société would put on more of these benefit concerts. Holoman, The Société des Concerts, p.145.
TABLE 3.1: Repertory for the Société des Concerts in 1828, continued.

<table>
<thead>
<tr>
<th>Composers</th>
<th>Works</th>
<th>Year</th>
<th>Concert</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cherubini</td>
<td><em>Des Abencerrages</em>, air with choir</td>
<td>1813</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Cherubini</td>
<td><em>Des Abencerrages</em> overture</td>
<td>1813</td>
<td>1st</td>
<td>9 Mar. 1828</td>
</tr>
<tr>
<td>Cherubini</td>
<td>Kyrie et Gloria de la Messe du Sacre (Mass for Coronation of Charles X)</td>
<td>1825</td>
<td>1st</td>
<td>9 Mar. 1828</td>
</tr>
<tr>
<td>Cherubini</td>
<td>March Religieuse de la Messe du Sacre</td>
<td>1825</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Cherubini</td>
<td><em>Gloria de la Messe du Sacre</em></td>
<td>1825</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Guillou</td>
<td>Introduction et rondo militaire for flute</td>
<td>n/a</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Habeneck</td>
<td>Fantasie for Violin</td>
<td>n/a</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Haydn</td>
<td><em>O sons amoris</em></td>
<td>n/a</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Haydn</td>
<td>Benedictus (Mass in B-flat)</td>
<td>1775-1802</td>
<td>5th</td>
<td>4 May 1828</td>
</tr>
<tr>
<td>Meifred</td>
<td>Solo for cor à pistons</td>
<td>n/a</td>
<td>1st</td>
<td>9 Mar. 1828</td>
</tr>
<tr>
<td>Mercadante</td>
<td>Air (not named)</td>
<td>n/a</td>
<td>3rd</td>
<td>13 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td><em>Sym. No. 39 in E-flat</em></td>
<td>1788</td>
<td>6th</td>
<td>11 May 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td><em>Sym. in G minor</em></td>
<td>1791</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td>Air (not named)</td>
<td>n/a</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td><em>D’Idoménée, Scène, choir and march</em></td>
<td>1781</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td>Piano Concerto (not named)</td>
<td>n/a</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td><em>Sym. No. 41, 4th mvt.</em></td>
<td>1788</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td>Requiem, Dies irae</td>
<td>1792</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Mozart</td>
<td><em>La Flûte enchantée</em> overture*</td>
<td>1792</td>
<td>4th</td>
<td>27 Apr. 1828</td>
</tr>
<tr>
<td>Rode</td>
<td>Violin Concerto (n. not specified)</td>
<td>n/a</td>
<td>1st</td>
<td>9 Mar. 1828</td>
</tr>
</tbody>
</table>

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327 Haydn wrote four masses in B-flat major that range in date from 1775–1802. Elwart does not identify which mass was performed. Elwart, *Histoire*, p. 134.

328 Elwart included the following note for this program: “L’œuvre symphonique de Mozart n’a pas été cataloguée avec soin ; c’est ce qui nous prive de pouvoir donner aux lecteurs la date certaine et le numéro d’ordre de cette composition.” “Mozart’s symphonic work has not been cataloged with care; this is what deprives us of being able to give readers the certain date and the number of this composition.” Elwart, *Histoire*, p. 102. Holoman identified this symphony as E-flat K. 543. Holoman, *The Société des Concerts*, p.144. He states in his book that his sources, some 3000 plates, can be viewed on the internet at www.ucpress.edu/holoman. However, that web page is no longer available.

329 Holoman states that this piece is the finale from the Jupiter Symphony. Holoman, *The Société des Concerts*, p. 144.
The repertory performed throughout the Société’s 1828 season is shown in Table 3.1. Six concerts, including a benefit, were played in the first season. Elwart chronicles the entire repertory played the Société between 1828, the year that the orchestra was founded, and 1860, the date that his book was published.

The inaugural concert of the Société des Concerts took place on 9 March 1828 and began with Beethoven’s Third Symphony, op. 55, and included the following: a duet from Rossini’s opera Sèmiramis, a solo for the new cor à pistons by Meifred, an Air from Bianca e Faliero by Rossini, a violin concerto by Rode and three pieces by the Conservatoire’s director Cherubini, the Choeur from Blanche de Provence, the overture from Abencerrages and the Kyrie and Gloria from his Mass in A for the Coronation of Charles X.\endnote{Elwart, Histoire, p. 130-31.}

The success of the first concert led to an encore performance (généralement redemandée) of the Third Symphony two weeks later at the Société’s second concert, dedicated to the memory of Beethoven. The program also included the Benedictus from the Mass in C, op. 68, the first movement of the Piano Concerto in C minor, op. 37, a quartet from Fidelio, the Violin Concerto in D major, op. 61, and the oratorio with chorus from Le Christ au mont des Oliviers. In the Société’s first season, Beethoven’s works were performed nineteen times, more than double the number of any other composer.

\begin{table}[h]
\centering
\small
\begin{tabular}{|l|l|l|c|l|}
\hline
Surname & Composition & Year & Concert & Date \\
\hline
Romberg & Morceau élegiaque for violoncello & n/a & 5th concert & 4 May 1828 \\
Rossini & Semiramis, duo & 1823 & 1st concert & 9 Mar. 1828 \\
Rossini & Bianca e Faliero, air & 1819 & 1st concert & 9 Mar. 1828 \\
Rossini & Le Siége de Corinthe, air & 1826 & Concert Extraordinaire & 21 Dec. 1828 \\
Schneitzhœffer & Proserpine, overture & n/a & 5th concert & 4 May 1828 \\
Vogt & Air for Oboe & n/a & Concert Extraordinaire & 21 Dec. 1828 \\
\hline
\end{tabular}
\caption{Repertory for the Société des Concerts 1828, continued.}
\end{table}
Habeneck’s passion for Beethoven’s music is well documented.\textsuperscript{331} Jeffrey Cooper reports that during Habeneck’s twenty years at the podium from 1828 until 1848, he conducted 191 concerts that featured 279 instrumental works, 192 major works and 178 symphonies by Beethoven.\textsuperscript{332} He notes that between 1828 and 1870, forty-three percent of the 1276 instrumental works performed by the Société were written by Beethoven; as a result, contrabassists in the Société were playing these challenging bass parts on a regular basis.\textsuperscript{333}

3.2. L’Opéra

The Académie Royale de Musique, also known as the Opéra, performed twenty-one operas in 1828 that range in date of composition from 1753 to 1828. The table below (Table 3.2) shows the operas arranged by the year of composition.\textsuperscript{334} The repertory for the Opéra appeared in the \textit{Almanach des Spectacles}, which published the repertory for major theatres each year throughout Paris, and as a result we have a list of concert venues, the musicians and the repertory played in 1828.\textsuperscript{335}

\begin{table}
\centering
\begin{tabular}{lll}
\hline
Composer & Opera & Year \\
\hline
Jean-Jacques Rousseau & \textit{Le Devin du Village} & 1753 \\
Christoph Willibald Gluck & \textit{Orphée} & 1774 \\
Christoph Willibald Gluck & \textit{Armide} & 1777 \\
Christoph Willibald Gluck & \textit{Iphigénie en Tauride} & 1779 \\
André Ernest Modeste Grétry & \textit{La Caravane du Cairo} & 1784 \\
Antonio Salieri & \textit{Les Danaïdes} & 1784 \\
Antonio Sacchini & \textit{Œdipe à Colonne} & 1787 \\
\hline
\end{tabular}
\caption{Operas performed by l’Académie Royale de Musique, 1828.}
\end{table}

\textsuperscript{332} Cooper, \textit{Instrumental Music}, p. 30.
\textsuperscript{333} Ibid., pp. 28–29.
\textsuperscript{334} Merville, \textit{Almanach des Spectacles pour 1828}, p. 46.
\textsuperscript{335} I was not able to find orchestral scores for \textit{Les Pretendus}, \textit{Les Mystères d’Isis}, \textit{Rossignol} and \textit{Macbeth}. 
TABLE 3.2: Operas performed by l’Académie Royale de Musique 1828, continued.

<table>
<thead>
<tr>
<th>Composer/Musician</th>
<th>Opera/Title</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jean-Baptiste Lemoine (Lemoyne)</td>
<td>Les Pretendus</td>
<td>1789</td>
</tr>
<tr>
<td>Mozart [sic] Ludwig W. Lachnith</td>
<td>Les Mystères d’Isis</td>
<td>1801</td>
</tr>
<tr>
<td>Louis-Luc Loiseau de Persuis and J.-F. Le Sueur</td>
<td>Triomphe de Trajan</td>
<td>1807</td>
</tr>
<tr>
<td>Gaspara Spontini</td>
<td>La Vestale</td>
<td>1807</td>
</tr>
<tr>
<td>Rudolphe Kreutzer</td>
<td>Aristippe</td>
<td>1808</td>
</tr>
<tr>
<td>Gaspara Spontini</td>
<td>Fernand Cortez</td>
<td>1809</td>
</tr>
<tr>
<td>Charles-Simon Catel</td>
<td>Les Bayadères</td>
<td>1810</td>
</tr>
<tr>
<td>Louis Sébastien Lebrun</td>
<td>Rossignol</td>
<td>1816</td>
</tr>
<tr>
<td>Nicolo Isouard</td>
<td>Aladin</td>
<td>1822</td>
</tr>
<tr>
<td>Gioacchino Rossini</td>
<td>Moïse (Mosé in Egitto)</td>
<td>1822</td>
</tr>
<tr>
<td>Henri-Montan Berton</td>
<td>Virginie où les Décemvirs</td>
<td>1823</td>
</tr>
<tr>
<td>Michele Carafa</td>
<td>La belle au Bois Dormant</td>
<td>1825</td>
</tr>
<tr>
<td>Gioacchino Rossini</td>
<td>Le Siège de Corinthe</td>
<td>1826</td>
</tr>
<tr>
<td>Hippolyte A. J. B. Chelard</td>
<td>Macbeth</td>
<td>1828</td>
</tr>
</tbody>
</table>

The three pieces examined below are Beethoven’s Fifth Symphony in C minor, op. 67, Rossini’s opera *Le Siège de Corinthe (L’Assedio di Corinto)* and Beethoven’s Sixth Symphony in F major, op. 68. The first two compositions were performed by the Société and the Opéra respectively in 1828 (see Tables 3.1 and 3.2). The Sixth Symphony was performed by the Société in the 1829 concert season.

My research found specific references to the Fifth symphony and *Le Siège de Corinth* that mention performance-related issues on the contrabass in fifths; therefore, these pieces are germane to this study and will be discussed in more detail below. My examination of this repertory is drawn from my personal experience playing Beethoven’s Fifth, Seventh and Ninth symphonies on a contrabass tuned in fifths ADGC. I will provide an overview and understanding of the issues related to shifting

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337 An Air from *Le Siège de Corinthe* was performed by the Société at their Concert Extraordinaire on 21 December 1828. Elwart, *Histoire*, p. 136.
and octave transposition that were faced by contrabassists in fifths by using specific examples in this repertory. However, a difficult bass part can present challenges to the contrabassist regardless of the tuning system and should be considered in the context of the criticisms that were levelled at fifths.

3.3. Beethoven’s Fifth Symphony

The trio from the third movement of the Fifth Symphony is examined here as an important piece in relation to fifths tuning. In the present-day orchestral repertory, the Fifth Symphony is performed with such regularity that the contrabass part from the trio has become a standard audition excerpt for contrabassists. Many of the passages feature several bars of eighth notes that challenge the player’s ability to make the strings speak under the bow using spiccato with clean articulation especially within the context of the fast tempo and playing with multiple contrabassists in a bass section. Moreover, several of these eighth-note passages are exposed (the fugal theme) as the contrabasses double the violoncellos while the remainder of the orchestra is tacit. It is not difficult to imagine the challenges experienced by nineteenth-century contrabassists who had to perform this part on the gut strings they used at that time. In the Société’s 1828 regular season alone, the Fifth Symphony was performed three times with a fourth performance at the Concert Extraordinaire. Between 1828 and 1832, Chenié would have performed this particular symphony ten times.

In addition to the Fifth Symphony’s history of performance by contrabassists using the ADG tuning, this composition features many examples of the use of lower-compass pitches at key points in the piece. The main key areas are: C minor, E-flat-major and C major in the first movement; A-flat major and C major in the second movement; C major and C minor in the third movement; and C major in the fourth

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338 *Spiccato* is a bow stroke using alternating up- and down-bows played toward the middle of the bow in which the bow bounces, but remains on the string. These short strokes give the note articulation and a percussive character.
movement. The tonic and dominant notes in C major and minor, E-flat major and A-flat major would most likely be emphasized because of the tonal organization of the piece.

There are numerous instances where the violoncello and the contrabass double the bass line. If the violoncello part plays any pitch between G2 and C2, the contrabass tuned in fifths lacks the range to double these pitches one octave below and is forced to transpose these pitches up one octave. This technique is shown in Example 3.1 towards the end of the first movement at bar 479: a C minor chord with an E-flat1 in the contrabass part leading to a dominant G chord in second inversion with a D1 played by the contrabass.

These five bars are almost identical to the opening five bars of the symphony except that Beethoven wrote the contrabass part an octave lower to fortify this dramatic moment. In order to play the sub-G1 pitches between bars 479 and 482, Chenié would have transposed the E-flat1, F1 and D1 up one octave; however, it seems more likely that he would have played all five bars an octave higher to preserve the melodic integrity of the theme.

EXAMPLE 3.1 Beethoven, Sym. No. 5, I, bars 478–82.

The second movement begins in A-flat major featuring a series of variations based on two themes and a cadence. The first theme, played by the viola and violoncello,
begins at bar 1. In bar 7 there is a dominant to tonic cadence where the contrabass plays E-flat1–A-flat1 using *pizzicato* (see Ex. 3.2).

**EXAMPLE 3.2:** Beethoven, Sym. No. 5, II, bars 6–10.

The texture created by the differences in range, articulation and dynamics between the contrabass and the violoncello demonstrates two contrasting uses of sub-E1 pitches. In bars 7 and 8, the contrabass plays an E-flat1–A-flat1 marked *piano* and *pizzicato*. The violoncello plays an E-flat4 *arco* and *forte*. The difference in written range between the violoncello and the contrabass is three octaves. Additionally, the contrabass is not doubling the violoncello, but instead shows a distinct use of the contrabass’s lower compass.

The cadence repeats at bars 9 and 10 with the full string section; in this variation however, the contrabass doubles the violoncello an octave lower, playing E-flat1–A-flat1 *arco*. A third variation of this cadence takes place between bars 18 and 21, where the contrabass part begins an octave higher, descending from E-flat2 down to A-flat1. In light of the fact that these cadences appear throughout the movement in different variations, Chenié would have transposed the E-flat1 up to E-flat2 without any detrimental effect to the bass part.

The second theme begins at bar 21 in the key of A-flat followed by a new variation of that theme at bar 32 in C major. The dominant G chord at bar 29 is voiced
in the contrabass part as a G1, and then followed by the cadence to C major in bar 31 with two eighth-notes, C2–C1 (Ex. 3.3).


This particular C1 pitch, at bar 31 is important because it announces the arrival of the key of C major with a V–I cadence. The orchestra plays a C major chord on the first eighth-note of bar 31, but is tacit on the second eighth-note; the contrabass’s C1, doubled by the violoncello’s C2, are both heard solo on second eighth-note of bar 31. The isolation of these two low Cs played fortissimo by the two lowest-pitched string instruments in the orchestra creates a dramatic accent that brings that phrase to a strong conclusion. At bar 100, there is a repetition of cadence heard at bar 31; however, this time Beethoven has given the contrabass a pair of C2 eighth-notes, a variation of bar 31 exploiting the contrabass’s lower compass. In both instances Chenié would have to transpose the C1 up to C2.

Between bars 39–44 (Ex. 3.4) the contrabass plays a series of four perfect fifths that reciprocates between E-flat1 to B-flat1, forming a horn call. The use of the E-

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flat₁ is necessary here to invoke the ascending melodic character of the horn call’s perfect fifth. Chenié could play the E-flat₁ up one octave; however this solution would interrupt the interval relationship with the violoncelli. The B-flat₁s would sound an octave below the contrabasses, but the E-flat₂s would form a unison with those pitches played by the violoncelli. The other solution is to play this section up one octave, preserving the original melodic contour of the horn call.

EXAMPLE 3.4: Beethoven, Sym. No. 5, III, bars 33–44.

My discussion now turns to the trio in the third movement where I examine critiques of its performance on the ADG-tuned contrabass compared with the GDAE-tuned contrabass with a specific focus of the issues of shifting.

3.4. The History of the trio

In his review of the Société des Concerts’ sixth concert on 11 May 1828, Fétis praised the contrabass section for having played the trio well enough that any “slackening” of the tempo was hardly noticeable writing, “Je dois aussi des éloges aux contrebasses, pour la netteté de leur exécution dans le trio du scherzo, et même pour la manière dont elles ont nuancé les effets. Jusqu’ici on avait été forcé de ralentir assez sensiblement ce trio, à cause de la difficulté de faire parler assez rapidement ce gros instrument; mais cette fois le ralentissement a été presque imperceptible.” In this

340 “I also owe praise to the contrabasses, for the sharpness of their performance in the trio of the scherzo, and even for the way they nuanced the effects. Until now we had been forced to slow down this trio quite noticeably, because of the difficulty of making this large instrument speak quickly enough; but this time the slackening was almost imperceptible.” Translation mine. François Joseph Fétis, “Nouvelles de Paris. École Royale de Musique. Société des Concerts,” La Revue Musicale 3 (1828): p. 375. This is Fétis’s review of the sixth concert that took place on 11 May 1828.
instance, Fétis attributed the difficult nature of making the contrabass speak for the
reduction in tempo. Still, several months later in his review of Hause’s contrabass
method, Fétis claimed that it had always been necessary to play the trio at a slower
tempo as a result of the excessive shifting used by contrabassists who used the French
system of tuning (fifths). Fétis wrote the following:

Qu’il me soit permis de citer un exemple pour démontrer la nécessité
d’adopter le système de l’accord allemand. Dans l’exécution si brillante de
la symphonie en Ut mineur de Beethoven, qui a fait taut d’honneur à
l’orchestre des concerts de l’École royale de Musique, on a toujours été
obligé de ralentir un peu le trio du menuet à cause du trait des contrebasses
qui, dans le système française, occasionne de nombreux déplacements de la
main qu’il faut avoir le temps d’execute. Avec le contrebasse accordée
comme l’indique M. Hause, ces déplacements sont infiniment moins
multipliés, en sorte que l’exécution est plus facile, et que l’on peut
conserver le même mouvement dans le menuet ou scherzo et dans le trio.

According to Fétis, there were two factors that caused the slower tempo: the
difficult nature of making the contrabass speak and the fact that contrabassists who
tuned in fifths had to shift more often. We can infer from the date that Fétis made this
statement (1828) that the issue of taking the trio at a slower tempo was an on-going
issue predated the formation of the Société des Concerts and even the contrabass class
at the Conservatoire.

In his memoirs, Berlioz relates the story of his conversation with Habeneck about
the conductor’s practice of cutting the contrabasses at the beginning of the trio,
leaving the violoncellos to play the fugal theme by themselves. According to

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341 Fétis was likely making reference to Habeneck’s time as leader of the Conservatoire’s student
orchestra from 1806 to 1815. Elwart, Histoire, p. 324.
342 “Allow me to cite an example to demonstrate the necessity of adopting the German tuning system. In
the brilliant performance of Beethoven’s symphony in C minor, which made a special tribute to the
orchestra of the concerts of the Royal School of Music, it has always been necessary to slow down the
trio of the minuet because of the contrabass line which, in the French system, causes many
displacements of the hand which must be allowed time to execute. With the contrabass tuned as Mr.
Hause says [fourths], these displacements are infinitely less multiplied, so that the execution is easier,
and that one can keep the same movement in the minuet or scherzo and in the trio.” Translation mine.
343 This meeting is discussed in Berlioz’s letter to the Academy of Fine Arts of the Institute, dated 11
Études Musicales, Adorations Boutades et Critiques (Michel Lévy Frères, 1862), pp. 259–68.
Berlioz, Habeneck had cut the contrabasses for the last twenty years, claiming that they did not sound good. He does not tell us exactly when this conversation took place but if we consider that Habeneck was the Société’s conductor from 1828 until 1848 (twenty years), then we can infer that he cut the contrabasses throughout his time as the orchestra’s conductor. Berlioz added that Habeneck’s successor, Narcisse Girard continued this practice. Although Fétis reported that it was the difficulties related to the French system of tuning that were responsible for slowing the trio’s tempo, we see that Habeneck cut the contrabasses from the trio even after 1832 when fourths tuning became the prevailing tuning system in France. We can conclude that the issues that led Habeneck to silence the contrabasses in the trio were not attributable to fifths tuning alone and suggest an issue common to either tuning, such as making the strings speak. It is also clear from the statements that sometimes the contrabasses did play in the trio as indicated in Fétis’s own review of the Société des Concert’s performance of the Fifth Symphony on 11 May 1828.

In a series of articles devoted to Beethoven’s symphonies, Darmstadt contrabassist August Müller discussed the performance of the trio, stating that the difficulty with performing the trio’s fugal theme was endurance and clarity, adding that there was no mechanical difficulty because the piece falls within the usual (emphasis mine) position. He advised the contrabassist to bow the strings closer to the bridge to add the necessary clarity.

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344 Girard was conductor from 1849 to 1859. Holoman, The Société des Concerts, p. 12.
345 “Nun kommt das Trio in C-dur, das schon so veil in der Welt wegen seines kräftigen Charakters besprochen, gelobt, und das von der Contrabassisten Welt gewiß vor Allem exercirt worden ist. Bei ihren muß sich der Ausführende von vornherein vornehmen, den Bogen mehr wie gewöhnlich in der Nähe des Steges zu führen, damit die Saiten nicht zu sehr vibrieren, was einen bedeutenden Vortheil in Bezug auf die Deutlichkeit gewährt; auch dürste bei ihm ein festeres, zusammengefaßteres Tempo (ohne daß es gerade langsamer wird) wohl an seinem Platze sein. Das ganze bewegt sich in der gewöhnlichen Lage des Instruments, und es ist keine eigentliche mechanische Schwierigkeit vorhanden.” “Now comes the trio in C major, which has already been widely discussed and praised in the world for its powerful character, and which has certainly been exercised above all by the world of contrabassists. With theirs, the performer must plan from the outset to lead the bow closer to the bridge than usual, so that the strings do not vibrate too much, which gives a decisive advantage in terms of clarity; with him, too, a firmer, more condensed tempo (without actually slowing down) would probably be in its place. The whole thing moves in the usual position of the instrument, and there is no real mechanical difficulty.” Translation mine. Müller, “Ueber den Contrabaß,” NZM 5, pp. 30–31.
Müller played the four-string contrabass tuned GDAE and his reference to the usual position likely refers to the left-hand position remaining within the distance of a perfect fourth from the nut. When Müller’s comments are considered alongside those made above by Fétis, we see that Müller is actually addressing the issue of shifting because tuning in fourths, as he says, permits the contrabassist to play the trio within specific area on the fingerboard position.

In my examination of the trio, I sought to determine how much of the criticisms mentioned above could be attributed to tuning in fifths. We do not know to what degree the tempo had to be reduced so that the contrabasses could perform the part satisfactorily. What we do know is that the tempo played during the trio was, in fact, performed to Fétis’s satisfaction as stated in his review above.

I present two analyses of the trio played in fifths and fourths (Example 3.5) where I have notated fingerings and string choice for the contrabass part in bars 140 to 218. The numbers above the staff indicate the fingering and also indicate a shift up or down the neck.346 The Roman numerals below the staff indicate the string on which those notes are played. The fingerings for the example in fourths tuning are those written by Oscar Zimmerman.347 The fingerings for the example in fifths tuning are based on the fingerings by Joel Quarrington that were given to me and my stand partner for a performance of the Fifth Symphony with Orchestra Toronto in 2014. The fingering and shifting in my analysis represent one interpretation of how to play the trio; alternate fingerings exist that differ from those presented below.

346 A bar above the number signifies a shift up the neck, towards the bridge landing on that finger; a bar below the number signifies a shift down the neck towards the nut.
EXAMPLE 3.5: Beethoven, Sym. No. 5, III, trio, bars 141–218.
EXAMPLE 3.5: Beethoven, Sym. No. 5, III, trio, bars 141–218, continued.
EXAMPLE 3.5: Beethoven, Sym. No. 5, III, trio bars 141–218, continued.
The criticisms described in the trio’s performance centred around issues of tempo, shifting and making the strings speak. Fétis claimed that displacements of the hand were infinitely less multiplied when playing the trio in fourths. Inasmuch as a faster tempo can affect a contrabassist’s strategy for a fingering solution that includes shifting, the actual tuning is the more significant factor that determines how much shifting is required.

My definition of a shift is based on the left-hand position as being defined by one whole tone between the first and fourth fingers. If any finger in the left hand moves from its current position up or down the fingerboard by a semitone or more to play the next pitch, a shift has taken place. This definition includes instances where the left hand moves to a new position immediately after playing an open string. Although the left hand benefits from the additional time afforded by shifting while the open string is played, it has still shifted its position. I felt it necessary to define this concept in that it establishes a common standard that can be applied to either tuning in my analysis.

The length of a shift is also important to define for the reason that some writers, in their criticisms of the amount of shifting in fifths, have made claims that playing “the scale” tuned in fourths does not require a shift. It is my contention that some eighteenth- and nineteenth-century authors believed that moving the left hand within the first four semitones of the nut, the distance before the next open string could be

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348 Fétis made these comments in his review for Wenceslas (Wenzel) Hauge’s contrabass method for the four-string tuning GDAE. While praising the GDAE tuning, Fétis was critical of the trio’s performance played on contrabasses using the French tuning ADG. Fétis, “Hauge,” pp. 549–52.
played, did not constitute a shift. For example, Berlioz states in his *Traité*, “La Contrebasse à quatre cordes me parait préférable à l’autre, d’abord pour la facilité de l’exécution, l’accord en quartes n’obligeant pas l’exécutant à démarcher.”

A. C. White makes a similar claim in his method: “In France they tuned G, D, A, in fifths. In Germany they have four strings tuned in fourths, E, A, D, G. This is a very good system, because the scale lies under the hand without any need of shifting the position. The French tuning in fifths, G, D, A, necessitates shifting at every scale.” White’s statement has some validity in that several scales, such as F major and B-flat major can be played in specific positions in fourths without shifting the hand. The remaining scales all require shifting, some more than others.

I define the length of a shift using the distance, measured in semitones, travelled by the first finger up or down the length of the fingerboard between the two pitches of the shift with the condition that the left hand maintains a consistent 1–2–4 whole tone spacing between the first and fourth fingers during the shift. I wanted to be sure that my analysis applied the same metrics for measuring the number of shifts in both tunings. The reason behind this definition is simple but important. A shift has a starting and an ending pitch and there are nine possible combinations to play most shifts stemming from the fact that the shift can begin and end on any of the three fingers in the left hand.

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349 Berlioz, *Grand Traité*, p. 53; Fétis, “Nouvelles de Paris,” p. 375; “DO 1, SOL 1, RE 2, LA 2: quest’accordatura sarebbe la più perfetta se non l’ostacolasse la grande difficoltà della digitazione, non potendosi, come con l’accordatura in quarta, passare da una corda all’altra, per grado tonale, senza spostare la mano . . . .” “C1, G1, D2, A2: this tuning would be the most perfect if it did not hinder the great difficulty of the fingering not being able, as with the tuning in fourth, to pass from one string to the other, for tonal degree, without moving the hand . . . .” Billè, *Gli Strumenti*, p. 138; Müller, “Üeber den Contrabaß,” *NZM* 5, pp. 30–31.

350 “The four-stringed contrabass appears to me preferable to the other: first, on account of facility in execution, tuning in fourths not compelling the performer to shift when playing the scale.” Translation mine. Berlioz, *Grand Traité*, p. 53.


352 1–3–4 would also work. It is the whole tone spacing in the left hand between 1 and 4 that is the critical measurement.
The scale in Figure 3.1 demonstrates that the range of the four-string contrabass, as presented by Corrette is thirteen natural tones without shifting, from E1 up to C3 on the first string. If we apply my criterion to Corrette’s example and play the C3 with the fourth finger then the left hand has in fact shifted.

Fétis’s claim that fourths used \textit{infinitely} less shifting was an obvious exaggeration; however, if it was believed that shifting in fourths used a broader criterion to define when a shift occurred, then that criterion would contribute to the perception that there was less shifting in fourths.

In Example 3.6, all of the pitches in the \textit{trio} excerpt have been mapped onto both fingerboards in yellow according to the positions in which my analysis suggest they are played.

\textbf{EXAMPLE 3.6:} Fingerboard layout for contrabasses tuned in fifths and fourths.

<table>
<thead>
<tr>
<th>Three-string contrabass tuned A2, D2, G1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
</tr>
<tr>
<td>2nd</td>
</tr>
<tr>
<td>3rd</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Four-string contrabass tuned G2, D2, A1, E1</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
</tr>
<tr>
<td>2nd</td>
</tr>
<tr>
<td>3rd</td>
</tr>
<tr>
<td>4th</td>
</tr>
</tbody>
</table>

The dashed red line on each tuning’s fingerboard identifies the position (in semitones) where the next highest open string can be played. This point is important in that this area, the first four semitones on the fourths fingerboard, illustrates Müller’s...
usual position. To illustrate this point further using the E string in fourths, the left hand can play the whole tone from F1 to G1 using 1–4, and then shift up one semitone to play the whole tone from G-flat1 to A-flat1 using 1–4, both within the first four semitones before moving to the next higher string. According to the statements above, we are led to believe a shift has not taken place as long as the left hand remains within the first four semitones in spite of the fact that the hand has changed position by a semitone. If we apply this broad interpretation of a shift to fourths, and compare it with Fétis’s statement, then it would appear that there was less shifting in fourths, and by comparison, more shifting in fifths.

It must also be remembered that the trio is in C major, a key with no sharps or flats, an advantage to both tunings because of the availability of open strings. A one-octave C major scale in fourths beginning on C2 with the second finger can be played in the first position without shifting but only as far as the seventh degree B2. The G major scale, also beginning with the second finger on G1, can be played one octave up to the ninth degree entirely without shifting. The point here is that Beethoven’s choice of key situates the fingering of either tuning in a familiar and frequently-used part of the fingerboard.

There is only one pitch in this excerpt that had to be transposed if played by an ADG contrabass, the F1 at bar 217 (Ex. 3.7). Chenié would have played this pitch as an F2 without any need to prepare it. The F1 is playable on the GDAE contrabass and consequently it does not have to be transposed.

EXAMPLE 3.7: Beethoven, Sym. No. 5, III, bars 212–18.

The fingerboard in fifths tuning (Ex. 3.6) further illustrates how the additional whole-tone difference between strings (compared to fourths tuning) situates pitches further up the neck on the second and third strings, thus contributing to the higher
instances of shifting (in fifths) in that the same number of pitches are played on three strings instead of four. It should be noted that pitches playable on the first string, from A2 up to F3, are one whole tone closer to the nut than their counterparts on the fourths fingerboard.

Throughout the majority of the excerpt, Beethoven did not write slurs with the exception of bars 182–189; therefore every pitch was to be articulated separately. Eighth-note passages such as the ones in the trio were called traits, defined as a fast or virtuosic passage where each individual note is articulated. Twenty-three of the seventy-seven bars are eighth notes, and are defined as traits. The pitch range of this excerpt is F1 to F3, with the majority of the pitch material falling between G1 and G2. Additionally, the range falls in the most frequently used part of the fingerboard where the distance between semitones is greatest.

Of the 264 pitches in the trio excerpt, ninety-eight pitches (thirty-six percent) are common to both tunings in that they are played using an identical fingering that includes the string on which that pitch is played and whether or not a shift was required to play that pitch. The majority (ninety-two percent) of these ninety-eight commonalities are played on the D string common to both tunings.

There are sixty-four shifts in the trio played in fourths compared to the version in fifths that has ninety-four shifts. If we divide the number of shifts by the total number of pitches for each tuning we see that twenty-four percent of the pitches played in fourths (64 ÷ 264 = 24%) required a shift whereas thirty-six percent of the pitches played in fifths (94 ÷ 264 = 36%) required a shift. The difference between the two figures reveals that the contrabassist tuned in fifths is shifting twelve percent more than their counterpart tuned in fourths.

Between bars 141 and 142 there are five shifts in fifths tuning (Ex. 3.8). The first shift occurs from the B1, played by 1, up one semitone to the C2, also played by 1,

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353 “La différence qu’il y a entre le Trait et la Coulade ne consiste qu’en ce que toutes les notes s’articulent dans le Trait . . . Le Trait demande un coup d’archet . . . pour chaque note.” “The difference between the Trait and the Coulade is only that all the notes are articulated in the Trait . . . A Trait requires a bow stroke . . . for each note.” Michel Pignolet de Monteclair, *Principes de Musique* (Paris: L’Auteur, 1736), p. 87.
allowing the D2 on III to be played by 4. Anytime the player shifts up the neck from the first finger to the fourth finger, they are minimizing the distance travelled by the hand.

The next pitch, G1, played on the open string, provides the player the duration of the open-string pitch to shift. The player must also consider the tempo and playing technique, as demonstrated in the example below where the first ten pitches of the theme are eighth notes, played spiccato on the third string.

**EXAMPLE 3.8: Beethoven, Sym. No. 5, III, bars 141–45, fifths tuning.**

The player shifts, using the open G string, from 4 on D2 back to A1 using 1, a large shift where the left hand moves three positions on a single string. The choice to play the D2 on the third string instead of the open string in bar 141 takes into consideration the pitch immediately following the D2—the G1, a pitch that can only be played in fifths tuning as an open string. If the player chose to play D2 as an open string in bar 141, they would have to play two consecutive open strings, D2 and G1 using a spiccato stroke. Furthermore, open strings will continue to vibrate and must be dampened by the hand. In such instances, the player may prefer to play the note closed.

On the last eighth note of bar 141, the player shifts up to B1 using 2 so that the C2 can be played by 4 at the start of bar 142. These two pitches are repeated using the same fingering. The next six pitches are to be played on the second string.

The D2 in bar 142 is played as an open string because on the next pitch, the player has to shift back to play E2 on the second string. In this instance, the open-string shift on D2 facilitates both the shift and the string change.

In the above example (Ex. 3.9), bar 161 contains a root-position G major triad arpeggiated up to the fifth degree, and then it descends diatonically back to the second degree (A1) before repeating at bar 159. There are noticeable differences in fingering and string use between the two tunings. In bars 158–59, there are eight shifts in fifths compared to only four in fourths. However, there are no string changes in fifths; everything is played on the third string. In fourths, the G1 can only be played on the fourth string. The remainder of the phrase is played on the third string. This example highlights the distribution of pitches over the strings between the two tunings.

Throughout the trio, there are eighty-five string changes in fourths compared to sixty-seven in fifths. This difference can be explained by the fact that in fourths tuning, there is a slightly higher concentration of pitches within the first four semitones, distributed over four strings as opposed to three in fifths. Furthermore, twenty-one of these string changes take place across three strings, between the fourth and second strings from bars 183 to 192. Although the left hand can comfortably play the G1–G2 octave using 1 and 4 on the fourth and second strings respectively, the bowing hand will be quite active having to play twenty-four consecutive string crossings between the fourth and second strings. The tempo marking for this movement is dotted-quarter note equals ninety-six beats per minute. I would presume that a competent player could perform this segment at tempo without issue.

The above example (Ex. 3.10) demonstrates that there are characteristics of tuning in fifths that are beneficial from another perspective. The G1–G2 octave can be played on the ADG contrabass using the open G string and the G2 on the adjacent D string. The bowing in fourths tuning necessitates playing the G1 on the E string (IV), then crossing over the third string (III) to play the G2 on the second string (II).

We also see that, in fourths tuning, the D2 in bars 158–60 is played on III instead of the open second string. The choice to play D2 stopped on III considered the fact that if it were played open, as shown in Ex. 3.11, the contrabassist would be playing four string changes in bar 158 and again in bar 159.


The additional shifting in fifths in these same two bars is a direct result of the fact that the G1 can only be played as an open string; therefore, the pitches that the contrabassist in fourths played over two strings on his contrabass can be played on the three-string contrabass's third string.
Bars 162 and 163 are played identically in either tuning in terms of left-hand position, fingering and string choice. The one difference between the two tunings in bar 163 is the choice of fingering for F2, the last eighth-note of the bar. The fifths version uses 3 instead of the 2 used in the fourths version. The issue here is the choice between using 2 or 3 to divide the whole tone between 1 and 4. The choice between 2 or 3 takes into consideration the fact that the second finger is the longest and is also quite flexible. However, the choice of the third finger provides better intonation for the reason that it is further away from the first finger and more accurately compensates for the fact that the distance between semitones decreases as pitch increases. The semitone between 1–3 sounds more in tune than 1–2. My discussion of this example, the choice between 1–2–4 and 1–3–4, both of which have merit, further illustrates a dilemma that contrabassists faced, whether they should use the fingering that is prescribed in methods or an alternative fingering that the contrabassist determined was the one that worked best.

It is not surprising that the trio excerpt was included in Durier’s method for fifths tuning in light of the popularity of Beethoven’s music at this time and the issues of performance surrounding the contrabass part in the trio. Although the trio excerpt appears in his section on simplification, Durier made only one small change to the excerpt: at the beginning of bar 157, he replaced the first two eighth notes (D2–C-sharp2) with a single D2 quarter-note. As a result of this alteration, the D2 quarter-note can be played on the second (D) string. Durier eliminated the shift required to play the C-sharp2 on the third string, and in doing so, has suggested a solution that keeps hand movement to a minimum.

The fourth movement's triumphant theme begins in the new key of C major. Beethoven gives the violoncellos three consecutive C2–C3 double stops in bars 1–2, supported by C2 in the contrabasses. The violoncellos play their lowest pitch C2 in bars 1 through 4 while the contrabasses play C2 in unison with the violoncellos.

354 Durier’s excerpt is only forty bars in length. Durier, Méthode, p. 52.
(Ex. 3.12). At bar 8, the contrabasses play C1 in the sixteen-foot range, doubling the violoncellos and the contrabassoon.\footnote{The reader is reminded that both the contrabass and the contrabassoon are transposing instruments and that their pitches sound one octave lower than written.}


The question remains as to why Beethoven has the contrabasses play C2 in unison with the violoncellos in bars 1 to 4, but then wrote the C1 an octave lower in bars 8, 10 and 12. I propose that he used the contrabass’s eight-foot and sixteen-foot registers as two contrasting types of textures to create variety and drama. When the contrabasses and violoncellos play the same pitch (C2) in unison as we see in bars 1 to 4, there is an increase in volume. However, when the contrabasses double the violoncellos an octave below, the lower compass of the orchestra is extended into the sixteen-foot range, creating a texture that maintains the energy of the opening C major chords played \textit{fortissimo}.

Beethoven orchestrated this theme in a way that pitch compass was used as part of an antecedent-consequent structure. Within the theme’s first four bars, the melody
rises a fifth from C to G and then back down to C. In bars 5 to 8, the melody extends a full octave higher to a high C played by the winds and the first violins. The descending figure played by the contrabassoons, violoncellos and contrabasses from bars 6 to 8 contrasts with this ascending melody. In addition, the contrabass figure in bars 8, 10 and 12 is an inversion of the violin melody on the last two beats of bars 7, 9 and 11. The two melodic fragments form a dialogue from bars 7 to 12 as demonstrated in Example 3.13.


Beethoven’s orchestration of the first eight bars gives the low strings the volume for the dramatic statement of the three C-major chords in bars 1 and 2, while at the same time delaying the statement of the contrabass’s C1 in the sixteen-foot register for the descending motif at bar 8.

3.5. Beethoven Symphony No. Six

The Sixth Symphony presented a unique challenge for French contrabassists tuned in fifths in that the primary key area is F major and as a result, the tonic pitch F1 would have been below the range of the instrument and would have to have been transposed to F2. Furthermore, the second movement is in B-flat major and presented a similar issue for dominant cadences written using F1.
The contrabass entrance at bar 13 (Ex. 3.14) illustrates this issue. The melodic phrase played by the violins, violas and violoncellos in bars 9 to 12 is repeated at bar 13 with the addition of the contrabass and the horns. We have seen this device before in Beethoven’s orchestration where he juxtaposes melodies in contrasting registers to add interest; here, the contrabass’s lower compass is used to achieve that effect. In this instance, the violoncello phrase that began on F3 is reiterated one octave lower beginning on F2 with the contrabass part doubling the line at bar 13 beginning on F1. EXAMPLE 3.14: Beethoven, Sym. No. 6, I, bars 9–16.

EXAMPLE 3.14: Beethoven, Sym. No. 6, I, bars 9–16.

The F1 pitches in bars 13 to 15 of the contrabass part would have to be transposed to F2 on the French ADG contrabass; however, I suspect that the entire three-bar figure in bars 13-15 would be transposed to preserve the melodic contour, but this solution places the contrabasses in unison with the violoncellos (Ex. 3.15). EXAMPLE 3.15: Beethoven, Sym. No. 6, I, bars 13–16 with transposition.

In addition, the two-octave change in compass between the violoncello line in bars 9 to 11 and the original contrabass part in 13 to 15 has been reduced to only one octave.
The primary theme of the first movement is stated by the first violins (Ex. 3.16). The descending octave between the first and last eighth-notes of the second bar form the basis of a recurring motive throughout the movement. This motif is repeated throughout thirty-seven consecutive bars between bars 151 and 186 in a number of combinations between the woodwinds and the strings.

EXAMPLE 3.16: Beethoven, Sym. No. 6, I, bars 1–4.

**Allegro ma non troppo**

Beginning at bar 175, the motif is played six times by the contrabass and the violoncello (see Ex. 3.17 a). The difficulty with playing this motif is that the last two eighth-notes, F-sharp1 and D1 are too low for the French contrabass and would have to be transposed. The D1 is also below the range of the four-string contrabass tuned in fourths.

EXAMPLE 3.17 a, b and c: Beethoven, Sym. No. 6, I.

This motif uses thematic material; therefore, if the contrabassist were to transpose only those notes that were out of range, the melody would be altered (Ex. 3.17 b). This motif can be heard throughout the development section and is played by most of the instruments. I would propose that the best solution is to transpose the entire motif up one octave with the result that the contrabass is playing in unison with the violoncello (Ex. 3.17 c). Furthermore, the motif is repeated over seven bars as the line crescendos from *piano* to *fortissimo* until it is taken over by the first violins at bar 182. As we have seen earlier, Beethoven juxtaposed melodic phrases among contrasting registers of the orchestra. Although this motif was unplayable as written on the French
contrabass, its presence demonstrates that Beethoven used this unique register of the contrabass for orchestral devices such as repeated motifs and crescendos.

In the fourth movement, Beethoven depicts the violence of a storm using the contrabass’s lower compass. From bars 21 to 32 the contrabass plays a series of sixteenth-note figures against the violoncello’s quintuplets as shown in Example 3.18.

**EXAMPLE 3.18: Beethoven, Sym. No. 6, IV, bar 21.**

![Example 3.18](image)

The figure shown in Example 3.18 repeats twelve times, rising a whole tone every four bars from F1 to G1 and then to A1 as illustrated in Example 3.19 a, b, and c. The resulting effect of the contrabass’s four sixteenth notes heard against the violoncello’s quintuplets recreates the chaotic energy of the storm that also underpins the chords played by the woodwinds and tympani.

**EXAMPLE 3.19 a, b, c: Beethoven, Sym. No. 6, IV.**

![Examples 3.19](image)

The nature of this section, particularly the dissonances resulting from the harmonies produced by the four-against-five rhythm between the contrabass and the violoncello, demonstrates the use of the contrabass as an effect. It is difficult to say how a contrabassist using the ADG tuning would have approached this passage; there is only one pitch, F1 that was out of range; I suspect that a contrabassist would have ignored the F1 and played the rest of the part as written.
3.6. Rossini: *Le Siége de Corinthe*

The third piece chosen is Gioachino Rossini’s opera *Le Siége de Corinthe* for it takes into consideration the fact that Chenié himself described using scordatura when performing this piece.\(^{356}\) In the earlier operas listed in Table 3.2 (from Rousseau’s *Le Devin du Village* [1753] up to and including Persius’s *Triomph de Trajan* [1807]), the bass part was commonly represented in the score by a single staff named *basso*.\(^{357}\) This term represented a variety of keyboard, wind and bowed instruments that would be notated at various points on the bass staff throughout the score and included basso continuo, violoncello, contrabass and bassoon. The score below (Fig. 3.2) illustrates the convention of assigning multiple instruments to play from the bass part. The bass part (bottom staff) throughout Rousseau’s score indicates no instrument names to the left of the staff. However, at various points throughout the score, Rousseau writes *basses, quintes, bassons, basso continuo* (with figured bass) and *contre basses*. Occasionally, he wrote *tous*, indicating that all bass instruments are to play. It should be noted that in the example below (Fig 3.2), the contrabass makes its only appearance in the score for four bars.\(^{358}\)

The scores from these early operas inform us that the contrabass was not yet considered a permanent member of the string family as we see in the later operas from Table 3.2. As orchestral instrumentation evolved towards the nineteenth century, keyboard instruments gradually disappeared from the orchestra and the violoncello and contrabass became the primary string instruments assigned to play the bass part.

\(^{356}\) Chenié, Letter to Cherubini.

\(^{357}\) In a number of the scores examined, the bass staff was left un-named. Several of Rossini’s operatic scores use the space where we would expect to see the term contrabass to indicate the tempo.

\(^{358}\) The term *Basses*, as it appears throughout the score, was used by the French to indicate violoncellos.
FIGURE 3.2: Rousseau, *Le Devin du Village*, scene 8, bars 77–81, p. 63.359

Rossini’s opera *Le Siège de Corinthe (L’Assedio di Corinto)* premiered in Paris on 9 October 1826 at the Salle Le Peletier. The opera was well received by French audiences and was performed regularly at the Opéra between 1826 and 1838. An unspecified Air from the opera was also performed by the Société des Concerts’

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benefit on 21 December 1828. Therefore, Chenié would have been familiar with this piece as principal contrabassist for both the Opéra’s and Société’s orchestra.

The violoncello and the contrabass double the bass line throughout much of the opera. Rossini often wrote one bass part, alternating it on either the violoncello staff or the contrabass staff and then used hash-marks to indicate that the one instrument was to double the other. However, when there were multiple character and choir parts performing, the violoncello and contrabass parts would be combined on a single staff with the violoncello part written stems up and the contrabass part stems down.

In the text of his letter to Cherubini (Appendix C), Chenié described using scordatura in Rossini’s opera *Siége de Corinthe*, explaining that he detuned his G1 string down a semitone to play the F-sharp1 (Fig. 3.3). He writes, “Dans le bel ouvrage du *Siége de Corinthe* de Monsieur Rossini, je descends un moment mon Sol à la fin du premier acte, pour avoir un Fa # qui se trouve à l’octave au dessous du violoncelle qui se fait sur l’Ut, et ce Fa # qui dure quelques instants, produit un superbe effet.” The fact that he says he uses it for a moment indicates that he detuned the G1 down momentarily for play the F-sharp1 and then tuned it back up to G1. This type of solution also is dependent on finding appropriate points in the music that give the player time to detune long enough to play the desired pitch and then retune back up to its previous pitch.

Throughout *Le Siége de Corinthe*, Rossini wrote pitches below the French contrabass’s G1 limit and into the sub-E1 range down to C1. In many cases these sub-E1 pitches are specifically notated in the contrabass staff separately from the violoncello indicating that Rossini intentionally wrote in the sixteen-foot range for the contrabass. His use of this range is surprising when we consider that in 1826, the year that *le Siége de Corinthe* was performed, the standard tuning for the French contrabass

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363 “In the beautiful work of the *Siége de Corinthe* by Monsieur Rossini, I lower my G for a moment at the end of the first act, in order to have an F-sharp that is one octave below the cello which is done on the [cello’s] C, and this F-sharp which lasts a few moments produces a superb effect.” Translation mine. Chenié, Letter to Cherubini, Appendix C.
was A2, D2, G1. In all but a few instances, the contrabass and the violoncello doubled the bass line an octave apart throughout the opera.

In the overture, Rossini demonstrated a wide use of range in the three-part writing between two violoncellos and the contrabass. In the first bar of Ex. 3.20, the contrabass doubles the violoncello part (Vc.II) one octave lower until the second beat. At this point, the top violoncello part (a) has an independent line. The violoncello (Vc. II) plays the F2 sixteenth-note on beat two; the contrabass (tuned ADG) must transpose the F1 up to F2. Rossini wrote the last three pitches of the violoncello part (Vc. II) an octave higher, expanding the range between it and the contrabass by two octaves. The F1 and the C1 are below the range of Chenié’s contrabass.


This extended range continues into the first half of next bar ending on the low C1 in the contrabass. The first sixteenth note on beat two of bar 54 is an F1 in the contrabass part, two octaves below the F3 played by violoncello (Vc. II) and three octaves below the F4 played by violoncello (Vc. I).

3.7. Summary

The Société des Concerts was created by Antoine Habeneck in part to promote Beethoven’s music. The enthusiastic reception of Beethoven’s works by Parisian audiences increased the demand to hear his repertory and as a result, his works were performed more than those of any other composer during Habeneck’s time at the podium.
The repertory performed by Chenié (1828 and 1832) as both the Opéra’s and the Société des Concerts’ principal contrabassist reveals that contrabassists who tuned in fifths had to perform a significant amount of octave transposition in addition to being criticized for the amount of shifting inherent in the tuning. My analysis of the three pieces in the study devoted more attention to the trio of Beethoven’s Fifth Symphony due to the number of times this topic appears in my research and because of the fact that this criticism came from composers, conductors and contrabassists.

Fétis’s claim that there was infinitely less shifting playing the trio on a contrabass tuned in fourths was explored in my analysis of the trio in both tunings and demonstrated to be an exaggeration. My research determined that throughout the discussion specific to playing the trio in one tuning versus another, there were no consistent definitions of what constituted a shift for either tuning. Moreover, the pro-fourths narrative made contradictory statements that contrabassists who tune in fourths did not have to change position when playing scales, a statement that is simply not borne out if we apply the same definition of a shift to both tunings. As a result of these statements, I was compelled to define a shift so that I could apply this metric to either tuning in my analysis.

My findings determined that there sixty-four shifts in fourths compared to ninety-four shifts in fifths, a difference of twelve percent. The increased amount in shifting in fifths can be attributed to the fact that the French ADG contrabass has one less string than its EADG counterpart and therefore the pitches are distributed over three strings not four. The additional whole-tone difference between open strings in fifths situates the trio’s pitch material further up the fingerboard in fifths with the result that a player tuned in fifths has to play more pitches up the fingerboard before they can change to an open string.

The analysis also revealed that although the player shifted less in fourths, they performed seven percent more string changes than a player in fifths. This figure can be attributed to two factors: first, there is a smaller interval between open strings in fourths compared to fifths and second, the trio’s pitches are distributed over four strings. These two factors, when combined, concentrate the pitch material of the trio in a smaller area of the fingerboard over four strings instead of three. However, twenty-
five percent of the total string changes in fourths involved skipping over a string. Consequently, we can indeed confirm that there is more shifting in fifths but that there is more string-crossing in fourths, and often of a more awkward sort. Finally, I have determined that the player in fifths shifts twelve percent more than the player in fourths, a more realistic figure than Fétis’s exaggerated claim.

Another component of my study of the repertory looked at octave transposition through the lens of the contrabassist tuned in fifths. I had already determined that the limits of the ADG tuning’s lower compass resulted in more octave transposition; I examined those instances where composers used this specific group of pitches in their works. My methodology considered whether these pitches were intrinsic to a melody or motif based on a theme in that composition, or were they used to delineate form such as the beginning or end of a phrase. I also considered that any pitch written below G1 in the three pieces had to be transposed an octave higher, and whether or not that transposition required additional notes before or after the pitch for the aesthetic reasons just described, but are also based on my own experiences as a contrabassist.

My study determined that lower-compass pitches were used in a number of different ways by Beethoven in both the Fifth and Sixth symphonies. He used this register to fortify dramatic moments such as the restatement of the Fifth Symphony’s primary motif in Example 3.1 where the motif is played an octave lower than its first appearance at the beginning of the first movement. Although this motif is based on a primary theme, its placement also defines the end of a particular section. Example 3.3 demonstrates how Beethoven used the C1 to announce the change to the new key of C major.

The form of the second movement is based on variations of the themes contained therein. It is here that Beethoven frequently gave a motif or phrase to the contrabass to be played as a variation using a lower register as demonstrated in Example 3.2. In Example 3.2, Beethoven also use techniques such as contrasting dynamics between piano and forte in addition to bowing techniques where the cadence is first played piano using pizzicato followed by the same cadence played forte using arco.
In the Sixth Symphony’s fourth movement, Beethoven simulates the violence of a storm using the harmonic and rhythmic clashes between the contrabass and the violoncello parts to create this specific and somewhat dated effect.

An issue that drastically affected the contrabassist tuned in fifths was the key of the composition as demonstrated in the Sixth symphony, written in F major. Although F1 is only one tone below the G1 limit on the ADG contrabass, Beethoven wrote a significant number of tonic F pitches in this register, with the result that all F1 pitches had to be transposed.

My research discovered that scordatura was a feasible, but limited option for sub-G1 pitches based on Chenié’s reference to using the technique himself to play an F-sharp1 in Le Siége de Corinthe. So far, Chenié’s comment on scordatura is the only one of its kind where a player tuned in fifths discusses an approach to play out-of-range pitches on their instrument with reference to a specific piece of music. Although the technique was applicable in Rossini’s opera, its use, as described by Chenié, appears to have been limited to the one section described above.

Throughout the repertory, many of the sub-G1 pitches that had to be transposed were part of a motif or even a theme, in which case transposing just that pitch by itself would be detrimental to the original theme or motif. The most musical solution would be to transpose all or part of of the theme or motif to preserve the melody, albeit in a register that is one octave higher.

This investigation does not suggest that the solutions applied to any of the examples of the above repertory were actually played by Chenié with the exception of his use of scordatura; we simply lack such evidence at this point. My purpose was to examine repertory that I know with certainty was performed on the ADG tuned contrabass with the aim of understanding how French contrabassists using the tuning between 1828 and 1832 may have dealt the issues identified above. The relevance of this study provides context for the demise of the tuning at the Conservatoire in addition to understanding what those issues were and whether or not such issues may still be present in the contemporary ADGC tuning in use today.
Chapter Four: Acoustic Characteristics

In this chapter, I explore some of the acoustic properties of the contrabass tuned in fifths using both empirical and subjective perspectives to explain the assertions made by practitioners of the tuning who unanimously claim that a contrabass tuned in fifths is more resonant than when tuned in fourths. Yet, these observations are subjective. Contrabassists who wanted to confirm that their instrument sounds more resonant in fifths undertook two empirical studies; each of these tests is presented on their websites.³⁶⁴ In the first study, Dennis Masuzzo presents a theoretical explanation of this resonance through the lens of the harmonic series.³⁶⁵ The second study, by Silvio Dalla Torre, is a graphic analysis that compares the waveform amplitudes of two audio-recordings of his contrabass, first tuned in fourths and then in fifths. In both cases, these two contrabassists conclude that the test results affirm their assertions that the instrument is more resonant in fifths. I discuss both tests in detail below.

4.1. Harmonic Overtone Series

I use the harmonic overtone series to explain resonance as it pertains to the tests throughout this chapter. It is necessary then to examine the character of a musical tone, the sound produced by a musical instrument. The difference between sounds that we identify as noise versus musical tones is that noise is characterized as irregular,

³⁶⁴ Dalla Torre’s website was under construction as of December 2021 and the original article first viewed in October 2018 was unavailable; however, a version of this article is featured on Joel Quarrington’s website. Silvio Dalla Torre, “The Latest About the Bass in Fifths.” https://joelquarrington.com/the-latest-about-the-bass-in-fifths. Accessed 19 February 2019.
rapidly-alternating sensations of sound, whereas musical tones are uniform with periodic, measurable frequencies.

EXAMPLE 4.1: Harmonic overtone series for C1.
The tone from a contrabass has a complex structure comprising a fundamental pitch as well as upper-harmonic frequencies or overtones, all of which conjoin into the musical tone we hear. This structure of pitches is called the harmonic overtone series (see Ex. 4.1). Moreover, it is the specific and unique combination of the frequencies and amplitudes of the fundamental and its overtones that defines a musical tone’s timbre and thus distinguishes a pitch made by that instrument from the same pitch made by other instruments. In Example 4.1, the fundamental C1 is the lowest frequency in this series. Upper-harmonic frequencies are related to the fundamental frequency \( f \) in that their values are derived by multiplying \( f \) by whole numbers 1–16.\(^{366}\) Using this information, we can describe resonance with regard to the contrabass as follows: when an open string with a specific fundamental frequency is excited \((arco\ or\ pizzicato)\) by a pitch of the same fundamental frequency, or by one of its upper-harmonic frequencies, then sympathetic vibrations of large amplitude are produced in that open string.\(^{367}\) The character of these vibrations on a contrabass tuned in fifths is related to the resonance described by those players who use that system, although this type of resonance and the theory behind it are applicable to any string instrument in any tuning.

4.2. Resonance Study One

The first test was carried out by Joan Miller, an acoustician with Bell Laboratories, who created the graph shown in Fig. 4.2 in which she applied the harmonic overtone series to demonstrate how sympathetic vibrations were caused by playing the open strings of a contrabass in fourths and fifths tunings.\(^{368}\)


\(^{368}\) My sincere thanks to Dennis Masuzzo who generously provided me with photocopies of Miller’s original chart and notes. Joan E. Miller, *Chart and Notes of Sympathetic Vibrating Strings in Fourths and Fifths*. Unpublished graph with notes given to Dennis Masuzzo (1999).
EXAMPLE 4.2: Miller, chart of sympathetic open string vibrations.

The impetus for the test was in response to contrabassist Dennis Masuzzo's explanation that his contrabass was more resonant in fifths than when tuned in fourths. Miller presented the hand-drawn graph and its explanatory notes to Masuzzo as a way of demonstrating his assertion. He summarizes her findings on his website, and in an article published in both *Bass World* and *American String Teacher*, but does not include Miller’s graph or notes.\(^ {369} \) Miller worked for Bell Laboratories as a mathematical acoustician for over thirty years and held a Ph.D. in mathematics from

Columbia University. She was also a violinist who published in the *Catgut Acoustical Society.*

Below is my discussion of the graph. I have reproduced Miller’s graph, separating the tunings into two separate graphs using the colours and terminology from Miller’s original graph; she demarcated the tunings using red for fifths and blue for fourths, and marked intersections with the overtone diagonals using dots and squares as mentioned in her notes. In my reproductions of Miller’s graphs, I use squares over pitches to identify closed-string pitches that, when played, can excite sympathetic vibrations above, or on the fundamental diagonal.

Miller’s empirically-based methodology demonstrates how pitches played on the contrabass cause open strings to vibrate sympathetically. Both tunings were superimposed on a single graph to show the overtone series as the primary point of reference. She elaborates on the chart’s layout in her notes stating, “Intersections along the horizontal coloured lines (for string pitches) with the diagonals determine sympathetically-vibrating strings in response to the fundamental of pitch, determined by dropping a vertical line to the horizontal axis from the point of intersection.”

Miller’s calculations are based on the harmonic series alone and not on testing the sympathetic vibrations that occur when playing an instrument. The graph is a Cartesian plane, or x-y plane where all values appear in quadrant one (all values are positive). The x-axis maps pitches (both tunings) played as closed pitches on the instrument with the lowest pitch of the fourth string beginning at x, y intersection or point of origin (PO). The graph is to scale with the unit of measurement being the semitone. The y-axis maps the open strings in both tunings, beginning with the lowest-pitched string at the PO and increasing in pitch by units of a semitone. Miller drew a series of diagonal lines beginning at the PO that, moving up the y-axis, represent the

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fundamental and the first seven harmonic frequencies of the overtone series. My graphs do not extend past the third harmonic frequency because there are no points of intersection beyond the second harmonic frequency in Miller’s graph. I have numbered each intersection identified on Miller’s graph on my own for reference purposes only.

An important observation of fifths tuning that affects the number of sympathetic vibrating open strings is that the first and second harmonic frequencies (the octave and the octave plus a fifth) occur earlier in the series with the result that they are likely to be excited more frequently. Each open string (except the fourth string, C1) on a contrabass tuned in fifths can be set to vibrate sympathetically by playing the adjacent lower string because they are a fifth apart, and because the second harmonic in the harmonic series is an octave plus a fifth above the fundamental. This particular example can be seen in Miller’s graph where she identifies sympathetic vibrating open-strings with red dots along the y-axis.

Miller’s graph demonstrates how the strings on the contrabass tuned in fifths resonate with each other using the harmonic series. She illustrates that the contrabass in fifths creates a situation where the first and second harmonic frequencies (the octave and the octave plus a fifth), appear earlier in the harmonic series with the result that they are likely to be excited more frequently because of that position. The pitch orientation of a contrabass in fourths is such that sympathetic vibrations of open strings occur less frequently than fifths primarily because the interval of a fourth does not appear in the harmonic series until the tenth harmonic (see Ex. 4.1). Therefore, the excitation of this harmonic frequency, when playing open strings, would be less pronounced as a result of its distance (tenth harmonic) from the fundamental; the perfect fifth appears earlier in the overtone series at the second overtone above the fundamental (octave plus a perfect fifth). The tables below (Table 4.1a and b), summarize the information shown in Examples 4.2 and 4.3.
TABLE 4.1 a: Miller, summary of overtones in fifths tuning.

Fifths tuning: A2, D2, G1, C1

<table>
<thead>
<tr>
<th>Pitch played</th>
<th>Ref. for pitch played Ex. 4.3</th>
<th>Pitch excited</th>
<th>Ref. for pitch excited in Ex. 4.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1 open 4th string</td>
<td>y axis, no. 16</td>
<td>G1 open 3rd string</td>
<td>G1 string, no. 17</td>
</tr>
<tr>
<td>G1 open 3rd string</td>
<td>y axis, no. 17</td>
<td>D2 open 2nd string</td>
<td>D2 string, no. 18</td>
</tr>
<tr>
<td>D2 open 1st string</td>
<td>y axis, no. 18</td>
<td>A2 open 1st string</td>
<td>A1 string, no. 19</td>
</tr>
<tr>
<td>D1 closed on 4th string</td>
<td>C1 string, no. 1</td>
<td>D2 open 2nd string</td>
<td>D2 string, no. 2</td>
</tr>
<tr>
<td>G1 closed on 4th string</td>
<td>C1 string, no. 4</td>
<td>A2 open 1st string</td>
<td>A2 string, no. 3</td>
</tr>
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<td>A1 closed on 4th string</td>
<td>C1 string, no. 6</td>
<td>A2 open 1st string</td>
<td>A2 string, no. 8</td>
</tr>
<tr>
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<td>G1 string, no. 7</td>
<td>A2 open 1st string</td>
<td>A2 string, no. 8</td>
</tr>
<tr>
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<td>D2 open 2nd string</td>
<td>D2 string, no. 11</td>
</tr>
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<td>D2 closed on 3rd string</td>
<td>G1 string, no. 10</td>
<td>D2 open 2nd string</td>
<td>D2 string, no. 11</td>
</tr>
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<td>A2 open 1st string</td>
<td>A2 string, no. 15</td>
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<td>A2 open 1st string</td>
<td>A2 string, no. 15</td>
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</tbody>
</table>

TABLE 4.1 b: Miller, summary of overtones in fourths tuning.

Fourths tuning: G2, D2, A1, E1

<table>
<thead>
<tr>
<th>Pitch played</th>
<th>Ref. for pitch played Ex. 4.4</th>
<th>Pitch excited</th>
<th>Ref. for pitch excited in Ex. 4.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1 closed on 4th string</td>
<td>E1 string, no. 1</td>
<td>G2 open 1st string</td>
<td>G2 string, no. 2</td>
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<tr>
<td>A1 closed on 4th string</td>
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<td>A1 open 3rd string</td>
<td>A1 string, no. 4</td>
</tr>
<tr>
<td>D2 closed on 4th string</td>
<td>E1 string, no. 5</td>
<td>D2 open 2nd string</td>
<td>D2 string, no. 7</td>
</tr>
<tr>
<td>D2 closed on 3rd string</td>
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<td>D2 open 2nd string</td>
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<td>G2 closed on 4th string</td>
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<tr>
<td>G2 closed on 3rd string</td>
<td>A1 string, no. 9</td>
<td>G2 open 2nd string</td>
<td>G2 string, no. 11</td>
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<tr>
<td>G2 closed on 2nd string</td>
<td>D2 string, no. 10</td>
<td>G2 open 2nd string</td>
<td>G2 string, no. 11</td>
</tr>
</tbody>
</table>

The columns marked Ref. for pitch played show the locations for the pitches on the four strings (displayed horizontally) for each tuning on each graph.

Miller’s graph affirms the claim by Masuzzo that his instrument exhibited more resonance after he began tuning in fifths.
EXAMPLE 4.2: Miller, sympathetic open strings, fifths tuning

- x-axis = pitches played on the fingerboard.
- y-axis = open strings in fifths tuning C1, G1, D2, A2.
- y-axis black diagonals represent the harmonic overtone series. uHF = upper harmonic frequencies.
EXAMPLE 4.3. Miller, sympathetic open strings, fourths tuning.

The graph demonstrates that sympathetic vibrations occur more frequently in fifths tuning as opposed to fourths tuning due to the second upper-harmonic frequency in the harmonic series. In summary, Miller’s charts for fifths tuning demonstrates that
three sympathetic overtones are produced when playing the C1, G1 and D2 open strings indicated on the y axis and nine sympathetic overtones are produced by playing the closed pitches indicated on the x axis, a total of twelve sympathetic overtones. The chart for fourths tuning shows a total of six overtones generated, but all of these were the result of playing stopped pitches on the second, third and fourth strings. None of the open strings in fourths tuning generated sympathetic vibrations according to Miller’s chart.

4.3. Chapman’s Reservations

Another factor that prompted Dalla Torre to conduct this test was an article by David Chapman in *The Galpin Society Journal* that critiques the contrabass tuned in fifths as a novel tuning. Chapman takes issue with Joel Quarrington’s statement that the contrabass tuned in fifths resonates more freely, writing, “to claim that a tuning scheme of C’-G’-D-A will provide any instrument with greater resonance over the entire range of the circle of fifths seems specious at best.” He cites his personal, subjective experience with his own contrabass tuned in standard orchestral fourths G2, D2, A1, E1, stating that he can achieve a similar resonance to fifths by playing the lower pitches C1 and D1 on his fourth-string extension. The resonance to which he refers in his example can be explained by the excitation of the open G1 string by the second upper-harmonic frequency of C1; the excitation of the open A2 string by the second upper-harmonic frequency of D1; and the excitation of the open string D2 by the first upper-harmonic frequency generated by playing D1.

Chapman’s example actually supports the claims related to superior resonance in fifths because the resonance to which he refers is a direct result and characteristic of the early position of the second upper-harmonic frequency (a major twelfth) in the harmonic series. His example is limited to the C1 and D1 pitches on his fourth-string

extension and ignores the other three strings on his contrabass. Chapman is correct when he states above that he can achieve a similar resonance to fifths. However, the issues of resonance in the arguments put forth by players in fifths are based on comparisons of their contrabass tuned in both fifths and in fourths and the fact that these pitches are found in the playable range in fifths, without an extension. Chapman’s example diverges from his argument on the validity of fourths based on the history of viol tuning because he changes the range of the fourth string from E1 to D1 and C1, altering its intervallic relationship with the other three open strings and the subsequent effect of upper-harmonic frequencies on these open strings. His argument is grounded in his assertion that the contrabass was wrongly identified by Quarrington and others as a member of the violin family, not the viol family, as he strongly contends. Therefore, the historical validity and acoustical viability of viols tuned in fourths must be taken into account, in Chapman’s opinion, as part of the discussion of resonance. He maintains that “today’s double bass instrument clearly falls into a category distinct from that of the other modern bowed string instruments, and its lineage is apparent in its physical differences from the members of the violin family.” I can agree that the contrabass [double bass] is distinct from other orchestral string instruments in that its complicated lineage can be attributed to both the viol and violin families with convincing arguments that support either point of view. I also do not refute Chapman’s research that traces the standard orchestral practice of tuning in fourths to the viol family. Nonetheless, today’s modern contrabass shares principal construction elements with the violin family such as the bass bar, the sound post and a fretless fingerboard that clearly define it as it exists today, as a member of the violin family. I argue that the current practice of tuning the contrabass in fifths is a modern application applied by contemporary contrabassists to their instrument as a practical solution for obtaining sub-E1 pitches down to C1 found in orchestral repertory. In my research, those players who tune in fifths, myself

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373 The other person Chapman identifies is Paul Brun who clearly asserts that the contrabass falls within the violin family of instruments. Brun, New History, p. 13.
included, unanimously agree that the instrument sounds more resonant tuned in fifths than when tuned in fourths and that the decision to use fifths is based on current, practical considerations and does not rely on historical factors at all. Quarrington’s comments regarding the instrument’s resonance are directly related to the laws of acoustics (harmonic-overtone series) applied to the contrabass tuned in fifths. These same laws govern all orchestral string instruments regardless of their history; any historical argument on a tuning, regardless of its viability, will not change these facts.

4.4 Resonance Study Two

Between December 2005 and February 2006, the second test was undertaken by contrabassist Silvio Dalla Torre to test the acoustic qualities of a contrabass tuned in fifths in comparison to the same instrument tuned in fourths. Dalla Torre’s methodology and findings appear in the article “The Latest about the Bass in Fifths” on his website. The impetus for the test was Dalla Torre’s appreciation of the tuning’s benefits coupled with his own perception of the instrument’s superior resonance in fifths that he observed after attending a masterclass given by Joel Quarrington at Toronto’s Royal Conservatory of Music.

For this study, Dalla Torre enlisted the help of sound engineer Carsten Storm to record Dalla Torre’s contrabass in December 2005 tuned in fourths and then in February 2006 tuned in fifths. In the first part of this test, Dalla Torre played a chromatic scale from F-sharp1 to A4 using the solo tuning (fourths) A2, E2, B1, F-sharp1; however, he began the scale on G1 to avoid playing the open string. For the second part of the test, he played a chromatic scale from C1 to A4 on a contrabass tuned in fifths A2, D2, G1, C1; he also began the scale on C-sharp1 to avoid playing the open string.

To maintain consistency, Dalla Torre used strings made by Pirastro called Obligato, presumably because this line is available in solo, orchestral and fifths
He also states that the same microphone, distance to source and recording studio were used to record both tests. He recorded the audio files using Samplitude 7.0 software but does not list the recording interface used, nor does he confirm that he used the exact same hardware and software settings regarding input levels and equalization.

Dalla Torre compared the two tests using a screenshot of the audio waveforms of each recording (Fig. 4.1). Each test was recorded in stereo showing the left and right channels for each tuning. The red vertical bars represent the amplitude or volume of the recording expressed in decibels. The waveform’s screenshot represents only a portion of the recording and it is not clear if we are looking at a comparison of similar pitch material from either tuning. He states that the larger amplitude shown in the bottom waveform for fifths tuning is larger than the top waveform for fourths tuning and therefore confirms his subjective impression that fifths is acoustically superior to fourths.

While the screenshot clearly shows the larger waveform for the instrument tuned in fifths, the main issue with this test is that only one contrabass was tested to make the claim that fifths tuning is acoustically superior to fourths. The test results are true for his instrument. I believe that in order to determine a consistent trend of results, a larger pool of instruments needs to be tested. Furthermore, the two tests were recorded approximately two months apart. This gap of time, Dalla Torre explains, allowed the new Obligato fifths-tuning strings time to settle and lose their harshness.

My concern is that the instrument’s set-up may have changed over the two-month interval between tests. Furthermore, the larger amplitude is not necessarily indicative of greater resonance; it could be interpreted as the overall volume at which the track was recorded. A spectrographic analysis would separate the audio file into specific frequency ranges and their amplitudes thereby revealing more detail.

The tests examined above explore two different methodologies used by practitioners of fifths to support their claims of its superior resonance; the Miller/Masuzzo test is theoretical in that it relies on the harmonic series as applied to all contrabasses in either tuning to explain the phenomenon, while Dalla Torre used an acoustic test using sound recording to explain the practical issues related to performance that are subjectively reported by the player. In both cases, these tests can be considered as acoustic evidence added to the subjective claims regarding fifths, possibly as an attempt by these two practitioners to legitimize and therefore normalize the tuning alongside the more predominant tuning in fourths. The tests themselves represent valid and useful methodologies for explaining the claims made above, independent of the conclusions.
4.4. Acoustic Test 2020 Methodology

The acoustic test I conducted is similar in approach to the one undertaken by Dalla Torre. Based on advice from an audio engineer with more than thirty years of experience, I used the following set-up: two full-range, omni-directional AKG C414 XLS microphones were mounted twelve inches apart on a stereo bar attached to a microphone stand positioned six feet in front of the instrument. I set the microphone height to be even with the horizontal plane of the bow position. Both microphones were connected to a Focusrite Scarlett 2i2 audio interface connected to a Macbook Air laptop. The software used for the recordings was Logic Pro X. Audio files were recorded at 96k, 24-bit settings to produce a high-quality recording with all equalization settings set to a flat response. The gain levels for the microphone inputs on the interface were marked and used for each contrabass that was tested.

The tests were recorded in my condominium in Toronto in the last week of June 2020. My original plan to record contrabassists playing their own instruments in a recording studio had to be reconsidered as a result of the state of emergency imposed by Ontario’s provincial government during the summer of 2020 as a direct result of the Covid-19 pandemic. In light of such restrictions, I made the decision to record the tests at my home with the full understanding that certain parts of that test would be compromised by that decision. I had a limited window of several hours each day to conduct the tests due to the unavoidable noise in my neighbourhood. I realize that a recording studio would have yielded a more isolated recording than my condominium with regards to the recording and the elimination of unwanted ambient noise. Additionally, the advice from a recording engineer would have been beneficial.

One of the tenets of my methodology was to maintain as much consistency as possible throughout the testing process. I recorded each of the three contrabasses in both tunings playing a one-octave chromatic scale from E1 to E2. The two string sets used for the test were the Pirastro Obligato set for fifths tuning and the orchestral set in fourths tuning. An important consideration for choosing the Obligato sets was that both sets are made from the same materials. Furthermore, Pirastro is the only manufacturer to make a specific line of strings in both fourths and fifths tuning.
In addition to using the same string sets for all three instruments, I performed all the tests myself using the same bow, same rosin and a consistent technique throughout all the testing. Inasmuch as my attempts to achieve consistency seemed logical at the time, I quickly discovered that the consistency I sought was limited, for the most part, because the response of each contrabass once mounted with new strings was out of my control.

Whenever new strings are mounted on a contrabass, they have to be tuned up to pitch continually until they stabilize and hold their pitch. During this time, both the strings and the instrument adapt to the tension—a break-in period. Ideally, the instrument should have its sound post adjusted as this adjustment can often improve instrument response when it is mounted with a new or different type of string. At the time of my test, none of the instruments were given more than a day to adjust to the new strings and I was not able to have any adjustments made in terms of setting up the instruments.

Contrabassists often experiment with strings, choosing individual strings by different manufacturers to assemble a set customized to their instrument in consideration of their playing requirements. This process is both time consuming and expensive. There are at least two manufacturers that make complete string sets specifically for fifths tuning: Thomastik Infeld makes the Spirocore “Red Mitchell” set and Pirastro, the Obligato fifths set. There is another option for choosing strings that involves selecting individual strings from three different types of sets: orchestral tuning, solo tuning and five-string tuning. This option gives the player far more choice in that most manufacturers offer all three sets made with a variety of tensions and materials.

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376 Orchestral tuning is G2, D2, A1, E1. A five-string set uses the first four strings from an orchestral set and adds a fifth string to the lower compass tuned to C1 or B0. A solo-tuning set is A2, E2, B1, F-sharp1.
4.5. Analysis

The first fifteen overtones from each of the thirteen pitches in the chromatic scale were measured using the spectrometer in WaveLab Pro 10, a software program used for mastering and analyzing audio. The spectrometer renders a visual representation of an audio file’s frequencies as overtones that appear as large peaks in the graph as demonstrated in Figure 4.2.\(^{377}\)

**FIGURE 4.2:** Spectrometer screenshot of E1 played *arco* on Cb. 2.

The graph, shown in landscape orientation is a snapshot of an E1 pitch played on contrabass no. 2 recorded in stereo; the top graph shows the left channel and the bottom graph shows the right channel. The x-axis measures the frequency of the overtone in Hertz (Hz) and the y-axis displays the level of the overtone in decibels (dB). The fundamental E1 is 41Hz; the first overtone E2 (82Hz) is significantly louder. This difference might be explained by the fact that the tests were not made in a recording studio with proper sound absorbing and dampening materials.

\(^{377}\) One feature in WaveLab’s spectrometer is that it allows snapshots to be taken of the pitch and exported as a graphic.
The spectrometer in WaveLab has a peak-hold function that displays a small bar at the apex of each overtone indicating the highest value (in dB) measured for that overtone. The display can be held for up to thirty seconds permitting measurements to be obtained by positioning the mouse pointer (shown as a crosshair) over this peak value. The information bar in the spectrogram displays the overtone’s amplitude in decibels and the frequency in Hertz according to the crosshair’s position. The measurements were taken for both left and right channels. This process was repeated for each of the sixteen partials for all thirteen pitches in the chromatic scale. Four measurements were recorded for each of the sixteen partials: partial, frequency, left channel amplitude and right channel amplitude. This entire process was conducted for both arco and pizzicato. In total, 3328 values were recorded.\textsuperscript{378}

The first contrabass tested (Cb. 1) was made by the Eastman company and featured violin corners, a carved back and a removeable neck.\textsuperscript{379} The previous owner made internal structural modifications to the instrument including strengthening the corner blocks and end blocks, changing the gradation of the instrument and inserting a carbon-fibre rod under the fingerboard. The scale length is forty-one inches. This contrabass does not have a traditional ebony tailpiece but instead features a Marvin tailpiece comprised of four thin twisted-steel cables that are anchored to the endpin. The string passes through a hole in a small metal disc at the end of each cable.

The second test instrument was my own contrabass (Cb. 2), a Panormo-style instrument built in Germany in 2005 by Heinrich Gill.\textsuperscript{380} Contrabasses built in the Panormo style feature a larger than normal upper bout with rounded shoulders. This instrument has a four-piece flat back and sides made of maple, a two-piece, carved spruce top, violin corners and a string length of forty-one inches.

\textsuperscript{378} The snapshot in Fig. 4.2 was captured while the audio file’s playback was being looped. The spectrometer’s snapshot features are limited and cannot show the wave at a pre-set point during playback; therefore, the example shown was captured after several attempts to show the file at the peak amplitude. The example is intended to show the process involved in taking measurements.

\textsuperscript{379} A removeable neck allows the player to disassemble the neck from the body for the purpose of transporting the instrument in a smaller flight case.

\textsuperscript{380} Vincenzo Panormo was an Italian-born luthier.
The third contrabass (Cb. 3) is an Italian instrument built in 1980 by Tunioli that features violin corners, a round back and a scale length of forty-one inches.

There are factors that need to be taken into consideration when undertaking a test such as the one presented below, some of which are out of the researcher’s control. In hindsight, the number of variables that can affect the sound of the contrabass were quite significant and although I tried to maintain consistency throughout the test, the individual response of each instrument, once mounted with the test strings was unpredictable. Furthermore, the two instruments I borrowed for the test had not been set-up in some time. Contrabass 3 had not been played for many months prior to the test due to the cessation of live music during the Covid-19 pandemic. In addition, the room where the tests were recorded was not sound-proofed and did not have any specific materials to absorb sound reflection and diffusion that one would find in a recording studio.

4.6. Test Results

The test results are shown in Tables 4.2 through 4.7. Each instrument has two tables, one for arco and one for pizzicato. The column at the far left of each table indicates the fundamental and first fifteen overtones. Across the top row, from left to right, are each of the pitches in the E1-E2 chromatic scale. The levels for each overtone, expressed in decibels, appear beneath each pitch in two columns marked 4ths and 5ths. The greater value between the two tunings for that specific overtone is highlighted in yellow. Due to the nature of the recording equipment’s metering conventions, the decibel values have a minus (-) sign. As the recording’s signal approaches zero dB, it is actually getting louder. For example, a level of -45dB is louder than a level of -55dB.381

381 Values that appear in red signify an identical value measured for both tunings for that pitch.
| 8 | 11 | 14 | 17 | 20 | 23 | 26 | 29 | 32 | 35 | 38 | 41 | 44 | 47 | 50 | 53 | 56 | 59 | 62 |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
| 65° | 66° | 59° | 55° | 51° | 47° | 43° | 39° | 35° | 31° | 27° | 23° | 19° | 15° | 11° | 7° | 3° | 0° | -3° |
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### TABLE 4.3: Acoustic test, contrabass no.1, pizzicato.

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*Contabass 1 Pizzicato.*
TABLE 4.4: Acoustic test; contrabass no. 2, arco.

| Notes | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 | 52 | 56 | 60 | 64 | 68 | 72 | 76 | 80 | 84 | 88 | 92 | 96 | 100 | 104 | 108 | 112 | 116 |
|-------|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| C     | 47| 49| 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 | 77 | 79 | 81 | 83 | 85 | 87 | 89 | 91 | 93 | 95 | 97 | 99 | 101 |
| E     | 42| 44| 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 | 82 | 84 | 86 | 88 | 90 | 92 | 94 | 96 | 98 |
| G     | 37| 39| 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 | 77 | 79 | 81 | 83 | 85 | 87 | 89 | 91 | 93 |
| B     | 32| 34| 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 | 80 | 82 | 84 | 86 | 88 |
| D     | 27| 29| 31 | 33 | 35 | 37 | 39 | 41 | 43 | 45 | 47 | 49 | 51 | 53 | 55 | 57 | 59 | 61 | 63 | 65 | 67 | 69 | 71 | 73 | 75 | 77 | 79 | 81 | 83 |
| F     | 22| 24| 26 | 28 | 30 | 32 | 34 | 36 | 38 | 40 | 42 | 44 | 46 | 48 | 50 | 52 | 54 | 56 | 58 | 60 | 62 | 64 | 66 | 68 | 70 | 72 | 74 | 76 | 78 |

Total number of longest oscillations by pitch.
Total number of loudest overtones by pitch

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</tbody>
</table>

215
TABLE 4.6: Acoustic test, contrabass no. 3, arco.

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</tbody>
</table>
There are a number of values marked n/a in each of the three tables for pitches played pizzicato due the fact that pitches played pizzicato do not sustain the same way as do pitches played arco and decay much more quickly. These values were taken from partials that appear higher up in the harmonic-overtone series and the amplitudes were so small as to be indistinguishable from other noise in the recording. Therefore, I was unable to determine a value for that overtone based on the spectrometer display.

Table 4.8 summarizes the information in Tables 4.2 through 4.7, showing the fundamental and overtones (designated as partials [Ptl.]) and number of instances where that partial was loudest for that tuning for each of the three instruments tested. For example, if we look at the arco column for Cb. 1, the fundamental ($f)$ in fourths tuning had a louder value for nine of the thirteen pitches in the chromatic scale as compared to fifths tuning where the fundamental was louder in only four of the thirteen pitches. In the pizzicato column, the fundamental was louder twelve times in fourths tuning compared to only one time in fifths tuning.

**TABLE 4.8: Acoustic test summary for contrabasses 1, 2 and 3.**

<table>
<thead>
<tr>
<th>Contrabass No. 1</th>
<th>Contrabass No. 2</th>
<th>Contrabass No. 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ptl.</strong></td>
<td><strong>4ths</strong></td>
<td><strong>5ths</strong></td>
</tr>
<tr>
<td>$f$</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>1</td>
<td>11</td>
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<td>14</td>
<td>9</td>
<td>4</td>
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<tr>
<td>15</td>
<td>7</td>
<td>6</td>
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</tbody>
</table>

Using the information in Table 4.8 we can state that Cb. 1, played arco, was more resonant in fourths tuning with the exception of overtone six where the value was the
same in both tunings. The values for *pizzicato* show that every partial was more resonant in fourths tuning.

The results for Cb. 2 shows a clear inclination towards more resonance in fifths. There were two overtones in the *arco* category where fourths tuning was more resonant and three overtones in the *pizzicato* test that were more resonant including overtone 13 where the values were the same for both tunings.

The results for Cb. 3 point to more resonance in fourths tuning played *arco* but not as definitively as shown for Cb. 1. There were three overtones in the fifths test that were greater than their fourths counterparts with another three overtones that were equal to those in fourths tuning. The values for Cb. 3 played *pizzicato* show more resonance in fourths with only two stronger overtones numbers 2 and 4 having a higher amplitude in fifths tuning.

The tables below (Tables 4.9 a–d) show the number of times that one of the three contrabasses was recorded demonstrating a more resonant partial than its counterpart throughout each of the thirteen pitches. The first table (Table 4.9 a) is for the scale played *arco* for all three instruments tuned in fifths; the second table (Table 4.9 b) is for fifths tuning played *pizzicato*. This process is repeated for fourths tuning using both *arco* (Table 4.9 c) and *pizzicato* techniques (Table 4.9 d). The totals for each partial are shown at the right-hand column where the highest value for each tuning is again highlighted in yellow. It should be noted that the second overtone in Tables 4.9 a and b is the first appearance of the fifth in the harmonic overtone series and is also, not surprisingly, the most prominent overtone measured in fifths tuning.

These test results did not establish a clear trend towards superior resonance in either tuning as a result of the fact that only three instruments were used. In the case of this particular type of test, I concluded that the number of instruments tested was not enough of a sampling to make any specific assertions even though the results for Cb.2 do, in fact, show superior resonance for fifths. Herein lies an issue with this particular methodology. Ideally, each contrabass should have had a set-up after changing the strings to both fourths and fifths tunings to determine whether or not the instrument is reacting favourably to that string change. If the instrument does not respond well, then one solution is to assemble a custom set of strings optimized for that instrument as
described above. However, it then becomes necessary to apply the same methodology to the other tuning. Yet, there are no guarantees that these strings would perform favourably on the contrabass in the other tuning. This methodology is also problematic.

TABLES 4.9 a, b, c and d.

<table>
<thead>
<tr>
<th>a.</th>
<th>Number of times a test instrument tuned in fifths had the highest partial, arranged by pitch, Arco</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ph</td>
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<tr>
<td>----</td>
<td>-----</td>
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<tr>
<td>f/</td>
<td>3</td>
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<td>1</td>
<td>2</td>
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<td>b.</td>
<td>Number of times a test instrument tuned in fifths had the highest partial, arranged by pitch, Pizzicato</td>
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<td>15</td>
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</table>

d. Number of times a test instrument tuned in fourths had the highest partial, arranged by pitch, Pizzicato |

<table>
<thead>
<tr>
<th>Ph</th>
<th>E1</th>
<th>F1</th>
<th>F#1</th>
<th>G1</th>
<th>G#1</th>
<th>A1</th>
<th>A#1</th>
<th>E1</th>
<th>E2</th>
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<tbody>
<tr>
<td>f/</td>
<td>4</td>
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</table>
The values from all four tables are summarized by tuning in Table 4.10.

**TABLE 4.10: Summary of strongest partials by tuning.**

<table>
<thead>
<tr>
<th>Partial</th>
<th>Description</th>
<th>Fifths</th>
<th>Fourths</th>
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</thead>
<tbody>
<tr>
<td>f</td>
<td>Fundamental</td>
<td>29</td>
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</tr>
<tr>
<td>1</td>
<td>1 x 8ve above f</td>
<td>31</td>
<td>49</td>
</tr>
<tr>
<td>2</td>
<td>1 x 8ve + P 5th above f</td>
<td>49</td>
<td>31</td>
</tr>
<tr>
<td>3</td>
<td>2 x 8ve above f</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>2 x 8ve + M 3rd above f</td>
<td>45</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>2 x 8ve + P 5th above f</td>
<td>32</td>
<td>46</td>
</tr>
<tr>
<td>6</td>
<td>2 x 8ve + m 7th above f</td>
<td>40</td>
<td>44</td>
</tr>
<tr>
<td>7</td>
<td>3 x 8ve above f</td>
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<td>41</td>
</tr>
<tr>
<td>8</td>
<td>3 x 8ve + M 2nd above f</td>
<td>37</td>
<td>42</td>
</tr>
<tr>
<td>9</td>
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<td>3 x 8ve + P 4th above f</td>
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</tr>
<tr>
<td>11</td>
<td>3 x 8ve + P 5th above f</td>
<td>23</td>
<td>53</td>
</tr>
<tr>
<td>12</td>
<td>3 x 8ve + M 6th above f</td>
<td>31</td>
<td>45</td>
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<tr>
<td>13</td>
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<td>15</td>
<td>4 x 8ve above f</td>
<td>25</td>
<td>46</td>
</tr>
</tbody>
</table>

4.7. Summary

Although the test results differ from the subjective claims of more resonance in fifths tuning, the testing process highlights important considerations when conducting a test such as the one undertaken in this study. The number of variables increases with the number of instruments being tested in lieu of the unique and complicated response of an instrument after introducing a new set of strings.

If I were to reconsider my methodology, I would test individual contrabassist playing their own instruments but with the strings of their choice for both tunings. In retrospect, I believe that using a preferred string set would produce a more realistic test as this would more accurately represent the player’s subjective experience. After all, this is what a professional contrabassist does—they experiment and choose
the strings that work best for their sound and playing styles, a process that is even recommended on several manufacturers’ websites.\(^{382}\)

I would also expand the test material to include measuring the resonance of each tuning’s open strings and their sympathetic vibrations using a spectrometer, if such measurements are possible. Although the first, third and fourth strings are different in both tunings, the sympathetic vibrations produced when playing the open strings are defining characteristics of how that tuning resonates as demonstrated in Miller’s graphs. In light of the time restraints for testing, I felt that the E1–E2 chromatic scale was not biased toward one tuning over the other. For that reason, the chromatic scale was the only test material that I used.

There is still a gap between the objective tests undertaken above and the subjective claims by contrabassists who have experienced the tuning on their own instrument that overwhelmingly assert that the contrabass exhibits more resonance. These claims cannot be ignored even though they are subjective because they are a significant and defining attribute of the tuning’s playing aesthetics experienced by those who tune in fifths. However, the complexities involved with testing the acoustic resonance of a large instrument such as the contrabass and the inherent variables of string choice suggest a modified test from the one undertaken in this study. This test and its results represent one approach in the study of the acoustic phenomenon of resonance in fifths tuning. Moreover, this test, along with those by Dalla Torre and Masuzzo contribute to the existing literature on this tuning.

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\(^{382}\) For example, the Thomastik website features an algorithm called Stringtelligence that will recommend strings from one or more of their sets based on input from the player. See https://www.thomastik-infeld.com/en/home.
Chapter Five: Personal Views of Players

In this chapter, I explore the perspectives of contemporary contrabassists who tune in fifths and those who tune in fourths with the idea of understanding how each group thinks about their experiences and approaches to playing lower-compass pitches from E-flat1 down to C1 and even B0. Eleven contrabassists were interviewed for this study; each participant was asked the same questions about their experiences playing lower-compass pitches in a professional orchestra. The answers reveal a variety in approaches to thinking about and performing lower-compass pitches in relation to the orchestral repertory.

Throughout these candid interviews, participants offered unique perspectives into the hierarchy of the orchestra through their experiences, taking into consideration not only the role of the conductor and the principal contrabassist, but also the symbiotic relationship between the violoncello and the contrabass. In addition to the ideas of autonomy and personal choice, participants also spoke of established norms and traditions within orchestras that affected how and when they play lower-compass pitches.

It has been established in previous chapters that eighteenth- and nineteenth-century contrabassists frequently had to make adjustments to their parts during performance, decisions that were determined by what they could play based on their ability, the range of their instrument and the quality of their strings. Today’s contrabassists do not experience the same limits faced by their historical counterparts and have no need to transpose or simplify their lines because they have access to better...

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383 The interviews conducted for this research conform with the protocol specified by the Western University Non-Medical Research Ethics Board (NMREB). See Appendix D. Participants’ personal information was to be kept confidential unless they acknowledged in writing that their names could be used in the text of this research. One participant did not wish to have their name used and so, for that reason, all eleven respondents are identified anonymously as Respondents 1 through 11 (R1–R11).
training and modern string technology. There are now several options to play sub-E1 pitches; octave transposition is an issue only for those contrabassists whose instrument is not tuned in fifths or is not fitted with an extension to play notes below E1.

On the basis of the interviews, I determined that when contrabassists adjust their bass lines during performance, they do one of three things: first, they transpose pitches down an octave into the sub-E1 range; second, they add pitches that are not in the score; third, they transpose sub-E1 pitches up an octave.\textsuperscript{384} Often, these changes go unnoticed by the conductor and other musicians in the orchestra primarily because these alterations do not change harmonic function.

When modern contrabassists transpose written pitches down an octave, that decision is based on several factors: first, they will compare their part with that of the violoncellos and transpose pitches to match the contour and compass of the violoncello part. Second, contrabassists use their own discretion regarding what they thought sounds aesthetically and musically pleasing. This process might involve direction from the conductor or the principal bassist. Third, the decision to transpose down might involve a pre-existing tradition or norm. The common thread I observed throughout these three examples is the decision to change the composer’s bass line to match the violoncello part. Another type of adjustment is the addition of notes that are deemed to be missing by the contrabassist or the conductor. I shall explain this in more detail below.

5.1. Question One

In the first question, I asked participants to describe their musical training. Every participant interviewed holds a university undergraduate degree in contrabass performance. Four of the participants hold a Masters degree in performance, while

\textsuperscript{384} Octave transposition—transposing pitches up one or down an octave—has already been discussed and is mentioned here only because one of the participants did not have an instrument capable of playing sub-E1 pitches at the time of the interview.
three participants hold an Artist’s Diploma from the University of Toronto.\textsuperscript{385} One of the factors that influenced the pool of participants was my location and access to participants. For that reason, six of the participants had studied, performed and taught in the greater Toronto area. Similarly, four of the Toronto-area participants had been instructed by a former principal contrabassist for the Toronto Symphony Orchestra (TSO) who was also a contrabass instructor at the University of Toronto. Five of the participants went on to play in the TSO bass section with this instructor while he held the position as principal contrabassist. For this reason, the participants acknowledged that this instructor had a significant impact on their training and their careers and that there is the possibility of some bias, particularly with regards to playing technique. Four of the five participants mentioned above use the French bow and play four-string instruments, some with mechanical extensions. One of the participants R2, holds a Ph.D. in musicology.

An important criterion for the study was that each contrabassist had played in a professional symphony orchestra for several years in addition to receiving training at the university level. As a member of a bass section, each musician would have benefited from the mentoring and experience of more senior members of that section, many of whom had played with a number of conductors. Therefore, each contrabassist has played a large variety of the classical symphonic repertory and has encountered scores containing sub-E\textsubscript{1} pitches in addition to a variety of different opinions in dealing with these pitches.

Another factor in my choice of participants was their system of tuning. Six of the participants tune in fourths and the remaining five tune in fifths. I chose to include these two groups as their approaches and solutions to playing lower-compass pitches are directly affected by their choice of tuning.

\textsuperscript{385} The Artist Diploma is a performance-based program offered by the University of Toronto into which exceptional students are streamed before they finish their undergraduate performance degree.
5.2. Question Two

In this question, participants were asked to talk about their choice of instrument and tuning method to play pitches below E1. Contrabassists in professional orchestras are required to have the ability to play pitches below E1. Still, some bass sections may have contrabassists whose instrument is not equipped to play sub-E1 pitches. This shortcoming is tolerated provided that there are sufficient contrabassists in the section who can play sub-E1 pitches.

My interviews determined that there are four options for playing sub-E1 pitches: a four-string contrabass tuned in fourths modified with a fingerboard extension, the five-string contrabass tuned in fourths, a four-string contrabass tuned in fifths, and scordatura. Only one respondent did not have an instrument modified to play sub-E1 pitches. Several respondents stated that they have used scordatura to detune to a lower pitch. There appears to be a preference among North-American contrabassists to use fingerboard extensions whereas European orchestras commonly employ five-string contrabasses. The reason for these geographic preferences remains unclear. One possibility proposes that the introduction of the five-string contrabass in German orchestras in the late nineteenth century led to its widespread use.\textsuperscript{386} Two of the respondents (R2 and R6), currently use a five-string contrabass while respondent 9 uses a five-string contrabass tuned in fifths, but only for playing jazz.\textsuperscript{387}

Respondent 1 has played in orchestras throughout North America and England, and observes that some European orchestras purchase their own five-string contrabasses and thus require each member of the section to perform on these instruments, giving each contrabassist similar access to sub-E1 pitches. Other

\textsuperscript{386} The five-string contrabass is said to have been developed by Dr. Carl Otho according to August Reissmann who writes: “Der Leipziger contrabassist Carl Otho hat dem Instrument noch eine fünfte Saite hinzugefügt, vermittels welcher er die Töne: gewinnt, die bisher dem Instrument unerreichbar waren.” “The Leipzig contrabassist Carl Otho has added to the instrument a fifth string, by means of which he gains the notes that were previously inaccessible to the instrument.” Translation mine. August Reissmann, \textit{Handlexicon Der Tonkunst} (Berlin: Robert Oppenheim, 1882), p. 91.

\textsuperscript{387} This instrument adds a high E string and is tuned E3, A2, D2, G1, C1.
respondents stated their opinions on playing a five-string contrabass although these were based on limited playing experience.

Respondent 6 provided the most comprehensive explanation regarding the benefits and drawbacks of this type of contrabass, explaining that the low fifth string affords the player the ability to play five pitches (Ex. 5.1) below the open E1 string, from E-flat1 to B0. As well, the technique required to play these pitches is identical, thus providing a continuity in pitch orientation on each instrument and uniformity of bowings, fingering solutions and left-hand techniques such as glissandos and vibrato. Furthermore, the intonation of pitches from E-flat1 down to B0 can be fine tuned by left-hand positioning, and so the contrabassist can adapt in real time to variations in intonation during performance. Respondent 6 observed that this ability to adjust intonation on his five-string contrabass is similar to fifths tuning as both systems allow for tuning the pitch in real time, in addition to techniques such as vibrato.

EXAMPLE 5.1: Tuning of the five-string contrabass with pitches below E1.

\[
\begin{align*}
&G2 & D2 & A1 & E1 & B0 & E_b1 & D1 & D_b1 & C1 & B0 \\
&\text{Cb.} & & & & & & & & & \\
\end{align*}
\]

Respondent 2 recently began using a five-string contrabass (at the time of this interview) and reported his only complaint was the instrument’s bulky size. The addition of the fifth string necessitates a wider neck and fingerboard to facilitate a playable string spacing, and in turn, a wider bridge. A common complaint among those who have used the five-string contrabass is the arc of the bridge and its consequent effect on bowing. The addition of the fifth string dictates that the bridge’s arc must be shaped so as to allow sufficient clearance when bowing a string so that the bow does not touch the string beside it. Respondent 6, who has played a five-string instrument longer than other members in the cohort, claims that this arc can result in an exaggerated difference in angle between the first string and the fifth string resulting in an increased movement of the bowing arm.

Respondent 1 argued that claims of excess tension exerted on the five-string contrabass’s top are questionable, explaining that this issue can be addressed through a combination of the instrument’s set-up coupled with an appropriate set of strings.
Some strings exert less tension on the table than others, and these differences certainly affect bow response and the overall sound of the instrument. It is reasonable to conclude that, in the opinion of respondents 1, 2 and 6, a five-string contrabass can be set up to play effectively. It is difficult to imagine a professional contrabassist tolerating a poorly set-up instrument.

It cannot be ignored that adding tension to the instrument’s top has the potential to stifle its ability to vibrate. The effect of changing the string tension on contrabasses was observed in the late-eighteenth and early-nineteenth centuries where contrabasses throughout France, England and Italy used only three strings for a time. Several sources attest to the fact that removing the fourth string produced a more defined, focused tone as stated by Cipriani Potter, “But, from experiment, the double-basses with three strings are preferred; Dragonetti (the highest authority) gives a decided preference for tone to the latter.”\(^{388}\) English contrabassist A. C. White claimed, in his presentation to the Musical Association, that three-stringed basses had a more brilliant sound.\(^{389}\)

Five respondents currently use fingerboard extensions; this type of modification consists of a narrow piece of ebony that is positioned from the nut to the scroll and increases the scale length of the fingerboard at the fourth string. The extension requires a longer string that extends the pitch from E1 down to C1 or B0. The string-scale for a 3/4 size contrabass is approximately 104–106 centimetres. The approximate scale of a C1 extension string is 131 centimetres; a B0 string is approximately 138 centimetres.\(^{390}\)

There are three types of extensions: gated, mechanical and fingered. The first two options use a mechanical system to close the string at each of the pitches along the extension; the player does not close the string with their fingers. The fingered extension uses a single capo positioned at the nut that, when closed, stops the fourth string at E1.

\(^{388}\) Potter, “Companion to the Orchestra,” p. 133.
The gated system features a series of capos positioned along the length of the extension that are manually opened and closed onto the string at the desired pitch. Some designs allow the player to adjust the capo’s position in order to tune the pitch, other designs do not, with the result that the intonation of that pitch is fixed. The primary benefits of this system is that it is noise-free, less expensive than a mechanical system and does not add the bulk and weight to the instrument compared to the machines described below. There is also an aesthetic appeal to the design of these extension in that some luthiers incorporate their talents as wood carvers because most extensions have to be custom fitted.\footnote{For examples of this kind of work, see the extensions by luthier Mario Lamarre, www.lamario.ca.}

A drawback of the gated system is that the contrabassist cannot play consecutive sub-E\textsubscript{1} pitches offered by the fingered and machine mechanisms, a five-string contrabass or by tuning the instrument in fifths. The system also requires time for the player to open and close the gates, a procedure that must be coordinated during performance. There is also an issue with string height for, as each successive gate is opened toward the lower range, the string height rises toward the bridge; this issue applies to all types of extensions.

A machine extension affords the player the extended lower compass plus the ability to play consecutive sub-E\textsubscript{1} pitches using their own instrument. Of the respondents interviewed, only R4 and R5 use machine extensions equipped with key-operated levers that, when pressed by the left hand, close the string at the pre-determined pitch along the extension. The keys are positioned over the fingerboard just below the nut, above the F\textsubscript{1} and F-sharp\textsubscript{1} on the fourth string. The location of the levers that close the pitches along the length of the extension can be adjusted. The two most popular machine designs are the Stenholm model and the Fawcett model; both designs are similar in appearance.

The Stenholm extension’s key layout closes the notes in a reverse order to the keys that are pressed; they are arranged in such a way that pressing keys that ascend from the nut towards the bridge closes pitches in a descending order toward the scroll.
The Fawcett extension’s key layout matches the descending order of pitches on the instrument; otherwise, the mechanical design is the same as the Stenholm.

The fingered extension dispenses with the machine or the gates used to stop the strings; a single capo closes the string at E1. The contrabassist must reach back over their head with the left hand to stop the notes. Players must use a somewhat awkward reach to play the notes on the extension, causing them to release their grip on the neck. This situation is further exacerbated by the increased distance between semitones caused by the longer string scale. None of the respondents that I interviewed use this system.

The most common complaint voiced by participants who use machine extensions is that they are noisy, producing an audible, clanking sound when pressing the keys. Several respondents cited Stravinsky’s Firebird Suite as an example where a noisy machine stands out. The Suite’s opening contrabass part (Ex. 5.2) is very exposed and is doubled by the violoncello an octave higher. Furthermore, Stravinsky has marked the part pianissimo and con sordino. When one considers the dynamics here in combination with the mutes, it is little wonder that a noisy machine’s mechanism could be heard over the music. This scenario was demonstrated in R4’s comment below where he not only sang the melody and vocalized the machine noise, but also described the reaction of the conductor.


“They [the machines] have to be adjusted all the time and if not, a lot of time you get rattling and with the Horst machines you always got a lot of rattling. In the Firebird, [sings introductory bass part] dee dah dah CLANK CLANK dee dah dah CLANK CLANK. I can remember [conductor’s name inaudible] going nuts, ‘cause that’s all
anybody had, you know, were these clanky old machines and he’d be...had his hand on his forehead, his head back like that.”

It would seem that this system is both tolerated and acknowledged as a less than perfect solution for playing sub-E1 pitches. The positioning of the levers that tune the stopped pitch must be adjusted using tools, thus preventing players from making adjustments to their intonation during a performance. As a luthier, R7 has installed extensions on a number of instruments in addition to using one himself before he began tuning in fifths and cautioned that these longer strings, when bowed, generate a bigger amplitude that can tend to make the pitch go sharp. Respondents who use mechanical extensions generally did not discuss any limitations of the extension other than acknowledging that they can be noisy.

Extensions are frequently installed on four-string instruments that were built before the development of the extension and C1 and B0 strings. The justification for adding an extension is that the instrument’s lower compass is extended while its tone remains relatively unaffected, giving the player the ability to play sub-E1 pitches on the instrument of their choice. The design of these extensions has improved in recent years such that luthiers no longer have to drill a hole through the instrument’s scroll to let the extended string pass through to the peg box. Extensions can even be removed from the instrument and the nut replaced by the player, transforming the contrabass back to its original condition.

Five of the participants (R1, R3, R7, R9 and R11) use a four-string contrabass tuned in fifths, although each of them began their career tuning in fourths. Each player switched to fifths tuning as a solution to play sub-E1 pitches, asserting that it facilitates playing these pitches on the fingerboard, eliminating the need for an extension. A further advantage to the player is that these pitches are situated on the original, unmodified fingerboard, making them playable using the conventional span.

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392 The Horst mechanical extension is the same as the Stenholm. According to a conversation I had with Rick Heinl, owner of Geo Heinl and Sons in Toronto, Horst was purchased by Stenholm.

of a whole-tone in the left hand. Furthermore, left-hand expressive techniques such as glissando and vibrato can be used.

The tuning eliminates the need to purchase a five-string contrabass. Moreover, changing from fourths to fifths allows the player to use a valuable, vintage instrument because the conversion from fourths to fifths tuning is minimally invasive to the instrument, requiring only minor modifications to the bridge and nut to accommodate the slight increase in string diameter.

Respondent 1 asserts that the system of fifths is the perfect solution for achieving a low C1, citing a simple and logical observation. He says, “you’ve got the complete range that you need in an orchestra. You’ve got four strings that keep the instrument very playable.” Three participants claim that a further advantage of fifths is the ability to react instantly and adjust the intonation of sub-E1 pitches.

The most significant drawback associated with tuning in fifths is an increase in left-hand shifting. Contrabass tutors and orchestration treatises from the nineteenth century cite this issue as the main reason why tuning in fourths was superior. Inasmuch as the tuning naturally creates a longer shift for intervals between the root and the major third of a scale, larger intervals such as the perfect fourth up to the major sixth can be played on two adjacent strings without shifting. The orientation of pitches on a contrabass in fifths does make some shifts more difficult yet other shifts become easier.

The fingerboard diagrams in Ex. 5.3 illustrate how the distance between open strings in either tuning directly affects the range that the left hand can cover in a single position without shifting. In the diagrams below, the first finger is indicated by the round end of the arrow and the fourth finger is indicated by the arrowhead.
EXAMPLE 5.3: Contrabass fingerboard layouts, fifths and fourths tunings.

### Fifths: A2, D2, G1, C1

<table>
<thead>
<tr>
<th>1st</th>
<th>A2</th>
<th>B♭2</th>
<th>B2</th>
<th>C3</th>
<th>D♭3</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>D2</td>
<td>E♭2</td>
<td>E2</td>
<td>F2</td>
<td>G♭2</td>
</tr>
<tr>
<td>3rd</td>
<td>G1</td>
<td>A♭2</td>
<td>A1</td>
<td>B♭1</td>
<td>B1</td>
</tr>
<tr>
<td>4th</td>
<td>C1</td>
<td>D♭1</td>
<td>D1</td>
<td>E♭1</td>
<td>E1</td>
</tr>
</tbody>
</table>

### Fourths: G2, D2, A1, E1

<table>
<thead>
<tr>
<th>1st</th>
<th>G2</th>
<th>A♭2</th>
<th>A2</th>
<th>B♭2</th>
<th>B2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>D2</td>
<td>E♭2</td>
<td>E2</td>
<td>F2</td>
<td>G♭2</td>
</tr>
<tr>
<td>3rd</td>
<td>A1</td>
<td>B♭1</td>
<td>B1</td>
<td>C2</td>
<td>D♭2</td>
</tr>
<tr>
<td>4th</td>
<td>E1</td>
<td>F1</td>
<td>G♭1</td>
<td>G1</td>
<td>A♭1</td>
</tr>
</tbody>
</table>

In the layout for fifths, the range between the first and fourth fingers, D-flat1 to C3 is twenty-three semitones—almost two octaves. The same fingering in fourths tuning F1 to B-flat2 is seventeen semitones. The contrabassist in fifths has access to a larger pitch range within a single position. This pitch orientation also permits the player to play certain intervals without having to cross as many strings as an instrument tuned in fourths.

There are certainly some pieces from the repertory that are more difficult to play in fifths yet other pieces are easier to play than on a contrabass in fourths. It is interesting to note that critics of tuning in fifths asserted that the player was forced to shift more, yet they do not present any advantages of the tuning. The benefits inherent to the tuning’s ability to play large intervals within a position without shifting are demonstrated in Beethoven’s Ninth Symphony. 394

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The excerpt in Ex. 5.4 appears in the first movement and features a phrase doubled by the violoncello and contrabass characterized by its large intervallic jumps. The first six bars (123–28) pose no problems to players tuned in fourths or fifths. The sixteenth-note figures in bars 129–30 are challenging to players in either tuning because of the minor-seventh interval between F⁰ and E-flat₂ and the fact that these phrases are slurred.

EXAMPLE 5.4: Beethoven, Sym. No. 9, I, bars 123–37.

The slurs in bars 129–30 were notated differently in each of the three versions I reviewed for this example. Beethoven’s autograph manuscript of the Ninth Symphony clearly shows a one-bar slur over bar 129, yet in bar 130, the slur is missing, possibly because the beams and stems of the violoncello part protrude into the contrabass staff. The apograph manuscript of the Ninth Symphony in the Julliard collection shows a separate slur over bar 129 and again in bar 130. The bass part in Oscar Zimmerman’s edition of Beethoven’s Nine Symphonies (Ex. 5.5) also shows separate one-bar slurs in bars 129 and 130. Within these slurs, Zimmerman marked a down bow on the first four sixteenth notes followed by an up bow on the second group of

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sixteenth notes in both bars, indicating that the phrase needs to be bowed in a way that considers the difficult nature of playing this minor-seventh interval on the fourth and second strings.

EXAMPLE 5.5: Beethoven, Sym. No. 9, I, bars 125–46. Fingering by O. Zimmerman.

The fingerboard layouts in Ex. 5.6 demonstrate the pitch orientation for bars 129–30 in fifths and fourths tunings. A contrabassist tuned in fourths faces difficulties in both the left and right hands when playing this figure in that the F1 can only be played on the fourth string with the result that the entire two-bar figure at bars 129–30 must be played in half position. The difficulty with bowing this figure in fourths is that, after playing F1 on the fourth string, the bow must skip over the third string five times throughout the course of this phrase to play the E-flat2 and the D2 on the second string while observing the slur.

EXAMPLE 5.6: Beethoven, Sym. No. 9, I, bars 129–30, fingerboard layouts in 5ths and 4ths.

Fifths: A2, D2, G1, C1

<table>
<thead>
<tr>
<th>1st</th>
<th>A2</th>
<th>B♭2</th>
<th>B2</th>
<th>C3</th>
<th>D♭3</th>
<th>D3</th>
<th>E♭3</th>
<th>E3</th>
<th>F3</th>
<th>G♭3</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>G1</td>
<td>A♭2</td>
<td>A1</td>
<td>B♭1</td>
<td>B1</td>
<td>C2</td>
<td>D♭2</td>
<td>D2</td>
<td>E♭2</td>
<td>E2</td>
</tr>
<tr>
<td>4th</td>
<td>C1</td>
<td>D♭1</td>
<td>D1</td>
<td>E♭1</td>
<td>E1</td>
<td>F1</td>
<td>G♭1</td>
<td>G1</td>
<td>A♭1</td>
<td>A1</td>
</tr>
</tbody>
</table>

Fourths: G2, D2, A1, E1

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>A1</td>
<td>B♭1</td>
<td>B1</td>
<td>C2</td>
<td>D♭2</td>
<td>D2</td>
<td>E♭2</td>
<td>E2</td>
<td>F2</td>
<td>G♭2</td>
</tr>
<tr>
<td>4th</td>
<td>E1</td>
<td>F1</td>
<td>G♭1</td>
<td>G1</td>
<td>A♭1</td>
<td>A1</td>
<td>B♭1</td>
<td>B1</td>
<td>C2</td>
<td>D♭2</td>
</tr>
</tbody>
</table>

This passage is also difficult for the left hand because the player will have to bar the first finger over three strings (in half position) to play the F1, E-flat2 on the D string in quick succession.
The contrabass in fifths can play bars 129–30 on two adjacent strings. Similar to what we saw above in fourths tuning, the F1 (in fifths tuning) can only be played on the fourth string, but it is further up the fingerboard with the result that the distance between semitones is smaller. Consequently, the contrabassist can execute a small shift or extension of a minor-third with the first finger on F1 and the fourth finger on the E-flat2 on the adjacent third string. The right-hand bowing, indicated by the slur in the score, is easier in fifths because the contrabassist can play this two-bar figure with a single bow stroke on the adjacent strings.

The next six bars, 131 to 137 (Ex. 5.7) contain a series of ascending major- and minor-tenth compound intervals: C2–E-flat3, D2–F3, E-flat2–G3 and F2–A-flat3. The phrase is then transposed down to F1 and continues with two more intervals: G1–B-flat2 and A1–C3.

EXAMPLE 5.7: Beethoven, Sym. No. 9, I, bars 131–37.

The pitch orientation across the fingerboard in fifths tuning gives the contrabassist the ability to play major- and minor-tenth intervals over three strings as opposed to four strings in fourths tuning. In Ex. 5.8, the pitches indicated in yellow illustrate the left hand’s position on the fingerboard playing the major and minor-tenth intervals in both tunings. In the diagrams, the round end of each arrow indicates the root and the arrowhead indicates the tenth. In fourths tuning, a dashed-line indicates a shift.

397 The fingering for fourths is by Zimmerman; the fingering for fifths is my own. Zimmerman, ed., *Beethoven’s Nine Symphonies*, p. 55
EXAMPLE 5.8: Beethoven, Sym. No. 9, I: major- and minor-tenth intervals in 5ths and 4ths.

To play the first interval in fifths tuning, C2 to E-flat3, the first finger plays the root C2 on the third string and the fourth finger plays the E-flat3 minor tenth on the first string. The remaining intervals beginning on D2, E-flat2, F2, G1 and A1 are also root position compound intervals played on the same two strings with a consistent and fluid fingering throughout the excerpt. Beethoven wrote this bass part in a very playable range of the violoncello, including the transposition down to the open G string. It is plausible that he wrote the violoncello part first and then had the contrabass double the same part. This explanation might account for the reason why this excerpt plays well on the contrabass tuned in fifths.

Major-tenth and minor-tenth intervals on the contrabass tuned in fourths can also be played without shifting, but only between the first and fourth strings. For example, both pitches in the C2–E-flat3 minor tenth interval can be played by barring the index finger across the width of the fingerboard; the major tenth interval, E-flat2–G3 can be played using the index finger to play E-flat2 and the fourth finger to play G3. The first three intervals of the phrase in fourths tuning, C2–E-flat2, D2–F3 and E-flat2–G3

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398 Beethoven had a thorough knowledge of the violoncello having written extensively for the instrument throughout his life. See Marc D. Moskovitz and R. Larry Todd. Beethoven’s Cello: Five Revolutionary Sonatas and Their World (Suffolk: Boydell & Brewer, 2017).

399 These fingerings are subject to the size of the player’s hand and finger lengths.
do not require a shift. The minor-tenth interval between F2–A-flat3 does require a shift; it could be played between the fourth and first strings in a single position but this fingering is impracticable as a result of its position so far up the fingerboard. Zimmerman’s solution employs the fourth finger to play the F2 on the third string and then shift up to the A-flat3 on the first string using the third finger.

This excerpt demonstrates how the pitch orientation in fifths can facilitate playing a passage with intervals larger that one octave. Furthermore, it should be noted that Beethoven wrote this bass line to be played by both instruments. The contrabassist tuned in fifths would certainly benefit from doubling a part written by a composer who had a thorough understanding of the violoncello’s character and its tuning.

The subject of shifting in fifths was addressed by R1 in an article on his website where he discusses the validity of claims that one shifts more when tuned in fifths. He says:

Italian virtuoso Isaia found this system ‘more sonorous, ampler in its vibrations and more perfect in its acoustic and didactic proceeding’ than the EADG type of bass. He rejected its use, however, owing to the frequent left-hand shifting it caused. Mr. Billé certainly had the right appreciation of fifths, but with all due respect, he was wrong about the ‘frequent left-hand shifting.’ In theory, it is natural to assume this to be the case as a player in fifths becomes much more sensitive to the keys works are played in, however the reality seems to be a slight increase in shifting that in my opinion does not make ‘frequent left-hand shifting’ a reason not to play in fifths. I will grant this though: to play in fifths requires a solidly developed technique. A player who uses a rigid fingering system ‘a la Simandl’ for instance, would find the difficulties overwhelming at times and injury a very real threat. An ability to play in all positions and strings of the instrument would be a definite advantage.

400 The D2–F3 minor tenth is fingered using the open D string.
401 For additional detail concerning the benefits of fifths from the perspective of left-hand positioning, see chapter four, “Analysis” and “Conclusions” in Bright, “Red Mitchell,” pp. 56–59.
402 Quarrington, “Playing the Bass in Fifths.”
The Simandl technique is a reference to the left-hand technique presented in the popular method by Franz Simandl (1840-1912). However, as R1 notes above, this system does not work so well in fifths. This technique is grounded in the convention of using the whole-tone interval in the left hand; as a result, each position is one whole tone in length and begins at the location of the first finger. Furthermore, the fingers are held perpendicular to the strings.

Joel Quarrington states that his technique addresses the issue of shifting related to tuning in fifths. The premise of his technique re-imagines the mechanics of how the left hand, wrist and forearm move while the hand is shifting; the technique is presented and demonstrated in great detail in his book, including links to videos demonstrating the hand positions and movements described in the method. The purpose of these exercises is to develop seamless and effortless shifting in the player’s left hand.

The cornerstone of Quarrington’s technique is the hand position where the wrist is rotated upwards while the player relaxes and drops the elbow so that it hangs naturally; the first finger stops the string at an angle approximately twenty degrees from string’s axis. He dispenses with the traditional technique where the fingers are placed ninety degrees to the strings. An important concept in this position is that the fingers are positioned more parallel to the string than perpendicular such that when they move up the string, they are less susceptible to be pulled out of shape by the friction between the string and the fingers than when positioned ninety degrees to the strings.

Another component of this hand position is keeping the hand in a closed or small position as opposed to the static hand position illustrated in the Simandl method where the fingers are positioned over the notes, retaining a whole tone between the first and

fourth fingers and the semitone between the first and second, and the second and fourth fingers.

Quarrington explains that keeping the hand small allows it to stay balanced on each note. Moreover, this position forms the basis of playing vibrato. Quarrington explains that a rotation is a movement from note to note and that a major benefit of using this technique is that the hand can easily rotate to each note as needed. Furthermore, rotation permits the playing of fast finger patterns by capitalizing on the inherent rhythm of finger patterns. One of the key benefits of this technique is that rotation allows the hand to encompass a minor third or more.

The shifting motion is isolated with the wrist and the forearm and never above the elbow. Furthermore, the mechanics of the shift are minimal; the majority of the motion occurs in the wrist rotation. Quarrington explains, “Because the distance of a minor third can be covered by a pivot of the hand, I don’t consider that a shift.”

The changeover from fourths to fifths tuning requires time to become familiarized with the different pitch orientation on the instrument and reading music. Therefore, contrabassists who change to fifths tuning will likely have to remove themselves from professional playing activities until they feel confident enough in the new tuning. The time period required to learn fifths varies according to the individual. Respondent 11 stated that it took him six weeks to learn fifths and that, for the first year, he was still making mistakes. I would conclude from his statement that he budgeted six weeks out of his schedule but clearly he had not completed the task because of the mistakes that ensued for the next year when one considers that, in the interview, he claims to have been making mistakes for the next year. He also described how he modified his left-hand technique to span a minor third, similar to that stated by other players who tune in fifths.

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406 Ibid., p. 7.
407 Red Mitchell states that he took a brief hiatus from his job as principal bassist for the MGM Orchestra to learn how to play in fifths, emerging nine days later, fluent in reading and improvising in the new tuning. Lees, “Red Mitchell,” pp. 143–67 at 56.
Respondent 3, a long-time student of R1, prefers to play in fifths but finds that some orchestras are unreceptive to the tuning, requiring him to revert back to fourths. Yet, the pivot technique he learned from R1 (the minor third reach) is applicable to either tuning and improved his playing in fourths.

5.3. Question Three

In the third question, I asked the participants if there was a time in their career when they did not have the ability to play pitches below E1, and how they managed playing these pitches. My rationale for this question was to see if any of the respondents had received formal instruction in octave transposition. This question was inspired by the nineteenth-century bass tutors I read in my research, many of which feature exercises on transposition.

Most respondents explained that in the early stages of their education, they became familiar with octave transposition while performing repertory with sub-E1 pitches. All respondents noted that it was critical to maintain the musicality of the line if and when octave transposition was necessary. Overall, responses to this question were limited as most respondents remarked that upon entering university, they were encouraged to have the means to play sub-E1 pitches on their instrument. Therefore, many respondents already had extensions when they were first introduced to sub-E1 repertory at the university level.

Respondent 10 was the only participant whose instrument is not equipped to play sub-E1 pitches and therefore the only option to play sub-E1 pitches as written was to use scordatura, but only detuning down to D1. In this situation, the use of scordatura does not require any changes or modifications to the instrument other than detuning the E string. Respondents R3, R4, R7 and R10 replied that before they acquired an extension, they also used scordatura on the fourth string for sub-E1 pitches, but usually no lower than D1. The decrease in the string’s tension caused by detuning will, at some point, make the string unplayable depending on the depth of the desired pitch.

Scordatura creates several issues that affect the player’s performance. First, the player must detune the fourth string to the desired pitch and tune it back to E1 during
performance. To execute this procedure, the player must locate a place in the score when they have time to de-tune the string and then find a similar part of the score to tune the string back up to E1. Second, the player can only approximate the accuracy of the target pitch when detuning during a performance. Two respondents who used this method (R3 and R4), reported that they memorized the relative positions of the E1 and D1 pitches on the fourth string’s tuning gear, or they marked the gear with a grease pencil. In both cases, they said that their system was somewhat accurate.

5.4. Question Four

In question four, I asked participants to talk about the function of the contrabass in the orchestra and its relationship to the violoncello. Every respondent described an explicit, almost symbiotic relationship between the contrabass and the violoncello; respondents noted that the contrabass regularly doubles the violoncello an octave below and that this octave relationship forms a crucial sound of the orchestra.

Respondent 1 stated that, “giving the double-bass section their own part, unless it’s completely solo, without it being doubled by some other instrument...it’s never really clear enough.” He added that some composers have tried (unsuccessfully) to write in a way that separates the contrabass from the violoncello, pointing out that when the violoncello doubles the contrabass an octave higher, it provides definition and clarity to the contrabass part. However, respondent 1 did identify the fourth movement in Henri Dutilleux’s Métaboles as a composition in which he notes that the contrabass is successfully orchestrated without the violoncello, or any other strings.

In “Torpide,” the fourth movement in Métaboles, the contrabasses are the only string instruments in the movement other than harp; Dutilleux orchestrated the contrabass part for five contrabasses, utilizing a number of diverse textures (Table 5.1) including arco and pizzicato to play closed pitches as well as natural and artificial harmonics to produce an unique pallet of textures. The contrabass in desk 5 is scored for a five-string instrument. The remaining orchestration includes clarinet, bass clarinet, trumpet, trombone, timpani, percussion, xylophone, celeste and harp.
Dutilleux’s orchestration demonstrates how a contrabass section can be used for more than its lower compass. The movement begins with all five contrabasses playing bowed artificial harmonics (Ex. 5.9) creating an atypically high texture for the contrabass; the resulting chord C\textsuperscript{3}–D\textsuperscript{5}–E\textsuperscript{4}–F\textsuperscript{♯4}–G\textsuperscript{3} falls in the range of the violin.
One feature of Dutilleux’s use of timbre in this movement is the contrast he invokes through his juxtaposition of higher textures created by the natural and artificial harmonics with contrabass 5 playing solo C1 pitches in bars 16, 18, 22, 23, 24 and 26. He also creates layers by scoring contrabasses playing in several registers as shown in Example 5.10.
The relationship between the contrabass and the violoncello has evolved to some degree from the Classical Era to the present. Respondent 2 offered observations on the instrument’s historic development and function in the orchestra, explaining that the contrabass went through three stages: from sound effect, to continuo instrument, to the sixteen-foot bass voice, the lowest pitched string-instrument.

The evolution of the orchestra in the later half of the eighteenth century saw keyboard instruments disappear from the orchestra and subsequently composers stopped writing continuo parts in favour of parts specifically for the contrabass, solidifying its place as the bass voice in the string choir. R2 explains this transition saying, “I don’t think until at least Beethoven and more wholesale, the generation after him in more progressive composers, that there was a genuine desire on the part of composers to differentiate the lines. I think until then, it was left to player’s discretion.”
5.5. Question Five

In his treatise on instrumentation, Hector Berlioz stated that sometimes the real bass is given to the cello. What do you think Berlioz means here? This question explores the bass line, the instruments responsible for realizing the line and whether or not contrabassists view their instrument as the only string instrument in the orchestra responsible for playing the bass line. It has already been established that the violoncello and the contrabass regularly double the same line. Therefore, the combination of the two instruments, the definition in the eight-foot register by the violoncello coupled with the depth of the contrabass’s sixteen-foot register, can be understood as a frequently-used texture when orchestrating the two instruments.

Responses to this question were mixed; several participants stated that they were not sure what Berlioz meant while others speculated that he was speaking to the relationship between the two instruments. Respondent 2 concluded that the tone and range of the violoncello represents the male voice noting that instrumental music was modeled on vocal music. He added that the violoncello was in fact a bass voice.

Respondent 3 stated that when musical instruments play together, they should build their sound from the bottom up, starting with the contrabass and then the violoncello above it, providing definition for the contrabass’s foundation, a perspective the acknowledges the close relationship between the violoncello and the contrabass.

Respondent 5 interpreted Berlioz’s comment in a more literal sense, referring to a specific situation where the contrabass is taken up an octave at a cadential point in unison with the violoncello part. In this context, it appears that the violoncello has the real bass part and the contrabass is supporting it. There is also the context of Berlioz’s comment taken from a nineteenth-century instrumentation treatise that R11 thinks we should consider. In his treatise, Berlioz describes contrabassists in some unflattering terms, stating that some players were more proficient than others. Respondent 11 expressed a different perspective stating, “given the technology of the time, string manufacture and instrument making and so on, probably the bassists of the time were not capable of much subtlety or gymnastical [sic] playing—certainly not like they are
today.” I interpret R11’s comment to mean that when the two instruments played the same part, violoncellists were less likely, if at all, to simplify their part than contrabassists, and therefore it was the violoncellists who played the line as written by the composer. This situation would give some insight to Berlioz’s statement.

5.6. Question Six

I asked participants to comment on those circumstances in which they encounter a phrase where the violoncello and the contrabass play an identical part and when the violoncello descends below E, the contrabass part is transposed up an octave once it reaches the lower limit E. I then asked if they thought that the contrabass part would sound better if the contrabass part followed the violoncello into the sub-E1 range. Generally speaking, contrabassists frequently encounter this scenario and were unanimous in observing that composers transposed the contrabass part up an octave once the E1 limit was reached, demonstrating that the composer was cognizant of the instrument’s limitations and how the contrabassist would play the part. Conversely, the use of sub-E1 pitches by composers prior to the introduction of the five-string contrabass, the fingerboard extension and the attainment of a viable low C-string could imply that the inspiration for composition took precedence over its realization. In other words, the composer was considering neither the plight of the contrabassist nor the effect of a transposed part on the composition during performance. All participants agreed that the bass line would sound better when transposed down below E1, with half of them qualifying their statement that it also depended on the type of music and the situation.

Although there are times when the contrabass part can be played down an octave, R8, R10 and R11 argued it has to be justified; the transposition must enhance the music and should not be done gratuitously. Several respondents indicated there were times when their fellow contrabassists were playing notes down because it was possible and for personal preference; in other words, it was fun for the player. In my observations, there is no question that contrabassists enjoy playing the lowest pitches on their instrument. I believe that we are drawn to our instrument because we truly
enjoy how these lower pitches sound; we are affected physically by their sound and vibrations.

Respondent 1 commented that organists also play pitches lower than written, sometimes more than one octave. He states, “when you hear organists play, they do it all the time, even when it isn’t even in the octave range, they’re adding the thirty-two foot voice, like, all the time. They just do it ‘cause that’s how their instrument sounds magnificent.” However, this personal preference is not justification to play pitches down whenever one feels like it. The respondents, myself included, indicated that as much as we enjoy playing pitches down, there is the awareness that we are taking liberties with the score. Therefore, we should play pitches down only for reasons that are musically valid. One such reason is described in the question above: the contrabass part was transposed up an octave once it reached the lower limit E1. Respondent 5 stated that playing lower-compass pitches was an integral part of playing the contrabass and viewed this range of the instrument as something to be used more frequently.

The decision to play pitches down ultimately rests with the conductor and then the section principal. However, respondents revealed that they act autonomously and play notes down without such approval. Respondent 4 complained that, “it was a question of getting people to stop playing low notes.” It was unclear if he was describing a lack of discipline within the section or a general distaste for those players who did not adhere to the score.

In my experience, there should be justification for playing pitches down contrary to what the composer has written and that it should not be gratuitous as R4 implied. It is incumbent on the player to be aware of the effect of the transposition in relation to the violoncello part and within the scope of composition. The player should consider how the proposed transposition could alter the dynamic level of the part in the context of where that transposition occurs, making that part louder. Likewise, the location of the transposed pitch, should it be placed on a weak beat in the bar, might introduce an unintended accent.

I have often heard contrabassists describe how their individual sound must blend within the section. Consequently, if a player were to play a pitch down arbitrarily and
independently, the effect could disturb the cohesiveness of the section. The majority of times I have played pitches down have occurred during passages marked fortissimo, at cadential points where it reinforces, not distracts from, the final note of a section. The governing criterion on whether or not to play pitches down is the aesthetic quality of the result. Ultimately, R4 proposes that there must be some sanctioned precedent, such as the Brahms’s four-hands piano arrangements or specific direction by the conductor, to justify playing pitches down. Perhaps the interview question could have been worded differently to extract a more in-depth explanation as to why the respondents thought it sounded better. As it stands, the question does ask for a personal opinion.

An interesting response came from R4, who observed that in some circumstances, playing notes down the octave was a norm. He states, “In the standard repertoire, we all now know where those parts are in the Brahms [second symphony] where you should play down.” The consensus among participants was that Brahms was strictly observing the contrabass’s lower-compass limits at that time.

There is little explanation for Beethoven’s use of pitches E-flat1 to C1.\textsuperscript{408} Several sources posit that instruments with the low C1 possibly existed in Beethoven’s time but are no longer to be found.\textsuperscript{409} Without such an explanation, contrabassists would be

\textsuperscript{408} Stephen Buckley addresses this issue in his DMA thesis. Buckley, “Beethoven’s Double Bass Parts.”
\textsuperscript{409} “Il est à croire qu’autrefois en Allemagne l’accord de cet instrument était en tout semblable à celui du violoncelle car Beethoven fait descendre fréquemment les contrebasses jusqu’a Ut.” “It is to be believed that formerly in Germany the tuning of this instrument was in all respects similar to that of the cello, for Beethoven frequently sends the contrabasses down to C.” Translation mine. Gevaert, \textit{Traité Général}, p. 36. “The low C’s at the beginning of the Finale of the 5th Symphony were in his time played in the octave above, just as they are nowadays. There has been no end of discussion on this subject. For a long time, this fourth string capable of sounding 16 ft. C was supposed to have existed. If it really ever had existed side by side with Bach’s little Trumpet, whereas, in reality, neither of these will-o’-the-wisps is to be seen in any collection, but in their stead we come across numbers of three-stringed Double-basses. Were they, to use a chemical expression, all volatilized at one and the same time? Is it credible that, whereas instruments used in the time of Louis XIII and Louis XIV are to be seen on all hands, not a single Double-bass dating from 1815 or 1820 can be discovered anywhere?” Widor, \textit{Modern Orchestra}, p. 185; “Remarquons que Beethoven dans cet exemple et dans beaucoup d’autres passages a donné aux contrebasses des notes graves qu’elles ne peuvent executer; ce qui ferait supposer que l’orchestre pour lequel il écrivit possédait des contrebasses descendant jusqu’a l’Ut octave basse de l’Ut des violoncelles, et qui qu’on ne trouve plus aujourd’hui.” “It is to be observed that Beethoven in this and many other passages gave the contrabasses low notes that they cannot perform; which would lead one to suppose that the orchestra for which he wrote possessed contrabasses descending to C, the lower octave of the C of the cellos, and which are no longer to be found today.” Translation mine. Berlioz, \textit{Grand Traité}, p. 57.
compelled to find a solution without the composer’s input as demonstrated in the Berlioz example or with auxiliary evidence such as Brahms’s four-hand piano arrangements, as I discuss below.

Respondents were aware of the contrabass’s pitch limitations prior to the invention of the flat-wound or ribbon-wound strings developed in 1914 and were therefore able to use this information when framing their discussion of Brahms’s Second Symphony. A comparison of Brahms’s autograph manuscript of the symphony arranged for four hands with the apograph of the orchestral score suggests that he wanted the contrabass and violoncello to play the exact same phrase, an octave apart. At bar thirteen in the apograph manuscript of the orchestral score (Fig 5.1), the violoncello plays E2–D2-sharp–E2; in the contrabass part, Brahms wrote a rest on beat two, observing the lower limit of E1 in the contrabass part.

**FIGURE 5.1:** Brahms, Sym. No. 2, I, bars 13–15.

The example below (Fig. 5.2) is Brahms’s autograph manuscript of Symphony No. 2 arranged for four-hands. The second piano part plays octaves E1–D-sharp1–E1 in bar 12. Brahms writes D-sharp1 in the lower voice, a pitch clearly playable on the piano and thereby suggests that the D-sharp1, absent in the orchestral score, can be explained by the limitations of the contrabass’s range. Therefore, it is plausible that Brahms would have included these pitches in his contrabass parts had they been available on contrabasses at that time.


Brahms could have written the contrabass part up one octave as well, creating a unison texture with the violoncello part, but it seems clear that he was maintaining the octave distance between the violoncello and the contrabass part that lasts until bar twenty-three.

Respondent 1 points out that when the violoncello and contrabass play in unison, the resulting texture sounds louder than when the instruments play an octave apart. This observation might explain Brahms’s decision not to have the two instruments play unison at a point where the dynamic is marked piano.

Another example cited by respondents where they play pitches down is the bass part from the first movement of Brahms’s First Symphony, op. 68, bars 1–8. Several respondents identified this passage where they play the C2 down an octave. Concerning my own experience playing this particular piece (tuned in fifths), R1 recommended that I play this passage as a double stop, the open low C1 and the stopped C2 (Ex. 5.11). Moreover, R1 cited Brahms’s four-hand piano arrangement of the symphony as his justification for the double stop.

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EXAMPLE 5.11: Brahms, Sym. No. 1, I, contrabass double stop.

The symphony begins with an eight-bar rhythmic pulse of eighth notes (marked *forte*) played by contrabass, contra-bassoon and tympani (Ex. 5.12). The contrabass plays C3 (sounding C2), doubled by the contrabassoon playing C2 (sounding C1) and the tympani plays C3.


The violoncello is absent from this lower-timbre instrumentation and instead, doubles the melody played by the first and second violins. Brahms appears to assign the part that we would expect to be played by the violoncello to the contra-bassoon, forming an octave between it and the contrabass. This instrumentation could be thought of as an alternative to the violoncello/contrabass doubling texture so common throughout the repertory.

Brahms marked the contrabass part *pesante*, invoking a heavy, ponderous, almost march-like quality; no other instrument is marked *pesante*. The woodwinds are marked *legato* and the remaining strings *legato e espressivo*. In every edition I have seen to date, the bowing for this bass part is marked up and down bow, adding rhythmic weight to this passage. Perhaps Brahms’s use of *pesante* can be interpreted as an attempt to add the depth and timbre that a C1 pitch would have brought to the part, had it been available. Respondent 1’s suggestion that I play this C1–C2 double-stop perfectly captures the *pesante* character that Brahms has indicated.
There is another source to support the C1–C2 double stop in this passage. The idea of playing notes an octave lower than written in Brahms’s symphonies was the focus of an 1976 article by Theron McClure who implies that an exploration of Brahms’s own four-hand piano arrangement of this work gives contrabassist justification when playing certain pitches down an octave. As I did above in my analysis of Brahms’s Second Symphony, I referred to Brahms’s autograph manuscripts of his symphonies arranged for two pianos. The autograph manuscript for the First Symphony (for two pianos) shows the left hand (bottom staff) of the second piano part playing the same eighth-note figure played by the contrabass (Fig. 5.3).

The piano plays C2 eighth notes with a C1 dotted half-note an octave below it. Brahms’s piano arrangement could be illustrating the octave texture between the contra-bassoon and the contrabass from the orchestral score and less so the C1 pitch that McClure suggests in his article. This interpretation does not stipulate that Brahms did not want the contrabass to play a C1 as much as the first two bars might imply, according to McClure. The other contra instruments that appear in the score must also be taken into consideration. In the third bar of the staff for the second piano, the C1 stops and the two-voice bass texture has risen up one octave; the C2 now occupies the lower limit and the top voice is now playing the viola (upper) divisi part from the orchestral score.

FIGURE 5.3: Brahms, Sym. No. 1, I, bars 1–14. Four-hand piano arrangement. \(^{414}\)

The point here is that Brahms’s four-hand arrangement is a distinct work in its own right and not merely a piano reduction of the symphonic score. The lowest voice of the work therefore, cannot be interpreted solely as the contrabass’s domain because, as shown in the full score, the contra-bassoon also plays in the sub-contra range.

The New York Philharmonic has made available, on its website, digital scans of scores marked by specific conductors, the individual parts associated with these scores and those responsible for marking the parts. In the final nine bars of the First Symphony’s first movement, Brahms restated bars 1–9 from the beginning of the movement with the contrabass and the violoncello pedaling on C2. The C1 pitches and the words “8va” were added by conductor Erich Leinsdorf below the contrabass part (Fig. 5.4) where it descends to its lowest note C2 in bars 502–07. It can be hypothesized that Leinsdorf had the contrabasses double the violoncellos down to the low C1 because Brahms used that voicing at the same location in the four-hands piano arrangement and Leinsdorf was maintaining the octave-doubling texture between the two instruments demonstrated throughout the majority of the movement.

There are times when notes are played an octave lower than written for the reason that R5 describes as tradition. He points out that there is a history of playing certain parts down within the bass section in a particular orchestra. He said that previous members of the section have marked the score with directions to play notes down. Supposedly, these markings would have had the approval of the principal bassist and the conductor. Furthermore, he comments that it is tradition to observe these directions saying:

I've been here almost forty years, right? So there's ones [pitches] that are just like, oh, come on! We gotta do that one. Sometimes, because I'm sitting
on the first stand this week, I’ll just play it down the octave at least once. I
got to get it out of my system you know. Because it hurts not to, you know?
[laughs]. Because the young guys, they don’t know that this is tradition. I
think there’s a fine balance between tradition that’s handed down and a fresh
look, and of course, the young guys, they bring a fresh look. But on the other
hand, many of these markings, they’ve been there for fifty, sixty years or
more. So there’s something to be said for the fact that, at some point, we
had a conductor that either allowed it, or actively asked for it. The number
of conductors that would know and asked for stuff, ha! These days that’s
fewer and fewer because these are the kinds of conditions that are handed
from player to player so it’s kind of a dying art, in a way, you know.

An important point to consider in R5’s answer is that he infers that the impetus to
play notes down originates from the player and is then handed down as tradition to the
next generation of players. He implies that the conductor is not involved to the same
extent as the player in preserving this tradition. This newer generation of players may
or may not follow the tradition unless, contrary to what R5 has indicated, the conductor
played a more significant role. For the player, it may be that the existing markings in a
score represent an established tradition, and that following these markings
acknowledges and preserves the tradition and the individual character of that orchestra.
However, this is the player’s perspective and does not consider the input of the
conductor. The principal, as the section leader, will let players know whether these
traditions are to be followed.

The examples below of Brahms’s Second Symphony appear in Leonard
Bernstein’s score from his tenure with the N.Y. Philharmonic. These markings then,
establish a point of origin with Bernstein and a tradition, should these markings be
continued by other conductors. The alterations demonstrate some of the points made
above and demonstrate how Bernstein used these at several points in the symphony.
There are three changes to pitch material in the contrabass part, written by Bernstein in
pencil. The other markings throughout the score pertain to dynamics and expression.
The first example (Fig 5.5) is from the first movement and establishes Bernstein’s
revision of the bass part.\footnote{This same revision occurs at bar 313 in the recapitulation.}

His addition of the D-sharp1 (in pencil) is consistent with the amendments discussed above by respondents who justify this alteration based on Brahms’s four-hand piano arrangement of his second symphony, although we do not know with any certainty if Bernstein followed this same line of reasoning.
In the fourth movement (Figure 5.6), Bernstein added a low C1 in the contrabass part on beat three of bar 234 until half way through bar 236; the C2 has been crossed-out by Bernstein indicating that he wanted an octave texture between the contrabass and violoncello.

I offer the following hypothesis for Bernstein’s C1 (at bar 234) for it accomplishes two things: first, the contrabass has been tacit for twenty-seven bars prior to its entrance at bar 234; the dramatic impact of this C1 succeeds because Bernstein creates intensity through his use of the contrabass’s lower register and timbre without having to increase the volume in a passage marked *pianissimo*; second, the C1 establishes a point of transition from the end of the development to the recapitulation that builds upon pedal points in fifths and fourths from C to G, to D and then to A. The C1 grounds this ten-bar transition towards the recapitulation at bar 244.

Brahms’s orchestration above is reminiscent of the beginning of the First Symphony from the point of view of R1’s double stops and Bernstein’s alterations to the contrabass parts. There are similarities in both parts concerning Brahms’s use of lower-compass strings in combination with a single brass or woodwind bass texture. Nonetheless, Bernstein’s alterations, however grounded they may be in theory or orchestration, present personal reinterpretations that are autonomous and demonstrate a departure from what the composer wrote in the score. Such alterations, specifically the D-sharp1, represent a revision of the contrabass part in which the modern contrabass’s capabilities are applied retroactively to Brahms’s score, written at a time when the instrument’s lower compass was impeded by inferior string technology. Inasmuch as the means justifies the ends, the act of adding a note or notes into a score marked with a rest (as shown above) is risky for it establishes a precedent of second-guessing the composer’s compositional choices.
Yet some of the modifications that have been discussed including the transposition of pitches down an octave and the addition of pitches (D-sharp1) were made on the basis
of evidence from the four-hand piano arrangements where this same bass line was written by Brahms himself for the piano. I suspect that playing these modifications would not be detrimental to the performance.

5.7. Question Seven

Question seven asked participants if they thought that the composer would have written the contrabass line to match the violoncello had these pitches been available on the contrabass. All respondents except R4 and R10 indicated that they thought the composer would have written the contrabass line to match the violoncello line had these pitches been available. The reason is that, in a situation where the contrabass and the violoncello are playing the same part, it makes sense compositionally for the contrabass line to follow the violoncello line to the end of the musical phrase. It can be postulated that the respondents’ reasoning concerns the symbiotic relationship between the violoncello and the contrabass. I propose that contrabassists view these two instruments as having a unique relationship in view of the evidence of how much they both play an identical line.

Respondent 9 believes that composers wrote sub-E1 pitches with the belief that there was a possibility that contrabassists could play these pitches at some point in the future. This viewpoint was demonstrated by Berlioz, who wrote the following comment (Fig. 5.7) in the score of Tragédie de Faust just below the contrabass part justifying his decision to write a low F1, a pitch unplayable on the ADG-tuned French contrabass: “Quoique un Fa grave ne puisse pas être faire sur les Contre-basses à Trois Cordes dont on se sert en France, je l’ai écrit néanmoins, parcequ’il est probable qu’on en viendra enfin à mettre en usage les Contrebasses à Quatre Cordes comme on l’a fait depuis longtemps dans plusieurs Villes d’Allemandes.”

Although Berlioz

417 “Although this low F cannot be obtained on the three-string contrabasses that are used in France, I have written it nonetheless, since it is probable that the four-string contrabass will eventually come into general use, as it has been for some time in several cities in Germany.” Translation mine. Hector Berlioz, Huit Scenes de Faust. Tragédie de Goethe (Paris: Maurice Schlesinger, 1829), p. 10.
knew that this pitch was unavailable on French contrabasses of the time, he reasoned that this pitch would be playable once the Conservatoire adopted the German GDAE tuning.

FIGURE 5.7: Berlioz, “Chants de la Fête de Pâques,” *Tragédie de Faust*, bars 55–57.

Conversely, R6 states that composers were not writing with an eye to the future but instead, wrote what they wanted to hear. He also believes that composers were, to some degree, experimenting when they wrote sub-E1 pitches with the expectation that contrabassists would tune down. Respondent 7 speculated that perhaps the composer’s bass line was not conceived just from the perspective of the contrabass and violoncello, but in consideration of all instruments. On those occasions where the bass line had to be transposed up, other instruments such as the contrabassoon could double the bass line. The question itself was asked in such a way that it asks respondents to give a yes or no answer based on historic events and for that reason the responses were limited. These answers broach the question of whether composers were writing contrabass parts considering what was possible or what could be possible. I suspect that composers created their music from inspiration and then committed it to paper. I think that the limitations of one particular instrument may be overlooked if the task ascribed to that instrument was not so critical as to change the course of the composition. Having said that, I would, if asked my own question here, suggest that composers wrote what could be possible, that is, with an eye to the future. What we do know regarding the contrabass in the early nineteenth century is that, according to the available treatises and tutors, there were multiple tunings throughout Europe. Few composers would write what they assumed would be possible in the future as did Berlioz in *Faust*. 
5.8. Question Eight

In question eight, I explored the kinds of discussions that participants had with other members of the orchestra about lower-compass pitches on the contrabass. The answers were quite varied concerning the dynamics of the communication process within the orchestra. Different tiers of decision-making were gleaned with regards to playing pitches down an octave or pitches that are not written in the score. If the principal bassist does not receive instruction from the conductor, then it is their job to direct the bass section regarding lower-compass pitches. There are a number of criteria upon which the principal’s or the conductor’s decision is based. Lower-compass pitches can be used to double the violoncello part through the placement of a sub-E1 pitch that marks the end of a section, a cadential point, a dramatic moment in the piece, or to create a louder dynamic.

Another situation offered by R5 was continuity where he explains, “my teacher, SK, was English and the English are very practical and he said generally, the same music should be played the same way, in general. If you see the same passage, generally play it the same way.” Both R5 and R7 identified the same passage in Beethoven’s Fifth Symphony, illustrating the application of continuity described above. Figure 5.8 illustrates the contrabass part at bar 31 of the second movement where Beethoven has written two eighth notes, a C2 followed by a C1.

FIGURE 5.8: Beethoven, Sym. No. 5, II, bars 29–31.⁴¹⁸

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The contrabass and violoncello play the identical part from bars 8 to 31. This phrase then repeats again as shown in Figure 5.9. Beethoven has cancelled the contrabass part at bar 80, writing the C2–C1 eighth-note figure in the violoncello staff above it but giving the contrabass two C2s. Every score that I reviewed shows the contrabass part as two C2s.

FIGURE 5.9: Beethoven, Sym. No. 5, II, bars 78–81.\footnote{Beethoven, “Sinfonie Nr. 5,” Mendelssohn-Stiftung 8.}

This figure is discussed in the chapter on repertory and it was pointed out that one possibility for changing this figure to C2–C2 was Beethoven’s use of variation in the contrabass part.

The Zimmerman edition and the Breitkopf and Härtel orchestral score both show the contrabass part playing two C2 eighth notes at bar 80.\footnote{Ludwig van Beethoven, Symphonien Für Grosses Orchester. No. 5 Fünfte Symphonie. Op. 67 C Moll (Leipzig: Breitkopf und Härtel, 1862); Zimmerman, ed., \textit{Beethoven’s Nine Symphonies}, p. 102.} While it is certainly possible that Beethoven meant this phrase to be a variation of the earlier iteration, a contemporary interpretation of this phrase considers the broader view in the contrabass/violoncello relationship. When we consider that bars 31 and 79 are marked \textit{fortissimo} and denote the end of a phrase, contrabassists, as described above by R5 and R7 can feel justified when playing the second C2 as a C1 at bar 80. Furthermore, this situation described above is pertinent to the discussion of continuity I present above.

Section bassists sometimes play pitches down without the expressed permission or approval from the principal bassist. It is the principal’s job to supervise and get the best performance out of the section and to that point, will be listening attentively to members of the section. At the time of writing, several participants were, or had held
the position of principal and were in a position to relate any discussions they might have had with the conductor. In this regard and based on the answers recorded, there does not seem to have been any significant amount of discussion between the conductor and the principal bassist concerning playing notes down, or there was discussion but it just was not mentioned. The participants certainly reported discussions between the section members. The consensus was that the principal would communicate verbally or, have marked in the score, specific pitches to be played down. Respondent 9, who is an assistant principal, said that he regularly scans the violoncello part, looking for passages where the contrabass cannot follow the violoncello due to the contrabass’s lower-compass restriction and would then bring these to the principal’s attention.

Respondent 3 stated that he too, had similar conversations as those voiced by R9 and that his answer drew upon his experiences having been both a section member and an acting principal. As the latter, he was responsible for the decision to play pitches down. During a performance of the Strauss opera, *Arabella*, R3 nodded to the player with the low B0 to play that pitch. This non-verbal communication was, according to him, completely understood. He added “You know, it really brings a lot of joy to everyone to hear that note, and Strauss didn’t write it, and the conductor didn’t ask for it. We haven’t had any complaints and I think it sounds good.” In this scenario, the conductor’s input was not involved. Respondent 5 added that, in cases where no one in the section had a low B, one of the section members would be instructed to detune their extension C string to a low B with the expectation that the player would miss some notes de-tuning and then re-tuning back to C. Furthermore, R3 and several other respondents describe instances like the one just discussed where only one or two contrabassists are instructed to play notes down with the remainder of section playing the notes as written. In these cases, the lower sixteen-foot register is added in a more subtle way that can be adjusted by adding or subtracting the instruments. This technique is also used in a slightly covert manner to see if the conductor notices the addition of the lower pitches.

The role of the conductor in the communication chain produced more discussion than I had anticipated when I designed the question. Although this study examines the
role of contrabassists with regards to playing sub-E1 pitches, equally important is the role of the conductor in these situations. Their viewpoints would certainly be considered for further study.

Several respondents remarked that some conductors understand the contrabass section more than others. Respondent 5 described a performance in which he participated with Zubin Mehta conducting, expressing the appreciation and understanding Mehta exhibited towards the contrabass section. During the performance he says “Zubin would just look over at the bass section and just the look in his eye, he understood what we needed to do and what we had to offer. So a really good conductor appreciates what the bass offers the orchestra.”

There is another circumstance where a bass section is already familiar with a conductor’s preference for allowing these pitches to be played down and they leave that decision to the principal bassist unless told otherwise. Respondent 1 reported that the previous conductor who led this particular orchestra from 1995 to 2015, was generally supportive of the bass section playing pitches down. In addition to being the principal bassist, R1 tunes his bass in fifths. He stated that it took this conductor some time before he “understood what I was doing,” specifically, the realization that R1 was tuned in fifths and possibly a reference to how tuning in fifths can (positively) affect the sound of the orchestra. I would speculate from R1’s interview that the conductor trusted his judgment owing to his reputation and demonstrated musicality and therefore, grants R1 some autonomy to play pitches down. There are very few players who tune in fifths playing in professional orchestras and even fewer who do so as principal bassist.

Respondent 2 brought up the point that he only feels the need to consult with the conductor in more contemporary music, explaining that within the standard repertory up until Stravinsky, those specific parts of the score that can be played down have been pretty much established.

At least five participants professed a lack of confidence in some of the conductors with whom they have worked. Their primary complaint questioned the ability of the conductor to hear the lower compass of the contrabass. Renowned contrabass-soloist Gary Karr wrote an article for Strad magazine in which he related his frustration
working with conductors who have little or no understanding of the bass section. Karr writes about one orchestra, whose bass section had been told by the conductor to play quieter so many times that, in protest, “the musicians decided to fake their bow movements, making no sound whatsoever” to the delight of the conductor and the composer. Karr’s sentiment is shared among several participants whose responses reveal a general unawareness of the contrabass on the part of the conductor. Respondent 1 states, “I notice that less and less conductors have an ear open to the bass.” When R3 was questioned as to whether he thought the conductor notices pitches that are taken down an octave, he replied, “No, I don’t think he hears it any differently. I think he just hears, oh that sounds great.”

Another thread that appeared in the discussion regarding communication with the conductor was whether or not the conductor’s direction was actively being sought with regards to playing notes down. Several respondents replied, albeit some appeared to be joking, that they never consult the conductor about playing pitches down. Karr, unfortunately, does not offer any insight into causes of the dynamics of the relationship he describes. I believe that within the orchestral purview, there is a general lack of knowledge about the contrabass. As Karr points out, it is a very big instrument that cannot be treated like the other strings. Perhaps it is the instrument’s lower compass and, the fact that, in many circumstances, it requires a doubling instrument to give definition to its sound that causes other orchestral members to be unfamiliar with the instrument. Contrabassists are also aware of the physical distance between them and the podium and can feel ignored by the conductor. There is also, in my estimation, the feeling that instruments responsible for carrying the melody receive more attention from conductors and that contrabassists sometimes feel relegated to playing harmonic function.

Another narrative proposes that the contrabass has always been misunderstood, since its origins in the eighteenth century. Respondent 1 suggested that I ask R2

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422 Ibid.
whether Mozart expected contrabassists to play all the notes in the final movement of the Haffner Symphony, implying that some composers wrote bass lines beyond the ability of contrabassists of that time. Respondent 2 replied saying, “I’m pretty persuaded in my own mind that, for most of the eighteenth century, a successful bass player would have selected from the line, not necessarily because he couldn’t play all the notes because they were off the scope, the compass of the instrument or beyond his technique, but he would have thought of the instrument as outlining or reinforcing major musical ideas, rather than playing every note.” Responses like this indicate that the contrabassist and the instrument have a history of being misunderstood to a degree, more so in the past.

5.9. Question Nine

In this question, I asked participants to relate their experiences playing pitches that were at one time considered unplayable due to the limitations of historic contrabass instruments. Moreover, it asks them to try to get into the mindset of the composer. Ultimately, their answers are purely speculative, with those exceptions where a composer does in fact, tell us why he wrote certain unplayable notes.

The following quotation from A. C. White reveals that this question was relevant even in the nineteenth century. He writes, “as frequently in Beethoven’s symphonies we find passages written down to E, as in the Eroica Symphony, and in the Choral Symphony to double D often; again, in the Pastoral Symphony, we find even double C, this being the lowest note on the violoncello. I imagine Beethoven left it to the basses to do the best they could with it, and all they could do was to invert the passage and play it an octave higher.”

Respondent 1 believes that many composers had a limited understanding of the contrabass based on his lengthy career and observations of violoncello and contrabass parts. He asserts that some composers had a clear understanding of the violoncello’s

range, from its lowest pitch, the open C string, to the A octave harmonic on the first string and observes that “the [violoncello] parts seem incredibly well written for that range.” His observation suggests that composers wrote the violoncello part first and then expected the contrabassist to double it without consideration of range and the subsequent difficulties that they faced replicating that part. He also contends that some composers were more aware of the contrabass’s limitations than others, acknowledging Berlioz’s *Grande Traité*. The treatise was written to inform composers on orchestration techniques and the section devoted to the contrabass can be viewed as an attempt to school composers on the range and uses of the instrument.

The role of nineteenth-century pedagogical literature on the contrabass is an important contribution to its development. The appearance of Berlioz’s treatise and other works on orchestration combined with the establishment of contrabass classes in conservatories across Europe highlighted the recognition of the contrabass’s contribution to the orchestra but moreover, it identified inconsistencies in how composers wrote parts for the instrument.

Respondent 2 believed that composers expected contrabassists to adapt to their parts, but even less so after 1840. The time period in question also coincides with the complex bass parts composers were writing for the instrument. Respondent 2 states that the parts written for the contrabass had undergone a shift from being descriptive to prescriptive. His answer lends credibility to the fact that contrabassists’ abilities and training were undergoing significant development and improvement.

5.10. Question Ten

In question ten, I asked respondents to speculate on Beethoven’s use of sub-E1 pitches in light of the evidence of whether or not an instrument existed that could play these pitches. My idea was to get a broad response of possibilities based on the participants’ experience with the repertoire as well as interactions with other musicians. The majority of respondents replied that they felt that Beethoven intentionally wrote sub-E1 pitches. Two respondents said that they were not sure, with one stating that they simply did not have enough background to make an informed
decision. Respondent 1 stated, “I don’t think he [Beethoven] had a clue.” He did not elaborate on his answer but his thinking is consistent with his assertion that, although composers wrote competently for the range of the violoncello, the same cannot be said for the contrabass. His answer supports the fact that, in many cases, the bass line could not always be doubled by the contrabass without some modifications to the part.

The only rationale for Beethoven’s use of sub-E₁ pitches was offered by R3 who proposed that Beethoven composed at the piano and therefore included that range in the contrabass parts. However, this hypothesis does not account for Beethoven’s interaction with musicians during performances and rehearsals of his works and for this reason, he must have had some understanding of the contrabass’s tuning. Alexander Thayer writes that Domenico Dragonetti met and performed with Beethoven at the composer’s house in 1799. According to the anecdote, Beethoven was told that Dragonetti could play violoncello music on his “huge contrabass” and so the two men played Beethoven’s Sonata No. 2 op. 5. The reference to the huge bass suggests that Dragonetti played his own instrument, a three-string bass tuned in fourths G₂, D₂, A₁. If this were indeed the case, then Beethoven would have heard Dragonetti play violoncello music on a three-string contrabass and would likely have witnessed him transposing sub-G₁ pitches up an octave.

Respondent 9 believes that Beethoven’s sub-E₁ pitches were deliberate, citing the Ninth Symphony as an example where these pitches were used for their dramatic effect. He says, “Why else would he do that, other than, he wanted the lowest frequency in the orchestra to be huge, as huge as possible. You can’t infer anything else from it I don’t think. Especially with Beethoven; it just makes sense when you hear it.” The frequent inclusion of sub-E₁ pitches throughout the autograph scores of the Fifth and Ninth symphonies demonstrates a decided use of sub-E₁ pitches for the contrabass separate from the violoncello part. What cannot be proven however, is

whether or not he was writing from inspiration or for a specific contrabass instrument with the ability to play down to the low C1.

There were larger scale compositional elements where Beethoven was considered groundbreaking such as the extended length of his Third Symphony, the cyclic thematic material throughout the movements in the Fifth Symphony and the choral elements in the Ninth Symphony. It is not inconceivable then that he pushed the boundaries of individual instruments such as the contrabass. Any contrabassist who has performed Beethoven’s symphonic works can attest to the difficulty and originality of his bass parts, such as the recitatives in the last movement of the Ninth Symphony.

Beethoven’s deafness forced him to rely on internal audiation of the music he imagined in his head, the result being that his musical inspiration may have, at times, superseded certain limitations of the instrument, namely the contrabass’s lower compass (sub-E1 pitches). I further speculate that he certainly understood a relationship between the violoncello and contrabass as demonstrated by fact that, throughout so much of his symphonic works, the two instruments share the same part. The sub-E1 pitches could be interpreted as Beethoven’s realization of the contrabass’s sonic potential where he imagined how the two instruments would sound together if the contrabass’s bottom string were tuned to C1, an octave lower than the violoncello’s fourth string C2. This scenario would describe the violoncello and contrabass as a bass and sub-bass pair respectively.

Beethoven’s exploration of an instrument’s sound potential is further demonstrated by his unconventional use of the pianoforte’s sustain pedal, a practice for which he was both praised and criticized. Carl Czerny, a student of Beethoven recalls noted-pianist Hummel and others voicing their dislike of Beethoven’s use of the pedal. Czerny writes, “Hummel’s partisans accused Beethoven of mistreating the piano, of lacking all cleanness and clarity, of creating nothing but confused noise the way he used the pedal.”425 Still there were others who claimed that his creative use of the

pedal to find and explore new sonorities was akin to a surrogate orchestra and the pedal allowed him to sustain the bass notes.\footnote{David Breitman, “The Damper Pedal and the Beethoven Piano Sonatas: A Historic Perspective,” (DMA diss., Cornell University, 1993), p. 26.} In his youth, Beethoven had received several years training as an organist in Bonn under the tutelage of Christian Gottlob Neefe and would have been familiar with the sixteen-foot range on the organ.\footnote{Austin states that the console of the organ that Beethoven played in Bonn is preserved in the Beethoven-Haus and includes a stop for a sixteen-foot pedal trombone. Therefore, Beethoven would have been familiar with the sound of the sixteen-foot register. Cecil Austin, “Beethoven and the Organ,” \textit{The Musical Times} 80 (1939): pp. 525–27.} His use of sub-E\textsubscript{1} pitches can be seen as an attempt to expand further the lower compass of the contrabass (and the orchestra) in a similar way to his exploration of piano sonorities through his use of the sustain pedal. Both of these innovations are consistent with Beethoven’s penchant for pushing the creative envelope in his compositions.

5.11. Question Eleven

In question eleven, I asked, “as a contrabassist, do you sometimes take the initiative to play pitches an octave lower than written because your instrument has the ability to do so? If yes, please explain the circumstances and the discussion (the reasoning) that took place (if any) between the musicians and/or the conductor.”

Every contrabassist in this study admitted to have played notes down the octave without direction from the conductor or the principal. Some respondents did not provide a specific composition, while others chose to name both the composer and the composition, citing Brahms’s Second Symphony most often as an example. Many respondents qualified their response, stipulating that it is not something they do all the time. In other words, there were several types of criteria involved: first, players acted on the basis of personal opinion where they thought that playing a particular pitch down was aesthetically pleasing or they would do it for their own enjoyment; second, the source of that idea originated outside their personal opinion, including a history or tradition of performing a specific repertory, and the history of, or preferences
associated with a specific orchestra or conductor. This question does ask if respondents take initiative to play notes down, but another equally interesting question would have asked why they did so. While the respondents were candid throughout the interview, only a few attached a personal reason for playing notes down in addition to musical criteria.

One of the initial influences behind this question comes not from the classical genre, but from the popular music genre—a YouTube interview on the making of Steely Dan’s 1977 landmark recording *Aja*. During the interview, bassist Chuck Rainey discussed the feedback he received from songwriters Donald Fagan and Walter Becker while recording the track “Peg.” Rainey recalls being seated in the control room in full view of Fagan and Becker and, when he started slapping the bass part in the chorus, they stopped the recording saying, they did not want that part slapped.\(^{428}\) Rainey remembers that on the next take, he turned his back to Fagan and Becker, obscuring their view and played precisely the exact same part, keeping the slapping technique. Fagan and Becker approved the part and it was used in the final version of the song. Rainey observed that, contrary to the songwriters’ initial impression, he knew that his performance was appropriate, stating, “by me being a player, I think that there are some songs where slapping sounds good.”\(^{429}\) Rainey refers to himself as a player and in the larger sense, the expertise exhibited by Rainey, as a studio musician who was held in very high regard by the recording community, was justification for the autonomous bass part he played that day.

I believe that there is a parallel here with the kind of autonomy Rainey exhibited and the kind that contrabassists exhibit when they play pitches down the octave. Contrabassists who consider themselves to be experts through their training and experience often encounter bass parts that cause them to contemplate whether or not

\(^{428}\) “Slapping” refers to a technique where the player slaps the bass string with the outside knuckle of the thumb resulting in a very percussive sound. The origin of this technique is attributed to Larry Graham who played electric bass for Sly and the Family Stone.

the composer understands how to write for the instrument’s range or shows consideration for the technical difficulties inherent in playing the contrabass. Therefore, experts may feel that they possess an accumulated wealth of knowledge and experience to offer their input to a situation where the decision to play pitches down is independent of the principal or the conductor. The principals, however, have won their positions through competition and will make decisions based upon their expertise.

Respondent 5 has played under many principals in his section and has noted that with the current principal, there is a tendency to play things as written. He adds that this tendency seems to indicate a more modern approach to take fewer liberties primarily because, as R5 states, tempos are getting faster.

5.12. Summary

Today’s contrabassists do not encounter the restrictions faced by their predecessors and have no barriers when playing sub-E1 pitches. Consequently, the contemporary contrabassist can now interpret the pitch range from E1 down to C1 through a different lens that includes the option to play pitches an octave lower than written even when not indicated by the composer. The conclusions drawn from this research demonstrate that contrabassists frequently exercise autonomy to the extent that they oftentimes play pitches down an octave and add pitches to a score that, in both circumstances, were not indicated by the composer.

The most common observation maintains the special relationship between the violoncello and the contrabass and the understanding that they co-exist as a bass and contrabass pair; the contrabass plays the sixteen-foot register and the violoncello provides the clarity and definition with its eight-foot register. The respondents noted that, in more contemporary music, composers seem to be less bound to this relationship and that, with a few exceptions, the separation of the contrabass from the violoncello was not successful. However, it is fair to say that because Classical and Romantic repertory accounts for such a significant amount of the pieces played by
orchestras, contrabassists may spend the majority of their playing doubling the violoncello.

The respondents asserted that the violoncello/contrabass relationship is not only critical to the sound of the orchestra but also informs their decision to play notes down an octave and whether to include pitches that the composer deliberately left out of the score. Respondents noted that they will refer to, and follow the violoncello part and play sub-E1 pitches after they have encountered the situation described in question seven; they concluded that composers would have written sub-E1 pitches for the contrabass if these pitches had been available on the instrument. Furthermore, the participants expressed the opinion that this re-imagined bass part sounded better because it maintained the octave distance between the two instruments and did not impose a sudden unison texture where the contrabass was forced to transpose.

There was a unanimous position amongst participants in stating that the principal bassist would give direction to the section if he/she proposed any changes to the part, although the conductor held the ultimate authority on such decisions. In this regard, I conclude that the members of the bass section would look to the principal for direction before the conductor. My conclusion considers that several respondents expressed, albeit with humour, the fact that some conductors lacked an understanding of the contrabass and in some cases they were unaware when pitches were played down. Therefore, in those situations where a contrabassist exercised autonomy, it was often done without the direction of the conductor. A possible area of additional research that arises from this study proposes that conductors be asked a similar set of questions to elicit their perspective on lower-compass pitches and that these be compared with the responses of participants in this study.

The autonomous decisions by contrabassists to play pitches down an octave were not gratuitous but were based upon their observations of the functional relationship between the contrabass and the violoncello. Furthermore, I observed a consensus among respondents that there are established points within the repertory where contrabassists perform this transposition based upon tradition, but ultimately the end result had to be appropriate and aesthetically pleasing to the player and the audience.
Conclusions

My research identified three significant factors that led to the ADG tuning being replaced by the GDAE tuning as the official tuning at the Conservatoire in 1832. First, contrabassists experienced difficulty trying to double violoncello parts on the thick gut strings mounted on their instruments, forcing them to simplify these parts. Second, the limited lower compass of the ADG tuning compelled contrabassists to transpose pitches that descended below G1; both of these issues were directly related to the strings that were available at the time. A third factor, unrelated to string quality, was the additional whole tone between open strings in fifths tuning that led to an increase in the amount of shifting. Several nineteenth-century authors proposed that the ADG tuning began as the four-string ADGC tuning, but the fourth string was removed due to the poor quality of its sound. Although the ADG tuning ceased to be taught at the Conservatoire, my research revealed that the tuning was used well into the latter-half of the nineteenth century; more research is needed to determine why contrabassists chose to play the ADG-tuned contrabass instead of the GDAE-tuned contrabass, especially when one considers the reasons why it was abandoned by the Conservatoire.

In 1839, we learn from Hippolyte Prévost that one of the characteristics of the three-string tuning in fifths that appealed to contrabassists who were still using it was the instrument’s greater resonance.\(^{430}\) Contemporary contrabassists who use the four-string ADGC tuning, myself included, cite the same reason stated by Prévost with regards to resonance. Similar descriptions of this same phenomenon were made by Billé in 1927, Mitchell in 1966 and Quarrington in 2021.\(^{431}\) It must be re-stated that

these claims are subjective. To test the efficacy of these assertions, I recorded three different contrabasses in both tunings; the spectrographic analysis of the recordings for my own contrabass indicated that it was more resonant when tuned in fifths. In other words, my objective test results agree with my subjective claim, demonstrating that it is possible, using this methodology, to determine that a specific contrabass tuned in fifths can sound more resonant than when tuned in fourths. However, these claims could not be confirmed by the analysis of the recordings of the other two contrabasses, both of which showed more resonance tuned in fourths. The owners of these contrabasses tune them in fifths and had both stated that their instruments sounded more resonant when tuned in fifths. In retrospect, there were too many uncontrollable variables involved in this type of test using this methodology, specifically, the type of strings used for the test and the unpredictable nature of how strings sound on three different contrabasses. Although I was able to determine that my own instrument was more resonant when tuned in fifths, I would say that overall, my test results were inconclusive and that my methodology did not account for strings that were incompatible with that instrument. Still, the fact that so many contrabassists who tune in fifths are consistent in their reports of the tuning’s effect on resonance suggests that these subjective claims deserve some credence in evaluating the tuning’s effect on resonance.

The strings shown in the photograph of the da Salo contrabass at the ROM are representative of the kind used on the nineteenth century contrabass. It is my contention that their larger size contributed to the contrabassist’s need to simplify their bass parts. The A string is 6 millimeters in diameter; the sheer thickness of this string and its texture suggest that it was difficult to play, especially close to the nut. I also suggest that Berlioz, when he comments that contrabassists who simplified their parts were lazy, may not have considered the effort needed by contrabassists to play on these thick strings and their consequent decisions to play simplified lines.

Charles Labro points out that the string pressure near the nut made playing extremely painful. Labro, Méthode, p. 32.
Several nineteenth-century authors stated that the three-string ADG tuning was a modified version of the four-string ADGC tuning where the fourth string was removed due to its poor sound, indicating that string-making techniques had not evolved to make a string that could play the C1 pitch at that string length. The fact that multiple sources describe the four-string ADGC tuning implies that string makers tried to make C1 strings to be used as the fourth string for the ADGC tuning that could double the full range of the violoncello an octave lower; however, these attempts were unsuccessful.

The sources that identify the four-string ADGC tuning appear in the literature during Beethoven’s lifetime. I examined the arguments that state that his contrabass lines ignored the contrabass’s lower pitch limit or that he wrote for a hypothetical instrument with a low C that became extinct. The evidence presented from Beethoven’s autograph manuscripts reveals that his use of sub-E1 pitches for the contrabass was deliberate. The statements made by Berlioz and Widor suggesting that instruments capable of playing C1 pitches were no longer extant are problematic. We know that contrabasses could be, and were modified to be mounted with three or four strings; therefore we can say that when a tuning system fell out of use, the instrument could be modified to accept a new tuning. It would be more accurate to say that the tuning and not the instrument became extinct. I cannot state definitively that Beethoven wrote for a contrabass tuned ADGC; however, the fact that sources that identify the ADGC tuning were published during Beethoven’s life suggest that he may have been aware of, or possibly may have heard such an instrument.

We know that Marie-Pierre Chenié played the three-string contrabass tuned in fifths while he was principal contrabassist for both the Opéra and the Société des Concerts; as a result we know the repertory he played. My analysis of Beethoven’s Fifth and Sixth Symphonies and Rossini’s opera Le Siège de Corinthe explored the practical performance issues that a contrabassist such as Chenié might have experienced when playing these pieces on the contrabass tuned ADG.

My analysis of the trio from the third movement of Beethoven’s Fifth Symphony was prompted by Fétis’s criticism that contrabassists who tuned in fifths caused the tempo to slow down; he blamed this on the amount of shifting inherent to the ADG tuning. My analysis did confirm Fétis’s assertion that players who tuned in fifths shifted more—twelve percent more than their counterparts tuned in fourths; however, Fétis’s claim that fifths tuning caused infinitely more shifting are not borne out. Additionally, his criticism ignores the fact that a contrabassist tuned in fourths made seven percent more string changes playing the trio than one who tuned in fifths.

My research into shifting further revealed that there was some discrepancy among those critics making these claims as to what exactly constituted a shift. My methodology for exploring these claims began by examining the fingerings written in methods for both tunings, including several sources that predated the first method written entirely for fifths tuning by Miné in 1828. I determined that there was some discrepancy over how far the left hand needed to move before that movement was considered to be a shift and that these discrepancies appear to be related to sources that predated Miné. Using Hause’s definitions of the first and second standard positions, I determined that the area within the first four semitones from the nut was considered by some authors to be a position. Moreover, this position defined the area where a contrabassist (tuned in fourths) played before taking the next open string. Therefore, a contrabassist playing in this home position could move their hand by a semitone without this movement being considered to be a shift. Due to the significant amount of criticism (against tuning in fifths) that identified shifting as a drawback, I felt that it was necessary to identify this issue so that any analysis I performed in my discussion of shifting used the same definition of a shift. Overall my research leads to the opinion that a contrabassist tuned in fifths does have to shift more often but that some of the criticisms of the amount of shifting were exaggerated while others used inconsistent criteria for defining a shift.

One of the aims of my research was to provide a history of the ADG tuning, not only for contrabassists who practise the tuning, but for string players in general, conductors and other orchestral instrumentalists who perform with contrabassists. This research will also be beneficial to musicologists with an interest in the history of string
instruments, pedagogy, string making and lutherie for the perspective it provides on
the contrabass’s history in France in the eighteenth and nineteenth centuries and the
crucial role that strings played in the instrument’s development. Furthermore, the
research shows how contrabassists adapted to playing bass parts that were difficult or
unplayable on their instrument. Composers will also benefit from this research
because it demonstrates the kinds of issues that arise from writing bass lines outside
the limits of the instrument’s compass and the player’s ability to play the line as
written.

My dissertation was also written from the point of view of someone who has used
both fourths and fifths tunings. This dissertation is not intended to be a polemic for the
ADGC tuning, but rather a source of information for anyone interested in the tuning’s
past and present applications. As a researcher, I have examined the tuning’s use in the
jazz idiom and as an orchestral instrument. Joel Quarrington’s career as principal
contrabass for the National Arts Centre Orchestra and the London Symphony
Orchestra attests to the fact that the contrabass tuned in fifths is a highly versatile
orchestral tuning. He states:

You can make fifth tuning work in every situation you’re in. You
can make it work in orchestras, solo, or chamber music. You don’t
have to have a different instrument for everything you do (which is
the current practice). One instrument can do everything when you
use fifth tuning. Double bass makers love the idea, the fact that it
doesn’t have to have this extension on the top of it; that it can really
be a pure, unadulterated instrument like a normal stringed
instrument. Composers love it because they understand how to write
for it. If I say to a composer that the bass is an octave lower than a
cello and to write for me whatever they would write for a cello but
an octave lower, then they understand how to write for the double
bass.\footnote{Quarrington, “Interview.”}
Manuscripts


New York City, Juilliard Manuscript Collection, Lila Acheson Wallace Library, The Juilliard School, [with-out shelfmark]. Mus. ms. of Johannes Brahms, Symphony No. 2 in D Major, op. 73 in the hand of copiest Franz Hlavaczek with annotations in hand of composer.


New York City, Juilliard Manuscript Collection, Lila Acheson Wallace Library, The Juilliard School, [with-out shelfmark]. Mus. ms. of Ludwig van Beethoven, Symphony No. 9 in D minor, op. 125 by two unknown copiests with extensive annotations in hand of composer.


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Scores


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Appendix A: Contrabass terminology.

### Appendix A: Contrabass terminology, external components.

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### Appendix A: Contrabass terminology, internal components.

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Appendix B: National tunings, late eighteenth century to early twentieth century.

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Je suis d'accord avec Monsieur Cherubini, qu'une Contre-basse accordée par quarte donnera plus de facilité, et par conséquence permet de faire plus de notes, mais j'observe que la 3ème corde perd le la bemol, et le sol, qui sont des notes essentielles pour la Contre-basse, et qu'il sera très difficile de monter plus haut que le fa sur la première corde, ce qu'on rencontre dans presque tous les ouvrages de nos jours, car on monte souvent jusqu'au fa dièse, sol, sol dièse, et la, pour ce qui regarde l'archet, et la manière de s'en servir, l'habitude sera tous.

J'ai l'honneur d'être votre
très humble et très obéissant
Serviteur
Höffelmayer

le 22 février 1827
Appendix C: Letter from Höffelmayer, translation.

I agree with Mr. Cherubini, that a contrabass tuned in fourths will give more facility, and consequently allow more notes to be made, but I will observe that the 3rd string loses the A-flat, and the G, which are essential notes for the Contrabass, and that it will be very difficult to go higher than the F on the first string which one encounters in almost all the works nowadays, because one often goes up to F-sharp, G, G-sharp, and A, for what concerns the bow, and the manner of using it; habit will do all.
I have the honor to be your very humble and very obedient servant.
Höffelmayer
February 22, 1827
Lettre à M. de Sorne, 3 mars 1837

Cher monsieur,

J'ai reçu votre lettre du 22 février, où vous me demandez l'autorité de publier une note sur l'harmonie. Je vous réponds avec satisfaction, mais avec prudence. Je ne peux pas publier cette note sans votre permission, car elle contient des informations confidentielles. Cependant, je peux vous transmettre cette information à votre intention. L'avantage de publier une note est de pouvoir partager des idées importantes avec d'autres savants. Cependant, si vous avez des objections ou si vous préférez ne pas publier cette note, veuillez me le faire savoir.

L'instrument que je propose est basé sur la théorie de l'harmonie traditionnelle. Il est composé de sept notes, dont les plus importantes sont la majeure et la mineure. Les autres notes sont accordées de manière à former des intervalles harmoniques, ce qui permet d'obtenir une musique harmonieuse.

Je suis convaincu que cette proposition de note sur l'harmonie est importante pour le développement de la musique. Je vous encourage à considérer cette proposition attentivement et à me faire part de vos opinions.

J'attends avec impatience votre réponse.

Cordialement,

[Signature]
expérience m'a été la même de sauter sur les instruments, mais pas sur le doigt, que sur la longueur et la gong".

Cela a dû être une distraction car, de la manière de l'accordé, elle ne doit pas être nuisible à la préférence que l'on doit donner à l'oreille.

À propos de la manière de tenir l'accordé, celle qui nous est indiquée n'est pas préférable à celle qui est pratiquée présentement par tous les dauphins

étrangers et nationaux, elle pourrait convenir à ceux qui jouent indépendamment des buses de Viollet, sur laquelle on mettait plus de cordes.

Je crois donc les observations que je vous ai faites sont utiles, comme des expériences, pour

avoir tenté si elle était adoptée, par l'usage général de plusieurs musiciens, que votre oblige et

d'annoncer, et ma propre expérience.

Pour le bien Monsieur après l'affaire de ma

haute considération, et des mille fois meilleure salutation,

Sorne.
Appendix C: Letter from Sorne, translation.

Belleville, 3 March 1827

Sir,

To respond to the desire you have shown me to have in writing my opinion on how to tune the contrabass in fourth intervals; I can only repeat to you in part, what I had the honor to tell you in the last conference that I had with you, and three of my colleagues.

The advantage of passing from one string to another without moving the hand, is balanced by the inconvenience, or the loss of the three notes, the most important of the instrument, since they are the lowest; these three notes are as you know, G, G sharp, and, A flat. Notice that the same loss of a tone exists at the octave above, because the natural extent of the three open strings in the double bass in tuned in fourths is only a minor seventh, A to G while when tuned in fifth, it is a G major ninth. The.

Observe further that the loss of these two tones is of the greatest importance for the effect of the instrument, for the reason that this manner of tuning gives the chanterelle only the tone of G and that in the tuning of fifths it happens to be an A which makes this string much more sonorous and facilitates the means of ascending to the octave above, and which gives to the instrument the extent of a fifth to the extent of two octaves and a tone, instead of the fourth it is only an octave and a minor seventh, because it is hardly possible to make the notes which are above the middle of the chanterelle resonate properly.

I could multiply the observations that a long experience has enabled me to make on this instrument, as much on the fingering, as on the length and thickness of the strings; but as these observations are applicable to both ways of tuning, they are not necessary for the preference to be given to one or the other.

With regard to the manner of holding the bow, the one indicated to us, does not seem to me [sic] preferable to that which is currently practised by all foreign and national bass players, it could be suitable for those who formerly played the viola bass [sic] on which had more strings were mixed.

Finally from these observations I conclude that the means which are presented to us as improvements, would produce the opposite effect, if they were adopted; I have as proof of this the example of several musicians who were obliged to denounce it, and my own experience.

Please accept the assurance of my highest consideration, Sir, and my most humble greetings.

Sorne
Davantage le Directeur,

J'ai l'honneur de répondre à la confiance que vous avez bien voulu me donner en déclarant avec importance mon opinion sur le nouveau système que l'on se propose d'adopter à l'école royale de musique pour la formation d'une classe de contrebasses.

On prend pour base et pourvue la manière dont le treble 

Dragonné à l'ordre de pièce de cet instrument accordé par quartes 

cet homme extraordinaire que j'avais désiré entendre et pour qui fixer mon jugement indubitablement m'a donné le désir de savoir 

e quelle école il est formé et les enseignements que j'ai eu 

occasion de me procurer à ce sujet sont appris qu'il n'apparait 

besoin de maître et que son talent est un don de la nation.

Dans le nouveau système on nous est un sol un sol et un sol dans la graine, en sorte que lorsque ces notes se présentent nous nous 

obliges de nous porter à chaque instant sur le re ce qui nous 

range nécessairement dans la catégorie des violoncelles et le la qui devient sol donne à cette corde des cordes 

d'un ton une mélodie qui fait tout à la qualité des autres sons.
Dans le bel ouvrage du Sieur de Corinthe de Monsieur Labinié je descends un moment mon Sol à la fin du premier acte, pour avoir un 2e qui se trouve à l’estage au dessous du 3e Genselle qui se fait sur un 2e et ce fait qui dure quelques instants produit un superbe effet.

que de beaux sons graves. Monsieur le Directeur se trouvaient perdus dans votre bleue masse du monty et dans toutes celles que nous découvrions à la chapelle du Robi. En supposant que non, s’ajoutera une quantité corde

Je suis charmée de pouvoir en tirer de faire le fil sur le ton.

Monsieur monsieur prendrait comme moi à cet egard.

Je termine Monsieur le Directeur en vous observant que la perte des treize sons graves dont il est question et qui se mulbeulient sous les sous roide des différentes gammes servirait beaucoup de tort à la beauté de cet instrument, pour qu’il faudrait la porter tous sur le ne.

D’après les motifs que j’ai eu l’honneur de vous soumettre et après avoir réfléchi en suivant le nouveau système, je pense que les contre basses accordées sur quarte peuvent convenir pour des solos mais que pour l’accompagnement des beaux ouvrages de l’opéra et Dramatiques, et avoir de véritables contre basses d’orchestra
L'accord par quarte est préférable.

Tâchez d'agir.

Monsieur le Directeur

J'assure de mon profond respect

Chenié

7 mars 1827.

monsieur cherubini directeur de l'école royale de musique.
Appendix C: Letter from Chenié, translation.

Mr. Director;

I have the honor to respond to the confidence you have kindly placed in me by declaring with impartiality your opinion on the new system which it is proposed to adopt at the Royal School of Music, for the formation of a contrabass class.

We take as basis and proof the manner in which the famous Dragonetti in London plays this instrument tuned by fourths this extraordinary man whom I would have liked to hear in Paris to make my decision invariably gave me the desire to know at which school he was trained, and the lessons I have had the opportunity to obtain on this subject have taught me that he did not need a teacher, and that his talent is a gift of nature.

In the new system we are stripped of a G, a G-sharp and an A-flat in the bass; so that when these notes are presented we are obliged to focus at every moment on the D [string], which necessarily places us in the category of violoncellos; and the A which becomes G gives this string, which has descended by one tone, a softness which detracts from the quality of the other sounds.

In the beautiful work of the Siège de Corinthe by Monsieur Rossini I lower my G for a moment at the end of the first act, in order to have an F-sharp which is one octave below the violoncello which is done on C, and this F-sharp which lasts a few moments produces a superb effect.

How beautiful the low sounds, Mr. Director, would be lost in your sublime mass for the dead, and in all those we perform in the King’s Chapel! Assuming that we could add a fourth string, I would be delighted to be able to avoid doing the F on D. Mr. Spontini thought as I did in this regard.

I will end, Mr. Director, by pointing out to you that the loss of the three low sounds, in question, and which are constantly multiplying in the order of the different scales, would do much damage to the beauty of this instrument, since it would be necessary to take them all on the D.

From the reasons that I had the honor to submit to you, and after having reflected on the new system, I think that the contrabasses tuned by fourths may be suitable for solos, but that for the accompaniment of beautiful religious works and dramatic, and having real orchestral contrabasses, tuning in fifths is preferable.

Deign to accept,
Mr. Director
the assurance of my deep respect
Chenié
first double bass of the opera
March 7, 1827

Monsieur Cherubini directeur de l’École Royale de Musique
Dans mon mot sur la Controleuse j’ai dit que dans la Comptoir et aimerai D’hiver est celui de Professeur. Peut-arriver que se fasse par manque de nouvelle le retour des avantages mentionne de la longueur de la terre de l’arche. Pour

Le registre est une chose qui ne peut se passer une seule fois. De Professeur. Donc la terre est à du temps de
La terre est celle de la Controleuse qui est de 85 heures. Il faut donc, comparativement, quitter les salles de

Pour faire les choses cette dernière. Cette fois-ci est

Dans le temps d’une ile de l’arche et de l’angle

pour l’exercice de l’arche. Ceste ce que je

vais écrire à Demontre fabriquement.

La porte naturelle de l’arche et de la main

elle contient dans le port Daragne, d’après le Dictionnaire de la main, une descente de cette composition.

La porte naturelle de l’arche, la porte Daragne, contre la couture de la couture. Dans cette porte, il faut dans la couture de l’arche par le seul mouvement de

quatre, il faut faire en quarte, en tour à quarte en un

Damas je croire à Droite et de la manière Don’-y-

Daragne qui trompe et se main est dans la

rotation naturelle, les Doigts successifs, enfin

pour faire apparaître de ceint sur les cotés de la personne à

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Damas contient de mouvement de l’occlusion le

bouge à de plus haute en avant en arrière.
Appendix C: Letter from Gelinek, p.2.
Appendix C: Letter from Gelinek, translation.

In my notes on the Contrabass I said, about the bow, and before having seen that of Mr. Dragonetti: The Germans have not failed to perceive the advantages resulting from the length and the grip of the bow and I will repeat it again, one cannot compare a Bass [violoncello] string, the tension of which is 20 pounds, to that of the contrabass, which is 85 pounds. Comparatively, therefore, four times more force is required to make the latter vibrate. This force does not exist in the ordinary bowgrip and it is gained by the system of Mr. Dragonetti. This is what I will try to demonstrate physically.

The natural posture of the arm and the hand is, as in the carrying of arms, according to military theory, if I may use this comparison: the arm outstretched without stiffness: the little finger against the seam of the trowsers. In this pose, I say, without the help of the arm the hand, by the movement of the wrist alone, can make a quarter of a turn to the left or a half quarter to the right, and, in the way in which Mr. Dragonetti holds his bow, the hand is in its natural position; the fingers even cooperate to make the horsehair rest on the strings and the wrist still has its quarter turn to raise the bow from above the strings: in addition to this rotational movement, the wrist also has those forwards or backwards all without the arm getting in the way of directing the bow on the strings.

It is not the same with the ordinary bow grip; because, in this position, the wrist has made its movement to the left and it can no longer turn to make the horsehair rest on the strings; and it is the arm that is used for this pressure of the bow as well as for pulling and pushing it: We see that the arm does two duties and we can see that the side movements of the wrist are so small that in a sustained Fortissimo, and if there is a multiplicity of notes, the arm, making two contrary movements, gets tired, the wrist stiffens, the fingers go numb, and the result is a poor performance.

Gelinek
1827
Appendix D: Ethics approval.

Western University Non-Medical Research Ethics Board
NMREB Delegated Initial Approval Notice

Principal Investigator: Dr. James Grier
Department & Institution: Don Wright Faculty of Music, Western University

NMREB File Number: 1690657
Study Title: The Contra-bassist and Autonomy in Lower Compass Pitches

NMREB Initial Approval Date: September 28, 2017
NMREB Expiry Date: September 28, 2018

Documents Approved and/or Received for Information:

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The Western University Non-Medical Research Ethics Board (NMREB) has reviewed and approved the above named study, as of the NMREB Initial Approval Date noted above.

NMREB approval for this study remains valid until the NMREB Expiry Date noted above, conditional to timely submission and acceptance of NMREB Continuing Ethics Review.

The Western University NMREB operates in compliance with the Tri-Council Policy Statement, Ethical Conduct for Research Involving Humans (TCPS2), the Ontario Personal Health Information Protection Act (PHIPA, 2004), and the applicable laws and regulations of Ontario.

Members of the NMREB who are named as Investigators in research studies do not participate in discussions related to, nor vote on such studies when they are presented to the REB.

The NMREB is registered with the U.S. Department of Health & Human Services under the IRB registration number IRB 00000941.