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A Guide to the Pedagogy of Microtonal Intonation in Recent Viola Repertoire:

Prologue by Gérard Grisey as Case Study

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A Guide to the Pedagogy of Microtonal Intonation in Recent Viola Repertoire: *Prologue* by Gérard Grisey as Case Study

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Abstract

Since its establishment as a solo instrument, the viola's repertoire has always heavily depended upon the works of composers contemporary with its first great soloists. As this dependence on recent repertoire continues, the viola boasts a growing number of works containing microtonal pitch collections, and the modern performer and pedagogue must have the skills to interpret these works. This document serves as a guide to the intonation of microtonal viola repertoire, asserting that the first step lies in understanding the pitch collections from the composer's point of view. Especially relevant is the unique compositional style found in spectral viola music, and the guide turns to *Prologue* (1976) for solo viola by spectral composer Gérard Grisey as its primary case study. An understanding of this work's spectral foundation is explained and placed in the framework of the pedagogical methods of Ivan Galamian.

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Chapter One: Microtonal Viola Literature in Context

From the beginning of its development as a solo instrument in the early twentieth century, the viola relied on composers of the time to expand, or some would argue create, its repertoire. The twenty-first century violist therefore has a wide range of repertoire from the past 100 years that represents myriad styles and compositional viewpoints coupled with a dearth of materials from earlier periods. Because the viola repertoire is so heavily dependent on this relatively recent music, violists and pedagogues working today must be able to interpret, understand, and express these styles in order to maintain full demand of the instrument and its repertoire. Unfortunately, there remains one particular area still elusive to many performers and pedagogues: microtonal viola music. This document serves as a guide to the pedagogue faced with teaching proper intonation in microtonal viola music, perhaps without even having the experience of performing or fully understanding such works.

Composers of microtonal music have often been thought of as working far outside the mainstream, even egomaniacally inventing new instruments designed solely to perform their own works. And in many cases, this indeed proves to be true. Herman Rechberger notes, however, "The steadily increasing instrumental technical skills and the sonic inventions by contemporary composers made it also possible to create microtonal music on conventional instruments…which became part of the standard contemporary repertoire of our days concert programs."[1] This is especially the case with the viola, whose repertoire heavily depends upon contemporary works, and because, as with any

[1] Hermann Rechberger, *Scales and Modes Around the World* (Helsinki: Fennica-Gehrman, 2008), 212.

fretless string instrument, it can relatively easily produce an infinite number of pitches between its highest and lowest possible notes.

And therein lies the problem—with an infinite number of pitches available when even a mastery of the major and minor pitch collections may take a lifetime to achieve, performers and pedagogues often push microtonal viola music aside because it presents too daunting a project or exists too far in the fringes of the musical mainstream to demand such attention. After the achievement of a more complete understanding of the importance of microtonal literature to both the history and the future of the viola as a solo instrument, violists and pedagogues then need a methodology in order to learn how to play different intonation systems accurately. I assert that in order to either perform or teach these works, one must understand the microtonality found within from the composer's viewpoint. That it, the violist, as teacher and performer, must understand why the microtonal writing exists in order to properly recreate it in performance.

The most immediate temptations when first given a microtonal piece exist on opposite ends of the spectrum—either relative improvisation of the unfamiliar pitches or unwitting mathematical obsession with their accuracy. Neither is the best place for any musician to come from, either musically or technically. Just as a keen understanding of the formal and tonal structure and sequence is essential to a free and musical performance of the work of a composer such as Bach, the same level of comprehension must exist with any other composition. Microtonal music is no exception, and by examining it from the viewpoint of the composers, the performer and pedagogue gains an insight important to the musical interpretation of this literature.

Just as there exist a wide variety of styles in recent viola literature, composers have also employed diverse microtonal writing. Although the Western tonal system is as ubiquitous and pervasive as anything else in the Western Classical music tradition, there exist a nearly infinite number of options beyond the major-minor tonality that is much better known and established in the Western world. But, despite the sheer number of tonal options available, even the most seasoned performers are generally only tangentially familiar with a few. Considering the panoply of ethnomusicological modes and tonalities, especially when coupled with synthetic scales, the spectrum of microtonal systems seems infinite. The fact remains, however, that composers who choose to write microtonally have done so with purpose, and an understanding of that point of view will go lengths in illuminating the requisite familiarity with the relative tonalities.

Furthermore, when considering a single repertoire, such as works for solo viola, the available number of tonal systems decreases exponentially. Many of the aforementioned tonal systems have been mostly limited to particular mediums, especially computer music and ethnomusicology, although stringed instruments are certainly capable of producing any scale or modality. For the viola, I contend that given the current breadth of repertoire, there are four major categories of microtonal pitch collections found in the standard repertoire: derived, borrowed, Pythagorean, and spectral.

The first major category, derived pitch collections, refers to any collection that is artificially created mathematically. It should not be ignored that this definition also applies to the pervasive equal temperament of Western harmony, which is derived my dividing the span of a natural octave into twelve equal steps. In the realm of microtonal viola music, however, this category applies particularly to the work of Iannis Xenakis,

and its understanding illuminates the performance of his works, especially *Embellie* for solo viola. The work of Xenakis is not all in the numbers, however. He was concerned with composers that "merely related objects in a numeric relationship not based on intrinsic musical qualities. But the process of composing appeared rational, tidy and coherent thanks to the number system masking the confusion beneath."[2] The microtonality in *Embellie* is precise, but hardly dogmatic, and uses derived tonal divisions to express musical ideas rather than create a mathematical soundscape, for instance, by using the quartertone just below to emphasize the lowest fifth on the instrument.[3] A reasonable comprehension of this viewpoint should afford the violist the opportunity to accurately intone the intended pitches.

Pitch collections borrowed from other musical traditions make up the second category. The realm of musical thought made famous by Béla Bartók, borrowing from ancestral folk music, is mostly applicable to the viola thanks to the work of Italian composer Luciano Berio. This is especially evident in his works for solo viola which are overtly based upon Sicilian folk song, *Naturale* for viola, percussion, and recorded voice, and *Voci* for viola and orchestra. In both works the Sicilian folk melody is presented in the viola and carefully notated microtonally. It is heard after the presentation of the same melody in the recorded voice, implying that the noted pitches in the viola should match those of the singer in the field recording. Jürg Stenzl suggests that Berio "allows the solo viola to function in lieu of a singer," and adds, "Berio's avenue to this music is transcription. His ideal is to employ three contrasting types of transcription in such a way

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[2] Nouritza Matossian, *Xenakis* (New York: Taplinger, 1986), 86–7.

[3] James Harley, *Xenakis: His Life in Music* (New York: Routledge, 2004), 134–35.

that they begin to resemble and mutually vindicate each other."[4] The possibilities of future application of this second type are seemingly endless and relatable to numerous musical traditions. There exists a distinct possibility that many composers over time will add to the number of works applicable to this second type of microtonal pitch collection in viola music, especially related to their own experiences and ancestry.

The third and fourth categories, Pythagorean and spectral collections, are actually interrelated. String players often utilize Pythagorean tuning because of its resonance with the physics of the instrument. If octaves and fifths do not correspond, highly suspect intonation results because partials are not complementary. This doesn't necessarily apply to a complete tuning system, and William Sethares explains, "Much to Pythagoras' chagrin, however, there is a problem. When extending the scale to a complete tuning system (continuing to multiply successive terms by perfect 3/2 fifths), it is impossible to ever return to the unison."[5] Pythagoras' ideal does correspond to the phenomenon of harmonics, however, representing an increasing source of musical material for composers over time.

György Ligeti's *Sonata* for solo viola has quickly made its mark on the viola repertoire, and its first movement, "Hora lunga," relies on the pitch ratios explored by Pythagoras and found naturally in the harmonics going all the way up the viola's C string. In fact, the violist is instructed to perform stopped pitches with the same intonation as these harmonics as they become increasingly distant from both tempered and just

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[4] Jürg Stenzl, "Luciano Berio's Native Language," *Berio: Voci*, ECM1735, 2001.

[5] William A. Sethares, *Tuning, Timbre, Spectrum, Scale* (London: Springer-Verlag, 2005), 54.

intonation.[6] It explores harmonics in partials rarely called for, and therefore a unique set of stopped pitches as well. In this instance, as in the Berio example, the microtonal pitch collections in question can be easily cross-referenced with their examples—natural harmonics and recorded voice, allowing for some degree of accessibility. Perhaps because these two works are relatively accessible, they have been quite often performed by professionals and advanced students alike. If less accessible works are somehow made more relatable, perhaps they could experience the same treatment.

The natural harmonics in the Ligeti example relate not only to Pythagorean tuning, but also to the harmonic series, which brings us to the fourth major type of microtonal pitch collection in recent viola repertoire, spectral pitch collections. Ligeti serves as an excellent segue to spectral music, both for this guide and for the performer and pedagogue, because he is often considered one of the earliest spectral composers, and later, highly influenced by the movement. Grisey referred to him as a member of the holy trinity of spectral music—Ligeti was the Holy Spirit, Olivier Messiaen the Father, and Karlheinz Stockhausen the Son.[7] Joshua Fineberg writes, "The works of György Ligeti from the 1960's played a pivotal role in many spectral composer's efforts to find a means of realizing their vision of a music that sounded and worked differently."[8] Theorists treat his work separately nonetheless, and the example of his *Sonata* in this guide differs significantly from the harmonic content found in rigorously spectral works. Fineberg

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[6] György Ligeti, *Sonata* (New York: Schott, 2001).

[7] Gérard Grisey, *Écrits, ou l'invention de la musique spectrale* (Paris: MF, 2008), 235.

[8] Joshua Fineberg, "Sculpting Sound: An Introduction to the Spectral Movement—Its Ideas and Music" (DMA thesis, Columbia University, 1999), 7.

continues, "Were it not for the severe limitations that Ligeti's dependence on 'cluster'-based harmonies created and the limited scope of the formal processes he employed, it would be easy to imagine his having evolved into a spectral composer."[9]

Spectral music makes use of a rich and complex microtonal palette, and because these complexities verge on the mysterious for many performers, their understanding is essential to an accurate and convincing performance, and spectral repertoire offers an excellent case study for this guide. The term "spectral" often elicits confusion from even well educated musicians, especially in the United States, where few composers have embraced the style. Therefore, the very first question to consider must be, "What is spectralism?"

In the 1970s, French composers Gérard Grisey and Tristan Murail spearheaded the *musique spectrale* movement and fervently produced a canon of spectral works. Each composer labeled as spectralist has a unique interpretation, but they all concern themselves with timbre and harmonic phenomena, and how these unfold over time rather than with melody, harmony, and rhythm in the traditional sense of the words. Murail avoided a stringent or rigorous definition of the style, instead considering spectralism a compositional point of view.[10]

Together with other composers who shared their unique attitude, Grisey and Murail founded the *Group l'itinéraire*, a collective of composers and performers who regularly undertook experiments in spectral music. This first generation of spectral

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[9] Ibid., 8.

[10] Ibid., 2.

composers discovered together what would and what would not become the precepts of their compositional style, and would influence generations to come.

Perhaps the simplest definition of spectral music comes from Jonathan Harvey, who refers to spectralism as "color-thinking."[11] This oversimplifies the issue, but provides a meaningful place to start. The colors Harvey refers to result from the layers of frequencies that make up the complex sounds that we hear, often referred to as the harmonic series. In the early nineteenth-century, French mathematician Jean-Baptiste Fourier demonstrated that all sounds are actually conglomerations of sine waves, the simplest of waveforms. Fourier Transform deconstructs these sounds, and with computer technology, Fast Fourier Transform became an essential tool to spectral composers, who compose by manipulating and controlling these frequencies the way that other composers manipulate and control pitches. By concerning themselves with the frequency of sounds rather than their pitch, spectral composers can have a difficult time translating those frequencies to performable notation on most Western instruments. Grisey uses microtonal notation, quartertones and eighth tones, in *Prologue* and in many of his other works, to best approximate the frequencies he desires. Figure 1.1 below shows the key to microtonal notation in *Prologue*. Joshua Fineberg remarks that this kind of notation, by more accurately approximating frequency, allows spectral composers to "constantly take into consideration the sonic entity that is being generated."[12]

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[11] Jonathan Harvey, "Spectralism," *Contemporary Music Review* 19, no. 3 (January 2000): 11.

[12] Fineberg, 3.

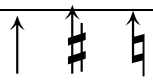
Pitches	
	sharp raised exactly one quartertone
	sharp lowered exactly one quartertone
	slightly higher (1/8 tone)
	slightly higher (1/8 tone)
The accidental affects only the note it precedes.	

Figure 1.1. Key to Microtonal Accidentals in *Prologue* by Gérard Grisey.[13]

If color-thinking were the leading prerequisite for spectral music, however, then a timbre-minded composer such as Richard Wagner, who Harvey calls a proto-spectralist, could be considered a forerunner to the movement.[14] But Gérard Grisey fundamentally disagrees with this assertion and instead offers, "…spectral music is not a question of sonic color. For me, spectral music has a temporal origin."[15] The idea of time versus rhythm in spectral music is key, especially in the works of Grisey. He refused to be shackled to the standardized pulse and rhythm of the common practice period that even other avant-garde composers of the twentieth century continued to use. Just as spectral composers consider frequency over pitch, they consider spectra over melody or harmony,

[13] Gérard Grisey, *Prologue* (1979) for solo viola (Milan: Ricordi, 1992).

[14] Harvey, 12.

[15] Gérard Grisey, "Did You Say Spectral?" trans. Joshua Fineberg *Contemporary Music Review* 19, no. 3 (2000): 1.

and time over rhythm. Duration is considered rather than rhythm, and the resultant compositions are often drawn out explorations of shifting spectra.

The most important thing to keep in mind when considering microtonal intonation is that pitch does not occur in a vacuum. There must exist some salient reason for a composer's choices. As far as spectral music is concerned, Viviana Moscovich posits, "Spectral music seeks to exteriorize the inner reality of sound, to project its inner dynamics into an acoustic space and time, and to transmit to the public the reality of sound in all its complexity."[16] By considering the sense of purpose throughout, the process behind the pedagogy of microtonal intonation remains dedicated to musical ideals rather than mathematical or scientific theories, and continues to be pertinent enough to keep any pedagogue or performer engaged musically.

[16] Viviana Moscovich, "French Spectral Music: An Introduction," *Tempo* 200 (April 1997): 27.

Chapter Two: Spectral Viola Music

Spectral composers chose to fully exploit the viola, just after it had entered a new era of compositional possibilities. Perhaps due to the work of twentieth century viola virtuosos such as Lionel Tertis and William Primrose, and their associated composers, the first spectralists saw two generations before them treating the viola as a legitimate solo instrument while earlier composers had often only been exposed to it as an oddity. By 1976, when Grisey began his seminal six-work cycle, *Espaces acoustiques*, with a *Prologue* for solo viola, the instrument already had a vast solo repertoire. Other spectral composers followed suit, and A. J. Hamilton points to Garth Knox's recording of the resultant works, *Spectral Viola*, as an essential primer to the movement.[1] Works by Grisey's generation of composers—Giancinto Scelsi, Tristan Murail, Horatiu Radulesclu—and beyond, especially Kajia Saariaho, have become important cornerstones of the contemporary viola repertoire.

The importance of the viola to the spectral movement demonstrates the significance of the exploration of accurate execution of its pitch collections. Composers in this idiom took the viola seriously as a solo instrument with significant possibilities for their compositions and violists must approach these works with complementary reverence. To that end, if proper intonation in the spectral context first demands an understanding of its tenets, then we must next pose the question, "Why the viola?"

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[1] A. J. Hamilton, "Spectral Composition," *The Wire* 237 (November 2003): 48.

The unique acoustic properties of the viola that generations of composers regarded as a hindrance to its development as a solo instrument were ideally suited for spectral music. It is the exploration and alteration of resonance that concerns spectralists, and traditional sonic values need not apply. Fineberg notes that "Western instruments have been developed, for the most part, to have spectra which are very close to pure harmonic spectra, so as to emphasize clarity of sound and pitch."[2] It cannot be avoided that the viola, especially before the twentieth century, was unfortunately never known for clarity of sound or pitch, and is often referred to as acoustically imperfect. Violists have grappled for centuries with the dimensions and ratios of their instruments in terms of sound quality, timbre, and intonation in particular. As the twentieth century closed, violists prevailed over the adversity of their instrument, and then through a partnership with spectral composers of their time, took control of the instrument's spectral output.

There exist myriad techniques available to all string instruments that affect the sound spectra. Because the viola has an extensive history of spectral exploration, even before the phenomenon was discovered, these techniques are particularly compelling to composers for the instrument. Maurice Riley writes that "for over three centuries there have been numerous 'experiments to improve the viola' by altering its shape, or by changing its dimensions or tuning."[3] He continues, "There was a particular concern in Paris in the early nineteenth century regarding the problem of viola sonority."[4] The historical background of the viola clearly connects composers of *musique spectrale* in the

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[2] Joshua Fineberg, "Sculpting Sound: An Introduction to the Spectral Movement—Its Ideas and Music" (DMA thesis, Columbia University, 1999), 23.

[3] Maurice Riley, *The History of the Viola,* (Ann Arbor, Braun-Brumfield, 1993), 218.

[4] Ibid., 225.

twentieth century with the sonic history of the instrument from nineteenth century France and far beyond.

It was the unique spectral makeup of the viola in particular that interested the composers whose goal it was to understand and subsequently alter spectra. The spectralists' colleague in microtonal composition, Harry Partch, took this alteration of the viola's spectra to the extreme with the invention of an entirely new iteration of the instrument in 1930, the Adapted Viola. This much larger viola was tuned differently, for fifths in just intonation, and featured notated microtonal pitches on its fingerboard.[5] While this is certainly the affectation of a different compositional aesthetic, Partch laid the foundation for the spirit of spectral alteration of the viola as far back as 46 years before the premiere of Grisey's *Prologue*.

Furthermore, because Grisey is widely considered the father of spectral music, and *Les espaces acoustiques* its seminal work, its twenty minute *Prologue* for viola will eternally hold a very special place in the history of spectral music. Grisey states, "It all began with *Périodes*…I experimented here for the first time with a technique that appeared to me to have to be developed."[6] *Périodes* is the second of six works in the cycle *Les espaces acoustiques*, and *Prologue* the first, effectively making the solo viola work the formal prologue to the birth of spectral music, according to Grisey.

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[5] Franck Jedrzejewski, *Dictionnaire des musiques microtonales* (Paris: L'Harmattan, 2003), 11.

[6] Gérard Grisey, *Écrits, ou l'invention de la musique spectrale* (Paris: MF, 2008), 131.

In order for the performer and pedagogue to understand spectralism from the composer's viewpoint, familiarity with its basic tenets is critical. Grisey divided the tenets of spectral composition into three distinct groups: harmonic, temporal, and formal.[7]

The harmonic content of *Prologue* is significantly impacted by the *scordatura* in the opening of the piece—the viola's fourth string is tuned down a half step to B. As the lowest string on the viola, the resonance of this string influences the sound of the instrument itself. If its tension is altered, pitches played normally on other strings will immediately be perceived by the listener as altered, because of the effect the *scordatura* has on the viola's formants. Concerning formants, Fineberg writes, "When physical bodies vibrate, they act, to a certain degree, as filters, emphasizing certain bands of frequencies and attenuating others. For most instruments this is a fixed part of their construction."[8] The alteration of the C string affects the formants of the viola's spectra because part of its basic structure—the tension of the fourth string—has been changed to a significant degree.

Remember that *Prologue* is the first of a cycle of six works that defined Grisey's style, *Espaces acoustiques*. B is the lowest pitch of the first work in the cycle, but the harmonic spectrum on which the material for *Prologue* is derived comes from E. E serves as the lowest pitch of the melodic fragments, while B is heard only in the interpolations. Grsiey codifies this basis in the score when he writes, "For the intonation of the

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[7] Gérard Grisey, "Did You Say Spectral?" trans. Joshua Fineberg *Contemporary Music Review* 19, no. 3 (2000): 2–3.

[8] Fineberg, 24.

beginning of the piece, refer to harmonics 4, 5, 6, 7, 8, 9, 10, 11, 12, and 13 at 41.2 Hz."[9] The exact pitches and frequencies of these partials and their pedagogical implication will be explored more fully in chapter three. The two pieces that follow in the cycle, *Périodes* and *Partiels*, are then based upon D and E, respectively, although the D on which *Périodes* is based can be heard as the seventh partial of E. These three pieces make up the first part of *Espaces acoustiques*, and may be performed either *attacca* or individually. Before *Prologue* becomes *Périodes* in a continuous performance, the viola re-tunes the fourth string up, not to C, but a whole tone above that, D. The viola D continues to sound through the beginning of *Périodes*, and forms the basis of the initial spectra of the work.[10] *Partiels* then moves up another whole-step, and is based upon a spectral analysis of the pitch E, this time as played by the trombone.[11]

The harmonic or spectral content of *Prologue* is not only based upon the harmonic series of E, but also on the increased inharmonicity of the melodic fragments with the resonance of the fundamental pitch. Grisey is concerned here with the shape of the melody, which he describes as a "melodic curve," and its gradual movement towards noise, the ultimate inharmonicity.[12] The melody begins as a short fragment that almost imperceptibly grows to include gradually more inharmonic frequencies before eventually descending, via both glissando and increased bow pressure, to noise. Grisey literally requests that the violist attempt to perform a sine wave in the score and writes, "When

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[9] Gérard Grisey, *Prologue* (1979) for solo viola (Milan: Ricordi, 1992).

[10] Grisey, *Écrits, ou l'invention de la musique spectrale*, 137

[11] Fineberg, 56–57.

[12] Grisey, *Écrits, ou l'invention de la musique spectrale*, 135–36.

speed no longer allows the violist to play the notes, he bluffs and scamps until finally only a sine wave is heard: the (geometric) envelope of the neumes."[13] Because performing only one sine wave at a time on any musical instrument is technically impossible, Grisey proposes a theoretical concept more than a practical one.

There are several more subtle and detailed ways in which Grisey also controls the spectra of the viola. We have already determined that scordatura changes the spectra to a large degree, but so do the use of manipulation of vibrato, muting, and sounding point instruction, all three of which are found throughout *Prologue*. The entire first quarter of the work is performed with mute until it is removed after the inharmonicity of the melodic curve has grown for a period of several minutes. Grisey also requests in the beginning of the score that the violist perform each melodic curve non-vibrato, except for the peak of each phrase, and sounding point instructions are found throughout the work.[14] Vibrato does affect instrumental spectra, and on string instruments it is an example of frequency modulation.

The presence of electronics is important to the spectral makeup of *Prologue*, where Grisey wanted to explore the idea of resonance, especially how expanded resonance can create an accompaniment to the melody of a solo line. He writes, "I love the idea of ghostly instruments that sound by themselves without human intervention."[15] Even without additional resonance, the reduced tension of the fourth string provides its own subtle, ghostly accompaniment, but *Prologue* exists in three versions: the solo

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[13] Grisey, *Prologue*.

[14] Ibid.

[15] Grisey, *Écrits, ou l'invention de la musique spectrale*, 136.

version, the version with acoustic resonators, and the version with virtual resonators. Grisey sanctioned the performance of all three versions (the third before it was even ready for performance), although the version with acoustic resonators involves a complex patching of the viola sound through each of five additional resonating bodies: *Palme Martenot* (the resonating body of the *Ondes Martenot*), a grand piano with the sustain pedal held down, a tam-tam, the small gong from the *Ondes Martenot*, and a snare drum. In 2001, IRCAM technician Éric Daubresse, working with violist Garth Knox, developed the virtual resonators, which involves the use of only one microphone attached to the viola and one computer running the Max/MSP patch that Daubresse designed. Garth Knox says that "each version of *Prologue* explores in its own way a play of resonances of the initial gesture that creates its own '*espace acoustique.*'"[16]

The second of Grisey's divisions of the main tenets of spectral music, temporal concern, can essentially be understood as rhythmic concern. We have already established that rhythm in the work of Grisey and Murail is generally considered in terms of duration, and that is certainly the case in *Prologue*. The idea of time and duration for Grisey is not confined solely to rhythmic structure, however, but combines with the other elements of sound to create one unique sonic entity. Grisey writes, "Strengthened by an ecology of sounds, spectral music no longer integrates time as an external element imposed upon a sonic material considered as being 'outside-time,' but instead treats it as a constituent element of the sound itself."[17]

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[16] Garth Knox, quoted in Gérard Grisey, *Écrits, ou l'invention de la musique spectrale* (Paris: MF, 2008), 350.

[17] Grisey, "Did you say Spectral?" 2.

There is no standard notation of rhythm in the score—instead there are three types of durational notation: acceleration beams, heartbeat notes (long-short), and number of seconds. Acceleration beams prescribe beats per minute and essentially dictate to the performer the exact number of seconds to play the first and last notes and approximates acceleration in between. Although it looks representative of eighth notes, it sounds rhythmically nothing like them. The acceleration beam can also be reversed to approximate a deceleration. Grisey's heartbeat rhythm has its own special notation and should be performed freely, perhaps resembling the violist's own heartbeat. Additionally, there exists strict durational notation, where the rhythm is reduced only to the number of seconds. This appears at the point in the piece where both the rhythm and the melodic curve have been entirely deconstructed.

Just as Grisey fused harmony with time to create an "ecology of sounds," he again blurs the line between time and form, considering the "integration of time as the very object of form."[18] This process driven formal structure is evident in *Prologue* and in *Espaces acoustiques* as a whole. We have already discovered that harmonically, *Prologue* generally moves in the direction of increased noise until the spectra is entirely disintegrated by the presence of only a sine wave. Only then can the viola re-tune, thus re-focusing on a new fundamental, D, which smoothly leads the listener to the next experience of *Espaces acoustiques*, *Partiels*.

In *Prologue*, melody is not something that disappears only to be referenced or altered later, as in the sonata tradition. Grisey's "melodic curve" moves so organically

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[18] Ibid.

from its first statement to its total deconstruction that it is almost barely noticeable. This, in effect, creates form. Viviana Moscovich states that "each gesture determines the next one as in a chain-reaction and the composer has to control its power and effects…. Musical form becomes the projection of a natural microphonic space onto an artificial screen which serves to deform…."[19]

Grisey's idea of harmony, time, and form is a journey that all three elements take together alongside composer, performer, and listener. He writes, "In my music, sound is never considered for itself, but always screened of its history: Where is it going? Where is it from?"[20] In order for the violist to replicate this journey in performance, a high level of technical comfort must already be in place, thus necessitating a proven, related, and reliable pedagogical methodology.

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[19] Viviana Moscovich, "French Spectral Music: An Introduction," *Tempo* 200 (April 1997): 25.

[20] Grisey, *Écrits, ou l'invention de la musique spectrale*, 27.

Chapter Three: Pedagogical Fundamentals of Microtonal Intonation

As with any other aspect of viola playing, solid fundamentals are key. Scales and etudes comprise the backbone of string pedagogy and should not be overlooked in the pedagogy of microtonal intonation, or any other extended technique for that matter. Furthermore, scales and etudes both provide the student and the seasoned performer alike the opportunity to perfect technical elements before having to consider them in tandem with musical elements. Legendary violin pedagogue Ivan Galamian divided practice time into three parts: building time, interpreting time, and performing time.[1] This standard methodology can certainly be applied to the complete spectrum of music, including musical styles conceived far after Galamian's passing.

This chapter explains scales and exercises applicable to Grisey's *Prologue*, and other microtonal works, that would be considered part of Galamian's "building time." The most basic of these elements are inarguably scales. Concerning the relative significance of scale practice, Galamian writes, "Their great importance lies in the fact that they can serve as a vehicle for the development of a large number of technical skills in either the left of right hand." He continues, "Scales build intonation and establish the frame of the hand…."[2] This is a critical point in the pedagogy of microtonal intonation primarily because intonation and its framework have likely been developed for a period of ten to twenty years or more before a typical performer even approaches a microtonal

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[1] Ivan Galamian, *Principles of Violin Playing and Teaching*, (Englewood Cliffs, NJ: Prentice-Hall, 1985), 95–101.

[2] Ibid., 102.

pitch collection. This extensive training must then be flexible enough to facilitate the performance of an entirely new set of pitches. What better way to approach the retraining of the left hand and intonation than the way in which it was primarily trained in the first place?

William Primrose asserts, "Scales are essential to a complete knowledge of the fingerboard, which is, in turn, the basis of finger technique."[3] His use of the word "complete" can certainly be used to imply the complete spectrum of a pitch's fundamental, and likely would have should Primrose have lived farther into the century. If scales can be used to gain mastery over the major and minor keys, then there are also applicable to the notes in between. Scales can and should be allowed to then illuminate musicality in practice, and applied to common practice pieces and beyond. Primrose continues, "To sum up, every possible form of what we understand to be beautiful playing should be applied to the practice of scales, and the student, while listening to himself with the greatest concentration, should seek to… invest this branch of study with musical richness."[4]

While we have used pedagogues from the early twentieth century to standardize the importance and relevance of scale practice and its applications to much later repertoires, it is important to remember that, understandably, not all early twentieth century pedagogues were totally accurate in their pedagogical models and their application in particular to spectral music. First in 1921—although then reprinted in

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[3] William Primrose, *The Art and Practice of Scale Playing on the Viola* (New York: Mills, 1954), 2.

[4] Ibid., 3.

1960—Leopold Auer writes, "Natural harmonics—obtained from the open strings—are present to the number of *four* on each separate string of the violin."[5] We have already mentioned Ligeti's extension of this rule as the entire basis of the first movement of his *Sontata* for solo viola, and spectral composers have certainly continued that practice.

While a traditional scale consists of a series of ascending and consequently descending adjacent pitches, the possibilities of microtonal scales present many options. One could simply add pitches in between in an approximation of the chromatic scale. However a scale is applied to the practice of microtonal intonation on the viola, it should be done with purpose and reference to the work or set of pitches at hand. With this in mind, it is therefore most useful to create a derived scale for a specific piece, considering the pitches contained therein. Depending upon the work, this could be a relatively simple task, or a somewhat complicated one.

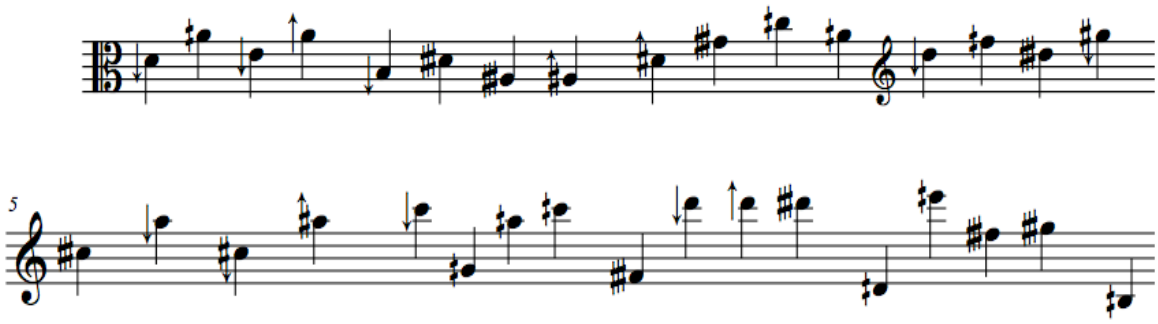
For Grisey's *Prologue*, there exists the possibility of two types of scales: the standard adjacent series, or a spectral scale. A spectral scale serves to iterate the pitches found in the harmonic series of a particular fundamental and can be useful for those works based on or influenced by the harmonic series phenomenon. For example, in the first movement of Ligeti's *Sonata*, it can be quite useful to practice the harmonics on the fourth string in order of partial number not only in order to be able to accurately find these harmonics, but to also to gain familiarity with the pitches they produce. Just as in any scale, fingerings may vary, as different partials have different fingering options and harmonic nodes. Practicing with a variety of fingerings allows the violist freedom to

[5] Leopold Auer, *Violin Playing As I Teach It* (London: Gerald Duckworth., 1960), 58.

reproduce harmonics and microtonal pitches with a command similar to that over common practice pitch collections.

Creating scales applicable to *Prologue* first involves the analysis of its component pitches, especially microtonal pitches. Below, figure 3.1 shows all microtonal pitches found in *Prologue*, in order of appearance. Pitches repeated at the octave are considered discrete, as they are representative of different frequencies, the true concern of a spectral composer, rather than pitch class. The key to microtonal accidental notation demonstrated in chapter two is applicable for all further figures and examples. Recall that key also defines that accidentals are only applicable to their adjacent pitch.

Figure 3.1 The Collection of Microtonal Pitches in *Prologue* by Gérard Grisey (In Order of Appearance).



The number of pitches in figure 3.1 may seem relatively small, considering they wholly represent the microtonal pitch collection of the entire work. It is important to remember two things here. First, the pitches are repeated many times, a function of the importance of time over rhythm, form, or phrase structure in spectral music—a topic explored in chapter two. Second, remember that the pitch collection at hand is

theoretically entirely based on the harmonic series of one note. Rather than extending harmony by including numerous potentially sonically unrelated microtonal pitches, Grisey pushes the limits of the harmonic series by including as many spectral pitches as possible.

Notice that the general contour of the pitches continues higher along the range of the viola and as the pitches ascend they also span a smaller range. Even without standard, non-microtonal pitches in the example, this bears a significant resemblance to the general contour of the harmonic series. This observation implies that the formal organization of the work to some degree parallels the contour of the harmonic series itself. It was determined in chapter two that *Prologue* is based upon the harmonic series of the pitch E at 41.2 Hz, and the harmonic series of that pitch is shown below in figure 3.2. A comparison of figures 3.1 and 3.2 is useful not only for its formal implications, but also to determine how the microtonal pitches in *Prologue* apply to the relevant harmonic series. Obviously the material in figure 3.1 cannot be applied to direct use as a scale, pedagogically speaking, but by further comparing the harmonic sequence, a scale can be derived.

Figure 3.2 Harmonic Series of E1 (41.2 Hz) to 32 Partials.

Frequency is the principle concern of spectral composers rather than pitch, and that element of spectral style is clearly applicable to *Prologue*. Therefore, it is not only important to consider the above harmonic series, but also its mathematical complement—the harmonic series in terms of exact pitch frequency, the true source materials of *Prologue*. Grisey used this set of numbers to derive the above pitches, as demonstrated in table 3.1, where pitch frequencies are translated to scientific pitch notation and their pitch equivalencies in *Prologue* are shown.

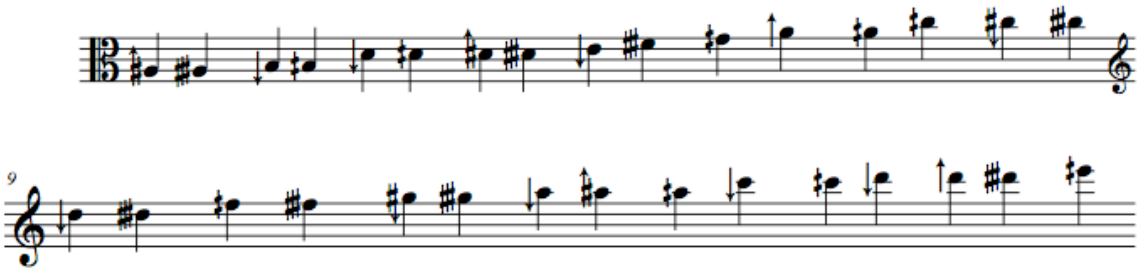
Partial Number	**Frequency** (in Hz)	**Pitch** (+/- in cents)		**Altered Pitch in *Prologue***
1	41.2	E1		(out of viola range)
2	82.4	E2		(out of viola range)
3	123.6	B2		B2 (*scordatura*)
4	164.8	E3		
5	206	G#3	-13.8	
6	247.2	B3		
7	288.4	D4	-31.3	D↓4
8	329.6	E4		
9	370.8	F#4		
10	412	G#4	-13.8	
11	453.2	A#4	-48.8	A𝄲4
12	494.4	B4		
13	535.6	C5	+40.4	C𝄲5
14	576.8	D5	-31.3	D↓5
15	618	D#5		
16	659.2	E5		
17	700.4	F5		
18	741.6	F#5		
19	782.8	G5		
20	824	G#5	-13.8	G♯5
21	865.2	A5	-29.4	A↓5
22	906.4	A#5	-48.8	A𝄲5
23	947.6	A#5	+28.1	A♯5
24	988.8	B5		
25	1030	C6	-27.5	C↓6
26	1071.2	C6	+40.4	C𝄲6
27	1112.4	C#6		
28	1153.6	D6	-31.3	D↓6
29	1194.8	D6	+29.4	D↑6
30	1236	D#6	-11.9	
31	1277.2	D#6	+44.9	D♯6
32	1318.4	E6		
33	1359.6	F6	-46.9	E𝄲6

Table 3.1 Harmonic Series of E1 With Frequencies and Pitch Equivalencies

It is clear from this table that the frequencies of pitch created by the harmonic series do not correspond very closely with Western temperament, here shown in scientific pitch notation. Grisey was forced to alter nearly half of the pitches in order to more closely approximate the desired frequency, even while ignoring pitch variations of approximately ten cents or less, which were also ignored on this table. It is particularly interesting to take a close look at partials twenty and higher on this table, as it is here where the Western tonal system particularly fails. As the partials get nearer and nearer, they move from semitone relationships to quarter and eighth tone relationships. The nearest twelve tone tempered pitches become less accurate and consequently less useful. These partials are not so far from the relevant pitches as to be rendered inconsequential, but are key to the tonal organization of the work—a fact easily proven by a comparison of figures 3.1 and 3.2. Even a basic understanding of the harmonic series phenomenon, its importance to spectral music as a whole and *Prologue* in particular, and its incompatibility with the Western tonal system, equips the violist and pedagogue with the necessary point of view and understanding to convincingly perform and teach this piece and the intonation of its pitch collection.

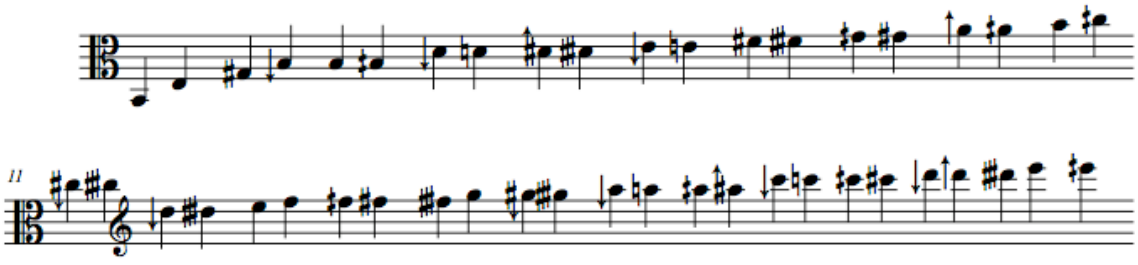
Additionally, by placing the pitches at hand in ascending order, a scale, in its sense as an adjacent series, can be easily created. Figure 3.3 demonstrates the microtonal pitches only in ascending order. Because this ignores other non-microtonal pitches, however, it is of limited pedagogical relevance. William Primrose states, “I have

Figure 3.3 Microtonal Pitch Collection of *Prologue* in Ascending Order.



never been able to understand why one should be counseled to practice in a manner completely opposed to the way one is expected finally to perform a work or passage."[6] The microtonal pitches cannot be practiced in a vacuum because they do not exist in a vacuum. By adding to this series the standard pitches that are also found in *Prologue*, whether or not they are also found in the harmonic spectrum of E, a scale of increased pedagogical significance is born, found in figure 3.4 below.

Figure 3.4 Scale Derived from Pitch Material in *Prologue* by Gérard Grisey.



[6] Primrose, 2.

This scale mixes microtonal and non-microtonal pitches as well as pitches strictly from the relevant harmonic series and those outside of that series. It includes most of the pitches in the work, and again the missing pitches are indicative of this collection's similarity to the harmonic series, although it does not strictly follow that series. Obviously, the bottom of the series is not present because it is out of the range of the viola. The low pitches are much farther apart than the higher pitches, however, just as in the harmonic series. The close eighth and quartertone relationships are also present towards the top of this scale. The presentation of these pitches in the scale and their presentation throughout the work differ greatly, but by practicing the pitches in an ascending and descending scalar pattern, not only can these close pitches be more clearly defined by comparison, but they can also be more accurately and reliably placed in the left hand frame.

Fingering choices should vary in practice of this scale, just as they should in the practice of any major or minor scale, or other mode. Concerning fingerings, Primrose suggests to the violist "not to be bound by any one system and that the more systems of fingering mastered the greater the ultimate command of the instrument."[7] It is relatively amusing to consider, in the case of microtonal intonation, that he continues to suggest that fingering be "based on the fact that the *shortest* distance between any two notes occurs when the notes are no further apart than the distance of a half step; a semitone."[8] In this case, however, the fingers may have to be much more creative in order to accommodate the very close pitches towards the top of the scale. Finger weight can be

[7] Ibid.

[8] Ibid.

shifted and rolled as necessary, which will affect the speed potential. This type of fingering also does not reflect the use of the left hand frame in the actual work at hand either, because while all these pitches do occur, they are at different points in *Prologue* and are generally approached by leap rather than by step. These facts do not make the scales any less useful, however. Simply by practicing the material as a pitch collection as a whole, the intonation will greatly benefit, just as it does when any other piece in the Western tonal system is practiced with its accompanying scale.

Alongside scales, etudes have long been used to present a series of concentrated technical problems all together at one time in order that they may be overcome before encountering their treatment in repertoire. For problem playing thirds, there are etudes completely in thirds; problems with the *détaché* stroke, there are etudes written to be performed completely in *détaché*, and so on. While many etudes also go on to combine such techniques, focused studies are invaluable to the student, especially when first presented with a particular technical issue.

No such studies existed in the realm of contemporary performance techniques for the viola until recently, leaving many contemporary works in a mysterious nether region of the instrument's repertoire. Violist, composer, and contemporary music proponent Garth Knox has filled this void with a very important series of concert etudes designed to teach the essential set of particular skill required for successful performance of many contemporary works. Knox notes, "When young musicians start to play contemporary music, many of them are discouraged by the complexity of what they are asked to do, and are ready to abandon the piece because it is 'too difficult.' I think the real problem is that

there are too many problems all at the same time—notation, rhythm, unfamiliar symbols, and an array of seemingly 'new' techniques, all to be tackled simultaneously."[9]

He concentrates on the issue of microtonal intonation in his seventh etude, "In Between." The title references the position of quartertones as between semitones, or more specifically between notes on the piano or between the places a string player would normally place the fingers. While this study does comprehensively, and very successfully, attempt the pedagogy of quartertone intonation, it does not cover the smaller intervals found extensively in *Prologue* and many other spectral works. That fact does not diminish the value of this study, however, a quartertone is the perfect place to start in an effort to become familiar with microtonal intonation. Knox writes, "The first thing to learn is what a quarter tone sounds like, so one can imagine the pitch of it before it is played (the key to all good intonation)."[10] Further application of this idea can then be carried over to eighth tones so that the violist has two methods at hand to guide intonation with the ear: considering eighth tones in between quartertones and adjacent semitones, and the harmonic series or spectral scale.

The etude does have spectral implications, however, even without eighth tones or specific and overt reference to the harmonic series. Knox explains, "The harmony produced by using quartertones with real notes can be very rich (once you get used to it!) and the passage from 61 to 67 in particular produces very special 'spectral' harmonies. In most cases (and particularly obviously in the closing bars) there is an open string present

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[9] Garth Knox, "Introduction," *Viola Spaces* (New York: Schott, 2009).

[10] Ibid., 5.

in these chords, and these give useful tuning references."[11] This type of spectral writing is particularly reflective of the more recent developments in its style, especially as made popular by some prominent composers who adhere to spectralism as an influence rather than dogmatically, such as Kaija Saariaho, who has also written an important solo viola work, *Vent nocturne*.

The harmonic significance of the quartertones, especially when used in conjunction with standard pitches, parallels the relative usefulness of the spectral scales discussed earlier in this chapter—without their semitone and whole tone complements, they exist in a vacuum and have little pedagogical or harmonic significance. And that is largely how Knox approaches the new quartertone pitches pedagogically. The opening phrase of this etude meanders along the space between B and D on the A string in first positions, initially finding only 2 notes in that space, but discovering the pitch in between at the end of the phrase. This introduction to the pitch is effective by comparing what is known very clearly with what is not known. Making such discoveries with a combination of basic pedagogical methods, such as scales and etudes, can effectively facilitate the violist's preparation for performance a work like *Prologue*.

[11] Ibid., 6.

Chapter Four: Beyond Fundamentals: A Practice Methodology

The Galamian approach of "building time," "interpreting time," and "performing time" explained in chapter three will serve as our model for a practice methodology as applicable to *Prologue* and other spectral or microtonal works. It is essential for the pedagogue to guide the student in practice organization and varied techniques, especially considering the vast majority of time spent with the instrument is in the practice room rather than the teacher's studio. Even the advanced student ready to tackle repertoire like *Prologue* requires such guidance, given the daunting nature of the work. This is especially true since many new elements, microtonal pitches in particular, may be found within, and incorrect or unguided practice can push the student's level back or result in a delayed learning curve.

The "building time" of the Grisey practice plan consists of the material discussed in chapter three on pedagogical fundamentals and especially their application to the work at hand. The spectral scales should first be considered and Garth Knox's etude should be practiced as a preparatory study. Because the scales differ greatly from the traditional major and minor scale exercises normally practiced, they will necessitate modified practice. Additionally, the major and minor scales should not be ignored. Although these pitches may not serve the same formal purpose in a piece like *Prologue*, they are still found therein. A combination of standard scales and exercises along with those specifically applicable to *Prologue* should build the appropriate set of skills and techniques necessary for an accurate on convincing performance of the work. All told, no

pedagogical stone should be left unturned simply because the work being prepared presents a wholly different tonal organization.

After the practice of scales and etudes, arguably the most important portion of "building time" is the actual process of learning notes and rhythms. This is where intonation of microtonal pitches, especially as they relate to the piece being learned, are aptly considered. For the most part, standard practice techniques developed over years of study that apply to common practice works will also apply here. Pitches and rhythms should be mastered separately and then practiced slowly together in incrementally increasing tempi, just as would be done in a common practice work. There exist, however, some special techniques to be discovered and considered that can aid in the pedagogy and practice of spectral pitch collections.

Galamian posits one practice mantra in particular that should not be forgotten when learning a piece like *Prologue*. "Whenever technical problems are encountered, they must be analyzed to determine the nature of the difficulty: intonation, shifting, rhythm, speed, a particular bowing, the coordination of the hands, and so on, or a combination of several of these. Each difficulty should be isolated and reduced to its simplest terms so that it will be easier to devise and apply a practice procedure for it."[1] Even when focusing on intonation specifically, the other factors Galamian mentions cannot be ignored because in most cases they may be a significant part of the issue.

For instance, there are many rapid, interjection-like passages in *Prologue* that present several microtonal pitches in a short span with string crossings and slurs. The

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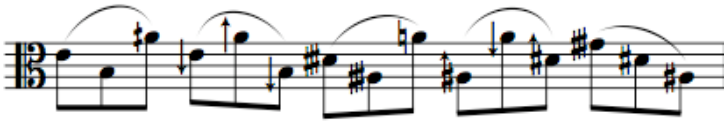
[1] Ivan Galamian, *Principles of Violin Playing and Teaching* (Englewood Cliffs, NJ: Prentice-Hall, 1985), 99.

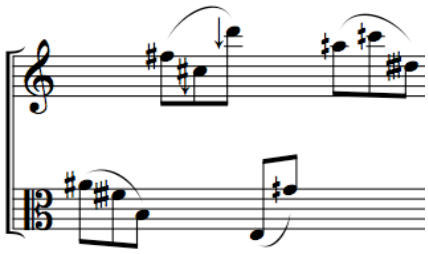
Figure 4.1 Selection from *Prologue* by Gérard Grisey.



intonation, rhythm, speed, bowing, and coordination are all issues in these particular passages, like the one shown in figure 4.1. The violist must have a plan to tackle all of these elements—not all at once, but first separately, and then all together, as Galamian suggests. Figure 4.1 demonstrates the five groups of three notes, each slurred, with at least one string crossing. In this example, when considering the intonation alone, the hand frame must be set separately for each group. The first group is nearly standard in frame—the only change being the fourth finger is lowered a quartertone to create the pitch between A and A-sharp. The second group lowers this frame by exactly one eighth tone, as do the following two groups, in a sequential descent by eighth tone. The arrival occurs on the subsequent group of three, which is played with the same frame as beginning, a microtonal journey from first to half position. By practicing this hand frame, considering across the string intervallic relationships, and practicing with double stops, good intonation can be achieved before adding the problems of speed or bowing.

As the piece continues, there exist an increasing number of large leaps back and forth. Here, good fingerings are essential to keep extraneous shifts out of the equation. In most cases, a combination of consideration of the left hand frame and an emphasis on small shifts, such as those of a semitone (or smaller) can keep leaping passages in order. The above passage also falls into this category. Often bowings can and should be planned in order to aid this effort, and figure 4.2 shows one particular passage with many

Figure 4.2 Selection from *Prologue* by Gérard Grisey.



microtonal leaps edited with my bowing suggestion that coordinates bow change and shifting. Shifting is not totally avoided under slurs in this passage, but is kept manageable with the grouping.

Since it has already been determined that the exact definitions of frequencies Grisey wished to approximate in *Prologue*, as well as in *Espaces acoustiques* as a whole, are available because he based each work on the spectra of specific pitches, the goal for intonation should be to produce pitches as close to the desired frequency as possible. This not only requires knowledge of the spectra and frequencies and their applications as a whole in the work, with which the performer can gain a familiarity by practicing the scale in chapter three, but also a plan of attack for each finger must be devised. For example, the D minus an eighth tone found in measure one is given a prescribed fingering by Grisey—fourth finger on the G-string in first position. This pitch can be achieved by shifting the weight of the fourth finger, but not the weight of the entire hand, slightly back.

The key to practicing this section is learning the distance from the second finger in first position, which just covered the fifth between B and F-sharp. This can be practiced using the hand position memory method described by Simon Fischer, by

playing the note, dropping the hand from the instrument, and immediately finding it again.[2] Although this technique might seem quite elementary to the level violist preparing a work like *Prologue*, it can be very useful to remember effective practice methods from earlier stages in musical development. Fischer provides a number of descriptions of useful practice techniques compiled from numerous pedagogical references and especially from his studies with Dorothy Delay[3] that complement the Galamian frame of this study in particular, and should serve to point out that standardized pedagogical methods should not be discarded in the exploration of more recent repertoire, but embraced as the building blocks of extended technique.

There are a few basic elements of pedagogy in particular that should not be forgotten when considering the pedagogy of microtonal intonation. Perhaps the most significant is that intonation needs to be lead from the ear. The importance of frequency to pitch definition in spectral music cannot be ignored, but, as Galamian states, "No violinist can play according to a mathematical formula; he can only follow the judgment of his own ear." He continues, "The most important part in all of this is assigned, obviously, to the ear, which has to catch immediately the slightest discrepancy between the pitch desired and the pitch produced and then demand an instant reaction from the fingers."[4] By understanding the mathematical basis of the pitch spectrum of *Prologue* and becoming familiar with the intonation of the spectrum and its scalar application, the violist can then transcend the formulaic elements of the pitch collection and rely most

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[2] Simon Fischer, *Basics* (London: Peters, 1997), 202.

[3] Ibid., vii.

[4] Galamian, 22.

vitally on the ear to lead intonation. Without this command over the work, the intonation, and therefore its constituent frequencies, is destined to be inaccurate and Grisey's desired effect will be lacking from the performance.

The concept of uniform intonation is essential to all string playing, but especially *Prologue* and much spectral music in general, since its constant reiteration of pitches is supposed to be with the purpose of echoing, or often recreating, the related harmonic series. Fischer asserts, "'Playing in tune' means that there is a definite structure to the intonation. Uniform intonation exercises are a quick and effective way to make intonation consistent, so that the same notes, played with any finger in any octave, are the same pitch."[5] There are a number of simple exercises that should be practice to promote this concept. Pitches can be repeated with differing fingerings or on different strings to ensure they remain the same. In *Prologue*, since many passages contain similar groups of pitches, they should be compared from different places in the work. This concept is dependent on the formal aspect of *Prologue* discussed in Chapter 2 that it begins with a relatively simple statement that is expanded until it eventually descends to noise. The pitch of earlier phrases should remain constant when compared to later, more complex phrases.

Once the ear comfortably leads intonation, touch and geography should also be factored in. Fischer writes, "To measure the right tuning of a note from the previous note, you not only judge by the sound, but by the relationship of the fingers together. When the

[5] Fischer, 191.

playing fingers are not next to each other, you need to imagine the missing fingers."[6] Because these relationships tend to be so different in microtonal music in general, and especially in *Prologue*, aptly demonstrated by the scale in chapter three, they need to be reconsidered and relearned. Finger weight must be factored into each relationship in a new way, and then these relationships must be practiced strongly enough to remain in muscle memory.

An exercise Fisher suggests for scale tuning to perfect intervals in particular can be modified to test this relationship. He suggests that scales also be practice by skipping certain pitches to aid intonation.[7] If the scale in chapter three is also practiced omitting some pitches, the exercise begins to more closely represent Grisey's composition. Skipping the pitches all together, or imagining that they are being played, will serve to strengthen the geographic relationship of the fingers in the microtonal context.

This brief survey of some of the most applicable practice techniques should point out that most of the numerous practice tricks and methods available are applicable and modifiable to the practice and pedagogy of microtonal intonation. They can be easily combined and varied to comprise a highly effective "building time" for learning a piece like *Prologue*. Galamian asserts that it is essential to then take these techniques and use them to effectively interpret the work as a part of the "interpreting time." This is where phrasing and musicality should be planned, practiced, and combined with the technical aspects of the music. Galamian warns students against obsessing over building time. "For such students a composition ceases to be a living work of art, but remains forever a series

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[6] Fischer, 186.

[7] Ibid., 197.

of technical challenges."[8] For spectral music in particular, this caution is highly relevant because it is a style with serious technical considerations and demands, but must be presented as a "living work of art" in order to have any effectiveness whatsoever.

The "interpreting time" in practice should be well familiar to the advanced violist, and should really bear no difference from the "interpreting time" of non-microtonal works. The same is true of the final step in Galamian's practice plan, the "performing time." Here, the technical building blocks are combined with the musician's interpretation to create a facsimile performance aimed at avoiding the phenomenon of very well prepared passages not sounding as such when recreated under performance circumstances. This portion of practice is especially essential in the performance of a work with so many new variables to consider. Galamian states, "Only then has one a right to expect that the isolated section can be successfully integrated again into the piece and made to grow together with the rest of the work without showing a seam or a scar."[9] A combination of these methodologies within the proven effectiveness of Galamian's frame will assure successful, relaxed, and effective performance of a complicated and technical work, both compositionally and pedagogically, like Grisey's *Prologue*.

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[8] Galamian, 100.

[9] Ibid., 101.

Chapter Five: Conclusion and Future Applications

The importance of contemporary music in the violist's repertoire has never been up for argument. Ever since the emergence of viola virtuosos such as Lionel Tertis and William Primrose, the involvement of their peer composers was essential. As composers continue to expand their horizons into new tuning systems, the violist must be prepared as both performer and pedagogue. It is therefore essential for violists and pedagogues to have access to an introduction and reference to those violists who have not yet had the chance to explore such works, but are now faced with them either in performance or in their studios as the music that many once thought they could ignore continues to become increasingly standard.

The question remains, however, while composers will always push the boundaries of what musicians and audiences believe is possible, will that innovation continue to include microtonal pitch collections? The answer is, of course, unclear, but much of the influence in this matter lies not only with composers, but also with performers and pedagogues. Enrique Moreno notes, "Another enormous problem, as far as the popularization of alternative forms of tuning among composers is concerned, is the inertia of the pedagogical establishment."[1] Without performers ready and willing to perform their works, no matter what the musical materials entail, a composer's work is not complete. For that reason, it will always be important for the composers to keep their performer in mind, to a certain degree, just as they often do for their audience.

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[1] Enrique Moreno, *Expanded Tunings in Contemporary Music: Theoretical Innovations and Practical Applications* (Lewiston, NY: Edwin Mellen Press, 1992), 107.

Some would certainly argue that neither of these factors were primary concerns of spectralist composers, especially those early in the movement who held closely to its stylistic tenets. They were groundbreaking composers with the resources and the gumption to embrace a serious stylistic sea change. That may not be for every composer, but it has set the precedent for the importance of its heretofore esoteric methodology. The significant role of the viola in early spectralist music does, in fact, serve to endear the movement to many violists, spurring spectrally minded composers to continue writing for the instrument. Therefore, a continued and increased familiarity with the technical requirements will serve the violist well in perpetuating this special relationship.

The significance of this movement is demonstrated by its expansion and evolution over a relatively short time period. The success of any dogmatic movement is highly dependent on performers, who are ultimately most willing to present performances of compositions that present them in a favorable light. When considering another considerably less popular microtonal pitch collection, 10-tet, and questioning its lack of popularity, William Sethares writes, "The facile answer is that there are no 10-tet guitars, flutes, or pianos, hence no musicians versed to play 10-tet, and no repertoire for them to perform. But there may be an underlying reason for this lack—that harmonic tones sound out-of-tune (or dissonant) when played in 10-tet."[2] While the 10-tet system may not sound great or work with the natural physical resonance of traditional acoustic instruments, spectral music is actually based on this acoustically satisfying phenomenon. The musical materials in the spectral composers arsenal, and especially in Grisey's *Prologue*, are based on the principles surrounding the sound of the instrument, especially

[2] William A. Sethares, *Tuning, Timbre, Spectrum, Scale* (London: Springer, 2005), 293.

applicable to those performers who have sought a very high level of sonic control through years, or a lifetime, of performance and study.

Through an ever-increasing interest and comprehension of microtonal music and its related pedagogies, the musician can support the development of such idiomatic compositional styles, despite their apparent hurdles. The pedagogical tools described here and their related scales and practice methodologies will facilitate work with past, present, and future repertoires. Ben Johnston notes, "Recent musical preoccupation with less precisely differentiated aspects of sound reflects an interest in freer kinds of scalar order as well as in more organized kinds."[3]

There is one particular instrument that has no pitch limitation, either in range or precision, and that is the computer. As computer music becomes more widespread, especially electro-acoustic works blending computer generated sounds with live acoustic sounds, so do the demands on live performers. It is this area in particular that is promising for the realm of microtonal pedagogy and microtonal music as a whole.

No matter what direction music in general takes in the near future, microtonal music in particular, the performer and pedagogue must be prepared to react and facilitate compositional creativity. Through embracing and understanding new styles and looking at them through the pedagogical eyes of the past and innovative ears of the composer, microtonal music and pedagogy will continue to grow and develop over time.

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[3] Ben Johnston, *Maximum Clarity and Other Writings on Music* (Chicago: University of Illinois Press, 2006), 44.

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