EXTENDED STRING TECHNIQUES AND SPECIAL EFFECTS IN ARNOLD SCHOENBERG’S STRING QUARTET NO. 1 AND ITS SIGNIFICANCE IN CHAMBER MUSIC LITERATURE

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Arnold Schoenberg’s String Quartet No. 1, Op. 7 stands out as being the first chamber music piece to use a vast number and variety of extended string techniques within one composition. This paper examines a brief history of extended string techniques in chamber music, analyses the unique ways in which Schoenberg applied extended string techniques to manipulate motives in his Op. 7 quartet, and ultimately shows that Schoenberg’s use of extended string techniques influenced future composers to employ even more extended techniques and special effects in their own twentieth-century chamber music.
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CHAPTER 1
INTRODUCTION

There is something intrinsically beautiful about the sound of a bowed string instrument, a quality that is difficult to put into words. Physically, a string instrument is designed to ring with harmonic overtones, creating a clear and open sound. The bow enables sustained tone production that is not as easily achievable with an instrument controlled by breath or by striking a key. Violinist and composer Charles De Bériot wrote of the violin’s ability to “render all the tender, plaintive and sorrowful expressions of the sentiments of the soul”,¹ and spoke of its “true mission, which is that of imitating the accents of the human voice”.² I strongly agree with these sentiments that the string instruments stand out as evoking human sounds, imitative of the natural singing voice.

On occasion, composers employ techniques which require that the bow does not draw across the string in its typical manner. These extended string techniques, achievable through alterations to typical playing methods in either the left hand or right hand, drive the instrument to sound harsh or percussive, or, alternatively, far away and eerie, adding a variety of colors and effects to the typical scope of the string player’s sound. Extended string techniques change the singing essence in the string instrument’s sound, so that the techniques stand out in stark contrast to the typical voice of the string instrument. In my experience as a teacher and a

² Ibid., 1.
performer, I have found that both experienced musicians and novice listeners alike immediately recognize the change in sound quality between normal string playing and extended string techniques.

The sounds of extended string techniques vary greatly depending on their context. For example, if an entire string section played with col legno\(^3\) bowing in an orchestra, there would be a pronounced percussive sound, whereas that sound would likely be subtler with a solo violinist or only a few string players playing together. On the other hand, a technique such as sul ponticello\(^4\) tends to have a more pronounced sound in chamber music because all the overtones produced by playing on the bridge would be audible and not covered by other instruments as they might be in an orchestral setting.

Extended string techniques and special string effects were not uncommon in orchestral music by the end of the nineteenth century; many prominent examples exist such as the col legno passage in *Symphonie Fantastique* by Hector Berlioz (1830), and passages of sul ponticello in *Tristan und Isolde* by Wagner (1857-59), as well as in Gustav Mahler’s Fifth Symphony (1904).\(^5\) These techniques were slower to appear in chamber music, but this would change after Arnold Schoenberg wrote his String Quartet No. 1, Op. 7 in D minor,\(^6\) a landmark work in the

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\(^3\) *Col legno*: Bouncing or striking the wood of the bow against the string to produce a percussive sound. This term will be discussed more extensively in Chapter 2.

\(^4\) *Sul ponticello*: Placing the bow by or on the bridge, which can either emphasize, eliminate or distort the higher partials, resulting in a harsh sound. This term will be discussed more extensively in Chapter 2.

\(^5\) Norman Del Mar, *Anatomy of the Orchestra* (Berkeley: University of California Press, 1981), 79-85. This book provides musical examples from the pieces that I mentioned, as well as even more examples of coloristic uses of the bow.

\(^6\) Schoenberg actually wrote one string quartet before this one that was published posthumously, so in order to avoid any discrepancies in numbering, I refer to this quartet throughout the document as Schoenberg’s Op. 7 Quartet.
use of these techniques in twentieth-century chamber music.

Little discussion exists regarding string techniques in the chamber music repertoire in the early 20th century, but when the topic is addressed, scholars most often cite Béla Bartók for the extended string techniques in his four string quartets. Yet, Schoenberg used a large number of these techniques very extensively in his first published string quartet, composed in 1905, years before composers such as Bartók used the same techniques to much greater acclaim.

A perusal of the score of Schoenberg’s Op. 7 String Quartet reveals clear patterns in Schoenberg’s application of these techniques. Schoenberg used extended string techniques and special effects in transitions between formal sections, creating a strikingly different type of sound in those passages. In the most extreme cases, he used these techniques to replace the development of motives, which disappear in sections of “liquidation” (Schoenberg’s term). This paper will elucidate the three ways Schoenberg contributed to extended string techniques and special effects in chamber music with his Op. 7 String Quartet: by using an unprecedented number of extended string techniques within one single string quartet; by using them to amplify or disintegrate familiar motives with the aim of making an effective transition between thematic sections of the quartet; and by creating what I see as a model for future composers

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8 Liquidation, according to Schoenberg, is “gradually eliminating characteristic features [of a theme], until only uncharacteristic ones remain, which no longer demand a continuation” [Arnold Schoenberg and Gerald Strang, Fundamentals of Musical Composition (New York: St. Martin's Press, 1967), 58].
interested in applying extended string techniques in their own chamber music.
CHAPTER 2

DEFINITION OF EXTENDED STRING TECHNIQUES
AND THEIR HISTORY IN CHAMBER MUSIC

2.1 Definition of Extended String Techniques

Currently there is no published or widely accepted definition of the term “extended string technique”, nor is there a clear line between what constitutes an extended string technique versus a standard one. Performer and author Patricia Strange refers to extended string performance technique as “extensions of normal bowing [or fingering] technique”.9 Musicologist Peter Walls equates these techniques with special effects, and explains how they change the timbre from the typical sound of the instrument.10 For the purposes of this paper, I will define “extended string techniques” as: bowings and fingering methods outside of those typically used to play a string instrument, that change the normal tone color or timbre of the instrument.

The following definitions of specific string techniques come from David Boyden’s articles about specific string techniques in the New Grove Music Encyclopedia, Patricia Strange’s book The Contemporary Violin: Extended Performance Techniques, and Hector Berlioz’s Grand traité

Con sordino (trans. “with mute”): Placing a mute on the bridge. While this is a standard string technique when it is used for the purpose of making a string instrument softer, it also creates a timbral effect that gives a “mournful, mysterious, and softened tone”.\textsuperscript{11}

Col legno battuto (trans. “hit with the wood”): Bouncing or striking the wood of the bow against the string to produce a percussive sound. Berlioz referred to this effect as “terrible combined with the grotesque”,\textsuperscript{12} and suggested that it should only be used rarely and for a definite purpose.\textsuperscript{13}

Harmonics: Changing the normal timbre of the string instrument by lightly pressing on one of the string’s harmonic nodes (natural harmonics), or pressing firmly with one finger to shorten it, and then lightly pressing with a higher finger on one of the nodes of the shortened string (artificial harmonics). Berlioz wrote, “These harmonics have a peculiar character of mysterious softness”.\textsuperscript{14} He added that their “delicacy and tenuity ... and their crystalline quality render them appropriate to chords that may be called fairy-like, that is to say, to those effects of harmony which inspire brilliant musings, and carry the imagination towards the most graceful fictions of the poetical and supernatural world.”\textsuperscript{15} It appears that Schoenberg used harmonics in his Op. 7 string quartet to the same effect.

\textsuperscript{11} Hector Berlioz and Mary Cowden Clarke, \textit{A Treatise on Modern Instrumentation and Orchestration; To Which Is Appended the Chef D’orchestre} (London: Novello, Ewer, 1882), 16.
\textsuperscript{12} Ibid., 21.
\textsuperscript{13} Ibid., 21.
\textsuperscript{14} Ibid., 21
\textsuperscript{15} Ibid., 14.
Sul ponticello (or, in German, am Steg\textsuperscript{16}): Placing the bow by or on the bridge, which can either emphasize, eliminate or distort the higher partials, resulting in a harsh sound. The sul ponticello technique has a reputation throughout history as being a distinctly unappealing sound. Musicologist Elisabeth Le Guin described sul ponticello as a “glassy, choked, and distant tone”,\textsuperscript{17} and emphasized that executing a sul ponticello sound requires a great deal of restraint, due to the difficulty of keeping the bow so close to the bridge.

Sul ponticello can have a different effect depending on its dynamic. Regarding a loud sul ponticello, Berlioz wrote, “I know nothing of this kind more dramatic or more terrible.”\textsuperscript{18} Sul ponticello creates a less abrasive effect when used in pianissimo, such as in the opening of the second act of Tristan and Isolde, where, as described by Richard Strauss, “this tremolo effect near the bridge (depicting the rustling of the leaves and the blowing of the wind) produces a feeling of awe and apprehension in the listener”.\textsuperscript{19}

Sul tasto: Synonymous with flautando, sul tasto is the placement of the bow near the fingerboard, which also changes the mix of overtones and creates a hollow sound, similar to the sound of the flute.

Tremolo: Strange writes:

The word tremolo no longer means only a rapid up and down movement of the bow that produces a quick reiteration of the same sound. A carefully articulated tremolo can be perceived either as a timbral or a rhythmic event. The beginning of each bow stroke contains transient noise bursts -- the sound of the rosined bow hair grabbing the

\textsuperscript{16} In both Schoenberg’s and Berg's string quartets, this instruction is in German rather than the typical Italian phrase.
\textsuperscript{17} Elisabeth Le Guin, Boccherini's Body: An Essay in Carnal Musicology (Berkeley: University of California Press, 2006), 127.
\textsuperscript{19} Ibid., 17.
string. If a fast, regular tremolo is executed, these transients will blend together, forming a timbral effect characterized by an additional noise band.  

Another string technique that should be considered when looking at Schoenberg’s quartet is *pizzicato*, or plucking the string with an upward motion. While I focus less on this technique because Schoenberg did not seem to apply this technique during transitions as he did with the others, *pizzicato* is sometimes present while other extended string techniques are occurring, as I will show in Chapter 4. Finally, *ordinario* is the instruction most often used to indicate that the performer should cease playing with any string technique.

It is debatable whether all contemporary violinists would consider these techniques “extended”, especially since *tremolo* and *con sordino* were common practice by the end of the nineteenth century. However, since these string techniques are all innovative characteristics in chamber music into the early twentieth century and are utilized to create an array of timbres and colors, I call all of the above terms extended string techniques and special effects within the context of Schoenberg’s Op. 7 Quartet.

### 2.2 Use of Extended String Techniques in Chamber Music up to 1904

The use of extended string techniques in both orchestral and chamber music was encouraged by Hector Berlioz, who used a variety of extended string techniques in his own *Symphonie Fantastique* (1830).  

21 Hector Berlioz, *Symphonie fantastique: episode in the life of an artist: op. 14* (Mineola, N.Y.: Dover Publications, 1997), *Con sordino* occurs in the opening measures. There is *tremolo* is in the opening of the second movement,
1844 treatise, one of the first publications to define the application and the effect of these techniques, extended string techniques became more common in the orchestral setting, heard in compositions such as in Wagner’s *Tristan und Isolde* (1859), and Richard Strauss’s tone poems. I will not go into detail with those examples, as this paper focuses on the use of extended string techniques within the chamber music genre, but I believe that Berlioz’s treatise led to the increased use of extended string techniques, appearing first in orchestral music, and soon after, in chamber music as well.

This chapter looks at applications of these techniques in chamber music up until 1905, when Schoenberg’s Op. 7 quartet was published, divided into the following categories:

1. Early experimentation in the 17th century

2. *Sul Ponticello* for contrast: from Boccherini to Grieg

3. A variety of extended string techniques: Debussy and Ravel.

2.2.1. Early Experimentation in the 17th Century

Carlo Farina’s *Capriccio Stravagante* (1627) stands out as parading a fascinating variety of extended string techniques within one chamber work; such an intense use of these techniques within chamber music was not seen again until the early 1900s. The composition is a long dance piece with episodes of programmatic music. Farina called for extended string

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22 Richard Wagner, *Tristan und Isolde: complete orchestral score* (New York: Dover Publications, 1973), *Sul Ponticello* can be found in Act 2, Scene 1, starting in m. 47.

techniques to imitate the sounds of animals and other instruments. In the following excerpt, *Il Gatto* (“The Cat”), Farina instructed, “The cat is played by making the notes die, that is, by shifting the [left] hand backwards a little at a time; but the sixteenth notes are played ungracefully and badly, that is, by making the bow run above and below the bridge, just as cats do when they scatter away.” These instructions describe the modern-day *glissandi* and, what I deduce is the technique of playing behind the bridge.

Figure 1: *Capriccio Stravagante* by Carlo Farina, mm. 288-298.

In mm. 289-294, the half notes are to be played with *glissandi*, likely to represent the meowing sound of cats, and the final measure of rapid sixteenth notes is to be played with the

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24 Rebecca Cypess, "“Die Natur und Kunst zu betrachten”: Carlo Farina’s Capriccio stravagante (1627) and the Cultures of Collecting at the Court of Saxony." *Musical Quarterly* 95, no. 1: 6.
bow on both sides of the bridge. By using these effects in such an innovative way, one can imagine the sound of cats meowing cats and then scurrying away. As indicated in measure 295, the cat excerpt ends, and the music resumes without ornamentation or special techniques.

In addition to the sounds of animals, Farina also used the string consort to represent instruments outside of the string family. Below is an excerpt where Farina instructed the player to use col legno, writing “here [the player] hits the wood of the bow against the strings”:

Figure 2: Capriccio Stravagante by Carlo Farina, mm. 103-112

In the appendix, Farina wrote that “these [notes] are hit with the wood of the bow, as

Capriccio Stravagante is an outlier in terms of the trajectory of extended string techniques in chamber music. Many of these techniques were not used again as programmatic elements until approximately 200 years later, in Berlioz’s Symphony Fantastique, and it would be even longer before composers used extended string techniques to this extent again in chamber music. That being said, I find it crucial to recognize that experiments with the sound capabilities of the string instrument in chamber music date as far back as the seventeenth century.

2.2.2. Sul Ponticello for Contrast: From Boccherini to Grieg

The following examples of chamber music containing sul ponticello span almost a century. While the styles, country of composition, and time-period vary greatly, the common thread is that the sul ponticello passages in each of these three pieces provide marked contrast from the surrounding material and, in some instances, a distinct departure from the music surrounding the occurrence.

The earliest example of using sul ponticello for contrast that I could find is Luigi Boccherini’s String Quartet Op. 9 No. 3 (1772), which has a minuet movement whose trio section alternates between sul ponticello and dolce (in this case, dolce seems to signify a cessation of the sul ponticello bowing), creating disparity between the two sound colors (Figure

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26 The tabor is a portable snare drum.
In this excerpt, the *sul ponticello* bowing occurs in what I label as “Phrase A”: a busy and diatonic melody with detaché bowing. In contrast, the *dolce* phrase, which I label as “Phrase B”, is legato and slower in rhythm. While Phrase A is decidedly in the tonic key, Phrase B is more melodically chromatic and harmonically dissonant, and moves to a half cadence. The *sul ponticello* bowing provides another layer of distinction between the two phrases, and, when combined with the change in harmony and articulation, emphasizes the marked contrast.
between the phrases.\textsuperscript{28}

The next prominent example of extended string techniques in chamber music was Ludwig van Beethoven’s use of \textit{sul ponticello} in the fifth movement of his Op. 131 string quartet (1826). This was Beethoven’s fourteenth string quartet, and the first and only time that he used \textit{sul ponticello} in his chamber music. The \textit{sul ponticello} passage occurs in the coda, before transitioning to the movement’s final flourish (Figure 4).

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{beethoven_quartet.png}
\caption{String Quartet No. 14, op. 131 by Ludwig van Beethoven, final 30 measures of the fifth movement.}
\end{figure}

\textsuperscript{28} As an aside, from a performer’s perspective, this would be a difficult bowing to execute correctly, as there is very little time to transition from \textit{sul ponticello} sixteenth notes to \textit{dolce} legato bowing.
Figure 4 (pg. 2 of 2): String Quartet No. 14, op. 131 by Ludwig van Beethoven, final 30 measures of the fifth movement.

The majority of the *sul ponticello* writing is with *pianissimo* dynamic. The cello, in this passage, is in the extreme upper register of its range, and stays on the dominant pedal almost for the entirety of the *sul ponticello* passage. The instruction *da capo per l’ordinario* in measure 488 tells the performers to return to ordinary bowing, and at this point, the dynamic rises and the cello returns to its normal range, and outlines the tonic instead of the dominant chord. I find the effect to be full of sardonic humor. The *sul ponticello* technique suppresses and restrains the sound. This, combined with the extremely high register of the cello and first violin, creates a *pianissimo* tension that greatly contrasts with the lightness of the melody that they
are playing.

Lastly, Edvard Grieg employed *sul ponticello* in a way that is remarkably similar to one of Schoenberg’s uses of *sul ponticello* that we will see later. Near the end of the first movement of Grieg’s String Quartet No. 1 Op. 27, written in 1878, the rhythm slows down, there is a decrescendo from *fortissimo* to *pianississimo*, and a grand pause. Then, the cello plays a slow expressive melody which the upper three voices accompany with *tremolo* and *sul ponticello* bowing. The combination of *tremolo* and *sul ponticello* together produces a sound that is greatly more intense than either technique alone would make, heightening the effect of this accompaniment. There is a fermata at the end of the section, and then a contrasting exuberant *Presto* finale with normal string sound to finish the movement. As I will show in chapter 4, Schoenberg set up this very structure in his quartet, using *sul ponticello* (and sometimes the combination of *sul ponticello* and *tremolo*) in its own section, completely apart from the rest of the surrounding music, and bookended on each side with fermatas, entirely separating the *sul ponticello* section into its own entity.
Figure 5 (pg. 1 of 3): *Sul Ponticello* in Grieg String Quartet No. 1, Op. 27, first movement, rehearsal Q - end.
Figure 5 (pg. 2 of 3): *Sul Ponticello* in Grieg String Quartet No. 1, Op. 27, first movement, rehearsal Q - end.
2.2.3 Variety of Extended String Techniques: Debussy and Ravel

Claude Debussy and Maurice Ravel both used a number of extended string techniques in their respective string quartets, Debussy’s written in 1893 and Ravel’s in 1903. Debussy alternated between muted and unmuted playing in the third movement of his quartet (Figures...
6 and 7), using the bright versus muted sounds to create contrast between the two sections.

Figure 6: String Quartet in G Minor Op. 10 by Claude Debussy, opening of the third movement in con sordino.

Figure 6 cont.: m. 37 of Debussy’s String Quartet, contrasting senza sordino section.

In the above examples, Figure 6 is full of fermatas and pauses, creating, in my opinion, the impression of spaciousness. The music immediately becomes more active as the mutes are removed (Figure 6 cont.).

Ravel made extensive use of these string techniques in his quartet,²⁹ such as a complete theme in pizzicato in his second movement,³⁰ a muted middle section in the second movement,

³⁰ Ibid., Rehearsal Letters H – L.
soft tremolo as a special effect in transitional sections, and a finale movement that barely has a moment devoid of tremolo.

All of the above examples show that composers were starting to use passages of extended string techniques in chamber music more frequently in the years leading up to 1905, and that the techniques were used to create a contrast from the surrounding musical material. In some cases, the extended string techniques created a louder or more intense sound, such as with Ravel’s tremolo, and other times the techniques created a very special, almost ethereal, far away sound, such as with Debussy’s and Grieg’s uses of sul ponticello.

I listed these examples for two reasons: firstly, to compare and contrast extended string techniques in quartets that preceded Schoenberg’s Op. 7 Quartet in order to see patterns in how extended string techniques evolved within chamber music. Secondly, these examples are present in order to demonstrate that Schoenberg’s string quartet is unique in comparison to all of the above examples, since Schoenberg used many more techniques throughout his entire Op. 7 String Quartet, and also more varied the ways in which he used them.

I show in Chapter 4 how Schoenberg used extended string techniques to transition between themes and formal sections of his string quartet, in addition to liquidating motives and creating interruptions to the flow. However, in order to have some background information, first I provide a brief biography of Schoenberg, as well as introduce the form of the Op. 7 String Quartet.
CHAPTER 3

A BRIEF OVERVIEW OF ARNOLD SCHOENBERG’S
LIFE AND HIS OPUS 7 STRING QUARTET NO. 1 IN D MINOR

The first section of this chapter is a glimpse into Schoenberg’s biography and compositional output, presenting information that I believe is significant when examining extended string techniques in his Op. 7 String Quartet. For a much closer look at his life, letters, written publications, and his compositions, I highly recommend visiting the Arnold Schönberg Center website.\(^\text{31}\) The second section of this chapter will give a formal overview of the string quartet, and show where the extended string techniques exist in the quartet, before looking at these examples in detail in Chapter 4.

3.1 Arnold Schoenberg’s Life and Early Works: A Brief Overview

Arnold Schoenberg was born on September 13, 1874 in Vienna. Born into a Jewish family with modest income and limited exposure to musical training,\(^\text{32}\) Schoenberg began studying the violin at age 8, and began teaching himself to compose and arrange music around the same time.\(^\text{33}\) Throughout his young adult years, Schoenberg taught himself cello, formed an amateur string quartet with his friends, and learned about compositional form and harmony

\(^{33}\) Ibid.
with the assistance of his friends, as well as by reading encyclopedia articles on the subjects.\textsuperscript{34}

In 1894, Schoenberg joined an amateur orchestra conducted by Alexander von Zemlinsky, an esteemed composer and teacher who became Schoenberg’s lifelong friend, and his only regular teacher. Zemlinsky also became Schoenberg’s brother-in-law, when Schoenberg married Zemlinsky’s sister Mathilde in 1901.\textsuperscript{35}

Schoenberg and Zemlinsky taught together in Vienna, and Schoenberg’s private students included Anton Webern and Alban Berg. In 1918, Schoenberg founded the Society for Private Musical Performances in Vienna, an esteemed private group that would give well-rehearsed performances of modern music to interested members, without the pressure of pleasing the press or the public audience. Although the society was short-lived, in three years, they gave 353 performances of 154 works within 117 concerts.\textsuperscript{36}

Several months after the passing of his first wife, Mathilde, Schoenberg married Gertrud Kolisch, sister of Rudolf Kolisch, one of Schoenberg’s pupils, and the first violinist of the Kolisch quartet. The Kolisch quartet became the leading quartet in performance of Schoenberg’s chamber works, and eventually recorded all four of his string quartets as well.\textsuperscript{37}

As the Nazis took control of the government in Berlin, Schoenberg reclaimed his Jewish faith and his family moved to Boston, where he held a one year teaching position at the Malkin Conservatory. His health dictated that he would be more comfortable living in a warmer climate, and he moved with his family to Los Angeles in 1934, where he gave lectures at

\textsuperscript{34} Ibid.  
\textsuperscript{35} Ibid.  
\textsuperscript{36} Ibid.  
University of Southern California, and was a professor at University of California at Los Angeles.\textsuperscript{38} Health problems limited Schoenberg’s work and travel in the 1940s, but he lived to see the world take interest in his compositions, and had the time to publish a series of his essays and articles in his compilation of writings, \textit{Style and Idea}. Schoenberg died on July 15, 1951, in Los Angeles.

Schoenberg’s String Quartet Op. 7 was one of his early works, written before he completely moved to atonal composition and serialism. Unlike his later works, these compositions are centered on tonality (although they do stray from tonal conventions), and motives permeate the compositions. As composer and conductor Pierre Boulez wrote,

His earliest works are a kind of introduction that includes prophetic types or patterns in which his ideal and his demands gradually take shape as he creates from the generally accepted language a language that is not only personal but highly individual, flooding his polyphony with an ever increasing number of motives and giving preference to melodic rather than the coordinating harmonic intervals. This had been done before by Beethoven and, more particularly, by Wagner, in whose music the relationship between harmony and counterpoint is so strained that it almost reaches breaking point.\textsuperscript{39}

Schoenberg was inspired by poetry, and many of his early works have programmatic elements, such as \textit{Verklärte Nacht} (1899), an immense single movement composition based on a poem of redemption and forgiveness by Richard Dehmel.\textsuperscript{40} Other large-scale single movement pieces in this time-period include his String Quartet No. 1, Op. 7 on which this paper is focused, and the \textit{Kammersymphonie} (1906), which is also a single-movement work, but much more concise in length than the quartet.

\textsuperscript{38} O.W. Neighbour, "Schoenberg, Arnold".
\textsuperscript{40} For further reading on \textit{Verklarte Nacht} and Schoenberg’s relations to poet Richard Dehmel, see: Richard Swift, "1/XII/99: Tonal Relations in Schoenberg's "Verklärte Nacht"" \textit{19th-Century Music} 1, no. 1 (1977): 3-14.
Schoenberg made several attempts at a first string quartet before finally publishing his String Quartet No. 1, Op. 7 in D Minor in 1904. Lasting approximately 45 minutes in performance, it is the longest instrumental composition that he wrote.\(^{41}\) Schoenberg prided himself on the fact that, unlike many of his other early works, this quartet was not intended to be programmatic, although early sketches show that he did start his drafts of the quartet with a programmatic impulse, outlining basic emotions to coincide with each movement.\(^{42}\)

Schoenberg, inspired by Beethoven’s expansive Third Symphony, wrote that Beethoven’s symphony guided him on “how to avoid monotony and emptiness, how to create variety out of unity, how to create new forms out of basic material, how much can be achieved by slight modifications if not by developing variation out of often rather insignificant little formulations. Of this masterpiece I learned also of the creation of harmonic contrasts and their application.”\(^{43}\)

Schoenberg’s biography has implications for his String Quartet Op. 7. The fact that he was primarily self-taught could be what led him to experiment as much as he did with string sonorities. Having studied violin and cello himself and playing chamber music from a young age, he was familiar with the technical aspects of string playing. He himself was able to try the extended techniques he wanted to apply, in order to determine what was possible, and he could consult the professional string players he knew for advice. For example, Schoenberg

\(^{42}\) Ibid., 378-380.
\(^{43}\) Schoenberg, Arnold, and J. Daniel Jenkins, Schoenberg’s program notes and musical analyses (New York: Oxford University Press, 2016), 359.
always gave the musicians time to put on and take off mutes in the string quartet, a consideration that other composers did not always render. His desire to emancipate dissonance and experiment with tonality could correlate with the idea of creating new sounds through extended string techniques in chamber music.

3.2 A Brief Formal Analysis of Schoenberg’s String Quartet No. 1 in D Minor, Op. 7

In order to understand the function of extended string techniques in Schoenberg’s Op. 7 string quartet, an explanation of the unique form of this quartet is necessary. The form follows that of previous large scale works of the 19th century, where individual movements were distinct but flowed together without pause. Schoenberg wrote that he was influenced by Ludwig van Beethoven’s String Quartet in C# Minor Opus 131, which also had no breaks between movements, as well as the large scale symphonies of Anton Bruckner and Gustav Mahler.

With this quartet, Schoenberg not only created an uninterrupted work that still had distinct movements, but he additionally incorporated a large-scale overarching sonata form into the quartet that stretches across the smaller continuous movements. Franz Liszt inspired this idea with his Piano Sonata in B-minor S. 178 (1854), another work in which a central sonata form is superimposed over the entire piece, and movements are less distinguishable.

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44 For example, Leoš Janáček only gave a quarter rest of time to remove a mute before the player had to resume playing in his String Quartet No. 1, a nearly impossible task to execute.
46 This also happens to be the only quartet in which Beethoven used *sul ponticello*.
Throughout this paper, I will refer to the overarching form that spans across the whole quartet as the macro level form, and to the movements within the quartet as the micro level form.

Schoenberg introduced motives at the beginning of the quartet that appeared throughout the whole composition, and through the process of developing variation, these motives changed their mood, harmony, character, and rhythm throughout the quartet. From a harmonic standpoint, Schoenberg would often take triadic progressions and add chromatic upper or lower neighbor tones, or juxtapose a whole tone scale on top of a diatonic scale, resulting in a disintegration of harmonies. Some of this loss of tonal bearings is also caused by what Schoenberg referred to as “vagierenden Akkorden”, or “vagrant harmonies”, where the music is not especially dissonant, but the ambiguity of harmonies causes the work to lose tonal definition. As a result of the manipulation of motives and disintegration of harmonies, I find that some passages in the quartet sound strikingly tonal and lyrical, while other passages are more difficult to grasp without consulting a score. The quartet outlines the key of D minor, but because the harmonic language reaches points of highly intense chromaticism, I find it is often easier to latch onto the basic shape of motives and themes rather than harmonic relations when listening to this quartet.

Within the large-scale work, Schoenberg divided his quartet into four movements: a sonata form first movement, a second movement Scherzo, a slow third movement, and a

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48 Schoenberg defines developing variation as: "variation of the features of a basic unit produc[ing] all the thematic formulations which provide for fluency, contrasts, variety, logic and unity, on the one hand, and character, mood, expression, and every needed differentiation, on the other hand—thus elaborating the idea of the piece" (Arnold Schoenberg, Style and Idea (Berkeley: University of California Press, 1985), 397).

49 O.W. Neighbour. "Schoenberg, Arnold."
Rondo finale fourth movement.\textsuperscript{50} Across these continuous four movements, Schoenberg intertwined an overarching sonata form with two developments and three recapitulations that weave across the smaller movements.\textsuperscript{51} The final movement culminates in a climactic passage of liquidation, before introducing a coda which ties together both the micro form and the macro form with a satisfying D Major ending.

The following figure (Figure 7) is a formal map of Schoenberg’s quartet, based on Walter Frisch’s formal overview of the quartet in his article, \textit{Thematic Form and the Genesis of Schoenberg’s D-Minor Quartet, Opus 7}.\textsuperscript{52}

\textsuperscript{50} Steiner, “A History of the First Complete Recordings,” 133.
\textsuperscript{52} Ibid.
<table>
<thead>
<tr>
<th>Exp, Dev 1, Recap 1</th>
<th><strong>Dev 2, Recap 2</strong></th>
<th>Recap 3</th>
<th>Coda</th>
</tr>
</thead>
</table>
| **First Movement:**  
(Allegro) Nicht zu rasch | **Second Movement:**  
(Scherzo) Kräftig | **Third Movement:**  
Mässig | **Fourth Movement:**  
A major (V) with D Major Coda (I) |
| *D minor [i]* | *Gb major [III]* | *A minor (v)* | |
| Exposition | Scherzo | A | |
| Development 1  
[measures A 100 – B 4]  
[measures C 12 – C 20] | Transition  
[E 124 – F 20]  
Trio | Sul Ponticello  
accompaniment  
[K 25 – K 30]  
B | A |
| Recapitulation 1 | Transition(Dev 2)  
[G 5 – G 20]  
Scherzo reprise  
Liquidation/Transition  
to third movement | Sul Ponticello  
interruption  
[K 75 – K 76]  
A’  
Sul Ponticello  
modulatory  
episode  
[L 23 – L 33] | A  
B  
A’  
C  
A”  
Liquidation  
[N 81 – N 90]  
Coda |
| Transition to Scherzo | | | |

Figure 7: A brief formal overview of Schoenberg’s Op. 7 String Quartet: the top row gives the macro level form of the work, while the four columns divide the work into four separate movements (micro level form). Sections marked with bold print contain extended string techniques. (Exp = Exposition, Dev =Development, Recap = Recapitulation). Measure numbers are given as the rehearsal letter, and then the measure number after said rehearsal letter.

I placed a bold line between the second and third movement, as Schoenberg himself separated the movements with a fermata, which is the longest pause that exists in the quartet. Also, the thematic material changes completely at that point. I marked the instances in which extended string techniques occur in bold on the map.

In the next chapter, I look at the boldfaced items in detail, showing that instances of extended string techniques reveal that the techniques appear only in developments,
transitions, interruptions, and liquidation passages of the quartet, but not in formally stable areas of the quartet, such as the expositions, recapitulations, or statements of smaller movement themes. I show how Schoenberg is effective in distorting and disintegrating motives, therefore disintegrating tonality, and bringing innovative sonorities into the string quartet genre through the use of extended string techniques. I compare his application of extended string techniques to the way composers before him used the techniques, and finally, in Chapter 5, I look at the way extended string techniques developed in chamber music after Schoenberg’s String Quartet Op. 7 was written.
In Chapter 3, I stated that extended string techniques occur during unstable and transitional formal sections of Schoenberg’s String Quartet Op. 7. This chapter takes that idea further by examining the seven most pronounced instances of extended string techniques which I hear in the composition. I organized these examples by the manner in which Schoenberg used the extended techniques. First, I show an example where extended string techniques amplify or draw attention to a motive (Section 4.1). Next, I describe how Schoenberg used extended string techniques to create contrast and interrupt the flow of the form (Section 4.2). Finally, I portray how he used extended string techniques in an unprecedented way: to obscure motives in liquidation sections (Section 4.3). Measure numbers are given as the rehearsal letter, and then the measure number after said rehearsal letter, as is done in the Berlin: Verlag Dreililien score (most recently reprinted by Dover Publications). I have transcribed the related musical examples into this paper, but for a more thorough viewing and understanding of these techniques within the context of the entire composition, I recommend reading this chapter with the full quartet score.

4.1 Using *Tremolo* to Amplify the First Subordinate Theme

As I mentioned in Chapter 3, Schoenberg often presented a motive from a myriad of angles, and manipulated the motive through the technique of developing variation. In this example, Schoenberg developed a motive and ultimately used *tremolo* to intensify and amplify the de-familiarization of the first subordinate theme.

The first subordinate theme, a motive thus labeled by Schoenberg himself, is first seen in mm. A 61 – A 63. In its most basic form, the theme consists of six climbing notes: three step-wise notes, a leap of a perfect fourth, and then three more step-wise notes. The example below (Figure 8) shows the initial occurrence of the first subordinate theme, portrayed in octaves by the first and second violin.

Figure 8: String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. A 61 – A 63.

The use of semitones in this figure is fascinating, and evolves throughout the

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presentation of the motive, marked in each figure with a caret (^).

In its initial form, the second violin part (between its inner voice in m. A 61 and its outer voice in m. A 62) outlines a C scale with a flat 6th. This is a diatonic line, with semitones between the third and fourth, and fifth and sixth tones (shown more closely in Figure 8b). Meanwhile, the cello’s material is completely chromatic, with semitones between each note. This concurrence of semitones sets up atonal harmonies within the motive, and foreshadows the importance of semitones as the motive progresses.

Figure 8b: String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. A 61 – A 62, reduction to show semitones.

Ten measures later, this subordinate theme develops into a melody in compound meter.

Schoenberg labeled this melody “a second subordinate theme, derived from [the first subordinate theme]”.55 Here, in Figure 9, the second violin plays the second subordinate theme:

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55 Schoenberg, Arnold, and J. Daniel Jenkins. Schoenberg’s program notes and musical analyses, 361.
The second subordinate theme develops very naturally out of the first subordinate theme; the main difference is that the motive is now a melody, with rhythmic variation and a diatonic accompaniment in the viola and cello, instead of chromatic harmonies from its first occurrence in Figure 8. While the first subordinate theme seems to read more vertically, as a series of block chords, the second subordinate theme (Figure 9), with its rhythmic variation and accompaniment in the viola, has the sensation of a lyrical melody.

Throughout the exposition, both versions of this subordinate theme show up, in ascending, descending, or inverted form. In the case of Figure 10 below, the subordinate theme manifests itself in all three different ways at the same time. The first violin plays the second theme from the macro form, but using the rhythm of the second subordinate theme. Meanwhile, the second violin and viola play the theme in diminution, and the cello plays an inversion of the subordinate theme.

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56 The second theme that I am referring first appeared in m. A 57, played by the first violin:
As the above figures show, this subordinate theme continually develops from its initial presentation in mm. A 61- A 63 (Figure 8), to the lyrical representation of the theme (Figure 9), to the inverted and diminutive versions of the theme (Figure 10). This motive amplifies and completely takes over in the culminating tremolo passage that follows (Figure 11).
Figure 11 (pg. 1 of 2): String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. A 96 - B 14
As shown in Figure 11, the theme starts softly in the inner voices in m. A 96; it is the most basic form of the theme in half note triplets, similar to the original version of the motive shown in Figure 8. This time, however, the motive is more resolute, continuing past its two-bar iteration in the viola, and, as the motive becomes even more insistent, the viola begins playing a kernel of the motive in diminution with *tremolo* in m. A 100. Intensity builds with repetition and crescendo in all of the voices, and finally, in m. A 103, all of the instruments play the first subordinate theme in unison in a *fortissimo tremolo*, completely interrupting everything else.
that was happening. From there, the inner voices continue repeating the subordinate theme, and its inversion, adding intensity until Schoenberg transitioned to a new section and tempo, *Viel Langsam*, in m. B 14.

During the measure of amplification, the semitones are on the first two notes and the final two notes of the motive, making the motive completely symmetrical in terms of its intervals. The amplification, through the use of *tremolo*, draws attention to the semitone alterations of this motive, which the inner voices continue to play in *fortissimo* until m. B 4. By creating symmetry in the motive, adding *fortissimo*, and instructing the use of *tremolo* in all four instruments, Schoenberg brought complete attention to the de-familiarization of this motive before winding down to the next section. Frisch labeled the first development as beginning in m. B 1,\(^57\) directly after the measure of *tremolo* amplification, making it clear that Schoenberg used the *tremolo* in transitioning from the end of the exposition to this development.

4.2 Extended String Effects in Transitional Passages during the Middle Movements

A majority of the extended string techniques in this work appear in Schoenberg’s middle movements, which are the scherzo and the slow third movement. The following examples show how Schoenberg interrupted the flow of the quartet in order to draw attention to harmonics, *col legno, con sordino*, and *sul ponticello*, and how he continued to use these techniques specifically in transitional passages during the quartet.

4.2.1 Harmonics and *con sordino* to Create Contrast and Chromaticism in the Second Movement Transition: mm E 128 – F 10

The example below occurs in the Scherzo second movement, where the theme is stated firmly in *fortissimo* with accents in m. E 128, and then echoed in *pianissimo* with harmonics in m. E 130, and finished with a fortissimo cadence (mm. E 133 – E 134). The harmonics are bookended with fermatas on each side, drawing even more attention to the difference in sound (Figure 12).

![Figure 12](image_url)

Figure 12 (pg. 1 of 2): String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. E 128 – F 10
Looking more closely at the chords outlined in the fermatas between E 128 and E 134, it becomes clear that the harmonics are moving chromatically down to the cadence in the tonic, Gb major, as shown in Figure 12b.

After the Gb Major cadence in m. E 128, the first fermata sustains an Ab minor chord (m. E 130), the fermata with harmonics sustains a G major chord (m. E 132), and the following cadence goes back to the tonic (m. E 134). Being in the key of Gb major, the harmonics stand out as being chromatic upper neighbors to the tonic. For a moment, Schoenberg seems to have
suspended the tonality, leaving a mysterious chord hovering in the air with harmonics, before moving back to the tonic. The G major chord transitions chromatically from the predominant Ab chord, disintegrating the harmony with chromaticism and harmonics, and then moves back to the home key of Gb major. Schoenberg used harmonics to transition to the tonic key, a small-scale variation of his use of extended string techniques to transition between formal sections of the quartet.

The second half of this example continues the chromatic descent that began in m. E 130. Figure 12c shows how the chromaticism continues until m. F 9.

![Figure 12c: String Quartet in D Minor Op. 7 by Arnold Schoenberg, harmonic reduction of mm. F1 – F9](image)

The key changes from Gb major to the relative enharmonic minor (F# minor), and then down to F minor. The bass line also has a stepwise chromatic descent from D# down to C natural. Schoenberg continued the chromatic line through the harmonics and to the con sordino section, using the string effects to de-familiarize the key areas until the tonality is no longer clear. The muted section continues for 30 measures,\(^{58}\) acting as a disjunct interruption between the Scherzo section and the trio section, which begins in m. F 30.

\(^{58}\) I provided a few measures of the con sordino material to show the effect. The complete viewing of this section is available in pgs. 32-33 of the Dover score.
These two special effects occur within merely 10 measures of each other, and, again, during a transitional section. The harmonics delay the return to tonality, and the *con sordino* material is wandering and transitory, without much hint of formal coherence or key. The cello is absent while most of these special effects occur, or it is in its upper register, implying a loss of foundation during this passage.

4.2.2  *Col legno*, Harmonics, and *sul ponticello*: Measures G5-G27

The next example, a passage that occurs between the Trio and Reprise in the Scherzo movement, combines the use of *col legno* and harmonics to create an episode that stands out from its surrounding material (Figure 13).
Figure 13 (pg. 1 of 2): String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. G – G 37
Figure 13 (pg. 2 of 2): String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. G – G 34
The passage here is marked *Flüchtig*, or “fleeting”, and begins with a melody played in harmonics by the second violin, while the viola plays *col legno* interjections, and the first violin flits around the melody (m. G 5 – G 9). Roles are reversed in m. G 13 – G 14, with the first violin playing harmonics and the cellist playing *col legno*. The whole section is marked *pianissimo*, giving a mysterious aura to the *Flüchtig* passage.

Although this passage is clearly in the key of E major, the cello is always playing a whole-tone version of the scherzo motive, except in m. G 13 – G 14 when it plays the chromatic *col legno* interjection, and the viola takes over the whole-tone material. Each string technique has a role, as the harmonics outline E Major, the *col legno* interjection adds chromaticism, and the *ordinario* material outlines the whole tone scale. At m. E 18 the cello plays a *sul ponticello* E natural that triggers a transition to the next section, where a fragment of the whole-tone motive completely takes over in all voices. There is a great deal of dissonance in the whole-tone takeover. As each voice plays its own whole tone scale, the stacked pitches produce a series of augmented chords that disintegrate the tonality for the remainder of the passage.

Regarding the sound of the extended string techniques, the harmonics are a remarkable change to the sound that we have heard so far in the second movement, attaining the “mysterious softness” and “fairy-like nature” about which Berlioz spoke in his treatise on instrumentation.\(^{59}\) This lightening in timbre implies a departure from the real world, with the simple and soft melody suggesting perhaps a temporary escape into a childlike dream world. The *col legno* adds bite to the sweet nature of the harmonics, and the *pizzicato* also adds a

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\(^{59}\) As cited in Chapter 2, Hector Berlioz and Mary Cowden Clarke. *A Treatise on Modern Instrumentation and Orchestration*, 21.
sharp timbre to the overall soundscape. The effects seem to be playful in nature, and because Schoenberg stacked so many techniques on top of each other into one passage, I believe that he must be experimenting with new sounds within the string quartet genre, just as Farina had experimented with the string instrument’s capabilities in *Capricio Stravagante*. I will show in Chapter 5 that Alban Berg and Béla Bartók also used several different extended string techniques within one passage, perhaps drawing attention away from motives and thematic development in order to focus on the sounds of these techniques.

When the *ordinario* sound returns, the listener is brought back into the real world. After a small crescendo with *sul ponticello tremolo* in the cello in measure G18, the main motive of the second movement takes over and disintegrates before leading to the reprise of the scherzo. It is telling that Schoenberg used these effects in the transitional section before the reprise. He seems to stray as far away as he can in sound before de-familiarizing the motives in the disintegration in mm. G 28 – G 34.
4.2.3 *Sul Ponticello* interruptions in the third movement: measures K72 – K 77 and measures L 24 – L 33

Schoenberg used extended string techniques most frequently in his third movement. Not only is half of the movement *con sordino*, but passages of *sul ponticello* are completely separate from the rest of the movement, and bookended with silence on both ends. The passages of *sul ponticello* do not directly relate to what came before them, or after, and instead act as eerie interruptions to the trajectory of the third movement.

In the first example, measures K72-77 (Figure 14), a brief interlude in *sul ponticello* interrupts the melodious tonal writing from the preceding passage (Figure 14).
Figure 14: String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. K 73 – K 77
The intensity builds before the *sul ponticello* interruption, but a fermata causes the melody to come to a halt, as if the music is disturbed mid-sentence. The melody of the short interruption is in the viola, and it echoes the B theme of the movement. However, in the original presentation of this theme, the key was solidly E major. This time, the melody is in e minor, a semitone lower than it was previously, with chromatic intervals showing up in every voice except for the viola melody. The pianissimo, the chromaticism, and the unison *sul ponticello* give this material a completely different quality from that around it. The four voices create a homophonic texture in the style of a chorale. This is a very strange chorale, however, because all four instruments play on the bridge, with dissonance, as if this is merely the memory of a chorale, with the *sul ponticello* tainting what was once a beautiful melody. This juxtaposition creates a prominent contrast between the cold sound of the *sul ponticello*, and the warm and rich sound of the strings before the *sul ponticello* occurs. The contrast recalls the differences between the restrained sound of *sul ponticello* compared to the typical singing string sound. After the *sul ponticello* interruption, another fermata closes the section, and the viola begins playing the lyrical melody again, as if the *sul ponticello* episode had never happened.

4.2.4 Modulatory Episode: Mm. L 22 – L 38

Schoenberg referred to the *sul ponticello* transition of this movement (Figure 15), as the
modulatory episode, and it bridges to the macro-level recapitulation. This episode is longer and more complex than the *sul ponticello* interruption from the previous example (Figure 14), and this time it is also combined with *tremolo*. Whereas the first instance of *sul ponticello* completely interrupted the melody, in this case there is a clear winding down and solid cadence in E major before the *sul ponticello* modulatory episode occurs.

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60 Schoenberg, Arnold, and J. Daniel Jenkins. *Schoenberg’s program notes and musical analyses*, 361.
In m. L 23, all the instruments rest except for the viola, which hangs onto its G#, the third of the E Major chord. This pitch changes function to become Ab in the next measure, the third of an F minor chord, the new key for the beginning of the modulatory episode. The first violin and viola play one of the main motives from the third movement in octaves, while the cello imitates the melody one bar later. Meanwhile, the second violin adds tremolo trills to the
texture. This section, although beginning in pianissimo, builds up intensity and has a sudden outburst to forte, before winding back down to pianissimo in m. L 31, and finally pianississimo in m. L 33.

After this passage, Schoenberg instructed the players to remove the mutes, and the third movement is essentially over, overshadowed by the return of the macro form recapitulation, showing that this episode was an effective transition between formal sections.

Schoenberg used a passage of extended string techniques to disorient the listener; after one of the most tonal passages of the quartet, he rattled the movement with the sul ponticello episode in order to transition to the more dissonant recapitulation, showing that the bliss he created in the third movement was only temporary. Schoenberg’s use of extended string techniques in this case not only added a haunting color and character to the third movement, but also created a transition between the formal sections, moving from the third movement to the macro level recapitulation.

This use of sul ponticello recalls Grieg’s use of the technique in his String Quartet No. 1 (Figure 4). In both cases, there is a winding down of the musical material, a silence before the sul ponticello passage, and a transition afterwards (In Grieg’s quartet, to the Presto finale of the movement, and in Schoenberg’s quartet to the macro-level Recapitulation).

4.3 Muddling the Motives: Tremolo Transition to Sul tastō Liquidation

In the final two examples, Schoenberg used tremolo and extremities in bowing contact points (sul tastō in example 4.3.1, and sul ponticello in example 4.3.2), to liquidate one of the
recurring motives in the quartet.

4.3.1 First Liquidation: Mm. C 10 – C 30

Throughout the quartet, there is a motive that essentially triggers a disintegration of tonality, and often leads to liquidation passages as well. Scholar Severine Neff called the motive itself a liquidation, but I will refer to the motive as “Motive x”. Highly chromatic, and descending with a series of leaps, this motive is easily recognizable when it first appears in the opening of the quartet (Figure 16).

![Figure 16: String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. 8-10, motive X](Image)

Motive X is based on a series of intervallic sequences. The first violin combines a chromatically descending line (marked in squares below in Figure 16b) with a three-note interval set that lowers a minor third, and then lowers one semitone (the pitches are circled in

Figure 16b). The viola has a similar pattern, raising a minor third, and then lowering a semitone.
The second violin has an inversion of that intervallic structure, lowering a major sixth, and then rising one semitone. The cello has a rising line, alternating between perfect fourths and major thirds, intervals that are not shared by the other voices. All these lines create harmony clashes when played together, and allow for quick disintegration of tonality.

I find this motive, with its off-kilter rhythm and chromatic makeup, to be a driving force of disintegration in the quartet, and, as I will show, it ends up driving the quartet into both liquidation sections in the piece.

Leading into the first liquidation section, motive x appears in measure C 9, in the viola and cello part (Figure 17):
Once again, motive x shows a descending chromatic line. The rhythm is now augmented and more emphatic than it was in its original appearance in Figure 16. This time the motive is amplified with two voices in octaves instead of just one voice. While the first appearance of the motive was slurred and rapid, this time each note is deliberate, with an accented punch.

The following example shows the development of motive x from mm. C 10 – C 30. The music builds to a *fortissimo* outburst, immediately suppresses into a *sul tasto* and *tremolo* transition, and then moves into the dissonant liquidation. For the entire duration, the music is focused exclusively on this one motive (Figure 18).
Figure 18 (pg. 1 of 3): String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. C 10 – C 30
Figure 18 (pg. 2 of 3): String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. C 10 – C 30
In the above figure, the first violin climbs and reaches a peak at the high B6 above the staff (m. C 13), and sustains the pitch while the other three voices furiously play motive x, the
second violin and viola in augmentation with *fortissimo* dynamic and *tremolo* bowing, and the cello in its original rhythm. A rapid decrescendo from mm. C 13-16 brings the dynamic from *fortissimo* to *pianississimo*, and all three voices begin playing *tremolo* and *sul tasto* in m. C 15.

At this point, all flow of the quartet seems to completely halt in a passage that is true to Schoenberg’s definition of liquidation. All other motives and melodies disappear, and motive x is repeated insistently in *pianississimo, sul tasto*, and *tremolo*, creating an ethereal and otherworldly affect, as if the sound effects of *sul tasto* and *tremolo* triggered a move into a totally different realm. The violins play motive x in thirds from each other, as do the viola and cello, and one set of instruments rise with the motive as the other set of instruments descend. The compound melody is outlining both a chromatic scale and a whole tone scale at the same time. In Figure 18b, the whole tone scale is circled, while the remaining notes are descending and then ascending chromatically.

![Figure 18b: String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. C 20 – C 21, whole tone and chromatic scales in motive x.](image)

This disintegration of the original form of motive x is a small scale liquidation, while on a large scale, the formal structure liquidation takes place. I find that the dissonance of the voices moving against each other, the lack of downbeat, and the lack of cadences, makes this an extremely disorienting passage to hear, as well as to play. From mm. C 20 - C 30, there is no sense of rhythm and very little indication of phrasing. The cello, the foundation of the string
quartet, is absent from this passage for the entire duration of the *sul tasto*, just as it was in example 4.2.1, and it plays in the higher part of its register during most of the consequent passage, implying that any sense of grounding or foundation is gone while the string effects occur. An *accelerando* and *crescendo* starting at C28 bring the quartet back to life, and set the stage for the recapitulation of the second theme group.

The *sul tasto* technique muffles the sound, causing motive x to lose even more of its definition during the liquidation. This passage occurs in the first movement of the quartet, and in the next example, the final liquidation passage before the coda, Schoenberg uses many similar features as he does here, perhaps channeling a memory of this moment before concluding the work.

4.3.1 Unleashing the Fury: *Sul ponticello* in the Final Liquidation

The final liquidation (Figure 19), closes off one of the most formally clear section of the quartet, the rondo fourth movement, and leads to the coda, a beautiful closing section that ties the whole quartet together with a closing section in the key of D Major.
Figure 19: String Quartet in D Minor Op. 7 by Arnold Schoenberg, mm. N 80 – O
Musicologist Mark Benson observed in his article, "Schoenberg’s Private Program for the String Quartet in D Minor, Op. 7", that the fourth movement of the quartet is securely in A major, and the coda is in D major. It would be a very simple modulation to transition to the coda, but instead, Schoenberg interrupted the final cadence of the rondo with an explosive liquidation passage. Benson wrote, “The disruptions in harmony, tempo, tone color (am Steg), playing technique (tremolo) and rhythmic figuration all but obliterate any relationship between the two sections.”

The quote above is the only written reference to Schoenberg’s use of extended string techniques that I could find, and it describes how extended string techniques enhance this liquidation passage.

As seen in Figure 20, there is an A major chord at the beginning of m. N 79, which moves on the third beat to a fortissimo C Major chord, a I-III move that mirrors Schoenberg’s move from d minor in the first movement to Gb major in the second movement. From there, the next chord is a C# minor chord that catapults us into the atonal realm of the liquidation, which begins with a G minor chord in the middle voices combined with the expected note A in the outer voices. The tempo reduces to Viel langsamer, and a hair–raising and chromatic sul ponticello passage follows. As the crescendo increases to fortississimo, the sul ponticello ceases, and all four voices play with furious tremolo (mm. N 84 – N 86).

In this instance, the inner part of Motive x is no longer outlining a whole tone scale, but

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is instead outlining thirds, and the passage ends with a first violin solo: a string of thirds that descends back to the home key of D.

This passage liquidates the chromatic Motive x, just as the previous liquidation passage did (example 4.3.1), but this time the motive is played sul ponticello instead of sul tasto. While example 4.3.1 moves into a passage of dissonant wandering through the whole tone scale, this time the music rises and falls in thirds, and settles into the D-Major coda, reconciling any tension that was left over from the first liquidation in the quartet. Schoenberg went to both extremities of bowing in his liquidation passages, from the muted soft sounds of the fingerboard to the harsh sounds of the bridge, before making the final descent and resolution into the coda.

Beethoven wrote a hushed sul ponticello episode before moving to the triumphant ending of his Op. 131 String Quartet, and Grieg also wrote a peaceful and dreamlike sul ponticello passage in his String Quartet No. 1 before finishing the movement with full vigor. In a very similar vein, Schoenberg effectively built up the ultimate tension in his sul ponticello and tremolo liquidation passage, and then released the tension with a serene coda that concluded the quartet.

Perhaps the fact that Schoenberg used extended string techniques in such a variety of ways is evidence of his compositional genius. Sometimes Schoenberg seemed to use extended string techniques to draw attention to the motives or themes, such as using tremolo to amplify the motive, or using tremolo and sul ponticello in the modulatory episode. In other examples, such as in the liquidation passages, he seemed to use the extended string techniques to
obscure the clarity of the motives.

The one aspect that all these passages of extended string techniques include is the motion of a journey, rather than a sturdy arrival. Schoenberg added the techniques in sections which were transitioning, such as the con sordino passage before the Scherzo’s trio, or in the liquidation before the coda. In contrast, when giving the initial presentation of a theme or motive in a thematic section that is not a transition, Schoenberg used the typical human sound of the string instruments. The journey of which I speak can have different purposes; the harmonics in the second movement imply a departure from the surrounding heaviness of the movement, as does the sul ponticello interruption in the third movement, whereas the tremolo amplification in the first movement gives a driving force towards the new thematic section.

The extended string techniques additionally imply a journey in tonality, as the motives and harmonic progressions surrounding the extended string techniques seem to de-familiarize the tonal center, such as when the harmonics de-familiarized the key in example 4.2.1, or when the liquidation sections disintegrated motive x (examples 4.3.1 and 4.3.2). While on a large scale the extended string techniques catapult a fragmentation of the formal structure, on a small scale the passages of extended string techniques also show a dissolution in musical language. The number of ways in which Schoenberg used extended string techniques in this quartet and the depth in which he used them is unprecedented in chamber music up until this point.

The next chapter looks at the use of extended string techniques by other composers in the 20th century, after Schoenberg’s String Quartet Op. 7 was published and performed,
showing that Schoenberg’s treatment of extended string techniques had an effect on his pupil, Alban Berg, and, consequently, on Béla Bartók.
CHAPTER 5

DRAWING A LINEAGE FROM SCHOENBERG TO BARTÓK: EXTENDED STRING TECHNIQUES IN CHAMBER MUSIC AFTER 1905

From examining the several passages of extended string techniques in Schoenberg’s first quartet, one can see that Schoenberg breaks ground in the chamber music genre with regard to the number of extended string techniques within one work, as well as the variety of string techniques within one work. In this chapter, I discuss the direct line that I see from Schoenberg’s early string quartets to Alban Berg’s string quartets, to Béla Bartók’s string quartets.

Alban Berg, an Austrian Composer who was one of Schoenberg’s premier pupils, studied closely with Schoenberg from 1904-1911, so he was a student at the time that Schoenberg’s String Quartet Op. 7 was written, published, and performed. Berg’s String Quartet Op. 3, composed in 1910, was one of the final works that he wrote while studying with Schoenberg. It is not surprising, considering that they worked together so closely during this time, that Berg continued in Schoenberg’s path by adding extended string techniques to his chamber music.

Schoenberg’s Op. 7 quartet, although sometimes straying from tonality, is still a tonal composition. On the other hand, Berg’s Op. 3 quartet is atonal, with an ambiguous formal

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structure. Adorno described this quartet as the "liquidation of the sonata". Because this quartet does not have the same formal outline and tonal foundation as Schoenberg’s Op. 7 quartet, I find that Berg used extended string techniques differently than Schoenberg did. Specifically, Berg’s extended string techniques either distinguish between the melody and accompaniment, or create a new soundscape that derives from various extended string techniques occurring at the same time.

In Figure 20, a passage from the first movement of Berg’s Op. 3 quartet, the viola and cello have a biting *staccato* and *sul ponticello* accompaniment, while the violins have a lyrical and sustained *sul tasto* phrase. When the viola moves to sustained notes in m. 45, it also changes from *sul ponticello* to *sul tasto*. Similarly, when the cello finishes the accompaniment and transitions to a more flowing phrase, Berg instructs the cellist to move back to ordinary bowing.

Figure 20: String Quartet Op. 3 by Alban Berg, First movement, mm. 41-47

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By using a distinction in bowing technique between the instruments, Berg was able to create a striking amount of contrast between the instruments, so that it is easy to hear the difference between the *sul tasto* melody and the *sul ponticello* accompaniment.

The next passage, also from the first movement of Berg’s Op. 3 String Quartet, has more extended string techniques in one section than any passage from Schoenberg’s string quartets. Within only seven measures, Berg filled the passage with *con sordino*, *sul ponticello*, harmonics, and *col legno*; for the entire duration of this passage, each instrument has at least one special effect happening at almost any given point (Figure 21).

![Figure 21: String Quartet Op. 3 by Alban Berg, First movement, mm. 75 - 82](image1.png)
In Figure 21, the second violin is marked *führend*, indicating that it is the principal line. Other than being muted, the second violin’s line is free of extended string techniques until the first violin takes over in m. 81. Meanwhile, the viola accompanies with *col legno tratto* (combining the wood and the bow hair when drawing the bow across the string). The first violin and cello have *sul ponticello* interjections and add harmonics (violin 1) and *pizzicato* (cello) to the soundscape. As with Figure 20, I see the extended string techniques as a means to accompany, as the second violin stands out from mm. 75 – 80 while the other instruments play effects around the line, and then the first violin plays with a normal sound in mm. 81 – 82 while the other instruments accompany with harmonics.

That being said, in addition to the practical purpose of accompanying the principal line, I hear this example as a truly new type of sound in the string quartet literature. The whole passage is extremely quiet; at its loudest, it is *piano*, and at the softest, *pppp*. The extended string techniques act as special effects and make the passage sound other-worldly. The suppressed dynamic combined with the techniques draw the listener in to hear a soundscape that is new to chamber music.

Alban Berg wrote another string quartet, *Lyrische Suite* in 1925, almost fifteen years after he finished studying with Schoenberg. The third movement of this quartet is riddled with extended string techniques in the following ways: the entire movement is *con sordino*, the first twelve measures are all *sul ponticello* and *pizzicato*, mm. 46-67 are completely *col legno tratto*, and interjections of *sul ponticello, sul tasto*, and harmonics frequently occur throughout the
Bartok heard Berg’s *Lyrische Suite* before composing his own String Quartet No. 3, Sz. 85 in 1927, a work that contains the highest concentration of extended string techniques in one piece of music up to that date, with pages of one technique after the other. As Theodore Adorno wrote,

A new coloristic approach to string sonority is displayed [in Bartók’s third string quartet], partly inspired by Berg’s *Lyrische Suite*, which Bartók had recently heard. The score bristles with ‘special effects’ – glissando, pizzicato, *col legno*, *sul tasto*, *ponticello*, *martellato*, muted passages, the use of exaggerating vibrato, strumming, and their combinations – all of which give the piece its startling piquancy.65

In this quartet, Bartók used *con sordino*, *sul ponticello*, left hand pizzicato while the bow is still playing a note,66 *col legno*, and using *sul tasto* in one voice while simultaneously using *sul ponticello* in another voice.

Figure 22 shows a passage of a *col legno* in Bartók’s String Quartet No. 3. This example is much more percussive and less melodic than any passages of *col legno* that Schoenberg or Berg wrote. The dynamic is *fortissimo*, and the effect is primal, aggressive, and rhythmic, far away from the typical singing sound of the string instrument.

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66 This is a technique that Schoenberg incidentally also added to his third string quartet, written the same year (1927).
Bartók’s fourth quartet, written in 1928, also includes snap pizzicato, a technique in which the string is plucked so hard that it snaps back onto the fingerboard (Figure 23).
In this passage, the music is again driven by rhythm rather than melody. The strumming of the lower strings combined with the snap pizzicato in the violin parts makes a completely new sound for the string quartet.

One article written in 1920 makes it apparent that Bartók was aware of Schoenberg’s chamber music by the time Bartók was writing his third and fourth string quartets. Bartók wrote an article about the importance of bringing Schoenberg’s music to Hungary, and mentioned an unsuccessful attempt to put together a concert in Hungary that would include Schoenberg’s second string quartet. 67 To me, this article completes the connection that runs from Schoenberg to Berg to Bartók. Schoenberg used an unprecedented number of string techniques in his Op. 7 string quartet, a feat of which Bartók must have been aware, considering that he wanted to bring Schoenberg’s chamber music to Hungary. At the same time, Schoenberg influenced his pupil Berg, who went on to influence Bartók with his Lyrische Suite. Schoenberg’s use of extended string techniques catapulted a change in the use of these techniques in the string quartet genre.

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CHAPTER 6

CONCLUSION

Although other composers had used these techniques in string writing before, Arnold Schoenberg’s String Quartet Op. 7 No. 1 in D minor is groundbreaking with regard to the number and length of extended string techniques and special effects within one work. Particularly, using extended string techniques to help liquidate formal sections on a large scale, and to help disintegrate motives on a small scale, was an innovation that had never been seen before in chamber music. Considering Schoenberg’s fascination with vagrant harmonies, liquidation, developing variation, and the emancipation of dissonance, it is not surprising that he also emancipated the ordinary sound of string playing by experimenting with the relatively little-explored world of extended string quartet sounds.

As is evidenced by historical accounts, Alban Berg continued in his mentor’s footsteps by adding an array of extended string techniques to his String Quartet Op. 3 (written in 1910) and his Lyrische Suite (written in 1927), thereby influencing Béla Bartók to add even more extended string techniques to his third and fourth string quartets. While the conversation about extended string techniques often begins with Bartók, it is my belief that Schoenberg should be recognized as a forerunner for compositional innovations with extended string techniques in chamber music.
In the mid to late Nineteenth century, the string instruments were well established as the window to the human soul, with the majority of composers writing for a lush string sound, and rich singing tones. By the end of Schoenberg’s life, the singing string sound was no longer a given. Music for the string instrument by the middle of the twentieth century could be percussive, abrasive, and could emit a vast number of partials depending on the proximity of the bow to the bridge. Schoenberg was a pioneer in awakening the audiences and other composers of the twentieth century to the capabilities of the string quartet.


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