I, Eduardo Carpinteyro, hereby submit this work as part of the requirements for the degree of:

Doctor of Musical Arts

in:

Violoncello Performance

It is entitled:

Pedagogical Aspects in David Popper’s Four Cello Concertos

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Pedagogical Aspects in David Popper’s Four Cello Concertos

A thesis submitted to the

Division of Research and Advanced Studies

of the University of Cincinnati

in partial fulfillment of the

requirements for the degree of

DOCTORATE OF MUSICAL ARTS (D.M.A.)

in the Performance Studies Division

of the College-Conservatory of Music

2007

by

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ABSTRACT

David Popper’s etudes and short pieces are well known among cellists but his cello concertos are in a state of oblivion. Popper wrote four cello concertos: *Concerto No. 1 in D minor Op. 8, Concerto No. 2 in E minor Op. 24, Concerto No. 3 in G major Op. 59, and Concerto No. 4 in B minor Op. 72*. This document explores the pedagogical value of the four concertos. Each concerto offers within the context of a musical discourse tools for improving right and left hand technique. Specific excerpts are analyzed in terms of cello technique considering four left hand and five right hand techniques. The discussion of each example takes in account the physical properties of the instrument and the physiological characteristics of the hands and arms. In addition, strategies for practicing are suggested and whenever possible the excerpts are compared to one of Popper’s etudes Op. 73.
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Introduction

The first time I came across the name of David Popper, I was around four or five years old. I was playing some kind of game and suddenly I started listening to my father practicing his cello. Unlike some of the music that I had heard him play before, the piece he was playing had a clearly defined rhythmic and melodic structure. So, I went into the living room where he was practicing and when he stopped playing to greet me, I asked him what piece he was practicing. His answer was David Popper’s *Gavotte in D major*, and even though the name David Popper did not mean anything at the time, I always remember the Gavotte’s characteristic melodic line. Some years later, when I was taking cello lessons with my father, he told me that his former cello teacher, Imre Hartmann, had been a student of David Popper in Budapest and this marked the beginning of my interest in Popper as a composer, teacher and cellist.

Among cello players, David Popper is known for his *Hohe Schule des Violoncellspiels 40 Etudes Op. 73* and for his salon pieces for cello and piano. Virtually all advanced cello students have to practice some of the Etudes Op. 73 before entering the professional world and their encore repertoire will probably include one or several short pieces by Popper. His four cello concertos Op. 8, Op. 24, Op. 59 and Op. 72, on the other hand, are virtually unknown today even among cellists.

One issue in performing and studying Popper’s concertos is their availability. Of the four concertos, only his second, Op. 24, which received for a time the attention given to his etudes and short pieces, is available for purchased in modern editions. The other
three concertos were published only once and their editions come from 1871 for Op. 8, 1880 for Op. 59, and 1900 for Op. 72.

After studying and practicing the four concertos, I noticed that the cello part in each concerto is highly idiomatic and facilitates the improvement of cello technique. Since specific passages function as tools for the development of specific bow strokes and left-hand techniques in the context of a musical discourse, this document explores the pedagogical value of Popper’s four cello concertos and proposes to make them part of both the standard repertoire and the cello syllabus.

This document is divided into four chapters. The first chapter discusses Popper’s teaching activities during his lifetime and the genesis and premiere of the four cello concertos. The second and third chapters explore right-hand and left-hand techniques respectively. In each chapter, specific examples from the four concertos are analyzed considering physical and physiological aspects; then they are related to a specific cello technique and when applicable compared to similar passages in the etudes Op. 73. The discussion also includes a short examination of each particular cello technique and strategies for practicing the examples. Finally, the last chapter presents an analysis of the results and a conclusion.
CHAPTER ONE

David Popper as a Composer and as a Teacher

Genesis of the Concertos

David Popper (1843-1913) was one of the most important cellists in the late 19th century. He lived in a time when a successful musician was expected not only to perform but also to improvise and to compose. As such, he is part of a long tradition of cellist-composers that made it their mission to enlarge the cello repertoire. Composing was an important issue for Popper whose works numbered over 60 by 1880. In his biography, De’ak gives a list of 76 opus numbers and 25 transcriptions published between 1865 and 1924.¹ A large portion of Popper’s compositions are salon pieces for cello and piano but they also include a string quartet, songs for soprano, three books of etudes, and four cello concertos: Concerto in D minor Op. 8, Concerto in E minor Op. 24, Concerto in G major Op. 59 and Concerto in B minor Op. 72.

There are conflicting views about the dates of composition regarding Popper’s Concerto in D minor Op. 8. Lev Ginsburg claims that Popper premiered his first concerto at his graduation recital from Prague Conservatoire in 1861 and that a year later he performed it in a program also including Mendelssohn’s Sonata, Fantasia on Czechoslovakian songs by Servais, and Goltermann’s Concerto A-moll.² On the other hand, De’ak gives the date of the premiere four years later on December 1865 with Popper as a soloist with the Löwenberg Court Orchestra and added that Goltermann

performed it on March 1867 with the Stuttgart Orchestra. This view is better supported since the *Neue Zeitschrift für Musik* published a review of the concerto in 1867.³

Popper dedicated his first concerto to George Goltermann and J. André published in 1871 with scores for piano and orchestra accompaniment. The piece is in one movement but with three clearly defined sections: Frisch und feurig, Andante maestoso, and Lebhaft, quasi Recit.-Tempo di Polacca. The review in the NZfM mentions that “…unlike most cello concertos, it avoids a potpourri-like style, moving forward and bringing unity to the work…” adding that although Popper’s style is not homogeneous and that he has not mastered the form, the ideas and instrumentation are effective.

Popper’s best known concerto is his *Concerto in E minor Op. 24*. It was premiered in Leipzig in 1879 with Popper as a soloist and the Gewandhaus Orchestra. The success achieved with this concerto prompted Popper to perform it all over Europe.⁴ Unlike the first concerto, the second was a three movement work with clear thematic unity and better balance between soloist and orchestra. The movements are: Allegro moderato, Andante, and Allegro molto moderato. Hofmeister published it in 1880 and gradually it became part of the standard cello repertoire and also part of the cello curriculum in conservatories and music schools.

The third concerto, *Concerto in G major Op. 59* is of modest proportions in comparison with the former two. It is in a single movement, Allegro moderato, and it was received with polite enthusiasm. The premiere took place on March 9, 1888 with the Budapest Philharmonic and Popper as a soloist. Along with the concerto, in the program

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³ De’ak, 93.
⁴ De’ak, 189.
Goldmark conducted the premier of his *Spring Overture*. Popper was very accepting of the mild reception to his third concerto, and as a result he did not try to perform it in his continuing tours in Europe. Also in 1890, Breitkopf and Härtel published Gewaert’s arrangement of Haydn’s *Concerto in D major Op. 101*, a piece very close to Popper. So it was Haydn’s concerto the one that Popper performed widely. D. Rahter published the third concerto in 1888 and it was dedicated to the Staatsrath von Ogarew.

Popper’s last essay in the concerto form, his *Concerto in B minor Op. 72* was probably his most ambitious and also the less known. It is the only concerto following a cyclical thematic treatment in four movements: Allegro moderato, Lento assai, Scherzo-Allegro ma non troppo, and Allegro non troppo. There is no record of its premiere and De’ak believes that Popper never performed it in public. He did teach it however, and it was performed by Popper’s advanced pupils in his class. Hofmeister published the concerto in 1900 and Popper dedicated it to Alfred Piatti. It is doubtful that Piatti ever performed it since he had discontinued his concert activities in 1898 and died in 1901. Popper’s last concerto was his last publication before the *Hohe Schule des Violoncellspiels-Vierzig Etuden, Op. 73* and as it will be shown in later chapters, some of the etudes were modeled on it.

**Popper’s Teaching Career**

In 1875, with Franz Liszt (1811-1886) as its first president, the Royal Hungarian Academy of Music opened its doors in Budapest. The institution offered classes in music theory, music history and composition. The only instrumental instruction was for the
piano, but it was of a high level since Liszt himself was professor of piano. The professors of the Academy were invited at the recommendation of Liszt through a direct invitation by Agoston Trefort, Minister of Religion and Education. When in 1886, a string department was opened, Jenő Hubay (1858-1937) and Popper were engaged as violin and cello professors. This was Popper’s first and only appointment as a cello teacher but one that he held for 27 years.

As is the case with many cello teachers in the 19th century, Popper’s teaching career was mainly preceded by his fame as a virtuoso cellist. Before 1886, Popper was well known as a performer and as a composer of small pieces for cello and piano. He had been principal cellist in the Löwenberg Court Orchestra and also in the Imperial Opera and Vienna Philharmonic Orchestras. He had toured Europe for 12 years and his compositions were played widely, but he had never been appointed to a teaching position. Popper, however, had taught cello in at least two different periods of his life: earlier in his career while still living in Prague, and before his appointment in Budapest. The first record of Popper’s teaching comes from Ginsburg, who states that Popper worked with Goltermann’s cello class for several months when Goltermann went on a concert tour in 1861.

There is almost no information about Popper’s teaching activities before his appointment in 1886, but Popper was sought as a cello teacher during both his tenure in Vienna and his touring years. In his History of the Violoncello, Straeten provides information about three of Popper’s cello students who developed professional careers. Siegmund Bürger, a solo violoncellist at Baden-Baden, was born in 1856 and studied

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8 Ginsburg, 91.
with Popper sometime before 1873.9 Hugo Jäger, born in 1848 and eventually principal cellist at the Löwenberg Court Orchestra, studied in Vienna under Popper at some point between 1868 and 1974.10 Finally, Joseph Sulzer studied with Popper between 1878 and 1880. Sulzer was a particular student because he had already finished his studies and was already a professional cellist. He sought Popper’s advice in trying to recover from an injury for overworking and after working with Popper, Sulzer became solo violoncello at the Imperial Opera in Vienna in 1880.11

When Popper became cello professor at the Royal Hungarian Academy of Music, the cello was by no means a popular instrument in Budapest or even in Hungary. As with many conservatories in Europe, there was an overwhelming number of piano and violin students and a lack of cello students resulting often in the cello being not taught at all or taught only occasionally. To complicate the situation, the music library at the Academy of Music contained precisely only 13 scores for the cello. So not surprisingly, Popper had only one cello student to teach in his first academic year (1886-87) and he had to take charge of the preparatory class during the 1889-90 academic year.12

Cello studies at the academy were planned for three years at the time Popper started his tenure and they were extended to four years for the academic year of 1892-93. The last year was a “school of virtuosity, in that its principal objective was to develop the content of previous classes to a very high artistic standard.” The teaching material

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10 Straeten, 452.
11 Straeten, 455.
12 Anna Dalos, “Traditions of the Hungarian Cello School from Popper to Starker,” in *Von Budapest Nach Bloomington: Janos Starker und die ungarische Cello-Tradition*, (Kronberg: Kronberg Academy Verlag, 1999), 162.
included concertos by Haydn, Sitt, Svendsen and Popper. In 1888-89, the preparatory class was divided into three years of study.\textsuperscript{13}

The syllabus Popper used in the preparatory class had specific technical and presumably musical goals. The first class or year of study included the technique of holding the instrument and the bow, the first four hand positions and exercises from Kummer’s \textit{Cello School}. In the second class all the diatonic and chromatic scales, and the use of thumb position, were complemented with exercises by Kummer and Romberg among others. All the major and minor scales in three and four octaves were expected in the third class along with Etudes by Bochmül (Op. 47), Kummer (Op. 44) and Merk, plus concertos by Romberg and Goltermann.\textsuperscript{14}

The syllabus for the preparatory class was literally a preparation to the syllabus for the advanced classes. The first advanced class required all the diatonic major and minor scales in four octaves and the same exercises studied in the third preparatory class. All the diatonic and chromatic major and minor scales played in sextuplets were part of the second class. The second, third and fourth classes included the study of concertos mainly from the nineteenth century. In 1886 Popper’s concerto Op. 24 was part both the second and third class while his concerto Op. 8 was part of the third class.\textsuperscript{15} Eventually the third and fourth concertos became part of the syllabus.

Popper’s responsibilities at the academy included the teaching of cello and chamber music and eventually he and Hubay were in charge of the student orchestra rehearsals and concerts. There are different accounts about Popper’s teaching schedule at the academy. Anna Dalos claims that in the academic year of 1886-87, Popper gave cello lessons three

\textsuperscript{13} Dalos, 164.
\textsuperscript{14} Dalos, 165.
\textsuperscript{15} Ibid.
times a week on Mondays, Wednesdays and Fridays, between 3 and 4 o’clock in the afternoon and that two years later, as the number of students increased, he was teaching four days a week. On the other hand, Margaret Campbell believes that as Popper usually had only seven or eight students, he met with them twice a week for three-hour classes.

Popper had a good sense of humor and a charismatic personality which helped him to create a positive atmosphere in the classroom. With his excellent pianistic background, he conducted the class from the piano accompanying his students playing of concertos and pieces and even improvising an accompaniment for his own etudes. In his chamber music sessions, he asked his students to study the score and become familiar with all the parts. This advice was not always followed and if a student had lost his place in the music, Popper would play the missing part on the piano showing his infallible memory.

Teaching was of the utmost importance for Popper. Although he did not write anything about his teaching philosophy, all surviving accounts point out great concern for his students and a genuine open mindedness. He believed in self-critical practicing as a tool to develop individuality, and he did not impose a uniform discipline upon his students. De’ak acknowledges that “very much depended on the pupil’s ability to absorb Popper’s demonstrations and criticisms, and to apply them during long hours of solitary practice.” De’ak also points out that Popper had three major concerns: musical interpretation, articulate technique and the conscious effort to produce tonal beauty.

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16 Ibid., 168.
18 De’ak, 258.
19 De’ak, 254.
Popper did not write a book explaining his thinking about the development of an articulate technique, but his books of etudes and his compositions provide examples of his methodology in cello teaching. As expected from a composer and cellist, all his works are idiomatic for the instrument and never go beyond the physical limitations that either the instrument or the player’s physiology imposed. There is plenty of literature regarding the pedagogical aspects of Popper’s etudes but there is no literature regarding the pedagogical aspects of Popper’s cello concertos. The next two chapters will explore Popper’s four cello concertos and their value as pedagogical tools for the development of cello technique.
CHAPTER TWO

Pedagogical aspects of Popper’s Cello Concertos

Right Hand Technique

Popper was praised for having a flawless technique and a beautiful sound. Taking into consideration the cello part of his concertos, the bow technique required to play them was extremely high. This chapter will examine four different bow techniques: Staccato, defined here as separate notes in the same bow direction, Spiccato, Arpeggios on the string (crossing three or four strings), and slurs. For the examples, a label will identify the concerto, the movement and the measure numbers. The first concerto was intended as one movement work but it contains three clearly defined sections, so it will be treated as a three movement work just as the second and fourth concertos. Only the third concerto is self-contained.

Staccato

Popper explores staccato in etudes 14 and 32 of his 40 Etudes Op. 73. The use of this bow stroke in his concertos is very effective although not very frequent. Example one shows the beginning of Tempo di Polacca, third movement of Concerto Op.8. The sixteenth notes in measures 30 and 31 require an up-bow staccato and a slight accent in the eight note that follows. Although the slur in measure 31 includes and eight note, fourth sixteenth notes and another eight note, the staccato notes should only include the last three sixteenth notes and the last eight note, to match the articulation of the preceding measure. To this end, an up bow can play the six notes with the first two notes as a
simple slur and then rearticulate the third note to initiate the staccato, or take the quarter, eight and sixteenth notes in a down bow rearticulating the eight note.

Staccato usually is not the best stroke for projecting sound but Popper expects precisely this in his second concerto. Example 2 shows measures 81 to 88 in the second concerto, first movement. The second and third beats use an up-bow staccato leading to the A# and G#. Of course the simple solution would be to either use separate bows or slur the four notes. The use of separate notes is tempting but musical tension and direction is easier to keep with an up-bow staccato. As for playing the four notes in a single slur, the change in articulation will result in a change of character. If the up-bow staccato is practiced slowly, the movement should start from the arm with the hand and fingers following. Since the dynamic marking is forte at measure 85, each note in the up-bow staccato should bite the string and the release it to create a projecting sound.

Concerto Op.72 provides in the third and fourth movements two more examples in the use of staccato. In example 3 from the third movement, a six note up-bow staccato occurs at measures 24-25 and 28-29 and a 12 note up-bow staccato at measures 32-35. The staccato here is more challenging but not difficult when compared with the 27 note up-bow staccato expected at the beginning of Popper’s etude #14 (example 4). In fact, for a student trying to learn this bow stroke, the staccato measures in the third movement can be a preparation for etude #14. Besides the obvious advantage of having fewer notes for each up bow staccato, there is a long half note that takes the bow comfortably closer to the tip where it is easier to start the staccato and the 12 note up-bow staccato do not require any shifting. Once this passage is learned, it becomes easier to start working on the longer up bows and down bows in etude #14. It is useful to remember that staccato is
a stroke that initiates from the forearm and not from the fingers or the wrist, and that a lower arm help with the contact point for each note.

The second example takes place in the fourth movement (example 5). Measures 19-20 and 23-24 use also an up-bow staccato. This is probably the most difficult passage so far, since the tempo is faster than in previous examples. As with example 3, there are discrepancies in the slurs at measures 19 and 23 and also in the notation at measures 20 and 24. The difference in the slurs is small but starting the staccato with the first sixteenth note as in measure 23 is the best option technically and makes more sense musically. As for the sixteenth note rest difference, the notation at measure 20 creates more musical tension before arriving measure 21. The rest creates the illusion of delaying the conclusion of the phrase and matches the articulation of the staccato; therefore, the notation at measure 24 is probably a misprint. A good bow distribution will help in getting towards the upper part of the bow to start the staccato. Beginning at measure 17, the bow speed should increase and travel to get closer to the tip before the staccato notes. Once the eight sixteenth notes and the eight note are played, the bow will literally leave the string before playing the last sixteenth note.

**Spiccato**

For the purpose of this document spiccato is defined here as an off-the-string bow stroke where each note gets one bow stroke. Since this bow stroke projects the sound with ease David Popper used it frequently in his four cello concertos. Example 6 shows measures 75 to 108 in the Concerto Op. 72, third movement. The passage starts in a relatively low register and explores the middle and upper registers as well. Since the
elasticity of the bow and the string changes with the different registers, this passage requires good bow control to make each string speak while creating a projecting sound. The jump at measure 79 not only requires to go from the A to the C string, but also to be able to control the muscles for a quick change in the string tension and contact point.

The passage at example 7 shows measures 353 to the end of the last movement in the Concerto Op. 72. Except for one position change between measures 356 and 357, the entire passage stays in two stationary positions which make it easier to focus on the bow stroke and gives more time for the right hand muscles to find the point where the string produces a better sound. The first four measures in this passage repeat a chromatic figure that needs emphasis. In technical terms, the down bows should be slightly stronger than the down bows but equally articulated, so that the chromatic ascending figure will take over the repeated notes. At measure 357, with the beginning of a B minor scale down bows and up bows become equal.

For the psychology of the player and the physics of the instrument a spiccato passage with repeated notes is easier than one with different notes. Popper used this figuration in his Concerto Op. 8 at measures 195 to 203 in the third movement (example 8), and in his Concerto Op. 59 at measures 156 to 170 (example 9). Both passages are similar in their use of spiccato and although example 9 includes octaves to end the passage, the principle is the same. In example 8, there are two similar phrases an octave apart that start in a D, ascend an octave and a sixth and descend to the original D. This broken scale is ideal to study spiccato and feel how the contact point for the bow changes. The bow gradually gets closer to the to the bridge as the passage ascends and gradually gets farther from the bridge as the passage descends, and then the process is repeated in the second phrase with
the corresponding changes in the contact point. This gradual change helps the right hand to feel the string reaction. A good method for practicing this passage is to play the notes not only two times each as written, but to repeat them as many times as it takes for the right hand to find the exact place where the spiccato works in the bow and in the string. Then, as the hand gets more accustomed to make changes, the notes get fewer repetitions until the passage is played as written.

In comparison with example 8, the spiccato passage in Concerto Op. 59 (example 9) presents more challenges since it includes the G string and ends with six measures of octaves. The example starts with three ascending arpeggios at measures 156, 158 and 160. There are two big leaps that require the bow to cross over the D string between measures 157-158 and 159-160. The difference in response between the A and G strings and the muscle adjustment that it requires, provides an opportunity for technical improvement. The whole arm will be used to make the string change as smooth as possible and transfer the weight from the A string to the G string. The octave passage starting at measure 164 is not more difficult than the previous bars as far as the bow is concern. There is more resistance in trying to move two strings instead of one, but the bow will bounce in a similar way. As with the previous example each octave can be repeated several times to find the best sounding point and gradually the hand will physically learn it. As more bow is required for playing both strings, the whole arm will lead the movement of the bow. Special care should be demanded in avoiding any tension in the arm which will stop the free movement of the bow. The only combination of spiccato and octaves in the Popper’s etudes appears at the last measures of etude no. 27 (example 11). However, while the octave scale in the etude remains in the D and G
strings and covers only a range of one octave, the passage in example 9 moves in the A and D strings and covers a range of a fourteenth. Since for the bow it is more challenging to make the D and G strings speak than the A and D strings, the passage in example 9 can be learn as a preparation to study the passage in example 11.

A descending chromatic scale played spiccato was very common in the virtuoso cello repertoire and Popper used in several of his pieces and in his first concerto. Example 10 shows measures 257 to 270 from the first movement in Concerto Op. 8. Leaving out the left-hand problems associated with this passage, the bow is not as easy as it may appear. As the scale starts descending at measure 259, the string becomes less tense and the sounding point gradually moves away from the bridge. These two changes start occurring slowly but since the physical distances between the notes in the fingerboard increase as the scale descends; the changes and adjustments need to take place gradually faster. The ideal objective in playing this scale is to keep the same quality of sound from the beginning to the end of the scale. It is arduous to become aware of the changes in a note-by-note playing of the scale; therefore it is advisable to choose specific notes to physically feel the differences in string tension and response. As a way of practicing this passage, the first note of each four should be repeated several times to find a good sound and clarity in the articulation. Then a similar process should be applied to the first note in the next group and come back to the original first note to become aware of the change. In this way there will be nine different notes in the whole scale whose sounding point will be found going back and forth among them. This will be easier for the muscle memory and once there is a controlled spiccato while playing the nine notes in the scale, playing the scale as written will not be hard to accomplish.
Popper used spiccato extensively in both the third and first movements of his Concerto Op. 24. Example 12 shows a long spiccato passage covering the high and relatively low registers in the cello. The movement is labeled Allegro Molto Moderato and has a 2/4 time signature which makes for a very fast sixteenth triplets in this passage. The main problems for the bow are the quick change of sounding point and the sudden change of strings. Clarity in articulation should be the same although there is a difference in response between the A and D strings. If following the fingerings proposed at measures 272-275, the continuous change from the A string to the D string back and forth becomes an issue. It will be easier for the bow to stay in the A string as much as possible or if going to the D string, do it to play several notes and not only one note. An example are the descending scales starting at measure 274 which should be played over the A and D strings. In the second section of the example beginning at measure 278, the continuous repetition of the last three notes in every group of six, could potentially obscure the clarity of the first three notes. Not only the first three notes are in a lower range but also the first two notes are played in the D string and since the tempo is rather fast, they could easily get lost. The final scale at measures 286-288 takes almost the whole extension of the A string providing the opportunity for development of an equal and clear spiccato. Since the ascending scale descends a third every six notes, there is more time for the adjustments in the sounding point and the tension of the string.

The first movement of Concerto Op. 24 (example 13) features a descending passage covering the upper register in the A string. The gradual descend in measures 311 and 312 and then the repeated descending arpeggios from measure 313 to measure 317 give the muscle memory time to adjust. Popper was very helpful when writing this passage. The
E at measure 307 is a harmonic and easier to make it speak. The continuous repetition of E at measures 309-310 gives plenty of time to check for the sounding point and prepare for the upcoming arpeggios. A way to improve the evenness of the staccato in measures 311-312 is to repeat each of the eight arpeggios and go to the next one only when each note is clear and has a ringing quality. Measures 328-332 feature spiccato arpeggios. If the fingerings written are followed, the arpeggios share an equal amount of notes on the A and D strings beginning at the third beat of measure 328. Since the arpeggios are gradually descending, the whole passage gives the opportunity to learn to control the spiccato by staying at least for four sixteenth notes on each string and changing the string length every eight notes.

**Arpeggios with Multiple String Crossings**

The flexibility of the fingers, hand and arm come into play with string crossings. Each string has a different mass which gives it a different resistance to movement; therefore crossing strings in a single bow demand a quick change in the amount of weight. The C string is the hardest to move and the slowest to respond while the A string is the easiest to move and the fastest to respond. The characteristics of the Arpeggios studied here are two: using just one bow for each arpeggio and crossing three or four strings to play them. Popper did not write any of his Op. 73 etudes addressing this particular kind of arpeggios but his cello concertos feature this figuration usually at the end of a virtuoso passage to close the final phrase. Example 14 shows measures 217-228, the last measures of the final movement in Concerto Op. 8. There are two kinds of arpeggios in this passage: the arpeggios beginning with a double stop including the G and C strings and then continuing
to the D and A strings; and the arpeggios starting on the G string and only going to the upper two strings. The first kind of arpeggio requires more weight from the arm to make both strings speak and then a weight release to play the upper strings. The bowing feature in example 14 allows for a good attack on the accent at measure 217 starting with a down bow. The slurs put the accented notes as the last notes on each bow, so at the end each bow requires a slight increase in bow speed and weight. Popper favored the change of bows in the second or third notes of each group of sixteenth notes. In example 14, this bowing helps the forward movement by making the first three notes on each bow feel as a pick up of the last one. For practicing this passage, it will help to take separate bows at first to be able to control the different weight applied to each string. In particular, the double stops using the G and C strings require a rather forceful attack when compared to the single notes on the D and A strings. The difficulty is not so much to make speak each note or double stop but to make a fast change so that the quality of the sound remains the same. Once the passage works with separate bows and in slow motion, the next step is to slur two sixteenth notes instead of four to be able to make the change between the D string and the G and C strings together. The movement should always be subtle even though the change in weight can be perceived as very large. Finally, when this is accomplished, the original slur should be tried keeping always the flexibility of the arm and hand when changing from one string to the next.

Example 15 shows a slightly simpler arpeggio figuration from the third movement of Concerto Op. 24. The passage starting at measure 166 ask for arpeggios that cross the G, D, and A strings in an upward and downward motion. The arpeggios gradually ascend changing the sounding point for the bow. In this movement the tempo is Allegro molto
moderato which makes this passage really fast and virtuosic. Therefore, although the
arpeggios are not extremely difficult, the tempo marking requires a quick adjustment in
weight when changing strings within the arpeggios and in sounding point when changing
from one arpeggio to the next. These two aspects should be practiced separately. First,
the different feeling produced by the different string length can be practiced by playing
only the notes played over the G string and this should be played gradually from a
moderate to a fast tempo to make quick adjustments. Then, each arpeggio should be
played slowly to feel the different requirements of each string. Because the passage is
actually very fast, the arm and hand should do only the necessary amount of work. The
arpeggios will be played close to the frog and the arm will feel a lot of movement, but
this movement is mainly coming from string crossing. So, any attempt to use a lot of
bow will just make this passage more difficult and less effective.

The final passage for this section comes from Concerto Op. 59 (Example 16). The
arpeggios cover the three upper strings and the last two measures include the C string as
well. As with example 14, the sixteenth-note arpeggios are slurred but this time starting
with the third note on each group. For measures 403-406, the first sixteenth note of each
group of four outlines the harmonic progression and should be brought up. With the
printed bowing, this note comes as the third note on each bow and also as the note played
mainly on the G string. This means that within one bow, the point where more weight is
needed comes not at the end or the beginning but close to the middle of the bow. This
becomes particularly arduous at measures 413 and 414 because the third sixteenth note
becomes a double stop that includes the G and C strings. Here again the whole arm is in
charge of making the string crossing but keeping always the hand and fingers flexible.
This passage can be practiced following the process in example 14, playing separate notes first, then using a slur for every two notes and finally as written.

**Long Slurs with String Crossings**

In many of the etudes Op. 73, Popper focuses on long slurs in combination with string crossing and shifting. Long slurs containing between 12 and 18 sixteenth notes are not uncommon in both his compositions and his etudes. There are several aspects to consider when playing long slurs to accomplish evenness of execution and sound. The bow speed has to be slow enough to accommodate each note and fast enough to make each note speak. With string crossings, the amount of bow needed varies from one string to another and if the string crossing is continuous the angle between the strings had to be kept to a minimum. Finally, there is a physical limit to the number of notes than can be played on one bow with a good projecting sound.

Example 17 shows a short passage from Concerto Op. 72 where each slur includes 16 sixteenth notes. The movement is labeled Allegro non troppo so the passage is moderately fast. The bow only uses the A and D strings and makes only two string crossings per slur. Of the 16 sixteenth notes in the first slur, the first seven are played over the A string, the next five over the D string and the remaining four again over the A string. While in the 16 sixteenth notes in the second slur, eight notes are played over the A string, the next three over the D string and the last five again over the A string. As a result, in the first slur the crossing to the D string occurs towards the middle of the bow and the crossing back in the upper part of the bow and in the second slur, the first string crossing takes place again towards the middle of the bow and the last on the lower part of
the bow. To play this passage evenly, the four string crossings cannot be treated equally. The wrist will take care of the second string crossing in the first slur and the arm will make the second string crossing in the second slur. Then, a combination of both, wrist and arm will make the first string crossings in both slurs. As a way of practicing without the interference of the left hand, the passage should be played on open strings and with a metronome. This method allows to focus on the bow arm and to observe how the string crossings are performed.

Long slurs with continuous string crossings are more challenging because they require greater flexibility from the arm, wrist and fingers. Any amount of tension will impede the movement and will result in notes not speaking and lack of clarity in the sound. Popper requires this bow arm flexibility in the last movement of his Concerto Op. 8 (Example 18). Beginning at measure 155, there are 12 sixteenth notes per bow with some slurs also requiring constant string crossings and shifting. It is better for the passage starting at measure 154 to start on an up bow to get to the next measure to a down bow and also, following the cello part printed in the piano part, the eight-note at measure 157 should be part of the slur in the previous measure. This results in a down bow for the remaining sixteenth notes at measure 157 and an up bow at measure 169 to finish the whole passage.

Two main aspects of string crossing are covered in measures 157 and 161-162. At measure 157, there is continuous string crossing between the A and D strings on a down bow with ten sixteenth notes. At first, the arm leads the bow going from one string to the other but gradually the hand and wrist share the bow movement, and they completely take over in the last string crossing. The bow needs to maintain the distance between
both strings as small as possible and since the D string is an open string, more weight is needed for the moving voice in the A string. To practice this passage, it is advisable to play it using open strings to find the right angle and feel the continuous shifting of weight between both strings. Measures 161-162 show an easier version of measure 157. Here, the string crossings between the D and A strings occur at larger temporal intervals. With 12 sixteenth notes per bow, this passage requires a relative slow bow speed and weight control to bring out the accents on the D string. Since the slurs contain gradually less notes per bow at measure 162 but return to twelve notes in the next measures, bow apportionment is important. A way of practicing the whole passage in example 18 is to play only four notes per bow and gradually build it up to the slurs written. The main objective is always to keep the same sound quality from the first to the last note.

Example 19 shows an excerpt from Concerto Op. 24, first movement. Starting at measure 163, the 8 sixteenth-note slur use the three upper strings on the cello. The passage starts in a pianissimo but in the context of a cello concerto, the dynamic needs to project above the orchestral accompaniment. The two instances where the G string intervenes take place with the bow close to the tip and at the beginning of an up bow at measure 163 and close to the middle of the bow at measure 166. So, in measures 163, the weakest string for projecting sound in this passage is played at the most difficult contact point to transmit weight. The passage starts the sixteenth-note slur with a down bow but to practice it, it can start on an up bow playing the G string notes comfortably close to the frog. This will allow getting the desired sound quality that the original bow demands. When practicing starting on a down bow, the weight control as the bow approaches the tip will depend on the lever created with the bow, the index finger and the thumb.
The final example comes from Concerto Op. 59 (Example 20). This is the only passage in the concertos where Popper asked for 24 sixteenth-notes per bow. There is no information regarding Popper’s involvement in the publication of his concertos and nineteenth-century publications are usually full of mistakes. Therefore, it is tempting to divide the slurs at least in two bows for better sound and comfort. However, Popper did write slurs containing 24 sixteenth notes in his etudes Op. 73. Examples 21 and 22 show excerpts from etudes no. 22 and no. 24 and in terms of bowing, the three examples are equally difficult. Example 20 covers three strings with several string crossings and example 21 covers only the A and D strings but crosses strings continually. In the two 24 sixteenth-note slurs of example 22, the first occurs in the A string and only the second includes the two upper strings with some string crossing at the end. The passage in example 20 is still highly idiomatic. The passage starts on a down bow at measure 67 and the notes played over the G string occur on an up bow near the frog. Then, the low E b on the C string starts on a down bow and using just a traveling bow at measures 71-72 there are no problems of bow apportionment. This means that the 2 sixteenth-note slurs at measure 72 will be played near the tip and that in the next measure the bow will come back to the frog for the high A.

The two long slurs stay mainly in the A string helping sound projection and when using the D and G strings, they do not come back to the previous string within the slur. The slurs may be difficult to play at first, but they are not extremely difficult for the left hand. For practicing purposes, the slurs should be divided into two 12 sixteenth-note slurs and play them using the whole bow for sound projection. After this, the bow speed can be slowed down to include another group of four sixteenth notes but always keeping
the same sound quality. Gradually the bow will take the remaining sixteenth-notes until the 24 sixteenth-notes are played in one bow. This process will work better if the tempo of the movement, allegro moderato, is kept; otherwise, a slower tempo will make this passage extremely hard.

The last three examples finish the discussion and analysis about right hand technique in Popper’s Cello concertos. The four aspects treated should get a clear idea of what to expect in terms of bow technique from the concertos. The next chapter will discuss left hand technique.
CHAPTER THREE

Pedagogical aspects of Popper’s Cello Concertos

Left Hand Technique

This chapter will examine five different aspects of left-hand technique: thirds and sixths, octaves, triple stops and chords, natural and artificial harmonics and thumb position. In his concertos Popper combines the use of thirds and sixths so for practical purposes they will be discussed together. Octaves are treated separately because they are usually assigned a specific role within the music. The discussion about thumb position leaves out any double stops and focuses on both the use of thumb in one position or continuous thumb position shifting.

Thirds and Sixths

Thirds and sixths are difficult intervals for the cellist in terms of intonation. Major and minor sixths lie relatively well for the hand, however; the difference in length and the different angle of each finger require small adjustments to play them in tune. Thirds are more problematic because the physical distance between the fingers playing them over the diapason is bigger than in sixths. For the cellist with small hands, minor thirds which cover more distance between the fingers are really difficult to play on the first three positions.

In high positions requiring the use of the thumb, the ideal scale in thirds is the one that uses the first and third finger for major thirds and the thumb and second finger for minor thirds. This arrangement gives the small physical distance to the fingers that can cover less distance, the first and third fingers, and gives the longer physical space to the two
fingers that naturally cover it, the thumb and the second finger. A scale having major and
minor thirds alternating with each other do not follow the harmonic patterns associated
with tonal music, but Popper managed to write a passage based on this premises. The
excerpt in example 23 comes from the Concerto Op. 8 and represents a highly idiomatic example in the use of thirds. In the ascending scale starting at measure 72, the first and third finger get only one minor third, A-C which is high enough to make it easier. The thumb and second finger are more flexible because physical space is not an issue for them, so they can get minor and major thirds. This scale lies well on the hand because it does not put any strain on the fingers. The descending quasi chromatic scale that follows at measures 73-89 uses mainly thumb and second finger, but it is slow enough to check for intonation and adjust the gradual opening of the fingers with each descending third. For a student trying to learn thirds using thumb position this passage can be very rewarding. It is easier than any of the Popper etudes featuring thirds, its ascending may be difficult but not strenuous, and if played it with piano, the descending scale is musically appealing.

Example 24 comes from the last movement of Concerto Op. 8. It features a highly idiomatic double stop passage with thirds, fourths, fifths and sixths. The passage takes advantage of open strings, the harmonic octave in the middle of the strings and the use of double stops within one position. It takes only four position changes to get to the highest double stop at measure 42. Of the four position changes, the second takes the fingers to a sixth in the fourth position, the most comfortable position, at the downbeat of measure 42 and the third shift following is not difficult because it takes the thumb position to a fifth over the harmonic octaves for the A and D strings. The first position change at the last
beat in measure 41 goes only to the third position but it takes the fingers to a fourth which is a difficult interval to play in tune. Similarly, the fourth position change at the seventh sixteenth note at measure 42 also goes to a fourth but has one advantage. The lower note, A, is a harmonic on the D string than can be use as a reference in the shifting. This is a passage that looks difficult and sounds difficult but once learned it, it is very comfortable to play. A practical way of practicing this passage is concentrating first on the shifts. There is usually one finger that stays for the two intervals included in the shift and this finger should lead the actual shift. In the first shift the first finger stays over the A string for both the third and the fourth, so this finger should lead the shift. Similarly, the third finger should lead in the second shift and the first finger in the fourth shift. The third shift does not require any finger leading because both fingers change to allow the placement of the thumb. When practicing, the fingers should not only shift to the next interval, but also come back to the original double stop to make sure to actually learn the physical distance. Double-stop shifting is more difficult because when shifting, there are two physical spaces to memorize: the space between one position and the next, and the internal space between the fingers playing the interval.

The last example from Concerto Op. 8 comes also from the third movement. Example 25 features an excerpt on thumb position using thirds, fifths, sixths and octaves at the end. Beginning at the pick up to measure 98 and for three measures and one beat, the thumb plays the reiterating fifths that come as the second sixteenth-note in each group of two. The remaining intervals are thirds played over the A and D string and sixths played over the D and G strings. There is only one shift at the end of measures 98 and 99 and one per beat at the remaining measures before the octaves. The most important aspect in
this passage is the tuning of the fifths which provide intonation reference for the thirds and sixths and for each position change and Popper did facilitate it. Assuming that the cello is in tune, the use of the harmonic octaves at measure 98 and at the third beat of measure 100 and harmonic fifths also at the first beat of measure 100 will facilitate the intonation and shifting. Popper uses the reiteration of fifths in a similar passage in his etude no. 29 (Example 26). The etude features stationary positions with the thumb performing fifths and other intervals with the help of the other fingers. The etude however, places the thumb not on the natural harmonics of the string but mostly over G# on the A string and C# sharp on the D string, and uses the harmonic octave only over the D string at measures 17, 18 and 24. While the key of the etude, F sharp minor, poses intonation problems, the Concerto, being in D major, provides reference points for shifting. In general, example 25 is a good option for exploring the double stops possibilities within one thumb position.

In his Concertos, pieces and etudes, Popper favored inversion, one of the most frequent processes in tonal music. Since thirds and sixths are inversions of each other Popper wrote passages in thirds and immediately repeated them as sixths or wrote the sixths first and repeated them as thirds. At measures 118 and 119 in example 27, from Concerto Op. 24, Popper repeats the thirds sequence immediately as a sixths sequence. For cello playing, the relationship between these two sequences helps with intonation. Starting at measure 116, the passage uses the octave harmonics and open strings to facilitate its execution. With the help of the harmonic octave over the D string, the next half-note chord becomes easier in terms of shifting and in terms of intonation. Of the three shifts utilized in the sequences already mentioned at measures 118 and 119, the first
uses the harmonic octave over the D string and the third one the open D string. So, the only shift without a reference position is the second one. At measure 120, the second note in the first triplet employs G and D as an open string double stop and the first note in the second triplet figure uses A and D also as an open string double stop. Finally at the end of the passage, the second double stop at measure 121 utilizes the harmonic octaves over the D and A strings.

Since example 27 is a highly idiomatic passage, practicing it is not strenuous. After tuning the initial chord, the next octave is not difficult to reach using the harmonic octave but the tuning of the octave and the sixth following it require attention. As with other passages involving thirds and sixths, the two basic aspects are the tuning of the interval from one position to the next and the tuning of the interval before and after the shift. For the first, the practicing can focus on shifting to each position, so starting on measure 117, the points to practice will be the octaves, the three position changes at measures 118-119, the last note of the triplet at measure 120 and the two half notes at measure 121. Practicing in this way will result in all position changes being in place before attempting the double stops in stationary positions. If the shifts are secure in terms of intonation, the intervals within the positions have a reference in the thumb or the finger doing the shift and this will make easier any adjustment or rotation the fingers need to do to play the sixths or thirds.

Popper used the possibilities of double stops in stationary positions for virtuosic figurations sounding more difficult than what they actually are. From his Concerto Op. 24, example 28 features a double stop passage in sixteenth notes. In measure 190, the last ten sixteenth notes are played in a single position using the A and D harmonic
octaves. This unit includes only three intervals, the fifth played using the harmonic octaves, the third, E-G, played over the A and D strings and the sixth, B-G, played over the D and G strings. As with example 27, the sixths here are a direct inversion of the thirds and having both of them the G as a common tone; it becomes a reference note to make the tuning easier. The only position change so far occurs between the second and third sixteenth note but since it lands on a fifth using the harmonic octaves over the A and D strings, it is not difficult to achieve. This 12 sixteenth-note plus an eight-note group functions as a musical question and its answer is a semi-chromatic scale that uses the D harmonic and D open string at measure 191 as pedals and the G open string at the next measure to close the phrase. The passage eventually includes a shift in thirds and octaves at measure 193 that increase the range and intensity of the passage. Measures 190 to 192 are an example of Popper’s ingenuity and a source for exploring the thirds and sixths possibilities within a stationary position.

The use of thirds either in a scale like fashion as in example 23 or in a melodic line as in the first theme in Concerto Op. 72 (example 29) was not uncommon in Popper’s music. The whole first theme in the first movement of Concerto Op. 72 is comprised of mainly thirds and some sixths covering almost two octaves. The beginning of the passage at measure 24 is very comfortable since the thumb is placed on the octave harmonic over the A and D strings. The octave harmonic over the D string and the common tones in measures 26 and 27 create a reference for intonation. The passage provides opportunities for shifting thirds either in a scale-like fashion as in measure 28 or as a descending arpeggios as in measures 29 and 30. The whole passage is related to Popper’s etude no. 9, an etude of primarily sixths and thirds shown in example 30. In the
four first measures of the etude, the melodic line shifts thirds between two adjacent positions and then descends using sixths. The theme in the concerto and the etude are similar in their development of thirds and sixths in thumb position and both demand accurate shifting with interchanging of major and minor thirds. However, since example 29 is in D major and example 30 is in Eb major, the concerto passage is easier for intonation.

Practicing example 29 requires an understanding of the difficulties involved in playing double stops over several positions on the fingerboard. The most obvious problem is the continuous interchanging of major and minor thirds which keeps the physical space of each third changing. However, the overall situation is more complex. To play the thirds in this passage in tune two major factors need to be considered. Major thirds played as double stops are shorter in their physical space than minor thirds if they occur in the same position and thirds in general will increase their physical space as they get closer to the first position or decrease it as they approach the upper register. These rules are related to the physics of the instrument and can create confusion in dealing with this passage. For instance, the first two thirds at measure 29, F#-A and D-F#, are minor and major. For the hand this will translate as a greater distance for the minor third and a smaller distance for the major third, however, since the second third is played in a lower range, its physical distance will increase and the physical space of both thirds will be almost the same. Therefore, the first step before playing this passage is an analysis of the physical distances for each third.

The last example covering the use of thirds also comes from Concerto Op. 72. Example 31 features a passage in the fourth movement that includes two ascending-third
scales and four descending-third scales. Despite the facts that the passage is in D major and uses the octave and fifth harmonics over the A and D strings, its execution still demands considerable skill. Scales in thirds are frequent as exercises but are rare in cello literature, so mastering this passage will make almost any other thirds passage an easy task. The two rules mentioned for example 30 apply here as well. The process for practicing the ascending scales is different from the one use in the descending scales. Ascending scales either of single notes or of double stops tend to be easier than descending ones because the finger or fingers doing position change are the ones getting to the new position. In contrast in a descending scale, the finger or fingers executing the shift are different from the ones playing the note or notes in the new position. This interchange of fingers makes the descending scales in thirds even more difficult. To practice the two ascending scales in thirds at measures 152 and 156, the initial task is to play only the thirds doing the shifts or the thirds played with the thumb and second finger if following the written fingers. Each shift should be treated separately and usually the thumb should lead each one because its placement provides the basis for the intonation of each third. An exception to this occurs when the second finger uses the harmonic octave or fifth over D string as reference for intonation. Once the muscles memorized the physical space for each third and the three shifts are performed with accuracy, the non shifting thirds can be added.

For the descending scales starting at measure 158, the learning process is similar in the beginning. The shifting thirds are learned first and the thumb usually leads each shift as well. To incorporate the non shifting thirds there is an extra step where the order is reversed. So, taking the second, third and fourth thirds from measure 158, E-G, D-F# and
C#-E as examples, E-G occurs first, C#-E second and D-F# third. The objective here is the muscle memorization of the non shifting thirds so that gradually, a shifting third can go directly to a non shifting third. Another issue in this passage is the shifting that takes place between the ending and the beginning of each descending scale at measures 159, 160 and 161. In these three position changes, the third before the shift uses thumb and second fingers and the third after the shift uses the first and third fingers. The best way to practice this shift is to execute it with the thumb and second finger arriving at the third located one step below the actual objective. In other words, for the first shift between measures 158 and 159, the thumb and second finger will travel from the original F#-A to C#-E and from there the first and third finger will locate the written D-F#. By doing this process, the fingers will memorize the physical distance between each position, the physical space within the third following the shift and will also prepare the next third that starts the descending scale. These two actions need independent practice first and only after accomplishing the execution of both, the shifting can be attempted as written. A final suggestion involving fingerings at the end of this passage is necessary. The last two descending scales at measures 160 and 161 feature thirds executed with the first and third fingers that are extremely hard if not impossible for the cellist with small hands. The minor third, C#-E, can be played using the first and fourth fingers. These two fingers cover more distance than the first and third finger and although it may feel awkward, a small rotation of the hand in the direction of the fourth finger will solve the problem. Finally for the last two thirds in measure 161, A-C# and G-B, is recommended either the use of the first and four fingers or the use of the thumb and second finger to arrive at the printed finger for the last third.
Octaves

In cello playing and particularly in the nineteenth century, octaves were heavily used for virtuosic display. Popper’s music was not an exception and he included different types of octaves passages in his concertos. In acoustical terms, the octave is the first harmonic in the natural harmonic series of any note and more precisely, the result of doubling the number of vibrations per second of any given sound. In an octave, the lower frequency note and the high frequency note share almost all their harmonic series or secondary vibrations. This makes the octave the most difficult interval to play in tune because a small deviation in the tuning interrupts the vibration of both notes. Popper included three types of octaves in his concertos: octaves in which the two notes making the interval are played one after the other, octaves where the two notes making the interval are played together, and octaves that include some figuration within the interval.

The first type of octaves is featured in examples 32 and 33, both from the first movement of Concerto Op. 8. The octaves starting at measure 212 in example 32 perform the low note first, the high note second and the high note of the next octave third. This is a case when the third finger executing the upper note performs the shift and the thumb, executing the low note follows. The main issue in executing octaves is the physical distance between the two fingers which changes with every shift. For practicing purposes, the octaves in example 32 should be practiced with both fingers leading the shift alternately. For measure 212, the third finger can practice the shifting from C to A and back to C keeping the thumb in position but without playing his lower notes. Then the thumb performs the shifting keeping the third finger in place but also without playing his upper notes. This allows both fingers to learn their distances which are parallel but
not equal in length. Next, the octaves are executed as written but taking special care with
the movement of both fingers during the shifting, so as to make sure that the finger not
leading the shift is still following the movement and more importantly, covering the
physical space of its own note. As a way of checking the intonation, the whole passage
should be played in parallel octaves but still with one finger leading the shifts. During
the process, the fingers have to remain flexible so as to allow the small adjustments that
the shift itself demands.

Example 33 features octaves of the first type at measures 206-205 and octaves of the
second type at measures 208-212. The octaves starting at measure 206 begin as a scale
and start a descending arpeggio in the next two measures. Here the thumb and third
finger alternate in leading the position changes. In the first measure the thumb and the
third finger share an equal amount of work in the position changes but at measures 207-
208, the thumb gets the bigger shifting distance in the descending arpeggios. These three
measures are really closed to Popper’s etude no. 38 from the Op. 73 (example 34)
because both passages feature octaves alternating the shifting finger. However, while the
etude maintains a stepwise motion for the shifts using whole tones and semitones, in the
concerto, the position changes cover fourths and fifths.

The second section of octaves in example 33 is of the second type. Beginning at
measure 208, the octave passage consists of an ascending D major arpeggio and a
descending chromatic scale. The use of the octave, fifth and double octave harmonics
over the D string and the double octave harmonic over the A string facilitates the
arpeggio’s intonation and shifting. The descending chromatic scale is more complicated
because although several harmonics can be used, the scale goes through twenty-four
shifts covering the whole fingerboard. The execution of this scale demands complete knowledge of the gradual expansion of the physical distance between the thumb and third finger. The usual practice of playing this scale from beginning to end in slow tempo will not give the best results since there is too much information for the fingers to learn. Instead, it is better to do a gradual process going from big intervals to small intervals. The first interval recommended is the minor third, so beginning at measure 209, the scale becomes an octave arpeggio of minor thirds giving this outline: D-B-G#-F-D-B-G#-F-D. The minor third will allow for the scale to start and finish in the corresponding octave and help the fingers in dealing with the expansion in each descending octave. Although both fingers played at the same time, one finger, usually the thumb, should lead the shifting. When the minor third arpeggios are played with fluency, they can become a descending D major scale and eventually, the original descending chromatic scale. The sequence proposed here, minor thirds-major scale-chromatic scale is optional and any combination going from big to small intervals will equally help in learning this passage.

In his second concerto, Popper employed octaves for the thematic material in the third movement (example 35). This short passage uses the third type of octaves, octaves with some kind of figuration, and in this case the inclusion of the G open string between octaves produces a virtuosic effect. The whole passage is basically a small scale ascending a minor sixth and descending a perfect fifth which uses several octave and fifth harmonics. The only major shift occurs in measure 79 between the D and G and the rest of the shifts follow a stepwise motion. Since the passage is not extremely difficult, it provides an option for studying octaves in a musical context more appealing that the usual octave scale.
Example 36 comes from the coda in the third movement of Concerto Op. 24. The octave passage features an ascending chromatic scale of over two octaves, an ascending shift of a perfect fifth and a descending shift of a fourteenth. In only six measures almost the whole fingerboard is covered beginning in the first position. In performance the chromatic scale sounds almost as a big glissando and it is tempting to try it. However, the actual movement with the thumb and third finger closing the length of its physical distance with the octaves ascending requires practicing each octave for intonation and control. Also the accents in the octaves imply not a bow accent but clear definition of each octave. It is not possible to literally stop and start again the shifting on each octave at the tempo of the movement, allegro molto moderato, but a short vibrato will create the articulation for the octaves. The chromatic scale can be learn first as an E major scale and then as written. Chromatic scales in octaves are not uncommon in Popper’s music and he particularly used them in his etude no. 20 (example 38). For the two major shifts at measures 304-306 a different approach is recommended. Since the shifts cover big distances and particularly the second goes through the whole fingerboard, a couple of octaves can be added for practicing purposes. Taking the second shift at measure 305, the octave movement C to D# can follow a sequence such as C-A-F#-D#-C-A-F#-D#. The purpose of this sequence is to give the fingers performing the octave shift more room for the adjustments. At first this process will take more time than the original shifting but the result will be a more secure shift in terms not only of getting to the position but also in including the octave interval.

The last octaves example comes from Concerto Op. 72 (example 37) and also features the third type of octaves. In this example the extra figuration is a trill that becomes a
series of triplets on the lower note of the octave as an accompaniment to the upper note in measures 173-176. The writing looks appealing on the written page but it entails practical problems. In an octave the upper note tends to dominate the interval because the lower note will produce harmonics that are compatible with the upper note doubling its resonance. This makes balance an issue because it is extremely easy for the lower triplets to get lost. To address this problem the D string will have to receive additional weight from the right arm and compensate the natural brightness of the A string. The second issue is the increase in the physical space between the thumb and the index finger. As the octaves go to the lower register the space between the thumb and third finger increase creating also more distance between the thumb and index finger. This causes that the execution of the triplets becomes more strenuous and if the cellist has small hands, the triplets that use only a semitone are extremely hard to perform. For practicing this passage, the octaves should be played excluding the triplets focusing on intonation and separately, the triplets should be played without the upper octave. Since the triplets are fluctuating between using half tones and whole tones, playing them by themselves will help in learning the distances and improving intonation. Popper wrote a similar passage in his etude no. 20 (example 39) in which the lower line of the octave includes four sixteenth-notes for each upper eight note. This passage is certainly easier because it is played at a slower tempo and because the thumb and index finger always execute whole tones.
Triple Stops and Chords

Popper used double stops frequently in his concertos and etudes but triple stops and chords are not as common. The execution of three and four notes chords entail problems for both the right and left hand. The main issue for the bow is the curve of the bridge that gives different angles for each string. Using the bow close to the sul tasto position where the curve of the bridge is less pronounced and with a fairly strong attack, it is possible to play three strings at the same time. For chords that include all four strings, the bow will have to follow the curve of the bridge while attacking the strings. If the movement is quick enough, the four notes of the chord will create the illusion of sounding together. The result of the former two methods is short three and four note chords because the physics of the instrument do not allow sustaining them. There are also problems associated to chords for the left hand. The fingers have different lengths and when positioned over the fingerboard, different angles. In a chord needing two or even three fingers, the flexibility of the fingers to change their angle or rotate with respect to the fingerboard can become impaired. Depending on the individual cello, a potential problem is the fingered fifth because the tuning of the fingered fifth may require a particular angle that diminishes the movement of the other fingers.

Popper gave special prominence to chords using three and four notes in his Concerto Op. 24 (example 2). The passage starting at measure 81 presents a whole phrase constructed solely on chords. Popper’s technical design for the chords is practical and clever. Four note chords are assigned to eight notes or quarter notes and they are never together allowing the time needed for preparing each one. The fingering for the first E minor chord, first finger over G and C strings, second finger over D and fourth finger
over E, gives the most comfortable position to the hand. The shortest finger, the fourth, lies over the closest string to the hand, the A. The first finger extends easily to cover the lower strings and the second finger has enough flexibility to reach the second string. Of the three different four note chords, the E and D minor chords use the mentioned fingering and the C major chord takes advantage of the G and C as open strings. Other characteristics that made this an idiomatic passage include: The triple stops following a similar fingering, the fingering fifth always done with the first finger and the fourth finger used only over the A string. If the fingered fifth in this passage requires a particular angle not allowing the placement of the other fingers, the finger playing the fifth should be release after the execution of the fifth to let the other fingers reach to their respective notes.

Example 40 from Concerto Op. 24 provides another instance of chords using triple and quadruple stops. The lay out of this short passage is similar to example 2. Four note chords are never together, the first and second fingers execute the fingered fifth, and open strings are included. For the left hand the main issue is the position changes. The eight chords in this example require three shifts: from the E minor to the dominant seventh chord, from the C major to the E major chord and from the E major to the A minor chord. The first shift becomes easier by releasing the first finger on the E minor chord which frees the two fingers needed for the dominant seventh chord. The second shift poses the problem of the first finger going from the A string in the fourth position to the G string in the half-position. The solution to this problem depends of both hands. The bow will provide the time needed for the shift if the shift is coordinated with the angle change the bow performs to get to the G string. The last shift ascends only a semitone and the index
finger leads it. However, if the fingered fifth in the E major chord needs a particular angle the first finger should be released.

The final chords example, example 41, comes from Concerto Op. 72 and shows Popper’s inventive skill in combining technical expertise and musical ideas. These are the last measures of the concerto and present a simple I-V-I-V-I-V-I progression. The tonic chords present triple stops and the dominant chords quadruple stops. In this passage of constant sixteenth-notes, the chords are never together and their two upper notes are repeated immediately which make it easier to play them at a fast speed. The fingers only travel a tone for the shifts between chords; the first finger takes care of the fingered fifth and the fourth finger remains in the A string.

**Natural and Artificial Harmonics**

Harmonics are secondary vibrations accompanying a fundamental tone. In cello playing when the bow puts a string in motion to produce sound, the whole string will vibrate to produce the fundamental tone. At the same time, the string will divide itself into two equal parts and the resulting sound of this secondary vibration is the first harmonic or octave. The string naturally subdivides itself producing a harmonic series whose frequencies or number of vibrations per second have mathematical relationships with the fundamental tone. The subdivision of the string allows the cellist to position fingers in specific places to produce the desired harmonic. So, since the most common harmonic, the octave, is located exactly in the middle of the string, placing lightly a finger there will produce the harmonic octave of the open string.
The two types of harmonics, natural and artificial, are the result of different methods following the same principle. The light placement of fingers at different points over a string results in natural harmonics. The production of artificial harmonics in the cello requires recreating the subdivision for the particular harmonic needed. For instance, if the string is divided into four sections the resulting harmonic in each one of these sections is the double octave. Using the A string and placing the fourth finger lightly in first position will produce the double octave harmonic since the finger is placed at \( \frac{1}{4} \) of the total string length. In this case the nut and the fourth finger create the required distance for the double octave harmonic and the fundamental tone is the open string.

Therefore, the thumb and the third finger can create the same distance to produce the double octave harmonics with different fundamental over the length of the string.

Popper used both types of harmonics in his concertos. In example 42, from Concerto Op. 72, he combines fundamental tones with natural harmonics. At the third beat of measures 51-54, after the fingers execute a fundamental tone, they stay on the same position and lighten their touch to play the harmonics. The resulting harmonics, an E, a fifth harmonic in measures 51 and 53 and an A, a double octave harmonic in measures 52 and 54 create a virtuosic effect where a high frequency note is reached without shifting. At measure 59 the second and third beats are a fifth harmonic over the A string and a double octave harmonic over the D string. An advantage in playing natural harmonics is that they work either using the higher or lower positions in the cello if the correct division for the string length is accomplished. So, the second harmonic at measure 59 can be played either placing the finger \( \frac{3}{4} \) above the nut or placing the finger over what normally results in a G which corresponds in string length to \( \frac{1}{4} \) above the nut. Two aspects should
be considered when practicing this passage. The execution of natural harmonics requires only a light touch because the finger is only dividing the string vibrations and at the same time lets the string continue vibrating and natural harmonics unlike fundamental tones allow more freedom in the fingers placement over the string. When a finger produces a fundamental tone the placement of the finger in a specific location defines its intonation. In the case of natural harmonics, a small deviation from the division point will still allow the harmonic to sound but it is not recommended to take advantage of this because the harmonic may not sound at all.

Natural harmonics are usually played along fundamental tones but in the case of example 43 from Concerto Op. 24, Popper managed to finish a phrase with ten consecutive natural harmonics. In measures 159-160, the G major arpeggio is part of the natural harmonics played over the G string. In the example the first harmonic, E, is a fifth harmonic that should be played over the A string although it is not printed. The harmonics are closed enough that there is only one position change from the first harmonic E to the second harmonic D and the rest of the harmonics are played extending the fingers without shifting. In practicing this passage two aspects need consideration. The natural harmonics over the G string do not need shifting but they are not in a stationary position, so the hand will have to rotate to reach some of them. Also, the fingers not executing the harmonics should be released not only because having more than one finger in one string will not allow the harmonic to sound but also because the extensions will exert unnecessary tension over the fingers. An instance is the use of the fourth finger to play the next to the last harmonic, D. Since the fourth finger is the shortest finger and the D harmonic over the G string is the farthest from the hand, it is
better to use the first finger over the D string as printed and stay there to play the last harmonic with the thumb. Popper wrote only one etude to address natural harmonics (example 44). The relationship between etude 40 and example 43 lays in the knowledge of G and D strings natural harmonics. Both examples keep the harmonics in close positions and require finger extension and hand rotation.

Examples 45 and 46 are the only instances of artificial harmonics in Popper’s concertos. Both examples use the double octave harmonic, a harmonic that requires the thumb and third finger to be positioned a perfect fourth apart from each other on the same string. In example 45 an ascending-harmonic scale starts at measure 193, ascends an octave and a fifth, descends an octave and finishes with a harmonic trill. Excepting the first harmonic which is natural, each artificial harmonic is in a different position over the fingerboard and as with octaves or thirds; the physical space between the thumb and the third finger will decrease in length as the scale ascends. To practice examples 45 and 46, the first step is to practice the shifts with the thumb, so the thumb can play the passage as a regular scale of fundamental tones for intonation purposes. Then, the thumb can play again the scale with the third finger adding the perfect fourth over each note. Since this type of practicing can be strenuous for the thumb, it should be done in small amounts of time. The next step is to play the actual harmonics but this needs further discussion about artificial harmonics.

In natural harmonics a small deviation in the placement of the fingers still allows the harmonic to sound. The same situation occurs with artificial harmonics but it only applies to the third finger and not to the thumb. The thumb needs to be in place because the thumb defines the harmonics intonation and the third finger defines its execution. As
before, this deviation should be ignored because as the artificial harmonics ascend on the strings, the physical space between the fingers becomes smaller; the position of the third finger has less margin of error and the deviation becomes meaningless. Another aspect to consider in executing artificial harmonics is the placement of the thumb. Although the thumb defines the harmonic intonation, it does not have to press the string down. The objective of the two fingers is to recreate the string division to create a particular frequency and the light placement of both fingers over the string accomplishes it. Pressing the thumb down does not affect the frequency of the harmonic but it creates unnecessary tension that could potentially affect the flexibility for the harmonics shifting.

Returning to the practicing of examples 45 and 46, the final step is to execute the harmonics as written. The two main issues in playing artificial harmonics are the wrong placement of the thumb which will cause a harmonic to be out of tune and the wrong distance between the fingers which will produce another harmonic or no harmonic at all. The trill at the end requires the continuous sliding of both fingers, therefore it is better to start the trill slowly and gradually increase its tempo.

**Thumb Position**

The last section in this chapter examines the use of thumb position whenever it is not directly related to double stops or harmonics. Popper uses the thumb for stationary positions, for linear intervals such as major and minor thirds figurations, for the spelling of chords within one position and for shifting sequences. Thumb position is usually associated with the higher positions above the fourth position and as such it is regarded as an easier position than the first positions in the cello because the physical space among
the intervals is shorter. The addition of the thumb as a fifth finger allows the execution of a scale without shifting and permits the fingers to reach octaves without tension in the high positions. However, the use of the thumb over the fingerboard in the lower positions can be as strenuous as the normal position because the distances are still the same.

The shape of the hand and fingers also affects the effectiveness of the thumb. In thumb position, the fourth finger, being the shorter finger is at great disadvantage. Its use requires either to rotate the hand towards itself in such a way that makes it difficult to play with the first and second fingers or if playing over two strings, to use it only over the higher frequency string located at the left to compensate for its shortness. The most comfortable thumb position, placing the thumb over the octave harmonic, demands for the first and second fingers to curve themselves so that, the third finger can reach the string. In addition, the different physical space among the fingers dictates the ease or difficulty in playing a passage. The thumb and the first finger can extend far beyond what the rest of the fingers are able to. However, if all fingers are extended as in the lower positions, half tones between the thumb and first finger become impossible to play without releasing the other fingers.

The use of thumb position to spell linear thirds over one string is featured in example 47 from Concerto Op. 72. Measures 147-150 and 151-154 show parallel sequences where the thumb executes the lower note for each linear third. The first two measures in each sequence keep a stationary position with the thumb functioning as a reference for the other fingers. Since the thumb does not move beyond a fourth, the next two measures allow the practice of shifting thumb position within a short intervallic range.
To practice measures 149-150, the thumb should lead the shifting because it never leaves the string. First the thumb should learn the positions changes and then, the second finger can be added to perform the thirds. Similarly in the ascending D major arpeggio that follows at measure 155, the thumb also should lead the shifting for practicing purposes even if another finger is executing the shifting. In thumb position, the thumb rarely moves within the position and works as a reference for the other fingers. If practicing this passage with the printed fingers in the last three measures, it is easier to use the third finger instead of the second to play the A in the second triple at measure 157 and D at the downbeat of measure 158.

The execution of linear thirds on two strings using the thumb for the higher frequency note is shown at example 49. The sixteenth-note sextuplets beginning at measure 146 utilize the thumb for shifting, linear thirds and linear octaves. The thumb and second finger execute major and minor thirds over the A and D strings. Even though the thumb executes a position change every three notes, the passage is very comfortable. As with example 47, the thumb shifting should be practiced first and since the thumb executes all the shifts, it should lead them whether in practice or performance. The second finger function is to open and close the distances needed for each third and the third finger is reserved for the occasional octaves and the third at the end. An issue in practicing this passage is the gradual physical compression in the intervallic distances. As the thirds ascend at measure 146, the degree of accuracy required for the placement of the fingers increases. To check for intonation problems and after practicing it as written, the thirds and octaves should be played as double stops: First doing the shift and tuning the third separately, and then as a parallel thirds scale. This type of writing is very effective for
the cello but Popper did not employ it frequently in either his concertos or his etudes. One of the few examples following the same principle is a short passage in his etude no. 21 (Example 48). Here at measure 18, the thumb and second finger outline descending linear thirds over the upper strings.

Popper employ assiduously thumb position for sequences involving stationary positions. In Example 50 from his Concerto Op. 59, thumb position defines each sequence of the descending arpeggios beginning at measure 152. The first finger executes all the position changes but the thumb defines the physical spaces among the fingers since it never leaves the strings. In this particular passage the first finger and the thumb need to work together because the whole passage is technically constructed on these two fingers. After practicing the shifts, the physical intervallic relationship between these two fingers, half tones or whole tones, have to be addressed. For practicing purposes the sequences can be played as F#-E, D-C#, B-A and G-F# where the first finger and thumb played the first and second notes respectively. When this relationship is in place, the passage can be played as printed.

Example 51 is a simpler and longer example of sequences involving the use of thumb position. The arpeggios beginning at measure 128 cover always an octave, the biggest interval thumb position reach without either stretching the fingers or using the fourth finger. The thumb performs all the shifts over the D string and in some arpeggios performs a perfect fifth above the lower octave. The thumb and third finger do not have any problem in executing the octave shaping each arpeggio, but the rest of the fingers encounter difficulties as the arpeggios go to the lower positions. At measure 131 the second arpeggio requires for all the fingers but the thumb to be released. The first finger
extends towards the thumb to reach the D and then has to be released so that the third
finger can execute the F#. Similarly at the next measure, the first finger should be
released for the third finger to play the last sixteenth-note, A#; otherwise, the third finger
cannot execute it because the major third goes beyond the fingers extension. The
problem of fingers extension also includes all three fingers at the second arpeggio in
measure 139 where the first finger is close to the thumb, the second is a minor third away
from the thumb and the first and third fingers are a major third away. The solution is to
release the second finger to play the first and then release the first finger to play the third.
The recommended way to practice this passage is to do it in three steps: First, practice
the octaves encompassing the arpeggios with the thumb leading the shifts, next, add the
second finger and the thumb when performing the perfect fifth since this two fingers do
not pose problems of extensions, and finally, include the first and third fingers practicing
the releases and extensions needed. For cellists familiar with etude no. 12 (example 52),
this whole passage may seem to come from the etude. The etude and the example from
the fourth concerto follow the same pattern employing thumb position arpeggios. Since
the Concerto is Op. 72 and the etudes are Op. 73, the Concerto’s passage may have
inspired Popper to write the etude.
CHAPTER FOUR

Analysis of the Results

In the previous two chapters, David Popper’s four cello concertos have been explored in terms of their technical demands for both right and left hands. The main purpose has been to show how those demands and its implied technical development can be used as tools for pedagogical purposes. Both chapters analyze the cello technique in 40 examples extracted from the concertos, and whenever possible compare them with some of the 12 examples from the Etudes Op. 73. The examples selected give a general picture of the technical and pedagogical possibilities of each concerto but they do not attempt to be an accurate description of all the possibilities available. Each example was selected to represent a particular technique or the use of a technique in a particular context. There are examples whose execution implies the use of two or more cello techniques but only the most prominent was emphasized for the purposes of this paper. A short discussion of each particular technique preceded the examples in each chapter. The main issues explored in each example included the technical analysis of a specific passage, the physical, acoustical, or physiological aspects to consider in executing it, recommended strategies for practicing it and a comparison with a similar or related passages from the 40 Etudes Op. 73 if applicable. The next table shows the results of the two previous chapters. The 40 examples from the concertos relate the different techniques on the left column with the four concertos in the upper row. The examples numbering corresponds with the original order and some examples such as example 2 appear twice when two different techniques are addressed in the same passage or in two passages following each other.
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This table shows an overall view of the technical analysis for the four cello concertos but since it does not encompass the total range of possibilities the data interpretation requires some commentary. There are four right-hand techniques and five left-hand techniques considered. These are the nine most prominent technical aspects but not the only ones. Based only on the table, the concerto covering more aspects in cello technique and with more examples is Concerto Op. 72 and the concerto offering fewer examples and therefore fewer technical issues is Concerto Op. 59. This is misleading because the number of examples for these concertos had to do with their length and not with their quality, so these two concertos and in general the four of them are valuable for their own specific characteristics.

Popper’s first essay in the concerto form, Concerto Op. 8 is a virtuosic piece in one movement but with three clearly different sections. The piece offers right and left hand technique challenges useful for pedagogical purposes. In terms of bowing technique, example 18 requires improvement of muscle flexibility in the right hand to perform the continuous string crossing and the spiccato examples, 8 and 10, explore virtually the whole range of the cello requiring also a high degree of accuracy in the left hand. The execution of the thirds and sixths examples do not put unnecessary strain on the left hand and takes advantage of the octave and fifth harmonics. A student wanting to improve octaves will find relatively easy passages such as example 25 and very challenging ones such as the beginning of example 33.

Concerto Op. 24 is still Popper’s best known cello concerto and arguably the best crafted. This three-movement work used to be part of the standard repertoire and the syllabus in many conservatories. The piece is very attractive for students because it
presents a variety of technical and musical challenges for both left hand and right hand. The physics involved in the sound production for string crossings are fully explored in examples 15 and 19. In examples 12 and 13, the execution of the spiccato passages demands bow control and a fluid use of thumb position. The use of thirds and sixths in examples 27 and 28 follows a highly idiomatic musical discourse and the octaves in examples 35 and 36 are used prominently for virtuosic display and as thematic statements. This concerto offers a highly effective use of triple stops and chords in examples 2 and 40 and an ingenious use of harmonics in example 43.

Concerto Op. 59 is the only one-movement piece and also the shortest of the four. In comparison to the other three concertos, the third concerto is the least technically challenging and therefore the best choice for a student who is not yet technically proficient. The few examples in this concerto are not extremely demanding and, with the exception of example 9, each one of them focuses on a particular technical problem. This is the only piece exploring artificial harmonics in examples 45 and 46. Apart from the octaves passage in example 9, double stops are not frequent, thus facilitating the focus on bow technique and sound. The concerto also covers the cello’s wide range from the first position to the thumb position passage in example 50 and the artificial harmonics already mentioned.

Concerto Op. 72 is the longest piece and includes four movements. Apparently, Popper never performed his fourth concerto but since his students studied it and performed it for the class, it can be assumed that Popper thought of it as a suitable pedagogical work. The piece is technically very demanding but each example is also highly idiomatic. Since Popper wrote it just before the 40 Etudes Op. 73, the concerto
may have inspired some of the etudes. For right-hand technique, the concerto provides passages for the development of staccato in examples 3 and 5 and spiccato in examples 6 and 7. Bow control in long slurs is addressed in example 17 and the execution of triple stops and chords in example 41. Being Popper’s last essay in concerto form, he wrote passages for the left hand that are not only technically more demanding but also more idiomatic. Instances of these are the unique use of continuing thirds for either thematic statement as in example 29 and scales figurations as in example 31, the combination of natural harmonics and fundamental tones in example 42, and the octaves passage including extra figurations in example 37. The concerto emphasizes the use of thumb position and shifting in examples 47 and 51. This concerto is a good choice for a student trying to improve octaves, third and sixths and for becoming familiar with the possibilities of natural harmonics.

Conclusion

David Popper’s four cello concertos are among some of the most idiomatic works written for the cello. Although they were written in the second half of the 19th century, their technical and musical demands are still valuable in the 21st century. The fact that Popper included them as part of the syllabus when he was teaching at the Royal Hungarian Academy of Music implies that the concertos fulfill the requirements needed to improve and master cello technique. The discussion in this paper reveals that each concerto offers within the context of a musical discourse tools for improving right and left hand technique. Studying and practicing these concertos, a cello student can improve bowing techniques such as spiccato and staccato and develop the facility to perform
arpeggios and long slurs with multiple string crossings. For the left hand, the study of
double stops such as octaves, thirds and sixths is musically rewarding and the concertos
use of harmonics, thumb position and multiple stops shows the technical and musical
possibilities of the cello within an idiomatic writing. For their pedagogical value,
Popper’s four cello concertos should be part of both the syllabus in music schools and
conservatories and the standard cello repertoire.

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