A technical method for the high school string classroom: priorities and presentation of essential skills

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University of Northern Iowa

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A TECHNICAL METHOD FOR THE HIGH SCHOOL STRING CLASSROOM:
PRIORITIES AND PRESENTATION OF ESSENTIAL SKILLS

An Abstract of a Thesis
Submitted
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Nicole Elizabeth Cody
University of Northern Iowa
July 2015
This thesis and its accompanying appendices synthesize pedagogical information from classroom method books, classroom pedagogy texts and individual instrument methods presenting new manuals for technique acquisition on violin, viola, cello and double bass in the secondary orchestra classroom. After reviewing the literature, the following categories were determined to be most important for this level of student: 1) Finger Patterns/Tetrachord Exercises, 2) Scales, 3) Bowing, 4) Shifting, 5) Position Etudes and 6) Chorales/Tonal Development. This paper focuses on these categories reporting on how different texts teach the various skills and creating a guide that encourages both a vertical and horizontal understanding of the fingerboard, that presents scales as they relate to finger patterns and tetrachords, and that clarifies the written structure of scales. Finally, the paper makes recommendations for teachers for incorporating these manuals into the curriculum of the secondary orchestra classroom.
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Entitled: A Technical Method for the High School String Classroom: Priorities and Presentation of Essential Skills

has been approved as meeting the thesis requirement for the

Degree of Master of Arts

Date Mr. Frederick Halgedahl, Chair, Thesis Committee

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Date Dr. Rebecca Burkhardt, Thesis Committee Member

Date Dr. April Chatham-Carpenter, Interim Dean, Graduate College
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BACKGROUND

As an instrumental music teacher at the secondary level, the technical proficiency of my students is of prime importance. My students need to leave high school with a wide range of skills and sufficient experience to apply to various situations and styles of literature. They need to achieve independence over their technical development and the ability to make intelligent musical decisions.

There is a great deal of published literature available for use in the heterogeneous, secondary level string orchestra classroom. In this paper, secondary level will be defined as a classroom in which the students have at least three years of previous string education. A majority of the available books are extensions of beginning methods; for example, book three of a series such as Essentials for Strings or All for Strings. Other texts are “festival preparation” manuals, which emphasize the rapid accumulation of sight-reading skills with an emphasis on various styles. There are books written with specific focus areas, such as rhythm or shifting. There are also a few that try to cover all the components necessary for a comprehensive high school-level string education.

The amount of music available on the internet that is in the public domain makes it possible for me to create a manual that includes a wide variety of high quality music literature—literature that holds student interest and encourages self-exploration of composers, their works and lives. Any music used in the classroom needs to address artistic goals, as well as specific techniques.
DESIGN OF WORK

In order to create a technique manual for use in my secondary level orchestra classroom, I first researched and reviewed the currently available classroom method books. I was able to find lists of these books on music websites such as J.W. Pepper.com, from personal experience, and from the ASTA curriculum document. I looked at each book to determine: number and selection of key signatures, number of octaves in scales, what fingering system was used, bowing exercises, tone production exercises, any specific exercises, and the overall organization of the method.

Next, I read through classroom pedagogy books, including those meant for college level orchestra/string teaching classes. In these books I looked for recommendations on specific scales, number of octaves, and order of presentation. I looked for information regarding which bow strokes are commonly cited as important for this level, and how they are described and notated. These texts place a particular emphasis on sequencing of materials.

The final group of books I read are methods written for specific instruments. While reading these, I was interested in how each individual method addressed the following categories: finger patterns, scales, shifting, bow strokes and tone production. My intent was to compare and contrast information in each of the methods regarding the same skill sets, and to note if any of the individual methods differed in terminology from the classroom methods.

Lastly, I synthesized the information I gained from this extensive review of materials and created technique books for each of the instruments that are taught in the
typical orchestra classroom, as well as a teacher’s manual of scores. This manual focuses on the five categories of skills that proved to be most important: Finger Patterns/Tetrachord Exercises, Scales, Shifting, Position Etudes, and Chorales/Tonal Development.

OVERVIEW OF CURRENTLY AVAILABLE CLASS METHOD BOOKS

There are several books available for use in the secondary orchestra classroom that attempt to be comprehensive. These are stand alone, upper middle school to high school level texts that try to cover all the most important aspects of string playing in a short, marketable book. *Advanced Technique for Strings* (Allen, Gillespie, Tellejohn-Hayes) is organized into four major sections: scales and arpeggios, shifting, rhythm and bowing, and musical styles.\(^1\) The scale section contains major and minor scales up to and including five sharps and flats. The upper strings use the Flesch system three octave scale fingerings,\(^2\) the cello uses the “universal” fingering for all scales (the same fingering for all scales that can begin on 1\(^{st}\) finger), and the bass uses the “universal” fingering adapted to accommodate the octave pitch drops that avoid the full three octave range. The book also contains a page on how to practice three-octave scales, including rhythm and speed work. The shifting section is very complete in that it covers all classes of shifts (using same finger, using new finger, from an open string) on all the strings, but the exercises

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\(^1\) Michael Allen, Robert Gillespie and Pamela Tellejohn Hayes, *Advanced Technique for Strings*

\(^2\) Information on this fingering system can be found on page 14, paragraph 3.
are dry and repetitive. Like many high school level string texts, the book concludes with a short section on how to play in each of the historical music periods.3

Another book in this category is *High Tech for Strings* (Doris Gazda). This book emphasizes finger patterns in learning scales and achieving speed in music reading.4 The first part of the book is dedicated to teaching the various finger patterns, designated by where the half step lies within the hand. The book covers scales through three accidentals in the key signature, but the scales are not presented in either chromatic or circle-of-fifths order, and are not isolated in their own section. There are no dedicated shifting exercises, but there is a section on playing and shifting to harmonics.5 All exercises are short and do not advance in difficulty.

*Essentials for Strings* by Gerald Anderson covers all of the major and minor scales in one-, two- and three-octave systems.6 Rhythmic variations are suggested for practice and are abstracted from literature. Aside from scales, there are five chorales presented at the end of the book for advancement of tone production.

The last of the reviewed books in this category is *Expressive Techniques for Orchestra* (Brungard, Alexander, Dackow and Anderson). This book covers the greatest breadth of material. It includes two- and three-octave scales up to and including four accidentals in the key signature. Position work is taken from literature, and shifting is

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5 Ibid, 16-20.
explained in terms of classes of shift (same finger, new finger, open string, etc.). The exercises are again very short and do not include sufficient musical material to allow students to practice and gain competence on any given skill.

Two books I reviewed are extensions of a series. The first is *Strictly Strings, Volume 3* (Kjelland and Dillon). The scales in this book cover key signatures of four accidentals and fewer. The major scales are presented in three-octave format, while the minor scales cover only two octaves. Each key is given a set of bowing and rhythm variations for use in practice. There are very few exercises that use a position outside of first.

The other series book is *Bow and Strings* (Helen Herman). This book covers the smallest amount of material: it only includes the keys A, B-flat and E-flat major, and G minor. The book is all about shifting to, and playing in, third position. While it does not attempt to cover a lot of skills, those it does present are covered in depth. There are ample exercises from the standard literature available in each key signature, providing many opportunities for practice and growth.

The last category of book I surveyed is the stand alone, topic-specific technique book. The first from this category is *Orchestral Bowing Etudes* by Samuel Applebaum. The exercises are half-page to a full-page in length, and cover many different types of bow strokes and skills. Another text, *Rhythm Techniques for Superior Musical*

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Performance by Robert Frost, focuses solely on rhythmic work. It covers rhythms at the beat, division, and subdivision levels in 2/4, 3/4, and 6/8 time.¹⁹

OVERVIEW OF CLASSROOM PEDAGOGY BOOKS

In 2011, a panel of teachers from the American String Teachers Association (ASTA) developed a curriculum with the mission of assisting all string teachers in designing curricular documents.¹⁰ The curriculum that they created supports the National Music Standards established by the Music Educators National Conference (MENC) in 1994 and has been left broad enough to reinforce various states’ standards. This document is divided into three main sections: Executive Skills and Knowledge, Musicianship Skills and Knowledge, and Artistic Skills and Knowledge.¹¹ The most readily usable portion of this document for creating a technique book is “Executive Skills and Knowledge.” The book outlines a scope and sequence for developing body format, and left and right hand technique. The outlined skills that are appropriate for the secondary level typically fall under the proficient and advanced categories. The following table, taken from the document, suggests the skills that can be developed through classroom technique practice.¹²

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¹¹ Ibid, 17.
Table 1: Proficient and Advanced String Skills as outlined by ASTA

<table>
<thead>
<tr>
<th>Body Format</th>
<th>Left Hand Skills</th>
<th>Right Hand Skills</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic Playing Position</td>
<td>Extensions (Violin/Viola), (Cello/Bass)</td>
<td>Extension of Technique related to control of bowing variables (weight, angle, speed, placement)</td>
</tr>
<tr>
<td>Unilateral Body Motion</td>
<td>Introduction of Positions</td>
<td>On string Strokes: Martele, Slurred Staccato, Hooked Bowings, Long Slurs, Accented Detaché, Louré</td>
</tr>
<tr>
<td>Bilateral Body Motion</td>
<td>Half Position</td>
<td>Off-String Strokes: Brush stroke, Spiccato</td>
</tr>
<tr>
<td></td>
<td>Advanced Positions (5th)</td>
<td>Double Stops</td>
</tr>
<tr>
<td></td>
<td>Refinement of Shifting</td>
<td>Chords</td>
</tr>
<tr>
<td></td>
<td>Simple Double Stops</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Advanced Double Stops</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chromatic Alterations</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Advanced Finger Patterns</td>
<td></td>
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</tbody>
</table>

*Teaching Stringed Instruments in Groups* by Elizabeth A. H. Green is a standard text on classroom orchestra instruction. She proposes the following order for the initial presentation of one-octave major scales to students: D, G, A, C, F, B-flat, E-flat, and E.\(^{13}\) Green states: “It is easy to see that if the “ideal” order of presentation is followed for one set of instruments, the others will automatically be handicapped along the way in trying to correlate.”\(^{14}\) Because of the unique needs of each instrument, concessions need to be made when sequencing material in class to meet the needs of many students at one time. This issue is addressed on page 26, as it forms the basis for understanding and implementation of the technique materials.


\(^{14}\) Ibid, 54.
For two-octave scales, Green cites fewer scales and a different progression of keys. Technique issues, such as extensions and shifting, begin to arise in the second octave.\textsuperscript{15} She suggests starting with G major, in which violas need to shift to third position, cellos to fourth and basses to third and fifth-and-a-half. G major is followed by C major, which requires the violins to shift to third position. The next scale is D major. This scale is entirely in first position for viola and cello, and requires shifting to third position for violin. She suggests an octave drop in the bass in lieu of shifting up past the octave harmonic on G-string. The last scale she presents is E major. This scale is in first position for viola, first and third for violin (including an extension to the octave harmonic on E-string), the cello shifting to fourth and minimal shifting on the G-string for bass if the scale is begun on E-string.\textsuperscript{16}

In chapter 6, Green discusses the eight fundamental bowing patterns for the development of the bow arm.\textsuperscript{17} These eight fundamental bowing patterns provide the technical foundation for a student who can then make two major accommodations: allotting equal amounts of bow to each note played (speed, placement and weight and distance remain constant) or varying the bow speed to accommodate the varying number beats required per bow.\textsuperscript{18} She describes the shape of the right arm and instrument at various points in the bow as basic shapes. The bow placed near the frog creates a triangle

\textsuperscript{15} Ibid, 56.
\textsuperscript{16} Ibid, 57.
\textsuperscript{17} Ibid, 66.
\textsuperscript{18} Ibid, 69.
from the shoulder to the elbow and point of contact of bow on the string. The bow placed in the middle creates a square. The eight fundamental patterns are listed below:\(^{19}\)

Table 2: Green’s Eight Fundamental Bowings

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td><img src="frog" alt="Image" /> to <img src="middle" alt="Image" /></td>
</tr>
<tr>
<td>2.</td>
<td>![Image](to point)</td>
</tr>
<tr>
<td>3.</td>
<td>![Image](On the down bow: Frog to middle, middle to tip. On the up bow: Tip to middle, middle to frog.)</td>
</tr>
<tr>
<td>4.</td>
<td>One whole bow per written note (Frog to tip, or tip to frog)</td>
</tr>
<tr>
<td>5.</td>
<td>![Image](Combining bowing 4 and 2. Whole bow, half half.)</td>
</tr>
<tr>
<td>6.</td>
<td>The reversal of 5.</td>
</tr>
<tr>
<td>7.</td>
<td>![Image]</td>
</tr>
<tr>
<td>8.</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

\(^{19}\) Ibid, 68.
Robert H. Klotman wrote *Teaching Strings: Learning to Teach through Playing* as a textbook for use in string music education courses. He details teaching each of the major bowing strokes (detaché, staccato, slurs, martelé, spiccato, hooked and louré).\textsuperscript{20} Teaching information on each stroke includes an exercise taken from the standard literature, a self-check list for students, and a short description of each bow stroke. The music taken from the standard literature and arranged for string orchestra is the most helpful material for gaining technique in this book. A variety of keys is presented and each exercise is concise.

For developing a stable hand position and proper sense of intonation, Klotman includes many short double-stop exercises of increasing difficulty. The exercises for shifting are the same basic same finger shift exercises that are included in most method books. For position playing, he includes the same piece in third, fourth and fifth position to encourage the use of the ear in adjusting the relative separation of fingers.

One book available is focused solely on the development of bowing: *The Art of Bowing Practice: The Expressive Bow Technique* by Robert Gerle. This text explores the mechanical aspects of bowing for each joint of the right arm and hand more deeply. He describes the three units of the arm as 1) the upper arm used vertically to cross strings, 2) the forearm used horizontally on up and down bows in a basic détaché, and 3) the hand that assists with both directions of motion.\textsuperscript{21} Improper combinations of these three cause

faulty technique and frustration in many players. Many texts mention the need to practice string crossings in order to improve flexibility in the right wrist, but Gerle’s text also provides specific practice exercises with advancing bowings and rhythms.

HOW INDIVIDUAL INSTRUMENT PEDAGOGIES ADDRESS SPECIFIC TECHNIQUES

In general, books that have been written which focus on a single instrument, as opposed to those that have been written for teaching string instruments in one heterogeneous class, are better organized and sequenced. These resources need not make concessions to the appropriate sequence of skills for another instrument, and therefore it can be assumed that the presentation of new material is in the most advantageous order for that instrument. Because my goal was to write a technique book to be used effectively in a class setting, it was particularly important to gain a balanced view of the skills required for each instrument. I will discuss the books I studied in terms of the skills they cover.

Finger patterns are the basis for setting up the left hand and developing efficiency. Ralph Matesky proposes seven finger patterns in his book *Playing and Teaching Stringed Instruments*. They are: the major tetrachord (whole step-whole step-half step), the minor tetrachord (whole step-half step-whole step), the low augmented tetrachord (whole step-whole step-whole step, built on a backward first finger extension), the high augmented tetrachord (whole step-whole step-whole step), the low major tetrachord (whole step-

\[22\] Gerle, 34.
whole step-half step, built on a backward first finger extension), the low minor tetrachord (whole step-half step-whole step, built on a backward first finger extension) and the chromatic tetrachord (half step-half step-half step). This could be simplified to just five finger patterns by disconnecting the patterns from an open string and maintaining the same collection of whole and half steps. These five patterns would be: the major tetrachord (whole-whole-half), the minor tetrachord (whole-half-whole), the Lydian tetrachord (whole-whole-whole), the Phrygian tetrachord (half-whole-whole) and the harmonic tetrachord (half-augmented second-half).

*The School of Violin Techniques, Book I* by Henry Schradieck (also transcribed for viola by Louis Pagels) is a collection of exercises particularly designed to build strong, quick and accurate fingers in the left hand in all finger patterns. The exercises are intended to be practiced in an acceleration pattern, by adding more notes under the same length of bow. Exercises cover notes on 1-string, 2-strings, 3-strings and 4-strings as well as exercises in positions other than first. A similar collection of finger pattern exercises can be found in the *Daily Exercises for Violoncello* by Louis R. Feuillard (etudes #1-6). Feuillard outlines all the finger patterns and provides variations of each. Exercises like those in Schradieck and Feuillard are very important for the development of left hand facility. Simon Fischer (*Basics*) and Otakar Ševčík (*Opus 8*) also developed exhaustive finger pattern work that utilizes all patterns, in many keys and positions.

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Janos Starker expands finger pattern exercises to include drones in his book, *An Organized Method of String Playing: Violoncello Exercises for the Left Hand*. He says: “The purpose is to strengthen the fingers, to establish intonation within the given position and to develop the tendency intonation.” While holding the drone does make these exercises more difficult, it also expands their usefulness in real-life musical situations because of the ear training achieved by creating harmony. The exercises are each only a measure in length, but are meant to be practiced with various rhythm patterns, and in succession. He presents these exercises in various positions, and notes that they are intended to be played in all positions and on all strings. More advanced exercises are presented in thumb position at the first harmonic. Starker notes that the thumb position exercises are specifically meant to address the intonation of the octave between the thumb on the lower string and third finger on the higher. This concept of framing the hand around the octave is consistent with the work of many violin pedagogues who advocate the initial forming of the left hand position around the third finger in first position. The last section of the book is titled “Control Exercises” and consists of a short, two-phrase melody that is presented in four different keys using four finger patterns: major, minor, Phrygian and Lydian.

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28 Ibid, 7.
The introduction to *Fiddle Magic*, a text for violin by Sally O’Reilly, presents a different approach to left hand set-up by emphasizing the fourth finger. Exercises in this book are very short and are appropriate warm-ups for violin students. Many of the exercises are specifically aimed at developing a particular finger pattern and some are meant to strengthen the independence of the fingers in those positions.

The study of scales is directly related to the study of finger patterns. The major and melodic minor scales are the most frequently cited as important for study by string players, for all finger patterns are utilized in these scales.

For upper strings, the two most often used systems come from Carl Flesch’s *Scale System in All Major and Minor Keys for Daily Study* (adapted for viola by Charlotte Karman) and Ivan Galamian’s *Contemporary Violin Technique, Volume 1, Parts I and II*. There are advantages to both systems, but debating their relative quality is outside of the scope of this paper. The fingerings in Flesch are universal to all keys (with the exception of G, A-flat, and A on violin and C, D-flat and D on viola) and all begin on the lowest string on second finger. The book is almost exclusively set-up for the practice of three octave scales. Galamian’s fingerings change for the given key and start with the open string or first finger. The two volumes of this book include music and fingering for scales in three and four octaves, as well as an exhaustive collection of bowing and rhythmic variations for practicing those scales. (The 24-note scale system and the acceleration

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practice that is found in many modern texts, including Simon Fischer’s Basics,
was formalized by Galamian). Otakar Ševčík’s Shifting the Position and Preparatory Scale Studies for the Violin, Opus 8 contains a scale system, but the layout is less conducive to student use than the Flesch or Galamian scale books, because C major is the only scale that is explicitly written out. The rest are noted at the bottom of the scale page, which just presents the first measure of each. For general use in the high school classroom, scales are educationally effective as long as most students are using the same system. Those who choose to use a different system may have to spend time outside of the classroom learning their scales with a private teacher.

For cello and string bass there are fewer books dedicated entirely to scales. Julius Klengel’s Technical Studies for Cello, Volume 1 provides fingerings for two-, three- and four-octave scales and arpeggios in long tones as well as bowing variations. The second book of the New Method for the Double Bass by Franz Simandl recommends for two-octave scales. While scales in more than two octaves are certainly possible on double bass, most of the pedagogical literature limits scale study to two octaves.

Learning to play in higher positions and to shift from one position to another is a baseline entrance skill for high school. These skills are then developed and applied to new and more advanced literature. Most individual instrument technique books address shifting and position playing. Violin and viola books move to third position after students have mastered first position, with fifth position to follow, for logical reasons (for

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32 Ivan Galamian and Frederick Neumann, Contemporary Violin Technique, Volume 1, Parts 1 and 2 (Boston: Galaxy Music Corporation, 1966), 5.
example, the first and third fingers play pitches found on the lines of the staff while the second and fourth fingers cover the spaces). Second and fourth positions come later, followed by positions higher than fifth. Same finger shifts are usually introduced first, followed by guide finger shifts, as in Henry Whistler’s *Introducing the Positions.*\(^{33}\) It seems that every book describes the different types of shift using a different language. Regardless of semantics, however, there are three types of shifts that appear in everyone’s work: Same finger, Higher Finger and Lower Finger.

For cellists, Rick Mooney’s books *Position Pieces for Cello, Books I and II* are valuable because they cover all three- and four- finger positions on the cello. Book II introduces students to reading notes in tenor clef, a skill that most high school students learn. In addition, *Thumb Position for Cello, Book I and II* by Mooney covers most of the thumb position patterns. The patterns are introduced by playing the scales that can be formed from the interval patterns of the positions. The music in all of these books is interesting and melodic. Other useful etudes of this type can be found in *Learning the Tenor Clef* (Legg and Gout) and *Intermediate Etudes in the Positions for Cello*, compiled by Francis Grant.

Bassists can rely on the advice for shifting from one position to another given by Barry Green in his book *The Fundamentals of Double Bass Playing*. Instead of presenting each position in a hierarchal design as with the upper string methods, Green begins with exercises for shifting the length of one position, then two positions, three positions and

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four positions.\textsuperscript{34} Throughout his book he employs a marking system that brackets all of the notes in one position together.\textsuperscript{35} Following a similar system of shift technique development is Simon Fischer in his book \textit{Basics}. Exercise 238, “All Shifts in one complete Sequence,” includes same finger shifts, old finger shifts, and new finger shifts, ascending and descending, starting with shifts of a half-step and continuing through an octave.\textsuperscript{36}

The double bass pedagogical world is divided between the studies of Francois Rabbath and Franz Simandl. The teachings of Rabbath can be found in George Vance’s \textit{Progressive Repertoire for Double Bass, volumes I, II and III}. While the first volume is probably too elementary for most students that enter high school, the books are presented as a progressive set, so a student can start at any place and continue to advance his or her personal technique. The Vance sequence places playing in upper positions very early on, perhaps eliminating fear of shifting that can result when students are held to one position for too long. Starting young students in a higher position puts the left arm lower in relation to the body, which can be more comfortable for beginning students who have not yet built up shoulder strength to support a raised arm.

Franz Simandl’s \textit{New Method for String Bass} is a collection of technical studies similar to those of Ševčík and Klengel. The exercises cover every half-position all the way up the neck of the instrument and in all keys. These exercises (in combination with melodic work) would be useful to help familiarize students with playing in upper

\textsuperscript{35} Ibid, 46.
positions across the strings. Scales and their fingerings for bass are available in many different patterns and systems. There is even a published version of Flesch scales adapted for double bass.

Positions are labeled in different ways on the four string instruments, and some texts, such as Simandl’s bass method, include fingering charts with position labels for student reference. His book addresses thumb position, unique to cello and bass, in detail, and provides exercises for shifting in and out of position from varying distances.

Right arm and hand development requires gaining an increasing knowledge of the functions of the upper arm, forearm, hand and fingers, as well as learning the symbols, techniques and stylistically appropriate use of different bow strokes. In his text, *The Viola: Complete Guide for Teachers and Students*, Henry Barrett outlines the necessary motions required of each bowing unit (upper arm, forearm, hand and fingers). The upper arm’s vertical motion is used in string crossing, while its horizontal motion is used while playing in the lower half of the bow. The forearm’s open-close motion is used for playing in the upper half of the bow (in the square to tip area that Elizabeth A.H. Green describes) and its rotary motion is used for placing weight into the string. The hand’s vertical motion is used for repeated string crossings and for some advanced strokes. Finally, the fingers work vertically during rapid string crossings and sautille bowings, while the horizontal is used to change bow direction. The teacher must understand each

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bowing unit (finger, hand, arm, shoulder) and appropriate motions and be able to describe the use of each when teaching bow strokes.

One of the first etude books most violin and viola teachers recommend is Franz Wohlfahrt’s *Etudes*, Op. 45 no. 1. The pieces are all in first position and stay within the range of the two-octave scale. These exercises would be accessible for most high school freshmen. This book contains sixty etudes that address bow division and basic left-hand techniques (leaving fingers down, key signatures up through three accidentals). The etudes are presented in progressive order of difficulty. Despite being written for the violin, these would be useful in the classroom as warm-up exercises for all string instruments were they transcribed, because they address bow division in a systematic way. Wohlfahrt’s Op. 45, no. 2 etudes are also appropriate for high school aged students. The exercises are similar to those found in book one, but they incorporate playing in, and shifting to, second and third positions. Etudes similar to those found in Wohlfahrt, Op. 45, can be found in Heinrich Kayser’s *Elementary and Progressive Studies for Violin*, books one and two.

It is essential to develop strength and flexibility in the fingers of the right hand, as well as the arm. Most texts do not provide exercises that target them. Simon Fischer includes a few exercises in his *Basics* for violin that could be applied in a classroom of string students. These exercises teach raising and lowering the knuckles for flexibility (#10), short string changing exercises to teach horizontal finger motion (#12), and string changes at the tip of the bow to teach the vertical motion of the upper arm (#28).39

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39 Fischer, 8-18.
Fischer also includes two exercises (#42-43) that teach students the seven levels of the bow (G-string, G/D double stop, D-string, D/A double stop, A-string, A/E double stop, and E-string). Détaché is the first bow stroke that all students learn. This stroke teaches the coordination of all parts of the bow arm. During the process of learning how to use the bow arm, sometimes the motions get confused or disconnected from one another. Robert Gerle suggests practicing various string crossing patterns on open strings in various rhythms to eradicate stiff string crossing motion. Gerle’s book *The Art of Bowing Practice* is one of many texts to include an index of the basic on-the-string and off-the-string bowings. Such indices can be very helpful for students who are learning to decipher many different symbols in various styles and historical contexts. Klotman’s *Teaching Strings* uses very short exercises taken from the standard repertoire in each bowing style.

Commonly, etudes are cast in one subdivision of the beat, to which a list of bowing variations may be applied. One of the more famous examples is the second of Roldolphe Kreutzer’s *42 Studies for Violin*. Though the exercise is written in sixteenth notes, Kreutzer includes a list of 81 rhythm and bowing patterns to apply to it. A similar exercise is found in Feuillard’s *Daily Exercises for Violoncello*. The original theme of etude #32 is 11 bars long, making it very usable as a daily warm-up. His collection of

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41 Gerle, 34-35.  
42 Klotman, 181-194.  
variations includes on-the-string and off-the-string bowings and both duple and triple rhythms. He also indicates where in the bow each exercise should be played.\textsuperscript{44}

DESIGN OF THE TECHNIQUE BOOK

After reviewing of all of these materials, I decided on the following sections for the technique manual that I developed for my classroom: 1) Tetrachord Exercises, 2) Scales and Arpeggios, 3) Shifting, 4) Position Etudes, 5) Bowing, and 6) Tone Development. In the following paragraphs, I will discuss the specific pedagogical choices I made.

Finger pattern practice was emphasized in many of the texts I read. I chose to focus on five finger patterns: major, minor, Phrygian, Lydian and Harmonic minor. I set finger patterns within a tetrachord for all the instruments. This allows the violins, violas and cellos to play the tetrachord without having to change strings, and the basses only need to cross to the open string. This assumes an open string start. Further, tetrachords form the basis of scales, and understanding them can help students to accurately learn scales and their application in literature. I labeled the tetrachords on the lowest octave of each two-octave scale to help students make the educational transfer from finger patterns to scale construction. I adapted a Schradieck etude from \textit{School of Violin Technics}, shrinking the range to a tetrachord and set it in each of the five finger patterns. I placed it in a basic key, appropriate for all instruments (D) to avoid complicating the information. These exercises could be played on the other four strings (A and G in class; C and E

\textsuperscript{44} Feuillard, 39.
privately), or if additional fingerings were added, played on any collection of four notes with shifting or string crossings.

The scales chapter includes two-octave and three octave scales. The two-octave scales are in keys up to and including five accidentals, in major, natural minor, melodic minor and harmonic minor. I chose to include the natural and harmonic minors because many educational pieces use those scales. Students can compare the three forms of the minor scale and improve their music literacy. The scales are sequenced in order of the circle of fifths, starting with C major and continuing in major keys clockwise through the sharps, then the flats. The minor scales begin with A minor. The tetrachord information is labeled on the lowest octave of each scale. To aid in understanding of scale construction, the tonic is repeated in the scale, but an optional tie has been written between the tonic pitches so that a teacher could easily choose not to repeat the tonic. Repeating the tonic prevents the confusion that can occur in the second octave if students lose sense of tonal center. By repeating tonic, it always occurs on a strong beat, which is another marker for students. Fingerings for violin and viola set the scale within one position, encouraging a horizontal understanding of the fingerboard. Fingerings for cello and bass are the universal fingerings, which also require students to learn to play in the higher positions on the lower strings.

For three octave scales I have used the Flesch fingerings for violin and viola, and the Klengel fingerings for cello because they are universal to most keys. For double bass, I adapted the universal fingerings to accommodate an octave drop somewhere during the first octave, near an open string when possible. While some three-octave scales are
certainly possible on bass, the technical demands of playing in the second and third octave are greater than they are on the other instruments. Further, scale requirements for All-State and college auditions usually only require two-octave scales for bass, and three-octave for the other three instruments. In all the three-octave scales, the 24-note system of Galamian is utilized. However, I have shifted the metric placement of the scale so that the tonic lies on the strong beat, and again repeated the tonic with optional ties as I did with in two-octave scales. In this way, the three note “turn around” that occurs before the ascent of the scale acts as an introduction and anacrusis to the scale that starts on the down-beat of the second measure.

The “Shifting” chapter of the books includes seven shifting warm-ups. These warm-ups focus on shifting to a higher numbered finger as well as to the same finger. The warm-ups that focus on shifting to a higher finger show a grace note in the place of the guide finger that would lead both the ascending and descending shift. This section contains one-octave major scales on one string, which focus on shifting to a lower numbered finger. These exercises allow students to explore the most frequently used shifts in a controlled way because of their familiarity with the major scale. While not in this section of the manual, scales, both two-octave and three-octave, also provide ample opportunities to practice shifting. Warm-ups 6 and 7 contain many different types of shifts to practice in the context of musical etudes.

Closely related to the shifting chapter is the “Position Etudes” chapter. All of these etudes are familiar folk tunes to aid in accuracy. For violin and viola, many of these etudes sit within one position and reinforce the horizontal understanding of the
fingerboard. If the etude requires shifting, the shifts are as common as possible and shifting is limited as much as possible. However, when working on shifting in a classroom with four instruments, concessions must be made. Most of the cello and bass etudes do not sit within one position and instead focus on playing in the upper positions on the instrument. Cellists and bassists also need to learn to play in thumb position, a position unique to their instruments. Etudes that are in the octave thumb position are included and stay in thumb position as much as possible. If a shift is necessary, it is made as smoothly as possible.

The “Bowing” chapter includes Kreutzer’s etude no. 2 (partial) and Feuillard’s etude no. 27, each of which provides a string of rhythmically equal notes and a set of variations. The variations that are included were developed based upon variations in Galamian, Kreutzer, Feuillard and Ševčík. In order to make these variations usable for both etudes, I have chosen eight note segments (the Kreutzer etude is written in sixteenth notes while the Feuillard is in quarter notes, but the variations are easily applied to both).

The next section consists of excerpts chosen from the symphonic literature that can be used to practice détaché, spiccato, brush spiccato, martelé, louré and legato bow strokes. Some of these bowing etudes also provide opportunities to practice shifting. While not inclusive of all possible bowing styles, this section aims to provide enjoyable warm-up material that could connect to other literature being studied in the classroom.

The final section of the technique manual addresses tone production. As exercises, I have included eight different J.S. Bach chorales and eight chorales from the orchestral literature, in various keys, styles and historical periods, set for string orchestra.
Chorales provide stable harmonic progressions, an opportunity to explore independence of parts, and a general legato style. Because of their relative simplicity, they can be used to teach a variety of phrasing conventions and to develop right hand techniques that yield a deepening of tone quality. These chorales have been included in full score for study of score reading, basic harmony and clef reading for all instruments.

TEACHER RECOMMENDATIONS FOR APPLICATION

The materials in the technique manual should provide a stable foundation of skills to achieve the advancing demands of secondary level literature. I foresee two methods of application for this manual in the classroom. The first would involve the teacher establishing a set sequence of techniques for the students to gain, possibly devoid of connection to the literature studied in class. This approach would be appropriate for the classroom that is only one grade level, ie. freshman orchestra, or for use in a school district that requires a published, skill-based curriculum calendar. The second would be a literature based model, in which the teacher selects the literature for the ensemble and then studies the pieces to determine what techniques are necessary for achievement of the music. Realistically, most teachers plan their instruction using a hybrid of these two methods, both sequencing skills that are appropriate for the students to learn, as well as choosing music that may include skills that are new to the ensemble.

Following a skill progression model, a teacher would decide first how to structure class time that is devoted to technique. One possibility would be to devote 10-15 minutes to technique each class period, understanding that the time frame is dependent on class
length, scheduling changes and possibly on the proximity to the ensemble’s performance. The dedicated time period could be structured to focus on one specific technique for the week. For example, a teacher could decide that the students should spend the week working on the D-flat major scale, working on it note-by-note, in a three-part round, and with various familiar rhythms and bow strokes applied. Prior to the scale week, it could be advantageous to spend a week studying the major tetrachord. In the technique manual, the tetrachords are presented in D major. This key starts as a good starting point because of the open string start, but asking the students to start on a d-flat and to work through what that looks like and feels like on the fingerboard would be a valuable step in achieving this scale. Another option would be a dedicated technique rotation schedule. For example, tetrachord study on Mondays, scales on Tuesday, bow strokes on Wednesday, position etudes on Thursday and chorales on Friday.

There is still a difficulty in order of presentation because of the unique needs of the instruments. Elizabeth Green said, “It is easy to see that if the “ideal” order of presentation is followed for one set of instruments, the others will automatically be handicapped along the way in trying to correlate.” This will always be true in the orchestra classroom, but being aware of potential pitfalls for various instruments is the most important factor in overcoming this. For example, deciding on an order of scale presentation can be difficult. A teacher could decide to use the circle–of–fifths order, starting on C major knowing that cellos and violas have a two octave scale all in first position, while violins have a scale in second position and basses must shift frequently. The next scale learned may be G major, which allows the violins to work in first position
and the basses in lower positions, while the violas work in third position and the cellos must shift. Teachers need to explain new fingering patterns to each instrument as new scales arise and consider any new notes or positions the students will have to master.

In a literature-based implementation model, a teacher would use the technique manual as reinforcement for previously learned skills, as well as a tool to structure new skill acquisition as it relates to the literature that the ensemble is studying. Students would study the scales that relate to the key areas of the piece, shifting patterns and positions that are required, as well as the necessary bow strokes. A teacher could look for a chorale that highlights a facet of the literature, possibly a soprano/bass framework, inner-voice independence, key signature or phrasing concerns. This teacher could either establish a rotation of skills for study throughout the week (appropriate if most of the skills are review) or develop a progression of skills to be studied during the time the piece is being played (appropriate if many of the skills are new, or unfamiliar to the students).

A study of Beethoven’s Symphony No. 7, movement II, provides an example of how the literature-based model might be implemented. The major key areas are A melodic minor and A major, but there are also moments in E melodic minor. Studying parallel keys, such as A minor and major, can help students to understand the relationship between major and minor keys, as well as teach them to be able to describe melodies in terms of scale degree. These scales utilize the major, minor and Phrygian tetrachords. The tetrachord studies can easily be transposed to A minor and A major by starting on the open A-string. The movement requires the use of a brush spiccato and détaché stroke. Studying the Tchaikovsky etude (see page 28 of technique book) would most closely
match the required détaché. Only the violin, cello and bass parts require shifting, though the cello only rises to the e-natural on the a-string. The viola part does not require shifting, but there are opportunities for position playing if the teacher chooses. The shifts are mostly stepwise, ascending shifts and therefore are “lower finger shifts” and so students could practice One-Octave Scales on One String (p. 33) as a warm-up. The violin parts require playing in 3rd position (Violin I and II) and 4th position (Violin I only). Simple Gifts (p. 43) and the Tallis Canon (p. 45) could be used as warm-up material for all instruments. The bass part also requires playing in 3rd position, which is part of the America, the Beautiful (p. 38) and Yankee Doodle (p. 46) position etudes. Choosing chorales to complement this piece was relatively easy. Ach wie flüchtig (p.47) is in A minor and Allein Gott der Höh sei Her (p. 49) is in A major, so both would be appropriate to reinforce the key signature. In addition, they both provide opportunity to work on the tonal richness required of the Beethoven, as well as the independence of parts. The Chorale from Finale of Symphony no. 1 (p. 58) has a similar melodic layout requiring the use of long bows, and the accompanying material in the bass line is ascending octave leaps, just as it is in the Beethoven.

My final recommendation to teachers would be to let the technique manual be a living and changing document. As new technical challenges are encountered, a teacher can develop exercises that relate to the issue. Additionally, instructors will come across good examples of bow stroke usage, chorale-like playing, or position playing in literature that the students play, or possibly when playing music themselves. These should be saved and added to the manual. A teacher’s manual is included in the appendices, and a special
page for teachers, “Teacher’s Notes,” explains the materials, and provides suggestions for practice.

CONCLUSIONS

After reviewing all of this material, I was struck by the fact the fundamentals of teaching and learning stringed instruments have not changed in 500 years. Many of the materials included in the technique manual are not new ideas. I found that the more I saw an exercise, or etude, the more I realized its importance and further developed my own ideas of specifically how I would like to present it to my students. For example, two-octave scales are in nearly every book I reviewed, as they are a basis of technique on stringed instruments. However, the fingerings chosen in all the books are not consistent, and I had to choose what I thought the purpose of learning two octave scales in my classroom should be. I decided that for violin and violas, it should be about understanding the horizontal geography of the fingerboard, which also allowed every scale to have the same fingering. For cello and bass there was a well-established universal fingering that also required playing in upper positions on the lower strings, allowing me to find a teaching philosophy related to two-octave scales. Further, with the two-octave scales, I realized that students often lose the sense of key, or sense of tonic, while playing two- and three-octave scales, so I addressed that by adjusting the way the scale was written.

Studying many of the existing technique books for secondary students, as well as various technique books aimed at specific individual instruments, has given me a valuable wealth of knowledge to help develop the acquisition of string-playing
techniques in my students. It has allowed me to condense all of the information in the vast pedagogical literature to its basic categories and decide what I find most important, and in what ways those skills can be best described and taught to students. I found that having the necessary materials available for comprehensive warm-up and technique teaching allows the teacher to apply the findings of score study and abstract those skills. Before I created these manuals, I would often find myself developing one-use warm-ups to apply to specific techniques. However, I believe that having students study technique and literature simultaneously and in an organized fashion enriches the experience the students receive in orchestra class in many ways. Working on technique daily reminds the students that learning each individual piece of music is not the end-goal of taking a music class. Instead, the goal is to develop the technical skills and historical, cultural and theoretical understanding to master artistry and continue making music for life. Developing technique is just one part of understanding and performing music, but each new ability opens up the student’s mind to focus on something else. By working on technique daily, the students also begin to piece together what it is involved in mastering their instruments, which can provide motivation for individual practice. Students who are never taught to focus on playing techniques and instead play only literature in class often gain a false sense of achievement taken from hearing the group around them, but not necessarily hearing their own contribution. The stronger the students’ technical understanding of the instrument and of those technical requirements of the music, the easier it becomes for students to self-diagnose problems, leading toward the eventual ability of the student to be his or her own teacher.
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APPENDIX B

VIOLIN TECHNIQUE BOOK
Tetrachord Exercises: Major

Based on the Compositions of Henry Schradieck
Tetrachord Exercises: Minor

Based on Compositions by Henry Schradieck
Tetrachord Exercises: Phrygian

Based on Compositions by Henry Schradieck

A

B

C

D

E

F

G

H
Tetrachord Exercises: Lydian

Based on the compositions of Henry Schradieck
Tetrachord Exercises: Harmonic

Based on Compositions by Henry Schradieck
Two Octave Scales: Major Keys

Major Scales are composed of two Major Tetrachords, separated by a whole step.

**C Major**

![C Major Scale Diagram]

**G Major**

![G Major Scale Diagram]

**D Major**

![D Major Scale Diagram]

**A Major**

![A Major Scale Diagram]

**E Major**

![E Major Scale Diagram]

**B Major**

![B Major Scale Diagram]
Two Octave Scales: Natural minor

Natural minor scales are composed of a minor tetrachord, followed by a phrygian tetrachord, separated by a whole step.

A minor

E minor

B minor

F-sharp minor

C-sharp minor

G-sharp minor
Two Octave Scales: Melodic minor

Melodic minor scales are composed of a minor tetrachord followed by a major tetrachord, separated by a whole step on the ascent (raising the 6th and 7th scale degree of the natural minor scale). On the descent, use the natural minor scale.

**A minor**

Musical notation showing the A minor scale.

**E minor**

Musical notation showing the E minor scale.

**B minor**

Musical notation showing the B minor scale.

**F-sharp minor**

Musical notation showing the F-sharp minor scale.

**C-sharp minor**

Musical notation showing the C-sharp minor scale.

**G-sharp minor**

Musical notation showing the G-sharp minor scale.
B-flat minor

F minor

C minor

G minor

D minor
Two Octave Scales: Harmonic minor

Harmonic minor scales are natural minor scales with the 7th scale degree raised.

**A minor**

![A minor scale diagram]

**E minor**

![E minor scale diagram]

**B minor**

![B minor scale diagram]

**F-sharp minor**

![F-sharp minor scale diagram]

**C-sharp minor**

![C-sharp minor scale diagram]

**G-sharp minor**

![G-sharp minor scale diagram]
Three Octave Scales: Major Keys

C Major: Universal Fingering

G Major

D Major: Universal Fingering
A Major

E Major: Universal Fingering

B Major: Universal Fingering
**D-flat Major:** Universal Fingering

**A-flat Major**

**E-flat Major:** Universal Fingering
**B-flat Major:** Universal Fingering

**F Major:** Universal Fingering
Three Octave Scales: Melodic Minor

**A minor**

**E minor:** Universal Fingering

**B minor:** Universal Fingering
F-sharp minor: Universal Fingering

C-sharp minor: Universal Fingering

G-sharp minor
**B-flat minor:** Universal Fingering

**F minor:** Universal Fingering

**C minor:** Universal Fingering
G minor

D minor: Universal Fingering
Scale Variations

Accelerations
Détaché: Hallelujah Chorus

G.F. Handel

\[\text{Tempo} = 110-130\]

\(\text{3rd} - 1\)

\(\text{1st} \quad \text{V}\)

\(\text{4}\)

\(\text{0}\)

\(\text{3rd} \quad -4\)

\(\text{4}\)

\(\text{0}\)

\(\text{1st} \quad \text{V}\)

\(\text{4}\)

\(\text{0}\)

\(\text{3rd} \quad -2\)

\(\text{4}\)

\(\text{0}\)

\(\text{1st} \quad \text{V}\)

\(\text{4}\)

\(\text{0}\)

\(\text{3rd} \quad -1\)

\(\text{4}\)

\(\text{0}\)

\(\text{1st} \quad \text{V}\)

\(\text{4}\)

\(\text{0}\)

\(\text{3rd} \quad -2\)

\(\text{4}\)

\(\text{0}\)

\(\text{1st} \quad \text{V}\)

\(\text{4}\)

\(\text{0}\)
Hooked Bowing: March to the Scaffold

Hector Berlioz

\( \text{\textcopyright 1968 International Music Company} \)
Martelé: Symphony no. 8, Mvt. 2

Franz Schubert
Legato: Romeo and Juliet

Choose upper or lower line

P.I. Tchaikovsky

\[d = 72\]
Détaché: Romeo and Juliet

P.I. Tchaikovsky

\[ \text{\textcopyright 120-140} \]

\[ \text{\textcopyright 3rd \quad 4th} \]

\[ \text{\textcopyright 5th \quad 1st} \]

\[ \text{\textcopyright 6th} \]
Spiccatto: Eine Kleine Nachtmusik, Mvt I

\( \text{q}=120-132 \)

Vln. I

Vln. II

Vln. III

W.A. Mozart
Louré: Concerto Grosso, Op. 3, No. 11

Antonio Vivaldi

Violin I

Violin II

Vln. I

Vln. II

Vln. I

Vln. II
Bowing Warm-Ups

Etude No. 2

Rodolphe Kreutzer

Etude No. 32

Jacques Feuillard
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A

B

C

D

E

F

G

H

I

J

K

L

M

N

O

P

Q

R
One Octave Scales on One String

G STRING

D STRING

3rd 5th 3rd 1st

3rd 5th 3rd 1st

3rd 5th 3rd 1st

4th 6th 5th 2nd
Shifting Exercises

Warm-up #1: Shifting to a higher finger
Sul D

Warm-up #2: Shifting to a higher finger
Sul D

Warm-up #3: Shifting to a higher finger

Warm-up #4: Shifting to the same finger

Warm-up #5: Shifting to the same finger
Warm-up #6: DeBeriot Etude

Warm-up #7: Fiorillo Etude
Amazing Grace
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John Newton

2nd
3rd

76
37
America, the Beautiful
Shifting Etude
Samuel Ward

\[ \text{Staff notation with musical symbols and notes.} \]
Hatikvah
2nd Position Etude
When Johnny Comes Marching Home
3rd and 5th Position Etude

Patrick Gilmore
Joshua Fit the Battle of Jericho

3rd Position Etude
Long, Long Ago
3rd Position Etude

\[\text{Musical Notation}\]
Simple Gifts
3rd Position Etude
Tallis Canon
4th Position Etude

Thomas Tallis
Yankee Doodle
5th Position Etude
Ach wie flüchtig, ach wie nichtig, BWV 26

J.S. Bach
Alle menschen müssen sterben, BWV 262

J.S. Bach

\( \text{Alle menschen müssen sterben, BWV 262} \)

\( \text{J.S. Bach} \)
Allein Gott in der Höh sei Ehr

J.S. Bach
Christ lag in Todesbanden

J.S. Bach
Christe, der du bist Tag und Licht, BWV 274
J.S. Bach

Violin

Viola

Cello

D.B.

5th

Vln.

Vla.

Vc.

D.B.

51
Christum wir sollen loben schon

J.S. Bach
Erschienen ist der herrliche Tag

J.S. Bach

Violin

Viola

Cello

D.B.

Vln.

Vla.

Vc.

D.B.
Erstanden ist der heilige Christ

J.S. Bach
Chorale from Finale of Symphony No. 1

Johannes Brahms

\( \begin{array}{c}
\text{Violin I} \\
\text{Violin II} \\
\text{Viola} \\
\text{Cello} \\
\text{D.B.}
\end{array} \)

Note: The image contains musical notation for the Chorale from the Finale of Symphony No. 1 by Johannes Brahms. The notation includes the musical score for various instruments such as Violin I, Violin II, Viola, Cello, and D.B. (Double Bass) with specific rhythms and dynamics indicated.
Chorale from "Jupiter" from "The Planets"

Gustav Holst

Violin

Viola

Cello

D. B.
Aase's Death (Chorale from Peer Gynt Suite No. 1)

Edvard Grieg
Chorale from "Finlandia"  
Jean Sibelius

\( \text{Violin I} \)

\( \text{Violin II} \)

\( \text{Viola} \)

\( \text{Cello} \)

\( \text{D. B.} \)

\( \text{Vln. I} \)

\( \text{Vln. II} \)

\( \text{Vla.} \)

\( \text{Vc.} \)

\( \text{D.B.} \)

Chorale from "Finlandia"  
Jean Sibelius

\( \text{Violin I} \)

\( \text{Violin II} \)

\( \text{Viola} \)

\( \text{Cello} \)

\( \text{D. B.} \)

\( \text{Vln. I} \)

\( \text{Vln. II} \)

\( \text{Vla.} \)

\( \text{Vc.} \)

\( \text{D.B.} \)
Petite Chorale from "The Soldier's Tale"

Igor Stravinsky

Violin 1

Violin II

Viola

Cello 1

Cello 2

D. B.
Vln. 1
Vln. II
Vla.
Vc. 1
Vc. 2
D.B.

3rd
APPENDIX C

VIOLA TECHNIQUE BOOK
Tetrachord Exercises: Major
Based on the compositions of Henry Schradeck
Tetrachord Exercises: Minor
Based on Compositions by Henry Schradieck
Tetrachord Exercises: Phrygian
Based on Compositions by Henry Schradieck
Tetrachord Exercises: Lydian
Based on the compositions of Henry Schradieck

A

B

C

D

E

F

G

H
Tetrachord Exercises: Harmonic
Based on Compositions by Henry Schradieck
Two Octave Scales: Major Keys

Major Scales are composed of two Major Tetrachords, separated by a whole step.

C Major

G Major

D Major

A Major

E Major

B Major
Two Octave Scales: Natural minor

Natural minor scales are composed of a minor tetrachord, followed by a phrygian tetrachord, separated by a whole step.

**A minor**

4th

5th

**E minor**

2nd

3rd

**B minor**

4th

5th

**F-sharp minor**

2nd

3rd

**C-sharp minor**

1/2 pos.

**G-sharp minor**

2nd 3rd
Two Octave Scales: Melodic minor

Melodic minor scales are composed of a minor tetrachord followed by a major tetrachord, separated by a whole step on the ascent (raising the 6th and 7th scale degree of the natural minor scale). On the descent, use the natural minor scale.

A minor

4th

E minor

5th

F-sharp minor

2nd

C-sharp minor

1/2 pos.

G-sharp minor

3rd
B-flat minor

F minor

C minor

G minor

D minor
Two Octave Scales: Harmonic minor

Harmonic minor scales are natural minor scales with the 7th scale degree raised.

A minor

E minor

B minor

F-sharp minor

C-sharp minor

G-sharp minor
Three Octave Scales: Major Keys

C Major

G Major: Universal Fingering

D Major
**A Major: Universal Fingering**

4th

E Major: Universal Fingering

5th

B Major: Universal Fingering
D-flat Major

A-flat Major: Universal Fingering

E-flat Major: Universal Fingering
B-flat Major: Universal Fingering

F Major: Universal Fingering
Three Octave Scales: Melodic Minor

**A minor**

4th

**E minor**: Universal Fingering

**B minor**: Universal Fingering

5th
F-sharp minor: Universal Fingering

C-sharp minor

G-sharp minor
**B-flat minor**: Universal Fingering

**F minor**: Universal Fingering

**C minor**
**G minor:** Universal Fingering

**D minor**
Scale Variations

Accelerations
Bowing Variations

Rhythm Variations
Détaché: Hallelujah Chorus

G.F. Handel

\( \frac{d}{\text{= 110-130}} \)

\( \text{Détaché: Hallelujah Chorus} \)
Hooked Bowing: March to the Scaffold

Hector Berlioz

\[ \text{Tempo: } 130-150 \]
Legato: Romeo and Juliet

Choose upper or lower part.

P.I. Tchaikovsky
Détaché: Romeo and Juliet

\[=120-140\]

P.I. Tchaikovsky

\[3rd\] - \[1st\] - \[0\]
Spiccatto: Eine Kleine Nachtmusik, Mvt. I

W.A. Mozart
Louré: Concerto Grosso, Op. 3, No. 11

Antonio Vivaldi
Bowing Warm-Ups

Rodolphe Kreutzer

Etude No. 2

Etude no. 32

Jacques Feuilland
8-note Bowing and Rhythm Variations
One Octave Scales on One String

C STRING

G STRING
Shifting Exercises

Warm-up #1: Shifting to a Higher Finger
Sul D

Warm-up #2: Shifting to a Higher Finger
Sul D

Warm-up #3: Shifting to a Higher Finger

Warm-up #4: Shifting to the Same Finger

Warm-up #5: Shifting to the Same Finger
Warm-up #6: DeBeriot Etude

Warm-up #7: Fiorillo Etude
Amazing Grace
3rd Position Etude
John Newton
America, the Beautiful
Third Position Etude
Samuel Ward

America, the Beautiful
Samuel Ward
When Johnny Comes Marching Home
3rd Position Etude
Patrick Gilmore
Joshua Fit the Battle of Jericho

2nd Position Etude
Long, Long Ago
3rd and 5th Position Shifting Etude
Simple Gifts
3rd Position Etude

Shaker Melody
The Star Spangled Banner

John Stafford Smith

Shifting Etude
Yankee Doodle
2nd Position Etude
Ach wie flüchtig, ach wie nichtig, BWV 26

J.S. Bach

\( \text{\textcopyright 2023} \)
Alle menschen müssen sterben, BWV 262
J.S. Bach

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.
Allein Gott in der Höh sei Ehr

J.S. Bach

\[=116\]

Violin

\[\text{Vln.}\]

\[\text{Vla.}\]

\[\text{Vc.}\]

\[\text{D.B.}\]
Christ lag in Todesbanden

J.S. Bach
Christe, der du bist Tag und Licht, BWV 274

J.S. Bach

163

51
Christum wir sollen loben schon

J.S. Bach

164
Erschienen ist der herrliche Tag

J.S. Bach

Violin

Viola

Cello

D.B.

Vln.

Vla.

Vc.

D.B.
Erstanden ist der heilige Christ

J.S. Bach
Chorale from Finale of Symphony No. 1

Johannes Brahms

\( \text{\(\frac{7}{4}\)}\)

Violin I

Violin II

Viola

Cello

D.B.

\( \text{\(\frac{5}{4}\)}\)

Vln. I

Vln. II

Vla.

Vc.

D.B.

\( \text{\(\frac{11}{4}\)}\)

\( \text{\(\frac{13}{4}\)}\)

\( \text{\(\frac{15}{4}\)}\)

\( \text{\(\frac{17}{4}\)}\)

Chorale from Finale of Symphony No. 1

Johannes Brahms

\( \text{\(\frac{7}{4}\)}\)

Violin I

Violin II

Viola

Cello

D.B.

\( \text{\(\frac{5}{4}\)}\)

Vln. I

Vln. II

Vla.

Vc.

D.B.

\( \text{\(\frac{11}{4}\)}\)

\( \text{\(\frac{13}{4}\)}\)

\( \text{\(\frac{15}{4}\)}\)

\( \text{\(\frac{17}{4}\)}\)

Chorale from Finale of Symphony No. 1

Johannes Brahms

\( \text{\(\frac{7}{4}\)}\)

Violin I

Violin II

Viola

Cello

D.B.

\( \text{\(\frac{5}{4}\)}\)

Vln. I

Vln. II

Vla.

Vc.

D.B.

\( \text{\(\frac{11}{4}\)}\)

\( \text{\(\frac{13}{4}\)}\)

\( \text{\(\frac{15}{4}\)}\)

\( \text{\(\frac{17}{4}\)}\)

Chorale from Finale of Symphony No. 1

Johannes Brahms

\( \text{\(\frac{7}{4}\)}\)

Violin I

Violin II

Viola

Cello

D.B.

\( \text{\(\frac{5}{4}\)}\)

Vln. I

Vln. II

Vla.

Vc.

D.B.

\( \text{\(\frac{11}{4}\)}\)

\( \text{\(\frac{13}{4}\)}\)

\( \text{\(\frac{15}{4}\)}\)

\( \text{\(\frac{17}{4}\)}\)
Chorale from "Jupiter" from "The Planets"

Gustav Holst

[Music notation image]

Violin

Viola

Cello

D. B.
Chorale from "Finlandia"

Jean Sibelius

\[ \text{Violin I} \]

\[ \text{Violin II} \]

\[ \text{Viola} \]

\[ \text{Cello} \]

\[ \text{D. B.} \]

\[ \text{Vln. I} \]

\[ \text{Vln. II} \]

\[ \text{Vla.} \]

\[ \text{Vc.} \]

\[ \text{D.B.} \]
Great Gate of Kiev

Mussorgsky

Violin 1

Violin 2

Viola

Cello

D. B.

Vln. 1

Vln. 2

Vla.

Vc.

D.B.
Petite Chorale from "The Soldier's Tale"

Igor Stravinsky

Violin 1
Violin II
Viola
Cello 1
Cello 2
D. B.
APPENDIX D

CELLO TECHNIQUE BOOK
Tetrachord Exercises: Major

Based on compositions by Henry Schradieck

Because of the fingerboard set-up on cello, students do not experience four-note or tetrachord patterns within a hand frame. These exercises for cellists should be used to encourage understanding of the theoretical building blocks of scales and Western Tonal music.
Tetrachord Exercises: Minor

Based on compositions by Henry Schradieck
Tetrachord Exercises: Phrygian
Based on the Compositions of Henry Schradieck
Tetrachord Exercises: Lydian

Based on the compositions of Henry Schradieck
Tetrachord Exercises: Harmonic

Based on Compositions by Henry Schradieck
Two Octave Scales: Major Keys

Major Scales are composed of two Major Tetrachords, separated by a whole step.

C Major

G Major

D Major

A Major

E Major: Universal Fingering

B Major: Universal Fingering
D-flat major: Universal Fingering

A-flat Major: Universal Fingering

E-flat Major: Universal Fingering

B-flat Major

F Major
Two Octave Scales: Natural minor

Natural minor scales are composed of a minor tetrachord, followed by a phrygian tetrachord, separated by a whole step.

**A minor**

Mineral Phrygian

**E minor**

Mineral Phrygian

**B minor**

Mineral Phrygian

**F-Sharp minor**

Mineral Phrygian

**C-Sharp minor**

Mineral Phrygian

**G-sharp minor**

Mineral Phrygian
B-flat minor

F minor

C minor

G minor

D minor
Two Octave Scales: Melodic minor

Melodic minor scales are composed of a minor tetrachord followed by a major tetrachord, separated by a whole step on the ascent (raising the 6th and 7th scale degree of the natural minor scale). On the descent, use the natural minor scale.

**A minor**

<table>
<thead>
<tr>
<th>A minor</th>
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<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Minor</td>
</tr>
<tr>
<td>Major</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Phrygian</td>
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<tr>
<td>Minor</td>
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<tr>
<td>Major</td>
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**E minor**

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<td>Major</td>
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**B minor**

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<tr>
<td>Minor</td>
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<tr>
<td>Major</td>
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<td>Phrygian</td>
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<td>Minor</td>
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<td>Major</td>
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**F-Sharp minor**

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<th>F-Sharp minor</th>
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<tr>
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<tr>
<td>Major</td>
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<tr>
<td>Minor</td>
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<tr>
<td>Major</td>
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**C-Sharp minor**

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<tr>
<td>Minor</td>
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<tr>
<td>Major</td>
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<tr>
<td>Phrygian</td>
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<tr>
<td>Minor</td>
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<tr>
<td>Major</td>
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**G-sharp minor**

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<th>G-sharp minor</th>
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<tr>
<td>Minor</td>
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<td>Major</td>
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<tr>
<td>Phrygian</td>
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<tr>
<td>Minor</td>
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<tr>
<td>Major</td>
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</tbody>
</table>
Two Octave Scales: Harmonic minor

Harmonic minor scales are natural minor scales with the 7th scale degree raised.

**A minor**

```
\[\text{Minor}\]
```

**E minor**

```
\[\text{Minor}\]
```

**B minor**

```
\[\text{Minor}\]
```

**F-Sharp minor**

```
\[\text{Minor}\]
```

**C-Sharp minor**

```
\[\text{Minor}\]
```

**G-sharp minor**

```
\[\text{Minor}\]
```
Three Octave Scales: Major Keys

C Major

G Major

D Major
Three Octave Scales: Melodic Minor

A minor

E minor

B minor
F-sharp minor

C-sharp minor

G-sharp minor
Scale Variations
Bowing Variations

Rhythm Variations
Détaché: Hallelujah Chorus

G.F. Handel

\( \text{Détaché: Hallelujah Chorus} \)

\( \text{G.F. Handel} \)

\( \text{Détaché: Hallelujah Chorus} \)

\( \text{G.F. Handel} \)

\( \text{Détaché: Hallelujah Chorus} \)

\( \text{G.F. Handel} \)
Hooked Bowing: March to the Scaffold

Hector Berlioz
Martelé: Symphony no. 8, Mvt. 2

Franz Schubert
Legato: Romeo and Juliet

Choose upper or lower line.

P.I. Tchaikovsky
Détaché: Romeo and Juliet

P.I. Tchaikovsky

\[ \text{\textcopyright P.I. Tchaikovsky} \]
Spiccato: Eine Kleine Nachtmusik, Mvt. I

W.A. Mozart

Cello I

Cello II

Cello III

Vc. I

Vc. II

Vc. III

Vc. I 3rd 1-2nd 4

Vc. II 4th 2

Vc. III 2nd 4

Vc. I 3rd

Vc. II 1st 3

Vc. III 2nd

Vc. I 1st 3rd 2

Vc. II 1st 3rd 2

Vc. III -

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2

Vc. I 2nd 3rd 2

Vc. II 2nd 3rd 2

Vc. III 2nd 3rd 2
Louré: Concerto Grosso, Op. 3, No. 11

Antonio Vivaldi
Bowing Warm-Ups

Rodolphe Kreutzer

Etude No. 2

Etude no. 32

Jacques Feuillard
8-note Bowing and Rhythm Variations

\[\text{A} \quad \text{B} \quad \text{C}\]

\[\text{D} \quad \text{E} \quad \text{F}\]

\[\text{G} \quad \text{H} \quad \text{I}\]

\[\text{J} \quad \text{K} \quad \text{L}\]

\[\text{M} \quad \text{N}\]

\[\text{O} \quad \text{P}\]

\[\text{Q} \quad \text{R}\]
One Octave Scales on One String

C STRING

G STRING
Shifting Exercises

Warm-up #1: Shifting to a higher finger
Sul D

Warm-up #2: Shifting to a higher finger
Sul D

Warm-up #3: Shifting to a higher finger

Warm-up #4: Shifting to the same finger

Warm-up #5: Shifting to the same finger
Warm-up #6: DeBeriot Etude

Warm-up #7: Fiorillo Etude
Amazing Grace

John Newton
Hatikvah
When Johnny Comes Marching Home
Patrick Gilmore
Joshua Fit the Battle of Jericho
Long, Long Ago

Thumb Position

\[\text{Musical staff and notation}\]
Simple Gifts
Thumb Position Etude

Shaker Melody
The Star Spangled Banner
Tallis Canon

Thomas Tallis
Yankee Doodle
Ach wie flüchtig, ach wie nichtig, BWV 26

J.S. Bach
Alle menschen müssen sterben, BWV 262

J.S. Bach
Allein Gott in der Höh sei Ehr

J.S. Bach
Christ lag in Todesbanden

J.S. Bach
Christe, der du bist Tag und Licht, BWV 274

J.S. Bach

\( \text{Christe, der du bist Tag und Licht, BWV 274} \)

J.S. Bach

\( \text{Viola} \)

\( \text{Cello} \)

\( \text{D.B.} \)

\( \text{Vln.} \)

\( \text{Vla.} \)

\( \text{Vc.} \)

\( \text{D.B.} \)

\( \text{Christe, der du bist Tag und Licht, BWV 274} \)

J.S. Bach

\( \text{Viola} \)

\( \text{Cello} \)

\( \text{D.B.} \)

\( \text{Vln.} \)

\( \text{Vla.} \)

\( \text{Vc.} \)

\( \text{D.B.} \)
Christum wir sollen loben schon

J.S. Bach

\[ \frac{\text{Violin}}{\frac{\text{Viola}}{\frac{\text{Cello}}{\text{Double Bass}}}} \]

\[ \frac{\text{Vln.}}{\text{Vla.}} \]

\[ \frac{\text{Vc.}}{\text{D.B.}} \]
Erschienen ist der herrliche Tag

J.S. Bach

\[ \text{\textcopyright 2023\, Hinweiszettel} \]
Erstanden ist der heilige Christ

J.S. Bach
Chorale from Finale of Symphony No. 1

\( \text{Johannes Brahms} \)

\( \text{\( \frac{d}{=72} \)} \)

Violin I

\( \text{Violin II} \)

Viola

Cello

D.B.

\( \text{Vln. I} \)

\( \text{Vln. II} \)

\( \text{Vla.} \)

\( \text{Vc.} \)

D.B.

\( \text{\( \frac{1}{2} \)} \)

\( \text{\( \frac{1}{2} \)} \)

\( \text{\( \frac{1}{2} \)} \)

\( \text{\( \frac{1}{2} \)} \)

\( \text{\( \frac{1}{2} \)} \)

\( \text{\( \frac{1}{2} \)} \)

\( \text{\( \frac{1}{2} \)} \)
Chorale from "Jupiter" from "The Planets"

Gustav Holst

Violin

Viola

Cello

D. B.

\( \frac{1}{4} = 76 \)

\( \text{Chorale from "Jupiter" from "The Planets"} \)

\( \text{Gustav Holst} \)
Aase's Death (Chorale from Peer Gynt Suite No. 1)

Edvard Grieg

\( \text{\textcopyright} \text{2023} \text{MusicaTextura} \)
Chorale from "Finlandia"

Jean Sibelius

\[ \text{\textcopyright 1908, Edition Russe d'Avantgarde, Moscow} \]

Violin I

Violin II

Viola

Cello

D. B.

Vln. I

Vln. II

Vla.

Vc.

D.B.
Great Gate of Kiev

Mussorgsky

Violin 1

Violin 2

Viola

Cello

D. B.
Petite Chorale from "The Soldier's Tale"

Igor Stravinsky

Violin 1

Violin II

Viola

Cello 1

Cello 2

D. B.
APPENDIX E

BASS TECHNIQUE BOOK
Tetrachord Exercises: Major

Based on compositions by Henry Schradieck

A

B

C

D

E

F

G

H
Tetrachord Exercises: Minor

Based on compositions by Henry Schradieck
Tetrachord Exercises: Phrygian

Based on the Compositions of Henry Schradieck
Tetrachord Exercises: Lydian

Based on the compositions of Henry Schradieck
Tetrachord Exercises: Harmonic

Based on Compositions by Henry Schradieck
Two Octave Scales: Major Keys

Major Scales are composed of two Major Tetrachords, separated by a whole step.

C Major

```
\begin{music}
\scalefrac{2}{4}
\underline{\text{Major}}
\underline{\text{Major}}
\end{music}
```

G Major

```
\begin{music}
\scalefrac{2}{4}
\underline{\text{Major}}
\underline{\text{Major}}
\end{music}
```

D Major

```
\begin{music}
\scalefrac{2}{4}
\underline{\text{Major}}
\underline{\text{Major}}
\end{music}
```

A Major

```
\begin{music}
\scalefrac{2}{4}
\underline{\text{Major}}
\underline{\text{Major}}
\end{music}
```

E Major: Universal Fingering

```
\begin{music}
\scalefrac{2}{4}
\underline{\text{Major}}
\underline{\text{Major}}
\end{music}
```

B Major: Universal Fingering

```
\begin{music}
\scalefrac{2}{4}
\underline{\text{Major}}
\underline{\text{Major}}
\end{music}
```
**D-flat major:** Universal Fingering

**A-flat Major:** Universal Fingering

**E-flat Major:** Universal Fingering

**B-flat Major**

**F Major**
Two Octave Scales: Natural minor

Natural minor scales are composed of a minor tetrachord, followed by a phrygian tetrachord, separated by a whole step.

**A minor**

```
\[ \begin{array}{c}
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
\end{array} \]
```

Minor  Phrygian

**E minor**

```
\[ \begin{array}{c}
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
\end{array} \]
```

Minor  Phrygian

**B minor**

```
\[ \begin{array}{c}
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
\end{array} \]
```

Minor  Phrygian

**F-Sharp minor**

```
\[ \begin{array}{c}
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
\end{array} \]
```

Minor  Phrygian

**C-Sharp minor**

```
\[ \begin{array}{c}
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
\end{array} \]
```

Minor  Phrygian

**G-sharp minor**

```
\[ \begin{array}{c}
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
1 & 2 & 3 & 4 \\
\end{array} \]
```

Minor  Phrygian
B-flat minor

F minor

C minor

G minor

D minor
Melodic minor scales are composed of a minor tetrachord followed by a major tetrachord, separated by a whole step on the ascent (raising the 6th and 7th scale degree of the natural minor scale). On the descent, use the natural minor scale.

### A minor
![A minor scale diagram]

### E minor
![E minor scale diagram]

### B minor
![B minor scale diagram]

### F-Sharp minor
![F-Sharp minor scale diagram]

### C-Sharp minor
![C-Sharp minor scale diagram]

### G-sharp minor
![G-sharp minor scale diagram]
B-flat minor

F minor

C minor

G minor

D minor
Two Octave Scales: Harmonic minor

Natural minor scales are composed of a minor tetrachord, followed by a phrygian tetrachord, separated by a whole step.

A minor

E minor

B minor

F-Sharp minor

C-Sharp minor

G-sharp minor
B-flat minor

F minor

C minor

G minor

D minor

Minor

Minor

Minor

Minor

Minor
Three Octave Scales: Major Keys

C Major

G Major

D Major
D-flat Major

A-flat Major

E-flat Major
Three Octave Scales: Melodic Minor

A minor

E minor

B minor
F-sharp minor

C-sharp minor

G-sharp minor
Scale Variations

Accelerations
Bowing Variations

A

B

C

D

E

F

G

H

I

J

K

Rhythm Variations
Hooked Bowing: March to the Scaffold

Hector Berlioz
Martelé: Symphony no. 8, Mvt. 2

Franz Schubert
Legato: Romeo and Juliet

P.I. Tchaikovsky

\( \frac{d}{dt} = 72 \)
Détaché: Romeo and Juliet

P.I. Tchaikovsky

\begin{music}
\includegraphics[width=\textwidth]{music.png}
\end{music}
Spiccatto: Eine Kleine Nachtmusik, Mvt. I

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W.A. Mozart
Louré: Concerto Grosso, Op. 3, No. 11

Antonio Vivaldi

\[ \frac{\text{\textbackslash \textbackslash d} = 60}{\text{\textbackslash \textbackslash d}} \]

Bass I

Bass II

Db. I

Db. II

Db. I

Db. II
Bowing Warm-Ups

Etude No. 2

Rodolphe Kreutzer

Etude No. 32

Jacques Feuillard
8-note Bowing and Rhythm Variations
One Octave Scales on One String

E STRING

A STRING
Shifting Exercises

Warm-up #1: Shifting to a higher finger
Sul D

Warm-up #2: Shifting to a higher finger
Sul D

Warm-up #3: Shifting to a higher finger

Warm-up #4: Shifting to the same finger

Warm-up #5: Shifting to the same finger
Warm-up #6: DeBeriot Etude

Warm-up #7: Fiorillo Etude
Amazing Grace
Thumb Position Etude

John Newton
America, the Beautiful

Samuel Ward
Hatikvah
When Johnny Comes Marching Home

Patrick Gilmore
Joshua Fit the Battle of Jericho
Long, Long Ago

Thumb Position

Sul II

5

9

13
The Star Spangled Banner

John Stafford Smith
Tallis Canon

Thomas Tallis
Yankee Doodle
Ach wie flüchtig, ach wie nichtig, BWV 26

J.S. Bach
Alle menschen müssen sterben, BWV 262

J.S. Bach
Allein Gott in der Höh sei Ehr

J.S. Bach
Christ lag in Todesbanden

J.S. Bach
Christe, der du bist Tag und Licht, BWV 274

J.S. Bach

Violin

Viola

Cello

D.B.
Christum wir sollen loben schon

J.S. Bach
Erschienen ist der herrliche Tag

J.S. Bach
Erstanden ist der heilige Christ

J.S. Bach
Chorale from Finale of Symphony No. 1

Johannes Brahms

\[
\begin{align*}
3rd & \quad V & \quad 1st \\
\end{align*}
\]

Violin I

Violin II

Viola

Cello

D.B.

Vln. I

Vln. II

Vla.

Vc.

D.B.
Chorale from "Jupiter" from "The Planets"

Gustav Holst

\( \text{\textcopyright 1910 Universal Edition, \textregistered 1928 Boosey & Hawkes Music Publishers, Inc. Used by permission.} \)
Aase's Death (Chorale from Peer Gynt Suite No. 1)

Edvard Grieg

\( \frac{1}{=50} \)

Violin I

Violin II

Viola

Cello

D. B.
Petite Chorale from "The Soldier's Tale"

Igor Stravinsky

Violin 1

Violin II

Viola

Cello 1

Cello 2

D. B.
APPENDIX F

TEACHER’S MANUAL FOR TECHNIQUE BOOK
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Teacher’s Notes: Chorales

Ach wie fluchtig, ach wie nichtig, BWV 26, J.S. Bach

Alle menschen müssen sterben, BWV 262, J.S. Bach

Allein Gott der Hôh sei Her, J.S. Bach

Christ lag in Todesbanden, J.S. Bach

Christe, der du bist Tag und Licht, BWV 274, J.S. Bach

Chirstum wir sollen loben schon, J.S. Bach

Erschienen ist der herrliche Tag, J.S. Bach

Erstanden ist der heilige Christ, J.S. Bach

Chorale from Finale of Symphony No. 1, J. Brahms

Chorale from Jupiter from the Planets, G. Holst

Aase’s Death (Chorale from Peer Gynt Suite No. 1), E. Grieg

Chorale from Finlandia, J. Sibelius

Great Gate of Kiev, M. Mussorgsky

Petite Choral from The Soldier’s Tale, I. Stravinksy
Teacher’s Notes: Tetrachord Exercises

Explanation:
The following exercises focus on the finger patterns that fall within a tetrachord (four note segment of a scale). The tetrachords start on open D string for all instruments. Violin, Viola and Cello will not have to change strings, but Bass will have to use the open G string to complete the tetrachord.

Practice Suggestions:
Because the notes have been printed in a single subdivision, almost any bowing—or simple rhythms—can be applied to these warm-ups.

1) Slur 2, Slur 4, Slur 8, Slur 16 at an increasing tempo. (Set the metronome at quarter note = 60 and play an increasing number of notes within each beat)
2) Apply a series of rhythms. Suggestions can be found on the Scale Variations page, or on the Kreutzer/Fiorillo Etude page.
3) Apply a slurring or rhythm pattern from the repertoire that the group is studying to reinforce it.

Taking it further:
These exercises can easily be adapted to the following tonics.

1) A
2) G

Violins and violas can start any pattern on first finger and not have to shift or cross strings. Cellos and Basses will have to cross strings or shift to complete a tetrachord that does not start on an open string. Fingerings can be applied that involve shifting and string crossing. These fingers can easily be assigned by the teacher, or students can be given the challenge of determining the appropriate fingering to match the tetrachord.
Tetrachord Exercises: Major

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.

Vln.

Vla.

Vc.

D.B.
Tetrachord Exercises: Minor

A

Violin

Viola

Cello

Double Bass

B

Vln.

Vla.

Vc.

D.B.

C

Vln.

Vla.

Vc.

D.B.
Tetrachord Exercises: Phrygian

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.

Vln.
Tetrachord Exercises: Lydian

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.

Vln.

Vla.

Vc.

D.B.
Tetrachord Exercises: Harmonic

A

B

C

14
**Teacher’s Notes: Scales**

**Explanation**
All scales are notated with the tetrachords labeled in the bottom octave of the ascent. Students should be encouraged to make the educational transfer between tetrachord practice and how scales are constructed.

*Two Octave Scale Fingering:* Violin and Viola have been given fingerings that cross the fingerboard and do not shift. Cello and Bass use the universal fingerings for those scales.

All forms of the minor scale have been included in two octaves. Many educational pieces utilize the natural and harmonic forms of these scales, as well as the melodic. Having all three forms allows the teacher to compare the scales and their construction, and also choose the appropriate form of the scale for the literature that is being studied in class.

*Three Octave Scale Fingering:* Violins and Violas use the Flesch fingering system, which uses a universal fingering on all scales that can begin on second finger. Cellos use the Klengel scale fingering system, which also uses a universal fingering. Basses have essentially two octave scales again, written with an octave drop in the first octave. Because of the sheer size of the instrument and the advanced technique required to play in the third octave of the instrument, the third octave of the scale has been omitted.

**Practice Suggestions:**
All scales are written with a repeated tonic and an optional tie over the bar line. The repeated tonic can help beginning scale players to hear the change of octave in the scale and connect the tetrachord patterns from the first octave into the second octave. As students progress, you may choose to hold the tonic tie over the bar line. This would eliminate a re-articulation on tonic, but the tonic will still be highlighted by its length relative to the other notes in the scale. Eventually, you can choose to have students ignore the tie and play up and down the scale with notes of the same length.

The three octave scales are written in the 24-note system of Galamian, but the turnaround notes have been shifted metrically to act as a three-note introduction to the scale which now begins on the down beat. This is again to help students appreciate the fundamental importance of the tonic pitch.

Scales can be practiced in the following ways:
1) With various bowing patterns applied (found in the scale variation section)
2) In increasing tempo, or increasing rhythm
3) In various rhythms.
4) In three-part rounds with the class (stagger entrances by 2 notes). This works better with two octave scales. It can be applied to three octaves, but the turnaround will need to be eliminated.
5) With rhythms, bowings, or articulations, from literature studied in class applied.
Two Octave Scales: Major Key

Major Scales are composed of two Major Tetrachords, separated by a whole step.

C Major

G Major
Two Octave Scales: Natural Minor

Natural minor scales are composed of a minor tetrachord, followed by a phrygian tetrachord, separated by a whole step.

**A Minor**

Violin

Viola

Cello

Double Bass

**E Minor**

Vln.

Vla.

Vc.

D.B.
Two Octave scales: Melodic Minor

Melodic minor scales are composed of a minor tetrachord followed by a major tetrachord, separated by a whole step on the ascent (raising the 6th and 7th scale degree of the natural minor scale). On the descent, use the natural minor scale.
C minor

G minor
D minor

Vln.

Vla.

Vc.

D.B.
Two Octave Scales: Harmonic Minor

Harmonic minor scales are natural minor scales with the 7th scale degree raised.

A minor

E minor
Three Octave Scales: Major Key

C Major

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.
A Major

Vln.

Vla.

Vc.

D.B.

Vln.

Vla.

Vc.

D.B.

43

44

50

45
Three Octave Scales: Melodic Minor

A minor

Violin

Viola

Cello

Double Bass

Three Octave Scales: Melodic Minor

A minor

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.
F-Sharp Minor

Vln.

Vla.

Vc.

D.B.
C-sharp minor

Vln.

Vla.

Vc.

D.B.
Bowing Variations

A

\[ \text{MIDI code for A} \]

B

\[ \text{MIDI code for B} \]

C

\[ \text{MIDI code for C} \]

D

\[ \text{MIDI code for D} \]

E

\[ \text{MIDI code for E} \]

F

\[ \text{MIDI code for F} \]

G

\[ \text{MIDI code for G} \]

H

\[ \text{MIDI code for H} \]

I

\[ \text{MIDI code for I} \]

J

\[ \text{MIDI code for J} \]

K

\[ \text{MIDI code for K} \]

Rhythm Variations

\[ \text{MIDI code for Rhythm Variations} \]
Teacher’s Notes: Bowing

Explanation:
Each exercise is an excerpt from the orchestral literature set in unison (or duet) for the entire class of string instruments.

Make sure that each bow stroke is taught with correct bow placement and distribution. Most bow strokes are anatomically unnatural in a different part of the bow.

Practice Suggestions:

1) Pair these exercises with literature that is being studied in class.
2) Listen to the orchestral work as a whole, and have students describe the bow stroke(s).
3) Vary the dynamics in the excerpts (none are written in). Some bow strokes have different characteristics at different dynamic levels.

Kreutzer and Feuillard Etudes:
These two etudes are taken from individual methods for violin and cello. The Feuillard has been altered slightly so that eight-note variations can applied to it. All the variations included are written in 8-note sections, but 2- and 4- note rhythmic variations work as well.

Use the supplied bowing and rhythms, or create your own. Apply a rhythm or bowing that is in the class’s literature.
Hooked Bowing: March to the Scaffold

Hector Berlioz

Violin

Viola

Cello

Double Bass

Vla.

Vc.

D.B.
Martelé: Symphony no. 8, Mvt. 2

Franz Schubert

\( \text{\textcopyright Fr. Schubert} \)
Legato: Romeo and Juliet

Choose upper or lower line.

P.I. Tchaikovsky

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.
Détaché: Romeo and Juliet

P.I. Tchaikovsky
Spiccatto: Eine Kleine Nachtmusik, Mvt. I

W.A. Mozart

\( \frac{1}{4} = 120-132 \)

Violin I

\( \text{Violin II} \)

\( \text{Violin III} \)

\( \text{Viola I} \)

\( \text{Viola II} \)

\( \text{Viola III} \)

\( \text{Cello I} \)

\( \text{Cello II} \)

\( \text{Cello III} \)

\( \text{Double Bass I} \)

\( \text{Double Bass II} \)

\( \text{Double Bass III} \)
Vln. I

Vln. II

Vla. I

Vla. II

Vc. I

Vc. II

D.B. I

D.B. II
Bowing Warm-Ups

Etude No. 2

Rodolphe Kreutzer

Violin

Viola

Cello

Double Bass
Etude no. 32

Jacques Feuillard

414
8-note Bowing and Rhythm Variations
**Teacher’s Notes: Shifting**

**Explanation:**
There are two sections to the Shifting Chapter, “One Octave Scales on One String” and “Shifting warm-ups”.

The one octave scales are intended to teach the students to shift up and down the strings, learning the vertical lay-out of the fingerboard. The scale is aurally familiar, which should aid in shifting accuracy. These scales are written out starting on an open string, and on first finger. Fingerings are provided, and reflect common ways of playing scalar passages. Scales that start on the C string (Viola and Cello) and E string (Violin and Bass) are matched with scales in the same key, but on a different string for the other instruments.

The shifting warm-ups are very short exercises that isolate shifts—the first two exercises teaching shifting to a higher numbered fingering. The grace notes are written as a reminder of where the guide finger (old finger) should land. These are shown on ascending and descending scales.

Shifting the same finger follows a scalar pattern with an alternating return to tonic.

All shifts can be practiced at first very audibly, then beginning to hide the shift by lessening finger pressure.

The last two warm-ups are etudes that require the use of many shifts. Although these shifts are unnecessary, they are suggested to provide exercise in shifting. Students should be encouraged to follow the fingerings. Both etudes require many types of shifting, but include repeated notes after a shift to help establish pitch.

**Practice Suggestions:**

1) The short warm-ups can be played by the class together, as the fingers and placement of the shifts will be in the same place.

2) On occasion, have only one section shift while the others play the exercise in first position to help with accuracy. Then rotate this to other sections.

3) Isolate certain shifts, and practice them up and down repeatedly.

4) Apply various bowings and rhythms to the one-octave scales.

5) One-Octave scales may be played in harmony. For example, one that starts on C paired with one that starts on E, or E-flat.
One Octave Scales on One String

C String

Violin

(Violin on A string)

Viola

Cello

(Bass on A string)

Double Bass

(Bass on A string)
G String

(Violin on D string)

(Bass on D String)
A String

Vln.

Vla.

Vc.

D.B.

81

89
E string

(Violoncello and Viola on D string)
Shifting Exercises

Warm-up #1: Shifting to a higher finger

Violin

Warm-up #2: Shifting to a higher finger

Vln.

Vla.

Vc.

D.B.
Warm-up #3: Shifting to a higher finger

Warm-up #4: Shifting to the same finger
Warm-up #5: Shifting to the same finger

Warm-up #6: DeBeriot Etude
Warm-up #7: Fiorillo Etude
Teacher’s Notes: Position Etudes

Explanation:
All the position etudes are familiar folk tunes, in various keys, set in unison for the string orchestra. Some of the etudes allow some of the instruments to stay within a single position and work on horizontal fingerboard understanding. Many require shifting, but fingerings have been chosen to limit the shifting as much as possible.

Because these tunes were set in the same key across the orchestra, each instrument has its own set of challenges with each piece.

Practice Suggestions:
1) If the tune can be played in first position play it there first to remind the students how it should sound.
2) If the tune cannot be played in first position, students can sing it either with the lyrics or on a neutral syllable.
3) Practice phrase by phrase, and check to see if students have “landed” on the proper finger at the end.
4) If class literature requires specific position playing, pair these etudes with the class literature to reinforce the positions.
Amazing Grace

John Newton

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.

100
America, the Beautiful

Samuel Ward

3rd

5th

3rd

Violin

3rd

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.

Vln.

Vla.

Vc.

D.B.
Hatikvah
When Johnny Comes Marching Home

Patrick Gimore
Joshua fit the Battle of Jericho
The Star Spangled Banner
Tallis Canon

Thomas Tallis

Violin

Viola

Cello

Double Bass

Vln.

Vla.

Vc.

D.B.
Yankee Doodle
Teacher’s Notes: Chorales

Explanation:
The chorales in these books have been included to provide a platform for work on tone production and independence of voice. The first eight chorales are by J.S. Bach and have very independent parts, but a limited range. The next eight chorales are taken from the orchestral literature and sometimes require higher position playing and shifting. Some also include alternate clefs for the viola and cello. All the chorales are in score-form in the books for individual instruments so that students may readily see how their particular voice is interwoven with the others.

Practice Suggestions:
1) Pair these chorales with classroom literature in any of the following ways:
   a. Same key
   b. Similar melodic material
   c. Similar harmonic material
   d. Similar independence/counterpoint
2) Teach students to read other clefs and play a part that is typically not their own.
3) Ask students to come up with an alternate fingering.
4) Encourage student conductors to conduct these warm-ups
5) Apply various dynamics or articulations.
Ach wie flüchtig, ach wie nichtig, BWV 26

J.S. Bach
Alle menschen müssen sterben, BWV 262

J.S. Bach
Allein Gott in der Höh sei Ehr

J.S. Bach

Violin

Viola

Cello

D. B.
Christ lag in Todesbanden

J.S. Bach

Violin

Viola

Cello

D.B.

Vln.

Vla.

Vc.

D.B.
Christe, der du bist Tag und Licht, BWV 274

J.S. Bach

Violin

Viola

Cello

D.B.
Christum wir sollen loben schon

J.S. Bach

\[ \text{\textcopyright J. Schott} \]
Erschienen ist der herrliche Tag

J.S. Bach

Violine

Viola

Cello

D.B.

Erschienen ist der herrliche Tag

J.S. Bach
Erstanden ist der heilige Christ

J.S. Bach
Chorale from Finale of Symphony No. 1

\( \text{d} = 72 \)

Johannes Brahms

\[
\begin{align*}
\text{Violin I} & \quad \text{Violin II} & \quad \text{Viola} & \quad \text{Cello} \\
\text{D.B.} & \\
\text{Vln. I} & \quad \text{Vln. II} & \quad \text{Vla.} & \quad \text{Vc.} \\
\text{D.B.} & 
\end{align*}
\]
Chorale from "Jupiter" from "The Planets"

Gustav Holst

Violin

Viola

Cello

D. B.
Chorale from "Finlandia"  
Jean Sibelius

\[ \text{\textcopyright 1907, G. Schirmer} \]

\[ \text{\textcopyright 1951, G. Schirmer} \]

\[ \text{\textcopyright 1951, G. Schirmer} \]
Great Gate of Kiev

Mussorgsky

Violin 1

Violin 2

Viola

Cello

D. B.

Vln. 1

Vln. 2

Vla.

Vc.

D.B.