Developing a Unified Sound in Full & String Orchestras

Practical Solutions for Real-World Tuning Challenges

Dr. Jacob Dakon, Dr. Martha Placeres, Dr. Laurie Williams

TODA July 22, 2022

Critical Building Blocks for Developing a Unified Sound

- Rhythmic Integrity (all beats line up vertically & horizontally)
  - Vertical = all beats occur at the same, precise time
  - Horizontal = all rhythms same length in time (i.e., articulations match & stop on time)

- Technical Facility
  - Technical difficulty matches the abilities of the ensemble members
  - Lyrical challenges are within grasp of the musicians (phrasing, dynamics, note lengths, etc.)

- Characteristic Tone Quality (**You cannot tune bad tone!**)
  - Quality tools for the job
    - Instruments - tuning closely matches Equal Temperament
    - Mouthpieces, Reeds, Mallets
    - Strings, Bows
  - Proper posture
  - Proper position/embouchure
  - Aural concept of characteristic tone (student & director)

- Accuracy of Intonation
  - Tune properly
  - Patience and determination - moral imperative
  - Aural training honed through daily practice (5-10 minutes)

Strategies for the Development of Proper Tone - Strings (right arm/hand)

A. Relax - release tension from the neck through the arm and hand
B. Adequate amount of rosin (not scratchy or breathy)
C. Helmholtz motion – string must resonate properly
D. Balanced relationships between:
   1. Point of Contact - where the bow is set between the bridge (lane 1) & fingerboard (lane 5)
   2. Angle – slant of the bow as it moves across the string (approx. 90 degrees)
   3. Weight – distributed evenly among fingers through arm (not pressure, leads to tension)
   4. Speed - correctly chosen to evenly disperse the energy depending on bow placement
   5. Tilt - number of hairs contacting the string
E. Part of the Bow - tip, middle, balance point, frog
F. Homogenous bow direction – each section demonstrates same bowing direction
G. Homogenous articulations – each section demonstrates same articulations
   1. Upbow staccato or portato?
   2. Staccato or Spiccato? staccato (eighth notes at quarter = 40-130 bpm); spiccato (eighth notes at quarter = 115-200+ bmp); heavy or light?
H. Making eye contact & breathing together – Musicians that breath together, move together in time

Strategies for the Development of Proper Tone - Strings (left arm/hand)

A. Tune properly
B. Relax - release tension from the neck through the arm and hand
C. Straight wrist - no backward or forward wrist alignment
D. Fingertip vs. Flesh – strings depressed by the fingertips or flesh offer a brighter or mellower tone, respectively. Each should contact fingerboard with solid weight
E. Homogenous fingerings – lower strings, darker timbres; higher strings, brighter timbres
F. Vibrato - relaxed and controlled, added after tonal center has been established
G. Non-vibrato – a calm, hushed choral-like sound; reveals inaccuracies in intonation and articulations

Strategies for the Development of Proper Tone - Winds

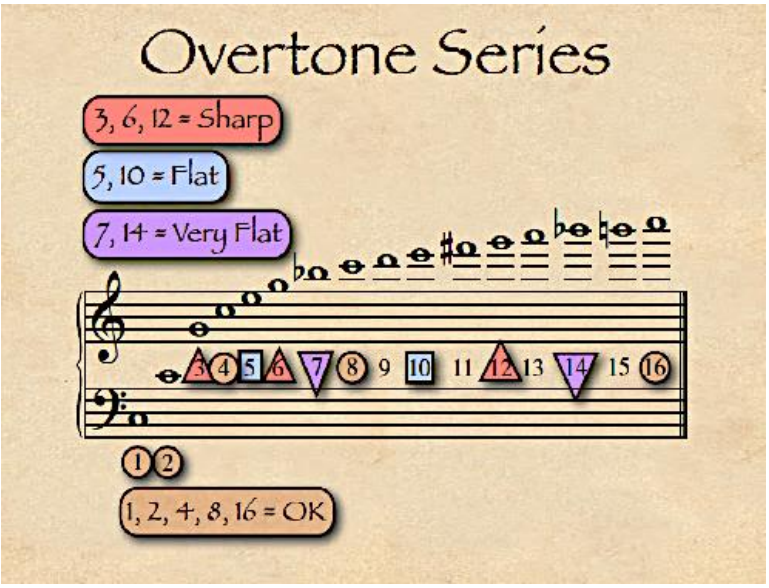
A. Breath support - wind speed and direction
B. Embouchure - allow the reed/lips to vibrate freely for each pitch
C. Aperture size & shape
D. Proper "voicing" - vary the oral cavity and vowel shape
E. Tongue and Jaw placement
F. Instrument angle

Strategies for the Development of Proper Tone in Rehearsal

A. Long Tones - varying pitches and dynamic levels
B. Lip slurs/Register shifts (winds) or Slurs/String crossings
C. Rounds & Chorales
D. Singing-playing circular exercises

Equal Temperament vs. Just Intonation

- Equal Temperament =
  - The 12 notes within an octave are divided into equal intervals (C#=Db).
  - Every interval is distorted except the octave; compromise both melodically & harmonically.
  - Technically necessary system for keyboard/fixed-pitch instruments.
  - This system works best for atonal music & when playing accompanied solos.
- Just Intonation =
  - Tuning based on naturally occurring harmonic interval ratios (C#≠Db).
  - Every interval is measured by proportions found in the harmonic series.
  - What the ear mainly hears is the relationship between the intervals.
  - Preferable tuning system for diatonic music.



http://www.bandworld.org/html/Overtone02.html
Max & Scott McKee

- Tuning Deviations between Equal & Just Temperament Intervals

Major 3rd	14 cents flat
Minor 3rd	16 cents sharp
Perfect 5th	2 cents sharp
Minor 7th	29 cents flat
Major 7th	12 cents flat
Major 9th	4 cents sharp

Solutions for Tuning Challenges in String and Full Orchestras

A. Basic Tuning Rules:
   1. Most instruments are made to be played with the tuning slide/barrel/head joint pulled out.
   2. A longer instrument will be flatter than a shorter instrument. Therefore, pull out when tuning notes are sharp and push in when they are flat.
   3. Winds should be warmed up before tuning, while strings should be tuned before playing.
   4. After the student plays the initial tuning note, tuning adjustments should be made to the instrument, not the player's instrument or body position.
   5. As with strings, all intonation adjustments after tuning must be made by the player through changes in embouchure, air-stream, slide-triggers, or alternate fingerings.
   6. Use "Concert" when giving discussing tuning pitches or scales with winds.

B. Tuning Procedure:
   1. Strings - tune open A first; then tune D, G, C, E (single strings, then double-stops, then using harmonics in low strings)
   2. **SPEEDY Tuning**: all woodwinds except clarinet & tenor sax tune to A;
      Clarinet, tenor sax & brass tune to concert F and Bb
   3. Flute - adjust the head joint for second-space A, then A above the staff; (never have students "roll-in' or "roll-out")
   4. Oboe - second-space A and A above the staff are the most stable pitches; the only tuning adjustments possible are made with the embouchure/amount of reed in the mouth, airstream, and reed scraping. ***Never** pull out a double reed to lower pitch.
   5. Clarinet - adjust barrel for open, second line G (concert F), mid joint for 3rd space C (concert Bb) or G on top of the staff; pull from bell if C or high G are still sharp.
   6. Bassoon – second space C and top-line A are the most stable pitches;
      ***Never** pull out a double reed or bocal to lower pitch. Instead, adjust from the bassoon bass joint (2-3 mm) or use a different length bocal if the instrument is consistently flat or sharp across the entire range.
   7. Saxophone – tune the mouthpiece with neck alone (Alto = Concert Ab; Tenor = E; Bari = D); tune the instrument using concert A (F# for alto/bari sax) or concert Bb
   8. French Horns – tune the Bb side **first** by engaging the thumb trigger (this will affect tuning on both the Bb & F sides). Play written third space C (concert F) & adjust the main tuning slide. Play this C again after it is in tune and continue to blow while releasing the trigger, noting whether the C on the F side of the horn is higher or lower. Adjust the F tuning slide until both Cs match.
   9. Brass – tune to Concert F and Bb because they are built on the Bb harmonic series.

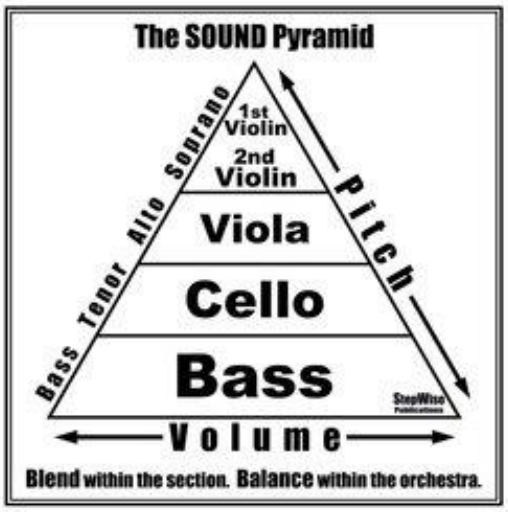
C. Tuning Chords
   1. When breaking down chords, <u>tune the most consonant intervals first</u>.
   2. Begin with the root pitch (regardless of inversion), including octave doublings. These pitches should "freeze" the dial in tune.
   3. Second, tune fifths slightly sharp (2 cents).
   4. Third, tune thirds slightly flat for Major chords (14 cents) or slightly sharp for Minor chords (16 cents).
   5. Finally, tune sevenths slightly flat for dom. 7 (31 cents) and M7 (12 cents).
      a) See Chart at the end of this handout for Chords of Just Intonation.

D. Tune the first and last chords of phrases.
   1. Reed instruments: loud dynamics tend toward flatness, while softer dynamics tend to be sharper (unless air support is weak).
   2. Flutes & Brass: loud dynamics tend toward sharpness, while softer dynamics tend to be flatter

E. Tune the melody against a drone of the root and the fifth.
F. Practice "Beatless" Tuning
   1. Have two students play the same note and listen for disturbances in the force (wavers in the pitch because of poor intonation).
   2. Adjust tuning until both are playing perfectly in unison, with no wavers in sound.
   3. Repeat this exercise with intervals and chords, increasing complexity as tuning improves.

G. Remember the Effects of Temperature on Instrument Tuning
   1. Heat causes instruments to play sharp, while cold causes instruments to play flat.
   2. Allow musicians and instruments to acclimate the temperature of the performance space before tuning if at all possible.

<u>Balancing chords</u>
- Tune intervals first (see above) before you adjust the balance.
- Major & Minor Chords: Strengthen the root and fifth, soften the third
- 7 Chords: Strengthen the root and fifth, soften the third and seventh
- Ensemble Balance
  - Acoustically, lower frequency sounds are harder to hear than higher frequency sounds.
  - Balance Pyramids:



- Ensemble Blend (Ed Lisk)
  - If you can hear yourself, play softer
  - If you can still hear yourself, adjust your intonation
  - If you can still hear yourself, adjust your tone

Considerations for Section Placement

A. What are your forces in each section?
B. What are the strengths and weaknesses within each section?
C. What stage equipment do you have available for altering the acoustics of the performance space (risers, shells, acoustic shields, clouds, curtains, etc.)?
D. How do the parts align musically in the repertoire (doublings, bass line, etc.)?
E. String Section placements:
   1. If you move second violins or violas to the right edge of the stage, their sound holes will be pointed to the back of the stage.
   2. Be careful not to allow cellists to angle their instruments to the back of the stage.
   3. Bassists should be placed so that they are not:
      a. on the edge of the stage (basses angled backwards),
      b. hidden in the curtains, or
      c. so close the cellos & violas in front of them that their sound is muffled.

F. Wind & Percussion Section Placements:
   1. Keep like-voicings together when working with beginning and intermediate groups.
   2. The section farthest from the podium will experience phasing/timing delays
   3. Be considerate of bell placement and the sounds projected into the hall – this can help or hurt the ensemble.
   4. Consider placing the timpani either:
      a. on the right side of the ensemble near the other bass voices, or
      b. on the left side of the ensemble in easy eye sight of the conductor & first chair bass.
   5. Get off the podium to:
      a. walk through & around the ensemble to listen more effectively.
      b. walk through the performance hall to hear intonation, balance, and blend issues.

Critical Building Blocks for Developing Precise Intonation

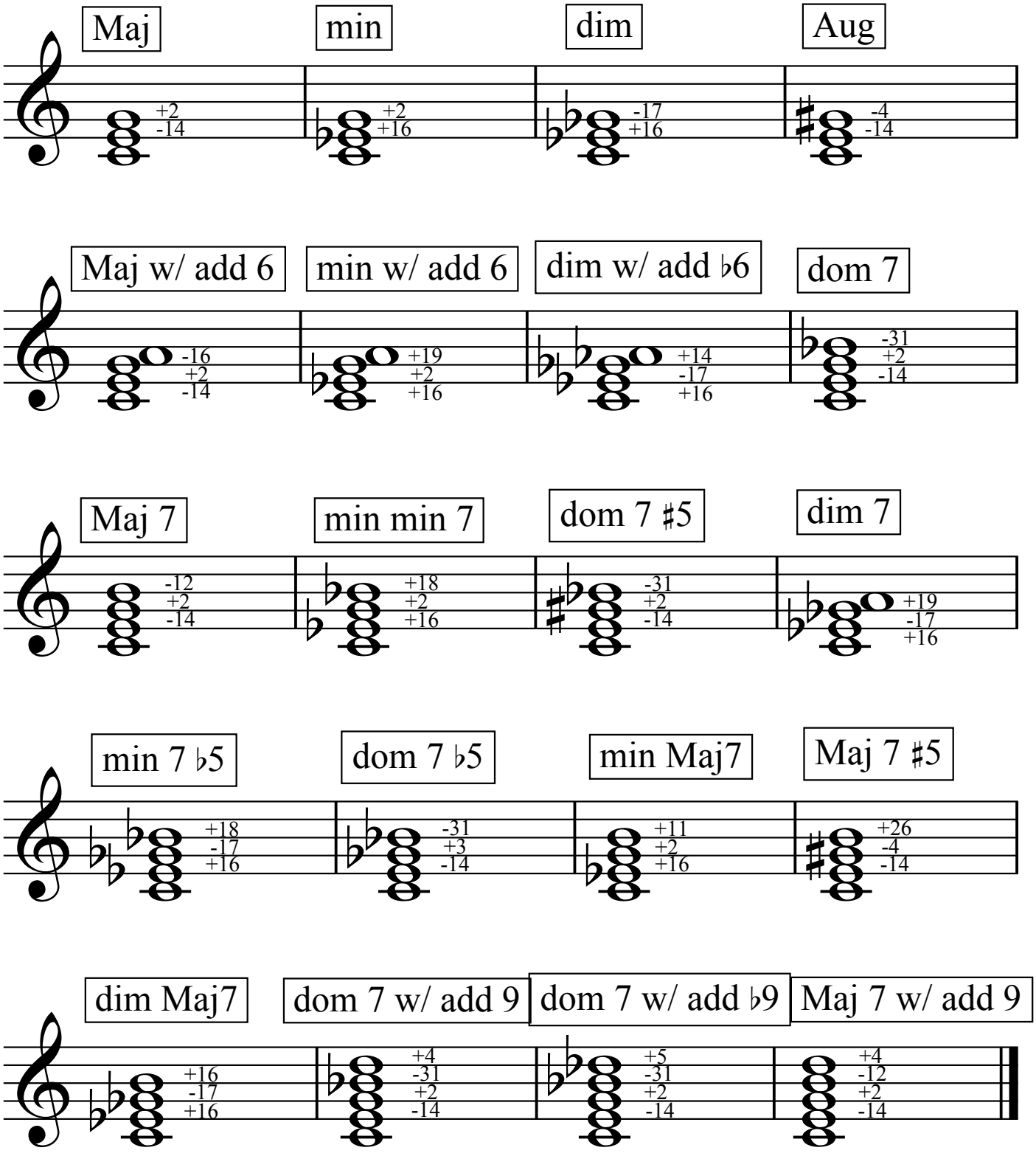
- Audiation
  - Internalization through simple pitch matching
  - Call & response melodies
  - Interval training
  - Scales with a drone and in rounds
- Singing
  - Tuning open strings with the voice
  - Vocalizing note names (singing on pitch)
  - Progressive part singing, beginning with (I-IV-V-I)
- Chord Building
  - Chord progressions & chorales (3 note, then 4 note chorales)
  - Break down repertoire into chords for practice
  - Part-singing
  - Independence through chamber ensemble collaborations

jmdakon@ku.edu
mplaceres@flsouthern.edu
williamsL001@uindy.edu

Chords of Just Intonation

All chords are based on root "C" which is "0" pitch.

+ or - is cents rounded to nearest whole number



Rewritten by Jeffrey Anderson