Fall 2009

Bringing Broadway Home: Organizing a Broadway Pit Orchestra in an Amateur Setting

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CHAPTER 1

Virtual Orchestra

What is Virtual Orchestra?

Virtual Orchestra, developed by Dr. David Smith, is a technology that simulates a live orchestra. Speakers of various shapes and sizes are placed throughout a theater (in the house and onstage), and each speaker represents an instrument in the "orchestra." To create the technology, instrumentalists recorded chromatic scales in different timbres. These pitches are then pieced together in a show's score, thus producing the sound of a full orchestra. A keyboardist controls the tempo at the behest of the conductor, but other elements, including phrasing, pitch, and dynamics, are set in rehearsal and remain throughout the performance.[1]

The Debate

Virtual Orchestra eliminates the need to hire, and therefore pay for, a full pit orchestra. One keyboardist is all that is required for it to work. It can also provide inexperienced actors with a sense of what it is like to perform with a live orchestra. According to Doborah Sandler, general director of the Kentucky Opera, in an interview with Shirley Fleming in the November/December 2003 issue of *American Record Guide*, "Orchestra contracts have become so cumbersome and complex and costly that it has become almost impossible to negotiate them. We are being strangled. We are being challenged now to think of new ways to approach the situation. The tail is wagging the dog."

However, on the other side of the debate, instrumentalists lose paying work. In addition, musical director David Chase suggests that human interaction, a crucial part

[1] Shirley Fleming, "The Virtual Orchestra," *American Record Guide* 66, no. 6 (Nov./Dec. 2003), http://proxy.lib.siu.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN

of musical theater, is lost:

> [Virtual Orchestra is] never going to replace the effect of people in a room interacting … you ask any actor what's the most exciting day, it's the day the actors go to where the orchestra is rehearsing. For the first time they hear the orchestra, and sing. People weep, laugh, scream for joy. Nobody ever hears it again like that because the orchestra gets pushed behind a wall, and we do everything to pretend the orchestra isn't there. When the music works, it's on a deep, deep level … the sense of musical theatre is collaboration: live musicians interacting with each other, the conductor, the actors, and the audience.[2]

Dr. Christopher Morehouse, director of bands and assistant professor at Southern

Illinois University Carbondale, in a recently conducted interview, argues,

> There is nothing that can compare to live, acoustic instruments. Synthesizers provide more variety of sounds and can often cover needed instrumental sounds, … but there are circumstances when Virtual Orchestra would sound better than simply a piano alone. Unfortunately, people have become lazy when trying to find musicians or the money necessary to hire the musicians to perform for a show. … unfortunately, popular and commercial music contains a lot of synthesized sounds, so audiences are used to and have come to expect a synthesized pit orchestra.

CHAPTER 2

Recreating a Broadway Pit Orchestra Sound

=11495437&site=ehost-live&scope=site (accessed November 23, 2009).

[2] Roger Armbrust, "Musical Director Questions Using 'Virtual Orchestra'." *Back Stage* 44, no. 5 (January 31, 2003). http://proxy.lib.siu.edu/login?url=http://search.ebscohost.com/login.aspx?

Finding Information

Resources on orchestration and arranging must be carefully selected, as many are not applicable for a pit orchestra. For instance, Philippe Oboussier's *Arranging Music for Young Players* may appear to be useful for one dealing with a high school production based on its title, but it focuses more on beginning players. The needs of a pit orchestra (smaller size/available space, instrumentation, volume, etc.) and the style of the music in a show, especially a contemporary production, must also be considered. René Leibowitz and Jan Maguire's *Thinking for Orchestra: Practical Exercises in Orchestration*, therefore, does not apply to this subject, as it discusses orchestration for more classically-oriented works, such as concerti and symphonies. One useful source is Gardner Read's *Orchestral Combinations: The Science and Art of Instrumental Tone-Color*. This book goes into detail on the sounds produced by many various combinations of instruments, gives listening examples to hear these combinations, and even includes an instrumental range guide.

Orchestration

Before beginning the process of arranging or instrumental substitution, one must figure out the "sound" of the show being done. Is it a more orchestral sound, as in *Oklahoma!*? Is it a show that is actually based on the use of synthesizers, as in *Aida*? Is it a rock 'n' roll show, like *Rent*? Once this decision is made, one can more ably proceed.

When showing instrumental ranges, the Helmholtz notation system will be used, and ranges given are the range of actual sounds. According to Dr. Christopher Morehouse, range is the primary concern, followed by tonal color, when finding instrumental substitutions, and this is given consideration when discussing each

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instrument's characteristics.

Woodwinds

Musical theater woodwind books are not classified by instrument; rather, they are classified by range. For example, in a show that uses four reed books, Reed I could be flute/piccolo, Reed IV could be bassoon, baritone saxophone, and bass clarinet, and the remaining books will contain clarinet, alto saxophone, oboe, etc. The instrumental division in the reed books of each show must be carefully considered when arranging. In older shows, such as those of Rodgers and Hammerstein, woodwind players will not have to frequently double, but this is a frequent occurrence in "jazz style" shows and more contemporary shows.[3]

Flute

Three types of flutes are typically found in a musical theater score: piccolo, flute, and alto flute. The piccolo is a C instrument, and it has a range of d''-c'''''. The bottom octave is rarely used. The second octave is "clear and bright," while the higher range is "more piercing." Due to its agility, it is employed mainly for melodic lines, and it usually doubles other woodwinds or strings.[4]

The flute is a C instrument, with a range of c'-d'''''. It can play a b with the proper extension. The bottom octave has a low volume, but the volume increases as the range gets higher. The flute is agile and versatile.[5] It is used for both melody lines and accompaniment in a pit orchestra. Because the characteristics of the flute in terms of tone color and ability are similar to that of the piccolo, the flute can be substituted for a piccolo. The flute will sound one or two octaves lower, depending on the range of the

[3] James Laster, *So You're the New Musical Director!: An Introduction to Conducting a Broadway Musical* (Lanham, Maryland, and London: The Scarecrow Press, Inc., 2001), 83.
[4] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 79-80.

part written for the piccolo.

The alto flute is a G instrument, with a range of g-g'''. The lush bottom octave is what this instrument is employed for. Playing in its upper range is unnecessary, as the flute can play those passages.[6] It is being used with increasing frequency in musical theater scores. With a proper extension and suitable amplification, either by microphone or thinned-out accompaniment, a flute can cover the alto flute part down to a b when the alto flute is unavailable.

Double Reeds

The oboe is a C instrument, with a range of b-flat-a'''. It has a "distinctive, somewhat nasal tone," making it ideal for solo passages but not for blended accompaniment. The extremes of the range should be avoided, as timbre and intonation issues arise.[7] In a situation where a good oboist is unavailable, a straight-muted trumpet provides a similar sound to that of an oboe. However, range for the oboe part must be considered, as the ranges of the oboe and trumpet are not similar. If proper range is more important than timbre, then instruments with a similar range can be used, such as the flute, clarinet, or soprano saxophone.[8]

The English horn is an F instrument, with a range of e-c'''. Its timbre and usage is comparable to that of an oboe. If an English horn is not available, an oboe can sometimes substitute, as long as the horn's part is transposed.[9] Otherwise, the clarinet and alto saxophone, due to their like ranges, are acceptable.[10]

The bassoon is a C instrument. Its lowest note is BB-flat. However, sources

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[5] Ibid., 76-77.
[6] Ibid., 81.
[7] Ibid., 82-84.
[8] Christopher Morehouse, interview by author, Carbondale, IL, November 18, 2009.
[9] Frederick W. Westphal, *Guide to Teaching Woodwinds* (California State University, Sacramento: Wm. C. Brown Publishers, 1990), 195-196.

disagree on its highest note. Kennan and Grantham's *The Technique of Orchestration* lists the highest pitch as e-flat'', while Westphal's *Guide to Teaching Woodwinds* says it is f''. Westphal also states that bassoon parts are written in bass, tenor, and treble clefs. So, a conductor may need to rewrite a part for someone who is playing it on another instrument if they are not proficient in reading in all of these clefs. The bassoon's lower register is full and rich, while the upper register is thin and chirpy. It has a low volume overall, and this should be taken into consideration when it functions as a melodic instrument. Yet, it usually reinforces the other lower-pitched instruments in the ensemble.[11] Therefore, according to Dr. Christopher Morehouse, other lower-pitched instruments make satisfactory replacements, such as the bass clarinet, tenor saxophone, baritone saxophone, and, depending on "range and technical requirements," the trombone and euphonium.

Clarinet

The most commonly called-for members of the clarinet family in musical theater are the B-flat clarinet and the bass clarinet. The A clarinet is used rarely in musical theater; it is seen more often in operetta.

The B-flat clarinet has a range of d-f'''.[12] The clarinet has four registers. The lowest octave, called the chalumeau, has a "dark, hollow quality." Next is the middle or "throat" range, with a "neutral quality." The clarion range, from about c''-c''' is "clear and bright." The high range becomes "more shrill." Compared to other woodwinds, it is "the most sensitive in the matter of dynamic range and control."[13]

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[10] Christopher Morehouse, interview by author, Carbondale, IL, November 18, 2009.
[11] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 97-98.
[12] Frederick W. Westphal, *Guide to Teaching Woodwinds* (California State University, Sacramento: Wm. C. Brown Publishers, 1990), 53.
[13] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ:

The bass clarinet is also a B-flat instrument. Kennan and Grantham disagree slightly with Westphal on its range; Kennan and Grantham say the range is D-flat-f", with pitches from D flat down to BB-flat possible on some bass clarinets, whereas Westphal claims the range is D-f". This wide range causes parts for it to be written in both treble and bass clefs. The upper register is rarely used, as this can be covered by other instruments. The bass clarinet is utilized instead for its dark lower register and can function as a member of the bass line or even as a solo instrument.[14] When it is not available, according to Dr. Christopher Morehouse, the bassoon and baritone saxophone with their like ranges are suitable substitutes.

Saxophone

The members of the saxophone family most called for are the alto saxophone, tenor saxophone, and baritone saxophone. The alto saxophone is an E-flat instrument, with a range of d-flat-a". Advanced players, with the help of a special key added to the instrument, can go as much as an octave higher in what is termed the *altissimo* register. The tenor saxophone is a B-flat instrument, with a range of A-flat-e"-flat. The baritone saxophone is an E-flat instrument, with a range of C-a'-flat. In general, saxophones have a wide array of colors at their disposal, and they are the strongest woodwinds in terms of dynamics.[15] Because of the wide range the family covers, they are able to substitute for just about any instrument.

Brass

Musical theater brass books are much more clear-cut than the woodwind books. Each instrument has its own book, and each player may have his/her own

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Prentice Hall, 1990), 90-91.

[14] Ibid., 94-95.

[15] Ibid., 339-340.

book (Trumpet I, Trombone II, etc.).[16] However, because of this division, it would be wise to know who is going to be available for the orchestra, as some brass players may need to cover other parts, as in the muted trumpet for the oboe mentioned earlier.

Trumpet/Cornet

The standard trumpet is a B-flat instrument, with a range of f-sharp-d'''. Notes higher than that are possible, but are used mainly in jazz. Other trumpets exist, such as the C or D trumpet, but, unless they are specifically called for, one can assume that a musical theater part is written for a B-flat trumpet. As with most instruments, its extreme ranges should be avoided due to intonation and "tone quality" issues. The cornet is also a B-flat instrument and has the same range as the trumpet. Both have a wide variety of tone colors to choose from thanks to the multitude of mutes available. For example, straight mutes provide a "nasal" tone, while a plunger can cause a "'doo-wah effect." The cornet has a more "mellow" tone than the trumpet.[17] Yet, everything else is the same, so they can easily be substituted for one another.

(French) Horn

The horn is an F instrument, with a range of BB-c''' (some sources differ on the lowest pitch, going as far as a half-step in either direction). This causes parts to be written in both bass and treble clefs. Although it has a wide range, the extremes of this range should be avoided due to volume and intonation issues. The horn has a tone that Kennan and Grantham in *The Technique of Orchestration* describe as "bright" and "brilliant." They also say that, while it is not an agile instrument, it can easily be used

[16] James Laster, *So You're the New Musical Director!: An Introduction to Conducting a Broadway Musical* (Lanham, Maryland, and London: The Scarecrow Press, Inc., 2001), 87.
[17] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 142-145.

as a solo instrument or member of the accompaniment or harmony. Horns, like trumpets, have many muting options, the most common one being the player's hand in the bell. For example, the player can create a "stopped" tone, one that is "nasal" and almost harsh in quality, by putting the hand so far into the bell that it almost cuts off the opening completely.[18] Due to this versatility, the horn part can be covered by any member of the saxophone or brass family, depending on the range and timbre desired.[19]

Trombone

The trombone, while built as a B-flat instrument, functions and sounds as a C instrument. Its range is E-f'', although the lower range can extend down to C with an F attachment. Its parts are written in both bass and tenor clefs. The slide makes it the only instrument that can do a true glissando. It has a grounded tone throughout its range, with the upper range being more bright. The trombone has the same mutes and therefore the same range of sounds as the trumpet.[20]

The bass trombone is a B-flat instrument, with a range of C-b'-flat. The lower range can be extended by various attachments. It usually plays bass line parts;[21] so, if one is unavailable, any other low brass instrument can substitute.

Euphonium

Dr. Christopher Morehouse states that the euphonium is a B-flat instrument, with the same range as the trombone. He also states that parts for it are written in bass clef, and it has a warm sound akin to that of the upper range of the tuba. Because of its range and sound, its part can either be covered by the trombone, bass

[18] Ibid., 126-134.
[19] Christopher Morehouse, interview by author, Carbondale, IL, November 18, 2009.
[20] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 147-151.

trombone, or tuba.

Tuba

The standard tuba is a BB-flat instrument, with a range of DD-f'. It cannot play parts that are too complex,[22] and a staccato articulation will sound longer on the tuba than on other instruments due to the amount of breath required. It typically plays bass lines, so any other instrument that does the same, such as string or electric bass, can cover its part.

Strings

The four members of the string family are violin, viola, cello, and double bass. They are all C instruments. While ranges are given for each, according to Kennan and Grantham, these ranges "may be extended upward by the use of harmonics." According to Dr. Christopher Morehouse, the order of importance of strings, from most to least, is

> double bass, violin, cello, viola, then second parts, i.e., second violin, etc. Double bass (or electric bass) is needed (required) for bass lines. Often this is the only bass instrument in the pit, rarely do you see tuba and or bass trombone. First violin and cello often perform needed melodic parts, while the second violin performs harmony and rhythmic parts. The viola fills out string voicings as the middle voice, with minimal melodic material.

All strings have the ability to produce different effects, such as pizzicato (a plucked, short sound) or tremolo (a trill-like sound). They can also play as many as four notes at a time, making full chords possible on single instruments. Because no other instrument can produce these effects, range is the only real concern when finding substitute instruments. If the strings' tone color and special abilities absolutely cannot be sacrificed, the parts can be combined into a single keyboard part set on the "strings" sound.

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[21] Ibid., 153-154.

The violin has a range of g-g"", and its part is written entirely in the treble clef.[23] The viola has a range of c-e"', and its part is written in both alto and treble clefs.[24] Instruments with a similar range to both include the flute, oboe, and clarinet.[25] The cello has a range of C-g", and its part can be written in the bass, tenor, or treble clefs.[26] Instruments with a similar range include the trombone and euphonium.[27] The double bass has a range of CC-d', with the lowest notes only possible with an extension on the fingerboard. It is written entirely in bass clef.[28] Instruments that typically play bass lines can cover its part, such as the tuba or electric bass.[29]

Plucked Instruments

Guitar

The guitar (acoustic, electric, and bass) is a C instrument, with a range that can vary based on how it is tuned. In pit orchestras, the acoustic and electric guitars are used mainly for accompanying chords and brief solos, especially in shows with a folk sound or rock 'n' roll-based shows. A piano can usually cover the chordal parts. Solos can either be given to another instrument or played on a guitar sound on a keyboard, but neither option is as effective as an actual guitar. If one does not have a guitarist

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[22] Ibid., 155-157.
[23] Ibid., 7.
[24] Ibid., 19.
[25] Christopher Morehouse, interview by author, Carbondale, IL, November 18, 2009.
[26] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 24.
[27] Christopher Morehouse, interview by author, Carbondale, IL, November 18, 2009.
[28] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 27.
[29] Christopher Morehouse, interview by author, Carbondale, IL, November 18, 2009.

available, this should be a serious consideration before choosing a rock 'n' roll, folk, or jazz-based show.

Harp

The harp is occasionally called for in musical theater scores, but it is often included in a list of sounds for a keyboard part. It has a range of CC-flat-g""-sharp,[30] and is used mainly for its tone color on arpeggiated chords.

Percussion

The main instruments called for in a musical theater score in the percussion family are snare drum, bass drum, cymbal, timpani, and xylophone/bells. Any number of auxiliary instruments can be included. The following table, from Mario Gaetano's "Percussion Instrument Substitution: A Practical Necessity" webpage, is extremely useful:

INSTRUMENT	**SUBSTITUTE**
anvil	brake drum, railroad tie, metal pipe
almglochen	suspended clay flower pots
Japanese cup gongs	suspended clay flower pots or Pyrex dishes
croatles or antique cymbals	bells, struck with a finger cymbal
agogo bells	two cowbells
waterphone	sus. cymbal bell-down on timpani. Play with mallets, move timpani pedal up and down. Also try triangle lightly touching timpani head.
bongos	high pitched tom-toms
tenor drum	low pitched snare drum without snares, or medium tom-tom
timbales	pair of snare drums
temple blocks	wood blocks with soft mallets
field drum	marching snare tuned low

[30] Kent Kennan and Donald Grantham, *The Technique of Orchestration* (Englewood Cliffs, NJ: Prentice Hall, 1990), 273.

ratchet	rapid strokes on rim of drum
sizzle cymbal	sus. cymbal with lightweight chain attached to top of stand and allowed to vibrate against cymbal
celesta	orch. bells with hard rubber mallets
chimes	vibes in low register
vibes	orch. bells in low register with soft mallets
xylophone	marimba one octave higher, use hard rubber mallets
marimba	xylophone one octave lower with yarn mallets
claves	xylophone, high "C" with plastic mallet or large share drum sticks, butts struck together
finger cymbals	triangle
log drums	low marimba notes, muted
suspended cymbal	hand cymbal held by strap
whip or slapstick	rimshot
sandpaper blocks	rub brush on snare drum head
thunder sheet	plastic drum head, shaken
conga	tenor drum with yarn mallet, muted with hand
castanets	sticks on rim, two in each hand
shaker	one maraca played like a shaker
shakere	hold a large bunch of maracas and shake
bull roarer	plastic tube swung in a circle overhead
roto-tom	small timpani
bell tree	gliss. on orch. bells with brass mallet
Indian tom-tom	concert tom-tom
Chinese tom-tom	concert tom-tom, muted
bom-bams	log drums

CHAPTER 3

Application

One's resources should be one of the top considerations when choosing a show. Resources include actors/actresses available, stage requirements, finances, the audience, and, last but never least, musicians available for a pit orchestra and the placement of and space for that orchestra. Unfortunately, in many amateur settings, the pit orchestra is the last consideration. This often leads to scrambling a few weeks or even days before the show opens. A hastily assembled orchestra, while possibly getting the notes and rhythms right, often does not do a show justice. Any element of a production that is not perfected to the best of the cast's, crew's, and musicians' ability creates an unfairly inferior experience for both those involved with the show and its audience.

Frank Loesser's *Guys and Dolls* premiered on Broadway in 1950. The music has a cool, jazzy feel reminiscent of that era. This requires access to a solid drummer and an adequate number of brass and saxophone players. A rental of the show for production from Music Theatre International (www.mtishows.com) contains the following books for orchestra:

Bass	Trumpet 1 and 2
Cello	Trumpet 3
Horn	Trombone
Violin A-C	Violin B-D

Percussion (including bells, bongo, chimes, clave, cowbell, scratcher, timpani, wood block)

Reed 1 (alto saxophone, clarinet, flute, piccolo)

Reed 2 (alto saxophone, clarinet, flute)

Reed 3 (clarinet, English horn, oboe, tenor saxophone)

Reed 4 (clarinet, tenor saxophone)

Reed 5 (baritone saxophone, bass clarinet)

Strings, auxiliary percussion, piccolo, English horn, oboe, and bass clarinet, assuming other instruments were secured before renting the materials, would likely be the hardest elements to obtain. Keeping transposition needs between instruments in mind, some substitutions can be made. The bass could be covered by an electric bass. If not, the strings as a whole can be combined into a keyboard part, either on piano or a "strings" setting. Another option involves using instruments already in the orchestra to cover the parts; flute and/or clarinet could cover some violin parts, and the trombone can cover some cello parts. A mute can soften the sound of the trombone to more closely resemble the tone quality of a cello. For auxiliary percussion, the chart above is very helpful. A scratcher refers to a guiro, and this can be mimicked by scraping a mallet or stick against any ridged surface. The piccolo part is not necessary here, but it can be played by the flute in a lower octave. A muted trumpet, depending on range, can play the English horn and oboe parts. The English horn and oboe are usually only used for melodic passages, which makes it easier for the Trumpet 2 or Trumpet 3 player to deal with the parts. As stated earlier, the baritone saxophone and bass clarinet are interchangeable in terms of range, so, with necessary transposition, the baritone saxophone can play the entire Reed 5 book. These substitutions maintain the sound with minimal electronic use and provide an avenue for saving money for the financially-burdened amateur theater.

Conclusion

While synthesizers and products like Virtual Orchestra have their justifiable uses in musical theater, they should not be used frequently or as automatic fall-backs. Musical theater is built on collaboration and human interaction; taking away a large element of that interaction lessens its effect. With a little time, effort, and ingenuity, money can be saved, musicians can have paying work, and everyone involved in the collaboration of a production can feel its magic.

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