

Instrument Design in Selected Works for Solo Multiple Percussion

by

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ABSTRACT

Instrument design is intrinsic to multiple percussion solo performance preparation, from formulating a physical layout of instruments that best suit each work's technical requirements to fabricating unique instruments to fulfill each composer's sonic specifications. Several works in the multiple percussion repertoire require setups comprised partly or entirely of performer-built instruments. Given that performers have varying degrees of expertise with instrument design and construction, the specialized instruments created do not necessarily meet the level of care with which many of the masterworks in the percussion field were created. Even with the many articles, books, and other publications regarding the instrument design issues of specific works, solo percussion literature is so varied that many set-ups are created using a set of nebulous guidelines. Developing solutions to the problems inherent in multiple percussion instrument design is clearly a continuing effort.

Instrument and setup design within selected works for solo multiple percussion is the focus of this document and will be addressed through specific examples from literature commonly performed on concert stages and educational institutions. The scope of this document is limited to the widely applicable design issues of three pieces: Maki Ishii's *Thirteen Drums: for Percussion Solo, Op. 66* (1985), David Lang's *The Anvil The Chorus: for Percussion Solo* (1991), and Steve Reich's *Music for Pieces of Wood: for claves* (1973). The set-up designs for these pieces suggested by the author are largely the focus for which other material in this document is preparatory.

Dedicated to my wife, Elyse.

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Preface

As a gift for completing undergraduate studies in percussion performance at Eastern Washington University, the director of percussion studies, Martin Zyskowski, gave me a pair of timpani mallets given to him by his teacher at the University of Michigan, Charles Owen. I treasure these mallets because of their connection to two great percussionists, and for their specific characteristics. These slightly miss-matched wood mallets were obviously hand made, probably turned by Mr. Owen or someone close to him, and used for Philadelphia Orchestra performances of Stravinsky's *The Rite of Spring* and Berlioz's *Symphony Fantastique*. Whether or not these mallets were made due to a simple lack of commercial options in 1971 when they were gifted, the fact remains that they were hand made.

Crafting instruments and mallets is all but a lost part of the contemporary percussionist's art. In a time abundant with percussion retailers, instrument and mallet making is logically not as common as it once was. I started making percussion instruments as a curiosity, and to curb costs on simply made yet expensive instruments. I began by rewrapping frayed marimba mallets, progressed to making gong and bass drum mallets, and then developed my woodworking skills to make wood blocks, claves, and drums shells. I also found that many works for solo percussion call for skilled customization of instruments or instrument configurations. What started as a way to save money turned into a necessary skill and a means of creating distinctly personal sounds.

Chapter 1

INTRODUCTION

Purpose of Study

More than any other instrumentalist, percussionists are faced with the challenge of creating instrument set-ups for different performance situations. Considering the many pieces that require special fabrication or design considerations, multiple percussion music is perhaps the most demanding area of percussion literature in respect to instrument choice. Instrument design is intrinsic to multiple percussion solo performance preparation, from formulating a physical layout of instruments that best suit each work's technical requirements to fabricating unique instruments to fulfill each composer's sonic specifications. A less experienced performer may choose to prepare a piece because of its compositional interest, only to realize later that set-up issues frustrate practice and may force the player to abandon preparation altogether. Even in view of the many articles, books, and other publications regarding the set-up issues of specific works, many multiple percussion set-ups are simply based on a performer's previous experience and a set of nebulous guidelines. Developing solutions to the problems inherent in multiple percussion set-ups is clearly a continuing effort.

In works for solo percussion, realization of the score is intimately joined to a performer's set-up design. In essence and by definition, a multiple percussion set-up is an instrument arranged out of other instruments. The most well known of these is the drum set: fashioned out of a snare drum, bass drum, cymbals, and other instruments. However, unlike the contemporary hardware-laden drum set,

no standardized system of hardware can accommodate the variety of instruments used in multiple percussion set-ups. The liberation of sound that began in the 20th century, and subsequent growth in numbers and variety in the percussion instrument family, also led to a liberation of percussion instrument set-up. Issues surrounding instrument variety and means of performance execution are therefore some of the main reasons for the ideas presented in this document.

All instruments require some preparatory thought or construction before an execution of sound can take place. For the most part, common string and wind instruments are constructed with sound execution in mind: they are held with the hands and are bowed, plucked, or wind is blown through a mouthpiece. For percussionists this could mean using trap tables, racks, clamps, instrument stands, or anything else that allows sound execution of instruments that don't share a similar playing means. When these means are of poor quality – which is a widespread problem among young players – trust in the set-up is diverted to a focus in nonmusical worries: unsecured instruments, audience distraction, extraneous noise, or memory errors. Simone Mancuso, recognized multiple percussionist and selected performer of Karlheinz Stockhausen's works for percussion, spoke of trust in one's set-up:

When walking out on stage to perform, you don't want anything to think about except for the music. You have to trust that your set-up won't cheat you. When you have to stop to think if the wood block is moving, you have lost trust in your instruments and will have a poor performance...A percussionist may have one tom tom this way and another that way, and for some reason they don't mind. A piano builder makes the instrument perfect. Percussionists should do the same.¹

¹ Conversation with the author, (February 15, 2012).

Educating young players to create trustworthy multiple percussion set-ups is another purpose of this study, as most players are less-experienced students.

Performers of percussion music are rightly expected to accommodate instrumentation requested by composers. Robin Engelman, founding member of Nexus and member of the Percussive Arts Society Hall of Fame, said, “Good percussionists need to be good orchestrators of percussion”.² This assumed rule applies to virtually every circumstance, however peculiar. It is not unusual for a percussionist to go through long processes of gathering or making instruments to meet a composer’s needs, only to find out after hours of building and practice that the sound is undesirable or the combination of instruments is very hard to play. This challenge is unique to multiple percussion performance, as issues of note accuracy and technique often overshadow instrument choice in timpani and mallet keyboard music.

Procuring good instruments and logical set-up should be more obvious challenges to resolve, especially when considering that practice is impossible until the set-up is addressed. Diverting more focus to instrument choice and set-up also becomes more important when considering the many pieces for percussion with titles at least indirectly referring to the instruments on which they are played, including the main pieces discussed later in chapters 3 through 5. The aspects of instrument design within works for solo multiple percussion are the main focus of this document and will be addressed through specific set-up examples of commonly performed pieces.

² Robin Engelman, “Percussionists in the West: Coping with Change,” *Contemporary Music Review*, Vol 7, part 1 (1992): 5-13.

Scope and Limitations of Study

Set-up and fabrication are two separate yet intimately related skills within multiple percussion instrumentation. For this reason, the word “design” is incorporated into the title of this document, rather than “set-up” or “fabrication”. Rather than guide percussion instrument makers in fabrication, this document will serve as a reference in instrument choice and manipulation. Because each performer has different physical characteristics, sonic tastes, and the over-all desired aesthetic effect, each performer’s set-up will be different. These differences are fostered in the contemporary percussion music vein, but they have boundaries based on instrument design skills and suitability within the context of a piece. Furthermore, instrumentation decisions will undoubtedly manifest in personal musical interpretation. Although interpretation of pieces is related to instrumentation, this relationship is subject to further research and will only be touched upon briefly.

Attempting to establish a list of universal rules for multiple percussion set-up design would yield results applicable to only some pieces. Likewise, considering the vast number and wide variety of pieces composed for solo multiple percussion, it would be impractical to discuss the instrument design specifics for all of them. Although some general rules are accepted, each piece requires its own set of implicit considerations for set-up. Therefore, the scope of this document is limited to the widely applicable design issues of three pieces: David Lang’s *The Anvil The Chorus: for Percussion Solo* (1991), Maki Ishii’s *Thirteen Drums: for Percussion Solo, Op. 66* (1985), and Steve Reich’s *Music for*

Pieces of Wood: for claves (1973). The set-up designs added by the author in chapters 3 through 5 are largely the focus for which all previous material in this document is preparatory.

As included on the title pages of *The Anvil Chorus* and *Thirteen Drums*, the terms “percussion” or “percussion solo” refer to those pieces within the multiple percussion classification. These terms can also refer to all instruments included in the percussion family, such as marimba, timpani, drum set, and other instruments that are often played in solo settings. For clarification in this document the terms “percussion”, meaning the instrument group as a whole, and “multiple percussion”, meaning multiple-instrument set-ups played by one performer, will go by their typical respective meanings.

Woodworking

Although a percussionist may have no desire to fabricate instruments, a general knowledge of wood species can be helpful in choosing an instrument for a specific sound. Although typically less desirable for musical instruments, softwood is an economic and practical choice for a novice woodworker with less experience in more obstinate hardwoods. Vibrant hardwood will produce high quality instruments, and endure physical strain and varying weather conditions, but is challenging to work with if only hand tools are available. Some study of the many wood species’ characteristics will be necessary for any amount of quality woodworking.

Throughout this document, various woodworking instructions and power tool practices elucidate different instrument fabrication and set-up designs. Using

the right tool will be invaluable to an instrument maker's precision and effective time use. Anyone interested in using a power tool should read the associated manual provided by the manufacturer. In addition to giving information on the proper use of a power tool, these manuals give vital safety precautions. In addition, woodworking should be void of any safety doubts. Many commonly used wood working tools are deceptively powerful and alternative means should be sought if a practice does not seem under control or safe.

Chapter 2

HISTORICAL BACKGROUND OF SOLO

MULTIPLE PERCUSSION INSTRUMENTATION

Early Concert Percussion and Sound Effects

Instrument variety is perhaps at the root of the challenge in designing a multiple percussion sound palette or set-up. A string player would likely use one instrument for an entire recital, and would even be breaking protocol if a performance included instrument changes. Contrariwise, a solo percussion recital would be unconventional if it was void of instrument changes or at least one multi-instrument set-up. Over several centuries of development, the percussion instrument family has taken shape, drawing instruments from many countries and music styles. Further development is due in part to the precedent set by percussionists and sound effects artists in early stage and film productions who portrayed a very wide spectrum of sound. A further examination of the many roles of early percussion instruments in western classical music and stage productions will help lead to a deeper understanding of the variety within the instrument family and how it is used as a medium for contemporary solo music. The following is a very brief look at the growth of the instrument family through select and pertinent historic periods.

On the concert stage, percussion instruments often provide sound effects to musical sequences. To meet the needed variety of sound effects, the concert percussion section developed from a small number of more standard instruments, to include an array of sound effects instruments including the whip crack, thunder

sheet, marching machine, lion's roar, horns, whistles, and many others. One of the first sound effects was "Harlequin's stick" from 16th century Italian *Commedia dell'Arte*. Arlecchino, or Harlequin, one of the few stock characters on which these plays were based, typically carried a split wooden stick, which when swatted across another character produced a loud, comedic sound.³ Today we call this instrument a whip or slapstick. Later in theater history, playwright John Dennis invented a new method for providing thunder for his 1709 play, *Appius and Virginia*, suspending a large copper sheet by wires and affixing a handle to one end.⁴ An effects worker would give a vigorous shake to the handle whenever the sound was needed. Other producers started borrowing Dennis' successful thunder sound effect. More innovators followed this trend, providing many other instruments now found in the percussion instrument family.

The bass drum, cymbals, triangle, and kettledrums of the orchestral percussion section are descendants of fourteenth-century Janissary band instruments of the Turkish military. The loud effects of these instruments struck fear in enemy armies and encouraged the soldiers of Turkish forces. European composers later selected from these exotic instruments to join opera and symphonic pieces, often orchestrated as "alla Turca", or "banda Turca".⁵ A very few notable examples are Nicolaus Strungk's opera *Ester* (1680), Mozart's opera

³ David Madden, "Harlequin's Stick, Charlie's Cane," *Film Quarterly* 22, no. 1 (Autumn 1968): 10-26. <http://jstor.org.ezproxy1.lib.asu.edu/> (accessed 10 November 2009).

⁴ Ray Brunelle, "The Art of Sound Effects," *Experimental Music Instruments* 12, no. 1 (September 1996): 8-13, <http://iimp.chadwyck.com.ezproxy1.lib.asu.edu/> (accessed 9 October 2009).

⁵ James L. Moore, "How Turkish Janizary Band Music Started Our Modern Percussion Section," *Percussive Notes* (September 1965): 12.

Abduction from the Seraglio (1782), and Beethoven's *The Ruins of Athens* (1811) and the final movement from the *Ninth Symphony* (1824).⁶ Many composers continued adding various cymbals, gongs, drums and other foreign instruments to add exoticism to orchestral scores.

While Janissary instruments increased in popularity, composers scored for more percussion instruments to create various sound effects. Most were of a representative nature: Marin Marais scored for a snare drum roll to accompany a raging tempest in his opera, *Alcyone* (1706), this being the first use of snare drum in an operatic or orchestral setting; J S Bach scored for timpani to typify the sound of thunder in his cantata *Der Zufriedengestellte Aolus* (1725); A tam-tam stroke simulates the splash of an anchor in the first movement of Wagner's *The Flying Dutchman* (1843).⁷ These are only a few of the numerous examples of sound effects in orchestral scoring, but they show how early percussion section instrumentation began to diversify.

Another important aspect of sound effects in the progression towards solo multiple percussion compositions is the efficiency capable by one percussionist. Near the turn of the 20th century, silent films, which were typically accompanied by a keyboard player and a sound effects worker, grew in popularity. The Hawkes and Son Moving Picture Sound Effects Company (c. 1914) was one of many that produced effects including, but certainly not limited to: anvil, baby cry, bear

⁶ Blades, James Blades, *Percussion Instruments and Their History* (London: Faber and Faber, 1984), 267.

⁷ *Ibid.*, 295.

growl, syren whistle, dog bark, fog horn, and hen cackle.⁸ More related to the development of multiple percussion set-ups, Hawkes and Son also produced the “Trap Drum Combination,” consisting of a bench-side contraption, or “trap set,” combining bass drum, cymbal, and triangle into one foot-pedal driven instrument.⁹ Vaudeville, ragtime, and theatre drummers used trap sets in essentially the same way a jazz drummer would in years to come: accompanying the music by adding punctuation, sound effects, and rhythmic stability. The invention of the trap set allowed theaters with a smaller budget to provide effects, but only employ one sound effects worker who was often a drummer or percussionist.

Early Multiple Percussion Repertoire

During the advancements in audio recording and playback technology for movies, the use of sound effects operators declined. The concurrent liberation of timbre bolstered percussion use in concert music and gave composers freedom to explore percussive arts in new ways. Pieces like Stravinsky’s *L’Histoire du Soldat* (1918), Walton’s *Façade* (1922), and Milhaud’s *La Création Du Monde* (1923), although not solo percussion works, are good examples of multiple percussion set-ups containing percussion instrument configurations very similar to the drum set. The drum set was common at the time, and therefore a natural, albeit innovative percussion instrumentation choice in chamber orchestras. *L’Histoire du Soldat*, *Façade*, *La Création Du Monde* would later influence instrumentation

⁸ Stephen Bottomore, “An International Survey of Sound Effects in Early Cinema,” *Film History* 11, no. 4 (June, 1999), <http://fiaf.chadwyck.com.ezproxy1.lib.asu.edu/> (accessed 11 October 2009).

⁹ *Ibid.*, 487.

in solo percussion pieces, and even provide inspiration for solo works. Shortly after these pieces, Milhaud, in his *Concerto for Percussion* (1930), and Bartok, in *Sonata for 2 Pianos and Percussion* (1937), similarly consolidated the instruments of an entire percussion section into one part. These pieces bridged the gap between the drum set set-up and the modern multiple percussion set-up: the set-ups were physically larger the instruments included were of a wider variety.

In the late 1930s to 1940s, sound exploration brought on by the percussion ensemble works of John Cage and Lou Harrison advanced toward a solo multiple percussion classification. Later, Cage was the first to compose a piece for what could be included in the classification of multiple percussion solo: *27'10. 554" for a Percussionist* (1956). Classifications of metal, wood, skin, and others make up the indicated non-determinate instrumentation. Additionally, the solo may be played in whole or in part, or as a conglomerate of simultaneous pieces. Pre-recorded tape may also be used to assist in the performance. Three years later, Karlheinz Stockhausen contributed the first piece of its kind to mandate a specific set of instruments and to require the performer to treat this assemblage as one large instrument: *Zyklus* for marimba, vibraphone, 4 toms, snare drum, guiro, 2 African log drums, 2 suspended cymbals, hi-hat, 4 almglocken, a suspended "bunch of bells", at least 2 high pitched triangles, gong, and tam-tam.

The subsequent development of unfixed instrumentation complemented the tremendous progress in solo multiple percussion literature. Morton Feldman's *The King of Denmark* (1964), Iannis Xenakis' *Psappha* (1975), Brian Ferneyhough's *Bone Alphabet* (1991), and David Lang's *The Anvil Chorus* (1991)

are a few examples of works with either categorized or non-determinate instrumentation. Also, departing the precedent left by Stockhausen in *Zyklus*, these composers offer no set-up description or diagram. Feldman, Xenakis, Ferneyhough, Lang, and a multitude of other composers made it clear that careful instrument choice and set-up are matters that concern the performer. Given the complexity of these compositions, formulating a physical layout of instruments that best suit each work's technical requirements demands serious study on the performer's part.

Instrument Innovators

Since the origins of instrumental music, instrument design, construction, and innovation have been continuing practices. One clear example of instrument innovation within the percussion instrument group is the progression of various timpani tuning mechanisms. As technology has advanced and instrumentation options have broadened, the search for new sounds has inspired further invention in the form of new instruments. A number of composers and inventors have developed new percussion instruments that are as much an artistic creation as their compositions. Although not specifically designed for solo multiple percussion compositions, these new instruments increase the awareness of possibilities within the percussion sound spectrum and embody the innovation necessary to create compelling multiple percussion set-ups. Regardless of the general proliferation of the following designers' instruments, their contributions have furthered experimentation and exemplified creativity. The following is a

brief look at some of the noteworthy percussion instrument innovators from recent history.



Figure 2.1 Cristal Baschet¹⁰

The Cristal Baschet by Bernard and François Baschet (b. 1917 and 1920): The Baschet Brothers have built many sculpture-like musical instruments of steel, aluminum, and glass. Several of their instruments incorporate large conical plastic and sheet metal resonators, including perhaps their most well known instrument, the Cristal or Cristal Baschet. The Cristal is a 4-octave chromatically tuned friction instrument, played by rubbing wet fingers against glass rods that in turn excite tuned steel rods into vibration.

¹⁰ Bernard and François Baschet, Jpeg file: *Cristal Baschet*, www.soniccouture.com (accessed March 5, 2012).



Figure 2.2 Clay marimba¹¹

The Clay Marimba by Ward Hartenstein (b. 1954): Having noticed the musical instrument possibilities in clay as a ceramics artist, Mr. Hartenstein began creating visually and sonically unique instruments of all sorts. Clay is a centuries-old medium for arts of all kinds, yet has been curiously neglected in western musical instrument design. Of Mr. Hartenstein's clay instruments, perhaps the most noteworthy is the clay marimba, a 3 octave pentatonic instrument with clay bars and wide base that acts as one large resonator. Inexperienced instrument builders could find success in building a similar instrument for application in pieces without strict tuning.

The Diamond Marimba, Cloud Chamber Bowls, and Boo II by Harry Partch (1901-1974): Harry Partch was an iconoclastic musician infatuated with the microtonal tuning system. He built instruments capable of playing within the tuning system he describes in his book, *Genesis of a Music* (1974). Partch's

¹¹ Ward Hartenstein, Jpg file: *Clay marimba*, www.ninestones.com/frommudtomusic/about.html, (accessed March 10, 2012).

designed his instruments specifically for his compositions. *Delusion of the Fury*, a 75-minute work including music, dance, and mime, is perhaps his most prolific piece. Orchestration includes instruments self-made by Partch between 1946 and 1965: the Diamond Marimba, Cloud Chamber Bowls, and Boo II (figures 2.3 and 2.4).



Figure 2.3 Diamond Marimba¹²

¹² Harry Partch, Jpg file: *Partch Diamond Marimba*, www.bradfordblackburn.com (accessed February 10, 2012).



Figure 2.4. Cloud Chamber Bells and Boo II¹³

¹³ Ibid, Jpg files: *Boo II* and *Cloud Chamber Bells*, www.harrypartch.com (accessed February 10, 2012).



Figure 2.5 The Aluphone¹⁴

The Aluphone by Kai Stensgaard (b. 1954): The aluphone is an aluminum keyboard-based instrument. Although it holds its own distinct characteristics, the aluphone is similar in appearance and sound to a vibraphone. In lieu of graduated bars with resonators, sound is produced via small, cone-shaped aluminum bells. Individual bells or small groups of bells can be arranged in different configurations depending on their application. The instrument is endorsed by percussionist, Evelyn Glennie, and was recently featured as a part of her performance in the opening ceremonies of the 2012 London Olympic Games.

¹⁴ Kai Stensgaard, Jpg files: *Stensgaard Standard*, www.aluphone.com (accessed May 2, 2012)

Chapter 3

The following three chapters explain the set-up design issues of three works performed by the author at various doctoral recitals. Dates and locations of performances precede each respective chapter.

ANVIL CHORUS

Performed on February 6, 2010 in Katzin Concert Hall, Arizona State University Music Building.

Standard Set-up Options

Since its premier by Steve Schick in 1991, David Lang's *Anvil Chorus* has become a staple fixture in the literature for solo percussion. Of the three pieces central to this study, *Anvil Chorus* has a set-up most typical to works for multiple percussion: a mix and match of various instruments to be played with sticks or mallets, and possibly one or more foot-pedal instrument. As stated above, creating a list of universal governing rules would frustrate set-up design. However, certain principles apply to many pieces that can help in logical set-up and in the note-learning process. Many of these principles are applicable to *Anvil Chorus* and can be found in Nick Petrella's publication, *The Multiple Percussion Book* (2000). Petrella suggests several general set-up aids, the first of which is "instrument duplication". In larger set-ups, as long as timbres are cohesive, placing a duplicate instrument in another location in the set-up can relieve an awkward reach. For large set-up consistency, especially with numerous pieces of hardware, "spiking" stands and instruments and photographing set-ups can help also. "Spiking" a set-up is to mark the stage floor, a portable rug, or the instruments themselves with

tape to represent hardware or instrument placement if the instruments are moved or temporarily stowed. Various principles like these will be included in this chapter as they relate to respective set-up considerations in *Anvil Chorus*.

Instrumentation in *Anvil Chorus* is simply categorized into groups, with the performer choosing specific instruments to represent those groups. Lang uses only brief descriptors to dictate these categories: 3 resonant metals, 4 non-resonant metals, 4 foot pedal-operated non-resonant metals, 1 foot pedal-operated bass drum, and 2 woodblocks.¹⁵ Although instrumentation is non-determinate, certain instruments have become typical by performers: metal pipes, containers, or bars for resonant metals; brake drums, or metal plates for non-resonant metals; Chinese opera gongs or a mixture of small “junk-yard” instruments for foot pedal-operated non-resonant metals; a drum set-sized bass drum for foot pedal-operated bass drum; and woodblocks of a variety of shapes and sizes. It is of note that in the score, Lang suggests the use of chime hammers in the measure 1 superscript. Although most players opt for a less cumbersome mallet, chime hammers or ball-peen hammers could be fitting when coupled with a responsive instrument configuration.

The terms “resonant” and “non-resonant” may be subject to slightly different interpretation than usual. In *The Percussionist’s Art*, Schick explains how he and Lang came to an understanding about the meaning of these terms during initial conversations about “Anvil Chorus”:

The score asks for resonant, semiresonant, and nonresonant metals, but I believe that resonance—in other words the length and nature of the decay of the

¹⁵ David Lang, *The Anvil Chorus for percussion solo* (NY: Red Poppy, 1991), 1.

instruments—was not precisely what David wished to specify. It is more accurate to say that he wanted to control the length of notes in combination with the relative sense of pitch of the instruments. By resonant, he means both sustaining instruments but also instruments of clearer and more appreciable pitch. By nonresonant he means dryer, but also noiser, junkier, and more jarring sounds.¹⁶

Schick also gives his own instrument choices within these groups, which is not far from what most players use. For resonant metals he uses three steel pipes, much like those suggested later in this chapter. For the non-resonant instruments, or what he actually refers to as “semi-resonant” – again, from conversations with the composer, Schick has a personal interpretation of instrument categories – he uses brake drums or bars from a sixxen.

Brake drums are commonly used and easily found in auto salvage yards, but the sixxen is a performer-fabricated instrument, unavailable commercially. More information will be given on the sixxen later in this chapter. For the foot operated non-resonant instruments, Schick employs tam-tams and cowbells. He actually calls this category the “junk” group, implying their contraption-like, clanging, non-resonant nature. In clarifying his instrument choice, Schick says, “I try to make the tam-tams imitate the flat noise of the cowbells at a lower pitch by taping each of the tam-tams firmly to the heads of two bass drums. I can then easily play them with bass drum pedals that are attached, as usual, to the hoops of the bass drums”.¹⁷

Many other percussionists have used Schick’s method, such as Norwegian percussionist and blogger, Anders Kristiansen, whose set-up is relatively close to

¹⁶ Steven Schick, *The Percussionist’s Art: Same Bed, Different Dreams* (Rochester, NY: University of Rochester Press, 2006), 31.

¹⁷ *Ibid.*, 30.

common *Anvil Chorus* configuration. Any piece that includes five pedals into one set-up is a clear challenge, especially if the performer is to stand while playing. Kristiansen's solution to spacious or awkward pedal placement actually involves adding more pedals to the set-up. Two slave pedals are used for the tam-tams, hence seven pedals instead of five. Using slave pedals is a common resolution to problems with reach and relieves awkward teetering due to foot pedal placement. Unfortunately, one solution may present other problems: it would be challenging to find enough pedals to consistently rehearse the piece, and dividing all other pedals around a centralized bass drum pedal would frustrate sections with recurring notes on bass drum amid varying notes on other pedals (figure 3.1). An awkward dance back and forth would likely result.



Figure 3.1 Kristiansen Anvil Chorus set-up¹⁸

Many other instrument configurations are possible and have been successfully used. The rhythmically simple opening figure of *Anvil Chorus* may be misleading and later problematic for those who decide to use larger

¹⁸ Anders Kristiansen, jpeg file "The Anvil Chorus"
<http://anderskristiansen.wordpress.com/2008/08/> (accessed March 2, 2012)

instruments. A temptation to use something as large as propane tanks will surely lead to difficulties later: subsequent sixteenth-note passages without rests or pauses between resonant metals and woodblocks will be nearly impossible to play at the suggested performance tempo. As with all multiple percussion set-ups, the entire score should be consulted before a final configuration is decided.

Further Options

Again, much of the difficulty in set-up for *Anvil Chorus* is centered on the non-resonant metal foot pedal instruments. Therefore, much of the remainder of this chapter will focus around the fabrication and design of a compact yet effective configuration of that instrument group. First, some explanation of the mallet-played instruments is necessary. As mentioned above, sixxen bars are one of the options that Schick prefers for the resonant metal group. Although this option is unusual, it is worth pursuing if the bars are made out of aluminum – a softer, more workable, and more vibrant metal than many others – as Brett Reed suggests in his June, 2003 *Percussive Notes* article, “Building a Set of Sixxen”. In Iannis Xenakis’ work for percussion ensemble, *Pleiades* (1978), Xenakis requires the performers to construct the set of sixxen to be played in the piece. The large, metal-barred mallet keyboard instrument takes its name from the number of instruments required in *Pleiades* (six), and the first three letters of Xenakis’ last name (xen). The non-diatonically tuned sixxen bars could be singly produced and tuned to meet the needs of the 4 notes required in *Anvil Chorus*.

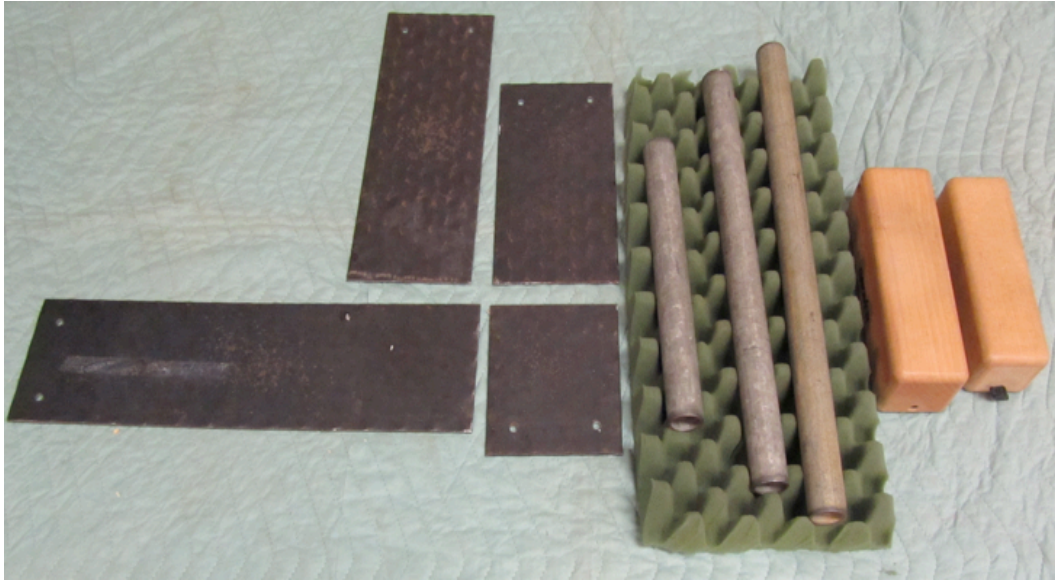


Figure 3.2. Resonant metal, non-resonant metal, and woodblocks¹⁹

As in figure 3.2, arranging the resonant metals and woodblocks in close proximity and similar height will insure a clean execution of sections with continuous notes back and forth between the two groups. Elevating the resonant metals enough to be horizontally even with the woodblocks eliminates problematic height discrepancies in playing surfaces. Corrugated foam padding is a suitable base material for many reasons: it is thick enough to elevate the pipes to meet the height of the woodblocks, the spongy nature of the foam allows the pipes to resonate more freely than a rigid surface, and the peaks and valleys space the pipes properly from one another. Arranging the pipes side to side makes lateral movement with the wrists and forearms physically easier and less jarring to the rest of the body than forward and backward arm movement.

Cylindrical steel pipe lengths work well in the resonant metal category. They produce a clear, sustained pitch when struck and are impervious to virtually

¹⁹ Image property of the author.

any beater. Corrugated foam or any soft material with adhesive works well in both keeping the pipe stationary and eliminating any contact sound with the trap table. The pipe will sustain best when supported by the nodal points, much like any other mallet keyboard instrument. This may actually produce too much resonance, in which case the performer may need to experiment with placement and dampening. Otherwise, simply resting the pipe directly on corrugated foam will provide enough support to keep it stationary while permitting sustain. Another issue with cylindrical pipe is the rebound deflection of the mallet head as it contacts the round surface of the pipe. Anything but a perfectly placed stroke will likely deflect the mallet-head toward one of the other pipes. A pipe with a larger diameter, such as 1½-inch or greater, will provide a playing surface suitable for this set-up. Although performing the piece with a smaller diameter pipe is certainly possible and appropriate, this added playing surface greatly improves the likelihood of note accuracy.

Figure 3.2 also shows ⅛-inch thick steel plates for the instruments representing non-resonant metals. This musically brash plating is common in industrial application, yet works well in *Anvil Chorus* to balance the clarity of the cylindrical pipe. For space economy on the table, and in order to arrange the plates in closest proximity to each other, a square design can be effective. The weight of these plates will keep them relatively close together on the playing surface, but some sort of adhesive will be necessary to eliminate movement of the plates as they are struck. Because these are naturally less resonant than other metal instruments in the set-up, the performer may choose to elevate these plates

at least partially off of the table for added clarity between the different pitches. Foam padded tape will work well to elevate the plates off of the table surface while adding a securing adhesive. Whatever instruments are chosen for the non-resonant metal group, the performer should keep in mind that these will be played at a pianissimo dynamic. Some kind of dampening may be necessary to keep these otherwise piercing instruments under control dynamically.

As explained above, the non-resonant metal foot pedal instrument group will need the most attention, and has the most affect on the potential discomfort of the player. Even with five pedals in the set-up, it is possible to arrange them in an ergonomic fashion with only a few considerations in design. Considering pedal placement and sound quality, Chinese opera gongs are a good choice because of their small size, abrasive sound, and brief resonance. The gong mounts can lie horizontally, eliminating the necessity of a box-like vertical mount for each gong. This will save space and allow the audience to see the instruments as they are struck. A fanning orientation gathers the pedals together while spreading gong space. Four hook screws and elastic strings suspend each gong above the pedestals. Although it may not be as durable, elastic string is more desirable over nylon or cotton if the player prefers fast set-up and teardown. Otherwise, the string and hooks will need adjusting each time the gongs are set-up. As a method of further space efficiency, the inside corners of each of the pedestals can be cut to accommodate tighter spacing (figure 3.3). The result is a pedal set up with no wasted space; the performer can easily make a small pivot between each pedal instead of taking a large step.



Figure 3.3 Gong mount corners²⁰

²⁰ Image property of the author.



Figure 3.4 *Anvil Chorus* Coleman set-up

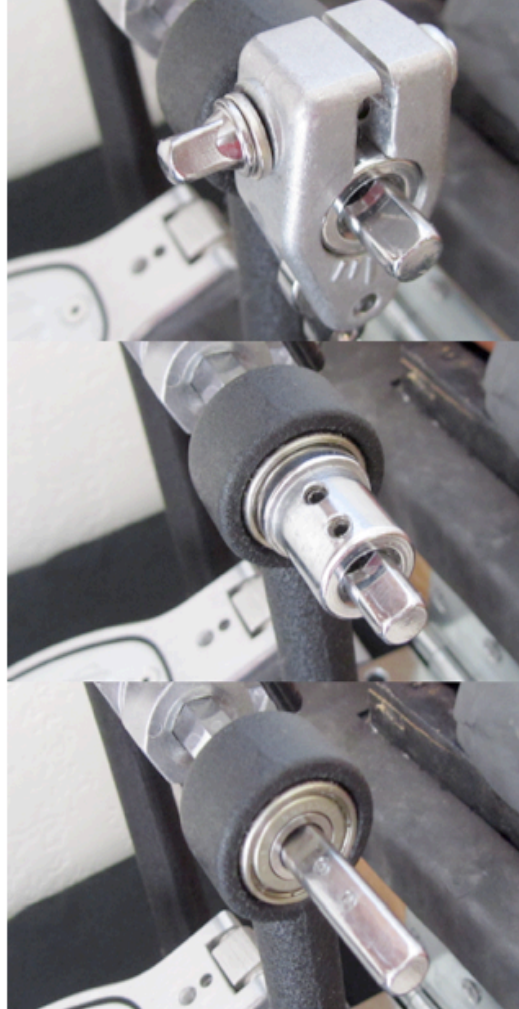


Figure 3.5 Pedal axle access

If the performer decides to stand, a rear-facing bass drum will be most comfortable: with the bass drum placed close to the gong pedals weight can quickly shift to the rear foot, allowing rapid front foot movements (figure 3.4). Each gong pedestal is clamped to a bass drum pedal by means of a hinge fastened to the underside. Although technology has drastically increased since the bass drum pedal invention, pedal mechanism adjustability is rarely

used to its full potential.²¹ Because the typical bass drum pedal beater follows a horizontal motion, the pedals will need adjusting to strike in a vertical motion. As in figure 3.5, removing any clamps, cams, or bushings adjoining the spring mechanism will give access to the bearings and axle. Once the necessary hardware and hex screws are removed or loosened, the chain drive cam and beater fastener can be removed and replaced in various angled settings (figure 3.6). The footboard height can also be adjusted by removing links in the chain. With the necessary adjustment, the footboard will have more play without contacting the bottom plate before the beater strikes the drumhead (figure 3.7).

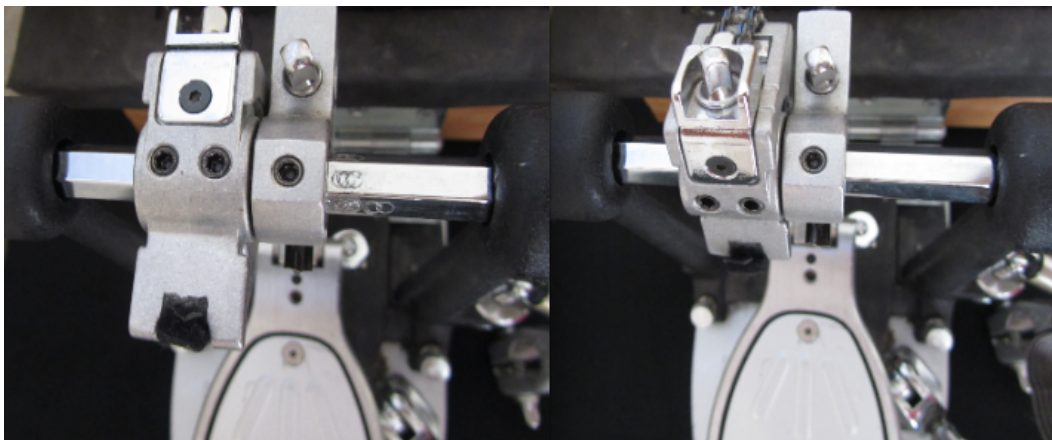


Figure 3.6 Pedal cam and beater adjustments²²

²¹ The pedals shown in figures 3.4 through 3.7 are various Pearl models with high quality components. Adjustability will depend on the make and model of the pedal.

²² Images in figures 3.6 and 3.7 property of the author.



Figure 3.7. Pedal footboard height adjustment

With the beater traveling in a downward motion instead of horizontal, the pedal will take on a more weighted feel. The spring tensioner and beater weights can operate in conjunction with other features of the pedal to offer adjustability in beater angle and weight without sacrificing rebound or response. The player may also experiment with beater types such as hard felt, plastic, or wood. Different beater types may be suitable for different performance situations depending on the size of the hall and the types of mallets used on the rest of the set-up. No matter how the beater action is adjusted to meet the needs of the performer, most contemporary bass drum pedals will have features to match the nuanced dynamics and general musicality of multiple percussion literature.

Chapter 4

THIRTEEN DRUMS

Performed on April 12, 2008 in Evelyn Smith Music Theater, Arizona
State University Music Building.

Standard Set-up Options

One of the compelling attributes often found in multiple percussion music is the dichotomy between simple instruments and complex compositional ideas. Given the pitch and timbral subtleties of many other musical instruments, a performance on a drum or even a number of drums has potential for monotony. Additionally, perhaps no simpler title could be given to a musical work than that of the instrument on which it is played. Although such titles may not directly imply musical form or style, they do offer interpretive freedom to both listener and performer. Maki Ishii's *Thirteen Drums* (1985) is, by virtue of both the title and performance realization, a combination of compositional ideas both complex and simple: Ishii employs the primal sound of membrane instruments, carefully woven into a percussive melodic interplay shared between thirteen drums.

Availability and cohesion of instruments are all common factors in instrument choice in percussion set-ups, but more than usual in *Thirteen Drums*. With many percussion solos, instrument availability can be the deciding element in performance programming. As *Thirteen Drums* is usually performed in recitals at educational institutions, likely with a mix and match of varying drum styles and sizes, poor drum choice can easily make for inappropriate instrumentation or even render the piece impossible to play. Too wide a variety of drums may diminish

the melodic lines and draw too much focus to timbral differences between drum styles. Even considering the limitations, with the variety of drums used in different music settings, possible set-up options are endless.

For pieces with extensive instrumentation, an unprepared player can hinder performances: too much unnecessary movement on stage around a set-up can be a distraction. In some instances, like percussion concerti, set-ups ought to be split between instrument groups due to the sheer scope of instrumentation. However, in most other instances, solo percussion music is performed from a stationary location. This challenge in *Thirteen Drums* is obvious from the onset: thirteen drums can take up a lot of stage space and make for an awkward performance if the performer is not careful to minimize extraneous space in the set-up.

Ishii leaves specific instrumentation up to the performer, but leaves no suggestions for mallets or possible drum configurations. However, he includes a brief instrumentation suggestion in the score: “Bongos, Congas, and other skin instruments with calf skin. (or Japanese drums: Shime-Daiko, Oke-Do).”²³ Instrument availability will also play a large part in the overall affect of the performance, although in an ideal setting the player would have unlimited instrument options. For students, this prospect would be helpful but is ultimately not possible. Instrument diversity is a special challenge to percussionists because

²³ Maki Ishii, *Thirteen Drums for Percussion Solo, Op. 66* (Celle, Germany: Moeck Verlag, 1986), 1.

of the many instruments common in the percussion family, or even in the membranophone sub-family.

The score shows thirteen horizontal lines, with line 1 representing the highest pitched drum, and line 13 representing the lowest as a pedaled bass drum. If bongos, congas or other skin-membrane instruments are used, mounting them on stands presents a few considerations. The performer must choose a space-economic, and ergonomic set-up, considering that the piece will probably require at least six drum stands and a very broad playing area. Many commercial hand drum stands are available with a tilting mechanism. If tilting stands are not within the performers resources then a less-desirable horizontally profiled set-up may be necessary. If western toms are used, drum arrangement is easier: the stands will likely have pivot capability in many directions. However, this style of drums has raised metal counter hoops, greatly increasing the level of accuracy needed by the performer in avoiding unintentional rim strikes. Also, if the player uses glancing strikes from drum to drum, the likelihood of any unintentional rim strikes will greatly increase.

Once the drums are chosen, arranging them is an important consideration. In his November 2009 Percussive Notes article discussing set-up options for *Thirteen Drums*, Mark Berry suggests possible drum configurations. Berry makes it clear that his suggestions are not the limit to set-up options, rather a catalyst for future developments. He refers to the phrase “space time concept” to establish his foundational idea behind these set-up options for *Thirteen Drums*:

Ishii was indeed aware of the relationship between the physical layout of instruments and the performer’s physical movements around the

instruments. Not only was he aware of these things, he was composing specifically for them as an integral part of the work. Along with reference to physical space, he describes how one determines the other—how physical movement, around the space of an instrument configuration, determines musical *time*. This is the fundamental to Ishii’s space-time concept.²⁴

The set-up of the drums, by virtue of the distances or spaces between them, will ultimately determine the phrasing and rhythmic character of the piece. This makes more sense in light of Ishii’s performance notes regarding passages marked to be played as fast as possible: “Rhythmic accuracy is less important than performing the patterns in a speed that is very fast or as fast as possible”.²⁵ Such rhythmic disturbances in an otherwise constant string of notes are not only acceptable, but provide the nuanced musical qualities that Ishii hopes to evoke from performers.

Berry suggests the performer set-up the drums in a manner that not only places the drums within reach, but also makes the score generally easier to execute. Within the above parameters, he gives three set-up examples. The first is a twelve-key chromatic set-up, with keyboard-style “accidentals” (figure 4.1). Berry lists several advantages to the chromatic set-up, the greatest of which “is that it most resembles a keyboard instrument—an instrument with which percussionists may already be familiar... With only two tiers of drums, the inward-outward motion is reasonable – about the same as on a marimba”.²⁶ One of the greatest disadvantages is the reach necessary to play all of the drums. Berry explains: “Even with the 12 drums slightly wrapped around the performer, the

²⁴ Mark Berry, “Thirteen Drums for Percussion Solo, op. 66: Interpreting in concurrence with Maki Ishii’s ‘Space-Time’ Concept”, *Percussive Notes* 47: no. 5 (November 2009): 43.

²⁵ Ishi, (1986): 13.

²⁶ *Ibid.*



Figure 4.1 Thirteen Drums Berry keyboard set-up²⁷

distance from the lowest drum to the highest drum is substantial. This distance makes rapid ascending or descending figures difficult to execute”.²⁸

Berry’s second option is a pyramid-style set-up (figure 4.2). This set-up also requires considerable lateral motion, but the majority of playing is done in a central cluster of drums. He argues that some advantages are the left-to-right aspect of the configuration; as in reading music or text, quick execution of passages involving alternating sticking, and only three of the drums are far from a performer’s typical reach. Space inefficiency is one of his main disadvantages in the pyramid set-up option:

²⁷ Berry, (2009): 54.

²⁸ Ibid., 56.

The use of three tiers requires the player to stretch and reach farther than if just two tiers were used. Also the largest drums are closest to the performer. Given this, the performer will most likely do most of the playing on the side of the drumhead farthest from his or her body. This means that the unused portion of all of these drumheads will occupy the space closest to the performer—a space that might otherwise be used to place more drums closer.²⁹



Figure 4.2 Thirteen Drums Berry pyramid and proximity-speed set-ups³⁰

²⁹ Ibid., 58.

³⁰ Ibid.

His final suggestion, the “proximity-speed set-up”, is essentially an upside down pyramid set-up that groups together those drums played in sections notated “as fast as possible” (figure 13). The advantages here are mainly the disadvantages of the pyramid set-up: the performer does not have to reach over the larger drums, and smaller drums replace wasted playing areas. Should a performer seriously consider any of the above set-ups, Berry adds other advantages and disadvantages based on numerous illustrated passages. Regardless of personal preferences, these suggestions will undoubtedly prove helpful in set-up choice.

Further Options

If the performer chooses not to use hand drums or standard tom-toms, Chinese tom-toms are a realistic option. For those performing the piece in North or South America, Chinese tom-toms are much more available than the Japanese drums suggested by Ishii. Mounting twelve standard tom-toms for one piece would be testing, but the prospect of mounting twelve Chinese tom-toms is worth further serious discussion. Plaster-covered wood shell Chinese tom-toms with pigskin heads are similar to Ishii’s suggested drums. This style of tom-toms has a wide size range, roughly between eight to twenty inches in diameter, and three to eighteen inches in depth. Fortunately, many Chinese tom-toms have a height close to eight inches, proving to be advantageous for a consistent playing plane throughout a set-up. Uniform drum height eases the execution of the entire piece, specifically in eliminating unintentional rim strikes during rapid glancing strikes and double bounces between drums.

Chinese tom-toms are manufactured in a very traditional style, providing no mounting system except for ringlets in sets of three to four around the widest part of the drums' circumference. These tom-toms are a more available option to the two Japanese drum types suggested in the score, but require special mounting, even if one drum is to be included in a multiple percussion set-up. The only exception to a *Thirteen Drums* set-up, otherwise entirely made up of Chinese tom-toms, is the pedaled bass drum. With the necessary stabilization, a large Chinese tom-tom with a deeper shell may be used. Although it has no wood counter hoop or stabilizing spurs, the animal-skin head and shell depth of a Brazilian surdo make it an appropriate choice for a cohesive, yet deeper drum timbre.



Figure 4.3 *Thirteen Drums* Coleman set-up³¹

³¹ Image property of the author.

Figure 4.3 shows a possible set-up configuration with Chinese tom-toms. Considering the weight distribution of the tom-toms, drums 1 through 12 can securely rest on pieces of $\frac{3}{4}$ -inch plywood. The surdo used for drum 13 may need extra stabilization such as a thick piece of foam padding which can be shaping to fit the circumference of the drum. As in *Anvil Chorus*, a slave bass drum pedal may be used if other parts of the set-up get in the way of the performer.

The mounting of the drums can be divided between two pieces of plywood, making the set-up comprised of only two portable pieces. When set up, the two pieces can be secured together with reusable zip ties or any other kind of similar fastener. The drums can be arranged as follows: row 1: 1, 2, 3, 4; row 2: 6, 5, 7, 8; and row 3: 9, 10, 11, 12. Drum 5 is foundational for much of the piece, and should be in a central location. Pages 3, 4, and 6 through 9 contain repetitive passages similar to that of figure 4.4. Drums 5 and 6 may be exchanged in order to make drum 5 more centralized. Due to the wide variety of note passages in *Thirteen Drums*, attempting to arrange the drums to ease execution of notes for other less frequent note groupings will only result in difficulties in other passages.

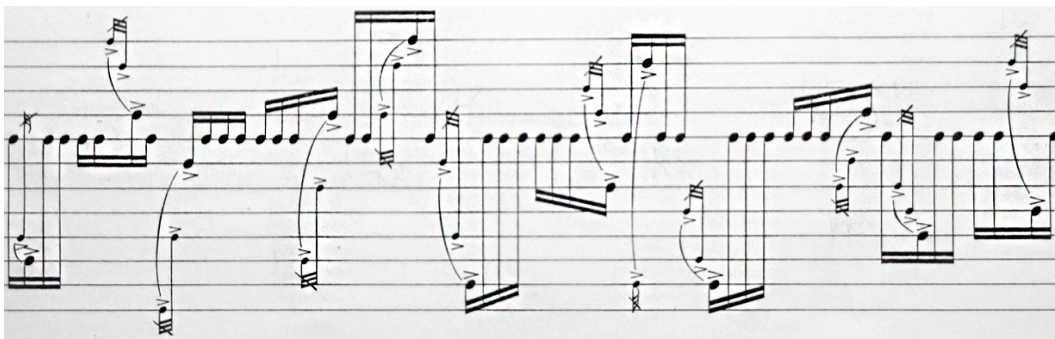


Figure 4.4 Passage based around drum 5³²

³² Maki Ishii, *Thirteen Drums for Percussion Solo, Op. 66* (Celle, Germany: Moeck Verlag, 1986), 4.

Other reach problems may arise due to the slant of the set-up. A horizontal profile may limit reach to drums 1 through 4 if they are to be placed farthest from the player. Many large Chinese tom-toms are to be used for this style set-up, therefore the most space-economic playing plane is at a slant toward the performer, rather than horizontal. This slant offers the close proximity of a more vertical playing plane while including the logical set-up benefits of a horizontal set-up.

Tracing each drum circumference with a pencil will help space the holes in the plywood correctly and gauge the eventual size of each piece of plywood. A reciprocating power saw or hand-held jigsaw will prove effective in cutting holes in the plywood for each of the drums and rounding off the corners of the plywood. A router with an adjustable circle-cutting jig will also be effective, assuming the drum circumferences are perfect circles. Adding one to three inches to each drum diameter allows sufficient space in which each tom-tom can nest. Given the slight convex profile of Chinese tom-tom shells, this excess of space in each hole allows the drums to nest tightly in the plywood and allows for small angle adjustments. As seen in figure 4.5, several small pieces of carpet around each hole provide shock absorption, and eliminate contact sound on the frame when the drums are struck.



Figure 4.5 Carpeted drum mounts³³

Because of the large size, weight, and relatively severe angle of this set-up, fastening legs to the plywood carriage system presents challenges. Simply cutting legs to length and fastening them at an angle would be undesirable: if the set-up were at a fixed height and angle, it would be exclusive to players of various height and unaccommodating should the player need to make adjustments. Many options could work to solve these problems. Hinges on the legs can perhaps easiest accommodate playing angle adjustability (figure 4.6). Hinges also allow the legs to fold flat against the plywood, making stowage and portability an option without disassembling the entire set-up. This is important, considering that practice and performance spaces are likely to be in different locations. For at least

³³ Image property of the author.

a few inches of height adjustability, the legs can be segmented with fasteners, rather than pieces of fixed length (figure 4.7).



Figure 4.6 Leg hinges³⁴



Figure 4.7 Leg segments

Considering its many adjustable features, a set-up of this kind is potentially suitable to a wide variety of players. Those seeking to build a similar set-up should seek out reusable fasteners, such as screws. This way, if height, tilt, or other adjustments are necessary, those screws and wood can be reused as slight changes are made. Additionally, if the set-up is to be disassembled for any reason, the teardown and rebuild process will be much easier. To keep each of the larger pieces of the set-up at a fixed and similar angle, and for general stability, a number of crossbeams may be added at the discretion of the player. With hinged legs, crossbeams will also allow for some angle adjustment of the set-up as a

³⁴ Images in figures 4.6 and 4.7 property of the author.

whole. Larger blocks of solid wood can be fastened to the plywood, offering more solid material to which crossbeams can then be fastened. If at all possible, a set up of this sort, however sizable, should be built with deconstruction and portability in mind: future performances and set-up adjustments then become much more realistic options.

Chapter 5

MUSIC FOR PIECES OF WOOD

Performed on March 14, 2009 in Katzin Hall, Arizona State University Music Building.

Standard Set-up Options

Numerous compositions by Steve Reich prevail in the canon of percussion ensemble literature. One of the most frequently performed is *Music for Pieces of Wood* (1973) for percussion quintet. As the score indicates, the piece is to be performed by 5 players, each with 1 set of pitched claves. The players stand in a semi-circle fashion for visual cues when needed: part 1 is to be centered, with parts 3 and 4 to the right, and parts 2 and 5 to the left. When comparing the rhythms of each part, this set-up is most advantageous because rhythmically alike parts are grouped together. Since it's publication, numerous ensembles have arranged *Music for Pieces of Wood* for a variety of instruments. In reading Reich's comments in the score preface, it is apparent that some attempts at alternate instrumentation have been at least inappropriate.³⁵ His detailed words of warning about alternate instrumentation are not typical as part of a score, but inspire special care in preparing the instruments in the most thoughtful way possible.

³⁵ See the recto page of "Notes on Performance" in the score. Noted substitute instrumentation includes crotales, tuned cow bells, xylophone bars, and temple blocks.

Pianist Rob Kovacs performed a solo arrangement of Reich's *Piano Phase* (1967) in 2004 by at Baldwin-Wallace College Conservatory.³⁶ This arrangement is particularly unusual – a solo version of a work composed as a duet – and has since been performed by other pianists. Reich's compositions, like any other published composition, are not exempt to adaptation. Unlike *Piano Phase*, *Music for Pieces of Wood* has been subject to more drastic alterations. Such arrangements are perhaps due to the ambiguity of the title, or the simple and therefore readily altered instrumentation of the piece.

Further Options

Before a clarification of set-up design for a solo arrangement of *Music for Pieces of Wood*, a brief explanation behind the purpose of such an arrangement is worth examination. The notion to prepare a solo arrangement is supported by countless other composers and arrangers who have artistically added to or altered an existing work. Performers can and should assume that responsibility when making performance choices regarding stylistic liberties, the type of instrument used when arranging canonic works, and many other highly interpretive aspects of musicianship. When performers arrange pieces – a common practice in contemporary percussion – they are essentially composing new works. If that arrangement diminishes the artistic value of the instrument or the original composition, it is likely to be unsuitable.

The instrument or instruments in a new arrangement can also be compared to the original instrumentation for textural appropriateness: if the arrangement

³⁶ Rob Kovacs, *Piano Phase* (solo arrangement).
<http://www.youtube.com/watch?v=AnQdP03iYIo> (accessed 10 June 2012).

rests too much attention on the performer or the timbre of the instrument, it will likely drain the artistic qualities from the composition. When performed at a high level of musicianship, a solo performance of *Music for Pieces of Wood* can contribute different dynamic inflection, rhythmic acuity, and visual performance than a quintet does.

Although topical to this chapter, whether a composition should or should not be arranged will not be covered further in this study. However, before explaining the particulars of a set-up design for *Music for Pieces of Wood* as a solo, it will be beneficial to touch on some points that lead to a logical solo arrangement. Although several rhythms occur simultaneously, these rhythms do not all enter at once. Reich composed *Music for Pieces of Wood* as a gradual additive process comparable to a drum set player slowly adding one limb at a time to successfully play with multi-limbed coordination. On the topic of his compositional technique of gradual process, Reich said, “To facilitate closely detailed listening, a musical process should happen extremely gradually”.³⁷ While this compositional technique helps the listener pay close attention, the extremely gradual process is mainly what makes *Music for Pieces of Wood* manageable as a solo.

Although the original composition requires some clave tuning, much more instrument design is required if *Music for Pieces of Wood* is performed as a solo. It is possible to play the piece with one performer and a sampled track of a clave

³⁷ Steve Reich, *Writings about Music*. New York: New York University Press (1974): 9, as quoted from Oliver Strunk’s *Source Readings in Music History: The Twentieth Century*, Vol. 7. Rev. ed., New York: W.W. Norton & Company, 1998.

acting as player 1 – the four other parts are spread between the 4 limbs. Carefully deciding which limb is to play which part is worth the time and effort. The performer can base this decision on which limbs are strongest in executing syncopated entrances, or consult the score for a more strategic approach. Parts 2 and 5, although entering at different times, share the same rhythms. Parts 3 and 4 share some of the same rhythms, but mostly counter one another. The piece can therefore take on a split orientation based between the right and left sides of the body, or between the hands and feet. In the following set-up, parts are split between the right and left sides: parts 2 and 3 played respectively by the right and left hands, and parts 4 and 5 played respectively by the left and right feet. Regardless of part orientation, the feet will unavoidably encounter the same rhythmic pattern as the hands. Because the percussionists are more accustomed to rhythms between hands, more foot practice will almost certainly be necessary to make coordination match the timing and consistency achievable by two individual players.

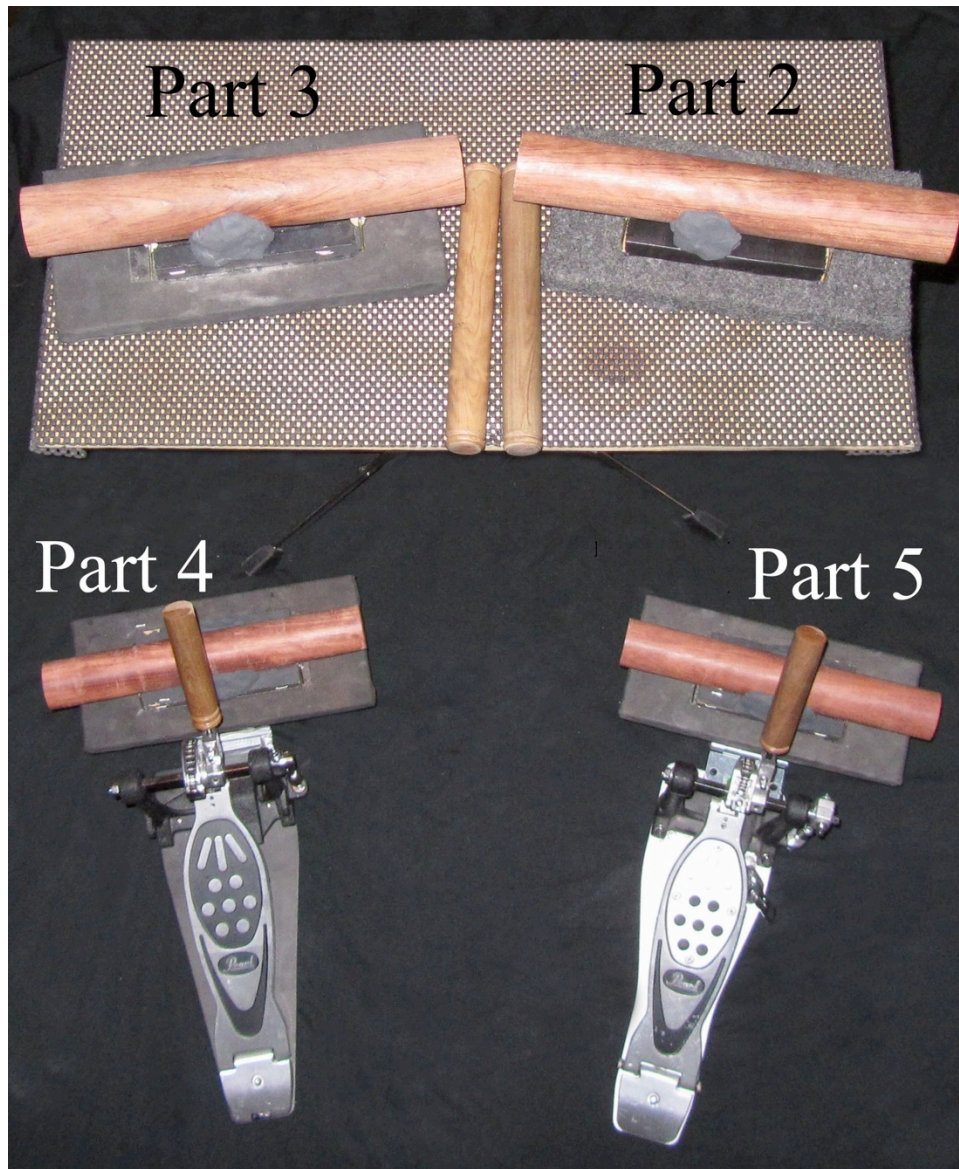


Figure 5.1 *Music for Pieces of Wood* Coleman set-up³⁸

A high-pitched commercial grenadilla wood clave, most commonly used in Afro-Cuban music, is required for part 1. This style of relatively inexpensive and commonly available clave is the instrument that will be electronically sampled and played back as part 1. Reich strongly suggests the use of LP traditional claves for parts 2 through 5. More specifically, the lower pitched 12-

³⁸ Image property of the author.

inch African model is to be used for parts 2 and 3, and the higher pitched 10-inch Standard model for parts 4 and 5. These are made of African hardwood, which implies any number of dense, high-grade wood species suitable for musical instruments of all sorts. Because of its simple design, fabricating claves of this kind is a viable alternative to commercial instruments.



Figure 5.2 Tuned clave³⁹

Claves for parts 2 through 5 can be made of bubinga – also known as African rosewood – due to its superior sound quality, availability, and durability (figure 5.2). This species is similar to Honduran Rosewood, but is readily available in large quantities in domestic lumberyards. Because of this relative abundance and moderate amount of skills and tools needed, personally manufactured traditional claves are a possibility for even a novice woodworker and considerably less expensive than commercially made instruments. For a traditional clave beater, a shorter and thinner dowel of the same wood species may be used. A softer wood species is optional in order to prolong the life of the

³⁹ Image property of the author.

claves. Too much striking on the same spot on any piece of wood will cause chipping and likely eventual cracking along the grain lines.

To meet the size and tuning specifications suggested in the score, lumber purchased must be at least 1¾-inch thick, and long enough to accommodate a 12-inch length of wood. Although hand tools could be helpful in the wood working process, a power sander, lathe, and table saw are necessary to an efficient fabrication of traditional claves. Four graduated lengths of wood with similar diameter will be suitable, assuming that Reich's recommendation of two different sized claves is simply based on the availability of LP 10-inch and 12-inch models. Considering that each clave would be manipulated to meet a specific pitch anyway, this makes tuning easier.

The next step is the lathing process, which is little more than rounding the square lengths into dowels. Once lathed round, each piece is ready for tuning on a belt sander. It will be advantageous to perpendicularly align the tuning groove with the growth rings of the wood. The opposite side of the claves can then be used as the batter side, which will also be perpendicular to the direction of the grain. This practice, used in this case for resilience to repetitive striking, is also used on commercial marimbas and xylophones. Reich includes rough instructions on clave tuning in the "Notes on Performance" in the score. This is a matter of removing material from the ends of the claves to bring the pitch up, or taking material off of the center groove to bring the pitch down.⁴⁰ A table saw will be the

⁴⁰ Information in Hopkin's "Musical Instrument Design" (1996) and Banek and Scoville's "Sound Design" (1995) on tuning xylophone and marimba bars may be useful.

most efficient tool for accurately and cleanly removing material from either end of the claves. Care should be taken in removing end material verses sanding material from the center: a table saw will aggressively remove material from the entire diameter of the clave, while a sander can gradually and more carefully remove material from the center tuning groove.

Although it is possible to adjust the pitch up and down as needed, it will be most advantageous to remove material very gradually in order to avoid too much sanding or cutting. The claves should be properly held as they are tuned, as the pitch may be unclear when held incorrectly. Once the prescribed pitches in the score are met, a clave mounting system of some kind is necessary. The mounting system should help duplicate the sound the claves produce when played in a normal circumstance. Larger, traditional claves are played with a firm grip in the hand, cupping the clave around the tuning groove on the underside. This creates a resonance chamber, which accounts for the clave's sonic quality. Without the proper mounting, the clave will sound like any other piece of wood with similar dimensions.



Figure 5.3 Clave mounting system with modeling clay⁴¹

As seen in figure 5.3, each clave nests on a grooved wood plank, with pieces of modeling clay firmly secured to simulate the thumb and fingers. A riser block supports each of the foot-pedaled clave mounts. This block serves two purposes: it raises the clave to a better striking height to the pedal beater, and allows space for hardware to which the pedal clamp can attach, as seen in figure 5.4. Without added height, the footboard of the pedal reaches the floor plate before the beater strikes the clave, similar to the pedal adjustment needs in *Anvil Chorus*. If more space is needed between the beater and the clave, the hinge can be extended by means of another metal bracket.

⁴¹ Image property of the author.



Figure 5.4 Hinged mount on foot-pedaled clavichord⁴²

One of the main challenges in the foot pedal parts in *Music for Pieces of Wood* is the rhythmic pattern involving three notes in rapid succession. This rhythm occurs in all limbs, but special attention should be diverted to pedal adjustment and careful foot exercises in order to achieve a clear execution of this rhythm. Pedal adjustment should come first as it may take a matter of minutes to resolve, whereas building the necessary dexterity in the feet may take several months. First, the beater can be cut to a much shorter length than the hand held beaters. After the desired length is cut, the spring tension of the pedal should be adjusted to balance the beater; the beater will weigh more and be considerably more sluggish than average. Shortening the beater rod and tightening the spring tension will drastically increase pedal response. As seen in figure 5.5, the angle of

⁴² Image property of the author.

the beater can be adjusted without affecting the footboard angle. Again, this adjustment is similar to pedal adjustments for *Anvil Chorus* in Chapter 3.



Figure 5.5 Clave beater angle adjustment⁴³

⁴³ Image property of the author.

Chapter 6

SUMMARY AND CONCLUSION

As stated in the introduction, an attempt to establish universal rules for all multiple percussion set-ups would not yield satisfactory results. However, many rules can apply to common challenges found throughout a vast majority of multiple percussion set-ups. In summation of the suggestions previously presented, the following is a list of basic principles that can help performers in a wide variety of set-up scenarios.

- Instruments can be arranged in a high-to-low or low-to-high order for ease in memorization and score reading.
- Instruments with similar sounds can be grouped together within a set-up: cymbals to the right, drums in the center, accessories to the left, and so forth.
- Use instrument duplication when a set-up is too large to reach everything from a stationary location.
- Take a picture of large set-ups, or use tape to mark the stage for a stand placement diagram.
- Foam padding of various sorts can be a versatile tool in supporting instruments while dampening when needed.
- When possible, arrange multiple foot pedals to minimize space: use a fan arrangement or set-up instruments to be played with the heel behind the performer.

- Use trap tables to support small groups of instruments and racks to support larger groups of instruments.
- Set-ups should be ergonomic and space-efficient; if desired, only compromise when it adds artistically to the visual display but does not diminish musically.
- Read through the entire score before deciding on a set-up arrangement.
- Hard wood species are more desirable than soft woods for musical instrument fabrication.

When compared to other instrument group development, the growth in multiple percussion instrument design has been so rapid in the recent past that it is difficult to imagine what may transpire in years to come. Although the growth may not be volatile, an apparent uncertainty surrounds multiple percussion set-up design because of the associated “anything goes” attitude. In many ways, an attitude of wide sonic acceptance is the catalyst to which percussionists owe their art form. However, the permissiveness exercised by Cage, Feldman, Reich, Lang, Ishii, and other composers of percussion music must not be mistaken for carelessness. As established early in this document, the suggestions contained herein are hoped to persuade players to have a serious attitude in considering set-up design as an integral part of performance. If done so, it is the submission of the author that lackadaisical set-ups will become an extinct practice.

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