

A Comparative Analysis of the Mechanics of Musser Grip, Stevens Grip, Cross Grip, and Burton
Grip

by

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A Document Submitted to the Faculty of
The Dorothy F. Schmidt College of Arts and Letters
In Partial Fulfillment of the Requirements for the Degree of
Bachelor of Arts

Florida Atlantic University

Boca Raton, FL

April 2011

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Introduction

Instruments of all classifications have gone through some sort of evolutionary process in the way they are constructed and the way they are played. These modifications are responsible for transforming folk instruments into modern day concert instruments. These modifications include ways to hold the instrument, increasing the number of pitches the instrument can play, changing the materials from which an instrument is constructed, and creating or improving upon the techniques employed to play the instrument. Woodwind instruments, brass instruments, string instruments, and percussion instruments have all gone through this process.

The flute, a member of the woodwind family, has gone through many changes since it was first created. The evolution of the flute can be traced back to the sixteenth century recorder which was played vertically. With the development of the transverse flute, the instrument was then played horizontally. Through the development of the Boehm system,¹ a system of fingering developed by Theobald Boehm that allowed for flutes to play chromatically,² it was then possible to write and play more complex music on the flute. It should also be noted that the flute was originally made of wood, and not metal as it is today.

The horn, a brass instrument, has also gone through many different changes since it was first constructed. The natural horn, a precursor to the modern day horn, is an instrument without valves that could only play notes in the overtone series. Performers devised a method to control tone quality and color by inserting the right hand into the bell of the instrument. In order to play in more than one key, crooks, interchangeable metal pipes of varying length, were used.

¹ Nancy Toff, *The Flute Book: A Complete Guide for Students and Performers* (London: David and Charles, 1985), 63.

² Michel Debost, *The Simple Flute: From A to Z* (Oxford: Oxford University Press, 2002), 84.

Eventually, these crooks were replaced by valves and tuning slides which allowed the instrument to play chromatically.³

The double bass, also known as the up-right bass and the contra bass, has gone through several changes as well within the last several centuries in terms of construction and the techniques used to play it. There are many obstacles to overcome when constructing a double bass due to the nature of its size and acoustical needs. There have been many disagreements as to whether or not a double bass should have an arched back like the rest of the bowed string instruments, or a flat back. There are advantages and disadvantages to both methods of construction. Building a double bass with an arched back requires a substantially large sum of lumber as the wood used to build an arched back must be free of imperfections like knots, sap streaks, pecks, and rotten spots. This is not the case when building a double bass with a flat back. Although a flat back double bass allows for the conservation of wood, a significant amount of construction is needed in order to install spruce support braces, or cross bars which show undesirable behaviors over time as the wood begins to warp.⁴

The techniques that double bass players use have also gone through a series of changes. There are two different kinds of bow holds. The bow hold that was first developed was the underhanded bow hold, and the newer of the two is the overhanded bow hold. The overhanded bow hold resembles that of the other stringed instruments which features the thumb on the bottom side of the bow near the hairs, and the rest of the fingers are placed on top of the bow at the frog. Sometimes, the pinky finger would be braced against the side of the bow facing the player. Frequently, students were told to allow the bow to tilt towards the bridge of the

³ Auburn University, "Natural Horn," <http://www.auburn.edu/~schafwr/naturalhorn.html> (accessed February 21, 2011).

⁴ Paul Brun, *A New History of the Double Bass* (Villeneuve d'Ascq: Paul Brun Productions, 2000), 18-9.

instrument. As this hold gained popularity, there rose a series of variations on this hold in the different schools of playing the double bass.⁵

Percussion instruments have also gone through a variety of changes since their conception. The drum can be described as a hollow, cylindrical object with a membrane, commonly called a drum head that is stretched over one or both openings. Some examples of this kind of instrument are the snare drum, the bass drum, the djembe, the conga, and the taiko drum. Although the basic structure of the drum has remained the same since it was first constructed, the way it is built and what the drum is made of has changed with the advancement of technology.

The stretched membrane that would be struck to produce a sound was originally made out of animal skin. Today, these membranes are made of high quality plastics and other synthetic materials; however, there are some manufacturers that still mass produce drums with animal skin drum heads. Some drums defy this general description. The kettle drum, or tympano (pl. timpani) can be described a large basin made of copper or fiberglass with a membrane stretched over its one opening. It is this large basin that acts as a resonator and gives the tympano its unique sound.⁶

Instrument construction is not the only reason why these instruments have evolved over the years. The development of the many different techniques used to play these instruments have also contributed to the advancement of the percussion section. For example, tympanists may use one of two mallet grips to play the tympani. One grip is called German grip and the other is called French grip. German grip requires that the player hold the mallets with his or her palms facing down with the thumbs resting on the side of the mallets' shafts. While using the French

⁵ Paul Brun, *A New History of the Double Bass* (Villeneuve d'Ascq: Paul Brun Productions, 2000), 18-9.

⁶ Arthur Clappé, *The Wind-Band and Its Instruments, Their History, Construction, Acoustics, Technique, and Combination* (Portland: Longwood Press, 1976), 135.

grip, one's palms are facing inwards towards each other with the thumbs resting on top of the mallets' shafts.

The German grip facilitates a sharper, staccato sound while the French grip facilitates a softer, legato sound. The French grip also has the added benefit of allowing the player to use a technique called cross hammering or cross sticking. This is done when the player strikes one drum and then brings the non-striking mallet over the other in order to play a drum that is either to the right or the left of the drum that was already struck. It is possible, but difficult to implement this technique using German grip.

In order to play the snare drum, one may use one of two stick grips. One grip is called matched grip, and the other is called traditional grip. Those who use matched grip to play the snare drum hold the sticks the same way as those who use German grip to play tympani. Traditional grip requires that the stick in the right hand be held with the player's palm facing down while the stick in the left hand is held with the player's palm facing up. The right hand while using traditional grip holds the stick in the same way as matched grip and German grip, but the stick in the left hand is held between the middle finger and the ring finger. Traditional grip is usually used while playing the marching snare drum, the drum set, and occasionally the concert snare drum while matched grip is used to play many different percussion instruments including the marching snare drum and the concert snare drum.

The percussion section also has a variety of melodic keyboard instruments which include the xylophone, the vibraphone, and the marimba. These instruments have also evolved through a series of modifications to both their construction and the way they are played. The predecessors to these instruments were ethnic percussion instruments that had never been adapted to playing the diatonic scale. The origins of melodic percussion instruments are widely speculated, but

marimbas and marimba-like instruments have been discovered all over the world. For example, the lithophone, a keyboard instrument comprised of large tuned stone blocks, was discovered in Vietnam and dates back to approximately 478 B.C.E. In Africa, it has been discovered that native musicians of the A-Zandeh and Zulu nations play an instrument called the balafo which is made up of a single line of tuned slabs of wood resting on a frame with tubes made of gourd hanging down from it acting as resonators. Some other names for this instrument are the marimba, the mahambi, and the malimba. Marimba-like instruments have also been discovered in Guatemala, Mexico, Honduras, Greece, Egypt, and Bali.⁷

It is unclear as to when the first marimbas capable of playing the diatonic scale were constructed, but the first marimbas capable of playing the chromatic scale were being made as early as the eighteenth century. These marimbas, however, were unlike the modern-day marimba in that they exhibited only a single row of keys. It was not until the late nineteenth century that piano-like marimbas featuring a “double keyboard” were created. The creation of the first piano-like marimba has been credited to several musicians including Jose Chaequin, Manuel Lopez, Sebastian Hurtado, and Frederico Guzman. The only thing that is certain about the “double keyboard” marimba is that it was invented in Guatemala.⁸ Subsequent to this innovation, the marimba’s popularity began to spread to the United States after the premieres of various marimba orchestras. By 1910, the marimba was being mass produced by a small company in Chicago, Illinois, owned by John Calhoun Deagan.⁹

“Literature for unaccompanied marimba was almost non-existent less than a half century ago. Outside of the efforts of a few pioneering composers/performers, such as Clair Omar

7 Frank MacCallum, *The Book of the Marimba* (New York City: Carlton Press, 1969), 12-30.

8 David Vela, and Vida Chenoweth, *Information on the Marimba* (Auckland: Institute Press, 1993), 59-60.

9 Frank MacCallum, *The Book of the Marimba* (New York City: Carlton Press, 1969), 12-30.

Musser and Vida Chenoweth, the marimba repertoire remained limited well into the 1970's."¹⁰

The reasons for the scarcity of marimba literature stem from the fact that the marimba was incapable of playing anything more than single lines of melody without the use of more than one player as well as its late introduction as an orchestral instrument. Because marimba literature was so rare, if one wanted to perform on the marimba, the performer would be forced to perform transcriptions of pieces from other instruments. Clair Omar Musser, one of the percussionists responsible for many of the techniques in marimba construction and performance utilized today, lived in a time when there was little marimba repertoire and had to perform his own transcriptions and arrangements of works from composers such as Chopin, Mendelssohn, Bach, and Paganini. Even today, there are percussionists who continue this practice by arranging entire piano and orchestral works for marimba choirs in the same way Musser arranged Baroque, Classical, and Romantic works for his marimba orchestras.

When marimba virtuosi such as Keiko Abe, Leigh Howard Stevens, and Clair Omar Musser began demonstrating the vast capabilities of the marimba, repertoire for the instrument dramatically increased. This was due to their abilities to perform utilizing four mallets simultaneously. As a result, interest by both composers and performers in the marimba has risen exponentially, and solo literature for the marimba has grown to well over two-thousand publications over the last fifty years.¹¹ Playing a marimba while using more than two mallets at the same time may seem innovative, but it is certainly not original. For instance, “the Vendu tribe of Africa, early users of the marimba, use three or four mallets to make long reaches easier, and

¹⁰ Darren Duerden, *A Pedagogical Guide for Twenty Unaccompanied Four-mallet Marimba Solos* (Tallahassee: Florida State University, 1997), 6.

¹¹ Darren Duerden, *A Pedagogical Guide for Twenty Unaccompanied Four-mallet Marimba Solos* (Tallahassee: Florida State University, 1997), 6.

the Guatemalans use multi-mallets for harmonic purposes.”¹²

The most obvious reason for using more than two mallets simultaneously is to give the percussionist control over the melody, harmony, and bass line by allowing each mallet to perform independently from one another. From the user’s point of view, the mallet furthest to the left would play the bass line, the two mallets in the middle would perform the harmony, and the mallet furthest to the right would perform the melody. However, there are exceptions to this description. For instance, the two mallets held in the left hand may both play the bass line while the two mallets in the right hand may play the harmony and the melody.

Percussionists generally agree on the fact that it is beneficial to learn to play with four mallets, but because there are several different ways to hold four mallets, the percussion community disagrees when determining which technique should be standardized.¹³ For instance, Gordon Stout, a prominent composer of marimba music and the professor of percussion at the School of Music of Ithica College, believes that every student should be exposed to all the four-mallet grips; however, Vida Chenoweth, the first professional solo marimba recitalist and one of Clair Omar Musser's marimba students, believes that a student should be exposed to one grip, and one grip only.¹⁴ The purpose of this document is to research the Musser grip, the Stevens grip, the cross grip, and the Burton grip as well as their creators (i.e. Clair Omar Musser, Leigh Howard Stevens, and Gary Burton). In addition, this document will compare the mechanics of these different grips in an attempt to determine which of these grips is best suited for performance practices.

12 Linda Pimentel, "Evolving Solo Technics for the Marimba, Part 3," *Percussionist*, Spring 1974, 2.

13 Linda Pimentel, "Evolving Solo Technics for the Marimba, Part 3," *Percussionist*, Spring 1974, 2.

14 James Moyer, *Applications of Four-Mallet Technique for the Beginning Marimba Student* (Ann Arbor: University Microfilms International, 1989), 3.

Clair Omar Musser

Clair Omar Musser was not only a marimba virtuoso, but also held many other positions which included being an educator, a composer, an arranger, an inventor, a conductor, and a businessman. Born on October 14, 1901, in Manheim, Pennsylvania, Musser was immediately exposed to the world of music by his father, a prominent violinist. Following in his father's footsteps, Musser began to take an interest in violin as well as piano when he was nine-years-old.¹⁵

His interest in playing the xylophone would surface in his fifth grade year, at his school's Christmas concert. After the performance was over, Ammon Bucher, the school's music director, brought out his phonograph on which he played recordings of different violin selections, Christmas music, and a recording of the United States Marine Band featuring Thomas Mills playing "Four Little Black Berries" on xylophone.¹⁶ The recording of Thomas Mills playing the xylophone left the audience awe-struck. They eagerly requested that the recording be played again. The young Musser was inspired by the sound of the xylophone, and he felt that more needed to be known about the person who performed and the instrument that was used in the recording. When he learned that a xylophone was used in the recording, Musser found a dictionary and quickly opened it to the back where he began looking up the word "xylophone." Having learned more about the xylophone, he decided that he would learn how to play it.

It was obvious to him that in order to be a great xylophonist, he needed his own xylophone and a tutor. Musser's aunt also recognized this and bought him a Deagan xylophone. He, then, began taking private lessons from Permin Burger. It was Burger who told Musser that the greatest xylophone player in the world was George Hamilton Green. Musser began collecting

¹⁵ David Eyler, *The History and Development of the Marimba Ensemble in the United States and its Current Status in College and University Percussion Programs* (Baton Rouge: David Paul Eyler, 1986), 96.

¹⁶ "Clair Omar Musser: Internationally Celebrated Maestro," *Percussive Notes*, April 1999, 1.

recordings of the xylophone virtuoso, and planned to become the next greatest xylophonist. It was not too long until he had learned several overtures and semi classics, and performed in several recitals.

Later, Deagan began mass producing a four and one half octave marimba-xylophone which they named the Super Deagan Marimba-Xylophone No. 4726. Subsequently, Earl Fuller's Big Band featuring Abraham Hildebrand, the world's greatest marimba virtuoso, was touring near Musser's home in Lancaster, Pennsylvania. Musser attended their performance at the Brunswick Hotel. He was shocked to discover that Hildebrand was performing on a Super Deagan Marimba-Xylophone and that he performed using four mallets. Excited by the performance, Musser introduced himself to Hildebrand. Through their discussions about how Hildebrand became such an accomplished marimbist, Musser was introduced to Philip Rosenweig, Hildebrand's teacher. Musser decided that he needed to study with Rosenweig in order to become a great marimbist. Musser's aunt presented him with a Super Deagan Marimba-Xylophone in order to enhance his education.

After his studies were complete, he began touring the country as a solo performer as well as making guest appearances with different symphony orchestras. While performing with the Chicago Symphony Orchestra, Musser met Rufus Dawes, the president of the Century of Progress Committee. While attending a dinner along with the officials of the upcoming Century of Progress Exposition, Musser overheard the strong desires of Dawes and his associates explaining how they would like to exhibit something musically groundbreaking for the Chicago World's Fair. Remembering how ecstatic his father was when he saw the nineteen piece Hurtado Marimba Orchestra at the 1915 San Francisco World's Fair, Musser quickly joined the conversation and proposed that the committee sponsor a one hundred piece marimba orchestra

for the Chicago World's Fair.¹⁷ He agreed to design a new marimba model known as the Century of Progress Marimba, train all of the orchestra members, compose the music, and conduct the ensemble.¹⁸

Musser's marimba orchestra was sponsored by J.C. Deagan Incorporated and debuted at the 1933 Century of Progress Exposition in Chicago, Illinois. Because of his accomplishments, Rufus Dawes awarded Musser with the Century of Progress Medal. Due to the success of his marimba orchestra, Musser organized yet another one hundred piece marimba orchestra and designed a new marimba model, the King George model, for the performers to use. He toured around the world with his new ensemble.¹⁹ It was from this point on that Musser was considered the "Marimba Maestro." He continued to organize these grand marimba orchestras which included the twenty five piece All Girl Marimba Orchestra which debuted at Chicago's Oriental Theater in 1929, and a three hundred piece marimba orchestra featuring a one hundred member choir which debuted at the Chicago Fair in 1950.²⁰

For his achievements in his field, Musser was presented with many awards which included the Arts and Letters Citation from the French government, and the Borez Award from the Brazilian government. He was also appointed as the director of marimba music education at Northwestern University School of Music in 1942. By 1975, he was elected to the Percussive Arts Society's Hall of Fame. He later died on November 7, 1998.²¹

Clair Omar Musser has been credited with having designed, constructed, and patented several marimba models including the Century of Progress Marimba, the King George Marimba,

17 Marg Holmgren, "Clair Omar Musser and the Marimba Symphony Orchestra," *Percussive Notes*, Spring 1978, 1.

18 "Clair Omar Musser: Internationally Celebrated Maestro," *Percussive Notes*, April 1999, 1-2.

19 Edwin Gerhardt, "Clair Omar Musser: A Brief Biography," *Percussive Notes*, December 1965, 1.

20 "Clair Omar Musser: Internationally Celebrated Maestro," *Percussive Notes*, April 1999, 2.

21 Edwin Gerhardt, "Clair Omar Musser: A Brief Biography," *Percussive Notes*, December 1965, 1.

the Imperial Marimba, the Queen Anne Marimba, the Windsor Marimba, the Mercury Marimba, the Century Marimba, the Diana Marimba, the Neo-Classic Marimba, and the Canterbury Marimba. He also invented the celestaphone and the marimba-celeste.²²

Musser was also the inventor of the Musser grip, at one time, a widely used four-mallet technique that allowed for a greater independence in mallet control when compared to that of the other four-mallet grips that were being used at the time. The origins of the Musser grip are still widely speculated. According to Vida Chenoweth, "Musser did not mention the source of his grip..." However, he often talked about marimba performers that used other four-mallet grips. Chenoweth assumed that Musser invented the grip out of the necessity to achieve a wider interval spread, that is to say a greater distance between two mallets, which could not be done with the four-mallet grips that were being utilized at the time.²³

Musser was also inducted into several societies including the Acoustical Society of America, the American Society of Metallurgists, the Society for Research on Meteorites, the Society for the Advancement of Science, and the Smithsonian Institution.²⁴ He started his own marimba and vibraphone manufacturing company, known as Musser Marimba Incorporated, which was sold to Bill Lyons, the owner of Lyons Band Instrument Manufacturers. In addition, he has published fifty-three compositions as well as an untold number of articles for magazines and journals of research. During his time as an educator, he taught almost one-thousand-four-hundred students all of whom preserve his legacy by composing, performing, and teaching.²⁵

22 "Percussive Arts Society Hall of Fame 1975." *Percussive Notes*, Winter 1976, 2.

23 Kathleen Sherry Kastner, *The Emergence and Evolution of a Generalized Marimba Technique* (Milwaukee: University Microfilms International, 1989), 36.

24 David Eyler, *The History and Development of the Marimba Ensemble in the United States and its Current Status in College and University Percussion Programs* (Baton Rouge: David Paul Eyler, 1986), 97-8.

25 Edwin Gerhardt, "Clair Omar Musser: A Brief Biography," *Percussive Notes*, December 1965, 1.

Musser Grip

Clair Omar Musser was responsible for one of the four-mallet grips that was used by many percussionists. The Musser grip allows for a performer to use four mallets simultaneously while playing any percussion instrument, but was primarily used for playing the marimba. Most collegiate percussion professors in the early 1970's knew the basics of how to use the Musser grip, but only several of them knew how to utilize the technique in a performance setting, however improperly. At the time, there were only a few people who had mastered the technique. Because many percussion professors only had a vague idea of how to use Musser's technique, there came about a surge in variations on the Musser grip.²⁶ The following is a detailed description on how to properly utilize the Musser grip.

When holding the mallets while using the Musser grip, the player must always keep his or her palms parallel to the floor with the exception of initiating Musser rolls which will be expanded upon later. The inner mallet is held between the index finger at the middle joint and the thumb near the butt of the mallet. Next, the index and middle fingers curl around the butt of the mallet for additional support. The outer mallet is held between the ring finger and the middle finger at the middle joints. The ring and pinky fingers, then, curl around the lower part of the shaft of the mallet for stability. The shafts of the outer mallets lie flat against the palm while the inner mallets are held firmly in place by the thumb, index finger, and middle finger (see figure 1).²⁷

²⁶ Leigh Howard Stevens, *Method of Movement for Marimba with 590 Exercises* (Asbury Park: Keyboard Percussion Publications, 2008), 106.

²⁷ James Arthur Moyer, *Applications of Four-Mallet Technique for the Beginning Marimba Student* (Ann Arbor: University Microfilms International, 1989), 5.

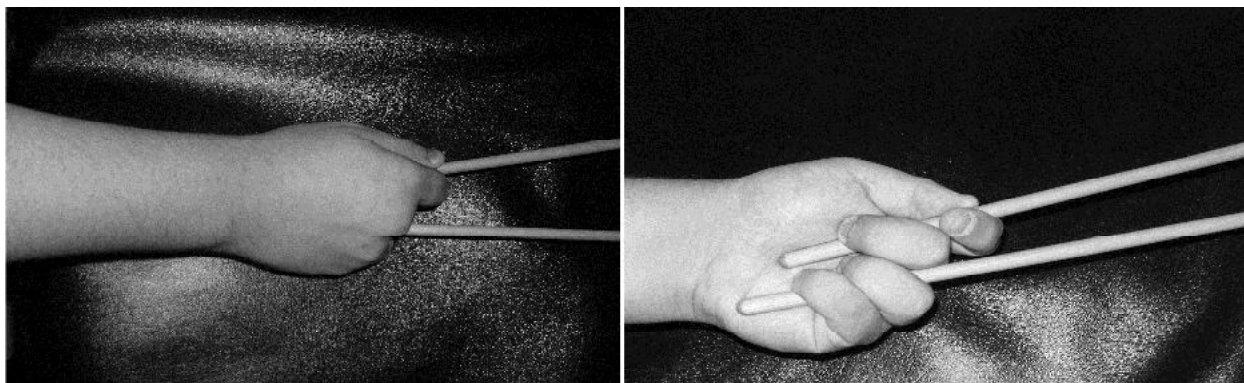


Figure 1. Musser grip, from above (left), and from below (right)

When using the Musser grip, the outer mallets are held in such a way that they are rendered immobile without obstructing the inner mallets when using the inner mallets to play melodic figures. The inner mallets are controlled by the thumb, index finger, and middle finger which raise and lower the mallet in much the same way as one would utilize matched grip; however, in this case, the percussionist would not make use of the wrist joints during this movement.

In order to play multiple notes at the same time, the mallets are held at the same height, and are forced up and down using the wrist joint as the fulcrum. In order to change intervals, or the distance between two mallets held in the same hand, the thumb and index finger act as a pivot point in order to move the inner mallet closer and further away from the outer mallet. In order to reach extremely wide intervals, such as an octave or a major ninth, the thumb pushes the inner mallet further away from the outer mallet by moving over to the other side of the mallet's shaft which forces the butt of the mallet to be held by the index and middle fingers as they curl around the bottom of shaft (see figure 2).²⁸

²⁸ Leigh Howard Stevens, *Method of Movement for Marimba with 590 Exercises* (Asbury Park: Keyboard Percussion Publications, 2008), 106.

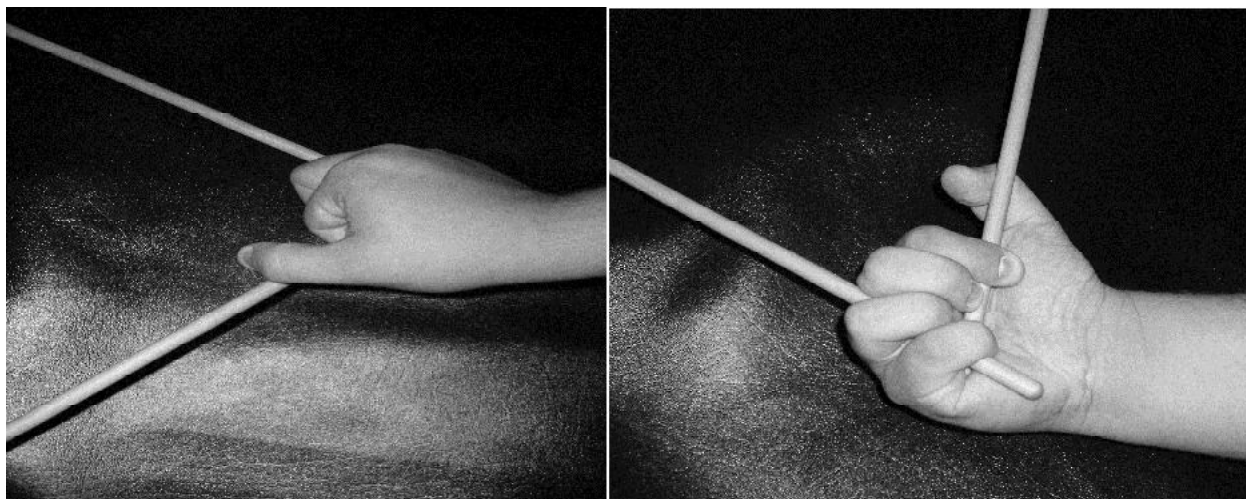


Figure 2. Technique used to achieve large intervals using the Musser grip, from above (left), and from below (right)

When executing a Musser roll, each mallet strikes the bars at a different time. The hand position changes from the palms being parallel to the floor to the palms being perpendicular to the floor and facing each other. The mallets are still lying straight across the palm, but the thumbs are on top of the inner mallets. The mallets in each hand are held in such a way that the heads of each mallet rest at a different height with the inner mallets held higher than the outer mallets (see figure 3). By doing so, this allows for the mallets to hit the bars at different times due to the varying distances from the keyboard much like a series of grace notes.²⁹ Typically, the mallets strike the bars in the following order when utilizing a Musser roll: the left outer mallet, then the left inner mallet, followed by the right outer mallet, and finishing with the right inner mallet.³⁰

²⁹ James Arthur Moyer, *Applications of Four-Mallet Technique for the Beginning Marimba Student* (Ann Arbor: University Microfilms International, 1989), 5.

³⁰ Vida Chenoweth, "Four-Mallet Technique," *Percussionist*, December 1963, 2.

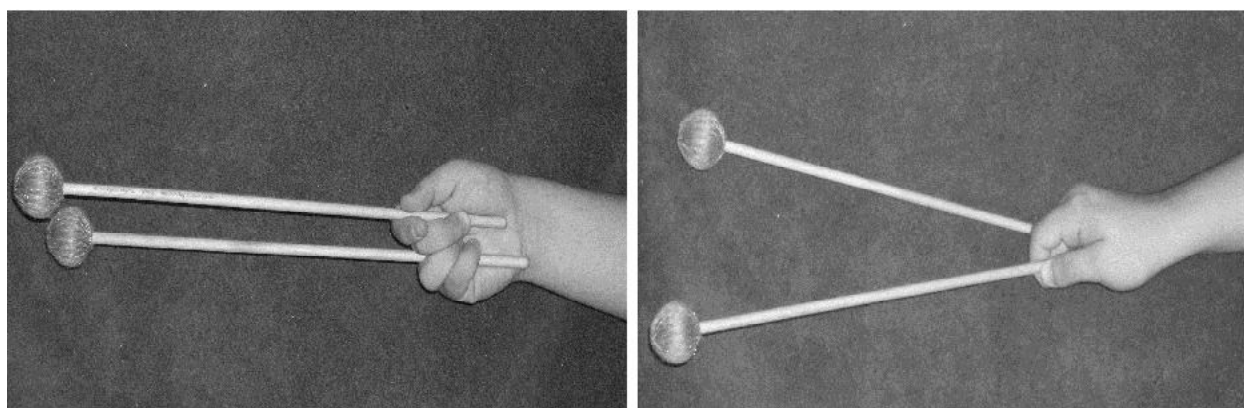


Figure 3. Hand position during a Musser roll (left), and hand position during two-mallet melodic passages (right)

There are several reasons why the Musser grip was not widely taught during the mid-1900's. The Musser grip has been described as being tense, uncomfortable, clumsy, cramped, and even “painful.”³¹ The grip is very difficult to master, and the other four-mallet techniques that were being taught at the time did not exhibit these characteristics. Also, no one published any marimba method books that taught Musser's grip. Any student who wanted to learn his grip had to find a teacher who was proficient at using it which was usually quite difficult. Eventually, a lot of people didn't see the need for a four-mallet technique. Using four mallets was considered to be a novelty and had no practical purposes.³² As a result, many percussionists did not take learning to use four mallets seriously, and many composers never wrote marimba repertoire that required the use of four-mallets. It was not until much later that playing instruments utilizing four-mallet techniques would be considered a necessary skill in the percussion community.

Leigh Howard Stevens

Like Musser, Leigh Howard Stevens is also a man of many accomplishments. Along with

31 Vida Chenoweth, "Pioneering the Marimba." *Percussive Notes*, December 1964, 2.

32 Vic Firth Company, "The 4 Mallet (Burton) Grip," http://www.vicfirth.com/education/keyboards/burton/burton_lesson05HQ.html (accessed December 31, 2010).

revolutionizing four-mallet pedagogy, he is also a performer, a composer, an arranger, a publisher, an educator, a businessman, and an inventor. Born March 9, 1953, in South Orange, New Jersey, his interests in music began in middle school. He began studying drum set with Gene Thayer, Glenn Weber, and Joe Morello. Later on, he began studying concert percussion with Bill Laverack.³³ Before Stevens became the marimba virtuoso that he is today, he was a very serious drummer playing in different rock bands and jazz bands in New York. One of the bands that Stevens played in, Tiger Tails, was managed by an upperclassman from his school by the name of Max Weinberg, the drummer for Bruce Springsteen. "I wanted to rock, and he wanted to become a musician," Weinberg told *New Jersey Monthly* in 2004. "Leigh was a very serious kid – very directed, and not distracted."³⁴

His first experiences with melodic percussion were in his junior year of high school. His band and orchestra directors convinced him to audition for the All-State Orchestra. He was told that he would have to prepare audition materials for snare drum, timpani, and xylophone. Because he spent his entire percussion career on drums, he was only capable of reading rhythmic figures. This made learning his audition pieces very difficult. It was at the audition when Stevens met Scott Bleaken, another percussionist auditioning for the All-State Orchestra. Instead of auditioning on xylophone like Stevens, Bleaken played his xylophone excerpt on a marimba. Stevens heard Bleaken's audition and surmised that it was the marimba's darker tone and lower range that made the piece sound so appealing. It was at that moment when Stevens decided that he wanted to pursue studying the marimba.³⁵

Stevens made a lot of assumptions about the marimba when he was younger, and it was those assumptions that paved the way to his success as a marimba virtuoso. He treated the

33 Lauren Weiss, "An Interview with Leigh Howard Stevens," *Percussive Notes*, October 1982, 1.

34 Lauren Weiss, "Leigh Howard Stevens," *Percussive Notes*, August 2006, 2.

35 Michael Burritt, "An Interview with Leigh Howard Stevens," *Percussive Notes*, December 1992, 1.

marimba a lot like a piano. He tried to sustain pedal tones and utilized Baroque ornamentation in his playing. When he started his studies at Eastman, he realized that not all, but only the most experienced percussionists used four mallets. He also noticed that using a one handed roll in order to sustain pedal tones was a technique that no one had ever attempted. Those who witnessed Stevens' style of playing convinced him that he had a lot more talent as a marimbist than as a drummer. It was then, in his first semester of studies, when he decided that he would become a professional marimba recitalist. However, Stevens believed that before he could pursue the marimba as his primary instrument, he first needed to find a tutor for more training.

Before seeking out private lessons, he decided to learn to use other four-mallet grips. After experimenting with different four-mallet grips, he decided to study with Vida Chenoweth. He, then, realized that he would have to learn to use the Musser grip. He greatly disliked using it as he found the grip to be very limiting. While learning to use Musser grip, Stevens made every effort to modify the grip in a way that it would be versatile enough to meet his needs.³⁶ While studying with Chenoweth, they paid little attention to his technique, and proceeded in working on the art of learning music, paying attention to detail, and how to perform. They especially worked on Milhaud's Marimba Concerto, Creston's Marimba Concerto, and Musser's marimba etudes in C Major, B Major, and A-flat Major.³⁷

He went on to be a very successful marimbist, and performed at many venues across the globe which includes having performed in forty eight states in the United States and eighteen other countries. He also has the distinction of "introducing the marimba to The People's Republic of China in a televised performance that reportedly reached an audience of eight hundred million

36 Lauren Weiss, "An Interview with Leigh Howard Stevens," *Percussive Notes*, October 1982, 2.

37 Lauren Weiss, "Leigh Howard Stevens," *Percussive Notes*, August 2006, 2.

viewers.”³⁸ Stevens has performed world premieres with many different professional orchestras, and has been invited to several different percussion conventions including PASIC 1976, PASIC 1978, and PASIC 1979.

Stevens went on to write his first four-mallet method book called *Method of Movement for Marimba*. Due to the unsuccessful attempts at finding a publisher for his book, Stevens set up his own publishing company called Marimba Productions and published his method book himself in 1979. After his performance at the 1976 PASIC convention, Vic Firth, a prominent figure in the industry of manufacturing percussion equipment, approached Stevens with the intent to mass produce the mallets that Stevens had been using. He was interested in Stevens' marimba mallets because they had many features that differed from what would have been considered as normal for mallets. They had longer shafts made of birch as opposed to shorter shafts made of rattan, fiberglass, or nylon. Also, the heads were loosely wrapped with stitching only at the top and bottom of the heads as opposed to being tightly wrapped with reinforced stitching near the playing surface in addition to the stitching at the top and bottom of the heads.

In 1982, Stevens left Vic Firth in order to establish Malletech, his own marimba mallet manufacturing company. They manufactured Stevens' line of marimba mallets, as well as Bob Becker's mallets, David Friedman's mallets, and David Samuels's mallets. At the same time, Stevens began working for Musser, a marimba manufacturing company owned by Ludwig Drums and Selmer Instruments, as a design consultant. By 1992, Malletech started producing its own line of marimbas and introduced their marimbas at PASIC that same year.³⁹

As an educator, Stevens pushed his students to test their limits by organizing one of the

38 Mostly Marimba, “Leigh Howard Stevens,” <http://www.mostlymarimba.com/artists/465.html?itemid=27> (accessed March 31, 2011).

39 Mostly Marimba, “About Our Companies,” <http://www.mostlymarimba.com/home/about-our-companies.html> (accessed March 31, 2011).

first international solo marimba competitions. He began organizing it in 1993, and by the summer of 1995, people from twenty one countries came to Asbury Park, New Jersey. At that particular competition, two world-renowned marimbists placed in the top three; Eric Sammut, a contestant from France, received first place, and She-e Wu, a contestant from Taiwan, won third-place. In 1997, Stevens established himself as the professor of marimba studies at the Royal Academy of Music in London, England, and he maintained that position until 2004. While he was serving as a professor at the Royal Academy of Music in 1997, Zildjian managed to purchase Malletch. However, Stevens was able to reacquire both the instrument portion of his company in 2000 as well as the mallet portion in 2005.

Leigh Howard Stevens has many achievements to his name. He started his own marimba manufacturing company which led to his patents in marimba construction and mallet construction. He has been featured in several mainstream and music trade publications which include *Time Magazine*, *The Wall Street Journal*, the *New Jersey Monthly*, *Percussive Notes*, and *Rhythm*. He is also the winner of the Classical/Mallet Percussionist category of the 2004 and 2005 Modern Drummer Readers Poll.⁴⁰ He was elected to the Percussive Arts Society's Hall of Fame in 2006 and revolutionized four-mallet pedagogy with his modifications to the Musser grip. "It is no exaggeration to say that Leigh Howard Stevens has not just been at the cutting edge of the development of the marimba in the last thirty years – he has been the cutting edge."⁴¹

Stevens Grip

Leigh Howard Stevens made significant changes to the Musser grip in order to develop his own four-mallet grip. Although the Stevens grip was undoubtedly modeled after the Musser

⁴⁰ Lauren Weiss, "Leigh Howard Stevens," *Percussive Notes*, August 2006, 4.

⁴¹ Mostly Marimba, "Leigh Howard Stevens," <http://www.mostlymarimba.com/artists/465.html?itemid=27> (accessed March 31, 2011).

grip, the technique that Stevens employs is truly of his own making. His ideas for the changes that he made to the Musser grip are attributed to what he learned about four-mallet technique in the various four-mallet method books that he studied as a student, and what he learned from his jazz drum set instructor, Joe Morello.⁴² The following is a detailed description of how to utilize the Stevens grip.

When holding the mallets while using the Stevens grip, the player must always keep his or her palms perpendicular to the floor with the palms facing each other and the thumb facing up. The inner mallet is held in between the index finger at the joint closest to the finger tip, and the thumb. The thumb should be placed on top of the shaft, and the index finger should be supporting it from underneath. Next, the middle finger curls around the shaft of the mallet for additional support. Also, the butt of the mallet should be firmly placed against the center of the palm as if the mallet were protruding out from the middle of the hand. The outer mallet is held in between the ring finger and the middle finger, at the middle joints. The ring and pinky fingers curl around the lower part of the shaft of the mallet in order to keep it in place.⁴³ The player should be able to see no more than an inch of the lower part of the mallet's shaft starting from the butt of the mallet distending from behind the pinky finger (see figure 4).

When using the Stevens grip, the outer mallets remain stationary as the inner mallets rotate around the axes of the outer mallets. This rotary process allows the user to play melodic figures with the inner mallets. The same is true when utilizing the outer mallets. The inner mallets remain stationary while the outer mallets rotate around the axes of the inner mallets. Manipulating the mallets in this fashion allows the player complete control over each individual

⁴² Leigh Howard Stevens, *Method of Movement for Marimba with 590 Exercises* (Asbury Park: Keyboard Percussion Publications, 2008), 106.

⁴³ Mario Gaetano, Jr., "Beginning Four-Mallet Playing," in *Percussion Anthology: A Compendium of Articles from The Instrumentalist on Percussion Instruments* (Evanston: The Instrumentalist Company, 1977), 621-22.

mallet. This method of rotation also makes the use of one-handed rolls, Baroque trills, and contrapuntal playing, the ability to use each mallet the same way a pianist uses each finger, easier.



Figure 4. Stevens grip, from above (left), from the front (middle), and from below (right)

In order to play multiple notes simultaneously, the mallets are forced up and down using the wrist joint as a fulcrum. There are two different methods that can be used in order to change intervals. One method is to extend and retract the pointer finger from side to side. The other method requires that the thumb roll the shaft of the mallet across the length of the pointer finger. A player using the second method of changing intervals can attain a greater interval span by comparison to the first method. For extremely large intervals, like those of an octave or greater, the user would roll the inner mallet until he or she is holding it between the tip of the index finger and the thumb in a pinching manner (see figure 5).

Similar to the way the Musser roll is characteristic of the Musser grip, the one-handed roll is characteristic of the Stevens grip. When initiating a one-handed roll, each mallet in a single hand strikes one or more keys alternating from one mallet to the other in quick succession. Typically, the player will be required to roll on two different keys, but on occasion, a one-handed roll will be used on the same key. This technique also makes it possible to implement Baroque

trills. It is very important to make sure that the roll is well controlled and not attempted haphazardly. Often times, the user will create so much tension in the wrist that it becomes impossible to adequately implement the technique.⁴⁴

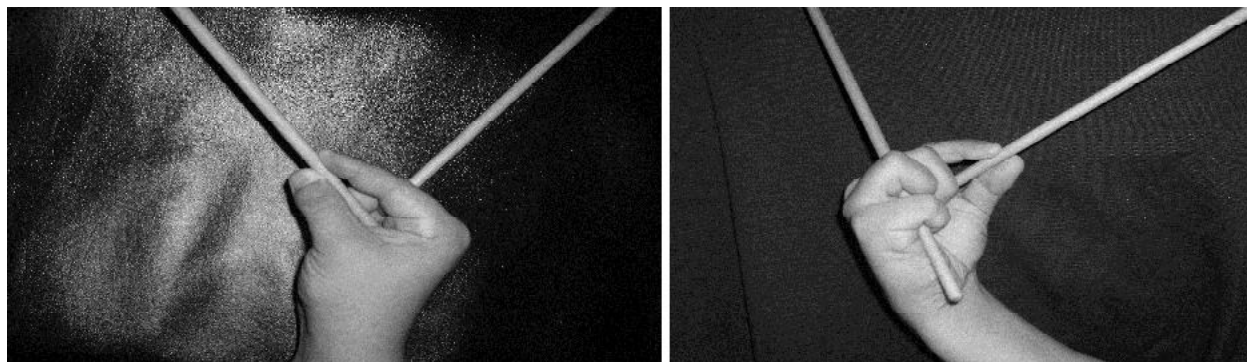


Figure 5. Technique used to achieve large intervals using the Stevens grip, from above (left), and from below (right)

There are several reasons why the Stevens grip succeeded in being widely taught. The Stevens grip is much more flexible than the other four-mallet techniques being taught and allows for a level of comfort without sacrificing the ability to use each mallet independently. Fortunately, by the late 1970's, Stevens was able to publish a method book that could instruct anyone on how to properly utilize his technique. Following Stevens' publication, many other method books were published that incorporated the Stevens grip in their curriculum. Because information about the Stevens grip was so readily available, it was not necessary to find a private instructor in order to begin learning the four-mallet technique, but one would eventually need to seek out tutelage in order to advance beyond what the method books could offer. Finally, Stevens' rotary method allowed for complete independence in each mallet and the ability to use one-handed rolls. This brought about a change in opinion in the minds of composers about the marimba as a concert instrument. Subsequently, there came a rise in the publishing of new solo

⁴⁴ Gifford Howarth, *Simply Four: 4-Mallet Technique as easy as 1-2-3-4* (Portland: Tapspace Publications, 2009), 14-33.

marimba repertoire. This new source of marimba literature in combination with the publications of four-mallet technique method books assisted in bringing about the legitimization of the marimba as a solo concert instrument.

A Comparison of the Musser Grip and the Stevens Grip

There are many differences between the Musser grip and the Stevens grip. The characteristics that exhibit the greatest differences are those in hand position, how the mallets are meant to be held, how to expand and contract the space in between the mallets, and how to execute a down stroke. The following is a detailed comparative analysis of the techniques implemented by these two four-mallet grips.

One recognizable difference is that of hand position. While using the Stevens grip, the palms of each hand are facing each other, the thumbs are facing up, and the inner mallets reside at a slightly greater level of height when compared to that of the outer mallets. In contrast, while using the Musser grip, the palms are facing the ground, the thumbs are facing inward, and all four mallets reside at the same level of height. There are two exceptions to this description of the Musser grip. First, when the performer is playing melodic passages, the outer mallets are held aloft so that they do not obstruct the movement of the inner mallets. Second, when initiating a Musser Roll, the hand position changes so that the palms are facing each other with the inner mallets positioned higher than the outer mallets.

Another noticeable difference is how the mallets are held. When utilizing either technique, the inner mallets are held between the thumb and index finger, and the outer mallets are held in between the middle and ring fingers. Despite these similarities, there are some key differences of which the user should be aware. While using the Stevens grip, a general rule is that

the player would not want the butt of the outer mallet to exceed more than an inch further than the palm. This allows the player to effectively use the weight of the mallet's head in order to play the instrument. The combination of the weight of the mallet and the gentle downward motion allows for a comfortable performance.

This is not the case when using the Musser grip. When using the Musser grip, the player must grasp the shaft of the outer mallet in a section that is by comparison significantly closer to the center of the shaft of the mallet. The inner mallet is then held at the very bottom of the shaft. These actions keep the outer mallets fixed in a position that will not interfere with the inner mallets during the performance of melodic passages, and it allows for the utilization of the inner mallets without affecting the outer mallets thereby demonstrating independence among the four mallets.

There are several reasons why each method of holding the outer mallets works for each technique. One reason is that players who used the Musser grip would usually use mallets that were light in weight and had short shafts made of a bendable material like rattan. A mallet that is so light and made of such flexible material would require more control in order to effectively use it. Therefore, the grip used with these kinds of mallets would need to be very restricting which is why the Musser grip requires that the player hold the mallet closer to the center of the shaft. Someone using the Stevens grip would often use heavier mallets with longer, stiff shafts made out of birch or maple. A mallet made of a material that is immovable and already easy to control would need to be exercised by a grip that is flexible and allows for a great amount of mobility which matches the Stevens grip's description.

Another difference in how the mallets are held pertains to the inner mallets. While using the Musser grip, the inner mallets are held at the butt of the shaft by the thumb, index finger, and

middle finger. These fingers alone are used to implement the upward and downward motions for striking the instrument. However, when a player uses the Stevens grip, the inner mallet is positioned so that the shaft of the mallet protrudes from the center of the palm. The differences in how the inner mallets are held are a direct result of the contrasting materials used to produce mallets, and the contrasting ways each four-mallet grip manipulates the mallets.

A defining characteristic is how each grip operates the mallets in the way they each execute a down stroke with the inner mallets. While using the Stevens grip, the player uses the supinator and pronator muscles in the forearm to rotate the inner mallets around the median of the arm. This motion allows for the mallets to be raised and lowered engaging in a successful down stroke. It is this rotary motion that allows players to successfully attempt one-handed rolls and Baroque trills. Also, because of the rotary motion of the Stevens grip, the need to move the outer mallets out of the way for melodic passages is no longer a concern. Instead of the rotary motion featured in the Stevens grip, the Musser grip makes use of a vertical motion controlled by a combination of the lumbrical muscles, the dorsal interosseous muscles, and the palmar interosseous muscles found near the base of each finger.⁴⁵ By using these muscles, the player is able to lift the mallets up and force the mallets back down allowing for a successful down stroke.

As mentioned previously, users of the Musser grip would have utilized mallets that were shorter, lighter, and made of flexible materials. This made it possible for the thumb, index finger, and middle finger to manipulate the inner mallet with such limited strength. The Stevens grip does not implement such a technique, but instead relies on the strength from the forearm as it rotates. Such an increase in power exerted on the inner mallets allows for the utilization of longer and heavier mallets. Using these mallets while implementing the Musser grip would put far too

⁴⁵ Gerhard Wolf-Heidegger and Petra Köpf-Maier, *The Color Atlas of Human Anatomy*, (New York City: Sterling Publishing Company Incorporated, 2006), 52-9.

much strain on the aforementioned muscle groups rendering the technique ineffective.

The ability to increase and decrease the distance between the inner and outer mallets in each hand is another inherent difference between these two grips. While using the Stevens grip, one would use the thumb to roll the shaft of the mallet across the length of the index finger using the center of the palm as a pivot point in order to alter the distance between the inner and outer mallets. While using the Musser grip, the thumb and index finger act as a fulcrum. The thumb moves up and down the length of the mallet's shaft which allows for the spreading and condensing of the space between the inner mallet and outer mallet. Also, in order to reach extremely wide intervals, the thumb pushes the inner mallet further away from the outer mallet by moving over to the other side of the mallet's shaft which forces the butt of the mallet to be held by the index and middle fingers as they curl around the bottom of shaft.

In spite of their differences, the Stevens grip and Musser grip do have some common characteristics. They both operate each mallet independently, and they each hold the inner and outer mallets using the same fingers. The Stevens grip was similar enough to the Musser grip that it allowed Vida Chenoweth, a pupil of Musser and master of the Musser grip, to successfully instruct Stevens on marimba performance practices. However, there are too many differences to account for in the mechanics of these two grips for the Stevens grip to be considered merely a modified Musser grip. Despite the fact that the Stevens grip was undoubtedly inspired by the Musser grip, the techniques that Stevens employs bear little resemblance to its predecessor.

The Origins of the Cross Grip

The cross grip is the oldest and most widely practiced four-mallet grip to be adopted by

the percussion community.⁴⁶ It is known by many other names including the Delecluse grip, the traditional grip, the scissor grip, the V-grip, and the X-grip. Although it is the most widely used four-mallet grip, its origins are in question. Similar to the way that keyboard percussion instruments can be found in several countries around the world without any one particular point of origin, so too can one find musicians using four-mallet grips that are identical to the cross grip. It is thought that people are instinctively drawn to use the cross grip, and that the method by which one holds the mallets has no distinct origin.

It has been suggested that it is the most “natural” and non-intrusive four-mallet grip, and therefore, can be easily learned without formal instruction.⁴⁷ It has been documented that the native marimbists of Africa and Central America implement cross grip-like techniques when using three or more mallets. There are many examples of percussionists who started using the cross grip when they began to play using a four-mallet technique only because they were trying to teach themselves how to play with four mallets. Linda Pimentel, the marimba clinic editor for *Percussive Notes*, is among these self-taught percussionists.⁴⁸ The cross grip was very popular among vibraphonists well into the 1970's, and it is still popular among marimbists today.⁴⁹ Some examples of accomplished marimbists that currently use cross grip in their performances include Nancy Zeltsman, Keiko Abe, Marta Kilmasara, and Katarzyna Mycka.

Cross Grip

Keiko Abe, one of the world's foremost marimba virtuosos, composers, and teachers,

⁴⁶ Wessela Kostowa and Mark Giesecke, *Compendium of Four-Mallet Techniques for Vibraphone, Marimba, and Other Percussion Instruments* (Frankfurt on Main: Musikverlag Zimmermann, 1996), 7.

⁴⁷ Keiko Abe, emailed to author, February 7, 2011.

⁴⁸ Linda Pimentel, "The Marimba Bar," *Percussive Notes*, Fall 1977, 1.

⁴⁹ Dean Gronomeier, "An Evolution of Keyboard Percussion Pedagogy," *Percussive Notes*, December 1992, 1.

professes that “the cross grip has the benefit of being able to convey the performer’s energy directly to the audience. As cross grip is not difficult to learn, the performer can practice the technique and still feel connected to the music. Also, the performer is able to maintain a large repertoire of music because the cross grip is suitable for expressing a large variety of music. The cross grip is a necessary grip for a soloist who wishes to perform a marimba concerto. This particular grip can maintain a powerful presence with good tone quality without being overwhelmed by the sound of the accompanying orchestra.”⁵⁰ The following is a detailed description of how to utilize the cross grip.

When holding the mallets while using the cross grip, the player must always keep his or her palms parallel to the floor with the thumb resting against the shaft of the inner mallet. The outer mallet is held in between the index finger just above the middle joint and the middle finger at the base joint with the middle finger partially curling around the shaft. The shaft of the mallet passes between the joint and finger tip of the thumb. The shafts of the two mallets are then crossed, one over the other with the shaft of the outer mallet on top of the shaft of the inner mallet. The ring and pinky fingers then curl around the shafts of both mallets at the point at which they cross. The thumb applies pressure to the side of the inner mallet’s shaft when playing large intervals (see figure 6), and to the top of the inner mallet's shaft when playing small intervals (see figure 7). The pressure exerted by the thumb is then counterbalanced by the pressure applied by the ring and pinky fingers. When grasping the two mallets, the mallets should be held at the crossing point approximately three inches from the butts of the shafts; this may vary from person to person depending on the size of the player's hands and the weight of the

50 Keiko Abe, emailed to author, February 7, 2011.

heads of the mallets.⁵¹

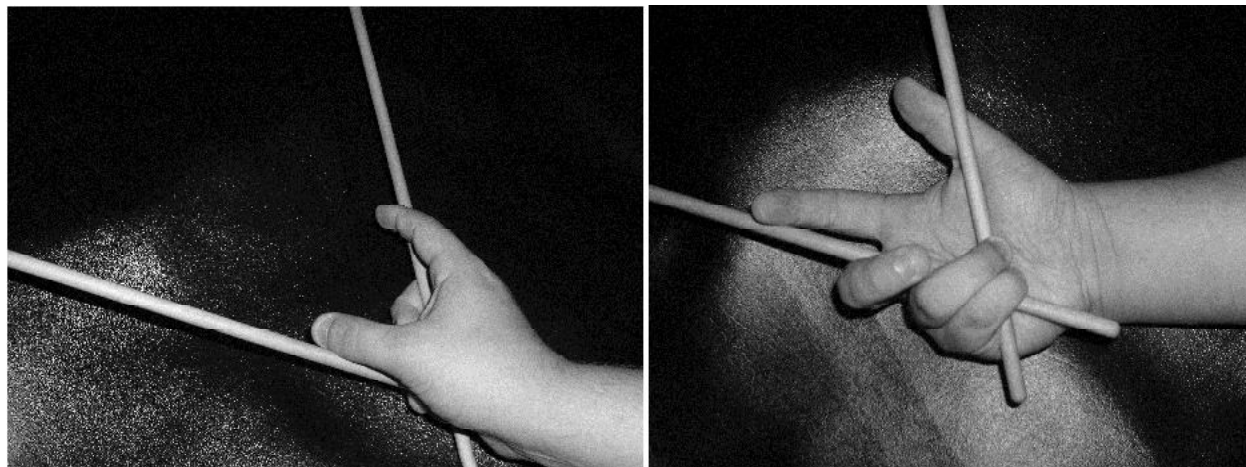


Figure 6. Technique used to achieve large intervals using the cross grip, from above (left), and from below (right)

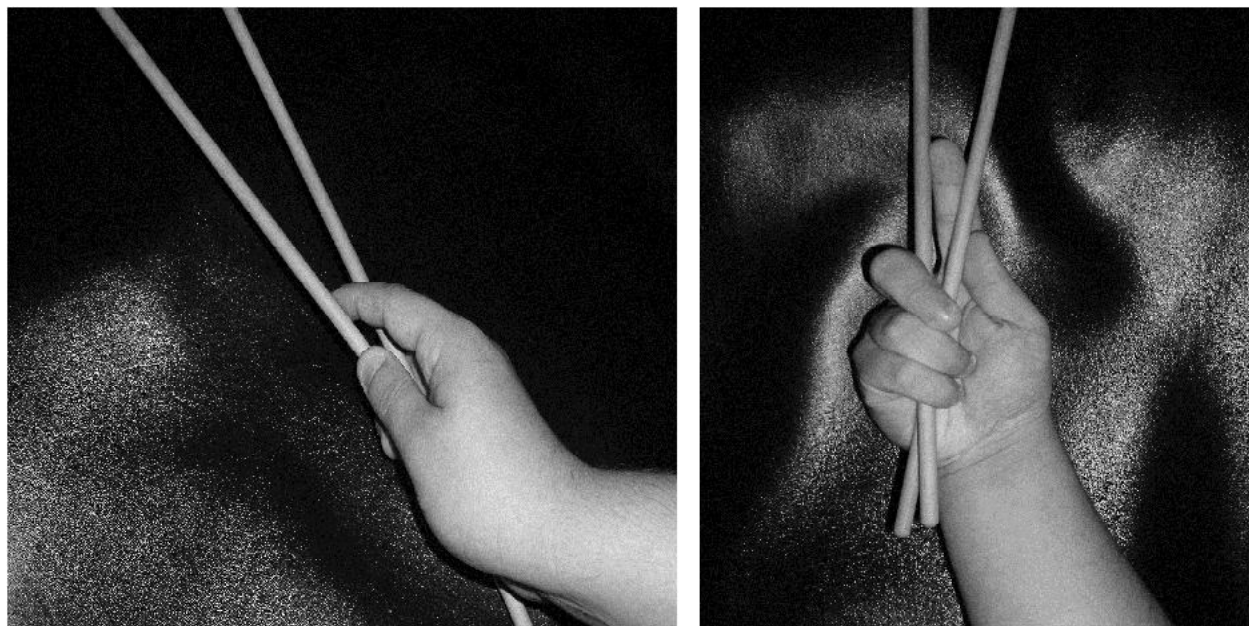


Figure 7. Technique used to achieve small intervals using the cross grip, from above (left), and from below (right)

When using the cross grip, the inner mallets and outer mallets move in opposite directions of each other by means of the rotary movement implemented by the forearm. For example, when playing a melodic figure, the inner mallets would be used. When the inner

51 Nancy Zeltsman, "Traditional Four-Mallet Grip," *Percussive Notes*, August 1995, 1-2.

mallets are forced down to strike the keys, the outer mallets are forced up in the opposite direction. The same is true when using the outer mallets to strike different keys. As the outer mallets are forced down, the inner mallets are forced up the opposite direction. This is because the mallets are crossing in the palm of the hand and are not being held independently from one another.⁵² The previously mentioned method of rotation in the forearm also allows for one-handed rolls, similar to the Stevens grip, but is not well suited to perform Baroque trills, or a “Stevens-tremolo.”⁵³

In order to play multiple notes at the same time, the mallets are held at the same height, and the upward and downward motions of the mallets are controlled by the wrist joint acting as a fulcrum. In order to change intervals, the outer mallet remains stationary while the thumb pushes the inner mallet closer to the outer mallet for smaller intervals, or the thumb can push the inner mallets away from the outer mallet for larger intervals. For extremely wide intervals, such as an octave or a major ninth, the ring finger may release its hold at the crossing point and shift its position to just above the crossing point resulting in the pinky finger having sole control over the crossing point. After repositioning the ring finger, it grasps the outer mallet along with the index and middle fingers (see figure 8).⁵⁴

There are several reasons for the success of the cross grip as a prominent grip in the percussion community. One reason is its simple method of holding and using the mallets. Another reason is that the user can play with heavier mallets without straining the muscles and connective tissue in the hands and wrists. The advantage to using heavier mallets is that they allow the player to produce a richer tone than someone using lighter mallets.

52 Mario Gaetano, Jr., "Beginning Four-Mallet Playing," in *Percussion Anthology: A Compendium of Articles from The Instrumentalist on Percussion Instruments* (Evanston: The Instrumentalist Company, 1977), 621.

53 Wessela Kostowa and Mark Giesecke, *Compendium of Four-Mallet Techniques for Vibraphone, Marimba, and Other Percussion Instruments* (Frankfurt on Main: Musikverlag Zimmermann, 1996), 12.

54 Lynn Glasscock, "Four-Mallet Grips," *Percussive Notes*, Fall 1973, 9-10.

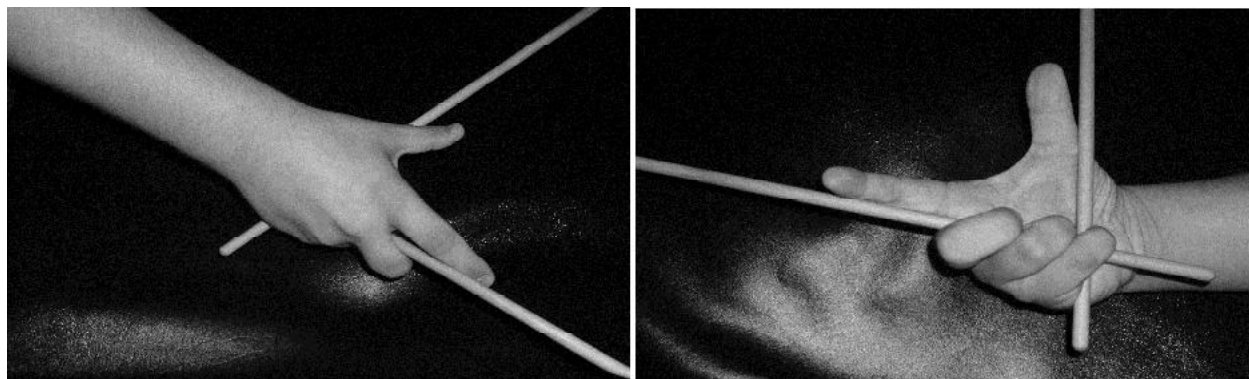


Figure 8. Technique used to achieve extremely large intervals using the cross grip, from above (left), and from below (right)

There are, however, many disadvantages to using the cross grip. These disadvantages stem from the fact that the shafts of the mallets are crossed and are not held independently. The first disadvantage is the “clicking” sound that can be heard during practice, or during a performance. This “clicking” sound is made by the shafts of the mallets tapping each other at the crossing point in the palm of the user's hand.⁵⁵ Another disadvantage is that interval changes are slow and can be a great hindrance when attempting to play pieces that require quick interval changes. Also, the cross grip can at times be limiting when attempting to play wide intervals.⁵⁶ Finally, the cross grip does not allow for the level of ease in contrapuntal playing that can be found while utilizing other grips. Each mallet is affected in the way it moves by the movements of the other mallet. Despite these disadvantages, the advantages to using the cross grip allow it to be the most widely taught and used four-mallet grip in the world.

Gary Burton

Unlike the virtuosi mentioned previously, Gary Burton pursued and excelled at a

⁵⁵ Ney Rosauero, "Crossing Grip Extensions," *Percussive Notes*, February 1998, 1.
⁵⁶ Wessela Kostowa and Mark Giesecke, *Compendium of Four-Mallet Techniques for Vibraphone, Marimba, and Other Percussion Instruments* (Frankfurt on Main: Musikverlag Zimmermann, 1996), 12.

completely different instrument known as the vibraphone, or the vibraharp. The vibraphone is similar to the marimba in that it is a keyboard percussion instrument, but differs in that the bars are made of metal (i.e. anodized aluminum) instead of wood, the accidental bars are not elevated as seen on a marimba or a xylophone, and the vibraphone has a pedal which controls a felt covered mechanism residing under the bars called a dampener. The dampener is used to control the resonance and sustain of the instrument. Another difference between the vibraphone and the marimba is the presence of revolving metal stoppers located at the top of the resonators. The spinning action of these metal stoppers produce a tremolo effect, but is often incorrectly identified as a vibrato effect.⁵⁷ The speed at which the axle and metal stoppers rotate are controlled by a mechanism called the motor commonly found at the high end of the instrument. “...The vibraphone is quite a versatile instrument. It can function in a lot of different settings. It is one of the few instruments that can play unaccompanied and sound complete,” says Gary Burton in an interview with Randy Eyles for *Percussive Notes*.⁵⁸ The vibraphone is used in many genres of music, but is most notable for its influence in jazz.

Gary Burton was born in Anderson, Indiana, on January 23, 1943. He first began his studies in music as a melodic percussionist playing on the xylophone and the marimba, and later switched to the vibraphone. He was introduced to the marimba when he was six-years-old. His older sister was learning to play the piano, and his parents thought that he might want to learn how to play an instrument as well. They took the young Burton to a series of recitals featuring different instruments. It was at a marimba recital where he decided that he wanted to learn how to play the marimba, and subsequently the vibraphone. His first instructor would be the performing marimba recitalist.

⁵⁷ Vic Firth Company, “An Overview of the Vibraphone and History of the Instrument,” http://www.vicfirth.com/education/keyboard/burton/burton_lesson01HQ.html (accessed March 20, 2011).

⁵⁸ Randall Eyles, “A Conversation with Gary Burton, Part 1,” *Percussive Notes*, Winter 1987, 2.

Burton began taking lessons as he was first acquainting himself with playing mallet instruments. Burton's instructor taught him to play popular tunes and transcriptions of classical pieces. Burton was also taught how to interpret chord symbols, and was encouraged to improvise introductions and transitions. These lessons introduced him to the basics of jazz music early on in his life, and led to him being very receptive to playing jazz music.⁵⁹

In high school, Burton first began using cross grip when he was playing with four mallets, but realized that he was not able to play melodic figures as well as he could when he played using only two mallets. He would frequently have ideas for a four-note chord when he was playing improvised solos with two mallets. During his sophomore year of high school, he decided that he needed to hold four mallets at all times during a performance so that he could make use of chords while he was improvising his solos. Another reason for Burton wanting to play with four mallets was his desire for a more “complete” sound. Because he grew up in a small town, there were very few musicians to play with, and he wanted the sound of his playing to feature a bass line, harmony, and a melody. All of which were attainable by one person while using four mallets.

He began experimenting with variations on the cross grip and came up with his own grip, currently known as the Burton grip.⁶⁰ Since there were not any other mallet players that lived near Burton when he was growing up, he had no way of comparing his style and technique to that of other percussionists.⁶¹ Therefore, he had no one to tell him that playing with four mallets all the time was unusual and impractical.

Burton did not play in any school ensembles simply because there was no need for a

59 Harold Howland, "Gary Burton: The Enfant Terrible at Forty, Part 1," *Percussive Notes*, April 1983, 1-2.
60 Vic Firth Company, "The 4 Mallet (Burton) Grip," http://www.vicfirth.com/education/keyboard/burton/burton_lesson05HQ.html (accessed December 31, 2010).

61 Jim Petercsak, "A Profile of Gary Burton: The Man and His Music," *Percussive Notes*, Winter 1974, 1.

vibraphonist, but by the time he was entering his junior year, he was performing with local groups on vibraphone and piano. He never formally studied piano. Everything he knew about playing the piano was self-taught based on his knowledge of the vibraphone. By doing so, he was convinced that the vibraphone should be considered a closer relative to the piano as opposed to being considered a relative to any of the non-keyboard percussion instruments.⁶²

As Burton was finishing his final year of high school, Hank Garland, a studio musician from Nashville, Tennessee, mentioned to Boots Randolph, a saxophonist who often performed in Nashville and lived near Burton's hometown, that he was planning to record a jazz album and wished that he had someone who could play the vibraphone. Randolph suggested that Burton should be the vibraphonist for Garland's new album. Randolph brought Burton to Nashville where Burton recorded with Garland. Afterward, Burton left Nashville to pursue his studies at Berklee College of Music, and would be distinguished by already having a record contract with RCA Records.⁶³

He left his studies a year later to pursue a performance career with George Shearing and Stan Getz. While performing in Stan Getz's quartet, Burton won *Down Beat Magazine's* Talent Deserving of Wider Recognition award in 1965, and he had recorded three albums with RCA Records. Burton tended to borrow rhythms and sonorities from rock music while maintaining the improvisational styles and harmonic intricacies of jazz music. He left Getz's group in order to form his own group in 1967, and attracted fans of both jazz and rock. By releasing albums like *Duster* and *Lofty Fake Anagram*, Burton and his quartet established themselves as members of the first generation of jazz fusion musicians.

Down Beat Magazine confirmed Burton's quickly growing popularity by awarding him

62 Harold Howland, "Gary Burton: The Enfant Terrible at Forty, Part 1," *Percussive Notes*, April 1983, 2-3
63 Rick Mattingly, "Gary Burton: The Innovators of the Vibraphone," *Percussive Notes*, October 1999, 2-3.

the Jazzman of the Year award in 1968. Burton was the youngest to ever receive this award. In the 1970's, Burton decided to focus more on being a solo vibraphonist, and recorded his first solo album in 1971. His 1971 album, *Alone at Last*, was recorded at the Montreux Jazz Festival, and led Burton to his first Grammy Award. Burton's other notable accomplishments in the 1970's were a result of his work at Berklee College of Music. He became a percussion instructor and a teacher of improvisation at Berklee in 1971.⁶⁴ At first, he found being a private instructor tedious and time consuming. The reason for his disinterest in teaching was due to his own personal need to develop his identity as a musician and distinguish his style of playing from other vibraphonists. Once he was satisfied with his personal goals as a professional jazz vibraphonist, he began to enjoy his teaching position.⁶⁵

In addition to all his responsibilities and duties at Berklee, he was still touring and recording with some of the greatest musicians at the time like bassist Steve Swallow, guitarists Ralph Towner and Pat Metheny, and pianists Makoto Ozone and Chick Corea. The albums subsequently produced led to Burton being awarded with several Grammy awards, and the number one spot on *Billboard Magazine's* jazz chart with the release of his 1990 album, *Reunion*. Burton has had the opportunity to record under several different recording labels including RCA Records, Atlantic Records, ECM Records, GRP Records, and Concord Records.

He was named Dean of Curriculum at Berklee in 1985, and in 1989, he received an honorary doctorate in music from Berklee. He was then appointed as the Executive Vice President, responsible for supervising the daily on-goings of the college, in 1996. In 2002, the album *Virtuosi*, a Burton and Ozone collaboration that featured improvisational possibilities of symphonic themes found in works like those of Brahms, Scarlatti, Ravel, and Barber, was

⁶⁴ Gary Burton Homepage, "Gary Burton Biography," http://www.garyburton.com/display_page.php?id=2 (accessed December 31, 2010).

⁶⁵ Jim Petercsak, "A Profile of Gary Burton: The Man and His Music," *Percussive Notes*, Winter 1974, 2.

honored with a Grammy nomination in the Classical Music category; this was a unique honor for the both of them. Burton announced his retirement from his position at Berklee in 2003, and assembled a group that he toured with called Generations. They toured regularly through 2006 and released two albums, *Generation* and *Next Generation*. In 2008, Burton gave a live performance with Chick Corea which was recorded and released on *The New Crystal Silence* album which led to another Grammy Award in 2009.⁶⁶ To this day, Burton continues to tour the world with accomplished artists such as Chick Corea, Antonio Sanchez, Julian Lage, and Scott Colley, and he continues to record with labels such as Concord Jazz and Mack Avenue Records.⁶⁷

Burton Grip

Gary Burton made many changes to the cross grip that were essential to developing his four-mallet grip. Although Burton clearly based his grip on the cross grip, the technique and methodology of his playing is, without a doubt, unique to his style. His ideas for the changes that he made to the cross grip are attributed to his own creativity and ingenuity. As there was no one to guide him in his endeavors to learning to play with four mallets, Burton was limited solely by his own imagination and physical abilities. In the case of the Burton grip, necessity was the mother of invention. The following is a detailed description of how to utilize the Burton grip.

When holding the mallets, while using the Burton grip, the player must always keep his or her palms parallel to the floor with the thumb resting against the shaft of the inner mallet. The outer mallet is held between the index finger and the middle finger just below the middle joints, and remains stationary at all times. The inner mallet is then placed between the index finger and

⁶⁶ Gary Burton Homepage, "Gary Burton Biography," http://www.garyburton.com/display_page.php?id=2 (accessed December 31, 2010).

⁶⁷ Gary Burton Homepage, "Gary Burton Biography," <http://www.garyburton.com/biography> (accessed June 8, 2015).

the thumb with the shaft of the mallet passing through the index finger's middle joint. The thumb rests against the side of the shaft of the mallet. The shafts of the two mallets are then crossed, one over the other with the shaft of the inner mallet on top of the shaft of the outer mallet. The index finger and pinky finger wrap around the shaft of the inner mallet while the middle finger and ring finger wrap around the shafts of both mallets at the point at which they cross (see figure 9).⁶⁸

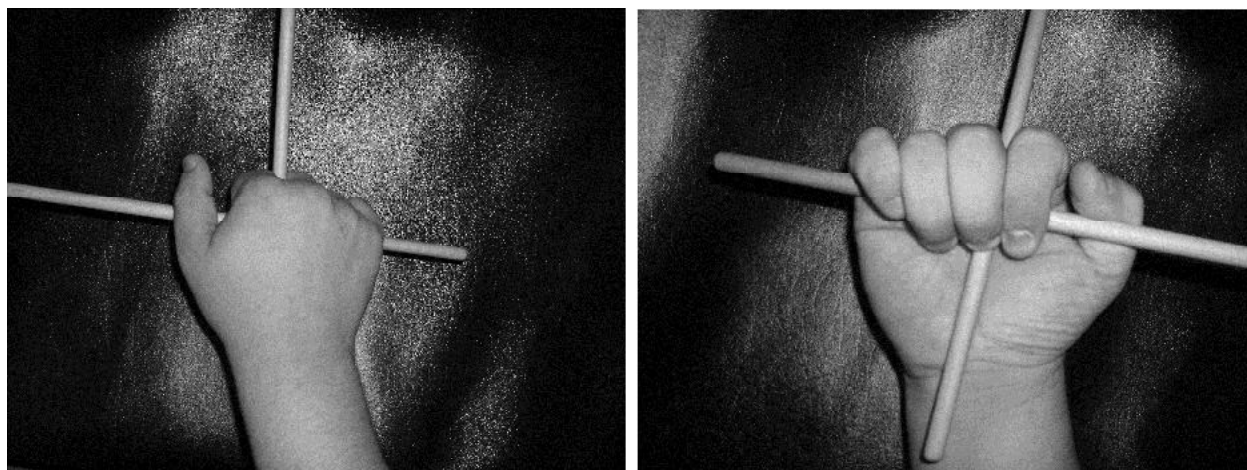


Figure 9. Burton grip, from above (left), and from below (right)

When using the Burton grip, the mallets in the right hand and the mallets in the left hand are operated differently. Unlike what has been discussed in regards to the other grips, the Burton grip does not feature the uniformity, or the symmetry that is present when utilizing the other grips previously discussed. Typically, the inner mallets of both hands would be used when playing melodic figures; however, when practicing with the Burton grip, the inner mallet of the left hand, and the outer mallet of the right hand are used to play melodic figures. In the right hand, the user holds the pair of mallets at a ninety degree angle. The inner mallet is held close to the player with the mallet pointing across the player's body, and the outer mallet is held away from the player with the mallet pointing towards the instrument.

⁶⁸ David Samuels, *A Musical Approach to Four Mallet Technique for Vibraphone* (New York City: Excelsior Music Publishing Company, 1982), 3-4.

This method of holding the mallets allows the user to hold four mallets, but still be able to play melodic figures without the intrusiveness of the second mallet. When using the other grips, the outer mallets are typically considered to be obstructive, and each grip is unique in how their inherent mechanics cope with the outer mallets by continuing to utilize them, but without interfering with the operations of the inner mallets. Their creators visualize the inner mallets as the two mallets that would be used for melodic figures, and the outer mallets are seen as extensions of the basic use of two mallets. However, when using the Burton grip, the outer mallet in the right hand is considered the mallet used for melodic figures while the inner mallet is seen as the extension of the basic use of two mallets.

By using the outer mallet in this fashion, the user is able to rotate the outer mallet around the axis of the inner mallet. This technique greatly reduces excess movement in the mallet not being used and maintains the vertical motion that all percussionists are accustomed to in order to strike the bars. Although, this contrasts with the rotary technique employed in the Stevens grip and the cross grip, the same cannot be said of the technique employed in the left hand. The mallets in the left hand are used in such a way that the inner mallet is the mallet being used to play melodic figures by rotating the mallets around the median of the arm and using the thumb to force the mallet down in order to strike the keys.⁶⁹ In fact, the methodology in using the mallets in the right and left hands in this way is almost identical to the way someone would play a snare drum using the traditional grip.⁷⁰

In order to play multiple notes simultaneously, the mallets are forced up and down using the wrist joint as a fulcrum. In order to change the intervals, the ring finger and the pinky finger are used to pull and push the inner mallet causing the intervals to increase and decrease

⁶⁹ Gary Burton, *Four Mallet Studies* (Glenview: Creative Music, 1995), 4-5.

⁷⁰ Mark Ford, "Four-Mallet Grips: Burton Grip" (lecture, West Boca Raton Community High School, Boca Raton, FL, April 23, 2005).

respectively; the index finger also facilitates in this procedure. The middle finger is used to keep the outer mallet stationary, and unlike the other aforementioned grips, the thumb shares no role in this process.⁷¹ Also, because this grip allows for the mallets to rotate around the median of the arm, like the Stevens grip and the cross grip, the implementation of one-handed rolls is made possible.

A Comparison of the Cross Grip and the Burton Grip

There are many differences between the cross grip and the Burton grip. Although these two grips look very similar, the differences in the way that these two grips are utilized is what sets them apart from each other. The most significant differences that will be discussed are those in the way the mallets are held, the techniques used to strike the bars, and how the grips change intervals. The following is a detailed comparative analysis of these two four-mallet grips.

The most significant difference between the cross grip and the Burton grip, is the way the mallets are held. In both grips, the mallets are crossed, one over the other, in the palm of the hand. However, while using the cross grip, from the perspective of the player looking at the mallets with his or her palms facing up, the outer mallet is crossed over the inner mallet. While using the Burton grip, looking from the same perspective, the inner mallet is crossed over the outer mallet. It is this small deviation between the two techniques that makes the way they change intervals and strike the bars of an instrument drastically different.

What is quite possibly the most unique characteristic of the Burton grip is the way the mallets are used to play melodic figures. Unlike the cross grip which uses both inner mallets to play melodic figures, the Burton grip makes use of the inner mallet of the left hand and the outer

⁷¹ Gary Burton, *Four Mallet Studies* (Glenview: Creative Music, 1995), 5.

mallet of the right hand. The way the mallets are used in the left hand while playing with the cross grip and the Burton grip is identical in this case. What makes the Burton grip unique is how it makes use of the outer mallet in the right hand. While using the cross grip, the inner mallet is utilized by rotating the pair of mallets around the median of the arm in order to initiate the down stroke. This is also how the mallets in the left hand are used while playing with the Burton grip; however, while using the Burton grip, the mallets in the right hand are held at a ninety degree angle with the inner mallet held close to the player and pointing across the player's body, and outer mallet held away from the player and pointing towards the instrument. The outer mallet is then allowed to rotate around the axis of the inner mallet in order to initiate the down stroke.

It is important to note that rotating the outer mallet around the axis of the inner mallet, as featured in the Burton grip, is not the same as rotating a pair of mallets around the median of the arm as seen in the cross grip. These two methods exercise different muscles. As explained previously in this document, the act of rotating the mallets around the median of the arm is controlled by the supinator and pronator muscles located in the forearm while the act of rotating the outer mallet around the axis of the inner mallet allowing for the mallets to move vertically is controlled by the extensor, flexor, and abductor muscles which are also located in the forearm.⁷² The technique featured in the Burton grip is advantageous to the inexperienced percussionist who is first learning to play with four mallets because the act of rotating the outer mallet around the axis of the inner mallet simulates the feeling of holding only two mallets, as opposed to four. In addition, the motion controlled by the extensor, flexor, and abductor muscles is a more natural gesture than the rotary motion of the supinator and pronator muscles.

The final difference that will be discussed is the method used to change intervals. While

⁷² Gerhard Wolf-Heidegger and Petra Köpf-Maier, *The Color Atlas of Human Anatomy*, (New York City: Sterling Publishing Company Incorporated, 2006), 52-4.

using the cross grip, the thumb controls how close, or far apart the mallets are from one another. The outer mallet remains stationary while the thumb pushes the inner mallet closer to the outer mallet for smaller intervals, and away from the outer mallet for larger intervals. For much wider intervals, like an octave or a major ninth, the ring finger may release its hold at the point at which the mallets are crossing and move from the crossing point to just above the crossing point. Doing this results in the pinky finger holding sole responsibility for supporting the mallets at the crossing point while the ring finger grasps the outer mallet along with the index and middle fingers.

This method contrasts from that of the Burton grip. While using the Burton grip, the ring finger and the pinky finger maintain total autonomy over the distance between the inner and outer mallets. With the aid of the index finger which is responsible for supporting the inner mallet, the ring and pinky fingers pull the inner mallet in order to achieve a large interval, and push the inner mallet in order to achieve a small interval. The middle finger is used to keep the outer mallet stationary, and the thumb has no role in the process. However, the Burton grip has no method for reaching extremely wide intervals. This is because Burton developed his grip as a means for improving his performance on the vibraphone which does not share the wide acoustical range of a marimba. The only characteristic of the method employed when using the Burton grip that shares any similarity to the method employed when using the cross grip is that while using either grip, the outer mallet remains stationary.

Both the cross grip and the Burton grip are widely used by marimbists and vibraphonists. The only factor in deciding which technique a percussionist will use is preference. Preference for one grip over the other is based on practicality during a performance situation. Each grip has its own advantages, and many percussionists are able to utilize both grips with equal mastery.

A Comparison of the Independent Grips and the Crossed-Stick Grips

This document has discussed the origins and pedagogy of the Musser grip, the Stevens grip, the cross grip, and the Burton grip. These four grips fall under two distinct categories. The Musser grip and the Stevens grip are categorized as independent grips, and the cross grip and Burton grip are classified as crossed-stick grips. There are advantages and disadvantages to both. The major differences between these two types of four-mallet grips can be seen in the way the mallets are held, the level of independence that each mallet afforded, the ability for contrapuntal playing, and the muscle groups that are exercised during the implementation of various techniques. The following is a comparative analysis of independent grips and crossed-stick grips.

The first difference that will be discussed is the way the mallets are held while using independent grips and crossed-stick grips. While using the independent grips, the mallets never come into contact with one another. The mallets are separated by two fingers, the index finger and the middle finger, and each mallet is supported by separate groups of fingers. The inner mallet is supported by the thumb, index finger, and middle finger, while the outer mallet is supported by the ring finger and pinky finger.

This configuration contrasts from that of the crossed-stick grips. While using the crossed-stick grips, the mallets come into contact in the palm of the hand. The name-sake of crossed-stick grips comes from the fact that the shafts of the mallets cross, one over the other, at the center of the palm of the hand. A drawback to letting the mallets touch is that the mallets tend to “click” against one another during practice. This sound can be very distracting to both the user and the audience.⁷³ The mallets are separated by only one finger, the index finger, and each mallet is controlled by separate groups of fingers. While using the cross grip, the inner mallet is controlled

73 Vida Chenoweth, "Four-Mallet Technique," *Percussionist*, December 1963, 1.

solely by the thumb with the exception of the index finger while playing small intervals. The outer mallet is controlled by the index finger and the middle finger, and is supported by the ring finger and the pinky finger. This is not the case when using the Burton grip. When using the Burton grip, the inner mallet is controlled by the thumb, the index finger, the ring finger, and the pinky finger, and the outer mallet is controlled by the index finger and the middle finger.

Another difference between the independent grips and the crossed-stick grips pertains to the level of independence afforded to each mallet. The level of independence that each mallet retains in an independent grip is much greater than that of the crossed-stick grips. This is because the mallets are not touching in the independent grips as they are in the crossed-stick grips. However, this does not mean the mallets are completely dependent upon each other when using crossed-stick grips, nor does it mean that the mallets are completely independent of each other when using independent grips. This means that there is the possibility for the mallets in independent grips to be affected by the actions of one another, and the mallets in crossed-stick grips to not affect one another.

In the crossed-stick grips, whenever one mallet moves in one direction, the other mallet is forced to move in the opposite direction. However, there is the possibility for each mallet to rotate around the axis of its counterpart. This possibility allows for some independence, however limited. When using one of the independent grips, the mallets are affected only by the residual motion in the hands and not as a direct consequence of moving the other mallet. Although this does not mean that the mallets are dependent upon each other, it does mean that the movements of one mallet can, at times, affect the actions of the other mallet.

The level of independence among each mallet directly affects the ability for contrapuntal playing, or the ability to use each mallet the same way a pianist uses each of his or her fingers.

Contrapuntal playing is much easier to implement when using an independent grip than it is when using a crossed-stick grip. This is a reflection of the fact that independent grips hold each mallet without letting them touch which leads to the fact that each mallet is unaffected by the actions and movements of the other mallets. Because the crossed-stick grips do not share these qualities, the crossed-stick grips are at a disadvantage when playing contrapuntally.

Another significant difference between independent grips and crossed-stick grips is the use of different muscle groups that control the movements of the mallets. This is important to note because the different muscle groups have a direct impact on comfort, fatigue, and the possibility of sustaining injuries to the tendons, ligaments, and muscles in the wrists and hands. Two of the most common injuries sustained by percussionists are carpal tunnel syndrome and tendonitis. These injuries can occur from the overuse, or misuse of four-mallet grips.

When using independent grips the majority of the tension and pressure is exerted upon the muscles in the hand in order to maintain control over the mallets during practice. The Musser grip, for example, relies heavily on a small group of muscles located at the base of the fingers while the cross grip and the Burton grip rely on the larger, and stronger muscles of the forearm. The Stevens grip relies on the muscle groups in the hand and to a limited degree the fingers as well, though not to the extent of the Musser grip. Stevens' modification to the Musser grip that allows the user to exercise the forearm muscles to initiate the down stroke makes it a much more comfortable grip to use in comparison to the Musser grip.

When using the crossed-stick grips, though, one can produce a fuller tone, and a louder volume than someone using the independent grips. This is also a result of the muscle groups that are used. Larger muscle groups are exercised when utilizing a crossed-stick grip, and the crossed-stick grips do not rely on the muscles in the hands and fingers to initiate the down stroke.

This allows for the use of mallets with a heavier core, and it allows for more force to be exerted when playing. Both of which result in producing a better tone.⁷⁴ While the Stevens grip can produce a substantial amount of power due to its reliance on the muscles in the forearm, it is difficult to use mallets with a heavier core because the grip still relies of the smaller muscle groups in the hands and fingers to support the mallets' weight. Using heavier mallets would increase the rate of fatigue, and could lead to injury due to over exertion. While such things may not be of great concern during a solo performance, it is an important issue to consider when allowing students to play with four mallets in marching band, or when rehearsing a marimba, or vibraphone concerto.

The Issue of Standardizing a Four-Mallet Grip

With so many different four-mallet grips to choose from, and with each grip retaining its own advantages and disadvantages, it is difficult for a beginning four-mallet student to decide on which grip to choose. Many percussionists will promote the grip that they use and claim that it is the best four-mallet grip. However, this is most certainly not true. It all depends upon the user and the situation. One grip can be more suitable than another for a person with specific anatomical features. One grip can also be more advantageous than another due to the kind of music being played whether it is a solo instrument or an instrument in an ensemble. The percussionist should also consider what techniques are being required by the composer.

Someone with small hands and short fingers would probably find it difficult to use one of the crossed-stick grips, and would most likely be comfortable with using one of the independent grips. However, someone with large hands and long fingers would most likely find it easier to

⁷⁴ Nancy Zeltsman, *Four-Mallet Marimba Playing: A Musical Approach for All Levels* (Milwaukee: Hal Leonard, 2003), 8-9.

use one of the crossed-stick grips as opposed to one of the independent grips. Also, a player with weak arm muscles, but strong hand muscles would probably be better suited for one of the independent grips while someone with strong arm muscles, but weak hand muscles would be more likely to learn one of the crossed-stick grips.⁷⁵ Someone who is playing a solo instrument does not require the power facilitated by the crossed-stick grips as there are no other instruments to contend with while someone who is playing in a percussion ensemble or performing a concerto would want the power of a crossed-stick grip.

An instance in which one may want to use an independent grip, specifically Stevens grip, is when being confronted with tremolos and trills. It is possible to play tremolos and trills with crossed-stick grips, but they are not as well suited to do so. Also, someone who needs a large range of intervals would want to use one of the independent grips as the crossed-stick grips, especially the Burton grip, are limited when playing large intervals.⁷⁶ As each four-mallet grip has its own advantages and disadvantages, it is up to the student and the instructor to choose the most suitable four-mallet grip. Perhaps the most logical approach to learning a four-mallet grip is to learn them all, and to employ them all as each unique situation arises.

Conclusion

Other related topics that should be further researched are the origins and mechanics of additional grips like the Stout grip, the Extended Cross grip, and the Mainieri grip. The origins and practical uses of any and all six-mallet grips should also be further researched. Also, some other related topics that should be further studied are the effects of long term use of four-mallet

⁷⁵ Nancy Zeltsman, *Four-Mallet Marimba Playing: A Musical Approach for All Levels* (Milwaukee: Hal Leonard, 2003), 2.

⁷⁶ Wessela Kostowa and Mark Giesecke, *Compendium of Four-Mallet Techniques for Vibraphone, Marimba, and Other Percussion Instruments* (Frankfurt on Main: Musikverlag Zimmermann, 1996), 12.

grips on the muscular-skeletal structure of the hands and forearms as well as which four-mallet grips are preferred and safest to use by students and teachers in high school concert and marching band programs.

After thoroughly researching the history and mechanics of the Musser grip, the Stevens grip, the cross grip, and the Burton grip, there is no conclusive evidence that suggests that one grip is better than the rest. The different grips employed should be decided upon by both the student and the teacher keeping in mind the following three things: the student's anatomical features (i.e. palm size, finger length, and hand and arm strength), the type of performance for which the student is preparing, and the musical demands of the work being performed. Otherwise, each grip has its advantages and disadvantages. The best advice to a young percussionist would be to learn how to utilize all of the different grips, or to incorporate elements of each grip into the percussionist's playing style. The author, for example, is proficient in performing with the Stevens grip, but chooses to employ the Musser grip's technique for reaching wide intervals. Incorporating all of the different grips and techniques would equip a student with a wide array of performance methods that would be suitable for various situations.

There is, however, conclusive evidence to suggest that the Musser grip has fallen out of favor, and should be considered obsolete. The Musser grip, for all intents and purposes, is rendered unusable for current percussionists. The grip itself is clumsy, and can be painful at times due to the large amount of tension in the hands. It was also meant to make use of short and light mallets. The kind, of which, are no longer in production since longer and heavier mallets became standardized. Using the mallets that are available on the current market would be impractical for a user of the Musser grip. The weight and length of the mallets alone would make using the Musser grip far more difficult to employ in comparison to the other grips discussed.

Continuing to use the Musser grip with the mallets currently available would surely lead to injury.

The Stevens grip should primarily be used for solo and chamber ensemble performances. The amount of pressure that it exerts on the muscles and tendons of hands and fingers is far less than that of the Musser grip, but still greater than the crossed-stick grips. It is, however, a flexible grip that allows for great mobility. Due to its nature, one-handed rolls and Baroque trills are accomplished with ease. Contrapuntal playing is also an advantage to using such a grip. However, it is more difficult to learn and master the Stevens grip as opposed to one of the crossed-stick grips. This is due to the awkward hand positioning, and the unnatural rotary movement.

This unnatural rotary movement is also shared by the cross grip, but the cross grip allows for comfortable hand positioning. It relies very little on the muscles in the hands and fingers with the exception of changing intervals. It makes the most use of the larger muscles in the forearm. Because of this, it is easy to make use of heavier mallets which results in better tone production. Therefore, the cross grip is exceptionally suited for large ensemble performances when the keyboard instrument must contend with the rest of the ensemble. However, the manner by which the user changes intervals makes the grip a very restricting. It is also not as easy to initiate techniques such as one-handed rolls and Baroque trills. While it is an easy grip to learn, it is still difficult to master.

The Burton grip makes use of both the vertical movement and the rotary movement, and it relies on the muscle strength of the forearms as opposed to the hands and fingers. This allows the user to exert a great deal of force enabling the user to practice with heavier mallets much like the cross grip. It is easy for someone to learn the Burton grip due to the natural feel of the

vertical movement. It has also been described as being similar to playing with two mallets, and playing the snare drum while employing the traditional grip. This not only makes the grip easy to learn, but allows for the transference of knowledge and skills from one percussion instrument to another. Implementing both the rotary movement and the vertical movement makes the Burton grip both unique and exceptionally versatile. The Burton grip is also very well suited for large ensemble performances. However, unlike the cross grip, the Bourton grip employs no method of reaching extremely wide intervals due to the nature of the vibraphone. Despite this, it is the author's opinion that the Burton grip's unique qualities and versatility will one day make the cross grip obsolete just as the Stevens grip eventually replaced the Musser grip.

The invention and innovation of four-mallet grips is a fundamental development in the evolution of keyboard percussion. Without these innovations, keyboard percussion would be where it once was approximately a century ago. The four-mallet grips and techniques that have been developed and demonstrated by Clair Omar Musser, Leigh Howard Stevens, Gary Burton, and the like led to the advancement of keyboard percussion instruments as legitimate orchestral instruments.

Four-mallet grips allowed for the possibilities of being able to accompany one's self by playing the bass line, the harmony, and the melody simultaneously. This inspired composers to write and publish new solo percussion literature which led to the first marimba and vibraphone recitals as well as the first marimba and vibraphone concerti. Also, because of these advancements, a standard goal for all percussionists is to learn to play using four mallets. Over the last one hundred years, there have been many advancements in field of instrument construction, a vast increase in the number of published pieces for solo percussion instruments and percussion ensembles, and advancements made in the art of percussive performances

through the development of the different four-mallet grips that have been discussed in this document. It is for these reasons that “the 20th century is the century of percussion instruments.”⁷⁷

⁷⁷ Philip Metzger, "Percussion will Fill Most Spaces on the Program at Muhlenberg," *The Morning Call*, January 28, 1995.

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