TIMPANI MALLET CHOICES AND HOW THEY AFFECT SOUND AND INTERPRETATION

By

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(Under the Direction of Timothy K. Adams, Jr.)

ABSTRACT

This project demonstrates the difference in tone and sound produced by timpani mallets with different materials, sizes, weight; the information is condensed in a timpani mallet catalog. Younger students, high school students that are learning to play timpani, beginner college music students, orchestra conductors and band directors can learn about timpani mallets and their importance, tradition, and sound characteristics. The mallets discussed in this project are the Cloyd Duff model, Duff model are the best timpani mallets in the market. The catalog provides information about the size, parts, shaft material, felt material, core shape, core material, head heigh size, weight, manufacturer, retailers in the US, retailers in other countries, price range, protection, felt approximate duration, purpose of the mallet, suggested repertoire, and photos of the mallets.

INDEX WORDS: Cloyd Duff, Timpani, Mallet, Core, Felt, Tone, Shaft, Roll, Knob, Adams Philharmonic, Dresden, Hinger Touch Tone, Ludwig Symphonic, Premiere, Ringer, Walter Light

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DEDICATION

To my family

ACKNOWLEDGEMENTS

Thank you to my family, friends and teachers for all the support.

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Chapter 1

Introduction

As a percussionist, I am fascinated by the nuances of timbre across different percussion instruments, that I have worked on during my career as a percussionist. Timpani, snare drum, marimba, vibraphone, and xylophone all have particular ways to be played or to be approached, and it is our job as performers to find the way to get the best sound out of any instrument.

Practicing and spending hours on intricacies of these instruments becomes a deep, focused, and endless process of experimentation and refinement to get the best sound out of them. My research topic discusses timpani mallets and their sound on the timpani, how their texture can change the interpretation of music and the sound of the instrument in performance. This research educates timpani players, conductors, band directors, and music teachers on why the quality and the differences in tone, texture, material, and weight of the timpani mallets are crucial. It broadens the conceptual vocabulary integral to describing sonic and physical experience of timpani playing. Rather than advancing the typical categories of ‘soft' or ‘hard’ I offer more precise terminology for timpani mallet construction and sounds producible by these mallets.

Timpani mallets are comprised of three fundamental parts with varied materials: first, the stick or the shaft, typically made of maple or bamboo, second, the core, mostly made of wood, cork, or felt, and finally, the outer layer of the head

which is usually made of felt.

Timpani players come from different backgrounds, traditions, and places. The instrument can be approached in many ways depending on the country and the culture. Over time, changes made to the instrument have contributed to improving the sound, and therefore the sound of the orchestra or music ensemble.

These nuances of the instrument allow listeners to distinguish between some of the best timpani players in history, such as Cloyd Duff, from The Cleveland Orchestra, Saul Goodman from New York Philharmonic, or Reiner Seegers from Berlin Philharmonic. They can all be easily recognized on recordings due to their sound and approach to playing in their specific orchestras.

Purpose of the Study

There is an extensive amount of literature available on the timpani, including its history, construction, materials, sizes, drumheads, tuning systems, pedals, guides, maintenance, etc. However, only a few documents discuss the importance of timpani mallets and their history and construction. Furthermore, there is also a lack of literature available designed for younger timpani students, band teachers, conductors, music educators, composition students, etc. to guide them and to help them to understand the role of mallets.

My research addresses timpani mallets made of different felts, shaft sizes, weights, and lengths affect sound production on the timpani based on the Duff mallets. It analyzes the literature of the most required excerpts for timpani auditions and discusses the interpretation of those pieces based on the characteristic of the mallet

Lecture Recital Program

Duff 1

Symphony No. 39 by Wolfgang Amadeus Mozart. Mvt. 1, bars 1-21

Symphony No. 7 by Gustav Mahler. Mvt.5, [223] until 2 before [225]

Duff 2

Symphony No. 9 by Ludwig van Beethoven. Mvt. 1,18 before [S] to the end.

Symphony No. 7 by Ludwig van Beethoven. Mvt. 1 bar 89 to 1 after [C]

Duff 3

Symphony Metamorphosis in Themes by Carl Maria von Weber by Paul Hindemith. Mvt. 2, 5 after [V] to 8 after [W]

Symphony No. 5 by Ludwig van Beethoven. Mvt. 3, [C] to the end. Mvt. 4, bar 1-22

Duff 4

Symphony No. 4 by Piotr Ilyich Tchaikovsky. Mvt 1, 6 before [T] to 2 before [V]

New England Triptych by William Schuman. Mvt 1, “Be Glad Then America”, bars 1-13

Duff 5

Concerto for Orchestra by Béla Bartók. Mvt. 4, bars 42-50

Symphony No. 5. by Gustav Mahler. Mvt. 5, 12 after [34] to the end

Duff 6

The Young Person’s Guide to the Orchestra by Benjamin Britten. Variation M (percussion), bars 1-10

Symphony No. 5 by Gustav Mahler. Mvt. 1, bar 316 to [15]

Duff 7

Symphony No. 1 by Johannes Brahms. Mvt. 1, bars 1-9

Symphony No. 1 Dmitri Shostakovich. Mvt 4, solo cadenza at. [35]

Methodology

In this project, I synthesize literature available about timpani mallets with my experience as a performer, along with an interview to a timpani mallet manufacturer, I discuss different kinds of timpani mallets and categorize them, based on sound, quality, price, etc.

The goal is to make the information accessible for students and percussion educators so they can use my research as an educational source. This research can help others to make informed decisions on what mallet to use and what kind of mallet to purchase based on the sound produced.

Cloyd Duff was the solo timpani player of the Cleveland Orchestra for more than forty years, and during his career he made seven pairs of timpani mallets that helped him to play most of the timpani literature. Each pair of mallet has a unique characteristic in their materials, and the sound that they produce on the timpani.

Even though there are many percussion companies that create new timpani mallets and different models, I believe that the replica of the original Duff mallets made by Freer Percussion, are by far the best in the market. The quality of the mallets, based on their weight, thickness, length, evenness, etc. allows beginner timpani students to understand the importance of sound based on the mallet that they play with. As I mentioned above, I interviewed Jeff Luft, the owner

of Luft Mallets, his experience, and expertise in the business provides input and significant information for this research.

Delimitations

I only look at Cloyd Duff timpani mallet model, and their effect on the sound on the timpani. There are countless kinds of mallets, and therefore I do not analyze every single mallet in the market. I focus on the Duff quality, determining characteristics they all share such as their

length, type, material, weight, size, price, etc., and provide samples of each category. I also discuss their tradition and evolution throughout history in relation to material and textures. Even though the sound quality of the timpani is also determined by the shape, material, size, and head of the instrument, my research proves that timpani mallets are crucial to the sound no matter what timpani is used.

I only discuss classical literature written for timpani and talk about timpani mallets based on the repertoire described in the program section. I do not discuss other kinds of mallets/sticks such as drums sticks, different brands, hand drumming, special sound effects, etc. Also excluded are different grips, technique, and ways to hold the mallets and different venues and their effect on sound.

Lecture recital

In my lecture-recital, I will demonstrate how timpani mallets affect sound production on the timpani. I will perform fourteen excerpts from the classical repertoire for timpani. They are standard in the audition timpani literature since they have been the most requested in timpani auditions for the last ten years. They can be interpreted in different ways, according to the mallet it is used, I will perform the pieces using a variety of timpani Duff mallets with different felts, shaft sizes, weights, and lengths, to demonstrate why and how the sound changes. Every excerpt of each piece will be performed along with the recordings so the concept can be illustrated in context along with the music, discussing the concepts and characteristics of the mallet before and after every excerpt is performed.

Review of literature

To start my project, I compare and analyze the literature available on timpani methods. Some of them discuss the topic briefly and others dedicate a few pages. The literature available

is *Timpani Tone* (2014) by Steven Schweizer; *The Timpani: A History in Pictures and Documents* (2002) by Edmund Bowles; *The Drum History* (2012) by Matt Dean; *The Complete Percussionist* (2005) by Robert Breithaupt; *Teaching Percussion* (1996) by Gary Cook; *Modern Method for Timpani* (1948) by Saul Goodman; *The Complete Timpani Method* (1954) by Friese and Lepak; *For the Virtuoso Timpani* (1975) by Fred Hinger; *Orchestral Excerpts for Timpani* (2010) by Randy Max.

As mentioned above, the available literature discusses historical background, construction, materials, physics of sound, and different kinds of mallets. However, specifics about timpani mallet construction and how the material affects performance has not been thoroughly discussed.

In relation to the historical background, Edmund Bowles in his book *The Timpani, A History in Pictures and Documents*[1] provides detailed information about timpani mallets and discusses historical events that changed their construction, consequently the sound of the timpani and its interpretation. For example, he talks about the transition from wooden mallets to their first use with leather or flannel. He also discussed relevant modifications made by Berlioz in 1825. Other people who have written about the history of the timpani include authors such as Matt Dean in his books *The Drum History*[2] and Gary Cook in his book/percussion method, *Teaching Percussion*[3] and in articles such as "Timpani Development"[4] by Rob Bride;

[1] Edmund A. Bowles, *The Timpani*: *A History in Pictures and Documents* (New York: Pendragon Press, 2002).

[2] Matt Dean, Matt, *The Drum: A History* (Lanham, Md.: Scarecrow Press, 2012).

[3] Gary Cook, *Teaching Percussion* (Belmont, Ca: Thomson Schirmer, 2006).

[4] Rob Bridge, *Timpani Development*, SMU paper, *Scribd*, Available at: https://www.scribd.com/document/465602462/Timpani-Development.

"Performing the Timpani Parts to Symphonie Fantastique"[5] by Andrew Simco and "Timpani: An Introspective Look"[6] by Domenico Zarro. *Timpani tone*[7] by Steven Schweizer also talks about the history of timpani mallets, but he only focuses on the Baroque period. His work is based on providing a deep analysis of the physics of sound, specifically, the scientific explanation of the sound produced by different timpani mallets regarding textures, size, weight, and length. He defines concepts such as pitch, texture, color and tone. He compares a spectrum from soft to hard mallets measuring their fundamentals and the distribution of the partials above. The fundamental determines the pitch as well as the tone color of the timpani such as when he states, "Lighter sticks (sticks that weigh less) produce a brighter color with fewer audible lower partials, and heavier sticks tend to emphasize the fundamental, with fewer audible upper partials."[8] Gary Cook in his book *Teaching Percussion* discusses different textures, construction of timpani mallets and their sound on the timpani. He also talks about the purpose of using different mallets according to the music or the sound that the performer wants to accomplish. Finally, He also discusses mallets manufacture and repair. Other books that also discusses about timpani kind of timpani mallets and construction are book/method *The Complete Percussionist: A Guidebook for the Music Educator* [9]

[5] Andrew P. Simco, "Performing the Timpani Parts to "Symphonie Fantastique,"" *Percussive Notes* 36, no. 2 (April, 1998)

[6] Domenico E. Zarro, "Timpani: An Introspective Look," *Percussive Notes* 36, no. 3 (June 1998)

[7] Steven L. Schweizer, *Timpani Tone and the Interpretation of Baroque and Classical Music* (Oxford University Press, 2010).

[8] Schweizer, *Timpani Tone and the Interpretation of Baroque and Classical Music*, 10.

[9] Robert B. Breithaupt, *The Complete Percussionist: A Guidebook for the Music Educator* (Oskaloosa, Iowa: C.L. Barnhouse Co., 2005).

by Robert Breithaupt, *Orchestral Excerpts for Timpani*[10] by Randy Max, *For the Virtuoso Timpani* by Fred Hinger, and *Modern Method for Timpani*[11] by Saul Goodman.

Timpani History

The timpani as we know it today is one of the most important percussion instruments in the orchestra, and its used dates from the 15th century, either oral or written tradition. From the 15th century to today, the timpani has gone through various and significant changes that have not only modified the size, weight, and shape of the instrument, but also the way timpanist play it and its sound production. The timpani as we know it today has been developed over years, each century has adapted to the instrument to make the proper sounds and fulfil the needs of different kinds of music, textures and purposes. Over the years timpani players have crafted timpani of

different sizes, shapes, weight, heads, and tuning system so they can improve the mechanism and therefore tuning and sound.

Timpani [It.] or Kettledrum [English] according to Zarro, comes from the word *Naker.*[12] The kettledrum was an instrument mostly used from the 15th century, it was a set of two small drums usually made of wood or metal. According to Rob Bridge, Kettledrums was first named during King VI's reign in England.[13] They were brought from the east to Europe during the Crusades in the 15th century, Muslims, Mongols and Ottoman Turks would use it by mounting it on a horseback and usually played along with trumpets (figure 1), they were tune in two fixed pitches, and used mostly for military purposes, royal entries into court, etc.

[10] Randy Max, *Orchestral Excerpts for Timpani* (Theodore Presser Co., 2010).

[11] Saul Goodman, *Modern Method for Timpani* (Warner Bros. Publications, 1945).

[12] Domenico E. Zarro, "Timpani: An Introspective Look," *Percussive Notes* 36, no. 3 (June 1998): 57.

[13] Rob Bridge, *Timpani Development*. SMU paper. *Scribd*. Available at: https://www.scribd.com/document/465602462/Timpani-Development (Accessed: 09 February 2024).

Figure 1: Edmund Bowles, The Timpani: A History in Pictures and Documents, Paris, Bibliothèque des Arts Décoratifs Portrait of a Mounted Timpani, pg. 96

By the sixteen century, Kettle drums diameter was around thirty-three inches. It was usually tuned in fourth or fifth intervals, since no hand or foot pedal tuning adjustment mechanism was invented yet.[14]

The first significant innovation happened by the end of the 17th century. The timpani was set on the ground, being no longer carried or mounted on horseback.[15] Because of the development

[14] Bridge, *Timpani Development*.

[15] "Introducing the Baroque Timpani | Evolution of Timpani Part 1." n.d. *YouTube*. Accessed February 9, 2024. https://www.youtube.com/watch?v=t_ERVpRupDQ.

of chamber ensembles, they became stationary and well established in the orchestral ensemble. This significant change allowed the instrument to be comfortably and properly performed as part of the orchestra. Playing them on the ground allowed the timpani player to have a better control of the sound and volume, having a variety of options for the interpretation. However, as I mentioned earlier, a tuning system or mechanism, either hand or foot tuning was not invented yet, so they were only able to tune two pitches. Heads were made of a thicker calfskin, making them harder to play and even harder to tune. Calfskin makes the tuning unstable and the pitch can variate depending on the weather conditions. The heat or the cold impact directly on the tightness or looseness of the head and therefore the pitch.[16]

As the timpani became more popular, composers started to include the timpani in fanfares. The tradition of execution was taught from one generation to the next, even some improvisation was allowed. Because of the nature of the instrument, it provided support to the lower textures of the orchestra, assisted moments of significant dynamic changes, supported dominant to tonic chord progressions, and more. As the use of the timpani started to be more demanding, specifically in operas and church work pieces, music notation was finally established and therefore the timpani officially transitioned from the once outdoor and mobile instrument to indoor performance setting.[17]

During the Baroque era, the first composer that wrote for timpani was Jean-Baptiste Lully. In 1671, he composed the opera Thésée, and later composers like Johan Sebastian Bach, and George Frederic Handel would include music written for timpani in their compositions. Despite the instrument's changes in sound and size, the timpani was limited in its use for orchestral

[16] "Introducing the Baroque Timpani | Evolution of Timpani Part 1." n.d. *YouTube*.
[17] "Introducing the Baroque Timpani | Evolution of Timpani Part 1." n.d. *YouTube*.

ensembles. The calfskin head did not allow a clear pitch and the tuning system was a tedious process for the timpani player, having to tune the drum before playing, similar to a harp or harpsichord.

By the end of the 18th century and the beginning of 19th century, composers such as Ludwig Van Beethoven, Wolfgang Amadeus Mozart, and Franz Joseph Haydn, begun to include the timpani on their compositions, and since the instrument gained popularity and music was composed for it, the demand for playing more notes, quick tuning changes, and stable pitches was a turning point for the instrument. Different improvements were developed by the inventors to fulfill this musical need. "…Early construction used rope tensioning on the drumheads. Due to the requirements of maintaining constant tension on larger heads, increasing demands of rhythmic function and precise tuning, the need for screw tensioning emerged. Screws were distributed around the rim of the drum and attached to a hoop by boring down on the skin and controlling the tension of the head. The tension was at first adjusted by a dozen bolts threaded into receptacles along the sides of the drum. In 1790, the T-handle was introduced to aid the timpanist with faster tuning change."[18]

Significant tuning mechanisms were developed during this century including the use of a main screw, which allowed all the screws of the rim to move at once, tightening or loosening the head a single handle attached to each screw, allowing to tune them manually (however this was not effective since each spot did not have equal tension and pitch), and finally a foot mechanism. By 1812, Gerhard Cramer, the Royal Court Timpanist in Munich invented a single-handed tuning mechanism. Eight metal rods, lining the outside of the kettle, are attached to a hoop placed on top of the head and connected at the base of the kettle by a ring. Through a series of rods and gears the

[18] Zarro, "Timpani: An Introspective Look: 57.

ring, and therefore the hoop, can be controlled by a handle on the outside and parallel to the drum, tightening and loosening the head by pushing and pulling the handle (figure 2).

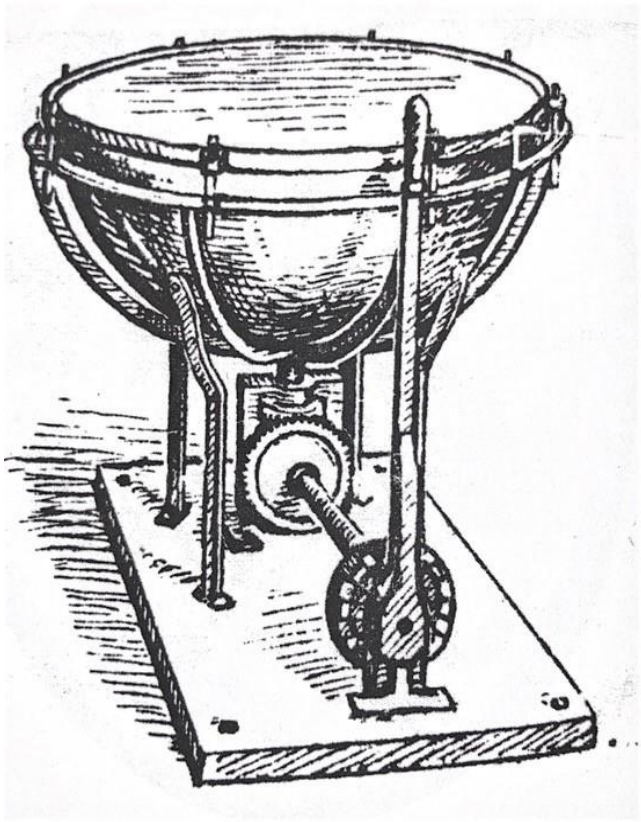


Figure 2. Bowles, The Timpani: A History of Pictures and Documents, Gerhard Cramer, Sketch for the First So-Called Machine Drum, pg. 270

In Amsterdam 1815, Johann Stumpff designed a much more effective tuning system.[19] This mechanism was a significant improvement for quicker tuning changes. It consisted in a vertical spinning tuning system, in which two main discs, later called the 'spider' (previously called the ring) underneath the timpani were assemble to a main screw at the middle. Spinning the timpani to the right or to the left lifts or lowers the instrument and therefore, tightening

[19] Rob Bridge, *Timpani Development*. SMU paper. *Scribd*. Available at: https://www.scribd.com/document/465602462/Timpani-Development (Accessed: 09 February 2024).

or losing the heads tension. However, due to the constantly spinning head, the playing spot was always moving away from the timpani player, and therefore each stroke did not have the same sound quality. In addition, both hands were required to spin the timpani, a tedious process for the performer.

Figure 3: Jeremy Montagu, Timpani & Percussion, Pair of Stumpff system rotary-tuned timpani, pg. 121

Between 1815 and 1840, Johann Kasper Einbigle and Cornelius Ward developed some improvements to the instrument and its tuning system. In 1836, Einbigler's system consisted of a suspended mechanism in which the shell was not attached to a screw underneath. Instead, the shell was suspended and set on a tripod frame. The tuning system was controlled by a side handle that was attached to the spider connected the counter hoop. This resulted in the handle raising or lowering the counter hoop in a vertical movement.

Figure 4: Bowles, The Timpani: A History of Pictures and Documents, Leipzig, Universität Leipzig, Musikinstrumentenmuseum Johann Einbigler, Lever or “Machine” Timpani, pg. 291

On the other hand, Ward’s model added two main T-screw bars and wires inside the bowl. The wires were attached to the counter hoop and the mechanism was attached to a side handle on the outside of the timpani bowl. Moving the handle would compress and decompress the head from the inside of the shell.

Figure 5: Montagu Jeremy, Timpani and Percussion, The interior of the larger of a pair. Of timpani by MacConnell of Woolwich, mid nineteenth century based on Cornelius Ward's patent, 7505 of 1837 pg. 122

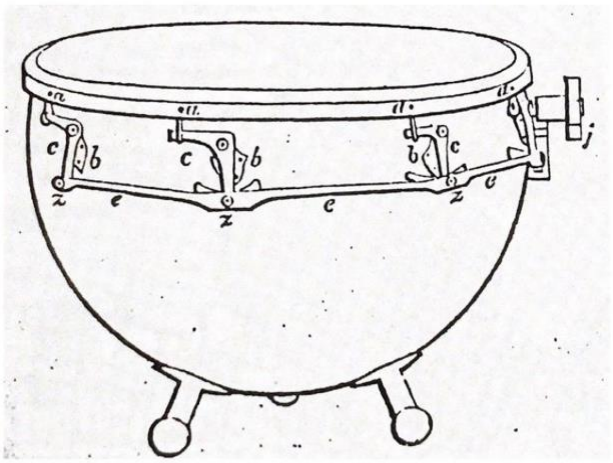


Figure 6: Edmund Bowles, The Timpani: A History in Pictures and Documents, Cornelius Ward, Improved Tuning Mechanism with Rack-and-Pinion Device Drawings. From Patent Specification, pg. 279

Comparing the two, Einbigler's system was more effective as the mechanism was less noisy, and most importantly, allowed the instrument to resonate and vibrate more due to the suspension of the timpani shell. This resulted in an overall better sound.

In 1840, August Knocke invented the first foot mechanism. It consisted of two discs attached underneath the shell, which could be moved by the timpani player with their foot.

Figure 7: Edmund Bowles, The Timpani: A History in Pictures and Documents, Munich, Deutsches Museum, Musikinstrumentensammlung August Knocke, Machine Drum with Foot-Activated Gears, pg. 282

Later in Leipzig, Ernst Gotthold Pfundt and Carl Hoffman designed a better mechanism than of the systems prior, known as the Pfund/Hoffman model, it involved two changes. First, a more solid frame system, allowing the bowl sit stable on it, Second, the bowl was now hammered and thinner, so the shell was lighter and most importantly, it allowed the timpani to resonate more, improving sound quality.

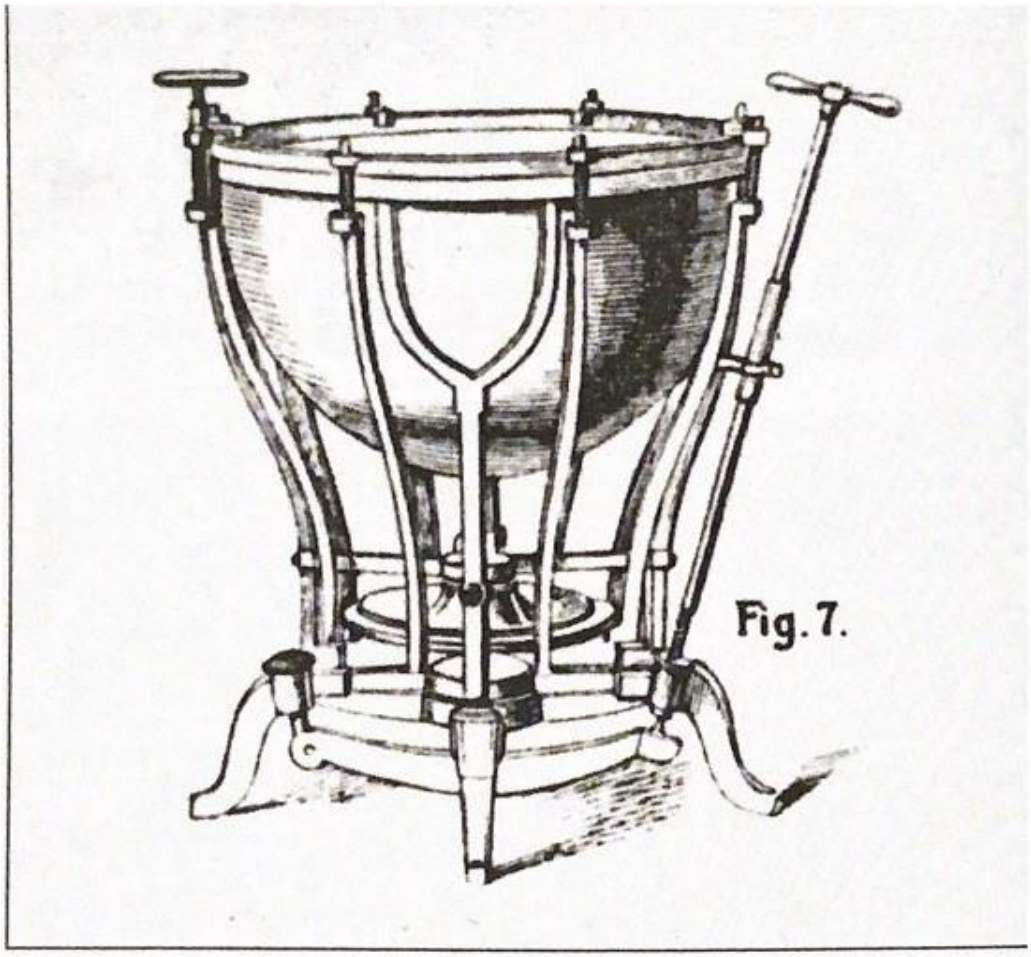


Figure 8: Edmund Bowles, The Timpani: A History in Pictures and Documents, So-Called. Pfundt-Hoffman, Improved Lever, or Machine, Timpani (Leipzig, ca. 1850) Manufactured. By Hoffman Apparatenbau, pg. 288

Lastly, in 1881, the Dresden model was designed. This timpani model would set the standard for today's timpani and the musical needs of the classical orchestra. The Dresden model was designed by Carl Pittrich. This model incorporated a foot pedal mechanism which allowed the player to tune the timpani by moving the pedal up or down.

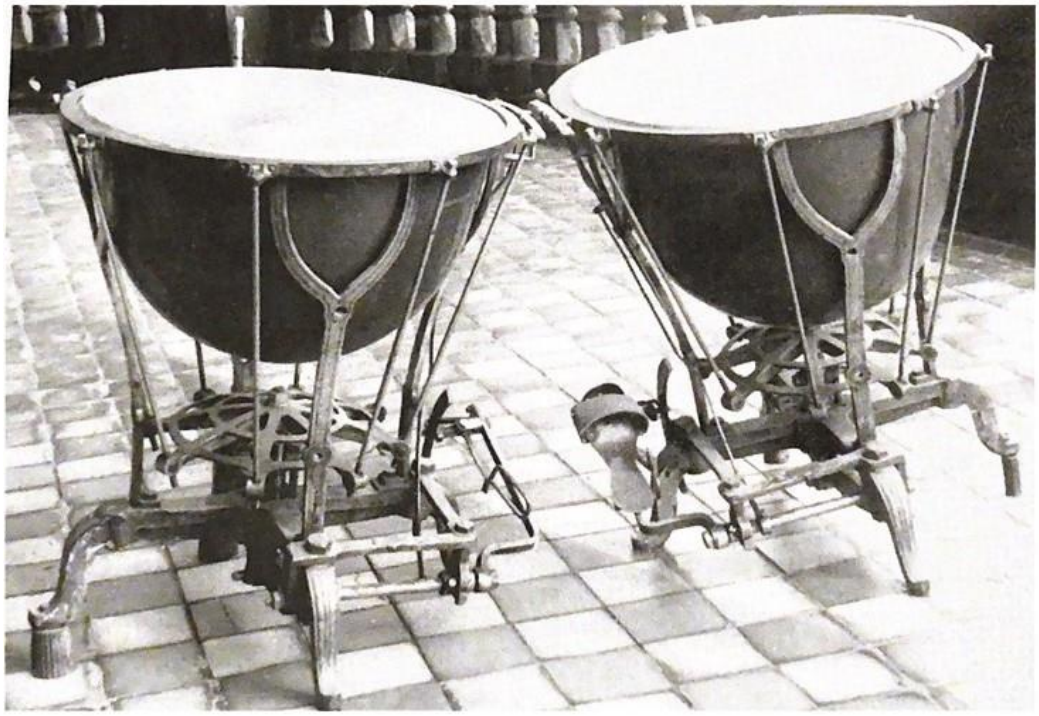


Figure 9: Edmund Bowles, The Timpani: A History in Pictures and Documents, Dresden, Staatskapeelle (Dresden. State Orchestra) First pedal. Timpani. With Original Pittrich Mehanism, pg. 303

Later, in the early twentieth century, the first American timpani prototype would be created by William F. Ludwig. His design incorporated a set of cables inside the timpani that allows the timpani player to tune by only pressing the pedal. Pointing the pedal down would add more tension to the head and pointing up would loosen the head's tension, therefore controlling the pitch. In the present, Ludwig's timpani system is the most common and is used in high schools and colleges. Its tuning system is officially called 'Balance Action' and is the simplest to understand and use.

During the twenty-first century, there are many other companies that have design other prototypes and some of them have improved their mechanism, making them easier to play and most important their precision.

Chapter 2

Timpani mallets

Timpani mallets are a crucial tool for the modern timpani player. They allow the timpanist to experiment and play with a palette of different colors and sounds that are needed for the music. The tradition of different mallets and material has evolved along with the development of the modern timpani. Mallets as we know them today have developed for more than four hundred years, however the most significant changes only happened by the eighteenth century. Unfortunately, unlike the history of the timpani in the first chapter, there is only a small amount of written information describing the evolution of the timpani mallet.

Other than what follows, there are no well-recorded or patented documents or other information recording when changes and modifications to the timpani mallet occurred or who made them from the eighteenth century to today.

The first timpani mallets were handcrafted and made of wood, and occasionally ivory, the design was a short shaft with a small tip or knob at the top. This knob was made of leather or cloth, so the performer could play softer passages. Later, in the early 1700s the tips were replaced with small discs which were wrapped with a softer material such as leather, flannel, cloth, etc.[20] However, the most significant innovation was in 1842, the introduction of a sponge to cover the mallet head, transitioning the timpani's sound from a hard sound to a smooth sound, closer to the mallets in today's market. The sponge mallet was introduced in Paris by the French timpanist Jean Schneitzhoeffer. It's first use was by Hector Berlioz in his

[20] Bowles, *The Timpani*, 69

Symphonie Fantastique. Berlioz was a turning point for the use of specific colors and tones with timpani mallets. In this symphony he wrote for specific mallets to be used at different musical moments, but most significantly, the use of the mallets covered with sponge in the first movement. At this time three kinds of stick heads were commonly used by the timpani player, wood, leather and sponge.[21]

Berlioz particularly liked the sound of the sea sponge. This type of sponge is denser than the regular sponge that we might be more familiar with, so the tone created was different compared with its equivalent of today's softer mallets. It has a significant difference in its texture and sound, while still being able to create a softer color at that time, rather than the use of wood or leather to cover the mallet. The final component added to the timpani mallets in 1850 was the introduction of piano felt, which originally was used for piano hammerheads, so timpani players started to use piano felt to cover timpani heads. In comparison with sponge mallets, piano felt created a softer, smoother and warmer tone. After the introduction of piano felt, different kinds of variations of mallets were created, timpani players experimented with different materials for the head such as felts, flannel, etc. For the shaft, they used wood, bamboo, aluminum.

Timpani mallets consist of four different elements, the shaft or the stick, the head or the disc, the felt which could be American or German felt, and some of them used a nut. Each material can be divided in different categories, depending on the material and their quality.

(1) The shaft, usually made of wood such as maple, ivory or bamboo

(2) The head or core, which is also made of wood, cork, or hard felt

(3) The felt, which it is usually a cloth made of wool, either synthetic or natural

(4) The nut, usually attached on top of the head to support the head.

[21] Andrew P. Simco, "Performing the Timpani Parts to "Symphonie Fantastique,"" *Percussive Notes* 36, no. 2 (April 1998): 62-65.

These four basic materials can create a useful pair of mallets for a timpani player, the quality of the mallet then will depend on the material, evenness, and the assembling of each part. The assembling is a meticulous process in which each part needs to be placed in the right spot using the right measurements. The shaft is glued to the head and the felt is wrapped around the head once the glue is dry and set with the shaft. Usually, the felt is wrapped or sewed around the head using dental floss.

I did my bachelor's degree in my native country, Chile. I did not have the opportunity to buy good quality timpani mallets. They were too expensive and American companies did not deliver products to South America, so I decided to make my own. I asked some of my teachers what I would need to accomplish this and then bought all the materials. After I made my first pair of timpani mallets, a world of possibilities opened for me. I realized that I was not only able to make them, but also combine their textures and materials so that every pair sounded different on the timpani. Since then, I wanted to share and teach my experience of creating mallets and using varied materials to younger timpani players and music students. This is now even easier to accomplish here in the U.S. now that I can find and buy quality timpani mallets of varied materials and prices.

As a teacher in South America and in the United States, I have realized that in general, percussion or timpani students are not fully aware about the impact that timpani mallets can make in sound production. Most of the students that I have been able to work with, teaching, instructing, guiding, etc., for the last fifteen years, do not understand the differences between them, and end up using only one pair of timpani mallets for the first three or four years of college. I have seen as well that music students, instructors, teachers, conductors, are not completely familiar with the sounding of the timpani based on the mallet they use.

My research/efforts here within will help subsequent generations of timpani players and conductors to understand how crucial timpani mallets are for sound production on the timpani. I will demonstrate that the quality of the timpani mallets matters, having an immediate impact on sound quality and musical interpretation.

The literature available regarding timpani and sound production has been mostly approached by the idea that the sound quality is determined by the size, material, heads, tuning mechanisms, etc., of the timpani. However, there is not much content about timpani mallets and their direct impact on sound production. Every timpani mallet has a distinct color that activates different tones on the instrument. Mallets are what fingers are for a pianist, the bow for a violinist, or the reed for a wood wind player. Timpani mallets have evolved along with the timpani throughout history. Both have changed over decades, by the timpanists, or percussion companies with the only purpose of improving the sound quality. Timpani mallets must be treated at the same level of seriousness in regards to understanding their history, tradition, and construction.

Compared others to other sticks, timpani mallets are the most expensive. For younger students it might be even more challenging to get five or ten pairs of mallets at once, keeping in mind that each pair could cost around sixty to ninety dollars. The expense to invest might be one of the reasons why students are not able to experiment and play with different timpani mallets. The goal of my research is to help younger students to understand the tradition of timpani mallets, and why they are crucial for sound production.

I come from a specific tradition of playing timpani. My teacher back home in Chile, Mario Baeza, studied at Carnegie Mellon University in Pittsburg under George Gaber. Mr. Baeza also attended the Duff timpani seminar in Cleveland, Ohio in 1992, taught by Cloyd Duff, who was the timpanist of The Cleveland Orchestra. Mr. Duff was one the most influential timpanists, and

teachers around the world with careers spanning more than 40 years. Cloyd Duff developed the "Cleveland Sound," which emphasizes the importance of the sound quality–that is tone, clarity in rhythms and musical phrases, and care for the role of the percussion section in the orchestra. In 1963, Cloyd Duff, along with his job at The Cleveland Orchestra as principal timpani, was the instructor at the Cleveland Institute of Music. Some of his students such as Tom Freer, retired percussionist of The Cleveland Orchestra, and Timothy Adams, former timpanist of the Pittsburgh Symphony, became incredibly successful performers and teachers. I have had the opportunity to study with both Tom Freer and Timothy Adams, as well as working at Tom's percussion company Freer Percussion, studying and continuing the tradition by learning how to make quality mallets.

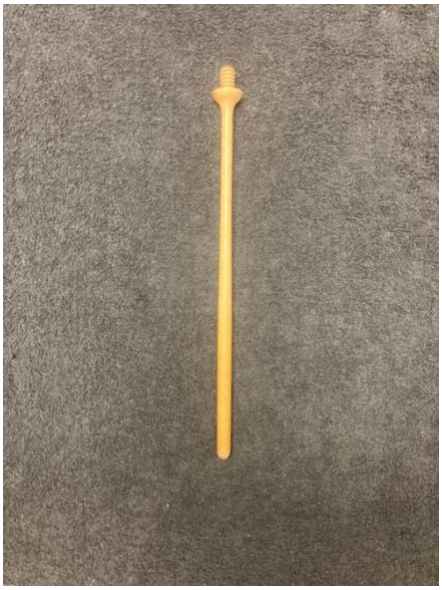
These instructors allowed me to continue to refine the Cleveland sound, and by extension, the earliest forms of instruction I received back home. It is this lineage of playing timpani that has driven my desire to work on this research, in other words the continuation of the legacy of the sound production developed by Mr. Duff. As I mentioned in chapter one, during his career as solo timpani in the Cleveland Orchestra, Mr. Duff designed seven pairs of timpani mallets, each mallet was designed to play most of the timpani literature. Even thou the mallets have been manufactured and owned by different companies for forty years, the quality and distinct sound, and tone production remind the same. Today, Duff brand is owned by Freer Percussion, this company manufactures accessories, sticks, and all kinds of timpani mallets for orchestral percussion players.

While working at Freer Percussion, assembling and carefully making the Duff mallets, I have learned the importance of timpani mallets, and the work that they take to produce a distinct sound. From my experience playing with different mallets, along with building them, I believe that Duff mallets are the best mallets in the market.

Catalog

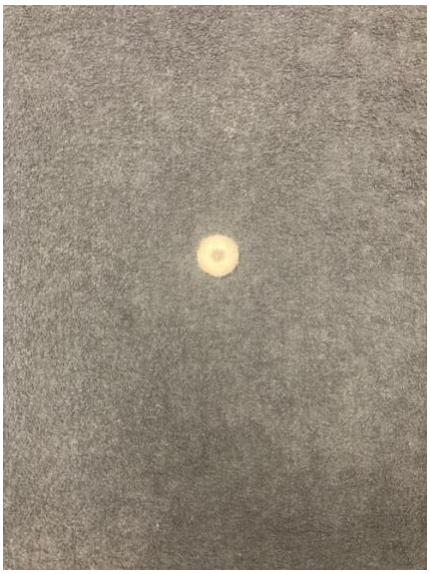
In this catalog I reference, Freer Percussion, the manufacturer of the Cloyd Duff mallets for description of the materials and size commentary on the timbre aspects of my own.

The shaft (Wood Hickory)

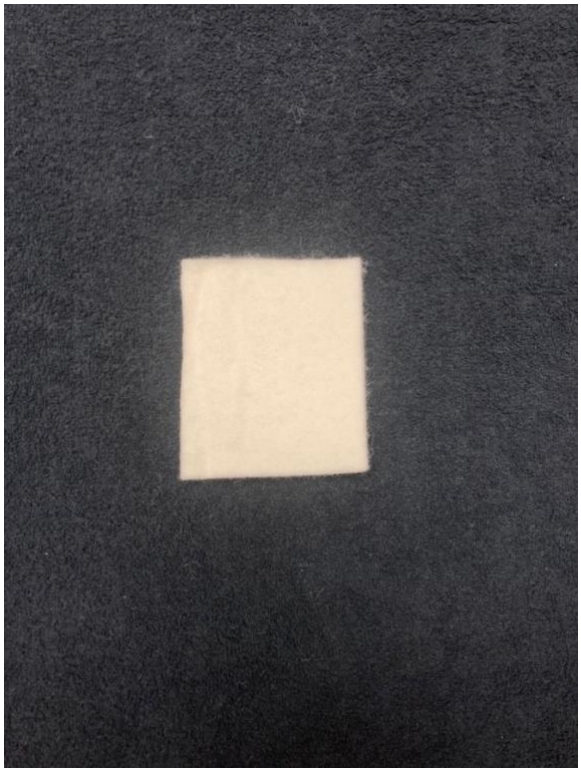


The shaft (bamboo)

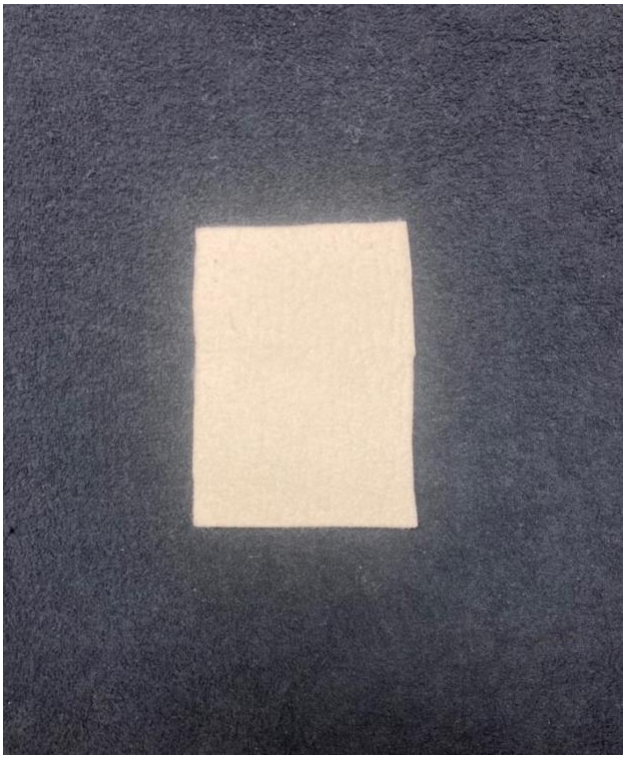
The core



The felt (German)



The felt (American)



The Nut

Thread or dental floss

Cartwheel/ Ball.

-

Model Name: Cloyd Duff 1

-Size: 15” long

-Parts: Shaft, head, felt.

-Shaft material: Bamboo

-Felt type/material: American Felt

-Covering: Cartwheel

-Core shape: Cartwheel

-Core/material: Wood

-Head heigh Size: one inch

-Weight: 0.16 lbs

-Manufacturer: Freer Percussion

-Retailers in the US: Exclusively sold by Freer Percussion.

-Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Wrapping the head of the mallet with a small plastic bag will protect the felt. Bamboo shaft is a sensitive material that can be cracked from temperature fluctuation as well as hitting the shaft in any other surface than a drum. Best practice to protect the mallet is to keep it in an appropriate stick bag in a room that is temperature controlled.

-Felt approximate duration: American felt tend to last longer because it is harder and more dense, allowing the felt to keep the same quality and thickness for a longer period.

-Purpose/function of the mallet: The hard American felt and wood core makes the mallet clear on rhythmic passages and articulations, the lightness of the shaft allows the timpani player to get a rich tone and better projection without losing the sound quality. The longer size of the shaft allows you to play loud and soft rhythmic passages, without over playing the instrument. I personally use this mallet to play passages that requires both. Duff 1 has been used by Mr. Duff and students for over 75 years, proving its success on sound production.

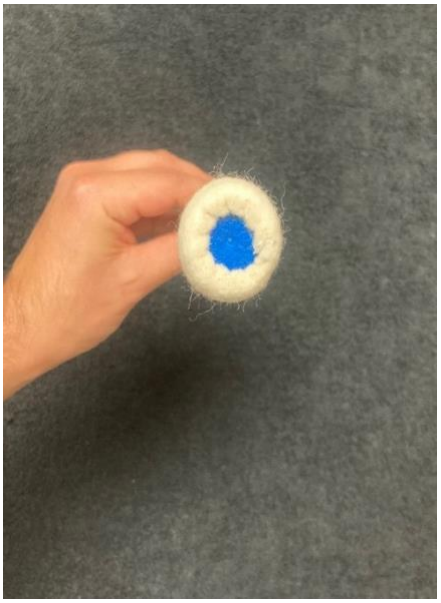
-Suggested passages:

Symphony No. 39 by Wolfgang Amadeus Mozart. Mvt. 1, bars 1-21

Symphony No. 7 by Gustav Mahler. Mvt.5, [223] until 3 before [227]

-Repertoire: Early classical, Romantic period

Photos of mallets



-Model Name: Cloyd Duff two

-Size: 13.5” long

-Parts: Shaft, felt core, Felt, Plastic knob.

-Shaft material: Wood (Hickory)

-Felt type/material: German felt

-Covering: Cartwheel

-Core shape: Cartwheel

-Core/ material: Hard American felt.

-Head heigh Size: half inch.

-Weight: 0.22 lbs

-Manufacturer: Freer Percussion

-Retailers in the US: Exclusively sold by Freer Percussion

Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Wrapping the head of the mallet with a small plastic bag will protect the felt. The wood shaft is more solid and hard, it does not crack or break. However, the shaft will dent if hitting it in any other surface than a drum. Best practice to protect the mallet is to keep it in an appropriate stick bag.

-Felt approximate duration: German felt is more fragile and tends to last less than American felt, it is less hard and dense and therefore it wears out faster. Its inner core, however, absorbs the impact when the mallet hits the timpani making it last longer than Duff 3, 4, 5, 6 and 7.

-Purpose/function of the mallet: The German felt and felt core allows to play soft passages. The short shaft, the small cartwheel, head height and the taper towards the head makes the mallet heavier on the head, makes the mallet easy to control.

-Suggested passages/repertoire:

Symphony No. 9 by Ludwig van Beethoven. Mvt. 1,18 before [S] to the end.

Symphony No. 7 by Ludwig van Beethoven. Mvt. 1 bar 89 to 1 after [C]

-Repertoire: Classical Period, Romantic period

Photos of mallets

-Model Name: Cloyd Duff 3

-Size: 15" long

-Parts: Shaft, wood core, felt**.**

-Shaft material: Bamboo

-Felt type/material: German

-Covering: Cartwheel

-Core shape: Cartwheel

-Core/ material: Wood

-Weight: 0.15 lbs

-Manufacturer: Freer Percussion

-Retailers in the US: Exclusively sold by Freer Percussion

Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Same as Duff 1

-Felt approximate duration: German felt tends to last less than American felt, it wears out faster, it is less hard and dense**.**

-Purpose/function of the mallet: The Duff 3 is one of the best mallet in the catalog. I personally recommend this mallet for students that cannot afford more than one mallet due to their expense. The soft German felt, and the wood core makes it flexible, allowing to play articulate and soft passages creating rich sound and projection. The longer size shaft gives the player the ability to play loud passages without over playing the instrument. I personally use this mallet for passages that require loud and rhythmic articulation. I have used them on different brands of timpani, spaces and venues. The mallet always provides the same tone quality.

-Suggested passages:

Symphony Metamorphosis in Themes by Carl Maria von Weber by Paul Hindemith. Mvt. 2, 5 after [S] to [T]

Symphony No. 5 by Ludwig van Beethoven. Mvt. 3, [C] to the end. Mvt. 4, bar 1-22

-Repertoire: Classical period, Romantic period

Photos of mallets

-Model Name: Cloyd Duff 4

-Size: 13.5” long

-Parts: Shaft, core, felt, plastic knob

-Shaft material: Wood (Hickory)

-Felt type/material: German

-Covering: Cartwheel

-Core shape: Cartwheel

-Core/ material: American felt

-Weight: 0.22 lbs

-Manufacturer: Freer Percussion

-Retailers in the US: Exclusively sold by Freer Percussion

-Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Same as Duff 1 and 3

-Felt approximate duration: Same as Duff 3

- Purpose/function of the mallet: The German felt makes the stick good for roll passages, the cartwheel diameter and felt core produces a dark tone warm sound. The light shaft, exactly the same shaft as Duff 2, makes the mallet have a nice balance, which makes rolls easier to play Due to the lightness of the shaft and heaviness of the head, the mallet rebounds off of the head with ease.

-Suggested passages:

Symphony No. 4 by Piotr Ilyich Tchaikovsky. Mvt 1, 4 before [T] to 2 before [V]

New England Triptych by William Schuman. Mvt 1, “Be Glad Then America”, bars 1-13

-Repertoire: Classical period, Romantic period

Photos of mallets

-Model Name: Cloyd Duff 5

-Size: 15” long

-Parts: Shaft, core, felt, rubber grip.

-Shaft material: Bamboo

-Felt type/material: German

-Covering: Ball

-Core shape: Cartwheel

-Core/ material: Cork

-Weight: 0.19 lbs

-Manufacturer: Freer Percussion

-Retailers in the US: Exclusively sold by Freer Percussion

-Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Same as Duff 1, 3, 4.

-Felt approximate duration: Same as Duff 1, 3, 4.

-Purpose/function of the mallet: The German ball covering felt produces a warm, bright, thinner and round sound. The Duff 5 is good for loud and legato roll passages. This is the first mallet in the catalog with a ball felt covering. Its original replica had a cork core, which produces a soft and less percussive sound with a delayed attack due to the flex of the cork. it allows the player the ability to play significantly loud without over playing the instrument, producing a rich tone. In addition to that, its first models did not have a rubber sleeve in that back of the shaft.
Freer Percussion has made a modern version with a sleeve on the shaft. The purpose of the rubber grip in the back is to improve control to improve the players to use a wide variety of sound.

-Suggested passages:

Concerto for Orchestra by Béla Bartók. Mvt. 4, bars 42-50

Symphony No. 5. by Gustav Mahler. Mvt. 5, 12 after [34] to the end

-Repertoire: Classical period, Romantic period

Photos of mallets

-Model Name: Cloyd Duff 6

-Size: 13.5” long

-Parts: Wood shaft, felt core, felt, plastic knob.

-Shaft material: Wood (Hickory)

-Felt type/material: German

-Covering: Cartwheel

-Core shape: Cartwheel.

-Core/ material: American felt

-Weight: 0.23 lbs

-Manufacturer: Freer Percussion

-Retailers in the US: Exclusively sold by Freer Percussion

Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Same as Duff 1, 3, 4, 5.

-Felt approximate duration: Same as Duff 3, 4, 5

-Purpose/function of the mallet: The German cartwheel head felt is the thickest in the catalog. Duff 6 produces a soft and warm sound with a rich low tone, making the mallet good for roll passages and producing a huge sound without overplaying the instrument, its attack is lower and delayed in comparison with the Duff 4. The shaft is the same as Duff 2 and the Duff 4, however the thickness and heaviness of its head, makes the mallet rebounds off the head more.

-Suggested passages

The Young Person’s Guide to the Orchestra by Benjamin Britten. Variation M (percussion), bars 1-10

Symphony No. 5 by Gustav Mahler. Mvt. 1, bar 316 to [15]

-Repertoire: Romantic period, Twentieth Century

Photos of mallets

-Model Name: Cloyd Duff 7

-Size: 15” long

-Parts: Shaft, Core, Felt.

-Shaft material: Bamboo

-Felt type/material: German

-Covering: Ball

-Core shape: Cartwheel

-Core/ material: Maple in a ball

-Weight: 0.22 lbs

-Manufacturer: Freer Percussion

-Retailers in US: Exclusively sold by Freer Percussion

-Retailers in other countries: Gu Feng Percussion, China; Edinburgh Percussion, UK; Mbeat Percussion, Chile; Musikk-Miljo, Norway; Optimun Percussion, Australia; Adams Music World, Netherlands/Western Europe; Komaki Music, Tokyo; Hr Music, South Korea; Jlaanlipercussion, China; Percussion Works, Singapore; Artista Percussion, Hong Kong; Percusion en Linea, Mexico; Timpano Percussion, Canada; Espace de Crescendo, Taiwan

-Price range (at time of writing the document): 93.00-100.00 US dollars

-Protection/best practice for storage to enhance longevity: Same as Duff 1,3, 4, 5 and 6

-Felt approximate duration: Same as Duff 3, 4, 5, 6.

-Purpose/function of the mallet: The German ball covered felt produces a dark, round, warm and bigger width of sound. The Duff 7 has more mass than any other mallet in the catalog, and therefore is a good mallet for soft rolls, round, legato, pesante, big and single loud note passages, especially in a lower register on the timpani. The round head produces a low and delayed attack that makes the mallet rebound off of the timpani. If used on a tight or higher note on a 26”and 23” timpani, the mallet will mute the instrument.

-Suggested passages

Symphony No. 1 by Johannes Brahms. Mvt. 1, bars 1-9

Symphony No. 1 Dimitri Shostakovich. Mvt 4, solo cadenza at. [35]

-Repertoire: Classical period, Romantic period

Photos of mallets

Conclusion

Timpani mallets are an important tool for the timpani player, the quality of the mallet determines the sound produced on the timpani. The Cloyd Duff mallet allows the timpanist to play most of the literature written for the timpani. As established in this research, Duff Mallets are the best mallets in the market, because of their materials, assembling, sizes and weight make them a unique set of seven pairs that every professional timpani player should have.

The condensed Duff mallets catalog is a useful tool for younger student, high school students that are learning to play timpani, beginner college music students, orchestra conductors and band directors. I believe that in most cases the value of timpani mallets are underestimated and therefore, it is crucial to teach students that the quality of the mallet will impact the sound on the instrument, weather a big and round note is required to play on the music, or an articulate and rhythmic passage, there is a specific mallet that will help to accomplish the sound required.

With my catalog students can decide what mallet to purchase according to what they need, without having to buy the wrong mallet, and realizing later that the mallet does not work for what is required in the music. On the other hand, band directors and orchestra conductors can have an informed opinion, and suggest students what mallet they should get according to the music they will perform.

Further research can discuss firstly, different venues and how acoustics impact the sound of the timpani. Second, mallet technique and how the way of holding the mallets change the tone on the instrument. Third, and material of the timpani, sound variation

based on the depth and weather the timpani is made of coper, plastic or carbon fiber.

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Appendix A

Script for Lecture Recital

Good morning, dear committee, I hope you are doing well. First of all, thank you for being here today, I really appreciate your time, all of you have been my teachers, and I appreciate everything I have learned from you. Today I am going to talk about my research topic. Timpani mallet choices and how they affect sound and interpretation. I will discuss the importance of timpani mallets and my personal relationship with them. There is a lot of information based on the timpani, and there are many books that talked about its materials, construction, heads, tuning mechanisms, etc. however I did not find the same amount of information about timpani mallet.

Before I discuss my topic, I would like to give you some context, and the reason why I decided to write about this research. The start of my research starts when I was back home studying my undergraduate degree at the University of Chile. I did not have the opportunity to have timpani mallets nor the chance to purchase them, in fact mallets were not even delivered by American companies due to the expense of the shipment. Since I needed them for my timpani lessons, I realized that I could make a pair of timpani mallet. I started to gather information from teachers, and some people that were already making handcrafted mallets in Chile. So, I decided to make my own and personalized first pair of timpani mallet. I went to the equivalent of Home Depot, and I bought a large piece of curtain shaft, tape and felt. I put those parts together. First, I cut the shaft into two equal parts; second, wrapped tape around on the tips in both shafts, and finally, cover the tape with felt.

As a percussion major student, I was listening to different recordings of the best

orchestras in the world, and I always liked a particular sound of the timpanist of the Cleveland Orchestra. Since then, I always dreamed of one day be able to learn that way of playing that is: clarity, articulation, placement of the notes and sound of the timpani, etc. I realized later that the timpani player in those recording was Cloyd Duff, who was one of the most influential timpani players of all time around the world. Ten years after I made my first pair of timpani mallets, I was able to come to the US and learn from two of the best students of Mr. Duff: Timothy Adams Jr., and Tom Freer, and learn the tradition of playing the timpani, and the concepts that I wanted to learn since I was in Chile, It is this lineage of playing timpani that has driven my desire to work on this research, in other words the continuation of the legacy of the sound production developed by Mr. Duff.

Mr. Duff designed the mallets that I am will be discussing today, a set of seven pairs of timpani mallet. Each mallet was designed to play most of the timpani literature, even thou the mallets have been manufactured and owned by different companies for forty years, the quality and distinct sound, and tone production remind the same. Today, the Duff brand is owned by Freer Percussion, this company manufactures accessories, sticks, and all kinds of timpani mallets for orchestral percussion players. I have had the opportunity to work at Freer Percussion and learn the differences between each mallet and how they work.

As a teacher in South America and in the U.S. I have realized that in general, percussion or timpani students are not fully aware about the impact that timpani mallets can make in sound production. Most of the students that I have been able to work with, teaching, instructing, guiding, etc., for the last fifteen years, do not understand the differences between them, and end up using only one pair of timpani mallets for the first three or four years of college. I have seen as well that music students, instructors, teachers, conductors, are not completely familiar with the sounding of the timpani based on the mallet they use.

My research/efforts here within will help subsequent generations of timpani players and conductors to understand how crucial timpani mallets are for sound production on the timpani. I will demonstrate that the quality of the timpani mallets matters, having an immediate impact on sound quality and musical interpretation.

Timpani mallets

Timpani mallets are a crucial tool for the modern timpani player. They allow the timpanist to experiment and play with a palette of different colors and sounds that are needed for the music.

The first timpani mallets were handcrafted and made of wood, and occasionally ivory. The design was a short shaft with a small tip or knob at the top. This knob was made of leather or cloth, so the performer could play softer passages. Later, in the early 1700s the tips were replaced with small discs which were wrapped with a softer material such as leather, flannel, cloth, etc.

In 1842, the introduction of a sponge to cover the mallet head, transitioning the timpani's sound from a hard sound to a smooth sound, closer to the mallets in today's market. The sponge mallet was introduced in Paris by the French timpanist Jean Schneitzhoeffer. It's first use was by Hector Berlioz in his Symphonie Fantastique. Berlioz was a turning point for the use of specific colors and tones with timpani mallets. In this symphony he wrote for specific mallets to be used at different musical moments, but most significantly, the use of the mallets covered with sponge in the first movement. Berlioz particularly liked the sound of the sea sponge. This type of sponge is denser than the regular sponge that we might be more familiar with, (picture of the music sheet) in 1850 was the introduction of piano felt, which originally was used for piano hammerheads, so timpani players started to use piano felt to cover timpani heads.

Today's timpani mallets consist of four different elements:

(1) The shaft, usually made of wood such as maple, hickory or bamboo (picture)

(2) The head or core, which is also made of wood, cork, or hard felt (picture)

(3) The felt, which it is usually a cloth made of wool, either synthetic or natural (picture)

(4) The nut, usually attached on top of the head to support the head (picture)

These four basic materials can create a useful pair of mallets for a timpani player, the quality of the mallet then will depend on the material, evenness, and the assembling of each part. The assembling is a meticulous process in which each part needs to be placed in the right spot using the right measurements. The shaft is glued to the head and the felt is wrapped around the head once the glue is dry and set with the shaft. Every timpani mallet has a distinct color that activates different tones on the instrument. Mallets are what fingers are for a pianist, the bow for a violinist, or the reed for a wood wind player.

Compared others to other sticks, timpani mallets are the most expensive. For younger students it might be even more challenging to get five or ten pairs of mallets at once, keeping in mind that each pair could cost around sixty to ninety dollars. The expense to invest might be one of the reasons why students are not able to experiment and play with different timpani mallets. The goal of my research is to help younger students to understand the tradition of timpani mallets, and why they are crucial for sound production.

Catalog

Duff 1 (picture) and its features are:

Size: 15” long

Parts: Shaft, head, felt.

Shaft material: Bamboo.

Felt type/material: American Felt.

Covering: Cartwheel

Core shape: Cartwheel.

Core/ material: Wood core

Weight: 0.16 lbs

Manufacturer: Freer Percussion

Purpose/function of the mallet: The hard American felt and wood core makes the mallet clear on rhythmic passages and articulations, the lightness of the shaft allows the timpani player to get a rich tone and better projection without losing the sound quality. The longer size of the shaft allows you to play loud and soft rhythmic passages, without over playing the instrument. I personally use this mallet to play passages that requires both. Duff 1 has been used by Mr. Duff and students for over 75 years, proving its success on sound production.

Suggested passages:

Symphony No. 39 by Wolfgang Amadeus Mozart. Mvt. 1, bars 1-21 (play with the recording)

Symphony No. 7 by Gustav Mahler. Mvt.5, [223] until 2 before [225] (play with the recording

Duff 2 (picture) and its features are:

Size: 13.5" long

Parts: Shaft, felt core, Felt, Plastic knob.

Shaft material: Wood (Hickory).

Felt type/material: German felt.

Covering: Cartwheel.

Core shape: Cartwheel.

Core/ material: American felt.

Weight 0.22 lbs

Manufacturer: Freer Percussion

Purpose/function of the mallet: The German felt and felt core allows to play soft passages. The

short shaft, the small cartwheel, head height and the taper towards the head makes the mallet heavier on the head, makes the mallet easy to control.

Suggested passages:

Symphony No. 9 by Ludwig van Beethoven. Mvt. 1,18 before [S] to the end. (play with the recording)

Symphony No. 7 by Ludwig van Beethoven. Mvt. 1 bar 89 to 1 after [C] (play with the recording)

Duff 3 (picture) and its features are:

Model Name: Cloyd Duff 3.

Size: 15" long

Parts: Shaft, wood core, felt.

Shaft material: Bamboo.

Felt type/material: German.

Covering: Cartwheel.

Core shape: Cartwheel.

Core/ material: Wood.

Weight 0.15 lbs

Manufacturer: Freer Percussion.

Purpose/function of the mallet: Duff 3 is one of the best mallet in the catalog. I personally recommend this mallet for students that cannot afford more than one mallet due to their expense. The soft German felt, and the wood core makes it flexible, allowing to play articulate and soft passages creating rich sound and projection. The longer size shaft gives the player the ability to play loud passages without over playing the instrument. I personally use this mallet for passages

that require loud and rhythmic articulation. I have used them on different brands of timpani, spaces and venues. The mallet always provides the same tone quality.

Suggested passages:

Symphony Metamorphosis in Themes by Carl Maria von Weber by Paul Hindemith. Mvt. 2, 5 after [V] to 8 after [W] (play with the recording)

Symphony No. 5 by Ludwig van Beethoven. Mvt. 3, [C] to the end. Mvt. 4, bar 1-22 (play with the recording)

Duff 4 (picture) and its features are:

Model Name: Cloyd Duff 4.

Size: 13.5" long

Parts: Shaft, core, felt, plastic knob.

Shaft material: Wood (Hickory).

Felt type/material: German.

Covering: Cartwheel.

Core shape: Cartwheel.

Core/ material: American

Weight: 0.22 lbs

Manufacturer: Freer Percussion

Purpose/function of the mallet: The German felt makes the stick good for roll passages, the cartwheel diameter and felt core produces a dark tone warm sound. The light shaft, exactly the same shaft as Duff 2, makes the mallet have a nice balance, which makes rolls easier to play Due to the lightness of the shaft and heaviness of the head, the mallet rebounds off of the head with ease.

Suggested passages:

Symphony No. 4 by Piotr Ilyich Tchaikovsky. Mvt 1, 6 before [T] to 2 before [V] (play with the recording)

New England Triptych by William Schuman. Mvt 1, “Be Glad Then America”, bars 1-13 (play with the recording)

Duff 5 (picture) and its features are:

Model Name: Cloyd Duff 5.

Size: 15” long

Parts: Shaft, core, felt, rubber grip.

Shaft material: Bamboo.

Felt type/material: German.

Covering: Ball.

Core shape: Cartwheel.

Core/ material: Cork.

Weight: 0.19 lbs

Manufacturer: Freer Percussion.

Purpose/function of the mallet: The German ball covering felt produces a warm, bright, thinner and round sound. The Duff 5 is good for loud and legato roll passages. This is the first mallet in the catalog with a ball felt covering. Its original replica had a cork core, which produces a soft and less percussive sound with a delayed attack due to the flex of the cork. it allows the player the ability to play significantly loud without over playing the instrument, producing a rich tone. In addition to that, its first models did not have a rubber sleeve in that back of the shaft. Freer Percussion has made a modern version with a sleeve on the shaft. The purpose of the rubber grip

in the back is to improve control to improve the players to use a wide variety of sound.

Suggested passages:

Concerto for Orchestra by Béla Bartók. Mvt. 4, bars 42-50 (play with the recording)

Symphony No. 5. by Gustav Mahler. Mvt. 5, 12 after [34] to the end (play with the recording)

Duff 6 (picture) and its features are:

Model Name: Cloyd Duff 6

Size: 13.5" long

Parts: Wood shaft, felt core, felt, plastic knob.

Shaft material: Wood (Hickory)

Felt type/material: German.

Covering: Cartwheel.

Core shape: Cartwheel. Core/

material: American felt

Weight: 0.23 lbs

Manufacturer: Freer Percussion

Purpose/function of the mallet: The German cartwheel head felt is the thickest in the catalog. Duff 6 produces a soft and warm sound with a rich low tone, making the mallet good for roll passages and producing a huge sound without overplaying the instrument, its attack is lower and delayed in comparison with the Duff 4. The shaft is the same as Duff 2 and the Duff 4, however the thickness and heaviness of its head, makes the mallet rebounds off the head more.

Suggested passages:

The Young Person's Guide to the Orchestra by Benjamin Britten. Variation M (percussion), bars 1-10 (play with the recording)

Symphony No. 5 by Gustav Mahler. Mvt. 1, bar 316 to [15] (play with the recording)

Duff 7 (picture) and its features are:

Model Name: Cloyd Duff 7.

Size: 15" long

Parts: Shaft, Core, Felt.

Shaft material: Bamboo.

Felt type/material: German. Covering: Ball.

Covering: Ball.

Core shape: Cartwheel.

Core/ material: Maple in a ball.

Weight: 0.22 lbs.

Manufacturer: Freer Percussion

Purpose/function of the mallet: Purpose/function of the mallet: The German ball covered felt produces a dark, round, warm and bigger width of sound. The Duff 7 has more mass than any other mallet in the catalog, and therefore is a good mallet for soft rolls, round, legato, pesante, big and single loud note passages, especially in a lower register on the timpani. The round head produces a low and delayed attack that makes the mallet rebound off of the timpani. If used on a tight or higher note on a 26"and 23" timpani, the mallet will mute the instrument.

Suggested passages:

Symphony No. 1 by Johannes Brahms. Mvt. 1, bars 1-9 (play with the recording)

Symphony No. 1 Dmitri Shostakovich. Mvt 4, solo cadenza at. [35] (play with the recording)

Appendix B

Interview questions and answers

Timpani mallets making questions.

1- What is the difference between bamboo and wood mallets?

2- What is the difference between American, and German felt and how that impacts the sound on the timpani? And which one last the most?

3- What is the difference between thickness and/or thinness of bamboo and wood shaft, and how they change the tone or sound production on the timpani?

4- What is the difference between wood, cork, and felt core?

5- What is the difference between light and heavy shaft in terms of the tone production on the timpani?

6- What is the difference between a short and longer shaft in terms of the tone production on the timpani?

7- What is the difference between Cartwheel and Ball felt in terms of the tone production on the timpani?

8- What mallets are sold the most, wood or bamboo shaft? Hard or soft mallets? cartwheel or Ball?

9- What makes (factors, materials, etc.) a mallet a good timpani mallet?

10- How much time does it take to make a pair of mallets?

11- How does a wood shaft tapered towards the head of the mallet impact the weight distribution, and therefore how that affect the sound on the timpani?

12- Who buy the most mallets, professional timpani players, college students, or high school students?

13- What type of wood is commonly used to make wood mallets?

14- What type of bamboo is commonly used to make bamboo mallets?

15- Besides Wood and Bamboo mallets what other material is used to make mallets?

16- How do you see the future of new models and prototypes of timpani mallets, do you think that the weight, the length, the shape, softness, etc. will change? if so, what will change, and how they will evolve?

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Mallets/ research

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Timpani mallets makingquestion

1-What is the difference between bamboo and wood mallets?

Bamboo is essentially hollow which allows for a much lighter mallet than wood. Light weight doesn't just plainly equate to be "better" but it's just more versatile because not all cores work on well on wood. More options for balance with bamboo.

2-What is the difference between American, and German felt and how that impacts the sound on the timpani? And which onelast the most?

American felt is all spun together.
German is woven in layers and softer. Less dense.

3-What is the difference between thickness and/or thinness of bamboo and wood shaft, and how they change the tone or sound production on the timpani?

I always just think of the extremes when answering this question or thinking about it myself. Imagine hitting the drum with a chopstick then imagine hitting it with a steep rod or a baseball bat. That is exactly what he mallets would sound like if you put a core on the end and wrapped them. The parameters are tightened when dealing with useful weights and thicknesses of bamboo or wood but the concept is the same.

4-What is the difference between wood, cork, and felt core?

Different densities and hardnesses.
Wood is the hardest. Very little "give".
Cork is the lightest has more give.
Felt densities can very but it's right in the middle. Not too hard not too soft. Similar in density to oak/maple.

5- What is the difference between light and heavy shaft in terms of the tone production on the timpani?
Similar to question 4. Usually. Thicker shafts means heavier when dealing with bamboo or wood. Of course there are exceptions but it's rare.
6- What is the difference between a short and longer shaft in terms of the tone production on the timpani?

7- What is the difference between Cartwheel and Ball felt in terms of the tone production on the timpani?
Cartwheel has 3 seams. One of those seams is only a 1/4" or so away from the playing spot of the felt/core. So they speak quickly.
Parachute has 1 seam/or drawstring and it's much further away from the playing spot. Plus it's a rounder shape so the sound is also rounder and less focused lol.

8- What mallets are sold the most, wood or bamboo shaft? Hard or soft mallets? cartwheel or Ball?

Bamboo but I've basically stopped selling them and use carbon fiber. General sticks sell the most. Cartwheel.

9- What makes (factors, materials, etc.) a mallet a good timpani mallet?

It has to be useful, well-made, and consistent. If it has all of those things it's good IMO. If it loses one they're garbage.

10- How much time does it take to make a pair of mallets?

from start to finish most take me about 1hr to up to 2.5hrs. This is now(2024) after years and years of trial and error and refining so it's hard to factor all of that in.

This includes making the cores, shaping them, pairing them to shafts, fitting the shafts to the cores, gluing cores to shafts, cutting and applying liner felt, then cutting the actual felt, sewing, then pulling tight, then trimming and sometimes voicing.

11- How does a wood shaft tapered towards the head of the mallet impact the weight distribution, and therefore how that affect the sound on the timpani?

I think of fishing a lot because I did a lot of fishing when I was growing up. I used and

experimented with lots of different rod lengths and set-ups in freshwater and saltwater. It's the same concept.

More taper means more agility but less power.
Less taper means more power but less agility.

It's like hitting a timpani with a baseball bat as a mallet. Even one of those souvenir mini bats. Play it with the taper one way then play flip it and use it the other way. The sound will be "clubby" and choked when the taper is thin to thick. It will be quicker and thinner when going from barrel to handle.

12- Who buy the most mallets, professional timpani players, college students, or high school students?
College students then professionals.

13- What type of wood is commonly used to make wood mallets?
Hickory, sometimes

14- What type of bamboo is commonly used to make bamboo mallets?
Tonkin

15- Besides Wood and Bamboo mallets what other material is used to make mallets?
Carbon fiber

16- How do you see the future of new models and prototypes of timpani mallets, do you think that the weight, the length, the shape, softness, etc. will change? if so, what will change, and how they will evolve?

I don't see many more changes honestly. The only thing that can be improved in my products is mostly processes and efficiency. I'd love for there to be a more options in felts but there just isn't and they investment it would take to really experiment is cost-prohibitive. Not getting rich over here.

Hope this helps out.

Jeff

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Mallets/ research

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6-What is the difference between a short and longer shaft in terms of the tone production on the timpani?

Longer shafts tend to make the focus more fuzzy and less control for the player. They can be powerful but unwieldy. Shorter shafts have more focus and easier to control. The are less powerful but easier to control in your hands and on the drums.

Jeff
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