KONINKLIJK CONSERVATORIUM
DEN HAAG

Master Research

John Cage´s Bacchanale.
A reconstruction for percussion ensemble.

Name: Gorka Catediano
Coach: Karst de Jong
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Introduction

This academic work intends to transcribe and approach one of the earliest pieces for prepared piano written by John Cage (1912-1992) in his early years as a composer. This research means the ending of my Master in Classical Percussion in The Royal Conservatory of The Hague with teachers: Pepe García, Niels Melifste, Theun van Nieuwburg and Hans Zonderop. Throughout it, I will analyze the piece, as well as Cage´s experiences to understand and transcribe it.

In 2015, while completing my Bachelor studies in the Center of Music of the Basque Country - MUSIKENE (San Sebastian, Spain), I researched the three *Constructions* of John Cage, considered three of the most relevant pieces for percussion ensemble repertoire. Inquiring into that topic forced me to learn about the emergence of prepared piano. In this way, I realized that when Cage began to write for prepared piano, he also stopped composing for percussion. From 1942, most of his new works were for prepared piano and his repertoire for percussion ensemble ceased to evolve. This fact can be looked at as a severe setback for percussionist community if we consider the importance of Cage in the creation and development of the percussion ensemble.

However, the emergence of the prepared piano is highly related to percussion music. In fact, one of the main impulses to develop this instrument were the troubles with percussion instruments large size. This relationship led me to think that, perhaps, it would be possible to research Cage´s prepared piano repertoire and perform it in a new way using characteristic percussion instruments that are used in his music. Maybe, we could add one more work to the already magnificent repertoire that this composer bequeathed to percussionists.

My main goal will be to understand *Bacchanale* to the point of establishing a new performance with percussion instruments. To achieve this, I need two partial objectives: the first step is to research into the figure of John Cage during the previous years to this

work (I need to know about any situation or action that has influenced the compositional process); and, afterwards, to analyze and understand the piece. Given the final goal, to perform *Bacchanale*, the aspects in which I will focus my attention to will be only those that can be varied by the performer. The next partial objective will be to analyze the aspects that can be modified in each version of *Bacchanale*. They are grouped in two blocks: study of the score and circumstances of composition, and sounds used for its performance.

Before deciding the *tempi*, adjusting the dynamics or simply beginning to read the score, a percussionist must set the instruments he will use. This means choosing the sounds that will replace the original ones in the prepared piano. The term "reconstruction" of the subtitle is essential here: if we leave the instrumental template open to all percussion instruments, the possibilities would be endless. For this research, the process of reconstruction requires using instruments that Cage used in his compositions at that time. To choose sound sources, to know the original sounds and have enough tools to perform the piece with different instruments are tasks that the percussionist must complete. My research is meant to help with these tasks.

The work is divided into three large sections. First, a basic section of contextualization is presented in chapter 1. "Contextualization of Bacchanale", where the focus will be on the figure of Cage, especially on the eight years that elapsed from the beginning of his studies until the composition of *Bacchanale*. *Bacchanale* was written in 1940, at Cage's early stage as a composer. This fact allows to review his formation and compositional ideas until 1940. The following chapter, called "Bacchanale", contains the circumstances surrounding the composition of the work, the analysis and the piano preparations. In the next chapter, "Reconstruction process", I will explain the steps towards the final performance with percussion instruments. "Conclusions" summarizes the information obtained and replies to the following questions:

- Is an instrumentation for percussion ensemble possible, and if so, how would this sound?

- What are the most suitable instruments for this reconstruction?

- Is there any criteria to specify the different tempi of the piece? Do the tempi depend on each version of Bacchanale? In that case, would the internal relation beetwen tempi be kept in all the versions?

- Are there options to simulate the una corda pedal effect with percussion instruments?

- What are the options to simulate the piano resonance, long notes and *fermatas* with percussion instruments?

To facilitate the reading fluency, the scores and recordings are presented in four Annexes. Some quotes of the work come from books in the Spanish language. They will be translated into English to facilitate its comprehension with the original quote added by footnotes. Quotes, references and bibliography of this research follow APA-5 system. The origin of quotes is indicated in parentheses at the end of themselves.

Using John Cage´s entry in New Grove Dictionary for Music and Musicians I obtained numerous bibliographical references from experts for the chapter "Contextualization of Bacchanale". Works by D. Nicholls or J. Cage stand out in this category. For the other chapters, I have attained information from renowned performers, such as L. Vaes or S. Schick, and musicologists, like C. Shultis, P. Emmerik.

Lastly, I would like to acknowledge the invaluable help and support of certain people whom without, this research would never have been possible. To Maria Zubimendi, Emil Emilsson and my colleagues from Percussion Department of The Royal Conservatory for all those hours that you have endured while I reflected on the best way to present this work. I also want to thank my coach, Karst de Jong, and Master Circle Leaders, Susan Williams and Wim Vos, for their advices and recommendations.

1. Contextualization of Cage´s Bacchanale

1.1 John Cage and his early percussion music

John Cage (1912-Los Angeles, 1992-New York) [1] is one of the most influential composers of the XX century, not just because of his musical innovations but also because of his role as a philosopher, painter and writer. Cage is mainly known for his contributions to electronic and chance music, as well as for the use of unconventional instruments. Although these are the fundamental pillars of his fame, the focus of this research will be on his first stage as a composer, when he had not looked into the possibilities of chance yet.

Cage´s first compositions were short pieces for piano written through complex mathematical procedures. His next step was to compose through improvisation. In 1931, after a trip to Europe, Cage began to study composition with Richard Buhlig in the New School for Social Research (New York). At this time, Cage learnt about non-western music, folk and contemporary music. "Buhlig advised him to stop composing through improvisation and Cage began to develop compositional techniques based on Schoenberg's twelve-tone system" (Bernstein, 2002, p. 63). During the first half of the 1930's, Cage developed a complex serial system based on a twenty-five-tone row. Although this technique was used in some pieces, e.g. *Six Short Inventions on the Subjects of the Solo* (1934) or *Composition for Three Voices* (1934), he gave it up soon.

Cage was 21 years old when he met the composer Henry Cowell [2] during a visit to New York. Cowell, who was highly involved in percussion music composition, did not teach Cage (he suggested to Cage to study with Schoenberg), but Cowell did have a special influence in the aesthetics of his compositions. One of the most relevant ideas Cage learnt from Cowell is found in the following quote: "The music was meant to flow along regularly, while you did irregular things" (Quoted in Miller, 2002, p. 153). Cowell had been working with dancers for several years and he concluded that contemporary dancers were always performing a pre-composed music. Their work was constantly subordinated to the music they had to choreograph. After writing some articles about this problem, he

found the solution, splitting the rhythm of dance from the rhythm of music. Later, Cage applied this solution in his own pieces (e.g. *Double Music* [1941] in which Cage writes two of the quartet´s parts and Lou Harrison the other two), as well as his assiduous collaborations with Merce Cunningham (both artists worked separately, based on a common rhythmic structure, but neither of them knew the music of the other until the premiere).

Apart from this new approach to music-dance relationship, Cage and Cowell shared the same ideology about which sound could be used to perform music. "Any sound is acceptable to the composer of percussion music; he explores the academically forbidden 'non-musical' field of sound insofar as is manually possible" (quoted in Nicholls, 2002, p. 16). Musical instruments are not the only source of sound anymore. They deleted any prejudice when choosing sounds for a composition. Therefore, any object capable of producing sound can be treated as a musical instrument.

The work of Oscar Fischinger [3] and Edgard Varése (*Ionisation* [1929-1931] for percussion ensemble in particular) reaffirmed the influences that Cowell had on Cage. *Ionisation* is one of the first works composed only for percussion and it has an extremely innovative instrumental template for the time: factory sirens, maracas, lion´s roar, etc. In those years, these elements were bound to draw the attention of the musical community. In 1935, Cage traveled to Los Angeles to study with Schoenberg and, in that trip, he met the film producer Oscar Fischinger. The following quote summarizes Fischinger´s contribution to a conversation between him and Cage: "There is a spirit inside each of the objects of the world, all we need to do to liberate that spirit is to brush past the object and to draw forth its sound"[1] (quoted in Nicholls, 2007, p. 38).

In this way, Cage was open to compose using not only percussion instruments and noise generators (such as lion´s roar or sirens) but also any other "everyday object". Perhaps this interest inspired *Quartet* (1935): "It is even possible that *Quartet* is, in fact,

1 "Hay un espíritu que esta dentro de todos los objetos de este mundo, lo único que necesitamos para liberar es cepillar lo que hay encima del objeto y extraer su sonido".

the soundtrack of a Fischinger´s film"[2] (Nicholls, 2007, p. 38).

At the same time that all of these new ideas took shape in his mind, Cage began his composition studies with Arnold Schoenberg [4]. In these lessons, he discovered his "inability to work with traditional pitched material, therefore he had to be interested in the possibilities offered by non-pitched music"[3] (Nicholls, 2007, p. 38). Despite this fact, he wrote some pieces using his teacher's twelve-tone system during those years. In this compositions, Cage tried to mask the row, instead of emphasizing it as the fundamental support of the compositional system. On the other hand, he learnt from Schoenberg that a musical structure is the result of dividing a piece into sections. However, Cage did not agree that harmony determinates this division. For Cage, time was the capable element of structuring a piece. Time is the most fundamental category. It exists before pitch and harmony and contains both musical sound as noise and silence. In those years, Cage associated time with the number of measures of the piece, all of them with the same duration.

Shortly after giving up lessons with Schoenberg, Cage began to structure music according to time instead of pitch. He focused on rhythmic structures: pre-composed temporary structures on which music must fit in a posteriori. The most outstanding structure is called "square root formula" and its guiding principle is: the same proportion will determinate the musical phrase´s division (microstructure) and the piece´s general structure (macrostructure). "Through the use of percussion instruments which had no access to pitch, but which allowed me to give a structure to the compositions" (Ford, 2001, p. 176). Therefore, Cage´s aesthetic is surely more influenced by Cowell than by Schoenberg. From Schoenberg he acquired only compositional discipline and a need for musical structures.

2 "Cabe incluso la posibilidad de que Quartet sea de hecho la banda sonora de una de las producciones de Fischinger"

3 "Incapacidad para trabajar con un material de tonos tradicionales, por ello tuvo que interesarse por las posibilidades que le ofrecía la música de tonos no afinados"

In 1937, Cage got a position at the elementary school of the University of California, Los Angeles (UCLA). He worked as accompanist, percussion teacher and collaborated with dancers as performer and composer. These activities brought him towards the development of the rhythmic structures aforementioned, in working with dancers, and the invention of a new instrument: the water gong. The water gong origin is due to a commission of an aquatic ballet by the UCLA swimming team. The swimmers could not hear the music when they were submerged, but Cage discovered that if he sunk a gong after beating it, they could hear it and were consequently able to adjust better to the music. The main characteristic of this instrument are that the gong´s frequency lowers when it is partially submerged in a liquid, that is, it does a descending *glissando* when we submerge it and ascending *glissando* when we raise it.

That year, Xenia Cage, his wife, began as bookmaker apprentice with Hazel Dreis. Dreis forced all her apprentices to move to her mansion in Santa Monica. Cage took advantage of this situation by asking the other apprentices, together with his wife and himself, for a part of their free time to form a percussion ensemble [5]. They played music that Cage composed using kitchen utensils, binding material, junk, etc. Although members of this ensemble were not professional musicians, they rehearsed everyday acquiring a high level of performance. This fact, along with his marriages economic hardship, prevented him from buying instruments, and are the conceptual basis of works such as *Living Room Music* (1940) or *First Contruction (in Metal)* (1939).

In the summer of 1938, Cage and his wife moved to Seattle, where one year earlier, Cage had given his famous lecture "The Future of Music: Credo". This conference, organized by B. Bird in an artistic society, was vital for the upcoming development of contemporary music. This time, Cage found a stable position at the Cornish School through composer Lou Harrison, with whom he shared ideas about composing for percussion and dance. During his stay at the Cornish School, Cage accompanied the dancer Bonnie Bird, composed new music for specific performances and continued developing his percussion ensemble. In that situation, "*First Construction (in Metal)"* was premiered on December 9th 1939.

At the beginning of the 1940's, Cage was constantly looking for new sounds: exotic instruments (cowbells, oxen bells, teponaztli, quijadas, etc.) and found objects (tin cans, brake drums, conch shells, etc.) This resulted with them being added to the conventional percussion instruments (bells, cymbals, tam-tams, etc.). However, the most important innovation was the prepared piano.

1.2 The emergence of the prepared piano

The invention of the prepared piano is directly related to Bird: Cage had to compose a new piece for Bird's outstanding pupil, Syvilla Fort [6]. "Three or four days before she was to perform her *Bacchanale*, Syvilla asked me to write music for it. I agreed" (John Cage's foreword in Bunger, 1981). The piece would be suitable for a dance suggestive of Africa. "The Cornish Theatre in which Syvilla Fort was to perform had no space in the wings. There was also no pit. There was, however, a piano at one side in front of the stage. I couldn't use percussion instruments for Syvilla's dance, though, suggesting Africa, they would have been suitable; they would have left too little room for her to perform. I was obliged to write a piano piece" (John Cage's foreword in Bunger, 1981). Cage first tried to find an African twelve-tone row, but he did not succeed. His next attempt was to modify the piano. After trying different objets (such as pie plate and nails), he found out that screw or bolts were the most suitable preparations. Cage also realised that it was possible to get two sounds out of the same preparation, one resonant and the other, quiet and muted by pressing the soft pedal.

In the light of the above, it seems that Cage created both a new instrument and piece in four days. However, as Luk Vaes explains, the emergence of the prepared piano was a longer procedure: "In actual fact the invention of the prepared piano came at an intersection of several roads that had been converging for a while until they connected with Cage for this historical event" (Vaes, 2009, p. 695). It has already been mentioned how Varésé's *Ionisation* (1931) influenced Cage. This is one of the first pieces for percussion ensemble and it includes a part for piano and percussion instruments. "Percussionists were asked to play keyboard instruments or pianists were asked to perform on a few percussion instruments next to their keyboard" (Vaes, 2009, p. 682). In 1933, William Russel

composed *Fugue for eight percussion instruments*, a piece that also includes piano in its instrumentation. Russel went much further in the use of extended piano techniques than Varése had done: scratching strings with a coin, striking the strings with rubber ball mallets, etc. However, as mentioned above, one of the most important influences in Cage´s early music comes from H. Cowell, not simply for sharing similar aesthetics but also for the use of the string piano.

There are examples of him using the string piano in his early compositions [7]. *First Construction* (1939) contains a string piano part with an assistant. In this piece, the assistant applies a metal rod on the strings producing a *glissando* of overtones among other effects. *Second Construction* (1940) also had a part for string piano. In *Second Construction* the techniques are significantly different: gong beater sweeping the strings, playing while muting the string with two fingers of the left hand, insertion of a cardboard between the strings in the treble clef or placing a screw between two strings. Therefore, it is obvious that Cage composed for piano with preparations before *Bacchanale*. However, "although the prepared piano made its first appearance in the *Second Construction*, Cage attributed its origins to *Bacchanale* (1940)" (Bernstein, 2002, p. 77). By any definition, the piano in *Second Construction* has been prepared (cardboard inserted in between strings), then it should be an explanation to justify the previous quote. Vaes proposes two hypothesis for this question: Cage could consider that prepared piano only has fixed preparations. In this case, *Second Construction*, that employs both fixed and mobile preparations, would have been composed for string piano but not for prepared piano in contrast to *Bacchanale*, in which all the preparations are fixed. The second hypothesis is much more simple: "Cage always (wrongly) remembered having composed *Bacchanale* in 1938, and *Second Construction* in 1940" (Vaes, 2009, p.711)

At this point, it is necessary to clarify some terminology: the differences between the string piano and the prepared piano are not always clear in Cowell's and Cage´s works. Cowell never used the term "prepared piano". Therefore, in his case, any grand piano with fixed preparations or mobile modifications is a string piano. However, Cage used Cowell´s string piano as a reference and later he developed the fixed preparations. Because of this, he utilizes both terms and sometimes it can be confusing to distinguish between the two

instruments.

To complete this chapter it is important to have a precise definition of what a prepared piano is. The earliest definition for it is found in the score of John Cage's *The Perilous night* (1943-1944): "Mutes of various materials are placed (in a grand piano) between the strings of the keys used, thus affecting transformations of the piano sounds with respect to all their characteristics".

2. Bacchanale

2.1 Period and circumstances of composition

In chapter 1.2 "The emergence of the prepared piano", the circumstances surrounding the composition of *Bacchanale* have already been discussed. Undoubtedly, this is an exciting story that predetermined certain requirements for the composition, but *Bacchanale* does not depend exclusively on the room available in the Repertory Playhouse. Information about the techniques used by John Cage at this time is much more relevant for understanding the piece.

One of the most remarkable aspects of Cage´s compositional technique during those years is the use of rhythmic structures. These structures were determined prior to writing anything, and later, he filled them with sound, noise or silence. One of the most used structures was the square root form. It is clear to see its use and development in *First Construction (in metal)* (1939), where the only structural exception is a nine measures coda, *Second Construction* (1940), where the microstructure rotates in each section, or *Third Construction* (1941), where the microstructure rotates independently in each performer.

According to this, it would also be possible to find this technique in *Bacchanale* [8]. During the time of rhythmic structures, "section lengths were counted in periods, marked in the score by double barlines or by rehearsal numbers or letters" (Emmerik, 2009, p. 218). Looking at the score, it is obvious to place a first division or section from bar 1 to 9 (tempo "Fast"); the next section ("Faster") starts at bar 10 and ends at 15 (six bars in total); the third section would have only eight bars. The total count of measures per section is: 9-6-8-6-13-10-7-43-32-etc. It is not necessary to understand that a rhythmic structure based on the number of measures per section does not exist. In fact, rhythmic structures need bars of the same duration to work, whereas in *Bacchanale*, bars of different measures are alternated. Therefore, it is possible to assert that there are not rhythmic structures in *Bacchanale*.

At this point, it is worth remembering *Bacchanale´*s role as a music written for a choreography and as Emmerik says: "many of Cage´s works from the 1940's [...] employed structures that could be described as 'additive'. In most cases, additive rhythmic structures were used in incidental music for the dance" (Emmerik, 2009, p. 219). In this situation the structure was not determined by Cage but by the dance. "This is the case in *Bacchanale* (1940)" (Emmerik, 2009, p. 219). Even so, a detailed study of the structure shows that if we replace the measure bar for the measure beat (it is kept even if the measures change), it is possible to glimpse some of the mathematical structures used by the composer. At the beginning of the piece, all sections "Fast" have a total of thirty beats, while "Faster" sections have only twenty beats. From bar 60, these divisions become longer and more irregular, adapting to Fort´s choreography.

Another result of analyzing the score is that most of the sections entail a new *tempo*. However, these new *tempi* are not really precise metronomic indications. *Tempi* range varies from "Very Slow" - "Slower" - "Slow" - "Fast" - "Faster" - "Fast II", keeping an overall shape of the piece within the scheme Fast - Slow - Fast (A B A form). The ambiguity of *tempi* helps with adapting the music to the choreography speed.

For the same purpose of coordinating dance and music, the endings of each section allow some rhythmic flexibility. In general, the end of a section contains a monodic part, often accompanied with a *diminuendo* and *ritardando* that ends in a *fermata*, long sound or silence [9]. This fact gives freedom to vary the length of each section to fit the choreography. An exception for this rule is the "Slow" section (bar 132) which is a long *accelerando* towards the rhythmical re-exposition of the piece.

Dynamics remain fairly stable throughout each section, that is, a single dynamic for the whole section. This stability evolves towards a greater activity (dynamical changes in the same section) in the end, in the re-exposition of fast sections. In any case, dynamic changes always affect both voices (right and left hands) and have a *subito* effect. There are just a few *crescendi*, and the written *diminuendi* are always related to a section ending. The last fact to emphasize the dynamics is the relation between slow *tempi* and soft dynamics,

and, by contrast, fast *tempi* and loud dynamics (with slight exceptions in this second case).

From a rhythmic point of view, it should be noted that a work with an African inspiration and such evident rhythmic character has a regular rhythm based on eight notes, sixteenth notes and quarters throughout the piece. Nevertheless, this writing was characteristic of Cage´s early stage: abundance of regular rhythms that are suddenly interrupted by irregular rhythmic events. These elements are, for example: the quarter triple in bar 28 (reinforced by a louder dynamic), or eighteenth notes triples, sixteenth notes triples and doted sixteenth notes in the re-exposition of "Fast". Another element that breaks rhythmic regularity is the use of rhythmic motives that measure different from the bar in which they are written. In this way, polyrhythms arise between these motives and the natural bar rhythm. A final element of rhythmic variety is the use of same materials in different measures, for example, the characteristic sixteenth notes bass line (A-Bb) written in 5/4, 4/4, 3/4, 6/8.

2.2 Compilation of alterations and effects

The table of preparations annexed to Peters Edition of *Bacchanale* shows three different types of mutes: fibrous weather-stripping, screw with nuts and small bolt. Cage did not specify the size of these objects, it must be the performer himself who experiments with them until finding the most appropriate solution. Even so, some pictures of the required materials are shown below with the purpose of helping the player [10].

Bolt and screw are two similar objects, particularly for those readers that are not used to hardware material. Apart from their different functions, there are also differences in the shape that distinguish them: both bolt tips are flat, one is designed to accommodate a nut and the other, to press with the right tool. On the contrary, one of the screw tips is pointed and is designed to penetrate directly into the material to be fastened. Curiously, Cage mixed both elements using a screw with nuts and a bolt without its corresponding nut. The number of nuts to be used together with the screw is again the performer´s decision.

Most preparations, excluding two, are weather-stripping bands [11]. This fact equals the timbre of the work in general. Thus, *Bacchanale´*s prepared piano sounds like an instrument with a defined timbre, instead of multiple timbres coming from the same source. This detail will be specially relevant in the next chapter 3. "Reconstruction Process".

Once the materials are known, it is necessary to place them in their exact position. Of course, it is known which pitch should be modified, but this still leaves two or three strings along its length to place the materials between. Cage only specified the small bolt placement on pitch F: between the second and third string at an approximated distance of 3" (7,62 cm) from the damper. The indications are not so precise with the rest of preparations: it is always indicated between which strings the mute should be inserted, but not how far from the damper. It is important to notice that weather-stripping is always placed between the first and second string. This reinforces the idea of a common timbre to most of the piece. Once more, the distances between the mute and the damper must be found by experimentation.

High B-flat pitch is the only one with two preparations at the same time. As Vaes says: "triple-string notes can be used for two different kinds of sounds without changing preparations" (Vaes, 2009, p. 79). To achieve this effect it is necessary to use the *una corda* pedal (that shifts the hammers to strike only the second and third string). That is, high Bb usually will have two preparations, screw with nuts and wheather-stripping, and, in other occasions (Very Slow - bar 74 and Slower - bar 108), using the *una corda* pedal, just screw with nuts. The use of this pedal also affects high F pitch: "If only the second and third string of a triple-string chorus is prepared (e.g. by a bolt put in between them), the preparation pitch of those two strings will mix with the unprepared first string of the chorus. When depressing the *una corda* pedal, only the preparation pitch is activated" (Vaes, 2009, p. 79).

Once the preparations indicated in the score have been understood, there is still a possibility to investigate more in depth:

> "Originally I knew where the preparations for *Bacchanale* should be placed and what they were, and so I didn´t write them down. As time passed and I no longer played it, my memory faded, etc. When the piece was prepared for Peter, I tried it out on some piano (I haven´t had on of my own since 1954) and wrote down what I thought was o.k. Then when Jeanne made the recording, we had a different piano, and so made the preparation that seemed suitable for it." (quoted in Vaes, 2009, p. 723).

This quote demonstrates the existence of three different preparations for this piece: the original preparation used by Cage at the premiere, the adaptation of this preparation to Jeanne Kirstein´s piano in 1969 [12], and finally, the one proposed in Peters edition of the score. Differences between them are abysmal, for example, in the version recorded by J. Kirstein there is no trace of weather-stripping, instead metallic materials are used in this version. In order to recreate, or at least to try the original preparation (1940), Vaes proposes to review the most contemporary preparation practices to *Bacchanale.* One of the conclusions he draws is about weather-stripping, the most common preparation: "it is unlikely that its original preparation table would have contained weather stripping" (Vaes, 2009, p. 725).

This issue, concerning the different options of preparation, could have been a difficulty around 1950 due to Cage´s opinion thereon: "very exact measurements must be made as to the position between the strings" and "in order to repeat an obtained result, that particular screw or bolt, for instance, originally used, must be saved" (Vaes, 2009, p. 724). However, over the years his attitude became more flexible and he opened up to new interpretations: "When I first placed objects between piano strings, it was with the desire to possess sounds (to be able to repeat them). But, as the music left my home and went from piano to piano and from pianist to pianist, it became clear that not only are two pianists essentially different from one another, but two pianos are not the same either. Instead of the possibility of repetition, we are faced in life with the unique qualities and characteristics of each occasion" (John Cage in Bunger´s foreword, 1981).

3. Reconstruction process

3.1 Part division and instrument setting

Once we have enough knowledge about Cage´s early music and his piece for solo prepared piano, we can start to reconstruct it. The first question that we have to answer is: how many percussionists will be required to perform it? Most of Cage's percussion music composed between the 1930´s and 1940´s is written for percussion ensemble (3-6 players), and, as we said before, the piece was planned originally to be played by Cage´s percussion ensemble. Additionally, the big size of percussion instruments and the chords with more than four notes make it impossible to play with only one percussion player. Therefore, a percussion ensemble playing *Bacchanale* sounds like the most logical idea. This is just a partial answer to our question: we know that more than one percussionist will be needed, but we still have to find out the exact number of performers.

For the moment, we assume that each percussionist can just play two sounds at the same time, one with each hand (i.e. no four mallets technique or similar). In this case, we need at least three performers to play the five-sound chords (bar 1). However, if we consider the instruments and set-up sizes and the amount of sounds to be played by each percussionist, we will realize that a version with four performers is more suitable. We, therefore, need to divide the original score between four players.

The best criteria to distribute the sounds is to keep, when possible, the melodic lines played by one musician. That means various performers will need the same sounds in different parts of the piece. For example: bar 1, at least two players are required to play the chord pitches G, C and F; however, two bars later these three notes are part of the same melodic line. At this point, we have two options: to duplicate sounds (each player will have all of the sounds in his own set-up) or to share sounds (put all the instruments together in a unique set-up and performers will play it from different sides). The advantage of duplicating sounds is that each performer can set the instruments at his own taste, but on the other side, it is extremely complicated to get exactly the same sound (timbre and pitch) in two percussion instruments. Due to this, *Bacchanale* would work better if we keep each original sound related to its corresponding percussion instrument. Therefore, our set-up

will have as many percussion instruments as different pitches/preparations has the original score: twelve.

However, if we pay attention to the pitches used by Cage to compose this piece, we will see that some of them can be grouped together in a chromatic scale: A, B-flat, B, C, D-flat, D, E-flat & G, A-flat. In Cage´s percussion music, it is common to play two different sounds from each drum, tin can or any other object.

One sound is produced playing in the middle of instrument or skin and the other, playing on the edge. This second sound is slightly higher than the first one. Since we are reconstructing the piece, it seems logical to use this Cage way of composing and performing percussion music in our version. That means we can assemble each chromatic interval in one instrument and its two sounds. Following these criteria, our final percussion set-up will have this appearance (players 1 & 3 are in front of players 2 & 4) [13].

3.2 Percussion score

Due to this diagram, the original piano score can be divided into four players. The result, being the attached score for piano quartet in which the original pitches and notes are kept as in the original (Annexe II. "Piano quartet score"). However, we cannot play this score with percussion instruments. At this point, we should choose the instruments we will use to perform it in order to write a new score for them. Instead of choosing a fixed list of instruments, we will work with some general facts and leave the final decision until later in the process. We know that Cage did not use pitched percussion instruments in his early works, so our palette of instruments will be restricted to unpitched instruments. If we are more specific about it, the instruments Cage used were, most of the time, drums (with natural skins), traditional instruments from other cultures (rattles, teponaxtle, etc.), metal instruments (thundersheets, cowbells, sleigh bells, etc.) and common objects (tin cans, brake drums, sheets of paper, etc.). The purchase of instruments such as "brass gongs, brass cymbals, chinese toms or wood-blocks" (Shultis, 2009, p. 96) for his own collection is jutify by invoices in the name of Cage.

In chapter 3.2. "Compilation of alterations and effects", we mentioned the different preparations between the first performance of *Bacchanale* (1940) with metal objects inside

the piano, and the preparations required in Peters Edition score edited thirty years later (mostly felt preparations). There are at least, two ways of preparing the piano for Bacchanale, resulting in two completely different sound palettes. We could transfer this idea to our reconstruction, meaning to work on two versions of the piece: one closer to the original preparations and the other closer to the newest preparations. However, due to the lack of knowledge about the preparations used in 1940, as well as the lack of recordings, we cannot have a precise idea about how this first version sounded. Because of this situation the difficulty to choose the most suitable instruments for its reconstruction becames bigger. For these reasons, we will propose options for its performance and interpretation, but they will not be put into practice. The goal will be to perform only the Peters edition.

In any case, for both piano versions of *Bacchanale*, the performer uses the same score and the same instrument interface (piano keyboard). In our reconstruction, we will keep this fact: the score will not change, neither the instruments placement, although they will produce other sounds. Therefore, a percussion ensemble can play both versions by just changing the instruments, but they will not need to learn a new score or disposition of instruments.

Then we need to create a percussion score. We already have the division for four players and instruments set-up, but we still have to make it understandable for percussionists. In images [14-17], we can see how many instruments each percussionist plays. Some of the instruments are used with the two sounds technique (center-edge), but not all of them. To make the score reading as understandable as possible, each line will represent one instrument. However, we will use a round note head to designate the middle sound and a cross note head for the edge sound. Instruments with only one sound are written with round heads. A triangular head designates instruments which do not belong to the drums group. The following images [14-17] show the notation for each percussionist. Annexe III. "Percussion quartet score" shows a transcription for unpitched percussion instruments.

3.3 Instruments selection

At this point, it is essential to decide finally which instruments will be used for the reconstruction. We have already seen that the piano preparations are based on

experimentation, and that both the conditions of the piano and the performers taste, make it difficult to standardize their sounds: "the often unclear or even lacking specifications of the mutes in scores make for the variable and undetermined nature of the prepared piano, and aboce all for the problem of subjectivity when describing its acoustical properties" (Vaes, 2009, p. 77). Therefore, based on the fact that it is not possible to relate with precision each piano sound with its corresponding percussion sound , there are some characteristics that can be helpful in making our decisions. Vaes sets a four-degree scale to define prepared pitch sound: "relatively definable pitch" (preparations with rubber, felt, plastic, etc.), "sound complexes with partly indefinable pitch" (preparations with wood, bamboo, etc.), "mostly noise-like" (screw + nut and two screws) and "only noise and no pitch" (bolt + screw). That is, preparations with soft material, such as weather-stripping, fall into the "relatively definable pitch", whereas harder materials, such as bolt or screw with nuts, fall into the "mostly noise-like" group. According to this first approach, Peters edition sounds must have a more defined pitch, and the ones from the original version, less defined and more noisier.

By already knowning the general sound characteristic of each version and Cage's collection of instruments, we must find two groups of instruments that produce an homogenous sound with eleven different pitches (in relation to the eleven preparations of the same material in piano version). One of the groups must have a defined pitch, and the other, a non defined pitch "mostly noise-like". From Cage's instrument collection, we can discard those that produce long sound (e.g. thunder sheets or tam-tams) because of their lack of clarity in the fast rhythms of *Bacchanale*. The same would happen with the different rattles. Of the remaining instruments, only drums and cowbells meet the mentioned conditions.

From these options, it seems logical to match the weather-stripping preparations of Peters Editions with drum sounds. For the original metallic preparations, the most suitable instruments would be: tin cans, brake drums or cowbells. Although tin cans, brake drums and cowbells can be played with the aforementioned center-edge technique, Cage only used it for tin cans. That is, tin cans is the group of instruments that best fits in the characteristics of the original version.

As we have said before, we will not reconstruct the original version of *Bacchanale* in this research. At this point we will abandon its approach, shifting our focus to the newest

version. As a final contribution before closing this topic, we open the possibility of performing it with tin cans.We can also add another possibility with gamelan instruments, as Virgil Thomson wrote: "the effect [of the prepared piano] in general is slightly reminiscent, on first hearing, of the Balinese gamelang orchestras" (quoted in Vaes, 2009, p. 715).

Back to Perters version, we have already linked the weather-stripping preparations with drums. In 1940, the drums used by Cage were Chinese toms [18], that is, barrel-shape drums with two thick natural skins and no possibility of tuning. Although these instruments have a quite defined pitch and allow the center-edge technique, their tuning can not be modified. Therefore, we could only perform the piece if we had the drums with right tunings. It is extremely difficult to have a set of Chinese drums with all the exact tunings for *Bacchanale*. For example, in the Royal Conservatory of The Hague there is a small collection of these drums, but only one fits the required tunings. This situation forces us to find an alternative, instruments that replace Cage´s Chinese toms. The best solution would be the use of *tamboras* [19], also barrel-shape drums with two natural skins. The advantage of tamboras is that they can be tuned with tensioning screws. On the other side, the heads of these drums are slightly thicker than the ones of the Chinese toms, producing a subtly different timbre with less fundamental tone and more overtones.

We have already linked the predominant preparation, weather-stripping with the drums. Now we will focus on the other preparations: small bolt in F pitch and double preparation, weather-stripping + screw with nuts in high B-flat pitch. We will start with the second: in chapter 2.2. "Compilation of alterations and effects" we have explained that, with this double preparation, we listen to both mutes at the same time, and only the screw with nuts preparation when the una corda pedal is depressed. Both preparations sound together only in bars 1, 2, 15 and 16. In our score for percussion quartet, these few occasions are always in second player´s part, without any combination with other sounds in the same part, and written in simple and not too fast rhythms. This allows the player to play two instruments at the same time: one related to weather-stripping preparation and the other, to screw with nuts. According to this decision, B'-flat would be composed of a single sound during most of the piece (indicated in the score with triangular heads). It would be formed by both sound components only in bars 1, 2, 15 and 16. And, in between bar 132 and bar 138, where the *una corda* pedal is released progressively, the second component

would maintain a stable dynamic while the first one would make a crescendo from *niente* to *fortissimo*.

It is obvious that the first of these sounds, linked to weather-stripping, must again be a Chinese tom (or *tambora*). Now we must look for the second component, the one linked to screw with nuts. According to Vaes classification, screw with nuts falls in "mostly noise-like" sounds group. With this preparation, there is still an identifiable pitch, although it is almost hidden behind a metallic sound formed by an attack and between one and three rebounds (depending on the dynamic). A metallic percussion instrument with some small metal fragments on its surface (to work as a small rattle activated by the main instrument´s vibration) would be the ideal choice. We have already discussed the options within Cage´s collection that meet these characteristics: tin cans, brake drums and cowbells. Both brake drums and tin cans do not have a long enough resonance in soft dynamics to activate the rattle. Cowbells are the best solution for this case. We can add to them some small coins (like the pence that Cage´s inserted in the piano), screws, nuts, thin chains, etc. to find the desired sound. The necessary material and its placement must be searched by experimentation once again, because they will depend directly on the kind of cowbell used. We will never use latin cowbells or *campanas*, much drier and without defined pitch, for this purpose.

Finally, we have to look for the sound that replaces F pitch with small bolt between second and third string. According to Vaes, this preparation falls again in the group of "mostly noise-like" sounds. Its sound is clearly metallic with defined pitch but short, without any rattle, just a slight buzz together with the attack. Perhaps the cowbell option, in this case without the rattle, would be again a good solution. By hitting with the hand, we will get this noisy attack that characterizes the piano preparation.

Once all the sounds are ready, there is only one more question to solve. We know the importance of long notes in *Bacchanale*, especially when they are at the end of a section, with the question then being, how to coordinate music and choreography?. Piano resonance, even with mutes inserted between strings, is longer than drums resonance. For this reason, we have to simulate this effect with a new performative technique, the finger roll used by Cage in his percussion pieces. Cage´s proposal was to roll on a drum with one hand by alternating thumb with the remaining four fingers. However, this kind of roll makes it difficult to hit exactly the same spot, to get an even sound and reach the

fundamental pitch of the drum. A roll alternating both hands and using one or two fingers of each hand would solve these issues. The notes that can be rolled are indicated in the score with the symbol *tr*. We must never forget that this techniques have the purpose of simulating the longer piano resonance. That is to say, it is not a matter of keeping a *tenuto* sound but simulating the progressive decay of piano in the most natural way. This results in small *diminuendi* during the drums rolls.

The other sound that needs a longer sustain is the F cowbell of the slow section (bars 86, 107 to 119). Taking advantage of the cowbells natural resonance, it is better to look for a beating technique that gets longer resonance instead of using the roll technique. If we use a soft rubber mallet (similar timbre to our hands) but quite heavy and we hit very close to the edge, we will get a longer sound and slower decay.

In case of very slow *tempi* performance, in which we need more sustain in the slow section, we can use felt mallets on the drums and F cowbell (excluding the spots where we use rubber mallet). In order to keep the noisy sound in B-flat cowbell, we will continue beating it with the hand.

To conclude the reconstruction process, it is necessary to verify that all the elements and techniques were used in the first pieces for percussion of John Cage. Our set-up has Chinese toms (or substitutes) and cowbells, both instruments widely used by the composer. About the techniques: hands hitting center and edge, fingers rolls and rubber mallet, Cage also used all these techniques. In Annexe IV. "Recordings" we can find recordings of each part where the instruments, tunings and techniques are showed.

4. Conclusions

Now that we understand the first stage of Cage as composer, the origins of the prepared piano, and even the preparations required for *Bacchanale*, we are able to immerse ourselves in the process of transcribing from a historicist point of view. It is now time to look back and see if we are able to answer the written questions in "Introduction" and if we can conceive new ideas based on this research.

The answer to our research question "Is an instrumentation for percussion ensemble possible, and if so, how would this sound?" is now obvious. There are sufficient historical evidences to justify the transcription of *Bacchanale* for percussion ensemble. Likewise, we have the instruments and interpretative techniques to carry out such a transcription. However, we must emphasize the fact that the reconstruction is based on the Peters Edition of the score instead of on the original preparations of the piano. The lack of knowledge about the original preparations and their sounds prevents us from performing a real reconstruction of the 1940 version.

Another question raised at the beginning of this research was regarding the selection of the most appropriate instruments to perform the piece. These instruments had to fulfill two conditions: to be known and used by Cage in his first percussion works and to simulate the sounds (timbre, volume and resonance) of the prepared piano. After studying the case, we can conclude that the best option is the use of Chinese toms (or *tamboras*) for the weather-stripping preparations and cowbells for the metallic preparations. We can add small metal pieces to cowbell´s surface to imitate the rebound of the screws with nuts preparation.

Regarding the original version of *Bacchanale*, after a theoretical study of it and without any sound reference, we can propose two approaches to the performance: First approach, using tin cans as main instruments, which meets the conditions of being known and used by Cage, but we do not know its similarity with the piano timbre. The second

approach, is the V. Thomson proposal of using gamelan instruments, which does not fulfill our condition of being an instrument used by Cage.

As we have chosen the most appropriate instruments for the performance, we have also obtained new ideas on the playing techniques. These techniques also follow the historical criteria and match certain characteristic effects of the prepared piano (such the use of *una corda* pedal or the resonance decay). The general techniques involves playing with hands in the center and edge of the drum. It is added with effects such as playing with a soft rubber mallet on the cowbells to lengthen their resonance; with the hand to get noise in the attack; or with combinations of cowbell plus drum to imitate the double preparation of B-flat. Likewise, in case the *tempi* are very slow, there is a possibility of playing the drums with felt mallets.

Given the doubts about the *tempi* of *Bacchanale*: we have not been able to establish any clear criteria that allows us to specify the metronomic speeds. However, we know the *tempi* range of the piece, that is, which sections should be faster, which should be slower and which share the same *tempo*. We also know the different piano preparations, their placement or material, and even that the piano itself will produce different sounds in each case. The dynamics and resonance of these sounds will vary on each occasion and the *tempo* of the piece will naturally adjust to them. With louder and longer sounds, we will opt for slower tempi so the rhythmic precision will be maintained and then the opposite with the short and soft sonorities.

However, we must not forget the role of Bacchanale as an accompaniment for dance. The above criteria will be valid in case of playing the piece in a concert version. When the piece includes the choreography, we must use the *tempi* inaccuracy in favour of the dancer and adapt the music to the speed of his or her movement. Even in this case, the *tempi* ratio between different sections must be kept.

After completing this last chapter and answering the questions raised in "Introduction", it is time to put all this knowledge into practice and try a real performance

of *Bacchanale* with percussion instruments. However, before finishing this paper, we can not avoid asking one last question: What could have happened if Cage had had enough room for his percussion ensemble? Would his music have developed in the same way as it did during the next ten years? An exciting question that will never get its answer.

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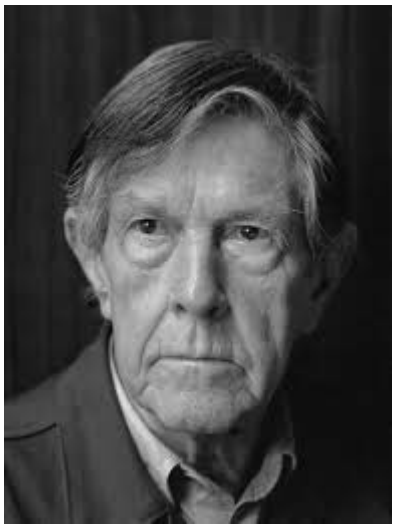
SCORES

Cage, John. *Bacchanale*. New York: Henmar Press.

Cage, John. *The Perilous Night*. New York: Henmar Press.

Annexes

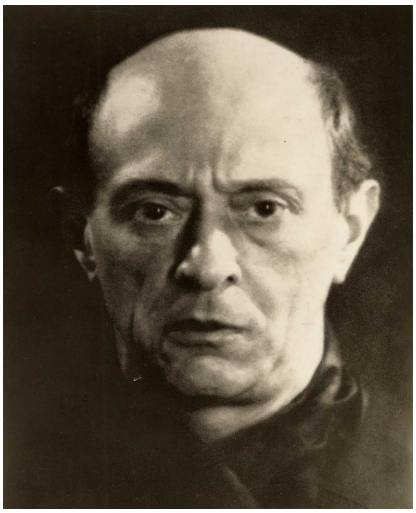
Annexe I. Image



[1] John Milton Cage Jr., 1988. Copyright: public domain.

[2] Henry Dixon Cowell,1926. Copyright: Imogen Cunningham

[3] Oskar Wilhelm Fischinger. Copyright: Center for Visual Music.

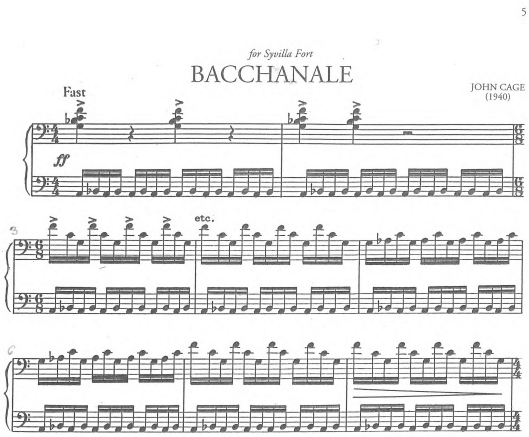


[4] Arnold Schoenberg, 1927. Copyright: Public Domain.

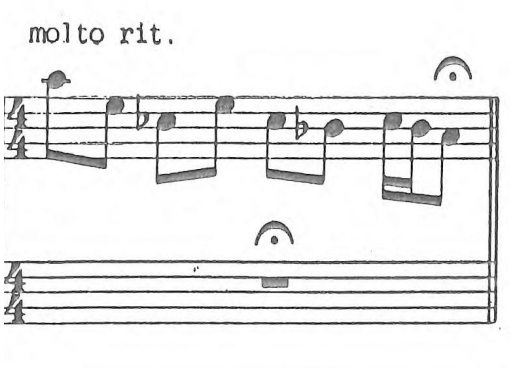
[5] John Cage´s ensemble. Copyright: Unknown.

[6] Syvilla Fort (dancer). Copyright: Ruth Margaret Kreps Archive.

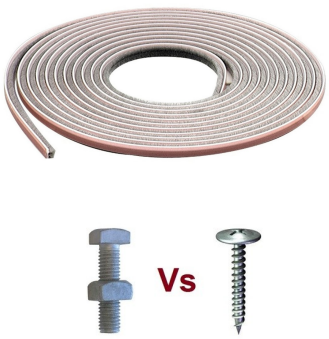
[7] Cage preparing a piano, 1947. Copyright: CondE Nast Publications Inc.



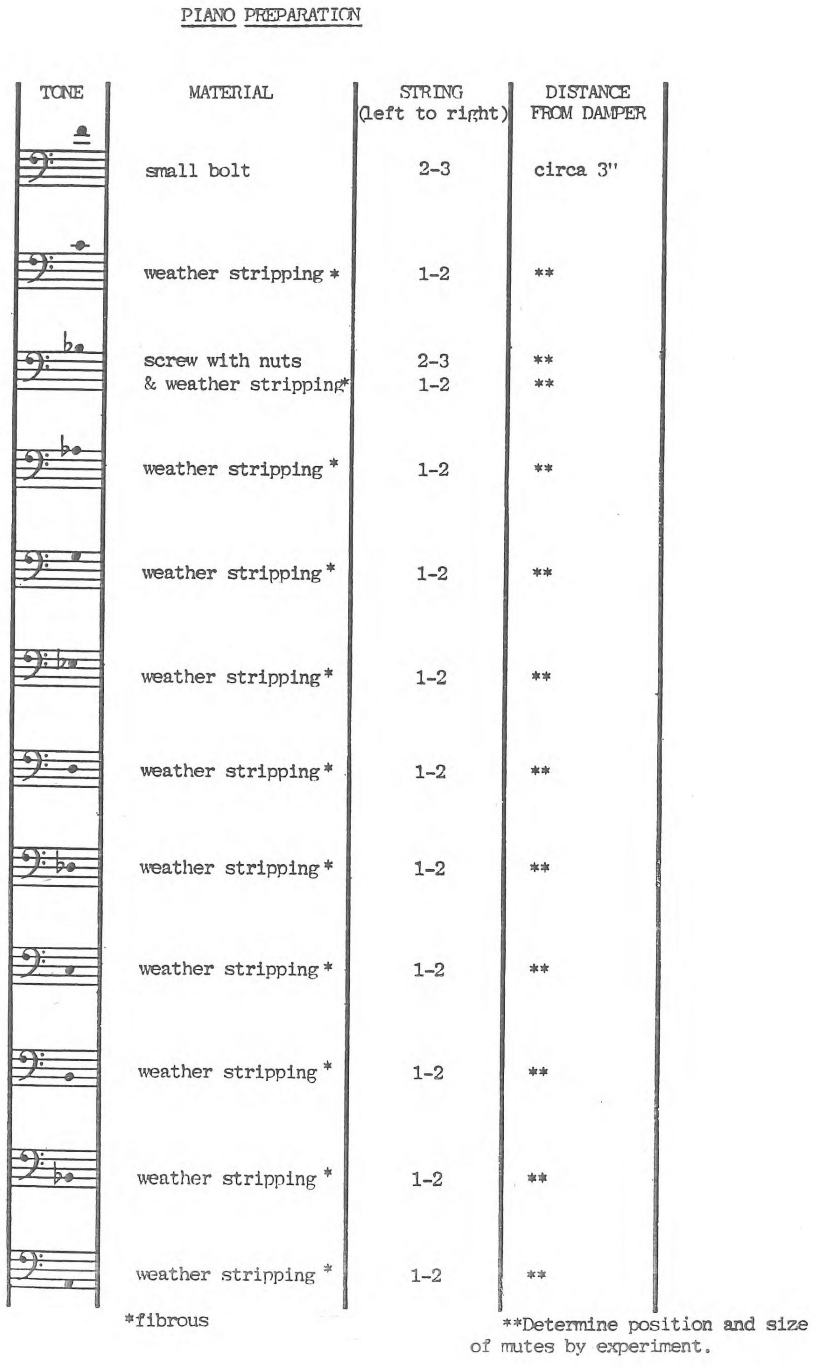
[8] Bacchanale first page, Peters Edition. Copyright: Henmar Press Inc.



[9] *Bacchanale*, bar 73. *Ritardando* and *fermata* at section ending. Copyright: Henmar Press Inc.



[10] Weather-stripping, bolt with nut and screw. Copyright: Unknown.



PIANO PREPARATION

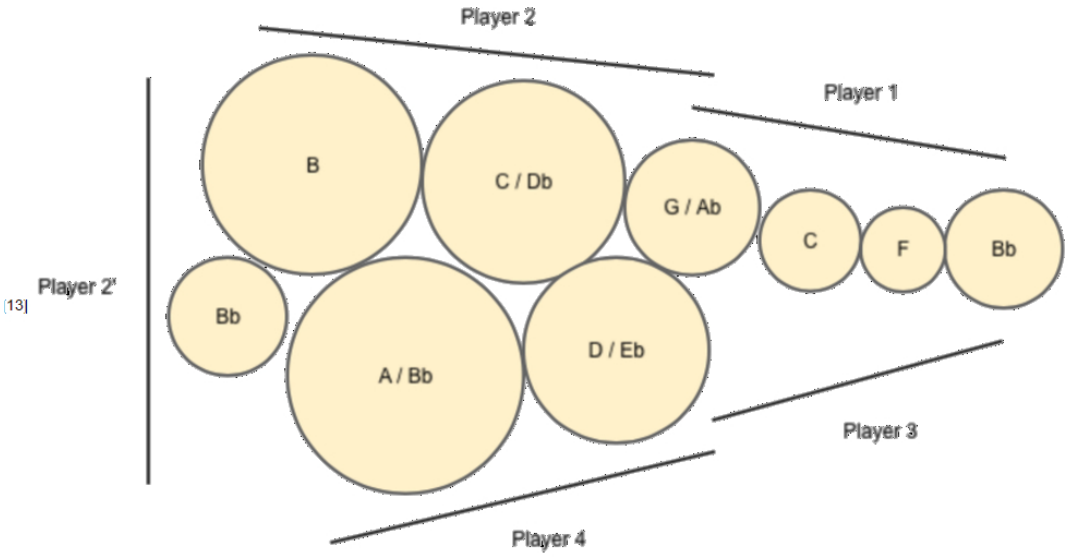
TONE	MATERIAL	STRING (left to right)	DISTANCE FROM DAMPER
	small bolt	2-3	circa 3"
	weather stripping *	1-2	**
	screw with nuts & weather stripping*	2-3 1-2	** **
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**
	weather stripping *	1-2	**

*fibrous

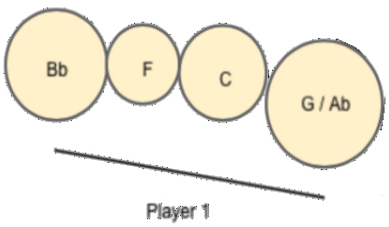
**Determine position and size of mutes by experiment.

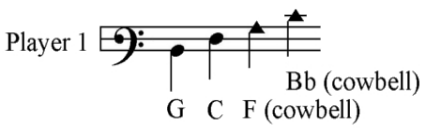
[11] Piano preparations for *Bacchanale*. Copyright: Henmar Press Inc.

[12] Jeanne Kirstein *Musique for Piano*. Copyright: CBS.

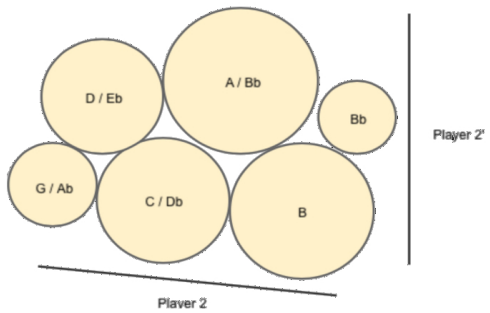


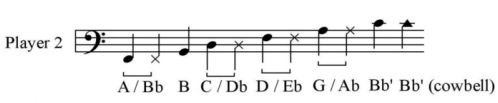
[13] Percussion instruments set-up. Source: Gorka Catediano



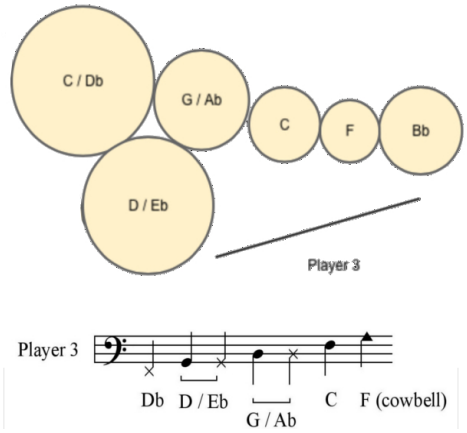


[14] Set-up and notation for player 1. Source: Gorka Catediano.

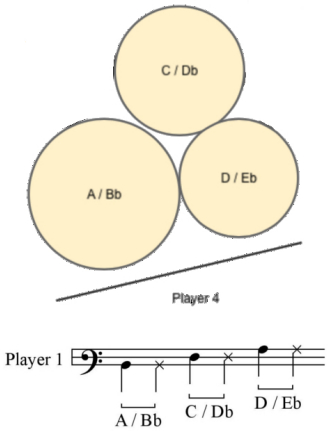




[15] Set-up and notation for player 2. Source: Gorka Catediano.



[16] Set-up and notation for player 3. Source: Gorka Catediano.



[17] Set-up and notation for player 4. Source: Gorka Catediano.

[18] Chinese tom. Copyright: Kolberg Percussion.

[19] *Tambora*. Copyright: Latin Percusion.

Annexe II. Original score

https://media.researchcatalogue.net/rclive/master/32_335025_01487772525_00001.pdf?key=62d346306b6e04764ad88d5dc5d62d28&timeout=1489413600

Annexe III. Piano quartet score

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Annexe IV. Percussion quartet score

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