UNIVERSITY OF CALIFORNIA

Los Angeles

The Caribbean and the Avant-Garde:

Luciano Berio's *Rhumba-Ramble*

A dissertation submitted in partial satisfaction of the requirements of the degree Doctor of Philosophy in Music

by

Orlando M. Calzada

2015
ABSTRACT OF THE DISSERTATION

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Doctor of Philosophy in Music

University of California, Los Angeles, 2015

Professor Ian Krouse, Chair

Abstract

With the establishment of the first Spanish settlement in Las Américas called La Navidad – in what is today Dominican Republic – Cristobal Colón established official domination of Europe over the newly discovered land. A new era of worldwide exchange started to reshape territories, societies, cultures and relationships between peoples around the globe. Early in the 16th Century, as Charles C. Mann explains in his book 1493, “slaves from Africa mined silver in the Americas for sale to China; Spanish merchants waited impatiently for the latest shipment of Asian silk and porcelain from Mexico; Dutch sailors traded cowry shells from the Maldives Island in the Indian Ocean for human beings in

Angola” while “tobacco from the Caribbean ensorcelled the wealthy and powerful in Madrid, Madras, Mecca and Manila.”

The musical arena was not exempt from the dynamic phenomenon created by this globalization. Slaves brought, from Africa, a strong and sophisticated sense of melodic rhythm and percussive tradition and the European colonizers imposed their overpowering structural and harmonic tendencies. Although the Taínos were eradicated in a few years after the beginnings of the colonization, they also contributed to this cultural amalgamation with prototypes of musical instruments commonly used in Caribbean music today.

Because of the historic socio-political situation from the 16th through the 19th Century, the importation of European music to the Caribbean concert halls was emphasized over the exportation of the Caribbean popular music to homogeneous venues in Europe. Yet, by 1850’s, the New Orleans pianist and composer, Louis Moreau Gottschalk took on the mission of composing music full of Caribbeanism with the purpose of presenting it in the concert hall. Inspired by his experiences in Cuba and Puerto Rico, Cocoyé (1853) and Souvenir de Porto Rico (1857) were early prototypes in the development of the influence of Caribbean music on classical composers. Since then, Caribbean music has become part of the influences embraced by classical composers around the globe. It has been a fountain of inspiration in pieces where the composer’s style interweaves with its elements and its character. Hector Berlioz, Georges Bizet, Maurice Ravel, Claude Debussy, Camille Saint-Saens, Aaron Copland, George Gershwin, Leonard Bernstein, Hans Werner Henze and György Ligeti, all adopted Caribbean elements into their music while preserving their own

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2 Natives of the Greater Antilles
3 Starr S. Frederick, Louis Moreau Gottschalk (Urbana and Chicago: University of Illinois, 2000), 266.
styles. In *Rhumba-Ramble*, Luciano Berio, as did his fellow composers, embraces Caribbean elements and its substance, allowing them to become pillars of the piece while still being truthful to his own compositional voice. This analysis of *Rhumba-Ramble* will identify and discuss the specific ways in which the composition serves Berio as a vehicle to manifest his idiosyncrasy in perfect integration with traditional dance Caribbean music.
This dissertation of Orlando M. Calzada is approved.

David Lefkowitz
Steve Loza
James Newton
Neal Stulberg
Ian Krouse, Committee Chair

University of California, Los Angeles
2015
Dedication

This dissertation is dedicated to my wife Mayra whose mission in life seems to be to love and support me. You deserve more than I could ever give you, I am sure that we will enjoy the fruits of our efforts together for years to come.

I also dedicate this dissertation to my parents Orlando and Nelly. The support that you have given me goes beyond anything imaginable. I am infinitely proud and grateful to have been born of you.
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Acknowledgements

I am very grateful to my committee members for being part of this process, generously imparting me with their knowledge, experience and time. I am especially grateful to Dr. Ian Krouse, my committee chairman, for all the knowledge and encouragement poured to me with his special teaching gift, on this dissertation and throughout my years at UCLA. I am also thankful to Dr. David Lefkowitz for the time he dedicated to have constructive discussions with me about this dissertation. Thanks to Dr. James Newton for sharing so much information and spending such great times exploring great topics of music. Thanks very much, Dr. Steve Loza and Dr. Neal Stulberg for being part of this committee. It has been an honor.

Many thanks to Edizioni Survini Zerboni –Sugarmusic S.p.A for their kindness in granting me permission to use pages 43, 52 and 56 of the score Divertimento per Orchestra as figures in this dissertation. Also, thanks to Tom Somerset for helping me in proofreading and editing this dissertation and to Dr. Juliet McMains for providing me with important information, which turned out to be key for the development of this dissertation.

Finally, I would like to thank, who has been, one of the most important persons in this process. My infinite gratitude and respect go to my mentor and precious friend Dr. Raymond Torres-Santos. Your encouragement, intellectual and emotional support has been invaluable.
Biographical Sketch

Orlando Manuel Calzada was born in San Juan, Puerto Rico. There, he received his Bachelors Degree in Percussion at the Conservatory of Music, where he was awarded the “Most Outstanding Student Award”, the “Highest GPA Award” and the “Conservatory of Music Award”. He received his Masters degree at UCLA in 2000, after which he taught at the Conservatory of Music of Puerto Rico, from 2002 to 2006 and served as Adjunct Professor at the Universidad Inter Americana from 2001 to 2008.

Calzada has been Composer in Residence of the New Albany Symphony Orchestra, the Festival de Orquesta Sinfónica Juvenil de las Américas, and the Instituto de Cultura Puertorriqueña. He has received commissions from the Puerto Rico Symphony Orchestra, the Johnstone Fund for New Music, the Instituto de Cultura Puertorriqueña and Música de Cámara Inc. His Music has been performed in the United States, Latin America and Spain. Orlando Manuel Calzada has also worked, since 2001, as arranger, film composer, theater composer, orchestrator and music producer, in Puerto Rico, New York City and Los Angeles.
Introduction

Although *Rhumba-Ramble* is the third movement of *Divertimento per Orchestra*, it was the first to be composed. It was finished in 1953, the year after Berio’s visit to New York City. *Dark Rapture Crawl*, the first movement of the *Divertimento*, was composed by Bruno Maderna in 1957 and the second movement, called *Scat Rag*, was composed, by Berio in 1958. Berio states himself, “we were always together and together we composed *Divertimento for Orchestra*”. The names of these three movements were given by the singer Cathy Berberian.

According to Berio’s statement (understatement as this dissertation will prove), *Rhumba-Ramble* is a “rigorous development of the rumba”; the other two movements are “frequent distorted echoes of jazz and night-club music”. The inclusion of a section of ten saxophones in *Dark Rapture Crawl*, five saxophones in *Scat Rag* and three saxophones in *Rhumba-Ramble* speaks about the composers’ intentions of evoking American sounds like the big band or, in the case of *Rhumba-Ramble*, the Latin big band.

A rare recording was found by the American Composer Charles Amirkhanian, in 1973, while “rummaging through the archives of the West German Radio in Cologne”. This recording was performed by the Cologne Radio Symphony, conducted by Bruno Maderna himself. Up to now there is not a single published study of *Rhumba-Ramble* and very little has been written about it. In fact, in my research I found no substantial information other

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4 Centro Studi Luciano Berio, Divertimento (nota dell’autore), accessed October 15th, 2015, http://www.lucianoberio.org/node/13671223294767=1
5 Ibid.
6 Ibid.
than the one offered by Charles Amirkhanian in Radiom.org and Berio’s *note dell’autore* in the *Centri Studi Luciano Berio* website.

This *Divertimento per Orchestra* has been a hidden treasure since its conception. It is an outstanding piece and should be recognized as an important contribution to 20th Century music. While I am greatly fascinated by the three movements of this *Divertimento*, I have a special interest in *Rhumba-Ramble*. This special interest arises from my own urge to discover how Caribbean musical genres, especially those of the Hispanic Antilles, have penetrated the European classical music territory of the 20th Century. As this study will reveal, the inclusion of Caribbean music as a “found object” does not suppress Luciano Berio’s compositional voice. On the contrary, Berio’s ingenuity is shown in that he manipulates the Caribbean elements in favor of delivering a syncretism that conveys his own version of Caribbean/avant-garde music.
Background and the Path to *Rhumba-Ramble*

Luciano Berio grew up in a musical environment. His father Ernesto and his grandfather Adolfo were both working composers and organists in Oneglia, by the Italian coast of Liguria. Thus, Luciano’s musical training began at home. At the early age of nine “he participated as a pianist in his father’s chamber music evenings and by his early teens he was producing occasional compositions”\(^8\).

During World War II Berio was, unwillingly, recruited to serve Benito Mussolini’s army of the *Repubblica Sociale Italiana*. While in training he severely injured his right hand. In 1945, with WWII finished, Berio entered the Milan Conservatory and it soon became clear that his injury would prevent him from a career as a pianist. This drove him to focus more on his studies in composition. Up to this point in time, when Luciano was twenty years old, he had not written more than a few compositions. Because of the isolation brought to Oneglia by the events of the war, his exposure to modern currents of composition was limited, if not nil. During his first year at the Milan Conservatory he witnessed performances of pieces by Milhaud, Bartók and Stravinsky and was astounded by Schoenberg’s *Pierrot Lunaire*. At Milan, Luciano became a student of Giorgio Ghedini. Throughout his career Gehdini was more interested in ancient music than in new techniques and even in “his most experimental period, made only occasional and tentative use of serial elements”\(^9\), so Luciano’s substantial exposure to serialism did not take place until his studies at the Berkshire Festival in Tanglewood with Luigi Dallapoccola in 1952.

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In 1950, while in Milan, Berio undertook the task of accompanist for singing classes where he met the young American singer Cathy Berberian, who became his wife a few months later. Berio’s visit to Tanglewood was determinant in the development of his craft as much as it was in the development of his career. In October 28th, 1952 he had the opportunity to be present at the first concert to include electronic music in the United States, at the Museum of Modern Art. These events – the marriage with Cathy Berberian, the visit to Tanglewood to study with Dallapiccola and the night at MOMA – as we will see, had an enormous impact in the outcome of the piece in our discussion, *Rhumba-Ramble*.

The experience at MOMA catapulted his eagerness to explore electronic music. Upon his return to Milan he started working at the Italian radio and television network RAI. In 1953, besides composing for television films and his concert piece *Mimusique* no.1, he met Bruno Maderna who became his lifelong comrade, with whom he founded and co-directed the *Studio di Fonologia* and who is the composer of the first movement of *Divertimento per Orchestra*.

In 1956 he taught at Darmstadt, where his first major work for orchestra, *Nones*, was well received. Although he returned to Darmstadt in 1959, he was very much distant from the controversies about serialism and aesthetics that were circulating in those days. In fact, the conception of *Rhumba-Ramble* goes against the compositional philosophy that prevailed at the Darmstadt School. Music was supposed to be primarily self-sufficient, not relying on outside influences for inspiration. The Darmstadt philosophy of strict serialism advocated the self-sufficiency of the row to dominate all the musical elements of a composition. Any kind of reference to an outside source of inspiration was foreign to the
thinking of this group (excluding Oliver Messiaen and occasionally Karlheinz Stockhausen), let alone influences from popular music from the Caribbean! Berio’s ingenuity enabled him to go beyond the norm, taking an outside language and extracting from it elements that will become the substance of his piece. On the other hand, Berio’s interest in serialism was thorough but the practice of strict serialism was not his focus. Instead, serialism served his purposes and was utilized as long as it would fit in his plans. As noted by David Osmond-Smith, Berio “took on board the exigencies of serial orthodoxy only in as much as they suited his creative needs”\textsuperscript{10}. Thus, \textit{Rhumba-Ramble} is a clear demonstration of Berio’s position regarding the Darmstadt School aesthetics. He freed himself from the exigencies of a restricted philosophy and took the mission of blending the “best” of two worlds. With this he created a syncretism that perfectly connects the dots between the Caribbean and the avant-garde.

Rhumba

The Clave

One of the main and most important components of Cuban music is the clave. It is shared among virtually all the Cuban dance genres as the fundamental pillar on which the music is built. The clave (translated as “key” in English) is a simple five-stroke pattern, traditionally played by striking a stick against another; this pair of sticks, as an instrument, is called claves. Contrary to this common practice, Berio, in Rhumba-Ramble, disconnects the basic clave pattern from the sound of the claves instrument. Instead of following the tradition, the claves play isolated notes and patterns that, although derived from the clave, depart from the original function of the pattern in popular Cuban music.

The importance of the clave goes far beyond its actual sound; it is the most fundamental aspect on which every single element, as an individual and as part of a conglomerate, is based. As Godfried Toussand says, referring to the clave, in his Geometry of Musical Rhythm “the key to the piece of music lies in the timeline rhythm itself”11. Toussand defines “timeline” as “timekeepers or ostinatos12” that “determine the predominant underlying rhythmic structure of a piece”13.

Figures I.1 to 4, show the traditional son clave patterns and rumba clave patterns. They are identified according to how they group the five strokes. In a 3-2 clave the first

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12 Ibid., p. 16
13 Ibid., p. 16
group is of three strokes and the second group is of two strokes. The 2:3 clave is just the opposite.

Figure I.1 Son clave 3-2

Figure I.2 Son clave 2-3

Figure I.3 Rumba clave 3-2

Figure I.4 Rumba clave 2-3

In a traditional Cuban piece the clave determines the construction of the phrases. It is established from the beginning, whether 3-2 or 2-3, as the frame on which every musical part is going to fit. The bass part, called the tumbao, the piano or the tres\textsuperscript{14} montuno, the percussion marcha and improvisatory riffs, the brass phrases, and the vocal lines, all rely on the clave pattern. Figure I.5 is an example taken from the introduction of the piece Son

\textsuperscript{14} A guitar like instrument constructed with three sets of two strings.
de la Loma composed by Miguel Matamoros. It shows how the melodic phrase lays on the clave. The second and third notes of the melody, as well as the seventh, delineate the 2-3 clave.

Figure I.5 Son de la Loma with the 2-3 clave

The agreement of the clave with the rest of the musical elements is what gives the distinctive flavor to Cuban music. Figure I.6 is a demonstration of what Son de la Loma phrasing would look like if the clave were placed wrongfully. In this example the clave pattern is 3-2, making the phrase feel out of place.

Figure I.6 Son de la Loma with the 3-2 clave

Here the only notes that align with the 3-2 clave are, the first note (C) and the fourth note (A), both of which are weak notes of the phrase, thus giving the music an
uncomfortable and unstable feeling. The rhythm and relevance of the pitches in the introduction of Son de la Loma are clearly delineated by the 2-3 clave.

An example of a phrase built on the 3-2 clave is found in the piece Cachita, by the composer Rafael Hernández. As the Figure I.7 shows, the melody of the vocal line in this guaracha delineates the 3-2 clave by leaning the second, fourth and sixth notes on the clave strokes.

Figure I.7 Cachita with the 3-2 clave

In essence the clave gives life to Cuban traditional music; it is its marrow and defines it. Musicians are supposed to feel the clave while performing. If the phrases are not in accordance with the clave, performing them becomes uncomfortable. It is comparable to singing a melody in the key of C minor with the accompaniment in C major. Playing in accordance with the clave, is referred by musicians as being “en clave”. This makes the music move forward smoothly.

In Rhumba-Ramble, not only the clave is developed in a traditional classical fashion but also states phrases that, just as in Son de la Loma or Cachita, are “en clave”. Figure I.8 is an example of an “en clave” phrase used by Berio in m. 47 by the xylophone.
Figure I.8 Xylophone phrase in m. 47, with 3-2 clave

As Figure I.8 shows, even though not every accent of the phrase aligns with it, the clave is delineated here. In this case, the version 3-2 of the clave is the template to this phrase.

The Eb clarinet in m. 54 plays a phrase that is based on the 2-3 son clave (Figure I.9). In this case only four notes of the phrase coincide with the notes of the clave, but still the 2-3 clave is the base to this rhythmic statement.

Figure I.9 Eb clarinet playing a phrase that delineates the son clave.
The Tresillo

Even when the whole clave is present, it is the first half of its 3-2 form that is the rhythmic pillar of Rhumba-Ramble. This pattern is called tresillo. It is the antecessor of the clave, described by Godfried as “a duration pattern {3-3-2}”\textsuperscript{15}. It is “popular in Central Africa”\textsuperscript{16}, and still widely used in the Caribbean. “However it forms part of almost every music tradition throughout the world, and dates back historically to at least thirteenth-Century Baghdad”\textsuperscript{17}. It is the most basic rhythmic pattern of the traditional Cuban contradanza (known outside of Cuba as habanera), which is the antecedent of Cuban styles such as the guaracha, son, danzón, chachachá and mambo.

Figure I.10 Tresillo

\[ \text{\includegraphics[width=\textwidth]{tresillo_diagram}} \]

or

\[ \text{\includegraphics[width=\textwidth]{tresillo_diagram2}} \]


\textsuperscript{16} Ibid.

\textsuperscript{17} Ibid.
As in the *contradanza*, in *Rhumba-Ramble*, the *tresillo* is the ostinato that drives the rhythm forward; here the *tresillo* is displayed almost perpetually and ties the piece together. It is constantly being presented in its simplest or transformed forms throughout the whole piece. After the bass introduces the *tresillo* in the first, second and third measure (Figure I.11), the percussion takes the role of keeping it resonating in its original form.

Figure I.11 Introduction of the *tresillo* by the bass in mm. 1-3.

Even when variants are put in place, the *tresillo* feel prevails in the ear of the listener throughout most of the piece.

As with the *clave*, there are phrases that rely on the *tresillo*. Figure I.12 is an example found in the violin in mm. 54 and 55. Contrary to Figure I.8 this time the *tresillo*, not the whole *clave*, is delineated.

Figure I.12 Delineated *tresillo* mm. 54 and 55
In m. 54 every first note of the groups of four aligns with the strokes of the *tresillo* and in m. 55 the same thing happens with the first note of the group of five.

As expected, permutations and variations of the *tresillo* are constantly stated in *Rhumba-Ramble*. The *maracas* in mm. 8-10 show a dismantling of the *tresillo*. In m. 8 the first sixteenth-note is eliminated and in m. 9 the first half of the *tresillo* is withdrawn until m. 10, where there are no notes left (Figure I.13).

**Figure I.13 Disintegration of the *tresillo* in the *maracas*, mm. 6-10**

![Figure I.13](image)

Although the *tresillo* is defined as a pattern of three strokes, in reality not only the sounding notes create it, but also the silences in between (here referring to the silences as the non-struck sixteenth-notes of the *tresillo*). The listeners hear the empty spaces of the rhythmic pattern, even when the actual sound emphasizes the struck notes. In fact, the empty spaces of the *tresillo* (or the *clave* as a matter in fact) contribute to its pleasant groove and the satisfactory feeling that it creates for its listeners. This is an element that Berio explores in *Rhumba-Ramble*. While the *maracas* in mm. 8-10 show the disintegration of the *tresillo*, the *claves* in mm. 6-10 display the creation of a rhythmic phrase, constructed on the silent spaces, by adding one figure per measure. The culmination of these permutations in m. 10 represents all the empty spaces of the *tresillo*. So, from mm. 6-10, Berio is simultaneously presenting, the de-construction of the sounding *tresillo* and the construction of its silent counterpart (Figure I.14).
Simultaneous deconstruction of the sounding \textit{tresillo} and the construction of its silent counterpart

It is interesting to observe that a retrograde of the five stroke cell corresponding to the silent spaces of the \textit{tresillo}, (played by the \textit{claves} in m. 10) is the basic pattern (equivalent of the \textit{clave}, called \textit{cuá}) for another Caribbean genre, the Puerto Rican \textit{Bomba Sicá}.

Examples of conventional ways of transforming the \textit{tresillo} are found throughout \textit{Rhumba-Ramble}. An instance of the augmented \textit{tresillo} is found in the bass part in mm. 21-22, followed by its extended variation from mm. 24-25. Meanwhile a varied imitation of the augmented \textit{tresillo}, also in augmentation, enters in mm. 22-23 in the violin and viola (Figure I.15). In this passage the value of each figure of the \textit{tresillo} is augmented from a sixteenth-note to an eighth-note. In other words, the augmentation of the \textit{tresillo} in mm. 21-25 is a ratio of 2:1.
The presentation of the *tresillo* truncated is common in *Rhumba-Ramble*. An example of the augmentation of only the first half of the *tresillo* is found in mm. 72-73, where the celesta plays two vertical diads (*A*/B) on the first beat of mm. 72 and another (*A*/G) on the second beat of m. 73. Here the sixteenth-notes of the *tresillo* are transformed to quarter notes, thus augmenting its value by four (Figure I.16).
Figure I.16 Augmentation of the *tresillo*, mm. 72-73

![Figure I.16](image)

The flutes and the E♭ clarinet in mm. 89-90 repeat the first part of the *tresillo* in augmentation. As shown in Figure I.17, the variation this time consists of the first note tied to its previous note.

Figure I.17 Variation of the *tresillo* mm. 89-90

![Figure I.17](image)

A retrograde of this variant is played by flute I, four measures later (mm. 94), with the pitches G and F♯ (Figure I.18).
It is worth noticing that the symmetric qualities of the first part of the tresillo (as originally stated in *Rhumba-Ramble*) do not enable its retrograde. Only when extending the first note it yields to a possible detection of its retrograde.

Retrogrades of the entire tresillo (or slightly varied tresillo) are stated several times in the piece. An example of this is mm. 57-58 on the first flute (Figure I.19). The first note of m. 57 and the second note of m. 58 are additions to the original tresillo.

In other places the tresillo – or its first half – is scattered through the orchestra. For example, in m. 47 the bass clarinet plays its first part and the flutes play its last eighth-note (Figure I.20).
Figure I.20 Scattered *tresillo*

Another example of this is in m. 51 (Figure I. 21), where the bassoon and the violins play the first two notes while the contrabassoon, contrabass, harp and clarinet III finish the *tresillo*. Meanwhile in this same measure the flutes accent the second note of the *tresillo* and the xylophone accents all of its notes.
Figure I.21 Scattered *tresillo* and its displacement

In addition to its dispersion throughout the orchestra, here in m. 51, the *tresillo* has also been displaced. In the Eb clarinet the first half of the *tresillo* has been shifted by the value of one eighth-note. In this occasion, similar to the *claves* in m. 10, the shifted *tresillo*
fills with sound what would otherwise be its silent parts. Another example of the displacement of the *tresillo* can be observed in m. 85 in the strings part (Figure I.22).

![Figure I. 22 Displacement of the *tresillo*](image)

The {3,3,2} starts not only on the downbeat (contrabass and violoncello), but also on the second sixteenth-note. Furthermore, this passage makes clear that Berio is also exploiting the retrograde capacities of the *tresillo*. Considering its first half, we can find that the *tresillo* is capable of yielding several forms of retrograde depending on its notation (Figure I.23).
Figure I. 23 Retrograde capacities of the first part of the *tresillo*

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As Figure I.23 demonstrates, the retrograde form of the *tresillo* will depend on the length of its first figure in its primary form. The longer the first figure in its primary form, the closest it will be to the second figure when retrograded.

In m. 86 (Figure I.22), the rhythm of the violins and violas read backwards (without the ties of the note E) reveals a varied retrograde of the *tresillo*. The variation consists of the addition of the third note of the measure – an E5 on the violin and a C5 on the viola – (Figure I.24).

Figure I.24 Retrograde of the rhythm of violins and violas in mm 86
Another clear occurrence that reveals the process of displacing the *tresillo* is in mm. 31-34 in the flute. In m. 31, the first displacement is a sixteenth-note away from the downbeat, while the second is an eighth-note away from the downbeat of m. 32 and crosses the bar line. In m. 32 the *tresillo* also appears shifted a sixteenth-note from the downbeat. Another displacement of the *tresillo* appears from the last note of m. 33 to the first note of m. 34 (Figure I.25).

Figure I.25 Displacements of the *tresillo*
The Rhumba

Despite the exclusiveness of its name, *Rhumba-Ramble* is full of traces of not just one Cuban genre. Although there are some elements that are common to the vast majority of the Cuban styles (as we discussed before about the *clave*), particular characteristics of *rumba, son* or *guaracha* and *mambo* - the new style in vogue during the 1950's - are part of the contour of the piece. These characteristics are manifested in different aspects: in its pitch content, rhythms, instrumentation and color. The inclusion of elements from different Cuban styles and the lack of a definite identification of a specific Cuban genre in *Rhumba-Ramble* might be due to the acquired definition, in the general public, of the word “Rhumba”. The origin of the word is unclear. One of the possible roots of the term is based on its similarity with the Spanish term “rumbo”, referring to the route or trajectory of one object moving from one place to another. The word is used to refer to the direction on which a ship navigates.

In his book *Orígenes de la música cubana*, Tony Évora names “rumbas blancas” (white *rumbas*) the “type of (Cuban) music that was made popular around the world, between 1930-60, by touring Cuban orchestras”¹⁸. Évora recounts that orchestras like the Leucona Cuban Boys (later renamed Havana Cuban Boys) did a fabulous work on disseminating Cuban music worldwide but at the cost of depriving it of its original vitality and authenticity, and converting it into a commercial product. In the United States the orchestras of Don Azpiazu, José Curbelo and Vicente Sigler interpreted “sophisticated *rumbas de salón* or “rhumbas” which was how the North American recording companies

use to call it, believing that its name originated from the word *rhum (ron* in Spanish)”19. The term “rhumba” was popularized as a general designation for Cuban music after the successful release, in 1930, of the song *El Manisero*, recorded by Don Azpiazu and the Casino Havana Orchestra. Although *El Manisero* is a Cuban *son*, not a *rumba*, the record company RCA Victor labeled it, on its release, as a “*Rhumba Fox Trot*”. Since then, the word *rhumba* has been used indifferently, in the commercial realm in the United States, to designate Cuban music20. Thus, is very possible that Berio’s selection of “rhumba”, for his title, is the result of his exposure to the misguided definition of the word. Nevertheless, *Rhumba-Ramble* genuinely represents, exposes and develops authentic elements of Cuban music.

**Rumba**

*Rumba* is an informal activity carried out in festivities where people gather around three drums and start playing, singing and dancing. It is a musical and dance complex based only on percussion and the human voice. It is spontaneous and can take place in the corner of a street, in a house, under a tree or at a public plaza. Besides the hand drums, called *tumbadoras* or *timbas*, the *rumberos* play the *clave*, and a hollow piece of wood (usually bamboo) struck with two sticks called the *guagua* or *catá*. Its beginnings belong to the sugar plantations of Matanzas and Habana, the slave’s barracks and the *bohíos*21.

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19 Ibid. (Translated by O. M. Calzada)
21 Huts, first used by the Taíno natives of the Caribbean
Abakuá\textsuperscript{22} slaves and the Bantú\textsuperscript{23} descendants are credited to have a strong influence in the origins of the \textit{rumba}. For their \textit{rumbas} the slaves used anything at hand. What today are the \textit{timbas} or \textit{tumbadoras}, for them were dry codfish boxes or wooden drawers. The \textit{catá} and \textit{claves} were played with anything they could find to strike: spoons, pans or bottles. \textit{Rumba} is not essentially religious in character and “lacks ritualistic elements\textsuperscript{24}” (although with \textit{Santería} being such a strong part of the Cuban culture it is hard to establish this with certainty) but it “absorbs gestures proper of the dances consecrated to the \textit{Orishas}\textsuperscript{25}. In spite of its percussive and rhythmic nature the \textit{rumba} drums also sing melodically. The \textit{tumbadoras} are tuned to cover different spaces of the melodic spectrum. The drums have different sizes and each has its own function in the polyrhythmic melodic counterpoint and the harmonies of a \textit{rumba}.

These drums are made of barrels with a stretched calf hide over one of its sides. The player sits and places the drum between his legs, the hole with no skin on the floor and the drum slightly turned to the side to let the sound flow through it. The bigger and deeper sounding drum is called the \textit{tumbadora}, the middle drum is the \textit{salidor} and the smallest one is the \textit{quinto}.

There are also Spanish influences, which are seen in the singing part” such as the Andalusian sounding “nasal timbre and the harmonies”\textsuperscript{26} of the \textit{Diana} “a string of vocal syllables at the beginning of the tune that sets the key”\textsuperscript{27}. The African tradition of

\begin{flushleft}
\textsuperscript{22} \textit{cabildo} or fraternity who’s origins were in the region of the Cross River or Oyono River, between Nigeria and Cameroon.

\textsuperscript{23} People who inhabit a geographical area that expands form Central Africa to Southern Africa.

\textsuperscript{24} Ibid. p.174 (Translated by O. M. Calzada)

\textsuperscript{25} Ibid. p.174 (Translated by O. M. Calzada) Orishas are the deities of the Santería.

\textsuperscript{26} Ned Sublette, Cuba and its Music: Form the First Drum to the Mambo (Chicago: Chicago Review Press, 2004), 267.

\textsuperscript{27} Ibid.
\end{flushleft}
percussive sounds met the Spanish popular style in the *coros de clave*. According to Ned Sublette, the Spanish poet José Anselmo Clavé founded, in Barcelona, a choral group formed by working class people. Soon these choral ensembles became a tradition in Spain, called the *coros de clavé* ²⁸. It was imported to Cuba and became popular in the black communities in Havana where its name changed to *coros de clave* (note the elimination of the accent). The *coros de clave* evolved to *coros de guaguancó*, which sang accompanying the *rumba* traditional percussion ensemble.

The most popular sub-genres of the *rumba* that are still alive today are: the *yambú*, the *guaguancó* and *columbia* which in turn is played in two styles: Havana style and Matanza style (Figure 3.1, 3.2, 3.3 and 3.4).

Figure 3.1 *Rumba columbia*, Havana style.

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²⁸ Ibid., p.262-263.
While the *rumba yambú* and the *guaguancó* use essentially the same pattern, the more apparent difference between them is the speed and energy with which they are played. It is said that the *yambú* is the dance for older people and thus this *rumba* is less energetic and in a slower tempo than the more dynamic *guaguancó*. 

Figure 3.3 *Rumba guaguancó* Matanza style.
Figure 3.4 *Rumba guaguancó* Havana style.

These examples only illustrate a simplified summary of the *tumbadora* and *salidor* parts of each of these sub-genres. Unlike the *clave* and the *catá*, the parameters of the rhythmic patterns of the *timbas* are intended to be used only as guidelines. The *tumbadora* and the *salidor* player are expected to take liberties “bending” the time using all kinds of figures, while the *quinto* player improvises virtuosically.

A good *timbero* can produce several different sounds, thus increasing the melodic richness of the ensemble. The improvisatory character of each drum part contributes greatly to the melodic, rhythmic and harmonic possibilities in a *rumba*. Thus the sonic outcome is a sophisticated, pointillistic melodic and harmonic amalgamation produced by the open tones and the dry percussive sounds of its instruments.

Whether influenced directly by the authentic *rumba* or indirectly by its vestiges in the diluted, but well-known, Cuban music outside Cuba, Berio engraves this pointillistic quality in *Rhumba-Ramble*. As the first page of the score reveals, the texture of the piece is gained mostly by the combination of percussive “dry” sounds tangled with open tone
sounds. The percussion section is composed of unpitched instruments: the claves, temple blocks, maracas and the bongos. Their sounds are equivalent to those of the clave, the catá and the “dry” sounds produced by the tumbadoras in a rumba. The rest of the orchestra (including the xylophone, which is inserted in the pitched instruments section of the score) produces the sounds equivalent to the open tones of the tumbadoras in an authentic rumba (Figure 3.5).

Figure 3.5 “Dry” sounds vs. “open” sounds in the first page of Rhumba-Ramble
Yet another trace of its influence is also found in the first page of the score. The first five measures of the introduction resemble an image of the more modern rumba. With the arrival of mambo in the 1950’s (to be discussed later) orchestras in New York and Mexico started to perform and record orchestrated Cuban sones, guaguancós and guarachas. Although the tresillo pattern is constant in Caribbean music (as it is in many music traditions throughout the world), the percussion accompanied with only the bass tresillo, became a common introduction in rumbas guaguancós performed by Latin orchestras (Figure 3.6).

Figure 3.6 Guaguancó with bass tresillo

A later example of this is the introduction of the arrangement of the song El vive bien, originally a traditional guaguancó, (written by Alberto Zayas) as performed and recorded by Tito Rodriguez’s orchestra, one of the most famous mambo orchestras of the time.\footnote{29 Tito Rodriguez, \textit{El Doctor: El vive bien} (New York: UA Latino), 1968.}
If there was an ambassador of the true Cuban and Caribbean music during the 50’s and 60’s it was the *mambo* orchestras. Although greatly influenced by the big band jazz orchestras and “jazz harmonies”, the *mambo* orchestras conveyed the strong, energetic spirit of authentic Caribbean music. Contrary to the soft replica popularized by Hollywood, the *mambo* orchestras imparted the true Caribbean essence with modernized arrangements. The word “*mambo*”, which means “conversation with the gods” in Bantú, became the designated term to a specific section introduced to the *danzónes* of the *Arcaño y sus Maravillas* Orchestra in the late 1930’s by the composer Orestes López. Usually towards the end of the song, this section was boosted with energetic, short and syncopated phrases by the woodwind and brass instruments and a busier percussion. This section “constituted the liveliest part, in which dancers executed their most animated movements”\(^30\). By 1943 Arsenio Rodríguez “began to record *son* music that featured similar structural and rhythmic innovations”\(^31\) and by 1944 Latin big band arrangers in Mexico were including the new section in their arrangements, as were Latin big bands in New York in 1946. A year later the press started writing about the “*mambo* revolution” and record companies started using the word “*mambo*” to label songs.

The Palladium Ballroom was the home of the *mambo*, located on 53\(^{rd}\) Street and Broadway in New York City, two and a half blocks from where the Museum of Modern Art had been located since 1939. It is not hard to imagine that Luciano Berio would feel

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\(^{31}\) Ibid.
curious and, on his 1952 visit to MOMA, might have strolled over to visit and personally experience what was attracting so many important figures. The *mambo* craze captivated, not only popular celebrities but also people of many nationalities, including Italians. Three orchestras were responsible for the *mambo* fever at the Palladium, Machito's Orchestra, Tito Rodriguez' Orchestra, and Tito Puente's Orchestra.

October 28th, the day when Luciano Berio visited the Museum of Modern Art, was a Wednesday\(^ {32} \), a performing night for Tito Puente's Orchestra at the Palladium and, as Dr. Steven Loza explains in his book, *Tito Puente and the Making of Latin Music*, “On Wednesday night, 'Killer Joe' Piro would teach the current *mambo* steps to the crowd. The place was a big melting pot of Jews, Italians, Irish, Black, Puerto Ricans, Cubans, you name it”\(^ {33} \).

There are some other Italian connections between the *mambo* and Luciano Berio. Two of Tito Puente's musicians were Italian, his trumpet players Jimmy Frisaura and Tony Di Risi. Also, among the pioneer *mambo* dancers who forged their dancing careers out of the Palladium was the Italian-American dancer Millie Donay (born Carmela Dante DeFrancesco). Thus, there are several reasons why Luciano Berio might have visited the Palladium and there have been exposed to the Latin music of the time.

Beside the fact that *Rhumba-Ramble* was composed one year after Berio's visit to New York City, the music itself presents strong evidence of Berio's exposure to *mambo*. Although, as with *rumba*, some features are shared with other Caribbean styles, there are some traits that specifically give shape to *mambo*. The most dramatic reference to *mambo*

\(^{32}\) This fact was confirmed by Juliet McMains, PhD., writer of Palladium.com and Dance Professor University of Washington in Seattle.

in *Rhumba-Ramble* is found in mm. 84-87 (Figure 4.1). In this climax, as in Tito Puente’s arrangements, the brass section explodes playing in its most brilliant register, carrying the whole orchestra in a big *tutti*. They play bright-sounding chords that generate an explosive intensity.

Figure 4.1 *Rhumba-Ramble* mambo-like climax

The “*mambo sections*” of the *mambo* songs turned into Latinized version of the jazz big band’s shout choruses, that became characteristic of the orchestras at the Palladium.
Similar examples of Rhumba-Ramble “mambo section” are found in Puente’s songs Cuban Nightmare (1956)\textsuperscript{34} and Picadillo (1948)\textsuperscript{35}.

Rhumba-Ramble’s ‘mambo section” reflects the condensation of syncopation typical of mambo arrangements. It also features rhythmic independence of the instrumental sections. In a Palladium mambo the reeds would play a rhythmic phrase with brass section counterpoint entering, usually with less syncopated phrases, on top of the reeds. In these measures of Rhumba-Ramble (85-87), as in any “mambo section”, the reeds (here the woodwinds included) and the brass become entangled in a question-answer conversation. Berio achieves that by having the woodwinds playing a non-strict rhythmic imitation of the phrase of the brass, displaced by a quarter note (Figure 4.2).

Figure 4.2 Summarized rhythms of the woodwinds and brass in mm. 84-86

![Figure 4.2 Summarized rhythms of the woodwinds and brass in mm. 84-86](image)

The mambo orchestras adopted the standard reed and brass instrumentation of the jazz big bands: four trumpets, three trombones and four or five saxophones. Caribbean music projected through this instrumentation became the iconic personality of mambo. Rumba-Ramble’s sonic color at the climax section (Figure 4.1) is also achieved by the use of

\textsuperscript{34} Recorded for RCA as a 78 RPM single.

\textsuperscript{35} Released in 1943 on the SMC label.
the idiomatic horn section common to the mambo orchestras, in this case: five trumpets, three trombones and two saxophones.

Another, less dramatic, reference to the Palladium in Rhumba-Ramble is the mambo riff of the xylophone in mm. 47-48 (Figure 4.3).

Figure 4.3 Mambo riff in Rhumba-Ramble

\[47\]

Admittedly, whether in this specific form or in other similar forms, this is a commonly used riff in Cuban and Caribbean music in general. A variation is found in the “mambo section” of Tito Rodriguez’ arrangement of Yamboro\textsuperscript{36}.

Another common riff appears in mm. 54-55 in the strings. This could be interpreted as a variation of the previous riff in m. 47, but here the groups of two notes are expanded to groups of four and five notes. These riffs denote accents that defy the downbeat, creating syncopations and hemiolas that are idiomatic of mambo (Figure 4.4).

Son

Although traces of Caribbeanism are present in every musical element of this piece, what brings all into context is the characteristic sound of the percussion section backdrop. The maracas, claves and bongó, were the instruments of the standard percussion section of the Cuban son. This combination was popularized, during the 1910’s and 1920’s, by recordings of the Sexteto Habanero, and the Septeto Nacional; ensembles that performed Cuban sones. During the next decades the son became one of the most important genres of Cuban music and was exported abroad.

As Évora states in Orígenes de la Música Cubana, “The typical sexteto sonero ...consisted of a guitar, tres, bongó, botija or marímbula”37, (the botija or marímbula was substituted by the double bass), maracas and claves were normally played by the main singer... As explained before, the tres (literally “three”) is a Cuban guitar-like instrument with three courses of two strings. Each string of each course is tuned to the same pitch (or an octave apart). The botija, is a wind instrument made out of a jar that produces low notes. Its limited sonic possibilities caused it to be substituted with the marímbula. The marímbula consists of a wooden box with a hole in its center and a few metal strips

37 Tony Évora, Orígenes de la música cubana: Los amores de las cuerdas y el tambor (Madrid: Alianza Editorial, 1997), 297.
attached to it. These metal strips are of different sizes and produce different tones when plucked. In time, the more versatile contrabass replaced the marímbula. With this instrumentation and the addition of the trumpet the son solidified in septets.

The success of the son El Manisero in the United States and Europe standardized the percussion section of maracas, claves and bongó as the obligatory combination for any musical arrangement intended to represent Cuban music. The preeminence of these instruments in Rhumba-Ramble makes clear Berio's intentions of embracing the typical Cuban sound. With this, and whether deliberately or not, he is also adopting the son.

Opening with the maracas is certainly a statement of what this piece is about. There is hardly another instrument that is more representative of Caribbean culture than the maracas. Its origins are traced to the pre-colonial Taíno tribes of the Antilles. The maracas' role is (normally in popular Caribbean music and elsewhere) to establish a fixed simple pattern (usually sixteenth-notes or eighth-notes) and thus help the ensemble to play rhythmically tight. The maracas are prominent in the traditional Puerto Rican bomba, the Cuban son, guaracha, bolero, and the more modern salsa. Figure 5.1 shows the basic pattern of the maracas in Caribbean popular music.

Figure 5.1 Basic pattern of the maracas in popular Caribbean music
Unlike in these popular genres, the *maracas* in *Rhumba-Ramble* drift from the simple steady pattern after just one measure. Their function here is to establish a typical Cuban sound rather than playing a typical pattern. Nevertheless, in a way, they contribute to keeping the music tight when it makes a return to a fixed pattern in m. 18 and m. 40.

During the rest of the piece the *maracas* are combined with the rest of the percussion instruments to create a quasi continuum pattern. As shown in Figure 5.2, in m. 20, what would be the continuum pattern of sixteenth-notes, normally played by *maracas*, is now formed by the combination of *claves*, temple block, *maracas* and bongos.

![Figure 5.2 Sixteenth-note pattern in Rhumba-Ramble, created by the combined percussion section](image)

As previously discussed, the *claves* also move away from its traditional role of establishing the *clave* pattern. Instead they are given isolated notes throughout the piece that, although derived from the *clave* pattern, depart from the original function of the instrument in popular Cuban music.

The *bongo* part in *Rhumba-Ramble* is also not true to its counterpart in the Cuban *son*. It reflects only limited elements of *bongó* playing. First, the traditional *bongó* consists
of two attached drums, and not three as in *Rhumba-Ramble*. The smallest of these drums is called, *macho* (male), and the larger *hembra* (female) and they are usually played with bare hands. The indication of “3 bongos” (as in *Rhumba-Ramble*) would mean the use of three drums out of two sets of *bongós* or (as indicated in the score) three small tom-toms. In a Cuban *son*, as in other Cuban genres, by playing a steady pattern of eighth -notes on the *macho*, on a cut time signature (or sixteenth-notes if on a 2/4 time signature) with a single accent on the seventh note on the *hembra*, the *bongocero* provides stability, helping the ensemble to stay rhythmically together. This pattern is called *martilleo* and it coincides with the traditional simple *maracas* pattern (Figure 5.3).

Figure 5.3 *Bongó* pattern, *martilleo*

![Diagram of Bongó pattern](image)

The *martilleo* is not found in *Rhumba-Ramble*. Nevertheless, Berio’s impression of *bongó* playing is not completely inaccurate. While the *martilleo* forms the basis of *bongó* playing, the *bongocero* is also expected to adorn it by inserting random sharp accents that add complexity and interest to the percussion steady driving pattern (*marcha*). These accents – equivalent to the *quinto* playing of the traditional *rumba* – recur throughout *Rhumba-Ramble* (Figure 5.4).
Figure 5.4 Bongos mm. 11-12
Ramble

The Row

Berio’s interest in serialism is evident in Rhumba-Ramble, and its integration with the Caribbean element is apparent in its statement of the row by the bass tumbao, right from the beginning. As we will see, the organic pitch content of the piece will rely upon the series: D♭, F, A♭, B♭, C, G, E♭, E, B, A, D, F♯ and the internal characteristics of this row (Figure 6.1).

Figure 6.1 Rhumba-Ramble 12-tone row

Embedded in this series of notes are several symmetries and interesting relationships that are to be explored by the composer during the course of the piece. The first characteristic to observe is the correspondence between the first four notes of the row and its last four; the last tetrachord is a transposition of the first (Figure 6.2).

Figure 6.2, Tetrachordal relationship in Rhumba-Ramble's row

< Db, F, Ab, Bb, C, G, Eb, E, B, A, D, F#>
In order to have an exact transposed reflection of the pitches one would have to reorder the last tetrachord, switching the D with the F# (Figure 6.3).

Figure 6.3 Comparison of the first tetrachord with the rearranged last tetrachord

First Tetrachord | Last Tetrachord (Reordered)

Figure 6.4 Hexachord comparison of P1 and I0 in Chamber Music

\[ P1 = 1 \, t \, 4 \, 6 \, 8 \, e \, 3 \, 0 \, 5 \, 7 \, 9 \, 2 \]

\[ I0 = 0 \, 3 \, 9 \, 7 \, 5 \, 2 \, t \, 1 \, 8 \, 6 \, 4 \, e \]

Disguising relationships between subsets of the row by switching pitches is common in Berio’s composition process. An example of this device is found when comparing P1 and I0 of his 1953 Chamber Music (Figures 6.4 and 6.5).

Figure 6.5 Hexachord comparison of P1 and I0 in *Chamber Music* with hexachords rearranged.

P1

I0 Rearranged

As evident in these examples, the last hexachord of P1 shares all of its pitches with the first hexachord of I0. The theoretical result of this relationship between two different forms of the row in *Chamber Music* is the perception of the use of permutations of the same form of the row. On the other hand, in *Rhumba-Ramble* the perception is that a permutation of a transposed form of the row is in use (Figure 6.6).
Figure 6.6 Comparison of P1 and P2 of *Rhumba-Ramble*

\[
P1 = \text{Db, F, A}\flat, B, C, G, E\flat, E, B, A, D, F\sharp}
\]

\[
P2 = \text{D, F\sharp, A, B, Db, A\flat, E, F, C, B\flat, E\flat, G}
\]

Thus the first tetrachord of any given form of the row will have consistency in pitch content with the last tetrachord of the same row form transposed a step higher (Figure 6.7).

Figure 6.7 First Tetrachord of Rx = Last Tetrachord of R(x+1).

Rx

R (x+1)
Another similar relationship is that the first tetrachord of any given row form will have uniformity of pitch content with its retrograde form of the row, transposed one step below (Figure 6.8).

Figure 6.8 Tetrachord 1 of \( P_x = \) Tetrachord 1 of \( R(x-1) \)

\( P_x \)

\[ \text{Diagram of } P_x \]

\( R(x-1) \)

\[ \text{Diagram of } R(x-1) \]

Another connection is found between the trichords \( B^b, C, G \) and \( E, B, A \) of the row. Here the last trichord \( (E, B, A) \) is a retrograde reflection of the first \( (B^b, C, G) \). See Figure 6.9.

Figure 6.9 \textit{Rhumba-Ramble} original row trichord comparison

\[ \text{Diagram of } \textit{Rhumba-Ramble} \]

Although Berio’s use of these attributes of the series to create association between row presentations works positively for the coherence of the work, it adds difficulty in determining what form of the row, if any, is being stated.
The use of the Row

Just as it is common in a modern orchestrated *rumba*, here the bass sets the tone with the opening notes of the score stating the first seven notes of the row (P1) before repeating the D♭ (Figure 7.1). Right after the repetition of the notes A♭ and B♭, by the xylophone, the electric guitar states the next four notes of the series, leaving out its last note. As we will discuss later, the F♯ is relegated and stated three beats later by the electric guitar as an addition to a C major chord, which in turn is a transposition of the first three notes of the original row. The relegation of the last note of the row will prove to be an important feature in determining the structure of the piece.
The second phrase of the contrabass, at m. 5, is deceiving. It gives the impression that the row is simply going to be stated in a transposed form (P3) for a second time. The C major chord stated by the electric guitar at m. 6 also gives the impression that the row is being presented in one of its transpositions (P0). Furthermore, the harp, in combination with the contrabass, states the first four notes of the row on its original form in m. 9.
In spite of this, the piece progresses without an emphasis in the concurrent statements of different forms of the entire row. Instead, these statements of a set of the row precede what will be the modus operandi of Berio in *Rhumba-Ramble*. Figure 7.2 represents fragments of the row that Berio will use as building blocks. In some instances this will appear as the impression of the whole block on the score and at other times it will appear as statements of selected elements of the block.

Figure 7.2 Building blocks of *Rhumba-Ramble*
Intervals

3rds and Triads

_Rhumba-Ramble’s row_ emphasizes triads. The first and last trichords form major triads, (labeled “a”: in Figure 7.2) which in turn surrounds a C minor triad (labeled “b” in Figure 7.2), separated from the last triad by a B and an E and from the first triad by a Bb. Major and minor thirds also figure prominently throughout the piece. On some occasions triads are plainly stated, as in m. 9 (Figure 8.1), where the harp plays a second inversion D♭ major chord.

Figure 8.1 Measure 9, harp major chord

![Musical notation image]

A similar example is the statement of a C major chord at the beginning of m. 6, played by the electric guitar (Figure 8.2). After the row is presented for the first time (from m. 1-5) its last note (F♯) is added to the C major chord, thus, overlapping it with what could be the first triad of the transposed row.
Although after m. 9 the plain statement of major or minor triads becomes scarce, thirds – major and minor – have a prominent role in the construction of the harmony of the piece. An example of the importance of major and minor thirds in the composition is on the muted trumpets phrase in mm. 56 to 58 (Figure 8.3).

The strong triadic content of *Rhumba-Ramble* does not attribute a tonal aura to the piece. The harmonic context of which these thirds (or triads) are a part weakens a sense of tonality throughout the piece.

The interval of the third gains importance as the piece progresses to its climax, where the major and minor thirds, become the main substance of the pillar chords (Figure 8.4).
2nds

The first and last tetrachords of the row are symmetrical, as we previously discussed, but this symmetry goes beyond its triadic quality, their notes constitute a major sixth chord. As Figure 7.2, shows these tetrachords overlap block “a” and are labeled as “c”. The feature of the major sixth chords that is important in *Rhumba-Ramble* is the distance of a major second between the A♭ and B♭ in the row. Admittedly, the same distance is presented right on the next interval of the series, between the B♭ and C, but the notes A♭ and B♭ are stated in a particular way that will become an icon to be developed during the piece. In m. 4 the xylophone presents this interval as a sixteenth-note (Figure 8.5).

Figure 8.5 Xylophone in m. 4, major second feature.
From m. 14 on (Figure 8.6), where the xylophone features the major second again, statements of this dyad will reappear sporadically, preceding the starting point of its ultimate development in m. 60. Its statements (Figures 8.6–10) function as reminders of the importance of this interval-motive in the structure of the piece.

Figure 8. 6 Xylophone, m. 14

Figure 8. 7 Electric guitar, m. 39

Figure 8. 8 Electric guitar, m. 42

Figure 8. 9 Xylophone, m. 55

\textit{pp}
In the section after m. 60 the major second establishes a fundamental sound. This interval expands through the section towards the climax. After a *fortissimo* timpani riff, which ends on a silent *fermata*, the flute starts over the *tresillo* with harmonic emphasis on major and minor seconds. Here a gradual harmonic expansion takes place (with the major and minor second as reference) as well as a rhythmic expansion (with the *tresillo* as reference) that leads to the climax in m. 84. Figure 8.11 shows the first 5 measures of this event, from mm. 60-64.

Figure 8.11 Measures 60-64, expansion of 2nds
4th’s

In the row, there are many occurrences of chords built in fourths. At first glance the interval of fourth is present between the fifth and sixth notes (C-G) the eight and ninth (E-B) and the tenth and eleventh (A-D). In spite of this, there are no instances in the row where there are two of these intervals consecutively. Nevertheless, a reordering of pitches 8, 9, 10, 11 and 12 yields to four consecutive fourths (Figure 8.12).

Figure 8.12 Original last pentachord of the row vs. reordered last pentachord of the row

a.

b.

The use of consecutive fourths is an important harmonic device in this piece. Traits of this are stated in different forms. Some of the presentations of simple vertical trichord statements are played in m. 5 by the celesta (Figure 8.13), m. 7 by the harp (Figure 8.14) and m. 29 also by the harp (Figure 8.15). In m. 29 the contrabass adds an F, which plays simultaneously with the harp, and a C, later in the bar, thus completing a pentachord in fourths. Other vertical dyads of fourths are found in many instances, for example in m. 44 by the clarinet and bassoons (Figure 8.16). Also, in m. 65 by the flute (Figure 8.17), as part of the harmonic expansion section that takes place here (discussed previously).
Figure 8. 13 Vertical fourths, m. 5 celesta

\[\text{\textit{pp sempre}}\]

Figure 8. 14 Vertical fourths, m. 7 harp

Figure 8.15 Vertical fourths, m. 29 harp

Arpa

Cb.

Figure 8.16 Fourths between clarinet I and bassoons, m. 4

Cl. I

Fag.
Figure 8.17 Vertical fourths, m. 65 flutes

Diagonal instances of quartal chords are found in the clarinet and E♭ clarinet parts, combined, in mm. 50 (Figure 8.18). In this case the fourths are reordered, leaving the clarinet with a minor seventh dyad and the E♭ clarinet stating a fourth that appears later in the measure.

Figure 8.18 Diagonal quartal chord, m. 50.

This is another example of a technique used prominently by Berio in *Chamber Music* (1953); where the inversion of the row retrogrades the dyads (Figure 8.19). Here, as in *Chamber Music*, the effect is as if permutations of the set are been used.
Figure 8.19 Chamber Music pitch series and retrograded dyads

\[
\begin{align*}
P_0 &\rightarrow  \\
&\text{\includegraphics[width=\textwidth]{chamber_music_pitch_series.png}} \\
I_0 &\rightarrow  \\
&\text{\includegraphics[width=\textwidth]{chamber_music_retrograded_dyads.png}}
\end{align*}
\]

Including the bass clarinet in the equation (mm. 50) shows that this is a reordered statement of notes 8, 9, 10 and 11 of P2 (Figure 8.20 and Figure 8.21).

Figure 8.20 Reordered statement of set of P2

\[
\begin{align*}
\text{Cl. Picc.} &\rightarrow  \\
&\text{\includegraphics[width=\textwidth]{reordered_statement_cl_picc.png}} \\
\text{Cl. I} &\rightarrow  \\
&\text{\includegraphics[width=\textwidth]{reordered_statement_cl_i.png}} \\
\text{Cl. B.} &\rightarrow  \\
&\text{\includegraphics[width=\textwidth]{reordered_statement_cl_b.png}}
\end{align*}
\]
Figure 8.21 Matrix with identified reordered set of P2

<table>
<thead>
<tr>
<th></th>
<th>I1</th>
<th>I5</th>
<th>I8</th>
<th>I10</th>
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<th>I4</th>
<th>I11</th>
<th>I9</th>
<th>I2</th>
<th>I6</th>
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<td>R12</td>
<td>R16</td>
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The statement of vertical fourths is presented throughout the piece in varied forms. Berio often varies the quartal chords by adding a foreign note. An example of this is found in m. 29 in the electric guitar (Figure 8.22).

Figure 8.22 Electric guitar disrupted quartal chords, m. 29
As seen in Figure 8.22, the outside note is a half step distant from one of the notes of the group. In this case E natural is a half step away from Eb. In m. 13 and 17 there are two foreign notes that in turn form a perfect fourth, so there are two groups of fourths separated by a half step between two of their notes (Figure 8.23 and 8.24). In m. 13 the Eb is a half step from D and the A♭ is half step from G and in m. 17 the F♯ and B are a half step from F natural and B♭.

Figure 8.23 Electric guitar, foreign notes form fourths, m. 13

![Figure 8.23](image)

Figure 8.24 Electric guitar, foreign notes form fourths, m. 17

![Figure 8.24](image)

The second sixteenth-note of Figure 8.24 shows other such sonorities. In this case the E is the foreign note and so is the G♯.

This feature of disrupting a symmetrical pattern with notes that are a half step away from notes of the cycle has its origins in the twelve-tone row itself. The original row could
be parsed into a seven-note group (from D♭ to E♭) and a five-note group (from E to F♯). At the boundaries of these two groupings is the half step E♭ - E (Figure 8.25).

Figure 8.25 Groupings of the row

The reordered pitches of each side form a pattern of fourths (Figure 8.27 and 8.28).

Figure 8.27

Original left side of the row  Reordered left side of the row

Figure 8.28

Original right side of the row  Reordered right side of the row
The Ramble

Berio’s creative use of pitch material takes an unexpected turn in *Rhumba-Ramble.* In many cases he does not follow a straight path, using a single form of the series. Instead, he finds them by “rambling” around the matrix. The pitches of a given chord or phrase are selections of adjacent notes that connect with adjacent row forms. The last chord of the electric guitar in m. 17, which was discussed previously as an example of a disrupted quartal chord, is also an example of how Berio traces a trajectory in the matrix to find its pitches. As figure 9.1 shows, this five-note chord is built on D/A#/C/E/F (Figure 9.2) demonstrates that these notes follow a trajectory of adjacent pitches in the matrix.

Figure 9.1 Electric guitar chord, m. 17
Figure 9.2 Matrix trajectory of pitches of the electric guitar in m. 17

<table>
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<td>B</td>
<td>F♯</td>
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</tbody>
</table>

The same chord (transposed) appears in m. 18 by the strings section (Figure 9.3).

Figure 9.3 Strings, m. 18

Vni.

Vle.

Vc.

Cb.

62
This set of five notes belong to the trajectory shown in Figure 9.5.

<table>
<thead>
<tr>
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<th>I5</th>
<th>I8</th>
<th>I10</th>
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</table>

A different chord formed from a selection of adjacent notes of the matrix is found in the electric guitar on m. 29 (Figure 9.6).

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<th>RI8</th>
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<th>RI4</th>
<th>RI11</th>
<th>RI9</th>
<th>RI2</th>
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</table>

Figure 9.6 Electric guitar chord, m. 29

In this case the chord could have been drawn from two different trajectories. One option is: from the third dyad of P4 (notes E♭, B♭) and the center dyad of P2 (A♭, E). This trajectory
includes diagonal adjacent pitches. The chord could have also been formed by the third and fourth pitches of I5, the second pitch of I8 and the third pitch of I10 (Figure 9.7).

Figure 9.7 Two possible trajectories of the electric guitar chord on m. 29

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<td>D♭</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td>P5</td>
<td>F</td>
<td>A</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>B</td>
<td>G</td>
<td>A♭</td>
<td>E♭</td>
<td>D♭</td>
<td>F♭</td>
</tr>
<tr>
<td>P0</td>
<td>C</td>
<td>E</td>
<td>G</td>
<td>A</td>
<td>B</td>
<td>F♭</td>
<td>D♭</td>
<td>E♭</td>
<td>B♭</td>
<td>A♭</td>
<td>D♭</td>
</tr>
<tr>
<td>P8</td>
<td>A♭</td>
<td>C</td>
<td>E♭</td>
<td>F</td>
<td>G</td>
<td>D♭</td>
<td>B♭</td>
<td>B♭</td>
<td>F♭</td>
<td>E</td>
<td>A</td>
</tr>
</tbody>
</table>

The chord played by the strings in m. 33, conformed by the pitches F/C/E/B (Figure 9.8), could also be traced to four different trajectories in the matrix (Figure 9.9) where the notes are linked to an adjacent pitch and/or adjacent form of the row.
Figure 9.8 Strings chord, m. 33

Figure 9.9 Possible trajectories of notes of the strings chord at m. 33
The Cycles

Cycles of 11

Besides the combinatorial characteristics of the row, *Rhumba-Ramble* reflects some other technical trends that Berio would use throughout his career. Some of the experiments in later pieces have their origins here and some of the technical elements that originated in previous pieces are developed here.

Two years before composing *Rhumba-Ramble*, Berio experimented with the use of rows that exceed twelve pitches and the related practice of using rows with less than twelve notes. In *Nones* (1953), the row is thirteen notes long. Its construction is palindromic, configured around the center pillar A♭ (Figure 10.1). The second hexachord, starting on D♭, is a retrograde inversion of the first.39 The reason to have one additional pitch in the row is that in order to get these specific qualities from this row the note D has to make two appearances, one at the second spot and one at the penultimate spot.

Figure 10.1 *Nones*, row

B, D, B♭, G, E, E♭ - A♭ - D♭, C, A, F♯, D, F

---

Unlike *None*, *Rhumba-Ramble’s* series is a twelve-tone row; nevertheless the statements of all of its forms are achieved in an unconventional way. Here, the row is presented in consecutive cycles that always omit one note. The missing note is relegated to appear later in the next cycle. While in *None*, Berio adds one note to the row of twelve; making it a thirteen-pitch series, in *Rhumba-Ramble* he subtracts one note of the twelve-tone row; effectively turning it into an eleven-tone row.

Other than the blocks (vertical or horizontal) built on sets of the different forms of the row (previously discussed) there is not a defined rule for the order of which the notes or the sets will be stated. As Osmond-Smith observes about Berio’s 1961 *Epiphanie*, “fields of pitches” also define the structure of *Rhumba-Ramble*.

The use of cycles of incomplete tone rows is a feature further developed in his piece *Point on the Curve to Find* (1974), where the process begins with “the piano line playing a cycle that uses the first ten of... the twelve-tone row” Another piece using similar cycles is *O king* (1965). In this piece the “vocal line is generated from a cycle in which seven pitches each occur thrice in different configurations”.

Here, in *Rhumba-Ramble*, each of these cycles is created using fields of eleven notes in an unordered manner. The clearest statement of the row comes in the first cycle. From m. 1 to the end of m. 5 the presentation of the notes of the cycle is straightforward (as discussed previously).

As a rule, the following cycle starts where the missing note from the previous cycle appears, then eleven pitches are introduced for the duration of the present cycle. Figure

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41 Ibid., p.58
42 Ibid., p.33
10.2 shows the introduction of the eleven pitches of cycles #1 (in red, from m. 1-5), #2 (in blue, from m. 6-10) and #3 (in yellow, from m. 11-13). The F# (in purple), the last note of the row, is temporarily left out until it appears in m. 6, as part of a chord played by the electric guitar, which in turn is part of the second cycle. The violin/viola B (colored green) is the missing note of the row in the second cycle, which appears as the first note of the third cycle in m. 11.
Figure 10.2 Introduction of the eleven pitches of the first, second and third cycle, mm. 6-10
When observing the pitches of each cycle, it is apparent that each one of the eleven pitches are unrestrained, appearing sometimes once, twice, thrice or several times, for an extended period. As Figure 10.3 shows, in the second cycle, while the missing note is the B natural, the F appears once, the C, D♭, E♭, F♯, G and the A (taking in consideration the violin/viola unison) appear twice, the E appears thrice, the D and the A♭ four times and the B♭ five times (Figure 10.3).
Figure 10.3 Appearances of the eleven pitches in the second cycle.

<table>
<thead>
<tr>
<th>m.m #</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Total Appearances</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Db</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Eb</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>E</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>F</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>F#</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>G</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ab</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Bb</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>5</td>
</tr>
</tbody>
</table>

The cycles are not predictable insofar as how long their expansion will be. Some cycles are as long as eight measures while others are as short as one. What is consistent is that, with the exception of six cycles, there is always a pitch that is relegated and does not appear until the rest of the pitches have been established. The cycles tend to get shorter after the climax (mm. 84-96) as the piece comes to its conclusion (mm. 101-109). At this point it gets more difficult to clearly identify the cycles. This is because the missing notes are not relegated for as long as they were during the first part of the piece. For instance, m. 101 could be considered a cycle, it is missing the pitch F, but the F quickly appears as the first note of m. 102. Similarly, m. 103 is missing the pitch E but it appears shortly as the second pitch of the next measure. In cycle # 3 either of the pitches Ab or G are relegated to
a chord that ends the cycle. On cycle #8, B and Db are relegated to sound simultaneously at the end of m. 30. Cycles 28, 29 and 34 have more than one missing pitch.

Other exceptions to the missing pitch strategy can be observed in cycles 31, 33 and 36. These contain the complete twelve-tone row and each pitch of the row appears either simultaneously (as a chord) or in rapid succession. Thus, these could be considered as special cycles that do not have relegated pitches. Figure 10.4 summarizes the strategy of the cycles in *Rhumba-Ramble*.

Figure 10.4 Sequence of cycles through the piece.

<table>
<thead>
<tr>
<th>Cycles</th>
<th>Measures</th>
<th>Missing Pitches</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 - 5.8</td>
<td>♯</td>
</tr>
<tr>
<td>2</td>
<td>6 - 10.8</td>
<td>B</td>
</tr>
<tr>
<td>3</td>
<td>11 - 13.5</td>
<td>♯ or G</td>
</tr>
<tr>
<td>4</td>
<td>13.6 - 16.7</td>
<td>B</td>
</tr>
<tr>
<td>5</td>
<td>16.8 - 20.1</td>
<td>♭</td>
</tr>
<tr>
<td>6</td>
<td>20.2 - 23.4</td>
<td>D</td>
</tr>
<tr>
<td>7</td>
<td>23.4 - 28.5</td>
<td>F</td>
</tr>
<tr>
<td>8</td>
<td>28.6 - 30.5</td>
<td>B or ♭</td>
</tr>
<tr>
<td>9</td>
<td>30.6 - 35.4</td>
<td>♩</td>
</tr>
<tr>
<td>10</td>
<td>35.5 - 37.7</td>
<td>♯</td>
</tr>
<tr>
<td>11</td>
<td>38.2 - 39.3</td>
<td>F</td>
</tr>
<tr>
<td>12</td>
<td>39.4 - 42.6</td>
<td>♩</td>
</tr>
<tr>
<td>13</td>
<td>43.4 - 44.2</td>
<td>C</td>
</tr>
<tr>
<td>14</td>
<td>44.3 - 47.6</td>
<td>♩</td>
</tr>
<tr>
<td>15</td>
<td>47.7 - 51.5</td>
<td>♩</td>
</tr>
<tr>
<td>16</td>
<td>51.6 - 54.5</td>
<td>♩</td>
</tr>
<tr>
<td>17</td>
<td>54.5 - 55.7</td>
<td>B</td>
</tr>
<tr>
<td>18</td>
<td>55.8 - 57.4</td>
<td>♩</td>
</tr>
<tr>
<td>19</td>
<td>57.8 - 59.8</td>
<td>♩</td>
</tr>
<tr>
<td>20</td>
<td>60 - 64.5</td>
<td>♩</td>
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<tr>
<td>21</td>
<td>64.6 - 67.1</td>
<td>♩</td>
</tr>
<tr>
<td>22</td>
<td>67.2 - 69.8</td>
<td>♩</td>
</tr>
<tr>
<td>23</td>
<td>70 - 74.8</td>
<td>F</td>
</tr>
<tr>
<td>24</td>
<td>75 - 76.7</td>
<td>♩</td>
</tr>
<tr>
<td>25</td>
<td>76.8 - 78.5</td>
<td>♩</td>
</tr>
<tr>
<td>26</td>
<td>78.6 - 80.8</td>
<td>♩</td>
</tr>
<tr>
<td>27</td>
<td>81 - 83.2</td>
<td>♩</td>
</tr>
<tr>
<td>28</td>
<td>83.3 - 84.3</td>
<td>♩ &amp; ♯</td>
</tr>
<tr>
<td>29</td>
<td>84.4 - 87.2</td>
<td>♩ &amp; ♭</td>
</tr>
<tr>
<td>30</td>
<td>87.3 - 90.8</td>
<td>♩</td>
</tr>
<tr>
<td>31</td>
<td>97 - 100.8</td>
<td>none</td>
</tr>
<tr>
<td>32</td>
<td>101.1 - 101.8</td>
<td>F</td>
</tr>
<tr>
<td>33</td>
<td>102.1 - 102.8</td>
<td>none</td>
</tr>
<tr>
<td>34</td>
<td>103.1 - 103.8</td>
<td>♩ &amp; ♭</td>
</tr>
<tr>
<td>35</td>
<td>104.3 - 105.4</td>
<td>♩</td>
</tr>
<tr>
<td>36</td>
<td>105.5 - 106.6</td>
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</tr>
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</table>
Structure Summary

*Rhumba-Ramble*'s structure could be analyzed using at least seven different parameters. A reflection of these parameters can be seen in Figure 11.1. As the table shows, the pointillistic feature, derived from the traditional *rumba* (parameter V), starts the piece. It transitions from mm. 60 to 84 to a non-pointillistic section. This transition at m. 60 coincides with a section where the *son* instrumentation (parameter VI) disappears from the score. The re-entering of any of the *son* instruments does not come until the last measure when the *claves* play the last two notes of the piece. The characteristic dry tone vs. open tone of the *rumba* also comes to an end at m. 60 with the transition towards the non-pointillistic section. The non-pointillistic section, in turn, is the climax where the *mambo* (parameter VII) Latin big band sound is heard and where the density of the sound increases. The sound density is perpetually attached to the dynamics. The piece lingers, characteristically, on the lower parts of the dynamic range (parameter II). Besides this climax, two appearances of *fortissimo* are registered, in mm. 58-59 and 95-96. In these measures a reoccurrence of a percussion riff (parameter I) takes place. This riff is a structural column that divides the piece into three sections: from m. 1 – 59, from m. 60 – 96, and from m. 97 – 109.

Figure 11.1 also demonstrates how the increment of sound density (parameter IV), the use of longer notes (reflected on the non-pointillistic quality), the increment of dynamic intensity, and the prominence of the brass/woodwind section (which results in the Latin big band sound) combine to create a boisterous climax. This climax transitions to a recapitulation of the pointillistic quality, the dry vs. open tone quality and to a quieter
dynamic. A last percussion riff (m. 96) gives the piece a sense of closure. After m. 96 the pointillistic sound disintegrates until the clave plays the last two notes, to close the piece.
<table>
<thead>
<tr>
<th>Measures</th>
<th>Percussion Riff</th>
<th>Dynamics</th>
<th>Sound Density</th>
<th>Latin Big Band Sound</th>
<th>Mambo Phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>3-4</td>
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</tr>
<tr>
<td>5-6</td>
<td></td>
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</tr>
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<td>7-8</td>
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</tr>
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<td>31-32</td>
<td></td>
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</tr>
</tbody>
</table>

Figure 11.1 Summarized structure table
Conclusion

With *Rumba-Ramble* Luciano Berio demonstrates that Caribbean music has as much potential to influence music for the concert hall as European tradition has done in the popular music of the Antilles. More specifically, this piece also proves the effectiveness of fusing Caribbean elements with avant-garde techniques, to create a piece of music that is representative of Berio’s originality. Berio’s ingenuity resounds without restraints in *Rhumba-Ramble*, enabling him to deliver a piece that is truthful to his compositional voice. The *clave*, the quintessential rhythmic pattern of Latin music, provides the essential feature of *Rumba-Ramble*. The *tresillo*, is constantly presented in its original form, developed in a traditional European fashion and, as in traditional Caribbean music, implicitly represented by the delineation of musical phrases.

From the *rumba*, Berio explores its pointillistic qualities and its capacity of combining dry tones with open tones. These two attributes of the traditional *rumba* are stated in *Rhumba-Ramble* through the use of the unpitched percussion section as the counterpart to the rest of the orchestra. The unpitched instruments reproduce the typical dry sounds of the *rumba* while the pitched instruments impersonate the open tones of the *tumbadoras*. Also, the opening bass line resembles a modern arrangement of an orchestrated *rumba*, as performed by the Latin orchestras of the 1950’s.
The climax of *Rhumba-Ramble* reveals that, most likely, in his trip to New York\(^{43}\), Berio was directly exposed to the *mambo* and that he was inspired by the sound of the Latin big band. As in the *mambo*, a syncopated phrase of the brass section sounds as counterpoint to a woodwind phrase. Common *mambo* riffs in *Rumba-Ramble* are also indicative of Berio’s fountain of inspiration.

In spite of borrowing many ingredients of Cuban music, it is the *son* percussion that brings all the elements into a Caribbean context. The rest of the components do not provide, as clearly as the percussion section does, a decisive attribution to its Caribbean roots. Thus, the percussion backdrop defines all the other Caribbean qualities in *Rumba-Ramble*.

The twelve-tone row is rich in symmetrical features, but it also contains an abundance of pitch intervals. Although it is not apparent that Berio used a systematic process of selecting pitches, there is evidence of the use of some traits of the row as building blocks throughout the piece. Among these are: the intervals of major and minor seconds, fourths and thirds, along with major and minor triads and sixths chords. Additionally, Berio displays his cleverness when selecting the notes of his chords by “rambling” around the twelve-tone row matrix. The pitches of such chords are horizontally, vertically or diagonally adjacent, in the matrix, to at least one other pitch of the same chord.

Among Berio’s compositional traits is the use of a different number of pitches of the row to create structural cycles. In the case of *Rumba-Ramble* the structural cycles are

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\(^{43}\) Oxford Music Online, Berio, Luciano, accessed August 15\(^{th}\), 2015,
http://www.oxfordmusiconline.com/subscriber/article/grove/music/02815?q=Luciano+Berio&search=quick&pos=1&_start=1#firsthit
composed of eleven pitches (out of the twelve-tone row), the remaining pitch being the first pitch of the next cycle. As in other works by Berio, the selection of eleven pitches is not completely systematic and some cycles are not consistent with the norm.

*Rumba-Ramble* is a perfect integration of Luciano Berio's compositional style with Caribbean genres. Its balanced syncretism makes it a remarkable 20th Century avant-garde piece, infused with “Caribbeanism” as much as it personifies Caribbean music fabricated with the ingenuity of a brilliant avant-garde composer.
Bibliography

http://www.lucianoberio.org/node/1367?1223294767=1


