



The Organology of Rotenese Musical Instruments According to the Hornbostel-Sachs Classification System

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Abstract

This article aims to propose a classification of Rotenese traditional musical instruments based on the Hornbostel-Sachs (the H-S) method. The author conducted this ethnographic field research on the island of Rote, East Nusa Tenggara Province, from 2015 to 2016. The seven existing Rotenese traditional musical instruments analyzed in this article are: 1) *meko ai* or the *meko o* (the wooden or the bamboo xylophone); 2) the *meko besik* or the *meko lilok* (the hanging iron or brass gongs); 3) the *meko besik* or the *meko lilok* (the iron or brass metallophone); 4) the *labu kici* or the *labu so'e* (the single-headed, bowl-shaped drum); 5) the *tambur* or the *labu* (the single-headed, long cylindrical drum); 6) the *bitala* (the crash cymbals); and 7) the *sasandu* (the heterochord tube-zither). The only Rotenese traditional musical instrument that is not discussed in this article is *kianuk*, the two-holed bamboo flute, approximately ten centimeters long. This instrument does not exist anymore. The four aspects discussed in this article are 1) the construction, 2) the materials, 3) the ways of playing, and 4) the size of the instruments. Information was gathered from interviews with some key persons and through photography and video recording. This research acknowledges some limitations; for instance, providing exact information is challenging and limiting in the absence of a standard for meko tuning and making. Therefore, the information given here about the size, the material, the tuning, and the note intervals is an approximation.

Keywords: organology, the Hornbostel-Sach classification system, Rotenese traditional musical instruments

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INTRODUCTION

The word “organology” was first used to classify musical instruments based on their physical features. Mantle Hood (1971) calls it “organography.” Later, organology shifted from studying the physical features of instruments to studying musical instruments in their social context (Dournon, 1992, p. 247). This word was coined by a German musicologist, Michael Praetorius (1571-1621), in the second volu-

me of his treatise *De Organographia* (Dournon, 1992, p. 245).

Organology is considered as a quite popular topic among researchers, particularly in Indonesia. For instance, Agustinus Irwanto Siwe et al. (2022) discuss the organology of *foi doa*, a double-pipe flute from Ngada, along with its playing techniques, materials, dimensions, and its making. Gusti Muhamad Ilham et. al. (2018) study the organology of *beruas*, a membranophone from North Pontianak used to accompa-

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ny Zapin dance. M. Abdi Baha et al. (2020) investigate the organology of *selober*, a mouth harp from East Lombok. Uswatul Hakim et al. (2022) examine the organology of a West Lampung bamboo flute, *serdam*. Sigit Setiawan and Aris Setyoko (2022) investigate Javanese kendhang's organology and sound. Ilham Maulana et al. (2022) explore the organology of *canang ceureukeh*, its production concept, process, and materials. Xaverius Pala et al. (2022) survey the organology, origin, and the making of a xylophone from Ngada, known as *Ga'a li*. Along with research on the organology of musical instruments based on its physical features, there have been some research on the ethnomusicology of musical instruments, e.g., Suharto and Aesijah (2014) studied the social function of *lesung* (mortar for pounding rice). Hidayatullah Panakajaya (2017) investigates that the change in social conditions in Situbondo has been affected by the change in *strékan* music (music for welcoming guests in Situbondo). Irfanda Rizki Harmono Sejati (2012) discusses: a) the historical background of *Gandrung* (one of Banyuwangi's traditional performances); b) the playing techniques of violin in *gandrung*; and c) the functions of violin in *gandrung* ensemble. Recently, there has been a research article written by Deborah Lee (2019) on the H-S Classification of Musical Instruments. This article analyzes the scheme's context, background, versions and impacts. Unfortunately, none of these aforementioned studies investigate the organology of Rotenese traditional musical instruments. Therefore, research on the organology of Rotenese classification of traditional musical instruments is to fill the gap. The Rotenese traditional musical instruments analyzed in this article only those which still exist.

This article discusses the construction, materials, size, and ways of playing Rotenese musical instruments according to the Hornbostel-Sachs (H-S) classification system of musical instruments. Rote is an island of 1278 square kilometers in size (Rote-Ndao, 2017) located to the South of the more oversized island of Timor in East

Nusa Tenggara Province.

The seven Rotenese musical instruments discussed in this article are: 1) the *meko ai* or the *meko o* (the wooden or the bamboo xylophone); 2) the *meko besik* or the *meko lilok* (the hanging iron or brass gongs); 3) the *meko besik* or the *meko lilok* (the iron or brass metallophone); 4) the *labu kici* or the *labu so'e* (the single-headed, bowl-shaped drum); 5) the *tambur* or the *labu* (the single-headed, long cylindrical drum); 6) the *bitala* (the crash cymbals); and 7) the *sasandu* (the heterochord tube-zither). These instruments are included in the discussion because they are still used and part of *meko* playing.

There are two reasons for choosing the H-S classification system: 1) it is used worldwide, and 2) it uses the Dewey Decimal System (DDS). In the DDS, the first number refers to the main category, and the following numbers classify the instrument in detail. For instance, instruments represented by numbers such as 1.1.1 indirectly struck idiophones. The DDS is beneficial because it uses figures to replace the combination of numbers, letters, and double letters. Adding a new figure to the right end of the row will subdivide further the classification (von Hornbostel & Sachs, 1961, p. 10). Another benefit of the DDS, it allows us to pursue the specification of any musical instrument without manipulating the numbers. The position of the last figure shows the ranking of a given term with the system (von Hornbostel & Sachs, 1961, p. 10).

Although Jaap Kunst (Dournon, 1992, p. 252) criticizes the H-S classification system for the lack of consistent criteria for its subdivisions, it remains the most popular classification system of musical instruments among museologists, organologists, musicologists, ethnomusicologists, and ethnologists all around the world (Knight, 2017, p. 1). For instance, certain scholars have developed the H-S classification system in more varied ways, e.g., Hans Heinz Dräger (1948) developed micro-taxonomical organology. Mantle Hood (1971) devises an organology that

enables the readers a visual description of musical instruments in their functional details. René T.A. Lyloff and Jim Matson develop a non-hierarchical taxonomy (1985). Kurt Reinhard (1960) bases his taxonomy on two principal categories: the number of sounding bodies and pitch adjustment. Tetsuo Sakurai (1980) developed his system based on seven major divisions: solid, membrane, reed, air, string, combination, and oscillator-vibrating instruments.

As there is little research to date on the music and the musical instruments of Rotenese people, this research offers a classification of Rotenese traditional musical instruments based on the Western perspective proposed by Hornbostel and Sachs. This research's novelty lies in the proposed classification system of Rotenese traditional musical instruments based on the H-S classification system.

METHOD

This research applies ethnographic methods, in which the researcher attempts to describe the whole aspects of a studied community, e.g., economically, socially, and culturally (Hennink et al., 2011, p. 46). James P. Spradley (1980, p. 3) regards ethnography as "hallmark of cultural anthropology." The H-S classification system of musical instruments is adopted to analyze the qualitative data. Primary data was collected through interviews with some research participants, i.e., Yusuf Mesah, the manager of *Deta Hitu* (meaning "seven strings") music and dance studio; Jonas Mooy, the manager of *Dolu Inggü* (meaning "peace that surrounds the village") music and dance studio; and Chornelis Tuy, the chief of *fetor* tribe. The author also collected data from photography and video recordings during the research. This data was first triangulated with the only available reference on Rotenese musical instruments, *Sasandu: Alat Musik Tradisional Masyarakat Rote Ndao* by P.A. Haning. Second, it was analyzed according to the H-S classification system based on four aspects, i.e., 1) the construction, 2) the ma-

terials, 3) the ways of playing, and 4) the size of the instruments. Finally, the analyzed data was interpreted and reported as seven tables representing the organology of Rotenese musical instruments.

RESULTS AND DISCUSSION

The *Meko Ai/O*

The word '*meko*' initially referred to a wooden or bamboo xylophone, which looks very similar to the *kulintang a kayo* from the Philippines. *Nitende* (*Rhizophora sp.*), *kula* (*Vitex parviflora*), and *bina* (*Mallostus repandus*) are the most common woods used in *meko ai* production. Among these three, *kula* is the most preferred by *meko* manufacturers for its resistance to fungus, termite, and lyctus beetle attacks (Orwa et al., 2009). To date, *kula* wood is also used for shipbuilding.

The *meko ai/o* is a xylophone comprising nine tuned bars made of wood or bamboo arranged from the lowest to the highest: E3-G3-A3-C4-D4-E4-G4-A4-C5. These bars are strung horizontally on a wooden frame called *hako*. The term '*hako*' literally means 'cattle trough.' Although wooden frame has replaced the cattle trough, the term '*hako*' is still to date.

The dimensions of a *meko ai* range from about ninety to one hundred and ten centimeters long, from forty to sixty centimeters wide, and from forty to fifty centimeters high.



Figure 1. A *meko ai* (source: Yandri Yapi Ishak Sine 2012)

The *meko ai/o* is usually played by two performers, with each performer holding one or two mangrove mallets. The first player (see **Figure 2**) plays the five lowest notes (E3 to D4), while the second

plays the last four highest notes (E4 to C5). In case when the *meko* is played by three performers, the second performer shares with the third. The second performer plays the first three notes, and the third plays the highest one (see **Figure 3**). The performers usually sit on chairs/small stools or squat on the ground face-to-face.



Figure 2. The seating arrangement for two *meko ai/o* performers (illustration: Galih Aulia 2018)

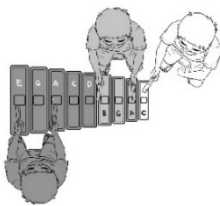


Figure 3. The seating arrangement for three *meko ai/o* performers (illustration: Galih Aulia 2018)

According to the H-S system, the *meko ai/o* is classified as an idiophone with a set of percussion sticks in a range of different pitches combined into one instrument (111.212).

Table 1. The H-S classification number for the *meko ai/o*

The Dewey Decimal System	Description
1	Idiophones
1	Struck Idiophones
1	Idiophones Struck Directly
2	Percussion Idiophones
1	Percussion Sticks
2	Sets of Percussion Sticks

The Meko Besik/Lilok

The *meko besik* (iron gong) or the *meko lilok* (brass gong) is another type of *meko*. The *meko besik/lilok* consists of two types: 1) the tuned knobbed metal bars suspended horizontally on a wooden frame; and 2) the hanging tuned knobbed metal gongs, which are suspended vertically on a wooden frame. Like the *meko ai/o*, the *meko besik/lilok* also comprises nine tuned metal bars or gongs. A set of nipple gongs may range from approximately fifteen centimeters (i.e., the *meko ana*, the smallest gong) to around thirty centimeters (i.e., the *meko ina makamu*, the largest) in diameter.



Figure 4. A set of suspended *meko besik* (source: Agastya Rama Listya 2015)

The dimensions of the *meko besik/lilok* are similar to those of the *meko ai/o*, as well as its playing technique.

Following the H-S classification system, this metallophone (Table 2) falls into the idiophone category, more precisely, a set of percussion plaques (111.222).

Table 2. The H-S classification number for the hanging *meko besik/lilok*

The Dewey Decimal System	Description
1	Idiophones
1	Struck Idiophones
1	Idiophones Struck Directly
2	Percussion Idiophones
2	Percussion Plaques
2	Sets of Percussion Plaques

The tuned knobbed metal gongs are similar to a Philippine *gandingan*, but the number of gong pieces. The *gandingan* comes with four pieces of gongs, whereas the *meko besik* has nine pieces of gongs. Both instruments are suspended vertically on a solid wooden frame, tree trunks, or sometimes between two house posts using a cord. The largest three gongs (i.e., the *meko ina makamu*, *meko ina taladak*, and the *meko ina tataik*) and the medium (i.e., the *meko nggasa laik* and the *meko nggasa daek*) are usually suspended vertically on a frame or a cord (Figure 5). The rest of the gongs are held in the performers' hands. Since the playing may take several hours, players prefer to sit while playing their instruments.



Figure 5. A set of hanging *meko besik* (Source: Agastya Rama Listya)

According to the H-S classification system, the tuned, knobbed metal gongs are registered under number 111.241.2 (sets of gongs [gong chimes]).

Table 3. The H-S classification number for a set of hanging *meko besik*

The Dewey Decimal System	Description
1	Idiophones
1	Struck Idiophones
1	Idiophones Struck Directly
2	Percussion Idiophones
4	Percussion Vessels
1	Gongs
2	Sets of Gongs

The *Labu Kici* and the *Tambur*

There are two kinds of stick percussion instruments acknowledged by the Rotenese to provide a rhythmic accompaniment for *meko* and *sasandu* playing: 1) the *labu kici* (small *labu*) or the *labu so'e* (see Figure 6); and 2) the *tambur* or the *labu* (see Figure 7). The *labu kici* is usually to accompany *sasandu* playing, while the latter is used to accompany *meko* playing.

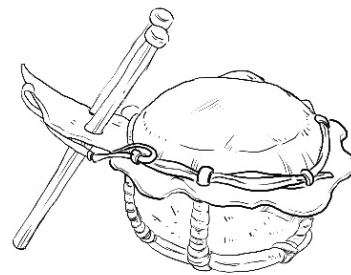


Figure 6. A *labu kici* (illustration: Galih Aulia 2018)



Figure 7. A *tambur* (source: Agastya Rama Listya 2015)

The *labu kici* is a coconut-shell drum played with two wooden sticks called *labu aik*. The *labu kici* ranges from about 20 to 25 centimeters, while the *labu aik* is about 1,5 centimeters with 25 centimeters in length. In the past, *labu's* drumhead (*bamba bau ro*) was made of bat skin and later has been replaced by goatskin (*bamba bau bibiru*) (Mooy, 2015). The drumhead of the *labu kici* is stretched on leather strings, which can be adjusted to change the pitch. The *labu kici* is held between the knees when played. The rhythms played on the *labu kici*

are similar to those played on the *tambur*.

According to the H-S classification system, the *labu kici* is categorized as a directly-struck single-headed drum in which the drum's body is bowl-shaped (211.11).

Table 4. The H-S classification number for the *labu kici*

The Dewey Decimal System	Description
2	Membraphones
1	Struck Membraphones
1	Directly Struck Membraphones
1	The Body of the Drum is Bowl-Shaped
1	Single Instruments

The *tambur* is a single-headed, long cylindrical drum played with a pair of wooden sticks similar to that of the *labu kici*. The *tambur* body was initially made of hollow coconut tree trunks approximately forty to fifty centimeters high. In recent decades, fishing net floats have supplanted the coconut tree trunks. Recently, two-legged musical instrument stands made of metal have been installed on the body of the *tambur*.

The drumhead uses the skin of a baby water buffalo, pony, pig, or deer (Mesah, 2015). Doeskin is preferred over other skins because of its thickness and durability (cf. Haning & Adu, 2009; Lido, 2015; Tuy, 2015). The diameter of the *tambur* ranges from about twenty to thirty centimeters. Similar to the playing of the *labu kici*, the *tambur* is held between the player's knees and always played in a sitting position.

According to the H-S classification system, the *tambur* is classified as an individual single-skin cylindrical drum under

number 211.211.1.

Table 5. The H-S classification number for the *tambur/la'bu so'e*

The Dewey Decimal System	Description
2	Membraphones
1	Struck Drums
1	Drums Struck Directly
2	Tubular Drums
1	Cylindrical Drums
1	Single-Skin Cylindrical Drums
1	Open Cylindrical Drums

The *Bitala* or the *Kringtingan*

The *bitala* or the *kringtingan* are a pair of small bossed, crash cymbals ranging from about 5 to 7 centimeters in diameter (see **Figure 8**). This instrument is made of iron and is considered a non-pitched percussion. Each cymbal comes with a finger strap, which is grasped between the player's thumb and first finger. The use of the *bitala* in *meko* playing is optional. If played, the *bitala's* rhythm usually follows the rhythm of the *tambur*.



Figure 8. A *bitala/kringtingan* (source: Agastya Rama Listya 2015)

Based on the H-S classification system, the *bitala* falls under the subcategory of vessel clappers with everted rims (111.142).

Table 6. The H-S classification number for the *bitala/kringtingan*

The Dewey Decimal System	Description
1	Idiophones
1	Struck Idiophones
1	Idiophones Struck Directly
1	Concussion Idiophones or Clappers
4	Concussion Vessels or Vessel Clappers
2	Cymbals

The Sasandu

'Sandu' or 'sanu' means 'to vibrate.' The *sasandu* or the *sandu* is a short form of the *sandu-sandu* or the *sanu-sanu*, meaning 'to vibrate repeatedly.' The *sasandu* used to be called '*depo hitu*' (seven strings). This name appears in a poetic saying: "*Sari Sandu la dei depo hitu la dei*" (to vibrate the instrument's strings by scrubbing the fingers and picking the seven-stringed instrument by pressing the fingers on the strings (Haning & Adu, 2009, p. 14).

The *sasandu* is a Rotenese tube zither with a resonator made of *lontar* (*Borassus sondaicus*) or palmyra palm leaves (*haik*). Its tube (*aon*, *sandu milak*) is made of a hollow piece of bamboo with a half-round lid or head called *langga* and a foot called *mea* or *sandu iko* (the tail).

The *sasandu* ranges from about 6 to 8 centimeters in diameter and 45 to 60 centimeters in height. Both the *langga* and the *mea* are made of wood. The *sasandu*'s strings are stretched from the tuning pegs (*aidipo*, *ndikodon*) on the *langga* to the nails on the *mea*. Once the *aidipo* was made of wood but later was replaced by metal screws. Each stretched string is supported by a movable wooden bridge (*senda*) placed on the surface of the *aon*. If the *sasandu* player desires to tune the pitch slightly higher or lower, the *senda* can serve as another tuner.

Adding a unique resonator known as *haik* distinguishes the *sasandu* from its counterparts (e.g., the Malagasy *valiha*, the

Cambodian *kong rla* or the Philippine *koli-tong*).

Formerly, the *sasandu* strings were made of the roots of the banyan tree (*Ficus benjamina*), but later were replaced by civet cat stomach (Haning & Adu, 2009, p. 11; Kartomi, 2001, p. 54). Recently, motorcycle coupling wire strands and metal guitar strings have become the most widely used materials for the *sasandu* strings because of their availability on the island.

There are two kinds of *sasandus*: 1) traditional (see **Figure 9**); and 2) modern (see **Figure 10**). The traditional *sasandu*, known as the *sasandu gong*, is typically a solo instrument that accompanies Rotenese traditional songs (the *sodak*), e.g., *Mai Fali E*, *Mana Lolo Banda*, and *Ofa Langga*. As a pentatonic instrument, the tuning of the traditional *sasandu* follows the tuning of the *meko*'s scale, i.e., E3 (the *meko ina makamu*)-G3 (the *meko ina taladak*)-A3 (the *meko ina tataik*)-C4 (the *meko nggasa lai*)-D4 (the *meko nggasa dae*)-E4 (the *meko leko*)-G4 (the *meko paiseli*)-A4 (the *meko paimali*)-C5 (the *meko ana*).



Figure 9. A *sasandu gong* (source: Agastya Rama Listya 2015)



Figure 10 A *sasandu biola* (source: Agastya Rama Listya 2015)

The modern *sasandu* comes with two names, i.e., *sasandu biola* (popular among the Rotenese of the island) and *sasando* (known among those who live in Kupang, West Timor). The term '*biola*' (violin) denotes that the instrument is tuned according to the Western diatonic system.

The *sasandu biola*'s strings may vary in number from 22 to 40. The number of strings is closely related to the number of notes altered. In other words, the more the number of strings, the more the number of notes altered.

The 22-stringed *sasandu* consists of G3-C4-D4-E4-F4-G4-A4-B4-C5-D5-E5-F5-F#5-G5-A5-B5-C6-D6-E6-F6-G6-A6. F#5 becomes the only note altered by an accidental one.

The 28-stringed *sasandu biola* comprises G3-C4-D4-E4-F4-G4-A4-B4-C5-D5-E5-F5-G5-A5-Bb5-B5-C6-D6-E6-F6-F#6-G6-A6-Bb6-B6-C7-D7-E7. Here we can see three notes altered by accidentals, i.e., Bb5, F#6, and Bb6.

The 32-stringed *sasandu biola* is composed of: G3-C4-D4-E4-F4-G4-A4-B4-C5-D5-E5-F5-F#5-G5-G#5-A5-Bb5-B5-C6-C#6-D6-E6-F6-F#6-G6-G#6 A6-Bb6-C7-D7-E7. In the 32-stringed *sasandu biola*, four more notes are altered than the 28-stringed, i.e., F#5, G#5, Bb5, C#6, F#6, G#6, and Bb6.

In the modern *sasandu*, a neck strap made of *lontar* or, more recently, cloth or nylon has been added to help the player control the movement of the instrument. One end of the strap goes around the player's neck, while the other is attached to the *langga*. Using a solid metal stand for the instrument has enabled the performer to be less encumbered, and the amplification has enabled the music to be heard more clearly when played outdoor.

The strings are plucked using the player's hands. These two hands play simultaneously with the same intensity and degree of difficulty. The right hand—usually plays the bass and chords—covers the lower notes, while the left hand usually plays the main melody. In the *sasandu gong*, the right-hand plays the first half of

the scale starting from the bottom to the top (i.e., E3-G3-A3-C4-D4-E5), and the left-hand plays the rest of the scale, moving from the top down to the bottom (i.e., E4-G4-A4-C5-D5-E5). Thus, the notes are arranged in circular order, starting from the bottom right of the circle, and proceeding counterclockwise (see **Figure 11**). This arrangement reminds us of the *kora*, a West African harp lute.

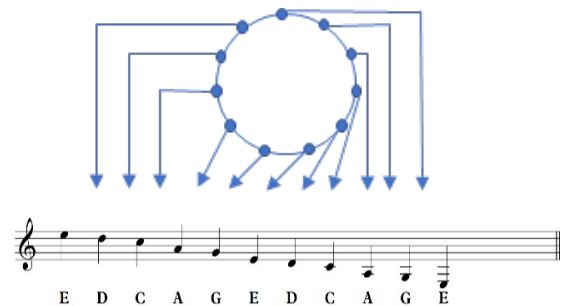


Figure 11. The pitching order of the *sasandu gong*

In contrast, the left hand of the *sasandu biola* moves in two different directions. The first three notes (i.e., F5, G5, and A5) are played downward, while the rest of the notes (i.e., Bb5 to E7) are played in the opposite direction (see **Figure 12**).

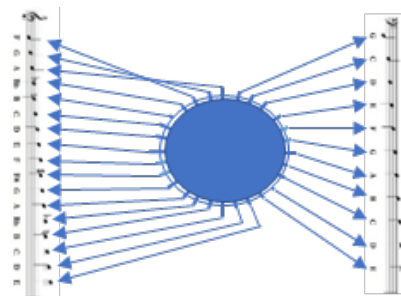


Figure 12. The pitching order of the 28-stringed *sasandu biola*

According to the H-S classification system, the *sasandu* falls in the chordophone category (string instrument) and is subclassified as a heterochord tube zither with an attached resonator (*haik*). The *sasandu* is classified under number 312.122. The first three numbers refer to the source of the sound, the instrument type, and the strings' arrangement. The last three numbers refer to the type of tube used, the

strings played, and the use of an extra resonator.

Table 7. The H-S classification number for the *sasandu*

The Dewey Decimal System	Description
3	Chordophones
1	Simple Chordophones or Zithers
2	Tube Zithers
1	Whole Tube Zithers
2	Heterochord Tube Zithers
2	With Extra Resonator

CONCLUSION

This classification is purely made to fill the gap, particularly in the absence of Rotenese traditional musical instruments. Besides, this proposed classification of musical instruments will help the readers to understand how Rotenese traditional musical instruments are classified according to the Western perspective. As this article only discusses the physical aspects and the way of playing of Rotenese traditional musical instruments, it opens an opportunity for the future research to study on the social context of these instruments, or borrowing Jeremy Montagu's (2003) term "ethno-organology", meaning a study of musical instruments in connection with their cultural meaning in a researched community.

According to the H-S classification system of musical instrument, the seven existing Rotenese traditional musical instruments [i.e., *meko ai/o*, *meko besik/lilok* (xylophone and metallophone), the *labu kici/so'e*, the *tambur/labu*, the *bitala*, and the *sasandu*] can be classified as follows: 1) the wooden or bamboo xylophone consisting of nine tuned wooden or bamboo slabs is classified as a set of percussion sticks in a range of different pitches combined into one instrument under number 111.212; 2) the metallophone consisting of nine tune

knobbed metal bars is classified as a set of percussion plaques of different pitches are combined to form a single instrument under number 111.222; 3) the hanging gongs consisting of nine tuned knobbed gong pieces is classified as a set of bossed gongs with metal circular discs under number 111.241.2; 4) the small crash cymbal is classified as vessel clappers with everted rims under number 111.142; 5) the small, single-headed and bowl-shaped drum is classified under number 211.11; 6) the long, single-headed and cylindrical drum is classified under number 211.211.1; and 7) the tube zither with an attached resonator made of palm leaf is classified as a heterochord tube zither with an extra resonator under number 312.122.

This article does not cover the discussion of the Rotenese classification system of musical instruments following the social-cultural meaning of Rotenese musical instruments (i.e., the significance and function of Rotenese musical instruments).

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