LIKEMBE TUNINGS OF KUFUNA KANDONGA (ANGOLA)

by

GERHARD KUBIK

The object of the present article is an analysis of the *likembe* tunings of one Angolan musician, Kufuna Kandonga, on the basis of his tuning process, his musical terms and the results of the measurements of his tunings. All this is related to the wider context of Ngangela/Mbwela musical concepts and the history of the *likembe* in Central Africa.

His tuning process was observed by me over a period of six weeks while we travelled together in southeastern Angola in 1965, and he carried his *likembe* with him. I also recorded his tunings on five different occasions on a UHER Report S tape recorder, at 19 c.p.s., half-track, with an AKG D. 19 microphone.

In recording the tunings I followed the method of The Rev. Dr. A.M. Jones of the School of Oriental and African Studies, London. I set the recorder going, then I sounded a pitch-pipe giving A = 440 c.p.s., then I played each note of Kufuna's *likembe* myself, in order from left to right, from the player's point of view as indicated by the numbers in Fig. 1 below, several times each note. The tape recorder was not stopped until the recording was completed. (See also Jones 1970: 122-124)

Dr. Jones later measured the tones from my tape recordings, via an intermediary copy on disc, with a Stroboconn at the School of Oriental and African Studies, for which I am indeed very grateful to him. The conclusions about the nature of Kufuna Kandonga's tunings are my own.

I. Some general remarks on the *likembe* in Central Africa

The name *likembe* is associated with a distinctive type of box-resonated lamellophone of Zaïrean (Congolese) origin, known in vast areas of Central Africa. It is characterized by the following organological traits:

1. A box-shaped resonator.
2. A distinctive cut-out section on the back, projecting from the top end of the hollowed-out box. (See the back view of the *likembe* in photo 2 below.) Thus the soundboard of a *likembe* is longer than its resonating box. Instrument makers usually begin by cutting out this top section.
3. The box is hollowed out, usually from the left side, but in many cases from both. Before closing the resonating chamber with thin strips of wood, the maker usually inserts a few small pieces of glass, one or two bottle-tops or small stones to create additional vibration when the instrument is played.
4. The iron bridge is usually ⌊‾⌋ -shaped. The backrest is a flat, longish piece of hard wood and is not attached to the soundboard. It is held in position solely by the pressure of the lamellae.

5. A characteristic is the attachment of the straining bar to the soundboard between bridge and backrest to hold fast the iron lamellae: a series of small holes is burned through the soundboard from the back along the innermost edge of the cut-out section. Wire is threaded through these holes and slung around the straining bar on the front of the soundboard in order to hold it firm. This method also explains why in this particular kind of lamellophone the soundboard must project beyond the resonator, for only in this way is the back of the soundboard accessible to pierce holes. The holes lie outside the box.
6. Usually a *likembe* has from 8 to 12 lamellae, made of forged iron. Umbrella ribs are nowadays common material in Angola and elsewhere. The width of each lamella varies little throughout its length in contrast to some other types of lamellophone (for example *chisanzi chandingo* in southeastern Angola) where the ends of the lamellae may be broadened. The notes of the *likembe* tend to be slightly thinner at their playing ends. Usually the ends are also filed smooth by the maker in order not to hurt the player's thumbs.
7. Iron ring buzzers are threaded onto some or all of the lamellae. The instrument makers (who are usually identical with the players) often calculate carefully the distribution of these buzzers over the keyboard, because one of the purposes of the buzzers is to *group* certain notes together and so create preconceived accentuation patterns in the music. In Angolan *makembe* (plural form) the buzzers are often attached to the deep notes.
8. Two sound holes are burned into the resonator, one in the end pointing to the player as he holds his instrument, the other into the back of the resonator. By alternately opening and closing the back hole with the left middle finger the player can modify the timbre of individual tones and produce vibrato and wow effects. The middle finger movement on this sound hole is considered the most difficult part of *likembe* playing technique. Often the middle finger moves in a counter rhythm to the motor patterns of the two thumbs.
9. The layout of the notes tends to be left-right alternating in pitch, with the lowest frequencies in the middle of the keyboard. In many instruments a further deep note is found at the right (from the player's point of view).

The word *likembe* is known throughout Central Africa today. It is known as far as western and northern Uganda and the southern Sudan and occurs in varied local adaptations according to the nature of the languages into which it was introduced. For example the Mpiɛmɔ̈ people in the southwestern corner of the Central African Republic and in southeastern Cameroon use the form *kembe.* The original *li-* prefix was not adopted, because it does not occur in the Mpiɛmɔ language. The instrument was reportedly introduced to that area by workers returning from Congo-Brazzaville along the Sangha river. (Field notes C.A.R. 1966.)

Among the Azande of southern Sudan another adaptation of the word is reported. It was called *ɾekembe* (with a flapped r) in 1930, according to A.N. Tucker (personal communication). Among the Acoli of northern Uganda it is called *lukeme* which is a further phonetic deformation of the original Zaïrean word, resulting from the adoption of name and instrument by speakers of a nilotic language in Uganda. (See also Kubik 1964 and 1965.)

The most likely area of origin and dispersal of this kind of lamellophone seems to be the region of the Lower Congo river. My guess is that it is a relatively recent,

possibly an early 19th century offshoot of the family of African lamellophones. Maes in an article in "Congo" (1921) called it "type fluvial" and wrote (p. 557-8): "ou bien cette forme de sanza provient du Bas-Congo et a été transportée à l'intérieur du Congo par les indigènes aux services des premiers coloniaux, ou bien son berceau se trouve dans la région des Bangala, tribu où nous avons recruté la grande majorité des soldats de l'armée indigène de la première periode de notre pénétration . . .". Laurenty (1962:205) also believes that "Bakongo et Bangala furent probablement les vecteurs de ce genre de sanza à travers le Congo".

In the decade before the first world war the *likembe* was established along the Congo river (among the Kongo, Mfinu and Teke) and up-river as far as Kisangani (ex-Stanleyville). It was known among the Loi and Mbuja. It had also already spread along the Ubangi river, where it was collected several times from Ngbaka musicians in the years 1911-13 and also from the Ngbandi.[1] In the northeast it had already penetrated Uganda via the West-Nile District, and in southern parts of Zaïre it was found in the Kasai at that time.

As a travel instrument used by porters, workers and colonial servants the *likembe* spread apace at the end of the 19th century with the increase in travelling during the final stages of Western exploration and colonization of the interior of Central Africa. This process even accelerated with the beginning of migratory labour in Zaïre. Often the *likembe* was the only companion of the solitary traveller to the mines and industrial and urban centres.

In Angola the *likembe* was still on the advance in 1965 when I started my field research there. I saw it being played then in eastern, southeastern and northeastern parts of Angola by Chokwe, Luvale, Mbwela, Luchazi and Nkangala musicians. I also found it used by the !Kung' near Longa (Cuando-Cubango District) who had adopted it from Bantu-speaking neighbours. Several standard songs as played by Ngangela-speaking musicians in the southeast, such as "Yani manguchata kumufweta" had texts in Chokwe or Luvale, a clear indication of the direction from which this instrument and its music was imported into southeastern Angola.

Fortunato Pereira Gonçalves (born 1933) of Cuito-Cuanavale, one of my friends and companions during my travels in the region of the Kwitu river, defined the *likembe* as an instrument "with a box resonator and played while walking on a long journey". (Note at Kabarata village, August 1965.) Like elsewhere in Central Africa, the *likembe* in Angola was an instrument of the emerging working class and as such it was also interethnic. In southeastern Angola in 1965 it was mainly played by casual labourers, usually between c. 14 and 30 years old. At Longa I recorded five *likembe* players of whom two were Mbwela, one was Luchazi, one Chokwe and one !Kung' in a group of about twenty workers employed by the local Portuguese agricultural merchant. Other *likembe* players I met in the region had either worked in some other part of Angola on Portuguese-owned estates or had been on the mines in South Africa (*ku Njoni*, i.e. in Johannesburg). One player, Tololi Mbundu, aged 30, whom I met and recorded at Chief Kabarata's village, 9 km northeast of Cuito-Cuanavale, had an exceptional repertoire. Besides many songs in the local Ngangela dialect he played "Ilanga la shona", a South African guitar song of the late 40s[2] which he had transferred to his *likembe*.

Kufuna Kandonga also said that the *likembe* was an instrument played by young people. This was certainly true for southeast Angola in 1965 when the *likembe* was considered one of the recent fashions. Kufuna also told me the following about the

appearance of the *likembe* at Longa: "*Muchapata* and *chisanzi chandoma* were the first (lamellophones) in the region, and also *lungandu. Likembe* was at first in Cuito-Cuanavale. At the time of the Chefe de Posto Mutalanima[3] at Longa, that was ten or fifteen years ago, the *likembe* was brought here. It was the *vantu vambunga* who brought it. Musisi, a man from the village of Soma Kakeke (a Chokwe settlement about 15 km south of Longa) went to Kwitu (= Cuito-Cuanavale) and brought the *likembe* from there." (Note, October 1965.)

According to this oral testimony it would appear that the *likembe* was in the Longa area not much earlier than about 1950, and that it came from the east, from Cuito-Cuanavale, where it probably arrived from eastern or northeastern Angola.

I did not see any guitars being played in the area of Longa and Cuito-Cuanavale in 1965. The guitar, which had begun to replace the *likembe* as an instrument for personal delight in Zaïre soon after World War II, was virtually unknown in southeastern Angola at that time.

II. Biographical notes on Kufuna

Kufuna Mwozi Kandonga, at the time a boy of about fifteen, was born in the village of Soma (Chief) Kayoko, north of the administration post Cuito-Cuanavale (Cuando-Cubango District, southeastern Angola). During my Angolan field research (July to December 1965) he was based in the village of Soma Chisende, northeast of Longa, in the same district. In the matrilineage he is a KaChokwe, but he was brought up in a predominantly Ngangela/Mbwela-speaking community. His colloquial language was Mbwela and he used it even in villages with a dominant Chokwe element. Once we went to Mariti (a Chokwe village north of Longa) and he was harshly rebuked by elderly men in the *ndzango* (i.e. the assembly place for men in the centre of a village) for speaking Mbwela, because they recognized him as a KaChokwe by the shape of his front teeth which were cut to a point.

Kufuna lost his father when he was very small, but his mother was still alive in 1965. He lived with his maternal uncle at Chisende when I arrived there in October. Shortly before that time he had worked for a year on a Portuguese coffee plantation in Central Angola together with two other boys of the same age from Chisende: Chimutwe and Kufuna Milonga. There he learnt the Angolan vehicular language Kimbundu and some Portuguese. He once even reached Luanda, he told me.

He learned *likembe* at a place called Kuhilili from a man named Titima Vutale, whom he paid 30 Escudos for the instruction. From him he learned the well-known pieces "Malova mundonga" and "Zambelela ngenzi mulikembe". After that this man left again for Johannesburg to work in the mines, Kufuna explained.

Likembe playing was an important element in Kufuna's life. Once he said to me: "If I gave up the *likembe* I would play with the vagina of a woman instead or even with my mother!". For him *likembe* playing had an important psychocathartic function at his adolescent stage and it was also socializing. At Chisende Kufuna was the leader of a small group of boys who were always active together and shared the *likembe* music. They were Kufuna Kandonga himself, who played the *likembe,* Tololi Masozi Chimutwe, who usually struck the 16-pulse time-line pattern called *kachacha* with two sticks on the front of the *likembe,* the small Ndeleiji Kahilu Vikuni vyaSoma, a learner on the *likembe* and Kufuna Milonga, all of them between c. 13 and 15 years old. They had all completed the traditional school called

mukanda. None of them had gone to a Western-type school.

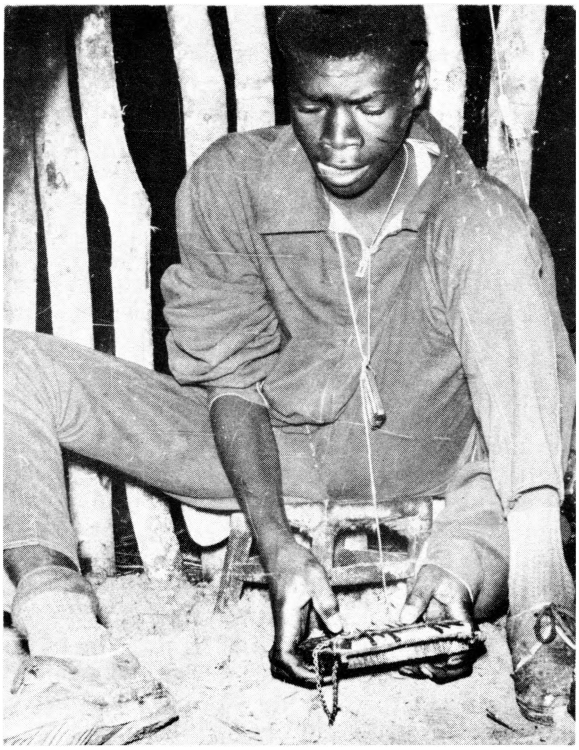


Photo 1. Playing the *likembe:* Kufuna Kandonga at Sakonvoyo village (kuMboyombacho), one of our many stops during the journey in Cuando-Cubango District, October 1965. The photograph shows Kufuna in one of his favoured playing attitudes. This position is the characteristic "seated" manner of playing the *likembe* and is very common in central and eastern Africa. The left hand is passed under the left leg. Both hands hold the instrument just above the ground which functions as a sound reflector. On other occasions I saw Kufuna playing it from the other side, passing the right hand under the right leg; and once he even played with both hands under both legs, but that was his show piece and not his regular playing position.

During my stay at Chisende one frequent amusement of this group was to mimic the movement style and the verbal behaviour of the Portuguese supervisor on the coffee plantation where they had worked and who used to urge them always to work faster.

From October to December 1965 Kufuna was my permanent companion during long excursions on foot to remote villages in the region. He even accompanied me to camps of the !Kung' (Khoisan) people.

III. Musical terms and the tuning layout of the *likembe*

In the Ngangela/Mbwela language as spoken in the area of Kufuna's home *chisanzi* is a category embracing all kinds of lamellophones. This term was even extended to include my Uher tape recorder. Kufuna's type of lamellophone was called *chisanzi chalikembe* or simply *likembe.* The other types of lamellophones found in the area were known under the following names: 1. *chisanzi chandingo* in Mbwela or *chisanzi chandoma* in Chokwe, a board lamellophone with a gourd resonator; 2. *chisanzi chalungandu* in Mbwela or *mandumbwa* in Chokwe, a board lamellophone with a gourd resonator, and with the lamellae arranged in two ranks; 3. *chisanzi*

chamuchapata or just *muchapata* in Chokwe, a lamellophone with a bell-shaped resonator. While the first two types were considered proper Ngangela/Mbwela instruments, though Chokwe musicians also used to play them, *muchapata* was known as a Chokwe import of long ago.

In Kufuna's village, Chisende, there was a strong lamellophone tradition. The most respected musician was Sachiteta, at the time about 70 years old, who was a marvellous performer on the *muchapata* and one of the last players left in the area.

The wood used for the body of all four types of *chisanzi* is usually from the *mukula* tree (Pterocarpus angolensis). Kufuna said it was difficult to find a big piece of *mukula* wood around Chisende to make a *likembe* as large as his own. Often the wood has to be collected far away, as was the case when he made a *likembe* for me.

Kufuna called the various parts of his instrument as follows: *vingeya* (sing. *ngeya*) = the lamellae; *manjota* = the buzzing rings round some of the lamellae; on Kufuna's instrument they were only on the four lowest, Nos. 3, 4, 5 and 8 (see Photo 2).

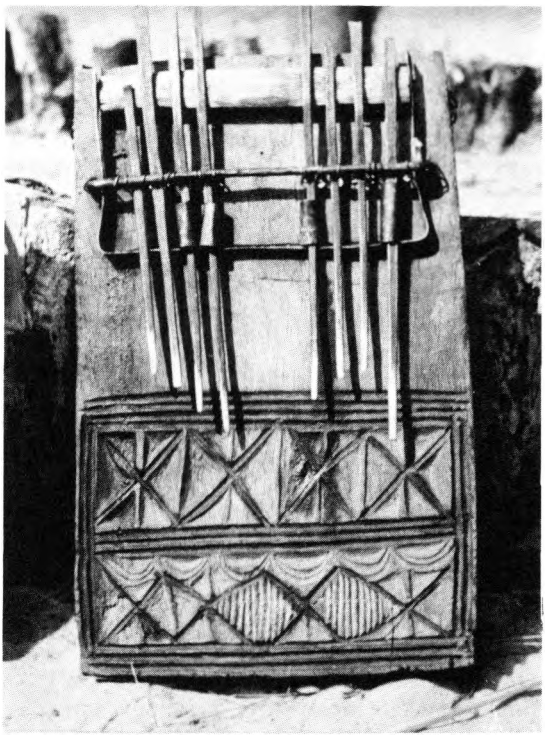


Photo 2. This is Kufuna's *likembe*. The soundboard measured 20 x 12.5 cms. Minus the projecting top part of the soundboard the box resonator then measured 16 x 12.5 x 2.5 cms. The body of this *likembe* was slightly curved in its length. The wood of the hollowed box was about 4 mm thick. The diameter of the back hole was 1.5 cms. The width of the lamellae decreased from c. 5 mm at the top ends to c. 2 mm at the playing ends. The buzzers *(manjota)* were attached only to the four lowest notes to amplify the sound and also to lengthen its duration. The soundboard was decorated with burned-in reliefs in Chokwe fashion. At Mupeku, November 1965.

Inside the instrument *(mu ntima yachisanzi)* there are various buzzers such as small stones, bottle-tops, small pieces of glass etc. All these are called *ndendulu*. They vibrate and provide a percussive "accompaniment" effect during play. The timbre of the vibration can be modified by the player by changing the way of holding the *likembe*. The buzzers then slide away to a different corner of the box

resonator and the timbre spectrum of the sympathetic resonance is changed. These buzzers are also called *minjota.*

For the box resonator a square piece of *mukula* wood is hollowed out from the sides. The two side openings are each closed with a cover *(chifwiko),* usually a thin (about 4 mm) and longish little board cut from the soft wood of a Eucalyptus tree *(kalipi).* The joints are then glued with black wax *(vulongo).* No nails are used in this area. Musicians do not usually leave their instrument in direct sunlight, as the wax melts easily.

A sound hole is burned into the back of the *likembe.* Kufuna did not name it specifically, but just called it *mpako* which is "a hole in a piece of wood". The sound coming out of this hole was referred to as *mwukû.* Kufuna did not define this term further. Rev. Emil Pearson in his Ngangela-English dictionary (1970:227) translates *"mûku"* as "breath".

Photo 3. Kufuna shows the technique of closing and opening the sound hole on the back of the *likembe* with the left middle finger. Note the characteristic shape of a *likembe,* with the cut-out top part and the series of holes pierced through the sound-board for threading wire to fasten the straining bar. The chain visible in this picture is for carrying the instrument. Other instruments in Kufuna's area had just a string instead. At Mupeku village, November 1965.

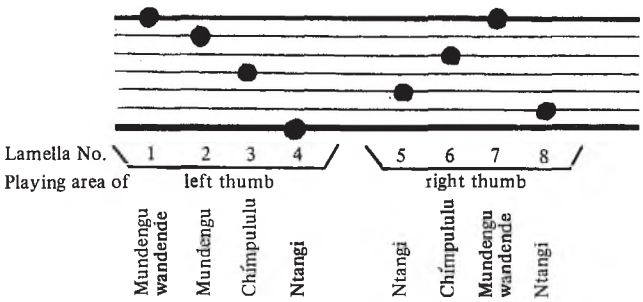
The sound hole is most important in the technique of *likembe* playing and the most difficult part to learn. In compositions such as "Zambelela ngenzi mulikembe" which are based on a cycle of 12 pulse units, the player's left middle finger performs quick alternate open-close movements on the sound hole as fast as the elementary pulses of the music. The basic technique of using the back hole is this, according to Kufuna: "When a thumb strikes *ntangi* (a deep tone) the hole must be closed, when it strikes *mudengu* (a high tone) it is opened." (For the note names see Fig. 1 below.)

The *likembe* is tuned by pulling the metal lamellae to different lengths over the iron bridge, which is called *lyambeji.* Black wax is never used for tuning, in contrast to the *ndingo* and *lungandu* lamellophones.

The tuning layout of the notes on Kufuna's *likembe* is shown in Fig. 1. I have

numbered the lamellae from left to right from the point of view of a person playing, and not from a musical or scalar point of view in order not to bias our analysis. Fig. 1 shows a typical arrangement of notes on a *likembe* of southeastern Angola such as Kufuna's, the playing areas of each thumb, and how he named the notes.

Fig. 1. The tuning layout of Kufuna Kandonga's *likembe*



The tonal range of Kufuna's *likembe* was exactly one octave. This is represented by the heavy lines in Fig. 1. Within the octave (lamellae 4 : 7) there are six different tones. The two highest notes (lamellae 1 and 7) are tuned in unison for technical reasons: Kufuna wanted to have an identical high note in the playing areas of both thumbs in order to use it in certain combinations of simultaneous (harmonic) sound. As to the two deepest notes, one lies in the playing area of the left thumb (No. 4) the other in that of the right thumb (No. 8). Ring buzzers were attached to those four low notes which formed the most frequent combinations of simultaneous sound in Kufuna's music, lamellae Nos. 4 + 5 and Nos. 8 + 3. The sound of these basic notes was thus *amplified.* Kufuna explained that both the *manjota* (ring buzzers) and the movements of the left middle finger on the back hole were particularly effective with the deep tones.

The naming of tones in the Ngangela/Mbwela language is based on the concept of *pitch regions* and not on that of individual notes of a scale. Kufuna and others distinguished three pitch levels: 1. *ntangi* (= a deep tone), 2. *chímpululu* (= a middle tone), 3. *mundengu* (= a high tone). The same terms are used for the three individual members of a *vipwali* drum set, tuned at different pitches. The various sections of the two cheeks of a slit-drum *(chinkuvu)* are also named in the same way according to the pitch they give. On the *likembe* the three lowest-tuned lamellae (4, 5 and 8) were referred to as *ntangi* by Kufuna, No. 3 and 6 as *chímpululu*, No. 2 was called *mudengu* and No. 1 and 7 were each called *mundengu wandende* (literally: small *mundengu*). Other players in the area used near variants of this terminology.

The designations "small" for the English "high" tone, and "large" for a deep tone are familiar from many areas of Black Africa, and these concepts are also essential in the music of the Mbwela, Nkangala, Luchazi, Chokwe and related ethnic groups. According to informant Fortunato Pereira Gonçalves a comparable terminology is used in Mbwela vocal music. *Kutendeka* means *kwimba lizi lyalindende* (to sing with a small, i.e. a high voice); *kukokolola* means *kwimba lizi lyakama* (to sing with a big, i.e. a low voice). If one wants a group of people to sing in parts one may

say in Mbwela: "Muli nakwimba lizi limolika, mwapande kwimba ou nalizi lyendi ou nalizi lyendi!" (You are singing all the same voice, you should sing this one with his own voice and that one with his own voice.) The Mbwela terms do not, however, match in their semantic fields with the idea of chordal part singing known in Western music. The sentence above can provoke a demonstration of harmonic multi-part music, but on another occasion it can elicit singing in parallel octaves. Only unison singing is excluded when everyone should sing his "own voice". I made a test: somebody was singing *lizi lyalindende* and I asked his partner to sing *lizi lyakama* together with him. On several occasions the result was indeed a "second voice" in thirds or fifths (or fourths respectively), but other individuals, according to the range of their voices, just sang the tune an octave lower. "To sing everyone his own voice" means to Ngangela-speaking peoples that *the same tune* should be sung at different pitch levels according to the individual range of the voices of men, women and children, but *not at random levels.* Although it is not explicitly stated in terminology, the implication is that these different pitch levels should combine at such distances that voice combinations recognised by the people as sounding well should arise. For the Ngangela group of peoples in eastern Angola this means the distances of what in Western music would be called thirds, fifths (or fourths) *and* octaves, though the sizes of the first three intervals are not identical with those found on Western instruments (see below). "Thirds", "fifths" ("fourths"), "octaves" and their combinations are all accepted as equally well-sounding, i.e. harmonious intervals in Ngangela/Mbwela multi-part music.

IV. Kufuna's tuning process

Kukeleka is the Ngangela/Mbwela verb meaning "to tune a musical instrument". *Kukeleka chisanzi* = to tune the *chisanzi. Likembe lyove vakeleka* = they are tuning your *likembe.*

The word *kweseka* (to try) can be used to describe the actions of someone who does not really know how to tune an instrument.

Kufuna's tuning proceeds along the line of a clearly perceived *inner tuning pattern.* On one occasion I observed the following with him: "When tuning he started definitely from the bottom. But he proceeded like this: first he tuned lamella No. 4 against 8, then No. 4 against 3 in a sort of fourth. Then he played the tone row 4 + 8 + 5 + 3, while tuning No. 5. Then he played 4 + 8 + 5 + 3 + 6 and finally the whole scale stepwise up and down." (Diary note at Mariti, 21st October 1965.)

On another occasion I observed again, when he was tuning: "He starts with No. 4, then he tunes No. 8 and then he plays melodically 4 + 8 + 5 + 3; then he tunes lamellae No. 4 with 5 together, No. 8 with 3 and No. 5 with No. 6; finally he plays in upwards movement the tone row 4 + 8 + 5 + 3 + 6 melodically. Suddenly he disliked the tuning of his initial *ngeya* (lamella No. 4). He played the series 4 + 3 + 2, then he checked No. 2 against No. 6, making No. 6 once again lower. Nos. 5 and 6 are also tuned to each other in a 'third'." (Diary note at Chingangu on our way home to Chisende, October 1965.)

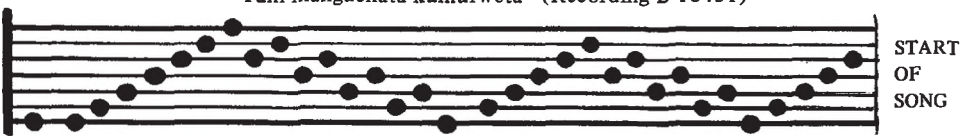
I was able to confirm on several occasions that the starting point of Kufuna's tuning process was always lamella No. 4, from which he proceeded to 8 and then to 3.

The prevailing trend in Kufuna's tuning process also became evident from his checking procedure: 1) He constantly examined what I would call a *scale*, proceeding from the largest (lowest) to the smallest (highest) note. 2) He checked certain determined intervals, by using a kind of spanning movement, always jumping one note of the scale.

At the beginning of each *likembe* song he used to play a characteristic melodic phrase. To an occasional observer it might appear to be a kind of introduction. Though it may be legitimate to call it introduction, it had some other distinctive quality and usually appeared in very similar form at the beginning of all of Kufuna's compositions. Kufuna did not give any verbal explanation regarding this matter, but it is clear that this phrase, apart from being an "introduction" is a device for a last check of the tuning.

Kufuna's tuning check phrase, as I would call it (Fig. 2), reveals very clearly the two main ideas guiding him when he tunes his instrument: 1) The idea of a scale, conceived as proceeding from the largest to the smallest note; 2) The idea of certain harmonic sounds, here played in "arpeggio" in a zigzag downward movement.

Fig. 2. Tuning check phrase as introduction to the song "Yani manguchata kumufweta" (Recording B 10451)



V. First reactions of a "Western ear" to Kufuna's tunings

Diary note at Chisende village, 17th October 1965: "I had requested some people in the village to make a new *likembe* for me exactly the same size as Kufuna's. So they asked for Kufuna's *likembe* as a model. During the work, however, they put it out of tune. When his *likembe* was returned to us, Kufuna appeared to be irritated, because of the discord. Then he tuned his *likembe* anew, but what came out was very strange. For me it was another scale, different from the one I had been familiar with from his playing . . . He said: 'Now the *likembe* is tuned well again!' and started to play the same tunes he had always played such as "Litombi" and others. For me this 'new scale' was characterized by the fact that two notes, namely lamellae 2 and 8, appeared to be about a semitone lower than before in the context of this scale; the whole tuning now sounded to me as if in a minor key. I must say that it was very hard for my ear to adjust to 'hearing' from now on all the *likembe* tunes which I had learned from Kufuna in 'minor', in this 'new scale'. Kufuna himself played with his usual zeal, without saying a word that anything had perhaps changed.

"For me this reorientation was so difficult that I took Kufuna's *likembe* secretly while he went to bring our food from the village and tuned it back to the 'old tuning'. Then I began to play "Litombi" and other pieces which I had learned from him with an innocent air, walking up and down while I saw Kufuna slowly coming back. Kufuna smiled with an expression of surprise and called to me in Portuguese: Isso! (That's it!) He instantly began to rock with his shoulders while I continued

playing the *likembe*. Immediately after this he took the instrument and now played himself without giving the slightest hint that he had noticed any change.

"This adventure has cost me a lot of headaches. The new 'minor scale' sounded to me completely consonant, and the 'old scale' with a note I perceived as between F and F♯ (lamella No. 3) also sounded consonant."

Diary note at Chisende village, 26th October 1965: "As regards the tuning of the *likembe* I now have definite indications that the 'F♯' (lamella No. 3) in the scale is deeper than a (relative) F♯ and lies somewhere between F and F♯, because once I tuned the *likembe* to a perfect F♯, but Kufuna immediately intervened and said this was a wrong tuning. Then he tuned my F♯ slightly deeper at once."

Diary note at Mariti village, 29th October 1965 (referring to my previous observations): "One day I noticed that he was not happy with the scale as I had tuned it, the one containing the F♯ (the interval of a major third between lamellae No. 8 and 3). He began to change the tuning; this took a long time. At a certain stage during this process that 'minor scale' came out again. But this time apparently it did not satisfy him. Then he tuned the octaves rather wrong . . ."

A self-analysis of my first reactions towards Angolan tunings in 1965 reveals a very familiar pattern. What I had perceived as different tunings on the two occasions, the first with a note between F and F♯ (relative pitches), the second in a minor key with an approximate semitone between lamellae No. 4 and 8, was appreciated by Kufuna, without any doubt, *as the same tuning.* Subjectively, therefore, he had not changed his tuning pattern at all on 17th October, when he had retuned his *likembe* and I had suddenly perceived it all in a minor key. It only appeared *to me* to be a different tuning from his previous one, because we reacted to the objective tonal material from two different view points of scalar perception. This was a result of our musical enculturation during childhood within two different musical cultures.

Kufuna has never shown any sign that he conceived of more than precisely one tuning pattern for his *likembe*. He always tuned his instrument to the same hexatonic scale, though with certain objectively measurable fluctuations in the intervals. These fluctuations, however, occurred within a clearly delimited margin of tolerance that was intra-culturally acceptable to him.

The "changes" in Kufuna's tunings which I had perceived over a period of some weeks were, therefore, merely a result of my projection of the Western tone system onto his tonal material. For him these slight modifications were irrelevant, because they did not destroy the identity of his scalar morpheme.

VI. The measurements

Table I shows Kufuna's *likembe* tunings, recorded on five different occasions between 15th October and 26th November 1965. Since Kufuna accompanied me on a journey with his instrument, two of the tunings were not recorded in his home village, but in Mupeku, a Luchazi village some 80 km north of Longa.

The tunings were recorded under the following circumstances:

B 10450 (15th October) was recorded immediately after the boys had performed the song "Litombi" rather enthusiastically for my first tape recording with them, in the house where we all stayed at Chisende village.

B 10618 (1st November) was recorded in the same house, after Kufuna had

Table I

The measurements in Cents and c.p.s (v.p.s., Hz) were kindly provided by the Rev. Dr. A.M. Jones, London. The Cents figures are from the Stroboconn. The c.p.s. figures are given to the nearest whole number.

	B 10450 Chisende, 15/10/65			B 10618 Chisende, 1/11/65		
Lamella No.	C.p.s.	Cents	Cents Intervals	C.p.s.	Cents	Cents Intervals
1	416	350		424	380	
			9			15
7	414	341		420	365	
			323			341
2	343.5	18		345	24	
			165			176
6	312.4	1053		311.5	1048	
			164			136
3	284	889		288	912	
			161			178
5	259	728		260	734	
			187			213
8	232.3	541		230	521	
			183			146
4	209	358		211	375	

	B 10622 Chisende, 4/11/65			B 10497 Mupeku, 24/11/65			B 10500 Mupeku, 26/11/65		
C.p.s.	Cents	Cents Intervals	C.p.s.	Cents	Cents Intervals	C.p.s.	Cents	Cents Intervals
435	427		412	331		411	328	
		8			31			5
433	419		404.5	300		410	323	
		351			337			353
354	68		333	1163		334.3	1170	
		132			192			184
328	1136		298	971		300.6	986	
		174			169			184
296	962		270.3	802		270.3	802	
		128			134			122
275	834		250	668		252	680	
		243			199			197
239	591		223	469		224.7	483	
		128			175			180
222	463		201.5	294		202.6	303	

played and sung several of his pieces solo. When he finished the last song, I took his *likembe* and sounded the lamellae to record the tuning.

B 10622 (4th November): Kufuna had just finished recording a large part of his repertoire, sixteen tunes at that time. After recording I said to him that I wanted to put the tuning on tape, as I had done before. He declined and said that he first wanted to retune his *likembe*. When he finished he gave it to me with the words: "Njinahaka lizi lyalindende" (I have put small voice), i.e. I have tuned it at a high level. This was the tuning I recorded here, and not the one in which he had played the sixteen songs. On that occasion I wrote in my diary: "This is another tuning, higher than the previous one". The *tuning pattern* had not changed, only the tuning *level*. It is also worth noting that Kufuna did not record any more songs after he had retuned his *likembe*.

B 10497 (24th November) was recorded at Mupeku, one of the stops on our journey. I took the tuning after Kufuna had played one song. There were no other people present in the house. After I had put the tuning on tape, he played six more songs without changing it.

B 10500 (26th November): Two days later, at Mupeku, I again took his tuning after a very inspired solo session. On this day he was so absorbed with playing that he did not even want to stop. At the beginning of this session he had said to me joyfully: "Maná njikulingileko ntsongo yange!" (Wait, I do that for you, my young brother!). Whenever I wanted to stop the recording presuming that he was playing the last item he said: "Not yet, let me do another one!"

The last two tunings taken at Mupeku (B 10497 and B 10500) may be considered identical except for one note. Kufuna did not, most probably, touch his tuning during the two day's interval, except that he adjusted the unison between lamellae No. 1 and 7 before the second tuning was recorded. In the first recording (B 10497 on 24th November) the two unison notes were out of tune by no less than 31 cents. This was probably a result of an ailment which his *likembe* had developed when we were still at Chisende. On my original tape No. R 74 there is a recording session with Kufuna dated 17th November which had to be interrupted for that reason. In recording No. B 10646/g his lamella No. 1 slipped out of its position during play towards the left and caused an audible rise in the note's pitch. But this *ngeya* did not get better in the following recording (B 10647) either.

Quite likely this "ailment" was not entirely cured when we arrived at Mupeku, where I recorded the next tuning in the chronological series (B 10497). This would be the explanation of the deviation of 31 cents. Then Kufuna must have adjusted or repaired this lamella with the result that the difference between the sounds of lamellae Nos. 1 and 7, supposed to be in unison, was down to five cents in the recording on 26th November (B 10500).

VII. Evaluation of the measurements

The five different tunings show a rather coherent picture.

1. Tuning level and "absolute pitch"

His *likembe* was a relatively low-tuned instrument, compared with most of the other *makembe* I recorded in Longa, Kabarata and other villages. The basic note fluctuated between the values 209, 211, 222, 201.5 and 202.6 c.p.s. on the different days. This is not a very wide margin, except for the 222 c.p.s. in B 10622 which he himself regarded as higher pitched. According to his statement about B 10622 (Njinahaka lizi lyalindende) Kufuna obviously recognized the overall *level* of this tuning to be different from the other tunings he had recorded before. His verbal statement is interesting, because it implies that in his pitch consciousness a rise of the tuning level by less than a Western semitone is recognized as a *change* of the "largeness" of the instrument's voice (the overall pitch level). The difference between tuning B 10622 and the previous tuning (B 10618) expressed in cents is as follows (Table II).

Since B 10618 is the highest of the four low tunings a comparison with B 10622 gives us an idea of the *minimum difference* in pitch necessary for Kufuna to consider two tunings to be different in their overall pitch level. From the cents figures in Table II it can be assumed that it is a difference of between c. 50 to 100 cents, about *half the value of a standard interval of his scale* (see below). Kufuna possesses absolute pitch within this margin of tolerance.

B 10618 Cents	Difference (in Cents)	B 10622 Cents
380	47	427
365	54	419
24	44	68
1048	88	1136
912	50	962
734	100	834
521	70	591
375	88	463

Table II

2. Unisons

Lamellae Nos. 1 and 7 are tuned in unison. On the five occasions recorded they were 9, 15, 8, 31 and 5 cents apart, with lamella No. 1 always being higher. Though Kufuna did not give any verbal statement as to the subjective accuracy of his unisons, his behaviour indicates that the 31 cents of B 10497 were out of his margin of tolerance for unisons. He would not have corrected it down to 5 cents if he had thought it was all right.

3. Octaves

The octave between lamellae Nos. 4 and 7 deviated from true octaves (1200 cents) by the following values: −17, −10, −44, +6 and +20 cents. The widest deviation (−44 cents) occurred on the day he had tuned his *likembe* "small voice". Since it also combined with an unusually narrow interval (of only 128 cents) between the two lowest notes (Nos. 4 and 8) I believe that lamella No. 4 (222 c.p.s.) might have gone too high on this particular occasion. If we tentatively added 44 cents to the bottom interval it would become 172 cents instead of 128 and the octaves would be true. Of course it is fruitless to speculate on whether or not one lamella was badly tuned in B 10622 without playing it back to Kufuna and asking his opinion. But there are *four* indications that B 10622 may be at least partly a poor tuning by Kufuna's standards: 1) He tuned especially for recording the scale and did not play a single song afterwards; 2) An octave of only 1156 cents is definitely out of tune for Kufuna's acute hearing; 3) The intervallic structure of this particular tuning is very *uneven* as compared with his other tunings; 4) He did not usually tune his *likembe* at "small voice", so it may have been just an occasional idea after all. The next time I recorded his tuning (B 10497) he was back at a low pitch level.

4. The nature of Kufuna's tunings

The cents figures of Table I display a pattern well-known among the large group of so-called equiheptatonic tunings which are found in various regions of Black Africa (see Jones 1970:24-55). Kufuna's scale is gapped, however, containing six notes within the octave; between his sixth and his octave there is a large step about twice the size of the standard interval of his scale. This gap is not found in all the other *likembe* tunings I recorded in southeastern Angola. Some other players had a tuning layout identical to Kufuna's but for lamella No. 7 which was tuned to the note missing in Kufuna's layout. Nos. 1 and 7 were not in unison on those instruments.

The gapped interval in Kufuna's tunings was 323, 341, 351, 337 and 353 cents on the different days, which are values very clearly in the region of equiheptatonic (neutral) thirds (342.8 cents).

5. Interdependence of certain pitches

The interval between lamellae Nos. 8 and 5, however, showed a constant and striking tendency towards deviation from the equiheptatonic standard interval of 171.4 cents. Lamella No. 5 is tuned slightly higher than its position in an equiheptatonic scale would demand.

In this context another fact strikes the observer: the *total interdependence* of the intervals between lamellae Nos. 4 and 8, compared with Nos. 8 and 5. When one of the two adjacent intervals becomes larger the other shrinks by about the same value. This pattern was very characteristic throughout the six weeks:

$$\frac{187}{183}\ \frac{213}{146}\ \frac{243}{128}\ \frac{199}{175}\ \frac{197}{180}$$

This confirms that in his tuning operations Kufuna does not only tune by comparing neighbouring notes with each other, i.e. by step, but also "by jump", i.e. *skipping one note of the scale.* This means, however, checking *thirds* whose cents figures are the sum of the pairs shown above. If we add those figures, two by two, we find that the resulting thirds showed very stable values over the period of six weeks, in contrast to their intervallic components: 370, 359, 371, 374 and 377 cents.

6. Simultaneous sounds and patterns of consonance

Further evaluation of the measurements can only be pursued in the light of Kufuna's behaviour in the tuning process and the structure of his music. Which are the most frequent simultaneous sounds in Kufuna's music?

Kufuna starts his tuning process with lamella No. 4, then No. 8, but he never strikes these two together. According to the measurements this basic interval is always smaller than a Western whole tone but never as small as a semitone. It fluctuated between the values 183, 146, 128, 175 and 180 cents during the six weeks. The next lamella to be tuned was No. 3, which he appeared to approach from No. 4. To a Western observer it would sound like a fourth, sometimes like an augmented fourth. The cents values were: 531, 537, 499, 508 and 499. The two notes cannot be sounded together because they are both in the playing area of the left thumb.

In his music Kufuna only sounded simultaneously those lamellae which are enumerated in the following Table III.

His *basic* consonances are the thirds of lamellae Nos. 4 + 5 and 8 + 3, and the fifths of Nos. 4 + 6 and 8 + 2. These are the most frequently heard simultaneous sounds in his *likembe* music. It is obvious that he is guided in the tuning process by the expectation of these particular consonances. In the vocal parts which he sang in duet with his friend Chimutwe to the *likembe* the same combinations occur. The vocal parallel thirds duplicate those of lamellae Nos. 4 + 5 and 8 + 3.

7. Tonal blocks

All the simultaneous sounds were grouped into two tonal-harmonic blocks which were built up on two roots (lamellae Nos. 4 and 8) *crossing* the separate playing

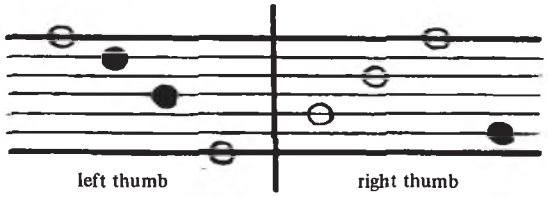
Simultaneous striking of lamellae No.	B 10450 15/10/65 Cents	B 10618 1/11/65 Cents	B 10622 4/11/65 Cents	B 10497 24/11/65 Cents	B 10500 26/11/65 Cents
4 + 5	370	359	371	374	377
8 + 3	348	391	371	333	319
4 + 6	695	673	673	677	683
8 + 2	677	703	677	694	687
5 + 1	822	846	793	863	848
6 + 1	497	532	491	560	542
4 + 7	1183	1190	1156	1206	1220

areas of the left and right thumbs. All of Kufuna's *likembe* pieces make use of root progressions between these two blocks. (For the term "root progression" see John Blacking's important article, 1959.)

The notes dependent on each root are found in the *opposite playing area;* this is for technical reasons. Together with the first root (lamella No. 4) Kufuna used to sound simultaneously No. 5 (giving a third), No. 6 (a fifth) or No. 7 (an octave). And together with the second root (lamella No. 8) he played No. 3 (giving a third) or No. 2 (a fifth). More rarely the combinations 5 + 1 or 6 + 1 occurred. Entirely *excluded* from the system are the following combinations: lamellae Nos. 4 + 8, 1 + 8, 3 + 5, 3 + 6, 3 + 7, 2 + 5, 2 + 6, 2 + 7. Though it would be technically possible these lamellae are never struck together.

Fig. 3. Tonal-harmonic blocks in Kufuna's *likembe* music

(Only lamellae of the opposite playing areas are sounded together. Those marked with rings only go with rings, those with dots only with dots.)



8. Equal-step principle and consonance: the compromise

If one considers not only the cents intervals between the steps of Kufuna's tunings, such as in Table I, but also those of the notes sounded together some further elucidation can be obtained.

The values of Kufuna's thirds (lamellae Nos. 4 + 5 and 8 + 3) are most frequently around 370 cents. The third between lamellae Nos. 4 and 5 was very stable, showing the values 370, 359, 371, 374 and 377 cents. As to the third of lamellae 8 + 3 there was a tendency to tune it slightly narrower. The fluctuations were also greater with this third. These are the cents figures: 348, 391, 371, 333 and 319.

There is a clear tendency in Kufuna's tunings to tune the third between lamellae 4 + 5 larger than a theoretical equiheptatonic third (342.8 cents), but smaller than a natural third (386 cents). From my experience with Ngangela/Mbwela music it

appears that this is one of the expressions of a basic compromise at work in the tonal-harmonic system of various ethnic communities in southeastern and eastern Angola. It is also evident in chorus singing. *The concept of a heptatonic scale, proceeding in identical steps from the largest (deepest) to the smallest (highest) note, is constantly adjusted against the equally important concept of harmonic consonance.*

In contrast to the thirds in Kufuna's tunings the fifths 4 + 6 and 8 + 2 are virtually equiheptatonic. The ideal equiheptatonic fifth is 685.6 cents. Against natural fifths (of 702 cents) equiheptatonic ones are only c. 16 cents out of tune, while equiheptatonic thirds (442.8 cents) deviate from natural thirds (486 cents) by no less than c. 43 cents, a very audible difference. Among populations such as those in eastern Angola, whose music is based on an equal-step heptatonic scale ***plus*** harmonic part-singing the need for *harmonic correction* in combining equiheptatonic intervals must be greater, therefore, with thirds than with fifths. Equiheptatonic fifths are as near to perfect fifths as are the major thirds on a Western piano (400 cents) to natural thirds. For a harmonically sensitive people such as the Mbwela, Luchazi, Chokwe and others in eastern Angola equiheptatonic fifths may be harmonically just acceptable out not the neutral thirds. One can observe both in Mbwela chorus singing and in the tuning of instruments such as lamellophones that the neutral thirds, structurally inherent in a non-modal heptatonic system, are as often as possible intonated half-way *towards* perfect (natural) thirds. This is why a value of c. 370 cents plays such an important role in Kufuna's tunings.

With *likembe* this compromise is achieved in the tuning process. The objective of producing harmonic sounds and at the same time even, non-modal pitch sequences is not at all easy to reach. Kufuna, who was an excellent musician, sometimes took a surprisingly long time to tune his *likembe* until he was satisfied with the sounds and their combinations. The absence of a seventh note in his tunings may be in itself at least partly an expression of this compromise.

In chorus singing the compromise is achieved by fluctuating intonation of the tones of the equiheptatonic scale in certain harmonic contexts. In places where three-part chords are held by the singers, one can clearly hear how they are slightly corrected towards "perfect" consonances, major triads, if one wants to use the Western term. In Mbwela music neutral triads are constantly "corrected" towards major triads in order to achieve euphony. As these adaptations may occur on any step of the equiheptatonic system a Western listener, who is accustomed to hear music either in a major or a minor scale, may become completely disorientated. He may hear the same song performed by the same people on different occasions, today in a quasi "major" and tomorrow in a "minor" scale. This is a very familiar phenomenon which I have been able to test with many people from musical cultures alien to Angola. And if that Western musician *believes* in his perception, he may go so far as to transcribe it all diligently in staff notation with key signatures and flats and sharps, and naïvely assume that this is what the Angolans sing. (One example is the transcriptions of Chokwe music in those two big volumes that were published years ago by the Companhia de Diamantes de Angola.)

The Chokwe, Mbwela, Nkangala, Luchazi, Luvale and other subgroups included in George P. Murdock's Ethnographic Atlas under the heading *Lunda* (Cluster 13) have one of the most impressive forms of vocal multi-part music in Central Africa.

The choral songs are organised in two, three and even four voices which yield well-sounding chords throughout, while each voice at the same time preserves its linear individuality. These voices are not just parallel, but there is plenty of oblique and contrary motion. (See Kubik 1968 and in *Encyclopaedia Britannica*, 15th Edition, 1974, pp. 246-247.) Modality, however, is alien to this musical culture.

The idea of euphonic or consonant sound would give rise to chains of perfect major thirds plus fifths (or fourths respectively). At the same time, however, there is the idea of scalar (step-wise) movement, which is manifested not only in the tuning processes of musical instruments, but also in the melodic movement of vocal music. *All individual voices in this kind of multi-part singing move predominantly by step.* These steps are thought to be identical; they occur at equidistant intervals within a seven-note tone system.

The singers' only (theoretical) problem arising from these basic concepts is that *the very same concepts conflict with each other.* It is not possible to sing euphonic major triads on all seven steps of *any* heptatonic system, let alone an equiheptatonic one. No three vocalists can sing in parallel major thirds plus fifths over stretches longer than two steps of a heptatonic scale without introducing alien notes into the system which simply break it up.

In Western music the historical compromise was to accept minor chords as well-sounding harmonies on some of the steps of a seven-note scale, thus reinforcing modality. The Ngangela/Chokwe compromise on the other hand is this: multi-part singing takes place within the general framework of a (non-modal) equiheptatonic scale, but the neutral thirds which are contained structurally in an equiheptatonic system are "corrected" by the singers at salient points towards natural major thirds. The latter, however, are only reached half-way in practice by "corrective intonation", because the introduction of real major chords would also break up the system, in this case the equiheptatonic one. The whole process is a very delicate one. What is conscious to the individual singers is that they sing by step and that they sing in "harmony". What they actually do is that each individual vocalist continuously adjusts his intonation very slightly to achieve precisely the attempted harmony throughout the song. The measurable result of this process is that the Ngangela/Mbwela/Chokwe compromise third is c. 370 cents, half way between a neutral and a natural major third.

In actual singing the distance principle proves to be stronger in fast sequences of notes; the adjustments in intonation are then less. But at points where the chords are held on for a time the euphonic principle is stronger. And here the adjustments in intonation are audible even to a Western ear, untrained in African music. In my lectures I always use a recording of a *Chilunga* song of women receiving a *Chikunza* masked dancer in a Chokwe village (Phonogrammarchiv No. B 10218), as a demonstration of this kind of harmonic part singing.

VIII. Summary

In his *likembe* tunings Kufuna appears to be aiming at a compromise between two conflicting principles: a) the idea of a non-modal, even, heptatonic scale, starting with the lowest note, with the seventh note missing in his case; b) the idea of consonant sounds in thirds and fifths over two roots (lamellae No. 4 and 8) which

are tuned approximately an equiheptatonic second apart. These roots and their co-notes form two opposing tonal-harmonic blocks. Progression between these two blocks is an important characteristic of his music and that of other lamellophone players in the region.

During the tuning process the first idea manifests itself in Kufuna's scalar checking movements, the second idea in his frequent checking of the thirds.

In addition Kufuna is aware of an absolute pitch level in his *likembe* tuning pattern.

RECORDINGS AND ACKNOWLEDGEMENTS

Kufuna Kandonga's recordings, including those of his tunings, are stored in the Phonogrammarchiv of the Austrian Academy of Sciences, Liebiggasse 5, A – 1010 Vienna. (See Catalogue 1970 under B 10069-10671, Afrikaexpedition Gerhard Kubik 1965 nach Angola, pp. 11-45.) Besides Kufuna I recorded many other lamellophone players in the area. Their music is also stored in the same archive.

Copies of the complete collection of my Angolan recordings, 1965, can also be found in the Instituto de Investigação Cientifica de Angola, Luanda.

My field research in Angola 1965 became possible through a kind recommendation by the late Professor Dr. António Jorge Dias and his wife Mrs. Margot Dias of the Centro de Estudos de Antropologia Cultural, Lisboa. It was carried out with financial assistance from the Junta de Investigações do Ultramar.

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NOTES

1 See the details of the collection in the Musée Royal de l'Afrique Centrale, Tervuren, and the sources indicated in Laurenty, 1962.
2 See unpublished recordings 1024 and 1023 of the International Library of African Music, Rec. 30/4/1948, by Hugh Tracey.
3 Nickname for a Portuguese Chefe de Posto, who had a habit of always looking behind.