Diyei and yeli. Yodeling in two musical cultures of Central Africa

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ON the African continent, the yodeling technique is known as one of the characteristics of Pygmy and Bushmen music (Rouget, Grimaud, and Marshall 1956, Grimaud 1960, Lomax 1962, Frisbie 1971, Sallée, and De Fraysseix 1976, Arom 1994, Olivier & Fürniss 1999, Grauer 2009). Here we will discuss the yodel within two musical heritages of Central Africa, namely those of the Aka (BaAka)[1] of the Central African Republic (CAR) and the Baka of Cameroon, that is, two distinct ethno-linguistic groups yet within the cluster of cultures commonly labelled "Pygmy".[2] Despite the abundance of musical diversity found among Pygmy cultures (Fürniss 2014), there does seem to be a particular style common to all. In every group, singing is the principle means of musical expression and there are relatively few melodic instruments. The use of vocal polyphony is perhaps the most salient feature, while other prominent characteristics include the use of counterpoint and singing without words. "Pygmy music" is also marked by a high degree of complexity that often distinguishes it from the music of their neighbors. Music making is an essential activity both for the society as a whole and for the individuals that are its foundation, each serving in their own way as intermediaries between the natural and supernatural worlds. These musical and extramusical features contribute to the general fascination with Pygmies, which operates not only on Westerners – musicologists as well as the general public –, but also on neighboring Africans. As a consequence, in any context, Pygmies are considered excellent musicians on which the neighbors and state-representatives call upon in order to "animate" local or national ceremonies.

Music and music making of different Pygmy societies have been studied by several authors. The first field recordings were collected in the 1940s and 50s by Hugh Tracey [1952] and Colin Turnbull (Turnbull and Chapman 1992) among the "Mbuti" (Kango-Sua) in the Northern Belgian Congo district of Ituri, and by Gilbert Rouget (Rouget, Grimaud, and Marshall 1956) among the "Babinga" on the border region between the Central African Republic (CAR), the Republic of Congo, and Cameroon. The first thorough study of the music itself was made by Simha Arom (1978, 1991, 1994) between the 1970s and 1990s among the Aka in the CAR. More recent studies have been conducted in Uganda by Marie-France Mifune; in the DRC by Didier Demolin (1993); in the Rep. of Congo by Jerome Lewis (2006),

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1. They call themselves Bàáká, Bayaka or Biyaka, depending on the spoken dialect. Following different research traditions and periods, the name of this people is designated and spelled as BaAka, Bayaka, BaYaka, Yaka, Biaka, Ba-Benzélé, Bambenzele, Mbènzèlè, Mbendjele or Babinga. The author's choice of the ethnonym Aka follows the linguistic tradition in which she is involved, which does not take into account prefixes in Bantu languages. This spelling has the advantage, in the specific context of this article, which is addressed to Western readers, of reducing confusion for the reader who is not familiar with these almost identical ethnonyms.

2. As to the use – or not – of the term "Pygmy", see Barry Hewlett's excellent "Introduction" to the collective book Hunter-Gatherers of the Congo Basin: Culture, History and Biology of African Pygmies he edited in 2014. Francophone readers can consult a synthesis of this issue in Robillard and Bahuchet (2012) available online.

Camille Oloa Biloa (2016), and Nathalie Fernando (2011); in the CAR by Susanne Fürniss (2006, 2012) and Michelle Kisliuk (1998, 2000); in Cameroon by Fabrice Marandola (2003), Susanne Fürniss (2011, 2012), and Camille Oloa Biloa (2015); in Gabon by Sylvie Le Bomin (Le Bomin and Mbot 2012a and b) and Magali de Ruyter (Bonhomme, De Ruyter, and Moussavou 2012).[3] It appears from these studies that the yodel technique is not shared by all of these many pygmy groups. Yodeling is documented among the Kango, Sua and Efe (collectively often called "Mbuti") of northern DRC (Demolin and Bahuchet 1991), the Aka of CAR and the Baka of Cameroon. The Bedzan and Gyeli of Cameroon, as well as the various Bongo groups of Gabon do not sing in yodel (Marandola and Fernando 2007, Oloa Biloa 2015, Le Bomin and Mbot 2012a).

More ethnological publications give insight in contexts and the symbolic values of singing (Joiris 1997, Bahuchet 1995, Lewis 2009). These studies show a diversified image of music, instruments, contexts, and meanings of music making among different groups, but also within the same groups in different places. Regional variants are important and are documented for the Bongo in Le Bomin and Mbot (2012a), for the Baka by Tsuru (1998) and Fürniss and Joiris (2011). For the Aka, they are summarized in Thomas et al. (1981-2018) and Kisliuk (1998) describes in detail the transmission of musical and ritual knowledge from people from one region to another. The great mobility of individuals and small groups is the reason why the musical and choreographical heritage is never identical from one place to another. Thus, it is necessary to specify that the work on Aka music presented here has been done mainly in the surroundings of Mongoumba and some 70 kilometers as the crow flies further West in three villages near Zoméa. Research among the Baka has been conducted in the village of Messéa and in several villages near Salapoumbe and Ndongo.

This article traces the career of the author since 1987 which has been conducted in a cross-culturally comparative approach, studying Aka and Baka musical heritages in their cultural context in Africa. The different research perspectives pursued by the author reveal a great proximity of these cultures, but also relevant differences which allow to individualize each of them. This article mainly gathers already published research which is scattered in articles mostly in French language. From Aka music, we move on to Baka music; from more technical questions such as phonetics, we move on to more anthropological questions. Musical analysis is present in both cases. The first part of this article is on Aka yodeling: its place in this society's music and culture in general, a short presentation of Aka polyphony – as it has been thoroughly studied elsewhere (Fürniss 2006) –, and a phonetical study of the yodel technique. The second and main part focusses on Baka yodeling: the symbolic value of this vocal technique and the incidence of yodeling on the formation of melodic variations. It contains new research emphasizing on syntactic aspects of Baka yodeling and on aspects of articulatory phonetics.

Before getting to the heart of the matter, a brief clarification of terminology is necessary. In order to avoid confusion between the aspect of vocal production and that of the perception of the resulting sound, we differentiate as two mechanisms of vocal production what elsewhere has been addressed as chest voice and head voice from the two related perceptive registers of the yodel. We adopt the terms "mechanism I" (MI) and

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3: A complete survey and bibliography may be found in Fürniss (2014).

"mechanism II" (M2) (Castellengo 1991) to designate the two vibratory modes of the larynx involved in yodeling and we will use the terms "low register" and "high register" in terms of the acoustic impression that emerges from them. Depending on the velocity of the performance, the listener may perceive the song either as one voice jumping from one timbral level to the other, or as two distinct and independent voices in different timbre layers.[4]

<div align="center">AKA AND BAKA IN CENTRAL AFRICA</div>

Aka and Baka have a common history (Bahuchet and Thomas 1986). Through his in-depth ethnolinguistic and ethno-ecological comparison of these societies – languages, techniques, conceptualization of nature and elements of the religious system – Bahuchet (1992) brought to evidence important elements of their common history. The Aka and the Baka formed a unique *Baakaa people about 500 years ago. Today, they are separated geographically by several hundred kilometers and linguistically by belonging to different language groups (Aka=Bantu, Baka=Ubanguian). In a very schematic way one can say that they migrated together from the northeast of the present Democratic Republic of Congo to the West. The Aka remained in the south of what is now the Central African Republic, while the Baka continued on their way to Cameroon (Figure 1). Traces of their common past are visible through all facets of their respective cultures, including through music (Bahuchet 1992). Among the Pygmy cultures currently known, the Aka and Baka are the closest relatives. They share singing in counterpoint, yodeling and the use of some specific musical instruments. Singing in counterpoint distinguishes both the music of Aka and the Baka from that of their neighbors who mainly sing in parallel movement or in unison.

In both societies, singing is the main vector of ritual efficiency, the objective of which is the understanding between humans and the supernatural entities. As such it has as an immediate consequence the success of the hunt, which in turn creates harmony and collective and individual happiness.[5]

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4. A very good example of this perceptive split is a recording by Herbert Pepper of a Bangombe (Baka) song (1958, record 1A, track 4), Archives CNRSMH_E_1959_002_004_001_04.
5. Bahuchet (1995) gives a very thorough demonstration of the interrelationship of these notions in Aka society.
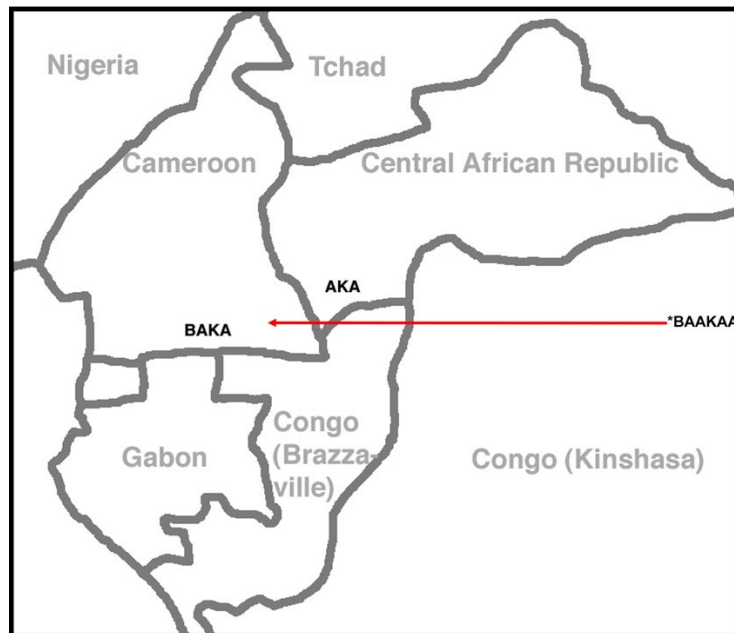
Figure 1: The Aka and Baka migration in Central Africa.

Aka and Baka also share terminology. Yodeling is called *yèí* or *yèngè* in Aka language (Thomas et al. 2005) and *yélī̄*, *yéyī* or *ndándó* in Baka (Brisson 2010). The most commonly used terms – *yèí*, *yélī̄*, *yéyī* – are based on the onomatopoeic representation of the vocal technique itself. Indeed, as elsewhere in the world, it is a song without words that accompanies the change of mechanism by a change of vowels that serve as support: mechanism I uses mainly vowels [ɛ, a, ɔ] and mechanism II uses vowels [i, y, u]. In general, this is coupled with a significant difference in pitch, which allows us to speak of the "low register" and "high register" of yodeling. As far as the correlation between register and vowels is concerned, we observe that the low register uses open vowels, and the high register uses closed vowels. The yodel terms *yèí*, *yélī̄* or *yéyī*, use this dichotomy, with the [e] being a more open vowel than the [i], which results acoustically in a lower intrinsic pitch (Hombert, Ohala, and Ewan 1979, 52). In the Aka language, this parallel with yodeling is further underlined by the lexical tones of the language: syllables are pronounced in a high [ó] or low tone [ò], or in a rising [ǒ] or falling tone [ô]. The term for yodel, *yèí* - low tone-high tone, thus imitates both the alternation of the yodel's supporting vowels and its change of register. A last necessary linguistic point is to mention that Aka is a Bantu language[6] with class prefixes. Several pairs of prefixes make it possible to distinguish the singular from the plural. For the two dialectal variants to designate yodel, the singular is *diyèí* or *diyèngè*, the plural *màyèí* or *màyèngè*. Thereafter, the author will only use the singular *diyèí*. Baka language, on the other hand, is an Ubangian language that does not distinguish the singular from the plural. It is always *yélī̄* or *yéyī*, depending on the dialect.[7]

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6. C70 according to the Guthrie classification (Maho 2009).
7 . Baka has a three tone levels – high, low, and medium – the latter being noted [ō].

<div align="center">

AKA **SINGING**

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The place of mechanism II and yodeling in the Aka's musical heritage

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In the Aka's musical heritage, vocal technique – and in particular the use of the mechanism II – participates in the distinction between musical and non-musical expressions (Fürniss 1991a). Mechanism II is part of three types of vocal expressions, each of them also characterized by large interval jumps in the melodic construction:

a) the hunting call *mòngɔmbɨ́*: mechanism II;

b) the yodel *dìyèɨ̀*: alternation between mechanisms I and II;

c) the playing of the small *mòbéké* flute: alternation between two sound sources (voice in mechanism II and flute).

Each use of mechanism II points to a particular context and thus has its own function or meaning. The Aka make an important conceptual distinction between a) on the one hand and b) and c) on the other. The hunting cries uttered during the net hunt – which to Western listeners typically have a musical character – are not measured and therefore do not fall within the realm of singing, but within the technique of net hunting (Arom 1978), track 5.[8] With these modulated calls, *mèngómbí*, the men communicate with each other during the installation of the net circle in the dense undergrowth of the forest which makes visual contact difficult.

Yodeling and singing with the small flute, on the other hand, falls within singing, *lémbò* (Thomas et al. 2003, 146–148), since it is integrated into a measured rhythmic structure.[9] This is a condition *sine qua non* for the definition of what is considered as music – or more precisely "song" – in Central Africa (Arom 1994, 143). The yodel is integrated into the contrapuntal polyphonies that accompany collective dance music (see below).

The playing of the small flute is a mainly individual expression.[10] The *mòbéké* is a whistle with a single mouthpiece cut into a hollow papaya stalk. This music is usually played and sung by men returning from a successful hunt. It is also integrated in a vocal polyphony that accompanies dances after the hunt (Arom 1978). Although, as in yodeling, there is only one performer, the music comes from two distinct sound sources. This is a voco-instrumental hocket, as the same person regularly alternates a whistling sound with a singing sound, the latter performed in mechanism II. The flute produces only one sound, around which the voice embroiders its melody. In the polyphonic version, a second instrument is integrated with less voco-instrumental alternation, since the player sings only one sound, often of very short duration (Figure 2).

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8. https://archives.crem-cnrs.fr/archives/items/15854.

9. For the same reason, rhythmically declaimed lyrics are also considered singing.

10. An excellent illustration of the complexity of this voco-instrumental music can be found in Arom (1998). Among the Aka of Western CAR, known by the ethnonym Mbenzele, this instrument is called *hìndèhú* – which is also an onomatopoetic representation of the sound of the flute. The analyzed song from Arom and Dournon-Taurelle (1966) can be listened to online: Archives CNRSMH_I_1983_001_004_05.

Figure 2: Voco-instrumental hocket with two small *mèbéké* flutes and two sung voices. Song *nzòmbì* (after Fürniss and Bahuchet 1995:97).[II]

The score is written in metric notation. Each grouping of 3 eighth notes represents a ternary beat. It is a cyclical music in which the basic material is repeated with the addition of variants. *Nzòmbì* is a song with a cycle of 12 beats. The beats are represented by barlines which are in no way measure bars, as Central African music is not based on the notion of measures (Arom 1991, 183).

THE YODEL IN AKA POLYPHONY

The functioning of Aka polyphony was first studied by Simha Arom and then by the author. Although a small part of the repertoires is sung in call and response with a chorus in parallel movement (Fürniss 1999), most of them use counterpoint with four vocal parts one of which is precisely defined by the use of yodeling (Arom 1994). The presentation of the Aka counterpoint will not be repeated here, the reader may refer to the article "Aka polyphony: music, theory, back and forth" for an in-depth presentation (Fürniss 2006). Let us only give an example of a polyphonic pattern (Figure 3). It shows the structural overlapping of the parts in the song *mábé* which belongs to the healing and divination repertoire *bòndó*.

II. Archives CNRSMH_I_2016_005_003_01.

Figure 3: Contrapuntal pattern of the song *mabe*.[12]

The parts *mòtángòlè* and *ngúé-wà-lémbò* are theoretically sung by men, *dìyèí* and *ó-sêsê* by women, but these gendered attributions are mainly conceptual. It is not uncommon for singers to change parts during the performance and the choice is made regardless of gender issues (Arom 1994, 145) and without explicit coordination (Arom and Dehoux 1978).

There are several variation techniques: *kɛtɛ bányɛ*, literally "take a shortcut" or "take a small path alongside of the large way", is the variation of the melody around the pattern. Melodic variations – which are the main concern in the perspective of yodeling – are mainly based on the substitutions of degrees. According to the structure of the scale, some degrees of a melodic motive can be substituted by another one a fifth below or a fourth above, or even by a neighboring degree. Another variant is to embroider around a sustained tone or to fill out a fourth with an intermediate degree. *Kùká ngó dìkùkɛ*, literally "simply cut it", is a variation technique that splits up the cycle in several short cells and combines this with melodic variations. Finally, the yodel technique *dìyèí* is also a variation process which combines the substitution of degrees with the change of the vocal mechanism. It is also used by men, and it is common to hear men launch polyphonies with a yodel, especially at the beginning of a ceremony, may it be related to a hunting or to a healing context.[13]

PHONETIC STUDY OF AKA YODELING

The majority of the acoustic and phonetical research on Aka yodeling is not yet available in English, but only in French and German (Fürniss 1991b and 1992). It was carried out in 1987–1988 when the author had not done fieldwork yet. The analyses were based on

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12. Archives CNRSMH_I_2016_005_005_01.
13. Several tracks on Simha Arom's records begin with male yodels (1973, 1978), see Archives CNRSMH_E_1988_012_002.

recordings by Simha Arom who had built up an important corpus of analytical recordings of the Akas' polyphonic repertoires.[14]

The Aka terms for the two phonatory mechanisms of yodeling are combined with the term kíngó, "neck, throat, voice" (Thomas et al. 2007, 41–42). Mechanism II is called "the little voice", *kíngô-kɛlɛlɛ*, literally "the voice of smallness". Mechanism I is called "the big voice", *kíngó-yà-bòlé*, literally "the voice of bigness" or *ó-sêsê-yà-bòlé*, "the underside of bigness". "Small" and "big" refer to the intrinsic sound quality of the vocal mechanisms, but also to the tessitura. Indeed, according to the Aka, a small voice is that of a child. The "small voice" is therefore both thinner and higher pitched than the "big one".

The conception expressed by this terminology reflects the fact that the yodeled melodies are essentially built on a steady succession of large intervals whose change of note is accompanied by a change in vocal mechanism. The acoustic characteristics of the yodel registers result from the combination of laryngeal mechanisms and the characteristics of the supporting vowels (Figure 4). From an acoustic point of view, vowels are defined by areas of energy concentration in the frequency spectrum, called formants. The formants are determined by the specific resonance frequencies of the cavities that are involved in the pronunciation of vowels (pharynx, mouth, lips) and depend on the articulatory constellation of the vocal tract that differs for each of them.

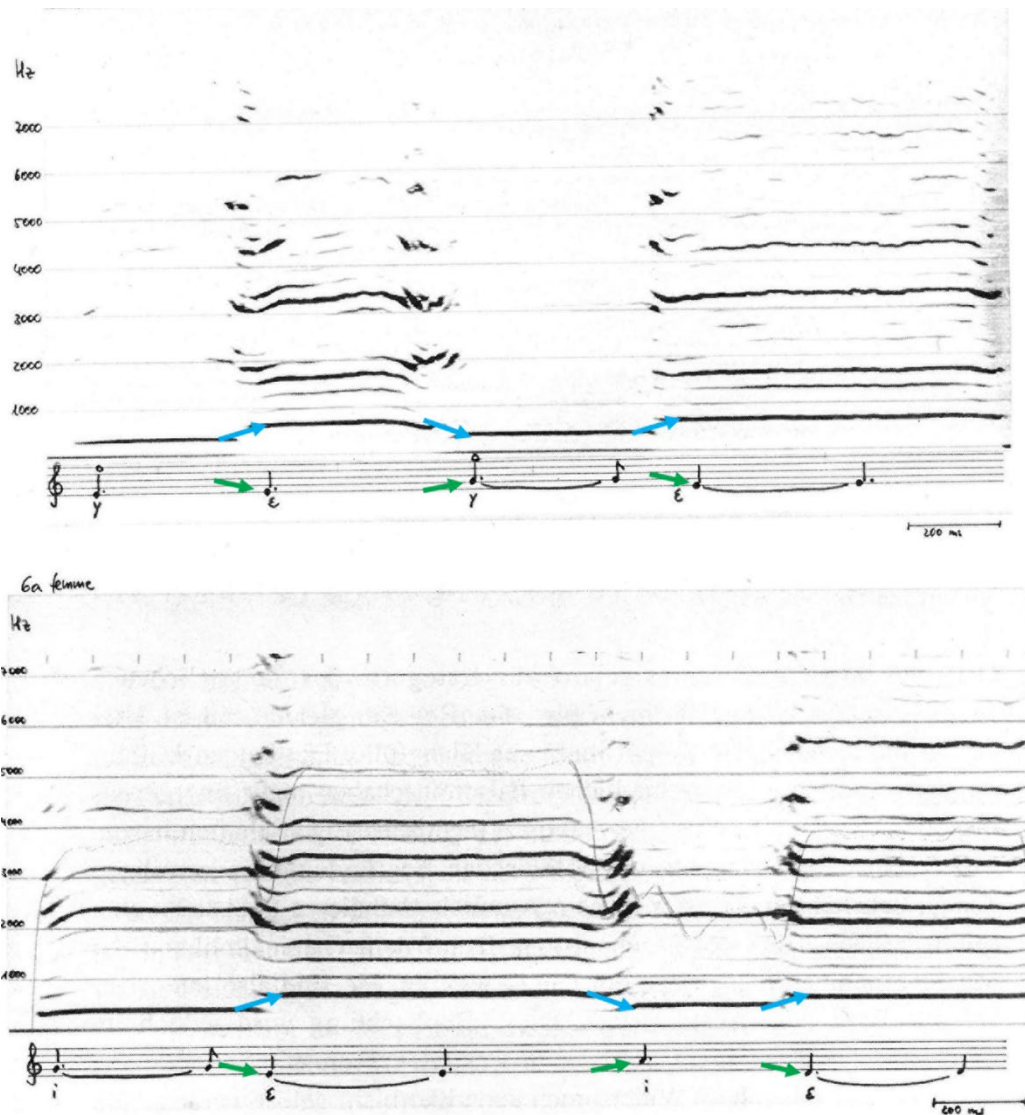14. Simha Arom's unpublished recordings of Aka music between 1971 and 1983 are kept at the French National Library, https://archivesetmanuscrits.bnf.fr/ark:/12148/cc103696t.

Figure 4: Two narrow-band sonograms of extracts from a *diyèí* part[15] (blue arrows: movement of the spectral energy; green arrows: melodic movement).

This sonogram shows that for mechanism I, the fundamental frequency of the low sounds is below the area of the first formant of the open vowels which is situated around 643 Hz for the [ɛ] of the female singer (Fürniss 1992, 69). It is therefore absent on the sonogram. The harmonics located between the formants, on the other hand, are well developed given the high overall intensity of the sounds of the mechanism I. This is not the case for sounds emitted in mechanism II. Their overall intensity is lower and the harmonics between the formants are attenuated. The fundamental, on the other hand, is very strong since it is in the area of the first formant of the closed vowels: [i] = 365 Hz, [y] = 417 Hz. It is very interesting to see that, as a consequence, the movement of spectral energy between the two mechanisms systematically goes against the melodic movement. This sonogram underlines the predominant acoustic feature of the Aka yodel: the relevant sound image is that of the alternation between two different densities. This characteristic

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15. Sounds produced in mechanism II are indicated by "°" above the corresponding notes of the musical score. The research presented here dates back to 1988. The sonograms were performed on an analog device Voice Print 700 Series.

prevails over that of the large sung intervals, as the change of mechanism is also carried out on intervals between neighboring degrees, or even on two sounds representing the same degree.

Comparison of the yodeled intervals between neighboring degrees (Fürniss 1991b, 184) has shown that the second note of an ascending interval always belongs to the high register and that of a descending interval to the low register. A correlation then emerges, determined by the vibratory mode with which the first note of the interval is sung. The following principle can be observed (Figure 5): if the first note of an ascending joint interval is sung in mechanism II (MII), there will be no change of mechanism. If it is sung in mechanism I (MI), the mechanism change will be performed, and the interval is yodeled. Similarly, a descending joint interval will be yodeled if the first note is sung in MII. But the same interval started in MI will not be yodeled.
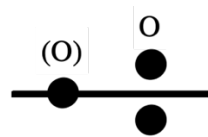

Figure 5: Principle of the treatment of intervals between neighboring degrees in Aka yodel.

If the change of mechanism is made at the same pitch, it is accompanied by a short unhooking of the fundamental frequency (Figure 6) resulting from a slight disturbance of the vocal folds (Roubeau, Chevrie-Muller, and Arabia-Guidet 1987, 282).
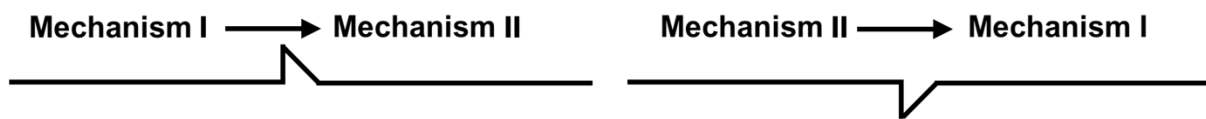

Figure 6: Unhooking of the fundamental frequency during a mechanism change on the same pitch.

In the melodies with large interval jumps, this articulatory unhooking resulting from the natural transition from one vibratory mode to the other is organically integrated into the melodic movement of the yodel. It is thus exploited in such a way as to become an integral part of the artistic expression of the yodel.

The high register of the yodel includes only the vowels of the first degree of aperture [i, y, u]. The vowels of all other degrees of aperture – second [e, ø, o], third [ɛ, œ, ɔ] and fourth [a] – are situated in the lower yodel register.[16] The study of Aka yodeling has shown that it uses supporting vowels that do not exist in the phonology of the language. This is the case of [y] which, in the international phonetic alphabet, is a rounded vowel and not the approximant consonant [j] that is transliterated "y" in English spelling. It is of the vowels widely used in yodeling, but not part of the vowel system of the Aka language (Cloarec-Heiss and Thomas 1978, 84–90). Another example is the vowel [ø] which appears only in a descending line in which two notes of the lower register follow one another (Figure 7):

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16. Articulatory phonetics has categorized four degrees of aperture determined by the position of the jaw: 1 closed, 2 half-closed, 3 half-open, 4 open.
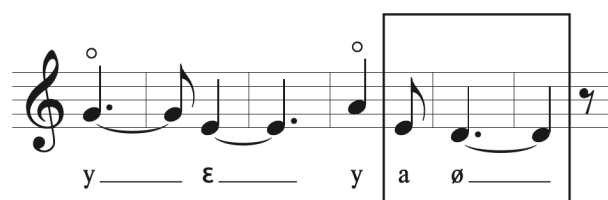
Figure 7: The vowel [ø] in the succession of two sounds sung successively in mechanism I.

This example seems to contradict the principle of regular alternation of registers stated above. But by singing this second sound in mechanism I with a half-closed vowel, the expected vowel alternation is maintained and gives the acoustic impression of yodeling. The succession of two sounds sung in mechanism II requires a similar yet different strategy. As the high register contains only vowels of the first degree of aperture, the singer cannot play on this criterion. It is then the rounding of the lips that comes into play, as illustrated in the following example (Figure 8):
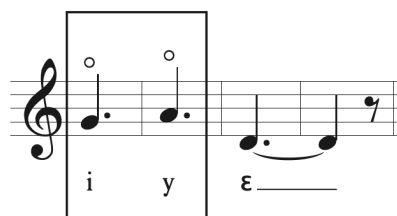

Figure 8: The vowel [y] in the succession of two successive sounds sung in mechanism II.

The rounding of the lips in the pronunciation of [y] narrows the passage of air compared to the pronunciation of the stretched [i]. The [y] then appears as a "very closed" vowel. These articulatory strategies make it possible to modify the melodic line *without changing the vocal mechanism* while keeping the characteristic feature of the change of timbre of the yodel, reduced here to the vowel timbre and the tension/rounding of the lips. A review of the yodeling literature (Fürniss 1991b, 171) suggests that this is a Pygmy specificity.

BAKA SINGING

The Baka do not make hunting calls like the Aka but share with them the yodeling and the playing technique of the little one-tone flute named *èlēhú* or *èlēpú*. It is a female entertainment instrument, played alone or with two instruments in unison. Although it seems to have fallen into disuse by now, this instrument has been widely made famous in Cameroon and beyond under the term "Pygmy flute" by Francis Bebey.[17]

Among the Baka, it is the women who are the specialists in singing, the men being the specialists in rhythm and dance. Men sing accompanied by the harp-zither or the harp and in some specific male ritual contexts as the rituals *édíó* and *dɔdì* and the circumcision *bèkà*. In two rituals, *mòkìlà* and *ngàngà*, the male officiant sings the solo part.[18] The singing

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17. https://www.youtube.com/watch?v=c6T6suvnhco&fbclid=IwAR3rftNEfc1rXPEVP_S4Bs9YH-6v3SRPYV9o2vX_oNwtfZZMRa9Zk4jm3MY.
18. As there is a great regional variability in Baka music and practice, it is possible that men may be more involved with singing in other places than those investigated by the author.

is led by an experienced soloist who is joined by the choir of younger women and children who immerse themselves in the music by imitating the older ones. The children are completely integrated into the musical activity of the adults and participate to the extent of their abilities. The same is true for aged women. From an acoustic point of view this produces a choir with a wide variety of timbres: girls (with shrill voices), young women (often also with high-pitched voices), and older women (with relaxed, deep voices in a frequency region generally covered by male voices).

Symbolic meaning of yodeling

In sung polyphonies, yodeling is used as a variation technique. The simultaneous realization of this type of variation in the different parts of the polyphony creates a dense sound fabric. It is in this knotwork of the yodeled parts that this vocal technique of the Baka seems to be charged with a much more important symbolism than that of the Aka. The vocal power of the women takes all its importance during collective ceremonies. This subject is the focus of Gilbert Rouget's (2011) article, "Musical Efficacy: Musicking to Survive – The Case of the Pygmies". Rouget insists on the intensified physical engagement of the singers in the technique of yodeling, which participates in cementing cohesion between individuals and forming a social body through singing (Rouget 2011, 111). Yodeling always appears at a moment of great ritual intensity.[19]

The ritual effectiveness of Baka yodeling crystallizes in the hunting ritual *yélī*, named after this vocal technique. It consists of a yodeled polyphony which is sung by women as magical protection for men who will leave for a spear-hunt for several days or even weeks while following the tracks of big game: elephants, buffalos, apes (see also Joiris 1997). It creates a strong link between women and men: "The lead singer, who directs the choir and, consequently, on whom the quality of the performance depends, is, significantly, the wife of the lead hunter" (Rouget 2011, 93).[20] The general ritual complementarity between husbands and wives – or a mature female relative of the diviner-healer, circumciser or leader of the hunters – has been described by Joiris (1997). This author underlines furthermore that mature women with strong personalities are themselves leaders of female ritual associations and participate in the leadership of male associations. They are also the specialists of singing, *ngàngà wɔsɛ nā njàmbà*, "specialists of singing in front" (Joiris 1997, 62), or "female specialist in intoning".

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19. Except for the ritual for the Forest Spirit ējɛngì/Edzingi which is not yodeled.
20. Gilbert Rouget was the first ethnomusicologist to record a *yélī* during the Mission Congo-Ogooué in 1946. See Archives CNRSMH_I_1974_013_021_05.

Figure 9: A recording session with singers of the *yélī* ritual[21] (Photo S. Fürniss, Lamèdou, 2006).

In a *yélī*, the simultaneous performance of yodeled variations of the polyphonic parts results in melodic cross-movements and leads to complementary alternations of the yodel registers between the singers (see below, "Compementarity of voices"). This density of the yodeled voices literally creates a sound envelope for men that is intended to ward off any harmful force that could endanger their lives. An ecological element reinforces its effectiveness: the reverberation of the song in the canopy of the forest trees creates a particular soundscape, a "cathedral-like acoustics" (Rouget 2011, 103). Jerome Lewis (2009; Abram and Lewis 2006) describes the fundamental importance of listening to the forest soundscape as a condition and cause for the Pygmies' musicality, sociability, and communication. The *yélī* ritual is performed the night before the men go hunting. It is only sound – no words, no dance – and is the culmination of the spiritual power of Baka women (Joiris 1997).

Another name of the *yélī* ritual is *yéyī nā màkā* "yodel of the great hunt" or *àbàlè yéyī*, "yodeled *àbàlè*" since it consists in singing the songs of the hunting ritual *àbàlè* in their yodeled version. "[*àbàlè's*] function is to establish contact with ancestors with the goal of ensuring their protection. As such it is associated with multiple circumstances such as departure on an important hunt, funerals, or the night before the end of a mourning period [...]" (Arom et al. 2019:221). The preparation for the hunt takes place in two stages: first in the village, where *àbàlè* is performed collectively, with drums and solo dancers who wear specific rattles tied to their dance skirt. The songs are sung "normally" – *gbɛlɛ bē* ("simple song") –, mainly in mechanism I. The performance is led by the diviner who establishes communication with the hunting spirits (Joiris 1993). These indicate if the moment to leave is opportune and show the hunters the direction to follow in the forest. Then, during the night, the women move into the forest to sing the *yélī* ritual *a cappella*.

Baka polyphony

Like Aka music, Baka music is mainly vocal. However, analysis of polyphonic processes reveals important differences in the treatment of musical material and a lesser complexity than Aka counterpoint (Fürniss 2012, 24–25). Except for lullabies, *wàndɛli*, that are sung in unison, songs always have at least two vocal parts which are displayed

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21. Some examples of *yélī* songs by the women of Lamèdou:
- Archives CNRSMH_I_2016_019_006_13;
- Archives CNRSMH_I_2016_019_006_14;
- Archives CNRSMH_I_2016_019_006_15.

successively in call and response.[22] The antecedent sung by a soloist is called *kpó njàmbā*, "to pick, to intone", the response of the choir *nā jā*, "to take" or *nā túkò bè*, "to pour the song". However, certain modalities of realization of the parts make this basic structure difficult to identify in a conventional in-context realization:

1) The part of the choir *nā jā* is realized in two simultaneous ranges of which the Baka name *lɛ́ nā tè*, "small voice", the one realized higher and *ngbɛ lɛ́* "big voice", the one realized lower. These melodic lines are partially independent of each other and form a true two-voice counterpoint[23] (Figure 10);

2) The splitting into two lines of *nā jā* leaves the singers a great flexibility. As in Aka counterpoint, they are free not only to choose in which register they wish to sing, but also to jump from one to the other and combine them.

3) The more the singers get involved in the singing, the more overlapping there is between the parts, which erases the underlying structure of alternating parts.

This leads to an important gap between the emic conception of call and response and the acoustic result of an overall counterpoint that can be heard in a normal performance.

<div align="center">PATTERN AND VARIATIONS</div>

The basic functioning of this polyphony will be shown with the song *nō mā* "raindrops" from the *èbùmà* repertoire (Figure 10).[24] The polyphonic patterns and variants of the parts are extracted from successive takes during analytical recording sessions that have been held with female song specialists in Cameroon in the village of Messéa.[25] Since the author was traveling alone and without a vehicle, the equipment was reduced to one stereo recorder. Adapting Arom's method of rerecording (1976), the author recorded one singer after the other. The first singer sang with the rhythmic accompaniment. After a while, the second singer joined in, and the first singer was asked to stop singing while the second one was heard alone. The same method was applied to the recording of the third singer. This has resulted in recordings where, at times, one of the three parts is completely in the background to better bring out another.

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22. An exception is the song category *mɛ̀ngbàā*, where the two voices sing in counterpoint, sometimes following a canon principle. The first part is then called *wà mbɛ̀lī*, "the first one", and the second *wà sīdī*, "the one that follows".

23. This gave rise to a musicological discussion of the question "What is a part? Polyphony between perception and conception" (Fürniss 2016).

24. *Ebùmà* is the most representative of the Baka dances at the present time. It has several functions, of which the link with the end of mourning ceremony is prevalent (Arom et al. 2019, 237). You can consult a tutti version of *nō mā* to get an idea of the overlapping: Archives CNRSMH_I_2016_018_003_12.

25. A village without electricity when the author worked there between 1999 and 2009.

Figure 10: The pattern of the song *nō mā* "raindrops".[26]

The metric notation makes visible the very strong contrametricity[27] of this music: only few rhythmic impacts are on the beat (*). The basic cycle of *nō mā* has 12 beats divided in two equal segments that are occupied respectively by the soloist or the chorus. The analytical recordings were based on two phases. The initial request made by the researcher was to sing without ornamentation, as the objective of the recordings was to bring to evidence the basic polyphonic structure. Singers are not used to restricting themselves in such a manner as this way of unvaried singing has no interest for them and does not correspond to their conception of a good performance of a song. Thus, singing several cycles without variation is an exercise that requires a lot of concentration. The second part of the recording protocol was to ask for variations of the basic pattern.[28]

Different types of variations are conceptualized in Baka music terminology. The minimal version of a part is called *kpàjē kpódé* ("one path") or *ndē ā bāndà* ("without reinforcement"). The singer varies her part – *nâ pɛndà bè* ("to cross the song", "to interweave the song") – either singing "normally" – *gbɛlɛ bē* ("simple song") – i.e., with mechanism I, or using the yodel technique, *yélī, yéyī* ou *ndándó*. Figures 11 and 12 show some realizations of the parts through a series of takes made during the same recording session.[29] It is interesting to start with the lower part of the chorus, *ngbɛ líɛ*, which, in this version of the song, does not perform yodeled variants.

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26. Archives CNRSMH_I_2016_018_006_18.
27. As to the concept of contrametricity, see Kolinski 1973 or Arom 1991.
28. In some recordings, one may hear the researcher say "nâ pēndà bè!" in order to ask for variations. Sometimes, the singers follow the request, sometimes not.
29. Archives CNRSMH_I_2016_018_006_14 and following items.

Figure 11: *Nō mā*: Four variants of the lower part of the chorus *ngbὲ lὲ̂*.

The most relevant type of variation in the perspective of yodeling is the substitution of degrees. In the first three lines, it is the neighboring degrees F and G that occupy beats 6 to 8 in variable rhythmic constellations and in variable positions. Beat 10 shows another substitution by the neighboring degree (D-F). In this pentatonic system, the degrees are separated by an interval situated between a tone or the equivalent of a minor third.[30] In line 4, the main degrees are transposed a fifth upwards (C and D) and beats 10–11 show the possibility of realizing the C in the upper octave. These transpositions concern longer passages or melodic cells which are still based on an oscillating melody.

When it comes to yodeling, the character of the melody is changed. Figure 12 shows some realizations of the solo part *kpó njàmbā*. The first line is the most refined version. It is the reference for the creation of longer variants that fill out the silences within the cycle. The first three lines are sung "normally", that is only in voice mechanism I, lines 4 and 5 are yodeled.

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30. These are only approximate interval indications. Indeed, it is not possible to correctly note these sounds in Western staff notation, as the intervals result from a different system. This phenomenon had already been observed in Aka polyphony (Arom and Fürniss 1993), a study of which has recently been taken up again together with the acoustician Michèle Castellengo. This new research allows us to identify an interval system strongly influenced by the natural intervals that escape the staff notation.

Figure 12: *Nō mā*: five variants of the solo part *kpó njàmbā*.

From oscillating movements, the melody changes to interval jumps. There are always the same types of degree substitution spread over a wider range. For example, on beat 5, there is a fourth substitution G-C between lines 2 and 3, and then a second one, C-F, between lines 3 and 4. Such a stacking of two fourths gives rise to a seventh, which then becomes a potential simultaneous interval at this precise point of the cycle. The seventh is also used as a melodic interval which is not an isolated case, but frequently found in yodeled songs.

YODELING AS A VARIATION PROCESS

The song *ndándó* of the *àbàlè* repertoire gives us examples for a more complex construction of yodeled variants. Figure 13 represents the yodeled pattern, that is, a version that would be used for the *yéli* ritual.

Figure 13: The yodeled pattern of the song ndándó "yodel".[31]

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31. The yodeled pattern of this song, as well as the variants are extracted from three successive takes: Archives CNRSMH_I_2016_018_004_20 and following items.

The basic cycle of *ndándó* has 8 beats. As this song has a strong structural tiling between the parts, it is here unfolded so that we can see each part individually. Figure 14 shows the complete inventory of the variants sung by the soloist *kpó njàmbā* in three successive recordings of this song.[32] The cycle of each part is built on two segments (**a** and **b**). Segment **a** shows eight melodic variants here (**a1–a8**), some of which are realized with rhythmic variations (indicated in non-bold numbers). Segment **b** is less varied (**b1–b4**).

Figure 14: *Ndándó*: Inventory of variants of the soloist part *kpó njàmbā*. The presentation of the variants of each segment begins with the most representative one within the recording series.

This inventory perfectly shows the micro-variations and their modularity that allow to repeat the basic musical material yet without producing sterile identic repetitions. The three successive takes of the *kpó njàmbā* part which was sung by the same singer during

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32. The reader will find the inventories of the other two parts in the appendix.

the analytical recording session are a good example for this variability. This part was first recorded alone, then with the higher part of the chorus, and finally with both chorus parts.

Take 1: a1b4, ‖: a2b1, a1b2 :‖, a3b1, a1b2, a3b1, a1b1, a2b2, a1b1.
Take 2: a1b1, a3b2, ‖: a1b1 :‖, a1b2, a1b1, a1b2, a2b1, a4b2, a2b1, a1b1, a1b2, a1b1, a1b1, a5b1, a6b3.
Take 3: a8b1, a8b2, a4b1, a2b2, a1b1, a8b1, a4b2, a2b1, a1b2.

Only three combinations occur in all three takes (a1b1, a1b2, a2b1). Take 2 has two simple repetitions of a1b1, take 1 has one repetition of the succession a2b1, a1b2, whereas take 3 is an unrepeated chaining of different combinations. Thus, one understands that the repetitions are neither regular nor structural. On the contrary, these takes show that even in this very unfamiliar recording context in which little variation is demanded, variability and the creation of diverse melodic lines, that renew the basic material, is a prevailing principle implemented by the singer.

For both segments, a superficial look on the score gives the impression that these variants are all more or less the same. A closer analysis of segment **a** shows how the variation rules offer the possibility of most minimal variations. It is particularly interesting to look at the note additions at the beginning and the end of the motive, as well as the passing notes. Figure 15 shows different pathways through the basic material of segment **a** by the combination of very slight modifications.

Figure 15: Melodico-rhythmic enrichment of segment **a**.

This assembly starts from the central unit of the segment which contains one sound sung in mechanism II. The first four lines deal with the modifications of the end of the segment. We notice the addition of a C as a passing note between D and A, as the object of an oscillation A-C-A, or as an appoggiatura at the end of the motive. The last two variants introduce supplementary yodeling or suggest a mechanism change (see below).

The next four lines focus on the beginning of the motive and the variants resulting from the addition of notes. The G is particularly interesting because it is realized in two different octaves, which also favors a change of mechanism. The last line, finally, is a theoretic compilation of the previous transformations which illustrates a maximum introduction of yodeling with a strict alternation between four sounds sung in mechanism II, five sounds clearly sung in mechanism I, and one sound that, as an appoggiatura, suggests the change of mechanism without realizing it. The appoggiatura in the succession of two neighboring sounds is one of the examples where yodeling is only suggested yet without changing the vocal mechanism. In the analyzed corpus, it can be heard in several recordings. Figure 16 shows another example of this phenomenon.

Figure 16: Introduction of an appoggiatura in a succession of neighboring degrees.

Other ways of alluding to yodeling are related to the introduction of consonants into the vowel flow (figure 17). The introduction of the semi-consonant [j] between two vowels shares with a real mechanism change from MI to MII the closing of the jaw and the narrowing of the air channel in the mouth. Just like the appoggiatura, this procedure is frequently applied to a succession of three or four sounds sung in mechanism I in an oscillating melodic movement of joint degrees. The fricative [h] was observed between two vowels in a descending line, inducing a "break" in the vowel flow.

Figure 17: Suggestion of yodeling by the introduction of consonants between vowels.

As far as vowels are concerned, the same play on the degree of aperture that has been noted for the Aka yodel is heard, notably the use of the half-closed vowel [ø] to suggest an expected Mechanism II sound and the rounded closed vowel [y] for the second sound in a succession of two sounds in Mechanism II. The many analytical recordings show that the singers have a great deal of freedom. One encounters interval jumps without any change in mechanism, neighboring degrees that are yodeled or not, or even whole parts not yodeled in one version, while the same singer performs them in yodeling in another.

COMPLEMENTARITY OF VOICES

In a polyphonic context, one observes a complementarity of the yodel registers between the parts. As already mentioned for the *yélī* ritual, the singers complement each other by crossing their melodic lines and the registers in which they sing. Figure 18 shows two singers yodeling simultaneously: most sounds in MII are sung while the other singer is in MI. This does not exclude encounters on the same degree which then question the notion of unison. As an example, see the G in the second beat of Figure 18. In the first cycle, it is a low sound for the *kpó njàmbā* who sings it in mechanism I and it is a high sound for the *ngbɛ lɛ́* who sings it in mechanism II. The meeting of these two different vocal timbres enrichens the sound and blurs the unison by creating a perceptive multiplicity. In the second cycle of this example, the G is sung by the *kpó njàmbā* also in mechanism II, but in the upper octave, which further changes the perception in spite of the same vocal mechanism performed.

Figure 18: *Ndándó*: Crossing of sounds in mechanism II. The two yodeled voices extracted from the version with three singers.[33]

After the third singer has entered the song – without yodeling –, these three realizations of the same degree may be found performed simultaneously, as in cycles 16 and 19 of Figure 19. This last example sums up the basic variation techniques that have been exposed here. The recording device needed a protocol which is far away from an in-context performance. It focused on the basic patterns of the songs in order to understand the general structure of Baka polyphony. New multi-track recordings should now be made to see how – in a conventional performance context with a large group of participants – the singers develop these basic principles or add eventually further variation techniques in order to fully deploy their art and creativity in interaction with each other.

33. Archive CNRSMH_I_2016_018_004_22.

Figure 19: *Ndándó*: An extract from the version with three voices.

TO CONCLUDE

The comparison of yodeling in the musical cultures of the Aka in the Central African Republic and of the Baka from Cameroon shows that its principles – as a vocal and a musical technique – are widely the same. Given their long-shared history, this is hardly

surprising. This way of singing distinguishes them from their respective neighbors. In their environment of the equatorial forest – be it in the forest camp or in the village – yodeling confers on their sound world a magical character and has necessarily an effect on everyone who hears it. Thus, in both cultures, yodeling is also a means for acting upon the world that facilitates and strengthens the communion between humans, ancestors, and spirits (Thomas et al. 2005, 198). The Baka have made this vocal technique the *yélī* ritual. The first to whom the *yélī* singers address their yodel are the ancestors, so that they can protect the men who will put their lives in danger for the good of the community. Then, there are a number of spirits who manage success in hunting and healing and who particularly enjoy hearing this way of singing (Joiris 1993 and 1997).

This singing also has a great effect on Westerners – travelers and musicologists, the author of this text included – who are challenged by this particular way of singing and who want to understand how it works. They then begin to ask questions that no Aka man, no Baka woman, would ask. "The White lady" comes with her problems of vowel quality, singing technique, periodicity, musical scale, and identification of the songs whose variations are so obvious to the singers even if they bear considerable differences between one version and another. The analytical recording sessions, however, have often been an amazing personal encounter around music and music making. They reveal ways of playing and singing that were previously unheard of by the local musicians. While the astonishment is shared and appreciated by Aka and Baka specialists who are satisfied that the researcher comes close to understanding the basics of their music, the actual musical analysis is done only by the Westerner and for Westerners. The rules of musical grammar are implicit. Within these societies of oral tradition, they are transmitted through active musical practice. That is why all generations participate in musical performance. Observations and interviews have shown that the correct execution of songs and rhythms are important among the criteria that determine ritual effectiveness. However, making these musical elements explicit is not of vital importance for musicians.

The conceptualization of polyphony shows first of all a great flexibility in the assignment and realization of the parts. Among the Aka, the parts are theoretically assigned to the singer's gender, but in the musical practice, their distribution is neither determined in advance nor invariable during performance. Among the Baka, where mainly women sing polyphonies, this freedom concerns more the part of the chorus. While the soloist part *kpó njàmbā* of collective music that gathers men and women is always sung by an experienced woman, the two lines of the chorus are not distributed in a predetermined and fixed way during a performance.

In both musical cultures, the most relevant variation technique for the yodel perspective is based on the substitution of degrees mainly by fifths, fourths, or octaves. This is a variation technique that favors yodeling since it introduces larger melodic intervals conducive to a change in the vocal mechanism. The substitution of a degree by the neighboring degree or its representative in the octave draws attention to the interval of a second and its complementary interval which is the seventh. As Figure 12 shows, it can result from the superimposition of two fourth substitutions. The seventh is well represented in the yodel and the melodic succession of two fourths can be found in several

yodeled recordings of the Aka or Baka. This is certainly a track to pursue for further research.

Aka and Baka yodel is based on a nearly regular alternation of mechanism I and II. It is based on mainly large interval jumps, but is not conditioned by them, as the mechanism change may be performed on small intervals or even on the same degree. Or it may even only be suggested by the introduction of appoggiaturas or consonants between two successive sounds sung in mechanism I. This strategy brought here to evidence in Baka music can be added to the phonetic treatment of the vowels in the succession of neighboring degrees already revealed for the Aka yodel. They bring to light what is called a pseudo-yodel by Le Bomin and Mbot (2012b) and what has been observed by these authors among the Bongo of Gabon and by Demolin and Bahuchet (1991) among the Kango, Efe and Asua in the RDC. These pseudo-yodels go with melodies built on large intervals and, among the Mbuti, also on short, hocket-like melodic motives which link this singing technique to the voco-instrumental hocket of the small flute. Moreover, most Pygmy groups sing without words, an aspect that has been particularly developed by Lewis (2009). Thus, although the Aka and Baka share the main phonetic aspects with other yodel traditions of the world, they have some specificities that distinguish and singularize their music among them and that link them to the other Pygmy music traditions of Central Africa.

REFERENCES

Abram, Dave, and Jerome Lewis. 2006 "Pygmy Music. Songs from the Forests of the Congo Basin." In *The Rough Guide to World Music, Africa and the Middle East*, edited by Simon Broughton, Mark Ellingham, and John Lusk, 304–312. London and New York: Rough Guides.

Arom, Simha. 1973. *Musique des Pygmées Aka*. CD. Philips: 6586-016.

———. 1976. "The Use of Play-Back Techniques in the Study of Oral Polyphonies." *Ethnomusicology* 20, no. 3: 483–519. https://doi.org/10.2307/851046.

———. 1978. *Anthologie de la musique des Pygmées Aka*. 3 records 33t./30 cm. Ocora-Radio France: 558 526-28 (re-edition as CD 2003, C559012/13).

———. 1991. *African Polyphony and Polyrhythm. Musical Structure and Methodology*. Cambridge, Paris: Cambridge University Press, Editions de la Maison des Sciences de l'Homme.

———. 1994. "Intelligence in Traditional Music." In *What is Intelligence?*, edited by Jean Khalfa, 137–160. Cambridge: Cambridge University Press.

———. 1998. "'L'arbre qui cachait la forêt': Principes métriques et rythmiques en Centrafrique." *Revue belge de Musicologie / Belgisch Tijdschrift voor Muziekwetenschap* 52: 179–195.

Arom, Simha, and Vincent Dehoux. 1978. "Puisque personne ne sait à l'avance ce que tout autre que lui-même va chanter dans la seconde qui suit…" *Musique en Jeu* 32: 67–71.

Arom, Simha, and Geneviève Dournon-Taurelle. 1966. *La musique de Pygmées Ba-Benzélé*. Record 33t./30 cm. Bärenreiter-Musicaphon. BM 30L2303 (reedition as CD 1998. Rounder Records. CD 5107).

Arom, Simha, Nathalie Fernando, Susanne Fürniss, Sylvie Le Bomin, Fabrice Marandola, and Jean Molino. 2019. "The Categorization of Musical Heritage in Oral Tradition Societies" [2008]. *Translingual Discourse in Ethnomusicology* 5. https://doi:10.17440/tde031.

Arom, Simha, and Susanne Fürniss. 1993. "An Interactive Experimental Method for the Determination of Musical Scales in Oral Cultures. Application to the Vocal Music of the Aka Pygmies of Central Africa." *Contemporary Music Review* 9: 7–12. https://doi.org/10.1080/07494469300640301.

Bahuchet, Serge 1992. *Histoire d'une civilisation forestière I. Dans la forêt d'Afrique Centrale : les Pygmées Aka et Baka*. Louvain, Paris: Peeters.

———. 1995. "De la musique considérée comme une philosophie (chez les Pygmées Aka de Centrafrique)." In *Ndroje balendro, Musiques, terrains et disciplines. Textes offerts à Simha Arom*, edited by Vincent Dehoux, Susanne Fürniss, Sylvie Le Bomin, Emmanuelle Olivier, Hervé Rivière, and Frédéric Voisin, 57–65. Louvain, Paris: Peeters.

Bahuchet, Serge, and Jacqueline M. C. Thomas. 1986. "Linguistique et histoire des Pygmées de l'Ouest du bassin congolais." *Sprache und Geschichte in Afrika* 72: 73–103.

Bonhomme, Julien, Magali De Ruyter, and Guy-Max Moussavou. 2012. "Blurring the Lines. Ritual and Relationships between Babongo Pygmies and Their Neighbours (Gabon)." *Anthropos* 107: 387–405. https://doi.org/10.5771/0257-9774-2012-2-367.

Brisson, Robert. 2010. *Petit dictionnaire baka-français*. Paris: L'Harmattan.

Castellengo, Michèle. 1991. "Continuité, rupture, ornementation ou les bons usages de la transition entre deux modes d'émission vocale." *Cahiers de musiques traditionnelles* 4: 155–165. https://doi.org/10.2307/40240099.

Cloarec-Heiss, France, and Jacqueline M. C. Thomas. 1978. *L'Aka, langue bantoue des Pygmées de Mongoumba (Centrafrique). Introduction à l'étude linguistique, phonologie*. Paris: SELAF.

Demolin, Didier. 1993. "Les rêveurs de la forêt. Polyphonies des Pygmées Efe de l'Ituri (Zaïre)." *Cahiers de musiques traditionnelles* 6: 139–151. https://doi.org/10.2307/40240164.

Demolin, Didier, and Serge Bahuchet. 1991. *Pygmées du Haut-Zaïre*. CD. Paris: Musée Dapper and Fonti Musicali. fmd 190.

Fernando, Nathalie. 2011. *Congo: Polyphonies pygmées du nord-Congo / Congo: Pygmy Polyphonies from North Congo. 2011. Archives internationales de musique populaire 100. Disques VDE-GALLO VDE CD-1339. Recorded and annotated by Nathalie Fernando*. VDE 1339.

Frisbie, Charlotte. 1971. "Anthropological and Ethnomusicological Implications of a Comparative Analysis of Bushmen and Pygmy Music." *Ethnology* 10, no. 3: 265–290. https://doi.org/10.2307/3772917.

Fürniss, Susanne. 1991a. "Falsetto Con Variazioni. The Falsetto in the Sound World of the Aka Pygmies (Central Africa)." *Bulletin d'Audiophonologie. Annales scientifiques de l'Université de Franche-Comté* 4(5-6): 587–606.

———. 1991b. "La technique du jodel chez les Pygmées Aka (Centrafrique). Une étude phonétique et acoustique." *Cahiers de musiques traditionnelles* 4: 167–187. https://doi.org/10.2307/40240100.

———. 1992. *Die Jodeltechnik der Aka-Pygmäen in Zentralafrika. Eine akustisch-phonetische Untersuchung*. Berlin: Dietrich Reimer.

———. 1999. "La conception de la musique vocale chez les Aka : Terminologie et combinatoires de paramètres." *Journal des Africanistes* 69 (2): 147–162. https://doi.org/10.3406/JAFR.1999.1213.

———. 2006. "Aka Polyphony: Music, Theory, Back and Forth." In *Analytical Studies in World Music*, edited by Michael Tenzer, 163–204. New York, Oxford: Oxford University Press. https://halshs.archives-ouvertes.fr/halshs-00453689/document.

———. 2011. "L'emprunt d'un rituel." In *Choc des langues et des Cultures : un discours de la méthode*, edited by Marie-Christine Bornes-Varol, 156–177. Vincennes: Presses Universitaires de Vincennes.

———. 2012. "Musiques aka et baka : une parenté de référence." *Journal des Africanistes* 82(1-2): 107–136. https://doi.org/10.4000/africanistes.4314.

———. 2014. "Diversity in Pygmy Music. A Family Portrait." In *Hunter-Gatherers of the Congo Basin: Culture, History and Biology of African Pygmies*, edited by Barry S. Hewlett, 187–218. New Brunswick & London: Transaction Publishers.

———. 2016. "What Is a Part? Polyphony Between Perception and Conception." *Res Musica* 8: 73–86. https://halshs.archives-ouvertes.fr/halshs-02387100/document.

Fürniss, Susanne, and Serge Bahuchet. 1995. "Existe-t-il des instruments de musique pygmées ?" In *Ndroje balendro. Musiques, terrains et disciplines. Textes offerts à Simha Arom*, edited by Vincent Dehoux, Susanne Fürniss, Sylvie Le Bomin, Emmanuelle Olivier, Hervé Rivière, and Frédéric Voisin, 87–109. Louvain-Paris: Peeters.

Fürniss, Susanne, and Véronique D. Joiris. 2011. "A Dynamic Culture: Ritual and Musical Creation in Baka Context." *Before Farming* [online version], 2011, no. 4: 12. https://doi.org/10.3828/bfarm.2011.4.3.

Grauer, Victor A. 2009. "Concept, Style, and Structure in the Music of the African Pygmies and Bushmen: A Study in Cross-Cultural Analysis." *Ethnomusicology* 53, no. 3: 396–424.

Grimaud, Yvette. 1960. "Note sur la musique vocale des Bochimans !Kung et des Pygmées Babinga." In *Les colloques de Wégimont III, Ethnomusicologie II*. Paris: Les Belles Lettres.

Hewlett, Barry S., ed. 2014. *Hunter-Gatherers of the Congo Basin: Culture, History and Biology of African Pygmies*. New Brunswick, London: Transaction Publishers.

Hombert, Jean-Marie, J. Ohala, and W. Ewan. 1979. "Phonetic Explanations for the Development of Tones." *Language* 55: 37–58. https://doi.org/10.2307/412518.

Joiris, Véronique D. 1993. "Baka Pygmy Hunting Rituals in Southern Cameroon: How to Talk Side by Side with the Elephants." *Civilisations* 31, no. 1/2: 51–89.

———. 1997-1998. *La chasse, la chance, le chant. Aspects du système rituel des Baka du Cameroun*. PhD diss., Free University of Bruxelles.

Kisliuk, Michelle. 1998. *Seize the Dance! BaAka Musical Life and the Ethnography of Performance*. New York, Oxford: Oxford University Press.

———. 2000. "Performance and Modernity Among BaAka Pygmies: A Closer Look at the Mystique of Egalitarian Foragers in the Rain Forest." In *Music and Gender*, edited by Berverley Diamond and Pirkko Moisala, 25–50. Chicago: University of Illinois Press.

Kolinski, Mieczyslaw. 1973. "A Cross-Cultural Approach to Metro-Rhythmic Patterns." *Ethnomusicology* 17, no. 3: 494–506. https://doi.org/10.2307/849962.

Le Bomin, Sylvie, and Jean-Émile Mbot. 2012a. "The Musical Heritage of the Gabon Bongo: Heritage Under Influence." *Before Farming* [Online version] 2012, no. 1 (article 3). https://doi.org/10.3828/bfarm.2012.1.3.

———. 2012b. "Sur les traces de l'histoire des Pygmées du Gabon : résultats de cinq ans de prospection." *Journal des africanistes* 82 (1/2): 277–318. https://doi.org/10.4000/africanistes.4387.

Lewis, Jerome. 2009. "As Well as Words: Congo Pygmy Hunting, Mimicry and Play." In *The Cradle of Language, vol. 2: African Perspectives*, edited by Rudolf Botha, and Chris Knight, 232–252. Oxford: Oxford University Press. https://discovery.ucl.ac.uk/id/eprint/1317599/1/As%20well%20as%20words%20111207%20Jerome%20Lewis.pdf.

Lomax, Alan. 1962. "Song Structure and Social Structure." *Ethnology* 1: 425–451. https://doi.org/10.2307/3772850.

Maho, Jouni F. 2009. *NUGL Online. The Online Version of the New Updated Guthrie List, a Referential Classification of the Bantu Languages*, version dated 2 june 2009. https://brill.com/fileasset/downloads_products/35125_Bantu-New-updated-Guthrie-List.pdf.

Marandola, Fabrice. 2003. *Les polyphonies vocales des Pygmées Bedzan du Cameroun : une approche expérimentale du système scalaire*. PhD diss., University of Paris IV.

Marandola, Fabrice, and Nathalie Fernando. 2007. *Cameroon: Bedzan Pygmies of The Tikar Plain. Maison des Cultures du Monde*. Inédit: W 260095.

Olivier, Emmanuelle, and Susanne Fürniss. 1999. "Pygmy and Bushman Music: A New Comparative Study." In *Central African Hunter-Gatherers in a Multidisciplinary Perspective: Challenging Elusiveness*, edited by Karen Biesbrouck, Stefan Elders, and Gerda Rossel, 117–132. Leiden: CNWS.

Oloa Biloa, Camille. 2015. "The Bagyéli of South-west Cameroon. The Impact of Sedentarisation on Musical and Dance Practices." *Hunter Gatherer Research* 1(3): 317–331. https://doi.org/10.3828/hgr.2015.17.

———. 2016. *The Egalitarian Body. A Study of Aesthetic and Emotional Processes in Massana Performances Among the Mbendjele of the Likouala Region (Republic of Congo)*. PhD

diss., University College London. https://discovery.ucl.ac.uk/id/eprint/1522643/1/Oloa-Biloa%20PhD%20thesis%20final%202017.pdf.

Pepper, Herbert. 1958. *Anthologie de la vie africaine: Moyen Congo, Gabon.* 3 records 33 t./30 cm. Ducretet-Thomson: 320c126-28.

Robillard, Marine, and Serge Bahuchet. 2012. "Les Pygmées et les autres : terminologie, catégorisation et politique." *Journal des Africanistes* 82(1/2): 15–51. https://doi.org/https://doi.org/10.4000/africanistes.4253.

Roubeau, Bernard, Claudie Chevrie-Muller, and Catherine Arabia-Guidet. 1987. "Electroglottographic Study of the Changes of Voice Registers." *Folia Phoniatrica* 39(6): 280–289.

Rouget, Gilbert. 2011. "Musical Efficacy: Musicking to Survive – The Case of the Pygmies." *Yearbook for Traditional Music* 43: 89–121.

Rouget, Gilbert, Grimaud Yvette, and Lorna Marshall. 1956. *Bushmen Music and Pygmy Music*, record 33t./30 cm. Peabody Museum, Harvard University, and Musée de l'Homme Paris. LD 9.

Sallée, Pierre, and Hubert De Fraysseix. 1976. *Pygmées et Bochiman*, record 33 t./30 cm. CBS. 80212.

Thomas, Jacqueline M. C., Serge Bahuchet, Alain Epelboin, and Susanne Fürniss, eds. 1981-2018. *Encyclopédie des Pygmées Aka. Techniques, langage et société des chasseurs-cueilleurs de la forêt centrafricaine (Sud-Centrafrique et Nord-Congo).* 16 volumes, Paris, Louvain: Peeters.

Tracey, Hugh. [n.d. 1952]. *On the Edge of the Ituri Forest. Northeastern Belgian Congo 1952.* International Library of African Music. SWP 009/HT 03.

Tsuru, Daisaku. 1998. "Diversity of Ritual Spirit Performances Among the Baka Pygmies in Southeastern Cameroon" *African Study Monographs. Supplementary Issue* 25: 47–84.

Turnbull, Colin M., and Francis S. Chapman. 1992. *Mbuti Pygmies of the Ituri Forest.* Smithsonian Folkways. SF 40401 [new edition of FE 4457 (1957) and FE 4483 (1961)].

APPENDICES

Appendix I: *Ndándó*: Inventory of variants of the chorus part *líɛ̌ nā̀ tɛ̀ɛ*.

Appendix 2: *Ndándó*: Inventory of variants of the chorus part *ngbɛ lɛ́ɛ*.