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Music in the Iboga initiation ceremony in Gabon: Polyrhythms supporting a pharmacotherapy

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Abstract

Music is used by traditional cultures worldwide to create and accompany trance states. However, the influence of sophisticated compositions and the choice of instruments on patients' recovery has been hardly examined. Rouget (1990), in his comprehensive overview, assumes that the choice of instruments and music is insignificant. We had the opportunity to assist several Iboga initiation ceremonies in 1999, 2001 and 2003 in Gabon (Central Africa). We recorded the music and finally decided to become initiated ourselves. The Iboga healing ceremony induces a near-death experience and is performed to cure serious mental or psychosomatic diseases, but people also undergo initiation rites for reasons of spiritual or personal development.

After an analysis of the compositions and their function in the ceremonies we come to the conclusion that neither the musical structures nor the choice of instruments should be seen as cultural and incidental qualities: There are indications of direct somatic influences apart from the psychological ones. Not only the absolutely consistant basic metre and the incessant use of polyrhythms, but also the harmonic organization and the choice of instruments in all probability serve to activate the cerebellum and generate theta-frequencies in the EEG. These methods seem to be used consciously to induce particular reactions, e.g. possessional trances and visions. We suppose that the music increases the effect of the drug

Ibogaine which is used during the initiation ritual so that patients may need smaller amounts only of this potentially harmful drug.

Introduction

In many traditional cultures, young adults experience an encounter with death during their initiation ceremony. For this purpose the pygmies use the root of the Iboga shrub. Initiation with this drug was imitated by several other ethnic groups who thought this drug to be more effective than their traditional initiation drugs. In the middle of the 20th century Iboga was discovered in Gabon as a remedy for serious mental or psychosomatic disorders. Consequently the average age of persons being initiated has risen; instead of the traditional initiation rituals on reaching puberty, initiations in the urban sector often serve to solve serious problems or fulfill a desire for self-awareness. Admission to the community of adults of the pygmy village is replaced by admission to the community of initiated people who also meet in future, organize ceremonies and who offer social protection (Goutarel 2000, Gollhofer and Sillans 1997, Mary 1983).

During a stay in Gabon in 1999 we met traditional healers of the ethnic group of Mitsogo in the region of Lambarené and studied their work.

FIGURE 1. Typical Mitsogho village

Having observed several initiation and curing ceremonies, and having recorded and analysed the music played during the ceremony, we decided to get initiated ourselves by the Mitsogho in Mitoné in December 2001 (U.M.) and in April 2003 (S.S.). We will concentrate on the Missoko initiation for men. Women's Mabandji initiation, which includes possession trance, is the topic of a separate paper. We start with the report of Uwe Maas' experience with the Missoko initiation. We will report pharmaco-

logical results about the drug Ibogaine used in the ceremony, and then analyze the musical compositions and the ritual use of instruments. At the end, we will propose some hypotheses about the neurophysiological effects of the music and interferences between music and drugs.

1. Personal experience: An initiation report by Uwe Maas

Six experienced male healers and musicians who accompanied the ceremony for the two nights, two female healers and the community of the village took part in my initiation among the Mitsogho people in the village of Mitone near Lambarené in December 2001.

I was fitted out with ritual weapons and protective objects for the encounters in the spiritual world. Just before sunset, having consumed about 150-200 g of the Iboga root's bark piece by piece, I reacted with nausea, coordination problems and tremor on the left side. I had a typical out-of-body experience in which I experienced myself as a football-sized spiritual being moving through visionary spaces.

FIGURE 2. Iboga visions

Simultaneously I perceived external reality so that I was able to communicate about and inform the others about my experiences. I moved around floating over tropical steppe and river landscapes, through long white corridors, with a countless number of doors, as well as under water without any (physical) resistance. I met several groups of people who seemed to have lived in older times and I met myself (as an independent individual).

My initiated attendants asked me to become active in this world: to move around, to open doors and to get in contact with the people I met. At first I had some problems with the (mental) movement and it was difficult to communicate. It took me about half an hour to learn this. Strangely enough, the mental communication then worked also in the "worldly"

reality: I was able to make out every detail of my companions' faces although it was almost completely dark and I was sure that I could read their thoughts – especially these of the musicians.

At the end of the visions, while the dimensions of space and time changed in a peculiar way, I had a vision (similar to a parable) which impressed me as divine.

The initiated persons around me – approximately 15, many of whom had travelled to Mitoné just for the initiation of a German - didn't have any problems to control me on my journey and to classify my experiences. My friend, and father-of-initiation, Antoine Makondo in particular, who had been looking forward with excitement to my reactions, was apparently pleased that I saw the pictures he expected. The Mitsogho obviously had their (secret) criteria which enabled them to classify the visions of a foreigner. For example, I was sometimes prevented from speaking in order not to pass on secrets which were only meant for me. The interpretation seems to be independent of the initiate's personal knowledge because the aim of the initiation is not to investigate the initiate's past but a general experience: The journey into the hereafter, the encounters with dead people and with God, the experience of dying and rebirth. The Mitsogho realized that their European friend could make this experience, too.

After about six hours the intensity of the visions wore off and I became very tired. I leant against my mother-of-initiation who sat behind me and I began to return back to life. This period was accompanied by singing and elements of physical therapy. To loosen up my "rigor mortis", all my joints were moved – which, to my surprise, cracked audibly! – and I was asked to get up and make some easy movements, with the prompt result of dizziness, vomiting and new visions. After a rest I was supposed to

dance for the first time in the morning and to take a ritual bath in the river. Afterwards I became partly isolated to mark the beginning of a new phase of my life. I was only allowed to talk to initiated persons, and in a ritual way. The ceremony came to an end with a dance celebration where I was admitted into the community of the initiated and simultaneously released into my real life (Figures 3+4).

FIGURE 3. On the way to the ritual bath

FIGURE 4. Entering the community of initiated men

2. The Iboga ceremony as a controlled near-death experience

Our visions during the Iboga initiation correspond with the experiences of other Europeans (Samorini 2000), with ethnological descriptions (Fernandez 1982) of out-of-body-experiences among the Gabonian Bwiti, and with reports by people who were very close to death. Greyson (1984) isolated four aspects of a near-death experience: a cognitive factor (acceleration of time, review of one's life, global understanding), an affective factor (feelings of joy, harmony and peace, a vision of an eternal light), a factor of paranormal experiences (transcendental perceptions, a view of the future, out-of-body-experiences) and a factor of transcendental experience (entering another world, encounter with mystical beings,

deceased persons or gods). The psychological consequences of near-death experiences have been examined by various authors (Groth-Marnat and Summers 1998, Insinger 1991, Flynn 1984). Flynn (1984) interviewed 21 persons who remembered a near-death experience. Nearly all of them were less afraid of death and more likely to believe in life after death. Most of them also believed in a deeper meaning of life and had the impression of feeling the presence of God. Interest in material things had dropped whereas tolerance, empathy, sensitivity, understanding and acceptance of others people had increased. In addition, most of those interviewed were less dependent on the opinions of others.

Groth-Marnat and Summers (1998, S.118) explored changes of personality after near-death experiences. They summarize their results by saying "There is a general agreement that changes include greater concern for others (patience, tolerance, understanding), a reduction of death anxiety with a strengthened belief in an afterlife, greater transcendental feelings, a reduction in materialism, increased self-worth, greater appreciation for nature, and increased awareness of paranormal phenomenon."

FIGURE 5. On the Ogoué river near Lambarené

These after-effects of spontaneous near-death experiences correspond with the expectations that Gabonian healers have of the initiation. According to the tradtional healer Antoine Makondo, the initiation should not be considered as a direct form of healing but as a method to broaden one's self-concept. It would allow you to see the world with different eyes and to see and resolve problems in a new and better way. It should be a step towards a new spiritual vision of the world. In conversations with initiated males about the results of the experience we were told that they had become more adult, had given up bad habits like chatting up women, lazing around etc. They had started a serious life, got married, searched a job etc.. Women opt for initiation if they have difficulties becoming pregnant.

In addition to the general near-death experience, the initiation allows a controlled, and longer, journey into the hereafter, facilitates the processing of infancy experiences and also brings contact with dead relatives.

3. Pharmacological effects of Ibogaine

FIGURE 6. Iboga shrub

There are a lot of studies about Ibogaine, the extract from the Iboga root, because American scientists have explored its possible use in drug therapy (heroin, cocaine, alcohol). Preclinical studies show that a single dose of Ibogaine may have spectacular results: Without any withdrawal some addicts "forget" their addiction. Others have profound experiences after consumption of Ibogaine (e.g.: see themselves in a grave during the vision) so that they decide to give up drugs. The effect usually lasts for a few weeks or even months but unfortunately a lot of people take drugs again after this time. Pharmacological studies with mammals came to the same result: Animals which were given drugs regularly were less interested in them after consumption of Ibogaine. The fact that Ibogaine has been classified as illegal in the US (and in most European countries) is the reason why clinical examinations have not been possible so far. Ibogaine is an illegal drug in most countries, and there are doubts about clinical studies, as it is known that several people died after the consumption of Ibogaine for reasons unknown.

A large number of animal experiments (in vivo and in vitro) with effects of Ibogaine on the different neurotransmitter-systems (dopamine, serotonine) produced a lot of interesting, but partly contradictory, results which were probably caused by complex interactions between the different neurotransmitter-systems that have not been examined yet (Alper 2001, Goutarel 2000). The fact that Ibogaine creates near-death experiences has been almost completely ignored in pharmacological literature. But there are similarities between near-death experiences and impacts of Ibogaine on the pharmacological level. Ibogaine affects the cerebellum in the same way as ischemia. An overdose of Ibogaine kills certain groups of Purkinje cells, the same groups that die under ischemia (Welsh et. al. 2002). Purkinje cells are much more susceptible to cell death than other neurons. They might have the function of a fuse. With Purkinje cells

being destroyed, the brain would adopt measures to protect the rest of the cells. Some authors believe that the near-death experiences belong to these measures (Whinnery 1997). Like ketamine, which also produces near-death experiences, Ibogaine has neuroprotective effects; this means it protects neurons (but not Purkinje cells) from cell death (Alper 2001).

It is not very probable, that the amounts of Ibogaine which humans consume actually kill Purkinje cells, because none of the well-known consequences of serious ischemia have ever been observed after consumption of Ibogaine. But we suspect a negative effect on the cerebellum for a short time, compensated later on by increased activation. Even increased cell growth might be assumed after the life-threatening situation, as demonstrated for cells in the hippocampus after global ischemia (Takasawa 2002).

The functions of the cerebellum remained a mystery to scientists for a long time. It has more cells than the rest of the brain. For a long time they were supposed to do nothing but support motor learning. The participation of the cerebellum in cognitive and creative tasks of the brain was investigated only recently (Leiner et. al. 1993). Ivry (1997) supposes that the cerebellum contains one (or several) “internal clocks” of the brain. Studies proved that people with damages of the cerebellum showed poor results in estimating short-time intervals compared to people with damaged neocortex.

Recent studies also found correlations between mental illness and growth of the cerebellum. Persons suffering from schizophrenia, trauma or addiction were shown to have a smaller cerebellum than controls (Anderson et. al. 2002, Jurjus et. al. 1994).

4. Music therapeutic aspects of the ritual

To the Mitsogho, continuous musical support from musicians playing the mouth bow and the harp, accompanying percussions and singing is essential for the initiation process. Music is the "life-line" that reaches from this life to the hereafter and serves as a means of locomotion in visionary space. And that is exactly our own experience, the renewed onset of musical accompaniment, after short interruptions, reactivates the faltering visions, facilitates spiritual communication and improves mental and physical well-being considerably.

Apart from our own Missoko and Mabandji initiation respectively, we were able to observe two Mabandji initiation ceremonies and three healing rituals including possessional trance states among the Mitsogho tribe, and three Mabundi initiation rituals among the Fang tribe. We recorded about forty hours of ritual music all together, to be analysed in detail as follows.

4.1 MUSICAL STRUCTURES; BIMETRICAL STRUCTURE WITH CONTINUOUSLY CHANGING ACCENTS

FIGURE 7. Visualization of a 4:3-polyrhythm on the back of a harp. From author's collection

The music has the specific structure of a twelve-beat metre with an ambivalent division in 6 x 2 and 4 x 3 impulses:

TABLE 1. Polymetric placing of accents on 12 elementary beats at the time of X

6x2-metre = „waltz time“	X		X		X		X		X		X	
4x3-metre = „marching time“	X			X			X			X		

Between these (not always percussively marked) metrics, we have the periodically repeated melodic motive; its melorhythmics cannot be clearly associated with one of the two, and through continuous minimal variations it emphasizes one and then the other. In the trance-inducing phase, there is a striking increase in the number of rhythmic changes resulting from overlapping of different, very fast rhythmic elements. Rattles and ankle bells which systematically ring out between or beside the fundamental beat make the ritual music even more complex.

In the following example a dominant solistic clapping in a 3x4-metre is introduced, overlapping the 4x3-metre of the rattles and thus giving a new rhythmic interpretation to the melodic motif (sound 1 ; mp3 - 852 kb).

TABLE 2. Polyrhythmic harp music with polymetric clapping

D’					x								x		x									
H			x						x		x						X				x		x	
A							x																	
G	x									x									x			x		
F							x						x											
E	x									x									x			x		
D													x											
CC	C						C						C						C					
SC	C				C				C				C				C				C			
RA	R			R			R			R			R			R			R			R		

Line 1-7 = relative pitch of the harp strings at the time of X
CC = joint clapping at the time of X
SC (blue) = dominant solistic clapping at the time of X
RA (yellow) = forward movement of rattles at the time of X
From left to right: elementary beats (smallest metrical units)

Ritual meaning:

> "There are always various paths and multiple crossroads." (Magui Abaniz Lubin, traditional healer at Medang-Nkoghe near Lambarené)

- **Perfect alternating balance for basis chords, melodic moves and rhythmic patterns**

The following piece for harp illustrates these principles; based on 16 elementary beats (which is unusual), with alternating binary and ternary melorhythm, its typical 3:2 interlocking of treble and baseline, inversion of the two minor chords after 16 elementary beats and continuous mirroring of the melodic movements between root and third on one hand and fifth and octave on the other (sound 2; mp3 - 2.9 MB).

TABLE 3. Polyrhythmic harp music with horizontal and vertical mirroring

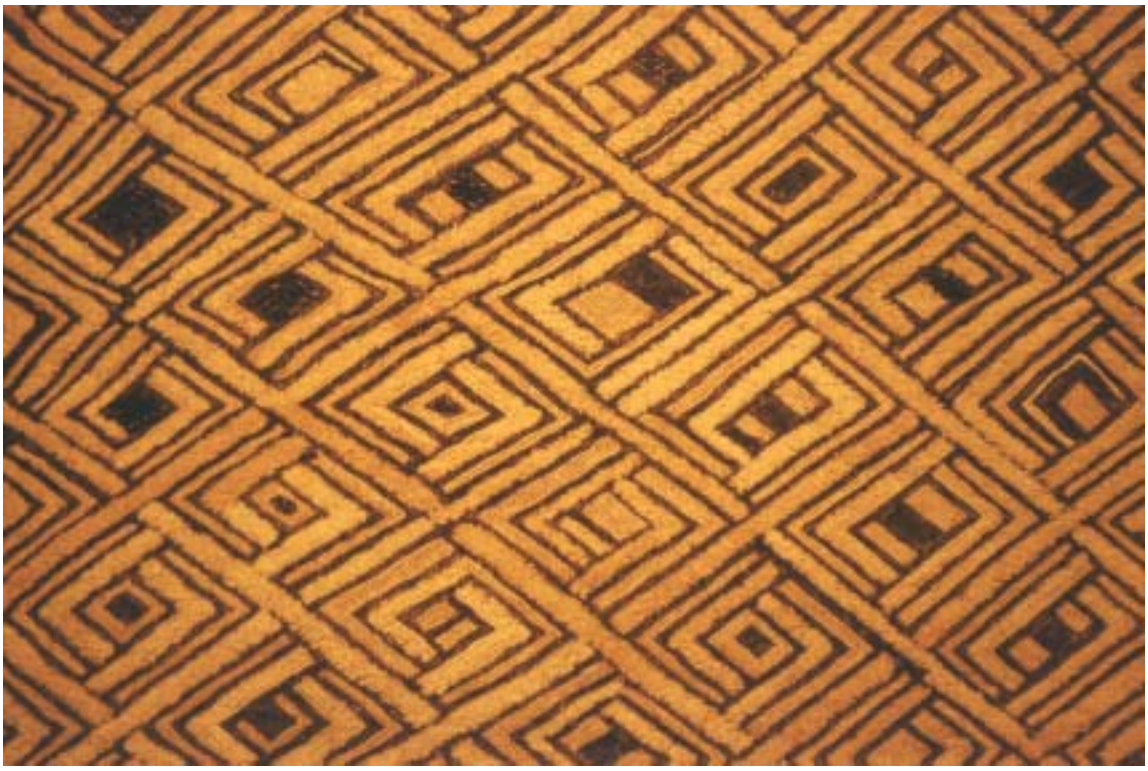
E'	X										X												X								
D'							X										X										X				
H			X		X								X		X										X						
A									X													X							X		X	
G				X										X											X							
F									X											X										X		
E	X										X												X								
D							X										X										X				

Line 1-8 = relative pitch of harp string at the time of X
From left to right: elementary beats (smallest metrical units)

We assume this continuous alternation reflects and supports the tightrope act of the person to be initiated ("ecstatic" instead of "static").

- **Periodical repetitions with continuous minimal changes**

FIGURE 8. The art of variation: Raphia cloth of the Kuba tribe, Congo. From author's collection



The melodic motifs are repeated mostly after 2x12 or 4x12 elementary beats and undergo minimal melodic or rhythmic variations. Here the melodic rhythm frequently diverges slightly from the elementary beats, thus suspended between the two fundamental metrics (Sound 3; mp3 - 3,7 MB). The repetitions lead to mental anticipations that are systematically frustrated by these minimal changes in order to "keep you on the move", as the Mitsogho told us: they create the open-minded attention that is required.

Ritual meaning:

> "Flow" means transition between life on earth and the hereafter as well as "amniotic sac": "everything is moving in waves and cir-

cles." (Nicole Mekame, initiated woman and nurse at Koungoulé near Lambarené)

4.2 MUSICAL INSTRUMENTS

4.2.1 Musical Instruments In The Missoko Initiation Ritual For Men

The mouth-bow "Mongongo“ .

FIGURE 9. Playing the mouth-bow

- Principle of sound production:

The musical instrument is similar to the pigmy hunting bow. The "arrow" strikes the bowstring and causes it to vibrate. The root may be elevated about one tone with a wooden or metallic object pressed against the string. The musician varies the volume of the oral cavity and is able to produce about eight different overtones corresponding to the root (like on a Jew's harp).

- Tonality:

Two major chords, the roots of which differ by one tone approximately.

- Principle of composition:

The root's moves are often mirrored after 12 elementary beats, the predominantly contrapuntal treble (overtones) is either mirrored or shifted vertically (sound 4; mp3 - 1,5 MB).

TABLE 4. mouth-bow music

G’ ’’		x	x	x								
F’ ’’					x	x						x
E’ ’’												
D’ ’’							x			x		
C’ ’’												
H’ ’								x	x			
A’ ’												
G’ ’												
F’ ’												
G		x	x	x			x	x	x	x		
F					x	x						x
R R	R			R			R			R		

G’ ’’												
F’ ’’		x	x	x								
E’ ’’												
D’ ’’					x	x						
C’ ’’							x			x		
H’ ’												
A’ ’								x	x			
G’ ’												x
F’ ’												
G					x	x						x
F		x	x	x			x	x	x	x		
R R	R			R			R			R		

G’ ’’												
F’ ’’												
E’ ’’												
D’ ’’							x	x	x	x		
C’ ’’					x	x						
H’ ’			x	x								
A’ ’												
G’ ’												
F’ ’												x
G			x	x			x	x	x	x		
F					x	x						x
R R	R			R			R			R		

G’ ’’												
F’ ’’												
E’ ’’												
D’ ’’												
C’ ’’							x	x	x	x		
H’ ’					x	x						
A’ ’			x	x								
G’ ’												x
F’ ’												
G					x	x						x
F			x	x			x	x	x	x		
R R	R			R			R			R		

Line 1-9 = relative pitch of overtone at the time of X
Line 10 and 11 = relative pitch of roots (bowstring vibrations) at the time of X
RR = forward movement of rattles at the time of X
From left to right: elementary beats (smallest metrical units)

As to melorhythms, the first six elementary beats are often divided into three, the second into two parts (sound 5; mp3 - 1,2 MB).

Ritual meaning:

> “Male” main instrument in the Missoko initiation ceremony. The overtones (corresponding to their “immaterial” origin) are considered to be the voice of the creator.

Bamboo canes knocked into the ground .

FIGURE 10. Playing the bamboo cane

Differently pitched large bamboo canes accentuate different metres (6x2, 4x3, 3x4, 2x6) (sound 6; mp3 - 2,3 MB).

Ritual meaning:

> "The sweeter and more complex the music, the longer the journey." (Marius Osseye, traditional healer and professional harp player)

Instruments with a latency period between movement and sound .

Several instruments are used in the Missoko initiation ritual the construction of which makes exact timing very difficult (sound 7; mp3 - 2 MB):

1. A special bell fixed onto a curved handle (thus moved from „diagonal behind") produces a clattering sound

2. rattles made of seed capsules attached to cords (played right-handed,

3. "straight" 4x3-metre)
4. the "fly brush" Mognangui (picture 3) (played left-handed, "uneven" 6x2-metre).

Their delayed, vague accents blur the fundamental beats.

Ritual meaning:

These "sacred" instruments may be played by initiated persons only (and the one to be initiated). The "fly brush" is an almost inaudible, therefore truly spiritual instrument.

The traditional healer Antoine Makondo describes their function as follows: "It's an education: There are always different paths you can follow". We understand it as an indication of two alternative ways to cope with problems: adjust oneself to given facts (specific latency period between movement and sound – thus learning to move earlier) or calmly await what happens (appreciation of unexpected sound).

4.2.2 Musical instruments in the Mabandji initiation ritual for women

The eight-string harp "Ngombi" .

FIGURE 11. Antoine Makondo playing the harp

- Tonality:

Two minor chords the roots of which differ by one tone approximately

- Principle of composition:

Polyrhythmic interlocking, mainly with different metres (6x2 resp. 4x3) left-handed (root and minor third) and right-handed (fifth and octave) (sound 3; mp3 - 3,7 MB).

Ritual meaning:

1. "female" main instrument in the Mabandji initiation ritual. Its sound symbolizes the lament of the mythical female ancestor Benzogho who sacrificed herself to bring Iboga to mankind.
2. "canoe" to cross the river between this life and the hereafter
3. representing the eight-legged spider that moves along a thread between heaven and earth
4. "family-therapeutical" instrument: the eight strings represents different members of the family. It is interesting that structures within the family have their counterpart in musical harmonies: The two alternating minor chords reflect the relationship between two nuclear families, the polyrhythmic play of the two hands stands for gender relations (the „spiritual" 6x2-metre is usually attributed to the female part):

TABLE 5. The meaning of the eight harp strings

Relative Pitch	Ritual meaning		Gender (treble/bass			Classifying according tonuclear families (minor chords			Generations (inversion of chords)	
E'	mother		X			X			X	
D'	aunt		X				X		X	
H	sister		X			X				X
A	niece		X				X			X
G	father			X		X			X	
F	uncle			X			X		X	
E	brother			X		X				X
D	nephew			X			X			X

The wooden idiophone "Bake" .

FIGURE 12. Playing the Bake

The "Bake" is a board, about two metres long and seven centimetres wide, it is played simultanously by two or three percussionists. While they independently stress different aspects of the polyrhythm, the resulting pattern is fast and permanently changing (sound 8; mp3 - 2,3 MB).

Ritual meaning:

> When the primeval egg broke into two pieces, it created the principle of polarization in this world (night and day, birth and death, woman and man…) as well as the division of the spiritual world into three parts (as the Trinity in Christianity). This "transition" at the Big Bang is identified with a "cosmical forging" of this very loud and sharp-sounding instrument.

The wooden rattle "Tseghe". Instrument shaped like a female figure, played before and during states of possessional trance (Sound 1; mp3 - 852 kb) played by spinning wrist movements ("diadochokinesis").

4.2.3 INSTRUMENTS USED IN THE INITIATION OF BOTH WOMEN AND MEN

The ordinary rattle "Soke" . These rattles accompany the mouth-bow; filled with seeds, they usually support the 4x3-metre, in the context of harp music and dance often the 6x2-metre (sounds 4; mp3 - 1,5 MB and Sound 9; mp3 - 1,1 MB).

The drum "Balafon". Three or four differently tuned drums are played exclusively during the ecstatic dances that usually start about three o'clock in the morning. The rhythmic patterns are similar to those of the "Bake" (sound 9; mp3 - 1,1 MB).

Vocal music. There are no human voices in the spiritual world, that is why the person to be initiated is guided there by instrumental music. On the long way back to this life, however, he is welcomed by songs located between spiritual and earthly communication. The lyrics are only understandable to initiated people and use a lot of symbols - often they reinterpret opposite poles as circular processes - and frequently use a foreign language (Mabongo, for example, the language of the Pygmies from between Sindara and Mimongo). Thus, the content is transmitted partly "spiritually" and serves to hold the balance between this world and the spiritual one. (sounds 2,7,9)

Dancing. There are three different styles of dancing:

1. Steps in a line in circles or wave-like movements like the mythical python (water spirit), rattles are shaken, often in a metre that complements the rhythm of the steps. Its name "Mayaya" has several meanings: "rebirth", "peace", "release from dependent relationship", "relief from segregation" in the Mitsogho language.
2. An individual dance for men only whose slow movements seem to express the tension between self-contol and liberation.
3. The ecstatic dance with rapid, wiggling hip movements. Its performance serves as proof of a successful initiation process. It symbolizes the vortex of birth and death as transition processes.

5. Hypotheses on neurophysiological effects of ritual Mitsogho music

During our initiation ceremonies, we felt a direct influence of music on our feelings and the pictures we saw during the visions. This was especially strong when we were moving ourselves to the music. Is music a kind of medicine that provokes specific physiological reactions, which promote trance states? And if this is so, how do the reactions to music interfere with Ibogaine- induced effects?

5.1. INDUCTION OF TRANCE AND THETA-WAVES

FIGURE 13. Wavy mangrove roots, Cap Esterias near Libreville

Neher (1962) reports laboratory research results that demonstrate that flashing lights as well as rhythmic drumming of theta-frequency (4-7/sec) generate EEG-waves of the same frequency and hallucinations. Goodman (2000) studied the impact of rhythmic stimulation on persons assuming ritual body postures known from native Indian civilizations. The traditional rhythms of 6 hertz originated theta-waves in the EEG. Some of the participants reported out-of-body experiences.

Body and Stevens (2000) augmented theta-activity in the neocortex by binaural beat stimulation. This stimulation, slightly different for both ears, was also used in the initiation ceremony of Uwe Maas at the culmination of his visions.

The musical theta rhythm ist maintained for days in the Bwiti ceremonies. It corresponds to a spontaneous trembling (or voluntary movement) of the left hand of men and the right hand of women. This tremor is probably caused by Ibogaine effects either on the cerebellum or on the dopamine metabolism.

We think the EEG theta-rhythm is also supported by the polyrhythmic structures of the music. To play the rattle with the frequency of the elementary impulses (including the forward and backward movements) could be a „mathematical" solution to endure the different rhythms. Our own experiences show that the perception of inner wave-movements (with a frequency of 6 hertz) continues even when the music stops. Time is no longer felt as a line but as a circle. The inner metrum is felt for days and continues even at night, underlined by the music, which is often also played while the person to be initiated is sleeping.

5.2 ACTIVATION OF THE CEREBELLUM

Music activates the cerebellum like Ibogaine; complex and unknown music is especially stimulating (Satoh 2001, Khorram-Sefat 1997). Dancing and playing the rattles is even more activating than music alone. Quick hand-movements, necessary to play the wooden rattle Tseghe, are known to medical students as diadochokinesis. Patients with cerebellar lesions have problems with this kind of movements. We suppose that the typical Bwiti dance with quick hip movements, performed by the initiated at the end of the ceremony, also requires an activated cerebellum. The dance is seen by Gabonian healers as indication of successful initiation .

FIGURE 14. The final dance

We think that activation of the cerebellum by music and movements enhance the effects of Ibogaine. We assume that the cerebellum is also responsible for changed time perception experienced under Ibogaine influence, and by near-death experiencers. Montain climbers and racing drivers who survived accidents often report that they were able to think extremly fast in seconds of extreme danger. Brain structures obviously accelerate thinking processes in moments of risk (Noyes and Kletti 1982). These phenomena occur independent of brain ischemia. Cerebellar structures, the inner clocks, may play an essential role in the acceleration of brain processes. The cerebellum was perhaps much more important for mankind in epochs when men were hunters and threatened by wild animals and quick reactions were essential for survival.

5.3 POLYRHYTHMS TO INDUCE OR DEEPEN STATES OF TRANCE

There are few studies about the effects of polyrhythms on the human brain.

Neher (1962) reports that optic stimulution by two independent flashing ligths induced hallucinations under laboratory conditions. But the effects of acustic polyrhythmic stimulation have hardly been investigated. So we can only hypothetisize on this subject. During Iboga ceremonies, music is not only an object of reception: people walk around, dance, play the rattle. Gabonian women are able to walk in a 4x3-rhythm and play the rattle in a 6x2-rhythm at the same time. How do they manage to do so and what might be the purpose of such a performance?

Ivry (1997) presumes after several perception studies that the cerebellum has not only one but various „inner clocks“. Tapping a rhythm with one hand is directed by the lateral cerebellum. Subjects with cerebellar lateral lesions perform poorly in this task. But they show much better results with both hands. The fact that contralateral cerebellum does not influence tapping of the other hand was seen by Ivry as an indication that the cerebellum has at least two, and probably more, inner clocks. Consequently, the cerebellum is able to perform several rhythms at the same time, while our consciousness cannot think two parallel rhythms. Studies with musicians found performance of polyrhythms based on only one principal „inner clock“. One rhythm was always more accurate than the second one (Pressing 1996). Thinking two rhythms at the same time, as Mitsogho music suggests and as Gabonian women seem to practice when dancing and playing different rhythms at the same time, requires changes in brain functions. These might include a separation of consciousness from cerebellar activity, or a unilateral activation of the right brain hemisphere, which can tolerate contradictions better than the left hemisphere. Activation of the right hemisphere is presumed to play a role during near-

death experiences as well, which are frequently experienced in epileptic attacks of the right temporal lobe (Schröter-Kunhardt 1999).

The result of polyrhythmic stimulations could thus be cerebellar activation (useful to find quick and creative solutions) and/or stimulation of the right hemisphere (useful to detect hidden unconscious contents and also for creative thinking)

FIGURE 15. Bapunu mask, from author's collection

Concluding remarks

Unfortunately, there are only a few areas where we have a chance to compare African traditional knowledge and international research results. Neither pharmacological, nor musical brain research, has provided sufficient scientific results to compare both areas. But in all cases where it was possible to compare western science and traditional knowledge we found that medical knowledge of traditional healers was „state of the art“. Their statements about Ibogaine effects, the danger for women, the possibility of interactions and complications between Ibogaine and other drugs have been substantiated by Western medicine. And we ourselves found that Gabonian statements about the effects of the music were true for us. We believe that many procedures in Bwiti are based on neuropsychological knowledge, although it is not yet proven by international science, because international science has hardly made efforts to investigate these subjects. We think it could be useful for pharmacological and musical science to formulate hypotheses on the basis of the knowledge contained in traditional medicine.

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