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Why Do People Sing?

Music in Human Evolution

LOGOS

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I want to dedicate this book to
my late father and first teacher Mindia Jordania,
and to my dearest friend, teacher and colleague, Izaly Zemtsovsky

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Photos on the book cover:
Left side: The group Te U'i nō Pare Nui is performing *hīmene rū'au* at the Heiva i Tahiti, in Pape'ete, Polynesia (2006.) Courtesy of Jane Freeman Moulin. Right side: Traditional ensemble of three singers (known as 'trio') from Guria, region of western Georgia, are singing at an informal gathering at the table in a house of a singer Vazha Gogoladze (2001). Courtesy of Vazha Gogoladze.

Photo on the back cover by *Grant Mathews*.

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INTRODUCTION

Human singing is one of the greatest mysteries of human evolution. Charles Darwin was one of the first people to be puzzled by this phenomenon. In "The Descent of Man" he wrote: "As neither the enjoyment nor the capacity of producing musical notes are faculties of the least use to men in reference to his daily habits of life, they must be ranked amongst the most mysterious with which he is endowed" (Darwin 2004:636). Many other scholars were similarly puzzled as to why such an extremely time and energy consuming phenomenon, such as singing, is so universally widespread in all societies, cultures and religions.

The topic of the origins of music was for a long time forgotten among scholars. Then suddenly, during the last ten years, an explosion of interest has come towards this issue. More books and articles were published on the origins of music in the first ten years of the 21st century, than during the entire 20th century. Not only musicologists, but psychologists, linguists, archaeologists, evolutionary biologists, primatologists, anthropologists, neurologists and even philosophers started writing about the origins of music. This explosion of interest towards the origins of music came mostly from the advancement of our understanding of the processes that go on in the human brain when we are singing or listening to music, and from the publication of the groundbreaking volume "The Origins of Music" (2000). Together with this new information came new questions; questions that did not even exist a few decades ago.

One of the most important new questions that this book will try to answer is why the most archaic parts of the human brain, which are only activated by the critical survival needs, are activated when humans sing or listen to music. Is it possible that singing really had a function of survival for our distant ancestors?

Despite this explosion of interest towards the origins of music, the function of music in human evolution still remains a mystery. Scholars

have very different attitudes towards the evolutionary functions of music. John Barrow, Dan Sperber and Steven Pinker believe that music had no survival value in human evolution. Pinker declared that 'music could vanish from our species and the rest of our lifestyle would be virtually unchanged' (Pinker, 1997:528). Herbert Spencer and Kurt Sachs were among those who thought singing and music was an outcome of the development of human language; Charles Darwin and Geoffrey Miller suggested that singing and dancing had a function of attracting the opposite sex; John Blacking, William Benzon, Edward Hagen and Gregory Bryant believe music was an important means for creating cohesion in human society; Carl Stumpf suggested that music was a form of long distance communication; Carl Bucher connected the origin of music with the rhythmic movements during work; Siegfried Nadel proposed that music originated as a sacred language for religious rituals; Roger Wescott suggested that initial human communication was based not on singing, but whistling; Ivan Fonagy offered the idea that musical contour was directly related to communicating meaning among our ancestors; Tecumseh Fitch proposed that human drumming is directly connected to the drumming behaviour of African apes; Thomas Geissmann proposed a possible link between human singing and the group coordinated singing of the gibbon family; Ellen Dissanayake argued that the communication between a mother and her newborn baby was the key to the origin of music.

Despite the diversity of the approaches and models for the origins of singing and music, the author of this book believes that singing and music had much more important functions in the evolutionary history of our species than has ever been suggested by any of the above mentioned scholars.

The central idea of this book is very simple yet very complex at the same time. The author suggests that human singing had a tremendously important role in our evolutionary past. It was singing that provided our ancestors with defence against predators, provided our ancestors with food, gave rise to human intelligence, morality, religion, formed the human body and facial morphology, gave birth to human arts and the mystery of artistic transformation.

That's why this book, dedicated to the origins of singing, is in fact a book about human evolution. That's why, in this book, we will be dis-

cussing many big issues that you would not expect to be discussed in a book about singing.

In accordance with the outlined aims, this book consists of four very different chapters. Readers who are mostly interested in the richness of choral polyphonic traditions of the world will find plenty of information on this subject in the first chapter. The second chapter is dedicated mostly to the comparative study of choral polyphony. The readers who are predominantly interested in the role of music in human evolution, as well as the history of human body morphology and behaviour, will be particularly inclined to read the third chapter. The fourth chapter tackles a wide range of topics, from the origins of human intelligence and language to the mysteries of the unconscious mind.

In 2006 the author of this book published a book on the human ability to ask questions: 'Who asked the first question?' The book was awarded the Fumio Koizumi Prize, the highest international award in Ethnomusicology. From this title it is obvious that the author loves asking questions. It is not a coincidence that the title of this book is also a question. So prepare yourself for plenty of questions when reading this book. Here are some of the questions that will be asked (and eventually answered) in the pages of this book.

Some of the questions will be directly connected to the human ability to sing:

- Why do humans sing?
- Why do humans hum?
- Why do humans whistle?
- Why do humans dance?
- Why do humans like listening to music?
- Why do humans enjoy making music together?
- Why are music and dance so closely connected?
- Why do we feel an urge to join the beat of the music with movements of our body?
- Why are, in some musical styles, listeners prohibited to make any sound while listening, while in other styles listeners can clap and even sing along with performers?

- How can some humans hear even the smallest mistake in others' singing but still can not sing in tune themselves?

As the book discusses the evolution of singing and music, there obviously will be plenty of questions on the history of singing:

- When did humans start singing?
- What was the initial function of singing?
- How and why did humans develop polyphonic singing?
- Why do people in some cultures sing in one part, while in others they sing polyphonically?
- Why are humans the only species in the world who live on the ground and sing?
- Why are humans the only species among which a group of individuals can follow the same musical rhythm?
- Why are singing traditions closer to music made on blown instrument rather than on string instruments?
- Why is the male voice so low compared to the female voice?

Some questions that will be discussed in this book are more mysteriously connected to the phenomenon of singing:

- Why is music used to cure physical and psychological disorders in all cultures?
- Why does singing and chanting with many other people feels good?
- How is singing connected to human religion and human beliefs?
- Why are some musicians treated with the same adulation as religious leaders?
- Why is it easier for us to synchronize a beat with another human than with a metronome?
- Why do all human newborn babies cry in the same pitch and have absolute pitch?
- Why is the question intonation universal in all human languages?
- Why is music played everywhere, in the most unlikely situations, such as in elevators, shopping malls, sporting events, political rallies, funerals and surgical operations?

We will also discuss some very important questions connected to our brain activities associated with singing or listening to music:

- Why does singing activate such deep structures in our brains, structures that are connected to the critical factors of our physical survival?
- Why is listening to rhythmic music one of the best known ways to induce hypnoses and trance in humans?
- How can a person with brain damage, who does not remember anything from his past, still remember musical compositions he learned decades ago?
- How can a person with a horrible head injury, who can not even clearly pronounce his own name, sing well and clearly pronounce all the words of a song?
- Why do people whistle when they are afraid?
- Why do people hum when they feel good?

We will also discuss some questions that are barely, if at all, connected to human singing:

- Why do birds stop singing when they sit on the ground?
- Why is it safer to sing if you live in trees or in the water?
- Why do soldiers in Iraq listen to loud rock music before going on combat missions?
- Why do some humans like having a radio or TV on when they are not paying attention to it?
- Why do some people like talking to themselves?

And finally, the reader will also find in this book, plenty of questions that might seem totally unrelated to the topic of singing:

- Why do humans have long hair on their head?
- Why do humans have long legs?
- Why do humans have eyebrows?
- Why do humans walk on two legs?
- Why do humans sweat and smell?
- Why did human ancestors practice cannibalism?
- Why are the evolutionary histories of humans and lions so close to each other?
- Why do humans stutter and have dyslexia?

- Why are there more stutterers among Africans than among American Indians?
- Why are there no professional speech pathologists in China?
- What was the evolutionary function of human clothes?
- Why do humans like decorating their bodies and faces?
- Why do male lions have manes?
- Why does the peacock has such an amazingly beautiful tail?
- Why are humans the only species who can ask questions?
- How can someone be intelligent enough to answer complex questions, and still be unable to ask questions?
- Why did Jacqueline Kennedy not remember climbing out of the moving car following the fatal shooting of President J.F. Kennedy?
- Why did Sigmund Freud not like listening to music?
- Why are masks so universally popular in human cultures?
- Why do some humans have two identities?
- What is the evolutionary function of our unconscious mind?

Questions, questions, questions. Hundreds of questions. As I have already mentioned, some questions will be directly connected to singing, others might seem hardly connected, and some questions might seem totally unrelated to the topic of singing. On the pages of this book the author will argue that all these questions are closely related to each other in a great story of human evolution, and then the author will try to answer them.

As this always is the case, answering these questions will give rise to plenty of new questions.

CHAPTER ONE

Singing Alone and Singing Together: Monophony and Polyphony

There is no human culture without singing, but singing plays a very different role in various cultures. In some cultures singing is considered as natural as speech, and every member of a society is expected to sing. Central African Pygmies are arguably the best example of such a culture. Every member of Pygmy society is a brilliant singer who can sing in harmony and participate in traditional choral singing with complex yodeling technique. Despite their amazing musicality, pygmies do not have any professional musicians. On the other side of the spectrum there are societies where most of the adults hardly sing at all, and where singing is seen as one of the possible professions. This is the case in many industrialized societies. For example, some of the middle aged members of my choir in Melbourne confessed that before joining our choir, they had sung for the last time when they were in primary school some thirty years ago. Basically, a contemporary person can have tremendously successful life without singing a single musical note during their adult life.

Generalizations are always dangerous, but we could say that when people lose links with their traditional culture, the role of singing decreases in a society. That's why in many western societies people generally sing less than people in more traditional societies. Interestingly, together with the decline of singing in the general population of Western cultures, there is also a contrasting development: plenty of studies strongly suggest that singing in a choir is good for your psychological and physical wellbeing. As a result, there is an increasing popularity of singing and participation in community choirs in western countries.

Before we start discussing distribution of singing in the contemporary world, we must note that there are two fundamentally different ways of singing in human societies: singing alone and singing together.

This book is mostly dedicated to the tradition of singing together, so we will be mostly concentrating on group choral singing. But let us first of all review the existing human cultures and find out where and why people sing alone, and where and why people sing together.

Monophony – Singing Alone

Simply speaking, monophony is singing in one part. For example, when a mother sings a lullaby to her baby, or when a trained professional singer sings on a stage the beautiful Japanese melody of Esashi Oiwake, this is monophony. Unfortunately, this term is not so simple as it might seem at first sight, because singing of a group can also sometimes be called monophony. This happens when all singers are singing together the same melody. For example, when a group of people sing the melody of 'happy birthday' together at a party, this is also monophonic singing. The professional musicological term for singing in one part is 'unison singing.'

Some readers might question if it is correct to call both singing of a single person and singing of a big group of people by the same term. I myself agree that there is an important difference between monophony of a solo singer, and monophony of a group of singers, and that we need to have a clear distinction between them.

Using the term 'monophony' for both a single person singing and a group singing is widely accepted among professional musicologists who look at music from the musical point of view only. Musically speaking, if a big group of people is singing the same melody, this is monophony, because we are hearing only one pitch at one time. However there is an important factor that we must take into account.

Singing is not only a musical phenomenon, it is also an important social phenomenon. From a social point of view, even if all the members of a big group are singing the same melody, there still is a huge difference between the singing of a single person and that of a group of people. I suggest that if the melody is performed by one singer, this must be called ***social monophony***, but if the song is performed by two or more singers, this must be called ***social polyphony***. Social polyphony

means that during singing there is a coordination and social cooperation between singers. In order to achieve a common sound, singers must coordinate their pitches and rhythm with each other.

When a singer sings alone, this is monophony both musically and socially, as there is only one pitch, and there is only one person singing. But if, for example, a big group of football team supporters are singing together a club song, this is musically monophony, but socially this is polyphony.

Polyphony – Singing Together

Basically speaking, the term 'polyphony' describes a group of singers singing in different parts. If we look closer again, we will find out that the term 'polyphony' is also quite complex. First of all we must remember what we just said: if a big group of singers are singing together the same melody, musically this is still monophony.

Apart from this, sometimes even professional musicologists and ethnomusicologists disagree with each other on what the term 'polyphony' exactly means. The term 'polyphony' has so called 'narrow' and 'wide' meanings. Some ethnomusicologists and musicologists consider that the term 'polyphony' should be used only in regards to the musical style where the coordination between different parts is very complex, and when the melody of each part is independent from the melodies of the other parts (like in compositions of J.S.Bach). This is a narrow understanding of the term polyphony. On the other hand, most of the ethnomusicologists today agree, that the term 'polyphony' can be used for all types of singing in parts. This is the wide understanding of the term polyphony. In this book we will be using the term polyphony in its wide understanding, so for us polyphony means any kind of group singing in different parts. For the most complex forms of polyphony, where each part is independent, we will be using the term 'contrapuntal polyphony.'

Polyphony can be of different types, and scholars use different classifications for the different types. Let me briefly discus some of the very basic classifications of polyphony:

(1) **Drone polyphony.** This is a type of polyphony where at least one of the parts is using long sustained notes. The drone can be anywhere: in the lowest, bass part, in the highest part, or in the middle part. A drone can also be a one long note, sung on one vowel (for example 'ooo'), or it can pronounce verbal text, still staying in the same pitch.

(2) **Ostinato polyphony.** This is a widely known polyphonic type which uses short repetitive phrases over and over again. The ostinato can either be in one of the parts only, or in multiple parts. In some polyphonic traditions all the parts are using ostinato, so the term 'total ostinato' has been suggested.

(3) **Parallel polyphony.** This type of polyphony is based on parallel movement of all voices. There are also different types of parallel polyphony, but we will not go into details.

(4) **Canonic polyphony.** In this polyphonic type all parts are singing the same melody, but each starts singing a little bit later than the previous part. Many know this type of singing as 'round.' There is also another term, 'imitational polyphony' which is sometimes used in similar contexts (particularly in classical music), but we will mostly be using the term 'canonic polyphony.' Imitational polyphony is usually used in professional music.

(5) **Heterophony.** In this type of singing all the singers are singing the same melody, but unlike group unison singing, where you can hear only one pitch at any one time, in heterophony different singers are singing slightly different versions of the same melody, so at least sometimes you can hear more than one pitch. Some ethnomusicologists do not consider heterophony as a type of polyphony, that's why the author uses the term 'heterophony', not 'heterophonic polyphony.'

The different types of polyphony are distributed in different parts of the world. For example, drone polyphony is particularly important in European singing traditions, parallel polyphony – in African singing traditions. Ostinato has possibly the widest distribution in the world, heterophony is very common in Eastern Europe, and canon is relatively rare in traditional music. But of course, this generalization is not precise, and there are places where you can hear all or almost all types of polyphony in a single culture.

If we remember that singing has both musical and social aspects, then it becomes clear that musically speaking, polyphony is when singers sing at least two different pitches, and socially speaking, polyphony involves the interaction of more that one singer.

The variety of world singing styles is amazing. There is even a style where one person produces two different pitches at the same time! In this style the singer produces a long note (which is called, as we remember, drone), and on top of this long note, the same singer produces a melody with whistling notes. As the high pitched melody is based on the series of overtones (harmonics) of the fundamental note, this style is called 'overtone singing' or 'harmonic singing'. If you have heard Central Asian or Mongolian overtone singers, you will know what I mean.

So, the overtone singing style is a unique combination of musical polyphony and social monophony. Later in the book we will discuss the origins of this singing style, but let us now sum up the four possible combinations of musical and social factors:

(1) social monophony and musical monophony: one singer singing a melody,

(2) social polyphony and musical monophony: a group singing the same melody,

(3) social monophony and musical polyphony: one person singing in two parts,

(4) social polyphony and musical polyphony: a group singing in different parts.

In this book we will be using the term 'polyphony' in regards to singing styles where polyphony is present both according to musical and social factors.

The central research topic for the author of this book is the origins of polyphonic singing. It is generally believed that polyphony is a late cultural development stemming from monophony. This idea seemed so natural to music historians, that no one tried to prove this. For a long time this was a tacitly agreed axiom. Even Charles Darwin mentioned in his 1871 book 'The Descent of Man' that: 'Helmholtz has explained on physiological principles why concords are agreeable, and discords disagreeable to the human ear; but we are little concerned with these, as music in harmony is a late invention" (Darwin, 2004:635). As we know,

Darwin was only interested in ancient phenomena that could participate in human evolution. Later we will talk about the possibility that human polyphonic singing could well be a very important participant of early human evolution, but this will be discussed in the third chapter of this book.

Until the 20th century it was firmly believed that medieval Christian monks invented polyphonic singing in the 9th century. Gradually, after the introduction of phonographic recording technique and after accumulating recordings of polyphonic music from different parts of the world, it became clear that polyphony existed in traditional music long before it was 'invented' by medieval monks.

The biggest authority on polyphonic singing in the first half of the 20th century, German scholar Marius Schneider, together with French scholar Paul Collaer argued that polyphony in European professional music came from traditional music. Today this idea is universally shared, and most contemporary scholars believe that polyphony is a cultural phenomenon that was developed from the initial monophonic singing in traditional cultures.

I will argue in this book that polyphonic singing is not a late cultural development from monophonic singing. On the contrary, monophony came much later in human history, both as a result of losing the ancient traditions of polyphonic singing, and the gradual professionalization of musical culture. For me the origins of polyphonic singing, as well as other forms of the arts, are directly connected to human survival strategy; therefore the origins of polyphonic singing must only be discussed in the context of human evolution. On the other hand, I believe that the study of human evolution without taking into account the origins of music and other arts (dance, painting) is not justified.

Before we start discussing the origins and functions of solo and polyphonic singing in human society, we first need to review the distribution of traditional vocal polyphony in the contemporary world.

World Distribution of Vocal Polyphony

As soon as ethnomusicologists learnt about different polyphonic traditions from different parts of the world, they were puzzled by the mosaic distribution of traditions in polyphonic singing. Some regions of the world are mostly monophonic, while others are mostly polyphonic, and in some regions monophony is dominating while there are isolated islands of polyphonic singing.

Despite the strong interest of ethnomusicologists towards the concept of polyphony, and particularly towards the origins of polyphony, there are surprisingly few works where an interested person can find the information about the world distribution of vocal polyphony. Marius Schneider's book "The History of Polyphony" (1934-1935, second edition in 1969) and two books by the author of this book (1989, 2006) are in fact the only works that try to represent all the known traditions of vocal polyphony of the world.

I will now discuss the distribution of vocal polyphony on the different continents. In this survey I decided not to have notated examples as the book is aimed to the general educated reader as much as it is to professional musicians and musicologists. If you want to find notated examples of polyphony from different cultures, you can see them in my book 'Who Asked the First Question: the Origins of Human Choral Singing, Intelligence, Language and Speech' (2006), and if you want not only to see the notated examples, but to hear recorded examples from different cultures as well, you can see my forthcoming book 'Choral Singing in Human Culture and Evolution.'

The most polyphonic regions of the world are sub-Saharan Africa, Europe, Melanesia and Polynesia. Asia and the Americas are mostly monophonic, although they contain extremely interesting isolated polyphonic traditions as well. To view the general picture of the distribution of polyphony in the world, you can see the maps provided in the forthcoming book 'Choral Singing in Human Culture and Evolution.'

Africa

In popular belief, Africa is arguably the most musical continent of our planet. This impression is hardly an exaggeration, as Africa does have uniquely vibrant local musical traditions. Many genres of popular music, including blues and rock music, stemmed out from African roots.

Musically Africa can be divided into three different zones: North Africa, sub-Saharan Africa, and the Sahara desert. They are very different in regards of the tradition of vocal polyphony.

North Africa is one of the most monophonic regions of the world. Solo singing, particularly professional singing, with the accompaniment of virtuoso instruments (often ensembles of instruments), is widely spread. Some minor elements of polyphony are found among Bedouins, and also in Egypt and Oman.

Sub-Saharan Africa is a complete contrast to North Africa. If North Africa is one of the most monophonic regions of the world, Sub-Saharan Africa is the largest and the most active region of distribution of vocal polyphony in the world. You can hardly find a tribe or a society in sub-Saharan Africa which does not have live traditions of group polyphonic singing. Rhythm and dance are so important in African culture that according to the belief of some African traditional musicians, if you can not dance to it, it is not music. Performance practice in most sub-Saharan African societies is also peculiar: there is no division of the society on 'listeners' and 'performers,' as all the members of society are actively involved in the performance. Even during the paid concerts listeners join the performers with singing, clapping and dancing. Going to a music performance is a different experience for native Africans in Africa than for most Europeans in Western Europe. As Simha Arom remarked, in Africa 'People do not go to "listen music", they make music together' (Arom, 1991:15). Alan Merriam wrote that in Africa the 'Distinction between the artist and his audience are not so sharply drawn as in our own culture. In some parts of Africa the cultural expectation involves almost everyone as potentially equal in musical ability' (Merriam, 1962:129). You may have had somewhat similar experience if you have ever been to an African-American church in the USA.

Another important feature of African traditional singing is a very close connection between singing and language. Sub-Saharan African

languages are tonal like Chinese, Vietnamese and many Native American languages. This means that the change of pitch in speech changes the meaning of the words. Because of this reason, the most widespread polyphonic type in Africa is parallel polyphony, where all the parts are moving in the same direction.

Discussing the distribution of vocal polyphony in sub-Saharan Africa, we will follow the division of Sub-Saharan Africa into east, central, south, and west Africa.

In **East Africa** polyphony is mostly based on parallel movements of melodic lines. The Maasai tribe from Kenya and Tanzania is a bit unusual for Africa as they use drone polyphony. The Wagogo tribe in Tanzania has a unique singing style consisting of unusual scales, the mixture of parallel polyphony and wide use of the yodeling technique. Polyphony among the Dorze tribe from Ethiopia reaches six different parts. Regarding contemporary development of choral singing, we can mention here that East Africa adopted a European choral singing style earlier than most of the other regions of Africa, and that blend of European choral music, African-American gospel, and tradition is thriving here.

Central African singing style is different primarily because of the unique musical traditions of the Pygmies. Pygmy polyphony is one of the most complex polyphonic traditions in the world. Yodeling technique is the most characteristic feature of Pygmy polyphony. Pygmy songs often do not have words, and as a result, melodies are moving more freely. Polyphony is based on the principles of ostinato and contrapuntal polyphony, where each singer sings a short repetitive phrase over and over again. There are no professional musicians among Pygmies. Instead, all of them are expected to perform traditional polyphonic songs. Their musicality and ability to sing naturally in parts is quite astounding. 'When two or three Pygmies are gathered together, they always sing polyphonically; I have never heard Pygmy choral singing in unison,' wrote an expert of Pygmy music Gilbert Rouget in 1959. Polyphony up to seven and eight parts had been documented among Pygmies. Even among the black Africans, whose outstanding musicality and rhythmic sense has been highly revered by Europeans, Pygmies are considered to be the most skillful and talented musicians. According to Lomax, 'Even today Congo Pygmies are regarded by their Negro neighbors as master entertainers who can outperform them on their

own drums and in their own dances' (1968:18). Interestingly, borrowings by the Pygmies from the Bantu neighbors' musical cultures were those of different musical instruments. As for the vocal style, Pygmies had a tremendous impact on the singing styles of the whole of Central Africa. Central Africa, apart from Pygmies, houses plenty of Bantu peoples, who also have vocal polyphony, based on parallel polyphony, very much like in East Africa.

If the music styles of Central Africa are very much affected by Pygmy vocal polyphonic traditions, singing styles of **South Africa** will have some unique features due to the Bushmen's singing traditions. Bushmen and Hottentots are the aborigines of this region, and they have lived in Southern Africa for many thousands of years. About one thousand years ago, Bantu-speaking peoples came to this region from the north and pushed indigenous Bushmen and Hottentot populations into the deserts. Today there are virtually no Hottentots left, but there still are some groups of Bushmen, also know as San People. They are widely known for their unusual language, which uses plenty of specific click sounds. Bushmen have polyphonic singing which has very interesting parallels with the Pygmy polyphonic style. For example, the wide use of the yodel technique and the use of polyrhythm based on the rhythm of 'swing', consisting of combinations of two and three beats, is common both for Pygmy and Bushmen polyphony. Unlike Pygmies, Bushmen sometimes use polyphony based on canonic repetition of the main melody. Among the Bantu speaking peoples of South Africa (for example, among Zulus) the main type of polyphony is based on parallel movements of the voices, as it is in most of sub-Saharan Africa.

In **West Africa** there are two very distinct ecological regions and musical styles. The first region is close to the Atlantic Ocean and is covered with forests. These peoples who live in the costal forest regions generally have more polyphonic traditions which are based on the similar pan-African principle of parallel polyphony. The second region is more distant from the ocean and represents arid savanna and semi-desert. West Africans living in this region have close cultural, religious and commercial contacts with the peoples of North Africa and Sahara. Because of these links there are plenty of professional musicians and monophonic singing traditions in the savannah regions of Western Africa (influence from North Africa). Also, there is a tradition of drone po-

lyphony, unusual for most of sub-Saharan Africa (apparently influenced by influence from the Tuareg tribes of the Sahara desert).

The island **Madagascar** is not a part of sub-Saharan Africa. Although it is geographically close to Africa, musically (and culturally) Madagascar has strong connections with the Austronesian world of South East Asia and the Arabic countries. The Sub-Saharan element was possibly the latest to arrive to Madagascar. Madagascar vocal polyphonic traditions show links to African and Oceanic singing traditions.

The **Sahara** desert is usually considered a buffer zone between the monophonic North Africa and the polyphonic sub-Saharan Africa. However, because of its rich traditions of polyphony it must be discussed separately. I suggest that the Saharan polyphonic traditions belong to the European (particularly Mediterranean) musical family. This is particularly evident from the wide use of drone polyphony. This is hardly surprising, for the indigenous peoples of North Africa, Berbers and Tuaregs, belonged to European type of population and culture. After the advance of Arabian populations in the 7th century, some indigenous peoples were assimilated, and others moved into the Sahara desert. That's why the musical style in North Africa is so close to the Middle Eastern musical traditions with the developed traditions of professional music, virtuoso instrumental playing, and richly melismatic monophonic singing style. The Aborigines of North Africa, Tuaregs, who moved deeper into the desert regions, preserved their polyphonic traditions much better. Tuareg singing traditions also influenced the musical style of the peoples of West Africa. Older Tuareg traditions are better preserved among Tuareg women. Although Tuaregs are officially Moslems, old animistic religion is clearly visible in their religious beliefs, and an unusually high status of unveiled women (among Tuaregs, the men are veiled), their freedom of behaviour and social rights is unique among Moslem cultures.

So, to conclude, we can say that the sub-Saharan Africa and Sahara regions together are the biggest and most active regions of vocal polyphonic singing in the world. For celebrations and other musical activities in an African traditional society it is usual to have all the participating members of society at the occasion singing, dancing and clapping. Music still plays a crucial part in everyday life in Africa. It was not accidental that the brilliant study on human musicality, written by

British ethnomusicologist John Blacking, was mostly written from the perspective of sub-Saharan African musical traditions.

Europe

Although contemporary ethnomusicology was started by European scholars, most of the European polyphonic traditions came to the knowledge of European ethnomusicologists much later than the polyphonic traditions of the faraway regions of the world. This was largely due to the attitude of European ethnomusicologists towards the study of traditional music: it was believed that 'proper' traditional music can only be found in non-European societies. Because of this, for example, European scholars learned about African and Polynesian polyphony much earlier than about the polyphony of northern Greeks or southern Albanians.

Unlike Africa, where the distribution of polyphonic traditions is represented as one unbroken geographic region, most of the European traditions of vocal polyphony represent certain isolated 'islands', scattered all across the Europe.

A very important factor that must be taken into account in Europe is the influence of professional choral singing. As a result of the strong influence of European professional music, the original character of many European local polyphonic traditions has been strongly affected. Ethnomusicologists often mention the existence of 'old' and 'new' styles in the polyphony of European countries. The most important stylistic elements of the 'old' polyphonic style are the presence of a drone and very dissonant combinations of the sounds (internationally known from the Bulgarian or Georgian singing styles). 'Old' European polyphonic style is found in mountain ranges, continent fringes, forests, and islands. The 'new' polyphonic style, developed from the 18th-19th centuries under the influence of European professional music, can be recognized by the softly sounding triads and parallel thirds. The 'new' polyphonic traditions are found today throughout most of Europe.

East Europe. Russians, Ukrainians and the Belarus peoples, living in eastern Europe, have two different styles of singing: heterophony and

drone polyphony. Heterophony, as we may remember is an intermittent form of singing between monophony and polyphony. Heterophony in this region often has a specific character: apart from the heterophonic singing of the melody by a group of singers, there is often another, higher voice, sung by a single person, which provides a contrast to the heterophonic 'thick' melody. This style of singing is widely known as 'podgolosochnaia polifonia' (literary – 'polyphony of subsidiary voices'). Among Russians, Ukrainians and Belarus peoples, heterophony is distributed very widely and covers virtually all regions of eastern Europe. Drone polyphony, unlike heterophony, is distributed in several widely isolated regions: in the Bryansk, Kursk, Voronezh, and Belgorod districts of Russia. The most important regions of drone polyphony in East Europe are the Ukrainian and Belarus Polesie regions ('Polesie' means 'forest region'). Drone polyphony is also strongly present in eastern Europe among the Mordva and Komi peoples who live between the Volga river and Ural mountains. Elements of polyphony are also present among Udmurts, Bashkirs, Mari, Tatars, and Chuvashs.

One of the richest polyphonic regions of the Europe and the world is **Caucasia**. Caucasia, named after the Caucasian mountain ranges (highest in Europe), is known for its unbroken cultural history (language, traditional culture, music). Most Caucasian peoples have vocal polyphony. Georgian polyphony has several polyphonic styles in a relatively small geographical region. In eastern Georgia the most widespread style is drone polyphony, based on long melismatic melodies in free metre. In Western Georgia drone polyphony is also widespread, but the best known singing style here is the extremely complex contrapuntal polyphony with dissonant chords. Several international conferences on traditional polyphony were organized in Georgia from 1984 onwards, and in 2002 an International Research Centre for Traditional Polyphony was established at Tbilisi State Conservatory. Vocal polyphony, mostly based on drone, is also widely present among North Caucasian peoples. These are mostly peoples who speak indigenous Caucasian languages: Abkhazians, Circassians, Chechens, Ingushes, and Dagestanians. Polyphonic singing is also present among Ossetians, who speak Indo-European language, and Balkarians and Karachaevis, who speak Turkic languages. Two other big Caucasian peoples, Armenians and Azerbaijanis, only have rich monophonic singing traditions.

Another very important region of distribution of vocal polyphony in Europe is the **Balkans**. There are two main styles of polyphonic singing in the Balkans: the old style and the new style. The old Balkan style of polyphony includes such characteristics as very dissonant, piercing harmonies, and the wide use of the drone. This style of singing is present in virtually all Balkan countries (southwestern Bulgaria, southern Albania, most of Serbia, Macedonia, and Bosnia and Herzegovina, southwestern Montenegro, mountainous regions of Croatia and Slovenia, and the northern tip of Greece). This style is mostly present in more isolated mountainous areas. The new polyphonic style is heavily influenced by European professional choral music, and is known in Balkan countries under the term 'singing on bass.' Romania is possibly the most monophonic country in the Balkans, although there are some isolated polyphonic traditions here as well.

North Europe. North Europe stretches from Scandinavia and the Baltic countries to Iceland. By the beginning of the 20th century the live traditions of older style of vocal polyphony were found only in the Baltic countries and Iceland. Among Baltic countries, the Lithuanian vocal singing style 'sutartines' is best known among western ethnomusicologists. It is a unique blend of canonic polyphony and secondal dissonances. In Latvia drone polyphony is totally dominating, and is sometimes based on very sharp dissonant chords. Estonia is mostly monophonic, although a small group of people, Setu, have vocal polyphony, and also examples of drone polyphony were recorded in the western regions of Estonia. In Scandinavia the situation is different: Finland is almost completely monophonic; from Norway and Sweden there are literary sources indicating that they had rich traditions of vocal polyphony which were gradually lost. The situation is mostly the same in Great Britain among English, Irish, and Scottish peoples. Literary sources of the 12th-13th centuries describe their rich traditions of polyphonic singing, but today there is very little polyphony found, instead there is the late European singing style. In nearby islands (Shetland, Hebrides and Orkney) more traditional types of vocal polyphony are still alive. In Iceland a very interesting tradition, known as 'twisongur,' was recorded in the beginning of the 20th century. This tradition is mostly based on the parallel movement of voices in interval fifth and has a truly unique scale with an augmented octave, unheard in European classical music

and most traditional musical styles, where the octave is always perfect (augmented octave is also present in Georgian, particularly western Georgian polyphonic traditions).

Central Europe. Singing in Central European countries has been strongly affected by the European professional musical culture. Austria is possibly best known for its classical music-influenced polyphonic traditions, and particularly for rich traditions of yodeling. Possibly because of this Austria is very active in organizing conferences on European traditions of vocal polyphony. Switzerland is another very polyphonic country, particularly German and Italian parts of Switzerland. Germany, Belgium and Holland, and particularly Czech Republic also show a late European-influenced singing style. In Slovakia the ancient 'Balkan type' secondal polyphony makes appearances in a few villages in the northwestern corner of the country.

Western Europe. France, together with Finland, are the most monophonic countries of the Europe, although a centre for the research of traditional polyphony was operating in France (organized by Simha Arom) during the 1990s. Only ethnically different Basques from the Pyrenees and also particularly Corsicans have rich traditions of vocal polyphony in France. In Corsica, richly ornamented two melodic lines freely develop on top of the drone bass. In Portugal, women's polyphonic tradition is present in the northern tip of the country, and men's polyphonic singing is mostly alive in the southern half of the country, the region Alentejo. Polyphony in Spain is also mostly influenced by European professional music (including the polyphony of pre-Indo-European Basques), although in the Albacete region more unusual, rhythmically free drone polyphony with melismatic melody was recorded in the 20th century. Italy is one of the most polyphonic countries of Europe. Northern Italy (alps) is the home of late European style choirs, and Italian cities are also known for their elaborate urban polyphonic singing traditions (like Genovese 'trallalero'). In central mountainous Italy there are regions with interesting older style close to the Balkan dissonant style, and according to historical sources, this style was wider spread in medieval times in Lombardy and Milan. Polyphonic traditions are also strongly present on Italian islands – Sicily and particularly Sardinia. Sardinian polyphonic tradition, known as 'a tenore' is based on

four part polyphony where drones and specific timbres play an important role.

So, polyphony is represented widely in Europe. More mountainous regions retained the earlier style of polyphony, based on drone and dissonances, and other regions have a later style of polyphony, based on parallel thirds and triads, influenced by professional choral singing practices.

Asia

Asia is generally known among ethnomusicologists and the general public as a region of very rich and elaborate forms of monophonic music, but with very little polyphony. The size of Asia, and particularly the size of Asian population makes it very difficult to be sure that all the polyphonic traditions of Asia are already known. In most Asian countries local scholars do not pay attention to local polyphonic traditions. There are several reasons for this: (1) polyphony in Asia is only found in the most isolated geographical areas, among high mountain ranges and deep forests, and it is not easy to find these traditions and study them (2) polyphonic traditions are mostly present among national minorities, not the main populations of the respective countries, and (3) scholars mostly concentrate on the most important musical traditions of the cultural identity of Asian countries, usually the rich traditions of professional music, so the traditions of vocal polyphony remain mostly outside of their interests. Because of these reasons I expect that we will be learning about more polyphonic traditions from Asia in the coming years.

Let us now review Asian vocal polyphonic traditions.

A very interesting tradition of vocal polyphony is found in the **Persian Gulf**, mostly among the Bahrain pearl-fishers. It is based on a very deep drone (considered to be an imitation of the sound of a whale from the deep of the sea), sung by a group of fishermen, and a highly melismatic melodic line. In the Middle East we can also mention elements of vocal polyphony in some Jewish groups, particularly drone polyphony

among **Samaritans**. Elements of polyphony are also found in Syria and Yemen.

One of the most interesting polyphonic traditions in Asia is found in eastern Afghanistan, in the impenetrable Hindukush mountains, among **Nuristanians**. Their long cultural isolation is believed to be the main reason for the survival of many unusual features of Nuristani culture and even their physical appearance (blue eyes and fair hair). Nuristani traditional singing is amazingly close to the 'old style' of European polyphony, using secondal dissonances around the rhythmic drone (see the box "Nuristan: Descendants of Alexander the Great?).

According to the available information, polyphonic singing is also present in the highest mountainous region of the world: in Tibet. At least one example of drone polyphony from Tibet was known to European scholars almost a century ago, and recently Chinese TV broadcasted Tibetan singers singing extremely interesting 'old European' style three-part dissonant polyphony. Apart from Tibet, there are more that 20 ethnic minorities in China who have vocal polyphonic singing, and they mostly live in the southwest of China. Different styles of singing can be found among them: drone polyphony, canon, ostinato, and heterophony. Unlike many other Asian countries, Chinese ethnomusicologists paid great attention to researching the polyphonic traditions of their minority peoples.

In India polyphonic singing is present in the southern part of the country, among the so called 'tribal peoples' of India. It is mostly based on parallel movement of voices and is mostly neglected by local scholars. Parallel polyphony from the north-eastern part of India, Assam, is much better known among ethnomusicologists. According to some information, there are also traditions of drone polyphony in Northern India, in Jammu, Kashmir, and Kumaon.

South-East Asia is one of the most important regions of distribution of polyphonic traditions in Asia. Marius Schneider was sure polyphony was 'invented' here. Mountainous national minorities of central and particularly north Vietnam have polyphonic singing, among them parallel and drone polyphony, some with sharp dissonant chords. According to available information, some other South-East Asian countries (like Nepal and Burma) also have vocal polyphonic traditions, but they are not documented and researched. In Indonesia polyphony is

NURISTAN: DESCENDANTS OF ALEXANDER THE GREAT?

Nuristan polyphony is possibly the second most isolated tradition of vocal polyphony in the world. Hidden from the expansionist politics of Arabs, Mongols, and Persians behind the impenetrable Hindukush mountains in East Afghanistan, about 150 000 Nuristanians maintained their independence until the end of the 19th century. As you would expect from people who live in such isolation, Nuristanians maintain plenty of elements from their pre-Moslem practices, most notably music with unique polyphony and dancing. They also look differently from neighboring peoples, with a large number of men and women with fair hair and blue eyes. Both men and women sing three-part polyphonic songs with a drone and secondal dissonances. With all its characteristics, Nuristani polyphony is amazingly close to Balkan and Baltic polyphonic traditions.

So, what is Balkan-type polyphony doing in the Hindukush mountains in Afghanistan? According to local legends,

only present on some islands, like on Flores and Sulawesi. Polyphony on the island Flores became widely known to ethnomusicologists relatively early and caused a strong shock among scholars for its obvious resemblance to the polyphony of Balkan peoples.

Possibly the richest and the best researched polyphonic traditions in South-East Asia are found in Taiwan. Millions of western listeners have heard Taiwanese traditional two-part polyphony without realizing they were listening to a Taiwanese traditional song, because when the British rock-band 'Enigma' used the recording of an Amis' two-part polyphonic harvest song as the main melody for their 1994 worldwide hit 'Return to Innocence', they did not acknowledge the source of the song, singers, the original recording and even ethnic origin of the song. Polyphony in Taiwan is found among different tribes (like Ami, Bunun, Paiwan) living in mountains. There are several different styles of polyphony in Taiwan: contrapuntal polyphony, canon, heterophony, chordal and drone polyphony, including very dissonant 'old European' type polyphony. Taiwanese polyphonic traditions were researched in depth by Japanese scholars before the World War 2. In 2002 the international conference on traditional polyphony was organized in Taiwan (so far this was the only such conference held in Asia).

The most isolated polyphonic tradition in the world is in East Asia, amongst the Ainus, the aboriginal people of the Japanese Islands. Ainus live on the Hokkaido and Kuril Islands, and despite the important studies of Tanimoto Kazuyuki, their polyphony is still relatively unknown to European and American ethnomusicologists. Ainu polyphony is based

the unusual features of Nuristani culture and physical appearance are a result of a prolonged friendly visit of the army of the Alexander the Great in the 5th century BC. The amazing musical closeness to the Balkan singing style can also add to this romantic hypothesis. To be more realistic, it seems to me that Nuristani polyphony is a remnant of the ancient common layer of European polyphony which was once widely spread from Europe through Central Asia to the regions of East and North Asia (up to the Ainu people on Hokkaido). Unfortunately, Nuristani polyphony is still mostly unknown even to professional ethnomusicologists, who are interested in traditions of vocal polyphony. Furthermore, no research on the history of Nuristani has taken into account their unique tradition of polyphonic singing. Finally, I want the readers of this book to know that many more parallels with the same 'Balkan' type of polyphony can be found in other regions of the world, however we will be discussing this issue later in the book.

on the principles of canon, drone, and contrastive polyphony (see the box "Mystery of Ainu Polyphony").

Central Asia, as we mentioned earlier, is home of unique overtone singing tradition, where one person produces two pitches: drone and very high whistling melody. This tradition is spread in Tuva (particularly western Tuva), western Mongolia, and in the Altai-Sayan mountain ranges.

To summarize, we can say that although Asia is definitely more monophonic than polyphonic, there are still some very interesting and rich polyphonic traditions. These traditions are found in isolated regions, mostly among high mountain ranges, islands or big forests. These traditions are difficult to find and study, and they are also often neglected by local ethnomusicologists. Study of Asian polyphonic traditions is a very prospective field for Asian native ethnomusicologists.

America

Among the **North American Natives,** group singing (particularly with the accompaniment of drumming) is widely spread but singing is mostly done in unison. As we remember, singing in unison is social polyphony, although musically it is still monophony. True polyphonic singing (where both the social and musical factors are polyphonic) is also present among native North Americans.

MYSTERY OF AINU POLYPHONY

There are many isolated polyphonic traditions, but I believe that the polyphony of the Ainus is the most isolated vocal polyphonic tradition in the world. Isolated in East Asia, one of the most monophonic regions of the world, Ainu polyphony is a total mystery for scholars. Ainus are also unique on many other accounts. Their language is a so called 'language-isolate'; their physical appearance with huge beards still creates heated debates between geneticists; the central element of their culture, the Bear Cult, has amazing similarities to the bear cult of European Neanderthals'. There are several possible explanations for the origins of the Ainu people, suggesting that Ainus might be connected to: (1) early Asian population, (2) ancient European populations, (3) Australian Aborigines, (4) Taiwanese Aborigines. Considering their prominent beards, the Ainu should not be related to

Northwest Coast natives from so called British Columbia (Nootka, Kwakiutl, Salish, Makah) are possibly the most polyphonic in North America. They often use drone polyphony. Drone was in some traditions the highest part (as among the Makah) as well as the lowest part (Salish Indians). The drone was sung mostly by women, and they were often ridiculed by the men for 'not being able to sing the melody of the song.' There are also bits of information available on the vocal polyphony of the Eastern Coast natives (for example, Menomini, Delaware and Fox Indians). Drone was the leading form of polyphony here too, and again mostly women were singing it. Among Southwestern USA natives polyphony was noted among the Yaqui, Papago, and Creek groups. In these traditions again mostly women sang the drone, which was placed higher than the melody. Among the Plain natives vocal polyphony was noted among Oglala Sioux (parallel thirds), and the Arapahos practiced polyphony in cadencial sections of songs. In an article dedicated to the polyphony in North American native music, Bruno Nettl also mentions the tradition of Peyote songs from the Arapaho, where the singer was specially 'tuning' his kettledrum to accompany his own singing with a kettledrum rhythmic drone. Vocal polyphony has also been recorded amongst southern Californian natives, although today this traditions is lost.

According to Bruno Nettl, out of the six musical areas identified in his seminal work on Native American music, 'only two, the Great Basin and the Athabascan, one an exceedingly simple style and the other represented only by the Navaho and Apache, lack references to Polyphony' (Nettl, 1961:360).

East Asian populations and Taiwanese aborigines, but can be related to Europeans and Australian aborigines; According to their polyphony Ainu cannot be related to the monophonic East Asians and Australian aborigines, but can be related to Europeans or Taiwanese Aborigines. Genetic studies cannot make a definitive contribution to the origins of the Ainu, even more so as there is hardly a single pure-blooded Ainu left. Unfortunately, in the search for the Ainu origins, their truly unique polyphonic singing tradition has been totally neglected thus far. To those who would be interested in incorporating Ainu polyphony in the search for Ainu origins, I can say that the Ainu traditions of vocal polyphony point to the direction of the ancient European populations or Taiwan Aborigines. The central principle of Ainu polyphony – canon – shows interesting parallels to a polyphonic tradition of one of the European countries – the Lithuanian 'Sutartines'.

Among **South American natives** the traditions of vocal polyphony are ostensibly richer than amongst North American natives, but the available information is rather unorganized and vague. Also, to my knowledge, no musical examples are available.

Possibly the most interesting is the singing tradition of the Q'ero people, who live near Cusco in Peru, on the high slopes of the Andes. Currently only about two thousand Q'eros are left. Scholars consider them as carriers of pre-Inca traditions. Most importantly for our topic, the Q'eros have a unique tradition of polyphonic singing where several melodies are sung together with the drone occurring in the cadences or ritual refrains. Among the Waraos from the eastern Venezuelan tropical forests, a ritual for curing, involving polyphonic singing by shamans, had been recorded. If the patient was an important person, the singing of two or three shamans was required, with the audio result resembling a free round.

Natives from the Amazonian region of Peru are known for their heterophonic-like two-part polyphony in intervals of fourths and canonic singing. According to Anthony Seeger, 'most Indian music is associated with ritual; it has little harmony or polyphony, and what polyphony it has is unfamiliar to unaccustomed ears' (Seeger, 1998:135). Heterophonic and canonic singing is present among the Venezuelan natives. Although free rhythm is quite common in their solo songs, polyphonic songs, particularly those accompanying dances, have a strict rhythm. The influence of European choral singing style is felt in the singing of different South American tribes. For example the 16th-17th century European polyphonic style is preserved among the highland Maya.

Another important feature of South American musical traditions is the abundance of polyphonic blown instruments – double, triple and even quadruple flutes were found during the archaeological excavations of pre-Columbian America. We will discuss the issue of polyphonic blown instruments and their possible indication of the earlier presence of vocal polyphony in the next chapter of the book, where I will talk about the possibility of the practice of vocal polyphony in ancient civilizations.

Polynesia

Polynesian polyphony became known in Europe in the 18th century, possibly earlier than any other polyphonic tradition. It was actually a shocking discovery for European musicians, as they believed that polyphony, as a feature of a higher musical civilization, was invented by Christian monks in Europe. Then suddenly, the very first encounters of European travelers in the 18th century with the Pacific Ocean Island communities brought to light their strong polyphonic traditions. According to some early descriptions, Polynesians had drone polyphony with dissonant harmonies. While early travelers' notes were very precise about the wide distribution of polyphonic singing tradition in Oceania, some European professional musicians still doubted the ability of Polynesians to sing in different parts, as they believed it 'a great improbability that any uncivilized people should, by accident, arrive at this degree of perfection in the art of music, which we imagine can only be attained by dint of study, and knowledge of the system and theory upon which musical composition is founded . . . It is, therefore, scarcely credible, that people semi-barbarous should naturally arrive at any perfection in that art which it is much doubted whether the Greeks and Romans, with all their refinements in music, ever attained, and which the Chinese, who have been longer civilized than any other people on the globe, have not yet found out' (cited from Kaeppler et al., 1998:15). It took more than a century and the discovery of many more vocal polyphonic traditions in different parts of the world untouched by European civilization (including the central African rainforests and Papua

New Guinean jungles) to convince professional musicologists that not all polyphony was an invention of medieval monks. But let us leave this matter until the second and third parts of the book.

The great success of Christian hymns in Polynesia was the result of the natural closeness between European polyphonic traditions and the polyphonic traditions of the Oceanic peoples. Although polyphonic singing in many Polynesian islands is strongly influenced by European choral music, we can still say that Polynesia is one of the most important regions in the distribution of traditional vocal polyphony in the world. This is true not only for such big and well-known groups of islands such as Tonga, Samoa or Tahiti, but for small and isolated islands, like the mysterious Easter Island in the east, or tiny islands like Luangiua, Bellona, Tikopia, Anuta) in the very west of Polynesia.

Melanesia

Together with Polynesia, Melanesia represents one of the richest regions of distribution of polyphonic singing. At the same time, unlike Polynesia which had been strongly affected by late European choral singing style, polyphonic singing in Melanesia has retained traditional features. Possibly the best-known polyphonic style in Melanesia is two-part singing based on drone and dissonant intervals. The parallels with so called ancient European polyphonic styles are so obvious that, shell-shocked, Jaap Kunst dedicated a special book to the comparative study parallels between the polyphonic singing of Flores, Indonesia, and that of the Balkan mountains. Later, Australian ethnomusicologist Florian Messner also researched this amazing closeness of these polyphonic traditions and found out that even singers themselves find it difficult to distinguish their own singing from a singing style of a place many thousand kilometres away. As we will see later, amazing parallels are present not only between Flores and the Balkans, but between many other polyphonic regions around the world. In the polyphony of Guadalcanal Island and a nearby small volcanic island Savo there exists a drone above which two solo parts interweave melodic lines. They also use the yodeling technique. Women's polyphonic singing is also based

on a continuous drone. Guadalcanal is also famous among ethnomusicologists for the rich traditions of polyphony in panpipe ensembles.

New Guinea is also an important region for polyphonic traditions. West Papua is home to several mountain peoples (Moni, Dani, and Yali) from the Central Irian Jaya regions, who widely use vocal polyphony. Drone-based polyphonic tradition with secondal dissonances has been recorded in the north-east of New Guinea, on Manus Island. Vocal music of the native peoples of Borneo (most notably, Kenyah and Kajang) also features drone polyphony.

According to the available information, Micronesia does not have the same strong polyphonic traditions that we discussed in relations to Polynesia and Melanesia. Group singing is widely distributed in Micronesia, but singing is mostly based on unison or heterophony.

Australia

Despite the fact that traditional music of the Australian aborigines is largely defined by group singing, polyphony is not characteristic of the indigenous populations of this continent. If we do not take into account the singing traditions of late migrants from different parts of the world, we may say that Australia is the most monophonic continent of our planet. The only tradition that contains polyphony is the vocal-instrumental forms, particularly in the northern tip of Australia, where the didgeridoo provides a drone and the singing voice creates a two-part vocal-instrumental polyphony. According to available information, polyphony is not performed in a purely vocal form among Australian aborigines.

We have now finished the overview of the distribution of vocal polyphony in the contemporary world, and we have seen how complex it is. In many parts of the world (Europe, Asia, Americas) polyphonic traditions are often distributed in geographically isolated regions, mostly mountains, islands, forests, or continental fringes. Only in sub-Saharan Africa is the tradition of polyphonic singing spread in one continuous region.

To answer the question of why do people sing, we must remember that the reasons why humans sing today can be different from the reasons why people sang a few centuries or few thousand years ago. Yet still, the best chance for us to start understanding the role of singing in human life is to observe the phenomenon of singing in the contemporary world. As we have already done this, now we can move on and discuss the origins and interaction of different polyphonic styles, which we will do in the next chapter of this book; and then, in the third chapter of this book, we will discuss the origins of the phenomenon of polyphonic singing.

CHAPTER TWO
Singing in Human Cultural History

In the first chapter we discussed the worldwide distribution of choral singing styles. We only had occasional references to important historical sources. This chapter is fully dedicated to the historical issues of human group singing, so we will be going back in the history and prehistory of human musical cultures. Of course, unlike the first chapter, which was an overview of currently available facts, this chapter will be mostly based on a hypothetical reconstruction of the history of human singing. As such, it will gradually prepare a steady basis for tackling the origins of the phenomenon of human choral singing.

The circle of issues we are going to discuss brings us to the necessity of the wide use of comparative methodology. Many of my colleagues are aware that comparative studies are often viewed in contemporary ethnomusicology with great suspicion and sometimes even animosity, so I think before going into the main part of this chapter we need to discuss, at least briefly, the history of comparative studies in ethnomusicology.

Comparative vs. Regional Studies

After the Second World War the centre of ethnomusicology shifted from Germany to the USA. This was not only a geographical, but also an important paradigmatic shift in ethnomusicology. To put it very simply, wide comparative studies, drawing conclusions from comparing musical cultures of the different parts of the world, were replaced by deep regional studies focused on one culture or tradition. Methodology of regional studies is based on the traditions of cultural anthropology, and the main aim of this method is to go into the depths of a studied culture. Ethnomusicologists who follow this paradigm try to look at every aspect of a studied culture. In order to get a deeper 'vertical' knowledge

of the whole system of social interaction and musical life, they conduct multiple fieldworks in the same region, learn the local language, live among the members of the society for years and learn to play local instruments. Such a high standard of dedication to get into the complex system of social and cultural life of any country, region or even a village under study, of course, gives unique insight into the studied culture, but at the same time it severely limits the number of cultures any scholar can study during his or her lifetime. As a result, most of the scholars who follow this paradigm consider themselves as experts of very few (usually only one) culture or a region.

On the other hand, comparative study, used by pre-war German and European scholars, had diametrically different aims and methods. Comparative methodology was geographically spread and did not go deep, or 'vertically', into every culture under comparison. We could call this method 'horizontal study'. Scholars would study and compare several cultures, sometimes from totally different regions of the world and without a deep knowledge of these cultures. In their studies, comparativist scholars had to rely on available materials from cultures they had never have visited. Of course, no comparativist scholar would consider doing prolonged fieldworks, or committing themselves to such a lifetime task as learning native languages of the compared cultures. Neither Schneider nor Nadel, authors of 'Caucasian/Georgian origins of European professional polyphony hypothesis' have ever visited Georgia or Caucasia. As a result, a comparativist ethnomusicologist would have a geographically wider knowledge of a studied musical phenomenon, but not a deep knowledge of the compared cultures.

After the Second World War the comparative method was discredited and rejected, together with the major part of comparative studies of pre-war Germany. A renowned American ethnomusicologist from the UCLA, Timothy Rice told me about this in Rio de Janeiro in 2001, during the ICTM Conference: 'the baby was thrown out together with the bath water'. Perhaps it is not a mere coincidence that Timothy Rice's most recent and widely discussed article in the journal Ethnomusicology (Rice, 2010) calls for a broader look at the problems and the creation of wider theoretical models in ethnomusicology.

Some of my colleagues, who favor the principles of cultural anthropology and follow only the methodology of deep regional studies, some-

ALTERNATIVE HISTORY OF COMPARATIVE STUDIES IN ETHNOMUSICOLOGY

The history of ethnomusicology is usually portrayed as a paradigmatic shift from wide comparative studies to deep regional studies. In terms of Western European scholarship this is certainly true, but this might not be a universal trend. For example, according to the history of the studies of my native Georgian traditional music, the study of regional traditions has been paramount for Georgian scholarship from the 1860s until the 1980s. Paradoxically, during the last few decades, long after the establishment of the so-called new non-comparative paradigm in Western ethnomusicology, Georgian scholars expressed more interest in comparative studies. The same can be said about the history of the study of traditional music in Russia, where research of regional traditions also dominated until the 1960s. The same is also true for Ukraine, Armenia, Azerbaijan, Lithuania, Portugal, Greece, Bulgaria, and in many other countries around the world. As a matter of fact if you count summarily, the comparative works coming mostly from representatives of the great Berlin school of comparative musicology during the first half

times criticize comparativist colleagues for their superficial knowledge of many cultures, calling them 'armchair ethnomusicologists.' On the other hand, a few other of my colleagues, who prefer wider comparativist studies, criticize proponents of deep regional studies for their narrow research interests and the lack of interest in recognizing more universal patterns. There is not much sense in discussing which of the abovementioned methods is 'better'. I hope that readers and most of my colleagues would agree that the method of any particular study should be relevant to the research goal of the study. If we want a better understanding of the social and musical life of a North Indian village, a gamelan-centered community musical life in Bali, or an urban society in Northeast Brazil, we need to spend months and years getting into the details of their social, economic and cultural life, understand their language and feel the flow of their everyday life. We simply cannot fulfill such a task only by going to the library and reading published accounts about this culture, region or country, or even visiting the region on short fieldtrips. On the other hand, if we want to understand the history of the development and distribution of, say, string instruments, drone polyphony, or lullabies, we cannot accomplish this goal by having long periods of fieldwork in one village or one country, learning the language and studying one tradition in amazing depths of detail. Instead, we will need to conduct a wide comparative study, using all the available resources that sophisticated contemporary libraries and the internet

of the 20th century, were a minority compared with the many hundreds of regional studies conducted by native scholars in the same period. If we try to summarize the gigantic output in ethnomusicological research throughout the world, we will find that in most national scholarships of the world, the share of comparative studies has actually increased after Second World War.

Another interesting topic is why German scholars became leaders in comparative research of the universal laws of music. Germany was as a great European power without colonies, so German musicologists were devoid of the possibility to study non-Western musical traditions in their own colonies. Let us remember that English, French, Dutch and Japanese musicologists were primarily studying musical traditions of the peoples that in one or other way were connected to their own countries. I think the absence of colonies was one of the main reasons that pushed German scholars towards the 'armchair study' of the traditional music of many peoples, mostly without visiting these peoples at all. The First World War actually became a great fieldwork opportunity for German scholars, and German and Austrian recordings from war prisoners are still of great scholarly interest.

can provide, and generally try to get as much possible additional information from any other available sources, including commercially available CDs and archived materials.

If we still try to compare the regional and comparative methods, we have to acknowledge that deep regional study is the 'backbone' of ethnomusicology, because regional studies can certainly exist without comparative studies, whereas comparative studies directly depend on the amount and quality of regional studies.

Before the Second World War there was obviously an insufficient number of regional accounts for comparative studies to rely on. Therefore, global theories about the general rules of the development of human musical cultures, or about the cultural 'borrowings' by one culture from another, were based on a mixture of inferior facts and incomplete second- and third-hand information.

Today, with a growing number of high-quality, in-depth studies from many regions of the world, I believe we are ready for the return of comparative ethnomusicology (see the box: 'Alternative History of Comparative Studies in Ethnomusicology').

This book itself is an example of a comparative study. Although the author of this book is Georgian and his primary expertise is Georgian (and Caucasian) traditional polyphony, as soon as he started researching the origins of polyphony, it became obvious that for these goals deep knowledge of Georgian polyphony was not enough, and that he

needed to widely study the phenomenon of polyphony, its patterns of distribution, and possible connections between the different polyphonic traditions of the world.

Now, before we start analyzing the available facts from a comparative perspective, we need to discuss the methodology of comparative studies. Let us look at the next section of this book which addresses this problem.

How can we to compare polyphonic traditions?

Let me start with an example from the musical life of my native Georgia. There was quite a historical 'cultural shock' in Tbilisi, the capital of Georgia, in the second half of the 1980s, when the Soviet Union's Central TV program 'The Rainbow' broadcast a film about the singing traditions of Corsica. Georgians were telephoning each other while the program was still on, urging their friends and relatives to switch on their TV and listen to the polyphonic singing that 'was not Georgian but sounded exactly like it'.

A few thousand kilometers away, in the northern part of the USSR in St. Petersburg, at the very same time when the same TV program was still on, one of the leading experts of folk musical instruments, ethnomusicologist Igor Macievsky called his colleague, Izaly Zemtsovsky: 'Izaly Iosifovich, listen and tell me who is singing now' asked Igor with a pleasant anticipation of a wrong reply from his former teacher and world renowned ethnomusicologist, holding the receiver closer to the TV set. 'Surely these are Georgians, but I am not sure which region of Georgia they are from' came the puzzled reply Igor was expecting. In a way, Zemtsovsky's reply was a very good guess, because if you have never heard Corsican polyphonic singing and if you know Georgian singing very well, then Corsican polyphonic singing does sound extremely 'Georgian'.

Interestingly, just a few years before that historical broadcast, I started working on a search of vocal polyphonic traditions that were, in my opinion, historically related to Georgian traditional polyphony. In the eyes of many of my friends and colleagues my research had the

wrong goal, because Georgian polyphony was considered to be too unique to have close relatives anywhere in the world. The TV program on Corsican music changed the attitude of many of my colleagues and relatives. 'Now that I have listened to that amazing Corsican singing,' one of my older musicologist friends, Gulbat Toradze, told me, 'I have started believing you are right – there are some traditions that might be closely related to Georgian polyphonic singing'.

Only very recently, in 2008, after meeting in Corsica a brilliant local singer, Philippe Rocchi, I found out that Corsican traditional musicians also had a similar musical 'shock' when they first heard a recording of Georgian traditional polyphony in the beginning of the 1970s.

So, we are coming to the crucial question: what should be the basis for comparative research? (1) our audio impressions, or (2) the results of stylistic analyses? Of course, hearing is our first and foremost tool, but we need to remember that our first audio impression can be very strong yet very misleading at the same time. As Izaly Zemtsovsky once said to me, the fugue of J.S. Bach, performed on the Kazakh traditional instrument, instantly sounded like a piece of Kazakh traditional music. We must remember that if we want to analyze parallels between different polyphonic traditions, we should rest our research on the appropriate fundament of stylistic analyses of the compared cultures.

The closeness of Georgian and Corsican polyphonic traditions was based first and foremost on a strong audio impression. Audio impressions have a much stronger emotional effect on the listener than a detailed stylistic analysis. Some of my Georgian friends (including professional musicologists) did not believe in the possibility of Georgian polyphony having any 'relatives' among other singing traditions, until they heard Corsican singing. Stylistically, the polyphony of Corsican and East Georgian table song are different as Corsican polyphony is based on a European professional harmonic system whereas Georgian polyphony is not. During my research in the 1980s and the 1990s, I came to the conclusion that some other polyphonic traditions (for example, Albanian polyphony) are stylistically closer to Georgian polyphony than Corsican polyphony, although they do not sound as similar to the Georgian sound as Corsican polyphony does.

The employment of the right method is crucially important for any research venture. The same is true for the comparative study of poly-

phonic cultures. The method I am going to employ is very simple. It is based on a specific set of stylistic parameters of polyphonic traditions. However, before we discuss the set of stylistic parameters for the classification and comparative study of part-singing traditions, we need to discuss in the first place whether we can trust music for any kind of diachronic conclusions. So, the next crucial question that we are going to discuss is how deep musical data can go in the past of human history, or simply – how stable is music?

What is more stable: Language or music?

To some readers this might sound a silly and 'non-scholarly' question. In fact this is a very serious question, and I remember quite a few heated discussions on this topic at several ethnomusicological conferences. So, what is more stable: language or music? I guess, for many readers, music is considered one of the most unstable elements of human society and culture. 'Look at the languages,' they might say, 'languages come throughout human history and cultures for hundreds and thousands of years. They do not change quickly, they do not follow a fashion, and there are certain rules of very slow changes that languages undergo during the centuries and millennia. And now look at musical styles – they change almost every decade, and different songs travel across cultures and state borders with amazing ease. Of course, language is much more stable than music, no question about this.' I guess that the majority of linguists will be in this camp.

But this opinion is not the only one on the topic. Now let us listen to another opinion. According to this point of view, music can be extremely stable. Again, although it might be difficult to specify exactly how stable music can be, the proponents of this opinion would argue that music is much more stable than language. They can name countless examples when people (or a part of a people), for different historical (political, economical, migration) reasons, lose their language but still keep alive their musical traditions. 'Besides,' they would say, 'even the most sophisticated linguistic analyses can not go further than four or five thousand years back in human history. Now look at the traditional

musical cultures of the world – you may see musical traditions that go back in history from many more thousands or even tens of thousands of years. Of course, music is much more stable than language, no question about that'. At least some ethnomusicologists would agree with this opinion. For those who do not believe that there is something serious behind this bold assertion, I would like to present a couple of historical examples of the stability of musical traditions from cultures I know:

(1) Ossetians live on both sides of the central part of the Caucasian mountain range in Russia and Georgia. They speak an Indo-Iranian language and were considered to be the descendants of the Medieval Indo-Iranian tribe, Alans. A study of the physical features of contemporary Ossetians, Medieval Alans, and the earlier Caucasian population of this region revealed that in fact, Indo-Iranian Alans did not have much impact on the genetic make-up of the Ossetians (Alexeev, 1974:197-200). Instead, there is a clear morphological continuum between the earlier Caucasian population and contemporary Ossetians. This means that a change of language occurred without the change of a major part of the indigenous population. Scholars are well aware of cases where language is lost without the population being replaced. The music of the Ossetians, unlike their language, shows a clear relationship with other, indigenous Caucasian populations. This brings us to the conclusion that the old Ossetian population of the Central Caucasian Mountains lost their language, but their musical traditions (together with their physical features) survived the painful process of their cultural assimilation.

(2) The neighbouring Balkarians and Karachaevis from central Caucasia represent the same kind of historical story. Both of them speak a Turkic language, are Moslems, and were believed to be the descendants of late medieval Turkic tribes who brought the Turkic language and Moslem religion to the North Caucasus around the 16th-17th centuries. Anthropological surveys of the Balkarian and Karachaevian populations proved that, as in the case of the Ossetians, there has been no serious trace of a genetic relationship between the Balkarians and Karachaevis on one side, and the population of the late medieval Turkic newcomers on the other side. Instead, there is an obvious genetic continuum between the earlier Caucasian population and the Balkarian and Karachaevian populations (Alexeev, 1974:200-203). This means that the old Caucasian population adopted the new language and religion with-

out being physically replaced by the carriers of this new language and culture. Their music, unlike their language, has not been assimilated in this process.

(3) Another example of the solid stability of musical traditions could be the mountainous Balkan region. This region is a tapestry of different Indo-European languages, at least two major religions and countless cultural traditions. At the same time, physical anthropologists propose that the populations of the mountainous regions of the Balkans show an obvious morphological unity within the Balkan mountain ranges, and that also there is a genetic continuum leading from the ancient pre-Indo-European population, the so-called 'Dinarian' anthropologic type. The ancient Dinarian type is the best represented among the populations of southwestern Bulgaria, the northern mountainous Greece, the mountains of Albania, Macedonia, Serbia, Montenegro, Croatia, Bosnia and Herzegovina. These populations currently have different languages and different religions, which means that new languages and religions spread here without the replacement of the indigenous population. Apart from physical anthropology, music also shows clear signs of the ancient unity of all these regions. A drone style of polyphony with specific dissonant harmonies is spread throughout virtually the same mountainous regions as the Dinaric physical anthropologic type is: southwestern Bulgaria, the population of North Greece, mountainous (mostly southern) Albania, Macedonia, Serbia, Monte Negro, Croatia, Bosnia and Herzegovina. So we again witness the change of languages in the population in the course of history without major demographic changes. Despite the language change, the ancient unity of the singing traditions on the Dinaric Mountains was preserved throughout the millennia by their polyphonic singing traditions.

I hope that these few examples of the stability of singing traditions are enough to demonstrate that music can be very stable. So, despite all the fashion-like kaleidoscope changes of musical styles and popular melodies, there is something extremely stable in musical traditions too. This is exactly what we are going to discuss next.

What are the Stable and the Mobile Elements of Musical Culture?

We must remember that any musical tradition is a complex phenomenon with a whole set of different elements. While some elements of musical language are unbelievably stable, other elements can be extremely unstable. They can easily be lost or obtained, or go traveling across cultures and territories. For example, song melodies or certain musical instruments can become cross-culturally popular and quickly spread over large territories within a very short period of time. So, melodies can travel, and certainly, musical fashions can change, and still, there are some elements of music that are extremely stable. Distinguishing stable and mobile elements is methodologically crucial, as stable elements are the ones we want to rely on for comparative studies and historical reconstructions.

To discuss this issue, I would like to present three not-so-ancient cases of cross-cultural musical contact, where all the participants and details of these contacts are relatively well known. Let us have a closer look at these cases and see how the cultures 'behave' in the process of cross-cultural contacts. These cases might help us to distinguish the mobile elements from the stable elements of a traditional musical culture.

(1) 'I have lost a little girl' is a typical example of an east Georgian urban song. The origins of this song lie in the neighboring Armenian and Azerbaijani traditions. This is clearly demonstrated by the specific scale used in this melody, containing augmented second and specific melodic embellishments, characteristics of Middle Eastern singing traditions. Now let us have a look at what has happened to this melody in Georgia. Although the main elements of the melody have remained the same, in Georgia this melody is performed in a three-part harmony. Following the principles of Georgian polyphonic tradition, the original monophonic melody is surrounded from both sides by two harmonizing parts: the higher melodic part on top of the main melody, and the bass part, a drone, performed by a group of singers.

Let us now analyze what has happened in the above mentioned case. Nothing particular – something that happened thousands of times between different cultures: a melody from one culture came into another culture and became popular. Every culture has a number of such bor-

rowings. Most importantly for us, during this transition the song has undergone ***certain changes in accordance to the intrinsic rules of the receiving culture***. In this particular case the monophonic melody became polyphonic. It is clear that the intrinsic rules of Georgian polyphony remained stable. These intrinsic rules are much more stable than melodies. In other words we can say that the changeable component for a culture is ***what*** is performed (melodies that can be borrowed from any other cultures), and the stable component is ***how*** it is performed (following the intrinsic rules of the culture). Every musical culture is able to receive songs and melodies from other cultures, and as soon as the basic rules of the receiving culture are intact, the newly received melodies will be naturally absorbed by the receiving culture. It is the tradition of singing in three parts (with the main melody in the middle part between the higher part and the drone) that is stable in Georgian traditional music. This is the way Georgians sing Middle Eastern, Russian, Ukrainian, French, Gypsy, Italian, English and other melodies.

(2) In the next case Georgian song traveled a long way from Georgia to Central Africa. This case is particularly interesting as it involves the interaction of two polyphonic cultures (Georgian and sub-Saharan African).

In a twist of fate, a Georgian doctor was sent by the Soviet government to work in Central Africa in the beginning of the 1980s. Apparently being a good amateur singer of Georgian urban songs and a socially easygoing person, he taught his new African friends a few Georgian urban songs. After the Georgian doctor came back to Georgia, Georgian TV made a documentary program about him and later broadcast this program on Georgian TV. A couple of minutes of the program were a live recording of the singing of three African women, performing the well-known Georgian urban song 'Spring Rain Came'.

Unlike the first case, when we had a monophonic melody absorbed by a polyphonic culture, in this case we have a song from a polyphonic culture absorbed into another polyphonic culture. Therefore the difference between the original and the new African versions are more subtle: as in many urban songs, the two top parts of this song are moving in parallel thirds, and as sub-Saharan African traditional polyphony is predominantly based on the parallel movement of parts, the original (Georgian) parallel thirds have been accepted without any change. The

bass part was different. In the Georgian version the bass is a moveable drone, following the European harmonic system. Drone polyphony is not a natural part of the singing style of sub-Saharan polyphony, so in the African version of this song the original Georgian drone is substituted by a different part, which moves in a parallel motion together with the two top parts.

The same relationship between 'what' and 'how' can be observed in this African case too. If we look at ***what*** the Central African women sing and ***how*** they sing it, the answers to these two questions will tell us completely different things. The answer to the question 'what are they singing?' is telling us that there must have been some contacts between the African community and faraway Georgia. Answering the question 'how are they singing this song?' informs us about the main principle of African traditional polyphony – all parts singing in parallel motion. In this case, once again, after the song from another culture entered the new environment, it has been absorbed by the receiving culture according to the intrinsic rules of the receiving culture. Although I am not aware of many such cases from sub-Saharan Africa, I am pretty sure that most of the songs from different cultures that were absorbed in sub-Saharan African cultures would have undergone somewhat similar changes.

(3) Of course, this kind of borrowing can be demonstrated on other, non-Georgian examples. The next case comprises an interesting interaction between Arabic and Polynesian musical cultures. In his letter on the 19th of August 1986, one of the leading experts of Polynesian culture and history, Thor Heyerdahl, wrote to me about a very interesting occasion on which monophonic songs from Arabian cultures were absorbed by the polyphonic Polynesian culture. Unfortunately, the letter did not contain the musical transcripts, but fortunately the description by Heyerdahl is quite eloquent:

'On my visit to Easter Island at the beginning of this year we managed to record on tape a number of choirs performing in three-part harmony, and some of the songs could easily have been mistakes for melodies from the Arabian world, while they were completely different from anything performed elsewhere in Polynesia'.

In this case as well, the question ***what*** are Polynesians singing (Arabian style melodies) informs us about the cultural/trade contacts of

Polynesians with the faraway Arabian culture, and the question ***how*** they are singing informs us about the intrinsic rules of Polynesian traditional music (singing in three-part harmony). So again, the new melodies and new songs come easily, but they are absorbed and performed according to the ***intrinsic rules*** of the receiving culture.

We have good reason to believe that contemporary cases of the borrowing of new tunes and songs from one culture to another effectively use the same general strategy that was employed by traditional musical cultures throughout their histories. That's how Ossetians, Balkarians, Karachaevis, and Balkan mountaineers retained their tradition of ancient polyphonic singing through the dynamic periods of Indo-European and Turkic migration waves, often accompanied by the painful processes of language and religion changes.

To conclude, it is obvious that the answer to the question 'what are traditional musicians singing?' can be quite mobile and can change relatively easily under the influences of cultural contacts. Sometimes very sporadic contacts are enough to bring new songs and new melodies into a culture. On the contrary, the answer to the question 'how are traditional musicians singing?' detects more stable parameters, indeed the intrinsic principles on which a given musical culture is based. Recalling the comparison between the stability of language and the stability of music, we may say that specific melodies are much more easily moved around and traveled from culture to culture than language, but the internal grammatical rules of a musical culture are far more enduring than language.

A set of stylistic parameters for polyphonic traditions

We have come to the conclusion that different elements of musical culture have very different dynamics over time. Some elements can change very easily and quickly through even sporadic contacts with other cultures, while other elements are extraordinarily stable. Of course, both mobile and stable elements convey plenty of information about the culture, but it is the stable elements of the musical language that

make the best 'comparative tool'. Operating with stable elements will allow us to follow the most chronologically distanced events of history.

During my almost 30-year long comparative research of traditional polyphony I came to a conclusion that the most stable and most important features of polyphonic music are the following two stylistic parameters:

(1) Type of polyphony,

(2) Vertical coordination between the parts.

Of course, there are more stylistic parameters that can be taken into account during a comparative study of polyphonic cultures, like social organization of the singing group, scale, rhythm and meter, but the mentioned two parameters are crucial and we will be mostly relying on these two parameters in our study. Let us briefly discuss each of these parameters.

1) **Type of polyphony.** This parameter is the most important among stylistic parameters not only because it is the main element of any polyphonic tradition, but because it also shows a remarkable stability in the course of human history. During the complex ethnic and cultural mixtures and during the migration processes, the type of polyphony is more likely to survive. The type of polyphony can be a (1) ostinato, present in most of the polyphonic traditions, and in some cultures totally dominating, as among Pygmies, (2) drone, present in many European and Pacific polyphonic traditions, (3) parallel polyphony, particularly widespread in most sub-Saharan African polyphonic traditions, (4) variant heterophony, particularly prevalent among Eastern Slavs.

(2) **Vertical coordination between the parts.** Polyphonic cultures differ from each other not only according to the type of polyphony, but also according to the intervals they prefer to hear in their singing. In more scholarly words, cultures differ from each other according to the principles of vertical coordination between the parts. There are two basic types of vertical coordination: some cultures prefer hearing dissonant intervals (mostly seconds), and some traditions prefer hearing consonant intervals (mostly thirds).

GIRALDUS CAMBRENSIS ON EARLY EUROPEAN POLYPHONY

Welshman Giraldus Cambrensis, a widely educated thinker, left us possibly the most important early source on the distribution of polyphony in Europe. Let us see what was he writing about the musical life in Wales and England at the end of the faraway 12th century:

'As to their musical euphony, they do not sing uniformly as this is done elsewhere, but diversely with many rhythm and tunes, so that in a crowd of singers, such as is the custom among these people, you will hear as many different songs and differentiations of the voices as you see heads, and hear the organic (polyphonic) melody coming together in one consonance with the smooth sweetness of B-flat. Moreover, in the northern part of Great Britain, that is across the Humber and on the border of Yorkshire, the English people who inhabit those parts employ the same kind of symphonious harmony in singing, but

Now we are methodologically ready to go into the comparative journey, but before this I think it would be interesting for the readers to know what kind of ideas were expressed by different scholars on the comparative study of polyphonic singing traditions.

Survey of Comparative Ideas and Events Related to Polyphony

To be as brief and efficient as possible, I arranged most of the ideas and important events relevant to the comparative study of traditional polyphony known to me in a single chronological list. This list contains information on traditional polyphony from medieval times to modern time. Some of the most important ideas will be also discussed in separate 'boxes.'

• 1280s. Giraldus Cambrensis gave a detailed description of the traditions of polyphonic singing on British Islands and suggested that polyphony in north part of Britain was brought here by Norwegians and Danes (see the box: 'Giraldus Cambrensis on polyphony').

• 1496. Italian music theorist Franchino Gafori described a very unusual for European professional music style of singing that was practiced in a Milan church, based on secondal dissonances. The same type of dissonant polyphony was mentioned in the earlier sources of the 1020s and 1030s, by Guido d'Arezzo. This style of singing was famously described by outraged medieval musicians as 'the howling of wolves'.

in only two parts: one murmuring below and the other in a like manner softly and pleasantly above. Both nations have acquired this peculiarity not by art but by long usage, which has made it, as it were, natural. Moreover, it prevails in both countries and is now so deeply rooted there that nothing musical is performed simply, but only diversely among the former people and in two parts among the latter. And what is more remarkable, children scarcely beyond infancy, when their wails have barely turned into songs observe the same musical performance... Since the English in general do not employ this method of musical performance but only the northerners, I believe that it was from the Danes and Norwegians, by whom these parts of the island were more frequently invaded and held longer, that they contracted this peculiarity of singing as well as their manner of speaking' (cited from Hibberd, 1955:8).

• 1770s. Participants of James Cook expeditions gave description of polyphonic singing among Polynesians. Despite the detailed character of descriptions, this information was met with distrust by European professional musicians (see the box: 'Polynesian polyphony: Shock for European Musicians)

• 1906. Victor Lederer suggested that North Europe was the birthplace of the phenomenon of polyphony.

• 1909. Erich Moritz von Hornbostel, the most influential scholar in shaping the development of the German school of comparative musicology, published one of the first articles on non-European polyphony. He also expressed the idea about parallels between African and Medieval polyphony and came up with the suggestion of 'harmonic' and 'melodic' types of polyphony.

• 1909. Czech Ludvik Kuba was possibly the first scholar who suggested that the unusual dissonant singing style heard in mountainous villages in the Balkans was the remnant of a very ancient common singing tradition.

• 1924. Curt Sachs, arguably the greatest musicologist of the 20th Century, studied a Sumerian tablet and suggested that it contained a musical notation of a polyphonic piece. This suggestion was severely criticized in 1933 and has been mostly forgotten.

• 1925. Vasil Stoin was one of the first to study Bulgarian traditional polyphony and he came up with the idea of the Bulgarian origin of European polyphony.

POLYNESIAN POLYPHONY: SHOCK FOR EUROPEAN MUSICIANS

The very first encounters of European travelers with the Pacific Ocean Island communities brought to light their strong predilection towards vocal polyphonic singing. 'They sing in parts, keeping the same time and varying the four notes without ever going beyond them. So many singers and so few notes you always hear the whole together. The difference of Words & Voices makes some variety. The singers (that I heard) were all women. One confined herself entirely to the Lower Note which acted as the Drone' – this eloquent and very professional description comes from Cook's second, 1772-1775 voyage. Very clear information on the Oceanic people's part-singing capability came from Cook's third voyage as well: 'Where there is a great number they

• 1926. George Ballanta, arguably the first influential native African musicologist wrote that all African melodies are constructed upon harmonic background and are based on duple metres.

• 1932. Joseph Yasser noted the correlation between scale systems and the type of parallelism in polyphony. He wrote about connection of parallel fourths and fifths with anhemitonic scales, and parallel thirds with diatonic scales. This correlation between a scale system and a type of polyphony was later widely accepted and used to explain sub-Saharan type of polyphony.

• 1933. Siegfried Nadel studied Georgian traditional polyphony and expressed the idea that Georgian traditional polyphony possibly contributed to the emergence of medieval professional polyphony.

• 1934 onwards. Marius Schneider, a student of Hornbostel and the author of the 'History of Polyphony', was the only author who specifically researched the origins of polyphony in his worldwide detailed study of traditional and professional polyphony. Throughout his lifelong work on the origins of the phenomenon of polyphony he argued that polyphony reached Europe late, from Southeast Asia via the southern parts of Asia and the Caucasus.

• 1940. Charles Seeger observed interesting parallels between shape-note books, African-American spirituals and early examples of European medieval polyphony.

• 1952. Hans Hickman came to the conclusion that the ancient Egyptians had a tradition of vocal drone polyphony.

• 1954. Jaap Kunst published one of the best known controversial hypotheses in ethnomusicology about the possible links between Bal-

divide into several parts each of whom sings on a different key which makes a very agreeable music'. Early records even indicated the use of unusual chords (most likely dissonances) as well: 'We now and then remarked some discordant notes, with which, however, the ear of these people seemed very much gratified'.

Such eloquent and precise descriptions from early travelers did not leave space for any scepticism about the wide distribution of polyphonic singing traditions among Polynesians before their first contact with Europeans. Quite amazingly, some European professional musicians still doubted the ability of Polynesians to sing in different parts. It took about 150 years and the discovery of many more vocal polyphonic traditions in different parts of the world, untouched by European civilization, to convince European musicologists that polyphony could have existed before medieval monks 'invented' it.

kan and Indonesian polyphony, as a result of ancient contacts between these two regions.

• 1955. Lloyd Hibberd studied the famous passage of Giraldus Cambrensis and concluded that the term 'organ' was used as 'organum', an early term for 'polyphonic singing' (before it was considered as a name of instrument).

• 1957. Yvette Grimaud, together with Gilbert Rouget, noted the closeness of the polyphonic traditions of the Central African Pygmies and the South African Bushmen.

• 1957. Erich Stockmann published one of the first comparative research articles involving Albanian and Georgian polyphonic songs.

• 1958. Cvjetko Rihtman suggested that the polyphonic traditions of the Balkan peoples could be a survival of a very ancient common singing culture.

• 1960. Paul Collaer studied European polyphonic traditions and came to the conclusion that the appearance of European professional polyphony was a result of the impulses from the ancient vocal polyphonic traditions of European peoples.

• 1961. Albert Lloyd expressed the idea that more advanced and complex polyphonic traditions in isolated mountainous regions of the Balkans (like four-past singing in Albania) might be a survival of more ancient tradition, not a late development.

• 1961. Bruno Nettl summed up the available information about the polyphony among North American Indians and suggested that the scattered elements of drone polyphony could indicate that (1) these isolated pockets of polyphony were remnants of the earlier wider distribu-

tion of polyphonic singing, or (2) that North American Indians were on the verge of developing their own polyphony from an initial monophonic tradition.

• 1963. Oscar Elschek conducted a comparative study of European polyphonic traditions. He distinguished six main areas: east Slav, Carpathian, Alps, Mediterranean (the Balkans, Sardinia, Portugal), the Caucasus and Iceland, and came to the conclusion that polyphony is not a European phenomenon.

• 1964. Ernst Emsheimer, with his characteristic and careful scholarly approach, wrote about European polyphonic traditions, stressing mostly the difference between the isolated traditions of different European regions and suggested that generally there are no connections between vocal and instrumental forms of polyphony.

• 1966. Nikolai Kaufman, independently from Rihtman, arrived at a similar conclusion that polyphonic traditions are a survival of the very ancient common singing culture of the Balkan peoples (possibly Illyrian tribes).

• 1966. Gerhard Kubik, from Austria, has been one of the most active researchers of sub-Saharan African polyphony, and his theory about the link between scale structures and vocal polyphony in sub-Saharan Africa is widely accepted.

• 1966. The ICTM (International Council for Traditional Music, earlier known as The International Folk Music Council, IFMC) organized an annual World Conference in Ghana, with two main themes, one of them being 'Multi-part techniques in folk music and dance.'

• 1968. Alan Lomax, the main force behind the "Cantometric" widely publicized project, wrote about the particular importance of social cohesiveness and the absence of male domination in the societies that practice polyphonic singing. He considered the West European polyphonic traditions to be earlier culture survival in the mountains, islands, and generally, 'on the fringes of Western Europe'.

• 1971. Anne Draffkorn Kilmer studied the examples of ancient music from Ancient Mesopotamia, recorded on fired clay, and suggested that it represented polyphonic (instrumental) music. This suggestion was criticized, although it is still widely circulated today.

• 1972. The Committee of Traditional Music of the Union of Soviet Composers (chair – Eduard Alexeev) organized in Georgia the first

known to me conference fully dedicated to traditional polyphony. Scholars from most of the former Soviet Republics were participating.

• 1973. International conference 'Drone in European Folk Music' was organized in Saint-Polten, Austria. This was the first known to me 'polyphonic conference' organized in Europe.

• 1980. Edith Gerson-Kiwi discussed the probability of historical links between the polyphony of the Samaritans and Syrian church organum, and possibly Caucasian polyphony as well.

• 1980. Gerald Florian Messner studied polyphonic traditions of the Balkans, Indonesia and the Pacific region and published a book dedicated to Bulgarian diaphony, with a wider look at the phenomenon of secondal dissonant singing.

• 1981. Alica Elschekova conducted a comparative study of vocal polyphonic tradition in the Balkans and the Carpathians.

• 1983. Karl Brambats, discussing the polyphonic traditions of the Baltic peoples, placed them into a wide Mediterranean and East European context and agreed with a large group of European scholars about the ancient (possibly pre-Indo-European) roots of the phenomenon of drone polyphony in Europe.

• 1984. William H. Tallmadge, an expert of Baptist Hymnody in the USA, attempted to explain the origins of folk polyphony from monophony, using different examples of contemporary congregation singing.

• 1980s and 1990s. Kwabena Nketia studied many local traditions of sub-Saharan Africa and wrote about the importance of the "secondary" material not gathered by a researcher in a field: "…it is impossible for any single individual to undertake fieldwork that covers the whole of a country or region (let alone the whole of Africa), one cannot but use data from secondary sources, including unpublished material at radio stations, ministries, and departments of information. The last often maintain an archive of photographs that cover musical events, performers, and musical instruments".

• 1984. The first in a series of biannual international conferences on traditional polyphony was organized in Tbilisi, Georgia. These conferences promoted direct interaction between scholars from different countries, and thus prepared the ground for future comparative studies of world polyphonic traditions.

• 1988. Two articles (one by Izaly Zemtsovsky and another by the author of this book) dedicated to the importance of music in ethnogenetic studies were published in the same issue of the central Soviet ethnographic journal 'Soviet Ethnography'.

• 1989. A special conference on polyphony among the people's of Russia was organized in Voronezh. This conference was particularly important as it drew attention to the previously neglected traditions of drone polyphony in Russia.

• 1989, 2005. Rudolf Brandl expressed doubts about the ancient origins of secondal polyphony and suggested that vocal drone could have arisen under the influence of the instrumental drone during the 19th century.

• 1991. Simha Arom worked extensively with the Pygmies and he is best known for his innovative recording methodology for polyphonic music. In 1991 Arom established the first international research body of traditional vocal polyphony (in Paris).

• 1991, 1998. Nino Tsitsishvili studied parallels between polyphonic traditions and elements of the ethnography of Georgians and South Slavs. In another study she suggested the presence of Indo-European elements in the drone-based polyphonic singing of eastern Georgian table songs.

• 1992. Martin Boiko studied Baltic polyphonic traditions and suggested direct connections between the polyphonic traditions of the Baltic region and the carriers of specific archaeological cultures.

• 1999. Emanuelle Oliver and Susanne Furniss critically reviewed the well-known hypothesis about the possible links between Pygmy and Bushmen polyphony and, unlike most of other researchers, came to the conclusion that the similarity between their polyphonic traditions is superficial.

• 2002. The First International Symposium on Traditional Polyphony was organized in Tbilisi, bringing the initial series of the conferences into major biannual international meetings. At the same time, the International Research Centre for Traditional Polyphony was established at Tbilisi Conservatory, with the help of UNESCO and financial assistance from Japanese government.

• 2002. An international conference, dedicated to polyphony, was hosted by Taipei National University of the Arts, Department of Musi-

cology. This was the first (and so far the only) such conference held in Asia.

• 2005. A special conference dedicated to the European traditional polyphony 'European Voices' was held in Vienna, Austria. A second in these series conference was hosted in 2008.

• 2005. Bozena Muszkalska studied sharp dissonant singing in the Mediterranean region and came to the conclusion that, unlike European professional polyphony where a 'maximum purity of intonation' requires a 'considerable involvement of the intellect', secondal singing is mostly based on the 'intuition and shaped, to a considerable degree, under the impact of emotion'.

• 2006. Victor Grauer studied the polyphony of Central African Pygmies in the wider context of vocal and instrumental forms of polyphony from around the world and suggested that Pygmy polyphony could be the survival of the earliest type of human choral singing with its roots going back to 100 000 years ago in human prehistory. In 2007 Grauer initiated a comparative study of singing styles and genetic markers in Africa with potentially groundbreaking preliminary results.

• 2009. An ICTM Study group on Traditional Polyphony was established. The first conference of the Study group was held in Sardinia, Italy, in 2010.

• 2010. Daiva Rachiunaite-Viciniene delivered a paper on the comparative study of Lithuanian and Ainu traditional polyphony.

• 2012. A comparative study of traditional polyphony is planned as the central topic of the 6th International Symposium on Traditional Polyphony, to be held in Tbilisi, Georgia.

I am sure that my survey of the comparative ideas and events on study, distribution and origins of polyphony is not complete, but I hope that it can still give the reader the feel of the diversity and richness of the ideas expressed by different scholars and thinkers from medieval times to this day. Now we are ready to go deeper into the search for the beginnings of the phenomenon of traditional polyphony.

THE EXCEPTION – A SCHOLAR'S ONLY TRUE FRIEND

Scholars formulate plenty of new hypotheses to explain existing facts. In the process of creating a new hypothesis, scholars are often carried away by the long list of facts that fit comfortably into their hypothesis, and therefore neglect the facts which do not fit their hypothesis. These 'misfit' facts are labeled 'exceptions'. Understandably, scholars usually dislike exceptions. Sometimes scholars push exceptions to coerce into their hypothesis, in other times they try to discredit the fact or the source where the fact came from. And if nothing helps, notorious sayings like 'no rule without exceptions,' or even worse, 'exception proves the rule,' are always at hand. But of course, to a non-biased person it is clear that an exception can not prove the rule, and that a rule with 'exceptions' is actually a bad rule. My favorite literary hero, brilliant analytic

The Origins of Polyphony: How Can We Look for Them?

As soon as musicians paid attention to the presence of two very different styles of human singing, monophonic and polyphonic, monophonic singing was considered to be the initial, the most primitive style of human singing. Polyphony was considered to be a later cultural invention, a new and higher level of development of musical culture compared to monophony, at which all human cultures should eventually arrive. This idea seemed so natural for the evolution of human musicality that no one took an effort to give support to this hypothesis. Actually, this was not considered as a hypothesis but as an axiom, something that does not need any additional proof (like an axiom 'A whole is always more than part of the whole').

Progress from the initial monophony to polyphony seemed axiomatic mostly for two reasons: (1) singing in one part is generally easier than singing in several coordinated parts; (2) The history of European professional music, the only style of music that was studied until the 19th century, also was a clear example of development of polyphony from monophony.

Not surprisingly, for a long time it was believed that polyphony was a new progressive development, invented by medieval monks in Europe in the 9th century, and then spread to various cultures through the European Christian missionaries. As I have mentioned, even Charles Dar-

Sherlock Holmes once said: "I never make exceptions. An exception disproves the rule". I agree with Holmes and consider the saying 'exception proves the rule' as the last resort for a wrong hypothesis. So what is in reality an exception? **Exception is a scholar's best friend, the only true friend that tells the bitter truth**. Do not listen to the calming array of facts that prove your hypotheses, they are like many flattering friends who are ready to lie to you in order to make you a happier person. Listen to your only true friend – exception. And only if this friend is silent, not complaining of any facts that do not fit your idea, you can be truly happy. One exception can outweigh dozens of proving facts. There is no greater proof for your hypothesis than the absence of an exception.

win stressed in his 1871 classic 'The Descent of Man,' as a well-known fact, that harmony is a later development. The only problem with this very logical and seemingly obvious model is that it does not fit the logic of the existing facts about the distribution of monophony and polyphony in the world. Such inconvenient facts started appearing as early as in the 18th century.

When vocal polyphony was found among the Polynesians in the 18th century, European musicians simply did not believe that Polynesians could have developed polyphony without the help of European missionaries and musicians. So the first sign of the fallacy of the idea of the European professional origins of polyphony was simply ignored. This happened with several other polyphonic traditions as well. In the best case these facts were considered as an 'exception from the rule' (see the box "Exception – Scholar's Only True Friend"). By the 1930s, when a large number of vocal polyphonic traditions were recorded in the cultures that did not have any historical contacts with European missionaries, the atmosphere for the paradigmatic shit was ready. Marius Schneider and Siegfried Nadel (almost simultaneously), and later Paul Collaer came to a new model of the origins of polyphony. According to their new model, polyphony was not invented by European professional musicians, but by traditional singers, and this happened earlier than 9th century. Schneider believed that the birthplace of vocal polyphony was South-East Asia, and that polyphony reached Europe through the long travel from South-East Asia via India, Persia and Caucasia. Nadel suggested that Georgian polyphony could have influenced the birth of European professional polyphony, and according to Paul Collaer, the

MILK DRINKING SYNDROME AND ORIGINS OF EUROPEAN POLYPHONY

Many readers of this book might not be aware that different human populations differ drastically from each other according to their ability to absorb milk. It was found, for example, that African Americans have a much higher percentage of people who cannot absorb milk compared to European Americans. Later studies suggested that the number of populations that have problems with milk is quite big, and includes populations of sub-Saharan Africa, Arabs, most of the Jews, most Asian populations, Australian Aborigines and Melanesians. And finally, in the 1970s, scholars came to the quite amazing conclusion that with some minor exceptions, the only major population on our planet that can drink milk without complications is the population of North and Central Europe and their descendants. If we take into account that most of these scholars were Europeans themselves, and for them drinking milk was a very natural part of their life, it is not difficult to understand this kind of initial unconscious 'European arrogance' towards other pop-

emergence of European professional polyphony was a result of the development of local, ancient European polyphonic traditions.

So, the first big shift came in the 1930s. From this time on polyphony was rarely considered as an invention of European professional musicians, although the idea of the 'invention' of polyphony from monophony still survived. Now, in the beginning of the 21st century, it is time to change this axiomatic idea as well.

Let us all agree on one thing: even if the idea of the development of polyphony from monophony seems to the readers the most natural one of all, let us not take it for granted and do not extrapolate the history of European professional polyphony on the rest of the world (see the box 'Milk Drinking Syndrome and the Origins of European Professional Polyphony')[1]. We must still follow the basic premises of scholarly method: we must first accumulate facts, and only after this should we try to find a hypothesis that fits the facts. If the hypothesis is right, ideally, it should not leave any conflicting facts, so called 'exceptions'. If we are lucky to find the correct hypothesis, every piece of the jigsaw puzzle must be comfortably in its place, without us trying hard to push them into the hypothesis.

But how can we check if the facts support the idea of the development of polyphony from monophony? Is this realistic? Of course we cannot go back in a time machine to check what our ancestors were do-

ulations of the world. From the end of the 1970s it has been acknowledged that although very young children of every human population naturally drink milk, it is a norm for most human populations that as children grow, they lose the ability to absorb lactose and to drink milk. Therefore it is the North and Central European adult population's ability to absorb milk, if we may say so, that is 'out of the human norm'. After this fact became known, the embarrassing earlier complaints from many parts of the world about the 'non-quality food provision' for the developing countries were understood, and humanitarian aid programs correspondingly had to adjust their policy of providing huge quantities of milk powder to the starving populations of third world countries, who could not actually drink milk. This methodologically interesting case teaches us a very important lesson – **not to extrapolate European experience to other populations of the world**. In my 2006 book I suggested the term 'Milk Drinking Syndrome' for similar cases when European experience is unjustly extrapolated on the rest of the world.

ing a few centuries or millennia ago, but I suggest there are still ways to do this with the help of the ***recorded history of human cultures***.

Audio recording technology has been around for more than a century. This is not a long time, but it should not be underestimated either. Apart from audio recordings, there are plenty of written sources from very different parts of the world. They go back in our past for centuries and millennia, in some regions of the world reaching depths of four-five thousand years. Also, many readers might not know that the music writing system is almost as old as the first written documents of human culture, and we even have a few written pieces of music that are thousands of years old. I will address the oldest written musical pieces later, in a discussion about the possibility of the presence of polyphony in Ancient Mesopotamia.

Checking available historical and archival records from different cultures can allow us to see the general historical picture and the dynamics of the development of human musical cultures, including polyphony, for several centuries and possibly for millennia (see the box: 'Rise of Andean Mountains and the Origins of Polyphony').

These records will also help us to see whether it is true that polyphony is gradually replacing monophony, as it was believed by the proponents of the theory of the late cultural 'invention' of polyphony. If this tendency is a fact, we must witness the appearance of a few new polyphonic traditions in regions where there was no polyphony before. That is exactly what I am going to do.

RISE OF ANDEAN MOUNTAINS AND THE ORIGINS OF POLYPHONY

Just a week after his 26th birthday, while resting in a forest, Charles Darwin experienced a major earthquake that struck Chile on 20th February of 1835. Walking a few days after the earthquake on the beach, Charles noticed that some molluscs that always live on the rocks under the water were now on the rocks well above the water level. Darwin made a correct conclusion that the recent earthquake was to blame for this, and on a bigger historic scale he concluded that series of such earthquakes during many millions of years were responsible for the actual rise of the surface and the creation of the huge range of Andean mountains. Darwin correctly understood the historical dynamics of landscape changes and the rest was a question of multiplying the results of small time span changes (that humans can observe) into a large evolutionary scale that humans cannot observe. Some things are incredibly slow. For example both American Continents are moving westwards about the same speed as nails grow on your fingers. To notice and understand this kind of slow developments, we need to study the **historical dynamics**. The question of historical dynamics is absolutely crucial for the correct understanding of any process that goes for centuries and millennia, including the process of the origins of vocal polyphony.

Is Polyphony Appearing or Disappearing?

Let us have a look at a list of cases when the disappearance of vocal polyphony is historically well documented:

• **North Europe.** According to an unambiguous written document from the educated Welshman Giraldus Cambrensis, the big group of North European countries (from Scandinavia to the British Islands) had active traditions of vocal polyphony by the end of the 12th century. According to the available data, in most of these countries today we have only either late pan-European style polyphony with parallel thirds, or no data on vocal polyphony at all. Only Iceland has retained the earlier form of polyphony until the beginning of the 20th century.

• **Italy.** In Lombardi, singing in seconds was documented in the 15th century, but has since disappeared.

• **Lithuania.** The unique vocal polyphonic style *sutartines*, based on the almost constant use of secondal dissonances, has disappeared during the last two centuries.

• **Latvia.** A tradition of three-part drone singing, with the drone in the middle of the polyphonic texture and the third part, singing a major

second below the drone, recorded by Andres Yurian at the end of the 19th century, disappeared without much trace.

• **Estonia.** A tradition of drone polyphony was recorded by Tampere in the beginning of the 20th century. No traces of this tradition have survived.

• **Russia.** A unique tradition of duet and trio singing with independent melodies was recorded by Evgeny Gippius in the 1920s, and was never heard again.

• **Sicily.** According to archived recordings, the western part of Sicily was as polyphonic as the rest of this Mediterranean island, but after the 1968 earthquake the tradition seems to be lost.

• **Macedonia.** According to Macedonian ethnomusicologists, as a result of government policies the tradition of Macedonian singing in dissonant seconds has been disappearing from the 1950s to the 1980s.

• **California.** According to historical sources and archived recordings, interesting forms of vocal counterpoint that were present among South Californian Indians also disappeared.

• **Venezuela.** According to Isabel Aretz, there was a general tendency of the disappearance of three-part singing in the states of Lara, Falcon, and Portuguesa.

• **Taiwan.** According to archived recordings made by Japanese scholars among the Taiwanese native tribes, the small mountain tribe Saisat had a tradition of singing in parallel fourths that later disappeared.

• **Indonesia.** According to Dana Rappoport, part of the traditions of vocal polyphony in Central Sulawessi has disappeared during the last decades.

• **Polynesia**. According to A. Kaeppler, a tradition of six-part polyphony on Tonga, a tradition that the knowledgeable older singers still remember, was eventually lost, and partly replaced by late European three-part singing.

• **Africa**. According to Simha Arom, the tradition of vocal and instrumental polyphony has been declining among pygmies from the 1970s, and some songs that were known in four parts survive today only in three- of two-part versions.

HETEROPHONY: THE ANCESTOR OR THE DESCENDANT OF POLYPHONY?

Because of its ambiguous placing between monophony and polyphony, heterophony was often considered as the natural model for the gradual development from monophony to polyphony. If you generally believe in the late development of polyphony from monophony, it is very easy to imagine gradual transformation of monophony into polyphony: first you would have unison singing, then unison with elements of heterophony, then heterophonic elements increase, and finally we have a full blown polyphony.

In search of the origins of any cultural phenomenon, the study of the distribution and history of this region is the best indication. Let us see what they can tell us about heterophony. The biggest and most important region of heterophony is Eastern Europe, particularly the regions where eastern Slavs (Russians, Ukrainians and Belarus) live. Heterophony is distributed

• **Georgia**. There are documented cases of the loss (and a major decline) in the traditions of vocal polyphony in southern, eastern and northern Georgia.

These documented cases of the loss of the tradition of vocal polyphony can not reflect a complete list of all disappeared traditions. Writing about the disappearance of the traditions of vocal polyphony is not a very prominent tendency in ethnomusicology. Despite my lifelong interest in all aspects of traditional polyphony, I myself failed to mention the facts of the disappearance of vocal polyphony in Saingilo and the decline of polyphony in Khevsureti in my Garland Encyclopedia article about Georgia (although I did mention one case of the disappearance of polyphony in Meskheti). Therefore I expect that ethnomusicologists with an interest in polyphonic traditions could name many other cases of the disappearance and decline of the tradition of vocal polyphony in different parts of the world.

In some cases the reasons for these disappearances and declines are known. For example, in the case of western Sicily it was the natural disaster that disturbed the social life of the traditional society, and in the case of Macedonia it was mostly the government policies of a socialist country, waging war against the 'out-of-date' cultural practices. There are lucky 'escapes' as well. According to Felix Quilici and Wolfgang Laade, the great tradition of polyphonic singing in Corsica was on its way towards dying out in the 1950s-1970s, but a later change of state cultural politics and international success made the Corsican tradition of polyphonic singing a much protected and popularized symbol of Cor-

virtually throughout the whole ethnic territory of the eastern Slavs. There is also another singing style in eastern Europe: drone polyphony. Drone polyphony has a very different pattern of distribution: it is found in several isolated regions, often in geographically isolated places (like in the region Polesie, the big and mostly inhospitable marshy regions between Ukraine and Belarus).

The distribution pattern of heterophony on the territory of Eastern Europe obviously points to its late distribution. This is particularly evident in comparison of stratification of heterophony with another singing style of Eastern Europe – drone polyphony. Therefore, we have to conclude, that drone polyphony in East Europe must be chronologically older than the tradition of heterophonic singing. Heterophony is not an ancestor of polyphony. On the contrary, it emerged as a result of the loss of the more ancient tradition drone polyphony, most likely as a consequence of active migrations and ethnic mixtures in the open territories of Eastern Europe.

sican culture and identity. Lithuanian sutartines was not so 'lucky', and while during the 20th century *sutartines* also became a symbol of Lithuanian national identity, and although you can still hear sutartines sung by University students and amateur ensembles, the village tradition is lost.

Of course, speaking of government politics and ideologies, we should not forget the vigorous and millennia-long fight that official churches conducted against the 'out-of-date' practices of singing and dancing to the old pagan gods. Historical records from many countries of Europe (including Georgia) about the strict bans against the old traditional singing and dancing practices certify the ferocity of this struggle. We may never know the full extent of the direct and indirect persecutions that the bearers of the 'pagan' and 'horribly sounded' loud and dissonant polyphony endured in Europe alone.

So, this was the list of cases where the loss of the tradition of polyphony is documented. Let us now have a look at the documented cases where the tradition of vocal polyphony was developed from monophonic singing traditions. If the idea of the late cultural invention of polyphony and gradual replacement of monophonic traditions is correct, we must have even a more impressive list of cultures where the birth of polyphony has been documented.

If readers expect that cases of the emergence of new polyphonic traditions in the previously monophonic cultures are more numerous, I have to disappoint them: despite my lifelong keen interest in the issues of polyphony in different peoples and regions, I cannot name **even one**

ORIGINS OF OVERTONE SINGING OF CENTRAL ASIA

Different scholars expressed different ideas about the origins of this unique singing style. These ideas range from the prehistoric era to the end of the first millennia AD. To search for the origins of overtone singing, we should first of all to look at the geographic distribution of overtone singing and the historical processes that took place in the area of distribution of this phenomenon.

Overtone singing is spread among several peoples of Central Asia, particularly those who live in (1) western Tuva, (2) western Mongolia, and (3) the Altai-Sayan mountain regions. Regarding historical processes, there is mounting evidence that Central Asia was initially populated by peoples of European origins (they are also mentioned in Chinese historical records). In about 9th century AD the situation changed, as East Asian populations took over in Central Asia. As a result, contemporary peoples of this region bear genetic and cultural traces from both their European and East Asian ancestors. The ancient European substratum is particularly clear in the following regions: (1) in Western Tuva, (2) Western Mongolia, and (3) the Altai-Sayan mountain regions. So,

well documented case of the internal development of vocal polyphony in folk music in a formerly monophonic culture.

If we remember how important the absence of any 'exceptions' is for a strength of any hypothesis, this fact will become even more important.

'Wait a minute! What about the history of European professional polyphony?' Some readers might ask, 'It is well documented that European professional music started as a monophonic tradition and polyphony was literally invented by medieval monks in the 9th century'. To answer this question, we need first of all to remember, that this is a case of professional, not folk polyphony. Besides, there is a good reason to believe, very much like Schneider, Nadel, and Collaer believed, that European professional polyphony was not 'invented' by Medieval monks, but in fact church authorities just gave up fighting against the local traditions of polyphonic singing, allowing the infiltration of polyphony into professional church music.

So, polyphony is very unlikely to appear naturally in a purely monophonic culture as a result of internal development. Even in cases when monophonic cultures reside next to the polyphonic tradition for centuries and millennia, and have a strong professional musical culture, there are hardly any borrowings from the polyphonic tradition. For example, Georgians and Armenians lived together at least for three thousand years as close neighbors and Christian allies in Caucasia, but Georgian

the regions of distribution of overtone singing and the regions where the European substratum is visible are obviously coinciding. From this fact we can derive following conclusions: (1) The Central Asian phenomenon of overtone singing is a result of the mixture of two opposite types of musical cultures: Ancient European drone polyphony, and East Asian monophony; (2) regions where the result of this mixture is better preserved, are the regions of distribution of overtone singing, and (3) the timeline for the origins of the phenomenon of overtone singing must be the end of the first millennia AD, at around 9th century. It is interesting that the first mentioning of overtone singing, as a 'strange mixture of low roaring sounds together with high whistling sounds', come from Chinese historical sources from the same 9th century.

And at the very end I want to mention that producing overtones is found in many cultures in different parts of the world (in Africa, North America, Europe), although it was only in Central Asia that this singing style became a well established cultural phenomenon.

traditional singing is profoundly polyphonic whereas Armenian traditional singing is equally profoundly monophonic.

The cultural policy of the former Soviet Union also provided us with a unique 70-year long mass experiment of creating polyphony involving over 200 million people. Aiming at forming a common socialist musical culture for everyone, Soviet authorities tried to bring choral singing, harmony and polyphony to all the peoples of the Soviet Union. Great amounts of finances were spent and Moscow-trained composers and choir leaders were sent to the monophonic Central Asian republics and Siberian peoples to help them to harmonize their traditional and newly composed monophonic melodies, and to organize big choirs. Despite these efforts, none of the traditionally monophonic peoples of Central Asia or Siberia started singing their traditional songs polyphonically, and as soon as 'perestroika' started, the choirs were disbanded.

So, after checking the available documented sources on the history of polyphonic singing, we came to a conclusion that ***the disappearance of polyphonic traditions is not the prevailing, but the only tendency***. Therefore, the idea of the late cultural invention of polyphony must be considered outdated and must be fully rejected. There is not a single documented fact that provides any support to this hypothesis. Even the phenomenon of heterophony, often used as a transitional model for the origins of polyphony from monophony, at a closer look reveals that it is in fact a later phenomenon in comparison with the ancient forms of polyphony (see the box 'Heterophony: The Ancestor or the Descendant of Polyphony?'). The closer study of the unique tradition of overtone

POLYPHONY AND THE INDO-EUROPEANS

For the understanding of the puzzling distribution of vocal polyphonic traditions on the European continent the question of Indo-European migrations is crucial. Polyphony in Europe is distributed in many geographically isolated and inaccessible areas: mountains, islands, big forest massifs, continent fringes. This kind of geographic distribution is typical for the ancient phenomenon, which is pushed out by newcomers and their culture. Therefore, the only natural explanation on the pattern of distribution of polyphony in Europe must be the one according to which vocal polyphony in Europe is the survival of some ancient cultural unity. Taking into account the history of the European continent, it seems natural to propose that surviving polyphonic traditions in Europe are the remnants of the pre-Indo-European cultural unity. After the appearance of migrating waves of Indo-Europeans, the ancient population of Europe must have been pushed towards more inaccessible places, as this is always the case amidst major migration processes. We know that the contemporary

singing also demonstrates that forms of vocal group polyphony must have been present in Central Asia in the past (see the box: 'Origins of Overtone Singing in Central Asia').

It is possible to conclude, that the earlier we go into human history and prehistory, more polyphony will be found. Before we start analyzing the evolutionary history of Homo sapiens in search of the origins of vocal polyphony in the third chapter, on the next few pages I shall discuss the possibility of the presence of polyphony in some of the earliest civilizations in human history (see a box 'Polyphony and the Problem of Indo-Europeans').

Did Sumerians and Hurrians have Vocal Polyphony?

Sumerians are widely regarded as one of the most important vestiges of contemporary civilizations. The wheel, the calendar, irrigation, monarchy and writing system are among many Sumerian inventions. The invention of musical notation, usually credited to another Mesopotamian people, Hurrians, was possibly another Sumerian invention, as Hurrians used a writing system and many other cultural inventions borrowed from Sumerians. However, we currently have no accepted Sumerian written example of musical composition.

carriers of pre-Indo-European languages in Europe (Basques and the peoples of Caucasia) have strong polyphonic traditions. On the other hand, considering the characteristics of the music of the Ancient Greeks and some other early Indo-European peoples (Armenians, Iranians, Tajiks) we may conclude that early carriers of Indo-European languages belonged to the 'oriental' monophonic musical family, with long melismatic melodies in a free non-metric rhythm. Indo-European migration must have produced occasions for mixture between the ancient polyphonic and new monophonic singing traditions in Europe. In such mixed cultures we find long melismatic melodies in a free metre, based on a drone polyphony. This type of mixed singing tradition is found in many regions of Europe: among Kartli And Kakhetians in eastern Georgia, among Tosks and Chams in southern Albania, among some Macedonians, among Farsheroti Aromanians in Romania, in Pirin in Bulgaria, in Epirus in Greece, in Corsica, and in Albacete in Spain. Drone polyphony in Europe is possibly the best surviving element of the ancient pre-Indo-European cultural unity.

There are various indications that Sumerians and Hurrians had a tradition of vocal polyphony. Let me briefly discuss them.

Presence of double blown musical instruments. Blown instruments show closeness to vocal traditions, therefore the presence of polyphonic blown instruments can indicate the presence of polyphony in vocal music as well. According to Curt Sachs, double blown instruments first appear in Ancient Mesopotamia (see the box: 'What Can Instrumental Music Tell Us About Vocal Polyphony?'),

Examples of notated music. Amazingly, there are notated examples of music from the ancient Mesopotamia. Curt Sachs' 1924 transcription of the Sumerian hymn was generally refuted, but there is a Hurrian musical composition too, written by cuneiform on clay tablets, and transcribed by Anne Kilmer. Kilmer famously came to the conclusion that the composition is an example of two and three-part polyphony. Most of scholars criticized this suggestion as totally unbelievable, chiefly because it was difficult for them to believe that polyphony could exist in such an ancient musical culture (see also the box 'Can We Really Read Mesopotamian Musical Notation?'). Some scholars tried to elicit other meanings from the ancient Mesopotamian musical writing to avoid their possible polyphonic interpretation, but the transcript made by Anne Kilmer is still considered the most convincing. The views on the global historical dynamics of disappearances of polyphonic cultures proposed by the author of this book, and the rejection of the idea of the

WHAT CAN INSTRUMENTAL MUSIC TELL US ABOUT VOCAL POLYPHONY?

Instrumental music has one obvious advantage over vocal music: unlike vocal music, which does not fossilize, musical instruments are found among the earliest archaeological remains and they can tell us plenty of useful information about bygone musical activities. In the case of wind instruments the information from archaeological cultures may even contain more specific details, like type of scales, the presence of polyphony, and even the type of polyphony. Most importantly for us, music played on blown instruments is often very close to the vocal music from the same culture. So, if the vocal traditions are polyphonic, double blown instruments in the same culture most likely will be also polyphonic, based on the same type of polyphony. Important note: we must always be careful and check the construction of a double blown instrument, because the construction can be both monophonic or polyphonic. The construction is polyphonic when

late development of polyphony, provides strong extra support to the suggestion that ancient Mesopotamians had polyphony.

Vocal nature of Sumerian polyphony. Even Kilmer and Sachs did not suggest that Sumerians could have had polyphony in vocal music. They interpreted written musical examples as the examples of instrumental music, more precisely, the harp playing two- and three-part chords (accompanying singing). This raises several doubts: (1) when musicians are transcribing singing with instrumental accompaniment, it is very unnatural to transcribe much less important instrumental accompaniment and not to transcribe the all-important vocal part. Even in the 20th century, when ethnomusicologists transcribed traditional singing with string instrumental accompaniment (for instance, examples of the Kazakh epic tradition), they were usually transcribing only the vocal part, completely neglecting the two-part accompaniment. Therefore it is very unlikely that Sumerians would transcribe an instrumental-only part. Most likely, both vocal and instrumental parts were polyphonic. (2) verbal text, written next to the musical transcription, does not leave any doubts that the composition was vocal. (3) We know that Sumerian temples had choral singers, named 'Nar-Nar'. (4) There are also a few non-logical octaves and double octaves in Sumerian three-part music. Double octaves mean that there were three of the same notes (like A, A, A). Three identical notes together would be understood more logically if it were an example of vocal polyphony. In this case there would have been three vocal parts singing in unison. So, if you have three identical

the tubes are of non-identical length, or have a different number of holes, and it is monophonic when tubes are identical, both in length and the number of finger holes. There are even double flutes where one tube is straight, and the other one is a bit curved with the same number of finger holes, clearly an indication that the musical instrument was most likely playing secondal dissonances (such instruments are found in ancient Mesoamerica).

String instruments do not show such links with singing, most likely because singing and playing string instruments involve completely different mechanisms, whereas singing and playing blown instruments are both based on the same physiological mechanism of breathing. Therefore, the presence of double blown instruments with non-identical tubes is a serious indication that the culture was familiar with vocal polyphony.

notes written for a harp, you have to play them in different octaves, but in vocal music this means that three parts are coming together into the unison (very usual for vocal music). (5) There are several regions in ancient Mesopotamia which most likely had historical and cultural contacts with the Ancient Mesopotamian civilizations (like the Island Bahrain, Caucasia, and the Balkans), and all these regions have ancient traditions of vocal polyphony. This also indicates that ancient Mesopotamia most likely also had vocal polyphony. (6) Mesopotamians invented and used the precise system of notation, which is known as a necessary tool for the performance and recording of polyphonic music.

All these arguments, together with the general historical tendency of disappearance of the traditions of vocal polyphony, give us strong grounds to propose that at least some peoples of Ancient Mesopotamia (Sumerians and Hurrians among them) had traditions of vocal polyphony.

Here I should add that the most celebrated expert of Ancient Egyptian musical culture, Hans Hickmann, also suggested (in 1952) that Ancient Egyptians were familiar with vocal polyphony. Apart from the ancient Middle East, the presence of vocal polyphony was also proposed in another ancient civilization, in Mesoamerica. Mesoamerica is particularly rich in the double, triple and even quadruple blown instruments, some with two different drones, with some of them even arranged so that a player would be playing mostly secondal dissonances.

CAN WE REALLY READ MESOPOTAMIAN MUSICAL NOTATION?

My Georgian colleague asked me a very logical question: 'How can we assume we can read musical writing from a musical culture totally unknown to us and which was already dead thousands of years ago, if we cannot even read the musical writings that our direct ancestors, the Georgians, used only 800 years ago?' The answer to this tricky question is actually quite simple: there are two basic systems of writing: (1) approximate, and (2) precise. If you write down a melody with a few curved lines, indicating only the direction of the melodic development, this will be an approximate writing system. That's how the neumatic writing system was used in medieval Byzantine and Georgia. But if you give different pitches specific names (say, use alphabet letters, 'A', 'B', 'C' etc for specific notes), and then write down a melody with these letters, this will be a much more precise writing system. Sumerians, inventors of the first writing system (cuneiform system), possibly must be credited with the invention of the first musical writing system as well (based on the same writing system). The ancient Mesopotamian music writing system existed for several thousand years, and a few written compositions from Ancient Greece were written using the same alphabetical system. This system

Conclusion

We are coming to the end of the second chapter. The most important conclusions of this chapter are that (1) vocal polyphony is an extremely stable element of human culture that can survive drastic cultural and linguistic changes and can indicate the ancient connections of the population, and at the same time, (2) vocal polyphony is gradually disappearing from our planet. Vocal polyphonic traditions are currently dispersed in the most isolated geographical areas – mountains, islands, large forest areas and continent fringes. Such a pattern of distribution in combination with the historical tendency of the gradual disappearance of polyphonic traditions strongly suggest that polyphony is an extremely ancient phenomenon, and therefore we must fully reject the existing model of the origins of polyphony as a late cultural invention.

Thus, if we want to find the origins of polyphony, we should stop seeking for the first creative individuals, or the first creative people who developed polyphony out of monophony. Instead, we need to go deeper into human prehistory. Only after researching human singing behaviour in the broad context of human evolutionary history can we

was in use for a much longer time than our contemporary writing system. During the early Middle Ages the Mesopotamian system was mostly forgotten, and musicians at Christian churches started using a new, neumatic, non-precise writing system. So, the musical writing system started its existence as a precise system, and in the 8th-9th centuries it turned into a non-precise system, and then returned to the precise system again. This paradoxical shift will make sense if we take into account a well-known fact: that a precise system is necessary if the music is polyphonic. Sumerian music most likely was polyphonic. Ancient Greeks, owners of monophonic musical traditions, used the precise system that was invented in polyphonic Mesopotamia. Georgians, on the other hand, owners of rich polyphonic traditions, used the writing system that was invented in monophonic tradition of the early Christian chanting. That's why Hurrian and Ancient Greek musical compositions are easier to read today than the Early Christian or Georgian transcriptions. As we still use letters for the musical notes (A, B, C, D, E, F, G), we can say that we still use a musical writing system invented in ancient Mesopotamia about four thousand years ago.

clarify the origins of human choral polyphony and answer the question of why do humans sing. These problems will be discussed in the next, third chapter.

CHAPTER THREE
Singing and War

It became a cliché in writings about the musical life of different traditional cultures to note that 'singing accompanies every moment of life in this society'. And truly, singing in many traditional societies literally accompanies every step of every single member of a society, from the birth of a person and mother's soothing lullabies, childhood game-songs, love songs, wedding songs, religious songs, hunting songs, agriculture songs, traveling songs, military songs, healing songs, finishing inevitably with funeral songs. Singing is so central for human cultures that no one ever questioned the universality of singing. The question which we are going to address in this chapter is which of the many functions of singing was possibly the initial core one that gave music its unique position in the life of every human society. Was it possibly the Mother-child relationship as Ellen Dissanayake proposed? Or charming the opposite sex as Charles Darwin and Geoffrey Miller argued? Or establishing cohesiveness in human society as John Blacking suggested? Or possibly singing is just an outgrowth of human language as Spencer thought? Or even simpler, was singing just an evolutionarily useless tool invented for auditory pleasing our ears as Steven Pinker suggested?

The current interest towards the origins of music is staggering. This topic for a long time was considered something out of the sphere of 'serious' musicology, very much like discussions on the origins of the language, which was famously banned from academy meetings by the Paris Linguistic Society in 1866. The reason for such a ban was simple: if we will never understand the real reasons of the origins of language, why then should we bother engaging in useless speculation? Of course, linguists did not maintain this unnatural ban for a long time, so during the 20th century, the origins of language became a very actively discussed topic at special conferences and in countless publications.

Music and musicology has always been tacitly considered as the 'younger sister' of language and linguistics, and although there has

never been an official ban on discussions on the origins of music, most music scholars were for a long time under the shadow of the linguistic ban. If funding research on the origins of music was to be a waste of time, energy and money, why should they discuss such an ephemeral topic at all?

During the 20th century many new facts appeared pointing to the unique emotional and psychological power of music. For example, in the first world war it was found that playing music to patients during the surgical operations allowed doctors to use almost half the regular dosage of the painkillers; it was also found that music can help to rehabilitate patients with strokes and severe mental disability. As a result of such findings, music therapy deservedly became one of the quickly developing spheres of musical research. Apart from such practical findings, there were very interesting theoretical findings as well. For example, it was found that music has unexpectedly deep roots in the human brain, and that listening and making music involves deep and ancient brain structures which are only activated for crucial for survival purposes; we also learned that virtually all newborn babies have absolute pitch (which is rare even among professional musicians), and the fact that all newborn babies cry at the same pitch, at the pitch known to us as 'A'.

Such facts pointing out the very deep neurological localization and unique emotional and psychological power of music were accumulating and awaiting explanation. The natural result of this buildup was the sudden explosion of interest towards the origins of music. The first major international sign for the comeback of the topic was the appearance of the volume 'The Origins of Music' in 2000. In a single volume, musicologists, psychologists, primatologists, ornithologists, archaeologists and linguists discussed the problem of the origins of music from the perspectives of their respective disciplines. The appearance of this groundbreaking volume became a powerful call for different scholars to approach the evolutionary origins of music. As a result, during the first ten years of the 21st century more publications appeared on this topic than possibly during the whole previous history of humankind. It is difficult to predict today for how long this explosion of interest will continue, but it is quite certain that during the forthcoming years we will learn many more facts about human musicality, and hopefully we will

come closer to the understanding of the origins and unique emotional and psychological power of music.

Before we start discussing the possible reasons of the emergence of singing and music in human history, let us first briefly discuss the different ideas about the origins and the role of music that have so far been expressed.

Different Ideas about the Origins of Music

Here is the list of the ideas and some findings about the nature and origin of music. This list is organized in chronological order to make it easier for readers to follow the development of the scholarly approach to this problem. We start with several important ideas expressed in Ancient Greece, as ancient Greek thinkers were extremely interested in the nature of music, and some of their ideas still circulate in the writings of contemporary scholars (although sometimes without realizing this).

• 6th-5th centuries BC. Pythagoras proposed that the essence of music is in numbers. His ideas of the consonance as the sound with the simpler mathematical relations and the dissonance as the sound with more complex mathematical relations, was in a way a predecessor of Helmholtz ideas of musical acoustics based on natural overtones.

• 5th-4th centuries BC. Plato acknowledged the unique emotional power of music, and considered music as the most potent means for instilling morality in the citizens of the Ancient Greece. In his writings Plato suggested to promote some scales and to ban other scales for the good of society. Attempts to ban certain musical styles, composers, or compositions had been a policy for many religions and states, including contemporary Western societies.

• 4th century BC. Aristotle, one of the greatest Greek philosophers and founder of western philosophy, considered arts and music as a means of imitation of the natural world.

• 4th century BC. Aristoxen, Aristotle's pupil, opposed Pythagoras' mathematical model of music, arguing that emotions, not numbers, are behind the phenomenon of music. For Aristoxen, for example, con-

sonance was primarily a sound that pleases our senses, not the sound with simpler mathematical relations.

• 1st century BC. According to Philodemus, follower of Epicure, 'music cannot express anything, it can only tickle and please our hearing, very much like the art of culinary'. 21 centuries later, in his 1997 book, Steven Pinker expressed a similar idea with almost the same words.

• 1722. Jean-Philippe Rameau published his influential work on harmony, declaring that harmony was the natural basis for music and that melody was derived from harmony.

• 1761. Jean-Jacques Rousseau disagreed with Rameau, suggesting that melody was the original element of music and that harmony was added later. According to his views, both music and speech had a common ancestor. This initial human communication was based mostly on singing, and it was more passionate and emotion-driven than contemporary human language.

• 1832. William Gardiner, the musician who introduced music of Beethoven to British audiences, wrote one of the first articles on the origins of music, arguing that music was derived from the sound of the natural world around us.

• 1857. Herbert Spencer suggested that music evolved from the exaggerated emotional speech of our ancestors, or in other words, from the prosodic elements (or tones) of human speech.

• 1871. Charles Darwin criticized Spencer's idea of the music being an outgrowth of human speech, and suggested that music predated the origin of language, serving the needs of sexual selection through charming the opposite sex with musical prowess. Maybe even more importantly, Darwin famously declared 'as neither the enjoyment nor the capacity of producing musical notes are faculties of the least use to men in reference to his daily habits of life, they must be ranked amongst the most mysterious [phenomenon] he is endowed.'

• 1891. Richard Wallaschek suggested that both music and speech originated from the shared primitive stage of communication, and music came from primordial 'dance-play'.

• 1895. Otto Jespersen hypothesized that language must have begun as 'half-musical unanalyzed expressions for individual beings and events'.

• 1895. Ernst Newman proposed that the origin of music was independent of speech, and that humans had the ability to express their emotions through music much earlier than they developed speech.

• 1911. Carl Stumpf suggested that music came into existence as a means of long-distance communication between early humans.

• 1919. Karl Bucher stressed the important links between music and rhythmic movements, and suggested that music developed out of work-related rhythmic movements and sounds.

• 1923. Boris Yavorsky introduced the idea of 'intonatsia' [intonation] as the smallest and oldest element of musical language, dominating Russian musicology throughout the 20th century and fundamentally influencing Boris Asafiev's view on the essence and development of musical culture. Yavorsky suggested that intonation was the earliest form of human language.

• 1930. Boris Asafiev suggested that music and language had a common ancestor that was later separated during the course of human evolution into two related but sometimes conflicting phenomena.

• 1930. Siegfried Nadel proposed that music originated as a supernatural language, used in religion and ritual, and that musical language was added to everyday speech through artistic expression.

• 1943. Curt Sachs suggested that music could have originated from two sources: (1) speech and (2) emotions. Later (in 1962) Sachs rejected all theories on the origins of music as un-provable or wrong.

• 1956 onwards. Bruno Nettl wrote in one of his early works that both music and language were born out of a common ancestor, a specific system of communication that shared elements of both music and language. In his 2000 article and 2005 book, Nettl discussed musical universals and the origin of music as a cultural invention.

• 1973. John Blacking considered music as a purely human creation, inseparable from social context and primarily serving the needs of social cohesion in human groups. His definition of music as 'humanly organized sound' is contradictory, as it excludes the possibility of the presence of elements of music in the animal kingdom (for example, the singing of birds or humpback whales), and implies that human speech is part of music as well.

• 1971. Roger Wescott suggested that the earliest predecessor of human language among Australopithecines was whistling, combined

with some other non-vocal sounds like 'hand clapping, foot stamping, and drumming on their chests or on external objects'.

• 1973. Miron Kharlap suggested that the historical development of human musical culture went not from monophony to polyphony, as it was universally believed by music historians, but from polyphony to monophony, from group to individual musical activity.

• 1981. Ivan Fonagy suggested that our ancestors' language was musical and that pitch modulations directly carried the meaning of the communication, and that speech evolved later as a more complex system to express more complex ideas more efficiently.

• 1983. Frank Livingstone suggested that human ancestors as far back as the Australopithecines were communicating by singing, although later he changed his view and linked the origins of singing to the period of tool-making technologies.

• 1984. Juan Roederer specially looked for the survival value of music and suggested that music was developed to play the role of assisting the human brain in acquiring language.

• 1986. Izaly Zemtsovsky stressed the importance of dialogical forms of communication for the origins and the initial forms of group singing. Zemtsovsky and the four following authors were participants in a special conference dedicated to the genesis and specificity of early forms of musical culture, held in Armenia in 1986.

• 1986. Viacheslav Ivanov suggested that the presence of 'personal songs' for each member of society in different cultures might imply that these songs were the oldest form of personal 'naming'. He also stressed the importance of the neurological aspect of musical activity, suggesting that music could play a crucial role in memorizing important texts in early human history, before the invention of a writing system.

• 1986. Boris Frolov and A. Demirkhanian stressed the crucial importance of rhythm in the initial stages of the development of human musical and social activities.

• 1986. Joseph Jordania, the author of this book, in his first publications on this topic suggested to distinguish musical language (as a means of communication) from musical culture (as a later cultural expression, art), and argued for the specific role of polyphonic group singing in the early stages of human evolution. In 2006 he published a book on the origins of choral music in the wide context of human evolution.

• 1991. James Brown and William Greenhood noted the evolutionary primacy of musical communication and suggested that the melodic utterances of *Homo erectus* changed into staccato-like speech with long utterances at the *Homo sapiens* stage.

• 1991. Nils Wallin researched the biological foundations of human musical ability based on a multidisciplinary approach to the human brain, physiology, auditory and vocal systems. Together with Bjorn Merker and Steven Brown, Wallin organized a cross-disciplinary conference on the origins of music in 1997 that resulted in the release of the groundbreaking volume 'The Origins of Music' in 2000.

• 1992. Bryan Levman provided a good review of existing theories on the origins of music. He suggested that both speech and music must have had a common ancestor, and argued that pitch modulations played a crucial role in the human protolanguage.

• 1993. Bruce Richman suggested that initial choral singing could have been a crucial element in the development of a more complex communication system – human language.

• 1995. John Barrow declared that music had no survival value for humans, and that it derived from an instinctive sensitivity for certain sound patterns that itself was the result of adaptation.

• 1996. Dan Sperber declared that music arose out of the ability to exploit parasitically our cognitive capacity to process complex sound patterns used for early stages of human communication.

• 1997. Steven Pinker dismissed the role of music in the evolution of human communication as a late phenomenon, mostly a by-product of language development, and continuing the line of the Greek Philosopher Philodemus, infamously labeled music as an 'auditory cheesecake'.

• 1997. Nathan Kogan discussed the possible adaptive functions of music and suggested that music could have enhanced the group movement synchronization and cooperation necessary for hunting.

• 2000. The volume 'The Origins of Music' was published by the MIT Press, providing an important incentive for the explosion of interest towards the origins of music. Several of the following authors published their ideas in this collection.

• 2000. Geoffrey Miller revived and refined the initial idea of Charles Darwin about the role of music in attracting the opposite sex,

suggesting that the function of music and dance was to demonstrate to the opposite sex the dancer's fitness to mate.

• 2000. Francois-Bernard Mache demonstrated existing parallels between human music and animal vocalizations and suggested that human musical faculty has strong links with animal singing behaviour.

• 2000. Ellen Dissanayake suggested that the origins of music are intimately connected to mother-infant interaction, particularly during the early period of infant development.

• 2000. Bjorn Merker proposed that music could have originated among hominids as a group activity, by which competing groups of males were inviting wandering females for mating.

• 2000. Steven Brown suggested the idea of "musilanguage", a common predecessor of music and language. In 2003 he suggested the model of 'contagious heterophony' for the origins of music. According to this model, group-singing behaviour was at the very beginnings of music, and that mirror neurons played a key role in this process.

• 2000. Thomas Geissmann presented a comparative study of gibbon singing and human singing behaviour, and suggested that one of the early functions of music could be to scare away aggressors and competitors.

• 2000. Peter Marler suggested using animal singing behaviour as a possible model for the study of the origins of human music.

• 2000. Jean Molino proposed that music, language, dance, chanting, poetry, and pretend play have common origins based on rhythmic formulas and imitation.

• 2001. 2006. Ian Cross discussed the possible biological and cultural foundations of human musical faculty, and criticized dismissive attitudes towards music that were often present in the mid 1990s.

• 2001. William Benzon wrote about the particular importance of shared musical creativity from the perspective of a jazz musician, and argued that 'music is a medium through which individual brains are coupled together in shared activity'.

• 2003. Edward Hagen and Gregory Bryant suggested that music and dance were primarily used as an 'honest' signal about the quality of a group's cohesion to be displayed to other human groups.

• 2003. Isabelle Peretz summed up recent studies on the cerebral localization of musical functions: 'In my view, the only consensus that

has been reached today about the cerebral organization underlying music concerns pitch contour processing … However, it remains to be determined if this mechanism is music-specific, since the intonation patterns for speech seem to recruit similarly located, if not identical, brain circuitries.'

• 2004. Robin Dunbar also suggested that the evolution of human language went through a musical phase.

• 2005. Steven Mithen suggested a model for the origin of music from the 'Hmmmm communication' (combination of 'Holistic, multimodal, manipulative, and musical' features), and noted that prelinguistic hominids may have had better musical abilities than modern humans.

• 2005. Timothy Justus and Jeffrey Hutsler investigated the possibility of innate constraints of human musical faculty, and suggested that despite the strong possibility of such an innate element, these elements could have emerged from selection pressures in other domains.

• 2003, 2005. Josh McDermott and Marc Hauser offered a comprehensive review of the existing publications on the innateness of several musical faculties. This review was 'motivated by the desire to understand music's evolutionary origins and adaptive significance'.

• 2006. Victor Grauer suggested that the contrapuntal polyphony of Central African pygmies is the survival of primordial human music, which was taken by anatomically modern human groups when they left Africa some 100 000 years ago.

• 2006. Tecumseh Fitch examined the drumming behaviour of African apes (chimpanzees, bonobos, gorillas) and suggested that drumming among apes could be viewed as a potential precursor of human instrumental music. Fitch also suggested the term 'prosodic protolanguage' as a reference for the pre-linguistic system of communication.

• 2006. David Huron studied the mechanisms of emotional gratification through the process of anticipation, and presented an interdisciplinary theory on the human emotional response to different elements and styles of music.

• 2008. Daniel Levitin suggested that six main types of songs constituted the basis of human musical culture, and proposed that the most ancient type of songs, so called 'songs of knowledge' provided a 'powerful mnemonic force for the encoded knowledge'. (This idea is close

to the idea expressed by Viacheslav Ivanov in 1986, discussed above). Levitin also mentioned the 'gruesome human invention' of the use of group singing by humans to intimidate opponents before battle.

- 2006. Erich Jarvis discussed the importance of vocal learning in birds and mammals for the research of the origins of music.
- 2009. Steven Livingstone and William Thomson continued the non-adaptationist line of Barrow, Sperber, and Pinker, suggesting that music can be a secondary phenomenon originated from Theory of Mind (ToM), the ability of humans to recognize the emotional state of other humans.
- 2009. Andrea Rinaldi provided a review on the biological foundations of music and their relationship with language and speech.
- 2010. Leonid Perlovsky published a wide overview of existing theories on the origins of music, focusing on the emotional power music has on the human brain.

Despite a long list of the authors and ideas, the reader needs to know that this overview is far from being complete, although it does present major theories and many of the authors who wrote on the origins of music. Now, after this review, we are ready to move towards the search of the origins of human singing in the context of human evolution.

Let us start discussing the history of singing from one very important but often neglected question:

Is Singing Dangerous for Life?

One of the most important and often overlooked characteristics of singing is that it is a potentially very dangerous activity for almost all living creatures. This is true for a very simple reason: singing reveals the whereabouts of the singer to every prospective predator in the vicinity. That is why the majority of animals do not sing.

Wait a minute, a reader might say, that is not correct! What about the plenty of animal species who can sing and are in fact very skillful singers? Nightingales and canaries, for example, are legendarily good

singers! Whales and dolphins are also wonderful singers and can even improvise and compose new melodies.

You are absolutely right, there are plenty of singers among different animal species. To be more precise, according to different accounts the number of singing species is somewhere from 4000 to 5400. So how can singing be dangerous for life, if literally thousands of animal species sing and continue to live prosperously?

Let me explain. Whether singing is dangerous or not depends on where you live. For the animal species who live in the trees, for some reason, singing does not seem to be dangerous, but for species who reside on the ground singing is deadly dangerous. If you do not believe this assertion look at the statistics: almost all of the singing species that we know today live high on the treetops, such as birds and gibbons. ***Not a single animal species that lives on the ground sings.*** There is only one exception, only one species which lives on the ground and sings: humans. Yes, let us repeat one more time: we are the only species on our planet who live on the ground and can sing. Even amongst animal species that live in the water there are at least a few singers like whales, dolphins, seals and sea lions, but not among ground living species.

This miraculously neglected fact is absolutely crucial for understanding the evolutionary history of singing in general, and particularly for singing amongst humans.

Now let us answer the crucial question: what is the reason for this strange imbalance? Why are there thousands of species living in the treetops that can sing, but no more than one creature living on the ground sings?

To answer this question, we need to pay attention to the survival strategies of the species living up in the trees and those who live on the ground.

Singing Trees and Silent Ground

When you go walking in a forest, you usually hear plenty of sounds. If you listen carefully, you may notice that almost all these sounds are coming from above, from the air and from the treetops. Birds and tree-living monkeys from tropical forests are among the noisiest species on our planet. Ground animals are usually so silent that you may not know whether they are around at all. We are so used to this fact that, as far as I know, no one has ever asked the question as to why there is so much singing and noise going on up in the trees, and why the ground living species are so silent.

I suggest that the core reason for this is a critical difference between the defence strategies of species living in the trees and that of those living on the ground. Animals living in the trees can live according to their weight, some higher, and some lower. Lighter species can live higher on a tree, where the tree branches are thinner. Those species that can live on thinner branches are unreachable for bigger predators because the heavier weight of the predators makes it impossible for them to follow their pray that high. So for example, if you are a 10 or 20 kilo primate, a 50 kilo leopard cannot reach you unless you've been caught off guard on the ground or on lower branches of the trees. That's why when a leopard appears in their vicinity, monkeys do not try to escape horizontally, instead they run straight up high in the life-saving tree branches, climbing as high as possible. By the way, a leopard itself often saves its own life and its food from menacing lions or hyenas by climbing trees, as a 150 kilo lion is too heavy to follow leopards, and also because hyenas, like dogs, cannot climb trees. Of course there are also flying predators, like hawks and eagles, who can attack tree dwellers from the sky, but still life is definitely more secure when all those prowling carnivores, like dogs and cats of different sizes, cannot reach you.

I suggest that this is the main reason why tree-dwelling species feel more secure to sing or to communicate with a wide range of vocal signals. A leopard or a wild dog can hear the singing of the birds and smaller monkeys from the higher branches of the trees very well, but the singers are well out of their reach.

On the ground the situation is very different. On the ground all animal species, from a small rabbit to a chunky lion and huge elephant,

live on the same 'ground level', hence keeping silent is crucially important for them to stalk more effectively, and also to avoid being stalked. I propose that this must be the main reason why there is virtually not a single singing species among land-dwelling animals.

Apart from singing, even making unusual sounds is much more common among tree-dwelling species. As I have already mentioned, if you go walking in the forest or a park you can notice that almost all the sounds that fill our forests and parks are coming from above, from the tree-dwelling animals. You will be very lucky to hear any sounds from land-dwelling species. Furthermore, domesticated species usually make much more sounds than their wild relatives, chiefly because domesticated species are provided with additional security against predators, as well as food.

In the wild, loud vocalizations are mostly made by big and powerful predators, so called 'apex predators.' These are the strongest species in their local environment (like lions or wolves), who are not preyed upon by other species. Such confident predators can make loud sounds to communicate with each other or to guard their territories, as they do not need to worry about their safety from other predators. For all other species who live on the same 'ground level' and fear for their lives, maintaining silence is crucially important.

Another good indicator of the importance of silence for everyone who lives on the ground is the fact that even birds, arguably the most ardent singers of our planet, stop making sounds when they land on the ground. Birds, like most of the tree dwellers, go down to the ground because many different types of food naturally end up on the ground, but when they go down to the ground for a meal they have to accept the unwritten rules of the survival game: they may certainly find a meal on the ground, but they themselves may also become a meal for someone else. I find it amazing that the fact of birds stopping singing when they sit on the ground because of fear of predators, to my knowledge, has never been discussed in scholarly literature. In a wonderful book on bird singing Catchpole and Slater discussed that birds need to be clear from the ground to sing, but only for the reasons of sound transmission. After having watched for several weeks the behaviour of Australian magpies, brilliant singers, in a nearby park in Preston, Melbourne, I got a strong impression that every time they would sit on the ground,

they would virtually become mute. For me this behaviour was primarily linked to the fear of predation, which is much more present on the ground. To ask for an expert's opinion, I wrote about this to an eminent expert on bird singing, Peter Slater, who replied to my question: 'It is certainly true that birds do not usually sing when they sit on the ground . . . One reason will certainly be the predation threat from ground predators such as mammals which might be attracted" (letter from March 3rd, 2008). So, even such ardent singers as birds stop singing when they reach the ground. No wonder no other land-dwelling animal species indulges in singing.

There is also another indication of the dangers of living on the ground in comparison with living on the trees: ground living species, as a rule, have teeth, whereas most of the flying species do not have teeth. Flying species with teeth are found only among mammals (like bats).

Therefore, we need to remember that unlike tree living species, ground living animals are mostly silent. Hence if you are a singing lover, you'd be safer for you to climb up the trees as high as you can and start singing from there. Remember, the ground is not for singers.

In this context, the noisy behaviour and love of singing in humans becomes even more intriguing. We are gradually coming closer to the core issues surrounding the mystery of human singing.

When Did Humans Start Singing?

Is it possible to pinpoint the time when our ancestors started singing? Considering that almost all singing species live in the trees, and taking into account the well known in evolutionary history fact, that for many millions of years our distant ancestors also lived in the trees, it seems inevitable to propose that singing among human ancestors started at the time when they still lived on the trees. It would be very strange and virtually non-evolutionary to propose that human ancestors did not sing when they lived on the trees where thousands of species sing, and that then they suddenly started singing when they came down to the ground, the place where none of the species sings. In case if anyone still would argue that humans did not start to until they moved their

habitat from trees to ground, then the only acceptable possibility would be to propose that humans started singing very late, only a few thousand years ago when they had already become the kings of the environment without having to fear other predators. However, the universality of singing in human cultures on one hand, and the localization of singing faculties very deep in the human brain on the other hand strongly opposes the idea of such a late origin of singing in human history.

Very much like singing birds who suddenly become silent when they visit ground, all the tree-living singing animals would feel enormous pressure to stop singing when they visited the ground even for a short trip, and more so if they tried to change their habitat from trees to the ground for good. In this context it seems natural to propose that the common human-chimpanzee ancestor was a singer, and that our closest living relatives, African apes, stopped singing after they came down from the safer trees to the hazardous ground. Watching noisy tree-living monkeys, who occasionally come down from the trees, it is easy to notice that they virtually stop making sounds while they are in the 'danger zone', very much like birds do. In this context the proposition that African apes stopped singing after they shifted from the trees to the ground seems to me very natural.

Some readers might object to my assertion that chimpanzees are silent animals. Well, from National Geographic films and Jane Goodall writings you may certainly learn that they have a big repertoire of communicative calls. However it is one thing to have a wide repertoire of sounds, the other thing is how often you use these sounds. According to the brilliant expert on animal vocalizing, Tecumseh Fitch, who specifically studied chimpanzee vocalizations, chimpanzees 'are surprisingly silent most of the time' (from his letter of June 10th, 2008). If you still do not believe this to be true, you can spend a couple of hours at the Chimpanzee enclosure at your local zoo, and then spend some time at the enclosure of some other, tree-dwelling monkeys, and compare what you hear.

Wonderful Dutch expert of animal behaviour, Adriaan Kortlandt, once had a rare opportunity to compare chimpanzee and human behaviour in similar situations at the same time. While he was watching (concealed high in a tree) a chimpanzee group in their natural environment in Africa, he saw a group of African children playing. Chimpanzee

youngsters were also playing at that moment, so visually it was a very similar picture, in both species children were running after each other and wrestling each other. But there was a huge difference in the noise they were making. Human children were, as you would expect, very noisy, loudly laughing and calling each other. Chimpanzee children, on the contrary, were not making any loud noise or vocalizations.

Considering the fact that living on the ground discourages animals to sing and make loud sounds, it should not be too difficult to believe that African apes stopped singing after they descended from the trees. What seems to me truly mysterious is why human ancestors did not follow suit? The possible reasons will be discussed soon, but I already want to suggest that one of the first crucial behavioural features that our very distant primate ancestors developed some 5-7 million of years ago, gradually leading to Homo sapiens, was their unusual vocal behaviour. Unlike their primate relatives, other African apes, who followed the evolutionarily proven path of becoming silent in order to survive on the ground, our ancestors, on the contrary, became louder. They not only continued singing, but in order to make their sound louder, they started singing in big groups, and even developed a new revolutionary phenomenon – rhythmically united choral singing to make louder singing possible.

To find out the reasons behind this important change in the behaviour of our distant ancestors, I suggest to pay attention to the survival strategies and defence mechanisms needed and utilized by our ancestors over the millions of years they spent in the African Savannah.

Times to Fight: Music and War

There is a strange neglect of one of the crucial areas of early human evolution, namely how human ancestors were defending themselves from predators. Starting with Charles Darwin, who had only a passing mention of this crucial issue in his 1871 classic book on human evolution, no scholar dedicated any decent attention to this problem. As a result, even today this remains possibly one of the most understudied topics of early human evolution. Let us now dedicate several pages to

this subject, as I believe that this question is closely related to the function of singing in the early stages of human evolution.

Animal species use several typical strategies to avoid predators: hiding and keeping silent, fleeing the scene as quickly as possible, fighting back, using their physical strength, teeth, horns, spikes, venom etc.

Humans are, in most of these faculties, hopelessly bad in comparison with other animal species, and even more puzzlingly, they gradually became worse during the millions of years after they descended to the ground. Let us have a quick look at how our ancestors used the most popular ways of defence from predators.

Crypsis. This term stands for 'hiding'. Hiding is possibly the most common initial strategy for many animals to avoid predators. Actually, not only the prey species, but predators also prefer to stay out of sight for obvious reasons. Human ancestors upright posture was not the best option if they really wanted to hide from predators. Some authors suggested that the upright posture was to help our ancestors to see the approaching predators. It is certainly true that you can see better when you rise on two legs, but it is also true that this posture helps others to see you better. Many animal species found the best solution: they use upright posture to scan the environment, but they do it for several seconds only, and after scanning their surroundings they return to their usual four-legged posture. I hope we can all agree that this option is much safer than to remain permanently on two legs and be easily seen by predators. Therefore, human ancestors did not try to hide, and in the case that they did, they were not very good at it. Another element of crypsis is to remain silent. We already discussed that humans are the only ground living animal that sings, so I will not repeat here the obvious fact: our ancestors definitely did not try to be unnoticeable and silent.

Running. Running is the most popular way of escaping predators, particularly on the open grasslands of the African savannah. Are humans good at running? Although we are in awe watching best human athletes competing at the Olympic games, we have to confess that we are amongst the worst runners of nature, particularly if compared to the animals of the African Savannah, a place where our ancestors lived for the millions of years. Even the best human athlete, the legendary Jamaican sprinter Usain Bolt, three time Olympic gold medalist and

recognized as the fastest man on the planet, would not be able to save his life with his fast legs from an attacking lion, or to catch a running antelope for his dinner. Both lion and antelope can run with the average speed of about 50-55 kilometers per hour, and the speed of Usain bolt on his record-breaking 100 metre run in 2008 was about 38 kilometers per hour. Very fast for a human, but still too slow to escape predators or to catch prey in the African savannah. Another amazing fact about human running is that bipedalism, the first and probably the most important behavioural change that lead our ancestors to the road towards humanity, instead of making humans run faster, actually slowed our ancestors down. The reader might not believe this, but chimpanzees can easily outrun the best human sprinters with their awkward four-limb running style. To conclude, we can say that even if Berndt Heinrich was correct in suggesting that our ancestors could run down antelopes with endurance running, human running was not fast enough for what running is primarily used for in many animal species: to escape from a predator (see also a box: 'Is Running Good for Your Health'?)

Physical strength. No one will argue against the fact that an animal's physical strength is directly connected to its ability to defend itself. The best human athletes' bodies are prodigious to watch at work and their musculature does not leave a shred of doubt that these bodies are full of physical strength. The question is though, how strong are humans when compared to animals? Apparently, humans are very weak compared not only to animals of a similar size, but even much smaller animals. For example, if you put together photos of a common chimpanzee and the legendary Arnold Schwarzenegger, it will be quite difficult to believe the fact that the much smaller chimpanzee is several times stronger than this powerfully built sportsman. Humans look much bigger and stronger than chimpanzees, no questions about that, but when it comes to actual physical strength, chimpanzees and even smaller baboons are much stronger than humans. Therefore, we need to remember that during the course of evolution humans became bigger, but they lost big part of their physical strength.

Teeth. I have already mentioned, that unlike birds, who have no teeth, many ground living animals use their teeth as their primary defence tool from predators. As a defence and attacking tool, canines are of the primary importance. If we compare canines of those primates

IS RUNNING GOOD FOR YOUR HEALTH?

Of course, generally speaking, running is good for your health like any other physical activity. But we need to take into account that running has some negative side effects. Running is effectively a series of jumps, and every jump and every landing causes stress to our ligaments and muscles. Professional runners often suffer from leg injuries. If you look at the anatomy of human leg, and compare it to the anatomy of the legs of some of the best running animals like antelopes, horses, wolves and cheetahs, you will notice that the lower part of the leg, the ankle, is much more bulkier in humans than in the best running animals. Leg morphology in these running animals has been refined by millions of the years of struggle for survival, that's why they have very lean ankles. As the ankle is the part of the leg that moves most vigorously during running and absorbs repeating stress of series of jumps, a lean ankle is a great advantage for a runner, as it helps to avoid injuries. The bulky human ankle anatomy compared to animal lean ankle anatomy is another fact suggesting that running was

who live on the trees and those who live on the ground, we can easily see that the ground living primates have predictably bigger canines. Charles Darwin noticed and mentioned in his 1871 book, that ground living baboons, for example, have dog-like jaws and a huge canines. Canines of Chacma Baboons are even bigger than lion canines. Humans, on the other hand, present us with mysterious dynamics of their teeth evolution: since they descended from the relatively safe trees to the predator-infested ground, human canines started disappearing. 'Because the small human canine has a disproportionately long root, it is clear that our ancestors had a larger tooth more typical of apes. Furthermore, the human canine bears a pointed tip when it erupts, although it quickly wears to a more spatulate shape' wrote Langdon in 2005. We will later discuss the possible evolutionary reasons as to why our ancestors canines started to disappear after they descended to the dangerous ground, but at the moment let us just remember that human ancestors could not use canines as well when they were confronted with predators.

Strong and tough hide. Most animals species, both predators and prey, have a strong and tough hide. Even though an antelope's hide may look very fragile to us, they are so strong that even lions need some time to cut through the hide and reach the nourishing parts of the body. The benefits of having a strong hide for animals, whose lives depend on the outcomes of violent physical confrontations with other animals with sharp fangs and claws, are obvious. A primate's hide is as tough as

not among human natural abilities that were refined in the course of evolution in the African savannah. Another very interesting fact came from Roy Palmer, a British sports writer and author, a former competitive runner himself. According to Palmer, humans are not naturally good at running, and even among professional runners there are some who do not run correctly. So, if you keep you physical form with weekly running, it might be a good idea to first check with professionals if your running technique is correct, and then to take it easy and not run very fast and very long distances to avoid injuries. And at the end, let me suggest something very unusual, but something that I believe might be better suited for your human morphology and health. A much less stressful way of keeping yourself in good physical shape is dancing. Dancing under your favourite rhythmic music, even for hours, is much more natural and injury-free for humans than running. If you wonder how can dancing be more natural to humans, than running, please keep reading this book.

other animals, but what about humans? We are faced once again with a puzzling evolutionary transformation: after our ancestors came down from the safer trees to the dangerous ground, their tough skin became gentler and softer. So even our skin is not suited for physical confrontations with predators.

We come to the end of our short survey of the most popular animal defence strategies. When discussing human evolution, there is not much sense in discussing such defence strategies as venom, horns or electric charges, as evolution only works with elements that are already available in ancestral forms. So, after this survey we have to conclude that our distant ancestors were not using any of the usual defence strategies: hiding from predators, remaining silent, fleeing from the danger, using their physical strength, using canines, or using strong and tough hides.

Despite these shortcomings, our ancestors managed to build a ingenious defence system that enabled them to gradually become the dominating species of the African savannah, and I suggest that singing played a critically important role in their defence system. How could that happen?

Can Singing Save Your Life?

We just finished a review of defence strategies and found that our ancestors were not using any of the usual defence strategies that countless species of animals use in their everyday struggles for survival. Later in the book we will discuss one more defence strategy that was deliberately omitted here – aposematism (this is a defence system based on giving audio, visual and olfactory warning signals to predators). But before we start discussing the principles of aposematic defence, I want to concentrate on the possible role of singing among our ancestors during the millions of years they spent in the open grasslands of the African Savannah.

Let us follow the blessed principle of Occam's Razor, and try to look for the easiest answer to the question of hominid singing. The most direct strategy would be to find out why other animal species use loud group vocalizations. Some social animals use loud vocalizations when their group meets another group, or most importantly for us, when group members are facing their deadly enemies, predators.

Plenty of animals, when cornered by a predator or a bigger competitor, try to look as big as possible and make as loud warning sounds as possible. Most readers would have seen, at least once, a frightened cat arch its back, fluff up its hair and make hissing sounds. The arched back and erected hair helps the cat to look bigger to the aggressor, and with the hissing sound while displaying sharp teeth, the cat also warns the opposition that it is going to defend itself. The aim of this audio-visual display is to look and sound as intimidating as possible.

Let us pay attention to this temporary transformation of appearance: most animals that are commonly prey try to avoid their predators by keeping themselves as silent and unseen as possible, however if they are detected and confronted by a predator and clearly have no option to flee, they instantly change their defence strategy and try to appear as big and as loud as possible.

Could our ancestors also have used loud vocalizations to protect themselves from the predators? They certainly could. It is widely known, for example, that our closest living relatives, chimpanzees and gorillas, when they are confronted by predators (like the leopard) or competitors, start shouting loudly, stomp on the ground, drum on trees

and other objects and basically try to make as much sound as possible. Even today if we suddenly encounter a big stray dog or some other potentially dangerous animal, and if we want to scare them away, we instinctively shout at them, stomp on the ground and make a hand gesture like we are throwing an object at it. Therefore it is highly plausible that the common ancestors we share with African apes were also using loud vocalizations and drumming to defend themselves from predators.

Despite these parallels, there is a big difference between how African apes and human ancestors used loud sounds to protect themselves from predators. Loud displays among apes are used rarely, and most of the time apes remain, to use Tecumseh Fitch's words, 'surprisingly silent'. Humans, on the contrary, are noisy most of the time, or we can at least say that humans do not try to be silent. I suggest that human ancestors used a different strategy – they did not try to conceal their presence, on the contrary, they tried to intimidate every possible predator with their confident look, behaviour and noise.

My suggestion is that our ancestors turned loud singing into a central element of their defence system against predators. They started using loud, rhythmic singing and shouting accompanied by vigorous, threatening body movements and object throwing to defend themselves from predators. The power of the loud vocalization of a group of humans is widely known from well-documented cases where a group of unarmed shouting humans have scared away even a hungry man-eating tiger from its prey, or when a shouting human group can drive large and dangerous animals towards an intended location.

Tomas Geissmann, an expert on gibbon singing, suggested in his 2000 article that human singing could have originated as a means to scare away aggressors and competitors. Noted American ethnomusicologist Bruno Nettl also supported this possibility. My model gives full support to this idea.

As mentioned above, human musical behaviour includes another element, unique among all other singing species – precise rhythm. As Estreicher noted in 1964, Africans have an 'in-built metronome' that gives them an extremely precise sense of rhythm. I think many would agree with me that this is a characteristic feature not only of Africans, but of humans generally. The appearance of such a unique feature must have had strong evolutionary reasons. Rhythmic unity brought a few

new important features into human defensive singing and made it much more efficient: (1) singing/shouting is physically louder if it is precisely organized rhythmically; (2) rhythmically well-organized group vocalizations send a strong message to the predator about the unity and determination of the group; and (3) doing repetitive rhythmic physical actions in a big group (working, marching) is an extremely effective way to create a strong bond between the members of a human group. But most importantly, I suggest that loud rhythmic chanting-singing-shouting, apart from the external function (scaring away predators) had a crucially important internal, psychological function as well. We are now going to discuss this factor.

Rhythm, Battle Trance and Collective Identity

August of 1839 saw possibly the fiercest fight that the war-torn Caucasian Mountains have ever seen. The military forces of the mighty Russian Empire were finishing off the prolonged resistance of the legendary Dagestanian military and religious leader Imam Shamil. Shamil was leading armed resistance against Russian forces for many years. After the epic 80-day-long siege at their mountain stronghold Akhoulgo, and after about 7000 were killed from both sides, a small group of Shamil supporters were surrounded by overwhelming number or Russian troops. Neither side took prisoners in this battle. The death of all Shamil fighters, including Shamil himself, was imminent. In this most critical situation Shamil suddenly started singing and dancing a traditional dance, gradually involving all his fighters in the dance. The speed of the dance was becoming faster and faster. Russian soldiers were in amazement hearing sounds of singing and dancing from their encircled and doomed enemies. When the tempo and the vigor of the dance was raised to boiling point, Shamil suddenly stormed out with his sword in the hand and with a fierce war cry attacked shocked Russian soldiers. All his fighters followed, and despite the overwhelming number of Russian troops, a few of the fighters including Shamil himself and his family escaped and continued to fight for many more years.

If you think that this kind of history can only happen with the members of conservative traditional societies, you are not correct. Even now, as you are reading this book, it is very likely that a group of American soldiers, positioned somewhere in Iraq or Afghanistan (or any other dangerous zone), are together singing and dancing to the loud sound of heavy rock song. Why are they doing this? Because in a few minutes they will be going in combat zones where they can be ambushed and killed, so they are preparing for their dangerous mission by singing and dancing to a loud rock song. It is not easy to prepare yourself for such a hard task. According to recent research by Jonathan Pieslak, many American soldiers confess that it would have been impossible for them to get into the required combat spirit if they did not listen to heavy and rhythmic rock music. I hope we all can agree that, when a combat unit goes out for a combat mission, it is of paramount importance that they all are feeling the strength of their unity and an utmost trust towards each other. This feel comes from being in a state of ***collective identity***, in a state of ***battle trance***, and rhythmic music and dance are the best means to put soldiers in the state.

I propose that ***the central function of the rhythmic loud singing was to put our distant ancestors into a very specific altered state of consciousness which I call the 'Battle Trance***.' This is a very specific state of mind designed by evolution for the most critical moments of life, when the total commitment of every member of the group was needed for a life-or-death fight. This state has several characteristics:

(1) Humans in a state of battle trance do not feel pain. This state is known as 'analgesia';

(2) In this state humans also do not feel fear. This state can be called as 'aphobia';

(3) In this state humans may totally neglect their individual survival instincts as they are fighting for something bigger and more important than their own life;

(4) In this state humans sometimes demonstrate supernatural strength; lifting cars and doing other things that are beyond their usual physical capabilities;

(5) In this state humans lose their individual identity and acquire a different, collective identity, and as a result every member is acting in

the best interests of the group, even neglecting the powerful instincts of self-survival.

(6) Going into the battle trance may happen instantly, fully instinctively, or can be induced by special ritual-like activities.

The classic example of the instant appearance of the battle trance is when a child is suddenly attacked in the presence of a parent. In such a critical situation parents often instinctively start an all-out fight against the aggressor, despite the fact that the aggressor might be much stronger and can easily kill both the parent and the child. In such critical situations a momentary switch happens in the mind, and a human turns from a logical, thinking being, which it usually is, into a furious bundle of nails and fists without any fear or feeling of pain.

This kind of self-sacrificial dedication and neglect of self-survival interests must have had its origins in the mother-child relationship of the mammalian species. When a survival of an offspring became totally dependant on the mother, evolution re-designed the hierarchy of instincts, and in many species the instinct of saving an offspring became a higher priority than the concern for its own safety. Hunters often remark that the most dangerous animal to encounter during a hunt is not a huge male, but a mother with a cub.

Among humans this motherly instinct of utmost dedication towards the offspring turned into something different: the total dedication of all members of the group to the interests of the Group they belong to. Like in a well-established combat unit, where in the heat of the battle one can sacrifice his own life to save friend's life, human ancestors developed the feel of ***group identity***. The feel of group identity is based on the total trust and dedication of each member of the group to the common interest. Group identity kicks in when there is a critical situation, a mortal danger for survival of the group or any of its members. In such moments the noble principle of 'One for all, all for one' rules any individual self-preserving instinct, fear and pain. Such human sentiments, like patriotism or religious belonging, are primarily based on this ancient instinct, and the feelings of group identity are becoming particularly strong in the moments of big national or religious upheavals, wars, natural disasters.

Going into the battle trance and acquiring group identity can be viewed as a classic example of altruistic behaviour, although I want

to maintain that humans go into group identity not because of their feeling of duty towards others, but mostly because the powerful forces of evolution designed this mechanism as a better survival strategy for a group and every member of the group. Evolution supplied powerful neurological mechanisms to make this feeling a positive experience. Going into group identity brings the most exhilarating feelings to every member of the group. Every member of the group feels bigger, feels stronger, and virtually feels immortal. You can only become truly immortal if you do not fear death. Group members in such an altered state of mind, when they share total trust with each other, emotionally believe that the group cannot be defeated (see also the box: "The Battle Trance and the Origins of Religion"). This unique altered state of mind is supported (and most likely caused) by the powerful neurological substances such as endorphins and oxytocin, which are momentarily released in the brain when a critical survival situation arises. As the neurological substances are released into the brain, feelings of pain and fear are blocked, and total trust and exhilaration of being a part of a supernaturally strong unit becomes overwhelming.

I am proposing that the mechanism of the battle trance has been designed by the forces of evolution as the highest ranking instinct in the entire hierarchy of human instincts, the instinct that rules our behaviour in the most critical situations of life.

'Wait a minute', a reader might ask here, 'this all sounds very exciting, but what is singing doing here? When a predator attacks a child with the mother present, she does not start singing, she instantly goes into the battle trance and starts fighting against the aggressor without feel of fear and pain. What has singing to do with the phenomenon of the battle trance in such situations?'

This is absolutely correct. When the aggressor attacks our loved ones, we do not start singing or rhythmic chanting. There is simply not enough time for this. Besides, there is no need for this, as our instincts can do all the required work instantly, switching our brain from the usual everyday relaxed mood into an intense self-sacrificing state of mind where we do not care for our life for the sake of a more important goal.

However, apart from the instant fight against attacking predators, there were other very important moments in the life of our ancestors when there was time and the need to prepare a whole group for a deci-

THE BATTLE TRANCE, ALTRUISM, AND THE ORIGINS OF RELIGION

In the state of battle trance, with oxytocin released in the brain, humans have an exalting, spiritual feeling, a feeling of being a part of something much bigger and much more important than their own life. The concept of battle trance, when individuals virtually lose their ego and acquire a new collective identity, provides a potent evolutionary model for the emergence of human altruistic morality and religion. Feeling yourself as a part of a bigger unity, placing the interests of the society over individual interests, and caring about other members of the society is in the very core of every human religion and every social moral codex. Even when a prayer is alone, the aim of the pray is to feel yourself a part of something bigger, part of the cosmic being, the God.

sive battle, and when the mental state of the group was crucially important, as it still is today for the members of a combat unit before they go into battle.

Hunters or Scavengers?

One of the crucially important moments in the everyday lives of our distant ancestors was obtaining food. There are heated debates on how our ancestors were obtaining their much needed protein after they started their new life on the ground. The early traditional view that human ancestors were hunters from a very early age is not considered today as strong and convincing as it was before. Instead the new idea that human ancestors were mostly scavengers, is finding increasing support from the archaeological records. Louis Binford was probably the central figure in this debate and in changing the attitudes towards the role of scavenging and hunting in human prehistory.

Scavenging in the ecosystem of Africa is not as easy as it might seem to the reader, sitting in a safe and comfortable house somewhere in New York, Tokyo or Melbourne. If a species relies on scavenging as one of the main sources of food, this species must be ready to fight for it, or to be engaged, as Blumenschine suggested, in 'confrontational scavenging.' The difficult part of scavenging is that in order to get to the coveted carcass, you must confront many other competitors. No carnivore animal, including the lion, refuses a chance to scavenge somebody else's kill. Often the kill becomes dinner not for the original predator

The battle trance model of the origins of religion supports Emile Durkheim's idea of totem and totemism being the earliest human religion where the group, society itself, was the initial symbol of supernatural deity. A highly ritualized process of going into battle trance that our ancestors were undertaking every time when total commitment of the group members was required, involving rhythmic singing, dancing, and other forms of the ancient expressive arts, must have laid a solid fundament for the religious rituals on one hand, and for the development of human arts and artistic transformation on the other hand.

who made the kill, but to the strongest competitor who is in the vicinity of the kill. The cheetah, for example, is probably the most successful hunter on the African savannah because of its superior speed (seven kills out of ten hunts against the three kills out of ten hunts among lions), but because of its fragile complexion which is built for speed, not for power, the cheetah often loses its kills to lions, leopards, and hyenas.

I want to suggest that our ancestors became very skillful competitors at scavenging opportunities. They were very slow and bad hunters, and they lacked natural weapons to kill a prey, but they became excellent at scaring away all other competitors, including the strongest of the African predators, the lion.

So I am suggesting that ***aggressive or confrontational scavenging was the central means of obtaining food for early hominids***. I propose that our distant ancestors were targeting lions and waiting for them to make a kill. As the kill was made, after some special preparation (we will talk about the nature of this 'special preparation' very shortly), hominids would approach the feasting pride and would start scaring them away from the kill with the display of loud rhythmic group sound, stomping on the ground, drumming, clapping, threatening body movements, and stone throwing.

There can be no doubts that lions would be very unfriendly towards uninvited guests, and would try to scare them away with either fake or real attacks, just as they do today when hyenas are harassing them.

Trying to scare away a lion from its kill is a formidable endeavor that only the bravest or craziest (and definitely the hungriest) can undertake. If you remember that the competitors of the lions in this case were not some other huge and well armed predators, but primates with nothing more than stones in their hands, then the whole idea of such

an attack seems even crazier. You would expect that such a group of primates would instantly clear the scene at the very first fake attack of any of the mighty lions, but here we must remember that our distant ancestors, in such a critical confrontation, would definitely be in a state of battle trance, where they did not feel any fear or pain, and were totally dedicated to the common aim to obtain the much needed food, even if this would require the self-sacrifice of a few members of the group.

To succeed in such a dangerous endeavor, and to become a worthy competitor for the strongest apex predator of the African savannah, our ancestors went through many behavioural and morphological changes during several millions of years of evolution. All these changes were aimed towards the same aim: to make our distant ancestors better intimidators with more powerful audio and visual displays. The result of this long and painful process with millions of trials and countless victims was the powerful system of Audio-Visual Intimidating Display', or AVID, which we are going to discuss in the next several pages.

Audio-Visual Intimidating Display: Behavioural and Morphological Changes

The model of Audio-Visual Intimidating Display gives us an opportunity to have a look at several well-known elements of human behaviour and morphology in a new evolutionary light. Let us remember that the sole aim of all morphological changes was the same: **to make our distant ancestors look taller, bigger, and to sound louder**. Here are some of the key behavioural and morphological changes that appeared during the evolution of Homo sapiens and which I suggest were related to the development of the system of Audio-Visual Intimidating Display.

Bipedalism. There are about a dozen distinct hypotheses as to how and why bipedalism (walking upright on two legs) started in human evolution. The different hypotheses are not necessarily mutually exclusive. The idea that the origins of human bipedalism might be connected to the desire to intimidate opponents was proposed by Fred Livingstone in the 1960s, and was supported by Nina Jablonski and George Chaplin

in the 1990s. Plenty of animal species use bipedal threat displays to look taller in order to avoid an undesirable fight or to intimidate antagonists during a confrontation. I suggest that, unlike other animal species that use bipedalism only when they are confronted by a predator or a competitor, our human ancestors used bipedalism most of the time, eventually shifting to habitual bipedal locomotion. The reason for this, as I have suggested, is that our ancestors did not try to become another silent dweller of the ground. On the contrary, they chose a policy to assert their presence wherever they went, and to intimidate all possible predators with their taller body, confident appearance and noisy behaviour.

Long Legs. Compared to our closest relatives, African apes, humans have unusually long legs. The first explanation that comes to mind when you think of the evolutionary reason of our long legs, is that humans needed longer legs to run faster. This argument fails if we take into account two facts: (1) humans are one of the slowest runners in the animal world, and certainly the slowest among the animals living in the savannah, where they had to demonstrate their running ability; and (2) chimpanzees, with their short legs and embarrassingly awkward running style, can in fact run faster than the best human athletes. So if long human legs did not develop in order to run faster what other purpose could they serve in human evolution? I suggest that the powerful evolutionary forces of natural selection developed longer legs in our distant ancestors for the same reason as bipedalism: to make the human body taller and more intimidating for predators and competitors.

Head hair. Human head hair is one of the unique elements of human morphology, although it has not been granted as much scholarly attention in the studies of human evolution as bipedalism has. Nina Jablonski suggested that it was evolutionarily advantageous for hominids to retain the hair on their heads in order to protect the skin there as they walked, upright, under the intense African sun. Desmond Morris suggested that the overgrown head hair was used as a species-specific morphological sign for the hominids, visible from afar. To understand the evolutionary function of human head hair, we need to remember that humans most likely had huge 'afro' style hair on their heads. I am specially stressing this because, in most scholarly reconstructions, our hominid ancestors look as if they just have walked out from a hairdress-

er. In reality our ancestors had a huge ball of hair on top of their heads. I suggest that the unusually long Hominid hair had the same purposes as that of the bipedal posture and the longer legs: to look taller. Untrimmed head hair can grow about one and a half meters long, so the size of the untrimmed 'Afro' hairstyle is several times as big as the diameter of a human head. Therefore, the huge ball of black hair must have been a significant addition to the hominids' body height. Here we can recall tall military helmets, which, apart from the function of defence of the head from different weapons, also served the similar purpose – to make the wearer look taller and more intimidating for the opponent. Adding horns and other objects to helmets had the same intimidating function. Sometimes even a hairstyle itself could be shaped to make a person look much taller: the well known 'Mohawk' hair style, popular among some contemporary Punk and Goth group members, originated from American Indian tribal warriors, and has the advantage of greatly increasing the height of the wearer.

Body painting. Hardly any known human tribe or society exists or existed without some form of body painting. Painting bodies and faces before battle or hunting is universal in many parts of the world. I suggest that our ancestors also started using body painting for practical reasons. Body painting used for confrontation with predators had two functions: external and internal. As an 'external' factor, the effect of 'unknown appearance' would confuse and threaten predators, because animals are instinctively weary of other animals and objects which have an unusual and colorful appearance. As an internal, psychological factor, change of appearance (body and face painting) could have helped our ancestors to obtain a different, collective personality and to go into a battle trance. The popularity of masked rituals from different cultures and religions are of particular interest in this regard. What substances could our ancestors use to paint themselves? Although the first material evidence comes from over 230 000 years ago, it is very likely that before the use of such elaborate substances as ochre or manganese dioxite, our ancestors were using simpler and more easily available substances like blood or different berries for quite a long time.

Clothes. The traditional approach to the origins of clothes is that they give protection from cold weather. I propose that initial use of clothes (more precisely – animal hides covering parts of human body)

served the function of intimidation, based again on the factors of unusual appearance on one hand, and psychological transformation into the state of battle trance on the other hand. I suggest that those groups of hominids, who were covering themselves with animal hides during scavenging confrontations would have been more successful in intimidating predators and competitors with their unusual appearance than other, naked groups. My suggestion does not conflict with the traditional idea, as clothes could easily serve both of these functions in human prehistory. At the same time there is an important difference between these two functions of the clothes. Clothes as a defence from the cold weather would have become important only after our ancestors moved to other geographical areas with colder climate. On the other hand, clothes as a part of the intimidating system could have originated when our ancestors were still living under the hot African sun, as an aid to make human defence and attacking ability against predators and competitors more effective. Therefore, our distant ancestors could have started using clothes primarily for the defence purposes, and much later, when they moved from sunny Africa to other geographical conditions, clothes were found to be a life-saving protection against the cold weather.

Male Voice Range. The big difference that exists between human male and female voice ranges is very rare among primates. The difference in range is an octave. None of the other apes and most of the primates, despite a much bigger difference in their body sizes (for example, between male and female gorillas) have such a big gap in voice range. In explaining the evolutionary reasons for the emergence of the unusually deep male voice, I totally agree with the suggestion of Desmond Morris that a low male voice could have been very useful to 'intimidate human rivals, to drive prey or to scare off predators'.

Singing in harmony. Choir directors would agree with me: the sound of a choir increases when its members sing in harmony. When the overtones of different pitches clash with each other in one simultaneous harmonic sound, the result is a more robust sound with seemingly greater number of participants (this phenomenon is known as "Beau Geste effect"). Therefore, it seems natural for me to propose that the initial impetus to sing in different parts was the result of a long evolutionary process of seeking more impressive sounds for survival

and safety. The same search for a more impressive sound, that brought rhythm into human singing, created another uniquely human musical element – singing in harmony. I suggest that hominids were not only singing together, but they were also singing in harmony (in different parts). Some readers might view my suggestion of the direct links between the cultural phenomenon of choral singing and the singing of prehistoric hominids as a bit of an insult, but for me there is something very deep and very poetic in making evolutionary connections between Bach's chorales and the final chorus of Beethoven's 9th symphony on one hand, and the trance-inducing loud singing in the harmonies of our distant ancestors in order to stand their ground against the mighty lions a few million years ago on the other hand.

Singing in dissonances. We have just discussed that singing in harmony makes the overall sound more robust, creating an impression of a larger and more imposing group. Another question is what kind of harmony could have been employed by our hominid ancestors? Professional musicians know that there are several different ways of singing in harmony. You can sing in parallel thirds, or parallel fourths or other intervals, use a drone with other parts, sing in very wide or very close intervals, you can also sing in two, three, four, or more parts, and also you can sing in consonant or dissonant intervals and chords. All these different types of singing in harmony create a very different overall sound. According to my long experience as a choir leader and a university lecturer in different styles of polyphonic singing and various styles of harmony, singing in dissonant intervals and chords creates the most startling, the most robust, and the most impressive overall sound. These characteristics make singing in dissonant harmonies the best possible option for the intimidation of opponents (see the box 'Can The Earliest Polyphonic Style of Humanity Still Be Around?').

Hairless Body. In total contrast to the huge bush of hair on top of the human head, the human body is almost naked, and there must be a good evolutionary reason for this unusual feature of human morphology.

An authority no less than Charles Darwin suggested that human ancestors lost bodily hair because a hairless body was considered to be more attractive for a mate. Taking into account humans' unusually active

sexuality, this idea seems highly plausible. At the same time we should remember that the human skin is not only hairless, but also much more fragile and sensitive than an animal's hide. Most of us would agree that a naked hairless body with gentle smooth and sensitive skin is sensually more attractive, but such skin is also a very vulnerable in violent confrontations with predators, and that's why gentle and soft skin is so rare among animals. What about human ancestors? I suggest that ***Hominids did not actually need to be engaged in contact combat with predators***. The new defence strategy, Audio-Visual Intimidating Display (AVID), based on loud and rhythmically united singing, stomping, rhythmical stone hitting, stone-throwing, coupled with bipedal posture, longer legs, huge bushy hair, and body painting, allowed our ancestors to defend themselves against predators and to obtain food (via aggressive scavenging) virtually without any physical contact.

As soon as the need for violent physical contact disappeared, the primate strong and hairy hide lost most of its survival function. The principle of evolution is simple and strict: 'use it or lose it'. As soon as AVID provided a potent non-contact defence system against predators, a green light was given to the sexual preferences for mates with gentler, more sensual skin and a hairless body. I hope we can all agree that if the interests of physical survival and sexual pleasure are in conflict with each other, sexual pleasure takes a back seat. However, as soon as the problem of the defence from predators was solved in our prehistory without the need for violent physical contact, Darwin's suggestion of sexual preference for the hairless bodies became a powerful driving force for the further evolution and refinement of the human body. Another possible reason for the gradual disappearance of bodily hair could be to get rid of the parasites that were (and still are) dwelling in long primate fur.

Teeth. We have already discussed the strange dynamic of the disappearance of human canines since our ancestors descended from the trees to the ground, where most animals try to grow bigger canines. Here I want to discuss briefly the reason for this transformation.

Darwin was probably the first to point out that the decrease of canines in human evolution must have been connected to the adoption of tools as weapons, relieving teeth of the function of physical defence. A century later Ralph Holloway suggested that the reduction of canines

CAN THE EARLIEST POLYPHONIC STYLE OF HUMANITY STILL BE AROUND?

If migrating humans took the common polyphonic singing style from the African 'cradle' to the different regions of the world, it is theoretically possible that some remnants of this primordial polyphonic singing style might still be surviving in the most isolated regions of the world. If we want to search for such survivals we need to look for a polyphonic style with a loud and piercing sound and with very sharp dissonances, and this style must be found in geographically isolated places, ideally on different continents.

If we look at the stratification of singing styles discussed in the first chapter of this book, a very specific polyphonic style stands out. This is a piercing and loud singing style, based on acoustically maximally dissonant intervals (this is a very specific interval between the major and minor seconds, 14-16 hertz, known by the German term 'Schwebungsdiaphonie'). This singing style is found in such geographically isolated regions as the Himalayas, mountain ranges of Hindu-Kush, Caucasian and Balkan mountains, North Vietnamese and Taiwanese mountains, South-West China's forest-covered mountains, some islands of Indonesia and Melanesia, swampy forests of East European Polesie, the fringes of Europe in the Baltic region. I call this polyphonic style Drone-Dissonant style (D/D Style), according to the two most important elements of this style. Some remnants of D/D style are also found in isolated regions of Africa, in North Japan among Ainus, and in the Andes among the Q'eros of South America. The amazing similarity between the polyphonic styles of such isolated regions and cultures strongly suggests that these all are the remnants of the earliest common singing tradition. The striking resemblance between Balkan and Indonesian polyphonies which left Jaap Kunst astonished, is only one example survived

followed changes in the social organization of our ancestors and was a selection against aggressiveness. Richard Wrangham and Peter Lucas recently suggested that it was the invention of cooking, not tools, that played the key role in the decrease in the size and number of hominid teeth.

I propose that the answer to this 'dental paradox' can be found in the intimidation strategy of our hominid ancestors. With the development of successful non-contact means of confrontation, the need for sharp canines as the primary weapon for defence and attack was over (very much like the tough and fur-covered hide).

Interestingly, the teeth of *Sahelanthropus tchadensis*, who lived some 6-7 million years ago, already show reduced canines. There are two possibilities to explain this fact: (1) *Sahelanthropus tchadensis* is an ancestor in the line leading to hominids, or (2) this was a common ancestor of human and Chimpanzee lines, still arboreal, with smaller teeth, and that chimpanzees gradually developed bigger canines after they moved

from this pre-historic mega-unity. When in the 1980s Florian Messner played a recording from Bulgaria to Indonesian villagers, Indonesians were sure that this was a recording made in a neighbouring village, and the reaction of Bulgarian villagers was exactly the same on hearing the recording of the Indonesian polyphony. I can also say that although I had been studying these polyphonic styles for years, I still cannot distinguish them from each other.

The only serious argument against the possibility that these polyphonic styles are survivals of pre-historic and even pre-modern human times is the immense stretch of time, literally millions of years, that is supposed to pass without much changes in these singing traditions. Otherwise the amazing closeness of singing traditions on one hand, and the distribution of this style in many extremely isolated regions on the other hand represents the classic case of 'remnants of the ancient common practice'. Victor Grauer famously declared that Bushmen/Pygmy polyphony (based on yodeling) can be a survival of the earliest singing style of humanity, stretching for the last 100 000 years. Grauer relies on the 'Recent African' or 'Total Replacement' model. My research and polyphonic data supports, as we will see later, the 'Multiregional model', also known as 'network model', where the count for the age of humanity goes on for millions of years. If we believe that such a long survival of a singing style is impossible, then we are facing the even more difficult task to explain the presence of amazingly similar and very specific dissonant singing traditions in very specific intervals in such wildly different places of the world. Therefore, I suggest that we should not discount the simplest possibility, that these are all remnants of the oldest human singing style, the style that helped our ancestors get into the trance and obtain collective identity in order to fight together, as a unit, for their common survival.

to the ground (while human ancestors chose another strategy and further decreased their canine size). I think the latter suggestion is closer to the historical reality. This suggestion is not very far from the suggestion of Charles Darwin, and the suggestion of Ralph Holloway should not be discounted either (they are not mutually exclusive). On the other hand, the suggestion that cooking was the driving force behind the decrease of canines does not fit the early timelines of the decrease of canines, as the earliest possible date for the use of fire among our ancestors is about two million years ago, while teeth started declining at least five million years ago.

At the end let me also mention, that the decrease in the size of teeth had profound long-term consequences for the development of subtler forms of vocal communication, leading ultimately to the emergence of spoken language a few million years later.

Body Size and Physical Strength. A bigger and heavier body is a liability if you live on the tree branches and try to escape a leopard on

the top of the tree, but if you live on the ground and try to intimidate lions with your sounds and looks, a bigger sized body is a blessing. It would be natural to propose that during the millions of years of confrontation with lions, hominids with bigger body size would be naturally selected by evolution.

As I have already mentioned, human body size increased during evolution, but the human's body strength actually decreased. This fact is another indication that for our ancestors size was much more important than the actual strength.

The decrease of the hominid body's physical strength could have been a selective trait towards the decrease of aggressiveness and fatalities during inter-group conflicts in a larger group of hominids, as Holloway suggested in relation to the decrease of size in hominid teeth.

The Origins of Paleolithic Industry. The origin of the stone tool industry is one of the crucial moments of human evolution. A few scholars who tried to accomplish the task of making a stone tool with their bare hands found that making even the most basic stone tool is an arduously difficult task. Even the talented bonobo, Kanzi, despite his impressive achievements in acquiring the basics of human language, still failed to manufacture stone tools.

In this connection there is an often neglected question hovering over the origins of Paleolithic industry: why and how did our ancestors start making stone tools? What was the initial drive behind this difficult task?

I suggest that the audio-visual intimidating strategy can provide the answer to this question. One of the important elements of intimidation strategy was the use of stones. Stones were used for two important purposes: (1) to make rhythmic sounds by hitting two stones against each other as loud as possible, and (2) to throw them at predators if the audio and visual factors were not effective and if the attack was imminent. Here we have an excellent situation to have plenty of shattered stones: we have a group of hominids in the heat of a life-and-death confrontation. They are using two stones as the simplest rhythmic devices, so they are hitting stones against each other with all the power they have, trying to make sound as loud as possible. The force they were hitting the stones with would have been also augmented by them being in a state of battle trance, much like modern-day soldiers during combat.

As a result, every such confrontation would provide our ancestors with a few shattered stones. A few minutes after the battle, during their feasting on a carcass, the presence of pieces of shattered stones with sharp edges would provide hominids with an excellent opportunity to get an idea of the effectiveness of the sharp-edged pieces of stone. In this scenario, before making stone tools, our ancestors used boulders for a much longer time. These boulders had two functions: (1) function of rhythmic/sound device and (2) function of a missile. I propose that stone tools, which appeared later, were initially an accidental by-product of vigorous 'drumming sessions'.

We should also consider the possibility that hominids were using stone tools with sharp edges not only for working on carcass, but as more effective missiles which could do more damage to a predator's body and head. The presence of unnaturally big and heavy stone tools made by early humans, too big for work on a carcass, but perfect for close combat with its crushing power, also supports this possibility (See also the box 'Is it Possible to Kill a Lion with a Stone?').

Musical Emotions: For Sex or for Survival?

While discussing the survival value of the musical faculty in human evolution, scholars often expressed their surprise about the extreme emotional power of music on one hand and the absence of any practical function of music on the other hand. Arguably the best known hypothesis of the adaptive function of music today is still connected to the Charles Darwin's idea of the attraction of the opposite sex, although now in a form of 'demonstrating one's fitness to mate' (Geoffrey Miller). Followers for the 'music for sex' suggestion should somehow explain two important facts which are conflicting with this suggestion: In those species where males sing in order to compete for female attention, understandably only males sing, and also, singers prefer to sing solo romances. In humans both sexes are ardent singers, and also humans prefer to make music in big groups.

To demonstrate the viability of his suggestion, Miller rightfully remarked in 2000: 'No one ever proposed a reasonable survival benefit

IS IT POSSIBLE TO KILL A LION WITH A STONE?

The classic answer would be 'it depends how big the stone is and how fast it is flying towards the lion, and where it hits the lion'. OK, what about a hand thrown stone? Well, who would consider doing such a crazy thing?

Throwing objects has been one of the well researched topics in human prehistory. William Calvin's idea of throwing objects as the earliest means of hunting is deservedly popular among a wide range of scholars. I want to suggest a small correction to this theory. In my opinion throwing was primarily used by our ancestors not for hunting, but for defence and confrontational scavenging situations. If we compare these two types of throwing we will find out that defence throwing has several important advantages over hunting throwing: (1) It is much easier to aim at an object when it is running towards you rather than running away from you, (2) the distance for the throw is much shorter in defence throwing, (3) as the distance is much shorter, a thrower can use much heavier rocks, and can even use both hands for throwing one bigger rock, (4) if you are throwing a stone at an animal that is running away from you, most likely you will hit the rear quarters of the animal, but in defence throwing, where a

to individuals taking the time and energy to produce music, which has no utility of finding food, avoiding predators, or overcoming parasites'. Well, I certainly do not claim that music has the power to overcome parasites, but I do claim that music played a crucial role in two other crucial needs of life: avoiding predators and finding food. Even more, I tried to demonstrate that music actively participated in the development of several important elements of human morphology and behaviour.

After a long period of neglect music, like in the African savannah a few million years ago, goes into a brave and noisy attack to claim the deserved and much belated acknowledgment for the crucial role it played in the evolutionary history of our species.

Music and War: Million Years BC and Today

So we came to the conclusion that the evolutionary function of music was directly connected to the physical survival of our species. It was loud rhythmic music that was preparing humans for confrontations with powerful African predators, instilling boundless bravery into virtually unarmed hominids with only rocks in their hands, turning separate individuals into a unit of dedicated and self-sacrificing warriors, and giving predators a strong message that behind our ancestor's

target is running towards you, the most likely place where the stone hits is the head, and (5) if you are throwing a rock at an attacking animal, the speed of the attacking predator is augmenting the speed of the flying rock. So in defence throwing there are several factors that make it more fruitful: we have much better aiming, much shorter distance, much heavier rocks, and the rock hits the head of the attacking animal at a higher speed. The result is much more deadly power from the hit, possibly even able to damage the skull of an attacking animal. The huge, over 30 centimeter, stone tools found in Africa with the sharp edges, were most likely used as a deadly weapon for such close combat rather than a scavenging tool. If you add here that African apes are also widely known to use defence throwing (but not hunting throwing), then the case 'hunting throwing vs. defence throwing' seems to be a case when the defence team clearly wins the case.

Considering that male shoulder morphology is built as a perfect throwing machine (unlike a female arm), it would be logical to propose that the crucial part of confronting attacking lions with heavy rocks during the millions of the years was predominantly a male task.

rhythmic war cry there was a fanatic unity and an absolute dedication from every fighter towards a common goal. As this fanaticism was also supported by the heavy rocks thrown at the closest possible range, no wonder that after countless bloody confrontations on the African savannah, lions started avoiding these kamikaze-style warriors. Lions did not need hominids, as it was too much trouble for them to hunt hominids or to eat them if they managed to kill some of them (about this see later). On the other hand, humans needed lions as 'professional killers' and hunters of the big game, who could kill a decent meal for the whole group (see the box 'Humans and Lions: Parallel Evolution?').

Millions of years of using music in combat situations did not go away. It is still with us, in our blood and brain. Humans still use rhythmic music to help soldiers and special forces in their developing the feel of the unity and dedication, and for the psychological preparation for the combat situations. Doing long and rhythmic army drills together gives new recruits the feel of a collective identity, the feel of a bigger entity they belong to. The effectiveness of army drills and rhythmic music is very well known from history. From the 16th century, when the rhythmic army drill became a routine part for preparing armies, soldiers who practiced drills were routinely defeating bigger opposition who had not been trained in army drills. American scholar William McNeill dedicated a fascinating book to this subject.

HUMANS AND LIONS: PARALLEL EVOLUTION?

The evolution of humans and lions has several strikingly similar features, and I want to suggest that these two species, as competitors and arch enemies for the last five million years, had a profound reciprocal influence on the morphological and behavioural evolution of each other. This was an evolutionary 'arms race,' where the development of one morphological and behavioural feature by one species was triggering the response from the other species. Here is the list of the evolutionary similarities between these two species: (1) both humans and lions evolved in the open grasslands of savannah in Africa, within similar timelines: first ancestral forms of both species appeared about 5 million years ago, and more contemporary forms of both species were formed during the last 2-1 million years; (2) both humans and lions are social animals (this feature is not unique among primates, but is unique among cats); (3) both humans and lions have a very unusual and effective intimidating morphological feature in common: long hair on their heads (1.5metre long hair on hominid head, and a mane on a male lion's neck and head), which is unique among both primates and cats; (4) both humans and lions have low and very loud voices which they effectively use for the intimidation of their opponents. Humans obtained the upper hand in this component after developing rhythmically coordinated loud group singing and drumming; (5) both humans and lions went out of Africa and went to different regions of the World in the same historical period, about 2 million years ago; (6) humans and lions were the two most widespread large terrestrial mammals during the Late Pleistocene (100,000-10,000 years ago); (7) the geography of their distribution also coincided, comprising Africa, most of Eurasia, and North America. Even contemporary theories on the evolution of humans and lions have amazing similarities: very much like the two most popular theories of the origins of Homo sapiens (multiregional evolutionary model and the single origin

Music still rules our emotions, and in the most critical moments for survival, humans still use it. Of course, most of us are lucky and we do not need to listen to a heavy rock music in order to prepare ourselves for combat missions where we might be killed, or be required to kill other humans, but many soldiers who have to do this know that music can prepare them for such missions. Millions of years later, music is still a powerful force in war.

It is no wonder that, as neurological research results pointed out, listening to music, singing and drumming activates the deepest structures of our brain, structures that are only activated when survival is on the line. The phenomenon of the battle trance, developed as a result of the millions of years of evolutionary history of the use of singing and drumming for the physical survival of our ancestors, gives this fact full explanation.

replacement model), scholars studying the evolution of lions are also grouped behind two models. One group of scholars maintains that regional varieties of the lions had a successful uninterrupted transformation into the modern groups (multiregional model), and the other group of scholars claims that a single population of lions from Africa later replaced all the local populations in Africa and southwestern Europe (single origin replacement model).

Contrary to the traditional view, according to which migrating humans followed the migrations of herbivores, I suggest that humans were actually following not herbivores (as killing them would be a problem), but the lions, professional killers, who followed and hunted herbivores. For millions of years the main strategy used for obtaining food by our ancestors was to chase away lions and scavenge their kills. That's why so many important elements such as social lifestyle, intimidating strategies, and the range of distribution of humans and lions coincide. In this context the origin of the biggest cat, the tiger, can also be seen in a new light as a result of ancestral forms of lions escaping human 'company' by going into the environment usually avoided by humans - tropical jungles. In the environment of tropical jungles, the ancestral lions were transformed into a new cat species with a different look and behaviour– the tiger. Realizing the vastness of this subject, and taking into account my deepest love and reverence for the tigers and generally for the big cats (I guess the result of our evolutionary past), I started writing a new book about the evolutionary duel between big cats and humans even before I finished writing the text of this book.

Defence Strategies in Darkness

One of the serious issues that our distant ancestors faced after becoming terrestrial was the problem of night time security. Even if hominids could stand their ground against the biggest predators during the day, sleeping in the open savannah for the badly armed hominids must have been a very serious challenge. Some insightful ideas were expressed. Adriaan Kortlandt made a brilliant suggestion that one of the ways to secure night time sleep was to organize a loud evening 'concert' to scare away potential predators. Kortlandt cites the behaviour of groups of Chimpanzees, who sometimes organize loud 'concerts' before they sleep, and cites also the behaviour of African tribes living in the forests, who organize the same kind of loud evening displays.

I would like to suggest that there were at least four more factors to make night time less dangerous for the hominids: (1) reclaiming the dead bodies, (2) cannibalism, (2) the use of eyespots, and (4) smell of the human body.

Reclaiming Dead Bodies

When a predator kills its prey, it intends to eat the kill. Prey animals, even after defending their family members with ferocity, usually stop fighting if the attacked member of their group is already dead. Therefore, as soon as the kill is made, there is no more confrontation – the predator got what it wanted, the fight is over and now the predator can enjoy the meal. It was totally different with hominids and humans: being superb masters of intimidation as a group, if their member was killed and taken by a predator, they would follow the predator and reclaim the dead body from the predators.

What is the aim of such crazy bravery? Of course, you can not bring to life the dead member of your group, but with this behaviour you can give a strong message to the predator: every time it attacks your group and kills someone, you are not going to give them a chance to eat the dead body in peace. This behaviour, repeated generation after generation, would teach predators the lesson that preying on humans was unprofitable. Of course, individual humans are among the worst armed animals, so tracking and killing a human for a leopard, tiger or a lion is much easier than killing an antelope or zebra, but it is a totally different story when it comes to eating the kill. Antelope or zebra family members do not start a massive attack on the predator after the kill is made, much unlike humans. Therefore, from a predator's point of view, humans are easy to kill but very hard to eat.

So in light of the ongoing argument it is clear that there was a very good evolutionary reason for hominids to attack the deadly predator and reclaim the body of their fellow hominid. In this way they would prevent more attacks from predators, or as scholars call this, would "educate" the predators. Another question is what hominids would do with the dead body after they reclaimed it from the fangs of the predator. This is the topic of the next discussion.

Prehistoric Cannibalism as the Survival Strategy of Human Ancestors

There are several options of how to deal with the remains of the dead human bodies: to bury them, to burn them, to put them on a boat and let it go sailing, to feed them to vultures, etc. There is also another option – to eat the dead bodies. Of course, this last option is the least acceptable for us, but unfortunately, our early ancestors had only two options on how to deal with the dead bodies: (1) to eat them, or (2) not to eat them. All the other options came much later with the development of technology.

These two options had different, short-run and long-run consequences. In short run, if you do not eat the dead body, then predators will eat it. You might think this does not matter as the person was already dead, but it did matter in the long run, because if predators can easily obtain and eat human/hominid corpses, there is a good chance that they will become habitual man-eaters. Arguably the biggest expert in man-eating tigers and leopards, Jim Corbett, noted that after the terrible bout of infectious disease that spread in India in the beginning of the 20th century, some of the worst man-eater leopards started their activity, apparently attracted by the readily available human corpses left unburied during the disease (Corbett, 2003:xiii). For this very reason, it was important for our ancestors to make sure that no human corpses were readily available for scavenging predators to eat.

So, I suggest that those groups of our ancestors who would eat the bodies of their dead fellow members, would have the advantage of forcing lions in their neighborhood to stop hunting humans as non-profitable strategy.

Besides, not eating the dead body of your fellow group member is a waste of high quality food. So despite the well-understood repulsive reaction of the readers of this book to my idea, I have to suggest that cannibalism was an important evolutionary strategy of predator control among our ancestors.

There have been wide ranging disputes over this emotionally charged behaviour in human history and prehistory. According to Tim White, cannibalism was very common in human societies prior to the beginning of the Upper Paleolithic period. This theory is based on the large

amount of 'butchered human' bones found in Neanderthal and other Lower/Middle Paleolithic sites. Food shortages are usually considered as the main reason for cannibalism. Taylor also suggested that Cannibalism was a usual practice in all continents in different times in human history. William Arens denied the existing evidence that humans were practicing cannibalism in all of the human societies but, according to White, the accumulating body of evidence for the past cannibalism is too strong to refute.

It is important to remember that I am not suggesting that hominids were killing and eating fellow hominids. Instead, I am proposing that hominid groups were co-operatively and self-sacrificially fighting against predators, and in the case of a fatal attack from a predators they were collectively attacking predators, reclaiming the bodies of their killed group members, and cannibalising them. To fight against predators for the body of your killed groups member, and then cannibalise the body in a ritualized way, has totally different evolutionary and even moral overtones. Our distant ancestors are getting undeserved bad publicity for their habit of cannibalism. I maintain that this was an important survival strategy that paid dividends in the attitude of predators towards our ancestors. Most big and powerful predators, who can easily kill humans, do not usually include humans in their diet unless they are incapacitated by wounds and prompted by circumstances. This is, in my opinion, the lasting result of millions of years of 'predator education' by our ancestors.

Apart from the attitudes of predators, cannibalism was an important factor for the emergence of ritualistic behaviour and religious feeling. We can be quite sure that eating the body of a fellow member, killed by a predator, must have been a highly ritualized act. A recent finding of the skull of a young hominid, reported in the July 2010 issue of National Geographic with Tim White's comments, also confirms this. We also know that cannibalism in many human societies was connected to the belief that the physical and moral strength of the dead person would go to the person who eats the flesh, so the origins of this belief may also have extremely deep roots. In many cultures (for example, my own Georgian culture) verbally expressing a desire to eat someone or something is the highest expression of love (like 'the puppy is so cute you want to eat it!' similar sayings are used about children, or about

attractive members of the opposite sex). Carl Vogt famously suggested in the 19th century that the Communion Rite of Roman Catholic mass comes from the ancient ritualized cannibalism.

Apart from archaeological evidence, there is also genetic proof of the past practice of cannibalism in our ancestors. Many humans have a special gene which protects us against brain diseases (known as prion diseases) that can be contracted by eating contaminated flesh. 'The discovery of this genetic resistance, which shows signs of having spread as a result of natural selection, supports the physical evidence for cannibalism' wrote John Roach in 2003.

As time went on, our ancestors obtained tools that made ground digging possible, and as their food supply improved, burying and burning the bodies became the better option, and eventually the only accepted option to deal with dead bodies.

Let us conclude this section on cannibalism. There are three main reasons of cannibalism, currently generally accepted among scholars: (1) cultural norm, (2) necessity in extreme situations of famine, and (3) insanity or social deviancy. None of them acknowledges the possible evolutionary significance of cannibalism. I suggest to add the fourth, the central reason for prehistoric cannibalism: (4) it was a mechanism of predator control among early hominids.

'I Can See You!' Eyespots in Humans

Eyespots are clearly visible marks on the body of an animal. These spots resemble an eye to deceive a predator. Plenty of butterflies, some reptiles, birds and most importantly for us – a few members of the big cat family also have eyespots. Eyespots on the back of the big cats' ears are to fool a predator or competitor into believing that the cat is alert to their presence. Eyespots are effective against predation and attacks because most potential predators seek a certain moment for their attack, when the prey is not looking at them. That's why the eyespots on the back of the head are so widespread among cats – to deter an attack from behind. That's why the cheap plastic masks worn on the back of

the head became so effective in deterring the man-eating tigers of the Sundarbans national park from attacking humans.

With many eyes present during daytime and their powerful audio-visual intimidation, human groups hardly need such a defence, but at night when everyone was sleeping, such a defence would have been very welcome. Hominids could not use plastic masks, but I suggest that evolution provided them with such a defence for the night time in the form of eyespots.

Although this has never been suggested before, I propose we have eyespots, but we fail to notice them because of two reasons: (1) humans are generally not good at noticing eyespots, and also, (2) because we only have them when we sleep.

If the reader asks friends or family members to close eyes and looks at their 'sleeping' faces, they may notice, that the eyebrows, arched upwards, and eyelashes, arched downwards, form quite visible oval eyespots on a 'sleeping' human face. Of course, it is not easy for humans to notice the resemblance of human eyebrows and eyelashes to the eye, but this is because we are not generally good at noticing eyespots. For example, we find it difficult to see the resemblance of the marks on the back of a leopard or a lion ears with eyes even after we are told about this. Let us remember that eyespots on our face were not designed by the forces of natural selection for humans to notice, they were designed by evolution to be noticed by big African predators, particularly predators from the cat family, and the cats seem to be particularly good at recognizing eyespots.

According to the generally accepted view, the main function of the human eyebrow is to prevent moisture, mostly salty sweat and rain, from flowing into the eye. Desmond Morris, discussing the possible function of the eyebrow in human evolution, criticized this suggestion as non-effective and suggested that the primary function of the eyebrows is to signal the changing moods of their owners. There is no doubt that eyebrows are excellent communicators of our moods, but I suggest that their primary function in human evolution was an anti-predatory defence, to ensure the safety of the night sleep of our ancestors during the thousands of generations of their life in the open savannah.

Body Odour as Defence Strategy

Human sweating is a well-known feature in human anatomy. It is generally believed that humans started sweating more profusely after they started walking upright and lost the body hair. So sweating was cooling down their overheated bodies. Another often neglected peculiarity that comes with sweating is the strong body odour it creates. In fact, the sweat itself is odourless, instead some bacteria who thrive on human sweat, particularly in the hair covered parts of the body (like armpits and genitals), produce the strong smell. In order to cool down a body, sweating does not have to produce odour, so if the sweating comes with a strong odour, it is very likely that there is some evolutionary reason for it. Here is my suggestion.

Our ancestors used a whole set of visual and audio signals during the day to make sure that all predators could easily recognize them and remember that these noisy, bipedal and conspicuous looking creatures were unprofitable prey for them because of their tenacity, fanatic dedication to each other and persistence and overwhelming bravery in fighting for the dead bodies of their slain group members. Apart from daytime security, there were some defence strategies for the nighttime. For example, the use of the eyespots on a sleeping human face, discussed above, had no value in daytime. I suggest that the body odour coming from a group of our ancestors was another strong signal aimed for predators. Predators always approach potential prey against the wind, so that they can smell the prey, but more importantly so that the prey can not smell the approaching predator. In this situation it was inevitable that predators would sense our ancestor's body odour from some distance. With the renowned power of all human secretive glands, and without a shower literally for millions of years, this must have been quite a powerful olfactory sign to all prowling carnivores with even the faintest sense of smell. This strong odour was the first line of defence for our sleeping ancestors. With this suggestion comes another preposition that the initial function of armpit and genital hair possibly was to produce the most effective body odour.

Some readers might ask, if body odour could already give a strong clue about the identity of the sleeping prey, why would our ancestors need eyespots as well, would not body odour be enough to turn them

away? Well, as scholars say, the determination of a predator depends on how hungry the predator is. If predator is too hungry, it will still continue hunt, so one more warning signal, another line of defence would never hurt. Sometimes no warning signal can save a prey from an attack. For example, even though any living being tries to avoid the skunk for its legendarily strong odour, sometimes skunks still get attacked, killed and eaten by predators. In such cases the predator was too hungry to take into account the disgusting smell of the food item. It is very much the same when starving humans start eating items that they would not consider in normal circumstances (like rats, cats, leather boots, or other humans). So despite at least two defence lines (odour and eyespots) I am sure that cases of nighttime attacks were still occurring. In such case the whole group would be momentarily up, and if the predator was able to take a body in amidst of the loudly shouting and fighting group members, soon the party of dedicated warriors would be ready to follow the trail and teach a predator a very costly (for both sides) lesson to leave them alone in the future.

Reconstructing the primordial polyphony

My arguments for the role of music in the history of human conflicts throughout human history is mostly completed. Before we start discussing the role of music in non-conflict situations, I would like to discuss the hypothetical 'primordial polyphony' that our distant ancestors took from their African cradle.

Any reconstruction of a 'primordial language' or a 'primordial culture' is a highly speculative business. Reconstruction of 'primordial' polyphony is not much different. To reconstruct a phenomenon that, according to my model, existed many hundreds of thousands or even millions of years ago among our hominid ancestors, we need hard evidence which is unlikely to ever enter our knowledge. The only possibility for such a deep historical reconstruction is to find some common features that characterize a big part of the live vocal polyphonic traditions from different parts of the world.

When we look for common features we need to remember that vocal polyphony, once a much-needed phenomenon, lost its 'survival value' after the development of articulated speech and started to decline (the reasons will be discussed in the next chapter).

Here is a list of the possible characteristic features that could have been present in the singing of our distant ancestors. This list was compiled after a comparative study of vocal polyphonic traditions from different regions of the world.

1) The choral singing of our distant ancestors was most likely based on the antiphonal and responsorial alternation of two groups, or of a soloist and a responding group. This is a truly universal feature for both polyphonic and even monophonic cultures, and there is hardly a human musical culture on our planet without any elements of the deep-rooted tradition of responsorial singing.
2) Choral singing must have included everyone, every layer of a hominid group. This feature is very characteristic for traditional polyphonic cultures, where everyone is expected to participate at some level and there are no formal listeners at all. Strict gender division in singing, or the division of society on performers and listeners seems to be a relatively late phenomenon (unless the situation itself requires the presence of only one gender, like for example, males confronting lions in order to drive them away from a kill).
2) The rhythm of choral singing must have been very precise and vigorous. Precise rhythm absolutely dominates in sub-Saharan singing traditions, and in many European and Polynesian polyphonic traditions.
3) The choral singing of our ancestors most certainly was accompanied by a dance, clapping and by bodily rhythmic movements involving all participants. This kind of syncretic unity of singing and dancing is conspicuous in all more or less archaic musical traditions. Even today when we hear rhythmic music, we instinctively want to follow it with tapping, stomping or bodily movements.
4) The use of body percussion is also highly probable for the ancient communal singing of our ancestors. The possibility of

group stomping in order to create a steady basis for the singing rhythm is even higher. When we hear rhythmic music we have an urge to follow it, and stomping is one of the instinctive and most usual means to do this.

5) The singing style of our ancestors was most likely loud and straight. Most archaic polyphonic singing traditions are still extremely loud. With every member of the society participating in singing that involves dance and clapping you will hardly ever hear any quiet and gentle choral music.
6) The meter of music was most likely based on duple rhythms (2/4, 4/4). This simplest and most common meter is arguably the most widespread in different cultures of the world (both polyphonic and monophonic), and even in classical music notation it is known as 'Common Meter' (expressed by letter 'C' in notation). Related meter 12/8, where each beat is divided into three sub-beats is another good nominee for the earliest human meter. 12/8 is widespread among Central African Pygmies, and is known to many as 'swing'.
7) The tempo most likely became faster during the performance and the pitch was gradually rising. These features are a usual part of archaic dance-songs. They start at a relatively slow or medium tempo and the tempo gets faster and the pitch rises during the performance in growing excitement. Most music teachers are well aware of the general tendency of music students to play faster and faster as the piece approaches the end.
8) The drone is the best nominee for the claim of the primordial universality. Drone is not popular in sub-Saharan Africa, although there are certain African cultures where drone is strongly present (e.g., among Maasai in East Africa, or Kpelle in West Africa, and even Pygmies). Also, drone polyphony with secondal dissonances (D/D style), is scattered so widely in spectacularly geographically isolated regions of the world that we already discussed the possibility of D/D polyphony being one of the oldest types of group singing among humans.
9) Ostinato is possibly the most universal type of vocal polyphony. There are hardly any polyphonic traditions that do not employ the ostinato principle (based on multiple repetition of the same

short phrase) to some extent. Drone and ostinato principles are not mutually exclusive, on the contrary, they often coexist.

10) I have to suggest that there was no separate function of a bass in the ancient primordial polyphony of our ancestors. Sub-Saharan African polyphonic singing does not seem to be using a bass as a functionally separate part. Even African ostinatos are not necessarily in a lower register, and the drone in traditional music is often in the middle of the polyphonic texture.
11) The yodel also has a claim for inclusion among the characteristics of ancient polyphony. It is by no means distributed in a lot of cultures, but nevertheless different forms of yodel are present in isolated pockets of European, sub-African and Pacific polyphonic cultures.
12) Verbal text must have been absent or kept to a bare minimum in this primordial polyphony (as it is in the polyphony of the Pygmies). Interjections and nonsense syllables must have been prevalent at this stage. Besides, we are talking about such an archaic period of time when the presence of articulated speech was very unlikely. Repetitive, mantra-like verbal formulas are the most likely candidates for the earliest 'song lyrics.' Repetitive and rhythmic mantra's ability to put humans into an altered state of mind is well known (we will discuss this topic in the last part of the book).
13) There is a good chance that the scale basis for the most ancient form of primordial polyphony was an anhemitonic pentatonic.
14) The performance was naturally leading participants to the state of trance. To transform individual members of the group into fanatically dedicated members of a unit – this was actually the core function of the whole action (see also the box 'Dancing Through the Night').

To summarize, we have the following description of the ancient 'primordial', or 'proto-polyphony':

This was loud, responsorial singing of a large mixed group, rhythmically very precisely organized (most likely in a duple rhythm), accompanied by rhythmic movements, stomping, body percussions, and

DANCING THROUGH THE NIGHT

Dancing is a very energy consuming physical activity, and it is quite amazing how humans can dance for many hours. I am not talking about the exhaustive dance competitions which would go on in order to find out the most resilient dancing pair. By its nature dance is not a competitive activity, much like singing. Dancing and singing are both cooperative activities, designed to unite participants into a unique mental state when they feel a strong bond with each other, a bond that in critical situations can lead to sacrificing their own lives for others and for the group interests. At the same time it is crucially important to remember that the aim of virtually every cooperation is competition, although this competition is aimed at external forces (predators, other human groups).

Group dancing was a great practical help in some critical situations. For example, if a group of our ancestors was in a very dangerous situation at night they could start a loud rhythmic dance, which would help them to keep up their spirit and scare away the predators. Loud dancing at night was like a bonfire which would help to keep predators away from humans. Since the aim of the dance was to achieve the physical safety of the group, it is very likely that males would create a circle, trying to keep children and women inside the circle (as is the case in several

stone hitting. The choral sound was polyphonic, based on sharp dissonances, the tempo rose during the singing/dancing, as well as the pitch, together with the general dynamics. Polyphony was based on ostinato and drone principles, there was little or no text (mostly interjections or mantra-like repeated verbal formulas), and the function of a bass part was not yet separated. Participants of this primordial session were going into the state of battle trance, where feelings of fear and pain would disappear. Putting participants into this altered state of consciousness was the central function of the primordial singing and dancing sessions.

Times to Relax: Singing and Peace

Apart from the adrenalin, oxytocin and endorphin-fuelled loud, relentlessly rhythmic and trance-inducing singing-drumming-dancing display, there was another, completely different side of hominid musicality – soft and relaxing.

As we all know, humans can hum. This vocal behaviour is so ubiquitous and so natural, that as is often the case, we mostly fail to notice it. At least, according to the results of my preliminary search, there are no scholarly publications discussing humming.

animal species). Interestingly, in many cultures the circle created during the round dance is considered a sacred and safe place from evil forces. This kind of round dance, performed during millions of years, must be the predecessor of the contemporary ritual round dance. In the state of trance our ancestors could dance for hours, even dance the whole night. These kind of long dancing sessions are still a part of some religious rituals (for example, Candomble night sessions in Brazil). That's why I suggested earlier that dancing as a physical activity is very natural to humans, and it is possibly evolutionarily more natural for our bodies than running. Humans are not natural runners, but they are natural dancers. Proponents of the 'born to run' model suggest that humans on long distances could outrun all other animals, including horses and wolves. Apart from the natural suspicion to the reality of such claim, even if human ancestors were able to run after an antelope for many hours, and kill the exhausted prey at the end, this long run would take so much energy (plus carrying the food back to others for many more hours) that it is questionable whether such an exhausting and energetically costly way of gaining food was a sustainable strategy.

So, let me ask a few questions – Why do humans hum? When do humans hum? And most importantly for us: could humming have (or had) any adaptive value in human or hominid life?

It would be quite safe to say that most humans hum at least occasionally, and there are a few who hum almost constantly. My late father was from this category. He was humming when reading a newspaper, walking, thinking, playing chess, eating. As Bernadette S., a 14 year old student from Mercy College in Melbourne, told me, she hums almost at every activity. 'But of course, I can not hum at school during my classes,' she told me with regret, 'as it would be embarrassing... So when I am attending classes, I only hum in my head'. Jeff Titon, a prominent American ethnomusicologist, answering my question if he ever hums, told me that he does, although he only sings in his head. Sometimes humans can not control their urge to sing, and as another of my students from the same Mercy College, Stephanie E. told me, she sometimes gets into trouble because she unconsciously starts humming during school classes and even tests.

Another prominent American ethnomusicologist, Timothy Rice, also belongs to the category of people who hum most of the time. 'When he is at home, he is usually humming, whatever he is doing,' his wife Ann told me. 'One day he came back from the University and I noticed right away he was not humming. I immediately guessed something was wrong. I asked him and he said they had had a very unpleasant meeting

at the faculty. After about an hour I heard him humming again, and I guessed with relief that he was over it and was feeling fine again'.

An informal survey on humming, conducted by London Zoo in 2008, found out that most people hum when they feel very good. People hum along when listening to music, driving a car, walking, even hum while eating, and some even while having sex. Well, the uniting feature for all these activities is that all these are usually pleasant activities. Although humming can induce negative feelings (particularly if humming is out of tune), generally the positive meaning of 'humming' cross-culturally is overwhelming. There is another very interesting and neglected universal human behaviour that often is used instead of humming – whistling, but we will discuss this phenomenon some other time.

Let us now search for the possible evolutionary roots and the possible adaptive function of human humming.

Why Do Humans Hum?

Some social animals are known to have an almost constant indistinct background sound when they are going about their everyday business. These sounds are known as 'contact calls' and include plenty of different sounds, like chicken clucks, baboon grunts, even the sounds of eating, etc. These seemingly unimportant background sounds, a kind of an 'audio byproduct' of everyday activity, in fact have two important functions: (1) it lets every member of the group know that everything is all right, they are only among their kin, there is no sign of a predator, and they all can relax; and (2) it alerts group members if there are any signs of potential danger. In this latter case the first animal who notices the signs of danger (suspicious sounds, or shadows in the forest), stops producing indistinct sounds and stands absolutely still, listening and scanning the environment. Soon other animals around also stop, and in a few seconds the whole group is silent and motionless, watching carefully the environment for the signs of danger. If the alert was false, after some time everyone starts moving again and the indistinct background sound resumes. So the group members can relax again. So let us remember: ***for social species, silence is a sign of danger***. To my

knowledge, Charles Darwin was the first who noticed this phenomenon on the example of wild horses and cattle and wrote about this in his 1871 book on human origins: "Wild horse and cattle do not, I believe, make any danger-signal; but the attitude of any one of them who first discovers an enemy, warns the others" (Darwin, 2004:123).

Taking into account the intensely social nature of human life and their noisy behaviour, it seems natural to suppose that the universal human habit of humming was routinely accompanying most of the everyday group activities of our distant ancestors. I suggest that humming is the ancient hominid 'contact call'. The fact that humming today is a universal expression for our positive feelings suggests that the positive message implicit in humming is not a late cultural development, but has a very deep, innate basis. A soft humming sound tells us that everything is fine, we are among keen, and we can relax. This simple message is very important for everyone, particularly for our ancestors, who lived under a constant threat to their lives.

It is interesting that although the loud, intimidating audio-visual display has long since lost its initial function in everyday life (only surviving in military forces), humming and soft music still plays an important role in everyday human life both in pre-literate and technologically advanced societies. The lullaby is one of the live examples of the calming power of humming and soft singing. The use of gentle music as a therapy is widely known in very different cultures, from the tropical forest dwelling tribes to the most technologically advanced western societies.

The universality of humming as an expression of positive feelings on one hand, and the total silence as an expression of a potential danger on the other hand, suggests that the human brain must be pre-programmed to perceive these emotions from hearing audio background. The fact that prolonged total silence is negatively affecting our emotion is quite well known. Silence can be perceived as an ancient sign of approaching danger, or as Timothy Rice suggested in a conversation with me, 'one suddenly feels as if he is alone'. These emotional responses might be wired in our physiology and psychology through the millions of the years of our evolutionary prehistory. Although we often are seeking a calm atmosphere, we internally feel more comfortable when we hear sounds, particularly human sounds. You may have seen that in some houses the TV or Radio are turned on, although no one is watch-

ing or listening. The same effect is achieved when people (usually when they are alone) talk to themselves. As a species, we hate silence.

This ancient desire to avoid silence must be the reason why there is so much music everywhere we go – in shopping malls, elevators, cars, trains, sporting events, political rallies, parties, funerals. Some complain that hearing music in such places, where people do not really listen to the music, is a sign of decline in musical taste. I believe that this kind of highbrow attitude towards music is not historically justified. Listening to music for the pleasure (particularly at concerts) is a much later, I would say, 'Pikerian' phenomenon. For millions of the years the function of music has been to help humans to live more secure, more harmonious and better life. In this context the infamous 'background music' is the evolutionary continuation of the ancient human habit of humming, and it has the worthwhile purpose of helping humans to feel better, to have a more positive attitude, or to fight the fear of small spaces in the elevators. Unlike a few other life pleasures, like eating, drinking or sex, we can not harm ourselves with too much music. I suggest that this extremely high tolerance towards a musical environment and our generally positive reaction towards musical sounds is the consequence of our evolutionary past, where musical sounds were accompanying virtually every moment of the lives of our ancestors, giving them a feeling of security and well-being.

Conclusion: Thank You for the Music

It is time for a general conclusion to this chapter. It is widely accepted that music, unlike language which can communicate precise arbitrary meanings, evokes emotions. In the next chapter we will be shortly discussing the possibilities of transmitting quite precise messages which can be sent by means of musical sounds, but even without that possibility, if we only acknowledge the emotional power of music, there is no need to dismiss the practical importance of music in human life and evolutionary history as a pleasure-inducing audio technology only.

Virtually all the needs of early hominid evolution, from defending themselves from predators, obtaining food via aggressive scavenging, watching out for predators and enemies and relaxing in the heat of the African savannah, were governed by musical sounds. We survived the long and unusual evolutionary path of the primates who descended from the trees to the ground with the help of music. We refused to become silent and throughout our evolutionary history music has been our great practical aid, both in times of life-and-death struggle and in times of relaxation. We can truly say 'thank you for the music'!

CHAPTER FOUR

Singing and Thinking

'Not only does the origin of music deserve as much attention as that of language, but we should not treat one without the other' wrote Steven Mithen in his insightful book 'Singing Neanderthal'. I totally agree with these words, and want to add that not only the evolution of language and music must be studied together, but the evolution of music, human behaviour, morphology, intelligence, language, and speech are all inseparable in human evolutionary history, and therefore must be studied together.

In the previous chapter we learned about the ways in which the history of human group singing is connected to various elements of human behaviour and morphology. I suggested that universal human behaviours such as bipedalism, prehistoric cannibalism, invention of stone tools, use of body painting, dance, clothes, altruism, rituals and religion are intimately linked with the evolution of human choral singing. The list of morphological changes in the human body, associated with the evolution of human singing ability, is even longer, and includes the appearance of head hair, longer legs, naked hairless body, reduction of teeth and disappearance of canines, increase of body size, decrease of body strength, appearance of body odour, patches of hair in armpits and genitals, eyebrows and eyelashes, and changes in voice range.

In the forthcoming chapter we will discuss the intimate links between the evolution of human singing and the evolution of human intelligence, language, speech, appearance of speech pathologies, and finally the human unconscious mind.

So let us start with human intelligence.

Singing and Intelligence, or Who Asked the First Question?

On 27th August 1977, ten days after Elvis Presley's unexpected death, I was sitting in a small cafe in Kechkemet, Hungary, where I was attending a music festival. This was my first (and actually the only) time I managed to go outside of the Soviet Union and I was very excited. Three very nice young Hungarians, two boys and a girl about my age (I was 23 at the time) were sitting at the same table, also having lunch. They were discussing something very lively. I do not speak Hungarian, so, on a few occasions, when one of them looked at me, I smiled in return. A typical use of a friendly facial gesture if you do not understand the speech, I guess.

After a few minutes of discussion the young Hungarians must have decided it was time to include me in their conversation, so one of them asked me a question. OK, it was now time for me to tell them that I did not speak Hungarian, revealing that I did not understand a word from all their long discussion. So I used the most useful words any traveler will need if she or he does not understand the language of the country she or he is visiting. 'Nem Tudom Magiarul' ('I do not speak Hungarian'), I told them candidly in Hungarian, adding some more of my heartfelt smile. The guy who asked me a question looked at me puzzled and asked me another question. 'Nem Tudom Magiarul, nem yertem Magiarul' ('I do not speak Hungarian, I do not understand Hungarian'), I told them both sentences that my host, the Hungarian composer and pianist, Kalman Dobosh, had taught me for such occasions. The young Hungarian looked at me even more surprised and asked me another question again in Hungarian. At this moment it seemed to me he could not understand my Hungarian. The two others were also looking at me in intense silence and with great curiosity in their eyes. I decided to try English. 'Do you speak English?' I asked them in English and a few seconds later we were all talking to each other in English, discussing the music festival we were all attending. To my pride, they told me that my reply in Hungarian, designed to let them know that I could not understand their speech, apparently was pronounced in such a pure Hungarian accent, that they got an impression that I was Hungarian, but for some reason unknown to them I did not want to speak to them.

I remember wondering that evening how I could understand they were asking me something, as I did not understand a word they were saying. Or, speaking more broadly, how can we distinguish whether a stranger is asking us something, or just saying something that does not need our reply. I remember as soon as the question was pronounced, I *knew* this was a question without even understanding a word. We mostly feel when we are asked a question, even if we do not know the meaning of any of the words. Readers can guess that I am talking about the universal human use of question intonation. The importance of question intonation in human language is well researched. According to scholarly publications, question intonations are used in so-called sentences with 'open meanings' (Cruttenden, 1986:171). These sentences are 'open' because they require somebody to finish the communication with a reply. And this 'openness' is expressed by the use of the rising intonation.

I think my fascination with the universality of question intonation started on that distant day almost 35 years ago. At that time I was still a student of the Tbilisi State Conservatory, and my interest in traditional polyphony was just beginning. I would not have a clue that many years later I would be seriously interested in the origins of the mysterious phenomenon of question intonation and the human ability to ask questions, and would publish a book with a very non-musical title 'Who Asked the First Question?'

Almost 20 years after that memorable meeting in the Hungarian café, in 1996, as soon as I arrived in Australia, I spent long hours for several consecutive months in the libraries of three Melbourne Universities – Melbourne, Monash and Latrobe, searching for publications about the evolutionary history of question intonation and the human ability to ask questions.

To my complete surprise, I found there was nothing published on the origins and evolution of the human ability to ask questions. Even checking linguistic, psychological, behavioural, sociological and philosophical encyclopedic editions did not provide any results, same as a CD-Rom and Internet search. It seemed that I was the first person 'asking questions about questions'. Since 1996, when I started this search, I have routinely checked at least the indexes in all new encyclopedic editions and books on the origins of human language or intelligence available to me for 'questions,' 'interrogatives', and 'asking questions'.

Still with no results. Questions are so natural and so prevalent in every moment of our life and communication that we simply fail to notice their significance for the evolution of human cognition.

Let us make up for our neglect of the basics of human behavior and for the next several pages of this book concentrate on different aspects of questioning behavior in human life and evolution.

If we look at the universals of human languages, we will see that one of the strongest universals is the way humans ask questions. There are two very different techniques to ask questions, (1) the syntactic technique, when you change the order of the words in the sentence to make it a question (like 'We shall go there' – 'Shall we go there?'), and, most importantly for us, (2) the use of the question intonation (like 'Let's go' and 'Let's go?'). According to Noam Chomsky, both techniques are universal for human languages, and asking questions with the use of the question intonation is of particular interest to us.

There are a two facts strongly indicating that asking questions by means of using only the question intonation is the original and the most ancient technique to formulate a question in all human languages:

(1) Despite the fact that babies from different cultures acquire native languages from their own unique cultural environment, all languages of the world – including tonal, non-tonal, intonational and accented languages, use similar rising question intonation to formulate very popular 'yes-no questions'. There is no exception to this linguistic universal;

(2) Babies of all cultures and all races ask their first question with the use of question intonation, still on one-word stage of their linguistic development and long before mastering even the simplest syntactic structures.

These facts strongly suggest that the development of human ability to ask questions must have happened on a pre-articulatory stage of the development of human language, before our ancestors developed fully articulated speech.

Before we discuss this interesting fact for both the linguistic and musical evolution of Homo sapiens, I must explain that I strictly distinguish 'language' and 'speech' from each other. Language is a system of symbols for transferring, encoding and decoding information. Language can be communicated without speech, with other mediums as

well, for example, by gestures, by whistling, by drumming, by Morse coding system, by the system of marine signal flags. Speech is one of the mediums of language, the most economical and widespread, but still the medium only. Scholars generally believe that language must have existed earlier than speech. The appearance of language is considered as a much more important evolutionary change in human prehistory, a true cognitive revolution, than the appearance of speech. The appearance of human intelligence is mostly connected with the appearance of language, not speech.

It is very important for us, that one of the true universals of human musical culture is dialogical forms of singing (Zemtsovsky, 1993). Dialogical forms of singing are widely distributed in both polyphonic and monophonic cultures. Dialogical singing, based on two alternative parties, is obviously reminiscent of the human question-and-answer form of communication, although in a more rigid, canonized, even ritualized form. Many traditional songs, based on antiphonal alternation of singers, do contain questions asked by those who start singing, and the replies come from the responding part.

I believe that dialogical forms of singing and the human ability to ask questions are of particular importance for discussions on the origins of human intelligence and language. Let us now address several topics related to this crucial human ability.

When and why do we ask questions? We ask questions throughout our life. We ask our first questions even before we can articulate what we want to ask, we start every scientific query formulating questions to which we want to find answers, we support everyday communications by asking questions, we have huge libraries and a staggering amount of available information because people are constantly asking different questions and are looking for the answers. Sometimes a question raised in the 16th century was answered in the 20th century; and some of the oldest questions have not been answered yet; we even have a talent to answer questions with other questions. I remember a clever 'Jewish' joke popular in my native Tbilisi: 'Tell me, please, why you Jews always answer questions with questions?' – 'So, do you think this is bad?'

I hope everyone would agree that it is absolutely impossible to imagine human society, human intelligence and language without our ability to ask questions. Without the ability to ask questions our brain would be a closed system, limited by the knowledge of our immediate experience.

Advantages for humans and human groups. Selective advantages are central to any evolutionary processes. Maybe the most important consequence for each 'questioning' individual was that the emergence of the question phenomenon turned the hominid brain into an open, self-developing system. We start our cognitive development from early childhood by asking questions, and the biggest human minds continue to ask original questions throughout their lives.

If you imagine two groups of humans (or hominids), out of which one group members are asking questions of each other, and the other group members are unable to do so, the difference will be so obvious and important that it would be correct to speak in the first case about a group of humans and in the second case about a group of hominids, or pre-humans.

The evolutionary implications of the ability to ask questions first of all was a revolutionary enhancement of the cognitive ability of a whole group of individuals by means of coordinating the cognitive abilities of the different individuals. This new capacity created a totally new phenomenon – group cognition and mental cooperation.

With the emergence of the ability to ask questions human language gained the last of three main language functions - declarations, commands and questions (sometimes mentioned as imperative, indicative and interrogative functions). It is crucial to remember that two of these functions, declarations and commands, already existed in animal communication.

I suggest that the birth of questioning behaviour was the birth of human intelligence. We can look at the entire evolution of the human species and the development of human society and civilization from the point of view of an exchange of information and the means available in a society to ask each other questions.

The ability to ask questions was the first and truly revolutionary change in the quest to exchange information via direct communication. Human dialogical language, intelligence, mental cooperation and a self-developing brain emerged together with the ability to ask questions. After this we never stopped inventing different ways of asking each other or ourselves questions. At some point we started asking questions using speech (do not forget – we started asking questions before the advance of fully articulated speech!). Then came written language, so our questions could survive time and could be transferred to other places. When published books appeared, many people could learn some of the most important questions of life and the answers to these questions given by the greatest human minds in human history. The telephone made asking and answering more mundane questions very easy. Radio and TV also contributed to this process, although more passively, but the latest technology, the Internet, revolutionized the art of asking and answering millions of questions by millions of people every day. Throughout our history as a species we have been asking questions of each other, of other generations, and even of people from different countries and continents we will never know. We truly are the species that asks endless questions.

Is asking questions a uniquely human ability? This is possibly the most difficult, most interesting and most important 'question about questions'. If our closest living relatives, apes, do not ask questions, we may claim that asking questions is a mental capacity that only humans possess, kind of a 'cognitive threshold.'

Whether apes could ask questions was an important issue in the 1970s and the 1980s. Unfortunately, the ability to ask questions was assessed only in the context of the primates' ability to form a syntactic structures, not as a distinct cognitive capacity on its own right. 'It does not really matter if apes do not ask questions, because we know they can use more syntactically complex utterances' was a kind of consensus among most of the scholars studying chimpanzee communication. I guess this was the central reason why this discussion never led to the acknowledgement of questioning behaviour as the crucial difference between the apes' and humans' mental abilities.

The 1970s and 1980s were booming periods for language experiments, when our non-talking relatives suddenly started communicating with us using sign language and other non-vocal means of communication. The experiments produced impressive results. Scholars discovered that apes could recognize themselves in the mirror as individuals, they could invent new symbols using the signals they already knew, and according to some authors they not only had some elements of syntax and metalanguage, but were able 'to acquire concepts and generate hypotheses and strategies' (Rumbaugh et al. 1994:321). These achievements lead the head of the experiments, Sue Savage-Rumbaugh, to declare, that 'apes posses the cognitive capacities for language but lack the proper organ of expression' (Savage-Rumbaugh et al., 1993:109).

What about questions? It has been documented for a few decades already that the vocabulary of the acculturated apes contains question words as well, like "Who", "What", Where" in Washoe's and Nim's vocabulary (Washoe and Nim are widely known chimpanzees from the early experiments on the language comprehension of Chimpanzees). So it seems almost obvious that apes must be able to ask questions.

Nevertheless, according to the accounts of the experiment authors, apes do not ask questions. Apes understand questions and give appropriate responses, but amazingly they themselves do not use questions and question words in conversations with their human teachers. Analysis of their conversations with humans shows that in human-primate conversations, questions are asked by humans only.

Ann and David Premacks designed a potentially promising methodology to teach apes to ask questions in the 1970s: 'Suppose a chimpanzee received its daily ration of food at a specific time and place, and then one day the food was not there. A chimpanzee trained in the interrogatives might inquire 'Where is my food?' or, in Sarah's case 'My food is ?' (Premack & Premack, 1991 [1972]:20-21).

More than a decade later after writing these promising words Premacks wrote with disappointment: 'Though she [Sarah] understood the question, she did not herself ask any questions – unlike the child who asks interminable questions, such as What that? Who making noise? When Daddy come home? Me go Granny's house? Where puppy? Sarah never delayed the departure of her trainer after her lessons by

asking where the trainer was going, when she was returning, or anything else' (Premack & Premack, 1983:29).

Earlier Washoe also failed to formulate and ask questions, though that was one of the aims of the Gardners' project. Despite all their amazing achievements, bonobos Kanzi and Panbanisha do not seem to possess the ability to ask questions either. Given the natural curiosity of the apes, it would be natural to expect that if apes were able to ask questions, they would be asking plenty of questions, just like young children do.

Interrogo Ergo Cogito. 'Cogito Ergo Sum' – 'I am thinking, therefore I exist' – these famous words are attributed to Rene Descartes (they were actually initially written in French and only later were translated into Latin). In the light of the evolutionary importance of human questioning behaviour I want to suggest another similar Latin saying, with obvious evolutionarily implications:

'Interrogo Ergo Cogito' – 'I ask questions, therefore I think'.

I suggest our ancestors became humans when they started asking questions.

It is a pity we will never know the name of the first individual who asked the First Question to mark the turning point in the long process of human evolution, but we know that the first question was asked by the First Human, the first Homo sapiens**.** It does not matter whether it was a woman or man. What matters is the huge advantage and the instant gratification that the ability of asking questions would give to the first questioning human being. Most likely this was a result of genetic mutation, although the development of ape and then hominid mental ability, and the increasing complexity of social interactions in hominid groups were heading towards this crucial point, so the emergence of the 'questioning gene' must have been a relatively smooth transaction.

I have already mentioned the fact well known to ethnomusicologists that responsorial singing is one of the strongest universals of human singing traditions. I propose that hominid responsorial singing was the central factor that paved the way for the emergence of the human ability to ask questions.

Questioning behaviour and the developments of TOM (Theory of Mind) are obviously interconnected, although not as directly as it might

seem. The fascinating fact about the TOM and questioning behaviour is that children learn the mystery of asking questions long before they show the development of TOM. On the contrary, apes are able to acquire at least some elements of TOM, which appears around the age of four in children's development, but at the same time apes seem unable to learn how to ask questions, which occurs in children's development in the form of the correctly pronounced question intonation before a child even turns one. Questioning behaviour seems to be more species-specific to humans than the development of TOM.

Here are a few more facts and considerations about questions and apes.

• It has been demonstrated that our closest living relatives, chimpanzees and particularly bonobos, understand human questions and can respond accordingly at a level of a human child roughly about 2.5 years old;

• Chimpanzees in the wild have vocalization that has extremely interesting and important elements of questioning behaviour. These are pant-hoots, an enquiry about the whereabouts of other members of the group, and most importantly, it has the human-like terminal rising question intonation, although it is not followed by the 'answer', instead it is followed by the same 'enquiring pant-hoots' from other chimpanzees; (Goodall, 1986:134).

• The reason for the inability of apes to ask questions almost certainly has genetic basis. These limitations do not allow for the mental ability from which apes would learn questioning.

• And finally, we should not forget that the experiments of teaching apes human language are still in progress, so there is always a chance that one of the apes in the future will amaze us by learning how to ask questions. Our closest living relatives already amazed us many times by displaying the abilities we never suspected they had.

Who Could Answer the First Question? This is a methodologically very important question. No evolutionary trait will give any advantage to its bearer if the environment does not support this new trait. If the questions of the first questioning human would stay unanswered, then there would be no survival benefit to the bearer of this new trait.

ARE THERE ANY HUMANS WHO CAN NOT ASK QUESTIONS?

This question is important in order to learn about the nature of human questioning behaviour. If this ability has a genetic basis then it would be helpful to know in which conditions may humans find it difficult (or even impossible) to learn how to ask questions. Questioning behaviour of autistic people would be very important to check, as according to the available literature, some autistic individuals find it extremely difficult to learn how to ask questions. Williams syndrome is another rare genetic disorder that possibly causes difficulties in learning how to ask questions. What about environmental factors? The tragic case of Genie, a girl who was imprisoned by her father for 13 years in her bedroom provides a crucial insight into the importance of human

The answer to this ostensibly difficult question is very clear and easy: experimental studies of ape mental abilities during the last few decades have provided ample proof that apes are very good at understanding questions and answering them properly. Knowing the ability of apes to answer questions, there can be no doubt that our hominid ancestors with bigger brains would be at least as good at answering questions as apes. Therefore, by the time the first human asked the first question, the members of hominid groups were ready to answer these questions. It might sound amazing, but for a few million years our ancestors were cognitively ready to answer questions, although there was no one around to ask them any questions (See also the box 'Are there Any Humans Who Cannot Ask Questions?).

Questions and Protolanguage. Derek Bickerton suggested that before the development of human language our distant ancestors used 'protolanguage', a simple surrogate of contemporary language, where the words were present, but very little grammar or none was involved (Bickerton, 1981). According to Bickerton, protolanguage is currently present among four different categories: (1) trained apes, (2) children under two, (3) Genie and other 'feral children', and (4) users of 'pidgin' languages.

In my opinion these four categories of protolanguage users should be divided into two very different groups: (1) those who do not use questions in their speech and (2) those who use questions. Those who cannot ask questions, are locked inside their own mental world and cannot develop further. On the other side, those who can ask questions have the ability to develop mentally and to become a part of the great

interaction for human emotional, intellectual and linguistic development. Genie was kept without any exposure to human social conditions longer than the so called critical period of language acquisition (this is a period when a child is about 12 years old). After her rescue from her abusive father (who killed himself after the case went public) Genie was able to make some progress, learnt a few words, but her speech never reached the usual level of human complexity. Importantly for our topic, Genie was not able to learn how to ask questions. The case of Genie strongly suggests that although questioning is most likely a genetic behaviour, social interaction with other humans in early childhood is crucially important to unlock this genetic ability.

information web of humanity. So, according to this criterion, the four groups nominated by Bickerton as protolanguage users must be divided into two very different groups: (1) Trained apes and 'feral children', who do not ask questions, and (2) Children under two and pidgin users – who can ask questions.

It is very important to note that the members of the former group (signing apes, and Genie and feral children) have very different reasons to be in the 'non-questioning' category. Signing apes are in this category because, despite intensive training and learning, they do not seem to possess the necessary innate basis that would allow them to learn to ask questions. Genie and feral children, however, have all the necessary innate basis to learn interrogatives, but due to environmental factors they missed out on the sensitive period for learning questioning. Therefore, ***questioning appears to be innately guided behaviour, in which inbuilt guidelines help the learner***.

How do we learn to ask questions? Learning to ask questions must happen in early infancy, no question about that. Children use the correctly pronounced question intonation before they can pronounce their first words. Are they imitating adult conversations that they hear?

I do not think young babies imitate adults speech. It seems to me that young babies inadvertently 'teach' their parents how to communicate with them in order to introduce them to their questioning behavior. How? If you start speaking to an infant in a serious 'adult' tone for a few minutes, and then start speaking with an emotionally loaded tone with very significant pitch modulations and asking plenty of questions, the response of the infant will immediately change, and the infant will immediately look happier. I think this way, through this kind of feed-

ORIGIN OF LANGUAGE AND A SMALL QUESTION TO NOAM CHOMSKY

American linguist Noam Chomsky suggested that language could have appeared suddenly, as a result of a 'monstrous genetic mutation', and after it appeared, the very first true human with the human abilities of intelligence and reasoning had a tremendous advantage compared to his non-human family and friends. Chomsky has been criticized for his almost creationist views on the origins of language and intelligence by fellow scholars, for example, by Steven Pinker. I suggest that even if we accept the idea of a monstrous genetic mutation, Chomsky's idea still cannot be evolutionarily viable. So here is a question to Dr Chomsky and the supporters of his idea of sudden origin of language:

Would a neurologically fully human child, born in a family of non-linguistic primates, be able to develop language faculties just from the new genetic abilities,

back, infants encourage their parents to speak to them with exaggerated pitch modulations and ask plenty of questions with rising intonation. This is a phenomenon known as 'baby talk', or 'infant-directed speech', or 'motherese'. Asking questions with exaggerated question intonation is arguably the biggest part of baby talk. So I suggest that teaching infants the mechanisms of asking questions in one of the central functions of motherese (See also the box 'Origin of Language and a Small Question to Noam Chomsky')

When was the ability to ask questions born? To answer this question, we should remember, that question intonation is one of the most widely distributed language universals all over the world. This universality strongly suggests that: (1) question phenomenon occurred at one place and time, and (2) this happened before the initial dispersal of human ancestors from Africa (about 2 million years ago). Taking into account these factors, any of the human (or hominid) ancestors, not younger than 2 million year old, could have made this critical step in the cognitive development of our species. Homo erectus or the earlier Homo habilis are the candidates for being called the first questioning humans.

According to this suggestion, archaic Homo sapiens (known as Homo erectus) or Homo habilis were the first humans to cross the cognitive threshold, leaving behind the animal kingdom. A number of paleoanthropologists (among them Weidenreich, Alexeev, Jelinek, Wolpoff, Frayer) suggested there is no 'difference of kind' between the cogni-

without any language speakers around in the early years of infancy?

Child development experts would unanimously answer this question: even a person with such extraordinary mental abilities as Noam Chomsky himself, would not have been able to develop a normal human language if he was not surrounded during his childhood by members of his own humanly speaking family. Genes are not enough. Every human child needs a human environment and humanly communicating adults to develop her or his genetically wired principles of 'universal grammar'. I fully agree with Steven Pinker's Darwinian approach towards the origins of language (although I strongly disagree with his dismissive attitude towards music). The emergence of language was a long and complex process, involving the gradual evolution of a whole set of elements of primate and then hominid communication.

tive and linguistic abilities of archaic Homo erectus and Homo sapiens. Wolpoff mentions Homo erectus as Archaic Homo sapiens. My model fully supports this suggestion.

Music, Speech, and Other Mediums of Language

The only serious alternative to pitch-based musical communication as the early medium of language, is the so-called 'gestural' theory of language origin. According to the proponents of the gestural' theory of language origin, the evolution of human language went through a gestural phase. The gestural theory had several attractive sides:

(1) First of all, it was believed that apes do not have voluntary control over their own vocalizations; therefore it was assumed that when our hominid ancestors wanted to communicate more complex ideas, they would not be able to use their vocal tract and had to turn to other means of communication, such as gestures.
(2) Another important point for the support of gestural theory was the lateralization of musical abilities and human language in different brain hemispheres. The idea that language (lateralized in the left hemisphere) could not be related to our vocal abilities (lateralized in our right hemisphere) was perceived as hard neurological evidence against the vocal theory.

(3) Most importantly, the boost for the gestural theory came from the groundbreaking experiments in teaching apes American Sign Language. Apes suddenly started communicating with the experimenters, answering their questions, following the directives of their trainers, and even constructing rudimentary sentences with sign language and other non-articulatory means of communication. This fact was a living proof of the ability of our very distant ancestors to start more advanced communication via gestural and other non-vocal channels.

Belief in the involuntary nature of ape vocal communications is not so strong any more among scholars, as information about voluntary control over vocalizations among apes is growing. Even Kanzi, a bonobo that provided some of the most remarkable examples of an ape's ability to comprehend human language, also provided evidence that apes can control their vocal chords as well as their hands. It was noticed that every time Kanzi communicated with humans with specially designed graphic symbols, he also produced (obviously voluntarily) some vocalization. It was later found out that Kanzi was actually producing the articulate equivalent of the symbols he was indicating, or, in other words, he was saying (articulating) these words, although in a very high pitch and with distortions, so it was not easy to notice this.

Regarding the localization of musical abilities in the right hemisphere and of language in the left hemisphere, a few new facts came to our knowledge, revealing that when music signals are learned from early childhood, they are localized in the left hemisphere both in humans and animals:

• Avian birds acquire their species-specific songs during the earliest period of their development. As a result, their songs are controlled by the left hemisphere of their brains;

• Most professional musicians learn music consciously from quite early childhood. This must be the reason why there is lateralization of part of their musical knowledge in the left hemisphere;

• The intonation of tone languages is learned in early childhood, long before the acquisition of articulated sounds of speech. As a result the system of tones among the tone-language speakers is also localized in the left hemisphere.

• Study of normally functioning brains, when the areas involved in different activities are identified, provide important proof of close links between music and language processing in our brains.

• We also need to take into account that, in regards to vocal communication, our noisy and singing-loving ancestors were very different from mostly silent and non-singing apes.

As to the brilliant works concerned with teaching ASL (American Sign Language) and other non-vocal forms of communication to the apes, they provide us with a unique possibility to understand the cognitive capacities of our closest living relatives, but they can hardly tell us much about the early history of the development of language among hominids. The situation of one species teaching a higher language to another species is evolutionally artificial. Our ancestors had not been taught a higher language by someone else. They developed language themselves simultaneously with the development of their cognitive abilities and gaining cortical control over their vocalizations.

An additional argument against the gestural theory is the overwhelming advantages of the vocal medium over gestures. They are well known and widely accepted by proponents of both vocal and gestural theories, although the proponents of gestural theory prefer to talk about 'speech' in this context. Let us listen to one of the main proponents of gestural theory, Gordon Hewes: 'There are several obvious advantages of speech over manual gestures, including the fact that the vocal auditory channel is practically a clear channel for communication, whereas the visual channel, as the prime modality for human and all higher primate perception of the external world, is subject to continual interference from non-language sources. Unambiguous decoding of gestural messages requires a fairly neutral background, good illumination, absence of intervening objects (including foliage), a relatively short distance between transmitter and receiver, and frontal orientation. Making manual gestures is slower than speaking, requiring more energy, and preventing the use of the hands for any other activity while the message is being transmitted; decoding sign-language message is also slower, even among trained deaf persons' (Hewes, 1973:10). All these facts were provided by Hewes to prove the necessity of the later change of the gestural medium into speech, but it is logical to ask why would our ancestors shift from a primary vocal channel to gestural commu-

nication in the first place, when it is clear that the same long list of advantages over the manual gestures are characteristic for the archaic hominid vocal communication as well?

Pitch-Based Language: Singing, Whistling, Drumming

We all know instances where language functions without speech, although we may not always pay attention to this fact. For example, people who communicate by means of sign language use fully developed sign language, but not speech. Communication with the Morse coding system of the early telegraph, based on the use of dots and hyphens, or the system of marine signal flags between ships are different examples of the use of language without speech. Speech is just one of the mediums of language, although by far the most economical, fast and universally employed in all human societies. Almost all the non-speech mediums of language were developed very late in human history. Sign language was officially developed after 1755 in France when Abbe de L'Epee founded a public school for deaf children. The Morse coding system was developed in the 1830s by Samuel Morse and Alfred Vail. The system of Marine Signal Flags was developed in 1855 in England by the British Board of Trade.

Pitch language, based on pitch modulations, or musilanguage (the term was suggested by Steven Brown in 2000 and is currently widely used by scholars), seems to be the only alternative medium of language that can compete with speech in universality and chronological depths in human history. Unlike sign language, Morse or Marine Signal Flags, pitch language used the same vocal channel that was later employed by speech, which is why, after the introduction of speech, a much more efficient medium for language, all known human societies shifted to speech, and today it is very difficult to find any traces of the 'past glory' of pitch language.

Fortunately, there are still some traces of pitch language left in contemporary human societies. Here is a brief account of three such in-

stances where very precise ideas are communicated by means of pitch only.

1. Whistle languages. George Cowan presented a fascinating dialogue between two villagers from Mexican Mazateco Indians.

Here is the literary translation of the whole dialogue:
'What did you bring there?'
'It is a load of corn.'
'Well, where are you going with it?'
'I am taking it to Tenango.'
'Are you going to sell it then?'
'I am going to sell it.'
'How much will you take then? Sell it to me here.'
'I will take 2.50 a box' [pesos]
'Won't you take 2.25? I will give that to you'.
'Three pesos are given to me where I am going with it'
'But that is far you are going with it then.'
'I will just drop the matter now'.
'Well, you sure want a lot'.

'What is so fascinating in this dialogue?' a reader might say. True, this is a quite mundane commercial agreement, but there is one unusual fact: not a single word was pronounced during this whole conversation. The Indians were using a whistle language, or a purely pitch language, used for everyday human communication when the communication on the distance was needed. The same phenomenon can be encountered in plenty of other countries and regions of the world: in Brazil, Bolivia, Alaska, Nepal, Burma, New Guinea, France, Greece and most of all – in many West African peoples. This kind of communication generally occurs among the users of tone languages, and it is based on the use of a tone element without the articulated component of speech. There are also very interesting cases where the whistle language is used in non-tone languages as well, as in some Spanish, Turkic, or Greek villages.

2. African Talking Drums. Africans use the so called "talking drums" in order to communicate over long distances, as a method of spreading important news between villages. Two drums with different

pitches are used to send messages. Very much like in the case of whistle languages, talking drums also use the tonal patterns of their speech. The existence of drum languages also proves that pitch-only based communication can function in human society. A very interesting detail of African Talking Drums is that different African tribes, who speak different languages, often use a more universal Drum Language, which sometimes employs earlier, already extinct words and expressions of the local languages.

It is important to remember that speakers of tone languages never speak without the use of the tone element, whereas, as we can see, in whistle languages and African Talking Drums they can successfully communicate with the use of the pitch element only, without the articulated component of the tone language.

It is a pity that in many ways the innovative and insightful book of Steven Mithen, 'Singing Neanderthal', does not even mention either whistle languages or African Talking Drums, both of which could further promote his idea of the importance of music in the evolution of human language. Most likely Mithen, despite his genuine efforts to promote the idea of the importance of music in the evolution of human language, sees music only as a 'non-referential system of communication', without even discussing the referential potential of pitch-based communication.

3. Tone languages. If whistle and drum languages are present in only a limited number of regions of the world, tone languages constitute in fact the majority of world languages. Virtually all sub-Saharan languages, most East Asian and some South American Indian languages are tonal. In total, more than half the languages of the world are tone languages. In these languages the tone component is very important for both the morphology and the syntax. The lexical use of tone is widespread in all tone languages, but the grammatical use of tones, such as singular and plural forms and present and past tenses is more typical of the many languages of Africa.

In tone languages, as well as in other non-articulated means of pitch communication (whistle and drum languages), pitch contour has nothing to do with the emotional content usually attributed to music and singing. An emotional element of tone is also present in tone languages,

but it is independent of the lexical and grammatical meanings. So, we may say that in these languages tone (pitch) is employed as a double-component system, overlaid on each other: (1) the first component has a referential lexical (and sometimes grammatical) function, and (2) the second component has a general-emotional, non-referential function. In contemporary tone languages both functions of pitch modulation are clear, and they are overlaid on each other in a flow of speech.

It seems that during the last major evolutionary change of human communication, when the so-called fully articulated language came into existence, articulated speech did not fully replace the older pitch-based language. A number of linguists believe that the system of tones has a late origin, suggesting that tonogenesis went through replacing some lost elements of speech with tones (for example, voiced consonants were replaced by low tones). Imagining the earlier speech devoid of tones, and then acquiring tones only later seems to be against the general historical dynamics of the development of vocal communication. I need to say here that linguists also note the cases where tones are lost during language development. Therefore, tones are quite a dynamic phenomenon and can be lost and acquired.

Singing and Speaking

We are now approaching the question that was raised in the first chapter of this book in relation to the distribution of vocal polyphony and monophony all over the world: why are some regions of the world almost entirely polyphonic, while other regions are mostly monophonic? If we take into account what was said in the second and third chapters of this book, the question must be formulated in a different way: if our distant ancestors took similar loud and dissonant choral singing with them to different regions of the world, why are some regions of the world polyphonic while other regions are monophonic?

I suggest that the answer to that question can be found in the origins of articulated speech.

Let us remember: according to the majority of scholars, language and speech are different phenomena, and language was most likely de-

SPEECH ORIGINS AND CHIMPANZEE LAUGHING

Of course, it is widely known that humans' closest living relatives do not have speech, but if we ask whether they have any elements of speech the situation suddenly becomes a little unclear. I do not think that all scholars would agree on where exactly to draw the dividing line between speech and non-speech communication, but I know that Roman Stopa argued in the 1970s that some of the words in human languages (for example, a word for strong laughing) has parallels in chimpanzee vocalizations during their laughing. You do not need to read Goodall's or Stopa's publications to notice that chimpanzees, Japanese macaques and some other primates do employ "kh" and "k" consonant-like sounds in their vocalizations. These consonant-like sounds

veloped earlier than speech. Speech, as a much more efficient medium of communication, replaced pitch-based vocal communication at some point in human prehistory. The crucial question is when did this happen? I suggest that ***in different regions of the world this happened in different epochs***.

Let us look at the possible chronology of related prehistoric events:

• About two million years ago: our hominid ancestors made a crucial change from non-questioning hominids to questioning humans; Dialogical communication, the new revolutionary ability to ask questions, mental cooperation, and a self-developing brain was born. The only feature that differentiated archaic Homo sapiens from anatomically modern Homo sapiens was articulated speech and a few facial morphological features derived from the capacity of articulated speech.

• About 1.8 million years ago: early humans started spreading out from Africa. The first strong evidence of this early spread is the presence of early humans in Caucasia, contemporary Georgia (accidentally about 60 kilometers from the city where I was born). The first human groups that came out of Africa already had human dialogical language and the ability to ask questions, but did not have articulated speech (See also the box 'Speech Origins and Chimpanzee Laughing')

• Grover Krantz suggested (and I have not seen anyone criticizing this idea) that the shift to articulated speech was signaled by the appearance of important morphological changes on the human face. Therefore, if different human populations shifted to articulated speech in different epochs, we should anticipate the appearance of so-called 'morphological continuity' between the fossil populations and contem-

have long since been recognized as a part of primate vocal communication. Therefore, there are no grounds to deny that at least a few consonants were present in the mostly pitch-based communication of Australopithecines. All contemporary human languages still use vocal communication based on the same two elements: (1) consonants and (2) prosodic (tonal) elements, based on vowels. An increase in the importance of consonants and vowels, and the decrease of the pitch component during the evolution of human communication resulted in the emergence of fully articulated speech. The wide distribution of tone languages in the contemporary world suggests that speech can still include fair amount of pitch element as an integral part.

porary facial details in the different regions of the world as well. Let us see what paleoanthropological materials say about different regions of the world.

• About 350 000 years ago: the earliest case of the appearance of morphological continuity between the fossil and contemporary populations is in East Asia, between the Hominids from the Zhoukoudian cave and contemporary populations of China.

• About 200 000 years ago: possibly the next chronologically earliest case of morphological continuity is among the so called Ngandong (Solo) fossil from Java which is similar to the morphology of contemporary Australian Aborigines.

• About 120 000 – 100 000 years ago: morphological continuity appears between the fossil materials from the Middle East and West Asia (sometimes known as 'progressive Neanderthals') and contemporary West Asian Caucasoid populations.

• About 40 000 years ago: Morphological continuity appears in western Europe as soon as the long ice age is finished, and contact between western Europe and the rest of the world becomes possible.

• About 11 000 years ago: Although sub-Saharan Africa is the cradle of humankind, the regional continuity between the fossils and the contemporary local population here is historically the shortest. The earliest finds that show the regional continuity are the so called Iwo Eleru skullcap from Nigeria (11 000 years old) and the skeleton from Asselar (6 400 years ago) in eastern Mali.

According to this chronology (which is based on the works of Wolpoff and Cavalli-Sforza), articulated speech must have appeared first in East Asia, among the ancestors of contemporary East Asians,

'MULTIREGIONAL EVOLUTION MODEL' OR THE 'ANCIENT AFRICAN MODEL'?

Despite the fact that my model fully supports the 'Multiregional Model', I want to note that I find the term 'Multiregional Evolution Hypotheses' confusing. At the very first sight it gives, to an uninitiated reader, an impression that the proponents of this theory suggest that different human populations evolved into Homo sapiens several times in different regions of the world. This is particularly obvious when a multiregional hypothesis is confronted with the competitive hypothesis, titled as 'Recent Single-Origin Hypothesis'. The reality is that the proponents of the Multiregional hypotheses also suggest that Homo sapiens had a single origin: in Africa. The main difference between the 'multiregional' and 'recent single-origin'

then among the ancestors of Australian Aborigines, then among the ancestors of West Asian and European Caucasoid populations, and then among the ancestors of the sub-Saharan African populations. Time differences are huge (from 350 000 in East Asia to 11 000 in sub-Saharan Africa).

Taking into account the general tendency of losing the traditions of vocal polyphony, it would be logical to suggest (as I did in my 2006 book), that ***the disappearance of the choral singing traditions started after the appearance of articulated speech***. As articulated speech became the leading medium of communication, the adaptive importance of good musical abilities also gradually declined, so people with good articulation gained the advantage, as they were favored by the new social conditions.

In this connection the above mentioned chronology is crucially important for understanding the uneven distribution of the traditions of choral singing in different regions of the world. If some populations shifted to articulated speech a long time ago, they would have had much more time for the gradual disappearance of choral polyphony than those populations that shifted to articulated speech later.

East Asian and Australian Aboriginal populations, according to this chronology, shifted to articulated speech the earliest, and as we may remember from the first chapter of this book, East Asia and Australia are the two most monophonic regions of the world. On the contrary, Europe and particularly sub-Saharan Africa are the two most polyphonic regions of the world, and this fact perfectly suits the chronology about the possible late shift to articulated speech in Europe and particularly in sub-Saharan Africa.

hypotheses is the huge time difference for the origin of *Homo sapiens* (2 million years against about 200 – 100 thousand years), and of course the suggestion of the recent hypothesis proponents of the total replacement of the earlier groups of humans. Interestingly, in a 2007 letter to me, Milford Wolpoff agreed with my suggestion that the name 'Multiregional Evolution hypotheses' may be giving a wrong (and politically unpopular) impression, although he was reluctant to consider a name change to the hypotheses to avoid unnecessary confusion. Another term for the Multiregional Evolution hypothesis, 'Network Theory', used earlier by Weidenreich in his unpublished notes, is sometimes used by the proponents of Multiregional Evolution hypothesis. It seems to be much more precise and devoid of unnecessary political overtones.

Multiregional and Recent African Models of Human Evolution

Some readers educated in paleoanthropology might object to my logic, claiming that my model is not justified by the most accepted evolutionary model today. They would argue that the most accepted contemporary model of the human origins would not agree with such a chronology involving hundred of thousands of years of differences in developing any traits in different populations. They will be right. According to the 'Recent African Model', contemporary human populations are not connected to the archaic local forms of Homo erectus, who spread from Africa about two million years ago. The 'recent' model suggests that our direct ancestors evolved in Africa only about 100 000 or 200 000 years ago and that they replaced archaic Homo erectus populations all over the world. This model has strong support from molecular biology, but apparently this support is not enough to settle the argument. Besides, the methods of molecular analyses of the proponents of the 'recent African theory' have also been criticized (Templeton, 1993).

There is also another model for the human origins, known as the 'Multiregional Model'. According to the supporters of this model, the common ancestor of all humans came out of Africa about two million years ago, and after reaching several regions of the world (East Asia, Southeast Asia, West Asia, Australia, and Europe) they continued their evolution in different ecological conditions, maintaining sporadic contacts with each other.

The debate between these two conflicting models is far from being over. It is difficult to know when this debate will be resolved, or what the outcome will be, but I want to say that the distribution of polyphonic and monophonic singing traditions supports the multiregional model (See also the box '"Multiregional Evolution Model" or the "Ancient African Model"'?).

The model of the asynchronous shift to speech in different populations creates a whole set of new and unusual suggestions about the different aspects of speech in different human populations. The next section of this book discusses one such aspect in particular, links between choral singing and… stuttering.

Polyphony, Monophony and Stuttering

On 16th October 1989 I was in the lobby of a Moscow hotel trying to book accommodation for a few days. It was always a huge problem finding a place in any of the Moscow hotels during the existence of the USSR. 'No Vacancies' was a universal reply at virtually all Moscow hotels, even if the hotel was half empty. Overpaying and bribing personnel at the counter was the usual way to get accommodation, but even this method could not always guarantee you a place. This time my position was very strong, as I had an official invitation from the Federal Clinic of Speech Pathology to attend the symposium 'Treatment and Rehabilitation of Patients with Speech Disorders', signed by Professor Shklovsky, and my name was on the list of guests.

'Which hospital do you work at?' asked me a woman at the counter without looking at me, busily filling a form.

'I do not work at a hospital. I work at Tbilisi State University,' I answered.

'At the University? What is your profession?'

'I am a musicologist.'

She stopped writing and looked at me.

'You are in the wrong place. We are accepting only speech pathologists who have arrived in Moscow for the international symposium. We do not have space for any other guests.'

'I also was invited to this symposium'.

'What does music have to do with speech pathology?'

So I gave a brief summary of my proposed conference speech at the hotel counter. I am not sure whether my explanation of the possible links between the distribution of polyphony and stuttering prevalence impressed her, but she nodded when I mentioned the well-known fact the stutterers do not stutter when they sing. So the link between music and stuttering was established. She checked my name one more time against the list she was given from the conference organizers and I was in.

I must confess that I was asked this question several times by different people, starting from my mother. So what is connection between choral singing and stuttering?

The genetic nature of stuttering is well established. Another well known and accepted idea about stuttering links this from of speech pathology to our evolutionary past. According to the widely shared idea of Robert West, human speech is a function overlaid on ancient systems for eating and respiration, and because speech is one of the latest abilities we acquired, it is one of the most readily lost or impaired (West at al, 1939).

As articulation obtained a high survival value in human society, it would be logical to anticipate the eventual decrease of the number of stutterers throughout human history. In this context it is interesting that speech pathologists noticed the general tendency towards reduction of the numbers of stutterers in contemporary society, and try to find explanation to this fact with different factors (Bloodstein, 1995).

According to the suggested in this book model that different human populations shifted to articulated speech at different times, it is logical to propose that different human populations must have different levels of prevalence in stuttering. The populations that shifted to articulated speech earlier (East Asian, Australian Aboriginal, and Native American populations) must have a lower rate of stuttering, and those populations that shifted to speech later (European and particularly sub-Saharan African populations), must have a larger number of stutterers.

So what is the real picture in cross-cultural studies of stuttering prevalence?

Without going into details of other stuttering-related factors such as gender (boys stutter more than girls), and age (children stutter more than adults), let us go directly into the cross-cultural studies.

There are two general approaches towards the prevalence studies of stuttering in different cultures:

(1) Most experts believe that all the populations of the world must have roughly the same prevalence of stuttering because, as one speech pathologist wrote to me, 'there are no compelling reasons to believe that the prevalence would be different in different populations'. This attitude is dominating among contemporary speech pathologists, and followers of this idea are not interested in cross-cultural prevalence studies in different populations, as they believe there will be no differences among different populations.

(2) Another, much smaller group of scholars believes that there can be substantial differences, and there are a few cross-cultural studies on this subject. We will soon discuss the results of these studies.

As you would expect, most studies on stuttering were done in European countries and North America, mostly by European scholars. There are quite detailed accounts of the incidence and prevalence of stuttering in most European countries. By the way, 'incidence' and 'prevalence' are two different, although linked, factors. Prevalence is the number of stutterers found in a population at any given time and is easier to estimate. Incidence is the number of people from a population who have ever stuttered in their lives (mostly in childhood). Most speech pathologists agree that about 1% of the general population stutters. Stuttering among children is much higher – about 5%. Most children stop stuttering without any help as they grow older. These figures are, as you may guess, from Europe. Most speech pathologists believe that the European figure (1% prevalence) is universal for all regions of the world (Bloodstein, 1995).

However, as I have already mentioned above, there are a few important cross-cultural studies and recent publications pointing to existing differences in the distribution of stuttering among different populations. Let me briefly discuss two different and possibly the best studied

non-European populations: Native American and sub-Saharan African populations.

Stuttering among Native Americans. The issue of stuttering among North American Indians was one of the hottest and most central in speech pathology for a few decades of the 20th century.

James Hunt was arguably the first scholar to note, over 150 years ago, that American Indians did not stutter. This fact was re-discovered in the well-documented studies by Wendell Johnson and his students in the middle of the 20th century. Johnson claimed that American Indians did not have stuttering individuals and even had no actual word for 'stuttering' (Johnson, 1944). One of his students, John Snidecor, a professional speech pathologist who spent a few years in an Indian community, confirmed he had never met a full-blooded Indian who stuttered.

Johnson explained this fact by cultural factors. According to Johnson, all human children have a difficult and sensitive period when they are acquiring speech. Different societies and even different parents have different attitudes towards this vulnerable period of childhood speech development. In some cultures adults pay too much attention to this normal stage of childhood development and they put unnecessary pressure on a child. They punish a child (sometimes physically), pointing out that she/he is stuttering, and actively try to stop a child from stuttering. This pressure, punishment and the label 'stutterer' deeply enters the child's mind and is the reason for the fear of speech and the associated social withdrawal. Therefore this is the main reason why stuttering does not go away and stays with a person for all his or her life. 'Stuttering starts in the ears of parents, not in the mouth of children,' was Johnson's famous slogan who believed his own lifelong stuttering had the same origin. His theory became known as 'diagnosogenic theory of stuttering'.

Johnson's theory dominated speech pathology for a few decades from the 1940s up to most of the 1970s. From the end of the 1970s the genetic approach towards the genesis of stuttering prevailed. According to the genetic theory, cultural practices are not so important, and it is instead up to the genes to decide the level of fluency for each individual. Genetic model could not actually explain the differences between the prevalence of stuttering in different populations, and as a result, all ex-

isting differences from different studies were claimed to be the result of insufficient and non-standardised methodologies.

Proponents of the genetic theory had a major victory over the diagnosogenic theory when they found that Johnson's and his students' claim about the full absence of stutterers among Indians was an exaggeration. It was suggested that among Indians it was usual to hide individuals with health problems. Most importantly, it was also found that some Native Americans from the tribes Nootka, Kwakiutl and Salish had not only a couple of stutterers, but quite a high number of stuttering individuals (about the European number of 1%).

Amazingly, despite the unparalleled interest of speech pathologists in stuttering Indians for decades, the rate of prevalence in stuttering among most Indian tribes is still not available. From the available publications we can only assume that stuttering is present in all known American Indian tribes, but the actual prevalence might be considerably lower.

Stuttering Among Sub-Saharan African Populations. The available data from a number of publications on the subject shows that the prevalence of stuttering among some sub-Saharan African populations and their descendants in the USA is higher than in European populations. According to some publications, the prevalence in some sub-Saharan African populations reaches 5.5% and even 9.2%. Summarizing prevalence studies, Eugene Cooper and Crystal Cooper concluded: 'On the basis of the data currently available, it appears the prevalence of fluency disorders varies among the cultures of the world, with some indications that the prevalence of fluency disorders labeled as stuttering is higher among black populations than white or Asian populations' (Cooper & Cooper, 1993:197).

What About the Rest of the World? Unfortunately, other major regions of our planet have not been so extensively studied, so the data is either very small or completely absent. For example, according to the data collected by Morgenstern more than half a century ago, there is no (or a very low incidence) of stuttering among Australian Aborigines and Polar Eskimos. Preliminary data also suggest that stut-

tering is also very reduced among Siberian peoples and Kazakhs from Central Asia.

The existing information (as limited as it is) about the very low rates of stuttering among American Indians, Polar Eskimos and Australian Aborigines (carriers of monophonic singing traditions) on one hand, and the very high rates of stuttering among the descendants of sub-Saharan African populations (carriers of polyphonic singing traditions) on the other hand agrees with the suggested model: cultures with polyphonic singing traditions seem to have much more stuttering individuals than the cultures with monophonic singing traditions. Even the higher stuttering prevalence in some Indian tribes (Nootka, Kwakiutl and Salish) confirms this correlation, as these are exactly the tribes who have the most polyphonic singing traditions among Native Americans.

What About Stuttering Among the Chinese? Data about the prevalence of stuttering among the Chinese is absolutely crucial for our discussion. According to my model, the ancestors of Chinese populations shifted to articulated speech the earliest, therefore the prevalence of stuttering among Chinese populations must be considerably lower that among European and particularly sub-Saharan African populations.

When I arrived in Australia in 1995, 'stuttering among the Chinese' was one of the central themes I researched at university libraries and then on the Internet. No publications were available on this subject. China did not exist in the world of speech pathology. Even the profession of speech pathologist seemed nonexistent in China (this was later confirmed to be true). I ended up going to Chinese restaurants and acupuncture centres and asking ethnic Chinese people if they knew a Chinese stutterer. Their reaction was very interesting. They usually could not understand what I was asking them. When I tried to demonstrate what stuttering is, they usually got the impression that I was asking about retarded individuals. When I told them that I was not speaking about retarded individuals, and that some of the brightest people in human history (like Charles Darwin, or Winston Churchill) were stutterers, they were completely confused.

I ended up doing possibly the first research on the stuttering prevalence among Chinese. With the help of the 'Multicultural Interest

Group' in Melbourne and the 'Speech Language and Hearing Association' in Singapore, I contacted speech pathologists in Singapore, Taiwan, Hong Kong and Malaysia and asked them to provide answers to a specially designed questionnaire. Responses were received from 33 speech pathologists, working with predominantly Chinese populations. I was particularly lucky that Sheree Reese, speech pathologist from Kean University (New Jersey, USA), got also involved in this research.

The results of our study indicated that the stuttering prevalence among the Chinese in Singapore is very low. Speech pathologists were seeing less than 1.5 stutterers in a year. Five speech pathologists claimed they have never seen or treated a Chinese stutterer during their entire practice. One of the respondents wrote: 'Some Chinese friends of mine who are stutterers have tried and tested many therapists for a "cure" to their stuttering'. This answer suggests that there is a possibility that some of the Chinese stutterers went to different therapists, and thus the same stuttering individuals might have been represented more than once. The number of hidden or 'concealed' stutterers who do not seek professional speech therapy was not large either, and all reported cases were mild. No moderate or severe 'concealed' cases were reported. Therefore, the information received from our respondents does not support the view that the main portion of Chinese stutterers never go to speech pathologists and their secret remains hidden in families.

A comparison of the stuttering populations of Chinese and Indian populations in Singapore and also Malaysia also points to a very small number of stutterers among the Chinese in comparison with Indians. Despite the difference in size of the Chinese and Indian populations in Singapore (Chinese – 76.4%, Indians – 6.4% of the population on July 1998 when the study was conducted) more Indian than Chinese stutterers were reported.

According to Singaporean speech pathologist Selena Young, editor of the Speech Language and Hearing Association Newsletter and practicing speech pathologist, cases of stuttering are several times rarer in Singapore than cases of cleft palate. Selena actually changed her research profile from stuttering to cleft palate specialist because, in her opinion, cleft palate patients were much more numerous, therefore she could be more useful to the Singaporean population as an expert of the cleft palate. I want to inform readers that the prevalence of cleft palate

is usually several times lower than the prevalence of stuttering. Usually 1 in 700 children have a cleft palate, and about 5 in 100 children stutter (so the stuttering rate is on average 35 times higher!). Cleft palate among Chinese children is actually higher than in many other populations (about one case in every 250 births), but it is still 12 times lower than the European stuttering prevalence. If Selena Young's estimate is correct, the rate of stuttering among Chinese could be about 10 times or more lower that the average numbers for European populations, and the difference from some sub-Saharan populations will be much higher.

Sheree Reese and myself published an article on the online conference 'Stuttering Awareness Day', organized by Minnesota State University in 2001. In the same year I also published a small paper in the newsletter of the Singapore Speech, Language and Hearing Association with similar conclusions regarding the very low incidence among Chinese. Of course, we should not forget that even if the incidence in China is much lower than in most European countries and the USA, we are still looking at many thousands of Chinese stutterers, trying to cope with their condition without the help of any available professional speech pathologists. Establishing the specialty of speech pathology in China would lead to more available means of therapy and would generally improve the life conditions of Chinese stutterers. Fortunately, as I have become aware, the profession of speech pathology has become established in at least some Chinese cities during the last few years with the help of the International Stuttering Association Outreach Working Group.

So, according to the model suggested in this book, the genetic factor is decisive in the onset and development of stuttering; and different populations of the world have different genetic inclinations towards stuttering.

It also seems that the correlation between the relaxed child-rearing practices and the lower incidence of stuttering established by Wendell Johnson exists, but the cause and the result of this correlation must be reversed. According to diagnosogenic theory, in low prevalence societies children do not stutter because parents do not pay attention to their articulation difficulties. I suggest that parents do not pay attention to the articulation problems of their children because in these societies there is very little genetic predisposition towards stuttering and there are almost no adult stutterers in their respective society.

Although I do believe that the influence of cultural factors in stuttering prevalence is important, it should not be responsible for the huge differences that exist in the prevalence of East Asian and American Indian populations on one hand, and sub-Saharan African populations on the other hand. I suggest that the impressive differences in stuttering prevalence are under genetic control.

Interestingly, there was no shortage of different explanations for the possibly reduced number of stutterers among the Chinese. These explanations were expressed by a very wide range of people, from the world's leading speech pathologists (like Mark Onslow from Australia and Viktor Shklovsky from Russia) to ordinary people with a knowledge of Chinese culture. The most popular explanation is that the Chinese do not stutter because both Mandarin and Cantonese (two main languages in China) are tone languages, so (1) when they speak they are 'singing' all the time, and as we know, (2) stutterers do not stutter when they sing. This explanation obviously does not work as West Africans also speak tone languages, but have arguably the highest stuttering prevalence in the world.

The monosyllabic and syllabic-timed character of the Mandarin and Cantonese languages was also suggested as the possible reason for the reduced prevalence (Onslow), although this cannot explain the reduced prevalence among Native Americans or the Central Asian Kazakhs (preliminary information from Prof. Shklovsky). Even infanticide was suggested, however stuttering is not something you would notice when a baby is just born.

There are some well-researched publications about stuttering in Japan, and the first World Stuttering Congress was also held in Japan. It would be interesting to know if the Ainus (carriers of polyphonic singing traditions) somehow have a higher stuttering prevalence in Japan, and to investigate whether the potentially higher prevalence in Japan is due to the Ainu substratum among the Japanese.

It is still too early to draw the final conclusions. The cross-cultural prevalence of stuttering is not researched sufficiently. Although some regions of the world are researched quite well, information from other regions is very limited, and there is even no information whatsoever from a few regions. Here is summary of the currently available information on the cross-cultural prevalence of stuttering:

• European and North American populations of European descent have about a roughly 0.8%-1% prevalence.

• African American, sub-Saharan African and West Indies populations (with the major part of the population of African descent) show a higher prevalence (reaching up to 4%, 5% and even 9.2% in some populations).

• At least some populations of North American Indians have a significantly reduced number of stuttering individuals.

• According to preliminary evaluation, Native Australians also have a much reduced number of stuttering individuals.

• The same can be true for some North Asian and Central Asian populations, although the available information can only be treated as preliminary.

• The same can be said about the largest population of our planet – the Chinese. According to preliminary research, the number of stuttering individuals is significantly lower, although more detailed study is needed for more decisive results.

Therefore, the differences in stuttering prevalence between different populations on our planet can turn out to be very significant. For example, the prevalence difference between some populations of West Africa and some populations of Native Americans can be more than 100 times larger. In this context, using the European prevalence (1%) in order to characterize the stuttering prevalence of all the populations of the world is hardly a reasonable policy. The shadow of the Europe-centric 'milk drinking syndrome' is again over us.

I am well aware of the possible reaction of most professional speech pathologists to my declarations. Fortunately for all of us, my claim is very easy to disprove – even a simple unbiased prevalence survey conducted in a few schools with Chinese children could easily eliminate the biggest of my arguments.

But such a survey can provide the proof as well.

Choral Singing and Dyslexia

Stuttering is not the only evolutionary disorder that could be affected by the chronology of the origins of articulated speech. Another such pathology, developmental dyslexia, can also be related to this problem. Dyslexia is a developmental disorder connected not to speech, but to reading and writing. People with dyslexia find it difficult to acquire reading and writing skills and are generally behind their peers at schools, although they can be intellectually extremely bright. About 10% of the European and North American populations suffer from dyslexia.

Most scholars agree on the genetic character of dyslexia, and there is an increasing number of studies which link dyslexia to genetic markers. The region on chromosome 6, DCDC2 has been linked to dyslexia as a result of a recent major study. On the other hand, some dispute even the existence of dyslexia. Also unlike stuttering, which is often a transient developmental phase in children's development, dyslexia is a persistent, chronic condition.

Dyslexia in China and Japan. When it comes to reading and writing difficulties, the natural reaction of scholars is to look at the differences between the writing systems. And there are really impressive differences between some of the writing systems of the world, for example, between English and Japanese (or Chinese). English spelling is a nightmare not only for the learners of English as a second language, but even for the native speakers. Japanese spelling and pronunciation are, on the contrast, pleasingly close to each other.

According to Akira Uno, an expert in cognitive neuroscience and psychology associate professor at Tsukuba University, Japans two phonetic scripts correspond more exactly to sounds than the English alphabet does. In other words, they are simply easier. Earlier the same preposition was made by Kiyoshi Makita in 1968. Most other scholars also agree on the importance of the writing system, although another scholar, Flores d'Arcais, wrote: 'if for Japanese children, as Makita proposed, the completely shallow kana orthography could favor reading activation, the same low incidence should be found for Serbo-Croatian, or, almost to the same extent, in Italian or Spanish, and this is not the case' (1992). I can also add that the Georgian writing system coincides

exactly with the pronunciation, but dyslexia is quite a serious problem in Georgia.

Despite the controversies in establishing the reasons for the lower rate of dyslexia among the populations of China and Japan, the possible influence of the genetic factor in these differences has never been seriously discussed. I believe that excluding the possibility of a genetic factor in the huge difference between the prevalence of dyslexia among the Chinese and Japanese populations on one hand, and the European and American populations on the other, limits the chances of scholars to establish the true reasons behind the significant cross-cultural differences in the levels of prevalence in dyslexia.

Information on dyslexia from many cultures is not gathered (for example, from sub-Saharan Africa). It seems to me that the percentage of dyslexic people in sub-Saharan Africa will be higher than in Europe, and particularly higher than that of East Asia.

Therefore, if we rely only on the data currently available, we can assume that the principle 'cultures with more polyphony have more speech related problems' seems to be working in the case of developmental dyslexia as well.

New studies about the distribution of the stuttering phenomenon (and dyslexia) in different countries and continents could shed new light not only on the origins of articulated speech, but also on the issue of the origins of stuttering and developmental dyslexia. This should not be surprising. A study of the earliest history of our species could reveal answers to some of the contemporary health problems of humanity. Even the sometimes puzzling differences in literacy achievements of primary and secondary school children in different countries might be illuminated (See also the box: 'Why Are Singaporean Students Better at Reading Than Australian Students?').

PS. I was adding some final touches to the text of this book (which will be published almost the same time as the Japanese version of this book), when a new report on the educational system state in the World, the so called 'Pisa Report', came out. After studying almost half a million 15 year old students in 65 developed countries of the World, experts of The Organization for Economic Cooperation and Development came to the conclusion that China, South Korea, Hong Kong, Singapore, Taiwan and Japan all did extremely well, mostly well ahead of their European

WHY ARE SINGAPOREAN STUDENTS BETTER AT READING THAN AUSTRALIAN STUDENTS?

Most civilized countries pay attention to the problem of literacy in the primary and secondary schools. Sometimes countries do comparative research as well, and come to the conclusion that their teaching methods are deficient in comparison to the teaching methods of other countries. I remember, there was an issue, widely discussed in the Australian Mass Media, as to why Australian school students have much worse literacy achievements than Singaporean students. During the discussion of expert educators this fact was examined and looked at from very different possible angles, but during the whole discussion there was never a suggestion made that this difference in literacy achievements can have genetic basis. I can imagine the reaction of many educators to my suggestion (I want to remind readers that I am a teacher myself, and as a mater of fact, going to an international edu-

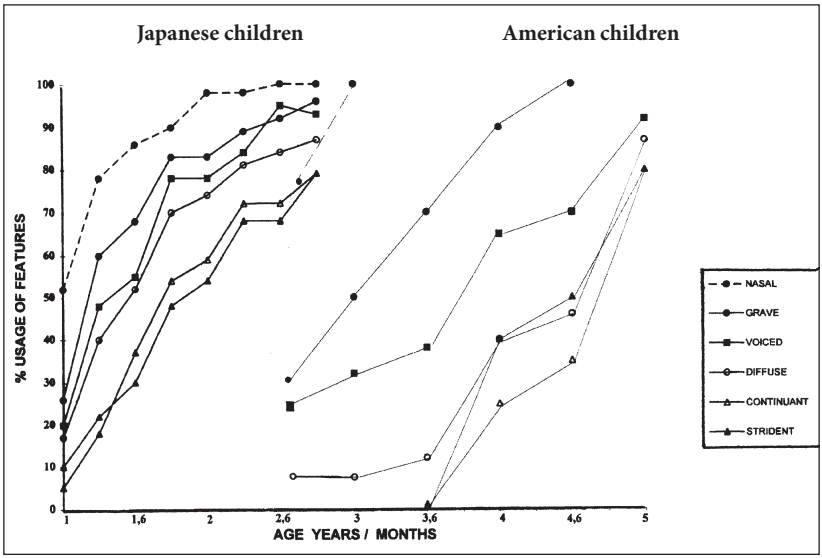
counterparts in literacy and a few other fields. In the report this was attributed solely to the superior educational system of Asian countries. Before generalizing this conclusion, I would strongly suggest the experts of The Organization for Economic Cooperation and Development to look at the achievements of Chinese, Korean and other Asian students in other, non-Asian countries, where they are taught in local, non-Asian schools (say, in the USA or Australia). They might find that despite the fact that Asian kids went to 'not so efficient' western schools, they are still performing much better in literacy (and some other fields) than local students. For example, at the exclusive Mac Robertson Girls High School, where vigorous test are conducted to accept students, as far as I know most of the students are from Asian countries. So, before making generalizations that the success of Chinese (and other Asian) students is a result of their 'educational values that favor equality as well as quality,' education experts need to make sure that the reason of the existing misbalance in Asian and European countries is solely the merits of educational system.

cational congress in a couple of weeks), however I still would like to suggest that we do not discount the possibility of the genetic factor. Excluding this possibility, we might also be excluding an important lead to the solution of this problem. Let us remember, we make our biggest mistakes not when we are hesitating, but when we are absolutely sure in something. Let us also remember, that I am not suggesting that if some population has a higher genetic inclination towards dyslexia, then we can not help this. On the contrary: I am suggesting that educators, after taking into account the possible importance of the genetic factor, should search for the optimal educational solutions to the problem of dyslexia for a given population. Some methods that are good in one population might not give the same results in another population.

Acquisition of the Phonological System

We all are excited when our children start pronouncing their first words, maybe not so confidently at the start. Correct pronunciation is something that comes later. Learning correct pronunciation, or scholarly speaking, the acquisition of a phonological system, follows universal rules among the children of totally different ethnic and racial origins. At the same time, the idea that the ancestors of different human populations shifted to articulated speech in different periods, and that the prevalence of speech pathologies vary greatly as a result of these historical differences, leads to the proposition that the acquisition of the phonological system in the ontogeny of children from different regions of the world may occur at different stages of development. In other words, I propose that children in East Asian, American Indian and Australian Aboriginal populations might acquire a phonologic system earlier than children of European or sub-Saharan African descent. Now let us have a look if there are any cross-cultural studies available on this subject.

According to the works of Paula Menyuk and Satoshi Nakajima, correct pronunciation of the phonologic system by American children starts from the age range of two and half to five years, while the same system is acquired by Japanese children from the age of one to three years (Menyuk, 1968). (Have a look at the graphic figure, 'Acquisition of Phonologic System by Japanese and American Children'. This figure is based on the materials of two graphic figures from Paola Menyuk 1968 article.)



This figure illustrates the conspicuous difference in the age of acquisition of a phonological system by Japanese and American children. Japanese children appear to have almost finished the process of acquisition of a phonologic system by the same age when American children are just beginning this process. Interestingly, this evidence has been so far neglected in scholarly literature.

Information regarding the acquisition of a phonological system by the two main languages of China (Cantonese and Mandarin) is very important to our model. Unlike the neglected sphere of stuttering among Chinese, there are a few highly interesting publications available on this subject. According to a study by Lydia So and Barbara Dodd, the acquisition of the phonologic system among Cantonese-speaking children is more rapid compared to that of English-speaking children.

According to another study, the 90 percent rate is achieved by English-speaking children from the age of three to seven years, and the same high rate is achieved by the Mandarin-speaking children from the age of one and half to four and half years. This difference is not too far away from the figures given in Paula Menyuk's and Satoshi Nakajima's publications.

Let us conclude. To get the fuller picture and to understand the nature of the existing differences in the age of acquisition of the phonological system, more research is needed. Also, when it comes to interpreting the results, if the results show significant differences, it would be sensible to not disregard any possible reasons, including the possible importance of the genetic factor.

Singing and Unconscious Thinking: Freud, Jung, Hypnosis and Split Personality

At the very end of this chapter dedicated to the questions of singing and thinking, I would like to address an important issue of possible connections between the singing and the unconscious mind through the evolutionary scenario suggested in this book.

Two great scholars who are at the very beginnings of the research of human unconscious mind, Sigmund Freud and Carl Jung, had cardinally different attitudes towards music. Very unusually for a Viennese aristocrat at the turn of the 20th century, Freud was indifferent and even suspicious of music. According to his own words, he did not want to trust something he could not understand where the source of its emotional power was coming from. Freud would sometimes go to classical music concerts for social reasons, and instead of enjoying music, he preferred writing notes during the performance.

For Jung, on the contrary, music was the source of great spiritual wisdom, the sphere that could connect human psyche with an individual's inner self, to help obtain the harmonious unity of the conscious and unconscious parts of our mind, or as he called this process, 'individuation'. Jung was particularly fascinated with strong African drumming rhythms.

Regarding the sphere of unconsciousness, Freud and Jung also had different views. For Freud unconscious was mostly a repository of repressed emotions, memories and desires. His suggestion, that our conscious emotions can be deeply affected by the hidden processes that are not under our deliberate control, is regarded as one of the great scientific discoveries. Jung proposed the idea of the 'collective unconscious-

ness', common to all humanity and transmitted genetically to every human. Jung believed that the unconscious mind was the main source of human arts and inspiration.

Following the Darwinian approach that everything must (or at least may) have an evolutionary reason, I would like to discuss the following questions in this section: (1) what was the evolutionary function of the unconscious mind? and: (2) Are there any connections between the unconscious mind and human singing?

The model of two emotional states for early humans, suggested in the third chapter of this book, gives a new evolutionary perspective to the unconscious mind. I hope the readers of this book remember that, according to my model, early humans had two mental states: the 'ordinary' state, or the state which was present in everyday non-critical situations, and much more rare 'critical' state, which was appearing only when the total dedication of the whole human group was necessary for the physical survival of the group. Although instances of the appearance of the 'critical' state were rare, it was crucial for the physical survival of our ancestors. Evolution provided powerful neurological mechanisms to promote the interests of the group over the individual interests when it mattered the most. That's why in this state our ancestors had a neurochemically-created uplifting feeling, a spiritual disregard of earthly needs including feelings of fear and pain, and had the intoxicating feeling of obtaining a super-personality. In order to achieve this state when it was needed, our ancestors developed elaborate rituals, mostly based on strong rhythms: loud drumming, group singing, group dance, use of verbal formulas or mantras, together with visual elements of personality change: body and face painting, use of clothing and most likely the use of masks. The central goal of human (and even hominid) rituals was to affect the mental state of the participating individuals, to turn their mental state from individual, or 'everyday' state into the collective, or 'critical' state of mind. This was an amazing transformation of mental state, nothing short of the changing of identity of a whole group of people, turning them from separate individuals into the members of a common single super-personality.

Most importantly for us, as physical survival was the biological priority, the orders of the collective or 'critical' state of mind were overrid-

ing any opposition from the 'ordinary' state of mind. The phenomenon known as 'common sense' is obviously a product of logical thinking of an individual in 'ordinary' state, but the 'critical' state of mind produces set of behaviours that often contradict the logic of common sense. In this state a person can do both deeply moral or extremely immoral things, from sacrificing his own life in order to save somebody else's life on one hand, to doing horrible atrocities during battle on the other hand. Such atrocities, committed in a state of a battle trance (and usually together with the members of the combat unit), are difficult to comprehend from the point of view of common sense, often even for those who actually committed them.

Most importantly, I am maintaining that these two 'ordinary' and 'critical' states of mind are present in the brain of every normal and healthy individual. These two states can be quite independent from each other, similar to two different personalities residing in one brain. In a way, ***we all have a 'split personality' in our healthy brain, but our second personality takes charge only in the most critical moments of our life***.

With the progress of civilization the number of dangerous situations that could push us into the 'critical' state of mind are gradually diminishing, but this still may happen. If the shock is too strong, then the 'critical' state takes over on a profound level, and we might experience amnesia, or a loss of memory of the events in a critical situation, although it is obvious that our brain and body were actively functioning in this moment. Jacqueline Kennedy went instantly into this 'critical' coma state of mind when her husband, USA President John F. Kennedy, who was sitting next to her in a car, was fatally shot in head in Dallas. As a result, she could not remember the fact that she was dangerously climbing out from the moving car following the fatal shot. If a reader of these lines ever had a great and sudden shock and does not remember his or her reaction for the next few seconds or even minutes, a reader must have had the experience of going into the critical state of mind, or in the 'second personality.' After such an experience the 'first personality' does not have the knowledge what has happened, because it was actually the 'second personality' who responded to the situation, and only the second personality has the knowledge of the actual events from the critical situation. That's why hypnosis is arguably the best way

to find out what has happened in the critical moments, moments that our conscious brain has no recollections.

So let us remember, in the critical moments of life our 'critical' state of mind takes over and overrides all other orders coming from our logical mind. In such moments we go into the extremely focused state of mind, where we instinctively follow either the group behaviour (if we are in a group), or follow the orders coming from the external source (for example, a group leader, or a hypnotist), or some other, instinctive and mostly unknown impulses from inside of our own brain.

The phenomenon of hypnosis is crucially important for understanding of the nature of trance and the unconscious mind and its connections to rhythmic music. Under the hypnosis a person is put into a 'critical' state of mind by a hypnotist. In this state a person loses the ability to think critically and instead blindly follows the orders of a hypnotist. Importantly for our subject, listening to rhythmic music (or just the sounds of drumming) is one of the most effective techniques to induce hypnotic trance to a person. There are various levels of hypnotic trance, and in the deep level, known as hypnotic coma, people are unable to question any orders given to them. Possibly even they are unable to ask questions at all in this state (this would be actually something very interesting to check!). Contrary to a popular belief that hypnosis is a state close to sleep, Clark L. Hull proved in the 1930s that hypnosis and sleep had nothing in common. Hypnosis is actually a wakeful state of extremely focused attention and heightened suggestibility. In other words, a hypnotized person is ready to act, but has no decision making ability, and instead is ready to follow orders. Any orders.

Historical examples when manipulative politicians could turn civilized people into the hordes of killing machines are sadly well known from human history.

The phenomenon of the post-hypnotic suggestion also proves that the conscious brain cannot resist orders coming from the 'higher authority' – the unconscious brain. A person who receives an order while still under the hypnosis (so the order is received by the second identity), will carry out the order after receiving the triggering signal, already in full consciousness, after the session, even if following the order causes a fully conscious person great embarrassment or even some personal danger.

Although today hypnotic trance is mostly (although not always) induced to individuals, group hypnosis must have been the original environment for the emergency of this state. I propose that the origins of hypnotic trance must be found in the primordial state of the battle trance, when for the sake of survival a group of individuals were acting as a single organism, with united single conscience and single aim. So I suggest that the individual unconscious was designed by the forces of evolution as a part of a united 'collective conscience', to promote the survival of a species. And here let us remember one more time, that loud rhythmic music and loud drumming were the central elements of inducing trance in our ancestors several millions of the yeas ago in African savannah, and the same method can be used today as well, not only in the shamanic rituals in the native peoples of North Asia or America, but in the comfortable lounge of the hypnotist as well.

Unconscious Mind and Split Personality, or Why Did You Kill John Lennon?

One of the most fascinating characteristics of the human brain is that these two states of mind, ordinary and critical, may act as two independent personalities, two identities locked in the head of a single individual. These two different personalities, different identities may not even be aware of each other. The process of 'individuation' suggested by Carl Jung, is a process when these two states of one mind, or two identities, with their sets of memories and activity agenda, are becoming aware of each other. Cases of amnesia, when a person is not aware of the deeds he conducted in the 'critical' state, suggest that the 'critical' identity might have some 'secrets' from the other, conscious identity (and vice versa).

As a result, if you put a person into a hypnotic trance and ask him/her about his/her behaviour regarding some facts from his/her personal past, there is a big chance that you will not get a correct answer despite the full submission of the conscience of a person in a trance. There are a few reasons for this: (1) first of all you are most likely talking to the 'wrong personality', virtually a different identity who does not have

knowledge to answer your questions; and also, (2) a person under the deep hypnotic trance is most likely unable to answer negatively to the questions of the hypnotist, so patient's brain in a deep hypnotic trance might create a fake explanation, an obvious lie, in order to follow the order and to answer a question positively. This lie will be interpreted as the ability of a person in a deep hypnotic trance to trick the hypnotist, but I suggest that this lie has a different nature. It is actually the result of the combination of two factors: (1) desire to blindly follow the order on one hand, and (2) the absence of the real knowledge of the events on the other hand. For example, I predict that if you ask an ordinary person in a state of deep hypnotic coma 'Why did you kill John Lennon?' you might get some fake explanations of the reasons of killing, instead of the statement of the truth 'I did not kill John Lennon'. So a hypnotist should be aware, that a personality sitting in front of the hypnotist might be literally a different personality, a personality who does not have the knowledge to answer so many trivial questions which the same person in the ordinary state of mind would answer without any difficulties.

We can remember here, that from the 18th century onwards hypnotists were reporting that a second personality was emerging in the hypnotic state, and were puzzled how two minds, two personalities could coexist in a single brain.

The phenomenon of two identities in a healthy human brain can explain why most of horrible memories (like sexual abuse, violence, etc) are stored in the unconscious part of the brain. I propose that these memories are not only 'stored' there, they actually 'happened there', with the second, 'critical,' 'collective' identity. In situations of strong stress or abuse, as a defense mechanism the human brain naturally switches to the 'second personality', so the bad memories remain stored in the place where they were perceived, in the second, 'critical' identity.

I suggest that, as part of the heritage from our evolutionary prehistory, we all have two identities in our brain, and there is nothing abnormal about this. The relationship between these two different identities usually does not cause us any discomfort, on the contrary, it can be a source of great artistic creativity and spirituality. But as anything else, the neurological and chemical balance between these two identities can go wrong for some genetic or environmental factors, and in this case we

may have disturbing and intrusive identity problems. I propose, that so called 'split personality', or Dissociative Identity Disorder, has its origins in the double mental state of a perfectly healthy human brain, although it is a disorder that affects the normal functioning of a human brain. Hearing inner voices, ordering a person to do something, or other associated symptoms might be ominous signs of a communication breakdown between these two personalities (although hearing voices might be happening to perfectly healthy humans as well). Involvement of such a person in different forms of arts might help to restore the right balance between the two identities in his/her brain (see also the box: 'Avoiding Stress or Searching for Stress?').

These two states of mind also refer to two sides of our human nature: individual and social. Like two masks of the ancient tragedy, happy and sad masks, we all have two personalities in a single brain, personalities that might not even know each other very well. Finding the balance between them is crucially important for a healthy and happy mental life. As Jung proposed, music and other arts help us keep the healthy balance between these two sides of our personality. Arts can connect us with our second, hidden, or 'critical' identity. I suggest that this mysterious power of different arts, including music, dance, painting, the use of masks, clothing, leading to the artistic transformation and the virtual change of our identity, originate from the ancient ritualistic exhilarating rhythmic dance and song, designed by the forces of evolution during the millions of the years in order to physically survive.

I believe that in his suspicion and desire to resist the power of music, Freud was inadvertently rejecting the best possible way to reach his own unconscious mind, the mind that he himself discovered, but with his own over-suspicious scholarly approach, turned it into a place of dangerous and uncontrollable negative desires and feelings only.

We do not need to stick together today in order to physically survive, apart possibly from army units, where the ancient survival function of the collective identity is still actively used in its primary practical function. As a result of the increasing safety standards during the last few thousand years, humans became increasingly individualistic and the fabled 'common sense' became the centerpiece of the human thinking process. However, our evolutionary past through millions of years of deep psychological experiences does not allow us to forget our

AVOIDING STRESS OR SEARCHING FOR STRESS?

Another fascinating side of the ancient 'critical' state is that for the normal functioning of our brain in the long run, we need to activate our 'critical' state from time to time, in order to feel our 'second identity' and to have a healthy relationship between the two sides of our selves. The millions of years of everyday battle and going into the 'critical' state of mind, where our ancestors were ready to fight for the higher aim, left us with a legacy where we crave the exhilarating feel of dedication to a higher aim, higher than one's own life. To experience this feeling, we use very different techniques: immersing ourselves into the arts (both creating and experiencing arts), doing meditation séances, praying and going into religious trance, listening to loud rhythmic

profoundly social nature, our interdependence on each other, and as a result we are today searching for venues to feel our collective identity in the individualized world. We are all still humans, and we all still crave to experience the same spiritual feeling of being a part of something larger than ourselves. If our personal life is the only thing we are left with, even with all the comfort of contemporary life, but without experiencing ourselves as a part of a something bigger, then we may experience feeling of losing the meaning of life, and this feeling can be the most devastating emotional stress for our profoundly social nature. Religion and arts are central among the ways to experience the higher meaning of life.

And as usual, music is the gracious host to lead us into this mysterious, and possibly the most ancient, emotional state of our mind, our second identity where we feel ourselves primarily as social beings, intertwined with other fellow humans in a state of collective identity. From the origins of human intelligence and the ability of asking questions, from the beginnings of human language and speech, through the good and bad times for millions of years, up to the depths of the human unconscious mind, music has always been our greatest practical aid and source of spiritual transformation.

music, dancing, abusing our health with chemical substances, and endangering our life with different activities (climbing mountains, swimming with sharks, doing bungee jumping, petting tigers and lions, running on the tracks in front of the racing cars, and even paying handsome sums of money to arrange our own kidnapping as a newly established service in Paris offers). From the point of view of the common sense some of these activities simply do not make sense. Extremely different in their actual forms and results (from reckless and life-endangering behaviour to altruistic religious and community based behaviour), these activities are directly or indirectly connected to the activation of our deep brain structures, and involving our 'second identity', the 'critical', or collective state of our mind.

Conclusions and Prospects

Although the initial intention of my research, started more than 25 years ago, was to search for the origins of choral polyphony, as the research progressed, I found that much more aspects of human life were involved in the evolutionary history of human choral singing. As a result, the book that you are holding in your hands actually represents a completely new model of human evolution. In the traditional model of human evolution, the phenomenon of singing is mostly considered as an unexplained human passion without much practical importance. Darwin famously said 'As neither the enjoyment nor the capacity of producing musical notes are faculties of the least use to men in reference to his daily habits of life, they must be ranked amongst the most mysterious with which he is endowed' (Darwin 2004:636). Pinker declared that human music was a 'much noise about nothing' and infamously suggested that 'music could vanish from our species and the rest of our lifestyle would be virtually unchanged' (Pinker, 1997:528). More than 2000 years before Pinker, the Greek Philodemus, follower of Epicure, expressed the same idea with almost the same words: 'music can not express anything, it can only tickle and please our senses, very much like the art of culinary.'

In the new model presented in this book, the role of human singing in human evolution is seen in a very different light. According to the new model, group singing was a crucial factor of hominid physical survival, the central means of defence from predators for our ances-

tors, and the central means for obtaining food through 'confrontational scavenging'. It was group singing, together with loud, rhythmic drumming and vigorous body movements that would put our ancestors into a battle trance, create an unseen but powerful mental network between individual humans, and turn all of them into a single, collective superpersonality through which each member of the unity was religiously dedicated to common interest. Music was creating a mental web for the groups of hominids, or as Benzon brilliantly expressed in his 2001 book, 'music is a medium through which individual brains are coupled together in shared activity.' It was the state of battle trance that allowed our distant ancestors to dominate African savannah and made them feared arch-enemies for the kings of the savannah – the mighty lion.

Altruistic drive, self-sacrificial dedication, human morality and religion are all the descendants of the ancient battle trance and of the important human principle 'strength is in unity'. According to this model the birth of human altruistic behaviour was not a well calculated 'you help me and I'll help you' mechanism, but it was a necessary psychic state, created by the power of natural selection, for the physical survival of our ancestors.

To sum up the general idea of this book, we need to discuss one outstanding and very important issue that I gave only a passing mention in the third chapter.

Defence from Predators: Crypsis vs. Aposematism

I still remember very well the words of Georgian traditional singer Datiko Imedaishvili, who once explained to me why Georgians often sing when they have to go alone through a forest at night. 'If you have to go through the dangerous places, there are two options how to do this. You can chose to be as silent as possible, in order to stay out of bears and wolves; but you can also go through the dangerous places loudly singing, as if saying "I am not afraid! Keep away!" It feels better if you go with singing. That's why many people, when they have to through dangerous places, sing loud'.

I heard these words in July 1975 on my very first fieldtrip, symbolically at the very first recording session I ever attended, as a third year undergraduate student accompanying my late father. These words came back to me in 2008, when I started reading books about two contrasting strategies of defence in animals from predators, known as 'crypsis' and 'aposematism'. Let me briefly explain these strategies, as they are crucially important for our topic and many readers might not be aware of them.

Animals which use 'crypsis' as a survival strategy try to conceal themselves in order to avoid predators. Their bodies are colored with the camouflaging colors, and they try to be as silent as possible most of the time. So the motto of the crypsis is 'keep low and quiet in order to avoid predators,' very much like walking in the forest at night and keeping as silent as possible.

'Aposematism' is the complete opposite strategy. Aposematic species do not try to stay unnoticed. On the contrary, they try to be clearly seen and heard by everyone. Their bodies are decorated in the brightest possible colors to be clearly seen, and they make sounds to let everyone know that predators must keep away from them. The principle of aposematic animals is 'here I am, I am not afraid, and I am warning everyone to stay away,' very much like a person singing loudly while walking at night in the forest.

The principle of crypsis is distributed widely among animal species, and is much better known amongst educated readers and scholars. The general population usually considers that all animal species are naturally cryptic, which means that in order to survive they hide from the predators.

Aposematism is more rare among animal species, and is much less known to educated readers and even scholars. Aposematic species usually have some behavioural or morphological features that makes them unprofitable for the predators. For example, some aposematic species are venomous, others are not good for digestion, or have some other nasty qualities that force predators to avoid them. The American skunk is a classic example of an aposematic species. It walks around with a clear aposematic signal – the raised and clearly visible tail, warning everyone that they should stay far from it. If a predator still attacks a skunk, it can defend itself by spraying horribly smelling liquid to the at-

tacker. Many venomous snakes and spiders are very beautifully colored, chiefly because they want to make sure that every potential predator can see them and remember that they better keep away from them. If crypsis is convenient only for prey, aposematic signals are actually beneficial both for prey and predator. Of course, if a young predator sees a venomous and colorful snake for the first time, it may attack the snake, and this attack can become fatal both for the snake and the predator. Fortunately for both aposematic species and predators, many animal species have a genetically wired suspicion towards brightly colored animals and food. So, if a young predator sees a pray-looking but colorful animal, there is a big chance that it becomes suspicious and does not touch the colorful food.

The discovery of the principles of aposematism was made in the 1860s, during the communication between two great scholars, co-discoverers of the principle of evolution, Charles Darwin and Alfred Wallace. Darwin was routinely explaining conspicuous coloring in many species as a result of the work of the forces of sexual selection. Then Darwin stumbled upon a case when sexual selection could not explain the bright coloring of a caterpillar larvae, as the larvae was not sexually active. He wrote a letter to Wallace about this problem in 1866. Wallace famously suggested that the conspicuous colors might have evolved not through the sexual selection, but through natural selection, and that they were 'warning flags' for predators. Darwin was very happy with Wallace's explanation. In 1869, even before the appearance of Darwin's book on human evolution, the first experimental evidence for the effectiveness of warning coloration in animals was received.

Readers must also note that the actual term 'aposematism' was coined over 30 years later by Edward Poulton. Aposematism is particularly widespread among insects. Many insects warn predators with their colors and sounds that they must keep away from them, as they have either poison (like many spiders, or wasps) or have a very bad taste. Aposematism is also relatively widespread among reptiles. Brilliant colors of some snakes and lizards are mostly designed to warn the predators that they will get a venomous bite if they start an attack. Aposematism became such a successful strategy in evolution, that many harmless and unprotected species started mimicking the apose-

matic species in order to avoid predator attacks. This phenomenon is known as Batesian mimicry.

Among mammals aposematism is very rare. A skunk with an easily noticeable tail is the most famous example of an aposematic defence strategy among mammals. African Striped Polecat (also known as Zorilla) is another example.

Apart from the conspicuous colors and shapes, aposematic species also use other types of signals: for example, they make sounds (like a rattlesnake, or some beetles, and even ants), or emit smell. Do not confuse this smell with the smell of a skunk. Skunk smell is not emitted for predators to identify them, it is rather emitted for actual physical defence from predators, therefore skunk smell is a defence itself and not a warning signal. That's why skunk only uses his famous glands if a predator fails to identify it and goes into an attack. Aposematic smell is designed to stop a predator from attacking. For a skunk, the clearly visible tail and slow movements serve as aposematic warning signals. Scholars agree that aposematic display is more effective when the signal comes simultaneously through several channels (visual, audio, olfactory).

Why do we need such a detailed discussion on the principles of aposematism? What does it have to do with human ancestors or with human singing?

I am proposing that **aposematism was the central defence strategy for our distant ancestors.** I am proposing that the elements of Audio-Visual Intimidating Display, which we already discussed in the third chapter, constituted a classic set of tools for a multi-channel aposematic display: audio elements (loud rhythmically united singing in harmony and drumming), visual elements (tall bipedal body on long legs, head hair, painted body, use of animal pelts on shoulders), and the olfactory element (body odour).

Ironically, if we add the olfactory element to the initial set of audio and visual signals, instead of AVID (Audio-Visual Intimidating Display) we will have AVOID (Audio-Visual-Olfactory Intimidating Display).

With their fierce look, big painted bodies, bipedal threatening posture, threatening movements, loud and rhythmically united sounds, and ability to go into the battle trance and fight fearlessly with heavy and sharp stones, our hominid ancestors were truly a species to avoid.

I am not aware of any scholar at any time suggesting that humans are aposematic species. Despite the fact that the idea is radically new, I hope that scholars will be able to see the huge potential of the new 'aposematic model' of human evolution in explaining human morphological and behavioural characteristics.

Aposematic Model vs. Sexual Selection Model of Human Evolution

The principle of sexual selection as a model for the evolution of most of the human morphological and behavioural features was suggested by an authority no less than Charles Darwin. So we can say that the principles of sexual selection received heightened attention from the very beginning of the scholarly study of human evolution, also because it was proposed by arguably the biggest scientific authority the world has ever seen.

The aposematic model of human evolution, proposed in this book, is a completely new suggestion and, to check its viability as the central principle of human evolution, there is no better way than to compare it to the model of sexual selection.

Unlike his first groundbreaking book, 'Origin of Species' (1859), Darwin's second groundbreaking book, 'The Descent of Man' (1871) was perceived more controversially even among the staunch supporters of the idea of evolution. Even Alfred Wallace, co-discoverer of the principles of evolution, was trying to convince Darwin that his attention towards the importance of sexual selection was exaggerated.

Of course, if you look at the Darwin's 1871 book from the perspectives of our contemporary 21st century, you have to admit that at least in some instances Darwin was exaggerating the importance of principles of sexual selection, particularly the famed principle of 'female choice'. According to Darwin's model, for example, human skin colors, tiger stripes, the rattling sounds of a rattlesnake, and brilliant colors of many insects were formed exclusively under the power of sexual selection (mostly through the female choice). Darwin was rejecting virtually all other explanations (which sometimes were already in place) that en-

vironmental factors could play a role in developing these features. Today most scholars would find the claim of such importance on sexual selection in these instances difficult to agree with.

So, while writing his 1871 book, Darwin was routinely explaining all the visually explicit morphological features of different animals (from insects to humans) as the result of sexual selection, mostly as a result of female choice. If the morphological features were different among the male and female representatives of the species, it was particularly easy for him to attribute them to sexual selection, although in some cases even the similar morphological features in both sexes did not stop Darwin from explaining these features on the basis of sexual selection.

Of course, as a brilliant observer and analytical genius, Darwin wrote about cases when animals were intimidating enemies with their voices (Darwin, 2004:589-90). In another place he noted that one of the possible reasons of the tradition of body painting in humans before going to the battle was to scare enemies with their fierce look (Darwin, 2004:643), but such examples were in a huge minority in comparison with the avalanche of examples of the power of sexual selection.

As there was no clear criterion why females should like or dislike certain colors, morphological features or behaviours of their male counterparts, theoretically it was possible to explain virtually any morphological feature and any behaviour by the power of 'female choice'. By its very nature Darwin's model of 'sexual selection' was almost as potent means for the explanations of morphological and behavioural changes as the earlier creationist model that it replaced.

And suddenly Darwin hit a brick wall, when he tried to explain the brilliant colors of the caterpillar larvae. Brilliant colors usually were easily attributed to sexual selection, but in this case Darwin had a larvae which was not sexually active, so brilliant colors could not be explained by the principles of sexual selection. Finding himself in such a dilemma, Darwin wrote to Wallace and asked him if he had any explanation. As we have already mentioned this earlier, Wallace suggested that the brilliant colors of a caterpillar was a warning signal to predators, advertising that the larvae was not good food for the predators. Darwin was famously very happy with Wallace's explanation, but despite this, unfortunately, Wallace's suggestion did not affect Darwin's overenthusiastic attitude towards the power of sexual selection.

CHARLES DARWIN:
MY PERSONAL HERO

As for many scholars who are fascinated by the evolutionary past of the life on our planet, Darwin has been my role model and hero for all my life. On my first visit to Cambridge University in 1994, I walked there with the sacred feeling that Darwin was walking the same places before. You can imagine how excited I was when I found out, still in my teenage years, that I had the same birthday as Charles Darwin! And one more, possibly a bit unusual token of my deepest reverence towards the great scholar and his personal influence on me: reading Darwin's works made me... a more religious person. This might sound strange, but for such a non-religious person with a strictly scientific mind as myself (and plus raised in an atheistic Soviet Union), reading in Darwin's works that he was not considering himself an atheist was truly a revelation. If this sounds unthinkable for some of the readers of this book, I can remind them a few of Darwin's own words from his writings: "I have… never been an Atheist in the sense of denying the existence of a God.' 'I may say that the impossibility of conceiving that this grand and wondrous

It is not surprising that in the scholarly publications dealing with the defence mechanisms in animals, Wallace's name is cited much more often than Darwin's name. For example, in a recent monograph on this subject, 'Avoiding Attack' (Ruxton at al., 2004) Wallace is mentioned about dozen times as one of the founders of this important sphere, while Darwin is cited only couple of times, mostly because of his enthusiastic responses to the ideas of Alfred Wallace and Henry Bates.

For any scholar who works on any aspect of evolution, to criticize Charles Darwin is something that can not be done easily. Of course, the self-critical attitude of the great scholar and ability to listen to different arguments made it possible to argue with him openly on any aspect of evolution, but it is still not easy for many reasons (see the box: 'Charles Darwin: My Personal Hero').

Potentially, both sexual selection and aposematism can work hand in hand. Bright colors, sounds, smells or behaviours can be potentially explained by sexual selection (as trying to impress the other sex with your beauty, energy and healthy genes), or by aposematism (trying to warn enemies and competitors with bigger size, bright colors, sounds, and unusual behaviours).

We must remember, that sexual selection has two very different strategies: (1) female choice, and (2) male to male competition (usually known as a 'male to male combat'). Apart from this well-known division I suggest that we must also differentiate between two related but very

universe, with our conscious selves, arose through chance, seems to me the chief argument for the existence of God…' In 1876 he even declared 'I deserve to be called a Theist.' According to Darwin's words, a person 'can be an ardent Theist and an evolutionist.' I hope we can all agree, that religious beliefs are as private as happiness – you can not decide for other person if this person is happy or unhappy, or religious or non-religious. So although for many of my much more religious friends I might still be a non-believer who does not go to church every week (again very much like Darwin), I do not consider myself a non-believer. Well, I am not sure how many people are out there whom reading Darwin's works made a more religious person, but that's exactly what happened to me. And at the very end, possibly as a justification for my critical remarks towards Darwin's model of human origins, I can say that my model, which is strictly based on the principles of natural selection through the struggle for survival, seems to me 'more Darwinian' than Charles Darwin's own model of human origins, based on sexual selection.

different strategies of male to male competition: (1) intimidation, and (2) combat. Nature prefers intimidation in order to avoid direct violence and unnecessary injuries, so I suggest that ***intimidation plays a leading role in male to male (or 'intra-sexual') competition***. I believe that different 'unnecessary' ornaments, that adorn the bodies of the males of many species, are chiefly designed to intimidate a rival male, not to impress the opposite sex.

It is easy to notice, that the same morphological features that can be used for male to male competition in animals in order to intimidate a rival (increasing body size, showing colors and unusual behaviours), can be used as the defence from the aggressors again through the intimidation/warning. I suggest that ***intimidation as a defence strategy*** has a tremendous and mostly unacknowledged importance in the life of animal species. Males across many species from insects to lions are trying to compete with each other primarily using only the ritualized forms of display.

Contrary to the popular belief that in the animal kingdom the only way of life is an all-out fight, animals actually try to avoid unnecessary fights whenever it is possible, because any serious physical confrontation is dangerous for both sides. To avoid direct physical fight, natural selection came up with ingenious strategies. Avoidance of direct violence is mostly achieved through the ritualized display of morphologically exaggerated features, sounds, smells, behaviours. Even the first seconds of the fight are still a part of the ritualized display, and the

fight as a rule does not go into a serious fight, aimed to kill the rival. Instead, a smaller and weaker animal usually retreats quickly after the first physical touch. Watching the filmed confrontation between male lions, for example, it might seem that they are fighting to destroy each other, but in fact lions are extremely rarely fighting seriously, and the fight itself is very seldom longer than few seconds. During the confrontation both sides are trying to intimidate each other first by displaying their own size and the size of their teeth, and then they have few seconds of 'showing off fight'. The fight itself is heavily aided by intimidating roaring sounds. As a rule, after few seconds of fighting one of sides retreats and both lions are content that the fight is over. Have you seen a filmed fight between male lions where one of the lions was heavily injured or even killed? Such things may happen, but they are so rare that the chance to film such an event is extremely slim.

In his evolutionary model, based chiefly on sexual selection, Darwin virtually neglected the importance of intimidation. He was sometimes puzzled why some species of birds that were powerful fighters, and could kill the opponent, had the exaggerated and useless morphological features (Darwin, 2004:454). These morphological features were in fact detrimental for their fighting ability. I propose that even those birds that can kill the rival, may receive serious injuries during the all-out fight. Therefore, it is in the interests of both sides to avoid any intense physical combat. Ritualized display of body size, colors and behaviours has the important function of settling the argument without fight. In this context I prefer to use the notion 'male to male competition' instead of the usually used notion 'male to male combat.' Real all-out combat is not the preferred evolutionary strategy of survival.

As a non-native English speaker, I am not good at word-play, but the term AVOID asks for such interpretation, as I am proposing, that the phenomenon of **AVOID** (Audio-Visual-Olfactory Intimidating Display) was primarily designed by the forces of Natural Selection to literary **avoid** unnecessary physical combat.

We should remember that non-aposematic species can also use aposematic warning signals for their defence. For example, when a hunter is entering a grassy patch where a wounded lion is prepared to defend its life, if a lion growls menacingly, this is an aposematic warning signal to the hunter, signal declaring that a lion wants to be left

alone, but it will attack if hunter goes closer. If a lion definitely wants to attack someone, or if it is actually hunting a prey, it will be waiting without making any sounds. Let us remember: a growling predator wants to be left alone. A silent predator is more dangerous.

So, non-aposematic species also can use aposematic warning signals, but this does not make all these species aposematic. We can only call a species aposematic, if aposematic display is used as a core principle of its defence system. Skunk, striped polecat, colorful spiders and snakes use aposematic display as a central means of their defence. So did our hominid ancestors. They were using the whole set of aposematic displays to warn all potential aggressors that they were very unprofitable prey. They were dong so with their clearly visible upright posture, the big bush of hair on top of their heads, longer legs, slow walking, strong smell, loud singing and drumming, use of body painting and animal skins. For the millions of years of their life in the African savannah, our ancestors taught tough and costly lessons to predators; that in case of an attack they had to deal with the whole group, a group of religiously dedicated warriors who would fight any predator in order to get back the body of their killed fellow member. This long and bloody history of fanatic dedication to each other and to the group interests for the millions of the years must have taught predators to leave our ancestors alone. This must be the reason why most wild animals (including lions and tigers) do not usually hunt humans. Of course, the contemporary hunter with a gun greatly contributed to the fear of humans among all animals, no question about that, but even in those regions and cultures where humans did not have guns, attacks on humans were still relatively rare.

Therefore, I suggest that Aposematism could better explain many cases of the colorful plumage and colorations of the insects, or the habit of singing, than such an unstable factor as 'female choice'. We can also remember here Wallace's famous remark that sexual selection is very unlikely to be working in the case of such low class creatures as insects, where the presence of aesthetic feelings or the conscious 'female choice' was very unlikely to be present.

Proponents of sexual selection thrive on cases when the morphological features or the behavioural traits can not be explained through the principles of natural selection. The viability of sexual selection is

particularly evident, when morphological or behavioural characteristics are seemingly detrimental to the survival of the bearer. A peacock's colorful tail (known as the 'train') is the most famous case of such a morphological feature, and we are going to discuss it next.

Peacock's Tail: Tale of Beauty and Intimidation

A peacock with its long colorful tail is one of the most prodigious visual attributes of our planet. It was famously featured on a cover of Amotz Zahavi's 1997 book, dedicated to the 'handicap principle'. According to this principle, the honest signal can only be a morphological or behavioural element which comes with a cost to the bearer. So in the case of sexual selection, for example, the power of charming the opposite sex is so great that it outweighs the problems of survival that are caused by this morphological or behavioural feature. The peacock's tail (known as 'train') is definitely the best known example of this principle.

So let us now discuss this topic in a bit more detail.

As we could see from the discussion above, any unusual exaggerated morphological feature (like brilliant colors, or unusual morphological forms, or sounds) can potentially be a sign not only to prospective mates to attract them, but a warning sign to predators and rivals as well. So if in one case it is a display of beauty and healthy genes, in other case it is a warning and intimidation through the size, colors and behaviour.

In this light, the peacock tail is not very different. It is huge, it is spectacular, and it can have both functions: it can definitely attract the viewers with even a faint aesthetical sense, and it can also scare away all the potential opponents with its extraordinary size and colors. The central question is: which function of the peacock tail is primary – attraction of females, or the intimidation and warning of rivals and predators?

I hope readers would agree that the easiest way to find out the answer to this question would be to study the lives of free-ranging peacocks for a long time in order to check out how the size and colors of

peacock tail correlate with their popularity among females, and their reproductive success. If the attraction of females is truly a leading reason for the brilliance of the peacock's train, you would expect that males with a better tail would be more successful in leaving descendants. It is amazing that such study had not been conducted long time ago. Most likely scholars were so sure about the sexual nature of peacock's dazzling display that they did not consider necessary to test this tacitly agreed idea (or even a belief) with a sufficient long-term field study.

Only in the beginning of the 1990s, Marion Petrie, Tim Halliday and Carolyn Sanders published the results of their study on peacock mating behaviour. According to their results, as it was expected, females were choosing males with bigger trains with the biggest number of 'eyespots'. Unfortunately, the study was not large enough (researchers studied only one lek with 10 males for very limited time). In the second half of the 1990s, finally, a seven year long study was conducted in Japan. During several mating seasons, from 1995 to 2001, the researchers in the Graduate School of Arts and Sciences at the University of Tokyo, under the leadership of Mariko Takahashi, studied a free-ranging population of Indian peafowl at Izu Cactus Park, Shizuoka, Japan. They expected to find confirmation of the power of sexual selection. Amazingly for the scholars, as well as for the supporters of the 'female choice' principle, they came to the conclusion that the female peahens were indifferent to the peacock tail size and brilliant colors, and that tail condition was not correlated with the reproductive success of their bearers either. Even the title of the publication in Discovery News expresses the amazement from the central conclusion of the study: 'Female Peacocks Not Impressed by Male Feather.' According to the article, 'The feather train on male peacocks is among the most striking and beautiful physical attributes in nature, but it fails to excite, much less interest, females, according to new research. The determination throws a wrench in the long-held belief that male peacock feather evolved in response to female mate choice. It could also indicate that certain other elaborate features in galliformes, a group that includes turkeys, chickens, grouse, quails and pheasants, as well as peacocks, are not necessarily linked to fitness and mating success.'

So what could be the reason of development of peacock's spectacular tail if females are indifferent to its beauty? Louise Barrett from the

UK suggested, for example, that huge brilliantly colored train can be an obsolete signal, and its growth can be connected to other factors (like the absence of estrogen in the male), not to the attraction of females.

What about the idea of intimidation of competitors and enemies with the display of huge and colorful tail? If we take into account that to look bigger is one of natural selection's favorite strategies to scare away predators and competitors and avoid unnecessary physical confrontation, the idea that peacock's train was primarily designed by natural selection to scare away other male peacocks (and possibly predators), will seem very plausible. So I am suggesting that **the size and beauty of a peacock's train was created by the forces of natural selection to intimidate the opponents, not by the forces of sexual selection to excite and attract females**.

I am sure that my suggestion will cause a negative response from the scholarly community, as the peacock tail is a symbol of the famed 'female choice', but I hope that my opponents will be able to weigh all the pro's and against of my suggestion with a unbiased clear mind. I believe that our emotional commitment to see a peacock's tail only as a display of extraordinary beauty comes mostly from our irresistible drive to humanize animals and their feelings.

There are at least two more factors that also point to the possibility that the natural selection through intimidation, not the sexual selection through the female choice, was the force behind the brilliance of peacock's tail:

(1) There are many 'eyespots' on the peacock tail, and we know that eyespots are one of the favorite strategies to scare away predators and competitors in many animal species;

(2) Apart from a huge tail, peacocks also have a huge voice, and we know that loud voice is also a great evolutionary tool to scare away predators and competitors. By the way, according to the Japanese study, even for peahens male vocalizations seems to be more effective in grabbing their attention than their colorful train.

Writing about the male desire to show off beauty, Darwin wrote: 'the males will sometimes display, when not in the presence of females, as occasionally occurs with grouse at their balz-places, and as may be noticed with the peacock; this latter bird, however, evidently wishes for a spectator of some kind, and, as I have often seen, will show off his

finery before poultry, or even pigs' (Darwin, 2004:444). Unfortunately, we can not ask a male peacock what is the true aim of his display in such unusual situations, but it seems to me much more plausible that if a pig approaches a peacock, a peacock might be more concerned about defending its territory and personal safety from the pig rather than trying to show off its beauty before such an ungrateful spectator.

There is one more proof that Darwin did not even consider the possibility that exaggerated morphology and different behavioural displays of males could serve a function of safety through the intimidation of rivals and predators. Arguing for the importance of sexual selection, Darwin famously wrote: 'To suppose that the females do not appreciate the beauty of the males, is to admit that their splendid decorations, all their pomp and display, are useless; and this is incredible' (Darwin, 2004:557). Well, I totally agree with the great scholar that all the 'splendid decorations', and 'all their pomp and display' were definitely created by the forces of evolution to impress, but I am questioning Darwin's suggestion that the ***only*** possible recipient of this display was the opposite sex. Instead, I propose that the primary aim of the myriads of methods of display (visual, audio, behavioural) in animal world is to intimidate competitors, and ***through the intimidation to avoid unnecessary physical fight***. As I have discussed above, many animal species replace fights with much more acceptable and safe ritualized displays of their size and colors. I suggest peacocks are among such species.

After all, if there is good evidence that a female peacock (peahen) is actively using her much smaller tail to intimidate potential predators, then there is no reason to deny that the male peacock could do the same with his magnificent and much bigger train.

For us humans living in the 21st century, it is very easy to ignore the fears for physical existence that is the natural part of life of most other animal species. We often humanize animals, inadvertently impose our ideas and mental qualities on them, and in doing so we often fail to notice some of the basic concerns of their life. For example, unlike most animals in the nature, we certainly do not expect to be killed and eaten on any day of our life. Therefore, if we want to understand the motives behind the development of their behaviours and morphological features, we should be able to see their need for physical survival, and respect their practical perspective on many things. If we can free our

thinking from the aesthetic-oriented human perspective, we will have a better chance to understand the most pragmatic, survival-driven animal behaviour and morphology.

This brings up a philosophical question: what is the real aim of beauty? Of course, to impress, but let us remember that the question of who we want to impress depends on the conditions and demands of our life. These demands are vastly different for a human living in a contemporary city, for a bird in a jungle, or for a hominid who live a few million years ago on the African Savannah. When we feel safe we can appreciate the awesome beauty of such displays of power as a collision of meteorite with a planet, a tornado, volcanic eruption, or a lion attack. But if we do not feel safe, the awesome beauty turns into a sheer horror.

And of course, many would agree that the extraordinary beauty can be intimidating by itself!

Final Comments

The contemporary scholarly world is racing towards the multiple division of each of the disciplines at an astonishing speed, but there is hardly a doubt that we still need interdisciplinary and multidisciplinary looks at many issues. Despite all the inevitable shortcomings, wider interdisciplinary research is able to provide a fresh look at some old problems (see the box 'Cannot See the Details? Step Back and Look at the Bigger Picture!').

This book is an example of very complex and multilayer interdisciplinary research. During all these years of research I was extremely lucky to have maintained fruitful contacts with some of the most renowned experts in the fields where my research was leading me to. I am a strong believer in dialogue between scholars of different disciplines, and I hope that at least some experts from the fields mentioned in this book will be able to appreciate freshness of look at some old problems, and a number of new questions and perspectives offered in this book.

At the very end of the book, let me organize the content of the whole book in a rough chronological list of main events in the history of human singing behaviour in the context of human evolution:

• 7 million years ago. *Sahelanthropus tchadensis*, or as it is known sometimes, 'Toumai', lived in Africa. It was most likely a common ancestor of hominids and chimpanzees. I suggest it was a singing primate, possibly still living in the trees.

• 6.3 – 5.4 million years ago. Human and chimpanzee lines are separated. Chimpanzee ancestors followed the general strategy of survival of the ground living animals, based on crypsis. As a result, they stopped singing, and increased their canine size. Human ancestors, on the contrary, maintained singing, and even turned it into an important element of their defence from predators. This new non-contact strategy of defence was so successful that the size of canines of the *Sahelanthropus tchadensis* further decreased.

• From 5.4 to 2.5 million years ago. These are the formative years for most of the elements of human morphology and behaviour. Following the aposematic strategy of defence from predators, and using the Audio-Visual-Olfactory Intimidating Display (AVOID), most of the human morphological and behavioural patterns leading to humans are gradually formed:

• Audio elements of AVOID include group singing, sense of rhythm, drumming (stomping, body percussion, stone hitting), and singing in coordinated dissonant harmonies in order to create a 'Beau Geste' effect (this is a phenomenon, when vocalization of a small group of individuals creates an impression of much bigger group);

• Visual elements of AVOID include upright bipedal posture, bigger body, longer legs, long bushy head hear, threatening rhythmic body movements, body painting and the use of animal hides;

• In order to provide night time security, loud evening singing concerts are organized, warning predators in vicinity. For the same reason eyebrows are formed (in a form of eyespots on a sleeping human face), and excessive sweating and patches of hair appear at some sweating places, creating a strong body odour (olfactory element).

• As the Audio-Visual-Olfactory Intimidating Display provides an effective non-contact form of defence from predators, hominids lose body hair and tough hide. With the success of the new defence strategy,

CANNOT SEE THE DETAILS? STEP BACK AND LOOK AT THE BIGGER PICTURE!

No method can provide a scholar with a guaranteed problem solution receipt, but I want to recommend to readers a method that I often use when I am facing a difficult problem. Here is the method: if you are searching for the solution of a problem, at some point try to look at the existing facts from a greater distance, take a wider scope of facts into your account. My own research of human singing behaviour can be used as an example of such an approach. When I was wondering over the problem of singing origins in humans, I looked on the distribution of singing outside of our species (as many other scholars have done), and found that our closer relatives, great African apes do not sing. What does this fact tell us? Does this necessarily mean that human-Chimpanzee ancestor did not sing, and singing is a human late development, or even invention? Wondering on this

based on aposematic display, hominid running speed and body strength also decreases;

• Rhythmic loud singing and drumming, coupled with the emotional heat of the moment of confronting predators, leads to the emergence of a neuro-chemically induced specific altered state of mind, 'battle trance', when participants do not feel fear and pain, lose themselves as individuals, obtain collective identity and are fully dedicated to the group interests;

• Aggressive scavenging, or chasing away predators from a kill, becomes the leading strategy to obtain protein rich food. Together with the powerful means of audio-visual display, heavy stone throwing from close range becomes an important element of defence against predators and aggressive scavenging. The male shoulder was gradually formed as an ideal throwing machine through millions of years of continual practice;

• Cannibalism becomes an important strategy of predator control. The whole group fight for the body of a killed member of their group, and then cannibalise a body in a ritualistic manner. This behaviour gives predators a strong message that it is unprofitable to diet on hominids;

• Lions and hominids become arch-rivals on the African savannah. In this rivalry both sides develop extra means of intimidation (big head hair, low and powerful voice, group defence and attack methods). Lions try to avoid hominids, but hominids follow lions and chase them from their kills, forcing them to make more kills;

problem, I 'stepped back' and looked at the phenomenon of singing even in the wider context, in that of all animal species. And I suddenly noticed an amazing fact: thousands of tree living animals sing, while none of the ground living species sing apart from humans. It became also clear that many noisy tree living species (birds, monkeys) become almost mute as soon as they descend to the ground because of predator fears. These facts gave me a totally new perspective to look at the origins of human singing behaviour. The idea that chimpanzee-human common ancestor was a tree-living singer, and that apes stopped singing after they descended on the ground for the security reasons (like many birds and tree living monkeys do today), came naturally. So, the wider look at the distribution of singing behaviour in animal kingdom allowed me to find the crucial fact for constructing my model.

• First rituals appear, involving loud rhythmic choral singing with drumming, dancing, body painting, use of animal hides and possibly masks. All these are used as the means to achieve a battle trance in order to transform individuals into a unit of religiously dedicated fighters;

• 2.5 million years ago. Although stones were most likely widely used to defend themselves (occasionally with split sharp edges), first proper stone tools are made by Homo habilis. Tools are made in different sizes. Smaller tools are used for work on carcass, and much bigger tools are made as heavy missiles, thrown by both hands to the attacking lion at a very close range.

• 2.5-2 million years ago. Increased complexity of social structure, the use of tools, body painting and ritualistic behaviour, prepares the basis for a massive cognitive breakthrough, and through genetic mutation the first questioning human is born. Human intelligence with self-developing brain, group cognition and mental cooperation is born. Surrounded by non-questioning hominids, who have the mental ability to answer questions, the first questioning human had obvious survival advantage, so the number of questioning humans quickly increases with every new generation.

• 1.8 million years ago. Humans travel out of Africa for the first time, possibly following migrating lions (who were most likely following herds of prey animals). They took a tradition of loud dissonant singing along with them. They reach Middle East, Caucasia, South-East Asia, East Asia, and Europe. They do not yet have fully articulated language, and their facial anatomy still contains many archaic features, although cognitively they are Homo sapiens. They are sometimes referred to in

paleoanthropology as 'archaic Homo sapiens' and sometimes as 'Homo erectus.' For more than a million years they continue their development in different regions of the world, maintaining sporadic contacts;

• 350 000 – 11 000 years ago. Different human groups, living in different regions of the world, in different environments, shift to articulated speech in different times. The appearance of articulated speech makes important changes in human facial morphology, and the morphological continuity between the fossil forms from this period and contemporary humans becomes clear. According to paleoanthropological evidence, the shift to articulated speech first occurred among the ancestors of East Asian populations, about 350 000 years ago, then in Australian Aborigines – about 200 000 years ago, in West Asian Europeans about 100 000-120 000 years ago, in Western Europeans about 40 000 years ago, and in sub-Saharan Africans a bit over 10 000 years ago.

• With the emergence of articulated speech, the role of singing in human everyday life and society declines. Speech becomes the leading medium of communication. Singing in tune and the sense of rhythm gradually decline on one hand, and the mastery of speech increases on the other hand.

• Those populations who shifted to speech earlier have a longer period of time and more number of generations to get used to speech-related changes, and as a result the number of speech pathologies (like stuttering) gradually declines. At the same time, an increasing number of people lose the ability to control their singing voice, and singing in harmony is gradually lost. A new social category of musical activity, 'audience', appears. Musical performance obtains elements of professionalism;

• In those populations, where the shift to articulated speech happened later, traditions of choral singing survive for a longer period of time. In such societies musical performances are divided into performers and the audience to a lesser degree, as everyone participates in music making;

• Pushed out from everyday communication, singing and music universally retain an important role as a crucial element in religious rituals. In some cultures people go into the religious trance individually, with the help of rhythmic drumming (like shamans), or rhythmic verbal formulas (mantras), but in other cultures group singing and dancing leads

a big group of people into a trance. As listening to music can induce analgesia and aphobia, and can relax an anxious person, music is used throughout human cultures for its healing power;

• With the rise of civilizations and statehood music continues to be an important part of state and national celebrations. Court ensembles and orchestras are created. Emperors, kings and rulers try to have bigger orchestras in order to impress their own citizens and guests. In some civilizations (for example, Ancient Greece) philosophers analyse the emotional power of music, the role of different instruments, and different scales; The first ideas about the origins of music are proposed. Professional musicians are mostly associated with religious centres, or with courts;

• In the 16th century an important military discovery is made: if the soldiers are trained in rhythmic synchronous drill sessions, their fighting abilities are markedly improved; Hominid rhythmic stomping and drumming, used as the means of achieving a battle trance, makes potent comeback into the military after many centuries. After this discovery every contemporary army uses drills for the psychological preparation of their soldiers;

• During 17th-19th centuries, professional composers try to establish their role in society, although even great composers still struggle to make a living with their music. Wealthy sponsors and influential patrons are the safest means to maintain music writing as a profession. The role of a musician in a society becomes a major problem and topic of discussions for professional musicians;

• In the 19th century, in the evolutionary scenario of human origins suggested by Charles Darwin, music is seen as a strange and 'mysterious' phenomenon, as the means of sexual selection through female choice only. Scholars struggle to find explanation to the extreme emotional power of music on one hand and to the ostensible lack of practical application of music in everyday life on the other hand;

• In the second half of the 19th century a revolutionary discovery makes it possible to record and reproduce sound. Scholars start collecting musical recordings from different regions of the world. They try to understand the patterns of distribution of different styles of music. Following the history of European professional music, scholars believe that singing in harmony is a new invention by medieval European monks;

• With the discovery of the unconscious mind, two leading scholars take opposite attitudes towards music: Sigmund Freud with his distrust of music because he cannot understand where its emotional power is coming from. Carl Jung, on the contrary, embraces music and other arts as crucial means to reach person's own unconscious mind;

• Austrian composer Arnold Schoenberg believes that musical taste has nothing to do with genetics and can be dictated to the audience, and he creates a new musical system, disregarding the tonal system and natural links between the tones. After a century this attempt is mostly considered a failure, as people show more stability in their musical thinking and tastes than it was earlier believed;

• During the first half of the 20th century scholars gradually change their attitude towards the origins of choral singing. It is no longer considered as the invention of medieval monks. By the end of the century the new ideas are expressed, that polyphony was possibly taken from Africa by the first humans;

• In totalitarian socialist countries, governments make a failed attempt to bring the development of all traditional musical cultures to the new common socialist musical culture, where all the cultures would have traditions of choral polyphonic singing;

• Music industry becomes an important element of the free economy. In some western countries people spend more money on music than their health; Music in the background is heard virtually everywhere;

• Music becomes a symbol of groups of people, associated with their countries, football teams, political parties. Organisations have their corporate songs that are performed together by the employees; People fight against racism, wars and totalitarian regimes with the songs of protest;

• With the invention of mass media, music occupies a major part of radio and TV programs. Rock concerts and rock festivals become indicators of the height of popularity that music and musicians can reach. Popular rock-musicians become fantastically wealthy. Therefore, the financial status of a composer as a servant of a rich noblemen in the classical period changes to the wealthy and much adulated people of the world. The term 'Rock-star treatment' becomes a cliché to describe the exaggerated adulation towards the most popular individuals (politicians, actors, athletes etc);

• Scholars find that listening, performance and creation of music activates the deepest centres of our brain. Study of the neurological mechanisms of music intensifies. Music therapy becomes one of the fastest growing spheres of medicine, and music is actively used to assist recovery and treatment in clinical cases;

• With the introduction of easy and effective playback devices (CDs, ipods) listening of music is actively used in everyday life by millions of people. Most importantly for the evolutionary understanding of the role of music, listening to rhythmic loud music becomes a widely used method for contemporary combat forces in order to prepare psychologically fighters for extremely dangerous combat missions;

• Choral movement intensifies in many countries. Research shows the obvious health benefits of singing in a choir;

• In the first years of the 21st century the origins of music becomes one of the most actively researched topics. Special international conferences are held, separate articles, collections of articles and monographs are appearing on this subject in great numbers.

This is a simplified list of the major development of musicality and human attitudes towards music throughout human evolution,. Despite the fact that this list can not be exhaustive and precise, it still recapitulates the central line of the development of human musicality from the common human-chimpanzee ancestor to contemporary humans. In this model singing is a crucial part of human evolutionary history, an active participant of all major morphological and behavioural developments in our prehistory including forming human anatomy, behaviour, cognition, language, speech, morality, and religion.

Although after the development of articulated speech many of us gradually stopped singing in our everyday lives, we are still one of the most musical species on our planet. Music can still alleviate our stress, and give us energy and vitality. We are a species who virtually cannot stand silence. Prolonged silence makes us tense and anxious because it is an evolutionary sign that tells us that something is wrong. And as we do not want to feel alone, to be without sounds around us, we hum, whistle, talk to ourselves, have our ipods, radio or TV turned on, sometimes even when we are not consciously listening. Although scholars are getting closer to understanding the genetic nature of our musical

ARE MUSICAL MEMORIES LAST TO DISAPPEAR?

If you have not yet read the fascinating book 'Musicophilia' by Oliver Sax, I would strongly suggest to do so right after finishing this book. The book is filled with fascinating and often unexplained stories of the strength of human musical emotions. And not only emotions. Music is often the last thing to be lost when the biggest part of human memories and intelligence is taken away by a relentless medical condition, or a severe physical trauma. I remember seeing myself a young Russian fellow at a Moscow clinic of speech pathology. He was one of many unfortunate Soviet soldiers sent by the Communist leaders to Afghanistan in the 1980s. Bullet went through his head, from one temple to another (I could clearly feel holes in his temples). It was a miracle that he did not die in a second when the bullet hit his head. He lost many of his abilities, including normal locomotion and most of his speech. When the director of the

abilities, there are still plenty of absolutely fascinating and mysterious stories about human addiction to musical sounds (see the last box in this book 'Are Musical Memories Last to Disappear?')

We are profoundly social, and we are profoundly musical. Our musicality and social nature had been together for millions of years. Unlike many other species who mostly use music as a means of competition, for us music was primarily a tool for cooperation. That's why the harmony made together in a group of singing humans is possibly the best symbol of our social nature. Of course, as with every cooperation, musical cooperation was also made as a tool for more successful competition on a bigger, group level. Today we are searching for the factors uniting humanity, and if we manage to find uniting music it will be a big step towards reaching the unity of humanity.

The main argument of this book is that the extraordinary strength of musical emotions and the amazing depths of musical centres in our brain comes from our evolutionary past, when singing was crucial for the physical survival of our species for the millions of years. The evolutionary choice that our distant ancestors made, when they did not stop singing on a predator-infested ground, a place where no other species dare to sing, triggered a chain of long transformations leading to Homo sapiens. I suggest that continuing singing was the first crucial evolutionary step towards becoming a Homo sapiens, possibly even before our ancestors committed themselves to bipedal locomotion.

Through the unique model of behaviour, based on living on the ground and trying to be as visible as possible and as loud as possible,

clinic, Viktor Shklovsky, asked him 'Tell us your name,' he slowly mumbled out 'Se-ee-zha' (Serjozha, from 'Sergey'). Then professor Shklovsky asked him 'Sing, Serjozha, sing!' and the young victim of the war started loudly singing a popular Russian song 'Katyusha', pronouncing all the words of the song quite clearly: 'Apple and pear trees started blossoming, heavy clouds are leaving us, following the river…' Serjozha was clearly enjoying singing. Music was one of rare positive things left in his life after the terrible trauma. I am sure that if Professor Shklovsky managed to develop his speech (this was the aim of the treatment), this would be with a great help of the deepest musical memories, left virtually intact after a deadly trauma to the brain of a young Russian fellow.

our ancestors developed most of the morphological features we still carry around: bigger body, longer legs, long head hair, hairless skin, eyebrows, small teeth, low male voice. The same model of survival, based on the Audio-Visual-Olfactory Intimidating Display, triggered plenty of other important behavioural features: bipedalism, making stone tools, dancing, singing in dissonant harmonies, use of body painting, use of clothes, altruistic behaviour, prehistoric cannibalism, fanatic dedication to group ideals and aims, strive towards morality and religion, ability of asking questions, appearance of human cognition, intelligence, language, and speech. As a species, we are all the children of our singing ancestors, and with the great evolutionary lullaby for many millions of the years we gradually obtained virtually all of our morphological and behavioural features that make us humans.

The model expressed in this book is closest to the idea that music serves as a 'means of cohesion' in human society, suggested by John Blacking and supported by many other scholars. It is particularly close to the suggestions of Thomas Geissmann and Bruno Nettl that, initially, music could have been a tool to scare away aggressors and competitors. At the same time, if we have a good look at the origins of music through the new model expressed in this book, we may notice that music was actually fulfilling many other functions as well, proposed by many other scholars at different times. Music can be and is used for communication on long distances as Carl Stumpf suggested; music helps to organise working process as Bucher proposed; music can attract the opposite sex as Charles Darwin and Geoffrey Miller suggested; music is a supernatural language used in religion transformation as Nadel suggested; music could carry meaning through pitch modulations as Ivan Fonagy suggested; music could help humans acquire language as Juan Roederer

suggested; music could help our ancestors to remember important information as Vyacheslav Ivanov and Daniel Levitin suggested; music could enhance the group movement synchronization and cooperation necessary for hunting as Nathan Cogan suggested; music is the most important means of communication between mother and child as Ellen Dissanayake suggested; music and dance are a wonderful means to signal the quality of group cohesion as Edward Hagen and Gregory Bryant suggested; music played an important role in the origins of human language as many suggested, and finally, who could refuse that music is also a wonderful 'cheesecake' to please our senses as Philodemus and Steven Pinker suggested?

Music is everywhere, not only around us in cars, shopping malls and elevators, but most importantly, it is in every human's soul. It has been with us for many millions of years. It helped us to survive the long evolutionary struggle for survival, and still helps us to feel better about the life around us and about ourselves. We are more altruistic, more moral, more sharing and happier when there is music resounding in our souls. Music is a live testimony to our profoundly social nature. We need music as much as we need each other. That's why humans sing.

Acknowledgments. I am very grateful to each and all of my colleagues, ethnomusicologists from different countries, for their generosity and help. Without their assistance my knowledge of the choral polyphonic traditions of the world would be very incomplete. Apart from ethnomusicologists, I am also very grateful to great number of scholars from many other spheres, including physical anthropologists, geneticists, primatologists, ornithologists, neurologists, linguists and speech pathologists for their comments and suggestions. I want to express deepest personal gratitude to my older friend and colleague Izaly Zemtsovsky from the Stanford University; brilliant physical anthropologists, the late Valeri Alexeev from Russia and Malkhaz Abdushelishvili from Georgia; My special thanks should also go to my Japanese colleagues, Prof. Minoru Morita, the late Tanimoto Kazuyuki, and ARC Publishing house. This book was actually written as a request from ARC Publishing, who will be publishing the Japanese version of this book. I am also very grateful to my wife, ethnomusicologist Nino Tsitsishvili, for her critical remarks and comments on my text, and to my son, Alexander Jordania, for stylistically editing the entire text of this book.

And last but not least, I want to express my gratitude to the readers of this book, particularly the critical ones. I am hoping that they will find many fresh, interesting and sometimes unexpected ideas in this book. It will be natural if they disagree with at least some of my conclusions and suggestions and ask me difficult questions. After all, as we might remember, asking questions to each other is what makes us humans.

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Readers should know that it was absolutely impossible for me to provide all the necessary references to all the works mentioned in this book. Almost no authors and no works on the polyphonic traditions of dozens of different cultures were even mentioned. This was chiefly the result of the nature of this book, which was considered primarily as a popular-science publication. Interested readers can find many references (particularly on polyphonic traditions from different cultures) in the book "Who Asked the First Question" which is freely available on the website of the International Research Centre for Traditional Polyphony, under the option "World", or also in a two-volume book "Choral Singing in Human Culture and Evolution" coming out soon in Portugal. Besides, if a reader is interested in a particular work or the idea mentioned in this text, it is usually not so difficult to find the needed publication details using the power of internet (with the help of only a name of the author and the year of the publication).

A very reduced number of references provided below contains mostly the list of works from which sections of text were cited in this book.

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1. Pygmy polyphony from Central Africa is one of the most complex polyphonic styles of the world. This photo, taken by Simha Arom in 1971 in Central African Republic, shows a group of Aka Pygmies singing. Courtesy of Simha Arom.

2. Polyphony of Wagogo (from Tanzania) has some unique features. On this photo, taken by Polo Vallejo in October 2006, members of Nyota Clan from the village Majeleko are performing Msuryhuno, a rain requesting song. Courtesy of Polo Vallejo.

3. Ukraine. Region Polesie is known as the region of survival of the earliest layers of Slavic language and culture, including drone polyphony with close harmonies. This Photo of singers from Polesie was taken on 20th January, 2006, by N. Seminog. Courtesy of Evgeny Efremov.

4. Russian polyphony is known under a special term “podgolosochnaia polifonia”. On this photo, taken in September 2006, traditional female ensemble from the village Krutoe is singing a traditional wedding song. Photo by V.M Skorodumov. Courtesy of Elena Razumovskaia.

5. Mordvinian polyphony (from Russian Federation) is mostly unknown. On this photo a group of Erzia-Mordvinian women from the village Mu-ran are singing a wedding ritual song. Photo by Kari Khakela. From the materials of Mordvinian-Finnish-Estonian fieldwork in 1993. Courtesy of Nikolai Bojarkin.

6. Adyghes from North Caucasia have rich traditions of vocal polyphony. On this photo, taken in 2008 by Alla Sokolova in Maikop, ensemble of Adighian traditional music, "Zhiu" is performing with the accompaniment of Shichepshine, Adighian violin. Courtesy of Alla Sokolova.

7. Chechen traditional polyphony is one of the least studied and known among ethnomusicologists, mostly due to the turbulent history of Chechen people. This is a Chechen female ensemble "Aznach". Photo by Bob Segrave in 2004. Courtesy of Bob Segrave.

8. Lithuania is a home of unique singing style *sutartines*. On this photo the ensemble " Tres Keturines", led by ethnomusicologists Daiva Rachiunaite-Viciniene, is performing sutartines. Courtesy of Daiva Rachiunaite-Viciniene.

9. Latvian polyphony is not very well known. On this photo. taken on 12th July 2008, an ensemble Saucejas is singing a Latvian polyphonic song, entirely based on sharp secondal dissonances. From the archive of Saucejas. Courtesy of Saucejas.

10. Bosnia-Herzegovina polyphony in known for its sharp secondal dissonances. On this photo, taken by Nerthus Christensen in Bosnia-Herzegovina in 1960 in Gabela, girls from Krvavac family are singing zhenska Ganga Okavica. Courtesy of Dieter Christensen.

11. Albania. Polyphonic style of Labs considered to be the most archaic. On this photo, taken by Michael Church in 2000 in the port of Vlore Lab singers from the ensemble Bilbili are singing. Courtesy of Michael Church.

12. Corsica is renowned for rich polyphony. On this photo, taken in 2009 in a local church of the village Bastelica, members of the group Spartimu are photographed during their recording session. Courtesy of Frederic Vesperini and Spartimu.

13. Persian Gulf. On this photo, taken by Sheherezade Hassan in Bahrain in1997 a group of singers are performing a traditional song of pearl divers. Courtesy of Sheherazade Hassan.

14. In Yakutia elements of heterophony are present in antiphonal round dance “Osuokai”, where a group of dancers reply to the call of the dance leader. On this photo, taken in 1977 by Eduard Alexeev, decorated Osuokai leader-singers are singing Osuokai. Courtesy of Eduard Alexeev.

15. Taiwan. On this photo, taken by Taiwanese ethnomusicologist Yuhsiu Lu in April 2008, members of Chuyin Culture and Arts Troup from the indigenous Amis Tribe are performing a traditional song and dance in Taidong, Taiwan. Courtesy of Yuhsiu Lu.

16. Papua New Guinea. On this photo, taken by Gerald Florian Messner in 1982, singers from Baluan Island, Manus Province are singing polyphony based on clashing secondal harmonies.

This book from award winning ethnomusicologist and evolutionary musicologist from the University of Melbourne, Joseph Jordania, presents the original model of human evolution based on the aposematic survival strategy of ancient hominids. Human musical abilities, together with dance and body painting, are viewed as the core factors of the evolution of the human body and facial morphology and behavior, including human intelligence, language, speech, culture, morality and religion. How are the evolutionary roots of human music connected to our ability to walk on two feet, use tools and clothes, ask questions or go into trance? Why do we not remember some of the most traumatic events of our life? And why do some humans have split personality? These and many more topics are discussed in this book, which is coming out simultaneously in English and in Japanese in 2011.

Scholars about Joseph Jordania's 2006 book "Who Asked the First Question? The Origins of Human Choral Singing, Intelligence, Language and Speech"

"This book is a great synthesis, that was urgently needed. I totally agree with the main idea of Joseph Jordania about the ancient origins of choral singing and its gradual disappearance. I can testify that even in Africa, arguably the most polyphonic continent of our planet, there are plenty of places where polyphony is either disappearing or becoming a 'secondary archaism'. To my opinion also, there is no 'evolution' from monophonic to polyphonic singing, and I was glad to see that the argumentation of this idea is so strong and logic". *Simha Arom, Emeritus Director of Research, Centre National de la Recherche Scientifique (CNRS), Paris, France*

"Joseph Jordania's book is a masterpiece of comparative musicology by a person with an amazing knowledge base... There is not a single book that I know of that covers even a small part of the terrain of this monumental book. In addition, the argumentation is strong and the book is thoroughly interesting to read. As a co-editor of the book "The Origins of Music", I am thrilled to finally see a true work of comparative musicology appear after many decades of neglect. This is the kind of material that people, from psychology to evolutionary biology, need to ponder in order to incorporate music into the emerging picture of human evolution." *Steven Brown, Simon Fraser University, Canada*

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