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ORIGINS OF RHYTHM AND THE DEFENCE STRATEGY OF HUMAN ANCESTORS

If we want to understand the history of such a complex phenomenon, as the origins of human music or the tradition of choral singing, we need first and foremost to establish the general historical tendency of development of this phenomenon. How is this phenomenon developing? in which direction? What are the stable and mobile elements in this phenomenon? Is it disappearing, or on the contrary, gets wider distribution as time goes by? All these issues are of the primary importance, and without addressing them directly all the theories or hypothesis represent baseless constructions.

Yesterday, on September 25, 2006, on the opening day of our symposium, Tbilisi State University press “Logos” published my book, which looks at the origins of human choral polyphony in the wide context of human evolution (Jordania, 2006). In my paper today I am going to discuss only one aspect of the origins of choral polyphony, namely – the emergence of rhythm. I’ll try to argue that the emergence of rhythm was as crucially important step in human evolution, as descending from the trees to the earth, or introduction of bipedalism, or the use of stone tools. But first and foremost we must discuss the importance of establishing the historical dynamics in the evolutionary processes.

On the 20th of February 1835, Just a week after his 26th birthday, Charles Darwin experienced a major earthquake that struck Chile. Walking a few days after the earthquake on the beach, Darwin noticed that the mollusks that always live on the rocks under the water, were now drying out on the rocks well above the water level. Darwin made a correct conclusion that the recent earthquake was to blame for this, so that the part of the western coastline of South America was raised because of the earthquake. Considering this event on a bigger historic scale, Darwin concluded that many thousands of such earthquakes during many millions of the years were responsible for the rise of the South American Pacific coast and the creation of the Andean mountains. Later scholarly research proved Darwin’s assumption to be correct.

Therefore, Darwin correctly understood the historical dynamics of the landscape changes and the rest was the question of multiplying the results of small time span changes (that humans can observe) into a large evolutionary scale that humans cannot observe.

The question of **historical dynamics** is absolutely crucial for the correct understanding of any processes that goes for centuries and millennia, including the process of the origins of vocal polyphony.

Regarding the origins of polyphony, as ethnomusicologists tacitly agreed more than a century ago, polyphony is a higher form of musical evolution, the new stage of musical development that came after the initial monophonic tradition. According to this paradigm, it is only natural to expect that the geographic area of the distribution of vocal polyphony would be gradually expanding.

My own research experience in the field of traditional polyphony suggests that this paradigm of the origin of polyphony needs to be fundamentally revised. In this discussion the question of historical dynamics is absolutely crucial. Of course, we can not go back in time to watch firsthand the process of appearance (or disappearance) of the traditions of vocal polyphony, but we can have a look at the recorded history of humankind and try to find out **which of the processes stand out from our recorded history more prominently: appearance or disappearance of the vocal polyphonic traditions.**

For this purpose I compiled two lists, where I was duly recording all the cases of the disappearance of polyphonic tradition (first list), and the appearance of polyphonic traditions (second list). Let us now have a look at the map of the world vocal polyphonic traditions in search of the facts of the historical dynamics.

Here is the **first list** of the cases when the **disappearance** of vocal polyphony is historically well documented in written sources and archival recordings (for more detailed information and references on each case reader can find the information in the corresponding regional sections on these cultures in my 2006 book):

- **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 traditional vocal polyphony by the end of the 12th century. According to the currently available data, in most of these countries today the tradition of vocal polyphony has been lost.

- **Italy.** In Lombardy, singing (or as it is sometimes referred in the source “howling”) in seconds has been documented in the 15th century, but later disappeared.

- **Lithuania.** The unique vocal polyphonic style *sutartines*, based on the almost constant use of secondal dissonances, has gradually disappeared during the 19th-20th 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, was recorded by Andres Yurian at the end of the 19th century, also disappeared.

- **Estonia.** Tradition of drone polyphony was recorded by Tampere in the beginning of the 20th century, but was never found later.

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

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

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

- **California.** According to the historical sources and archival recordings, discussed in the article of Bruno Nettl (1961), interesting forms of vocal counterpoint that were present among South Californian Indians, also disappeared.

- **Venezuela.** According to Isabel Aretz (1967:53), there was a general tendency in few states of Venezuela towards the disappearance of the tradition of three-part

singing.

- **Africa.** According to the information, provided by Simha Arom (personal communication), there are obvious signs of the decline and disappearance of vocal polyphonic traditions among pygmys. According to Arom, Some of the songs, that were recorded the 1970s in four parts, are curenly performed in three or even two parts.

- **Taiwan.** According to the archive recordings, the small mountain tribe Saisat had a tradition of singing in parallel fourths that disappeared within the first few decades of the 20th century.

- **Polynesia.** According to Adrian 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.

- **Georgia.** Gradual losing of the polyphonic tradition in Meskhiti is well documented, but losing and degradation of polyphonic traditions in Meskheti, Saingilo and partly in Khevsureti should be mentioned in this list as well.

I believe that all these documented cases of losing the tradition of vocal polyphony by no means represent a complete list of all disappeared traditions. This list can be only considered only as the “tip of the iceberg”. Writing about the disappearance of the traditions of vocal polyphony is not a very prominent tendency in ethnomusicology, and therefore, plenty of such cases might not be represented in the published literature. I can judge about this even from my own experience of knowing Georgian musical culture. 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 the disappearance of polyphony in Meskheti, Jordania, 2000: 827). Therefore I expect that ethnomusicologists with an interest in polyphonic traditions could name many other cases of the disappearance of vocal polyphonic traditions in different parts of the world. And of course, besides the complete disappearance, there are also numerous cases of the decline of the tradition of vocal polyphony.

In some cases the reasons for this disappearance (or decline) are known. For example, in the case of western Sicily it was the natural disaster that disturbed the social life of the traditional society, or in case of Macedonia it was mostly the government policy 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 tradition of polyphonic singing in Corsica was on its way towards dying out in the 1950-1970s, 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 Corsican culture and identity. Lithuanian sutartines was not so “lucky”, and although 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 seems to be irreversibly 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 medieval Georgia (as well as many other countries of Europe) 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 have endured in Europe only.

Now let us concentrate on the **second list**, where I was collecting the documented cases of the **emergence** of vocal polyphony from monophony. This list is extremely interesting. According to the theory of evolution of polyphony from monophony, the cases of the emergence of traditions of polyphony must be much more frequent than the cases of disappearance of polyphony. But if the readers think that the cases of the emergence of polyphony are more frequent than the cases of the disappearance of polyphony, I will disappoint them. Despite my lifelong interest towards all aspects of traditional polyphony, I am not aware of **even one** documented case of the emergence of vocal polyphony in traditional music from monophony. It was only the medieval European **professional** (not traditional) polyphony that underwent the change from monophony to polyphony, and of course, as we know today, this transformation was not the result of the inner development of initial monophonic tradition either. Instead, it was the result of the influence of traditional polyphonic practices of European peoples, practice that existed outside of the official church monophonic music.

So, on one hand we have a long list of countries and regions from different parts of the world, where losing of the tradition of vocal polyphony has been documented, and on the other hand, we do not have even a single case of the emergence of vocal polyphony from monophony in traditional music. What does this fact tell us? This fact strongly suggests that disappearance of the traditions of vocal polyphony is not only a “prevailing tendency”, or even a “dominating tendency”, but it is the **only historical tendency**. Therefore, we should reject the “stage theory” of development of vocal polyphony from monophony, as this theory directly contradicts facts and the the historical tendency of the worldwide disappearance of traditions of vocal polyphony. **Vocal polyphony did not emerge as the logical development of monophonic tradition.**

And in case if some of our colleagues will be still trying to push the case of the late emergence of vocal polyphony, they will need to face the fact of general historical tendency of disappearance of traditions of vocal polyphony all over the world.

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Now, when it is clear that according to my model the human choral singing is not a late cultural development from initial monophonic singing, let us make a huge chronological leap to the earliest periods of the human evolutionary history. I believe that the reasons and the forces behind the origins of human vocal polyphony should be researched here. In the remaining of the paper I am going to argue that the emergence of rhythm was crucial for the emergence of human choral polyphony (and in fact, human music), and besides, emergence of rhythmic group music had a crucial practical importance for the early evolutionary history of humanity.

To discuss this issue, let us first of all consider two important facts:

1) Singing is relatively widely spread among few species, and even such a phenomenon as a group singing is known in few social species;

2) despite this relatively wide distribution of singing in few animal species, we should not forget that **singing is a “dangerous activity” for the life of the singer** (as predators can easily identify their location).

In the light of the abovementioned it is understandable that only few categories of animals can afford to sing (or to produce long and loud vocalizations). Singing species usually are those, who a) are big and strong predators, and are not afraid to be heard (like lions, or wolves), b) those who are just too big to be afraid (like whales, one of the most creative singers among animals), c) those who can fly (this is the biggest group, as most of the singing species are among birds) and d) those who can escape predators on the top of the trees (like gibbons).

Human ancestors have never been big and strong predators, nor had they the gift of flying, but as we know, they did spend few millions of years on the trees. So, they must have been in a category of singers who could escape predators on the tree branches (like few other primates). Therefore, it would be logical to conclude that in human evolution singing started before our ancestors descended to the ground.

The singing behavior of gibbons can provide the rough model of the singing behavior of our ancestors. Gibbons are well known for their “family singing traditions”. Male and female gibbons sing every morning and evening in duets, and sometimes they are also joined by their offspring. The function of their singing is to let other gibbons to know that the territory is occupied by the well-bonded couple, and in case of transpassing aggressors will need to face the whole family.

Now let us have a closer look at the crucial moment of the evolution of our species, which, according to my model, initiated a whole chain of events that lead to the origins of choral singing and human music. This crucial moment was when our ancestors made the “biggest migration of the whole human evolutionary history”, or when they descended from the trees to the ground.

Any migration and the subsequent sudden change of environment requires certain behavioral changes from migrating individual or the whole species. I suggest that the **biggest change must have occurred in defence strategy of our ancestors**.

There is a huge difference between living on the tree branches and living on a ground. Every dweller of the trees live there according to their weight. Bigger and heavier animals live on the lower branches, and lighter animals live on higher branches of the same tree. We can say that there are several “floors” on every tree, and different animals and birds who reside on the same tree live, feed, give birth and rear their offspring according to their weight, on different “floors”. For example, 20-kilo primate can easily escape 60-kilo leopard by climbing higher on thinner tree branches, where leopard is unable to follow. So the primate is safe from leopard unless it got caught on the lower branches of the tree, or worse, on a ground. By the way, leopard itself climbs trees to avoid facing lion, as 60-kilo leopard can climb the trees much higher than 150-kilo lion.

Now let us have a look at the predator-prey interaction on the ground. Unlike tree

branches, where animals live according to their weight, all the representatives of animal kingdom, who live on the ground, from the small rodents with the weight of only about a kilo, 30-kilo antelopes, 50-kilo hienas, 150-kilo lions, half-tone bufallos and four-tone elephants, all spend their lives on the same “ground floor”. That’s why most of the ground dwellers are most of the time silent (except big predators). If you stand still and listen to the sounds of the forest, you will hear that almost all the sounds are coming from the “upper floor” of the forest – trees and the sky.

Therefore, we should conclude, that the first thing that our ancestors encounter after they descended from the trees, was much worse “criminal situation” of the ground in comparison with safer trees. Interestingly, scholars mostly try to reconstruct human behavior in regards of obtaining food, neglecting much bigger problem that our ancestors faced – the problem of security (or not to become food for others). Everyone would agree, that the new environment must have put huge pressure on our ancestors, asking for drastic behavioral adaptations to face new challenges, and I want to suggest that the problem of predatory control was the issue of the primary importance.

In their quest to colonise ground, our ancestors had few evolutionary options:

1) Give up “irresponsible” singing behavior, stay put and be as silent as possible, in order not to attract the attention of crawling predators (like most of the animals do, who live on the ground);

2) To grow bigger teeth in order to better fight against predators (like few other primates who descended to the ground and grow dog-like teeth, like baboons and pavians);

3) To learn how to run faster in order to flee from the predators like most of the antelopes do;

4) to climb back on the safe tree branches and avoid dreaded ground predators;

5) And finally, to apply a principally new strategy to defend themselves against the fierce ground predators.

As we know, 1) humans did not stop singing and did not lay put, on the contrary, we are arguably the noisiest animals living on our planet, 2) nor they grow bigger teeth; on the contrary, the number and size of their teeth decreased after our ancestors descended from the trees to the hazardous ground, 3) they never mastered fast enough running to outrun lions, 4) and they did not come back to the tree branches to avoid predators. I suggest that our ancestors managed to develop a **revolutionary new strategy** to avoid predators. This strategy was based on **loud, rhythmically synchronised group shouts and threatening body movements**.

As a matter of fact, this was not a new strategy. Many animals (including primates) are known to use noise to intimidate aggressors. More than 30 years ago Kortlandt wrote about the loud display of vocalizations, accompanied by foot-stamping and drumming on tree trunks made by chimpanzee bands as a possible means to scare away predators and competitors, and also suggested that Australopithecines “probably sang and drummed” (Kortlandt, 1973:14). Humans also widely use loud vocalization (like screaming) in critical situations. Even today, if we are suddenly faced with a mortal danger, we instinctively scream. This is not a waste of time and energy as some might think, because loud scream in a critical situation fulfills two important

functions: 1) audio attack on the aggressor, and 2) call for a help. Many lives were saved by sudden loud scream both in the jungles and the streets of night city.

Group shouting is much more effective than individual screaming. Even birds use mobbing calls when they attack an intruder together with loud calls (if you ever took a baby bird from a ground you might experience such loud attack from adult birds). Humans use this method very successfully, and even against the biggest predators of our planet. Even today, if a stray lion comes close to an African village, group shouting is the first means of shooing it away. The “beat” method of hunting, when the loud shouting and noise of an unarmed group can scare large and strong animals towards the intended spot, is based on the same principle. Group of unarmed shouting humans can scare away even the hungry men-eater tiger from its kill.

If screaming by a big group is more effective than individual screaming, **rhythmically well-organized loud noise from a big group** is even more effective. This is something that only humans do. Therefore, I suggest that instead of becoming another silent dweller of the ground in order to survive, our ancestors, on the contrary, increased noise and shouting, and augmented it with the impressive, rhythmically united sound display. No doubt, this impressive “wall of sound” must have been coupled with different rhythmic sounds made by different body parts (hand clapping, foot stomping) and other objects (like stone hitting), and also by threatening body movements and object throwing. This behavior, used for few million years in critical situations, had such a deep impact on our brain, that even today when we want to scare away a potentially dangerous animal (say, a stray dog) we shout at it, make a threatening hand movement (“go away” or stone throwing imitation) and stomp on the ground. And it usually works.

Rhythmically synchronised shouting is physically louder, but possibly most importantly, it has much bigger psychological impact on the aggressor (and on the group of shouting humans as well). Let us pay attention, that instead of random group shouting, **synchronised group shouting gives a strong message to the predator that it has to deal not with the group of scared individuals, but with a well-organised and determined unity**. On the other hand, group rhythmic shouting and stomping that continued for few million years, must have had a tremendous hypnotic impact on the group of shouting and stomping human ancestors. Even today, hearing loud rhythmic music (or even only the loud rhythm, such as drumming) creates a strong desire to follow the rhythm with body movements, clapping or stomping. (Even the rare outbursts of violence, sometimes present during the loud heavy metal rock concerts, might have evolutionary precursors in human brain genetic make up.) This hypnotic uniting effect of loud rhythmic music must have been extremely important during the dramatic stand-off against predators, as the hungry lion was only few metres away, and any panick-stricken human, who would try to run away, would be killed.

And of course, we can also recall that loud audio display has been a part of countless human conflicts in the form of war cries, prolifically used between conflicting tribes and armies. Loud war cry still carries a strong punch to intimidate the opponent and to help to boost the fighting spirit of the combatants. William McNeill, American historian from the University of Chicago, published an insightful book “Keeping

Together in Time: Dance and Drill in Human History”, where he gives ample examples of the different human activities when large group of humans find it easy and even exciting to move and do physically demanding exercises, **if their movements are precisely rhythmically unified** (McNeill, 1995). The powerful influence of long army drill in achieving psychological unity and obedience of the new recruits is also well known to army generals.

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Besides the successful defence against the big ground predators, I suggest that loud and rhythmically precisely organized shouting/singing must have had another extremely important function in the early history of human ancestors. This function was **obtaining of food**.

Let us think: if loud rhythmic display could scare away big predators, it could successfully chase away the same predators from their own kill, so that our ancestors could obtain the much needed meat, killed by other, better specialized hunters. Interestingly, in the 1980s Louis Binford expressed a very plausible and argued idea that the main source of protein food (meat) of our ancestors came not from their own hunting success, but from scavenging (Binford, 1985). Here we should note, that scavenging in the African environment (where our ancestors spent millions of the years) is a very competitive, dangerous and widely practised business (on so called “confrontational scavenging” see Blumenshine, 1986). None of strong predators (including lions) refuse the possibility to scavenge kills of other animals. “Armed” with the loud and intimidating sound display, incorporating synchronised chorusing, threatening body movements, clapping, stone hitting, stomping and stone throwing, our ancestors could chase away even the king of the African savannah from its own kill. The importance of throwing in human evolution is well known (See Calvin, 1982). By the way, Calvin mentions throwing primarily as a means for hunting, mostly neglecting the huge potential of throwing in defence. I suggest that throwing was primarily used for defence and intimidation (as it is used in some primates), and only later it became the leading means of hunting and obtaining food.

At the end of my paper I also want to mention few other important research perspectives, which I did not discuss in this paper. Namely, the model of loud and rhythmic audio-kinesthetic display, as a main means of defence and food obtaining in hominid prehistory, gives us a possibility to see few other elements of early human evolution in a new light, such as:

1) emergence of **bipedalism** (standing on the hind legs to look taller is a well-known strategy in many animals, and is used for intimidation. On a role of intimidation in the emergence of bipedalism see Jablonski & Chaplin, 1993),

2) emergence of first **stone tools** made from the pebbles (vigorous stone hitting during the confrontation must have provided plenty of stone pebbles to our ancestors, certainly enough to give them the idea of the effectiveness of the new sharp-edge stone tools, triggering the development of the palaeolithic industry),

3) decrease of the number and **size of teeth** (big teeth were not needed for the defence, as humans learned to fight and intimidate opponents without coming into bodily contact. And of course, smaller teeth provided less robust and more flexible

jaw, preparing our ancestors for subtler activities, like language and speech),

4) increase of the human **group size** (intimidating and sound display is more effective when the group is bigger. On the other hand, the bigger group size leads to more complex social interactions and the increase of human mental capacities (On this topic see Aiello & Dunbar 1993; Dunbar, 1996; Byrne & Whiten, 1988, 1992).

5) increase of **body size** of our ancestors (if life on tree tops favoured lighter primates who could easily escape on the higher tree branches, life on the predator infested earth favoured bigger sized individuals),

6) emergence of the first **ritual dances** (it is a great feeling when a group of relatively weak creatures can shoo away a big and strong predator like a lion, and it does not take much speculation to imagine that our ancestors would soon transform their effective “lion dance” into a exciting and vigorous ritual dance, effectively making it a ritualistic rehearsal for the real-life confrontations. Such ritual dances, conducted in the evenings, could also keep predators away. Kortland suggested similar idea in his analyses of Chimpanzee and few African forest tribe evening loud displays (Kortland, 1973).

7) emergence of the first **musical instruments** (drumming and drums are usually identified as the first type of musical instrument humans used in the course of their musical evolution. I suggest that hitting stones in a vigorous rhythmic unison during the confrontation was the first musical instrument that was used by our ancestors, and therefore I suggest that the first “musical instrument” was used long before the origins of language and speech, and before the palaeolithic revolution. Actually, as I mentioned above, palaeolithic revolution possibly was a by-product of human drumming activity).

Possibly one of the most important (and amazingly still mostly neglected) facts of human evolution is that **humans seems to be the only creatures on our planet that use group rhythmically unified sound display**. None of other animals are known to employ metro-rhythmically synchronised vocalisations, although as I have already mentioned, mobbing calls and group sound displays, used for the territory defence and intimidation are well known among few animal species.

In understanding the evolutionary mechanism of the emergence of the sense of rhythm among humans it is extremely interesting to note, that there seems to be at least few exceptional individual animals who are able to follow the given rhythm. For example, Thomas Geissmann writes about a monkey at a zoo that can follow the given rhythm, and few readers might have seen a parrot who can follow the musical rhythm). These individual cases suggest that the sense of rhythm could emerge several times independently in different species in the evolutionary history of different species as a genetic aberration. It was the environmental pressure that made this new ability necessary and useful in evolutionary terms. Only practical need for this new behavioral ability transformed the new genetic trait of one individual into a new trait for a whole species. Zygmunt Estreicher made a much-cited comparison about the “in-built metronome” in the heads of African musicians in his remarkable study of rhythms among the Bororo tribes (Estreicher, 1964). This “in-built metronome”, or a sense of rhythm is one of the strong musical

universals that unite the human race, and could be the much sought “uniquely human” elements of our genetic make-up.

According to my model, it would be quite safe to suggest that the feel of rhythm that provided security and food for our ancestors, was one of the key features that separated the line leading to the *homonidae*, from our closest living relatives – great African apes. I suggest that human ancestors developed the sense of rhythm (and the affective means of group defence and obtaining food) while they were in the process of colonising of the ground. Only after the success of the new audio methods in securing their lives and food provision via intimidation, they managed to become fully independent from the trees and wandered away to meet new challenges. Regarding the origins of drumming behavior, we should note here that great both African apes (chimpanzees and gorillas) display drumming behavior (although not isorhythmic), and Fitch made a plausible suggestion that their drumming behavior is homologous to human drumming behavior (Fitch, 2006).

We may never know the true and full story of the evolution of all the evolutionary branches that were leading (and not leading) towards *Homo sapiens*, but it seems to me that those who opted for closer contacts between the group members, increasing the group size, cooperation and more effective means of group defence and food obtaining, were favored by evolution. If we also remember the best known (and often overstated as the **only**) function of music – charming the opposite sex (see Darwin, 1871; Dissanayake, 1992; Miller, 2000), then we will come to the **general conclusion** of this paper:

Music (and primarily group singing) played a crucial role in the development of early human survival mechanisms for the following three key issues of evolution:

- (1) security,
- (2) feeding,
- (3) procreation.

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