

A THEORY OF MUSIC

*As neither the enjoyment nor the capacity of producing notes are faculties of the least use to man in reference to his daily habits of life, they must be ranked amongst the most mysterious with which he is endowed. -- Charles Robert Darwin, *Descent of Man**

... even the most trivial, convention-bound song can suddenly trigger an unruly emotion.
--John Pareles (Can pop music move us after we turn 25?) *Ann Arbor News*, April 24, 1988, p. G1

*Government is words. Thoughts are reduced to paper for speeches which become policy. Poetry has everything to do with speeches -- cadence, rhythm, imagery, sweep, a knowledge that words are magic; that words like children have the power to make dance the dullest beanbag of a heart. -- Peggy Noonan, quoted by Hugh Sidey, *Time Magazine*, p. 32)*

*Poetry makes sense of the world. --Joseph Brodsky, *Ann Arbor News*, November 1991*

They (gibbons, showing territorial behavior) merely sit and singe, and hardly have to do anything else.-- Alison Jolly

Introduction

My (eventual) purpose is to develop a testable theory of the evolutionary background of musical ability, and the use and appreciation of music, in the interests of eventually completing a "rough draft" of human behavioral evolution, and in the spirit of Darwin's effort to account for the most difficult phenomena that can be encountered, such as the sterile castes of eusocial insects, which he saw as threatening the universality of his theory.

Any viable theory about the origin and significance of music has to conform to two sets of laws. The first are the laws of physics, particularly those that apply to vibrating bodies. Music is comprised of sounds, and sounds consist of longitudinal waves produced by vibrating bodies. The second are the laws of organic evolution, particularly the mode of operation of natural selection, and most particularly natural selection as it applies to the evolution of communication. Music is produced by living organisms, and all living organisms have evolved, primarily as a result of the operation of natural selection. Music is an aspect of communication.

Sounds of organisms are made by vibrating bodies (such as a cricket's wings) or strings (such as the vocal cords of birds and mammals or the strings of a violin). In turn, the auditory organs of animals are evolved to respond to the vibrations of strings or bodies. Strings and other bodies tend to vibrate in sections, which means -- among other things --that when multiple sets of strings or bodies vibrate, the major vibrations can reinforce one another or interfere with one another. We tend to refer to interferences as "discords" and reinforcements as "harmony." (The significance of this dichotomy will become apparent later: I think one might make an argument that people with superior ability to appreciate or produce music may have abilities to detect certain kinds or stacks of reinforcements -- harmonies -- that others with no such abilities cannot detect.)

A fairly new and basic assumption about communicative signals (Otte, 1974; Lloyd, 1975; Dawkins and Krebs, 1978) is that they are evolved to be produced in the interests of the signaller (see also, Alexander, 1987). In developing a theory of music I will make the same assumption: that music is created, performed, and appreciated as an aspect of the creator, performer, or appreciator serving his or her own interests. I will further assume, from the discipline of biology, that the interest that music serves is always, ultimately, reproduction. Reproduction can be served either directly, or quite indirectly, for example through elevation of status, assuming that differences in status affect access to resources such as the best mates, housing, and food. Such effects, in turn, can come about either directly or indirectly, in the latter case, for example, through effects of one's status

on the usefulness and availability of relatives or other potential cooperators or helpers.

Communicative signals evolve, then, when they do one or more of the following things:

1. Tell other(s) something (true or false) about the signaller that benefits the signaller (advertisements). *Example:* a male bird, mammal, or insect giving a calling signal that advertises his position, identity, status, and probably other information (and misinformation) about himself to sexually responsive females.
2. Tell other(s) something (true) about something other than the signaller (either about the receiving individual or about something extrinsic to signaller and receiver both) that benefits the other (and the signaller indirectly, because of relatedness, spousal relations, or reciprocity) (assists). *Example:* a parent giving an alarm signal to its young upon the approach of a predator, which causes the young to take cover or otherwise protect themselves or escape.
3. Tell other(s) something false or deceptive about something other than the signaller that benefits the signaller indirectly by its detrimental effects on the other (manipulations). *Example:* I may tell someone about to attack me that a policeman is standing behind him.

Statement of the Theory

The theory I propose to explain the origin and elaboration of music has five parts, which also suggest an evolutionary sequence. In what follows I have italicized the statements that I regard as hypotheses rather than generally accepted facts:

(1) *Vocal language involves rhythmic tonal and intensity variations. These are the basic elements of music, to which may be added rhyme, as part of songs, ballads, poems. Subtle changes in these basic elements are of great value to listeners (partly because of deception), hence are used by speakers (and sensed by listeners). It should follow that extreme sensitivity to these elements evolved early, because of their importance in speech, and if something close to music preceded speech (or language), then this sensitivity may also have preceded speech and language. Although musical abilities surely continued to elaborate long after language and speaking had become complex, there is no reason why language per se should have preceded attributes of human vocalizations (or other kinds of sound-making) that would be termed "musical," or even why musical kinds of sounds could not have been the initial forms of human auditory communication. Thus, the theory developed here neither suggests nor excludes an onomatopoetic origin of human language and music. (An onomatopoetic origin would surely demand that birds were the models, because only they and whales learn vocal sounds openly, so that among sounds humans commonly hear, bird songs alone carry lots and lots of human-like musical intervals – although horses – a fascination for humans since they initially began to create life-like graffiti on cave walls – actually produce human- and bird-like melodies in their not openly learned but apparently "hard-wired" whinnies. Why have only the vertebrates that humans describe as singing evolved to modify their vocalizations extensively by learning?*

(2) *Use of elements of music in communication (i.e., litting or "musical" speech, and its interpretation) enhances language function by indicating health, mental and emotional states, and perhaps other qualities of the speaker. It thus serves interests of speakers and also provides information to listeners, further enhancing rudimentary musical ability, use, and appreciation (e.g., through sexual selection). Every individual seeking a long-term mate should be interested in physical and mental health, attitude toward life, enthusiasm, sense of humor, etc., all of which kinds of things are revealed to some extent in speech by tone, rhythm, intensity, and emphasis changes of the sort also found in music.*

(3) *Involvement of music in socially positive emotionality caused it to become an increasingly complex means and system of interpretation of events of general significance to humans, including group unity, thus, in ceremonies of various sorts.*

(4) *Tone, rhythm, and rhyme are supreme memory aids, hence, prior to written language, came to be used extensively in recalling (and predicting) important events (beyond tonal and rhythmic*

sensitivity, and interpretive skills, unusual musical ability seems also to involve unusual memory; as a student in this class remarked, she knows hundreds of songs and poems verbatim but little or no prose so well).

(5) For all these reasons, musical ability, and, later, evidence of ability to appreciate it, came to excite awe, and as a result both became sources of potent status changes. Music is closely related to such activities as art, drama, dance, theatre, and literature because of its role in surrogate scenario-building, hence, interpretation of meaning and values.

[Note: These are the "five parts of the selective hypothesis described in the abstract" that are referred to on the diagram accompanying this manuscript]

One of the facts that must be explained about music (and many other aspects of human performance) is that appreciation of music appears to be much more widespread than is ability to perform it at the highest levels (these two abilities might be partly separate with respect to brain function). This may partly be an artifact, for ability to appreciate music in complex or subtle ways is more easily faked than is ability to perform it. But I would not be surprised if any theory of music eventually has to account for a more widespread ability to appreciate music than to produce it. Presumably, the explanation will have to take the form that whatever is gained by being able to appreciate music is a gain realizable even when it involves a high proportion of the population, while the ability to create first-rate music may have a large gain only when it is relatively rare.

Certain aspects of human vocal communication are pleasing to the ear and certain others are not. Melodious and harmonious sounds are more pleasing than harsh or non-melodious sounds, and they are also more difficult to produce, meaning that to accomplish them requires both special abilities and special effort: they can be regarded as involving a cost. My hypothesis is that normal human spoken communication can vary with regard to whether or not it is harmonious and pleasing to the ear. Everyone wishes his or her vocalizations to be harmonious and pleasing to others, except when the intended effect is negative. I will argue that music represents an extreme or "runaway" direction of change toward increasingly melodious and harmonious sounds. It is possible that the ability to make such sounds indicates health and confidence, the opposite of hoarse and non-melodious vocal sounds, including such extremes as coughing, caused by some kinds of illnesses, and also the opposite of sounds made by frightened individuals or others lacking in confidence or spirit. I hypothesize that the ability to turn vocal language into music in the form of ballads or story songs was one kind of early magnification of the positive effects of melodious sounds in human voices, and that, especially prior to written language, it was of enormous usefulness in recalling history and verifying precedents in mores. Following is a description of what I had in mind regarding this stage of human use of music (from W. D. M. Bell. 1923. *The Wanderings of an Elephant Hunter*. London: Neville Spearman (quoted by Elspeth Huxley in *Nine Faces of Kenya*, pp. 278-279):

Whereas, on our way up, the camps had been rather gloomy – disasters having been prophesied for this expedition – now all was joy. The safari chronicler became once more his joyous self and his impromptu verse became longer and longer each night. The chronicler's job is to render into readily chanted metre all the important doings of the safari and its members. It is a kind of diary and although not written down is almost as permanent, when committed to the tenacious memories of natives. Each night, in the hour between supper and bedtime, the chronicler gets up and blows a vibrating blast on his waterbuck horn. This is the signal for silence. All is still. Then begins the chant of the safari's doings, verse by verse, with chorus between. It is extraordinarily interesting but very difficult to understand. The arts of allusion and suggestion are used most cleverly. In fact, the whole thing is wonderful. Verse by verse the history rolls out on the night, no one forgetting a single word. When the well-known part is finished, bringing the narrative complete up to and including yesterday, there is a pause of expectation -- the new verse is about to be launched. Out it comes without hesitation or fault, all to-day's events compressed into four lines of clever metric precis. If humorous its completion is greeted with a terrific outburst of laughter and then it is sung by the whole lot in chorus, followed by a flare-up of indescribable noises; drums, pipes, horns and human voices. And then to bed.

My argument regarding the evolution of artistic ability presumes that there was an initial period

of selection when it was favored in everyone because it was an offshoot of the memory-learning part of scenario-building capacity, this followed by a longer period, extending to the present, during which further elaboration of artistic ability was a matter to some large extent of sexual selection, with those having unusual capabilities in this direction being favored in sexual selection, and perhaps other ways as well, but during which there was not necessarily a widespread or universal favoring (?) of continued elaboration. This is not entirely clear or correct; I leave it here in order not to lose the thought. The question here is how it relates to the evolution of musical abilities.

I will continue developing this theme, and I will argue eventually that some kind of runaway social process has been involved in many aspects of human social intercourse, including humor and art.

The general background of this theory developed gradually in my mind, but it was aided by being exposed to some extremely musical voices of young women on Pacific Islands during the 1980's; for example, a Vanuatu airline hostess startled me no end by giving instructions to the passengers in a spoken voice that bordered on actual song without giving any impression that such was being striven for. I also reflected on the attention given across the years to the musicality of the telephone answering voice of Ursula Freimarck, who worked for much of her career in the Biology Department of the University of Michigan; she was famous for the way she said, "Biology: Mrs. Freimarck." I thought about the unattractiveness of the speaking voice of apparently tone-deaf (at least in terms of output) people such as Henry Kissinger. I considered the musical forms of "speech" practiced by auctioneers and poets, and by those who perform what is termed "talking blues (and parallel kinds of "singing poetry" since earliest recorded history)." I developed predictions that musicality is likely to be more pronounced in the speech of young women than in any other category of humans (because of the special value to them of being chosen by the extremely small proportion of males with exceptional power or resources), and that it is likely to be most pronounced in those locations where sexual competition for men has been most extreme, namely where polygyny has been practiced and men's desirability as mates varies widely (probably varying most significantly with access to resources, and with relatively small numbers of males possessing the extremes). In the fall of 1991 I suggested to a graduate student, Mitchell Ross, a project he now has underway, involving having evaluated passages spoken on tape, first by individuals knowledgeable about music for "musicality" (tone, rhythm, melodiousness) and second by "ordinary" people with regard to the question of which voices were more "attractive," and whether "attractiveness" in their terms correlated with "musicality" in the musicians' terms.

In a 1992 book, *Music and the Mind*, Anthony Storr notes that Herbert Spencer, in 1857, and William Pole, in 1924, both argued that music might have arisen from speech, and that Darwin thought instead that music came first. Music is a topic in which it is easy to become confused about origins and subsequent functions because it appears that there have been sequences of different functions, with the likelihood of some ways that vocalizations functioned earlier returning, so to speak, as "new" functions. It is likely that a complex succession and combination of functions and effects is one of the reasons people have been so confused about the history of music. Another difficulty is that modern musicians are often extremely specialized and removed from any context within which music might have originated, and sometimes quite recalcitrant to having their subject analyzed. Thus, one friend of mine, a prominent local composer, told me that when he composes he only hears in his mind the sounds of the particular instruments used in orchestras, never any other sounds. Similarly, another friend who has taught music in college for more than two decades, and is "evolution-minded," nevertheless declined to participate in the experiment Mitch Ross is conducting because she insisted that music cannot be "analyzed" because it is a whole that cannot be dissected into parts like tonality, rhythm, and melody. Musicians are not scientists; it is not their kind of enterprise either to establish and test hypotheses or to seek the kinds of undeniability on which scientists thrive. They seek meaning, which is essentially always somewhat individual in nature; thinking about it and reveling in it leads one in a direction of thought virtually opposite of analysis and even hostile to it. Music is probably a lovely subject to use to illustrate not only the potential for confusion about origins and functions of traits but as well the difference between function as evolutionary reason and function as conscious personal response or effect.

And that's as far as I have gotten.