

## Microcosmic Music: A New Level of Intensity

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Advances in biotechnology are breathtaking to be sure, and our ability to read information encoded in the most fundamental structures of our being marks a great step forward. But, science presents only one side of the picture; it represents one view of life, albeit an important one. We are moved by knowledge, but we are inspired by other means, not the least of which is music. From ancient times, sages have proclaimed the analogous relationship between macrocosm and microcosm. Scientific advances in many ways have confirmed this view. However, the music of the spheres was a long-held metaphor that is once again gaining at least tacit recognition.

The Academy, of course, has long emphasized and illustrated the efficacy of music, and the *Book of Knowledge: The Keys of Enoch* confirms the importance of each of our individual resonances. The implication is that we have our own note, our own song. Yet the question that immediately poses itself asks where the metaphor ends and the reality begins. In this article we will find that the line of demarcation is more illusive than ever imagined.

Here, a San Francisco Bay Area composer, musicologist and sound designer, presents an intriguing first-look at the intimate relationship between genetic material and music. Although Ms. Alexander has produced two tapes thus far, this still represents work-in progress. Anyone interested in obtaining the referenced tapes, learning more, or potentially sponsoring this work is encouraged to contact her at Science and the Arts, P.O. Box 8162, Berkeley, California 94707. The Editors

All day and night music, A quiet, bright reed-song.  
If it fades, we fade.  
Rumi

Is the body creating music? Are we, as the composer Charles Ives felt, walking, talking musicians capable of creating our own symphonies? The answer seems to be an increasingly obvious "yes" as we study the body, its brainwaves, heartbeat, rhythms of blood circulation, endocrine cycles, right up to the microwave level of organ vibration. On the fastest level, we reach the rates of vibration of infrared light, as molecules and their atomic structures vibrate and jiggle, stretch, and bend. If these movements are happening...can they be recorded, can they be "heard"? If so, what would they sound like? Random noise? Melodic?

It was with these questions (as a composer) that I approached Dr. David Deamer, cell biologist at the University of California, Davis, in 1988. Dr. Deamer had published two tapes based on a measuring of the rhythm of the four DNA bases (adenine, thymine, guanine and cytosine) as they traveled along the helix (*DNA Suite* and *DNA Music*). He had discovered some charming patterns that made sense to our ears and bodies. We recognized the movements as music, somewhere between stasis and chaos.



An important key to understanding how we can actually hear high, fast light vibrations is the Law of the Octave. This law states that any vibration of sound (or light) can be doubled or halved, and the same pitch (or light frequency) will result, but what changes is the octave of the sound (or radiation). A simple example: Orchestras tune to the concert pitch A, which is established at a frequency of 440 hertz (cycles per second). Playing the same note at 220 or 880 hertz results in a tone we recognize immediately as an "A," but it sounds either an octave lower or higher than the concert A as such. By taking a very rapid vibration of light and halving it many times (about 35 iterations), we can bring this vibration into the range of hearing. In this manner we can get an idea of what all those light "pitches" might "sound" like if we heard them within the octave range of our sense of hearing. Hence, the sound is relational -- poetic, if you like. But, is it musical?

From an artistic perspective I believe it is. On Earth Day 1990, my first tape, *Sequencia*, was recorded and published in cassette form. This music, for synthesizer, tabla, cello, violin, and voice, is based entirely on a tuning system created out of my collaboration with Dr. Deamer. There are some astonishingly beautiful combinations which arise out of the total number of about 60 pitches that we measured. Most of the pitches are microtonal, that is, their frequencies occur in the areas between the half-tone, or halfsteps, of our normal musical scale. It should be recognized that our equal-tempered scale is a crude one. Microtonal pitches are nothing new, however, in that some cultures have long histories of their use. The most familiar of these, of course, are the cultures of the Indian subcontinent and the Far East, but also those in the Middle East as well.

Many of the DNA "pitches" are tightly packed, or extremely close in frequency. Yet, there are curious leaps, larger intervals of almost minor 7ths. (The layperson may get an idea of this range by performing the following exercise: Sing "There's a place for us" from the popular film musical *West Side Story*; the first two notes are a minor 7th.) Each DNA base, however, is very similar to the other three, with only subtle differences. And, if we are laying out pitches from low to high, the span for each base is about two and a half octaves. We can therefore state with a high degree of certainty that we are creating wondrous combinations of light and sound within our bodies, playing off of and in relationship to each other.

Some listeners, but not all, report profound reactions to the tunings. They describe an expansiveness, an opening, a naturalness in reaction to them. This leads to the interesting possibility that through listening we are somehow setting up a corresponding reaction to the light patterns that are already in place. Are we touching some part of ourselves that is alive and singing? Is there an aspect of us that is coming into resonance with intelligence and possibly even memory? And if so, what is it about the particular ratios involved that might help us access that intelligence? Is some lower fundamental at work, generating the tunings as overtones? Are the sonic patterns relating to other areas of the body in any orderly way that we can perceive? The implications of our findings and the reactions of the listeners to the tunings open heretofore unsuspected vistas of possibilities.

Perhaps by looking at vibrations through the sonic filter we can discover relationships and mystery that have been hidden in their connectiveness -- hidden in the exquisite continuum of our life essence, the quiet, bright reed-song.