

# journal of visual culture



## Auralizing in the Sonosphere: A Vocabulary for Inner Sound and Sounding

Pauline Oliveros

### Abstract

'Auralization' is a term coined by Architect Mendell Kleiner for acoustic simulations of rooms and buildings. This term is also apt for referring to inner sound and sounding, or sounds and sounding heard mentally. Generally the word 'imagination' is used with reference to all senses. Image, of course, is a visual term. So there is a cognitive dissonance when using 'imagination' to refer to hearing inner sound – for example a phrase of a new piece of music. This article introduces some vocabulary for discussing sound including the concept of the sonosphere.

### Keywords

auralize • deep listening • faith • sonosphere • vocabulary

The sonosphere is the sonorous or sonic envelope of the earth. The biospheric layer of the sonosphere is irrevocably interwoven with the technospheric layer of the sonosphere.<sup>1</sup> Humans sense the sonosphere according to the bandwidth and resonant frequencies and mechanics of the ear, skin, bones, meridians, fluids, and other organs and tissues of the body as coupled to the earth and its layers from the core to the magnetic fields as transmitted and perceived by the audio cortex and nervous system. (All of this with great variation, of course). All cells of the earth and body vibrate.

The visual is favored over the aural in our culture. Thus we have fewer words in our vocabulary to express aurality. 'Auralization' is a term coined by architect Mendel Kleiner for simulating the acoustics of rooms and buildings (Kleiner et al., 1993). This term is also apt for referring to inner sound and sounding, or

sounds and sounding perceived subjectively through inner listening. Generally the word 'imagination' is used with reference to all senses. Image, of course, is a visual term. So there is a cognitive dissonance when using 'imagination' to refer to hearing or creating inner sound – for example, a phrase of a new piece of music. This article introduces some vocabulary for discussing sound including the concept of the sonosphere (see also Oliveros, 2006).

I conceive of the sonosphere as beginning at the core of the earth and radiating in ever increasing fractal connections, vibrating sonically through and encircling the earth. The sonosphere includes all sounds that can be perceived by humans, animals, birds, plants, trees, and machines. Human ears are limited to approximately 20hz to 20khz. However, this range can be exceeded by some individuals and extended with the aid of technology.

Just as we can look out into the universe far beyond our seeing eyes with the aid of telescopes and into the micro world with microscopes, we can listen far beyond and below the human range of hearing with microphones. We are, of course, protected from constantly hearing and perceiving the sounds of our body, such as the sound of cells dividing, of blood flowing or neurons firing, etc. However, we can tune into these sounds voluntarily with the aid of technology.

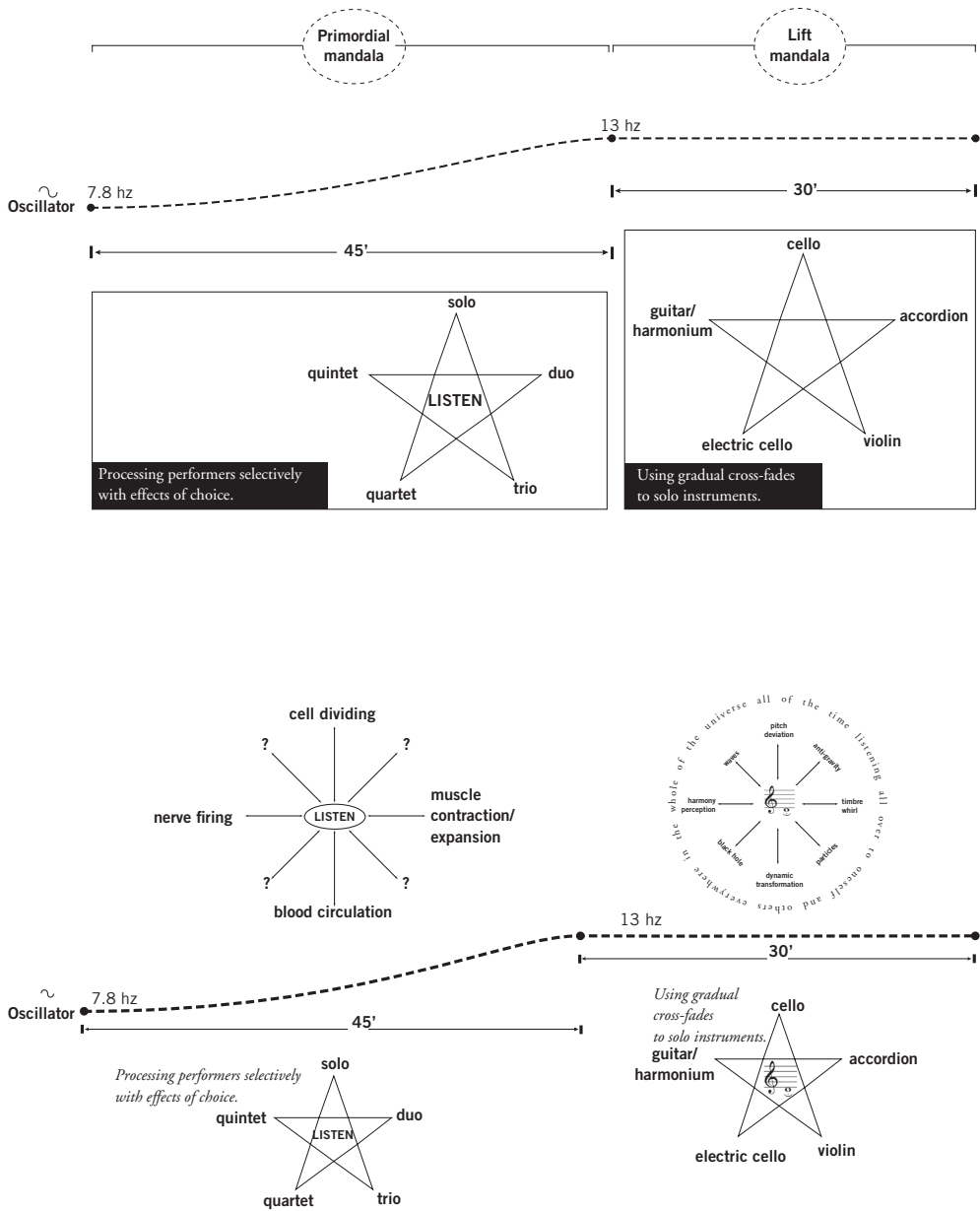
Why would one want to listen to sounds beyond our human range? Or sounds below our threshold of hearing? Curiosity could be the answer and also for the possibility of expanding perception of the sonorous body that we inhabit. Perhaps new data could be collected for artistic purposes and for scientific and medical purposes as well. For example, I ask musicians to auralize the sound of cells dividing as a sonic metaphor in my score – *Primordial Lift* (see Figure 1).<sup>2</sup> It could be helpful though to actually be able to hear the real sound as an example.

We live in a sonorous environment. Most of the time we shut out sound that is extraneous to our current purposes. It takes energy to ignore sounds. Our ears respond to sound involuntarily. It is the brain that processes sound to extrapolate meaning and take action.

I have faith in listening. Listening brings me to faith – faith that I can believe my ears as much as I can believe my eyes. Sound impacts my body and resonates within. Sounds keep returning to me as I listen. Our vocabulary limits discussing inner or mental sound and sounding or listening in dreams and day dreams. We need words that highlight the auditory cortex.

My appropriation of Kleiner's word 'auralization' then can be used to refer to mentally modeling sound by remembering or by creating sound. We need to know that this is possible in dreams as well as daily life. We can project sound in space or the sounding of a composition. We can auralize an improvisation. We can auralize a score without sounding a note outwardly. The body can and does resonate with such auralizations.

Figure 1 Primordial/Lift. © 1998 Deep Listening Publications – ASCAP.



(Continued)

Figure 1 (Continued)

<p><i>Primaldial/Lift</i> is based on information concerning the shift in the resonant frequency of the earth from 7.8hz to 13hz given in <i>Awakening to the Zero Point</i> by Gregg Braden, Radio Bookstore Press (1995). According to Braden the resonant frequency of the earth was measured as 7.8hz in 1960 and by 1994 the measurement was at 8.6hz and it will rise to 13hz by 2010. At the same time the magnetic fields of the earth are diminishing in strength towards zero point. By the time that 13hz is established as the resonant frequency the magnetic fields will reverse their polarity — North will become South and vice versa.</p> <p>The acceleration from 7.8hz to 13hz of the earth's resonant frequency is represented in <i>Primaldial/Lift</i> by a low frequency oscillator. The oscillator is heard indirectly as it moves almost imperceptibly from 7.8hz to 13hz over a 45 minute period and modulates the sounds of various performers in the ensemble. The amplitude of the performer's sound when selected will change rhythmically in step with the oscillator. When the oscillator reaches 13hz it will stabilize for another 30 minutes.</p>	<p><b>PLAYERS INSTRUCTIONS:</b></p> <p><b>Primaldial Mandala</b> — Each of the five instrumentalists follows the mandala as a map to the performance beginning in the center.</p> <p><b>Listen</b> — Each performer listens intently for the moment to perform a selected metaphor. Any of the eight options may be selected at any moment after listening. Always return to the center — listen after performing an option. Any option may be repeated any number of times during the 45 minute period.</p> <p>The given options are: The sound of 1) a call dividing, 2) a misde conducting/expanding, 3) Blood or fluid circulating, 4) a nerve firing.</p> <p>There are four more options designated by “?” for the performers to select their own metaphors on the body theme.</p> <p>Each performer is free to interpret each metaphor selectively and express it in sound.</p> <p><b>Lift Mandala</b> — When 13hz is established the Lift period begins. It may be cued by the processing performer.</p> <p>The center is the note D for all performers and is maintained throughout the 30 minute period by the electric cello. All performers are asked to Listen all over to oneself and to others everywhere in the whole of the universe all the time.</p> <p>The note D anchors the activities. Each performer explores the given options always returning to the note D.</p>	<p><b>THE OPTIONS:</b></p> <p>Pitch deviation from micro tonal to macro tonal always departing and returning to D.</p> <p><b>Rhythmic transformation</b> — When a rhythm is perceived merge with it and then transform it.</p> <p><b>Timbre whirl</b> — Find a way to amplify quick runs of different partials</p> <p><b>Harmony perception</b> — Focus on a pitch that harmonizes with some other player. Play the pitch until the harmony changes or disappears.</p> <p><b>SUGGESTED METAPHORS:</b></p> <p>Anti gravity</p> <p>Black hole</p> <p>Waves</p> <p>Particles</p> <p>Interpret these metaphors or substitute other metaphors on the given theme.</p>	<p><b>PROCESSOR PERFORMER:</b></p> <p>Control the oscillator glide from 7.8hz to 13hz over a 45 minute period, then maintain 13hz for 30 minutes. The output of the oscillator (sine) is intended to amplitude modulate the performers' sounds. Follow the Primaldial star pattern for modulating and other processing. Select a solo performer, duo, trio, quartet or quintet at any moment after listening. Special effects may be applied.</p> <p>Cue the ensemble when 13hz begins. Follow the Lift star pattern and use very gradual cross fades for modulation and processing selected solo performers.</p> <p>The piece ends when the oscillator period is over.</p>
---	--	--	---

We need more words to access the richness of auditory phenomema and to express the meaning of sound and sounding. Here is a rudimentary list to add to our vocabulary so that, instead of speaking of sound and sounding in visual terms, we speak in auditory terms.

audiate  
audile  
auditive  
aural  
auralization  
aurality  
call  
call up  
dissonance  
echo  
inaudible  
inaudibility  
knell  
noise  
noiseless  
noiselessly  
noiselessness  
peal  
phon  
phonal  
phonascetics  
phonate  
phonation  
phonautograph  
phone  
phonetic  
phonic  
phonics  
phonogram  
phonogramic  
phonographic  
phonon  
racket  
randomness  
recall  
resonant  
resonating  
resound  
resounding  
reverberate  
reverberating  
reverberative

ring  
silence  
silentious  
silently  
silentness  
silents  
sonic  
soniferous  
sonogram  
sonor  
sornorous  
sonosphere  
stochasticity  
subsonic  
supersonic  
telephone  
transonic  
unhearable

There are more words to be discovered or invented and added to our vocabulary.

You might begin to notice how your attention changes when you use auditory terms instead of visual terms to speak about sound. Your dreams may become richer and soniferous. Your environment might come alive with sounds formerly unnoticed. The ear tells the eye where to look and the eye sometimes silences the ear.

## Notes

1. There is no dictionary definition for the *Sonosphere*. In my usage of the word, sonosphere is the sonorous or sonic envelope of the earth created by all vibrations set in motion by natural or technological forces that travel through earth from its core to beyond earth, air, fire and water as waves and phonons to receivers. Receivers are humans, all creatures perceiving and using earth bio and technological systems. Vibrations within the range of hearing may be processed consciously or unconsciously; vibrations beyond the range of the human ear are nevertheless received by the body and processed unconsciously or by other inhabitants of the earth and beyond. The biosphere (environment) defines a whole system model of life on earth (see Vernadsky, 1998[1926]). ‘Technosphere’ is the term used to define the effects of the technological tools that are guided by human thought (see Argüelles, 2002).
2. Music and the Brain: a symposium with integrated live performance held at the Stanley Kaplan Penthouse, Rose Building, Lincoln Center, New York on 30 October 2009. The recorded sound of a single cell resembled soft white noise with a dynamic envelope. We were asked to think of the trillions of cells in the body all sounding in this manner. Now that the medical establishment is including the impact and effect of music on the brain there will be a need for more vocabulary to discuss their findings.

## References

- Argüelles, J. (2002) *Time and the Technosphere: The Law of Time in Human Affairs*. Rochester, VT: Bear and Company.
- Braden, G. S. (1995) *Awakening to Zero Point: The Collective Initiation*. Radio Bookstore Press.
- Kleiner, M., Dalenbäck, B. and Svensson, P. (1993) 'Auralization - An Overview', *Journal of the Audio Engineering Society* 41(11): 861-75.
- Oliveros, P. (1998) *Primordial Lift*. CD, Deep Listening Publications, Kingston, NY.
- Oliveros, P. (2006) 'Improvisation in the Sonosphere', *Contemporary Music Review* 25(5): 481-2.
- Vernadsky, V.I. (1998[1926]) *The Biosphere*, complete annotated edn, trans. D.B. Langmuir. New York: Copernicus.

Pauline Oliveros is a world-renowned composer and a central figure in the development of postwar electronic music. Expanding upon Cage's work in environmental sound, she has taught and performed her 'Deep Listening Pieces' around the world for nearly four decades. She was the first Director of the California Center for Contemporary Music and has acted in an advisory capacity for organizations such as the National Endowment for the Arts, the New York State Council for the Arts, and many private foundations. In addition to her 14-year tenure as Professor of Music at UCSD, she has held artistic residencies at over a dozen universities.

*Address:* Deep Listening Institue, 77 Cornell St. Suite 303, Kingston, NY 12402, USA. [email: paulineo@deeplisting.org]