

Some Sound Observations

PAULINE OLIVEROS

Composer Pauline Oliveros (1932–) played a key role in the development of a range of contemporary musical practices: tape music, electronic music, experimental music, minimalism, World Music, and Ambient music. In the early 1960s, she co-founded the San Francisco Tape Music Center, one of the first electronic music studios in the United States. She is well known for a series of haunting electronic pieces (among them *Alien Bog*, *Beautiful Soop*, and *Bye, Bye Butterfly*) that make use of analog electronics and tape delay systems. More recently, Oliveros has built her music around drones generated by her just-tuned and often electronically processed accordian. Throughout her career, Oliveros has actively advocated for the recognition of women composers both in her writings and through the Pauline Oliveros Foundation, inaugurated in 1985. The following piece was commissioned by *Source*, a San Francisco-based magazine that documented the American experimental music scene in the late 1960s. The article exemplifies Oliveros' lifelong investigation into the process of listening, its centrality to composition, and its importance for a holistic conception of human existence.

As I sit here trying to compose an article for *Source*, my mind adheres to the sounds of myself and my environment. In the distance a bulldozer is eating away a hillside while its motor is a cascade of harmonics defining the space between it and the Rock and Roll radio playing in the next room. Sounds of birds, insects, children's voices and the rustling of trees fleck this space.

As I penetrate the deep drone of the bulldozer with my ear, the mind opens and reveals the high pitched whine of my nervous system. It reaches out and joins the flight of an airplane drone, floats down the curve of Doppler effect.

Now, fifteen minutes since the beginning of this writing, the bulldozer has stopped for a while. The freeway one-half mile away, unmasked, sends its ever-shifting drone to join with the train whistle from Encinitas.

The bulldozer starts again moving the air like an audible crooked staircase before reaching its full power. As I lean on my wooden table, my arm receives

sympathetic vibrations from the low frequencies of the bulldozer, but hearing seems to take place in my stomach. A jet passes over. Some of its sound moves through my jawbone and out the back of my neck. It is dragging the earth with it.

I would like to amplify my bowl of crackling, shaking jello. (Once in 1959 a bulldozer came through the side of my house while I was eating lunch. The driver looked at me, backed out, and continued to operate the bulldozer.)

I would like to amplify the sound of a bull dozing.

The bulldozer has stopped again. On the other side of the freeway, a dog repeats a high bark which curves downward. My dog has a tinkling collar. I would like to find a free way.

Three days ago at UC Davis, I experienced a magnificent performance of Bob Ashley's *Wolfman*. My ears changed and adapted themselves to the sound pressure level. All the wax in my ears melted. After the performance, ordinary conversation at two feet away sounded very distant. Later, all ordinary sounds seemed heightened, much louder than usual. Today I can still feel *Wolfman* in my ears. MY EARS FEEL LIKE CAVES. Monday I am going to hear *Wolfman* again. It will be the fourth time I've heard *Wolfman*, and I can't wait to hear the feedback dripping from his jaws again.

My present bulldozer has started and stopped again. A faraway jet simulates a fifty foot tabla, accompanied by an infinite freeway tamboura.

I am tired of writing this article, but not of the opportunity it is giving me to listen and remember. My chair is creaking as restlessness grows. I wonder what God's chair sounds like? I would like to amplify it. I would like to amplify a spider spinning its web.

Loren Rush calls his new work Theater of the Mind. Since last night, he is still playing and singing in the theater of my mind.

The bulldozer remains silent. A very low frequency is shaking my belly. (7 Hz at high intensity can make you sick or kill you.) It is an automobile becoming more apparent as it passes, now accented by a motorbike.

(Once in a half-waking state, my head was held hard against a wall by the sound of a model airplane motor. I thought some cosmic dentist was drilling for my mind's tooth.)

The breeze is rising and blowing my papers about the table. The rustling in the trees sounds like tape hiss until it mixes with the next plane overhead.

Recently, a young man described his experience working in proximity to jet engines. After overcoming fear of the sound, he began to find sounds to listen to, such as small tinklings within the engine.

Why can't sounds be visible? Would the feedback from ear to eye cause fatal oscillation? Can you remember the first sound you ever heard? What is the first sound you remember hearing?

Why shouldn't a music department in a university devote itself entirely to music since 1950? Without a substantial body of new literature and instrumentation, the symphony and opera will become defunct—dead horses in the 21st Century. Who cares.

I often think of the title of one of La Monte Young's pieces which I have not yet had the pleasure of hearing: *The Second Dream of the High Tension Wire*.

In the Schwann long-playing record catalog there are special sections for railroads, sound effects, sports cars, test records, and honky-tonk piano, but none for electronic music.

When a concert pianist is on tour, he usually finds a tuned Steinway grand piano to play. What kind of sound system does the electronic musician find?

When I stopped writing yesterday, I went on listening. I attended dinner in a Syrian restaurant and ate a concert with my *Wolfman* ears. The house lights dimmed to a singing SCR (Silicon Controlled Rectifier). Spots came up and the bassoon soloist walked on the stage, bowed to the applause, walked off again and told someone to turn off the heating fan which was playing a duet with the SCR. He returned, bowed again to the new round of applause. His taped accompaniment began. I heard trees rustling in the speakers.

Loren Rush has synthesized a bassoon sound at the artificial intelligence center at Stanford. With John Chowning's programming, he can make it move in circles, ellipses, or figure-eights around two speakers. He can make the synthesized bassoon do a *glissando*. Loren has a lecture entitled "A Day in the Life of a Plastic Bassoon."

Next, a quiet trio played in the manner of Morton Feldman: accented, perfectly-cued car drones.

I listened to a Schubert octet in the recording engineer's sound booth. The speakers added their characteristics to the orchestration. As we watched the audience, the engineer said, "Those people are not listening to the music as it was intended. They should be having dinner."

I am inside my house now. Outside, sounds are attenuated by the insulation. I hear a dripping faucet and the ticking of my cuckoo clock. They combine and are joined by the refrigerator. The planes from Palomar Airport dwindle in through the furnace openings.

I have listened to many refrigerators. There is often a flickering between the sixth and seventh harmonic. Once, while in the process of drinking ouzo with David, Bob, and Orville, a refrigerator sent its harmonics out to surround my head with circles, ellipses, and figure-eights.

In 1963 I made a tape piece for dancer Elizabeth Harris. It was made from piano sounds. On the night of the first performance, I stood in the wings prepared to start the tape recorder. Suddenly, I heard the opening sounds of my piece, but the tape transport was not moving. The dance involved a mobile that was suspended from a strand of piano wire. When the mobile was lowered, it moved like a pendulum, causing the piano wire to vibrate.

In New York, Terry Riley led me fifteen blocks out of our way to hear a building ventilator. I wonder what microbes hear?

Sitting in a parking lot on my third day of article writing. I could listen to the stereophony of car starter gaggings, motor wiggings, door squeals, and "bllaps" forever. It's almost like Debussy, compared to Saturday's Wagnerian bulldozer.

The best part of Lincoln Center is the tunnel from the IRT to the Beaumont Theater. Walking toward the theater, my footsteps greeted me from the approaching wall; midway, they followed me from the opposite wall. I listened to this more than one hundred and fifty times—an Alice in Tunnelland—while moving from the saga of subway sound to Brechtian music drama.

"If the moon is ever visited, one feature of its environment will be known beforehand with certainty; the wastes will be noiseless except for vibration transmitted through the solid surface. Since there is no gaseous atmosphere, there can be no tread of footsteps heard, no rustle of clothing, and if an obstruction is dyna-

mitted, the debris will fly apart silently as in a dream." (Edgar Villchur: *Reproduction of Sound*)

During the quiet evening of a summer vacation near the Feather River Canyon, Lynn, Bob, and I wanted to play music. We decided to read John Cage's *Atlas Eclipticalis* from the original score, which was shining brightly above.¹ The canyon creatures joined us as we played, and we played until our awareness became imbedded in the canyon and summoned a ghostly, floating train, an apparition of metal meeting metal, reflected doubly, triply, endlessly from the canyon, from the mind, from the flickering passenger windows, the rumbling ties, OUR EARS FELT LIKE CANYONS. We didn't speak until morning.

One's ideas about music can change radically after listening to recorded works at fast forward or rewind on a tape recorder. Ramón Sender arranged Wagner's *Ring Cycle* by a series of re-recordings at fast forward to four successive clicks. "The auditory basis of obstacle detection by bats was independently recognized in 1932 by a Dutch zoologist, Sven Dijkgraaf, who made a careful study of these faint, audible clicks and noted how closely they were correlated with the echo-location of obstacles. This is an example of the need for care, patience, and appropriate conditions if one is to notice and enjoy some of the more fascinating facets of the natural world." (Donald R. Griffin: *Echoes of Bats and Men*)

According to Loren Rush, the reason for studying counterpoint is that you may have to teach it some day.

"Airborne sound waves are reflected back almost totally from the water, and underwater sound is equally well reflected back downward from the surface . . . once proper equipment was available for converting underwater sound to audible airborne sound . . . underwater listening became refined enough and common enough to reveal the immense variety of sounds used by marine animals." (Ibid)

In most schools and universities the language laboratories are better equipped for sound processing and modifications than the music departments.

Human hearing is non-linear. Our ears are less sensitive to low and high frequencies approaching the limits of audibility. Our ears are most sensitive at about 3000 Hz where some people can hear collisions of air molecules.

A fast sweep of the audio range by a tone generator can produce a click.

"Some animals, notably insects, do not have ears in their heads but in such unlikely places as legs (some crickets) or the thorax, the 'middle' portions of the insect body to which the legs attach (some grasshoppers)." (Bergeijk, Pierce & David, *Waves and the Ear*)

I stopped writing yesterday in order to go on listening. Monday's performance of *Wolfman* was somewhat marred because the sponsors failed to provide proper speakers and amplifiers. I heard Wolfman's ghost drooling feedback.

Many music departments are more concerned with analysis than communication.

When I was sixteen, my accordion teacher taught me to hear combination tones. The accordion is particularly able to produce them if you squeeze hard enough. From that time, I wished for a way to eliminate the fundamental tones so I could listen only to the combination tones. When I was thirty-two, I began to set signal generators beyond the range of hearing and to make electronic music from amplified combination tones. I felt like a witch capturing sounds from a nether realm.

In one electronic studio I was accused of black art, and the director disconnected line amplifiers to discourage my practices, declaring that signal generators are of no use above or below the audio range because you can't hear them. Since all active processing equipment contains amplifiers, I found that I could cascade two pieces of equipment and get enough gain for my combination tones to continue my work, plus the addition of various amplifier characteristics as orchestration. I worked there for two months, and, for recreation, would ride my bicycle to the town power plant where I would listen for hours to the source of my newly-found powers.

Saturday's bulldozer has gone away. The birds and insects share the air with waxing, waning plane and car drones. The insects are singing in the supersonic range. I hear their combination tones while the insects probably hear the radio frequency sounds created by motor drones, but not the fundamentals. If we could hear the micro-world, we would probably hear the brain functioning.

NOTES

1. [*Atlas Eclipticalis* is a graphic score rendered from star charts —Eds.]