What is sound? What is sounding?

An ample, adjustable definition for both terms is resonance, precisely because resonance is and is not sound. Stretching beyond the acoustic, auditory, and audible to reach the zone of the vibratory, resonance transduces energies across various media. Therefore, it can enlist not only the sonic but also the tactile and haptic, as well as that which oscillates just beyond the sensible, in the domain of what dubstep artist Kode9 calls unsound.1 Resonance—transductive and synchronous vibration—operates, too, in the register of the associative imagination, which turns out to be, with some frequency, at the very center of its imagined opposite: scientific rationality. In Reason and Resonance, historian of sound Veit Erlmann suggests that there is a minor-key Western tradition that has hearing, listening, and feeling resonance as a path to reason.2 If the dominant visual idiom of reflection has posited that the mind is a mirror of the world—an entity detached, apart, objective—then resonance suggests participating in the world, moving in sympathy, working in an empirically attuned embodiment. Resonance allows us to understand how energy must always be translated, through a relay of associations, in order for it to be received at a point distant from its source.

Within this alternative Western tradition of resonant rationality, the human has been envisaged as an Aeolian harp, an instrument named for the ancient Greek ruler of the winds, Aeolus. The Aeolian harp resonates with the wind, animated by the world around it, air brought to a dynamic instability so that it might oscillate strings and transduce energies that are thereby moved to sing. Such a harp, made by humans, becomes an eerie nonhuman agent, famously celebrated in the poems of Samuel Coleridge, the music of Frédéric Chopin, and the works and philosophies of other Romantics. The Victorians considered the harp a sensitive, an attuned being, imagined in that age as essentially feminine (whether Bruno Latour’s “Sensitizing” invites an ungendering or transgenders the sensitive is open to question).3 When Henry David Thoreau listened to wind traveling through telegraphy wires—those 19th-century modern skeins of cables carrying significant signals—the Aeolian harp of the Romantics went electric (FIG. 1).


Sifting wind through their wiry strings, telegraph cables also oscillated in another, more interior, realm. Resonating in the audible range of human hearing, they simultaneously transduced via their inner channels the resonance of electromagnetic energy from the earth’s ionosphere. The off-duty machinist Thomas A. Watson, listening in on this static sizzle, was more fascinated by such “clicks and tweeks” than his boss Alexander Graham Bell, hearing it as a kind of unearthly 20th-century music of the spheres. Here, human sensing moved into the domain of what media scholar Douglas Kahn calls the *electrosonic.* Strings and wires, resonance without and within, the transduction of celestial energies into accessible form—the *electrosonic* became a model for what modern human hearing could aspire to be. For Hermann von Helmholz, of course, hearing had already become explicable through an analogy with the telegraph; the ear was “a tuning fork interrupter with attached resonators,” transducing sound for the listening mind. Fast-forward to information theory at mid-20th century, at which moment the MIT-based founder of cybernetics, Norbert Wiener, turned hearing into a function that might be imitated and installed in cyborgs, looping acoustic capacities between organisms and machines. Such cyborgian sounds have been with us ever since. They weave through modern music, as Christina Dunbar-Hester suggests—from the work of John Cage to Bebe Barron to Wendy Carlos to Brian Eno to Afrika Bambaataa to Jessica Rylan to Janelle Monáe. Cyborg sounds find themselves instantiated in technologies such as the cochlear implant, or the “eyeborg” that allows color-blind Neil Harbisson to “hear” color.

That cybernetic story reverberates in the work of Alvin Lucier, known for compositions that investigate sound as resonance, as transduction, as amplification, or as perceptual effect. Lucier, too, has tapped the *electrosonic,* setting up antennae to pick up the energies of lightning whistling through the ionosphere (codified in his 1981 piece *Sferics,* an activity featured in Robert Ashley’s film about him, *Music with Roots in the Aether* (1975). With Lucier’s 1969 *I Am Sitting in a Room,* “composition” is given over to the resonant frequencies of a room in which a speaking and listening performer sits, an enclosed space that begins to hum with reverberations set off by the simple probe of a voice, recorded, and recursively replayed into the same space, then recorded again, both testing the sonic affordances of specific spaces and making them ring like resonant bells and lapping baths of sound. In the 1965 *Music for Solo Performer,* Lucier scaled resonance down from the atmospheric and even down from the architectural-acoustic, to the realm of the internal bodily milieu, amplifying brainwaves of the alpha state in order to produce impulses that would activate percussion instruments—a practice of cyborg resonance that blurs boundaries between the intentional, agentive human author and the inhuman electromagnetic materials of which fleshy bodies are made. This piece is, in the vernacular, “mind-blowing.” It forms what I want to call an “audiodelic” exploration of the insides and outsides of human experience akin to what Tauba Auerbach theorizes for the psychodelia of color. Lucier’s performative range complicates a simplistic notion of signal transmission-reception. (See Tauba Auerbach, “Amphibian,” and Alvin Lucier with Brian Kane, “Resonance” in this volume.) Resonance and transduction are both active, ensuring that while the listening subject is specifically situated, she is also filtered, calibrated, and tuned to pick up signals amid noise, sometimes switching the cultural valuation of one for the other (turning noise into signal, nonsense into sense). Listeners become the sound engineers of their own spatial-temporal experience.

There may be resonance in the forest without animals to hear it, but there is no life of sound as such without an animate apparatus of sensing. My own interest in the anthropology of sound led me to join a submarine dive in the Woods Hole Oceanographic Institution’s three-person research submersable named *Alvin* (fig. 2). (One might hope this was in homage to Lucier, but in fact the namesake was Allyn Vine, a scientist at Woods Hole.) Sinking to the bottom of the sea in order to explore underwater volcano fields in the eastern Pacific Ocean, the submarine surrounded its human inhabitants with the sounds of sonar pings, of cyborgian robotic subroutines, of the MP3 player of the pilot. These auditory emanations all contributed to my sense of immersion: in sound, in water, in the culture of oceanographers. But that immersion was hard won—the result of an assembly of technologies working well, working in sync, working...
In harmony. The components of this sonic envelope formed by the ocean itself, sloshing around us, were thoroughly mediated and structured in this situation. The water had to stay outside the sub; so what were we hearing in our small pod of displaced and submerged air? Put simply, in order for us submariners to feel immersed in sea sound, this energy had to be seamlessly transduced, translated from the watery surround into our interior sphere. There is no self-evident immersion, no self-evident presence, without the work of signal transduction, which can glitch at any time, drowning us in sound unwound. No self-evident “presence,” because that merely labels the experience of immersion without acknowledging the transducing processes that always already need to be there. There is no life of sound without an apparatus of sensing, and this transducing apparatus frames and forms effects typically associated with subjective experience. In this sense, presence might be understood to be a particularly convincing illusion formed as various processes unfold—the registration of sound waves on eardrums, the transduction of mechanical vibration into neuronal impulses, the reading of same as identifiable sources of sound—each of which require multiple acts of transduction before presence can be felt.6

But presence implies co-presence (being “in the presence of”). Being present to sonic energy can give humans the feeling of something preexisting their sensing. Back in 1960, minimalist composer La Monte Young proposed, according to musician and critical theorist Seth Kim-Cohen, “sound as an organism with its own reason for being.”7 And in 1975, French critic and composer Michel Chion pronounced that sound “unscrolls itself, manifests itself within time, and is a living process, energy in action.”8 These are tropes of presence as self-evident: sound is there, living and acting. Being. But, as electronic music critic Tara Rodgers has shown, such statements emerge from an audio-technical tradition, dating back to Helmholz, that gives to sounds the status of discrete individuals whose lifetimes can be graphed, whose energies can be isolated from the “big blooming buzzing” world whose properties can be purified (as with the sine wave), and whose essences can be known through the shape of the waveform.9 Rodgers argues that the waveform, rather than simply a preexisting thing in the world, should rather be seen as an artifact of the technological apparatuses designed to capture and represent it—exemplified by the 1943 Triumph Wobbulator (Fig. 3). Once pictured in this way, the waveform’s technological origins are often erased, its debts to transducing operations forgotten. The waveform is present in sound. In a term borrowed from Bruno Latour and Steven Woolgar’s Laboratory Life, the waveform becomes an inscription, one that resonates with its conditions of production, but then effaces these in an autotelic fantasy of disclosing a pure reality.10

Resonance has a history, a language, and an infrastructure. It is indebted to transduction, all the way up, down, and across. In the contemporary moment, we and our machines have come to specialize in transducing operations in order to produce what we can then call experience.