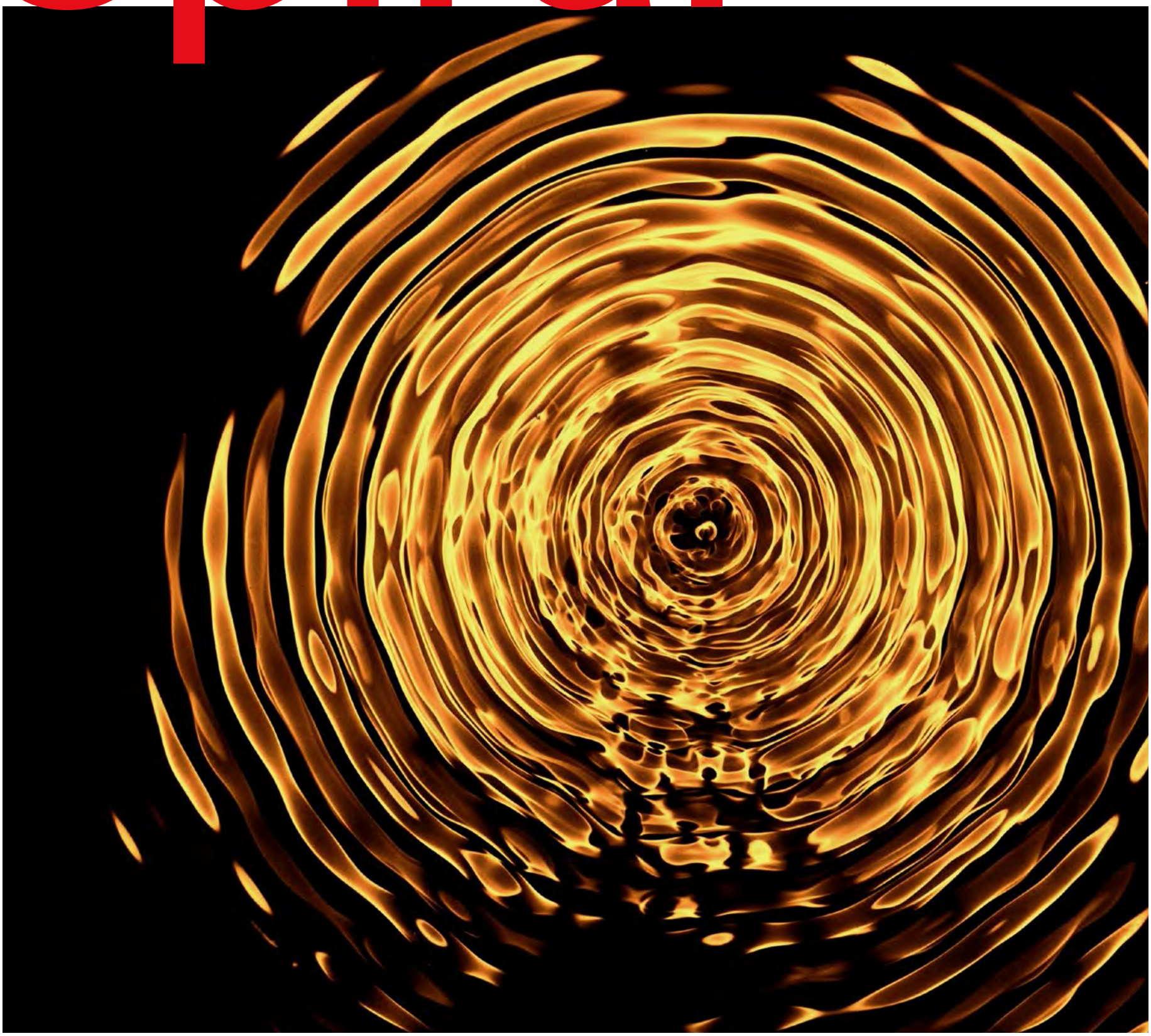
Spiral

THE SOUND ISSUE



THE RUBIN

The acoustics of the **universe**

Music that makes **Moby** smile

Learn to listen like **Krista Tippett**

The **sonic desires** of your reptilian brain

ACKNOWLEDGMENTS

This magazine is published in conjunction with the exhibition *The World Is Sound*, organized and presented by the Rubin Museum of Art, New York (June 16, 2017–January 8, 2018) and curated by Risha Lee with the assistance of Anna Cahn and Amy Goudge.

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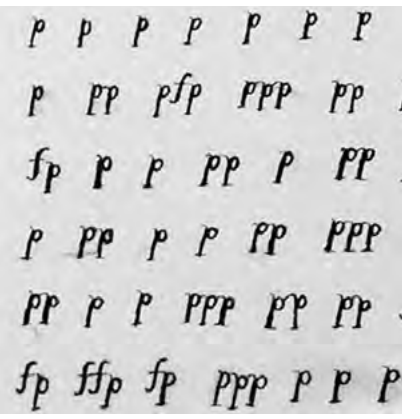

LISTEN TO AUDIO, FIND ADDITIONAL CONTENT, AND EXPERIENCE MORE OF SPIRAL AT RUBINMUSEUM.ORG.

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John Stuart Reid is an English acoustics engineer, scientist, and inventor. He has studied the world of sound for more than thirty years and speaks extensively on his research findings to audiences throughout the United States and the United Kingdom. Inventor of the CymaScope Pro, a tool for visualizing sound, his primary interests lie in investigating sound as a formative force and discovering why sound heals.

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C. Spencer Yeh is recognized for his interdisciplinary activities and collaborations as an artist, composer, and improviser as well as for his music project Burning Star Core. Yeh has toured and performed at venues ranging from the 2014 Liverpool, Whitney Museum, and Museum of Arts and Design Biennials to the Pérez Art Museum (Miami) to the Kunsthalle Stavanger (Norway) among many others. Recent recorded works include *Ambient, Transitions,* and *Wake Up Awesome*.

Do You Listen to Art?

Milarepa and Scenes from His Life (detail); Tibet; 18th century; pigments on cloth; 47 x 34½ in.; Rubin Museum of Art, gift of Shelley and Donald Rubin; C2006.66.26

Sound enwraps us all, and there is no escape from it. We cannot close our ears like we can choose to shut our eyes. And sound—both the wanted and unwanted varieties—affects us in manifold ways. Your brain's expectation of a particular section of a musical composition not only leads to the release of neurotransmitters but can also give you goosebumps. A repetitive lullaby puts babies to sleep. Sound can make us cry but also create the irresistible urge to move our bodies. Sound can unite and divide. Sound allows us to exchange information. Sound can make us quiet. Sound can damage our hearing and make us sick. Sound can heal.

The prevalent use of headphones in our times is a strong visual reminder of our attempt to claim control over what we hear. Some might be listening to an informative podcast, others to a favorite track from an album, and some might simply be trying to cancel out external sounds. But when was the last time you truly listened to art? When was the last time you used your ears to see?

The Rubin Museum's exhibition *The World Is Sound* invites you to do just that. Many of the objects in the exhibition were used in a context extending well beyond the purely visual domain to which we are so accustomed in an art museum. How can we understand the transformative power of a deity that has a sacred syllable on its chest without considering the powerful sound of that syllable? We invite you to listen to the mantras associated with the thangkas and sculptures on display but also experience the power of communal chant by immersing yourself in a composition of thousands of OMs visitors recorded this spring. Also featured in this exploration of sound is a site-specific audio installation made of drone-like sounds that extends from the ground floor to the ceiling of the Museum's uppermost gallery. It is only your movement through space and time, that unlocks the power of this composition. And there are other seemingly empty places that make up the physical space of the Museum in which you may encounter sonic journeys of all sorts. Sound enwraps the Rubin, and we invite you not only to be part of these installations but also to listen and to let them transform you.

The Rubin Museum's iconic spiral staircase lends itself to the name of this publication accompanying *The World Is Sound.* While the cochlea, a spiraling mechanism in our inner ear, only makes two and a half turns around its axis, this magazine circles sound in many more turns, offering deeper insights into the exhibition and contributions that cover sound more widely, demonstrating how it is relevant to us today. Where else can you ponder a lama's thoughts on silence on one page and learn about the first sound Moby remembers on another? Scholars, scientists, writers, artists, and practitioners have kindly agreed to share their expertise with us, allowing you to dive deeper into the world of sound.

Patrick Sears
Executive Director

Jorrit Britschgi
Director of Exhibitions, Collections, and Research

SYNTHESIS

DRENCHED IN MAGENTA LIGHT and saturated with the fragrance of Nag Champa incense, a studio apartment above an Italian restaurant in New York City's Tribeca neighborhood throbs with a loud and dense electronic drone pouring from monolithic speakers in each corner of the room. The sensory amalgam is intense, particularly the flow of sound, which vibrates the viscera and prickles the eardrums through an array of pure tones that span the audible spectrum. The sound is static, temporally unchanging, though a turn of the head or a walk across the white-carpeted floor reveals different elements in the sonic field.

This is La Monte Young and Marian Zazeela's *Dream House*, an installation first mounted in Munich in 1969 and running more or less continuously since 1993 in its current location above the couple's Church Street apartment.

Fifty-three blocks north, in the hubbub of Midtown Manhattan, another seminal sound installation broadcasts its steady drone, a harmonic cluster of tones unexpectedly emerging from an unmarked subway vent on a pedestrian island crossed each day by thousands of shoppers, theatergoers, workers, and businesspeople. The piece affects a slight shift in the sensory landscape, defining a sonic space that's perceptible but, for many who pass through it, sensed only at the edge of awareness. Installed by the artist in 1977 and dismantled in 1992, Max Neuhaus's *Times Square* was relaunched in 2002 and since then has sounded twenty-four hours a day, seven days a week as one of New York City's great works of public art.

What accounts for this fascination with the drone among the pioneers and current practitioners of sound art? The answer to this question plunges us into technological, philosophical, and spiritual concerns and projects us back into sound art's prehistory. With the invention of the phonograph in 1877, Thomas Edison unwittingly disclosed a new field of sound and a new way of thinking about it. Edison saw the device primarily as a means to register human speech and music, yet the phonograph makes no distinctions among audible phenomena.* With equal facility it captures vocal utterance, musical pitches, the whoosh of the wind, the rattle of traffic, and the hum of the device itself. The whole world of sound became available for aesthetic apprehension and appreciation, though it took some time for this capacity to be fully grasped. The Futurist painter Luigi Russolo affirmed this sonic shift in his 1913 manifesto *The Art of Noises*, which expressed his desire to orchestrate "the eddying of water, of air or gas in metal pipes, the muttering of motors […], the throbbing of valves, the bustle of pistons, the shrieks of mechanical saws," and other sounds of urban life. The widespread availability of portable recording devices by the mid-1940s enabled radio engineer Pierre Schaeffer to realize Russolo's vision through a set of "noise studies" that montaged audio recordings of everyday sounds—notably, locomotives at a Paris train station.

The philosophical resonance of noise was more fully grasped by John Cage, whose infamous 1952 composition *4'33"* asks the performer to make no intentional sound. As such, the piece shifts aesthetic attention from the foreground to the background, from music to what Cage called in his *Future of Music: Credo* "the entire field of sound." Reflecting on this piece, Cage remarked: "I have felt and hoped to have led other people to feel that the sounds of their environment constitute a music which is more interesting than the music which they would hear if they went into a concert hall."† Cage thus attuned his listeners to a domain of sound that precedes and exceeds music and, indeed, all human contributions: the sonic flux of the world, the broadband totality of sound that has filled the world since time immemorial. Inspired by Russolo, Cage, and the growing ecology movement of the 1960s, Canadian composer R. Murray Schafer proposed in the early 1970s in his *The Music of the Environment* to treat the world as a "vast musical composition which is unfolding around us ceaselessly." Schafer termed this "the world soundscape," describing it as a macrocosmic flow of sound composed of more limited soundscapes, or acoustic environments.

Cage and Young drew deeply from Asian spiritual traditions: the former from Zen Buddhism, the latter from Hinduism and Sufism. Young has often pointed to the ancient Indian Vedic distinction between *ahata nada* ("struck sound") and *anahata nada* ("unstruck sound"), between what we call music and the cosmic harmony of the universe.‡ Like the *nada-yogi* who employs music as a vehicle for transcendence, Young conceives of his drones—collections of pitches calculated with precise mathematical rigor—as pointing the listener toward the abstract numerical structure of the cosmos. Cage, too, hoped to reveal the transcendental condition of all music, but for him this source was more mundane and material: background noise, the constant flow of worldly sound from which all music and speech emerges and into which they inevitably recede. Either way, the sensuous manifestation of this transcendental sonic domain can only be a drone: a bewilderingly complex concatenation of pitches or noises.

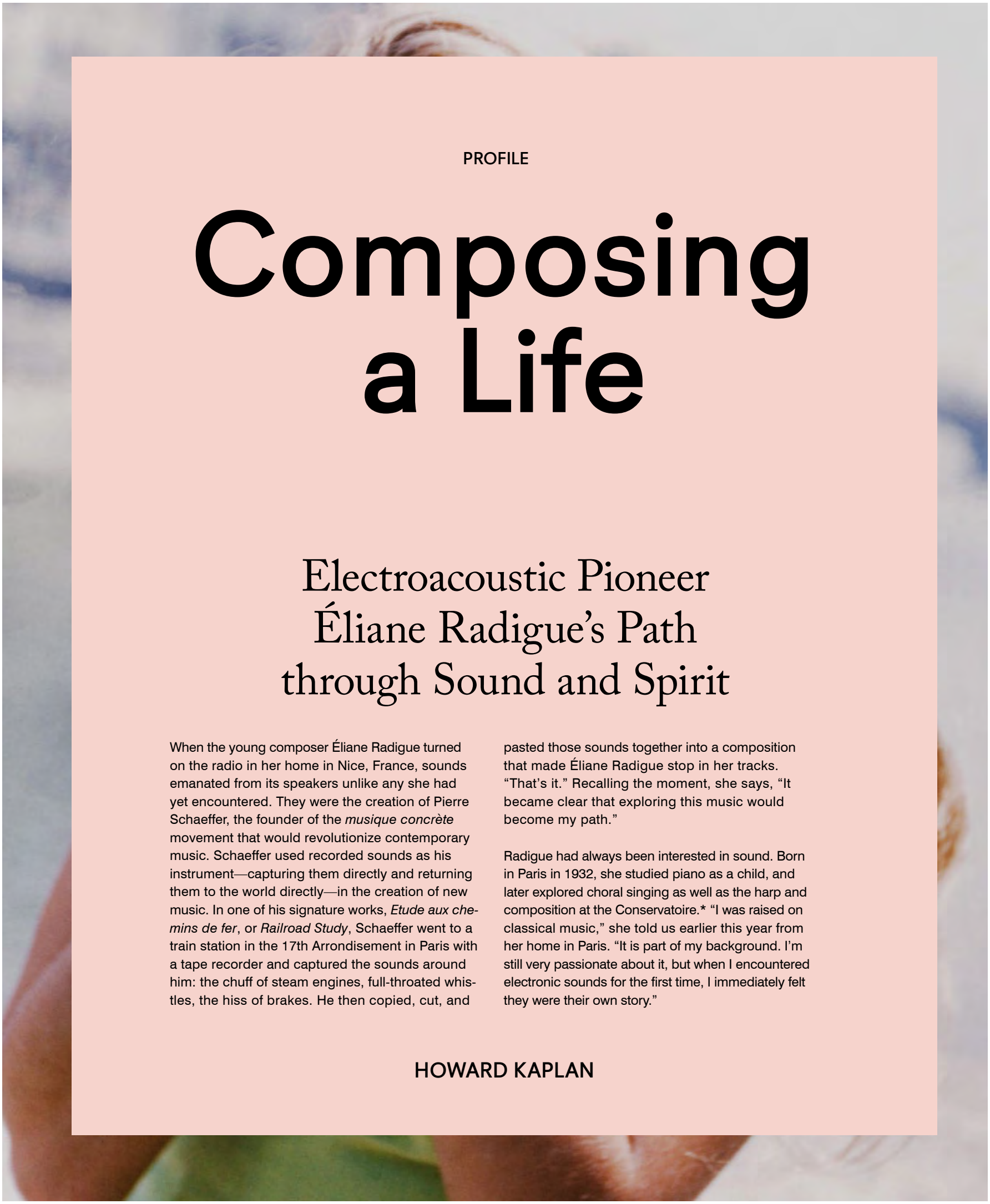
The affective, conceptual, and spiritual power of the drone has proven to be a constant inspiration for experimental composers and sound artists since the 1950s and 1960s. It is evident in the sublime electronic compositions of Éliane Radigue, Alvin Lucier's seminal installations *Music on a Long Thin Wire* and *I Am Sitting in a Room*, the rainforest soundscapes of Francisco López and Steven Feld, Toshiya Tsonoda's vibration studies, the dark metal of SUNN O))), the aquatic field recordings of Annea Lockwood and Jana Winderen, the urban hum revealed in Christina Kubisch's *Electrical Walks*, and so much more. Disparate though they may be, all these projects attune us to something beyond themselves, employing the drone as a microcosm of, and vehicle for transport toward, the macrocosmic sound of the universe.

CHRISTOPH COX

* See Thomas Edison, "The Perfected Phonograph," *North American Review* 146 (June 1888), 641–50.

† *Conversing with Cage*, 2nd Edition, ed. Richard Kostelanetz (New York: Routledge, 2003), 65.

‡ See Gabrielle Zuckerman, "An Interview with La Monte Young and Marian Zazeela," American Public Media, July 2002, and "La Monte Young and Marian Zazeela at the Dream House: In Conversation with Frank J. Oteri," *New Music Box* (October 1, 2003).



PROFILE

Composing a Life

Electroacoustic Pioneer Éliane Radigue's Path through Sound and Spirit

When the young composer Éliane Radigue turned on the radio in her home in Nice, France, sounds emanated from its speakers unlike any she had yet encountered. They were the creation of Pierre Schaeffer, the founder of the *musique concrète* movement that would revolutionize contemporary music. Schaeffer used recorded sounds as his instrument—capturing them directly and returning them to the world directly—in the creation of new music. In one of his signature works, *Etude aux chemins de fer*, or *Railroad Study*, Schaeffer went to a train station in the 17th Arrondisement in Paris with a tape recorder and captured the sounds around him: the chuff of steam engines, full-throated whistles, the hiss of brakes. He then copied, cut, and pasted those sounds together into a composition that made Éliane Radigue stop in her tracks. "That's it." Recalling the moment, she says, "It became clear that exploring this music would become my path."

Radigue had always been interested in sound. Born in Paris in 1932, she studied piano as a child, and later explored choral singing as well as the harp and composition at the Conservatoire.* "I was raised on classical music," she told us earlier this year from her home in Paris. "It is part of my background. I'm still very passionate about it, but when I encountered electronic sounds for the first time, I immediately felt they were their own story."

HOWARD KAPLAN

Éliane Radigue, 1955, photograph by Jacques Brisseaut, courtesy of Fondation A.R.M.A.N and the artist

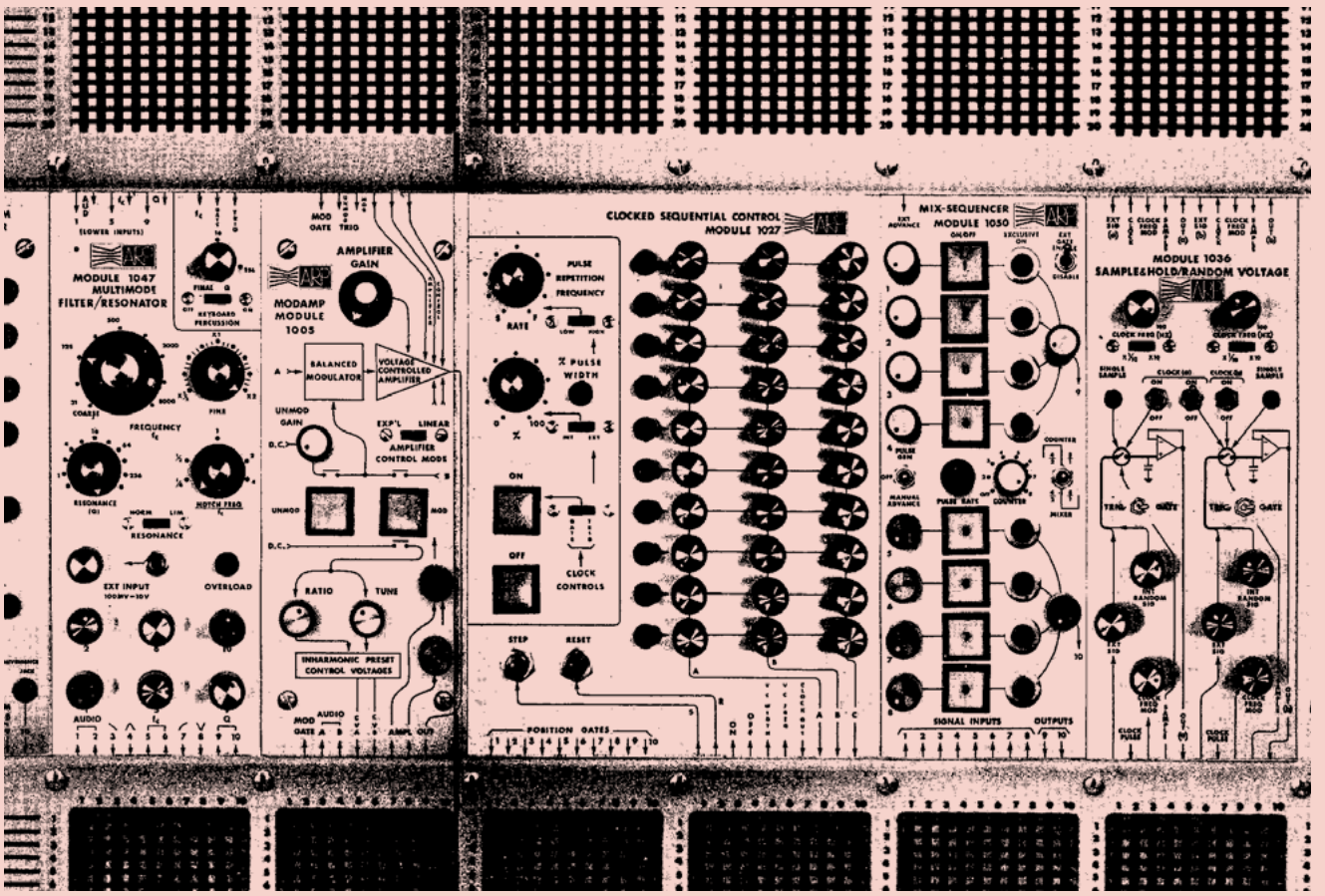
Those sounds she heard on the radio inspired her to connect with Schaeffer. Soon she would start commuting from Nice to Schaeffer's studio at Radio Transmission France (RTF) in Paris and eventually become his assistant. With Schaeffer she learned how to cut and splice tape and how to make montages, working with, as she says, "a few old machines from the first generation of tape recorders in the 1950s," as well as a mixing board, an amplifier, loudspeakers, and a microphone.† Later she began work at Studio Apsome under the mentorship of Pierre Henry, another important member of *musique concrète*. With Henry she abandoned the techniques she learned from Schaeffer and began to work with feedback. She had a gift for making feedback poetic, offering an incredible elegance and delicacy. It wasn't long before she left Henry and *musique concrète* in order to embark on her own story in sound. As she recalled in an interview with the blog *Electronic Beats* in 2012, "There was some music I wanted to hear and to hear it I had to make it. It's as simple as that."

"There was some music I wanted to hear and to hear it I had to make it."

Radigue kept working with electronic sounds, using feedback effects with a mic and a loudspeaker. In the late 1960s she began creating what she called "sound propositions," or environmental music for art gallery exhibitions, installations, and happenings, often using three long tape loops. In one of these propositions, part of a stark white installation by artist Tanya Mouraud at the Galerie Rive Droite, Radigue hid her speakers behind panels in the gallery walls to prevent her equipment from intruding and looking like "a tarantula in a dish of cream." Her work was to be heard but not seen.

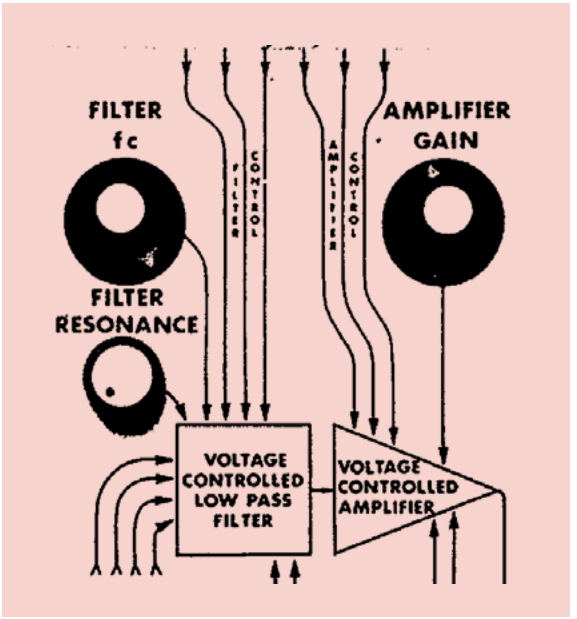
Though the sound propositions and feedback were her focus, in the 1970s Radigue became interested in working with synthesizers. However, one was not readily available in France. So she headed to the United States and spent a year at the Electronic Music Center at New York University, where she explored a modular synthesizer designed by Don Buchla and installed by composer Morton Subotnick. In addition to the "Buchla," Radigue also experimented with the Moog synthesizer, but when she tried the ARP 2500, she knew that it was the instrument for her.

In fact she referred to her beloved ARP as "the Stradivarius of synthesizers" and brought it back with her to Paris to have it installed in her apartment. The modular instrument's optional keyboard was left behind. Radigue preferred to connect directly with the ARP's potentiometers—those knobs whose



Details of the ARP 2500

subtle changes Radigue had mastered—getting as deep as possible into the "unfolding" of sound. With her synthesizer of choice, she created drone-based sounds and deeply layered compositions that reveal themselves slowly and were more akin to the minimalist compositions of Steve Reich and Phillip Glass, with whom she became friends in New York, than to those by her *musique concrète* forebears.



In 1975, after a performance of the first part of Radigue's trilogy *Adnos* at Mills College in northern California, three young French people came up to her and said, "Do you know it is not you doing the music?" The complex and pointed statement confused and intrigued her. The trio were disciples of the Buddhist teacher Kunga Rinpoche, and, along with their cryptic wisdom, they gave Radigue the address of Karma Kagyu, a Tibetan Buddhist center in Paris. "When I returned home I went there immediately, and I have never looked back."

Spirituality has always been an important aspect of Radigue's life. She grew up Christian—at one point even wanting to become a nun—and later undertook the study of Hinduism. "There were always signs in my life pointing me toward some direction," she says. After her visit to Karma Kagyu, she became a devoted student of Buddhism, and as her practice deepened, she felt she needed to stop making music: "I cannot do two things at once. I need to be fully into it. While I still stayed a bit connected to my music, my life was mostly dedicated to going to the Dordogne with my master, Pawo Rinpoche."

Though Buddhism took her away from music, it was Buddhism that brought her back. She was inspired by the words of the venerated eleventh-century Tibetan Buddhist poet-saint-yogi Jetsun Milarepa. She went to her master in deference to ask if she could make a piece based on this historic figure. His response: "Some karmas need to be lived."

An encouraged Radigue immersed herself in the project, which became *Les Chants de Milarepa*, or *Songs of Milarepa*. The recording included the voices of composer Robert Ashley and Radigue's spiritual teacher Lama Kunga Rinpoche. Her return to music was not as radical as one might assume. She feels she ended up composing "the same music I was doing before encountering Buddhism." There was no before and after; the sounds and textures were consistent.

"As is often the case when I start something," she says, "I thought I might make the *Songs of Milarepa* for the rest of my life." Ultimately she determined that "after five, I felt that was enough." But it was not the end of her inspired output. After *Les Chants de Milarepa* she composed *Jetsun Mila*, again inspired by the great Buddhist poet. This was followed by *Trilogie de la Mort* (*Kyema*, *Kailasha*, and *Koume*), profound and deeply felt pieces based on the *Bardo Thodrol*, or "Tibetan Book of the Dead," that served as reflections on the tragic loss of her son at age thirty-four from a car accident and the death of her beloved master Kunga Rinpoche.

Radigue made her last composition on the ARP in 2005. Today she works directly with musicians such as cellist Charles Curtis, for whom she composed *Naldjorlack*, a two-and-a-half hour work in three movements. As she says, she composes for the instrumentalist and not the instrument. There is no score. Nothing is written down. The sounds were created during meetings between Radigue and Curtis, until she felt the work was complete. The piece is solely for him. If, one day, he wants to teach it to a student, he will pass down the music the same way Radigue gave it to him, through voice and sound only. In many ways it resembles the Buddhist oral tradition of passing down knowledge from master to disciple.

"I am doing the same music now, but with instrumentalists, which allows for more subtlety, it is more delicate, and allows me the great pleasure of sharing," Radigue says. "All my life I had worked alone, no assistant, except for my cat, which would purr when satisfied, so working with others has made me extremely happy."

* Dan Warburton, "Invisible Jukebox: Éliane Radigue," *Wire*, February 2010, 26–29.

† "Éliane Radigue: Feedback Works 1969–1970," *Forced Exposure*, last updated April 28, 2016, http://www.forcedexposure.com/Catalog/radigue-eliane-feedbackworks-1969-1970-lp/ALGA.040.2LP.html.

CODA

THE SOUNDSCAPES OF INDIA

Hildegard Westerkamp

The term "soundscape composition" did not exist when I started writing music with environmental sounds. Through a variety of fortunate circumstances I had discovered a medium that was my perfect compositional language. I had learnt much while working with the composer R. Murray Schafer and his research group, the World Soundscape Project: about listening, about the properties of sound, about noise, and the issues we face regarding the quality of the sound environment. It was from within this exciting context of soundscape studies and acoustic ecology—the study of the interrelationship of sound, nature, and society—that my work emerged.
The style has unique creative challenges, formed by the meeting of two distinct forms of composition and the relationships and balance between them: that of the artist's musical aesthetic and the language inherent in recorded sounds and soundscapes. It is not unlike a traveller's encounter with a new place. The journey itself becomes the point of balance between the traveller's own inner reality and how he or she meets the new place. It is in the quality of the journey that this relationship can be seen as balanced or unbalanced. Similarly a soundscape composition is the journey that circumscribes the relationship, the conversation between composer and sound sources.

The sounds I have captured in India form the language with which I speak of the connection, the love that I developed for the country. The initial impetus for visiting India came in 1992 from an invitation by Max Mueller Bhavan of the German Goethe Institute in Delhi to conduct a soundscape workshop. I had never been in India before, and when I first arrived, I felt confronted by complete and utter strangeness. It was a dizzying experience. But the country got under my skin, like love does. It simply took hold of me and whirled me around, inside out and upside down.

Despite fearful incidents during my travels, repeated obstacles and difficulties, countless hassles and frustrations, a strong glow remains for me, a renewed and different love for life. This is the gift I received from my travels in India. And of course, I am hoping that the compositions born from the country's audio landscapes—small as they are in the face of the vast complexities of its ancient, enriching culture—can somehow transmit this glow to a listener.

One Verse

A Chorus of Light and Sound

Sound is a basic condition of our surroundings that we have come to understand, use, and create. We breathe, we hear, we speak. We live, we sense, we think. As far as we know, we are the only place in the universe where this happens.

We developed our sense of hearing because we live in an ocean of air. Air, a life sustaining mixture of gases, is breathed in and out by everything that lives within it. On earth, air makes up a remarkably thin skin of atmosphere that provides a medium through which sound travels as undulating waves of pressure. The roar of the wind, the crack of lightning, the dripping of rain, the cackle of birds, and the cacophony of voices all uniquely disturb the air. Life long ago developed sense organs to detect sound for defense and to aid in survival. Before life evolved out of the sea, sense organs for sound developed under water, as sounds transmit there as well.

Our ability to think is fed by the senses we use for survival. Surrounded by sound and light, our ears and eyes, like those of other creatures, allow us to gauge our surroundings beyond our immediate touch. Also like other creatures, we have developed ways to communicate with sound.

The chanting of the sacred syllable OM, as a chord that aspires to contain one's full vocal range, is a set of audible frequencies we create with our vocal cords, but its meanings are a metaphor for our existence in a universe that we now know is fundamentally wave-like in nature. If we take the utterance of OM as a chorus of sound, we can consider how this set of waves in air is metaphorically parallel to our current understanding of the underlying nature of the universe.

The vibration of our vocal cords is like that of a violin string or the surface of a drum. We make high or low pitch sounds by changing the length of the vibrating mechanism or by adjusting its tension. The instrument, once disturbed, vibrates back and forth at a particular rate, which we hear through the air and recognize in our brain as high or low pitch. This vibration back and forth actually resembles the apparent motion of an object in a circular orbit viewed from the side. And if we plot this periodic motion along the axis of time, we see a sinusoidal wave.

CARTER EMMART AND TIM PAGLIONE

Allium ©Nick Veasey/Getty

Vibrational wave action is not unique to the sound we hear. We measure it not only in strings and drums but also in water waves and light.

While looking closely at the rainbow of colors made by a glass prism, Sir Isaac Newton noted that the white light of the sun was bent (or “refracted”) through the glass by different amounts depending on the color. Red is less bent than blue, thus the colors of the rainbow are dispersed across the full spectral range, a “chorus” of light. Unlike sound as pressure waves, however, we discovered that the sun and the stars we see transmit their light not through a medium, like a gas, but instead by a disturbance of electric and magnetic fields. These fields fill space such that even the vacuum of space has electromagnetic properties.

just as sound and light, creating an interference pattern. This wave-particle duality on atomic scales is challenging to fathom yet plainly measurable, and it forms the basis of the universe we know. Electrons bound in atoms occupy discreet and wave-like spatial domains that define electrodynamic architectures of form. These atoms are the building blocks of molecules, they are the bases of replicating patterns of DNA, and they comprise the materials that surround us.

Light and atoms interact by exchanging energy, and we exploit this to study the depths of space. While light travels very fast, space is still very big. The light from our sun takes just over eight minutes to reach us on Earth. This means we actually see it eight

“Our telescopes are like time machines, looking deeper into the past as we extend our gaze farther away. ”

The fields surround a source that, when in motion, displaces the field. Fields in periodic motion cause a periodic disturbance that then radiates through space as waves. This propagation means that space itself can carry energy and information. Just as sound is the undulating pressure in the medium of air, light is the undulating electromagnetic field in the non-medium of empty space.

Wave actions in air, water, or fields in space all share the ability to pass through one another and in the process either amplify or reduce each other as they do so. Waves from two stationary sources create a predictable pattern of interference that can either be heard or seen in the cases of sound and light. Through the early twentieth century it was established that even matter itself behaves like a wave, culminating in a 1961 experiment showing that electrons passing through two slits in a wall amazingly behave

minutes in the past. The light of stars in distant galaxies can take millions or billions of years to traverse the vast tracts of emptiness between us. Our telescopes are like time machines, looking deeper into the past as we extend our gaze farther away. When we look far enough, we ultimately reach back 13.8 billion years, nearly to the beginning of the universe and the Big Bang itself. It has been obvious for almost a century that the universe is expanding, as nearly every galaxy we observe is quickly moving away from us. Running the clock backward, this implies that in the past the universe must have been smaller, and consequently hotter, very dense, and opaque. We remain immersed in that glow leftover from the universe’s birth, which shines faintly today as a phenomenon we call the Cosmic Background Radiation. In it we see minute temperature fluctuations within the early universe, when matter and light strongly interacted as they fell toward and bounced away from the slight

density enhancements that eventually matured into the tremendous galaxy clusters we see today. The acoustic power of these oscillations captures the first chorus of the universe, literally the harmonic sounds of the seeds of the largest structures around us.

As recently as late 2016 we gained the ability to detect some of the feeblest imaginable sound waves, whispers of the collision and joining of enormous black holes. A black hole is so massive and compact that, according to Einstein's theory of general relativity, it severely warps the spacetime around it, generating an inescapable gravitational field. A black hole in orbit will produce ripples in spacetime just as an accelerating charge emits electromagnetic radiation. These gravitational waves carry energy away from black hole pairs orbiting each other, causing them to fall

"The chanting of OM can be viewed as a metaphor for our current understanding of the foundations of our existence."

toward each other in an ever tightening death spiral and culminating in their ultimate coalescence into one large black hole with a tell-tale, and very final, chirp. After decades of carefully calming and quieting our instruments to detect gravitational waves, we have found as many as three such systems in just months, remarkable proof of the existence of the first members of our newest chorus.

Our knowledge of cosmic totality on the largest of scales is in sync with our knowledge of the exchange between matter and energy on the smallest of scales, and both can be analyzed through our knowledge of waves. The vibrational disturbance of forces in periodic waves is something we use to map the outer reaches of our knowledge. As such, the chanting of OM, although limited to sound waves in air, can be viewed as a metaphor for our current understanding of the foundations of our existence.

CODA

SENSING THE SOUND WEB

Annea Lockwood

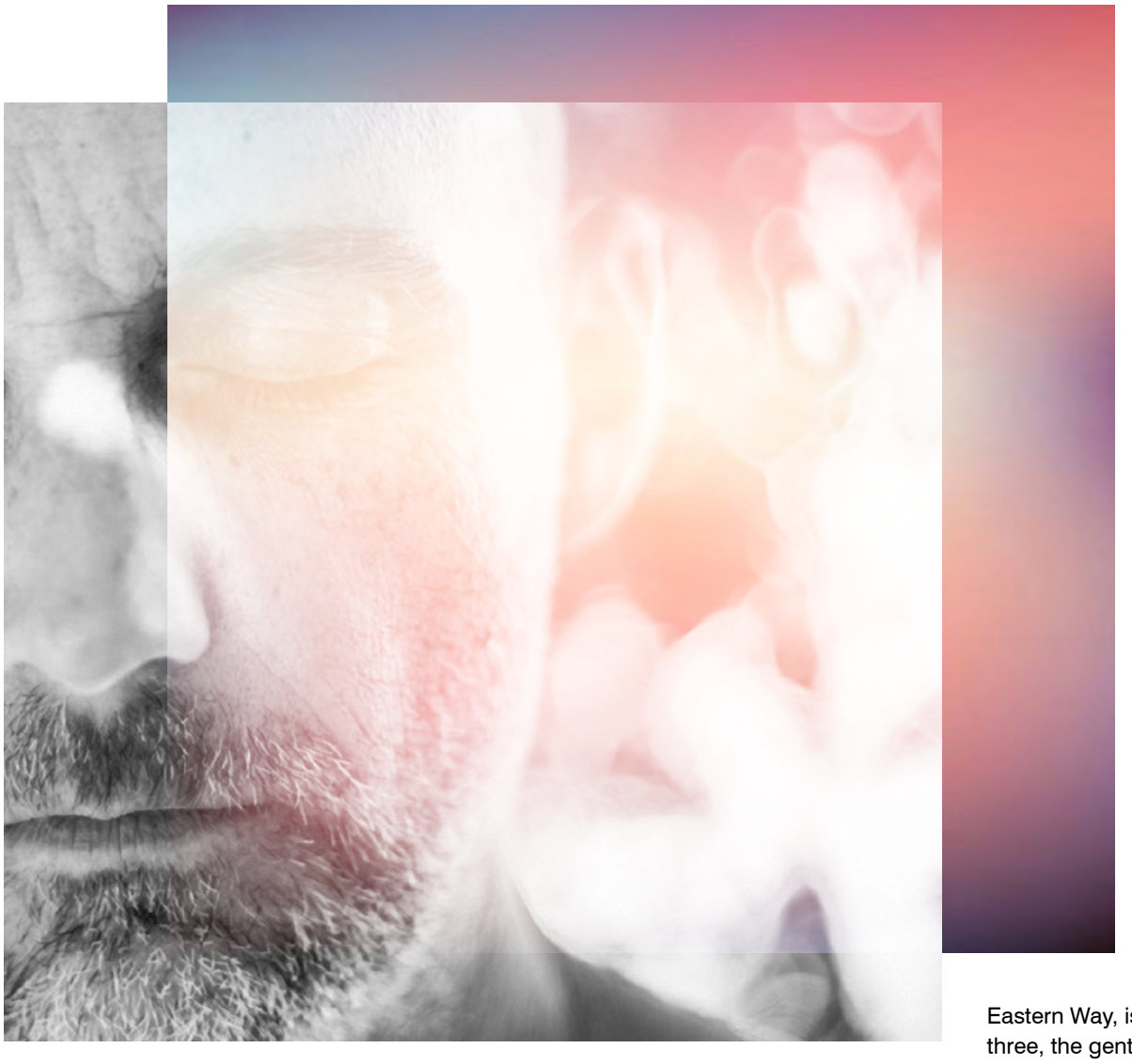
We live in a web of sound and vibration. Some of the web falls within our hearing range, allowing us to be conscious of it, and some lies above (ultra sound) or below (infra sound), coursing through our bodies, affecting such functions as blood sugar levels, pulse rate, and muscle tension. We can feel deeply permeated by it, responding powerfully to both human sound and environmental sound.

The natural environment is particularly fascinating. Rivers, for example, are tangible physical presences, carrying layers of meaning. The sounds they create fall largely within our hearing range; we drink from them, absorbing them internally; we dive into them, feeling them on the skin; we watch the play of light on their constantly changing surfaces; smell them. They are accessible to all the senses, and we are affected by their energy, which creates a strong sense of connection.

But other environmental phenomena are inaccessible to our ears, vibrations in the ultra sound and infra sound ranges. These emanate from sources which affect us fundamentally—the sun, the ionosphere, the earth's crust and core, trees—everything deeply integrated; an inaudible web within which we move, through which we live, and on which we depend. Through these sounds one can feel the energies generated not as concepts but as fields moving through one's body. Such immersion can bring a feeling of at-oneness with the source of the sound—an antidote to our embedded but eroding sense of the world's phenomena as purely material resources. And from that feeling of non-separation can come joy, caring, and, I believe, changes in how we act in the world.

Music, Molecules, and the Middle Way

The Rubin Museum talks to Moby about the power of the invisible



What is the earliest sound you can recall? It's one of my very first memories. I must have been three years old, and I had done something that made my mom yell at me, and I ran to my room. We grew up very poor, so my room was actually a closet with a tiny bed in it. So I ran to my closet. I had been given a kazoo and I started crying into it. My mom came into my little room laughing hysterically, because the sound of somebody crying into a kazoo is really, really funny.

What do you think is the most powerful quality of sound? I used to work with Oliver Sacks at the Institute for Music and Neurological Function that he started. One of the things in the work I did with Dr. Sacks that became strangely apparent to me was how powerful music is in ways that we oftentimes overlook. At this point, music doesn't cost anything. You can access it anywhere on the planet, basically. We take it for granted that music can make us cry, and can make us laugh, and can make us dance, and can make us have sex, and can make us stand in a field with a hundred thousand people and scream at the top of our lungs. But all that music is and all that sound is are air molecules moving a little bit differently. It's really quite striking when you think about it that air molecules hitting our eardrums slightly differently can either make us wince or cry or yell or dance. The fascinating thing with sound is that it has never been created. There's no such thing as material sound. If you took a sound wave and passed it through some sort of solid, you could make the case that sound has created something, but all that sound has ever been is air molecules moving a little bit differently. And it's such a wonderful analogue or metaphor for the workings of spirit; the idea that this invisible thing that has no corporeal substance can affect us so powerfully.

What happens to your body and mind when you use your voice? The way sound affects our body really depends on the meaning that we give it. If we're exposed to a beautiful Baroque concerto, our body is literally transformed by it. Our breathing changes, our metabolism changes, our neurogenesis changes; all these things change because we respond to something that we deem beautiful. Alternatively if you're exposed to a truly grating, awful sound, it's stressful. It stresses your systems and it impedes neurogenesis and compromises your immune system.

What music makes you happiest? One piece of music that always triggers a very intense emotional reaction on my part is Beethoven's *Moonlight* Sonata, because it's such a beautiful, plaintive piece of music. Also, as far as I know, he wrote it when he was going deaf, so he didn't really know what it sounded like. There's such a sadness attached to that, and not just for Beethoven; it's the simple sadness of the human condition. No matter who we are, no matter how wealthy or powerful we are, at some point we die. At some point we are unable to register the material world. There are three different ways I think of looking at that. One, we'll call it the Western Way, is to fully immerse yourself in the physical world. Two, the Eastern Way, is to reject the material world. And three, the gentle Middle Way, is to recognize the nature of the material world in a rational way but also have space for the sadness around it, to accept that we are mortal, to accept that we live short lives, but not to shut down our emotional reaction to it, to allow ourselves the space to mourn death and to mourn loss even though they are inevitable.

Another piece of music that always makes me happy is the beginning of *Rhapsody in Blue* by George Gershwin. It's one of the most joyful, complicated, nuanced pieces. I'm hesitant to call it classical music, although I guess technically it is. On its own it's a remarkable composition, but what it represented for George Gershwin…it's basically a love letter to

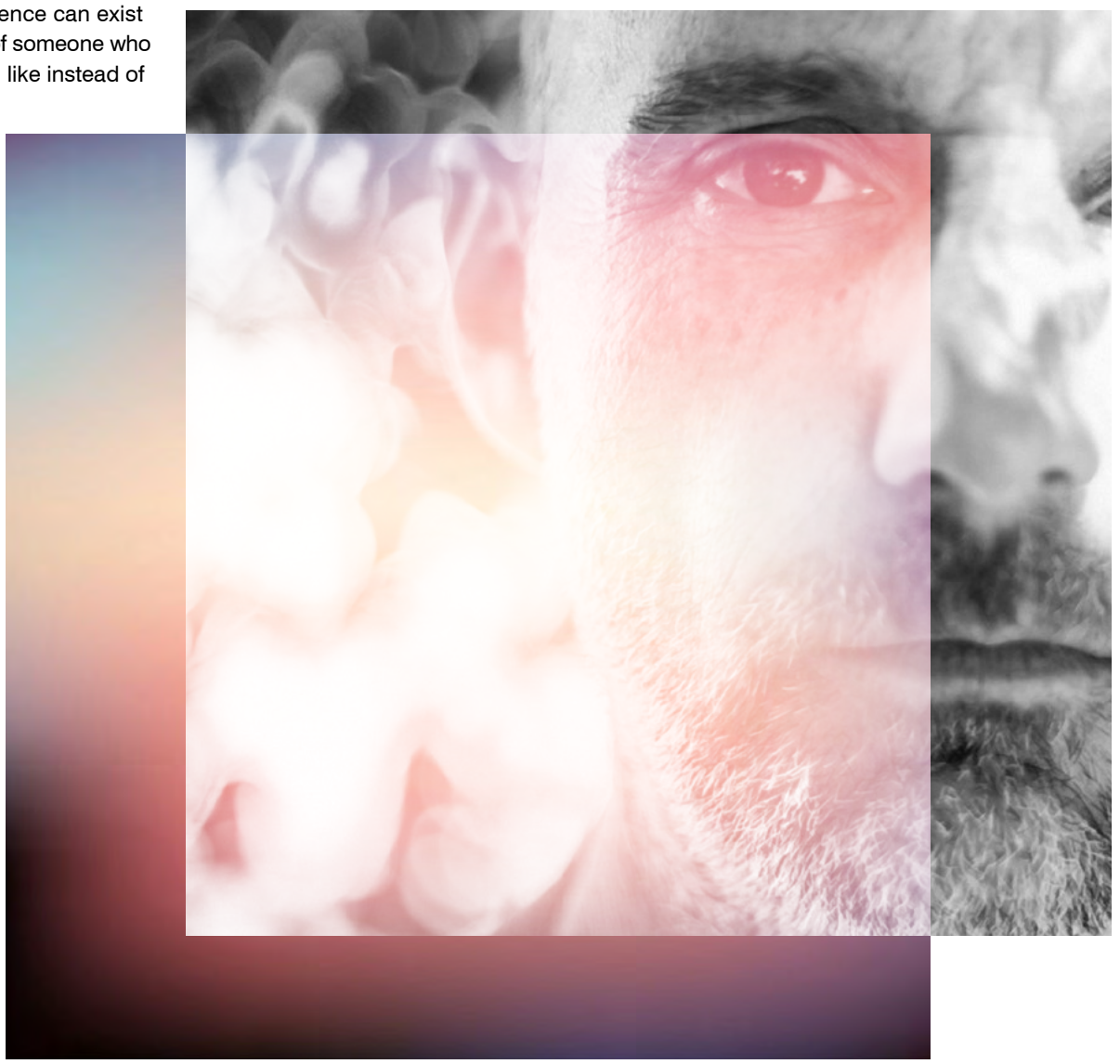
all these musical idioms he loved. There's Debussy, there are some other nineteenth-century French composers, there's the sound of the Jewish settlements on the Lower East Side, there's the sound of big grand orchestras. There's the almost Yiddish theatrical folk element and the birth of jazz in there. The fact that he was able to beautifully shoehorn all these idioms into one piece of music is really special. I think it's one of the most special pieces of music ever written.

Putting Beethoven and Gershwin to the side for a moment, how important is silence to you? I think silence is an unfortunately used word and concept because the only place in which silence can exist is in a vacuum or in the experience of someone who is incapable of hearing. I almost feel like instead of silence it's better to talk about things being very quiet. For example, if I'm on a meditation retreat and they call it a silent retreat, in truth it's a non-talking retreat in a very quiet place. As far as I know I have never experienced silence, because all the mechanisms in my ears have been working from the time they were formed in the womb and I hope they keep working till the day I die.

I like the idea of retreats. But to be honest—and maybe I don't have enough experience with them—I almost prefer dealing with the world and having a meditation practice that helps me with that. I think sometimes being exposed to the stimuli in the world can be a better teacher for me than being on a silent retreat.

Speaking of meditation, could you talk about the meditation album you recently released? Basically I made a lot of very long ambient music for myself. As much as I like other people's ambient music, I found it was either too short or too demanding or too cliché. It was either four minutes long or had noisy drums in it or it was a sample of a hawk with Shakuhachi flute underneath it. I don't dislike any of those things but I wanted something long and quiet and utterly undemanding. So I started writing it for myself and realized I had four hours of this very quiet ambient music and thought I'd give it away in case anybody else wanted to use it. First and foremost I have to make music that I love, and then you put it out in the world and hope it might find itself in people's lives and that they might get something from it. And especially now that people don't pay for music, in a way it's kind of liberating because you can put music out into the world and see what happens.

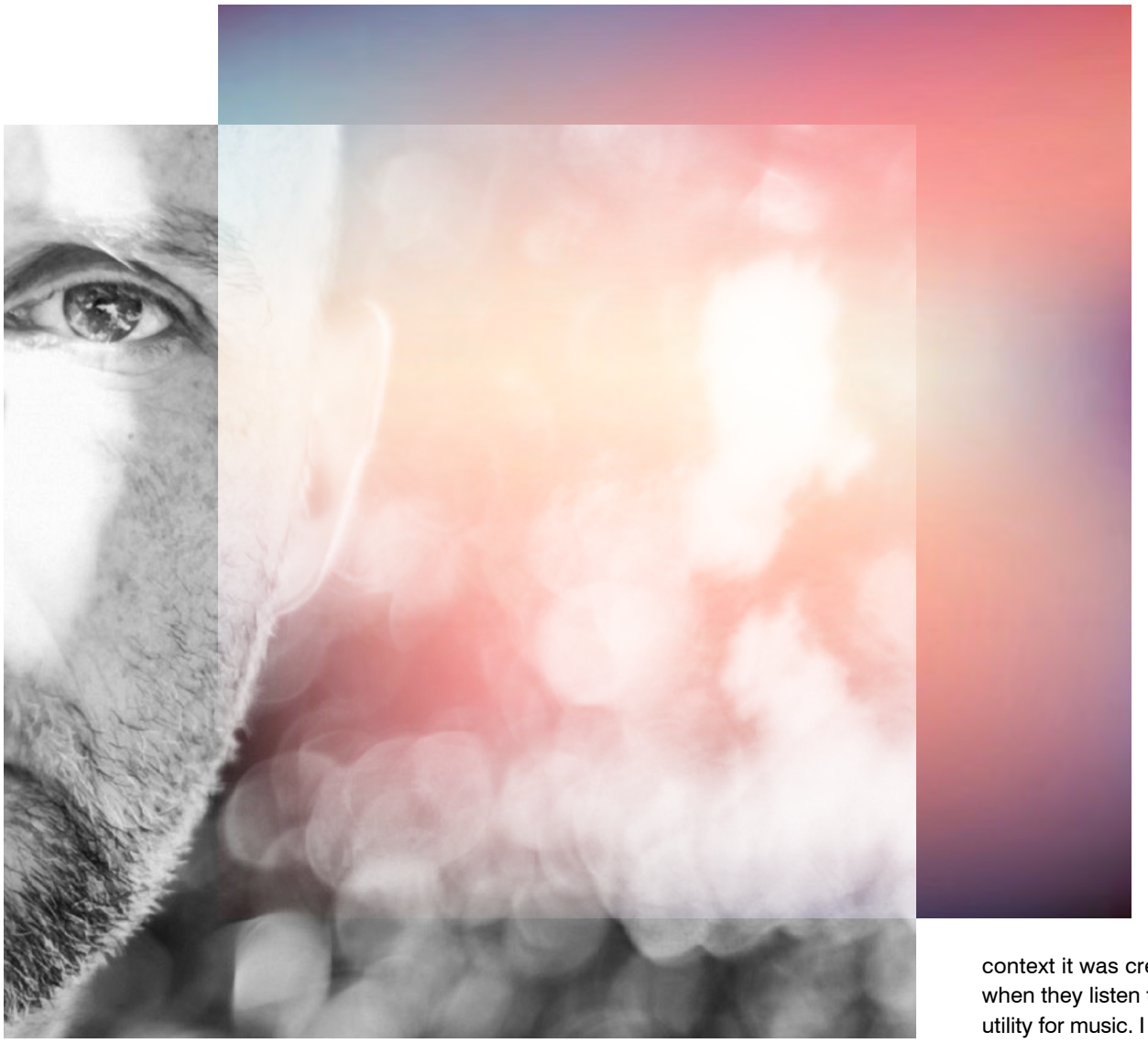
I taught a meditation class a couple of weeks ago. One of the things that breaks my heart is how self-critical people are when it comes to self-care and meditation. So many people think they should be meditating more or meditating better, and honestly the goal of any self-care, meditation practice is to serve the practitioner, not for the practitioner to serve the practice. In releasing this meditation music or any music I make, it's hopefully letting people, giving people the license to let themselves feel better and to calm down. As organisms we're so hyper-stressed. You look at your average human who is drinking four cups of coffee a day, checking their phone from the time they wake up until the time they go to sleep, probably in relationships that are not very satisfying, doing work that they don't like very much, sitting in traffic, being exposed to all this stress. And then you look at most meditation practices, which were invented by people three thousand years ago, before the advent of electricity, and so if someone who has this hyper-stressed, hyper-caffeinated life at the end of the day sits down on their yoga mat or meditation cushion, it's not surprising that they can't quiet their mind because they have been basically stimulating it for the last eighteen hours. One of the goals of the meditation music is to help people calm down in a fairly expedient way.



You mentioned in a blog entry that you try to make music that has a quality of vulnerability.

Photographs by Moby

Can you speak about vulnerability in your work? I think that we live in a culture that really doesn't encourage vulnerability. People are taught to identify with their most aggressive, defensive, cynical, ironic, bitter impulses. But to me, what we are—you can almost say the nature of organic biological life—is vulnerable in the most literal way, meaning it's short-lived and it's delicate. When someone is being bellicose or violent or aggressive or ironic or bitter or what have you, they are basically putting a cover on the core of vulnerability that all biological life shares. And music is one of the most effective ways of getting past that carapace, or suit of armor. In my life there has been something really special and powerful when you can connect with that feeling of vulnerability. In the music that I make I aspire to that. Of course I make music that isn't vulnerable. I make music that is big and goofy and celebratory sometimes, and I sometimes make angry music. Ultimately it's that connection with the vulnerable, however, that manifests itself and should be a huge part of not just our spiritual lives but our daily practice in order to keep our species alive, because the opposite of that is just wholesale indulgence and aggression, which, as we've seen for the last few thousand years, hasn't worked out too well.



How can we use music in times of political unrest? There are so many ways in which music can both heal people and help people connect with each other and help people feel heard. It's a way of communicating. I've been trying to do that in my own little way for a while. But there's such a long history of very powerful protest music. I feel that at the very least every musician should try to write effective protest music. It doesn't mean that's all you have to do. I think of Neil Young who wrote some very beautiful personal music but he also wrote some great protest music. John Lennon, same thing. I think that now—not just in terms of facing an incompetent, right-wing Republican administration, but the issues that our species is facing, in terms of climate change and environmental degradation and antibiotic resistance—we're at a turning point for our species, where if we don't deal with the things with which we're confronted, there's a very good chance that we may not make it. And human beings for all our shortcomings, I feel we do enough interesting things to warrant our survival.

What excites you about the future of music? The two biggest changes in the world of music are 1) how easy it is to access any piece of music that's ever been made, and 2) how easy it is for anyone to make music. There are so many apps and software programs that enable even someone with no musical ability to sit down and make music. I think both those things are really encouraging. The one thing that really hasn't changed in thousands and thousands of years is the ability of music to reach people emotionally. Using the *Moonlight* Sonata as an example: I'm assuming that when it was first performed people had a very similar reaction to someone listening to it today on Spotify. That ultimately is the criteria by which music can be judged. It's not how it's made or how it's distributed, or in what context it was created, but how it affects the listener when they listen to it. To me that's ultimately the sole utility for music. I get really vexed when people criticize or celebrate music based on how it was made. Ultimately it's up to the listener and their subjective relationship with music.

What is the last sound you want to hear? I'm trying to think…I guess someone telling me that every human being on the planet has finally decided to stop using animals for human purposes. Hopefully that will happen before I die.

HEAR MOBY'S "DESERT ISLAND" PLAYLIST IN THE ONLINE VERSION OF SPIRAL AT RUBINMUSEUM.ORG.

Listening and Liberation: The World Is Sound

BY RISHA LEE

Milarepa; central Tibet; 15th–16th century; parcel gilt silver with gilt bronze base; H 5 1/8.125 x W 4 1/8 x D 4 in.; long-term loan from the Nyingjei Lam Collection; L2005.9.62

When you enter a Tibetan shrine, you see objects lit by the flicker of candles, hear the sounds of chanting, and inhale the smell of incense. We are trained to look at art, but these objects have lives and relationships with humans that are contingent on all of our senses. In a museum we typically prioritize sight when interpreting objects, but how is it possible to consider, to a fuller extent, our multifaceted sensory engagement with the world?

The Rubin Museum of Art's exhibition *The World Is Sound* departs from a pure focus on the visual and ventures into the power of sound and the practice of listening. It considers sound as an integral dimension of the works in the Museum's collection of historical art from the Himalayan region, many of which were designed as tools in Tibetan Buddhism for helping devotees escape from the cycle of death and rebirth (samsara) and to attain liberation (nirvana). This same theme pervades the work of certain contemporary artists, who take the activity of listening as an opportunity for a radical reimagining of one's relationship to the world. The juxtaposition of these historical and contemporary works of art elicit surprising connections—all of the art in the exhibition perceives the sense of hearing and sound as tools for removing entrenched modes of thinking, frequently moving beyond conceptions of an individual self and toward expressions of existence as collective experience. They draw attention to our embodied experience of the world, whether it is through a Buddhist practitioner's recitation of a mantra or a contemporary artist's electronic transformation of the voice. They also equivocate: are sounds inseparable from their sources and the political and historical circumstances that produce them? Can they instead be regarded as methods for thinking through the fleeting nature of human life and humankind's relatively recent arrival in the universe, forging non-human-centric perspectives? Are these conceptual concerns equivalent to the spiritual concerns of religion? These are some of the questions that arise when we examine the historical and contemporary art brought together in this exhibition.

The Buddha emphasized the importance of listening in his earliest teachings and methods. He did not write a single word of his sermons during his lifetime (ca. 563–483 BCE). He spoke them. In the year after the Buddha's death, a close follower (often identified in Mahayana literature as his relative Ananda) gathered together five hundred monks in Rajgir, eastern India, and recited all of the Buddha's discourses from memory. The monastic community (*sangha*) then approved them as the authentic teachings of the Buddha (dharma). For hundreds of years after this event the Buddha's teachings still were not written down but transmitted orally in memorized musical chants. It was only around the first century that Sri Lankan Buddhists committed the Buddha's teachings to writing, codifying them in treatises called sutras, or sayings of the Buddha. The Mahayana sutras stress the importance of listening as a means of receiving wisdom. They are written from the perspective of Ananda, who begins each new teaching with the words "*evam maya srutam*," or "Thus did I hear."* The Buddha's words were not considered a divine revelation; rather they contained kernels of eternal truth that all humans might ultimately understand.

Within the Tibetan Buddhist tradition the power of the word finds its expression in mantras: syllables or formulas chanted aloud or silently as instruments for transforming consciousness, removing obstructive karma, and attaining liberation. The importance of these practices is embedded in the religion's name, Mantrayana Buddhism, a major offshoot of Mahayana Buddhism. Together with diagrams of cosmology (mandalas) and ritual hand gestures (mudras), mantras symbolize religious truth, which the practitioner may use to attain liberation in a single lifetime—a synchrony of body, speech, and mind. The Mani mantra associated with the bodhisattva of compassion Avalokiteshvara is believed to contain all of the Buddha's teachings in just six syllables and is one of the most important and widely used mantras in Tibetan Buddhism. By chanting "OM MANI PADME HUM" repeatedly, practitioners connect their minds to that of the bodhisattva and focus on compassion for all sentient beings. The mantra may be produced vocally or mentally and is accompanied by visualization of the deity, a practice that aids the devotee in understanding the truth of compassion and attaining liberation. To a Buddhist devotee, an image of Avalokiteshvara is an embodiment of this mantra. In some representations, Avalokiteshvara appears in a form known as Shadakshari, or "Six Syllables," a name that makes this connection explicit by referring to the six syllables of the Mani prayer.

The voice is vital to Buddhist practice. Longer choral chants preserve Buddhist teachings and are fundamental to liturgical traditions, serving as the primary means of transmission and information technology. While vocal chanting is common to all of the diverse Buddhist traditions, the use of instruments and attitudes toward music vary considerably. The ritual and musical practices in Tibetan Buddhism are some of the more elaborate among these traditions. Instrumental music is required on almost every ritual occasion as it is considered an offering intended to please the deities. As with mantras, it is either physically played or mentally produced. A full ensemble consists of two types of cymbals, double-headed frame drums, handbells, hourglass drums, conch-shell trumpets, long trumpets, oboes, and bronze gongs. Monks and nuns play these instruments on a daily basis in ceremonies, frequently accompanying choral chants. Apart from pleasing the deities, music guides the practitioner toward the recognition that phenomenal existence is impermanent and transitory and ultimately toward the transcendence of desire and one's sense of self.

The importance of listening is also expressed in the iconography of images such as that of Milarepa, the eleventh-century Tibetan poet and meditation master. In the gleaming sculpture seen on the title page of this article, he is shown listening with his entire body. His head is cocked, leaning into his cupped right hand, fingers curled gently, suggesting that he hears even the slightest sound. His smiling lips gently part, suggesting that he is simultaneously singing and listening to his own voice, vividly embodying the idea that one may gain wisdom through listening. The story of Milarepa's life recounts dramatic events and demonstrates that even a great sinner can attain liberation from rebirth in a single lifetime. After murdering thirty-five people with black magic, Milarepa's remorse compelled him to seek out his guru, Marpa, who successfully instructed him to commit to a life of devotion, isolation, and meditation. During those years of meditation Milarepa realized fundamental Buddhist truths and spontaneously composed scores of great songs of awakening (*gur*) that extolled the Buddha's teachings. These songs describe meditation experiences, dreams, and realizations, and they were Milarepa's primary means of teaching his disciples.

"The Buddha did not write a single word of his sermons during his lifetime. He spoke them."

Four-Armed Avalokiteshvara; Tibet; 19th century; pigments on cloth; 25 7/8 x 17 7/8 in.; Rubin Museum of Art, gift of the Shelley & Donald Rubin Foundation; F1997.4.1

In one of these songs Milarepa reflects on a dream in which he attempts to plow impermeable earth and almost gives up until Marpa appears and instructs him to persevere. He does, resulting in bounteous crops. His song interprets this dream as a metaphor for overcoming difficulties on the path to liberation:

> *I clear away stones of unwholesome character*
>
> *And pull up weeds without pretense.*
>
> *From ripened ears the truth of actions and results,*
>
> *I reap the harvest, a superb life of liberation.*†

The World Is Sound brings together a selection of artists whose work, knowingly or unknowingly, intertwines with Buddhism. Some of the artists are practicing Buddhists or maintain other kinds of spiritual practice, while others are devoutly secular. What all share is their resistance to entrenched modes of thinking and their search for alternate systems to process the human experience, a phenomenon that might be compared to the Buddhist effort to escape samsara. All the artists focus their awareness through listening and consider the body as a permeable conduit for connecting with the world. They also treat sound as a medium, similar to paint or charcoal, but unlike these latter media it is understood that the sonic cannot be confined to a specific location or even time. As philosopher Christoph Cox writes in his forthcoming book *Sonic Flux: Sound, Art, and Metaphysics*, many works of contemporary sound art consider the "notion of sound as an immemorial material flow to which human expressions contribute but which precedes and exceeds those expressions." In this definition of the sonic, it is inherent that sound is not isolated to the sense of hearing, but extends across multiple registers of sensory experience and conceptual thinking.

The composer and artist Éliane Radigue began experimenting with feedback and tape loops in the late 1960s. Trained by the founders of *musique concrète*, Pierre Schaeffer and Pierre Henry, Radigue ultimately rejected the form, developing what would become known as her signature style of long-duration or drone sound. Schaeffer and Henry considered Radigue's work an affront to their new genre. While the reasons for their displeasure are unclear, it is possible that the fathers of the new genre took issue with the philosophy Radigue's sound espoused and considered it oppositional to their own. While *musique concrète* blended unrelated sounds together and suggested that sounds could possess life independent of their sources, Radigue's undulating drone insisted on a fundamental and universal

* Donald S. Lopez, Jr. "Authority and Orality in the Mahayana," *Numen* 42, no. 1 (Jan 1995), 21.

† Tsangnyön Heruka, *The Life of Milarepa*, trans. Andrew Quintman, (New York: Penguin Classics, 2010), 131.

sonic connectivity. Several years later Radigue would find spiritual grounding for the formal qualities of her music in Tibetan Buddhism, which teaches that interrelatedness is one of the primary conditions of reality.

Radigue became one of the first artists to create site-specific sound installations. She developed the concept for *labyrinthe sonore*, or *sound maze*, which will find its ultimate iteration in the exhibition as *le corps sonore*, or *sound body*, a collaboration realized with the artists Laetitia Sonami and Bob Bielecki. Carefully choreographed on the ARP 2500 synthesizer, her drone sounds slowly modulate and move over us, bringing our awareness to the continually changing, immersive nature of our shared sonic reality. In an interview with the Rubin, Radigue commented that the main purpose of her work is for the listener "to awaken to the music within themselves." "We should give ourselves over to the sounds," she says, "be open to the sounds, listen to what is resonating within ourselves." In conversation she interweaves metaphors of water and soundwaves with the directive to detach from the ego—a concept that verges on a kind of spiritual philosophy, reminiscent of Milarepa's aim to awaken the awareness of the dharma in others through song. When I ask how she would guide a visitor through *le corps sonore* she spontaneously composed the following lyrics:

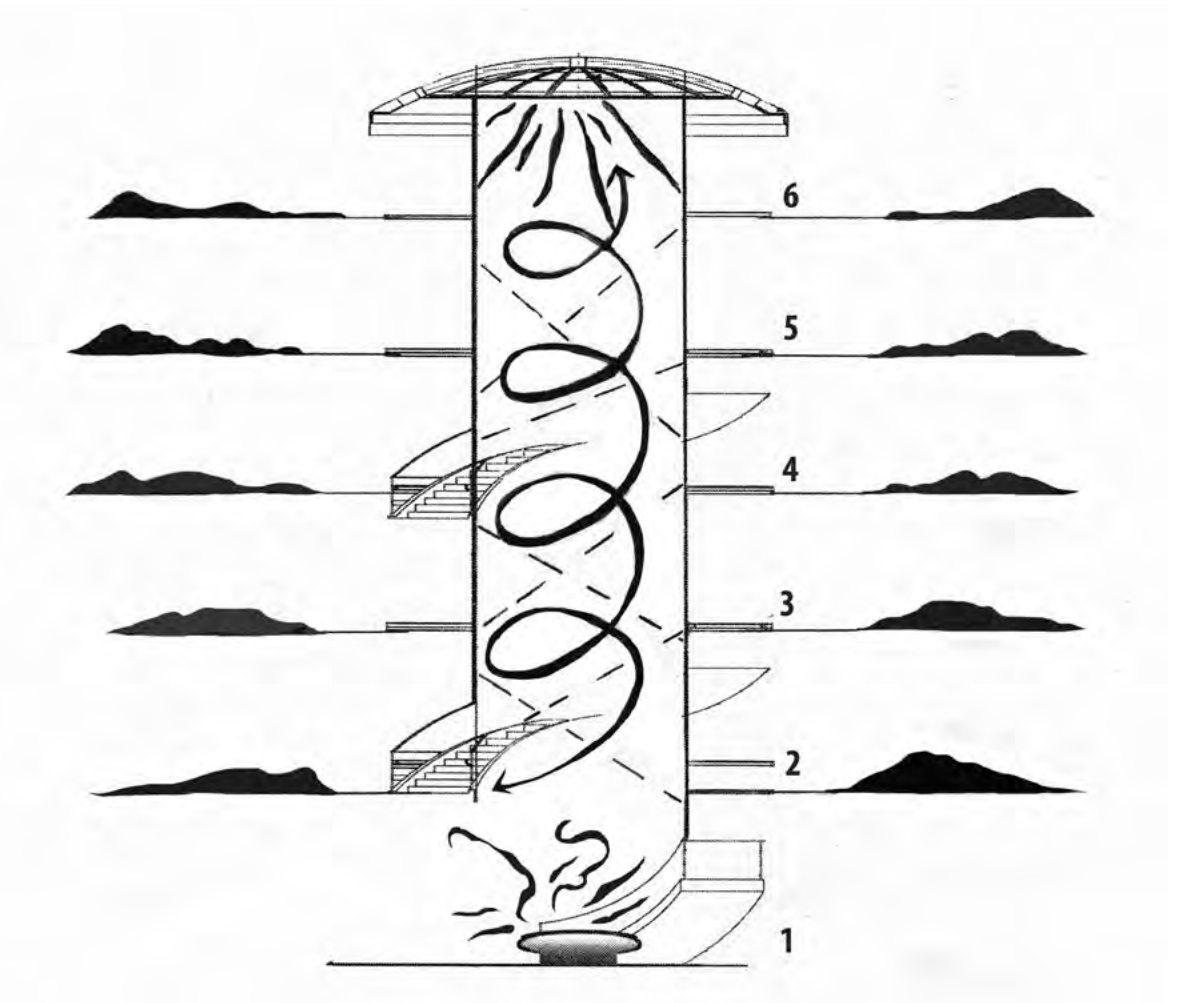
> *Just leave your body floating in the wave*
> *So leaving the mind*
> *The spirit floating in the sound*
> *Check what happens*

Radigue met sound artist Laetitia Sonami in the late 1970s, just as Radigue was beginning her Buddhist practice. Then a young artist newly acquainted with electronic music from a yearlong stint at the School of the Museum of Fine Arts in Boston, Sonami would become Radigue's longtime student and collaborator. Perhaps not coincidentally, Sonami met Radigue the same year that she met her own Tibetan Buddhist guru, Sakya Trizin. Sonami and Radigue's shared interests of electronic music and Buddhism, and identities as women within a male-dominated musical culture, ushered their close bond. A few years later the artists were close enough that Sonami's brother-in-law, Lama Kunga Rinpoche, performed on Radigue's *Songs of Milarepa*. Although the two artists have a different aesthetic, their sonic philosophy has much in common, perhaps informed by their Tibetan Buddhist practice. When Sonami describes working on compositions with Radigue, she evokes images of guru-student transmission replete with visualization exercises. As Sonami relates the process: "A lot of music is oral transmission. . . [Radigue] asks people to play; they bring a palette of technique and then she listens. She says you have to choose an image, the image is your score."

Le corps sonore is in many ways the culmination of these efforts, taking previous installations of the piece skyward. Radigue, Sonami, and Bielecki use the Rubin's central architectural element (a spiral staircase) as the score and spine of the composition. At the base, Bielecki and Sonami collaborate on a resonant bowl that emits worldly sounds such as mantras, environmental field recordings, and voices. As visitors travel upward, they move through five tracks of Radigue's subtle drone (originally made for *labyrinthe sonore*). In doing so they leave behind the mundane, much like the desired effect of repeating a mantra. Bielecki, a renowned sound engineer, has precisely programmed the vertical movement of the sound so that it moves up and down all six floors, periodically enveloping the listener and then fading into nothingness, emphasizing the in-between state of Radigue's sound. Bielecki's longtime interest has been in measuring and mapping the threshold of hearing and "of finding the place where hearing becomes imaginary." The verticality of *le corps sonore* presents a challenge to typical listening because our ears usually localize sound from left to right and not from above and below. The work thus encourages increased focus and an expanded definition of listening to encompass the entire body. To fully absorb the piece, Bielecki states, "It would be nice to have a third ear on the top of your head." The immersive and ephemeral qualities of sound are thus discovered by connecting bodily movement to listening, awakening the listener to their own existence as part of a universal acoustic stream.

The Five Cosmogonic Elements, a folio from the *Ritual Empowerment Text and Illuminations of the Hundred Peaceful and Wrathful Deities of the Chonyi Bardo*; Tibet; ca. 15th century; pigments on cloth; 2 5/8 x 12 in.; Rubin Museum of Art, gift of the Shelley & Donald Rubin Foundation; F1998.16.5.2

Laetitia Sonami (French, b. 1957); Sonic Map for *le corps sonore*; pen and ink on paper; courtesy of the artist



The subtlety and ephemerality of the sounds in *le corps sonore* prepare the listener for understanding a core tenet of Buddhist philosophy that flows through the works of art in the Rubin's collection. In Tibetan Buddhism music is a metaphor for change and impermanence, the primary conditions of reality for the Buddhist practitioner. The ethnomusicologist Sean Williams writes that "when a person performs Buddhist music as part of a crowd of chanters, the individual self disappears into the *sangha*, or community, eliminating the problem noted by the Buddha himself of attaching importance to one's individual voice."‡ Musical symbolism also infuses Buddhist teachings, and as ethnomusicologist Ter Ellingson remarks, the "act of proclaiming the Buddhist teaching is historically known as 'sounding the drum of the Dharma,'"§ drawing sonic parallels between the instrument's and the dharma's clear and authoritative properties. Similarly, early Indian texts liken the tuning of the mind in meditation to the tuning of the vina, a lute-like stringed instrument.

The Buddhist attunement toward sound, impermanence, and minimizing the individual in favor of the collective continues to have a significant impact on certain strains of contemporary art, inspiring different perspectives on listening and being in the world. The late composer Pauline Oliveros (a dear friend of Radigue's and mentor to several artists in the exhibition) pioneered Deep Listening, an institute, philosophy, and set of practices that focus awareness on the act of listening as a tool to discern both individual and collective consciousness. For Oliveros listening is the basis of creativity and culture and provides information about how we direct our attention. It is also a form of activism that has the potential to transform the consciousness of groups and individuals. To gain insight into the process of listening, Oliveros devised the *Sonic Meditations*, a series of written instructions for individuals and groups, often gesturing to Tibetan Buddhist imagery such as mandalas as a point of departure for her exercises. The freedom of listening opens other artists to the fertile potential of sound for reimagining philosophical and political notions of selfhood. Jules Gimbrone, one of the artists featured in the exhibition, regards sound art as a method for subverting normative visual culture. The sonic is a metaphor for the fluid self that defies reification into discrete identities, whether of gender, race, or anything else. Gimbrone states that "Sound is the most queer medium in the sense that it is both physical and uncontainable and doesn't have the bounds that other forms do." Listening thus offers opportunities for transformation of individual and societal cultural codes.

Within Tibetan Buddhism the fluidity of sound extends from life into death. Listening may guide the Buddhist practitioner toward liberation and away from the cycle of rebirth. Tibetan Buddhist death rituals include the recitation of texts that guide the consciousness of the deceased through three intermediate states (bardos) that lie between death and rebirth. After death the deceased's relatives gather to pray for swift release from the bardo. Texts are read aloud that describe colors, lights, sounds, and peaceful and wrathful deities encountered while navigating these liminal states over a total of forty-nine days. The ritual also seeks to rid the deceased of fear and anxiety and liberate the deceased entirely from the cycle of death and rebirth through the recognition that everything encountered in the bardo is a vision of their own mind. For the ritual to be effective, the deceased must have studied the recited text during their own life with the assistance of a teacher.

There is an acute connection between hearing, understanding, and liberation from rebirth. One of the most widely distributed ritual texts, popularized in the West as the "Tibetan Book of the Dead," expresses this connection and the centrality of listening in its title, *Bardo Thodrol,* which translates as *Liberation upon Hearing in the Intermediate States*. Although rebirth is not the ideal outcome of a deceased individual's journey through the bardo, for the living there is some comfort in knowing that, with guidance, practice, and attention, it is possible to be reborn as a human and to have another opportunity to attain liberation.

The bardos are not limited to the afterlife, and in fact we all reside in the fourth bardo, which lasts from our births until our deaths. Within this bardo of life there are more bardos still, comprising dreams and meditation. These are intermediate states in which consciousness is at its most fluid, where we are most attuned to the ceaselessly occurring transitions that structure our daily life. Listening for these gaps, we find uncertainty, and within this uncertainty exists the space to reflect and change if we so choose. Writing about music, the Tibetan scholar and leader Sakya Pandita (1182–1251) implies that listening could aid an individual, no matter their stage or position in life, expressed by the following:

> *For the faithful, an offering, and*
> *For the hungry, a means of livelihood, and*
> *For the passionate, a swaying of the mind—*
> *All these arise from skill in music.*

These teachings continue to resonate in the present, spreading far beyond their historical Tibetan locale and through unexpected paths of transmission. What would happen in our world if everyone listened to them?

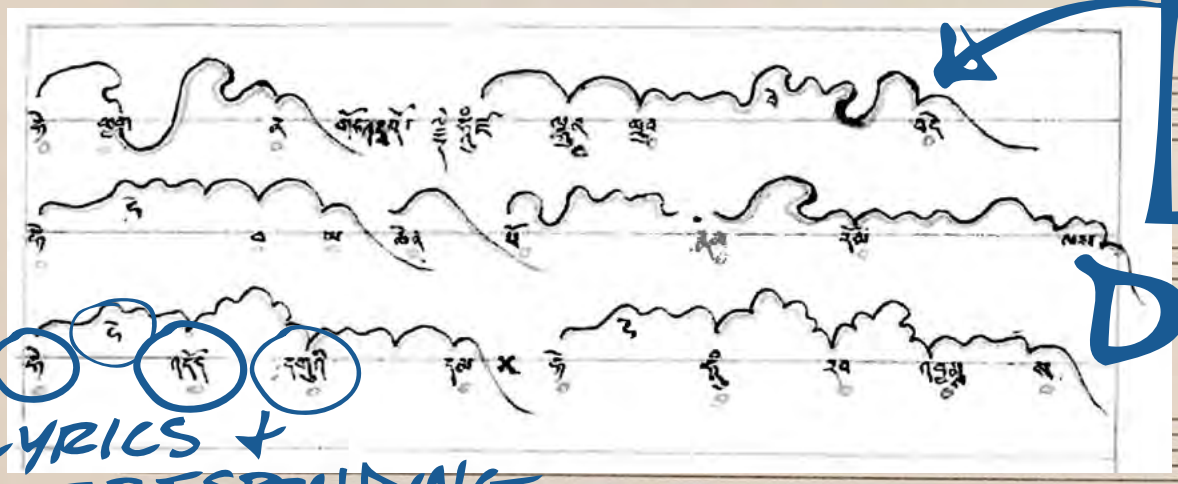
I dedicate this essay to my mother, Ida Jean Newton (1944–2015), who was a reader, thinker, listener, and lover of art. —R. L.

‡ Sean Williams, "Buddhism and Music," in *Sacred Sound: Experiencing Music in World Religions*, ed. Guy Beck, (Waterloo, ON: Wilifred Laurier University Press, 2006), 186.

§ Ter Ellingson, "Drums," in the *Encyclopedia of Religion*, ed. Mircea Eliade, vol. 4 (New York: Macmillan, 1987).

You may be familiar with common Western musical notation, which identifies exactly what is to be played, the "notes" of the music, on a ground of five lines. But this emphasis on individual notes is not the standard, and many musical traditions, spanning across time and place, depict the contours and nuances of compositions in artful ways. These notation systems, some of which are explored here, visualize an invisible experience—an auditory performance—that inherently defies representation.

NOTES ON NOTATION



THICKER LINES = INCREASED VOLUME

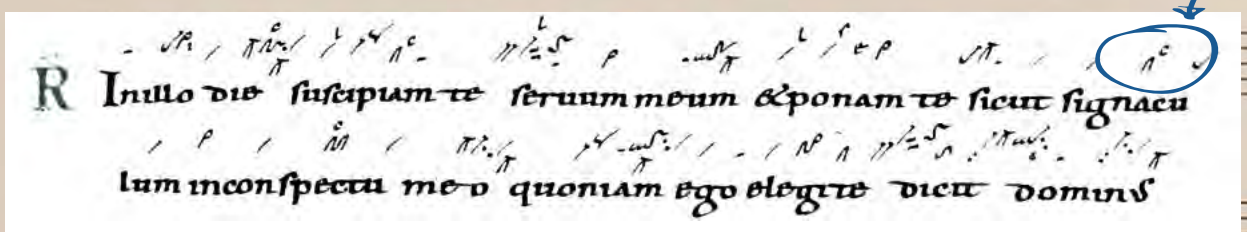
LYRICS + CORRESPONDING RITUAL

DBYANGS YIG

TIBETAN BUDDHIST CHANT

GREGORIAN CHANT*

*FROM THE "ST GALLEN" MANUSCRIPT



"NEUMES" REPRESENT MOVEMENT OF THE MELODY, BUT NOT INDIVIDUAL PITCHES

-USED TO HELP CHORAL SINGERS MEMORIZE THE CHANT

TEXT=LATIN

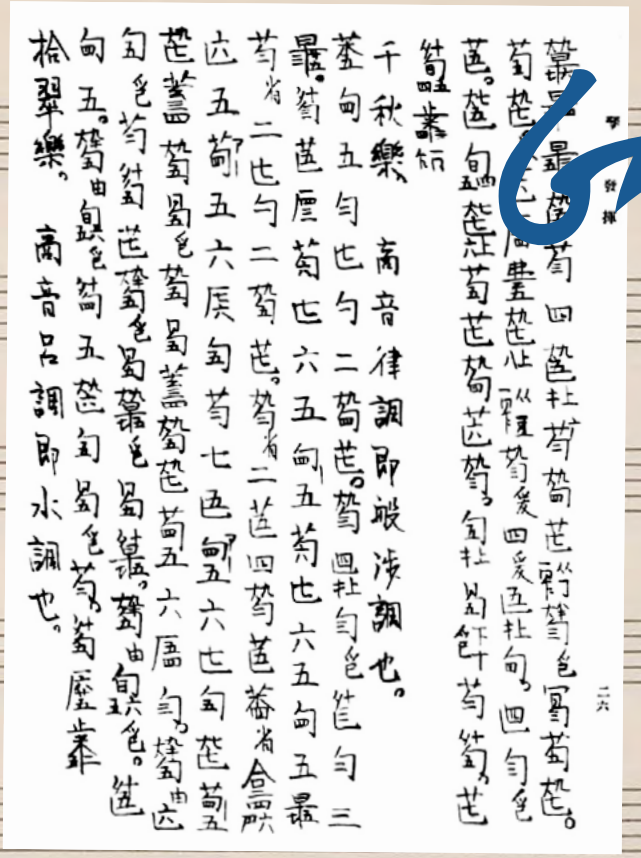
NO RHYTHM OR ORNAMENT

YOTSUMOTO YOSHITOYO, COMPOSER

ON GAGAKU

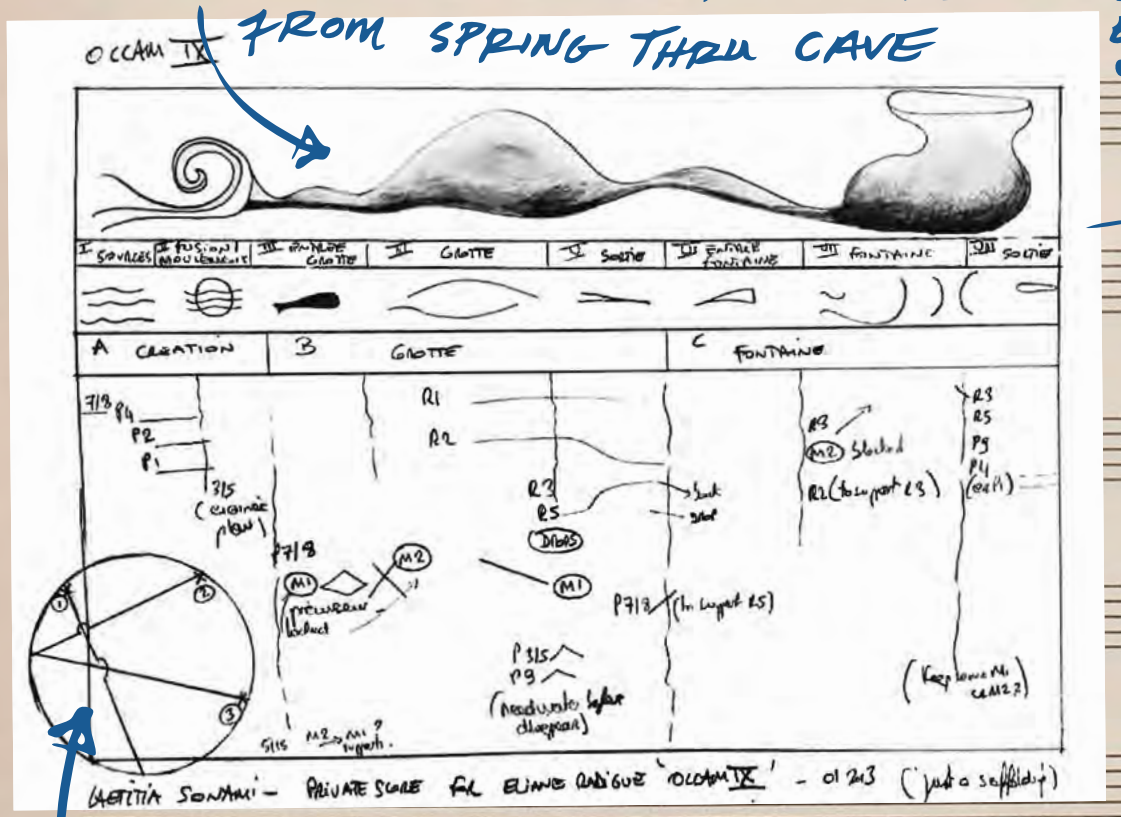
JAPANESE GENRE BASED ON COURT MUSIC FROM CHINA'S TANG DYNASTY (FOR ENSEMBLE)

INTERPRETED BY PERFORMER DEPENDING ON MOOD, OCCASSION OR SKILL



ELECTRONIC MUSIC

ILLUSTRATION of THE WORK'S "LANDSCAPE" — WATER MOVING FROM SPRING THRU CAVE



LAETITIA SONAMI'S PERSONAL RENDERING OF ELIANE RADIGUE'S "OCCAM IX" — A SCORELESS WORK THAT IS AURALLY DICTATED BY THE PERFORMER

DOES NOT INDICATE PITCH — GIVES GENERAL FEELING + FLOW OF THE PIECE

LINES REPRESENT # OF DIFFERENT SOUNDS + DENSITY OF THOSE SOUNDS

"SPRING SPYRE" DIAGRAM OF THE INSTRUMENT INVENTED BY THE COMPOSER

The Wisdom of Silence

(and Chocolate)

KHENPO PEMA WANGDAK

[redacted]

Silence is fascinating because it is equivalent to emptiness, one of the main messages of Buddhism. The simplest way to explain silence is to call it the absence of sound, while emptiness is the absence of everything. In Buddhism we say, “That which is empty, everything is possible. That which is not empty, nothing is possible.” To apply this to the idea of sound, I’d say, “That which is silent, everything is possible.”

[redacted]

Sound is all about ideas. Silence, however, takes you to the next level. If you want to put your ideas into practice, then you need to let silence take over. If I’m talking about the taste of chocolate, my words will give you an idea, but they will not give you the experience. Saying the word chocolate might make you think about it, but only unwrapping the package and placing the candy in your mouth will bring the “aha” moment of satisfaction. Say the word “sweet” and nothing happens. The word sweet isn’t sweet. The experience is when you eat.

[redacted]

In spiritual matters we refer to three practices: study, reflection, and meditation. With these you journey from sound to silence.

Thopa is the Tibetan word for hearing. When you study, you listen to your teacher, read books, get ideas from friends, watch TV. Yet all of these are noise. Even when you read books silently you are mentally talking. Through listening or hearing, you get ideas and concepts.

Sampa means to reflect on, sorting out as if through a strainer what to throw out and what to keep. When you start to look very carefully, then you know what to place in the trash.

Gompa, the third and final phase, means to meditate, to get rid of the thoughts and quiet the noise.

[redacted]

In traditional Tibetan practice a young person training to be a monk begins study at the age of seven or eight. When they reach their twenties or thirties they can continue their studies and teach others, or they can disappear into the wilderness (caves, mountains, or remote monasteries) to meditate. Their entire lifetime of learning is then spent contemplating—cut off from civilization and in a world where there is no hustle and bustle—words that imply a cacophony of sounds. This can last years, months, or even a lifetime and gives the inner self a chance to reflect and experience itself.

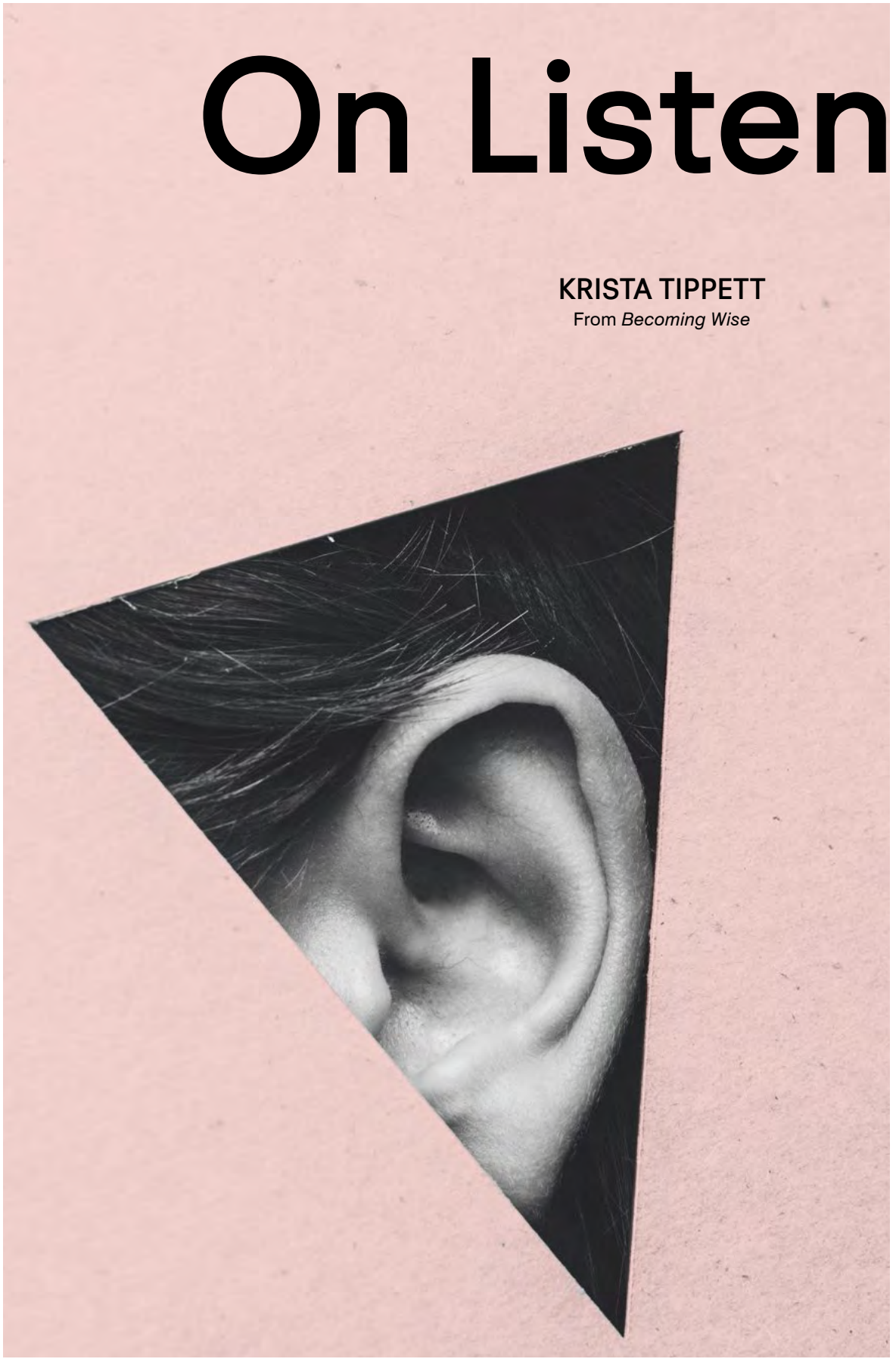
[redacted]

Silence is embedded in the teachings of the Buddha. In the flower sermon the Buddha held up a lotus in front of hundreds of his disciples. He said nothing. They said nothing. Only his disciple Mahakasyapa responded, and with nothing more than a faint smile. The flower that blooms from mud held infinite meaning for the Buddha. In that moment he said a million things silently.

On Listening

KRISTA TIPPETT

From *Becoming Wise*



I began to learn the art of conversation from the Benedictine monks of St. John's Abbey of Collegeville when I moved to Minnesota by way of one of life's odd, unplanned trajectories in the mid-90s. Religious stridency in American life had reached a fever pitch of toxicity, spurred on by a media appetite for voices that delivered entertainment. I was fresh from my study of theology, and intensely aware that we were working with a very limited vocabulary and skillset to discuss things that matter in public. These Benedictines had founded a quiet but mighty institute for "ecumenical and cultural research" in the 1960s, when the notion of Catholics and Protestants in relationship was an unimaginably daring move. It became a seedbed of cross-religious ferment for the latter half of the twentieth century.

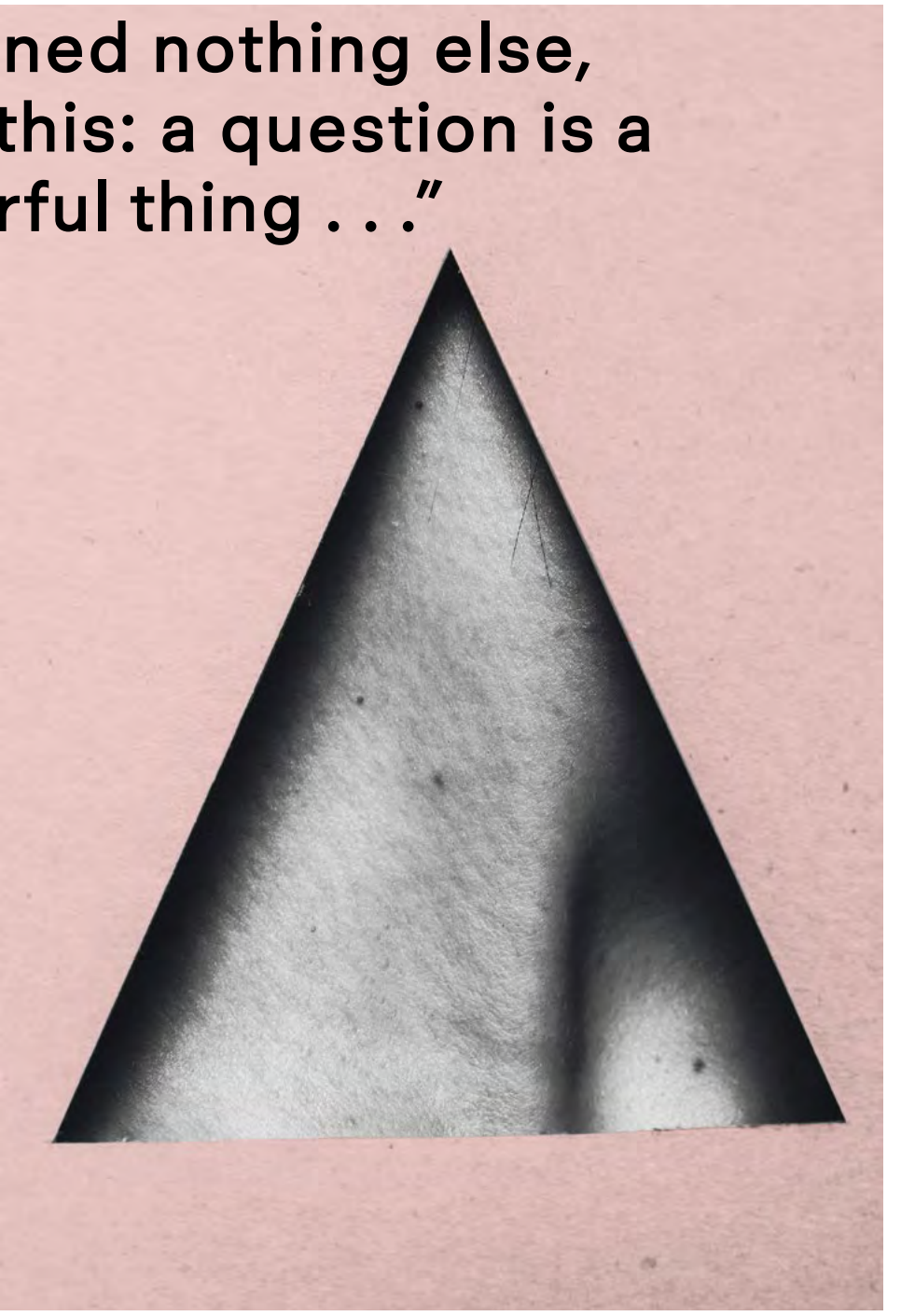
"I can disagree with your opinion, it turns out, but I can't disagree with your experience."

In Collegeville, discussion about a large, meaty, theological subject began by framing it as a question and then asking everyone around the table to begin to answer that question through the story of their life. "Who is God?" "What is prayer?" "How do we approach the problem of evil?" "What is the content of Christian hope?" I can disagree with your opinion, it turns out, but I can't disagree with your experience. And once I have a sense of your experience, you and I are in relationship, acknowledging the complexity in each other's position, listening less guardedly. The difference in our opinions will probably remain intact, but it no longer defines what is possible between us.

At St. John's, we had hours to tell our own stories and listen to others, days to unfold the "why" and "what next" and "so what" questions that followed and take them up together. I've found it possible to preserve the core wisdom of this approach and condense it in other times and places. I walk with people back and forth across the intersection of what they know and who they are, what they believe and how they live, and what that might have to do with all the rest of us. My usual opening inquiry, whether I'm with a theologian or a physicist, a parent or a poet, atheist or devout, is this: Was there a religious or spiritual background to your childhood? To be clear, this is radically different from the more obvious, unnerving question I would never ask: Tell me about your religious or spiritual life now? This part of us is as intimate as anything we attempt to put words around, and it ultimately defies them. The wise Quaker author and teacher Parker Palmer, my beloved mentor and friend, likens the human soul to a wild animal in the backwoods of our psyche, sure to run away if cross-examined. But everyone, I've learned, has a story to tell about the spiritual background of their childhood. This simple inquiry invites an open-hearted recollection that honors all the nuance and improvisation and clarity we've gathered around whatever soul or spirit means. It stirs a part of us where certainties are leavened by experiences, by hopes, and by fears. It's a place that remembers questions as vividly as answers—questions we may have followed our whole lives long and that, with the right encouragement, we might take up with others. Just as importantly, this question plants the entire conversation to come in a stance that is softer and more searching than we usually present as adults to the world. And it leads organically, along straight or meandering paths, into the roots of the curiosity that becomes, in adulthood, passion and vocation.

I've heard answers that are captured in one word and take off from there: "love" and "loneliness." Much of the way people talk about the religious background of their childhood has to do with absence as much as presence—the mother, for example, who would take the family to church while the father stayed home and read the paper. The newspaper-reading father is etched into the fabric of subsequent spiritual wonderings as much as any ritual inside walls of faith. I've spoken with many, many scientists who describe their discovery that mathematics could explain the colors on the surface of an oil slick, not to mention the motions of stars, and how this realization thrilled them with a sense of purpose transcendent in its way; that it was possible to explore how the world works and our place in it. I've spoken with a neuropsychologist who as a young volunteer with the Special Olympics began puzzling over the question of what makes a mind

“If I’ve learned nothing else, I’ve learned this: a question is a powerful thing . . .”



original and beautiful. I’ve met a French-born Tibetan Buddhist monk and passionate photographer who started his life as an atheist molecular biologist and whose life was upended by photos he came across of the faces of monks, pictures that revealed an unexpected template for radiant, integrated life.

There are pleasurable, primal, life-giving reasons we are rediscovering the power of personal story everywhere in media and culture. The art of conversation I’m describing here is related, but it is something subtly and directionally different—sharing our stories in the service of probing together who we are and who we want to be. To me every great story opens into an equally galvanizing exchange we can have together: So what? How does this change the way you see and live? How might it inform the way I see and live? I believe we can push ourselves farther and use words more powerfully and tell and make the story of our time anew.

The art of starting new kinds of conversations, of creating new departure points and new outcomes in our common grappling, is not rocket science. But it does require that we nuance or retire some habits so ingrained that they feel like the only way it can be done. We’ve all been trained to be advocates for what we care about. This has its place and its value in civil society, but it can get in the way of the axial move of deciding to care about each other.

Listening is an everyday social art, but it’s an art we have neglected and must learn anew. Listening is more than being quiet while the other person speaks until you can say what you have to say. I like the language the physician Rachel Naomi Remen uses with young doctors to describe what they should practice: “generous listening.” Generous listening is powered by curiosity, a virtue we can invite and nurture in ourselves to render it instinctive. It involves a kind of vulnerability—a willingness to be surprised, to let go of assumptions and take in ambiguity. The listener wants to understand the humanity behind the words of the other, and patiently summons one’s own best self and one’s own best words and questions.

Generous listening in fact yields better questions. It’s not true what they taught us in school; there is such a thing as a bad question. In American life we trade mostly in answers—competing answers—and in questions that corner, incite, or entertain. In journalism we have a love affair with the “tough” question, which is often an assumption masked as an inquiry and looking for a fight. I edited the “spiritual background of your life” question out of our produced show for years for fear that it sounded soft, though I knew how it shaped everything that followed. My only measure of the strength of a question now is in the honesty and eloquence it elicits.

If I’ve learned nothing else, I’ve learned this: a question is a powerful thing, a mighty use of words. Questions elicit answers in their likeness. Answers mirror the questions they rise, or fall, to meet. So while a simple question can be precisely what’s needed to drive to the heart of the matter, it’s hard to meet a simplistic question with anything but a simplistic answer. It’s hard to transcend a combative question. But it’s hard to resist a generous question. We all have it in us to formulate

questions that invite honesty, dignity, and revelation. There is something redemptive and life-giving about asking a better question.

Here's another quality of generous questions, questions as social art and civic tools: they may not want answers, or not immediately. They might be raised in order to be pondered, dwelt on, instead. The intimate and civilizational questions we are living with in our time are not going to be answered with answers we can all make peace with any time soon.

The poet Rainer Maria Rilke spoke of holding questions, living questions:

> *Love the questions themselves as if they were locked rooms or books written in a very foreign language. Don't search for the answers, which could not be given to you now, because you would not be able to live them. And the point is to live everything. Live the questions now. Perhaps then, someday far in the future, you will gradually, without even noticing it, live your way into the answer.*

The poet Elizabeth Alexander has posed a question by way of poetry that I wish I could throw out into the world right now, into town hall meetings and the halls of Congress, and just let it roll around for a while: "Are we not of interest to each other?"

Our cultural mode of debating issues by way of competing certainties comes with a drive to resolution. We want others to acknowledge that our answers are right. We call the debate or get on the same page or take a vote and move on. The alternative involves a different orientation to the point of conversing in the first place: to invite searching, not on who is right and who is wrong and the arguments on every side, not on whether we can agree, but on what is at stake in human terms for us all. There is value in learning to speak together honestly and relate to each other with dignity, without rushing to common ground that would leave all the hard questions hanging.

And sometimes one wise voice that has been in the world for a while and evolved, lived the same human drama from a few different angles, can provide more nuance than any two-sided debate. Frances Kissling is one of those voices for me. She's steeped in the particular context of reproductive rights, but what she's learned applies to every sphere. She also has stopped using some of the comforting words we understandably reflexively leap to as a basis for dialogue, like identifying common ground in the midst of deep differences: "The pressure of coming to agreement works against really understanding each other," she says. "And we don't understand each other." And, she adds:

> *The need to approach others positively and with enthusiasm for difference is absolutely critical to any change. More importantly, you have got to approach differences with this notion that there is good in the other. That's it. And that if we can't figure out how to do that and if there isn't the crack in the middle where there's some people on both sides who absolutely refuse to see the other as evil, this is going to continue. There's a lot of pressure and it's much easier to preach to the choir versus listening to people who disagree with you. But the choir is already there; the choir doesn't need us.*

In the crack in the middle where people on both sides absolutely refuse to see each other as evil, we rediscover the power of words to move us toward each other and away. We simultaneously circle back to the necessity of virtue to hold us to a care with our words—the intention we bring to what we speak, the quality of our listening, the trustworthiness and generosity we impart to the spaces in which we share our lives. The point of learning to speak together differently is learning to live together differently. It's a dance of words with arts of living.

CODA

THE POWER OF LISTENING

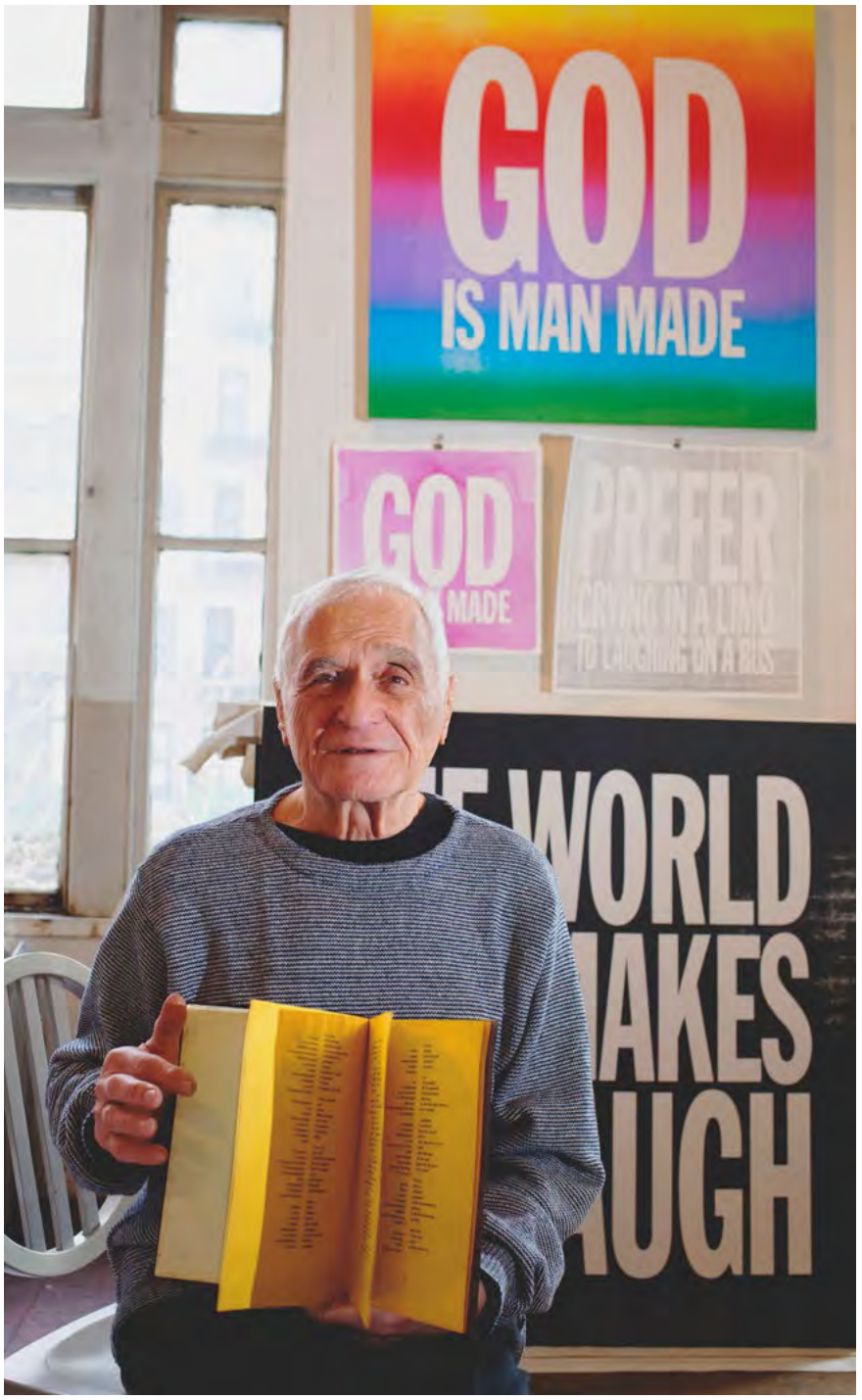
C. Spencer Yeh

How do we listen? What influences and shapes such a seemingly elementary act? Without understanding this basic principle, we cannot even begin to tackle the complex universe of sound and all the understanding it might offer about reality and from where things come.

I think about the ear as having multiple channels. One is tuned toward information, whether it be an ambulance siren clearing a path or the theme song of an approaching shark or the lyrics of some song you can't escape. Another is tuned to the sensual, each ear with its own palate, savoring particular textures, timbres, cadences: a sharp high-pitch that cuts through the air, throbbing bass that shakes the glass on the table.

Listening begins outside of the ear with the many systems that eventually install themselves into our thoughts and emotions. It could be someone who first "turned you on" to a musical artist or some self-help book or click-bait article telling you to "never not say no." These systems of influence can be affirming, families and communities built around acts of exchange, sending and receiving, thinking and feeling. They can also be what I would call real noise, reactionary walls swaying us to close our ears off to the sounds and stories of others.

But to listen, to really listen, we must take a seat, let down our respective walls, and immerse ourselves in the sounds and stories of others. Sometimes the voices telling us to react and respond to the noise before we even have the chance to experience or understand are themselves the noise clogging our ears. The key to where we come from, our origins, the past, is to create anew, to engage in new listening, new dialogue, new thought. The answer lies in our own voices and experiences.



John Giorno
in his studio, 2017.
Photograph by
Asya Danilova

Christine Sun Kim
and Emily McDermott holding
Kim's signs at Women's March,
Berlin, January 23, 2017.
Courtesy of the artist

Mediated Voices

The Art of John Giorno and Christine Sun Kim

What do our minds sound like? Every day they fill with running internal dialogues of which we are largely unaware. These are constant and repetitive thoughts, whirring like wheels and dripping like interminably leaky faucets. In their individual bodies of work, John Giorno and Christine Sun Kim become aware of these private voices and ponder how external social forces shape their public expression. Their graphic work is simultaneously minimalist and sumptuous, bursting at the seams from the effort of resisting the narrow self-definitions these dialogues impose.

"Each painting may be read on its own as a mantra, which when repeated, has the potential to transform the reader's mind."

Giorno's canvases revolve around words, which emanate from the paintings' centers against bright rainbow or monochromatic backgrounds. The phrases are short and pithy, proclaiming: "BIG EGO," "GOD IS MAN MADE," "YOU GOT TO BURN TO SHINE." They resound in your brain. Giorno draws these words largely from his own poetry, which in turn draws text from the mass media and common culture. Giorno's poetry, in earlier incarnations, contributed to the genre of "found" or "cut-up" poetry, which appropriated texts from newspapers and other sources. Giorno's flat surfaces and confrontational, yet seemingly generic typeface (he actually developed the typeface with a designer) continue to allude to mass-produced poster advertisements, many of which use catchy slogans that bombard and control the consumer in daily life. Even if the texts of his more recent paintings are not official examples of his "cut-up" style, they are components of an immense graphic archive—from the 1980s onward, Giorno created hundreds of similar or nearly identical poetry-slogan paintings silk-screened on canvas. Their messages also index Giorno's commitment to Tibetan Buddhist practice. For decades the artist has hosted numerous Tibetan Buddhist lamas and held ceremonies at his loft on the Bowery in Manhattan, which contains an elaborate shrine room. Each painting may be read on its own as a mantra, which when repeated, has the potential to transform the reader's mind and to loosen the ego's hold. In an introduction to Giorno's poetry book *You Got to Burn to Shine*, the renowned Beat writer (and Giorno's former housemate) William Burroughs describes the effect of Giorno's repeated phrases, writing that they "break apart the too familiar 'meaning' of the words, to crack them open and show their emphasis. This explicit realization conveys a feeling of liberation." In public poetry performances, Giorno accentuates his repetitive verse with changing volume and pitch to achieve similar effects, building into a fiery energy he has likened to a Tibetan Buddhist heat-generating meditation practice called *tumo*.

RISHA LEE

John Giorno's studio,
2017
Photograph by
Asya Danilova

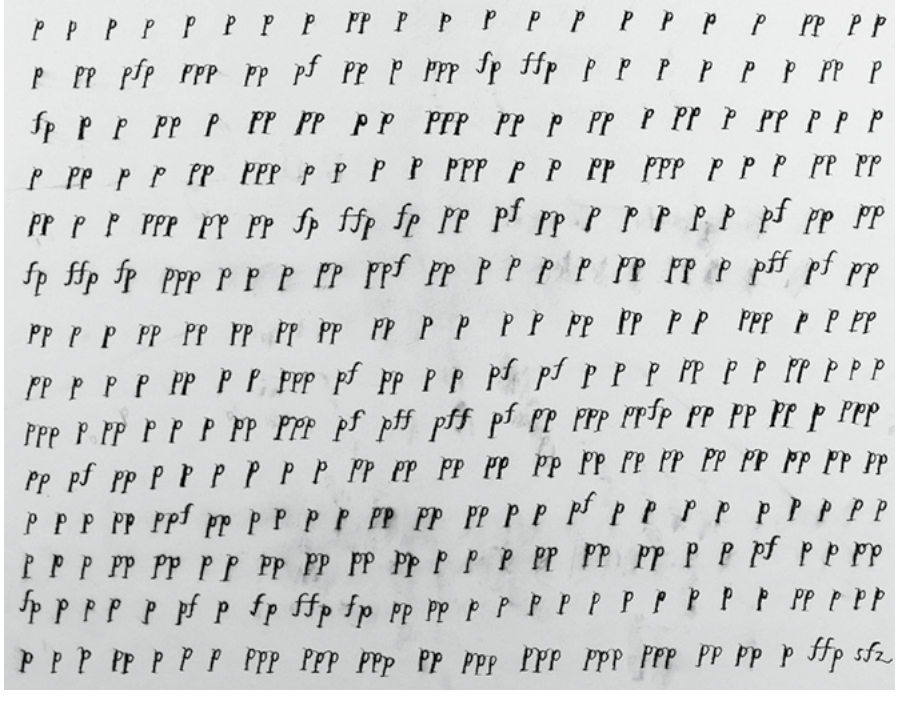
SEE MORE PHOTOS OF OUR VISIT TO JOHN GIORNO'S STUDIO IN SPIRAL ONLINE AT RUBINMUSEUM.ORG.

Similarly Kim's drawings use strategies of repetition to break apart familiar meanings, but instead of deconstructing words, she deconstructs the politics of sound. Musical notations known as dynamics—originating in European classical music to indicate the relative loudness of a note or phrase—fill the paper in successive lines, forming constrained and irregular grids. Collectively the dynamics in each drawing communicate the frequently playful central titles. In *The Sound of a Waiting Room (*pictured below), the first lines contain an orderly sequence of *piano* (p) markings, meaning soft, and a couple of *pianissimo (*pp) notations, meaning very soft. We are in a waiting room filled with complacent individuals leafing through *Time* and *Women's Health* magazines. In the following lines they grow impatient, perhaps one checks in again with the receptionist (*forte piano*, fp = loud then soft), while another is visibly agitated (*fortissimo piano*, ffp = very loud then soft). Others fall more silent in embarrassment (*pianississimo*, ppp = very, very soft), and so on. The last dynamic on the paper is the loudest and most abrupt change (*sforzando*, sfz = with sudden emphasis): "The doctor will see you now!" In her composition Kim's sounds are anthropomorphized, each exuding an individual personality only understood in relation to another. But sounds in this setup are inaudible and, rather, refer to their behavioral dimension. Ultimately Kim, who was born deaf, enables the hearing viewer to participate in the same mediated experience of sound that she does, de-familiarizing the process of hearing itself. For Deaf audiences the drawings are accessible and poignant; while Kim says that she often does not have a Deaf or hearing audience in mind when making drawings, she has observed that in her encounters with other members of the Deaf community they have not needed explanation to understand her work.

Kim frequently has stated that her art practice "deals with socially informed ideas surrounding sound" and attempts to unlearn sound etiquette and challenge "vocal authorities."* For Kim the audible and cochlear dimension of sound is shaped by others, including American Sign Language (ASL) interpreters, subtitles on television, texts on paper, and digital media. Because of this she is particularly attuned to the social politics of sound, and her drawings are a score for listening. She repeatedly has referred to hearing people as her "speakers" for transmitting bits of sonic information. Many of her graphic and performance works focus on the musicality of ASL and, by extension, all spoken language. In *Face Opera ii* Kim composed a score of emotions presented in sequential text on an electronic tablet, which the conductor (sometimes Kim herself) displays to a choir of pre-lingually Deaf people. The choir performs the score by using corresponding facial expressions and body movements, drawing attention to these expressions that qualify nuances of speech and language. ASL is music in which each component, such as a hand movement or facial expression, comprises a chord in a composition.

Just as Giorno and Kim's graphic works may be read as extensions of their performances, they also gesture to the artists' political activism. Giorno's poetry-slogans share the aesthetic of protest signs, perhaps alluding to the artist's well-documented participation in Vietnam War protests and his lifetime advocacy of gay rights. Kim's work advocates for a broader definition of listening and for marginalized ASL communities. As much as the artists question the politics of voice, their work collectively communicates an optimistic message about the potential of voice to transform our inner and outer worlds.

* Christine Sun Kim, "Stretched Boundaries: Improvising across Abilities," in *Negotiated Moments: Improvisation, Sound, and Subjectivity*, eds. Gillian Siddall and Ellen Waterman, (Durham and London: Duke University Press, 2016), 187.



Christine Sun Kim,
The Sound of a Waiting Room
(detail), 2017

CODA

AUDITORY CHOREOGRAPHY IN TAIWAN

Wendy Hsu

My memories of Taiwan are not visual. They are sonic. Sounds of the people, sounds of the objects, sounds of everything, coming and going, moving through spaces. Born in Taipei, I moved to Virginia with my family when I was twelve. In my adult years I've come to reconnect with my birthplace through listening deeply to how music and sounds make up a transitory texture in the rich, sensory tapestry of urban Taiwan. Sounds flow through towns and cities like a river.

Many things talk in Taiwan. Elevators and traffic lights project sonic messages, orchestrating movements of urban travelers. Street vendors amplify their rhythmic hawking by using megaphones with mp3 players pre-programmed to play audio advertisements on loop. "Skirts, pants, and T-shirts! All on liquidation sale! Last day. Hurry and buy!" Sounds spill into the streets and through permeable walls of night and day markets. Scattering and smattering, these loquacious objects constitute the materiality of this unique moving architecture of sound.

People, of course, talk. They sing! Urban dwellers sing through karaoke machines set up in the streets and in open public spaces like river parks. Groups of middle-aged cyclists ride along the river while singing along to karaoke tracks projected by their personal mp3 stereos with built-in speakers. At home, enthusiasts call in on the radio to sing their favorite tunes with karaoke backing tracks to a live audience over the air.

With tarps, bamboo sticks, and amplified music equipment powered by generators, itinerant musicians shape transitory spaces for parties, relaxation, and residence, especially for the migratory urban underclass, including the elderly, war veterans, disabled, and poor. Traditionally these musicians performed at tea parlors set up along the rivers. These days you can find them at pop-up tea parlors in city parks and sometimes inside metro stations. Friends I made while doing field research told me that these ad hoc gatherings are their daytime home, a home away from home. It's a place where they can be themselves and be happy.

Like a flâneur, I love getting lost in the streets, listening while walking, vice versa. Allowing the sounds to map my path extemporaneously, I stroll and dance through the alleys, arcades, and semi-permeable walls of outdoor markets and public parks.

The Ear of the Beholder

Are we hardwired to love music?

We're certainly hardwired for sound. The research seems to suggest that we're also hardwired for music in particular. It's not for just one reason but a host of evolutionary forces. One of those is the communicative nature of music. Music is an exaggerated signal in terms of speech—exaggerated in its contours, rhythms, and timbres. When a signal is exaggerated it's more robust and able to withstand passing down from generation to generation. Music is exaggerated in the way infant-directed speech is exaggerated. When talking to a young child, you don't say, "Look at the ball" you say, "Look at the baaalllll!!!" because it's easier for the infant to track what is going on with that exaggerated prosody.

Music is easier to track and so its message or melody stays intact better than speech when it is shared. It's one reason why the Old Testament was committed to music before it was committed to writing. For a couple of thousand years at least, it was only sung and, scholars believe, quite well preserved.

The brain evolved in an interesting way as reptiles became mammals and some mammals became primates and some primates became humans. Layers were added to our core brain area, built out like the rings of a tree trunk. In fact the word "cortex," which is used to refer to the outermost layer of our brain, means "bark" in Greek. And so we think of ourselves as a very sophisticated species, but it's all built on this core of a reptilian brain, which is in charge of the most fundamental and basic aspects of being alive. Music activates the reptilian brain and that suggests to me that it has some ancient evolutionary quality, but we don't know for sure.

When does sound turn into music?

There's no scientific answer and no neural answer because it's a continuum. What sounds like music to one person may sound like noise to another. In effect there's no scientific definition, but rather it's in the ear of the beholder. There are circuits in the brain that respond differently to music than to language, but what "music" is varies from individual to individual. For my purposes as a researcher, I'm willing to accept anything somebody says is music as music. I don't want to exclude something due to snobbery or enthocentrism or my own taste. For instance, although I don't particularly care for atonal music, a lot of people like it. So if I want to understand how the human brain reacts to music, I have to include that. I keep coming back to the definition of music by composer Edgar Varèse: "Music is organized sound."

Have you ever studied a composer or a musician using the MRI?

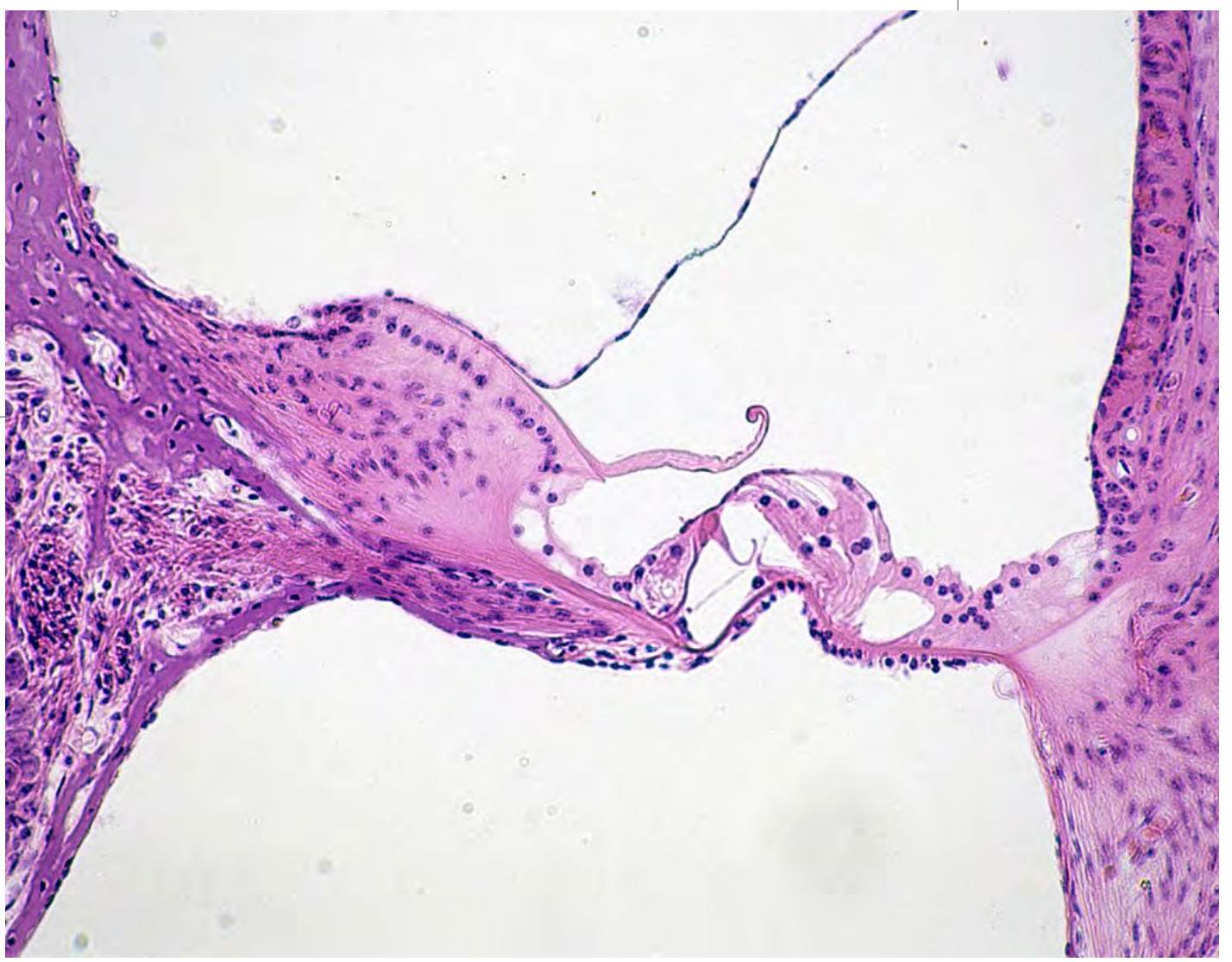
Sting came into the laboratory and he composed in the scanner. What we found was really interesting. The gist of it is that he used a lot of the visual cortex when he was composing. I asked him about it and he says that when he's composing he thinks of songs like architecture with buttresses and filigrees and supports—it's a very visual metaphor for him. In one experiment we had him imagine ten songs that he knew well, and then we played him those songs and compared the activation. It was strikingly similar. That tells us that when we are mentally imagining or composing music (or at least when Sting is), we're playing the songs back inside our heads, using the same circuits that would be activated if the music came from outside our heads.

What is the relationship between music, mood, and our brains?

Music can convey our emotional states better than language can, because our emotional states tend to be mixtures of different things. We're rarely just purely happy or purely sad. There's always a mixture. The complexity of music allows it to convey that better than language.

Music can modulate serotonin and dopamine reliably. Your brain is producing them all the time, but the amount is up for grabs. Dopamine is involved in feelings of reward when it is present in certain parts of the brain but it's also involved in helping you to pay attention when it's in other parts of the brain. Seratonin is a well-known correlate of mood. That's why we have a whole class of selective serotonin re-uptake inhibitors (antidepressants) that slow down the absorption of

Daniel Levitin, the rocker turned neuroscientist tells us about the relationship between mood and music and the stuff that makes our gray matter happy.



Inner ear (50X magnification)
© Ed Reschke/Getty

serotonin so that whatever your brain is producing tends to stick around for a while. It puts people in a better or less slothful mood.

Prolactin is a soothing, comforting hormone. It's released when mothers nurse their infants by both the mother and the child. It's calming. It's also released when we listen to calming music. I can't tell you what music to put on that will do that for you because what one person finds calming another person might find aggravating or stimulating. It's very subjective. For a lot of people a calming song might be Joni Mitchell's "Blue" but not for everybody (and not for Joni).

Moods to a neuroscientist are just neurochemical states. We talk about happy or sad or lustful or sleepy as moods, but they are neurochemical states. Our chemistry can put us into those moods based on events. You hear some bad news, it alters your brain neurochemistry, and that puts you in a bad mood. Unless it's bad news about someone you hate and then it's Schadenfreude.

Can you prescribe music the way a doctor prescribes medicine, along the lines of "Take two Joni Mitchells and call me in the morning"?

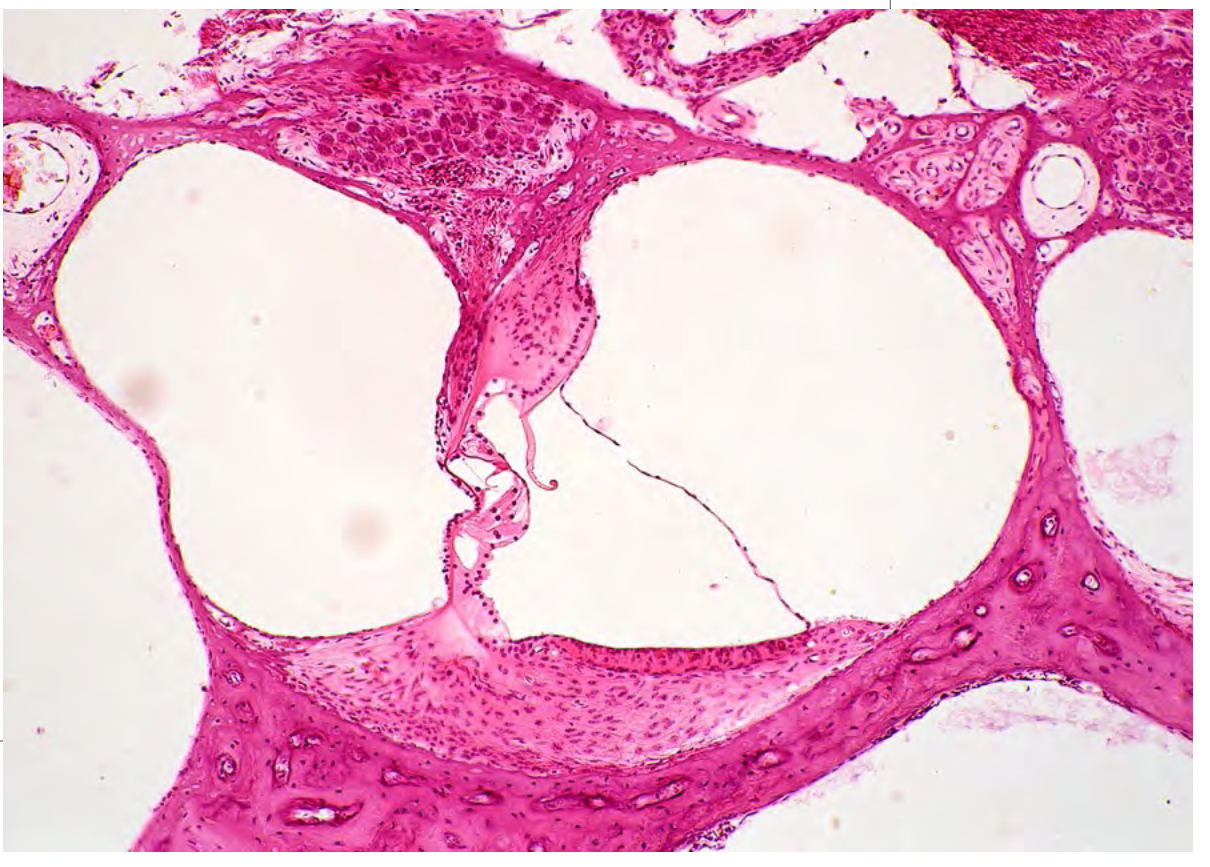
Clinicians who are part of the American Association of Music Therapists prescribe music for certain outcomes. The issue is that there is no one piece they prescribe to everybody. They have to work carefully with the patient in order to find the right music. There was a study done where people about to undergo surgery were given either valium or soothing music. The patients who listened to the music did better than the medicated patients on a number of measures. But there's a whole host of literature that shows that the soothing music must be determined by the patient rather than the doctor.

DJs get to control the mood of an entire room. Did you ever DJ in your musical life?

I did. I think of DJs as musicians. Even if they don't play an instrument or write music, they are manipulating mood, which is what composers and musicians try to do. They are doing it in often nuanced and skilled ways that cause you as a listener to detect patterns or make connections in music you might not otherwise have made.

So recalling the 1980s disco song, can a DJ save your life?

Of course there's also the Smith's "Hang the DJ." But I do think music can save a life, showing us what's beautiful about the world and helping us feel more connected to our true selves. It can also make us feel more connected to others. Music and all the arts—dance, sculpture, painting, literature—can help us see things from a perspective that we hadn't seen before, see connections between things that we didn't see connected before, to open our hearts to truths that we might not be able to understand logically. If a DJ can play a set of songs that does that for you, then yes, a DJ can save your life.



Inner ear (25X magnification)
© Ed Reschke/Getty

CYMATICS: SOUND SCIENCE OF THE FUTURE

John Stuart Reid

Sound has been an invisible force throughout history that permeates every aspect of our lives. Traffic noise, sirens, airplanes thundering overhead, and other jarring sounds jolt our nerves, while the sounds of nature and music flow over us and around us like soothing waters, lifting our spirit, inspiring us, exciting us. Yet if we could see sound, our world would be even more beautiful than nature has gifted us to see—a world filled with shimmering, holographic bubbles, and wherever a bubble meets a surface, an invisible kaleidoscopic pattern is imprinted.

If asked to visualize sound or music, we might imagine a wave undulating through the air, since we were taught in school that sound is a wave. However, while classical texts refer to sound and music travelling in waves, this model relates only to the graph of sound not to what we might refer to as sound's physical "space form." In the real world, audible sounds travel through the air as bubbles. Sound bubbles pulsate in and out and it is the rhythmic movement of this pulsation that, when graphed, is depicted as a wave.

To see the sounds that create light and life is to open a new window on our world, one that has been veiled for all time. But revealing visible sound is not a new pursuit. Few will be surprised to learn that the first person to leave a written record of this work was none other than Leonardo da Vinci. In the late 1400s, after observing how the dust motes on his worktable stirred to create shapes when he vibrated the table, he wrote, "I say that when a table is struck in different places the dust that is upon it is reduced to various shapes of mounds and tiny hillocks." Da Vinci's close observation of dust under the influence of vibration was, quite literally, sound made visible. Rather like sprinkling powder on a fingerprint to render it visible, a light sprinkling of particulate matter on any vibrating surface will reveal hidden sound patterns.

German musician and scientist, Ernst Chladni (1756–1827), applied this simple physics principle with great flair. He made sand-strewn metal plates ring by playing their edges with a violin bow, creating beautiful sand patterns known today as "Chladni Figures." Chladni became famous throughout Europe and even demonstrated this seemingly magical phenomenon to Napoleon. The French leader was so impressed he sponsored a competition with the Paris Academy of Sciences to acquire a mathematical explanation of the sound patterns. Sophie Germain (1776–1831), a young French woman, won Napoleon's three-thousand-franc prize.

The person who made the largest contribution in the twentieth century was Hans Jenny (1904–1972), a Swiss medical doctor and scientist. Jenny published his first volume Kymatic—a title derived from the Greek word kuma ("billow" or "wave"), a description of the periodic effects that sound and vibration have on matter—in 1967 and his second in 1972, the year he died. His two volumes are rich sources of imagery, which he observed and described in great detail, although leaving scientific and mathematical explanations to scientists who would come after him.

Today the science of visible sound—now termed cymatics, after Jenny's work—offers insights into many fields of science, from astrophysics to zoology and almost every discipline in between. I have researched the subject intensively for twenty years. That work that has led to the development of the CymaScope, a new instrument that renders sound visible by imprinting sound vibrations onto the surface and sub-surface of water, creating remarkable visuals like those seen at right.

(Clockwise from top) Harmonic of a Schumann cavity resonance | Twelvefold matrix of a human spinal signal | Beta brainwave signal. All images courtesy of CymaScope.com

Photograph by Asya Danilova

The Rubin Museum of Art

Where contemporary minds meet the art and wisdom of the Himalayas

Founded in 2004, the Rubin Museum is located in New York City's vibrant Chelsea neighborhood. For those fueled by discovery, we fuse art, science, and human behavior to reveal fresh perspectives on our world. Through thought-provoking exhibitions presented across six gallery floors and programs in a state-of-the-art theater, including films, concerts, and on-stage conversations, the Rubin provides immersive experiences that encourage personal discovery and spark new ways of seeing the world. Emphasizing cross-cultural connections, the Rubin is a space to contemplate ideas that extend across history and span human cultures.

MUSEUM HOURS

Monday 11:00 AM–5:00 PM
Tuesday CLOSED
Wednesday 11:00 AM–9:00 PM
Thursday 11:00 AM–5:00 PM
Friday 11:00 AM–10:00 PM
Saturday 11:00 AM–6:00 PM
Sunday 11:00 AM–6:00 PM

ADMISSION

$15 for adults
$10 for seniors (65 and older)
$10 for students
FREE for children (12 and younger)
FREE for members
FREE for select university partners
FREE on Fridays, 6:00–10:00 PM

CONNECT WITH US

Explore the collection, peek behind-the-scenes on our blog, and receive the latest updates on our exhibitions and current program listings.

Visit us online: RubinMuseum.org

Follow us on social media: @RubinMuseum

Exhibitions

Through the lens of Asian art, particularly that of the Himalayan region, we journey with all who are curious to explore our shared human experience—the ways we think and react to the forces acting upon us in our present day.

SECOND FLOOR

Gateway to Himalayan Art

Start here for an introduction to the rich artistic traditions of the region, illuminating the primary figures, symbols, materials, and techniques presented throughout the Museum.

THIRD FLOOR

Masterworks of Himalayan Art

Journey across geography and more than a thousand years of history, tracing artistically and historically significant works from the Rubin's collection, as well as new acquisitions and gifts.

FOURTH FLOOR

Sacred Spaces
featuring the Tibetan Buddhist Shrine Room

Reflect on devotional activities in awe-inspiring places, with a rotating selection of art that highlights the world's most sacred places. Engage all your senses in the Shrine Room with flickering butter lamps, incense, and an installation of more than 150 objects.

FIFTH FLOOR

Henri Cartier-Bresson:
India in Full Frame

Through September 4, 2017

Experience India's mid-century turmoil in scenes of political upheaval, the final moments in Mahatma Gandhi's life, and everyday people in Cartier-Bresson's "street photography" style. Together the images illustrate a master photographer's perspective on transformative moments in Indian history.

SIXTH FLOOR

The World Is Sound

June 16, 2017–January 8, 2018

Listen deeply. *The World Is Sound* invites you to experience how sound impacts our daily lives, our traditions, our history, and all of existence. "Listen to" traditional Tibetan Buddhist paintings juxtaposed with new commissions of contemporary sound art as you challenge your entrenched ways of thinking and being.

Public tours are offered daily, and are free with admission.

Photograph by David De Armas

Programs

As a space for mindful, cultural exchange, the Rubin is driven by the desire to challenge, surprise and provoke—we want to bring you into the fold to expand the limits of what an art museum can be.

The Rubin presents on-stage conversations, workshops, live musical performances, film screenings, and other innovative public events to expand on the themes in the galleries. Visit RubinMuseum.org/events for a full listing of upcoming programs.

Thee Majesty perform "I'm Looking for You, Can You See Me?" at the Rubin Museum, April 20, 2016, photograph by Jeff Shock

MUSIC

WEDNESDAYS

Spiral Music presents free acoustic music every Wednesday evening at the base of the museum's spiral staircase. Artists who specialize in music from the Himalayas and South Asia are invited to forge a connection between their music and the art in the galleries.

FRIDAYS

Naked Soul presents performances from some of the country's top singer/songwriters without microphones or amplifiers, as if the music were, acoustically speaking, naked. The musicians in the series draw upon the universal themes inherent in Himalayan art—spirituality, peace, tolerance, wisdom, compassion—on select Friday evenings.

Jazz at the Rubin features performances that play off the Buddhist notion of non-attachment, as jazz musicians improvise and interpret in our cherrywood-lined theater.

Rhythms of India performers explore the varied traditions of Indian music, from timeless ragas to contemporary fusion.

TALKS

Brainwave
Our longest running series is all about understanding the mind and what makes us who we are. Now in its eleventh year, this talk series brings together neuroscientists and notable personalities for engaging conversations with related films and workshops.

Tibetan Book of the Dead Book Club
Ramon Prats, a leading bardo scholar, sits down with seven conversation partners to explore the *Bardo Thodrol*, or "Tibetan Book of the Dead." Each week Dr. Prats will select a passage that corresponds to a new topic: addiction, palliative care, dementia, near-death experiences, and others.

FILMS

Still from *Apursansar*

Cabaret Cinema
These Friday night screenings of classic films from around the world explore themes featured in the Museum's galleries. Each screening is introduced by a special guest.

Check listings for special screenings, including premieres and art house films that are rarely shown elsewhere.

BREATHE: CONNECT MIND AND BODY

Explore the connections between the wisdom traditions expressed in Himalayan art and contemporary mind/body practices in a variety of programs and workshops.

WEDNESDAYS, 1:00 PM

Mindfulness Meditation
Beginners, dabblers, and skilled meditators can join expert teachers weekly to practice the art of attention. Each session is inspired by a different work of art from the Rubin Museum's collection. A free podcast of each program is also available.

FAMILY PROGRAMS

SUNDAYS, 1:00–4:00 P.M.

Family Sundays
The Rubin welcomes visitors of all ages! Families can drop into the Museum on Sundays afternoons for casual art making and free family-friendly activities. Designed for children ages three and older with accompanying adults, the art activities change monthly and connect to the art and ideas of the Himalayas.

More Than a Museum

We strive to mix an arts and culture experience with a social experience. In addition to exploring six galleries, you can join friends in the café and shop or make the Rubin the lively venue for your next private event.

CAFÉ SERAI

Enjoy the aromas and flavors of the Himalayas at Café Serai, an inviting spot for your next meal. The café is open to anyone during Museum hours and does not require an admission ticket.

EVENING HOURS

Acoustic Wednesday Evenings
Open late, 6:00–9:00 PM
Peruse the galleries accompanied by the sounds of Spiral Music. Café Serai offers Himalayan Happy Hour with special discounts on drinks, shared plates, and more.

K2 Friday Nights
Free museum admission, 6:00–10:00 PM
During K2 Friday Nights, Café Serai becomes the K2 Lounge, offering a special pan-Asian tapas menu to accompany the evening's DJ and programs. Happy Hour runs from 6:00 to 7:00 p.m. with a two-for-one special on all beer, wine, and well drinks.


Photograph by Michial Seto

THE SHOP

Take a memory of the Museum home with you or give it as a gift! The shop's selection of jewelry, artisan items, books, and other treasures include an array of items unavailable anywhere else.

All proceeds from the shop support the Rubin Museum of Art and items can be purchased in store or online at RubinMuseum.org. Members receive a 10% discount on all purchases.

SPACE RENTALS

If you're planning an event or need to make a professional conference more inspiring, don't forget that the Rubin is available for corporate entertaining and private rentals. It's a memorable place for guests, and we make it easy to plan, with a range of wellness experiences, educational tours, and catering menus available.

You Make It Possible

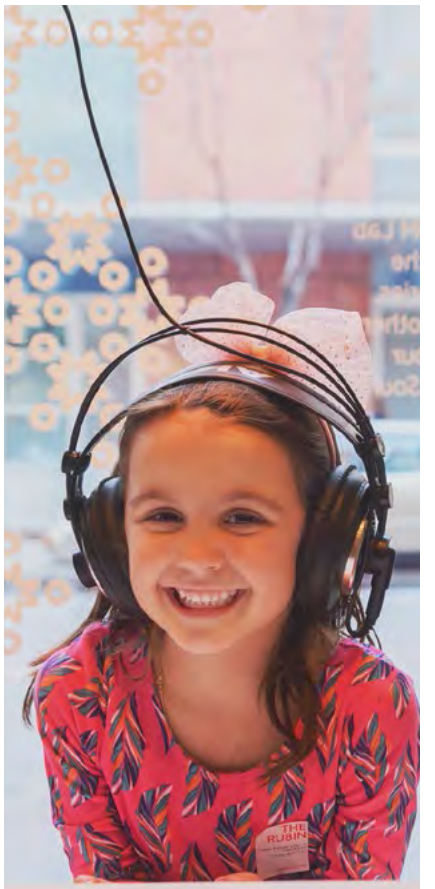
Like all non-profit arts organizations, the Rubin Museum is only as strong as its base of support. You help us create a space for contemplation, learning, inspiration, community, and art. Join us!

Become a member or give the gift of membership
Rubin members receive benefits that include invitations to exclusive previews and tours, free admission to Mindfulness Meditation and Cabaret Cinema, unlimited entry to the galleries, and much more. Membership to the Rubin Museum of Art is also a special gift that friends and family of all ages can enjoy throughout the year.

Become a corporate member
Offer your clients, employees, and guests an experience unlike any other in one of the most dynamic venues in New York City. Corporate members gain access to exhibitions and select programs, receive special rates on event rentals, and more.

Make a donation
Support the Rubin Museum of Art and you'll be helping to fund six gallery floors of exquisite art from the Himalayan region and hundreds of talks, on-stage conversations, films, performances, educational initiatives, workshops, and access programs for all audiences.

Volunteer
See the inner workings of the Museum and contribute your valuable time and service. Our volunteers must be willing to make a long-term commitment. In appreciation of your dedication, you'll receive special benefits, including free admission, discounts at the Museum's shop and café, and an invitation to our annual appreciation event.


Photograph by Filip Wolak

Lead tours by becoming a docent
Connect new visitors with our art and programs as you present thematic tours, gallery talks, and other educational initiatives. Apply for our docent program online for consideration to join our intensive training.

General operating support of the Rubin Museum of Art is provided by the New York State Council on the Arts with the support of Governor Andrew Cuomo and the New York State Legislature, as well as by generous donations from the Museum's Board of Trustees, individual donors, and members. *Sacred Spaces* is made possible by The Hoch 2009 Charitable Lead Trust and Rasika and Girish Reddy, as well as Bob and Lois Baylis, Ashwini and Anita Gupta, Preethi Krishna and Ram Sundaram, William and Pamela Michaelcheck, Tulku Tsultrim Pelgyi, Manoj and Rita Singh, Venkat and Pratima Srinivasan, the Zakaria Family Foundation, and contributors to the 2017 Exhibitions Fund. *Henri Cartier-Bresson: India in Full-Frame* is organized by the Rubin Museum of Art in collaboration with Magnum Photos and the Henri Cartier-Bresson Foundation, with generous support provided by The Robert Mapplethorpe Foundation, David Solo, an anonymous donor, and contributors to the 2017 Exhibitions Fund. Musical performances at the Rubin are made possible by the Carlo and Micól Schejola Foundation. Mindfulness Meditation is presented in partnership with Sharon Salzberg and the Interdependence Project, and is supported in part by the Hemera Foundation. Family Sundays are made possible by New York Life, with additional support provided by Con Edison, Agnes Gund, and public funds from the New York City Department of Cultural Affairs in partnership with the City Council.

PARTNER

Hearing in Three Dimensions

Humans hear space. Because our ears are located on either side of our head, we receive audio signals in each ear at slightly different times depending on our position. This allows us to localize sound with a great deal of accuracy.

So what happens when we close our ears off and listen with earbuds or headphones? According to Dr. Sean Olive, Acoustic Research Fellow at HARMAN, "we tend to localize the sound coming from headphones inside or slightly around our heads." This can feel less natural than listening to the same audio through speakers, where the sound is externalized and coming from a source in front of us with some reflection around the room. Without that sense of envelopment, headphone listening can be seriously compromised compared to loudspeaker listening.

It's Dr. Olive's job to try and remedy this disparity. In the audio products he helps develop, the goal is to create "accurate sound" that feels as close as possible to professional loudspeakers in ideal conditions. For example, HARMAN has worked on a headphone and software system called LiveStage, which uses signal processing to simulate the experience of having a speaker in front with reflections coming from the side. "It essentially uses spatial processing to trick the brain into thinking there are sounds outside of the head," Dr. Olive explains. He's also worked on head tracking, which is technology that recreates the experience of natural hearing by noting the angle of your head and electronically adjusting the audio signal for each ear every few milliseconds. Although this type of technology is currently used primarily in virtual and augmented reality, HARMAN has started putting gyroscopes in select headphones so that when such technology is used more widely, the headphones are ready to track head movement with just a software update.

The future of sound seems likely to fully embrace our relationship to space. Dr. Olive believes it will be customized, immersive, and multi-dimensional: "In the future you'll walk into your living room or wherever you're listening and there will be a body scan, like you're in the transporter in Star Trek, and then your audio experience will become completely personalized based on your physiology." With more and more attention being paid to the individual experience, the future may be here sooner than we might suspect.

HARMAN is a proud sponsor and partner of the Rubin Museum's exhibition *The World Is Sound.*

HARMAN

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150 WEST 17TH STREET
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EXHIBITION / JUNE 16, 2017–JANUARY 8, 2018

The World Is Sound

RubinMuseum.org/sound

JOIN OUR LISTENING CHALLENGE / SEPTEMBER 17–23

Learn to listen with your whole body

Join artists and experts for a week of daily challenges that illustrate how sound impacts your life.

Visit **RubinMuseum.org/enews** to sign up and have each activity sent directly to your inbox.