

[“Music Lovers’ Field Companion” from *Silence* © 1961 by John Cage. Published by Wesleyan University Press. Used by permission.]

## Music Lovers’ Field Companion

John Cage

*In 1954 an issue of the United States Lines Paris Review devoted to humor was being prepared. I was invited to write on the subject of music. I contributed the following article.*

I have come to the conclusion that much can be learned about music by devoting oneself to the mushroom. For this purpose, I have recently moved to the country. Much of my time is spent poring over “field companions” on fungi. These I obtain at half price in second-hand bookshops, which latter are in some rare cases next door to shops selling dog-eared sheets of music, such an occurrence being greeted by me as irrefutable evidence that I am on the right track.

The winter for mushrooms, as for music, is a most sorry season. Only in caves and houses where matters of temperature and humidity, and in concert halls where matters of trusteeship and box office are under constant surveillance, do the vulgar and accepted forms thrive. American commercialism has brought about a grand deterioration of the *Psalliota campestris*, affecting through exports even the European market. As a demanding gourmet sees but does not purchase the marketed mushroom, so a lively musician reads from time to time the announcements of concerts and stays quietly at home. If, energetically, *Collybia velutipes* should fruit in January, it is a rare event, and happening on it while stalking in a forest is almost beyond one’s dearest expectations, just as it is exciting in New York to note that the number of people attending a winter concert requiring the use of one’s faculties is on the upswing (1954: 129 out of 12,000,000; 1955: 136 out of 12,000,000).

In the summer, matters are different. Some three thousand different mushrooms are thriving in abundance, and right and left there are Festivals of Contemporary Music. It is to be regretted, however, that the consolidation of the acquisitions of Schoenberg and Stravinsky, currently in vogue, has not produced a single new mushroom. Mycologists are aware that in the present fungous abundance, such as it is, the dangerous *Amanitas* play an extraordinarily large part. Should not program chairmen, and music-lovers in general, come the warm months, display some prudence?

I was delighted last fall (for the effects of summer linger on, viz. Donaueschingen, C. D. M. I., etc.) not only to revisit in Paris my friend the composer Pierre Boulez, rue Beautreillis, but also to attend the Exposition du Champignon, rue de Buffon. A week later in Cologne, from my vantage point in a glass-encased control booth, I noticed an audience dozing off, throwing, as it were, caution to the winds, though present at a loud-speaker-emitted program of *Elektronische Musik*. I could not help recalling the riveted attention accorded another loud-speaker, rue de Buffon, which delivered on the hour a lecture describing mortally poisonous mushrooms and means for their identification.

But enough of the contemporary musical scene; it is well known. More important is to determine what are the problems confronting the contemporary mushroom. To begin with, I propose that it should be determined which sounds further the growth of which mushrooms; whether these latter, indeed, make sounds of their own; whether the

gills of certain mushrooms are employed by appropriately small-winged insects for the production of *pizzicati* and the tubes of the *Boleti* by minute burrowing ones as wind instruments; whether the spores, which in size and shape are extraordinarily various, and in number countless, do not on dropping to the earth produce gamelan-like sonorities; and finally, whether all this enterprising activity which I suspect delicately exists, could not, through technological means, be brought, amplified and magnified, into our theatres with the net result of making our entertainments more interesting.

What a boon it would be for the recording industry (now part of America's sixth largest) if it could be shown that the performance, while at table, of an LP of Beethoven's *Quartet Opus Such-and-Such* so alters the chemical nature of *Amanita muscaria* as to render it both digestible and delicious!

Lest I be found frivolous and light-headed and, worse, an "impurist" for having brought about the marriage of the agaric with Euterpe, observe that composers are continually mixing up music with something else. Karlheinz Stockhausen is clearly interested in music and juggling, constructing as he does "global structures," which can be of service only when tossed in the air; while my friend Pierre Boulez, as he revealed in a recent article (*Nouvelle Revue Française*, November 1954), is interested in music and parentheses and *italics*! This combination of interests seems to me excessive in number. I prefer my own choice of the mushroom. Furthermore it is avant-garde.

I have spent many pleasant hours in the woods conducting performances of my silent piece, transcriptions, that is, for an audience of myself, since they were much longer than the popular length which I have had published. At one performance, I passed the first movement by attempting the identification of a mushroom which remained successfully unidentified. The second movement was extremely dramatic, beginning with the sounds of a buck and a doe leaping up to within ten feet of my rocky podium. The expressivity of this movement was not only dramatic but unusually sad from my point of view, for the animals were frightened simply because I was a human being. However, they left hesitatingly and fittingly within the structure of the work. The third movement was a return to the theme of the first, but with all those profound, so-well-known alterations of world feeling associated by German tradition with the A-B-A.

In the space that remains, I would like to emphasize that I am not interested in the relationships between sounds and mushrooms any more than I am in those between sounds and other sounds. These would involve an introduction of logic that is not only out of place in the world, but time-consuming. We exist in a situation demanding greater earnestness, as I can testify, since recently I was hospitalized after having cooked and eaten experimentally some *Spathyema foetida*, commonly known as skunk cabbage. My blood pressure went down to fifty, stomach was pumped, etc. It behooves us therefore to see each thing directly as it is, be it the sound of a tin whistle or the elegant *Lepiota procera*.

[Excerpted from Steve Goodman, *Sonic Warfare: Sound, Affect, and the Ecology of Fear* (Cambridge, MA: The MIT Press, 2010). Reprinted courtesy of the author and The MIT Press.]

## 1999: Vibrational Anarchitecture

Steve Goodman

*Neo-Tokyo.*

*An elaborate terrorist plot is staged, stringing together an infovirus, architectural vibration, and inaudible frequencies to catalyze a revolt of machine slaves and bring down the towers of the Babylon Project. The sinister plot was to hack into and infect the operating system of the 8,000-strong, Transformer-like, robotic police force (the patrol labors, or Patlabors for short). When two cops were sent out to investigate an unexplained wave of rogue Patlabors rampaging across the city, they uncover the sinister revenge plot to infect the city's population of labors with the BABEL virus. This computer virus in the Hyper-Operating System could be triggered only by a very specific frequency of sound. This tone, a high-pitch whistle, is emitted only by the sympathetic vibrations generated by the resonating skyscrapers of the Babylon Project as it channels, like a huge tuning fork, the winds of a massive tropical typhoon. The whistle is inaudible to humans but not to the cybernetic audio sensors of the Patlabors, which are much more sensitive. If unleashed, the virus threatens to spread across the robots, forcing them to defect, mutating them into terrorists, and causing the population to descend into panic-stricken chaos.*

*Patlabor*, a slice of Japanese animation from 1989, describes a city whose future hangs in the balance, permanently on the brink of dystopia. The immanent threat of meltdown is set up with a delirious complexity at which Manga typically excels. A number of features make this crazed yet weirdly prophetic science fiction of interest here. First, the vibrational architecture of the city becomes a weapon. The city is no longer merely the site of warfare but, as a result of the resonant frequency of the built environment, the very medium of warfare itself. Using emitted tones as a chance triggering device, the plot tunes into the city as an instrument, not just venue, of terror. Second, in its imagination of disaster, this scenario is properly ecological in a manner befitting the conflicts of the twenty-first century. It sketches an ecology no longer confined to the “natural” and the organic, but rather one that encompasses the climatic, the artificial environment of the urban, and the affective drift of the city's inhabitants. It is an ecology in which volatile processes in one milieu transfer their energy into volatile processes in another milieu, from typhoon, to architectural resonance, to infovirus, to robot revolt, to the fear of population turbulence. Third, in the Babel virus, *Patlabor* indicates that the virus, whether biological, computer, or affective, is the abstract model of threat in cybernetic control societies. Finally, audition has been upgraded. This is a cybernetically upgraded mode of perception in which the bandwidth of hearable frequencies has been technically expanded.

What if, however, the shifting relation between the audible and the inaudible was not merely a matter of technical upgrades to the human sensorium but rather indicated a kind of policing of frequency that distributes that which is sonically sensed? In *Patlabor*, moreover, the emitted frequency was merely a switch, triggering the technical cascade of

the weapon: the computer virus tagged Babel. But what if the actual weapon was vibration itself, and its target not the operating systems of robots but the affective operating system of the city's population? This would be a scenario in which that which was being transmitted would be not just information but bad vibes. In this ecology, an event would simultaneously draw in the physics of its environment (its vibrations) and the moods of its populace (its vibes), sending an immense collective shiver through the urban as resonating surface.

The work of American artist Mark Bain draws attention to the primacy of vibration in any discussion of sound, affect, and power. Bain is a vibration artist. He repurposes military and police research into infrasonic and ultrasonic weaponry intended as crowd control devices in order to create an ethico-aesthetic intervention into the resonant frequency of objects and the built environment. He deploys infrasound, that is, sounds at frequencies below the threshold of hearing, to investigate the unpredictable effects on movement, sensation, and mood. For example, a typical occurrence related to vibration is its effect on the vestibular system and the sense of orientation in which balance can be modulated so that suddenly your perception is, as Bain describes it, that of "surfing the architectural plane."<sup>1</sup>

As opposed to a sound artist, he describes the sonic effects of his work as side effects, or artifacts, merely an expression of a more fundamental subsonic vibrational ecology.<sup>2</sup> Bain seeks to tap into a "secret world of sound resident within materials. Using multiple oscillators . . . it becomes more like an additive synthesis type of production." He unleashes the contagiousness of vibration in the production of a "'transient architecture' that describes a system of infection where action modulates form . . . where stability disintegrates" and effects are "re-injected into the walls of the 'host' site" in a "translation of sorts, one building's sound infecting another."<sup>3</sup>

Influenced by and mutating Matta Clark's notion of *anarchitecture*, Bain has referred to his work as both "massaging buildings" and a kind of "architerrorism."<sup>4</sup> In one of his more recent pieces, he turned the seismological data recorded from the September 11 attacks into a musical composition, using data gathered from a Columbia University listening station located 21 miles north of New York City. Bain was fascinated by what he called the "screamingness of the earth," its countless, constantly active, inaudible pulsing and vibration. In addition to collating seismological information, increasing its frequency range, amplifying its volume, and stretching it out in time to render it audible, Bain's research has revolved around a series of installations such as *The Live Room*, in which he attaches oscillators to buildings to make them resonate, the sounds enveloping and immersing the audience. This trembling envelope, Bain argues, produces a vibrational topology or "connective tissue" between one building and another and the bodies in attendance.<sup>5</sup>

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<sup>1</sup> Mark Bain, "The Live Room — Transducing Resonant Architecture" at <http://framework.v2.nl/archive/archive/node/text/.xslt/nodenr-128820> (last viewed June 2, 2007).

<sup>2</sup> See Mark Bain interview with Josephine Bosma (1999) at <http://www.nettime.org/Lists-Archives/nettime-1-9908/msg00023.html>

<sup>3</sup> Ibid.

<sup>4</sup> "Interview with Mark Bain" by Molly Hankwitz and David Cox, January 3, 2000, Artists' Television Access, San Francisco, "qualifying this by noting that 'to a certain degree, developers and architects are terrorists in themselves . . . in the sense that most common people who live in the street or who live in these buildings don't have ownership on the properties, and so the decision to make buildings or to develop areas of cities or towns is really out of their hands.'" <http://www.nettime.org/Lists-Archives/nettime-1-0007/msg00069.html> (last viewed June 2, 2007).

<sup>5</sup> "The Live Room — Transducing Resonant Architecture," *Organised Sound* 8 (2): 163–170. In his installation

Bain's work resonates with Augoyard and Torgue's call in *Sonic Experience* for the audible city to be understood less in terms of sound objects and the soundscape but rather as an *instrumentarium*.<sup>6</sup> He notes that "one of the things that is interesting about the building being sized so large: when I am putting energy into it, it acts as a radiator, or a speaker in a sense. The surfaces are rattling and vibrating out. What you hear is the movement of the building. Most of it is subsonic though, and it has this heaviness that relates to the heaviness of the architecture. I like this massiveness of the sound."<sup>7</sup>

If the built environment is frozen music, then the freeze occurs in both the folding of tectonics into architectonics and of vibration into organized sound or music. Architecture is designed to withstand a spectrum of vibrational strains, from the accident of the earthquake to the infrasonic infrastructure produced by hydraulic channels, ventilation shafts, and reverberations of passing traffic. A bass materialism or vernacular seismology returns the vibrational event of liquefaction back to the city. It promotes an anarchitecture that is no longer merely deconstructive in style, but rather experiments with sonic liquefaction, where interior and exterior and discreet entities are unfolded onto a continuum of differential vibration. The concrete ripples and pulses with invisible vortical force fields. Objects become vectorial, simultaneously projectile and contagious, defying gravity, sliding across horizontal surfaces. The air becomes heavy, and metal screams under the torque. Liquids become turbulent; vortices emerge. But aside from these physical interventions, this anarchitecture also modulates affective tonality and mutates ambience. The weightless, perfumed music described by Brian Eno congeals in the dread, heavy space of a drowned world. The city submerged in an infrasonic soup—a contagious swamp of rumbles, gurglings, and murmurs. A reservoir of potential.

A vibrational anarchitecture occupies a topological mediatic space that cuts across the plexus of the analog and the digital, their nested intertwining. The conception of a vibrational topology can be approached initially through cymatics and the experimental work of Hans Jenny. Cymatics revolved around the way in which materials, objects, and entities affect and are affected by vibration and the way rhythmic motion can become apparent in static objects as well as in moving objects, producing not just patterns but forms continuous with the vibrational environment. Looking at the effects of oscillation, gradients, and fluctuation on media by passing viscous substances through vibrating of magnetic fields, Jenny was able to speculate on the generation of structures implicated into the environment. When experimenting with the generation of special sonorous patterns in a liquid metal such as mercury, he noted the formation of wave patterns, vortices, and other hydrodynamic phenomena. For Jenny, cymatic observation focused on "the rhythmic beat, the circulation, the ever recurrent rotations" and the way such substances "always present themselves as a whole entity which *at the same time* oscillates,

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work, Bain seems to be aiming at a vibrational topology: "I'm trying to find a bridge between the two, between inhabitants of a structure and the structure itself. I am using a vibrational vehicle to connect them together." One of Bain's installation projects, *The Live Room*, was described as constructing "a topological space composed of virtual objects which haptically interface with the audience. By interacting with the cycling wave forms the visitor is occupied, infested with frequencies, modulated by vibrational energy and imparted with the volumetric sensibilities inherent within the body. The audience are the activated objects, traversing the site and feeling the liveliness of themselves, others and the space within." <http://framework.v2.nl/archive/archive/node/text/.xslt/nodenr-128820> (last viewed June 2, 2007). See also M. Oliver, "The Day the Earth Screamed," February 13, 2004, <http://arts.guardian.co.uk/features/story/0,,1147696,00.html>.

<sup>6</sup> J-F. Augoyard and H. Torgue, eds., *Sonic Experience: A Guide to Everyday Sounds*, trans. A. McCartney and D. Paquette. (Montreal: McGill-Queens University Press, 2005).

<sup>7</sup> Mark Bain interview with Josephine Bosma.

vibrates, flows within itself, pulsates and moves to-and-fro. . . . Such turbulences are of particular interest in that they render the environment sensitive to the effects of sound.”<sup>8</sup> Cymatics therefore provides an initial model for an ontology of vibrational force based on analog wave phenomena. However, other approaches are required to those based in analog continuity to conceptualize the status of vibrational force and its coding within digital culture.

From cymatics to the vibratory anarchitecture practiced by artists such as Mark Bain, the vernacular seismology and sonic dominance practiced by the bass materialists of the musical diaspora of Jamaican sound system culture,<sup>9</sup> a set of experimental practices to intensify vibration has been developed for unfolding the body onto a vibrational discontinuum that differentially traverses the media of the earth, built environment, analog and digital sound technologies, industrial oscillators, and the human body. Each actual occasion of experience that populates this discontinuum will be termed a *vibrational nexus*, drawing in an array of elements into its collective shiver.

This differential ecology of vibrational effects directs us toward a nonanthropocentric ontology of ubiquitous media, a topology in which every resonant surface is potentially a host for contagious concepts, percepts, and affects. In this speculative conception of ubiquitous media, not just screens (and the networks they mask everywhere) but all matter becomes a reservoir of mediatic contagion.<sup>10</sup> By approaching this topology of vibrational surfaces without constraint to merely semiotic registers that produce the “interminable compulsion” to communicate, media themselves are allowed to become fully expressive. An outline of a vibrational anarchitecture,<sup>11</sup> then, diagrams a topological mediatic space that cuts across the plexus of the analog and digital, the waveform and the numeric sonic grain, implicating the continuity of the wave into the atomism of the granular. It will be argued that the quantum field of this vibrational anarchitecture constitutes the most elementary battlefield of sonic warfare and the microtexture of its weapons and targets.

This ontology of vibrational force is constructed through bass materialist research concepts and practices. Bass figures as exemplary because of all frequency bands within a sonic encounter, it most explicitly exceeds mere audition and activates the sonic conjunction with amodal perception: bass is not just heard but is felt. Often sub-bass cannot be heard or physically felt at all, but still transforms the ambience of a space, modulating its affective tonality, tapping into the resonant frequency of objects, rendering the virtual vibrations of matter vaguely sensible. Bass demands more

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<sup>8</sup> Hans Jenny, *Cymatics: A Study of Wave Phenomena and Vibration* (Macromedia Publishing, 2001), pp. 96–97.

<sup>9</sup> Note particularly, via sonic dominance, the transduction of bodily movement via dance.

<sup>10</sup> Note the vibrational tendencies of flat panel speaker research. “As an example, the standard understanding of a ‘loudspeaker’ producing sonic waves has historically been constrained by the semiotic end of the continuum. Given the liberation of forces from such constraints allowed for by the military we find here that new avenues for sound are opened up in their direct interaction with human and nonhuman bodies. Flat panel speakers are a relatively recent technology in which dynamic surfaces are agitated to produce audio waveforms. This technology is currently being developed by weapons companies as a cladding surface for submarine vessels. If the waveform pumped out by the speakers can be generated at sufficient scale it can act both as a sound dampening technology and also as a means of repelling attacks by torpedo. As with contemporary musical aid ventures, sound acts directly to save lives. But more importantly, recognising the material effectiveness of media, without constraint to merely semiotic registers or the interminable compulsion to communicate allows media themselves to become fully expressive.” Matt Fuller and Andrew Goffey, “Evil Media Studies” in *Spam Book*, ed. T. Sampson and J. Parikka (Cresskill, N.J.: Hampton Press, 2008).

<sup>11</sup> The approach developed here sets up a parallel between bass and some of the ideas of architectural theorist Greg Lynn, especially his notion of the blob.

theoretical attention, as it is too often equated with a buzzing confusion of sensation and therefore the enemy of clear auditory perception and, by implication, clear thought. But for many artists, musicians, dancers, and listeners, vibratory immersion provides the most conducive environment for movements of the body and movements of thought.

[Excerpted from Ines Weizman, “Tuning into the Void: The Aurality of Adolf Loos’s Architecture,” in *Harvard Design Magazine*, Do You Read Me? No. 38, S/S 2014. Reprinted courtesy of the author and Harvard Design Magazine.]

## Tuning into the Void: The Aurality of Adolf Loos’s Architecture

Ines Weizman

Adolf Loos suffered from progressive hearing loss. As a child, his hearing was poor, and by the time he reached his mid-50s, his condition had deteriorated to the point that he became dependent on a hearing trumpet. As it declined further, he began to carry a pen and notebook, turning to the written word in lieu of speech. This form of communication was slow and complicated, particularly for an extroverted man who lived life with gusto. Despite this setback, Loos was always engaged with his surroundings—the buzz of his architecture office; the dust and hammering of construction sites; the people he encountered on the street, in noisy cafés, and in boisterous cabaret theaters. A music enthusiast, Loos frequented concert halls even when he could no longer hear most sounds.

In 1921, Loos titled his first essay collection *Spoken into the Void*; the work was intended as a critique of his Austrian contemporaries’ ignorance of modern lifestyles. Indirectly, the “void” in the title pointed to Loos himself. It was he who could not hear the world around him; it was his own voice that lacked reverberation, as if the words he spoke produced no echo. As early as 1910, he had written “I, the unpublished architect, I, the man working in a vacuum, am the only one among thousands who has real influence.”<sup>1</sup>

If we revisit Loos’s work with attention to his hearing condition, we can speculate about how—despite the “theatrical gestures and aphoristic flourishes” that John V. Maciuika attributes to his writing<sup>2</sup>—his demands for architectural precision and his careful choice of materials might in fact have originated in his sensitivity to the acoustic qualities of environments.

In 1912, when the famous Bösendorfer Saal, a concert hall next to his Vienna apartment, was threatened with demolition, Loos composed a charming theory on acoustics entitled “The Mystery of Acoustics.” In it, he claimed that concert halls, similar to wooden violins, absorb the music played in them via the molecular structure of their building materials, making some buildings better acoustic forums.

And materials are very sensitive. You only have to let a military band blast away in the Bösendorfer Saal for a week and its celebrated acoustics will have gone to pot. Just as a ham-fisted amateur would ruin a violin that had belonged to Paganini. As a matter of general principle brass music is bad for building materials. That is

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<sup>1</sup> Adolf Loos, “Architecture” (1910), in *On Architecture*, ed. Adolf Opel and Daniel Opel, trans. Michael Mitchell (Riverside, CA: Ariadne Press, 2002), 78.

<sup>2</sup> John V. Maciuika, “Adolf Loos and the Aphoristic Style: Rhetorical Practice in Early Twentieth-Century Design Criticism,” *Design Issues* 16, no. 2 (Summer 2000): 84.



why one side of opera houses is always poorer acoustically. [... Halls] in which brass instruments [are] never play[ed] develop the best acoustics. The tones of Liszt and Messchaert live on in the mortar of the Bösendorfer Saal and vibrate with every note of a new pianist or singer. That is the mystery of the hall's acoustics.<sup>3</sup>

This quote suggests that the architect's hearing was exceptionally fine-tuned, enabling a nuanced understanding of structure as an expression of acoustical potential.<sup>4</sup> He ultimately conceived of architecture as a medium that reflects on the means of production and reproduction.<sup>5</sup> That he was attentive to the influence of brass instruments in a particular part of an opera hall, and to the instruments' long-term impact on the experience of sound in the building, shows that he was attuned to the aural dimension of materialities in a way few architects before him had been.

Perhaps Loos was aiming to substitute architecture for hearing itself—as if, in the fine, fragile structures and textures of the inner ear, he could understand the relationships of materials to sound. Marble would of course differ from wood or glass in its reflectivity of sound, just as people, as they moved about, would impact the acoustic qualities of a space. The marble, wood, carpet, and concrete in Loos's designs are intended to perform not simply as visual features or designations of luxury, but as elements of a carefully engineered sound contraption.

I would argue that Loos's acute aural sensibility—his attention to voices, acoustics, and reverberation—provides an essential entry point to understanding his late works. The less Loos could hear, the more his buildings began to suggest prosthetic devices—extensions, perhaps, of his trusted hearing trumpet.

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<sup>3</sup> Adolf Loos, "The Mystery of Acoustics" (1912), in *On Architecture*, 109.

<sup>4</sup> The Viennese fascination with this hall began in 1872 when Ludwig Bösendorfer, a gifted musician with exceptional hearing and the son of the famous piano maker, who himself was a gifted musician with exceptional hearing decided to convert the equestrian stables of the Palais Liechtenstein into a music hall. According to one anecdote, Bösendorfer marked out the position of the walls for the concert hall while riding a pony and listening to the sounds his assistant made for him from different corners of the hall. The hall soon gained a reputation as for being a primary location for music performance in Vienna, and Loos was keen to prevent the building from destruction.

<sup>5</sup> For more on architecture as media form, see Ines Weizman, "Copying as a Media Form," in *Add Metaphysics*, ed. Jenna Sutela (Helsinki: Aalto University, 2012), 94–105; and Ines Weizman, "Architectural Doppelgängers," *AA Files* 65 (2012): 19–24.

[From Adolf Loos, “The Mystery of Acoustics” (1912), in *On Architecture*, ed., Adolf Opel and Daniel Opel, trans. Michael Mitchell (Riverside, CA: Ariadne Press, 2002).]

## The Mystery of Acoustics

Adolf Loos

I was asked whether the Bösendorfer Saal should be preserved. I presume what prompted the question was the idea that reverence for the past demands we should not demolish a hall that has played such an important role in the musical history of Vienna.

But it is not a question of reverence for the past, it is a question of acoustics. And that is the question I propose to answer. It was a good thing I was asked, otherwise I would have taken the answer to the grave with me.

For centuries architects have been working on the problem of acoustics. They tried to solve it on the drawing board. They drew straight lines from the sound source to the ceiling, assuming the sound would bounce off at the same angle, like a billiard ball from the cushion, and continue on its way. But all these diagrammatic representations are nonsense.

The acoustics of a hall do not depend on the spatial design, but on the materials. A hall with poor acoustics can be improved by soft fabrics, by curtains and wall-coverings. Even a piece of thread strung across the middle of a hall can completely change the acoustics of the space and improve them.

But these are only makeshift solutions. The soft fabrics absorb the sound, taking away its fullness. The Greeks knew better. At regular intervals under the seats in their theaters they had sound-chambers containing huge metal bowls covered with drum skins. They tried to amplify the sound, not diminish it. And the Bösendorfer Saal has the most magnificent acoustics without any curtains at all, just straight, bare walls.

Perhaps what should be done, then, is to build a new hall using the exact measurements of the old one—to satisfy the supporters of the previous theory of acoustics—and using the same materials—to satisfy me. Certain result: a hall with terrible acoustics.

This kind of thing has already been tried. In Manchester they made an exact copy of the Bremen concert hall, which is world-famous for having the best acoustics. With negative results. But until now every new hall has had poor acoustics. Many of you will remember the opening of the Opera in Vienna. People complained that the house had such poor acoustics it would mean the end of the singer’s art in Vienna. And today it is considered a model theater for acoustics.

Have our ears changed? No, it is the material the hall is made from that has changed. For forty years the material has absorbed good music and has been impregnated with the sound of Philharmonic and the voices of our singers. These are mysterious changes in

molecular structure which until now have only been observed in the wood violins are made of.

Does that mean that to give a space good acoustics you have to play music in it? NO, that is not enough. You have to play good music in it. You can fool people, but you can't fool materials. Halls in which only brass bands have played will always have poor acoustics. And materials are very sensitive. You only have to let a military band blast away in the Bösendorfer Saal for a week and its celebrated acoustics will have gone to pot. Just as a ham-fisted amateur would ruin a violin that had belonged to Paganini. As a matter of general principle brass music is bad for building materials. That is why one side of opera houses is always poorer acoustically. With time halls in which brass instruments never play develop the best acoustics. The tone of Liszt and Messchaert live on in the mortar of the Bösendorfer Saal and vibrate with every note of a new pianist or singer.

That is the mystery of the hall's acoustics.