

Research Article

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The Sound Monad: A Philosophical Perspective on Sound Design

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Abstract: This article aims at sketching a philosophical theory of sound based on the perspective of sound designers: unique agents blurring the boundaries between engineering, music, acoustics and sound-based art. After having introduced the general framing in Section 1, focusing on a short history of the theory and practice of sound design, in Section 2 we propose a reading of sound as monad. We derive such intuition from the technology of digital sampling of audio signals, based on the decomposition of complex sound waves in a number of elementary sinusoidal waves. Thus, in Section 3, we attempt at grounding the resulting “sound-atom” on Leibniz’s notion of monad, intended both as a “simple substance without parts” and as a “nucleus of forces *in statu possibilitatis*.” The insight is resumed and further discussed in Section 4, where we draw our conclusions by demonstrating the fitness of such framing with regards to the standpoint of sound design, while accounting for the work of sound artists Carsten Nicolai and Ryoji Ikeda.

Keywords: aesthetics, art, sound, design, monad, entelechies, contemporary, digital, sampling, synthesis

1 Introduction

In 1997, the iconic, American experimental-electronic act “Matmos” released their first, eponymous record. Aside from the spin that such work gave to the definitive consecration of “glitch” as a music genre on its own (and, possibly, as a whole procedural mindset in music-making), the album featured one track in particular conceived in a pretty awkward way.

We are referring to track number nine: *Verber: amplified synapse* whose creation, as producer/journalist Tom Doyle¹ reported, involved sound samples of “amplified crayfish nerve tissue.”

Matmos’ attempt works as a brilliant exemplification of a first, great issue at stake here: how the act of designing a sound and of using certain sources, not thought-of as musical instruments, reflects in music.

The track and its unusual means of creation question a standardized process of composition stemming from a reference to music theory (notes, chords etc.) articulated through certain timbres produced by a given variety of musical instruments. In this work, in fact, the “utilitarian” bond between sound and music is seized, so that sound can be searched and construed for its own sake, without the forceful need to “serve” a musical composition. A crossroad opens up here.

On one end, there is the chance to craft a certain timbre out of the most diverse sources and to set this very process as the core of the musical creation. This path leads to sound-centred music, wherein a certain structure and a palette of techniques serve the purpose of highlighting the newly crafted sounds. This

¹ Doyle, “Matmos,” 1.

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applies to the dawn of any kind of musical instrument (let us think of piano and electric guitar down to a unique human voice), when the exploration of its limits and opportunities demands the spotlight: electronic music is often the elective “playground” of such process. On the other end, when literally everything may be transformed in a musical instrument, the very notion of “musical instrument” itself is questioned, along with the need to classify what a musical instrument is and what it is not. To this latter extent, for as bizarre and extreme that their attempt might seem, *Matmos* were well aware of being not even ahead of their time, as they were shaping, “recycling,” manipulating and ordinating sounds but not actually “creating” them.

Other than being just a part of what sound designing involves, what *Matmos* did might be considered the least innovative part of the process, given what samplers had made possible since 1969 with the advent of EMS’s *Musys*² and, more broadly, with the introduction of the *Fairlight Computer Musical Instrument* in 1979.

The latter marked the definitive step beyond the conventional musical instrument, by giving the operator an “instrument of instruments.” A device that could both let the user work with the timbre of any given instrument without the need to play it the conventional way or have it at hand and, by virtue of the same laws, imagine and create new waveforms – therefore new timbres – at will, without the need for a “sonorous body,” some physical object to be excited in order to produce sound (other than a loudspeaker, by the way).

A little historic background might be of help, here. *Fairlight*’s creators, Kim Ryrie and Peter Vogel,³ along with engineer Tony Furse,⁴ drew inspiration from the processes of digital synthesis of acoustic instruments based on Fourier’s transformations, a technology at its infancy back in the early seventies.⁵

Fairlight C.M.I. was a sampler in every respect, but its flexibility went far beyond sampling: it had 16 notes of polyphony, meaning that the user could assign several samples or the same one to up to 16 notes on a keyboard and have each sample tuned according to the pitch of the note played. Also, still stemming from Furse’s research, a laser pencil was implemented in order to let the composer “draw” on the screen any kind of modification to the given waveforms. To sum up, back in 1979 the world not only already had samplers, polyphonic digital synthesizers and digital audio workstations: it had (better: the economically wealthiest ones had) all of them in a single machine.

To a skeptical eye, however, even these breakthroughs may result only half as exciting as they actually are. On one hand, continuous tape record-players such as the Chamberlin (the lesser-known father of the Mellotron, introduced during the fifties) had already made possible to seize the bond between the physical presence of a musical instrument and the chance of hearing its timbre while playing it. On the other hand, tape manipulation in general, the entire movement of *musique concrète*⁶ not to mention the efforts of the movie and television industry,⁷ back in the sixties had already taught the world how to create brand new sounds from already existing ones.

“So what was really *new* under the seventies sun?” one might ask. Such sneaky question would let us underline the most important effect caused by these two instruments: more than speeding up already existent processes or expanding the size of sound libraries, what both *Musys* and *Fairlight C.M.I.* really did was to set a point of no-return in terms of ripping the boundaries contingent to the matter of manipulation.

² About the *Musys* software systems, please refer to: Grogono, “Musys”; Douglas, *Electronic Music Production*.

³ Not to be confused with the German sound-artist Peter Vogel (1937–2017).

⁴ Between 1972 and 1976 Tony Furse had developed three versions of a digital synthesizer (the “Qasar” I, II and M8) the latter of which was based around two parallel-driven Motorola 6800 8-bit processors. In 1979 he licensed to Ryrie and Vogel the patent of his M8 which constituted the core of the *Fairlight C.M.I.* See: Chapman, “The Qasar.”

⁵ See Mathews, “The Digital Computer,” 553–557; Cooley and Tukey, “An Algorithm,” 297–301; Clark, “A Program,” 21–9; Freedman, “A Digital Computer,” 43–50; Chowning, “The Synthesis of Complex Audio,” 526–34; Smith, “Viewpoints,” 1–10.

⁶ See Schaeffer and Bayle, *Musique Concrète*; Chion, *Guide des Objets*.

⁷ See Grogono, “Electronic Music Studios.”

Before the advent of such devices, sound – it might be told – had gone hand in hand with itself alone. Whether willing to get inspired by an experiment or to create something unheard of, one had to rely either on the purposely-made supports (i.e. tape, vinyl etc.) or on other more or less conventional sound sources that stayed in the domain of physical, tangible reality. Therefore, it is true that the introduction of recording and reproduction devices in general definitely heightened the tactile dimension in the experience of sound. Yet, it wasn't before the digital sampler that sound could even surpass the domains of hearing and haptic while breaking into the visual and the virtual reality thanks to computer screens, graphic user interfaces, displays and so on. Sound, so to speak, could now undergo infinite transformations, up to the point of being displayed on a computer screen and manipulated freely, thus factually existing in the visual domain regardless of the hearing. This made for a deep transformation in the shape of the experience of sound which, starting from the niche of sound design's pioneers, has come down to digital audio workstations and visual-based sonic devices⁸ affordable to anyone.

There is even more, though: another unique feature of the Fairlight was its transparency, its absolute lack of “character,” so to speak. Unlike a violin or a piano, whose materials, structure and components demand for certain playing techniques and would hardly sound like something else (e.g. it is pretty unlikely for a piano to sound like a trumpet), the Fairlight had no “inherent” timbre. To this extent, let us report a comment that two consultants of the Audio Engineering Society (namely Steve Levine and J. William Mauchly) made about the *Fairlight C.M.I.* at the time of its public showoff, in 1980:

In general, the Fairlight offers an enormous palette of sounds to the musician, but it can't do everything. Like a camera, *the CMI becomes transparent to the viewer*, with no characteristic sound of its own.⁹

Albeit probably not aiming at pointing that out, this line shows exactly what had always been missing within the materials of a musician (soon to become a sound designer): a blank canvas. An anonymous medium coming out of the same reality as any material entity yet sharing as little as its mere physical constituents with it. Something which does not already exist within a specific purpose (for instance, a painter might consider pretty much anything as a blank canvas), which does not bring with itself the history and constraints of such addressing while, at the same time, offering and opposing anything else but its void, its mutism to creativity.

Therefore, we may assess that reaching the digital domain, sound underwent a multifaceted liberation. As the digital replay is theoretically exempt from the corruption of agents (time, wear etc.), any instantiation of the same sound is identical to the next one, facing us with something no human being could experience before the last 60 years. Being unencumbered by the “usual” musical instruments, substituted with a chain of “transparent” devices (from the computer to the loudspeaker), sound was not only freed from its own contingency and from the status of *quality* (i.e. the sound of something): it was also liberated from the supposed duty to carry with it traces of properties of the objects at its origin. Sounds we may hear nowadays might as well be nothing of this world, meaning precisely that if it's true that we could still start from a physical source and process it to the point of getting something completely different (i.e. *Matmos'* track cited in the opening), it is also true that we could also simply combine numbers, locating the origin of sound directly in the virtual domain. It also follows, then, that by reaching at the same time the visual and the tactile fields, as a representation (i.e. sound waves on a screen manipulated via a cursor) sound has been somewhat freed from its mediums (air and water).

Albeit these profound transformations still require a calculator (therefore still relying on some sort of dependency), the pervasiveness of sound design in music, entertainment and art in general is so deep that the sound-world surrounding us, today, might have very little to share, at times, with the direct experience of sonorous bodies actually existing in the physical domain.

⁸ One might think at the countless synthesizer applications available for electronic tablets and smartphones, all based on the ready-availability of visual feedbacks concerning sound waves and controls dedicated to tone-shaping.

⁹ Levine and Mauchly, “The Fairlight,” 566, our italics.

In our view, all this became possible thanks to an idea, namely the possibility of hearing the sound of something without that something *being there*. According to our stance, thus, sound design starts from an act of imagination in which sound is created as a mental entity to be forged in the acoustic domain, hence creating a *poietic* cycle between design, creation and experience. As we are about to see, however, mental acts as prediction-making, thought associations and so on are also integral to any listening experience.¹⁰

As we will attempt to show, this framing blurs the boundaries between a sound designer and a common listener for not only any sound designer listens to what she has created, yet both may share an *idea* of sound which may precede their factual experience and which may drive both the crafting and mental associations, connections and predictions, thus reverberating on emotional responses.¹¹ Following this path, sound as idea and sound as manifestation (as event) share a common root which, in the following pages, we will attempt to locate in the notion of *monad*.

2 Towards the *inneres auge* of sound

Whether following an inspirational path suggested by a sound heard somewhere or lucidly hallucinating one, driven by her own imagination, the sound designer typically merges the mental and the physical *facie* of sound in a seamless flow. Such a creative merry-go-round as the *poietic* cycle we mentioned before takes the most different forms, challenging the listening process altogether both on the side of the designer (as listener) and on the generic hearer. Sound may come from material or immaterial objects (i.e. numeric codes); it may be used as an effect in broader musical contexts or claim for a new genre of its own; it may be incidental or intentional, actually heard or metaphorically described.

Bringing the act of crafting a timbre to the core, sound design stretches the very definition of “sound” as a matter of philosophical interest: we may think of sounds we have never heard before, and, by the means of digital technologies, we can create sounds simply by manipulating timbral features in realms (the visual and the tactile) traditionally different from that of reference (the audible).

Therefore, we should appeal to a conceptual portrait able to gather both the effective dimension of sound as a perceptual given and the mental aspects related to both the faculty of prediction-making (within what is heard and what is expected to come next) and that of imagining something unheard before.

In order to do so, we shall try isolating the minimal starting point of the sound-crafting process and, as we are about to see, we will basically be left with oscillations. In the next paragraphs, we will delve into the Leibnizian notion of *monad* and, then, sketch a juxtaposition between such notion and the “sound-atom.”

2.1 The sound-atom

What we are about to introduce, in this section, is a first glimpse on sound accounted in the digital domain. In such “realm” sound is held as a possibility: something that we may experience in the audible domain but on which we may nevertheless operate, given the chance to intervene on its constituents.

By the way, the process of designing a sound may take advantage of the most diverse techniques: foley artists, for example, usually rely on material objects while countless audio mastering and mixing-engineers rave about analog filters and processors for superior-quality tone-shaping. This means that sound design is not forcefully tied to either the analog or the digital domain and the sound designer may take advantage of

¹⁰ To this extent, we might recall what, in tonal music, is known as the system of cadences and its consequent dynamics of preparation – instability – [resolution]. Such dynamics is very well described by the American philosopher David Huron and his scheme known under the acronym “I.T.P.R.A.,” see Huron, *Sweet Anticipation*.

¹¹ See Bradley and Lang, “Affective Reactions”; Weininger et al., “On the Acoustics of Emotion.”

techniques and equipment belonging to one or the other or even both. On the other end, the most advanced sound designing tools available today deal with digital synthesis and re-synthesis of sound signals and make for a much broader and more radical palette of interventions than the one allowed by any analog device. This is why we are going to focus on the digital domain of sound manipulation and, coherently, onto *Fourier's Transform*, which is the basic operation grounding every process of digital sound manipulation. The *transform's* principle assesses that any complex periodic signal is actually mad of a bulk of sinusoidal waves that can be exploded in order to isolate its constituents, corresponding to a number of elementary sines varying, one from each other, in frequency of oscillation and length. It could be argued that this principle is only viable for signals with a certain time-duration, thus limiting its applications to periodic sounds. This would confine, albeit indirectly, our proposal to “periodic sound” as opposed to “noise,”¹² where the latter is precisely some non-periodic audio signal.

For what concerns non-periodic sounds, however, there are still special sub-orders of transformations, namely the *short-time Fourier Transform* and the *Gabor Transform*, allowing to decompose short-duration signals, hence the framing we are about to propose can still be applied to a broader conception of “sound” which does not make any formal distinction between “musical sound” and “noise.”

Thus, let us depart from the consideration of sound as waveform. According to Fourier, no matter how complex a waveform might be, we should always be able to convert it in a series of sines within which to find a “fundamental” (that is, the sine-wave possessing the highest amplitude) and a n number of partials. In the brilliant explanation of the American engineer and musicologist William Sethares:

As sound (in the physical sense) is a wave, it has many properties that are analogous to the wave properties of light. Think of a prism, which bends each color through a different angle and so decomposes sunlight into a family of colored beams. Each beam contains a “pure color,” a wave of a single frequency, amplitude, and phase. Similarly, complex sound waves can be decomposed into a family of simple sine waves, each of which is characterized by its frequency, amplitude, and phase. These are called the *partials*, or the *overtones* of the sound, and the collection of all the partials is called the *spectrum*.¹³

Now, as stated in the opening of this sub-paragraph, the principle of *Fourier's transform* (or, more precisely, that of *Fast Fourier Transform* [FFT] from now on) is at the basis of spectral analysis which, on turn, makes for the core of sound manipulation in the digital domain.¹⁴ The ability to decode any given sound in a number of elementary sines, in fact, paves the way to a pretty infinite number of sound-related manipulations, starting from the sampling processes we have mentioned in our introduction and going as far as audio steganography,¹⁵ speech recognition and tonal re-synthesis. We shall deepen this latter option by quoting William Sethares once again:

Is it possible to make any interval consonant by properly manipulating the sound quality? For instance, is it possible to choose the spectral character so that many of the 10-tet intervals became consonant? Would it then be “easy” to play in 10-tet? The answer is “yes” [...]. Although Western music relies heavily on harmonic sounds, these are only one of a multitude of kinds of sound. Modern synthesizers can easily generate inharmonic sounds and transport us into unexplored musical realms.¹⁶

¹² See Everest and Pollman, *Master Handbook*.

¹³ Sethares, *Tuning, Timbre*, 13.

¹⁴ For a fully comprehensive insight on the “microscopic” dimension of sound and its pliability, especially within the digital domain, we shall redirect the reader to Curtis Roads’ masterpiece: *Microsound*, with a particular focus on chapters 3, 5 and 6 (see: Roads, *Microsound*).

¹⁵ One of the most famous cases of hidden spectrograms is that of the track “ $\Delta M_{i-1} = -a \sum D_i(n) (\sum F_{ij}(n-1) + F_{exti}(n-1))$ ” (often referred to as “Equation”) by the English electronic virtuoso Richard D. James aka Aphex Twin, contained in his 1999 EP, “Windowlicker.” If scanned with the help of a spectral analyser, the song’s spectrogram reveals the traits of a spooky human face. More information to be found at the following resources: <https://www.wired.com/2002/05/hey-whos-that-face-in-my-song/>; http://www.bastwood.com/?page_id=10.

¹⁶ Sethares, *Tuning, Timbre*, 7.

By virtue of this portrait, it follows that we are not only legitimated to claim that there *is* such thing as an elementary sound, but also that it is way smaller and less vanishing as it seems at a superficial gaze and that each and any of these sound “particles” are sinusoidal waves, meaning: they are all identical and, yet, each one is unique.

Each singularity, though, allows for a universe of possible combinations and transformations that really open to a broader conception of sound wherein “sound objects” actually become “items made of sound,” that is: compounds of sound-atoms.

Philosophically speaking, such framing closely recalls Leibniz’s notion of *monads* and in the next sub-chapter we are committed to show how this confrontation can take place without translating sound *ipso facto* into such a theologically centred system as the very *Monadology* is.

2.2 The sound monad

As hitherto seen, we are now presented with the simplest form of sound, that is: a sinusoidal wave, common to every sound event. We are also holding that albeit each sine wave does not differ in shape from any other, no two are the same, hence we awarded ourselves the right to call these sines the very “atoms” of sound, that is, simple substances. But what do we mean with that, exactly?

This is where we call into play Gottfried Wilhelm Leibniz by the means of a number of definitions and arguments he presented in his *Monadology*.

As is well-known, this oeuvre describes the core of the whole Leibnizian theoretical system based precisely on the notion of *monad* that is, the tiniest element of the universe which is also the tiniest component of the universe’s “fabric,” common to each and every object there is (from stars and planets to dust and cells) and therefore containing the whole universe in itself. We will try to render the compliance of this notion with an account on sound continuously transforming. As we will attempt to show, in fact, sound takes a myriad of different forms both as “sounding matter” (sound as a physical wave) and as “thought,” relentlessly negotiating itself with the perceptual world. We shall try to locate a common ground to all sound transformation in the notion of monad hence, in order to pursue our goal, we will make explicit the references to the *Monadology* and other works by Leibniz whenever possible, though it shall be made clear that a certain degree of competence with these works is expected from the reader.

We will start by recalling the definition of “simple substance” given by Gottfried Wilhelm Leibniz at §1 of his *Monadology*: “The monad, about which we shall speak here, is nothing other than a simple substance which enters into compounds, ‘simple’ meaning ‘without parts.’”¹⁷

As is known, this claim is immediately followed by the assumption that: “[...] there must be simple substances, because there are compounds; for the compound is nothing but an accumulation or *aggregate* of simples.”¹⁸ To this, Leibniz adds that: “where there are no parts, neither extension, nor shape, nor divisibility is possible. And these monads are the true atoms of nature and, in a word, the elements of things.”¹⁹

We assume the reader will already spot the similarities between these Leibnizian sentences and the nature of sound we have attempted at sketching so far. Though, albeit this all seems not to differ under any aspect from what we suggested about complex sound-waveforms, we shall refrain from the temptation to resolve our quest in a proper “monadology of sound,” for this would imply sustaining the same exact theoretical (therefore theological, in this case) framework with regards to the creation and annihilation of substances. To Leibniz, in fact, it is God’s will to determine the creation of substances and such will grounds the whole ontology by virtue of his pure teleology which, on turn, sets the basis for the principle of identity

¹⁷ Leibniz, *Monadology*, §1 in Strickland, *Monadology*, 14.

¹⁸ Ibid., §2 in Strickland, *Monadology*, 14.

¹⁹ Ibid., §3 in Strickland, *Monadology*, 14.

of indiscernibles.²⁰ Rather than committing us to any attempt to sustain or undermine this point, we would better scale the issue down onto the analysis of elementary substances of sound, focusing on the oscillations of the sine-figure.

This way, we are allowed to focus on §§14 and 17 of the *Monadology* where we are about to find the most crucial hints to our investigation. According to the first:

The passing state, which encompasses and represents a plurality within the unity (or simple substance) is nothing other than what is called *perception*, which must be distinguished from apperception, or consciousness [...].²¹

Leibniz introduces, here, his account on the central topic of *perception*. He further develops the notion in the subsequent statement, the already-mentioned §17 where he claims:

Moreover, we are obliged to admit that perception and that which depends on it *cannot be explained mechanically*, that is, by means of shapes and motions. And if we suppose that there were a machine whose structure makes it think, feel, and have perception, we could imagine it increased in size while keeping the same proportions, so that one could enter it as one does with a mill. If we were then to go around inside it, we would see only parts pushing one another, and never anything which would explain a perception. This must therefore be sought in the simple substance, and not in the compound or machine. Moreover, this is the only thing that can be found in the simple substance, that is, perceptions and their changes. It is also in this alone that all the *internal actions* of simple substances can consist.²²

Supporting the hypothesis of a monadological nature of the sound world, to understand how the passage from sound to music might take place is an essential step, at this point one might even say that it is “instinctively” comparable to the passage from monads to compounds and bodies. For the sake of clarity, we shall refrain that the need to understand the transition from sound to music is dictated by our starting claim, i.e. the sound designer stays in relation with music as a “free-player,” someone who is not necessarily aiming at making music but whose sound productions often constitute the core content of musical works. To this extent, the sound designer has the power to fuel the creation of music departing from timbre, therefore overturning the usual dynamics of music-creation based on an instrumental role of sound in light of a desired artistic goal.

Indeed, the process of sound “morphing and compounding” in tones, chords, harmonies up to music would appear straightforward: it looks like a matter of understanding what the driving principle of the various transitions is; yet this simplicity is just as easily undermined by a fundamental critical objection concerning the very necessity of transitions. Thus, conversely it is all but an immediate affair to grasp the reason for movements and transitions in spite of the fact that each monad expresses, embodies and materializes the whole universe within itself.²³

To this extent, however, we are asked to keep in mind that it is only in perceptions and movements that “all the *internal actions* of simple substances can consist” and what “perception” is all about, in Leibniz, is the inner state of the monad confusingly representing to itself the outside. This concept is quite distinct from that of apperception, by which is meant that the monad’s “gaze” turns upon itself and becomes self-conscious. Nevertheless, if we are to follow Leibniz, we cannot amend ourselves from setting the condition of the *continuum*; henceforth, this exterior cannot constitute an “outside” of the monads by the conventional meaning of “beyond a given boundary.” Therefore, there is no question that what the monad perceives is not a set of phenomena in itself with unfathomable or in any case dissociated origins, but

²⁰ As Leibniz postulates, in fact, since everything in God’s words is God’s will, he could not create two absolutely identical substances for no other reason than his own will per se, otherwise it should be admitted that he is willing something without a sufficient reason sustaining his will. Cfr. Leibniz’s Third Letter to Clarke, points #7 and #8, Leibniz et al., *Correspondence*, 15–6.

²¹ Leibniz, *Monadology*, §14 in Strickland, *Monadology*, 16.

²² *Ibid.*, §17 in Strickland, *Monadology*, 17.

²³ Turning our gaze back onto sound for just a second, we should try to translate this within the sound/music relationship holding that at the core of any given note, any given musical order (be it a rhythmic succession of noises or an endlessly sustained single periodic sound) there is a compound of sinusoidal waves. Hence, each “music” is a world within a universe, and the whole universe is made of the same minimal substance.

rather the very own progressive and complex unravelling of the swarm of possibilities of becoming that each monad embodies. Moreover, as Leibniz's scholar Heinrich Schepers underlines:

[...] the terminology of “internal/external” should be understood as only metaphorical. In fact, there is nothing external apart from monads, which produce in the same way their world inside themselves. Furthermore, what Leibniz calls “phenomena” in fact remain inside the monad and are, in addition to the monads from which they result, the only existing things in the world.²⁴

Therefore, in a universe essentially made of monads – each of which is a perceptual entity whose perception, though, is not anything mechanical (i.e. a process governed by a finite number of “instructions”) – we are left with two interpretations between which to conceive a nomological structure of the whole of nature: there's either no chance at all for a structure (given the unpredictability of monads) or the structure of nature emerges through composition. The latter is evidently the only tenable one, here, also in view of the uncertainty of monadic perception. In fact, in contrast to the particular state of confusion proper to each monad, the progressive multiplication and clarification of affinities and mutual representations are syncretic with the emergence of an actual structure and orderly regularity that can be represented in symbolic form. On the other hand, this is not the case for “naked” monads but rather for compounds, and for the same reason the resulting “skeleton” is but one among infinite possible orders.

This implies two further corollaries: first of all, a continuous perceptual negotiation, for once the compounds have reached their own stability of concretion, their “unitary” perceptions can still change because of the nebulous ones of their monadic constituents. Consequently, that of the compounds is all the less a “feeling” and all the more a “knowing” the more distinctly it is realized: it is the materializing of a reality (we could say an orienting and a becoming oriented) that verges on crystallization, on the reaching of a stasis without, thus, fully achieving it from all points of view.

The second corollary is explicated in terms of the perceptual content. Again, following Leibniz, we hold that what each monad perceives is a confused representation of the particulars of the whole universe. Thus every monad is an integral mirror of it, but it is more precisely a mirror of the compound of which it is part, so that each monad's perception “[...] is merely confused as to the detail of the whole universe, and can be distinct only for a small part of things, that is, those which are either the nearest or the largest in relation to each of the monads [...]. They all go confusedly to infinity, to the whole, but they are limited and distinguished by the degrees of their distinct perceptions.”²⁵

That is precisely the reason why we can think of multiple possible worlds, since the space-*continuum* forces two or more identical-yet-different monads to perceive each other. As explained in the famous example at §57 of the *Monadology*:

The same town, when looked at from different places, appears quite different and is, as it were, multiplied in perspectives. In the same way it happens that, because of the infinite multitude of simple substances, there are just as many different universes, which are nevertheless merely perspectives of a single universe according to the different points of view of each monad.

Through this, we are entering another central issue, the one concerning the kind and nature of monadic relations. We will get deeper into this in a while, though we shall anticipate that, in this respect, the resolution of apparently contradictory relations between possible worlds can be solved by shifting the perspective focus onto the idea of vice-diction. That is, “to tell” at the same time about oneself and one's own alternative version, creating simultaneously what Gilles Deleuze would call “a minimum of actuality and a maximum of virtuality.”²⁶ In this sense, impossibility would arise from a divergence between series or from a difference in the “expressive content” of two or more monads.

²⁴ Schepers, “Monadic Perception,” 389.

²⁵ Leibniz, *Monadology*, §60, in Strickland, *Monadology*, 26.

²⁶ Deleuze, “Il metodo della drammatizzazione,” 126, our English translation.

We might (over-)exemplify this by thinking at two “F” notes, indicatively pitched at 349 Hz:²⁷ let us postulate that these two exist for their respective worlds, namely Richard Wagner’s *Tristan Und Isolde* (circa 1859) and Glenn Branca’s *Symphony #5* (1995). We could barely think at other two worlds in harsher contradiction; under many aspects they could not exist at the same time, and in a certain order of harmonic and aesthetic ideas one would deny the other, but there is nothing forbidding to think and subsume them both possible. This is evidently because the law of pertinence of the worlds is derived from an individual perspective that nevertheless has a projective function, one of passage with respect to the actual law lying outside the subject and that corresponds, precisely, to the production of worlds that precedes that of souls, consequently pertinent to that world for which they were created in order to express it. In other words, the world of *Tristan Und Isolde* is incompatible with that of *Symphony #5* only because of that entity created specifically to express one of the two worlds, but the law of the creation of worlds exceeds both instances and therefore their impossibility is a circumstantial effect, not their predicate.

By virtue of both their nature and contiguity, individual notions (monads) are compossible, not only by the extension or infinite continuation of the converging series they compose, but also by the fact that each of them extends, individually, into the related part of the neighbouring monads. This leads to the outcome of inflection, i.e. the torsional movement of a monad on itself, capable of satisfying, in a single stroke (and without the need for windows), the demand for a world existing in the subjects (maintaining all of them exist for that world) and the demand for an indivisible *continuum* requiring the formation and change of compounds.

On the other hand, relations themselves are not qualifiable as real entities, for monads and their changes are the only ones allowed in Leibniz’s system. Nonetheless, relations do exert a transformative force without limiting this exercise to a single subject. This is the reason why relations exist as an abstract entity (*entia rationis*) which does not belong to each existent being, though it inherits existence as a whole.

In these terms, the relations between the monads themselves are certainly external to them, but they are also external to any other subject, and – precisely – they are not part of concrete reality, but of a sub-order, a “diminished” reality, to which the monads cannot avoid referring without being aware of it. Consequently, to point that a variation in state can only be grasped by a given subject according to her point of view is at least as true as the fact that she cannot hold the “truth” of what she grasps, nor the reasons behind it and, above all, neither the alternative perspectives of the state of affairs before her. This determines a continuous “negotiation” between real and non-real, between absolute and relative; a confrontation animated – for Leibniz – eminently by the internal principle of the monads, that is, the force acquired in reason of their preformation.

Such force is to be thought of as the displaying of a maximum distance within the *continuum*, something embodying the reason of both the expansion and the contraction of the universe at the same time. Just as if the monads could feel an intolerable distance and feebleness of the mutual perception and let this guide them in a quest for similar, aimed at getting closer and closer.

Yet, again, these are but *small*, confused and partial perceptions, which are given to the subject without him being able to notice them. It is a non-conscious perceiving that would be contradictory if it were not drawn at the highest level of a body, capable of integrating all the small perceptions (and having itself constituted by the integration thereof), changing the definition of monadic “perceiving” to lead it back to an “orientation *in absentia*” (be it something like total darkness as well as blinding light) where the only actual thing left is oneself, though where everything may *potentially* happen and exist – and at least in part, at least at a mental level, it does – and nothing can be properly experienced nor grasped. If we add to this the relational network mentioned above, it is legitimate to envisage a perception that we regard as mimetic, which holds firm and central the roles of imagination, fantasy and memory, as well as reflection: each monad “sees” (or, better, “feels”) in another only a part identical to itself; it may or may not collide with

²⁷ This would be nowadays’ F4 on a piano. We shall point out that rather than a “sound-monad,” this would be a “tone-monad” whose network of relations appeals to descriptions inherent to the systems of tone-networks derived from Hugo Riemann’s idea of *Tonnetz*. See: Gollin and Rehding, *Handbook*.

other substances, and although the same incident affects individual monads, all are connected in a *continuum* made up not only of continuity (and contiguity) but also of parallelisms, invisible threads that branch out in all directions and represent, precisely, the possible relations.

In this framework, something akin to a desire, the “pleasure of seeking,”²⁸ a primary vital trait, represents an unfulfillable attempt of the monad at seeing “everything,” an eventuality tautologically excluded by the very tendency to becoming, so to speak: a whole that wants to “see” the whole.

Yet this unfulfilled tendency can always give birth to a self-completion while returning an element of similarity such as to prelude a “version of the facts,” a self-portraying originated from what of identical to itself the monad “sees” outside. In a broad sense, we can tell this process to envisage a “what if,” thus creating one of the possible worlds precisely under the same condition of envisioning.

We may spot this very dynamics at play within musical harmony, when we see a major or minor triad included in a seventh chord or, even more vividly, when we are faced with the same major scale also existing as a minor scale, making explicit – and to all intents and purposes experiential – the existence of a parallel world. Nonetheless, this is also what we could identify in that sonic granule which, timbrally speaking, can be the seed of any sound compound.

With all this in mind, we can now turn our gaze on *Monadology*'s §18, in order to get even deeper into what we mean by claiming sound can be intended as substance of its own event. Says Leibniz:

The name “entelechies” could be given to all simple substances, or created monads, for they have in themselves a certain perfection (ἔχουσι τὸ ἐντελές). There is a self-sufficiency (αὐτάρχεια) which makes them the sources of their internal actions and incorporeal automata, so to speak.²⁹

The notion of “incorporeal automata,” sources of their internal actions, is key, here, since by this “window-non-window” we glimpse the already mentioned essential duplicity of the sound monads. Being tied to nothing else but their own nature, in their acts of moving and perceiving themselves, the Leibnizian monads do not possess a proper will but they exhibit a tendency, that which leads them to new perceptions. On their turn, perceptions are representations of a multitude of possible phenomena,³⁰ therefore the self-perceiving (apperception) of monads is configured as a faculty, in the guise of natural dispositions situated upstream of the experience but in relation to the stimuli that they can receive from the compounds or, better, from the bodies. In other words, the perception of each monad can be assimilated to an intimate disposition of its own, which is the origin of any possible experience but which, in the end, is resolved in the realization of a particular “giving of oneself.” The stabilizing of such giving in the form of experience is affected by the collisions, the affects and, ultimately, the forces that each monad sees itself imprinted by means of the collisions between aggregates. It follows, by the very words of Leibniz, that:

[...] In this, compounds are analogous to simples. For the whole is a plenum, which makes all matter interconnected, and in a plenum every movement has some effect on distant bodies in proportion to their distance, such that each body is affected not only by those which touch it, and in some way feels the effect of everything that happens to them, but also by means of them it is affected by those which touch the former ones, the ones which directly touch it. From this it follows that this communication extends indefinitely. Consequently every body is affected by everything that happens in the universe, so much so that the one who sees all could read in each body what is happening everywhere, and even what has happened or will happen, by observing in the present that which is remote both in time and space: οὐμπνοια πάντα, as Hippocrates said. But a soul can read in itself only what is distinctly represented there; it cannot unfold all at once all that is folded within it, for this proceeds to infinity.

To rejoice with the purpose of this article, let us ask: what difference in grade is there between the chance to “reach in every body [...] what has happened or will happen” and an occurrence such as the 6 s sampled

²⁸ We are referring to a feature pertaining to the notion of “aesthetic mechanism” explained by Italian philosopher Fabrizio Desideri; see Desideri, “Origine dell’estetico.”

²⁹ Leibniz, *Monadology*, §18 in Strickland, *Monadology*, 17.

³⁰ See Schepers, “Monadic Perception,” 384.

drum loop known as the “Amen-break” which is to be found in over 1,500 songs spanning from 1969 to the present day?³¹

To sum up, the conception of movement remains a system with two incognitae: on the one hand, the monads proceed from perception in perception while harmonizing the various shifts by reason of representing the same multitude of phenomena (and the same epiphenomenon) from different points of view. On the other hand, everything is instantaneous, point-like in time and space. Perceptions precede phenomena and at the same time originate them, constituting, however, an “elsewhere,” i.e. detaching and recomposing themselves in different forms and spaces but not in different times, since everything possible is already present in each of them.

There is a last point to be clarified and it concerns both the kind of phenomena Leibniz is speaking of and the dynamics of the whole system. We are going to outline these two elements in the following paragraph, through which we will recollect all elements needed to draw our conclusions.

3 The sound-event in light of the monadic perspective

With reference to the sinusoidal waveform in which we have located our elementary form of sound, this is where we can finally put an accent on the “form” factor, meaning that albeit we could think of actual sine-waves, these would nevertheless be figures. A waveform is, therefore, a description, namely that of the continuous oscillating between a maximum and a minimum. What is proper to the notion of monads, though, is precisely the fact that since each substance is driven by its internal motion and such internal motion is the very oscillation between several possibilities concerning the “other” (that is, perceptions), it follows that there is no separation whatsoever between the movement and its figure. The explication of this assumption is what we are going to focus on.

It is by merging the concepts of movement and transformation that we are eventually acquainted with the unique Leibnizian meaning of “event” (“phenomenon”). In fact, just as in everyday-language, also here a “phenomenon” has to be intended as “that which happens,” but what goes through a modification involves the process of identifying those aspects that have changed. With these two steps (i.e. mutation and its identification) we have first of all a differential and, at the same time, a certain qualitative *corpus* of something that we no longer find under the same features with which we had assumed it at first. This “something” constitutes the intension, the very content that can be qualitatively different from a given criterion. Therefore, if it is right to call “form” the external aspect of the phenomenon, the content of each phenomenon will be precisely the union, in succession, of the three factors described above: differential, quality and extension. To Leibniz, their unification constitutes the concept of “force” and it is in his *Specimen Dynamicum* (1695) that the philosopher really settles the question, dividing between active and passive forces, which, on turn, are respectively divided into derivative and primitive (or, as we might also say, original).

Now, the active primitive force is inherent to any corporeal substance *per se*, while the active derivative forces result from a limitation to the primitive force which, for example, may derive from the collision between bodies and thus the degree of their intensity may vary. “Indeed, primitive force (which is nothing but the first entelechy) corresponds to the *soul or substantial form*.”³² This bipartition of active force is contrasted by passive force, which in itself is twofold. The primitive passive force, *vis primitiva patiendi*, is the force of being acted-upon (or resistance) that is shown when one body obstructs penetration by another “and at the same time is endowed with a certain laziness, so to speak, that is, an opposition to motion, nor, further, does it allow itself to be put into motion without somewhat diminishing the force of the body acting on it.”³³ This result, this “restitution in negative” to the culprit of the impressed force, corresponds to the

³¹ See the brilliant article by Ellen Otzen, “Six Seconds that Shaped 1,500 Songs.”

³² Ariew and Garber, *Leibniz Philosophical Essays*, 119.

³³ *Ibid.*, 120.

passive derived force, the force of the being acted upon; of this too one can derive different gradations. From the description of these principles, for Leibniz it follows that the form is the cause of every action by any body, while matter is what puts every body in the condition of being acted upon and of opposing or, in more elementary terms: resisting. Little of this is already clear, however, if referred to the perspective with which we generally place ourselves in relation to what we are accustomed to consider “movement,” since crucial components such as direction, time and labour have not yet intervened in a picture that, all things considered, seems to remain motionless. To dispel this mistaken impression, Leibniz himself explains the complex framework determined by the four types of force described above.

He does so identifying the necessity to take back the leads of the question concerning the derivative forces in order to deal with the extent to which bodies can alternatively possess their own power in relation to different gradations of effort (*nisus*) or, on the contrary, oppose resistance. Specifying the frame of reference, that is, the understanding of a reciprocal action between bodies connected to local motion that, therefore, even in conditions of new productions of motion will not see their effects drop out of this context, Leibniz preliminarily confronts himself with motion in the following terms:

Motion is the continual change of place, and so requires time. However, just as a mobile thing in motion has motion in time, so too at any given moment it has a *velocity*, which is greater to the extent that more space is traversed in less time. Velocity taken together with direction is called *conatus*. Furthermore, *impetus* is the product of the bulk [*moles*] of a body and its velocity, whose quantity is what the *Cartesians* usually call quantity of motion, that is, the momentary quantity of motion; although, more accurately speaking, the quantity of a motion, which exists in time, of course, arises from the sum over time of the impetuses (equal or unequal) existing in the mobile thing, multiplied by the corresponding times.³⁴

Guarding himself from the risk of trespassing into the technical terminology of the counterpart from which he intends to take the strictest distance, Leibniz immediately distinguishes between present or instantaneous motion (*motio*) corresponding to the notion of momentum, from that which extends in time (*motus*), deriving from an infinity of impulses, in their turn momentary but originating from an unspecified number of increments impressed on the same “mobile thing.” With the due premise of not wanting to assert that mathematical entities of this type exist in nature, but that they are presented only for the purpose of making possible very complex calculations, practicable at a mental level, Leibniz can finally arrive at clarifying the duplicity of the force understood in his system. In his words:

From this it is obvious that the *nisus* is twofold, that is, elementary or infinitely small, which I also call *solicitation*, and that which is formed from the continuation or repetition of elementary *nisus*, that is, *impetus* itself. [...] From this it follows that *force* is also twofold. One force is elementary, which I also call *dead force*, since motion [*motus*] does not yet exist in it, but only a solicitation to motion [*motus*], as with the ball in the tube, or a stone in a sling while it is still being held in by a rope. The other force is ordinary force, joined with actual motion, which I call *living force*.³⁵

Examples of “dead force” in the Leibnizian framework are, therefore, the centrifugal force, gravity and inertia, but this same force is also certainly “alive” in the instant, that is, in the moment of impetus, since there are innumerable moments of dead force impressed on the thing. Yet, here lies the crucial distinction concerning the understanding of the dynamics of the living force within the aggregates:

But even though impetus is always joined with living force, we shall nevertheless show [...] that these two differ.

Living force in any aggregate of bodies must, again, be understood as twofold, namely *total force* or *partial force*, and *partial force*, again, is either relative or directive, that is, it either belongs to the parts or is common to the whole. *Relative* or *proper* force is that by which bodies contained in an aggregate can act on one another; *directive* or *common* force is that by which the aggregate itself can, in addition, act outside of itself. Moreover, I call it “directive” since the entire force embodied in the direction as a whole is conserved in this variety of partial force. If we imagine that the aggregate suddenly

³⁴ Ibid.

³⁵ Ibid., 121.

froze solid, having eliminated the motion of the parts with respect to one another, this force alone would remain. Whence the *total absolute force* consists of the relative and directive forces taken together.³⁶

The recurring involvement of two main actions, displacement and deformation, is evident in the framework of the forces at play as understood here. Elastic bodies that are stretched and that return to rest, directionality of the forces, changes of state (solidification): all operations on bodies showing the aspect of a force that results at the same time “perennial,” constant (ergo everywhere equal and potentially unrecognizable, if we gave that its most evident parameters were constituted by the effects that it produces) but also localized and relative. Therefore, it is not such an impervious operation anymore to deduce the sense of what Leibniz affirms while he claims that:

We must realize, above all, that force is something absolutely real in substances, even in created substances, while space, time, and motion are, to a certain extent, beings of reason, and are true or real, not *per se*, but only to the extent that they involve either the divine attributes (immensity, eternity, the ability to carry out works), or the force in created substances. From this it immediately follows that there is no empty place and no empty moment in time. Moreover, it follows that motion taken apart from force, that is, motion insofar as it is taken to contain only geometrical notions (size, shape, and their change), is really nothing but the change of situation, and furthermore, that *as far as the phenomena are concerned, motion is a pure relation* [...].³⁷

In light of this reconstruction, we are allowed a leap forward in the direction of clarifying one of the most recent and perhaps the most famous account derived by the Leibnizian ontology, that is, the one proposed by Gilles Deleuze. As to deal directly with the French philosopher’s standpoint would be a task far out-reaching the character of this work, we will resume his account indirectly, by the means of the sketching provided by Christoph Cox in his recent book *Sonic Flux: sound, art and metaphysics*.³⁸ As Cox recalls, Deleuze postulates the existence of two entities such as bodies and incorporeal effects, these latter being something that involves bodies as its cause but differs from them as to its nature. The notion of “effect” is of particular interest since Deleuze not only refers to it as a result of “something happening to a body” but also in light of a phenomenon which happens by virtue of a broad system of causes which are apparently unrelated yet, nonetheless, coherent: to think at the usual Doppler effect might be of help in clarifying this statement.

Now, as Cox points out: “this notion of ‘effect,’ independent of cause, has a broad and important set of usages in the world of audio. Musicians use the term to refer to the distinctive timbral and textural modulations (reverb, fuzz, echo, flange, distortion, etc.) produced by electronic signal processing devices known as ‘effects units’.”³⁹ What these processors do is exactly to shape and manipulate a substance within such a complex system of interactions that outputs yet another substance, resulting from a source with which it may not share any resemblance anymore.

After having displayed the system of relations and forces making for the idea of “substance” in Leibniz, we can easily grasp why Cox would rely on Deleuze to account for such a powerful sound-designing weapon as “effects processors.” As we can see, in fact, on the basis of sound itself there would hardly be a connection anymore within the sound and the shape of what we know as, let’s say, a guitar and the same “entity” after its sound has been heavily processed by – let’s suppose – a fuzz and a gated reverse reverb.

There is, however, a relation between the two and it would have to be found not only in the characters of their manifestations (i.e. both are sounds in the audible domain) but precisely in the net of relations they weave, each one creating a “possible world.” To exemplify even further, it seems hard to grasp how the same instrument that made the fortune of jazz-guitar virtuoso Kenny Burrell might be at the core of the artistic work of Kevin Shields, the “tutelary deity” of the so-called “shoegaze”: a music genre based

³⁶ Ibid., 122.

³⁷ Ibid., 130.

³⁸ Cox, *Sonic Flux*, 33–6.

³⁹ Ibid., 34.

precisely on multi-layered, heavily processed electric guitars. What holds together these two musical worlds is nothing else but sound, precisely by virtue of the apparent irreconcilable difference between the two which, on the other hand, finds its unity in the chance of accounting for minimal common elements at the core of broad systems of interactions.

What is possible with the combination and interaction of several entities is nothing else but a fabric of relations which is bound to create something else. Each element brings along the possibility to account for trajectories, predictions and hypotheses and with regards to this, that of the sound designer is a privileged perspective. Freed from the urge to rely on conventional musical instruments, to rely on the very own physicality of sound by virtue of the chances offered by today's digital technologies and not tied to the need to "serve" a purpose other than the exercise of instituting relations, the sound designer can account for anything as a discrete element self-sufficient to creation (or, as well, incidentally be in the midst of an unpredicted interaction) and set relations of the most different kind, bound to create nothing shorter than yet another "possible world."

This sets the end of our quest, as this gives us the chance to reconcile, in the upcoming conclusions, such framework with the nature of sound in light of the perspective of the one who can grant herself an access to the sound monad.

4 Conclusions

Aiming at supporting a broader view on sound, capable of accounting for the "ghostly," phantasmagoric dimensions of such a complex phenomenon, what we attempted to in these pages was to inflate the definition of the issue at stake. Paraphrasing Leibniz himself, perhaps music is the best among the possible worlds for sound, yet to say that many other sound-worlds are constantly given to our experience, that sound itself makes for an elective entrance to unique worlds and that music itself is ever-changing mostly by virtue of the "non-linear" components of sound (from synthesized sound, to the innumerable shapes of noise) [...] are all true statements in need of deep investigations.

The character of the sound designer and its progressive emerging and taking shape in the proscenium of sound-related art, possibly led to the blurring of distinctions between music and sound art in an irreversible way. Particularly with the advent of digital technologies (not to mention the crucial role played by its commercial spreading), we assist to the affirmation of a craftsman who is a creator, an operator, a musician, an artist, a player and a composer all at the same time, just like the main instrument of her making is, again, "an instrument of instruments," capable of finding its place at any step of both the creative and the fruition processes. Whether due to literally having the fabric of sound at our fingertips (i.e. the ability to intervene in waveforms by directly manipulating them) or to the aforementioned blurring of experiential boundaries, this portrait claims an all-encompassing conception of sound.

In order to sustain the relevance of the "thought-sound," central to the work of the designer, and to account for a sound that is often manipulated, shaped and created way before being heard, as is the case of the operations made possible by digital audio workstations, we considered the Leibnizian concept of *monad* to potentially fit our goal. In Sections 2 and 3 of this article, therefore, we delved in Leibniz's *Monadology* in order to demonstrate such fitness by presenting sound as *substance of its own event*. We were unsurprisingly faced with the issues bond to the tenability of such ontology deprived of a focus on its theological skeleton, though we were also awarded with the chance to define sound as a nucleus of possibilities with very positive reflections on the actual functioning of devices and software fuelling the advancement of sound re-synthesis, creation and manipulation.

As furtherly comforted by the latest insight on the dynamics of the monadic system, the outline here provided lets us maintain *sound as a substance better defined as a nucleus of both active and passive forces*. Among those, the forces of the first kind pertain to the inner tension towards the becoming, embodied in the very will to "perceive" the similar that is, to establish some sort of a bond, a relationship with the unknown. To this end, we have also seen such two-folded nature recur in the idea of "effect" as an invariant pattern of

possibilities detached from bodily causes, compatible with several contemporary noise-based sound installations dwelling on the Deleuzian take on the concept of “haecceities.”⁴⁰

Henceforth, at first we are left with a sort of “vertically-oriented” weaving of relationships which we may easily relate to what is primarily acoustic-related in terms of resonance, consonance, dissonance to be brought up to intervals, chords, melodies, harmonies and what we would normally call the constituents of “musical” work. As it should be clear enough, at this point, this inheres both to the “active” force of sound, that is its quest for new relations, and to passive forces meaning the accidents, collisions and interpenetration of sonic bodies. This latter interpretation is still compliant with the “classical” view on music and harmony, albeit not providing any impressive degree of novelty, compared to what the likes of Hermann von Helmholtz had described in his *Tonempfindungen* back in 1863. Seeing things under a different light, however, paves the way for a preliminary broadening of the conception of what a music work is, meaning that such accidents are not necessarily bound to happen within kindred objects (e.g. a string and a bow) but, on the contrary, the farthest the relationships converging in the work, perhaps the stronger its power.

This reflection naturally appeals to the aesthetic theories of Walter Benjamin and Theodor W. Adorno who, albeit according to different perspectives, both grounded their studies (especially on contemporary art) precisely on notion of the “work of art as monad.” To this extent, such outline also has positive outcomes with regards to those musical works dealing with the supposed boundaries of sound, namely: noise and silence.

To conceive sound as monad, in fact, means to bring back to the core of the aesthetic and philosophical debate a number of works often simplistically dismissed as provocative while offering the means to account for them not only under a “semantic” perspective, but precisely in view of a proper ontology.⁴¹

On the other hand, we are also acquainted with a “horizontally-oriented” threading that is constituted by the chance to intervene in the unravelling of the relations towards which each monad tends. In a sense, this has always been the ground of artistic composition, again: to set “things” in relation one another. Before the advent of computer technology and digital sound, however, such act has kept being performed mostly within the contiguity of what “there is or *should be*,” instead of dealing with the dimension of “what there *might be*.” This has always been particularly evident with regards to silence, constituting that form of arrest, that “ultimate frontier” leaving to imagination the task to fill the void with expectations and predictions.

Conversely, by focusing on the potential, on the unveiling of the possible worlds, the gaze of sound design meanders through transformations while avoiding any arrest, this explaining both how and why the sound craftsman is so profoundly reshaping, nowadays, the very relationship between sound and art.

Silence stays to the designer just as the shadow of sound: yet another point of view on the same nucleus of possibilities. This means that one could not only offer the blank canvas of “mutism” to accidental and contextual sounds as in John Cage’s *4’:33”* but rather push the unravelling of sound beyond the spectrum of human hearing. This is already the case of the mere bodily experience of pressure waves but it is also the case of many contemporary works, among which we should mention Carsten Nicolai’s installation “well-enwanne lfo”⁴² or, even further, the merging of sound, light and numeric data as in the works of the Japanese artist Ryoji Ikeda which by every means can be considered hypertextual. To this extent, we are definitely allowed to call into question the notion of “hypertextuality” by its very own father, sociologist Theodor W. Nelson, who specified that “‘Hyper-’ is used in the mathematical sense of extension and generality (as in ‘hyperspace,’ ‘hypercube’) rather than the medical sense of ‘excessive’ (‘hyperactivity’). [...] ‘Hyper-’ refers to structure and not size.”⁴³

⁴⁰ See: Deleuze, *Difference and Repetition*.

⁴¹ Of course to this extent it is worth mentioning the attempt made by Greg Hainge in his important work, see: Hainge, *Noise Matters*.

⁴² Much like the famous Chladni’s figures, this installation made for the Echigo-Tsumari Triennale of 2012, aimed at showing patterns on water by the means of inaudible low-frequencies sound waves.

⁴³ Nelson, “Hypertext Notes,” 1.

This is how we attend to the closing before our eyes of the circle of virtuality and reality, imagination and creation existing and transforming one into each other without ever “jumping” out of the *continuum* of our experience: something that the sound designer embodies “naturally” and whose evolutions are at the same time beyond and within our imagination.

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