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**Mimesis as interactive listening: insights on ecological thought
through the use of natural models in composition**

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ABSTRACT

The use of natural models and laws in music is common across various 20th-century musical experiences, from Canadian soundscape composition to American experimental music and European musical avant-garde. Moreover, as highlighted among others by musicologists Marius Schneider, Steven Feld, and Ana Maria Ochoa Gautier, the mimesis of environmental sounds, or of their organization, is a fundamental practice in numerous non-European traditions, where it appears to be linked to forms of healthy coexistence between humans and the environment. But what are the implications of the spread of this musical practice, albeit in different forms, in contemporary music? Is there a connection between the exploration of soundscape mimesis in music and the development of ecological thought? Can this practice, in the context of artistic research, contribute to enriching ecological understanding in a broader sense?

Drawing from musicological and cultural studies, and, crucially, from insights arising from my artistic practice as a composer engaged with ecological themes, this paper characterizes the mimesis of the natural soundscape not as a mere extraction of material but as a form of interactive listening and engagement with the environment. It distinguishes between more immediate and more mediated forms of musical mimesis, analysing several examples, including one of my compositions based on augmented listening and imitative processes. At the same time, it explores the connection between these different forms of mimesis and ecological thought, understood not only as the ability to think about relationality but also, more radically, to unthink the dichotomy between the individual and the environment. Finally, it discusses how musical mimesis, thus conceived, can be seen as a form of co-production of knowledge, understood not as a rational reflection of an external reality but as a form of interaction and of cognitive and affective attunement with the environment.

INTRODUCTION

In one of the first ecomusicological papers, in 1995, Maria Anna Harley noted that at the beginning of the 20th century “the widening of the area of ‘musical’ sounds happened simultaneously with the recovery of the mimetic principle by composers, or, rather, with the shift away from the romantic emotive response to nature towards the use of ‘natural’ models and laws as structural frameworks for the music’s construction” [1].

We now know that natural models influenced composers well before this 20th-century turning point; an example could be the importance of the ‘organic’ paradigm in Romantic symphonic

music [2, pp. 91–92]. The change noted by Harley, however, is evident. Composers such as Bartók, Varèse, Xenakis, Stockhausen adopted approaches based on the scientific observation of natural phenomena, as did the musicians who employed new techniques as additive synthesis and spectral resynthesis. Other composers connected their practice to deepened forms of listening and perception; it is the case of composers as Nono, Lachenmann, Sciarrino and, although with very different outputs, of the Canadian school of soundscape composition [3]. While many of these practices can be analysed using Simon Emmerson's concepts of 'timbral' and 'syntactic' mimesis [4], other works seem rather to implement a mimesis of processes: it is the case of the generative approaches to form or to the compositional process that, after John Cage, were explored by American experimental composers and, afterwards, in the field of electronic music – especially by composers who work with 'ecosystemic' electroacoustic assemblages and envisage emergent processes based on feedback loops (e.g. the Italian composer Agostino Di Scipio [5]).

As Salvatore Sciarrino shows in his essay *Le figure della musica*, composers often tend to employ structural and formal models that can be traced back to their historical period's understanding of nature [6, p. 19]. Accordingly, the discontinuity mentioned by Harley could be seen as the consequence on music composition of the paradigm shift in the interpretation of nature produced by the theory of evolution, the birth of ecology and the increased importance of new keywords such as process, complexity and interrelation [7]. In the light of this new paradigm, nature isn't fixed, stable and timeless: it is subject to change. Organisms, minds, natural entities in general are not copies of models given once and for all; rather, they are to be seen as events in the ever-changing organization of matter. In a complex way, this shift brought research-oriented composers towards a new attention to the materiality of sound, of the soundscape and of its underlying processes, as opposed to a re-implementation of already codified sounds, sound hierarchies and compositional formulas.

One of the results of this paradigm shift is a new, strong connection between music and the soundscape. While in previous centuries the deliberate mimesis of extramusical sound was considered an occasional device, in most of the practices mentioned above it becomes a structural feature. In many cases the very boundary between musical and extramusical sound – which, some say, can be traced back to Pythagorean pedagogy and its connection between music and *logos* [8] – is called into question.

However, according to several anthropological and ethnomusicological accounts, this mimetic bond between music and the soundscape wasn't established for the first time in the twentieth century. On the contrary, the mimesis of environmental sounds, or of their organization, is a fundamental practice in numerous non-European traditions, as well as in ancient (pre-Pythagorean?) European music. This paper moves from this connection between the new mimetic practices outlined above and these ancient or non-European musical practices, which appear to have been linked to forms of healthy coexistence between humans and the environment. The objective is to better specify the relationship between sound mimesis and ecological thought, with the hope of gaining insights both about the spread of this musical practice in contemporary music and about ecological thought itself.

THE LOST BOND BETWEEN MUSIC AND THE SOUNDSCAPE

According to several musicologists, between music and the soundscape there is a primordial bond which reflects a pre-modern relationship between humans and the environment. As German musicologist Marius Schneider wrote in 1946,

[...] imitative music, reduced in our culture to a purely aesthetic role, forms the art or, better said, the science par excellence in primitive cultures. All the research we were able to conduct in this regard leads us to believe that, from very ancient times,

humanity considered imitative music as an instrument of direct action and as the deepest source of wisdom, because it constituted the most substantial and succinct expression of phenomena [9, pp. 32–33].

Far from being an isolated hypothesis, Schneider's conclusion resonates with ethnological and anthropological data from various sources. In a fragment of the Greek philosopher Democritus there is evidence of a mimetic theory of music according to which humans learned to sing by imitating birds. Traces of this anthropological scheme can be found also, for example, in a passage from Aristophanes, in a legend about the birth of Homer, and in a fragment from the poet Alcman [10, pp. 47–59].

Moving from ancient cultures to modern ethnomusicological studies, a link between music and the soundscape has been hypothesized, for example, in the case of the Bayaka, a Central African people whose songs were recorded and published by Louis Sarno. These recordings fascinated the American musician Bernie Krause, who compared them with his own experiences with Native American culture and African soundscapes [11]. In the afterword of the book that accompanies Sarno's recordings, Krause writes:

For those living in the rainforests of the world, this creature ambience has served as their major communication influence. [...] The rhythms from chimps pounding on the buttresses of fig trees have inspired the drum. Frogs rhythms in different habitats have spurred the use of complex time (rhythm) patterns. Lead melody lines have been influenced by bird song and certain mammals. The idea of orchestration itself, comes directly from whole habitats and the way in which creatures perform at different times of the day and night, under different weather conditions and seasons [12, p. 88].

The Great Animal Orchestra, Krause's later book entirely dedicated to this topic, quotes other examples among which the music of the Yanomami people (Brazil/Venezuela), which was also recorded by David Toop, and of the Sami people (Northern Europe) cited also by Harley [1], [13, pp. 132–133], [14].

The hypothesis that music originally evolved from the imitation of soundscapes and in particular of animal voices resonates also with the anthropological trope of the metamorphosis of humans into animals, which plays an important role first in Elias Canetti's thought [15, pp. 107–112, 348–357] and then in the post-structuralist philosophy of Deleuze and Guattari, who coined the concept of 'becoming-animal' [16, pp. 232–309]. On the other hand, this idea can be linked to the primary role which imitation plays in the way humans, and especially children, relate to the world – a subject which has kept developmental psychologists busy since the 1940s, starting from Henri Wallon and especially Jean Piaget [17].

A decade before, Walter Benjamin explicitly linked this 'ontogenetic' occurrence of imitation to its 'phylogenetic' history, speculating that the human ability to produce similarities has decayed over time, or rather transformed itself in the ability of relating to the world through the language [18]. A similar notion of mimesis as a lost faculty permeates the much more elaborate theory developed, in the same years, by French anthropologist Marcel Jousse, according to whom "we are dead from the point of view of phono-mimicry", because musical conventions have excessively simplified our hearing [8].

Not unlike Jousse, also Schneider laments the decline of mimetic abilities:

The departure from realistic imitation produces one of the most serious spiritual crises in human history, because instead of continuing to understand its environment through the imitation of natural rhythms, humankind, by means of artificial rhythms, turns toward speculative thought. The development of discursive

intelligence begins to destroy the perception of a series of natural wholes, and speculative reflection begins to select certain elements from the total form [9, p. 51].

Interestingly, many of these discourses about the primordial nature of sound mimesis describe this practice with terms characteristic of what today we might call ecological thought. Schneider already speaks of ‘natural wholes’ and balance between man and environment, which are common keywords in ecology as a science as well as in ecological discourse. Steven Feld, ethnomusicologist and keen reader of Murray Schafer, after studying the imitative music of the Kaluli people of Papua New Guinea, concluded that their practice is closely linked both to the sonic ecology of the rainforest and to the structure of Kaluli society and helps keep the two in balance [19]. In those cultures, the imitation of the soundscape in music often appears to be associated with a more wholesome relationship to the environment, which in Western culture has long been lost.

There is an example that goes even further in this direction. It is the analysis developed by Colombian ethnomusicologist Ana María Ochoa Gautier in relation to the *bogas*, the rowers who transported travellers along the Magdalena River in Colombia in the 19th century and who, during their work, seamlessly alternated music, language and the imitation of animal sounds. According to Ochoa Gautier, the capacity of the *bogas* to move between the world of the human and the nonhuman by envoicing animal sounds is consistent with a specific ontology of the self and of the relationships between the self and the world, whereby “the common condition of animals and humans is not animality but humanity” and “[s]ongs and languages can potentially be transmitted between species by entities who have the ability to do so”. Quoting the anthropologist Marshall Sahlins, Ochoa Gautier maintains that

the self in these societies is not synonymous with the bounded, unitary and autonomous individual as we know him [...] Rather, the individual person is the locus of multiple other selves with whom he or she is joined in mutual relations of being; even as, for the same reason, any person’s self is more or less widely distributed among others.

The vocalizations of the *bogas*, according to Ochoa Gautier, are instrumental in establishing and maintaining this notion of a distributed self, even in the face of a culture (the colonizers’ one) that was violently imposing a clear boundary between the human and the natural [20, pp. 31–67]. This idea of a distributed self is consistent with the statement, common in ecological literature, that “[o]rganisms and milieux are not two things” [21, p. 56] and that the boundaries between the self and the system are mobile and permeable [22, p. 11].

THE NOTION OF IMITATION IN MODERN ECOLOGICAL THOUGHT

Imitation is a recurring theme also in modern ecological thought, as one of the ways of knowing the environment by interaction rather than by detached observation. Especially since the mid-20th century, when ecology came under the influence of cybernetics and general systems theory, a conception of knowledge emerged that the English historian of science Andrew Pickering defines as ‘performative epistemology’. The brain is seen as “an adaptive organ performatively engaged with a lively world at the level of doing rather than knowing” [23, p. 151]; the key shift is the replacement of ‘observation’ with ‘interaction’ and of ‘truth’ with situated, performative and emergent knowledge [23, pp. 343–346].

This epistemology stems from a critique of the Cartesian distinction between mind and matter, according to which the former is rational and endowed with free will while the latter is subject to deterministic natural laws. It relies instead on the cybernetic vision of intelligence

as a property of complex systems, whose boundaries do not coincide with the individual, much less with the conscious self [22, p. 64]. In other words, awareness of the complexity of systems, along with the fact that we ourselves are part of them, prevents ecological thinking from adopting a neutral viewpoint on reality.

In conceiving knowledge as situated and relational and in criticizing the idea of an objective look on reality (the «god trick of seeing everything from nowhere» [24]), this epistemology has much in common with the feminist concept of situated knowledge and with Karen Barad's 'agential realism'. Moving from quantum mechanics, Barad maintains that the 'phenomenon' does not coincide with a given object but is a non-dualistic whole which encompasses the object and the agencies of observation. The cut between the two is not intrinsic or predetermined but is constructed locally, via interactions [25]. This means that "phenomena are ontologically primitive relations without preexisting relata" [26, p. 139] or, as poetically expressed by Donna Haraway: "Natures, cultures, subjects, and objects do not preexist their intertwined worldings" [27, p. 13].

Among the various forms that these worldings can take, imitation plays an important role as an 'embodied' mode of knowledge and interaction with the environment. As Daniel Belgrad shows throughout his essay *The Culture of Feedback*, popular culture has also contributed to the articulation of this performative epistemology, often connecting it with the way of life of indigenous peoples [22]. In these often-fictional contexts, as well as in the actual examples we saw in the previous paragraph, *sonic* imitation plays a particularly important role, most probably by virtue of the 'relational' nature of hearing if compared to the other senses. For both physiological and historical-cultural reasons, in fact, sound, more than sight, "puts us in this situation of irreducible belonging; we do not appropriate anything, but are instead part (implicated) of a phenomenon that encompasses us and somehow transcends us" [28, p. 95].

MUSICAL MIMESIS AS AN ECOLOGICAL PRACTICE

When, in April 2025, I started the first listening and recording session of a Northern Italy wetland area as part of my PhD, I didn't really know what I would get out of it. Like many before me, I had discovered that augmented listening and field recording are an exceptionally insightful way of exploring natural environments. The most interesting recordings I had heard, however, came from rainforests, glaciers, or other difficult-to-reach environments. I was glad to find, at little distance from the neighbouring village, a complex and layered soundscape, with plenty of voices of amphibians, birds and insects each occupying its own acoustic niche [11].

Following that session I composed two pieces which, without directly incorporating the field recordings, are based on a mimetic reinterpretation of them. The second one, *Song for the Marshes* for mezzo-soprano, violin, viola and bass clarinet, combines echoes of these soundscapes with fragments of texts that testify the negative attitude towards marshy environments typical of Western culture, which traditionally considered them as mere land to be 'reclaimed'. The idea was to create a tension between the meaning of the text and the meaning of the sound, which on the contrary should convey a sense of the complex life hosted by these habitats.

Later, while discussing *Song for the Marshes* with other musicians, I was asked some questions that are well known to composers who admit to adopting mimetic processes. Will the listeners hear the piece as pure music, or is it important that they recognize the original sounds on which it is based? If the audience has never heard that environment, how can they recognize it? For me, listening to that soundscape was clearly an insightful experience, but what about the audience? The following final reflection about the different degrees of mediacy of musical mimesis is aimed at addressing this kind of questions, as well as to better articulate the possible functioning of musical mimesis as an ecological practice.

If we consider what emerges from the extra-European traditions and from the performative epistemology outlined in the previous paragraphs, these imitative processes might indeed appear meant for those who perform them, rather than for an audience. This idea reflects itself in the practice of several contemporary composers who worked with mimesis. In her *Sonic Meditations*, which often envisage the imitation or ‘reinforcement’ of environmental sounds, Pauline Oliveros “attempts to erase the subject/object or performer/audience relationship by returning to ancient forms which preclude spectators” [29] – these ‘ancient forms’ are the same I referred to in the first paragraph of this paper. Similarly, Alvin Lucier, while performing his *Vespers*, based on the imitation of echolocation techniques employed by bats and other animals, felt more than once the necessity to involve the audience in the performance [30, pp. 16–27].

If these compositions exemplify the most immediate instance of musical mimesis, a slightly more mediated example could be represented by the musical practices which envisage the presence of an audience but in which the imitation of the environment occurs live, at the moment of the performance. This is, for example, the case of Richard Teitelbaum’s *Threshold Music*, from the mid-70s, where the performers were asked “to match the level of sound of the environment as precisely as they can” in order to direct the attention of the audience to environmental sound as well as to its imitation [22, p. 124].

A higher degree of mediacy is represented by Canadian soundscape composition: the creation of electroacoustic pieces based on recordings of actual places, incorporating also the subjective or cultural implications of these soundscapes. In this case the model of the mimesis is not part of the performative setting; what the audience listens to is filtered by the recording process and by the composer’s choices. Starting from this level of mediacy, we seem to face the risk of adopting an ‘extractive’ attitude, as emerges from the reflections of the very musicians engaged in this practice [31]. According to Barry Truax the real goal of soundscape composition is reached when, instead of merely extracting materials from the environment, “the work enhances our understanding of the world, and its influence carries over into everyday perceptual habits” [32, p. 240].

But how, exactly, can this work? An insight could come from the thoughts of Salvatore Sciarrino, a composer who probably wouldn’t use the terms ‘soundscape composition’ or ‘ecological thought’ but whose work is deeply shaped by listening and imitation, albeit in the field of written contemporary instrumental music. According to his poetics,

the artist doesn’t assume an authoritative position as a dispenser of truth, but rather it’s as if he’s saying: “I see this. What do you see? Look yourself”. For me, the focus is neither the composer nor the world itself, but the listener’s perception. Thus, artistic language becomes a sharing, an invitation to a different, deeper kind of attention to the world, an education to openness [33].

With Sciarrino’s written music we probably touched on the musical practice which shows the higher degree of mediacy, since at the moment of the performance the models of the mimesis are not present, even in recorded form; the audience experiences only their interpretation by a composer, performed, moreover, by other musicians. This is also the case of my *Song of the Marshes*. However, Sciarrino’s invitation – “look yourself” – suggest a very interesting possibility for explaining how this ‘education to perception’ can work even in these cases. The idea is that, even in the case of those more complex and mediated practices, the idea of ‘reception’ could be replaced, again, by ‘imitation’: the listeners are invited to imitate the composer’s attitude, and in turn to appropriate – in a performative way – a knowledge that is a way of perceiving the world. Mimesis as an ecological practice could, then, work not only as a paradigm for the composition of music, but also for its fruition in the performative setting.

CONCLUSION

After noting that the mimesis of environmental sound is more or less explicitly at the basis of many 20th-century musical practices, this paper has attempted to show the connection between this practice and ecological thought, understood as a new paradigm of nature that spread at the beginning of the century and was profoundly revised in the mid-20th century under the influence of cybernetics. To this end, it investigated ethnomusicological, anthropological, and philosophical theories on the relationship between humans and the environment, the ‘performative epistemology’ which emerged among ecological and cybernetic thinkers in the post-war period, and the discourses of some of the composers who adopted mimetic procedures in the 20th century.

According to this conception, mimesis can be understood as a form of interactive listening and engagement with the environment. Precisely since it is a performative practice, it takes on epistemological value; it can be seen as a way of knowing, understood not as an objective reflection of an external reality but as a form of interaction and of cognitive and affective attunement with the environment. This idea – which is consistent with the performative epistemology mentioned above – surprisingly resonates with the anthropological hypotheses of, among others, Marius Schneider, who maintained that imitation and especially the imitation of sounds was the original way of knowing the environment and acting on it. However, this idea can also find a much more recent theoretical framework in Karen Barad’s agential realism, in the feminist epistemology of situated knowledges, and Donna Haraway’s postfeminist theory. In this sense, the exploration of soundscape mimesis in contemporary music, and artistic research in and through it, can possibly contribute to enriching ecological understanding in a broader sense.

Finally, the paper has distinguished between more immediate and more mediated forms of musical mimesis, discussing how this practice can maintain its ecological value also in the more mediated cases. By elaborating on the idea of music as an education to perception, it has hinted at a possible performative theory of the fruition of mimetic music, which, however, needs to be further developed.

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