Research Article

Asunción López-Varela Azcárate*

Ecopoetic Noticing: The Intermedial Semiotic Entanglements of Fungi and Lichen

https://doi.org/10.1515/culture-2024-0004
received December 13, 2023; accepted April 4, 2024

Abstract: This article employs Peircean semiotics to delve into the nuanced realm of "noticing" more-than-human forms of communication. It posits a fundamental challenge to the anthropocentric perspective, asserting that life itself constitutes a distinct form of agency and that voices extend beyond the human domain. Peircean semiotics disrupts the traditional superiority of human cognition and language, emphasizing the continual interplay of diverse signs rooted in various material modalities. Amidst the intricate fabric of more-than-human interactions, the article examines the roles of noise and sound within natural environments. In its exploration, the article turns its focus to the dynamic interplay of very simple organisms, like fungi and lichen, using them as exemplars to enrich comprehension of symbiosis and interconnectedness within communication systems spanning the entire spectrum of living organisms. By accentuating the significance of "noticing" within ecopoetics, the article underscores the latent communicative potential inherent in all life forms, beckoning for a heightened awareness of the voices that echo across the vast tapestry of existence.

Keywords: Archie R. Ammons, Emily Dickinson, John Cage, Kathleen Jamie, Forrest Gander, Hajrije Kolimja, Pablo Neruda

1 The Semiotics of the Noise

Whenever I take my cats for a stroll (they grew up in the wild and they like their walks), the sudden sound of a branch cracking, or the rushing of the leaves in autumn, frightens them. These noises are signs, which in Charles S. Peirce's definition are "something which stands to somebody for something in some respect or capacity" (*Collected Papers* 2, p. 228). In this case, the "somebody" to whom these signs signify is a nonhuman. Peirce considers that what we call mind (in humans associated with the awareness of the self or consciousness) is a product of semiosis, so that he often refers to it as a quasi-mind, or a mind in the making. He also sees meaning making (and agency) as not exclusive to humans (López-Varela Azcárate, 2023a). The cracking of the branch and the rushing of the leaves are indices. Peirce distinguished between three types of signs, icons, indices, and symbols, which are related to multimodal forms of perception and the ways in which they are communicated.

Iconic signs often evoke a connection with what they represent through inherent similarities (as seen in maps, realistic images, etc.). Thus, iconicity often relies on vision. Indices stand for relations, establishing connections with their referents (things in the world) through some causal or contextual relationship; for example, the cracking sound that signals something breaking, or the rushing of leaves that announces autumn winds. Indices can signal a prediction of what is not yet present, drawing attention to things and events not currently visible, but expected to occur soon. Indices, also known as pointers, serve to focus attention on particular things and events within the continuous flow of spatiotemporal experience. They can flashback to

* **Corresponding author: Asunción López-Varela Azcárate,** Department of English Studies, Complutense University Madrid, Madrid, Spain, e-mail: alopezva@ucm.es

Open Access. © 2024 the author(s), published by De Gruyter. This work is licensed under the Creative Commons Attribution 4.0 International License.

the past or foreshadow future events. While icons play on presence, indices do so on absence, writes Eduardo Kohn, 2013. The ancient Greek root *sêma*, which has given way to "semiotics," originally referred to the stone marker of a grave, which stood as a symbol of remembrance in absence.

A symbol, in Peirce's terminology, is a sign that stands for its object (referent) by virtue of a conventional or agreed-upon association decided by a group, established through sociocultural conventions (habits, laws) rather than through any inherent similarity or direct connection (as with icons and indices). Symbols constitute the root of oral and written languages. Different languages use different characters and words to represent objects or concepts, illustrating the arbitrary nature of symbolic relationships. Symbols can represent and evoke meanings that extend beyond the immediate, thus referring to absent things/events. Learning a symbolic language incorporates a level of abstraction in cognitive processing. Symbols are combined to form texts, either in oral form, grounded on the sound waves upon which spoken languages rest, and later in writing in different supporting materials and media. Texts create networks of interconnected meanings, referring to other texts and sometimes to iconic signs (graphs, maps, images). In human languages, indices take the form of syntactical markers that situate actions in particular spatiotemporal contexts (i.e. the temporal makers of verbs and adverbs, pointers that indicate the subjects or objects of actions, and so on). In this way, the ongoing process of sign production and interpretation passes through three processes, firstness, secondness, and thirdness, which increasingly entail more complex meaning-making processes that capture aspects of the world. In their repetition and habit (thirdness), signs enter the symbolic realm of lawmaking. They not only connect the past and present of perceptual experiences (more related to firstness and secondness), but also project them into possible future scenarios. For Peirce, "Thought is not necessarily connected with a brain. It appears in the work of bees, of crystals, and throughout the purely physical world; and one can no more deny that it is really there, than that the colours, the shapes, etc., of objects are really there" (Peirce, 1906, p. 492).

Habit establishes the functionality of signs. Repetition of similar situations makes my cats aware that the cracking sound is just a branch and not an impending menace. Regardless of whether we call this awareness "consciousness," as in the case of humans, or "instinct," referring to nonhumans, the fact is that all minds have mechanisms that enable connections between the innermost parts of the body and the things and events of the world, particularly when they might announce life threatening or dangerous situations. It is in this sense that Eduardo Kohn, in his inspiring work *How Forests Think* (2013), insists that signs are alive. He speaks of a sort of "energetic component" that comes from the phenomenological noticing of material things, perceived as signs with a functional agentive potential (see also Alaimo, 2014, p. 9). To explain this, Kohn focuses on the concept of absence, particularly in relation to indexical signs. Referred to as a form of lack, absence operates on both the material and conceptual levels as a catalyst for meaning making. Indeed, "The concept of the trace is incompatible with the concept of retention of the becoming past of what has been present" (Derrida, 1982, p. 21). The trace left by the absent is indexical, for it leaves a mark of location and presence, as lichens on a rock.

Thus, the cause–effect construction of events facilitated by indices (pointers) also includes a temporal component, akin to a narrative structure. It is in this sense that nonhumans, animals, plants, and even microorganisms leave a trace for us to notice. Pointers can include aspects such as size, colour, sound, and other physical aspects. In organic individuals capable of willed movements, indices also include gestures as waymarks of their semiotic telling. The more fundamental function of indices is to be noticed and to situate things and events within the flow of experiences and the spatiotemporal continuum.

In his essay "Form, Substance, and Difference," Gregory Bateson explored the realm of mental processes, specifically addressing how causality operates within the domain of the mind. It was in this essay that Bateson affirmed that "In the world of the mind, nothing – that which is not – can be cause" (Bateson 1970/2015, p. 94). This assertion highlights the role of absence in the causal dynamics of meaning making, underscoring the functional role of absence. The unexpressed, not explicitly present, can shape and influence semiotic exchanges. Nothing can be truly absent, as it is the presence of something that highlights what is missing in the first place.

Absence appears as a lack of apparent content. However, it is important to highlight that content is not necessarily material. It might also be a form of energy, or it might be a material form that is not quickly perceived by human physical apparatus. For example, the waves that function as medium for oral symbols (i.e.

words that refer to things in the world) and certain indices (accompanying sounds like onomatopoeias, whistles, grunts, and so on) might not be visible to the human eye, even if they rest on the vibrations of vocal cords from a body. In animals, including humans, visible aspects might include the positioning of nose, mouth, jaw, lips, tongue, and other vocalizing structures, all of which influence the sounds produced. In this process, certain sonic components are filtered out, while other possible sounds are eliminated. What remains is a specific sound that corresponds to the intended expression. Absence plays a pivotal role wherein the lack of an element contributes to highlight other elements. "Noticing" involves this play between presence and absence, permeating the intricate web of signs and the processes of sign making.

The belief in the superiority of humans as the only beings capable of using their minds to shape the world through conscious acts (agency) that include the willing representation of thought processes can be traced back at least to Descartes. The generalized contention was that nonhumans do not possess meaning making capabilities, being only capable of very basic forms of thinking and communication, often not-willed and non-conscious. Peirce was among a group of scholars who began to argue against anthropocentrism from a semiotic point of view. In the 1980s, Bruno Latour explored human intentionality in relation to the possible "actant" agency of tools, including the role of technology, and then moved on to look at the impact of the natural world upon human culture. In *Politiques de la nature* (1999), he drew attention to "noise ," as that which might not be heard (also Lachmann et al., 2004). Latour's influence is evident in the efforts of post-humanist approaches to challenge human-centric perspectives. In an attempt to give more relevance to nonhumans, particularly biological entities like animals and plants, research has considered the possible translation of their basic acts of communication into humanlike narratives (i.e. Iovino & Oppermann, 2012), and inquired into new forms of bodily hybridization (Alaimo, 2014) as well as medial exchanges (Paszkiewicz, 2021; Weik von Mossner, 2023). The revision of the ontological status of species and their symbiotic connections is a fundamental turning point (Karpouzou & Zampaki, 2023). In this sense, the concept of intermediality plays a pivotal role since it not only extends the discussion on media beyond the sphere of the technological to include any material substratum. It also questions the notion of individuality, for the term, with the prefix "inter" signals the relationship between material forms and their reciprocity. The root "med-" in "medium" indicates not only an intermedial position. Terms like "meditation" or "medicine" point to the idea of equilibrium or a mediating middle point. When it comes to the implication of the arts in the intermedial debate with a focus on environmental issues, it is fundamental to highlight that artistic creations always aspire to transgress ontological and epistemological limits in an attempt to semiotically mask the border between signs and what they represent (López-Varela Azcárate, 2023b). It is in that liminal space, where absences become traces of presences, where intermediality creates its own "Symbiocene," as Karpouzou and Zampaki highlight (2023, pp. 11–39).

In spite of these great advances in helping give expression and voice to the presence of the more-than-human in human imaginary terms, it might be argued that there is a need to look for alternative critical stances that do not unintentionally underscore the superiority of human symbolic language in voicing the nonhuman. Thus, the challenge might lie in drawing attention to more-than-human intermedial forms of communication, that is, to learn to "notice" how nonhumans signify. In turn, this would mark a shift in perspective towards understanding more-than-human agencies.

2 Navigating the Phenomenology of Hearing and Listening

For humans, many natural sounds are noises. The crack of a branch, the rushing of leaves, or the murmuring of the wind might not be perceived as threatening to humans as they do to my cats. They might pass unnoticed by a human, even if they contribute to creating a specific contextual atmosphere. In information theory, noises are unwanted interferences or distortions that can affect transmission or reception. Claude Shannon introduced his ground-breaking ideas on "noise" in his 1948 influential paper. He demonstrated that noise, which is typically seen as disruptive, can carry its own kind of information. It can make communication less organized, less predictable, and more uncertain. But surprisingly, it can also help transmit information more efficiently

and reliably by serving as a trace that enhances "absence" in the transmission. In the context of human communication, noise can be seen as linguistic variations, idiosyncrasies, and redundancies; nuances that play a pivotal role in shaping the syntax and semantics of human communication, along the lines of Derrida's tenets (1982, p. 21).

Human verbal communication is characterized by structured sequences of signs (mostly symbols and indices) to convey meaning. For the majority of individuals, the visual and auditory modalities represent the most immediate sensory connections. While the association between sight and language appears to be somewhat arbitrary, as evidenced by the efficacy of tactile communication in braille for the visually impaired, it is highly probable that the genesis of human language is intrinsically linked to the auditory domain. Linguists, cognitive scientists, and evolutionary biologists have delved into the intriguing aspect of the development of human language. In his influential book *The Language Instinct* (1994), Steven Pinker discussed how the human brain has evolved to acquire language, with the auditory modality as a central aspect of this evolution. Noam Chomsky also acknowledged the importance of auditory processing in the generative grammar of human languages. In the context of evolutionary biology, Nowak et al. (2000) have sought to understand the transition from non-syntactic to syntactic communication in human evolution. They found that syntax appeared after the number of signs in a potential language went above a certain threshold. The consensus among researchers is that the auditory domain played a crucial role in the evolutionary emergence and development of human language.

With the advent of writing, a transformative capacity emerged – the capability to encapsulate language within a given medial space, which also required organizing symbols (hieroglyphic script, characters, words, etc.) within syntactic structures of growing intricacy. This removed signs from immediate auditory reception, emphasizing their permanence in visual and tangible forms (initially, writing scripts were engraved in stones, cuneiform tablets, and so on). Unlike auditory reception, the visual does not inherently evoke internalized sensations, for it does not rely on internal vibrations that impart a sense of penetration into the body. Thus, along with growing abstraction, a consequence of writing might have been the inadvertent estrangement of language from the corporeal realm, a development with further ramifications, whether beneficial or detrimental, in the age of online communication, which has severed even more the intrinsic connection between language and the body.

In animal communication, sign systems are typically more direct and are linked to particular stimuli. Some species rely on bio-acoustic signals, in a sort of syntactical order. Other types, like bees, use a sort of dance language known as "waggle" that exhibits a form of syntax where the angle and duration of the dance convey specific information about the direction and distance of food sources. Other social insects, like ants, communicate primarily through pheromones, chemicals that mark trails. The concentration and arrangement of these chemicals also form a kind of syntax, guiding other ants in the colony. Chemical signals are, in turn, influenced by factors like temperature, or humidity, representing a complex symbiotic system of communication. Among the birds, their songs often involve a structured sequence of notes whose arrangement and repetition convey information related to food, territory, mating, and so on. Some aquatic mammals, like dolphins, have systems of vocalizations where order, frequency, and signal patterns constitute a sort of syntax. Many mammals, like elephants, convey meanings through variations in the pitch and rhythm of their calls, and primates and great apes, the evolutionary ancestors of humans, exhibit complex intercourse systems that include vocalizations, facial expressions, and body language, all of which demonstrate a level of specificity in their communication. Finally, ecosystems and symbiotic relationships among organisms also involve various sign systems. Many of these would be considered "noise" to other bio-groups, since the specificity of signs might be situated outside their perceptual threshold. Just to give one example, while humans can hear sounds limited to frequencies between 20 and 20,000 waves per second, bats can emit and hear sounds at frequencies that are over 100,000 waves per second.

While hearing is the biological process of perceiving sound, listening is a more complex and intentional act involving the active and embodied engagement and processing and interpretation of sounds (Merleau-Ponty, 1976). For instance, the continuous and uniform sound produced by the running water of a waterfall can appear inaudible unless attention is paid. Sounds that contain all audible frequencies with equal intensity within human audible range, reverberating in an almost imperceptible but consistent and continuous hiss, are

known as “white noise.” The term is derived from the analogy with white light, which contains all colours of the visible spectrum in equal amounts. It is paradoxical that in both cases, white stands as a sign for the absence of content, when in reality it is quite the opposite. The contemporary interest in sound and listening is inextricably linked to growing concerns with the environmental degradation of our planet, so that the exploration of auditory experiences beyond human audible spectrum begins to incorporate not only the study of animal communication, but also plants and even non-biological phenomena. As mentioned, the arts can have an important role in stressing the different communication abilities of nonhumans. In particular, ecopoetry punctuates the sonic impact of the environment and its non-speaking part in environmental noticing.

3 Sonic Liminarities: Beyond the Threshold

In the context of environmental studies, the exploration of “noise” as a herald of a new level of organization is a fascinating field of research. As mentioned, noise is no longer merely perceived as a disruptive element, but seen as a dynamic force that may signify a deeper underlying order or complexity. This perspective aligns with research in various scientific domains, including physics, dynamic systems theory (also known as chaos theory) biology, or information theory. Researchers exploring noise as a precursor and herald to a new level of organization often delve into the realms of complex systems, where emergent phenomena and self-organization may arise from the interplay of seemingly random chaotic elements. These theories have intriguing resonances in mythological narratives where noise and sound played pivotal roles.

In many cultural myths, sound often serves as a powerful symbol, marking transformative moments. In ancient Native American stories, the beating of the winds of creatures known as thunderbirds announced rain and beneficial storms. In aboriginal Australian mythology, the time of primal creation, known as “dreaming,” was accompanied by chanting and other ritualistic sounds that brought the landscape, plants, and animals into existence. In Greek mythology, Orpheus used the mesmerizing sound of his lyre to rescue his beloved Eurydice from the Underworld. The role of sound in the myth of Echo and Narcissus (the name derives from Greek “narkàο” = narcotic in reference to the smell of these flowers, suggesting also a certain detachment from the world) can also be interpreted as a commentary on the consequences of self-absorption and the challenges of paying attention and “noticing” one’s surroundings. In Hindu mythology, the creator god, Brahma, is related to a primordial cosmic vibration represented in the sound Om. Brahma is part of the trinity that includes Vishnu, the preserver god, and Shiva, the destructor but also liberator, whose dance symbolizes the three cosmic and natural cycles (creation, preservation, and transformation). In Japanese mythology, Amaterasu, the sun goddess, hides in a cave, causing darkness at night. When the cheerful noisy goddess Ame-no-Uzume performs a dance, Amaterasu and other gods join, and light returns to the world.

In the Bible, particularly in the Old Testament, there are instances where the sound of a ram’s horn (known as shofar), is significant. In the story of Jericho, the Israelites’ victory is attributed to its sound (Joshua 6:20). In the book of Revelation (8:6–7), seven angels sound trumpets that herald catastrophes associated with apocalypses and the end of the world. In the New Testament, the day of Pentecost is marked by the descent of the Holy Spirit upon the apostles, an event that was accompanied by the sound of the mighty rushing wind of the Spirit (Acts 2:1–4). Furthermore, the biblical narrative of the “Word” of God as a divine force in the act of creation, becoming embodied in the figure of Christ (“the Word made Flesh”) and in the spiritual energy of things to come with the Holy Ghost (Pentecost), aligns with the contemporary exploration of “noise” as a precursor to new organizational levels. These examples showcase the diverse roles that sound plays in conveying cosmic and divine messages, signalling significant events, and symbolizing the presence of the sacred. The use of sound in these narratives serves to emphasize the transcendent and transformative nature of the encounters with the divine and provide a rich tapestry that resonates with and enriches contemporary scientific understanding of “noise” as a harbinger of emergent order and profound transformation.

Exploring sound as a precursor to a new order is directly linked to the notion of noise as proto-information, emphasizing its capacity to announce change. Instead of viewing it as pure interference, we might consider that what we perceive as noise can be an alien form of communication. The response to noise could

manifest itself in the expansion of vocabulary to include not only spoken words but also visual, tactile, or even chemical signals. In essence, this suggests that the richness of communication extends beyond human languages and encompasses a variety of modalities, allowing for adaptability and effective interaction in diverse environments.

As noted, the ability to produce sound generally involves the vibration of specific structures. To give some more examples of natural metamorphosis, we can mention how changes in physical states are accompanied by small mutations that are seldom perceptible to the human sensory apparatus. Noise can be considered as an anticipatory indexical sign of upcoming phase transitions, a sudden modification in the properties of a physical system in response to external conditions such as temperature or pressure. The sound associated with the melting of ice is not typically audible to the human ear but, in specific environments, such as glaciers or regions with large amounts of ice, noticeable sounds can occur due to the expansion and contraction of ice. At the other side of the spectrum, evaporation happens when water molecules absorb enough thermal energy to transition from the liquid to the gaseous state. Again, evaporation of sea water does not typically produce audible sound, but the rapid change from liquid to vapour of boiling water can result in bubbling sounds. In the context of a volcano, when magma (molten solid rock) encounters water, an explosive phase transition can occur, which is accompanied by very loud noises. These examples illustrate how changes in physical states can manifest themselves as noise, that is, sounds that speak to humans in the languages of nature.

4 Noticing as Listening in More-than-Human Aesthetics

We have argued that the impact of writing on human language shifted communicative emphasis from immediate auditory reception to visual forms. This transition to spatially contained written spaces, particularly when writing was no longer carved in cuneiform or hieroglyphic forms, might have influenced the development of syntactic communication, a milestone that, in turn, could have led to the estrangement of language from the sonic and tactile to the visual realm, which detaches perception from experiences that leave a greater physical impact (i.e. aural vibrations, touch). In the age of digital online communication, and more recently with advancements in language processing and AI generative technologies, the connection between language and bodily sensorial perception is further diminished.

However, a number of scholars (i.e. Haraway, 2008; Hayles, 1999) have argued that the posthumanist scenario of human–machine interaction has, somewhat paradoxically, opened the way to reflections on more-than-human forms of communication. Traditional humanist perspectives often ignored or marginalized nonhuman entities and their communication patterns. Acknowledging the interconnectedness of humans with technology, animals, and the environment, new research shows a shift away from anthropocentrism, inviting consideration of the communicative capacities of nonhuman entities, whether technological or biological. In fact, AI is already helping decode and comprehend intricate forms of expression exhibited by animals and plants. Many of these sign patterns and behaviours in ecosystems were previously challenging for humans to decipher because their transmission occurs outside human perceptual abilities. Thus, the complexity of these processes often passes unnoticed by humans, and AI can help in this regard.

Additionally, the arts also play a crucial role in helping notice and understand more-than-human worlds. Beyond representation, the arts create new worlds in which to explore perception and cognition. For example, artists can create multisensory immersive spaces that invite audiences to engage with the environment. Bioartists explore the intersection of art and biology using genetic manipulation, living sculptures, and interactive biological installations that interrogate the boundaries between the living and the nonliving. Over time, artists have certainly engaged with ecological concerns through art forms that bring close animals, plants, and the environment. Emily Dickinson's nature poems, for example, speak of the symbiosis and intimacy among all creatures. In "Bloom" (1865), she focuses on flowers and their role in securing harmonic environmental relationships: " To pack the Bud – oppose the Worm – /Obtain its right of Dew – /Adjust the Heat – elude the Wind – /Escape the prowling Bee" (Dickinson, 1865/2021, p. 1058). The notion of the picturesque, which was introduced in the European aesthetic debate in the eighteenth century, or the work of the Romantics and the

Transcendentalists, as in the case of Ralph Waldo Emerson whose 1836 essay on "Nature" inspired the writings of his friend Henry David Thoreau, and even Victorian nonsense poetry, with its blurring of borders between human and nonhumans and its questioning of Darwinian strict classifications (López-Varela Azcárate, 2024) have all served as inspiration for contemporary more-than-human approaches to the natural world.

John Cage was one of the pioneering figures of the twentieth century in sound innovation and experimental avant-garde, particularly in his association with the Fluxus group, which sought to blur the boundaries between artistic disciplines by incorporating intermedial aspects. Cage had a special interest in nature and environmental sounds and created sonic installations with a variety of "found objects" ("objets trouvés") reminiscent of natural auditory environments. In 1952, Cage suffered an intoxication with mushrooms, after which he decided to study them more closely. He became an expert in mycology and co-founder of the New York Mycological Society. Cage was sure that, in dropping their spores, mushrooms made sounds and believed he could hear them. He also explored what he described as "writing without syntax," a departure from syntactical order, which allowed him to incorporate noise in his musical compositions. For Cage, noise not only referred to sounds coming from the natural world. He also understood noise as random and alien forms of communication, which he incorporated into his works by using the ancient Chinese divination text known as *I Ching*. Cage believed that this helped to create more organic sounds.

A transcript of Cage's 1983 long poem and performance, *Mushrooms et Variationes,* is featured in *John Cage: A Mycological Foray* that includes a selection of Cage's art experiences with fungi and excerpts from his *Diary* (1965–1982). Cage's introduction to this piece highlights the need to move beyond ordinary sonic expression in order to fully experience the environment. His 1979 poem "Mushrooms" describes this process as: "a sudden refreshMent/reassUrance/Surprise/deligHt/thRill/push in the right directiOn/inspiratiOn/Moment you'll never forget and on top of that/a continuing enveloping myStery" (cited in Kostelanetz, 1993, pp. 143–46). The capitalized letters, MUSHROOMS, seem to echo the name of the little organisms and their reddish-brown colour, while the verses bespeak the riddle of fungal magic. Closing another one of his poems, "Mushroom Haiku" (1961), the same capitalised letters MUSHROOMS evidences the cryptic "escape rooms" of Cage's sonic experiences.

> they'll be separated froM the rest of creation
> and pUt in a kingdom
> by themSelves. all of tHis is an attempt
> to stRaighten
> Out
> Our understanding of these plants, which perhaps
> are not plants at all. so far they've
> Managed to remain
> juSt as mysterious as they ever were.

"Mushroom Haiku" speaks about synergies in nature, emphasizing Neoplatonic and Buddhist philosophical ideas related to the ultimate unity within the diversity of the world. In both traditions, the goal is to transcend multiplicity to be reunited symbiotically with the unified source of all beings. They share a belief in the interconnectedness and interdependence of all phenomena, an idea that can be seen exemplified in the symbiotic associations of fungi and lichen. Some fungi decompose dead organic matter, such as fallen leaves, wood, and animal remains, breaking down complex organic compounds into simpler forms and releasing nutrients back into the soil in a cyclic process that turns diversity into the earth of primal creation myths.

Inspired by mycology, Cage's musical experimentation played on blurring the boundaries between natural noise and music, reflecting an openness to unconventional sonic elements as well as a passion for mimicking the complexity of nature with special sensitivity to natural acoustic environments. Cage's "writing without syntax" aligns with a mode of listening and composition attentive to subtle vibrations and sounds emitted during fungal growth and spore release, changes that also incorporate different colour patents. The notion of "Symbiocene," as advocated by Karpouzou and Zampaki (2023, pp. 11–39), is particularly useful here for it refers to a performative scene where "noticing" becomes key (note that "key" is a synonym of sonic aspects

such as tone, pitch, and timbre, as well as visual ones such as tonality, tone colour, modulation, etc., highlighting the synesthetic component of perception and representation).

Indeed, the subtle ways of communication of fungi and lichens require what Scottish poet Kathleen Jamie has termed "serious noticing." Jamie emphasizes the importance of paying close attention to the natural world, even in its most humble aspects. She underscores two concepts: "attentiveness" (2021, "Introduction," p. xiv) and "noticing" (2021, "Introduction," p. xvi). For Jamie, the act of noticing is necessary in order to gain awareness. Furthermore, it becomes a demonstration of quiet resistance, promoting the idea that deep and reflective attention to natural details can be a resistant response to the lack of appreciation and care (to be "attentive" means to be mindful) in a world filled with superficial distractions. Deep observation and listening show engagement with the things perceived. In semiotic terms, this is how things become meaningful. This idea is embedded in Jamie's work as a poet, where she highlights a necessary meticulous immersion in one's surroundings, going beyond the surface in order to explore the deeper layers of meaning inherent in natural phenomena. The poet has also explained that it is not possible to be a passive onlooker, for gaze is reciprocal and, thus, subject to judgement. Jamie emphasizes that to regard nature as "other" and the environment as "external" and "outdoors" speaks volumes about human alienation from nature.

> I don't believe in God. I believe in spiders, alveoli, starlings…I might suggest that prayer in the world isn't supplication, but the quality of attention we can bring to a task, the intensity of listening, through the instruments we have designed for the purpose. It might be the outermost reaches of the Universe, the innermost changes at the bottom of a lung, the words on a page, or a smear of blood on a slide. I think it's about repairing and maintaining the web of our *noticing*, a way of being in the world. Or is that worship? (Jamie, 2002, p. 39; emphasis added).

Jamie encourages a mindful and intentional "noticing," urging individuals to engage with the world almost as an act of spiritual contemplation, in a similar way to Cage. BBC radio producer and a poet, Faith Lawrence, who researches on the "poetics of listening," explains that Jamie's often compares human syntax to spider webs, stressing that the task of the poet, is not that of finding their own voice, but listening and giving voice instead. This also echoes Cage's "writing without syntax." Jamie's approach is evidenced in the following lines: "I discover a cave/green and ventricular/and there, with tremendous patience,/I'd teach myself to listen: what the whale-fish hear/answering through the vastnesses/I'd hear too" (Jaime, 2015, p. 46 cited in Lawrence, 2015, p. 13).

5 Synesthetic Encounters and Listening to Colours

While many fungi form mycorrhiza associations with plants, lichens constitute mutualistic relationships with a fungus and either a green alga or a cyanobacterium (or both). They grow over diverse substrates, including rocks, soil, tree bark, and even other organisms, and they play important roles in ecosystem processes such as nitrogen fixation, soil stabilization, decomposition, and nutrient cycling in ecosystems. Often thriving in extreme environments, lichens have been the object of recent interest in relation to nonhuman forms of communication. Their variety of colours bespeaks of the mutual dependency of the organisms that form lichens. As we have argued, noise, understood as information and potentially a form of communication, might not be just auditory, but also visual, incorporating aspects such as colouring. In basic organisms like bacteria, algae, fungi, or lichens, as well as in more complex plants and animals, colours can convey simple multisensory messages where certain shades indicate environmental conditions or the presence of specific elements. In *The Forest Unseen,* biologist David Haskell, explains that the quietude and outer simplicity of the lichens hides the complexity and interconnection among natural entities.

> Lichens are amalgams of two creatures: a fungus and either an alga or a bacterium. The fungus spreads the strands of its body over the ground and provides a welcoming bed. The alga or bacterium nestles inside these strands and uses the sun's energy to assemble sugar and other nutritious molecules. As in any marriage, both partners are changed by their union. The fungus body spreads out, turning itself into a structure similar to a tree leaf: a protective upper crust, a layer for the light-capturing algae, and tiny pores for breathing. The algal partner loses its cell wall, surrenders protection to the fungus, and gives up

> sexual activities in favor of faster but less genetically exciting self-cloning. Lichenous fungi can be grown in the lab without their partners, but these widows are malformed and sickly. Similarly, algae and bacteria from lichens can generally survive without their fungal partners, but only in a restricted range of habitats. By stripping off the bonds of individuality the lichens have produced a world-conquering union. (Haskell, 2012, pp. 131–132)

Lichens provide a notable example of natural cooperation. The intimacy between lichen partners, with their fused bodies and interwoven cell membranes, serves as a metaphor for material intermedial relationships that extend beyond human experiences, emphasizing interdependence and collaboration.

In 2016, the Department of Art History and Design at the University of Notre Dame in the United States hosted the exhibition "Invisible Landscapes" by Sarah Hearn. The exhibition drew attention to terrestrial life forms that generally go unnoticed – lichens. Covering approximately 8% of the earth's surface, lichens can grow on all kinds of biological substrates and live for over 1,000 years. NASA recently took lichens into space, demonstrating their ability to survive. The contemporary fascination with lichens encompasses many artistic realms, from drawing, photography and music, to ecopoetry.

"The City Limits," a famous poem that closes the volume *Briefings: Poems Small and Easy* by American poet Archie Randolph Ammons, celebrates nature by focusing on the presence of light in the world, highlighting its connection to sonic aspects. The expression "when you consider," which is repeated throughout the text, invites the listener to notice "that birds' bones make no awful noise against the light but lie low in the light as in a high testimony." Exploring how light is important for all living organisms, including lichen, the poem underscores that "noticing" involves an interconnection among all things in the world.

> when you consider
>
> that air or vacuum, snow or shale, squid or wolf, rose or lichen,
> each is accepted into as much light as it will take, then
> the heart moves roomier, the man stands and looks about, the
>
> leaf does not increase itself above the grass, and the dark
> work of the deepest cells is of a tune with May bushes
> and fear lit by the breadth of such calmly turns to praise.
> (Ammons, 1971, "The City Limits")

Forrest Gander has also reflected on lichens as organisms that undergo such a profound transformation through collaboration that they cannot revert to their previous states. In this way, they become a metaphor for the complexities of intimacy and relationship. Additionally, Gander has contemplated the temporal dimension of lichens, which stretches beyond human temporality. The second and third stanzas of his poem "Twice Alive" read like this:

> you take a 3-lens jeweler's loupe to inspect the holdfast
> of the umbilicate lichen then the rock-tripe lichen
> then the irenic Amanita mushroom
> swarming with a kind of mite that has no anus
> then the delicious chanterelles called Trumpets of Death
> supreme parsimony in drought
> lets lichen live on
> sporadic events
> of dew and fog, a velvety
> tomentum and the wet thallus. (Gander, 2021, "Twice Alive")

The second stanza moves through different organisms, from the "umbilicate lichen" and "rock-tripe lichen" to the "irenic Amanita mushroom." The mention of a mushroom "swarming with a kind of mite that has no anus" adds to the diversity present in nature. Descriptive terms like "swarming" contribute to the sensory experience of the poem, enhancing the evocative atmosphere of ongoing life. The "delicious chanterelles called Trumpets of Death" herald the coexistence of life and apocalypse in the cycles of nature. In the third stanza, the focus is on the resilience and adaptation of lichen in the face of environmental challenges. The phrase "supreme parsimony in drought"

suggests the remarkable efficiency of the lichen's ability to endure dry conditions. The mention of "sporadic events of dew and fog" adds a layer of vulnerability. Phrases like "a velvety tomentum" and "the wet thallus" evoke sensory images, allowing the synesthetic visualization and feel of the texture of lichen. The brevity of the stanza adds to its impact, focusing on very essential elements, imitating the delicate simplicity of lichen.

Similarly, Jen Hadfield's anthology, *The Stone Age* (2021), reflects on the untamed nature of the Shetlands. Like a colourful canvas, the natural things worded in her poems pulsate life and dynamically resonate, beckoning deep noticing. Her audacious wordplay, functions not merely as a literary device, but as a portal into a more-than-human realm of existence. Her poem "Dolmen" refers to the standing stone with "Pouringdownlikeporridge: lichen." In her previous collection, *Byssus* (2014), her poem "Lichen" further explores the act of close listening to nature: "Who listens like lichen listens?" This initial question is followed by a mention of "assiduous millions of black and golden ears," which paints a vivid picture of the abundant presence of lichen in nature. By saying "You hear and remember, but I'm speaking to the lichen," the poet directs audience's attention to the personified lichen, their "little ears prunk, scorch and blacken," their "little golden mouths gape." The personifications add a layer of intimacy to the relationship nonhuman and humans. The verbs "prunk, scorch, and blacken" suggest a transformative response of the lichen, a kind of bodily multisensory reaction to our noticing; the reciprocal gaze of which Kathleen Jamie speaks.

The symbiotic relationship between lichen and stones has been the object of many poems. One of the best known is by Chilean poet Pablo Neruda, "El liquen y la piedra" ("The Lichen and the Stone"), in his collection *Las piedras del cielo* (*Heaven Stones,* 1970). The poem opens with the image of lichen on the stone, describing it as a "gum vine ivy" ("enredadera de goma verde"), comparing lichen to ancient hieroglyphs, a silent but enduring communicator that "extends ocean writing on the round stone" ("extiende la escritura del océano en la roca redonda"). The image emphasizes the continuity of nature's writing, connecting the present to the distant past. The sun becomes an active participant, illuminating and reading the lichen's script, bitten by mollusks ("La lee el sol,/la muerden los moluscos"). In its symbiosis, the lichen interacts with marine life, creating a dynamic, interconnected ecosystem. The poem introduces the notion of a silent alphabet, submerged signs along the personified hip of the coast. The lichen is a carpet that symbiotically connects the cave and the water ("alfombrando la gruta de aire y agua"). The text speaks of the silent but profound natural texture, taking place beneath the superficial perceptual range of human communication: ("En el silencio sigue el alfabeto/completando los signos sumergidos/en la cadera clara de la costa"). Neruda personifies the lichen as a weaver of natural history, underscoring the fact that its weaving creates a space akin to a writing space of memory.

> El liquen tejedor con su madeja
> va y viene sube y sube
> alfombrando la gruta de aire y agua
> para que nadie baile sino la ola
> y no suceda nada sino el viento. (Neruda, 1970, p. 38)

The poem also highlights the significance of these small organisms in shaping the world. It has been found that lichen growth chronicles climatic change, so that the bluey-green lobes could be read almost as historical documents (Evans, 2020). Besides, since lichens rely on the atmosphere for all their nutrients, they accumulate many different types of elements and particles in their tissue. By studying them, scientists peek into the air we breathe at a molecular level.

The last example in this article comes from a poem by Hajrije Kolimja titled "What I'm Lichen," created within the project "Poems While You Wait," established by Dave Landsberger, Kathleen Rooney, and Eric Plattner in Chicago. The objective of this group of poets was to performatively create poems using manual typewriters in diverse public settings, street festivals, libraries, theatres, and museums. Kolimja is an Albanian-born writer and educator. Her poem is exhibited at the – Field Museum in Chicago, one of the world's great museums of natural history, whose immersive exhibits feature an extensive collection of lichen. Kolimja's poem plays with the paradoxes and dualities of lichen, making affirmations about what they seem, but are not. She also stresses their longevity and their silence, in contrast to the "cricket laughtrack" that accompanies each stanza. In the context of the project "Poems While You Wait," the symbolism of lichen is

metaphorically explored to convey the theme of patience, endurance, and the quiet passage of time. Ultimately, Kolimja's poem suggests that, akin to the lichen's growth, waiting involves a symbiotic relationship between presence and absence, between noisy laugh and silence.

6 Conclusions

In the context of ecopoetics, this article has used Peircean semiotics in order to approach the idea of "noticing" more-than-human forms of communication. The article contends that life itself is a form of agency and that humans are not the only entities that have a voice. Peircean semiotics challenges the notion that thinking is exclusively tied to the symbolic systems of human language, underscoring the constant interplay of other kinds of signs, linked to different material modalities. Recognizing the complexity of more-than-human interactions, the article has explored the role of noise and sound within natural environments, discussing multimodal communication formats and synesthetic intermedial relations. From this semiotic perspective, and with the example of fungi and lichen, the article has sought to enhance the understanding of the symbiosis and interconnectedness of communication systems across the entire spectrum of living organisms, all of which are waiting to be noticed.

> This is how they survive –
> as almost nothing. A spot
> of sun, a droplet of rain,
> a breath of wind, a moment's
> shelter. At the edge
> of life, on the way
> to elsewhere, they neither
> live nor die, but wait. (López-Varela, unpublished)

Acknowledgements: The author wishes to thank the Eurasia Foundation (from Asia) for support in the project "Narratives of Sustainability in the Anthropocene. Interdisciplinary Dimensions." More information https://www.ucm.es/siim/eurasia-foundation-cross-cultural-partnerships.

Author contribution: The author confirms the sole responsibility for the conception of the study, presented results and manuscript preparation.

Conflict of interest: Author states no conflict of interest.

References

Alaimo, S. (2014). *Bodily natures. Science, environment, and the material self*. Indiana University Press.
Ammons, A. R. (1971). *Briefings: Poems small and easy*. W. W. Norton & Company, Inc.
Bateson, G. (2015). Form, substance, and difference. *A Review of General Semantics*, *72*(1), 90–104. http://www.jstor.org/stable/24761998.
Derrida, J. (1982). Différance. In J. Derrida & A. Bass (Trans.), *Margins of philosophy* (pp. 3–27). University of Chicago Press. https://web.stanford.edu/class/history34q/readings/Derrida/Differance.html.
Dickinson, E. (1865/2021). Bloom. In P. Prakashan (Ed.), *The Complete Poems* (p. 1058) https://www.google.es/books/edition/The_Complete_Poems/jS_eDwAAQBAJ.
Evans, P. (2020, February 6) Country diary: Tiny shield lichen tell a big story. *The Guardian*. https://www.theguardian.com/environment/2020/feb/06/country-diary-tiny-shield-lichen-tell-a-big-story.
Falconer, R. (Ed.). (2015). *Kathleen Jamie: Essays and poems on her work*. Edinburgh University Press.
Gander, F. (2021, February 15). "Twice Alive". *The Chicago Review*. https://www.chicagoreview.org/gander-twice-alive/.
Hadfield, J. (2014). *Byssus*. Picador.
Hadfield, J. (2021). *The Stone Age*. Picador.

Haraway, D. (2008). *When Species Meet*. University of Minnesota Press.
Haskell, D. G. (2012). *The forest unseen: A year's watch in nature*. Penguin Books.
Hayles, N. K. (1999). *How we became posthuman: Virtual bodies in cybernetics, literature, and informatics*. University of Chicago Press.
Iovino, S., & Oppermann, S. (2012). Material ecocriticism: Materiality, agency, and models of narrativity. *Ecozon*, *3*(1), 75–91. https://core.ac.uk/download/pdf/58910639.pdf.
Jamie, K. (2002, June 6). Diary: Counting the Cobwebs. *London Review of Books*, *24*(11), 38–39. https://www.lrb.co.uk/the-paper/v24/n11.
Jamie, K. (2015). *The Overhaul: Poems*. Graywolf Press.
Jamie, K. (Ed.). (2021). Introduction. *Antlers of water: An anthology of Scottish writing on nature* (pp. xi–xvii). Canongate Books.
Karpouzou, P., & Zampaki, N. (Eds.). (2023). Introduction: Towards a symbiosis of posthumanism and environmental humanities or paving narratives for the symbiocene. *Symbiotic posthumanist ecologies in western literature, philosophy and art. Towards theory and practice* (pp. 11–39). Peter Lang.
Kohn, E. (2013). *How forests think: Toward and anthropology beyond the human*. University of California Press.
Kolimja, H. (2019). What I'm Lichen. *Poems While You Wait*. Field Museum in Chicago. https://poemswhileyouwait.tumblr.com/post/186814978888/what-im-lichen-by-hajrije-kolimja-field.
Kostelanetz, R. (Ed.). (1993). *John Cage writer: Selected texts*. Cooper Square Press.
Lachmann, M., Newman, M. E. J. & Moore, C. (2004) The physical limits of communication or Why any sufficiently advanced technology is indistinguishable from noise. *American Journal of Physics*, *72*(10) 1290–1293. doi: 10.1119/1.1773578.
Latour, B. (1999). *Politiques de la nature*. Paris: Editions La Découverte.
Lawrence, F. (2015). A Poetics of Listening. In R. Falconer (Ed.), *Kathleen Jamie: Essays and poems on her work* (pp. 10–20). Edinburgh University Press. doi: 10.3366/edinburgh/9780748696000.003.0003.
López-Varela Azcárate, A. (2023a). Cognitive semiotics and agency in the Anthropocene. In A. Biglari (Ed.), *Open Semiotics, 4. Life and its Extensions* (pp. 433–451). Editions L'Harmattan.
López-Varela Azcárate, A. (2023b). Posthuman Intermedial Semiotics and Distributed Agency for Sustainable Development. In J. Bruhn, A. López-Varela Azcárate, & M. de Paiva Vieira (Eds.), *The Palgrave handbook of intermediality*. Palgrave Macmillan. doi: 10.1007/978-3-030-91263-5_61-1.
López-Varela Azcárate, A. (2024). Una aproximación semiótica a la lógica queer y poshumanista de los disparates microliterarios de Edward Lear, Lewis Carroll y Laura Howe Richards. *Signa. Revista de la Asociación Española de Semiótica*, *33*, 85–106. https://revistas.uned.es/index.php/signa/article/download/38815/28417/111487.
Merleau-Ponty, M. (1976). *Phénoménologie de la perception*. Gallimard. https://monoskop.org/images/8/8f/Merleau_Ponty_Maurice_Phenomenologie_de_la_perception_1976.pdf.
Neruda, P. (1970). *Las Piedras del Cielo*. Buenos Aires: Losada.
Nowak, M., Plotkin, J., & Jansen, V. (2000). The evolution of syntactic communication. *Nature*, *404*, 495–498. doi: 10.1038/35006635.
Paszkiewicz, K. (2021). Cinema and environment: The arts of noticing in the anthropocene. *Res Rhetorica*, *8*(2), 2–21. doi: 10.29107/rr2021.2.1.
Peirce, C. S (1906). Prolegomena to an apology for pragmaticism. *The Monist*, *XVI*(4), 492–546.
Peirce, C. S. (1931–1935). *Collected papers of Charles Sanders Peirce* (Vol. 1–6). In C. Hartshorne & P. Weiss (Eds.). Harvard University Press.
Peirce, C. S. (1958). *Collected papers of Charles Sanders Peirce* (Vol. 7–8). In A. W. Burks (Ed.). Harvard University Press.
Pinker, S. (1994). *The language instinct*. William Morrow and Company.
Shannon, C. (1948). A mathematical theory of communication. *The Bell System Technical Journal*, *27*, 379–423, 623–656. https://people.math.harvard.edu/~ctm/home/text/others/shannon/entropy/entropy.pdf.
Weik von Mossner, A. (2023). Feeling wild: The mediation of embodied experience. In A. Lopez, A. Chang, K.W. Chu, S. Rust, M. Tola, & A. Ivakhiv (Eds.), *The Routledge handbook of ecomedia studies* (pp. 305–311). Routledge. doi: 10.4324/9781003176497-38.