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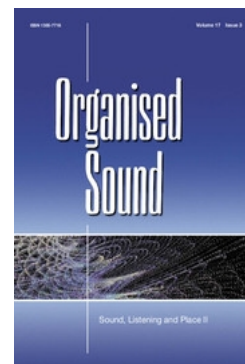
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Examining the Place of Music in Western Eco-cosmology, with Implications for Electroacoustic Musical Practice

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This article addresses the place of music in the Western worldview, arguing for a greater appreciation of music in a modern eco-cosmology which embraces environmental priorities as central to human prosperity, while contextualising defensible connections between music, sound and environment potentially useful for electroacoustic musical practice. Precise analytical terminology is established, and the methodology of environmental history is used to assess Western understandings about the role and place of music. Origins and ideas regarding immersive space, emotive power and the development of dualistic ‘nature–culture’ schemas are explored. Impacts of key developments in twentieth-century technology and environmental thought are examined as they relate to electroacoustic research. Biomusicology is reviewed for insights into innate musical structures and possibilities, and a recent linguistic study is analysed from a musical perspective to advance a cross-disciplinary argument: music may represent a form of mitigational behaviour used to balance the evolutionary tradeoff that enabled modern language. This argument suggests that if music in itself represents an environment critical for human mental health, then the contribution of electroacoustic music is vital for fresh eco-critical debate and awareness, and that an increased musical practice, especially in participatory contexts, may be essential for the human project.

1. INTRODUCTION

This article addresses the manner in which music and the biophysical environment have historically interacted and been understood in Western culture, while investigating how this informs music’s eco-cosmological role in modern society, and how electroacoustic musical practice might reflect and make use of this understanding. Can a cultural product such as music shape and be shaped by physical realities outside of culture, while somehow accurately invoking an aesthetic sense of the beauty and importance of that reality? Is musical experience valid only as an exhilarating and imaginative undertaking, or does it have any quantifiable links to an external biophysical environment or inheritance? How does electroacoustic musical research offer a way forward for the relationship of humanity with the natural world? Some might dismiss these questions

out of hand; some might qualify them by excluding the music of the West (Krause 1997: 1); some have argued that all music is in itself essentially useless, an artefact or by-product left over from the development of more practical language abilities (Pinker 1997: 528). However, a central area of inquiry in current environmental history practice focuses on human thought regarding the environment and its subsequent effect on human behaviour (Hughes 2006: 3), contending that this social history is critical to understanding cultural conceptions of the world and people’s place in it. As social history necessarily includes ‘perceptions, ethics, laws, myths, and *other structures of meaning* (as part of an individual’s or group’s dialogue with nature’ (Worster 1988 cited in Hughes 2006: 3; emphasis added), then the progress of music’s place in Western culture, its *meaning*, especially as it corresponds with understandings of biophysical reality, deserves to be explored. As electroacoustic musicians engage with environmental questions, an awareness of these developments becomes critical.

As a production of human thought and perception, but with functional mechanisms long poorly understood or wrapped in mysticism, music has had a long history of associations with the environment – associations that, in many contexts, can be deeply imbedded with meaning for participants and listeners alike. A critical realist position, relying on evidence and reason, can be established that argues that human experience, music, and the external environment have been intertwined in ways that may predate our very humanity; that music has maintained an enduring if sometimes contentious place in Western eco-cosmologies; and, ultimately, that music offers effective responsive strategies for improving the human condition, particularly in industrial societies facing unprecedented levels of sensory and informational complexity. These complex, connective relationships present fertile possibilities for future electroacoustic research that seeks to explore the intersection of music, sound and environment.

2. TERMINOLOGY

The relationship of music to the environment is perhaps best approached initially by addressing the position of 'Nature' in a greater 'nature-culture' debate structure. Distilled to a closed conceptual subset of this unwieldy terminological area, it can then be more effectively utilised. Within the field of environmental studies, the term 'nature' has for some time been acknowledged to be exceedingly problematic (Williams 1980b: 219–23) due to a multiplicity of definitions; other scholars have noted that the word can come weighted with unwanted and ambiguous Romantic associations (Morton 2007: 79–139). In this discussion, 'environment' will be used whenever possible to denote biophysical reality, though the term 'Nature' will inevitably appear in reference. Environment viewed in this sense does not necessarily designate a wildness isolated from human culture.

Music, for its part, can be more easily defined as an art form based on organised sound in time (Charlton and Hickok 2007: 4). When discussing music this article will differentiate between the *intention* of a composer or a musical practice and two other key factors of musical experience: the temporal *actuality* (the vibrational event sounded in external reality, as felt by the ear and interpreted by the brain during that actuality) and the *resultant* (i.e. any and all internal and external effects of an actuality in both listeners and creative participants). With these clarifications established, it becomes easier to seek evidence of defensible connections between human musicality and the environment.

3. IMMERSIVE SPACES

The immersive quality of place continues to hold enduring interest for modern electroacoustic musicians; the challenge of *ambient poetics*, the methodologies for 'conjuring up a sense of surrounding atmosphere' (Morton 2007: 22), remains fresh. This extends to works that extricate musicality from some actual physical framework, or through electronic recreations of distance and space. The attraction of immersive spaces has ancient roots; evidence of immersive musical practice reaches far back into prehistory. Igor Reznikoff, a specialist in musicology and sound anthropology, has demonstrated that over 90 per cent of the Pleistocene cave paintings he has studied – often situated in difficult-to-access, cramped, underground areas – are found in locations of exceptional acoustic resonance (Reznikoff 1995). The placement of this cave art had long confounded anthropological theorists, yet Reznikoff discovered that these spaces not only enhanced sung notes, but also amplified imitative sounds of the animals depicted at the particular sites. As remains of whistles

and bone flutes were also found in situ, a case could be made for an extremely early music practice, directly interacting with a physical environment, which incorporated visual and sonic elements to purposeful resultant effect. Seeking out such immersive subterranean environments for musical activity reveals a surprising dedication and acoustic sophistication, even if the intention of the practitioners remains conjectural. In any case, Reznikoff's musical perspective has shed new light on this perplexing anthropological question.

Somewhat more recent motifs of water immersion have also been identified by Francois Bernard-Mâche in early Greek myths, indicating a strong environmental and eco-cosmological influence in Hellenic traditions (Mâche 1992), an influence he has euphoniouly termed *katapontismos*. The beautiful location of many Greek amphitheatres, for example those at Segesta and Tindari in Sicily, further suggest a combined musical and theatrical practice deliberately poised between earth and sky, a surviving physical testament of what Aristotle sensed as *periechon* or the ambient (Hagen 2005: 1); the sweeping grace of later Gothic cathedrals also seeks to claim this same eco-cosmological space, while maintaining a completely different acoustic environment within, capable and perhaps subconsciously reminiscent of cavernous Paleolithic resonances. Grand architectural spaces and dramatic natural locations continue to invite immersive investigations, but electroacoustic opportunities are also to be found in the commonplace. Indeed, many immersive soundscapes remain 'active processes which are invisible' (McLuhan 1967: 68) to the participants: their eco-cosmological role is not apparent, but they can, in whole or part, present environmental actualities that can be manipulated to convey intention and sense of place.

4. EMOTIVE POWER

Music's power to shape emotion and behaviour, whether in relation to natural or cultural conditions, far predates electroacoustic music, and has been recognised historically since antiquity. One Greek writer in particular has left a striking early description of music mediating the relationship between culture and environment. Polybius' *History* tells of a Greek tribe that used constant musical activity in order to preserve civility and harmonious relations. Faced with harsh living conditions, 'the Arcadians of old did not introduce music out of frivolity but out of necessity' (Glacken 1967: 90). The intriguing premise of this passage is the defensive intention and resultant of musical practice. Music was used in Arcadia as an ameliorating buffer; it helped to maintain the civility of its citizens as they tried to cope with an inhospitable environment. This trope of music as a cultural

ennobler should be familiar to modern minds, yet for much of antiquity and continuing well beyond the medieval period, music was often viewed with suspicion due to its emotive powers.

The Greek philosopher Plato especially distrusted music, and he famously argued in *Republic*, approximately 373 BCE, that music be strictly regulated, banning modes that encouraged vices, while retaining those considered useful for managing soldiers: 'For martial spirit I recommend Dorian harmonies, and the Phrygian for making troops tractable when they return home from campaigns' (Plato 2003: 261). Saint Augustine of Hippo, writing nearly eight hundred years later, also noted that 'all the varied emotions of the human spirit respond in ways proper to themselves to a singing voice and a song, which arouse them by appealing to some secret affinity'. Augustine cautioned, however, that, 'I vacillate between the danger of [music's] sensuality and the undeniable benefits' (Augustine of Hippo 1997: 269–70). Despite such misgivings, music remained a central feature in medieval societies, both in the holy chant voiced in reverberant churches and in the peasant songs sung at work in open fields or at play in village celebrations.

The apparent fluidity of music's eco-cosmological place during this period should spark special interest in sound artists. Music functioned in multiple and even unearthly spheres; humans could create music evocative of angelic choirs in an empyrean realm above, while fearing siren songs of temptation emanating from an ancient evil below. This vacillation from sacred to profane would characterise Western cultural attitudes towards music until the end of the eighteenth century. Conceptions of 'environment' did not yet exist; the wilderness remained a hostile threat, howling outside the bounds of human culture, waiting to be tamed. These Western perceptions would change with the onset of Romanticism.

5. ROMANTIC ROOTS OF THE 'NATURE–CULTURE' DUALITY

Morton argues in *Ecology without Nature* that if eco-critique accepts that there is a problem to be debated, it lies in social reality and the persistence of dualistic thinking about ecology (Morton 2007: 23). Social histories of environmental problems can rarely be summed up quite so neatly; still, Morton places the origins of this dualism in the Romantic era, when artists and philosophers began to react against the strict reasoning of the Enlightenment, seeking more intuitive ways of comprehending reality. Music was thought more and more to act in a symbiotic embrace with Nature, separate from God (Williams 1980a: 76–7), but inexorably intertwined in a mysterious holistic relationship with humanity. German philosopher Friedrich Schelling held that 'music is nothing

other than the primordial [*urbildliche*] rhythm of nature and the Universe itself. The fully completed forms, which the plastic arts produce, are the objective representative prototypes of organic nature itself' (Schelling 1802 trans. Esposito 1977: 175).

In 1840s America, Ralph Waldo Emerson, himself influenced by Schelling, explored this theme further in two pivotal essays, both titled *Nature*: 'A work of art is an abstract or epitome of the world ... it is the result or expression of nature' (Emerson 1836: 9). While Emerson freely embraced Romantic conventions of using musical metaphor to describe environmental experience, his work, contrary to dualistic paradigms, does not necessarily suggest that people should consider themselves as distinct from the natural world. His 1839 poem 'Music' speaks directly of a unity inherent in music, the biophysical environment, and human experience, not restricted to the beautiful and the sublime: 'in the mud and scum of things, there always, always something sings'. Despite this, the writings of naturalists such as Thoreau and Muir perpetuated and eventually solidified in America the Romantic idealisation of a separate 'Nature', wild and beyond human ken.

Musicians of the Romantic period also recognised in their works and methodological writings the prominent influence of natural environments. However, the programmatic devices that many initially employed were impugned by composers who followed them, such as Debussy who, in his critical alter-ego Monsieur Croche, presaged modern soundscape aesthetics when he claimed that: 'Musicians listen only to the music written by cunning hands, never to that which is in nature's script. To see the sun rise is more profitable than to hear the *Pastoral Symphony*' (Debussy 1927: 9).

Romantic and Impressionistic artists both celebrated an individualism that intensified the questioning of prevailing ways of thinking. As organised religion began to lose its unchallenged grip on the Western worldview, music and art began to fill some of the eco-cosmological spaces of meaning that religion could no longer satisfy. Forward-looking individuals envisioned a more personal and accessible relationship with existence, with music acting as a mediating influence between man and his environment, inspiring and connecting humanity to the biophysical world, not subject to any religious tradition.

6. TECHNOLOGY, ELECTROACOUSTIC MUSIC, ENVIRONMENT

During the twentieth century the accelerating spread of mechanical and electronic technology became an integral part of the cultural and physical landscape that musicians would have to negotiate and interpret. By enabling the separation of listener from practitioner, music went through an astounding evolution in experiential possibility; technology, for its part,

increasingly influenced the intentional tonality of musical actualities (classic early examples include George Antheil's *Ballet Mécanique* and Edgar Varèse's *Ionisation*), and quite likely the unintentional tonalities of popular musical styles such as jazz and rock (Thompson 2002: 115–44). Some philosophers, such as Martin Heidegger, welcomed the deeper perceptual promise in these new capabilities: 'Technology is therefore no mere means. Technology is a way of revealing' (Heidegger 1954: 12). Heidegger saw technology empowering a human connection to environment, and that 'Nature appears everywhere – because willed from out of the essence of Being – as the object of technology' (Heidegger: 1954: 100). During the same period, other philosophers expanded the moral sphere of ethics to encompass the biophysical world, most notably Aldo Leopold, who anticipated the birth of acoustic ecology later in the century with this passage from *A Sand County Almanac*: 'That the good life on any river may likewise depend on their perception of its music, and the preservation of some music to perceive, is a form of doubt not yet entertained by science' (Leopold 1949: 154). The rise of environmental ethics reflected a widening Western eco-cosmology that acknowledged in the biophysical environment an intrinsic worth not subject to human valuations.

Advancements in science and shortcomings in humanity continued to erode traditional belief systems of the West. More existential philosophies were advanced in the postwar years in an effort to accommodate this; technology too began to be viewed in a more critical, cautionary manner. Nonetheless, advancements in electronics helped to firmly establish and enrich the practice now known as electroacoustic music, opening entirely new areas to sonic discovery. Audio recording and playback equipment gradually improved and spread globally, becoming a cultural commonplace; entire media industries thrived on the manufacture, distribution and marketing of music recordings and the musicians that produced them. The motion picture industry created a demand, which continues to this day, for increasingly sophisticated soundtracks to enhance the impact of films. Environmental sounds and experimental approaches were appropriated by soundtrack composers eager to expand their palette; musical theorists in turn expanded the conceptual idea of what music could be (the classic example being John Cage's *4'33"*); musicians and audiences became slowly, if sometimes reluctantly, predisposed to accepting a much wider range of sounds as having musical potentialities. The expanding parameters of what has been memorably termed timbral praxis continue to be studied and pushed against by electroacoustic musicians today (Rudy 2007).

Cage himself advanced two pivotal ideas regarding music and the environment in *Silence: Lectures and Writings*. The first, actually a quote from Ananda

Coomaraswamy's 1956 book *The Transformation of Nature in Art*, and often erroneously attributed to Cage himself, is that 'the function of Art is to imitate Nature in her manner of operation' (Cage 1967: 25); the second, especially important given the current rate of technological transformation, is that 'art changes because science changes – that is, changes in science give artists different understandings of how nature works'. Cage's efforts, in both his struggle against what he termed 'inherited aesthetic claptrap' and his promotion of an inclusive concept of what music could be, would resonate strongly with succeeding generations of experimental musicians as they attempted to incorporate environmental perspectives in their work.

Journal readers will be familiar with the recent history of music technology and the recording industry; it is worth noting, however, that the industrial production and commoditisation of music and musical devices, though frequently critiqued as catering to sensibilities of the lowest common denominator, have nonetheless resulted in a tremendous broadening of the listening possibilities, resultant environments and musical tastes of both Western and non-Western societies, even as traditional assumptions regarding music and the biophysical world endured in many quarters. Still, while dualistic conceptions of 'Man separate from Nature' may have persisted in the culture at large, new ideas were beginning to take hold.

In the closing decades of the twentieth century, electroacoustic musicians, researchers and environmentalists all incorporated pioneering concepts in acoustic ecology as the fields of music, electronics, sound investigation and ecology consistently cross-pollinated each other with ingenuity and intellectual vigour. Technological improvements enabled the investigation of other organisms' subjective perception of the environment – the *Umwelt*, a concept first proposed in 1909 by German biologist Jacob von Uexküll (whose work influenced Heidegger), and reintroduced by acoustic ecologists.¹ Animal sounds above and below the range of human hearing were studied (Poole, Payne, Langbauer and Moss 1988); meanwhile sound designers, audio engineers and electronic musicians all used subsonic frequencies to dramatically enhance recordings and live productions. Possibly one of the most significant early contributions of electroacoustic research to the environmental debate was the recording of whale songs by Roger Payne in 1967, which, when publicised, brought a humane perspective and emotional intensity to the efforts to preserve cetaceans. By any measure, at the beginning of the twenty-first century in the West, musical *intentions* had been immensely broadened, while the aesthetic, ubiquity and sheer physical possibility of musical *actualities* had widened significantly as well.

¹Morton erroneously attributes this idea to Heidegger in *Ecology Without Nature* (2007).

Music seemed to offer a pathway that could bridge environment and sound in an immersive ecological worldview, and innovative electroacoustic musicians melded this into their artistic philosophies:

To me the world is sound. Sound penetrates me, linking me to the world. I give sounds active meaning ... To me this is the greatest reality. It is not that I shape anything, but rather that I desire to merge with the world. (Takemitsu 1995: 189)

7. BIOMUSICOLOGY

As the biophysical palette represents a significant resource to sound artists, the insights of biomusicology, especially in the ways it informs human eco-cosmology and musicality, cannot be overlooked. Western music has long used devices, of varying complexity, that are imitative of natural sounds; however, recent studies of song in some bird and mammal species, along with showing remarkable variation and development in and of themselves, have also given credence to the idea of an instinctual or *innate* foundation for a great deal of the organisational structures and ornaments seen in human music (Mâche 1992: 95–160). As in individual humans, ability and nuance varies tremendously between species, and though an empirical argument cannot be made for a shared aesthetic sense, a common biological inheritance, suggested quite early on by John Locke (Dean and Bailes 2007), has been demonstrated in painstaking studies undertaken by trained musicians (Mâche 1992; Taylor 2009). These musicians have in turn argued for a reconsideration of music in human and animal existence: ‘In the animal as in man, music is a relationship with the world which goes well beyond a simple circuit of communication between individuals’ (Mâche 1992: 159). These innate biological structures predate humanity itself, and the sense of a primordial environment speaking through music has not been limited to philosophers such as Schelling, but has been observed by electric and acoustic musicians of every stripe: ‘this weird echo of very, very ancient music that you don’t even know. It’s much older than I am, ... like a recall of something, and I don’t know where it [comes] from’ (Richards 2010: 240). While identifying and somehow manipulating innate structural elements in music may present future avenues for post-Messiaenic electroacoustic compositional approaches, the advances in biomusicology make inquiries into the evolutionary development and purpose of music all the more compelling.

8. NEW ARGUMENTS ABOUT MUSIC

The evolutionary origins and intrinsic physical functions of musical activity in humans have enjoyed considerable recent attention from both neuroscientists and musicologists. Nearly every area within the brain has now been found to respond to music

(Levitin 2007: 9), while the activity of mirror neurons within human brains has been implicated in the genesis of language and artistic behaviour (Ramachandran 2000). However, Charles Darwin early on suggested an adaptive musical precursor to language (1871), and modern scholars have enlarged on this idea, envisioning a complex, pre-linguistic musical communication system, or *musilanguage* (Brown 2000). Evolutionary explanations for musical behaviours have ranged from social cohesion and territoriality to sexual selection and display (Wallin, Merker and Brown 2000); Daniel Levitin has argued persuasively that music evolved because it promoted cognitive development, and also that, based on an evolutionary lag for adaptations to appear in the genome (estimated to be at least 50,000 years), music has persisted for a very long time and, as it is present in virtually all humans, must therefore be serving some sort of adaptive purpose (Levitin 2007: 249–52), counter to Stephen Pinker’s assertions to the contrary. These arguments all have merit, and all point towards a greater underlying reason for the persistence of musical practice that I feel gives music crucial stature in a modern realist ecological worldview. Most interestingly, however, it was a recent case study of linguistics that sparked the following argument of this article, which may serve to illustrate the use of musical perspective in cross-disciplinary contexts.

Daniel Everett’s recent article (Everett 2005: 621–46), claiming that his linguistic studies of the Pirahã tribe in the Amazon refuted a central assertion of Chomsky’s ‘universal grammar’ paradigm, raised a firestorm of controversy among linguists, leading to a *New Yorker* article on Everett’s experiences (Colapinto 2007), and a subsequent book documenting his work (Everett 2008). Everett had gone to the Amazon initially to convert the Pirahã to Christianity, but encountered great frustrations attempting to learn their language. Pirahã speech is dizzyingly complex and, as he eventually concluded, does not use recursion, a foundational concept of Chomskian theory. Linguistic disputes aside, part of this complexity results from the language having five separate communication channels, each with a unique cultural function: whistle speech; hum speech, conducted at low volume; musical speech, used for conversing with spirits, relaying important news and accompanying dance; yell speech; and normal speech, often used for talking with outsiders (Everett 2008). Much of their language is in a musical form – hums, whistles, singing – leading some experts to speculate that it may represent a ‘snapshot of language at an earlier stage of syntactic development’ (Berlin cited in Colapinto 2007: 132) Could Pirahã represent a surviving form of *musilanguage*? John Colapinto, a journalist with the *New Yorker*, visited the tribe and described their language as ‘sound(ing) like a profusion of exotic songbirds, a melodic chattering scarcely

discernible, to the uninitiated, as human speech' (Colapinto 2007: 120). Everett's former wife Keren, who still works with the tribe, considers the singing and prosody (communication through varying rhythm, pitch and emphasis, without having to use words) of the Pirahã fundamental to learning their language (Colapinto 2007: 137). Colapinto himself found evidence of this:

I was reminded of an evening in the village when I heard someone singing a clutch of haunting notes on a rising, then falling scale. The voice repeated the pattern over and over, without variation, for more than half an hour. I crept up to the edge of one of the Pirahã huts and saw that it was a woman, winding raw cotton onto a spool, and intoning this extraordinary series of notes that sounded like a muted horn ... when I described the scene to Keren she grew animated and explained that this is how the Pirahã teach their children to speak. The toddler was absorbing the lesson in prosody through endless repetition – an example, one might argue, of Edward Sapir's cultural theory of language acquisition at work. (Colapinto 2007: 137)

Environmental historians have repeatedly demonstrated that present-day appearances are not always an accurate indicator of how things have been in the past (McCann 1999: 79–107); indeed, recent research indicates that the common understanding of humanity's presence in the Amazon may merit considerable revision (Grann 2009: 310–19; Mann 2005: 315–49), and perhaps Pirahã represents a different path of development rather than a linguistic living fossil. Currently, however, anthropologists believe the Pirahã entered Amazonia in the remote past, perhaps 10,000 to 40,000 years ago, and are a remnant of a larger tribe known as the Mura who assimilated into Brazilian culture about 300 years ago (Colapinto 2007). The Pirahã remain very resistant to cultural change; this conservative culture apparently shapes their cognition. Everett has described Pirahã eco-cosmology as hinging on the principle of immediate experience – unless you or someone you know has directly observed something, it simply doesn't enter into your scheme of reality. Their worldview eventually convinced Everett to abandon his own evangelical beliefs, both because of the lack of direct evidence for them and also in large part because the Pirahã, despite the considerable pressures contingent to their lifestyle, were 'an unusually happy and contented people' with 'no evidence of depression, chronic fatigue, extreme anxiety, panic attacks, or other psychological ailments common in many industrialised societies' (Everett 2008: 278–9). As the many tribes in surrounding areas do not demonstrate this same unusually high level of mental health, Everett ultimately decided that their cultural practices must be responsible.

I will go further and argue that the constant presence of musical tones and activity in Pirahã culture

may be a significant factor in this. Human physical development has long been considered to be a series of pragmatic but costly evolutionary trade-offs: bipedalism was a tremendous advantage for human societies but has resulted in the persistent scourge of human back problems; large brains have exacted a steep price in maternal mortality. Perhaps in the acquisition of modern language another evolutionary trade-off was made, one that sacrificed a mechanism that had long reinforced human stability and eco-cosmological contentment. A continual musicality may have co-evolved as a simultaneous regulatory process for the advanced mental activities of *Homo sapiens*, helping to provide a sense of place and meaning for individuals within their immediate human society and their greater environment. Humanity's universal use of music in ritual, art, work and entertainment may represent an instinctual behaviour to somehow mitigate the loss of that ingrained evolutionary mechanism. Reports on Pirahã culture suggest this may be true; studies of the prosocial effect of music creation in young children support this (Kirschner and Tomasello 2010). Other related studies (Li, Yu, Yang, Gao, Jiang, Feng, Zhao and Chen 2010) suggest that music could be an effective therapy for treating anxiety; Oliver Sacks' work is replete with examples of music therapy relieving a variety of mental and physical ailments (Sacks 2007). Perhaps this is what David Dunn was intuiting when he stated that music may be a possible conservation strategy (Dunn 2001: 4); more work should be done to study mental health in cultures with relatively intact musical traditions, as well as in our own culture, with its widely varying forms of electronic and acoustic music, to investigate the strength of these ideas. In addition I will argue for an increased and more nuanced appreciation of music in modern societies, above all in participatory contexts. With some 15 to 20 per cent of the total US population on anti-depressants, and these drugs being the most prescribed in the USA (CDC 2004), any electroacoustic research that could potentially address such an imbalance in human well-being should be considered.

9. CONCLUSION

'Can the mystery of a forest be expressed by measuring the height of the trees? Is it not rather its fathomless depths that stir the imagination?' (Debussy 1927: 88). When Debussy wrote this in 1903 he provided sound artists with more than a justification for trying to reveal the correspondences between music, sound and the natural world; he also confirmed his deep understanding of the emotive power of music and the aesthetic appeal of natural environments. Debussy would later state that 'we don't pay enough attention to the thousand voices of nature around us; we don't listen out for this music which is so varied, which she offers us so generously ... this, according to me, is the new path' (Potter 2003: 137).

He would doubtless be pleased by the great variety of electroacoustic art being produced today that synthesises environmental elements and ideology. Artists such as Douglas Quin, Andrea Polli, Lang Elliott, Ruth Happel and Francisco Lopez are only a few of many artists who, through their own creative compositions, or through collaboration with environmental scientists or filmmakers, are lending the persuasive strength of musical sound art to ecological messages. People must be moved if they are to act; electroacoustic musicians can bring both artistic perspective and the emotional persuasion of music to environmental issues while bridging multiple disciplines, and provide the media expertise to see that their work accomplishes its professional objectives. The safety of the biophysical world has now become an urgent priority in the lives of many people across the planet; the contribution that electroacoustic music can make to the environmental debate is not trivial.

All music exists as a living inheritance that humans as biological organisms share with the greater physical environment; as individual artists we shape our sonic environment and our inner selves with its tonalities as it continues to shape us, in ways that may never be fully comprehensible. Like all art, music's value is heavily context-related; it can often be meaningless. Yet music retains real currency as an essential component of the modern Western worldview, inspiring and invigorating without dogmatic requirements of faith; music, at the very least, can promote ways of thinking that encourage cross-cultural and ecological understanding (Diamond 1990), while fostering a creativity which responds intuitively to the unexpected and the unknown. Many of the world's greatest scientists and thinkers have shared a musical background, and so too does Daniel Everett – perhaps music helped to mould the thought processes that helped him disregard his training and decipher the structure of Pirahã language. The moment holds promise: humanity remains 'to music, and to music's thought, inextricably bound' (Emerson 1847: 78), and music may yet prove to be a foundational pillar for a brighter Western eco-cosmology, sustaining an immersive conception of lived human experience, at ease in the biophysical reality of existence and ultimately coherent unto itself.

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